A PROJECT OF THE PEORIA PARK DISTRICT

LAKEVIEW RECREATION CENTER RENOVATION LAKEVIEW PARK 1013 W. LAKE AVENUE PEORIA, ILLINOIS

PEORIA PARK DISTRICT PEORIA, ILLINOIS



PROJECT NUMBER 14-057

DATE: September 12, 2017

PROJECT MANUAL

PACKAGE #_____

LAKEVIEW RECREATION CENTER RENOVATION LAKEVIEW PARK 1013 W. LAKE AVENUE PEORIA, ILLINOIS

ARCHITECT:	apaceDesign ATTN: BEN KAUFFMAN 2112 EAST WAR MEMORIAL DRIVE PEORIA, ILLINOIS 61614 TELEPHONE: (309) 685-4722
OWNER:	PLEASURE DRIVEWAY AND PARK DISTRICT OF PEORIA, PEORIA, ILLINOIS
TRUSTEES:	TIMOTHY J. CASSIDY, PRESIDENT ROBERT L. JOHNSON, SR. JACQUELINE J. PETTY WARREN E. RAYFORD JOYCE A. HARANT MATTHEW P. RYAN NANCY L. SNOWDEN
PROJECT MANAGER:	MICHAEL FRIBERG, RLA, ASLA PLANNING, DESIGN & CONSTRUCTION DIVISION BRADLEY PARK EQUIPMENT SERVICE 1314 N. PARK ROAD PEORIA, ILLINOIS 61604 TELEPHONE: (309) 686-3386
ADMINISTRATIVE STAFF:	EMILY CAHILL, EXECUTIVE DIRECTOR BRENT WHEELER, DEPUTY DIRECTOR MATT FREEMAN, SUPERINTENDENT OF PARKS JANET BUDZYNSKI, SUPERINTENDENT OF FINANCE AND ADMINISTRATIVE SERVICES BECKY FREDRICKSON, SUPERINTENDENT OF PLANNING DESIGN AND CONSTRUCTION SHALESSE PIE, SUPERINTENDENT OF HUMAN RESOURCES

Address all communications regarding this work to the Project Manager listed above.

Sealed bids will be received by the Peoria Park District, Peoria, Illinois, hereinafter known as the Owner, for the following project:

LAKEVIEW RECREATION CENTER RENOVATION 1013 W. LAKE AVENUE PEORIA, ILLINOIS 61614

It is the intent of the Owner to receive Base Bids & Alternates for the project listed above.

Sealed bids will be received until October 10, 2017, 1:30 p.m. prevailing time, by the Owner, at the Peoria Park District Administrative Office, 1125 W. Lake Ave., Peoria, Illinois 61614. (The Board Room clock shall be the official time keeping device in respect to the bid submission deadline.)

An electronic file including Bid Documents is available at <u>www.peoriaparks-planning.org</u> at no charge. Bid Documents, including Plans, Specifications and Interpretations for this project may be obtained at the Planning, Design & Construction Department, Bradley Park Equipment Service, 1314 N. Park Road, Peoria, IL 61604. Telephone (309) 686-3386. A non-refundable plan deposit of \$250.00 will be charged for each printed set of Bid Documents.

A list of planholders can be obtained upon request. This information will be available up to twenty-four (24) hours prior to the scheduled bid opening time. After that deadline, no information pertaining to the project will be given.

A 10% Bid Bond is required, and is to be included with the Bid Proposal. The successful Bidder will be required to furnish a 100% Performance Bond and a 100% Labor and Materials Payment Bond within ten (10) days of formal Award of Contract.

The general prevailing rate of wage for the Peoria area shall be paid for each craft or type of worker needed to execute this contract or perform this work as required by the State of Illinois Department of Labor. Additionally, it is required that provisions of the Illinois Preference Act, the Illinois Drug Free Workplace Act, and the Substance Abuse Prevention on Public Works Act must be adhered to. Bidders are also advised that contract documents for this project include the non-discrimination, equal opportunity and affirmative action provisions in the Human Rights Act and rules and regulations of the Department of Human Rights. The Peoria Park District is an AA/EEO organization and encourages participation by minority and female-owned firms. Furthermore, the Peoria Park District encourages bidders to utilize minority and women-owned businesses as sub-contractors for supplies, equipment, services, and construction, as well as utilize minority and women workers as a part of their own workforce and the workforce of sub-contractors they employ.

The Peoria Park District reserves the right to reject any or all bids, waive technical deficiencies, informalities or irregularities or rebid any project.

This project is being financed, in part, with funds from the Illinois Department of Natural Resources, "Park and Recreational Facility Construction Grant Program" (PARC) grant program.

PLEASURE DRIVEWAY AND PARK DISTRICT OF PEORIA, ILLINOIS

BY: TIMOTHY J. CASSIDY, President

BY: V. JOYCE MCLEMORE, Secretary

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SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

1. INSTRUCTIONS TO BIDDERS

- A. "Instructions to Bidders", AIA Document A701, 1997 Editions, published by the American Institute of Architects, including revisions adopted before date of this Project Manual, is hereby made part of these specifications with same force and effect as though set forth in full.
- **B.** The following modifies, changes, deletes from or adds to the **Instructions to Bidders** (AIA Document A701, 1997 Edition). Where any Article of the Instructions to Bidders is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these Supplementary Conditions, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.
- C. Parenthesis () indicates the appropriate section and Subparagraph of the Instructions to Bidders which each paragraph of the Supplementary Instructions to Bidders modifies or refers to.

2. PROJECT DESCRIPTION

- A. The Project description generally is as follows:
 - 1. BASE BID:

Including but not limited to materials and labor for: asbestos remediation and disposal, demolition of one wing of the building, concrete pool demolition, selective demolition, structural steel work, block masonry, insulation, roofing replacement and repair, HVAC work, concrete work, IT and low voltage wiring, electrical wiring and lighting, poured in place flooring, wood flooring, rough and finish carpentry, plumbing work, fire protection sprinklers, glazing, and painting.

2. ALTERNATES:

Alternate #1: Provide and install fire suppression sprinkler system in miscellaneous rooms. Alternate #2: Provide and install fire suppression sprinkler system in existing gymnasium. Alternate #3: Provide and install fiber optic cable in bored underground conduit between the Noble Center and the Lakeview Recreation Building.

B. PRE-BID MEETING :

1. A pre-bid meeting will be held at the Lakeview Recreation Center on Tuesday, September 26, 2017 at 9:00 a.m.

3. CODES AND PERMITS

- A. COSTS ASSOCIATED WITH REGULATORY COMPLIANCE. All Work performed in connection with this Project shall be in compliance with the requirements of all applicable local, state, and federal laws, regulations, and rules, as well as the requirements of the Construction Documents. The Bid Price shall reflect all costs of compliance to those requirements, whether or not specifically stated in the Construction Documents or specific sections of the Project Manual.
- **B. PERMITS/FEES.** Work shall not commence until all required building (and/or other) permits have been secured by the Contractor and copies of these permits submitted to the Owner's Representative. Cost of permits is to be included in the Bid Price.

4. BID GUARANTY

The bid must be accompanied by a Bid Guaranty which shall not be less than 10% of the amount of the Bid. At the option of the Bidder, the 10% Guaranty may be a Certified Check, Cashier's Check, or a Bid Bond. The Bid Bond shall be secured by a Guaranty or a Surety Company acceptable to the Owner. No bid will be considered unless it is accompanied by the required Guaranty. Funds must be made payable to the order of the Owner. Cash deposits will not be accepted. The Bid Guaranty shall ensure the execution of the Agreement and the furnishing of the Surety Bond or Bonds by the successful Bidder, all as required by the Contract Documents.

5. AWARD OF CONTRACT/REJECTION OF BIDS:

The Contracts will be awarded on the basis of Paragraph 5.3 of the Instructions to Bidders. The Bidders to whom the awards are made will be notified at the earliest possible date. The Owner, however, reserves the right to reject any and all Bids, to accept any combination of base bids and alternates and to waive any technical deficiencies, informalities, or irregularities in Bids received whenever such rejection or waiver is in its interest.

No bid shall be withdrawn for a period of sixty (60) days after the opening of bids without the consent of the Owner. The failure of the Bidder to submit a Bid Bond, Certified Check or Cashier's Check in the full amount to cover all proposals bid upon shall be sufficient cause for rejection of his bid. The award will be made contingent upon submittal and evaluation of Contractor's Qualification Statement, Bonds, Certificate of Insurance, Contractor Certification(s), including Peoria Park District Certificate of Equal Employment Opportunity Compliance for Contractors and Vendors, etc.

6. EXECUTION OF AGREEMENT:

Subsequent to the award and within ten (10) days after the prescribed forms are prepared and presented for signature by the Owner's Representative, the successful Bidder shall execute and return to the Owner's Representative an Agreement in the form included in the Contract Documents in such number of copies as the Owner may require. The President of the Board of Trustees will complete execution of Agreement

after all bonds and any other required documents have been received by the Park District. One fully executed copy of Agreement will then be returned to Contractor.

7. PERFORMANCE BOND/LABOR AND MATERIAL PAYMENT BOND & INSURANCE

- A. BONDS REQUIRED. Having satisfied all conditions of award as set forth elsewhere in these Documents, the successful Bidder shall, within ten (10) calendar days after award of contract, furnish Surety Bonds in penal sums, each not less than the amount of the Contract as awarded as security for the faithful performance of the Contract (Performance Bond), and for the payment (Labor and Materials Payment Bond) of all persons, firms or corporations to whom the Contractor may become legally indebted for labor, materials, tools, equipment or services employed or used by him in performing the work.
- B. FORM OF BONDS. Such bonds shall be in the same form as the samples included in the Project Manual and shall bear the same date as or a date subsequent to that of the Agreement. The current Power of Attorney for the person who signs for any Surety Company shall be attached to such Bonds. Bonds shall be signed by a Guaranty or Surety Company acceptable to the Owner.
- C. COST OF PERFORMANCE BOND/LABOR AND MATERIAL PAYMENT BOND. All costs for the Performance Bond/Labor and Material Payment Bond shall be included in the submitted Bid Price.
- **D. INSURANCE.** Insurance requirements for this project are addressed both in the Supplementary General Conditions and in "Attachment A.6", in the "Exhibits" section of this Project Manual.
 - a) In respect to the property ("builders risk") insurance coverages referenced in the Supplementary General Conditions: the successful Bidder Will be required to provide such coverages as the work of the Project will be accomplished by ONE general/prime contractor(s).
- E. TIME FRAMES. The successful Bidder shall, within ten (10) days after award of contract by the Board of Trustees, submit Proof of Insurance coverages/Bonds in the form and amounts required to the Owner's Representative. Should the Bidder be unable to provide the required Proof of Insurance(s)/Bonds within the specified ten day period the Owner reserves the right, at its sole discretion, to withdraw its award of contract from that Bidder.

8. DEFAULT

A.

A. The failure of the successful Bidders to execute the Agreement, supply the required Bonds or proof of required insurance coverage(s) within (ten) 10 days after award of contract, or within such extended period as the Owner may grant based upon reasons determined sufficient by the Owner, may constitute a default. In such case, award of contract will be transferred to the second lowest bidder.

9. CONTRACTOR'S QUALIFICATION STATEMENT

A. Contractor's Qualification Statement (AIA Document 305) shall be submitted by low bidder for evaluation prior to award of contract <u>if</u> so requested by the Owner or his representatives.

10. LIST OF SUBCONTRACTORS/PRODUCT & EQUIPMENT SUBSTITUTIONS

- Each Bidder shall submit a "MAJOR SUBCONTRACTORS LIST" proposed to be used in the execution of the Work. If there will be no subcontractors, the Bidder shall state "No Subcontractors" on this form. The completed form is due with the Bid Proposal.
 - 1) Identify the trade name, address, telephone number, and category of work of each subcontractor.
 - 2) Failure to submit the "Major Subcontractors List" with the Bid Proposal may result in the rejection of the Bid.
 - **3**) Delete Subparagraphs (6.3.1.1) and (6.3.1.2) from AIA A701.
- **B.** The Bidder, by submission of a signed bid form, agrees to install all products and equipment by brand name or names specified in the Technical Specifications sections of this Project Manual. "Or equal" substitutions will be allowed <u>only if approved in writing prior to the bid opening and listed in the "Substitutions" section of the Bid Form.</u>

11. CONTRACT ADMINISTRATION FORMS/COSTS OF FORMS

- A. **REQUIRED FORMS.** The following AIA forms will be used (AIA forms will be supplied by the Owner if requested, and charged to the Contractor at cost) in the administration of the project:
 - 1) AIA Document A310: "Bid Bond", February 1970 edition
 - 2) AIA Document A305: "Contractor's Qualification Statement", 1986 edition
 - 3) AIA Document G702: "Application and Certificate of Payment", May 1992 edition
 - 4) AIA Document G703: "Continuation Sheet", May 1992 edition
- **B. OTHER FORMS**. Other contract administration forms (to be provided by the Owner unless otherwise noted) required for use in the Project are:
 - 1) Major Subcontractors List
 - 2) Contractor's Affidavit

- 3) Individual Contractor Form
- 4) Corporate or Partnership Form
- 5) Performance Bond
- 6) Labor and Material Payment Bond
- 7) Lien Waiver Forms
- 8) Weekly Workforce Report
- 9) Certified Payroll Form (Contractor may use own form)
- 10) Insurance Forms: As required in Attachment A (at end of Project Manual) (will not be provided by Owner)
- 11) Agreement Between Owner and Contractor
- 12) Standard Subcontractor Certification

Examples of these forms are included in the Project Manual.

12. CONSTRUCTION TIME AND LIQUIDATED DAMAGES CLAUSE:

- A. **PROJECT COMPLETION**. The Agreement will include the following paragraph(s) or language substantially the same, regarding construction time and liquidated damages:
 - LIQUIDATED DAMAGES: Owner and Contractor recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not Substantially Complete within the time specified below, plus any extensions thereof allowed in accordance with Article 8 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time.
 - 2) Accordingly, instead of requiring any such proof, Owner and Contractor agree that as Liquidated Damages for delay (but not as a penalty) Contractor shall pay Owner TWO HUNDRED AND FIFTY DOLLARS (\$250.00) for each calendar day that expires after THREE HUNDRED FORTY(340) calendar days from Notice of Award until Substantial Completion is attained. The work is tentatively scheduled to begin on OCTOBER 26, 2017 and be at Substantial Completion by OCTOBER 1, 2018.
 - 3) After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work necessary to achieve Final Completion within THIRTY (30) calendar days or any proper extension thereof granted by Owner, Contractor shall pay Owner TWO HUNDRED AND FIFTY DOLLARS (\$250.00) dollars for each day that expires after the time specified.
 - 4) Owner and Contractor agree that the per day liquidated damage amounts set forth in subparagraphs "2" and "3" of this section constitute a reasonable forecast of the financial losses, actual costs and increased expenses the Owner may incur as a result of delayed Substantial or Final Completion of the Project.

13. PROJECT MANUAL/PLANS & SITE VISITATION

- A. A set of Bid Documents may be examined, at no charge, at the office of the Owner's Representative.
- B. PLAN DEPOSIT. An electronic file including Bid Documents is available at <u>www.peoriaparks-planning.org</u> at no charge. A printed set of Bid Documents, including Plans, Specifications and Interpretations for this project may be obtained at the Planning, Design & Construction Department, Bradley Park Equipment Service, 1314 N. Park Road, Peoria, IL 61604. Telephone (309)686-3386. A non-refundable plan deposit of TWO HUNDRED FIFTY DOLLARS (\$250.00) will be charged for each printed set of Bid Documents.
- C. FAMILIARITY WITH BID DOCUMENTS & SITE VISITATION. Bidders, by submission of their Bids, represent that they have visited the site to acquaint themselves with the local conditions in which the Work is to occur, and that they are familiar with all the requirements of the Project, as defined in the Project Manual and the Plan(s).

14. OTHER MODIFICATIONS TO AIA-701/OTHER CONDITIONS

- A. Add the following sentence to (4.1.7): "Bidder shall submit two (2) completed copies of Bid Form and retain one (1) copy for his files."
- B. Delete Section (6.2) "Owner's Financial Capability"; and last sentence of Paragraph (4.2.1.)
- C. In reference to (7.2.1), the Peoria Park District reserves the right of final approval of bonding companies.
- **D.** Delete paragraph (7.1.3).

15. EQUAL EMPLOYMENT OPPORTUNITY/AFFIRMATIVE ACTION/SEXUAL HARASSMENT

- A. The "Peoria Park District Certificate of Equal Employment Opportunity Compliance for Contractors and Vendors Form" and "Workforce Profile" and "Sexual Harassment Policy" shall be filled out and returned with the Bid. Failure to submit a completed "Peoria Park District Certificate of Equal Employment Opportunity Compliance for Contractors and Vendors Form" and "Workforce Profile" and "Sexual Harassment Policy" may result in rejection of the bid.
- **B.** Effective July 1, 1993, every party to a public contract and every party bidding on public contracts is required to have a written "Sexual Harassment Policy" that contains:
 - 1) A definition of sexual harassment under state law;
 - 2) A description of sexual harassment utilizing examples;
 - 3) A formalized complaint procedure;
 - 4) A statement of victim's rights;
 - 5) Directions on how to contact the Illinois Department of Human Rights Illinois companies. Out-of-State companies must include directions on how to contact the enforcement agency within their state. Companies that issue a standard policy for all business locations must prepare an addendum providing directions on how to contact the appropriate enforcement agency.
 - 6) A recitation that there cannot be any retaliation against employees who elect to file charges.

Recommendation: Your "Sexual Harassment Policy" should be drafted in language easy to understand and any revisions should be reviewed by legal counsel. A copy of your policy should be posted in a prominent and accessible location to assure all employees will be notified of the company's position.

In order to conduct business with the Peoria Park District, you must have a written "Sexual Harassment Policy" that conforms to the new Act.

FAILURE TO DO SO WILL DISQUALIFY YOU AS AN ELIGIBLE VENDOR.

- C. Lowest responsible bidder not meeting the Park District's goal of 12% for minority/women participation, must provide proof of efforts made in contacting an adequate number of minority and women owned firms and/or labor.
 - 1) Documentation shall provide evidence that shows:
 - A reasonable number of MBE/WBE firms were contacted.
 - The work selected by the bidder for allocation to MBE/WBE firms was selected in order to increase the likelihood of achieving the specified goal.
 - The bidder negotiated in good faith with the potential MBE/WBE firms who responded to the solicitation by
 not imposing any conditions which are not similarly imposed on all other subcontractors or suppliers, or by
 denying benefits ordinarily conferred on subcontractors or suppliers for the type of work for which bids
 were solicited.
 - 2) The Park District may reject one or all bids where the information submitted by the bidder(s) fails to objectively demonstrate compliance with the MBE/WBE utilization clause requirements. Upon finding that a contractor has not complied with the provisions of this clause, the Park District may declare the bidder non-responsive and therefore ineligible for contract award.

16. ILLINOIS LABOR

A. At least 50% of the labor used on this project must be performed by actual residents of the State of Illinois. This project is funded in part by State of Illinois capital funds, and thus is subject to Article 80 of the FY 10 Budget Implementation Act, P.A. 96-37 (HB 2424).

17. BID SUBMISSION

- A. DATE, TIME & PLACE OF RECEIVING BIDS. Bids will be received until the date and time listed in the "Advertisement for Bids", at which time they will be publicly opened, read aloud and recorded. The Bid Opening will be held at the place listed in the "Advertisement for Bids".
- B. **REQUIRED ITEMS**. The following items <u>must be included</u> as part of the "BID":
 - 1) Two (2) signed copies of the **BID FORM**. (Retain the third copy for your files.)

2) The PEORIA PARK DISTRICT CERTIFICATE OF EQUAL EMPLOYMENT OPPORTUNITY COMPLIANCE FOR CONTRACTORS AND VENDORS FORM and SEXUAL HARASSMENT POLICY.

- 3) The WORKFORCE PROFILE.
- 4) The ILLINOIS DRUG FREE WORKPLACE CERTIFICATION.
- 5) The **CONTRACTOR CERTIFICATION** (individual or corporate/partnership).

- 6) The LIST OF SUBCONTRACTORS. (Submit form and state "No Subcontractors" on the form, if none will be used.)
- 7) The **BID GUARANTY**.
- 8) The CERTIFICATION OF SAFETY COMPLIANCE.
- 9) SUBSTANCE ABUSE PREVENTION PROGRAM CERTIFICATION
- C. **BID SUBMISSION**. The "BID" shall be enclosed in envelopes (outer and inner), both of which shall be sealed and clearly labeled with the following information, in order to prevent premature opening of the bid:
 - "PROPOSAL"
 - NAME OF PROJECT
 - NAME OF BIDDER
 - DATE/TIME OF BID OPENING

END OF SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

BID FORM

BID TO: PEORIA PARK DISTRICT

UNDERSIGNED:

- 1. Acknowledges receipt of:
 - Α. Project Manual and Drawings for:

LAKEVIEW RECREATION CENTER RENOVATION

- В. Addenda: No. _____ through No. _____
- 2. Has examined facility and the bid documents and shall be responsible for performing work specifically required of him by all parts of bidding documents including specifications for entire project, even though such work may be included as related requirements specified in other divisions or sections.
- And agrees to enter into and execute Contract with Owner, if awarded on basis of this bid, and to: 3.
 - Furnish Bonds and Insurance required by the Bidding & Contract Documents. A.
 - B. Accomplish work in accord with Contract.
 - C. Complete work within specified Contract time.
- 4. CONTRACT TIME: Contractor agrees to Substantially Complete ALL WORK as required by the Contract Documents per the Supplementary General Conditions and Supplementary Instructions to Bidders.

5. BASE BIDS:

A. Base Bid:

> Bidder agrees to perform all building and site work, as set forth in the Project Manual and Drawings for the sum of:

> > _____ Dollars (\$_____)

ALTERNATES: 6.

Bidder agrees to perform all building and/or site work items as set forth below. The prices submitted may be accepted either at the time of Base Bid approval or up to no later than ninety (90) days after award of the Bid; however, if not approved at the time of the award of the Base Bid, the contract times as set forth in the Project Manual and Drawings will be adjusted to compensate for the additional time taken in award of the Alternate:

Α. Add Alternate #1: Fire Protection Sprinkler System – Misc. Rooms All work required to provide and install a sprinkler system in Rooms 112, 113, 114, 117, 118, 119. See fire protection plans, details, etc.

Add: Dollars (\$.)

 B. <u>Add Alternate #2: Fire Protection Sprinkler System - Gymnasium</u> All work required to provide and install a sprinkler system in the existing Gymnasium. See fire protection plans, details, etc.
 Add:______Dollars (\$_____)

C. <u>Add Alternate #3: Fiber Optic connection</u> Provide and install fiber optic cable in bored underground conduit between the Noble Center and the Lakeview Recreation Building.

Add:	Dollars (\$)

7. **<u>UNIT PRICES</u>**:

A. Bidders submitting prices for the Base Bid, shall submit Unit Prices for adding or deleting work. Unit Prices shall include all costs, including but not limited to preparation, labor, equipment, and materials necessary for a complete installation.

ITEM	<u>UNIT</u>	UNIT PRICE
Thermoplastic-Polyolefin (TPO) roofing, w/ insulation and Protection mat, installed:	SQ FT	\$
Polyurethane sports flooring system, installed	SQ FT	\$

8. **PROPOSED SUBSTITUTION LIST:**

Base Bid(s) and Alternates are understood to include only those product brands, items, and elements which are specified in the Bid Documents. The following is a list of substitute products, equipment or methods of construction which the Bidder proposes to furnish on this project, with difference in price being added or deducted from Base Bid(s).

Bidder understands that acceptance of any proposed substitution which has not been approved as an "equal" to the product brand, item, or element specified prior to bid opening is at Owner's option. Approval or rejection of any substitutions listed below will be indicated before executing Contract.

ITEM	ADD	<u>DEDUCT</u>
	\$	\$
	\$	\$
	\$	\$

9. BIDDERS CHECKLIST:

Did you visit the site?	Yes	No
Is Bid Security enclosed? (If applicable)	Yes	No
Is Peoria Park District Certificate of Equal Employment	Yes	No

Opportunity Compliance for Contractors and Vendors and	l
Sexual Harassment Policy enclosed?	

Is Workforce Profile enclosed?	Yes	No
Is List of Subcontractors enclosed?	Yes	No
Is Contractor Certification enclosed?	Yes	No
Is Ill. Drug Free Workplace Certification enclosed?	Yes	No
Is Certificate of Safety Compliance enclosed?	Yes	No
Is Substance Abuse Prevention Program Certification enclosed?	Yes	No
Is Standard Certifications signed and enclosed?	Yes	No

10. **<u>BIDDER INFORMATION</u>**:

NAME OF BIDDER:	
ADDRESS:	
CITY, STATE, ZIP:	
TELEPHONE NO.:	
BY:(Signature of	of Authorized Official)
TITLE:	
BIDDER'S SEAL	
WITNESS:	

END OF BID FORM

STANDARD CERTIFICATIONS

Vendor acknowledges and agrees that compliance with this section and each subsection for the term of the contract and any renewals is a material requirement and condition of this contract. By executing this contract Vendor certifies compliance with this section and each subsection and is under a continuing obligation to remain in compliance and report any non-compliance.

This section, and each subsection, applies to subcontractors used on this contract. Vendor shall include these Standard Certifications in any subcontract used in the performance of the contract using the Standard Subcontractor Certification form provided by the State.

If this contract extends over multiple fiscal years including the initial term and all renewals, Vendor and its subcontractors shall confirm compliance with this section in the manner and format determined by the State by the date specified by the State and in no event later than July 1 of each year that this contract remains in effect.

If the Parties determine that any certification in this section is not applicable to this contract it may be stricken without affecting the remaining subsections.

1. As part of each certification, Vendor acknowledges and agrees that should Vendor or its subcontractors provide false information, or fail to be or remain in compliance with the Standard Certification requirements, one or more of the following sanctions will apply:

- the contract may be void by operation of law,
- the State may void the contract, and
- the Vendor and it subcontractors may be subject to one or more of the following: suspension, debarment, denial of payment, civil fine, or criminal penalty.

Identifying a sanction or failing to identify a sanction in relation to any of the specific certifications does not waive imposition of other sanctions or preclude application of sanctions not specifically identified.

2. Vendor certifies it and its employees will comply with applicable provisions of the U.S. Civil Rights Act, Section 504 of the Federal Rehabilitation Act, the Americans with Disabilities Act (42 U.S.C. § 12101 et seq.) and applicable rules in performance under this contract.

3. Vendor certifies it is not in default on an educational loan (5 ILCS 385/3). This applies to individuals, sole proprietorships, partnerships and individuals as members of LLCs.

4. Vendor (if an individual, sole proprietor, partner or an individual as member of a LLC) certifies it has not received an (i) an early retirement incentive prior to 1993 under Section 14-108.3 or 16-133.3 of the Illinois Pension Code, 40 ILCS 5/14-108.3 and 40 ILCS

5/16-133.3, or (ii) an early retirement incentive on or after 2002 under Section 14-108.3 or 16-133.3 of the Illinois Pension Code, 40 ILCS 5/14-108.3 and 40 ILCS 5/16-133, (30 ILCS 105/15a).

5. Vendor certifies it is a properly formed and existing legal entity (30 ILCS 500/1.15.80, 20-43); and as applicable has obtained an assumed name certificate from the appropriate authority, or has registered to conduct business in Illinois and is in good standing with the Illinois Secretary of State.

6. To the extent there was an incumbent Vendor providing the services covered by this contract and the employees of that Vendor that provide those services are covered by a collective bargaining agreement, Vendor certifies (i) that it will offer to assume the collective bargaining obligations of the prior employer, including any existing collective bargaining agreement with the bargaining representative of any existing collective bargaining unit or units performing substantially similar work to the services covered by the contract subject to its bid or offer; and (ii) that it shall offer employment LAKEVIEW RECREATION CENTER RENOVATION - Project Manual

to all employees currently employed in any existing bargaining unit performing substantially similar work that will be performed under this contract (30 ILCS 500/25-80). This does not apply to heating, air conditioning, plumbing and electrical service contracts.

7. Vendor certifies it has not been convicted of bribing or attempting to bribe an officer or employee of the State of Illinois or any other State, nor has Vendor made an admission of guilt of such conduct that is a matter of record (30 ILCS 500/50-5). 8. If Vendor has been convicted of a felony, Vendor certifies at least five years have passed after the date of completion of the sentence for such felony, unless no person held responsible by a prosecutor's office for the facts upon which the conviction was based continues to have any involvement with the business (30 ILCS 500/50-10).

9. If Vendor, or any officer, director, partner, or other managerial agent of Vendor, has been convicted of a felony under the Sarbanes-Oxley Act of 2002, or a Class 3 or Class 2 felony under the Illinois Securities Law of 1953, Vendor certifies at least five years have passed since the date of the conviction. Vendor further certifies that it is not barred from being awarded a contract and acknowledges that the State shall declare the contract void if this certification is false (30 ILCS 500/50-10.5).

10. Vendor certifies it is not barred from having a contract with the State based on violating the prohibition on providing assistance to the state in identifying a need for a contract (except as part of a public request for information process) or by reviewing, drafting or preparing solicitation or similar documents for the State (30 ILCS 500/50-10.5e).

11. Vendor certifies that it and its affiliates are not delinquent in the payment of any debt to the State (or if delinquent has entered into a deferred payment plan to pay the debt), and Vendor and its affiliates acknowledge the State may declare the contract void if this certification is false (30 ILCS 500/50-11) or if Vendor or an affiliate later becomes delinquent and has not entered into a deferred payment plan to pay off the debt (30 ILCS 500/50-60).

12. Vendor certifies that it and all affiliates shall collect and remit Illinois Use Tax on all sales of tangible personal property into the State of Illinois in accordance with provisions of the Illinois Use Tax Act (30 ILCS 500/50-12) and acknowledges that failure to comply can result in the contract being declared void.

13. Vendor certifies that it has not been found by a court or the Pollution Control Board to have committed a willful or knowing violation of the Environmental Protection Act within the last five years, and is therefore not barred from being awarded a contract (30 ILCS 500/50-14).

14. Vendor certifies it has not paid any money or valuable thing to induce any person to refrain from bidding on a State contract, nor has Vendor accepted any money or other valuable thing, or acted upon the promise of same, for not bidding on a State contract (30 ILCS 500/50-25).

15. Vendor certifies it is not in violation of the "Revolving Door" section of the Illinois Procurement Code (30 ILCS 500/50-30).

16. Vendor certifies that it has not retained a person or entity to attempt to influence the outcome of a procurement decision for compensation contingent in whole or in part upon the decision or procurement (30 ILCS 500/50-38).

17. Vendor certifies it will report to the Illinois Attorney General and the Chief Procurement Officer any suspected collusion or other anti-competitive practice among any bidders, offerors, contractors, proposers or employees of the State (30 ILCS 500/50-40, 50-45,50-50).

18. In accordance with the Steel Products Procurement Act, Vendor certifies steel products used or supplied in the performance of a contract for public works shall be manufactured or produced in the United States, unless the executive head of the procuring agency grants an exception (30 ILCS 565).

19. a) If Vendor employs 25 or more employees and this contract is worth more than \$5000, Vendor certifies it will provide a drug free workplace pursuant to the Drug Free Workplace Act.

b) If Vendor is an individual and this contract is worth more than \$5000, Vendor shall not engage in the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance during the performance of the contract (30 ILCS 580).

20. Vendor certifies that neither Vendor nor any substantially owned affiliate is participating or shall participate in an international boycott in violation of the U.S. Export Administration Act of 1979 or the applicable regulations of the U.S. Department of Commerce. This applies to contracts that exceed \$10,000 (30 ILCS 582).

21. Vendor certifies it has not been convicted of the offense of bid rigging or bid rotating or any similar offense of any state or of the United States (720 ILCS 5/33,E4).

22. Vendor certifies it complies with the Illinois Department of Human Rights Act and rules applicable to public contracts, including equal employment opportunity, refraining from unlawful discrimination, and having written sexual harassment policies (775 ILCS 5/2-105).

23. Vendor certifies it does not pay dues to or reimburse or subsidize payments by its employees for any dues or fees to any "discriminatory club" (775 ILCS 25/2).

24. Vendor certifies it complies with the State Prohibition of Goods from Forced Labor Act, and certifies that no foreign-made equipment, materials, or supplies furnished to the State under the contract have been or will be produced in whole or in part by forced labor, or indentured labor under penal sanction (30 ILCS 583).

25. Vendor certifies that no foreign-made equipment, materials, or supplies furnished to the State under the contract have been produced in whole or in part by the labor or any child under the age of 12 (30 ILCS 584).

26. Vendor certifies that it is not in violation of Section 50-14.5 of the Illinois Procurement Code (30 ILCS 500/50-14.5) that states: "Owners of residential buildings who have committed a willful or knowing violation of the Lead Poisoning Prevention Act (410 ILCS 45) are prohibited from doing business with the State until the violation is mitigated".

27. Vendor warrants and certifies that it and, to the best of its knowledge, its subcontractors have and will comply with Executive Order No. 1 (2007). The Order generally prohibits Vendors and subcontractors from hiring the then-serving Governor's family members to lobby procurement activities of the State, or any other unit of government in Illinois including local governments if that procurement may result in a contract valued at over \$25,000. This prohibition also applies to hiring for that same purpose any former State employee who had procurement authority at any time during the one-year period preceding the procurement lobbying activity.

28. Vendor certifies that information technology, including electronic information, software, systems and equipment, developed or provided under this contract will comply with the applicable requirements of the Illinois Information Technology Accessibility Act Standards as published at www.dhs.state.il.us/iitaa. (30 ILCS 587)

29. Vendor certifies that it has read, understands, and is in compliance with the registration requirements of the Elections Code (10 ILCS 5/9-35) and the restrictions on making political LAKEVIEW RECREATION CENTER RENOVATION - Project Manual

contributions and related requirements of the Illinois Procurement Code (30 ILCS 500/20-160 and 50-37). Vendor will not make a political contribution that will violate these requirements. These requirements are effective for the duration of the term of office of the incumbent Governor or for a period of 2 years after the end of the contract term, whichever is longer.

In accordance with section 20-160 of the Illinois Procurement Code, Vendor certifies as applicable:

Vendor is not required to register as a business entity with the State Board of Elections. or

Vendor has registered **and has attached a copy** of the official certificate of registration as issued by the State Board of

Elections. As a registered business entity, Vendor acknowledges a continuing duty to update the registration as required by the Act.

VENDOR (show Company name and DBA)

Signature	
Printed Name	
Title	_Date
Address	



Office Use Only: Approved: _____ Date:

Peoria Park District

Certificate of Equal Employment Opportunity Compliance

for

Contractors and Vendors

Disclosure of the information requested in this form is required by the Peoria Park District. Failure to properly complete and sign this form will result in it being returned unprocessed thereby resulting in a delay or denial of eligibility to bid.

As part of the Company's commitment to equal employment opportunity practices, this company does the following:

- Recruits, trains, upgrades, promotes and disciplines persons without regard to race, color, sex, religion, national origin, veteran status, age, mental or physical ability.
- Notifies all recruitment sources that all qualified applicants will be considered for employment without regard to race, color, sex, religion, national origin, veteran status, age, mental or physical ability.
- When advertising is used, specifies that all qualified applicants will be considered for employment without regard to race, color, sex, religion, national origin, veteran status, age, mental or physical ability.
- Notifies all labor organizations which furnish this company with any skilled or non-skilled labor of the Company's responsibility to comply with the equal employment opportunity requirements required in all contracts by the Peoria Park District.
- Notifies all of its sub-contractors of their obligation to comply with the equal employment opportunity requirements required in all contracts by the Peoria Park District.
- Has an affirmative action program that assures the company's fair employment practices are understood and carried out by all of its managerial, administrative and supervisory personnel.

Is the Company a minority/woman owned business (MBE/WBE)? ____NO ____YES, if yes ____MBE or ____WBE?

The Company does not discriminate against any employees or applicants for employment because of race, color, religion, sex, national origin, veteran status, age, mental or physical ability.

The Company does not maintain segregated facilities for any of its employees on the basis of race, religion, color, national origin, because of habit, local custom, or otherwise.

The Company has a written sexual harassment policy meeting the Illinois Department of Human Rights requirements.

By signing this form, the Company attests that it complies with all statements listed above as part of the Company's commitment to equal employment opportunity practices. The Company further agrees that it has completed the attached Workforce Profile Sheet truthfully, to the best of its knowledge.

Company Name

Company Address

Signature of Company Official

Name / Title

Telephone Number & Fax Number

Email Address

Rev. 9/2015

WORKFORCE PROFILE

Job Classifications	Black		White Employees		Hispanic		Native American		Asian		Other		TOTAL	
	M	F F	M	F	M Empi	F	M Emp	F	M Emp	F	M Empi	F	EMPL M	F
1 Officials Managers Supervisors	101	1	101	1	111	1	IVI	1	IVI	1	IVI	1	111	1
Drefessionals Drefessionals														
2. Professionals														
3. Technicians														
4. Sales														
5. Office/Clerical														
6. White Collar Trainees:														
7. Skilled Crafts:														
8. Apprentices:														
9. On-the-job Trainees:														
10. Semi-skilled														
11. Service Workers														
12. Unskilled														
TOTALS														

COMPANY NAME: _____

05/2017

WORKFORCE PROFILE INSTRUCTIONS

RACE/ETHNIC IDENTIFICATION

<u>WHITE (not of Hispanic origin)</u>: All persons having origins in any of the original peoples of Europe, North Africa, or the Middle East.

BLACK (not of Hispanic origin): All persons having origins in any of the Black racial groups of Africa.

HISPANIC: All persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.

<u>ASIAN or PACIFIC ISLANDER</u>: All persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands. This area includes, for example, China, India, Japan, Korea, the Philippine Islands, and Samoa.

<u>NATIVE AMERICAN or ALASKAN NATIVE</u>: All persons having origins in any of the original peoples of North America, and who maintain cultural identification through tribal affiliation or community recognition.

DESCRIPTION OF JOB CLASSIFICATIONS

<u>OFFICIALS, MANAGERS, AND SUPERVISORS</u> - Occupations requiring administrative personnel who set broad policies, and exercise over-all responsibility for the execution of these policies, and direct individual departments or special phases of a firm's operations. Includes: officials, executives, middle management, plant managers, department managers/superintendents, salaried foremen who are members of management, purchasing agents and buyers, and kindred workers.

<u>PROFESSIONALS</u> - Occupations requiring either college graduation or experience of such kind and amount as to provide a comparable background. Includes: accountants/auditors, airplane pilots and navigators, architects, artists, chemists, designers, dietitians, editors, engineers, lawyers, librarians, mathematicians, natural scientists, personnel and labor relations workers, physical scientists, physicians, social scientists, teachers, and kindred workers.

<u>TECHNICIANS</u> - Occupations requiring combination of basic scientific knowledge and manual skill which can be obtained through about 2 years of post high school education, such as is offered in many technical institutes and junior colleges, or through equivalent on-the-job training. Includes: drafters, engineering aids, junior engineers, scientific assistants, surveyors, technical illustrators, technicians (medical, dental, electronic physical sciences), and kindred workers.

<u>SALES WORKERS</u> - Occupations engaging wholly or primarily in direct selling. Includes: advertising agents/salespersons, insurance agents/brokers, real estate agents/brokers, stock and bond salespersons, demonstrators, salespersons and sales clerks, and kindred workers.

<u>OFFICE AND CLERICAL WORKERS</u> - Includes all clerical type work regardless of level of difficulty, where the activities are predominantly non-manual though some manual work not directly involved with altering or transporting the products is included. Includes: bookkeepers, cashiers, collectors (bills and accounts), messengers and office couriers, office machine operators, shipping and receiving clerks, stenographers, typist and secretaries, telegraph and telephone operators, and kindred workers.

<u>WHITE COLLAR TRAINEES</u> - Persons engaged in formal training for official, managerial, professional, technical, sales, office and clerical occupations.

<u>SKILLED CRAFTS</u> - Manual worker of relatively high skill level having a thorough and comprehensive knowledge of the processes involved in their work. Exercise considerable independent judgment and usually receive an extensive period of training. Includes: the building trades hourly paid foremen and leadmen who are not members of management, mechanics and repairmen, skilled machining occupations, compositors and typesetters, electricians, engravers, job setters (metal), motion picture projectionists, pattern and model makers, stationary engineers, tailors and tailoresses, and kindred workers.

<u>APPRENTICES</u> - Persons employed in a program including work training and related instruction to learn a trade or craft which is traditionally considered an apprenticeship, regardless of whether the program is registered with a Federal or State agency.

<u>ON-THE-JOB TRAINEES</u> - Persons engaged in formal training for craftsmen when not trained under apprentice programs; semiskilled, unskilled and service occupations.

<u>SEMI-SKILLED WORKERS</u> - Workers who operate machine or processing equipment or perform other factory-type duties of intermediate skill level which can be mastered in a few weeks and require only limited training.

<u>SERVICE WORKERS</u> - Workers in both protective and non-protective service occupations. Includes: attendants (hospital and other institution, professional and personal service), barbers, charwomen and cleaners, cooks (except household), counter and fountain workers, elevator operators, fire fighters, guards, watchmen and doorkeepers, stewards, janitors, police officers and detectives, porters, waiters and waitresses, and kindred workers.

<u>UNSKILLED WORKERS</u> - Workers in manual occupations which generally require no special training. Perform elementary duties that may be learned in a few days and require the application of little or no independent judgement. Includes: garage laborers, car washers and greasers, gardeners (except farm) and groundskeepers, longshoremen and stevedores, lumbermen, craftsmen and wood choppers, laborers performing lifting, digging, mixing loading and pulling operations, and kindred workers.

PLEASE BE ADVISED!

Every party to a public contract and every party bidding on public contracts are required to have a written sexual harassment policy that contains:

- (1) a definition of sexual harassment under state law:
- (2) a description of sexual harassment utilizing examples;
- (3) a formalized complaint procedure;
- (4) a statement of victims rights;
- (5) directions on how to contact the Illinois Department of Human Rights Illinois companies. Out-of-State companies must include directions on how to contact the enforcement agency within their state. Companies that issue a standard policy for all business locations must prepare an addendum providing directions on how to contact the appropriate enforcement agency.
- (6) a recitation that there cannot be any retaliation against employees who elect to file charges.

Recommendation: Your sexual harassment policy should be drafted in language easy to understand and any revisions should be reviewed by legal counsel. A copy of your policy should be posted in a prominent and accessible location to assure all employees will be notified of the company's position.

<u>In order to conduct business with the PEORIA PARK DISTRICT, you must have a written sexual harassment policy that conforms to the new ACT.</u>

FAILURE TO DO SO WILL DISQUALIFY YOU AS AN ELIGIBLE VENDOR!!!

Please be advised, effective July 1, 1993, Governor Jim Edgar established under Executive Order Number 7 (Public Act 87-1257) that every party to a public contract and every party bidding on a public contract within the State of Illinois must have a written policy statement prohibiting sexual harassment. The following model policy statement is a draft copy provided for use in formulating your company's policy statement

SEXUAL HARASSMENT POLICY STATEMENT

It is the responsibility of each individual employee to refrain from sexual harassment and it is the right of each individual employee to work in an environment free from sexual harassment.

DEFINITION OF SEXUAL HARASSMENT

According to the Illinois Human Rights Act, sexual harassment is defined as:

Any unwelcome sexual advances or requests for sexual favors or any conduct of a sexual nature when

- 1. submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment;
- 2. submission to or rejection of such conduct by an individual is used as the basis for employment decision(s) affecting such individual; or
- 3. such conduct has the purpose or effect of substantially interfering with an individual's work performance or creating an intimidating, hostile, or offensive working environment.

The courts have determined that sexual harassment is a form of discrimination under Title VII of the U.S. Civil Rights act of 1964, as amended in 1991. One such example is a case where a qualified individual is denied employment opportunities and benefits √ividual 🚽 nces or sexual favors. that are, instead, awarded to wits (voluntar//w or under) to s ndrue in rde Another example is where ind lual m su t to unwe me sexual b Aceive an employment opportunity.

Other conduct commonly considered to be sexual narassment includes.

- \Rightarrow Verbal: Sexual innuendoes, suggestive comments, insults, humor and jokes about sex, anatomy or gender-specific traits, sexual propositions, threats, repeated requests for dates, or statement about other employees, even outside of their presence, of a sexual nature.
- \Rightarrow Non-Verbal: Suggestive or insulting sounds (whistling), leering, obscene gestures, sexually suggestive bodily gestures, "catcalls", "smacking" or "kissing" noises.
- \Rightarrow Visual: Posters, signs, pin-ups, slogans of a sexual nature.
- \Rightarrow Physical: Touching, unwelcome hugging or kissing, pinching, brushing the body, coerced sexual intercourse or actual assault.

Sexual harassment most frequently involves a man harassing a woman. However, it can also involve a woman harassing a man or harassment between members of the same gender.

The most severe and overt forms of sexual harassment are easier to determine; however, some sexual harassment is more subtle and depends to some extent on individual perception and interpretation. The trend in the courts is to assess sexual harassment by a standard of what would offend a "reasonable woman" or a "reasonable man", depending upon the gender of the alleged victim.

An example of the most subtle form of sexual harassment is the use of endearments. The use of terms such as "honey", "darling", and "sweetheart" is objectionable to many women who believe that these terms undermine their authority and their ability to deal with men on an equal and professional level.

Another example is the use of a compliment that could potentially be interpreted as sexual in nature. Below are three statements that might be made about the appearance of a woman in the workplace:

Sexual Harassment Model Policy Statement

- Page 2
 - \Rightarrow "That's an attractive dress you have on."
 - \Rightarrow "That's an attractive dress. It really looks good on you."
 - \Rightarrow "That's an attractive dress. You really fill it out well."

The first statement appears to be simply a compliment. The last is most likely to be perceived as sexual harassment depending on individual perceptions and values. To avoid the possibility of offending an employee, it is best to follow a course of conduct above reproach, or to err on the side of caution.

RESPONSIBILITY OF INDIVIDUAL EMPLOYEES

Each individual employee has the responsibility to refrain from sexual harassment in the workplace. An individual employee who harasses a fellow worker is, of course, liable for his or her individual conduct. The harassing employee will be subject to disciplinary action up to and including discharge in accordance with company/organization policy or a collective bargaining agreement, as appropriate.

RESPONSIBILITY OF SUPERVISORY PERSONNEL

Each supervisor is responsible for maintaining a workplace free of sexual harassment. This is accomplished by promoting a professional environment and by dealing with sexual harassment as with all other forms of employee misconduct.

The courts have found companies/organizations as well as supervisors can be held liable for damages related to sexual harassment by a manager, supervisor, employee, or third party (an individual who is not an employee but does business with a company/organization, such as a contractor, customer, sales representative, or repair person).

Liability is based either on a com	ny rganizati	s ponsibility	maintain a	tanni vel voi	d discipline, or on the
supervisor acting as an agent of	e com ny/org:	za, I. As suc	bervisors r	st/ct quickly	d responsibly, not only to
minimize their own liability, but a	o that / the cor	pa vorganizati/			
ل			J J	J	

RESOLUTION OUTSIDE THE COMPANY/ORGANIZATION

It is hoped that most sexual harassment complaints and incidents can be resolved within a company/organization. However, an employee has the right to contact the Illinois Department of Human Rights (IDHR) or the U.S. Equal Employment Opportunity Commission (EEOC) about filing a formal complaint. An IDHR complaint must be filed within 180 days of the alleged incident(s) unless it is a continuing offense. A complaint with EEOC must be filed within 300 days.

Illinois Department of Human Rights (217) 785-5100 – Springfield (217) 785-5125 – TDD Springfield (312) 814-6200 – Chicago (312) 263-1579 – TDD Chicago Illinois Human Rights Commission

(217) 785-4350 – Springfield (217) 785-5125 – TDD Springfield (312) 814-6269 – Chicago (312) 814-4760 – TDD Chicago

U.S. Equal Employment Opportunity Commission

(312) 353-2613 – Chicago District Office (800) 669-4000 – Toll Free Within State of Illinois (800) 669-6820 – TDD Chicago

An employee who is suddenly transferred to a lower paying job or passed for promotion, after filing a complaint with IDHR or EEOC, may file a retaliation charge, also due 180 days (IDHR) or 300 days (EEOC) from the alleged retaliation.

An employee who has been physically harassed or threatened while on the job may also have grounds for criminal charges of assault and battery.

FALSE AND FRIVOLOUS COMPLAINTS

False and frivolous charges refer to cases where the accuser is using a sexual complaint to accomplish some end other than stopping sexual harassment. It does not refer to charges made in good faith which cannot be proven. Given the seriousness of the consequences for the accused, a false and frivolous charge is a severe offense that can itself result in disciplinary action.



ILLINOIS DRUG FREE WORKPLACE CERTIFICATION

The undersigned Contractor/Vendor hereby certifies that it will comply with all provisions of the Illinois Drug Free Workplace Act of 1991.

Dated this _____, 20 _____,

Contractor/Vendor

By: _____



SUBSTANCE ABUSE PREVENTION PROGRAM CERTIFICATION

Project Name:_____

Location:_____

The Substance Abuse Prevention on Public Works Act Public Act 95-0635, prohibits the use of drugs and alcohol, as defined in the Act, by employees of the Contractor and by employees of all approved Subcontractors while performing work on a public works project. The Contractor/Subcontractor herewith certifies that it has a superseding collective bargaining agreement or makes the public filing of its written substance abuse prevention program for the prevention of substance abuse among its employees who are not covered by a collective bargaining agreement dealing with the subject as mandated by the Act.

A.The undersigned representative of the Contractor/Subcontractor certifies that the contracting entity has signed collective bargaining agreements that are in effect for all of its employees, and that deal with the subject matter of Public Act 95-0635.

Contractor/Subcontractor

Name of Authorized Representative (type or print)

Title of Authorized Representative (type or print)

Signature of Authorized RepresentativeDate

B.The undersigned representative of the Contractor/Subcontractor certifies that the contracting entity has in place, for all of its employees not covered by a collective bargaining agreement that deals with the subject of the Act, the attached substance abuse prevention program that meets or exceeds the requirements of Public Act 95-0635.

Contractor/Subcontractor

Name of Authorized Representative (type or print)

Title of Authorized Representative (type or print)

Signature of Authorized RepresentativeDate



CERTIFICATION OF SAFETY COMPLIANCE

The undersigned Contractor/Vendor hereby certify that they and their sub-contractors will comply with any and all prevailing occupational safety and health standards including, but not limited to the following: hazard communication, hearing conservation, respirator use, permit required confined space entry, scaffolding, personal protective equipment, ladder usage, ventilation, flammable and combustible liquids handling and storage and lockout/tagout. Such compliance may include a training component or require a written program of compliance.

Dated this day of _____, 20 _____.

CONTRACTOR/VENDOR: _____

By: _____

PLEASURE DRIVEWAY AND PARK DISTRICT

OF PEORIA, ILLINOIS

Individual Contractor Form

CONTRACTOR CERTIFICATION

I, ______, do hereby certify that I am a contractor who has not been barred from bidding on a public contract as a result of a violation of either Section 33E-3 (bid-rigging) or Section 33E-4(bid rotating) of the Illinois Criminal Code, Illinois Compiled Statutes 720 ILCS 5/33E-3 and 5/33E-4.

Contractor

By: _____

Subscribed and Sworn before me this _____ day of _____, 20____

Notary Public

My Commission Expires _____, 20_____

PLEASURE DRIVEWAY AND PARK DISTRICT

OF PEORIA, ILLINOIS

Corporate or Partnership Contractor Form

CONTRACTOR CERTIFICATION

I,	, a duly authorized agent of
(Agent)	
(Contractor)	, do hereby certify that neither
(Contractor)	, nor any individual presently
affiliated with(Contractor)	, has been barred from
bidding on a public contract as a result of a violation of either Section 33E-3 (bi Illinois Criminal Code, Illinois Compiled Statutes, 720 ILCS 5/33E-3 and 5/33E	d-rigging) or Section 33E-4 (bid rotating) of the E-4.
Contractor	
By:	
Subscribed and Sworn before me this day of,	20
Notary Public	
My Commission Expires, 20	

MAJOR SUBCONTRACTORS LIST

The following tabulation of Major Subcontractors shall be attached and made a condition of the Bid. The Bidder expressly understands and agrees to the following provisions:

- A. If awarded a Contract as a result of this Bid, the major subcontractors used in the prosecution of the work will be those listed below.
- B. The following list includes all subcontractors who will perform work representing 5% (five percent) or more of the total Base Bid.
- C. The subcontractors listed below are financially responsible and are qualified to perform the work required.
- D. The subcontractors listed below comply with the requirements of the Contract Documents.
- E. Any substitutions in the subcontractors listed below shall be requested in writing by the Contractor and must be approved in writing by the Owner. No subsubcontractors will be allowed unless specifically stated on the form. All pertinent financial, performance, insurance and other applicable information shall be submitted with the request for substitution(s). Owner shall respond to such requests within 14 calendar days following the submission of all necessary information to the full satisfaction of the Owner.
- F. Failure to submit the list of Major Subcontractors as stated herein shall constitute a material variation from the Invitation to Bid; and any such Bid may be rejected by the Owner.

Subcontractor Name	Address	Telephone	Area of Work	Minority/Women Owned Business (Yes/No)

(Attach additional sheets if required)

END OF MAJOR SUBCONTRACTORS FORM

Directory of Minority & Women Owned Business Enterprises Compiled with Information from City of Peoria Equal Opportunity Office Peoria Housing Authority Peoria Park District

04/2017

Absolute Risk Management Strategies Kelly Peterson	MBE Construction Safety, Job Site Safety Plan Development, Job Site Risk Assessment, Construction OSHA Training 416 Main St., Suite 533, Peoria, IL 61602	309-222-4050		
Adams Septic & Sewer Services, Inc. Michelle Adams	WBE Septic and Sewer Contractor 1641 N. Tiber Ridge Ct., East Peoria, IL 61611	309-691-6113		
AFE Construction, Inc. Tommy and Monica Arbuckle	WBE General Contractor WBE P.O. Box 199, Mackinaw, IL 61755	309-208-3092 tommy.AFEINC@hotmail.com		
Alexander Brother Construction Allester Alexander	MBE Concrete, Demolition, Excavating, Landscaping Trucking P.O. Box 1508 Peoria, IL 61605	309-713-3010 abrosconst@aol.com		
A & L Salvage, Inc. Archie Brown	MBE Clean Up, Tree Cutting & Removal, Truck Salvaging 824 W. Brons, Peoria, IL 61604	309-682-4412		
A. Lucas & Sons Steel Margaret Hanley	WBE Structural Steel Fabrication 1328 SW Washington, Peoria, IL 61602	309-673-8547 309-673-7213 Fax <u>Margaret@alucasiron.com</u>		
Ambri Inc. Robert J. Hunt. Jr.	MBE Drywall, Flooring, Painting, Cabinetry 9101 S. Nashville Ave., Oak Lawn, IL 60453	708-634-6303 Ph/ Fax		
Atherton, P.A. Patricia Atherton	WBE Asphalt, Concrete, Demolition, Excavation 57 Eichorn Road, Spring Bay, IL 61611	309-822-8575 309-822-8782 Fax		
A Unique Maintenance Service Andrea McKnight	MBE Commercial and Industrial Construction Cleanup 2101 N. North St., Peoria, IL 61604	309-685-7197 309-685-4472 Fax		
BMI Contractors and Associates Sammy L Hobson	MBE Excavation, Environmental Services, Concrete 1123 MacQueen, Peoria, IL 61604 <u>bmicontractorsandassociates@comcast.net</u>	30-657-4469 309-713-1569		
Braun Excavating, Inc. Teresa Braun	WBE Demolition, Digging of Footings, Excavation, Pipe Laying 24 Gulf Stream, Bartonville, IL 61607	309-697-5454 309-697-6567 Fax		
Brown, Leo Trucking, Inc. Leo Brown	MBE Trucking/Hauling P. O. Box 9057, Peoria, IL 61612	309-685-6710 309-685-0759 Fax		
Buddy's Landscaping Dexter Davis	MBE Landscaping P. O. Box 1836, Bloomington, IL 61702	309-824-9211 309-454-3342 Fax dexterdavis2@aol.com		
Central IL Consulting Inc. Jessica Youngman	WBE Land Surveying 416 Germantown Rd., Germantown, IL 61548	309-383-3156 youngman@mtco.com		
Central IL Rebar Insulators Roger Fleming	MBE Structural Steel and Rebar Replacement 4719 Ridgelawn, Peoria, IL 61615	309-258-1379 888-387-5716 Fax		
Central Landscaping Donna Brandenburg	WBE Landscaping 12512 Mendell Rd., Princeville, IL 61559	309-385-4832 309-385-2644 Fax		
CJL Landscaping, Inc. Rebecca J. Kelch	WBE Landscaping 10902 W. U. S. Highway 150, Brimfield, IL 61517	309-691-9200 309-691-5131 Fax		

meinders_81@yahoo.com

Clevenger Contractors Inc. Misty Bahman

CNS Forestry & Landscaping LLC Christine Schilling

Cordova Construction Tina Christopher

Cornerstone Builders & Developers Ron Touilly

Creative Touch Painting Chris Ridge

CSS (Construction Specialties & Services) Dave Suzuki

CWG Incorporated Teresa E. Gustafson

Davis Brothers Construction Company Russell Davis

DECA Realty Eddie J. Washington

Design Air Inc. Courtney Eston

E & D Trucking and Hauling, Inc. Eddie Proctor

Flessner Electric

Fire & Ice Heating and Air J.T. Toombs

Foster-Jacob Electric Emily Rudesill

Fuhrmann Engineering Inc. Matt Smith

Garza Heating & Cooling

GIVSCO Construction Ronnie Givens

Gutters & More Kristine Stone-Rainey

Hancock Trucking, Inc. Nancy Hancock

Hanley Steel, Inc. Jill Hanley WBE Guardrail, Bridge Rail, Seeding, Fencing 355 Naples Rd., P.O. Box 19, Bluffs, IL 62621 www.clevengercontractor.com

WBE Landscaping, Seeding, Sodding, Tree Removal 1813 1000th St., Lincoln, IL 62656

WBE Concrete Removal, Curb & Gutter Removal, Sidewalk Removal 2424 N. Ellory Road, Peoria, IL 61615

WBE 6129 W. Southport Rd., Peoria, IL 61615 www.cornerstonebd.com

MBE Painting Exterior/Interior 3318 N. Isabell Ave., Peoria, IL 61604

MBE Building Specialties, Design, Engineering, Estimating P. O. Box 120703 Peoria, IL 61614

WBE Demolition, Excavation, Trucking 24635 Cooper Rd., Morton, IL 61550

MBE Trucking/Hauling 1522 W. Kettelle St. Peoria, IL 61605

MBE Real Estate Broker, Appraiser 417 W. Main, Peoria, IL 61606

MBE Commercial Air Duct Cleaning 3806 W. Hearthwood Dr., Dunlap, IL 61525 www.designair-inc.com

MBE Trucking/Hauling 1913 N. Idaho, Peoria, IL 61604

WBE Electrical 3600 S. Cameron Ln., Mapleton, IL 61547

MBE HVAC Maintenance, Installment 922 W. Smith St., Peoria, IL 61605

WBE Electrical 826 W. Main St., Peoria, IL 61606

WBE Civil Engineers / Land Surveyors 456 Fulton St., Suite 146 www.fuhrmann-eng.com

MBE HVAC 1304 S. Western Ave., Peoria, IL 61605

MBE General Contractor 2321 Lakeshore Dr., Pekin, IL 61554

WBE Roofing 157 Thunderbird Ln., East Peoria, IL 61611 www.gutters&moreinc.com

WBE Trucking/Hauling 30570 Hancock Road, Mackinaw, IL 61755

WBE Fabricated Structural and Miscellaneous Steel 8811 N. Industrial Rd., Peoria, IL 61615

217-754-3411 217-754-3537 Fax <u>clever@irtc.net</u>

217-792-3808 217-792-3808 Fax

309-674-8810

309-674-9000 309-673-7783 Fax info@cornerstonebd.com

309-229-1253 309-643-7400(cell) info@creativetouchpnt.com

309-685-8453 sai@sai-x.com

309-208-5461 (cell) 309-208-8899 (cell) tgusdesigns@yahoo.com

309-683-6931

309-637-3322 309-682-3922 Fax

309-693-8632 309-243-2102 Fax cle@designair-inc.com

309-682-4336 309-251-6736 Cell proctor13@comcast.net

309-697-2484

309-219-3708

309-674-8129

309-713-3498 Ext. 5

msmith@fuhrmann-eng.com

309-645-6294

309-620-9127 info@GIVSCO.com

309-694-4000 309-694-3356 Fax ksr@gutters-more.com

309-447-6733

309-692-5250 309-692-5251 Fax

Heart Technologies Jim Bainter, Brad Armstrong

Hermann & Associates Alisha Hermann

Hoops Painting Monty Hoops

Horan Construction, Inc. Susan Arnholt

Infrastructure Engineering Thu Truitt

Intech Innovations John McCrary

JC Construction Frank Coates

J & K Construction James Tillman

JM Industrial Supply Ron Givens

Kahbeah Contracting & Trucking Larry Kahbeah

Kreiling Roofing Co.

LV Enterprise John L. Palmer

M & A Plumbing Michael Abner

M & L Plumbing Manzell Lawson

Mid-Illinois Companies, Corp. Debra Young

Midwest Construction Services Sheila Shover

Millennia Professional Services of IL Paul Moreno

Molleck Electric

Ordaz Construction Co. Inc. Elizabeth Ordaz Mercer

Porter, V. L. Vincent Porter

RNS Electric Inc. Regina Slonneger

WBE Data\Telephone Communication and Construction 3105 N. Main Street, Peoria, IL 61611

WBE Consultant Engineering 5835 N. Galena Rd., Peoria, IL 61614

MBE Painting 136 Middle Park Dr., Canton, IL 61520

WBE Carpentry, Concrete, Demolition, General, Wrecking 1720 W. Chanute Road, Peoria, IL 61615

MBE Civil Engineering 456 Fulton St., Suite 104, Peoria, IL 61602

WBE Audio/Video Design and Integration Washington, IL 61571 www.intechinnovations.com

MBE General 3609 N. Woodvine Terrace, Peoria, IL 61605

MBE General 4003 N. Rochelle, Peoria, IL 61615

MBE Maintenance Items, Tools, Soaps 2323 Lakeshore, Pekin, IL 61554

MBE Trucking/Hauling 510 N. Yates, P. O. Box 56, Tallula, IL 62688

WBE Slate, Wood Shakes, Tile, Thatch, Custom Fabricated 309-673-3649 Copper and Steel, Residential and Commercial 2335 W. Altorfer Dr., Peoria, IL 61615

MBE Trucking/Hauling 303 E. Archer Avenue, Peoria, IL 61603

MBE Plumbing 6216 N. Devonshire Avenue, Peoria, IL 61615

MBE Plumbing 1309 W. Lincoln, Peoria, IL 61605

WBE Metal Framing, Insulation, Drywall, Plaster & Exterior Insulation, Acoustical Ceilings and Wall Panels, Painting and Wall Covering, Access Flooring 905 NE Adams St., Peoria, IL 61603

M/WBE Traffic Control Products, Trucking/Hauling P. O. Box 4185, Bartonville, IL 61607

MBE Civil Engineering, Erosion Control, Landscaping, Sewer Construction, Surveying, Retaining Walls 850 N. Main St., Morton, IL 61550 www.mps-il.com

WBE Electrical 14926 W. Winchester Dr., Brimfield, IL 61517

WBE Concrete 10088 Modena Rd., Wyoming, IL 61491 www.ordazco.com

MBE Concrete, General 500 W. North, Suite 10, Springfield, IL 62704

WBE Electrical 28558 Irish Lane, Washington, IL 61571 309-427-7000 309-427-7007 Fax

309-687-5566 309-687-0571 Fax

309-224-0736

309-691-3133 309-691-1841 Fax

309-637-9200 309-637-9210

309-370-6676 309-745-9691 Fax jmccrary@intechinnovations.com

309-303-3919 Cell fcoates1@yahoo.com

309-685-8554 309-685-8554 Fax tesinc@comcast.net

309-346-5796 309-347-5100 Fax

217-634-4157 217-634-4157 Fax

info@kreiling.com

309-657-2420 309-682-8872 Fax

309-689-0133 309-689-0133 Fax

309-674-8466

309-674-0717 dyoung@mic123.com

309-697-1000 309-697-1004 Fax sshover@mcstraffic.com

309-321-8141 309-321-8142

sdietz@mps-il.com

309-446-3483

309-693-3338 309-693-5505 Fax lindahall@odazco.com

217-744-8050

309-444-5200 309-444-5201 Fax

Rudd Trucking Nanette Jenkins-Rudd	WBE Trucking/Hauling 107 Washington St., Kingston Mines, IL 61539	309-389-4150 309-389-2849 Fax
Rufus Construction Company Rufus Nelson	MBE Painting, Roofing, Remodeling 1819 S. Idaho Street, Peoria, IL 61605	309-673-6776 309-497-9453 Cell
Searle Trucking, Inc. Debbie Searle	WBE Trucking/Hauling P.O. Box 4142, Bartonville, IL 61607	309-686-0708 309-688-5365 Fax <u>searletrkn@comcast.net</u>
Tabitha Ventures, Inc. Edward O. Taiwo	MBE Asphalt, Concrete, Demolition, Earthwork, Electrical, Excavation, General, HVAC, Landscaping, Painting, Plumbing, Resurfacing, Roofing, Trucking/Hauling 2000 W. Pioneer Parkway, Suite 7B. Peoria, II, 61615	309-692-1473 309-692-1564 Fax
	www.tabithainc.com	Edward@tabithainc.com
TEMCO Heating & AC Ellen Robinson	WBE Heating & AC 913 Laramie St., Peoria, IL 61605	309-637-7746
The Communication Connection Jennifer Stone	WBE Communication, Wire & Cable, Electrical & Telephor 604 Filmore Street, Harrisburg, PA 17104	ne Products 717-561-7267
Three Cross Development J. T. Donelson	MBE Concrete, General, Sidewalk, Drywall, Painting Roofing, Electrical, Plumbing, Trucking/Hauling 1519 W. Millman, Peoria, IL 61605	309-637-1238
Thompson Brothers Inc. Todd Thompson	MBE General Carpentry & Construction, Interior Finishes, Millwork P.O. Box 313, Pekin, IL 61555	309-613-0254 thompsonbros@me.com
Thornton Rave dba Illini Concrete Co. of Illinois	MBE Precast & Prestressed Concrete, Demolition, Excavating, Grading, Drainage, Aggregate Bases & Surfaces, Pavement Patching 929 E. Grove St., Suite A, Bloomington, IL 61701	309-585-2376 309-585-2472 Fax
Tillman Electric James Tillman	MBE Electrical 4003 N. Rochelle, Peoria, IL 61615	309-685-8554 309-264-3903 Cell
Willie Veneble Construction Willie Venable	MBE Construction, Concrete Removal, Demolition 1000 E. Wilcox, Peoria, IL 61605	309-686-1429 309-360-0757 Cell
Willis Electric Phyllis Willis	WBE Electrical P.O. Box 545, Chillicothe, IL 61523	309-579-2926 Willi158@mchsi.com

Phyllis Willis

rns@att.net

Prevailing Wage rates for Peoria County effective Sept. 1, 2017												
Trade Title	Region	Туре	Class	Base	Fore-	M-F	OSA	OSH	H/W	Pension	Vacation	Training
				Wage	man Wage	ОТ						
ASBESTOS ABT-GEN	ALL	BLD		26.89	28.39	1.5	1.5	2	7.80	18.85	0.00	0.80
ASBESTOS ABT-GEN	ALL	HWY		29.99	31.49	1.5	1.5	2	7.80	20.64	0.00	0.80
ASBESTOS ABT-MEC	ALL	BLD		32.78	35.28	1.5	1.5	2	12.12	11.70	0.00	0.72
BOILERMAKER	ALL	BLD		39.50	42.50	2	2	2	7.07	12.47	0.00	0.40
BRICK MASON	ALL	BLD		33.16	34.66	1.5	1.5	2	9.40	10.57	0.00	0.79
CARPENTER	ALL	BLD		32.01	34.26	1.5	1.5	2	8.45	17.10	0.00	0.54
CARPENTER	ALL	HWY		34.04	36.29	1.5	1.5	2	8.45	17.50	0.00	0.52
CEMENT MASON	ALL	BLD		28.05	29.80	1.5	1.5	2	7.50	15.65	0.00	0.50
CEMENT MASON	ALL	HWY		32.11	33.61	1.5	1.5	2	8.25	16.77	0.00	0.50
CERAMIC TILE FNSHER	ALL	BLD		30.86	30.86	1.5	1.5	2	9.40	10.57	0.00	0.77
ELECTRIC PWR EQMT OP	ALL	ALL		43.76	54.80	1.5	1.5	2	6.81	12.25	0.00	0.44
ELECTRIC PWR GRNDMAN	ALL	ALL		29.96	54.80	1.5	1.5	2	6.40	8.39	0.00	0.30
ELECTRIC PWR LINEMAN	ALL	ALL		48.61	54.80	1.5	1.5	2	6.96	13.61	0.00	0.49
ELECTRIC PWR TRK DRV	ALL	ALL		31.42	54.80	1.5	1.5	2	6.44	8.80	0.00	0.31
ELECTRICIAN	ALL	BLD		35.71	38.21	1.5	1.5	2	7.55	12.21	0.00	0.80
ELECTRONIC SYS TECH	ALL	BLD		28.00	30.00	1.5	1.5	2	7.10	11.44	0.00	0.40
ELEVATOR CONSTRUCTOR	ALL	BLD		43.43	48.86	2	2	2	15.28	15.71	3.47	0.60
GLAZIER	ALL	BLD		34.87	34.87	1.5	1.5	1.5	10.50	7.70	0.00	1.25
HT/FROST INSULATOR	ALL	BLD		43.70	46.20	1.5	1.5	2	12.12	12.96	0.00	0.72
IRON WORKER	ALL	BLD		32.41	34.31	1.5	1.5	2	10.66	15.47	0.00	0.54
IRON WORKER	ALL	HWY		36.82	38.82	1.5	1.5	2	10.66	15.47	0.00	0.64
LABORER	ALL	BLD		25.89	27.39	1.5	1.5	2	7.80	18.85	0.00	0.80
LABORER	ALL	HWY		29.24	30.74	1.5	1.5	2	7.80	20.64	0.00	0.80
LABORER, SKILLED	ALL	BLD		26.29	27.79	1.5	1.5	2	7.80	18.85	0.00	0.80
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LABORER, SKILLED	ALL	HWY		29.54	31.04	1.5	1.5	2	7.80	20.64	0.00	0.80
LATHER	ALL	BLD		32.01	34.26	1.5	1.5	2	8.45	17.10	0.00	0.54
MACHINERY MOVER	ALL	HWY		36.82	38.82	1.5	1.5	2	10.66	15.47	0.00	0.64
MACHINIST	ALL	BLD		45.35	47.85	1.5	1.5	2	7.26	8.95	1.85	0.00
MARBLE FINISHERS	ALL	BLD		30.86		1.5	1.5	2	9.40	10.57	0.00	0.77
MARBLE MASON	ALL	BLD		32.61	33.86	1.5	1.5	2	9.40	10.57	0.00	0.78
MILLWRIGHT	ALL	BLD		31.74	33.99	1.5	1.5	2	8.45	17.72	0.00	0.54
MILLWRIGHT	ALL	HWY		33.59	35.33	1.5	1.5	2	8.20	16.95	0.00	0.52
OPERATING ENGINEER	ALL	BLD	1	39.69	42.69	1.5	1.5	2	9.00	19.23	0.00	3.00
OPERATING ENGINEER	ALL	BLD	2	36.83	42.69	1.5	1.5	2	9.00	19.23	0.00	3.00
OPERATING ENGINEER	ALL	BLD	3	32.12	42.69	1.5	1.5	2	9.00	19.23	0.00	3.00
OPERATING ENGINEER	ALL	HWY	1	39.69	42.69	1.5	1.5	2	9.00	19.23	0.00	3.00
OPERATING ENGINEER	ALL	HWY	2	36.83	42.69	1.5	1.5	2	9.00	19.23	0.00	3.00
OPERATING ENGINEER	ALL	HWY	3	31.27	41.62	1.5	1.5	2	8.00	19.23	0.00	3.00
PAINTER	ALL	ALL		35.35	37.35	1.5	1.5	1.5	10.30	8.20	0.00	1.35
PAINTER SIGNS	ALL	BLD		33.92	38.09	1.5	1.5	1.5	2.60	2.71	0.00	0.00
PILEDRIVER	ALL	BLD		33.01	35.26	1.5	1.5	2	8.45	17.10	0.00	0.54
PILEDRIVER	ALL	HWY		34.04	36.29	1.5	1.5	2	8.45	17.50	0.00	0.52
PIPEFITTER	ALL	BLD		38.90	43.18	1.5	1.5	2	7.10	12.53	0.00	1.06
PLASTERER	ALL	BLD		29.00	30.25	1.5	1.5	2	8.15	16.19	0.00	0.80
PLUMBER	ALL	BLD		35.17	38.34	1.5	1.5	2	7.00	14.21	0.00	0.95
ROOFER	ALL	BLD		31.00	32.55	1.5	1.5	2	9.00	9.20	0.00	0.30
SHEETMETAL WORKER	ALL	BLD		32.75	34.39	1.5	1.5	2	9.37	16.46	0.00	0.80
SIGN HANGER	ALL	HWY		36.82	38.82	1.5	1.5	2	10.66	15.47	0.00	0.64
SPRINKLER FITTER	ALL	BLD		37.12	39.87	1.5	1.5	2	8.42	8.50	0.00	0.35
STEEL ERECTOR	ALL	HWY		36.82	38.82	1.5	1.5	2	10.66	15.47	0.00	0.64
STONE MASON	ALL	BLD		33.16	34.66	1.5	1.5	2	9.40	10.57	0.00	0.79
TERRAZZO FINISHER	ALL	BLD		30.86		1.5	1.5	2	9.40	10.57	0.00	0.77
TERRAZZO MASON	ALL	BLD		32.61	32.61	1.5	1.5	2	9.40	10.57	0.00	0.78
TILE MASON	ALL	BLD		32.61	33.86	1.5	1.5	2	9.40	10.57	0.00	0.78

TRUCK DRIVER	ALL	ALL	1	36.15	40.04	1.5	1.5	2	12.16	5.89	0.00	0.25
TRUCK DRIVER	ALL	ALL	2	36.67	40.04	1.5	1.5	2	12.16	5.89	0.00	0.25
TRUCK DRIVER	ALL	ALL	3	36.91	40.04	1.5	1.5	2	12.16	5.89	0.00	0.25
TRUCK DRIVER	ALL	ALL	4	37.25	40.04	1.5	1.5	2	12.16	5.89	0.00	0.25
TRUCK DRIVER	ALL	ALL	5	38.23	40.04	1.5	1.5	2	12.16	5.89	0.00	0.25
TRUCK DRIVER	ALL	0&C	1	28.92	32.03	1.5	1.5	2	12.16	5.89	0.00	0.25
TRUCK DRIVER	ALL	0&C	2	29.34	32.03	1.5	1.5	2	12.16	5.89	0.00	0.25
TRUCK DRIVER	ALL	0&C	3	29.53	32.03	1.5	1.5	2	12.16	5.89	0.00	0.25
TRUCK DRIVER	ALL	0&C	4	29.80	32.03	1.5	1.5	2	12.16	5.89	0.00	0.25
TRUCK DRIVER	ALL	0&C	5	30.58	32.03	1.5	1.5	2	12.16	5.89	0.00	0.25
TUCKPOINTER	ALL	BLD		33.16	34.66	1.5	1.5	2	9.40	10.57	0.00	0.79

Legend

M-F OT Unless otherwise noted, OT pay is required for any hour greater than 8 worked each day, Mon through Fri. The number listed is the multiple of the base wage.

OSA Overtime pay required for every hour worked on Saturdays

OSH Overtime pay required for every hour worked on Sundays and Holidays

H/W Health/Welfare benefit

Explanations PEORIA COUNTY

The following list is considered as those days for which holiday rates of wages for work performed apply: New Years Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, Christmas Day and Veterans Day in some classifications/counties. Generally, any of these holidays which fall on a Sunday is celebrated on the following Monday. This then makes work performed on that Monday payable at the appropriate overtime rate for holiday pay. Common practice in a given local may alter certain days of celebration. If in doubt, please check with IDOL.

Oil and chip resealing (O&C) means the application of road oils and liquid asphalt to coat an existing road surface, followed by application of aggregate chips or gravel to coated surface, and subsequent rolling of material to seal the surface.

EXPLANATION OF CLASSES

ASBESTOS - GENERAL - removal of asbestos material/mold and hazardous materials from any place in a building, including mechanical systems where those mechanical systems are to be removed. This includes the removal of asbestos materials/mold and hazardous materials from ductwork or pipes in a building when the building is to be demolished at the time or at some close future date.

ASBESTOS - MECHANICAL - removal of asbestos material from mechanical systems, such as pipes, ducts, and boilers, where the mechanical systems are to remain.

CERAMIC TILE FINISHER, MARBLE FINISHER, TERRAZZO FINISHER

Assisting, helping or supporting the tile, marble and terrazzo mechanic by performing their historic and traditional work assignments required to complete the proper installation of the work covered by said crafts. The term "Ceramic" is used for naming the classification only and is in no way a limitation of the product handled. Ceramic takes into consideration most hard tiles.

ELECTRONIC SYSTEMS TECHNICIAN

Installation, service and maintenance of low-voltage systems which utilizes the transmission and/or transference of voice, sound, vision, or digital for commercial, education, security and entertainment purposes for the following: TV monitoring and surveillance, background/foreground music, intercom and telephone interconnect, field programming, inventory control systems, microwave transmission, multi-media, multiplex, radio page, school, intercom and sound burglar alarms and low voltage master clock systems.

Excluded from this classification are energy management systems, life safety systems, supervisory controls and data acquisition systems not intrinsic with the above listed systems, fire alarm systems, nurse call systems and raceways exceeding fifteen feet in length.

LABORER, SKILLED - BUILDING

The skilled laborer building (BLD) classification shall encompass the following types of work, irrespective of the site of the work: cutting & acetylene torch, gunnite nozzlemen, gunnite pump men & pots, kettlemen & carriers of men handling hot stuff, sandblaster nozzle men, sandblasting pump men & pots, setting up and using concrete burning bars, wood block setters, underpinning & shoring of existing buildings, and the unload-ing and handling of all material coated with creosote.

LABORER, SKILLED - HIGHWAY

The skilled laborer heavy & highway (HWY) classification shall encompass the following types of work, irrespective of the site of the work: jackhammer & drill operator, gunite pump & pot man, puddlers, vibrator men, wire fabric placer, sandblast pump & pot man, strike off concrete, unloading, handling & carrying of all creosoted piles, ties or timber, concrete burning bars, power wheelbarrows or buggies, asphalt raker, brickset-ters, cutting torchman (electric & acetylene), men setting lines to level forms, form setters, gunite nozzle man & sandblasting nozzle man, power man, and rip-rapping by hand.

TRUCK DRIVER - BUILDING, HEAVY AND HIGHWAY CONSTRUCTION Class 1. Drivers on 2 axle trucks hauling less than 9 ton. Air compressor and welding machines and brooms, including those pulled by separate units, truck driver helpers, warehouse employees, mechanic helpers, greasers and tiremen, pickup trucks when hauling materials, tools, or workers to and from and on-the-job site, and fork lifts up to 6,000 lb. capacity.

Class 2. Two or three axle trucks hauling more than 9 ton but hauling less than 16 ton. A-frame winch trucks, hydrolift trucks, vactor trucks or similar equipment when used for transportation purposes. Fork lifts over 6,000 lb. capacity, winch trucks, four axle combination units, and ticket writers.

Class 3. Two, three or four axle trucks hauling 16 ton or more. Drivers on water pulls, articulated dump trucks, mechanics and working forepersons, and dispatchers. Five axle or more combination units.

Class 4. Low Boy and Oil Distributors.

Class 5. Drivers who require special protective clothing while employed on hazardous waste work.

TRUCK DRIVER - OIL AND CHIP RESEALING ONLY.

This shall encompass laborers, workers and mechanics who drive contractor or subcontractor owned, leased, or hired pickup, dump, service, or oil distributor trucks. The work includes transporting materials and equipment (including but not limited to, oils, aggregate supplies, parts, machinery and tools) to or from the job site; distributing oil or liquid asphalt and aggregate; stock piling material when in connection with the actual oil and chip contract. The Truck Driver (Oil & Chip Resealing) wage classification does not include supplier delivered materials.

OPERATING ENGINEERS - BUILDING

Class 1. Cranes; Overhead Cranes; Gradall; All Cherry Pickers; Mechanics; Central Concrete Mixing Plant Operator; Road Pavers (27E - Dual Drum - Tri Batchers); Blacktop Plant Operators and Plant Engineers; 3 Drum Hoist; Derricks; Hydro Cranes; Shovels; Skimmer Scoops; Koehring Scooper; Drag Lines; Backhoe; Derrick Boats; Pile Drivers and Skid Rigs; Clamshells; Locomotive Cranes; Dredge (all types) Motor Patrol; Power

Blades - Dumore - Elevating and similar types; Tower Cranes (Crawler-Mobile) and Stationary; Crane-type Backfiller; Drott Yumbo and similar types considered as Cranes; Caisson Rigs; Dozer; Tournadozer; Work Boats; Ross Carrier; Helicopter; Tournapulls - all and similar types; Scoops (all sizes); Pushcats; Endloaders (all types); Asphalt Surfacing Machine; Slip Form Paver; Rock Crusher; Heavy Equipment Greaser; CMI, CMI Belt Placer, Auto Grade & 3 Track and similar types; Side Booms; Multiple Unit Earth Movers; Creter Crane; Trench Machine; Pump-crete-Belt Crete-Squeeze Cretes-Screw-type Pumps and Gypsum; Bulker & Pump - Operator will clean; Formless Finishing Machine; Flaherty Spreader or similar types; Screed Man on Laydown Machine; Wheel Tractors (industrial or Farm-type w/Dozer-Hoe-Endloader or other attachments); F.W.D. & Similar Types; Vermeer Concrete Saw.

Class 2. Dinkeys; Power Launches; PH One-pass Soil Cement Machine (and similar types); Pugmill with Pump; Backfillers; Euclid Loader; Forklifts; Jeeps w/Ditching Machine or other attachments; Tuneluger; Automatic Cement and Gravel Batching Plants; Mobile Drills (Soil Testing) and similar types; Gurries and Similar Types; (1) and (2) Drum Hoists (Buck Hoist and Similar Types); Chicago Boom; Boring Machine & Pipe Jacking Machine; Hydro Boom; Dewatering System; Straw Blower; Hydro Seeder; Assistant Heavy Equipment Greaser on Spread; Tractors (Track type) without Power Unit pulling Rollers; Rollers on Asphalt -- Brick Macadem; Concrete Breakers; Concrete Spreaders; Mule Pulling Rollers; Center Stripper; Cement Finishing Machines & CMI Texture & Reel Curing Machines; Cement Finishing Machine; Barber Green or similar loaders; Vibro Tamper (All similar types) Self-propelled; Winch or Boom Truck; Mechanical Bull Floats; Mixers over 3 Bag to 27E; Tractor pulling Power Blade or Elevating Grader; Porter Rex Rail; Clary Screed; Truck Type Hoptoe Oilers; Fireman; Spray Machine on Paving; Curb Machines; Truck Crane Oilers; Oil Distributor; Truck-Mounted Saws.

Class 3. Air Compressor; Power Subgrader; Straight Tractor; Trac Air without attachments; Herman Nelson Heater, Dravo, Warner, Silent Glo, and similar types; Roller: Five (5) Ton and under on Earth or Gravel; Form Grader; Crawler Crane & Skid Rig Oilers; Freight Elevators - permanently installed; Pump; Light Plant; Generator; Conveyor (1) or (2) - Operator will clean; Welding Machine; Mixer (3) Bag and Under (Standard Capacity with skip); Bulk Cement Plant; Oiler on Central Concrete Mixing Plant.

OPERATING ENGINEERS - HEAVY AND HIGHWAY CONSTRUCTION

CLASS 1. Cranes; Hydro Cranes; Shovels; Crane Type Backfiller; Tower, Mobile, Crawler, & Stationary Cranes; Derricks; Hoists (3 Drum); Draglines; Drott Yumbo & Similar Types considered as Cranes; 360 Degree Swing Excavator (Shears, Grapples, Movacs, etc.); Back Hoe; Derrick Boats; Pile Driver and Skid Rigs; Clam Shell; Locomotive - Cranes; Road Pavers - Single Drum - Dual Drum - Tri Batcher; Motor Patrols & Power Blades - Dumore - Elevating & Similar Types; Mechanics; Central Concrete Mixing Plant Operator; Asphalt Batch Plant Operators and Plant Engineers; Gradall; Caisson Rigs; Skimmer Scoop - Koering Scooper; Dredges (all types); Hoptoe; All Cherry Pickers; Work Boat; Ross Carrier; Helicopter; Dozer; Tournadozer; Tournapulls - all and similar types; Operation of Concrete and all Recycle Machines; Multiple Unit Earth Movers; Scoops (all sizes); Pushcats; Endloaders (all types); Asphalt Surfacing Machine; Slip Form Paver; Rock Crusher; Operation of Material Crusher, Screening Plants, and Tunnel Boring Machine; Heavy Equipment Greaser (top greaser on spread); CMI, Auto Grade, CMI Belt Placer & 3 Track and Similar Types; Side Booms; Asphalt Heater & Planer Combination (used to plane streets); Wheel Tractors (with Dozer, Hoe or Endloader Attachments); CAT Earthwork Compactors and Similar Types; Blaw Knox Spreader and Similar Types; Trench Machines; Pump Crete - Belt Crete -Squeeze Crete - Screw Type Pumps and Gypsum (operator will clean); Creter Crane; Operation of Concrete Pump Truck; Formless Finishing Machines; Flaherty Spreader or Similar Types; Screed Man on Laydown Machine; Vermeer Concrete Saw; Operation of Laser Screed; Span Saw; Dredge Leverman; Dredge Engineer; Lull or Similar Type; Hydro-Boom Truck; Operation of Guard Rail Machine; and Starting Engineer on Pipeline or Construction (11 or more pieces) including: Air Compressor (Trailer Mounted), All Forced Air Heaters (regardless of Size), Water Pumps (Greater than 4-1/2" or Total Discharge Over 4-1/2"), Light Plants, Generators (Trailer Mounted - Excluding Decontamination Trailer), Welding Machines (Any Size or Mode of Power), Conveyor, Mixer (any size), Stud Welder, Power Pac, etc, and Ground Heater (Trailer Mounted).

CLASS 2. Bulker & Pump; Power Launches; Boring Machine & Pipe Jacking Machine; Dinkeys; Operation of Carts, Powered Haul Unit for a Boring Machine; P & H One Pass Soil Cement Machines and Similar Types; Wheel Tractors (Industry or Farm Type - Other); Back Fillers; Euclid Loader; Fork Lifts; Jeep w/Ditching Machine or Other Attachments; Tunneluger; Automatic Cement & Gravel Batching Plants; Mobile Drills - Soil Testing and Similar Types; Pugmill with Pump; All (1) and (2) Drum Hoists; Dewatering System; Straw Blower; Hydro-Seeder; Bump Grinders (self-propelled); Assistant Heavy Equipment Greaser; Apsco Spreader; Tractors (Track-Type) without Power Units Pulling Rollers; Rollers on Asphalt - Brick or Macadam; Concrete Breakers; Concrete Spreaders; Cement Strippers; Cement Finishing Machines & CMI Texture & Reel Curing Machines; Vibro-Tampers (All Similar Types Self-Propelled); Mechanical Bull Floats; Self-Propelled Concrete Saws; Truck Mounted Power Saws; Operation of Curb Cutters; Mixers - Over Three (3) Bags; Winch and Boom Trucks; Tractor Pulling Power Blade or Elevating Grader; Porter Rex Rail; Clary Screed; Mule Pulling Rollers; Pugmill without Pump; Barber Greene or Similar Loaders; Tract Type Tractor w/Power Unit attached (minimum); Fireman; Spray Machine on Paving; Curb Machines; Paved Ditch Machine; Power Broom; Self-Propelled Sweepers; Self-Propelled Conveyors; Power Subgrader; Oil Distributor; Straight Tractor; Truck Crane Oiler; Truck Type Oilers; Directional Boring Machine; Horizontal Directional Drill; Articulating End Dump Vehicles; Starting Engineer on Pipeline or Construction (6 -10 pieces) including: Air Compressor (Trailer Mounted), All Forced Air Heaters (regardless of Size), Water Pumps (Greater than 4-1/2" or Total Discharge Over 4-1/2"), Light Plants, Generators (Trailer Mounted - Excluding Decontamination Trailer), Welding Machines (Any Size or Mode of Power), Conveyor, Mixer (any size), Stud Welder, Power Pac, etc., and Ground Heater (Trailer Mounted).

CLASS 3. Straight Framed Truck Mounted Vac Unit (separately powered); Trac Air Machine (without attachments); Rollers - Five Ton and Under on Earth and Gravel; Form Graders; Bulk Cement Plant; Oilers; and Starting Engineer on Pipeline or Construction (3 - 5 pieces) including: Air Compressor (Trailer Mounted), All Forced Air Heaters (regardless of Size), Water Pumps (Greater than 4-1/2" or Total Discharge Over 4-1/2"), Light Plants, Generators (Trailer Mounted - Excluding Decontamination Trailer), Welding Machines (Any Size or Mode of Power), Conveyor, Mixer (any size), Stud Welder, Power Pac, etc., and Ground Heater (Trailer Mounted).

Other Classifications of Work:

For definitions of classifications not otherwise set out, the Department generally has on file such definitions which are available. If a task to be performed is not subject to one of the classifications of pay set out, the Department will upon being contacted state which neighboring county has such a classification and provide such rate, such rate being deemed to exist by reference in this document. If no neighboring county rate applies to the task, the Department shall undertake a special determination, such special determination being then deemed to have existed under this determination. If a project requires these, or any classification not listed, please contact IDOL at 217-782-1710 for wage rates or clarifications.

LANDSCAPING

Landscaping work falls under the existing classifications for laborer, operating engineer and truck driver. The work performed by landscape plantsman and landscape laborer is covered by the existing classification of laborer. The work performed by landscape operators (regardless of equipment used or its size) is covered by the classifications of operating engineer. The work performed by landscape truck drivers (regardless of size of truck driven) is covered by the classifications of truck driver.

SAMPLE ADDENDUM

Peoria Park District Planning, Design and Construction Department 1314 N. Park Road Peoria, IL 61604 Telephone: (309) 686-3386 ADDENDUM NO.

PROJECT TITLE:

ISSUANCE DATE:

LOCATION:

The proposed Contract Documents for this Work are modified as follows:

- I. **<u>DRAWINGS</u>**: (Delete/Change/Modify/Etc.)
- II. <u>**PROJECT MANUAL/SPECIFICATIONS/GENERAL CONDITIONS/ETC**</u>.: (Delete/Change/Modify/Etc.)
- III. **INVITATION TO BID**: (Delete/Change/Modify/Etc.)

END OF ADDENDUM NO.

(Addendum may be bound into Project Manual, attached to front cover, faxed, mailed or delivered to bidders.)

Addendum No. _____ Page 1 of 1

LAKEVIEW RECREATION CENTER RENOVATION - Project Manual



Pleasure Driveway and Park District of Peoria, Illinois Sample Agreement Between Owner and Contractor

This AGREEMENT for	LAKEVIEW RECREATION CENTER RENOVATION LAKEVIEW PARK
is made as of the day of	of in the year of Two Thousand Seventeen (2017)
Between the Owner:	PLEASURE DRIVEWAY AND PARK DISTRICT OF PEORIA, ILLINOIS 1125 W. LAKE AVENUE PEORIA, IL 61614
And the Contractor:	
The Owner's Representativ	PLANNING, DESIGN AND CONSTRUCTION DEPARTMENT 1314 N. PARK ROAD PEORIA, IL 61604
The Architect or Engineer	is:

The Owner and Contractor agree as follows:

I. THE CONTRACT DOCUMENTS. The Contract Documents consist of this AGREEMENT, the Plans/Drawings for the Project dated September 12, 2017, all sections of the Project Manual dated September 12, 2017, including but not limited to the Instructions and Supplementary Instructions to Bidders, the Bid Form, the General Conditions (1997 AIA Document A201) and Supplementary General Conditions, the General Requirements, the Specifications, and other documents as enumerated in Section 10 and Attachment #1 of this AGREEMENT, and including addenda issued prior to the execution of this AGREEMENT. The Contract Documents form the CONTRACT between the Owner and the Contractor. The CONTRACT represents the entire and integrated contract for the construction of the Work of the Project between the parties hereto and supersedes prior proposals, contracts, negotiations, or representations, either written or oral.

II. THE WORK OF THE CONTRACT. The Contractor shall execute the entire Work described in the Contract Documents, unless modified in Section XI of this AGREEMENT.

III. BASIS OF PAYMENT. The Work of the CONTRACT shall be performed on a Lump Sum basis.

(and incorporates the acceptance of bid alternates as defined in sub-paragraph "A", below) for the Contractor's performance of the Work required by the Contract Documents, subject to modifications made by Owner approved Change Orders. If this CONTRACT calls for a unit price basis of payment, the contract sum stated above shall be adjusted by Change Order based upon multiplying the unit prices submitted by the Contractor on the Bid Form (and included herein as an Attachment to this CONTRACT) times (x) the actual quantities installed.

A. ACCEPTANCE OF ALTERNATES.	The contract sum stated above is based on the acceptance of the following
alternates, which are described in the Project	et Manual:

ITEM	ADD	<u>DEDUCT</u>

V. DATES OF COMMENCEMENT AND COMPLETION OF THE WORK. The Owner's Representative will issue a written Notice to Proceed with the Work of the Project after receiving the required Performance Bond, Labor and Material Payment Bond, and Certificate of Insurance (in proper form and providing the required coverages and amounts from a company [or companies] acceptable to the Owner, and naming the Owner as an Additional Insured), and any other pre-construction submittals required by the Contract Documents. The Contractor hereby acknowledges and agrees that failure to provide such submittals in a timely manner shall not be cause to adjust the date(s) for completion of the Work.

- A. LIQUIDATED DAMAGES. Owner and Contractor recognize that time is of the essence of this CONTRACT and that Owner will suffer financial loss if the Contractor has not achieved Substantial Completion and Final Completion of the Work within the time specified below, plus any extensions thereof allowed in accordance with Article 8 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time.
- **B. SUBSTANTIAL COMPLETION.** Accordingly, instead of requiring any such proof, Owner and Contractor agree that as Liquidated Damages for delay (but not as a penalty), Contractor shall pay Owner TWO HUNDRED FIFTY dollars (\$250.00) for each calendar day that expires after THREE HUNDRED FORTY (340) calendar days from Notice of Award until Substantial Completion is attained. The work is tentatively scheduled to begin on OCTOBER 26, 2017 and be at Substantial Completion by OCTOBER 1, 2018.
- **C. FINAL COMPLETION.** After Substantial Completion if Contractor shall neglect, refuse, or fail to complete the remaining Work necessary to achieve Final Completion within THIRTY (30) calendar days or any proper extension thereof granted by Owner, Contractor shall pay Owner TWO HUNDRED FIFTY dollars (\$250.00) for each day that expires after the time specified.

VI. PROGRESS PAYMENTS, REDUCTION OF RETAINAGE AND FINAL PAYMENT.

A. Unless otherwise specified elsewhere in the Contract Documents, the Contractor may submit monthly applications for progress payments ("Application for Payment") to the Owner's Representative. Each Application for Payment must be certified by the Architect or Engineer (if applicable), or the Owner's Representative if an Architect or Engineer has not been engaged for construction phase services. An Application for Payment shall be for a period of no less than one calendar month ending on the last day of the month, unless otherwise approved in writing by the Owner's Representative. Application for Payment shall be subject to Owner's approval. Each Application for Payment shall be based upon the Schedule of Values submitted by the Contractor, in accordance with the Contract Documents. The Schedule of Values shall be approved by the Owner's Representative and the Architect or Engineer (if applicable) in advance of the Contractor's first Application for Payment and the approved schedule shall be used by the Contractor as the basis for submitting payment requests. The Owner's Representative and/or

LAKEVIEW RECREATION CENTER RENOVATION - Project Manual

Architect/Engineer's (if applicable) approval of the Schedule of Values shall not constitute a complete check for accuracy, and shall not relieve the Contractor from responsibility for errors of any sort.

- **B.** An Application for Payment (certified by the Architect or Engineer, if applicable) shall be submitted to the Owner's Representative no later than the fifth (5th) day of the month following the period for which the application is being submitted. In such case, the Owner shall make the progress payment to the Contractor not later than the twentieth day of the next month. A progress payment request on an Application for Payment (certified by the Architect or Engineer, if applicable) received by the Owner's Representative after the fifth (5th) day of a month shall be made by the Owner not later than forty-five days after receipt by the Owner's Representative.
- C. Based upon its review of the certified (by the Architect or Engineer, if applicable) Application for Payment, the Owner shall make a progress payment to the Contractor in such amount as the Owner reasonably determines is properly due, subject to a retainage of ten percent (10%) of the value of the Work completed and covered by the Application for Payment, less the aggregate of previous payments in each case. In determining the amount properly due, the Owner shall consider the value of labor, materials and equipment incorporated in the Work, or properly allocable to materials and equipment suitably stored at the site or at some other location previously agreed upon in writing by the parties. The Owner's Representative shall have the sole right to determine that materials or equipment stored off-site have been properly delivered, protected, and/or secured. The Owner's Representative (or the Architect or Engineer, if applicable) may nullify or withhold a Certificate of Payment, in whole or in part, for the reasons set forth in Section 9.5 of the General Conditions. Upon Substantial Completion of the Work, the Owner shall pay the Contractor a sum sufficient to increase the total payments to ninety-five percent (95%) of the Contract Sum, less such amounts as the Owner's Representative shall determine for incomplete work and unsettled claims.

VII. Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner when **1**) the Contract has been fully performed by the Contractor except for the Contractor's responsibility to correct nonconforming Work as provided in Subparagraph 12.2.2 of the General Conditions and to satisfy other requirements, if any, which necessarily survive final payment; and **2**) a final Certificate of Payment has been issued by the Architect/Engineer or Owner's Representative; such final payment shall be made by the Owner not more than forty-five (45) days after the receipt of the final Certificate of Payment by the Owner.

VIII. CHANGE ORDERS. The Owner and Contractor agree that changes in the Work are sometimes required and necessary, and that timely: **a**) submission of proposed changes in the Work or the scope of Work by the Owner, **b**) pricing by the Contractor, **c**) review by the Owner's Representative and/or Architect/Engineer, and **d**) final approval by the Owner are necessary in order to assure that the Work of the Project is completed on schedule. <u>The Contractor hereby acknowledges and agrees that an increase in the scope of the Work does not grant or imply an increase in the Contract Time, unless specifically so stated on the final approved Change Order. The Contractor also agrees that any and all Work which deviates from the plans and specifications and/or results in additional Work performed by Contractor's forces, including those of his sub-contractor's, will not result in additional expense to the Owner, unless **finally approved both by the Owner and the Architect/Engineer (if applicable) prior to the additional Work being performed.** No claim for an addition to the Contract Sum shall be valid unless approved by a written Change Order signed by the Owner and the architect/engineer (if applicable) **prior to the additional Work being performed.**</u>

IX. TERMINATION OR SUSPENSION. The CONTRACT may be terminated by the Owner or the Contractor as provided by Article 14 of the General Conditions. The Work may be suspended by the Owner as provided in Article 14 of the General Conditions.

X. ENUMERATION OF CONTRACT DOCUMENTS. The Contract Documents, except for modifications issued after the execution of this Agreement, consist of:

- A. this Standard Form of Agreement Between Owner and Contractor, of the Pleasure Driveway and Park District of Peoria, Illinois.
- **B.** the Plans or Drawings titled "LAKEVIEW GYMNASIUM RENOVATION, dated SEPTEMBER 12, 2017, and enumerated in ATTACHMENT #1 "LIST OF DRAWINGS".
- C. Supplementary and other Conditions of the CONTRACT, and the Specifications, are those found in the Project Manual titled "LAKEVIEW RECREATION CENTER RENOVATION", and dated SEPTEMBER 12, 2017 enumerated as follows:
 - 1) Supplementary Instructions to Bidders
 - 2) Contractor's Proposal, as accepted by the Owner
 - 3) General Conditions of the Contract for Construction, AIA Document A201, 1997 Edition
 - 4) Supplementary General Conditions
 - 5) Major Subcontractor List
 - 6) Directory of Minority & Women Owned Business Enterprises
 - 7) Illinois Drug Free Workplace Certification
 - 8) Contractor Certification (Individual or Corporate/Partnership)
 - 9) Peoria Park District Certificate of Equal Employment Opportunity Compliance for Contractors and Vendors
 - **10)** Workforce Profile
 - 11) Performance Bond
 - 12) Labor and Material Payment Bond
 - 13) Proof of Insurance
 - 14) Specifications: Division 010000, "General Requirements"; Divisions 020000-350000 as applicable
 - **15**) Attachment A.6 Insurance Requirements
 - 16) Certificate of Safety Compliance
 - 17) Peoria Park District Weekly Workforce Report
 - **18**) Certified Payroll Form
 - 19) Substance Abuse Prevention Program Certification
 - **20)** Standard Certifications

XI. MISCELLANEOUS PROVISIONS. Other Provisions of this Agreement are as follows:

This AGREEMENT is entered into as of the day and year first written above and is executed in at least three original copies of which one is to be delivered to the Contractor, one to the Architect/Engineer (if any) for use in the administration of the CONTRACT, and one to the Owner.

OWNER:

CONTRACTOR :

(Signature)

(Signature)

TIMOTHY J. CASSIDY, Park Board President

(Printed Name and Title)

ATTEST:

ATTEST:

ATTACHMENT #1 - LIST OF DRAWINGS

Number	Title
G001	TITI E CHEET
0001 -	TITLE SHEET
C100-	EXISTING/DEMOLITION SITE PLAN
C200-	SITE GRADING AND STORM WATER POLLUTION PREVENTION PLAN
S001 -	STRUCTURAL GENERAL NOTES
S101-	FOUNDATION PLAN
S201 -	FRAMING PLAN
S301 - S302-	STRUCTURAL DETAILS
5502-	SIRVETURAL DETAILS
A001-	SCHEDULES AND DETAILS
A100-	EXISTING/DEMOLITION MAIN FLOOR PLAN- WEST
A101 -	EXISTING/DEMOLITION MAIN FLOOR PLAN- EAST
A102-	EXISTING/DEMOLITION MEZZANINE FLOOR PLAN
A103-	REVISED MAIN FLOOR PLAN - EAST REVISED MEZZANINE ELOOR PLAN
A106-	EXISTING/DEMOLITION ROOF PLAN
A106-	REVISED ROOF PLAN
A200-	DEMOLITION/REVISED ELEVATIONS
A201-	REVISED ELEVATIONS
A202-	REVISED ELEVATIONS
A300-	REVISED GYMNASIUM BUILDING SECTIONS
A400-	EXISTING/DEMOLITION MAIN FLOOK REFLECTED CEILING PLAN
A402-	REVISED MAIN FLOOR REFLECTED CEILING PLAN
A403-	REVISED MEZZANINE LEVEL REFLECTED CEILING PLAN
A500-	WALL SECTIONS
A501 -	WALL SECTIONS AND DETAILS
A5()2-	SECTIONS AND DETAILS
A503-	SECTIONS AND DETAILS
A504- A600-	SECTIONS AND DETAILS INTERIOR SECTIONS AND DETAILS
A000-	INTERIOR SECTIONS AND DETAILS
FP100-	EXISTING/DEMOLITION MAIN FLOOR FIRE PROTECTION PLAN
FP101 -	EXISTING/DEMOLITION MEZZANINE FIRE PROTECTION PLAN
FP102-	REVISED MAIN FLOOR FIRE PROTECTION PLAN
FP103-	REVISED UPPER LEVEL FIRE PROTECTION PLAN
P100- P101 -	EXISTING/DEMOLITION MAIN FLOOR PLUMBING PLAN REVISED MAIN ELOOP PLUMBING PLAN
P200-	PLUMBING DETAILS
H100-	EXISTING/DEMOLITION MAIN FLOOR HVAC PLAN
H101 -	REVISED MAIN FLOOR HVAC PLAN
H102-	REVISED MEZZANINE HVAC PLAN
H200 -	REVISED SECTIONS
H201 - M100	DETAILS EXISTING/DEMOLITION BOOF DLAN
W1100 -	EAISTINO/DEMOLITION ROOF FLAN
E001 -	SITE PLAN -ELECTRICAL
E100-	ELECTRICAL DEMOLITION- MAIN FLOOR PLAN -WEST
E101 -	ELECTRICAL DEMOLITION- MAIN FLOOR PLAN -EAST
E102 -	ELECTRICAL DEMOLITION- MEZZANINE FLOOR PLAN
EIII -	REVISED MAIN FLOOR LIGHTING PLAN -EAST
E112 - E121	REVISED MELLANINE LIGHTING PLAN DEVISED MAIN ELOOP DOWED DLAN EAST
E122-	REVISED MEZZANINE AND ROOF POWER PLAN
E131 -	REVISED MAIN FLOOR SYSTEMS PLAN - EAST
E132 -	REVISED MEZZANINE SYSTEMS PLAN
E200-	PARTIAL RISER DIAGRAM AND EQUIPMENT CONNECTION SCHEDULE
E201 -	EXISTING ELECTRICAL PANEL SCHEDULES
E202 -	REVISED ELECTRICAL PANEL SCHEDULES
E300- E201	FIKE ALAKM AND TELECOMM. DETAILS
E301 - E400 -	ELECTIVITYI, DETAILS AND SPECIFICATIONS FLECTRICAL DETAILS

E500- ELECTRICAL MATERIAL AND LUMINAIRE SCHEDULES, NOTES

PERFORMANCE BOND

TO: PLEASURE DRIVEWAY AND PARK DISTRICT OF PEORIA PEORIA, ILLINOIS

KNOW ALL MEN BY THEIR PRESENTS;

That	
as Principal, and	
	as
corporation of the State of	, as Surety, are held and firmly bound unto the
PLEASURE DRIVEWAY AND PARK DISTRICT OF	PEORIA, PEORIA, ILLINOIS, as Obligee, in the amount of
(\$), for the payment whereof Pr	incipal and Surety bind themselves, their heirs, executors, administrators,
successors and assigns, jointly and severally, firmly by th	iese presents.

WHEREAS, Principal has by written agreement dated ______, 20 _____ entered into a contract with Obligee for ______

in accordance with contract documents prepared by the Architect-Engineer, which Contract is by reference made a part hereof and is hereinafter referred to as "the Contract".

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if Principal shall promptly and faithfully perform the Contract and all changes thereof, and during the life of any guaranty or warranty required under the Contract, and, if Principal shall fully secure and protect the Obligee from all liability and from all loss or expense of any kind, including all court costs, engineering fees and attorneys' fees made necessary or arising from the failure, refusal or neglect of Principal to comply with all obligations assumed by Principal in connection with the performance of the Contract and all changes thereof, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

Surety hereby waives notice of any changes in the Contract, including extensions of time for the performance thereof. Whenever Principal shall be and is declared to be in default under the Contract, Obligee having performed Obligee's obligations thereunder, Surety shall, after notice of such default, reserve all rights against all parties, take over and complete the Contract and become entitled to payment of the balance of any monies due or to become due to such defined Principal in accordance with the progress of the work.

A condition of this Bond is that the Principal shall faithfully perform in accordance with the prevailing wage clause provided in the bid specification or Contract pursuant to Illinois Compiled Statutes 820 ILCS 130/1 *et. seq.*

No right of action shall accrue on this Bond to or for the use of any person or corporation other than the Obligee named herein.

Signed and Sealed this	day of	, 20
0		//

CONTRACTOR

SURETY

Contractor Firm Name

By: _____

Signature

Title

Surety Name

By:_____ Attorney-in-Fact

Resident Agent

ATTEST:

Corporate Secretary (Corporations only)

LABOR & MATERIAL PAYMENT BOND

TO: PLEASURE DRIVEWAY AND PARK DISTRICT OF PEORIA PEORIA, ILLINOIS

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS, Principal has by written agreement dated _	, 20	, entered into a Contract
with Obligee for		

in accordance with contract documents prepared by the Architect-Engineer which Contract is by reference made a part hereof, and is hereinafter referred to as "the Contract".

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if Principal shall promptly pay for all laborers, workers and mechanics engaged in the work under the Contract, and not less than the general prevailing rate of hourly wages of a similar character in the locality in which the work is performed, as determined by the State of Illinois Department of Labor pursuant to the Illinois Compiled Statutes 820 ILCS 130/1 et. seq. and for all material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect.

1. A claimant is defined as any person, firm, or corporation having contracts with the Principal or with any of Principal's subcontractors for labor or materials furnished in the performance of the Contract on account of which this Bond is given.

2. Nothing in this Bond contained shall be taken to make the Obligee liable to any subcontractor, materialman or laborer, or to any other person to any greater extent than it would have been liable prior to the enactment of The Public Construction Bond Act, approved June 20, 1931, as amended; provided further, that any person having a claim for labor and materials furnished in the performance of the Contract shall have no right of action unless he shall have filed a verified notice of such claim with the Obligee within 180 days after the date of the last item of work or the furnishing of the last item of materials, which claim shall have been verified and shall contain the name and address of the claimant, the business address of the claimant within the State of Illinois, if any, or if the claimant be a foreign corporation having no place of business within the State the principal place of business of the corporation, and in all cases of partnership the names and residences of each of the partners, the name of the Contractor for the Obligee, the name of the person, firm or corporation by whom the claimant was employed or to whom such claimant furnished materials, the amount of the claim and a brief description of the public improvement for the claimant of its right of action under the terms and provisions of this Bond unless it shall affirmatively appear that such defect has prejudiced the rights of an interested party asserting the same.

3. No action shall be brought on this Bond until the expiration of 120 days after the date of the last item of work or of the furnishing of the last item of material except in cases where the final settlement between the Obligee and the Contractor shall have been made prior to the expiration of the 120 day period, in which case action may be taken immediately following such final settlement; nor shall any action of any kind be brought later than 6 months after the acceptance by the Obligee of the work. Such suit shall be brought only in the circuit court of this State in the judicial district in which the Contract is to be performed.

4. Surety hereby waives notice of any changes in the Contract, including extensions of time for the performance thereof.

5. The amount of this Bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder.

6. The Principal and Surety shall be liable for any attorneys fees, engineering costs, or court costs incurred by the Obligee relative to claims made against this Bond.

Signed and Sealed this	day of	, 20
<u>CONTRACTOR</u>		<u>SURETY</u>
Contractor Firm Name:		
By:Signature		By: Attorney-in-Fact
Title		Resident Agent
ATTEST:		

Corporate Secretary (Corporations only)

CONTRACTOR'S AFFIDAVIT

STATE OF ILLINOIS)) SS COUNTY OF PEORIA)

TO WHOM IT MAY CONCERN:

Of the	
who is the contractor for the	
building located at	
owned by	

That the total amount of the contract including extras is \$________ on which he has received payment of \$_______ prior to this payment. That all waivers are true, correct and genuine and delivered unconditionally and that there is no claim either legal or equitable to defeat the validity of said waivers. That the following are the names of all parties who have furnished material or labor, or both, for said work and all parties having contracts or sub-contracts for specific portions of said work or for material entering into the construction thereof and the amount due or to become due to each, and that the items mentioned include all labor and material required to complete said work according to plans and specifications:

NAMES	WHAT FOR	CONTRACT PRICE	AMOUNT PAID	THIS PMT.	BALANCE DUE

TOTAL ALL LABOR AND MATERIAL TO COMPLETE

There are no other contracts for said work outstanding, and that there is nothing due or to become due to any person for material, labor or other work of any kind done or to be done upon or in connection with said work other than above stated.

Signed this	day of	. 20
Digneta uno	Gu i i i	
0		/

Signature: _____

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

Notary Public

FINAL WAIVER OF LIEN

STATE OF ILLINOIS)) SS COUNTY OF PEORIA)

TO WHOM IT MAY CONCERN:

(Name of sole owner, corporation or partnership)

ATTEST:

(Signature of secretary of corporation)

(Signature of sole owner or authorized representative of corporation or partnership)

(SEAL)

WAIVER OF LIEN

GENERAL CONTRACTOR'S PARTIAL TO COVER ONLY CERTAIN PAYMENTS

STATE OF ILLINOIS)) SS

COUNTY OF PEORIA)

TO ALL WHOM IT MAY CONCERN: WHEREAS, the undersigned has been employed by THE PEORIA PARK DISTRICT to furnish material and labor for the at the premises commonly known as _____ located in the City of Peoria, County of Peoria, and State of Illinois. NOW, THEREFORE, the undersigned, for and in consideration of the sum of _____ Dollars, and other good and valuable considerations, the receipt whereof is hereby acknowledged by the undersigned, does hereby waive and release to the extent only of the aforesaid amount of _____ Dollars, paid simultaneously herewith, any and all lien or right or claim of lien under the statutes of the State of Illinois relating to mechanics' liens, with respect to and on said above-described premises, and the improvements thereon and on the money, funds, or other consideration due or to become due from the owner on account of labor, services, material, fixtures, apparatus or machinery, furnished by the undersigned, to or on account of the said owner, for the above-described premises, but only to the extent of the payment aforesaid. Dated this ______, 20 _____. [Affix corporate seal here] (Name of sole owner, corporation or partnership) ATTEST: (SEAL) (Signature of secretary of corporation) (Signature of sole owner or authorized representative of corporation or partnership)

SUB-CONTRACTOR'S FINAL WAIVER OF LIEN

STATE OF ILLINOIS)) SS COUNTY OF PEORIA)

TO WHOM IT MAY CONCERN:

WHEREAS, the undersigned	
-	(sub-contractor)
ha been employed by	
(general to furnish material and labor for the	contractor) at the
premises commonly known as	, in the City of,
County of Peoria, State of Illinois.	
The undersigned, for and in consideration	of
the receipt whereof is hereby acknowledged, do the statutes of the State of Illinois relating to Mecha the money, funds or other considerations due or bec apparatus or machinery heretofore furnished or whice described premises.	_ (\$) Dollars, and other good and valuable considerations, hereby waive and release any and all lien or claim or right of lien under nics Liens, on the above described premises and improvements thereon and on ome due from the owner on account of labor or services, material, fixtures, ch may be furnished at any time hereafter by the undersigned for the above
Dated this day of	
[Affix corporate seal here.]	
ATTEST:	-
(Name of sole owner, corporation or partnership)	
(Signature of sole owner or authorized representative of corporation of partnership)	(SEAL) (Signature of secretary of corporation)

WAIVER OF LIEN

SUB-CONTRACTOR'S PARTIAL TO COVER ONLY CERTAIN PAYMENTS

STATE OF ILLINOIS	00				
) COUNTY OF PEORIA)	55				
TO WHOM IT MAY CONCE	ERN:				
THE undersigned,					
has been employed by	(sub-contract	tor)			
(general contractor) to furnish material and labor for the					
at the premises commonly know	own as				
located in the City of Peoria, 0	County of Peoria, and State of	Illinois.			
NOW, THEREFORE	E, the undersigned, for and in a	consideration of the sum of Dollars, and other good and valuable considerations, the receipt			
whereof is hereby acknowledge	ged by the undersigned, does h	hereby waive and release to the extent only			
of the aforesaid amount of	and all lien or right or claim o	Dollars, paid			
liens, with respect to and on sa	aid above-described premises,	and the improvements thereon and on the money, funds, or other			
consideration due or to becom	e due from the owner on acco	bunt of labor, services, material, fixtures, apparatus or machinery,			
furnished by the undersigned,	but only to the extent of the p	ayment aroresard.			
Dated this	day of	, 20			
[Affix corporate seal here.]					
		(Name of sole owner, corporation or partnership)			
ATTEST:					
		(SEAL)			
(Signature of secretary of corp	poration)	(Signature of sole owner or authorized representative of corporation or partnership)			

PEORIA PARK DISTRICT Weekly Workforce Report Instructions

This weekly workforce report must be completed and returned to the Peoria Park District project manager for each week that you are working on Peoria Park District property. You are to report only those employees that are actually working on the Peoria Park District project identified on this report. Do <u>not</u> report employees that are <u>not</u> working on the project identified on this report.

If you have further questions regarding this report, please contact the Owner's Project Manager.

- I. Trade and Hour Breakdown Table
 - List the different trades (carpenter, laborer, plumber, etc.) and report the number of hours by race/gender for each trade;
 - Total the hours for each trade on the right.
- II. New Hires by Race and Gender
 - If additional employees are hired for the job, please record the number of employees hired by race/gender.
- III. Total Project Employee Breakdown
 - Please track total hours by race/gender for the project if project lasts longer than a week.

Weekly Workforce Report (Peoria Park District Form) Date:_____ Week Ending: _____

Contractor/Subcontractor:______ Project: ______

Trade & Hour Breakdown:

TRADE	FEMALE HOURS	CAUCASIAN HOURS	AFRICAN- AMERICAN HOURS	HISPANIC HOURS	NATIVE AMERICAN HOURS	ASIAN, PAC. ISLANDER HOURS	TOTAL HOURS

New Hires by Race & Gender

TRADE	CAUCASIAN	AFRICAN- AMERICAN	HISPANIC	NATIVE AMERICAN	ASIAN, PACIFIC ISLANDER	MALE	FEMALE

Total Project Employee Breakdown

CAUCASIAN	AFRICAN- AMERICAN	HISPANIC	NATIVE AMERICAN	ASIAN, PACIFIC ISLANDER	MALE	FEMALE

LAKEVIEW RECREATION CENTER RENOVATION - Project Manual



Certified Transcript of Payroll

IDOL Case File Number:	Payroll Start:			Payroll End:										
	Contractor and/or Subcontractor				Public Body Information									
	(Company Name)			(Contact Name)			(Public Body Name)			((Contact Name)			
(Contract Number)(Project Number)			(Street Add	dress)	(City)			(Street Address)				(City	/)	
(Project Location)	(State)	(Zipo	code) –		(Telephone Number)		(State)	(Zipcode)		(Telephone	Number)			
	Repo	rt Hours	for Eac	h Day, In	cluding	Overtime	e Hours,	List Hour	ly Prevailing W	√age Rate a	and Hourly F	Fringe Ben	efits Allotr	nents.
Worker Name, Address Last Four of SSN & Telephone Number		SUN	* I MON	Hours work TUE	ed each d WED	lay THR	FRI	SAT	Total Straight Time Hours	Total OT Hours	Hourly Wage Rate	OT Wage Rate	Per Pay Gross	Period Net
	PW N													
Labor Classification	Ho	urly Fring	e Benefit:	Pensior	n:		Health/	Welfare:		Vacation:		Training	g:	
	PW N													
Labor Classification	Ho	urly Fring	e Benefit:	Pensior	n:		Health/	Welfare:		Vacation:		Training	g:	
	PW													
Labor Classification	Но	urly Fring	e Benefit:	Pensior	n:		Health/	Welfare:		Vacation:		Training	g:	

Please place an "F" by the hourly rate for fringe benefits paid to a Fund jointly managed by one or more labor organizations or employers in accordance with the federal Labor Management Relations Act (See instruction 4 for completing this form). In addition contractors/subcontractors who do not make contributions for covered fringe benefits to a fringe benefit fund that is jointly managed and jointly governed by one or more labor organizations or employers in accordance with the federal Labor Management Relations Act must provide the additional information set forth on the form on page 2 (see Instruction 5). Contractors/subcontractors who do not make contributions for fringe benefits on a per hour basis for each hour worked must convert such contributions to an annualized per hour basis for purpose of reporting on this form in accordance with instruction 5. You must keep original records showing start and end time each day.

*PW - Prevailing Hours Worked *N - Non Prevailing Hours Worked

Certified Transcript of Payroll



AFFIDAVIT	FRINGES	SUBCONTRACTORS
Weekly Statement of Compliance Date: , , , , (name signatory party) , do (Title) hereby state: that I pay or supervise the payment of the persons employed on the public works project ;	Health Fund Health Address Health Sponsor Health Admin Pension Fund Pension Address Pension Sponsor	Attach explanation of Monies paid, copy of contract of billing, or other pertinent information. Company Name: Contact Person: (Address) (City) (State) Telephone Number:
(name of project) that during the payroll period commencing on the day of,,,,,,,,, all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said	Pension Admin	Company Name: Contact Person: (Address) (City) (State) Telephone Number:
(name of contractor or subcontractor) from the full weekly wages earned by any person, and that no deductions have been made either directly or indirectly from the full weekly wages earned by any persons, other than permissible deductions as defined by Federal and/or State Law. I further certify that this payroll is correct and complete; that the wage rates contained therein are not less than the actual rates herein stated and that the classification set forth for each laborers or mechanic conform to the work he/she performed.	Vacation Fund Vacation Address Vacation Sponsor Vacation Admin	Company Name:
Signature Digital Signature		(Address) (City) Telephone Number:

ge 2.	2 Business name/disregarded entity name, if different from above			
pe ons on pa	Check appropriate box for federal tax classification; check only one of the following seven boxes: Individual/sole proprietor or C Corporation S Corporation Partnership single-member LLC	4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):		
Print or ty Instruction	 Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnersh Note. For a single-member LLC that is disregarded, do not check LLC; check the appropriate box in t the tax classification of the single-member owner. Other (see instructions) 	ip) ► he line above for	Exemption from FATCA reporting code (if any) (Applies to accounts maintained outside the U.S.)	
F pecific	5 Address (number, street, and apt. or suite no.)	Requester's name a	ind address (optional)	
See S	6 City, state, and ZIP code			
	7 List account number(s) here (optional)			
Par	t I Taxpayer Identification Number (TIN)			
Enter	your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoi	d Social sec	urity number	
backu reside entitie	p withholding. For individuals, this is generally your social security number (SSN). However, for ant alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other is, it is your employer identification number (EIN). If you do not have a number, see <i>How to get</i> i			
TIN or	n page 3.	or		
Note.	If the account is in more than one name, see the instructions for line 1 and the chart on page 4	for Employer	identification number	
guidel	ines on whose number to enter.		-	

Part II Certification

Under penalties of perjury, I certify that:

- 1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
- I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
- 3. I am a U.S. citizen or other U.S. person (defined below); and

4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

Sign	Signature of
Here	U.S. person ►

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. Information about developments affecting Form W-9 (such as legislation enacted after we release it) is at *www.irs.gov/fw*9.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following:

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)

Date 🕨

- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- · Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding? on page 2.

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),

2. Certify that you are not subject to backup withholding, or

3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and

4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting?* on page 2 for further information.

Note. If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

• An individual who is a U.S. citizen or U.S. resident alien;

• A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;

• An estate (other than a foreign estate); or

• A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership to enducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States:

• In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;

• In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and

• In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.

2. The treaty article addressing the income.

3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.

4. The type and amount of income that qualifies for the exemption from tax.

5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,

2. You do not certify your TIN when required (see the Part II instructions on page 3 for details),

3. The IRS tells the requester that you furnished an incorrect TIN,

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt* payee code on page 3 and the separate Instructions for the Requester of Form W-9 for more information.

Also see Special rules for partnerships above.

What is FATCA reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code* on page 3 and the Instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of \$50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a \$500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account, list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

Note. ITIN applicant: Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or "doing business as" (DBA) name on line 2.

c. Partnership, LLC that is not a single-member LLC, C Corporation, or S Corporation. Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulations section 301.7701-2(c)(2)(ii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, "Business name/disregarded entity complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

Line 3

Check the appropriate box in line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box in line 3.

Limited Liability Company (LLC). If the name on line 1 is an LLC treated as a partnership for U.S. federal tax purposes, check the "Limited Liability Company" box and enter "P" in the space provided. If the LLC has filed Form 8832 or 2553 to be taxed as a corporation, check the "Limited Liability Company" box and in the space provided enter "C" for C corporation or "S" for S corporation. If it is a single-member LLC that is a disregarded entity, do not check the "Limited Liability Company" box; instead check the first box in line 3 "Individual/sole proprietor or single-member LLC."

Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space in line 4 any code(s) that may apply to you.

Exempt payee code.

Generally, individuals (including sole proprietors) are not exempt from backup withholding.

• Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.

• Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.

 Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

1 - An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)

2-The United States or any of its agencies or instrumentalities

3-A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

 $4\!-\!\mathrm{A}$ foreign government or any of its political subdivisions, agencies, or instrumentalities

5-A corporation

6-A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession

 $7{-}\mathrm{A}$ futures commission merchant registered with the Commodity Futures Trading Commission

8-A real estate investment trust

 $9-\mathrm{An}$ entity registered at all times during the tax year under the Investment Company Act of 1940

10-A common trust fund operated by a bank under section 584(a)

11-A financial institution

 $12\mbox{--}A$ middleman known in the investment community as a nominee or custodian

13—A trust exempt from tax under section 664 or described in section 4947 The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for	THEN the payment is exempt for
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over \$600 required to be reported and direct sales over \$5,000 ¹	Generally, exempt payees 1 through 5 ²
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

¹ See Form 1099-MISC, Miscellaneous Income, and its instructions.

² However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B-The United States or any of its agencies or instrumentalities

C-A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D-A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E-A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F-A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G-A real estate investment trust

 $\rm H-A$ regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I-A common trust fund as defined in section 584(a)

J-A bank as defined in section 581

K-A broker

L-A trust exempt from tax under section 664 or described in section 4947(a)(1)

M-A tax exempt trust under a section 403(b) plan or section 457(g) plan

Note. You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited Liability Company (LLC)* on this page), enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at *www.ssa.gov*. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an TIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/businesses* and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting IRS.gov or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, or 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see Exempt payee code earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
 Individual Two or more individuals (joint account) 	The individual The actual owner of the account or, if combined funds, the first individual on the account ¹
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor ²
 4. a. The usual revocable savings trust (grantor is also trustee) b. So-called trust account that is not a legal or valid trust under state law 	The grantor-trustee' The actual owner'
5. Sole proprietorship or disregarded entity owned by an individual	The owner ³
6. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i) (A))	The grantor*
For this type of account:	Give name and EIN of:
 Disregarded entity not owned by an individual 	The owner
8. A valid trust, estate, or pension trust	Legal entity ⁴
9. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
10. Association, club, religious, charitable, educational, or other tax- exempt organization	The organization
11. Partnership or multi-member LLC	The partnership
12. A broker or registered nominee	The broker or nominee
13. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
 Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i) (B)) 	The trust

List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

Circle the minor's name and furnish the minor's SSN.

³ You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

⁴ List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see Special rules for partnerships on page 2. *Note. Grantor also must provide a Form W-9 to trustee of trust.

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- · Protect your SSN,
- Ensure your employer is protecting your SSN, and
- · Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039

For more information, see Publication 4535, Identity Theft Prevention and Victim Assistance

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to phishing@irs.gov. You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at: *spam@uce.gov* or contact them at *www.ftc.gov/idtheft* or 1-877-IDTHEFT (1-877-438-4338).

Visit IRS.gov to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

A complete copy of AIA Document A201, 1997 Edition, with Supplementary General Conditions incorporated, is available for review in the Peoria Park District's Planning, Design and Construction Office.

SUPPLEMENTARY GENERAL CONDITIONS

- 1. A. "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION", AIA Document A201, 1997 Edition, published by the American Institute of Architects, including revisions adopted before the date of the Project Manual, is hereby made part of these Specifications with same force and effect as though set forth in full.
 - **B.** The following modifies, changes, deletes from or adds to the General Conditions of the Contract for Construction (AIA Document A201, Fourteenth Edition, 1997). Where any Article of the General Conditions is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these Supplementary Conditions, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.
 - C. Parenthesis () indicates the appropriate section and Subparagraph of the General Conditions which each paragraph of the Supplementary General Conditions modifies or refers to.
- 2. INSERT THE FOLLOWING PHRASE TO PARAGRAPH (1.1.1) AFTER THE WORDS "The Contract Documents consist of the Agreement Between Owner and Contractor (hereinafter the Agreement)":

"the Contractor's Bid, the Advertisement for Bids, the Instructions to Bidders, sample forms and addenda relating to these,"

DELETE THE LAST SENTENCE OF PARAGRAPH (1.1.1).

3. ADD THE FOLLOWING SENTENCES TO END OF PARAGRAPH (<u>1.2.1</u>):

The Contractor shall notify the Owner's Representative immediately if discrepancies are discovered. Fullsize or large-scale details or drawings shall govern small-scale drawings that the former are intended to amplify. Dimensions from drawings shall not be determined by scale or rule. Where the Drawings and Specifications conflict with each other or with themselves, the Owner's Representative (in consultation with the Architect, if any) will decide which conflicting requirement governs. Should discrepancies or doubt occur, Contractor shall not proceed with the Work without clarification from the Owner. Contractor shall request clarification in a reasonable time to avoid delays and increases in the Contract Sum.

ADD THE FOLLOWING PARAGRAPHS TO SECTION (1.2):

- **1.2.4** If any item or material shown on the Drawings is omitted from the Specifications, or vice-versa (except when the Drawings and Specifications clearly exclude such omitted item), and when such item or material is clearly required to complete the detail shown or specified, the Contractor shall furnish and install such item or material of the type and quality established by the balance of the detail shown and specified at no increase to the Contract Sum.
- **1.2.5** Where a typical or representative detail is shown on the Drawings, this detail shall constitute the standard for workmanship and materials throughout those parts of the Work.

- **1.2.6** Any Summary of Work as outlined in the Specifications shall not be deemed to limit the work required by the Contract Documents. The Contractor and each Subcontractor shall be responsible for carefully examining all Drawings, including all details, plans, elevations, sections, schedules and diagrams for each particular type of work, and for coordinating the Work described in the Drawings, with the related Specifications. The Contractor shall also be responsible for determining the exact scope of work for each type of work per the Contract Documents and Contractor shall endeavor to check cross-references of work excluded from any division. The Contract Sum is deemed to be based on a complete installation. When additional details or instructions are clearly required to complete the work, the Contractor is deemed to have made an allowance in the Contract Sum for completion of such Work consistent with the local standard of care.
- **1.2.7** The Drawings are intended to show the arrangement, design and extent of the Work and are schematic in nature. They are not to be scaled for roughing-in measurements or used as shop drawings.

4. ADD THE FOLLOWING PARAGRAPH TO SECTION (<u>1.5</u>):

1.5.3 Neither any oral representation by or oral agreement with any officer, agent, or employee of Owner or Architect before execution of this Contract shall affect or modify any of the Contractor's rights or obligations hereunder. Contractor is not aware of any facts that make misleading or inaccurate in any material respect any information Owner or Architect has furnished to Contractor which would have a material adverse affect on the Contract Time or Contract Sum which Contractor has not advised Owner or Architect of, and if, during the course of the performance of the Work, Contractor learns of any such facts it will so advise Owner. Contractor shall not be entitled to any adjustments in the Contract Time or the Contract Sum as a consequence of Contractor's breach of the terms of this Subparagraph.

5. IN PARAGRAPH (<u>1.6.1</u>) DELETE THE WORD "Architect" IN THE FOURTH SENTENCE AND REPLACE IT WITH THE WORD "Owner".

DELETE SENTENCES #7, #8, #9 STARTING WITH "The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are"

6. DELETE PARAGRAPH (2.2.3) IN ITS ENTIRETY.

7. ADD THE FOLLOWING SENTENCE AT THE END OF PARAGRAPH (2.3.1):

"The Owner shall not be liable for any extra cost incurred by the Contractor by such an order."

8. IN PARAGRAPH (<u>2.4.1</u>) DELETE THE SECOND TO LAST SENTENCE.

9. IN PARAGRAPH (3.2.1, 3.2.2 AND 3.2.3) AFTER THE WORD "Architect" ADD THE WORDS "and Owner".

10. ADD THE FOLLOWING PARAGRAPHS TO SECTION (<u>3.2</u>):

3.2.4 Before starting any work, the Contractor shall examine work performed by others to which his work adjoins or is applied to and report to the Owner's Representative any conditions that will prevent the satisfactory accomplishment of his work. Failure to notify the Owner's Representative of deficiencies or faults in preceding work prior to commencing work shall constitute acceptance thereof and waiver of any claim of its unsuitability.

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11. ADD THE FOLLOWING PARAGRAPHS TO SECTION (3.4):

- **3.4.4** Before ordering any material or doing any Work, the Contractor shall verify all measurements at the Project site and he shall be responsible for the correctness of same. No extra charge or compensation will be allowed to the Contractor on account of any difference between actual dimensions and the measurements shown on the Project Drawings.
- **3.4.5** The Contractor shall carefully inspect all materials delivered on and to the Project site and reject defective materials without waiting for the Owner's Representative or other representative of Owner to observe the materials.

12. ADD THE FOLLOWING PARAGRAPHS TO SECTION (3.5):

- **3.5.2** The Contractor agrees to assign to the Owner any and all manufacturer's warranties relating to materials and equipment furnished as part of the Work and further agrees to perform the Work in such manner so as to preserve any and all such manufacturer's warranties subject to installation directives and other terms of the Contract Documents. The Contractor agrees to deliver to the Owner, upon final payment, such assignments along with or as part of a reference manual, in form and detail reasonably acceptable to Owner, showing all such warranties and guarantees provided by the Contractor and Subcontractors. Such warranties and guarantees shall commence no sooner than the date of purchase from the supplier.
- **3.5.3** The warranty of Contractor provided in Paragraph 3.5 shall in no way limit or abridge the warranties of the suppliers of equipment and systems which are to comprise a portion of the Work, if they are broader, and all of such warranties shall be in form and substance as required by the Contract Documents. Contractor shall take no action or fail to act in any way which results in the termination or expiration of such third party warranties or which otherwise results in prejudice to the rights of the Owner under such warranties subject to installation directives and other terms of the Contract Documents. Contractor agrees to provide all notices required for the effectiveness of such warranties and shall include provisions in the contracts with the providers and manufacturers of such systems and equipment whereby Owner shall have a direct right of enforcement of such warranty obligations.

13. IN PARAGRAPH (<u>3.6.1</u>), DELETE THE WORD "Sales".

ADD THE FOLLOWING AT THE END OF PARAGRAPH (3.6.1):

The Peoria Park District is exempt from Federal, State and Local taxes. A certificate of exemption will be furnished upon request.

14. IN PARAGRAPH (3.10.2) BEFORE THE WORD "Architect's" ADD THE WORDS "Owner's and".

IN PARAGRAPH (<u>3.10.2</u>) **AFTER THE WORD** "Architect" **ADD THE WORDS** "and Owner's Representative".

ADD THE FOLLOWING PARAGRAPHS TO SECTION (3.10):

3.10.4 The construction schedule shall provide for the most expeditious and practicable execution of the Work. The Contractor shall also work closely with the Owner to confirm that the construction schedule accurately reflects the status of the Project. The Contractor's construction schedule shall be updated every month by the Contractor and submitted to the Owner.

- .1 Whenever it becomes apparent from the updated construction schedule that any substantial completion previously established by the construction schedule cannot be met, the Contractor shall, at the Owner's request, take any or all of the following actions with no increase to the Contract Sum or Contract Time (unless the delay is caused by an event set forth in paragraph 8.3 of these General Conditions thereby permitting adjustment of the Contract Sum and/or Contract Time under Paragraph 4.3.5 of these General Conditions):
 - .1.1 Increase construction manpower to substantially return the Project to schedule;
 - **.1.2** Increase the number of working hours per shift, shifts per day or the amount of construction equipment or any combination of the foregoing which will substantially return the Project to schedule;
 - **.1.3** Reschedule activities to concurrently accomplish activities, to the maximum degree practicable, in the time required by the Contract Documents.

If the Contractor fails to take any of these actions Owner shall have the notice and other rights set forth in Paragraph 2.4.

15. IN PARAGRAPH (<u>4.1.1)</u> DELETE THE FIRST SENTENCE AND SUBSTITUTE THE FOLLOWING:

"The Architect, Owner's Representative, and Owner's Project Manager are defined in Paragraph C of "Section 01000 - General" of "Division 01000 - General Requirements".

- 16. IN PARAGRAPH (4.2.1) DELETE THE WORDS "and will be an Owner's Representative".
- 17. IN PARAGRAPH (4.2.2) DELETE THE WORDS "as a representative of the Owner".
- 18. IN PARAGRAPH (<u>4.2.4</u>) IN THE FIRST SENTENCE SUBSTITUTE THE WORD "Architect" FOR THE WORD "Owner" AND SUBSTITUTE THE WORD "Owner" FOR THE WORD "Architect".
- 19. IN PARAGRAPH (<u>4.2.5</u>) DELETE THE WORD "Architect's" AND "Architect"AND SUBSTITUTE THE WORDS "Owner Representative's" AND "Owner Representative".
- 20. IN PARAGRAPH (<u>4.2.6</u>) IN THE SECOND SENTENCE AFTER THE WORDS "will have authority" INSERT THE WORDS "upon written authorization from the Owner".
- 21. IN PARAGRAPH (<u>4.2.8</u>) DELETE THE WORD "prepare" AND SUBSTITUTE THE WORDS "assist the Owner's Representative in preparing".
- 22. IN PARAGRAPH (<u>4.2.9</u>) DELETE THE WORD "Architect" AND SUBSTITUTE WORDS "Owner's Representative, assisted by the Architect".
- 23. IN PARAGRAPH (4.2.11) IN THE FIRST SENTENCE DELETE THE WORDS "and decide".
- 24. IN PARAGRAPH (4.2.12) IN THE FIRST SENTENCE DELETE THE WORD "and decisions".

IN PARAGRAPH (<u>4.2.12</u>) IN THE SECOND SENTENCE DELETE THE WORDS "and initial decisions" AND "or decisions".

25. ADD PARAGRAPH TO SECTION (<u>4.2</u>):

- 4.2.14 Notwithstanding any other provision of this Agreement to the contrary, the Architect shall have no authority to order or approve any material deviation from the Contract Documents, whether or not such deviation affects the Contract Sum or other Substantial Completion Date (as defined herein). In the event any such deviation is sought, prior written approval from the Owner's Representative and the Owner must be obtained. The Architect may decide quality issues and may approve non-material deviations from the Contract Documents.
- 26. IN PARAGRAPH (<u>4.3.4</u>) IN THE FOURTH SENTENCE DELETE THE WORD "decision" AND SUBSTITUTE THE WORD "recommendation".

IN PARAGRAPH (<u>4.3.4</u>) IN THE LAST SENTENCE DELETE THE WORD "determination" AND SUBSTITUTE THE WORD "recommendation".

27. DELETE PARAGRAPH (<u>4.3.10</u>) IN ITS ENTIRETY.

28. DELETE PARAGRAPH (4.4.1) AND SUBSTITUTE THE FOLLOWING:

"Claims, disputes and other matters in question between the Contractor and the Owner relating to the execution or progress of the Work or the interpretation of the Contract Documents shall be initially referred in writing to the Architect for a recommendation."

29. IN PARAGRAPH (<u>4.4.2</u>) AFTER "(2)" ADD THE WORD "recommend" AND CHANGE THE WORD "reject" TO "rejecting".

IN PARAGRAPH (<u>4.4.2</u>) AFTER "(3)" ADD THE WORD "recommend" AND CHANGE THE WORD "approve" TO "approving".

IN PARAGRAPH (<u>4.4.2</u>) **AT THE END OF THE SENTENCE DELETE THE WORD** "resolve" **AND ADD THE WORDS** "make recommendation on".

- **30.** IN PARAGRAPH (<u>4.4.3</u>) DELETE THE WORD "decision" AND SUBSTITUTE THE WORD "recommendation".
- **31.** IN PARAGRAPH (<u>4.4.4</u>) IN THE LAST SENTENCE DELETE THE WORDS "either reject or approve the Claim" AND SUBSTITUTE THE WORDS "provide a recommendation regarding the Claim in accordance with Paragraph 4.2.2".

IN PARAGRAPH (<u>4.4.4</u>) **AT THE END OF THE LAST SENTENCE DELETE THE WORDS** "in whole or in part."

- 32. DELETE PARAGRAPHS (<u>4.4.5</u>) AND (<u>4.4.6</u>) IN THEIR ENTIRETY.
- **33.** IN PARAGRAPH (<u>4.4.8</u>) DELETE THE WORD "resolution" AND SUBSTITUTE THE WORDS "final recommendation".

IN PARAGRAPH (4.4.8) AFTER THE WORD "Architect," ADD THE WORD "or".

IN PARAGRAPH (4.4.8) AT THE END OF THE SENTENCE DELETE THE WORDS "or by arbitration".

34. IN PARAGRAPH (<u>4.5.1</u>) DELETE THE WORD "decision" AND SUBSTITUTE THE WORD "recommendation".

IN PARAGRAPH (4.5.1) **DELETE THE WORDS** "arbitration or".

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35. IN PARAGRAPH (<u>4.5.2</u>) IN THE SECOND SENTENCE DELETE THE WORDS "a demand for arbitration" AND SUBSTITUTE THE WORDS "legal or equitable proceedings".

IN PARAGRAPH (<u>4.5.2</u>) **AFTER THE WORDS** "proceed in advance of " **DELETE THE WORDS** "arbitration or".

- 36. IN PARAGRAPH (<u>4.5.3</u>) DELETE THE FIRST SENTENCE.
- 37. DELETE SECTION (<u>4.6</u>) IN ITS ENTIRETY.

38. IN PARAGRAPH (<u>5.2.1</u>) DELETE THE FIRST SENTENCE AND SUBSTITUTE:

"The subcontractors/suppliers listed by the Contractor on the Major Subcontractor/Supplier List (submitted with the Bid) shall not be changed without the written consent of the Owner."

IN PARAGRAPH (5.2.1) **IN THE SECOND SENTENCE DELETE THE WORDS** "Architect will" **AND SUBSTITUTE THE WORDS** "Owner's Representative will".

IN PARAGRAPH (5.2.1) **IN THE SECOND SENTENCE AFTER THE WORDS** "promptly reply to" **ADD THE WORDS** "any request made by".

IN PARAGRAPH (5.2.1) **IN THE SECOND SENTENCE AFTER THE WORDS** "any such proposed" **ADD THE WORDS** "change in".

IN PARAGRAPH (5.2.1) **IN THE LAST SENTENCE DELETE THE WORDS** "Owner or Architect" **AND SUBSTITUTE THE WORDS** "Owner's Representative".

IN PARAGRAPH (5.2.1) **IN THE LAST SENTENCE DELETE THE WORD** "promptly" **AND ADD THE WORDS** "within 10 calendar days (of receipt of written request for such change from the Contractor)".

- **39.** IN PARAGRAPH (6.2.2) BEFORE THE WORD "Architect" ADD THE WORDS "Owner and".
- 40. IN PARAGRAPH (6.3.1) DELETE THE WORD "Architect" AND SUBSTITUTE THE WORD "Owner".
- **41.** IN PARAGRAPH (<u>7.2.1</u>) DELETE THE WORDS "the Architect" AND SUBSTITUTE THE WORDS "the Owner's Representative".

ADD THE FOLLOWING PARAGRAPHS TO SECTION (7.2):

7.2.3 A Change Order shall include all of the Contractor's costs associated therewith.

- **7.2.4** The Contractor shall not accept any request for a Change Order from any person other than the Owner and may not perform any work asserted to constitute a change in the Work until the Owner has approved the Change Order in writing, unless the Owner authorizes the Contractor, in writing, to proceed with a change prior to the Owner's final approval. Notwithstanding anything to the contrary herein, the Contractor shall not charge for overtime services in the performance of any Change Order Work, unless the Owner has specifically authorized overtime in writing. Owner may competitively bid changes in the Work and Contractor, Subcontractor and suppliers shall provide Owner with all documents Owner requests to facilitate such competitive bidding of changes in the Work.
- **7.2.5** There shall be no change in the Work, whether an alteration or addition to the Contract Sum or to any amounts due under the Contract Documents or to a change in the Contract Time, unless and until such alteration or addition has been authorized by a written Change Order executed and issued in accordance and compliance with the requirements with this Article 7 or by written authorization to proceed with such change in the Work signed by the Owner or as otherwise provided pursuant to the Contract Documents. The requirements set forth in this Paragraph 7.2.5 are of the essence. No claim that the Owner has been unjustly enriched by any alteration or addition to the Work, whether or not any such unjust enrichment to the Work or to the Owner in fact exists, shall form the basis of any claim for an increase in any amount due under the Contract Documents or a change in the Contract Time, and the terms of a fully-executed Change Order shall be conclusive.
- 42. IN PARAGRAPH (7.3.1) DELETE THE WORDS "the Architect" AND SUBSTITUTE THE WORDS "the Owner's Representative".
- **43.** IN PARAGRAPH (<u>7.3.4</u>) DELETE THE WORDS "the Architect" AND SUBSTITUTE THE WORDS "the Owner's Representative".
- 44. IN PARAGRAPH (<u>7.3.6</u>) IN THE FIRST SENTENCE DELETE THE WORD "determined" AND SUBSTITUTE THE WORD "recommended".
- **45.** IN PARAGRAPH (<u>7.3.7</u>) IN THE FIRST SENTENCE AFTER THE WORD "Architect" ADD THE WORDS "and the Owner's Representative".
- **46. IN PARAGRAPH** (<u>7.3.8</u>) **DELETE THE WORDS** "the Architect" **AND SUBSTITUTE THE WORDS** "the Owner's Representative".
- **47. IN PARAGRAPH** (<u>7.3.9</u>) **DELETE THE WORD** "determination" **AND SUBSTITUTE THE WORD** "recommendation".
- **48.** IN PARAGRAPH (<u>8.1.3</u>) DELETE THE WORD "Architect" AND SUBSTITUTE THE WORDS "Owner's Representative".
- 49. ADD THE FOLLOWING PARAGRAPHS TO SECTION (8.2).
 - **8.2.4** All work shall be "Substantially Complete" as required by the **Instructions to Bidders** and the **Agreement Between Owner and Contractor.**
 - **8.2.5** It is further agreed that said completion schedule is reasonable, and the Contractor shall prosecute said work regularly, diligently and continuously at such rate of progress as will insure full completion thereof within the time specified.
 - **8.2.6** Provided, however, the following exceptions:

- .1 Any preference, priority or allocation order duly issued by the United States Government.
- .2 Any unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including acts of God, or of a public enemy, acts of the Owner, acts of another Contractor in performance of a separate contract with the Owner, fire, floods, epidemics, quarantine restrictions, strikes, freight embargoes and unusually severe weather. The criteria on which the unusually severe weather shall be based is the average precipitation/temperatures received in the project area, as recorded over a period of the last five (5) years at the local area United States Weather Station. Any extension of time due to unusually severe weather must be requested by the Contractor on the basis of documented records of the actual precipitation/temperatures during the contract time period, compared with the normal/average for the area. Also, the criteria shall include the number of excessive precipitation or extreme cold days (i.e., days in which the temperature would adversely affect the type of work being constructed) over the same period and whether or not the Contractor's force worked on said days or stage of construction was affected.
- .3 Any delays of subcontractors occasioned by any of the causes specified in this paragraph.
- **8.2.7** Provided further that the Contractor shall, within seven (7) days from the beginning of any such delay during the performance of the Contract, notify the Owner's Representative in writing of the alleged cause of such delay.

50. IN PARAGRAPH (8.3.1) DELETE THE WORDS "and arbitration".

IN PARAGRAPH (8.3.1) DELETE THE WORD "determine" AND SUBSTITUTE THE WORD "recommend".

51. DELETE PARAGRAPH (<u>9.2.1</u>) AND SUBSTITUTE THE FOLLOWING:

"Before the first Application for Payment, the Contractor shall submit to the Owner's Representative a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect and Owner's Representative may require. This schedule, unless objected to by the Architect and Owner's Representative, shall be used as a basis for reviewing the Contractor's Applications for Payment."

52. IN THE FIRST SENTENCE OF (9.3.1), CHANGE "ten" TO "forty five".

IN PARAGRAPH (<u>9.3.1)</u> IN THE FIRST SENTENCE DELETE THE WORD "Architect" AND SUBSTITUTE THE WORDS "Owner's Representative".

ADD THE FOLLOWING TO THE END OF PARAGRAPH (9.3.1):

Payment requests shall consist of AIA Documents #702 "Application and Certificate for Payment"; AIA #703 "Continuation Sheet"; Contractors Affidavit of Payment to Subcontractors and Suppliers; Weekly Workforce Reports; Certified Payroll Form; and Waivers of Lien. (Waivers of Lien are required from the general contractor in the full amount of the current payment application, and from all subcontractors, suppliers, or workers who provide more than \$10,000 of project material/labor of the Work. The waiver shall be in the amount(s) listed in the Contractor's Affidavit.) For final payment, the general contractor shall also provide a Waiver of Lien in the full amount of the contract price.

The Waiver of Lien and Contractor Affidavit forms used shall be the Peoria Park District's standard form(s): 1) "Final Waiver of Lien" (for general contractors), 2) "Waiver of Lien - General LAKEVIEW RECREATION CENTER RENOVATION - Project Manual

Contractor's Partial To Cover Only Certain Payments", 3) "Sub-Contractor's Final Waiver of Lien", 4) "Waiver of Lien - Sub-Contractor's Partial To Cover Only Certain Payments, and 5) "Contractor's Affidavit". (These forms are included in the Project Manual, and are the required Waiver of Lien forms for the project.)

(If the Contractor is unable to provide the required sub-contractor waiver at the time the application for payment is submitted (preferred method) alternatively, it may be provided at the time that payment is delivered by the District. If the sub-contractor waiver(s) still cannot be provided at that time, the District will provide "two-party" checks in which the Contractor and the sub-contractor are named jointly as payees.)

Format of AIA #703 shall follow that of "Schedule of Values". (See Division 01000 Article IV.) All payment requests shall reflect retainage in the amount of 10% of completed work.

53. IN PARAGRAPH (<u>9.3.1.1</u>) **DELETE THE WORDS** "or by interim determination of the Architect, but not yet included in Change Orders".

54. ADD THE FOLLOWING SUB-PARAGRAPHS TO PARAGRAPH (<u>9.3.1</u>):

- **9.3.1.3** Upon Substantial Completion, the Owner will pay 95% percent of the amount due to the Contractor on account.
- **9.3.1.4** Monthly progress payments will be made by the Owner on projects lasting more than sixty days (from award of the bid to the Substantial Completion date given in the Supplementary Instructions to Bidders).

55. ADD THE FOLLOWING SUB-PARAGRAPHS TO PARAGRAPH (<u>9.3.2</u>):

- **9.3.2.1** Material stored on site will be considered for payment only when a Schedule of Stored Materials with appropriate values accompany the payment request as an attachment.
- **9.3.2.2** All material and work covered by partial payments made shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of material and work upon which payments have been made or the restoration of any damaged work, or as a waiver of the contract.
- 56. IN PARAGRAPH (9.4.1) DELETE THE WORDS "Architect" AND "Architect's" AND SUBSTITUTE THE WORDS "Owner's Representative" AND "Owner's Representative's".

IN PARAGRAPH (9.4.1) DELETE THE PHRASE "with a copy to the Contractor".

57. IN THE FIRST SENTENCE OF PARAGRAPH (9.4.2) DELETE THE WORD "Architect".

IN THE FIRST SENTENCE OF PARAGRAPH (<u>9.4.2</u>) **AFTER THE WORDS** "Architect's" **ADD THE WORDS** "and Owner's Representative's".

IN THE FOURTH SENTENCE OF PARAGRAPH (<u>9.4.2</u>) **DELETE THE WORDS** "Architect has" **AND SUBSTITUTE THE WORDS** "Owner's Representative and Architect have".

58. IN PARAGRAPH (9.5.1) DELETE THE WORDS "Architect" AND "Architect's" AND SUBSTITUTE THE WORDS "Owner's Representative AND "Owner's Representative's".

- 59. IN PARAGRAPHS (<u>9.6.1, 9.6.3, AND 9.6.4</u>) DELETE THE WORDS "Architect" AND SUBSTITUTE THE WORDS "Owner's Representative".
- **60.** IN PARAGRAPH (<u>9.7.1</u>) DELETE THE WORD "Architect" AND SUBSTITUTE THE WORDS "Owner's Representative".

IN PARAGRAPH (9.7.1) DELETE THE WORDS "or awarded by arbitration".

- 61. IN PARAGRAPH (<u>9.8.2</u>) DELETE THE WORD "Architect" AND SUBSTITUTE THE WORDS "Owner's Representative".
- 62. IN THE FIRST SENTENCE OF PARAGRAPH (<u>9.8.3</u>) DELETE THE WORD "Architect" AND SUBSTITUTE THE WORDS "Owner's Representative assisted by the Architect".

IN THE SECOND AND THIRD SENTENCES OF PARAGRAPH (<u>9.8.3</u>) DELETE THE WORDS "Architect's" and "Architect" AND SUBSTITUTE THE WORDS "Owner's Representative's" and "Owner's Representative".

- 63. IN PARAGRAPH (<u>9.8.4</u>) DELETE THE WORD "Architect" AND SUBSTITUTE THE WORDS "Owner's Representative".
- 64. IN PARAGRAPH (<u>9.9.1</u>) DELETE THE WORD "Architect" AND SUBSTITUTE THE WORDS "Owner's Representative".
- 65. IN PARAGRAPH (9.10.1) IN THE FIRST SENTENCE AFTER THE FIRST TWO APPEARANCES OF THE WORD 'Architect'' ADD THE WORDS "and Owner's Representative".

IN PARAGRAPH (<u>9.10.1)</u> DELETE THE THIRD AND FOURTH APPEARANCES OF THE WORD "Architect" and "Architect's" AND SUBSTITUTE THE WORDS "Owner's Representative's".

IN PARAGRAPH (<u>9.10.1</u>) **AFTER THE FIFTH APPEARANCE OF THE WORD** "Architect's" **ADD THE WORDS** "and Owner's Representative's".

IN THE LAST SENTENCE OF PARAGRAPH (<u>9.10.1</u>) DELETE THE WORD "Architect's" AND SUBSTITUTE THE WORDS "Owner's Representative's".

- 66. IN PARAGRAPH (9.10.2) DELETE THE WORD "Architect" AND SUBSTITUTE THE WORD "Owner's Representative".
- 67. ADD THE FOLLOWING SUB-PARAGRAPH TO PARAGRAPH (<u>9.10.2</u>):
 - **9.10.2.1** When all items including items noted within Division 1000 General Requirements are found to be complete and in conformance with the Contract Documents, a final payment will be issued.
- 68. IN PARAGRAPH (<u>9.10.3</u>) DELETE THE WORD "Architect" AND SUBSTITUTE THE WORDS "Owner's Representative".
- **69.** IN PARAGRAPH (<u>11.1.1</u>) IN THE FIRST SENTENCE AFTER THE PHRASE "as will protect the Contractor" ADD THE WORDS "Architect and Owner".

70. IN PARAGRAPH (<u>11.1.2</u>), IN THE FIRST SENTENCE DELETE THE WORDS "limits of liability specified in the Contract Documents" AND SUBSTITUTE THE WORDS "limits required in 'Attachment A – Project Specific Insurance Requirements' (which is included as the last section of the Project Manual and the requirements therein shall be made part of the Contract Documents),".

IN PARAGRAPH (11.1.2) AFTER THE FIRST SENTENCE ADD:

"In addition, if any of the work occurs within fifty feet of an active railroad line and the Contractor's general liability coverages provide for exclusions of coverage when working on or near a railroad, the Contractor shall provide a separate Railroad Protective Liability Insurance Policy naming the railroad as the insured party, with the coverage limits required by that railroad."

71. IN PARAGRAPH (<u>11.1.3</u>), AFTER THE WORDS "Certificates of insurance" ADD THE WORDS "and endorsements to the insurance policy(s) which are".

IN PARAGRAPH (<u>11.1.3</u>) **AFTER THE WORDS** "acceptable to the Owner" **ADD THE WORDS** "and naming the Owner, their agents and consultants as additional insured".

ADD THE FOLLOWING SUB-PARAGRAPHS TO PARAGRAPH (11.1)

- **11.1.4** The Contractor may, at his option, furnish Owner's Protective Liability Insurance in lieu of naming the Owner Additional Insured on the Contractor's policy, as required above. This insurance shall protect the Owner from claims as set forth in Paragraph 11.1.1 of the General Conditions, and to the limits required herein, as shown in "Attachment A".
- **11.1.5** The Contractor shall furnish two copies of each of the required Certificates or Endorsements for each copy of the Agreement which shall specifically set forth evidence of all coverage required by the Contract Documents. The form of the Certificate(s) or Endorsement(s) shall be those as required in "Attachment A". The Contractor shall also furnish to the Owner copies of any endorsements which limit coverage, or are subsequently issued amending coverage or limits of coverage.

72. DELETE PARAGRAPHS (<u>11.3.1, 11.3.2, AND 11.3.3)</u> IN THEIR ENTIRETY.

73. DELETE PARAGRAPH (<u>11.4.1)</u> AND SUBSTITUTE:

"If the work of the project is being completed by one general or prime contractor rather than multiple prime contractors, the Contractor shall purchase and maintain property insurance upon the entire Work at the site to the full replacement value thereof. Such insurance shall be in a company or companies against which the Owner has no reasonable objection. This insurance shall include the interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work.

74. AT THE END OF PARAGRAPH (<u>11.4.1.1)</u> ADD THE FOLLOWING SENTENCE: "The form of policy for this coverage shall be "Completed Value".

75. DELETE PARAGRAPH (<u>11.4.1.2)</u> IN ITS ENTIRETY.

76. DELETE PARAGRAPH (11.4.1.3) IN ITS ENTIRETY AND SUBSTITUTE:

"If by the terms of this insurance any mandatory deductibles are required, or if the Contractor should elect, with the concurrence of the Owner, to increase the mandatory deductible amounts or purchase this insurance with voluntary deductible amounts, the Contractor shall be responsible for payment of the amount of all deductibles in the event of a paid claim. If separate contractors are added as insureds to be covered by this policy, the separate contractors shall be responsible for payment of any deductibles in the event of any deductible are paid on their part of the Project."

77. DELETE PARAGRAPHS (<u>11.4.3, 11.4.4, AND 11.4.5)</u> IN THEIR ENTIRETY.

78. DELETE PARAGRAPH (<u>11.4.6)</u> AND SUBSTITUTE:

"The Contractor shall file two certified copies of all policies with the Owner before exposure to loss can occur. If the Owner is damaged by the failure of the Contractor to maintain such insurance and to so notify the Owner, then the Contractor shall bear all reasonable costs properly attributable thereto.

79. DELETE PARAGRAPHS (<u>11.4.7, 11.4.8, 11.4.9, AND 11.4.10)</u> IN THEIR ENTIRETY.

80. DELETE PARAGRAPH (<u>11.5.1)</u> AND SUBSTITUTE:

"The Contractor shall furnish a Performance Bond and a separate Labor and Material Payment Bond, each for one hundred percent (100%) of the Contract Sum. Form of these bonds shall be as provided by the Owner in the Project Manual and no other form will be accepted. The Surety shall be authorized to do business in the State of Illinois and be acceptable to the Owner.

- 81. IN PARAGRAPH (<u>12.1.1</u>) DELETE THE WORD "Architect's" AND SUBSTITUTE WORDS "Owner's Representative's and Architect's". DELETE THE WORD "Architect" AND SUBSTITUTE THE WORDS "Owner's Representative".
- 82. IN PARAGRAPH (<u>12.1.2</u>) AFTER THE WORD "Architect" ADD THE WORDS "and Owner's Representative".
- **83.** IN PARAGRAPH (<u>12.2.1.1</u>) AFTER THE WORD "Architect" ADD THE WORDS "and Owner's Representative".
- 84. IN PARAGRAPH (<u>13.5.4</u>) AFTER THE WORD "Architect" ADD THE WORDS "and Owner's Representative".
- 85. IN PARAGRAPH (<u>14.1.1.3</u>) DELETE THE WORD "Architect" AND SUBSTITUTE THE WORDS "Owner's Representative".
- **86.** IN PARAGRAPH (<u>14.2.2</u>) DELETE THE PHRASE ", upon certification by the Architect that sufficient cause exists to justify such action,".
- 87. IN PARAGRAPH (<u>14.2.4</u>) DELETE THE WORD "Architect" AND SUBSTITUTE THE WORDS "Owner's Representative".

88. DELETE PARAGRAPH (14.4.3) IN ITS ENTIRETY AND SUBSTITUTE:

In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination. In no event, however, will such amounts exceed the Contract Sum reduced by the amount of prior payments except for increases pursuant to the claims procedure in the Contract Documents. Subcontracts, subsubcontracts, and purchase orders will contain appropriate provisions for termination for convenience under this Paragraph 14.4.

89. ADD THE FOLLOWING ARTICLE 15: LABOR, SAFETY AND WAGE STANDARDS TO THE GENERAL CONDITIONS OF THE CONTRACT:

ARTICLE 15 LABOR, WAGE, SAFETY, AND OTHER STANDARDS

15.1 LABOR STANDARDS. All employers shall comply with the Employment of Illinois Workers on Public Works Act [30 ILCS 570/1 to 570/7].

15.2 WAGE STANDARDS.

- **15.2.1** PREVAILING WAGE ACT: Wages and benefits to employees shall comply with all Federal and State of Illinois statutes pertaining to public works projects and specifically: Wages of Employees on Public Works [820 ILCS 130/1 12].
- **15.2.2** Not less than the prevailing rate of wages as determined by the Park District or the Department of Labor shall be paid to all laborers, workers and mechanics performing work under this contract. All contractor's bonds shall include a provision as will guarantee the faithful performance of such prevailing wage clause as provided by this bid specification or contract.
- **15.2.3** The terms "general prevailing rate of hourly wages", "general prevailing rate of wages" or "prevailing rate of wages" when used in this Act mean the hourly cash wages plus fringe benefits for training and apprenticeship programs approved by the U.S. Department of Labor, Bureau of Apprenticeship and Training, health and welfare, insurance, vacations and pensions paid generally, in the locality in which the work is being performed, to employees engaged in work of a similar character on public works.

15.2.4 PREVAILING WAGE ACT/FOIA

Contractors and subcontractors shall submit certified payroll on a monthly basis to the Park District in compliance with requirements of 820 ILCS 130/5. These records will be kept by the Park District for three years and may be reviewed by others through the Freedom of Information Act (FOIA). The Park District will exclude employee's address, telephone number, and social security number from public inspection.

15.3 SAFETY STANDARDS.

- **15.3.1** PROTECTION OF PERSONS AND PROPERTY: The Contractor and his subcontractors shall, at all times, comply with applicable provisions of Federal, State and Local laws.
 - **15.3.1.1** The Contractor and his sub-contractors shall have written programs complying with Occupational Safety and Health Administration standards and/or Illinois Department of Labor requirements including, but not limited to the following: hazardous communications, hearing conservation, respirator use, confined space entry, scaffolding, ladders, ventilation, flammable and combustible liquids, and lockout/tagout. The LAKEVIEW RECREATION CENTER RENOVATION Project Manual

Contractor shall submit documentation of their programs at the request of the Owner's Representative, or Occupational Safety and Health Administration and/or Illinois Department of Labor officials.

15.4 EQUAL EMPLOYMENT OPPORTUNITY/AFFIRMATIVE ACTION/SEXUAL HARASSMENT

- **15.4.1** During the performance of the contract, the contractor agrees to the following:
 - **15.4.1.1** That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, marital status, national origin or ancestry, age, physical or mental handicap unrelated to ability, or an unfavorable discharge from military service; and further that it will examine all job classifications to determine if minority persons or women are under-utilized and will take appropriate affirmative action to rectify any such under-utilization.
 - **15.4.1.2** That, if it hires additional employees in order to perform his contract or any portion thereof, it will determine the availability (in accordance with the Rules and Regulations of the Illinois Department of Human Rights) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not under-utilized.
 - **15.4.1.3** That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, marital status, national origin or ancestry, age, physical or mental handicap unrelated to ability or an unfavorable discharge from military service.
 - **15.4.1.4** That it will have a written sexual harassment policy to include at the minimum, the following:
 - **15.4.1.4.1** a definition of sexual harassment under the law;
 - **15.4.1.4.2** a description of sexual harassment utilizing examples;
 - **15.4.1.4.3** a formalized complaint procedure;
 - **15.4.1.4.4** a statement of victim's rights;
 - **15.4.1.4.5** directions on how to contact the Illinois Department of Human Rights. Outof-state companies must provide directions for filing with the enforcement agency within their state. Companies that issue a standard policy for all business locations must prepare an addendum providing directions on how to contact the appropriate enforcement agency; and
 - **15.4.1.4.6** A recitation that there cannot be any retaliation against employees who elect to file charges.
 - **15.4.1.4.7** In addition, it is recommended that the employer post a copy of the sexual harassment policy in a prominent and accessible location and distribute it in a manner to assure notice to all employees on an annual basis.

- **15.4.1.4.8** The Illinois Human Rights Act specifically provides that all documents may meet, but cannot exceed, the sixth grade literacy level. Therefore, the employers sexual harassment policy must be stated in plain language and in "laymen's terms".
- **15.4.1.5** That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other agreement or understanding, a notice advising such labor organization or representative of the contractor's obligations under the Illinois Human Rights Act and the Department's Rules and Regulations. If any such labor organization or representative fails or refuses to cooperate with the contractor in its efforts to comply with such Act and Rules and Regulations, the contractor will promptly so notify the Department and the contracting agency and will recruit employees from other sources when necessary to fulfill its obligations thereunder.
- **15.4.1.6.** That it will submit reports as required by the Department's Rules and Regulations, furnish all relevant information as may from time to time be requested by the Department or the contracting agency, and in all respects comply with the Illinois Human Rights Act and the Department's Rules and Regulations.
- **15.4.1.7.** That it will permit access to all relevant books, records, accounts and work sites by personnel of the contracting agency and the Department for purposes of investigation to ascertain compliance with the Illinois Human Rights Act and the Department's Rules and Regulations.
- **15.4.1.8.** That it will include verbatim or by reference the provisions of this clause in every subcontract it awards under which any portion of the contract obligations are undertaken or assumed, so that such provisions will be binding upon such subcontractor. In the same manner as with other provisions of this contract, the contractor will be liable for compliance with applicable provisions of this clause by such subcontractors; and further it will promptly notify the contracting agency and the Department in the event any subcontractor fails or refuses to comply therewith. In addition, the contractor will not utilize any subcontractor declared by the Illinois Human Rights Commission to be ineligible for contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations.
- **15.4.2** In the event of the contractor's non-compliance with the provisions of the Illinois Human Rights Act, the contractor may be declared ineligible for future contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporation, and the contract may be cancelled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked as provided by statute or regulations.

END OF SUPPLEMENTARY GENERAL CONDITIONS

DIVISION 010000 GENERAL REQUIREMENTS

SECTION 010000 - GENERAL

A. SUMMARY OF THE WORK

- 1. The Work covered under this Contract consists of that work described by the Invitation to Bid, the Instructions/Supplemental Instructions to Bidders, the Bid/Proposal Form, the General/Supplemental Conditions of the Contract, these General Requirements, the Plans, and the Technical Specifications.
- The Contractor shall be responsible for all items incidental to the scope of the Work intended by the bidding documents as per A.1 above, including but not limited to, expenses incurred by the requirements of various Sections of Division 010000, unless specifically stated otherwise herein.
- 3. Changes to the Work as required by approved Change Orders shall be at the expense of the Owner, however, requests for additional payments made after the fact will not be considered.

B. OCCUPANCY BY OWNER.

1. The Owner reserves the right to occupy any portion of the project before it has been entirely completed, with the understanding that such occupancy shall in no way constitute acceptance of the work, in whole or in part, or of any work performed under the Contract, provided that such occupancy does not substantially interfere with completion of the work by the Contractor.

SECTION 012300 - ALTERNATES

Α.

A.

- Alternates to the Bid are set forth in the Supplementary Instructions to Bidders and are listed in the Bid Form.
 - 1. Accepted Alternates have been incorporated into the Agreement.
- B. Bid Alternate pricing, as set forth in the Supplementary Instructions to Bidders and the Bid Form, shall be good for a minimum of 90 calendar days after the date of the Bid opening, and the Owner reserves the right to accept Alternates up to that time.

SECTION 012600 - CHANGE ORDERS

- OWNER'S REPRESENTATIVE'S FIELD ORDERS
 - 1. From time to time during progress of the Work the Owner's Representative may issue an "Owner's Representative's Field Order" which interprets the Contract Documents or orders minor changes in the Work without change in Contract Sum or Contract Time.
 - Should the Contractor consider that a change in Contract Sum or Contract Time is required he shall submit an itemized proposal to the Owner's Representative <u>immediately and before proceeding with the Work</u>. If the proposal is found to be satisfactory and in proper order, the Field Order will be superseded by a Change Order.
- B. PROPOSAL REQUESTS
 - From time to time during the progress of work the Owner's Representative may issue a "Proposal Request" for an itemized quotation for changes to the Work which may result in a change to the Contract Sum or Contract Time. This document **is not a Change Order** and is not a direction to proceed with the changes described therein.

C. CHANGE ORDERS

1.

- Change Orders are written documents describing changes in the Work, in the Contract Sum, in the Contract Time of Completion, or any combination thereof. Change Orders must be signed by both the Owner and the Architect/Owner's Representative <u>prior</u> to proceeding with the Work subject to the Change Order. **REQUESTS FOR ''EXTRA'S'' OR OTHER ADDITIONAL PAYMENTS OVER AND ABOVE THE CURRENT CONTRACT SUM WILL NOT BE CONSIDERED WITHOUT THE PRIOR, WRITTEN APPROVAL OF BOTH THE OWNER AND THE OWNER'S REPRESENTATIVE.**
 - a) INITIATION. Change Orders may be initiated by a "Field Order" or "Proposal Request" per paragraphs "A" and "B" above. In addition, either the Contractor or Owner (or Owner's Representative) may initiate a Change Order through:
 - 1) Discovery of a discrepancy in the Contract Documents,
 - 2) Discovery of concealed conditions or,
 - 3) Discovery, during the course of the Work, of methods of accomplishing the Work in a better or more economical manner.
 - b) PROCESSING CHANGE ORDERS.
 - 1) Change Orders will be dated and will be numbered in sequence.
 - 2) The Change Order will describe the change or changes, or will refer to the Proposal Requests or Field Orders involved.
 - 3) The Owner's Representative will issue three copies of each Change Order to the Contractor.
 - 4) The Contractor promptly shall sign all three copies and return them to the Owner's Representative.
 - 5) The Owner and Owner's Representative will retain two signed copies in their files, and will forward one signed copy to the Contractor.
 - Should the Contractor disagree with the stipulated change in Contract Sum or change in Contract Time of Completion, or both:
 The Contractor promptly shall return all three of the Change Orders, unsigned by him, to the Owner's Representative with
 - a letter signed by the Contractor stating the reason or reasons for the Contractor's disagreement.
 - The Contractor's disagreement with the Change Order shall not in any way relieve the Contractor of his responsibility to proceed with the change as ordered and to seek settlement of the dispute under pertinent provisions of the Contract Documents.

SECTION 012900 - PAYMENT PROCEDURES

A. SCHEDULE OF VALUES

- 1. Prior to the start of construction, submit a proposed Schedule of Values to the Owner's Representative which shows a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the Work, as specified herein and in other provisions of the Contract Documents.
 - a) The Schedule of Values is required to be compatible (in the same format) with the Application for Payment "Continuation Sheet", AIA G703.
- 2. If not requested to submit additional data or to modify the submitted Schedule of Values within ten (10) days of submittal, the initially submitted Schedule shall be deemed approved.

B. APPLICATIONS FOR PAYMENT

- 1. Progress payments will be made only if specifically called for in the Agreement. In all other cases, the Contractor may submit an Application for Payment (3 copies) upon Substantial Completion (95% of the Contract Sum), with the balance of the Contract Sum to be paid at Final Completion.
 - a) Paragraph #52 of the Supplementary General Conditions defines the documentation required for each payment request.
 - b) Applications for payment shall be delivered to the Owner's Project Manager at:

Department of Planning, Design, and Construction Peoria Park District Bradley Park Equipment Service 1314 N. Park Road Peoria, Illinois 61604

SECTION 013100 - PROJECT MEETINGS

A. PRECONSTRUCTION CONFERENCE

- 1. Conduct a preconstruction conference prior to the start of the Work, at the location of the Work. Provide attendance by the designated personnel of the Contractor, including Sub-contractor's and/or suppliers of major components of the Work, if requested by the Owner's Representative.
 - a) AGENDA. Discuss items of significance that could affect progress including such topics as:
 - 1) Tentative construction schedule.
 - 2) Critical Work sequencing.
 - 3) Designation of responsible personnel.
 - 4) Procedures for processing field decisions and Change Orders.
 - 5) Procedures for processing Applications for Payment.
 - 6) Distribution of Contract Documents.
 - 7) Submittal of Shop Drawings, Product Data and Samples.
 - 8) Preparation of record documents.
 - 9) Use of the premises.
 - 10) Office, Work and storage areas.
 - 11) Equipment deliveries and priorities.
 - 12) Safety procedures.
 - 13) First aid.
 - 14) Security.
 - 15) Housekeeping.
 - 16) Working hours.
 - 17) Permits and Permitting Agency Requirements

B. PROJECT MEETINGS

- 1. Project Meetings will be held per the schedule determined at the Preconstruction Conference, or as needed for proper coordination and administration of the project.
 - a) AGENDA
 - 1) Review and correct or approve minutes of the previous progress meeting.
 - 2) Review progress of the Work since last meeting, including status of submittals for approval.
 - 3) Identify problems which impede planned progress.
 - 4) Develop corrective measures and procedures to regain planned schedule.
 - 5) Complete other current business.

C. REPORTING 1. Distril

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Distribute copies of the minutes of each meeting to each party present, and to other parties who should have been present, no later than three business days after each meeting.

SECTION 013300 - SUBMITTALS

- A. Requirements for shop drawings, samples, mock-ups, product data, etc., relative to specific elements or components of the work are called out in the various sections of the Technical Specifications.
 - 1. Submit items to allow for Owner's Representative's review and approval, potential re-submission if full approval is not given, ordering, delivery, fabrication time, etc., so as to allow the Work to proceed in a timely manner and in conformance with the project schedule.

B. OTHER CONTRACTOR SUBMITTALS

- Unless otherwise modified the Contractor shall also submit:
 - a) A "bar chart" type proposed construction schedule, within ten days after award of the Bid.
 - b) Other submittals as required by other section of Division 010000.
- C. Submission of the required Bonds and Certificate of Insurance are to be made prior to the Owner's issuance of a Notice to Proceed.

SECTION 014000 - QUALITY/REGULATORY REQUIREMENTS

A. GENERAL: Contractors shall comply with all laws, rules and regulations governing the work.

- 1. When Contractor observes that contract documents are at variance with specified codes, notify Owner's Representative in writing immediately.
 - Owner's Representative will issue all changes in accord with General Conditions.
- 2. When Contractor performs any work knowing or having reason to know that the work is contrary to such laws, rules and regulations and fails to so notify the Owner's Representative, Contractor shall pay all costs arising therefrom. However, it will not be the Contractor's primary responsibility to make certain that the contract documents are in accord with such laws, rules and regulations.

B. SAFETY:

- 1. Comply with all federal, state, and local laws, rules and regulations governing the installation/construction of the work.
- 2. Develop and utilize safety program and training for workmen and sub-contractor employees.

C. TESTING 1. TH

- TESTS AND INSPECTIONS REQUIRED
 - a) Provide all tests and inspections required by governmental agencies having jurisdiction, as required by provisions of the Contract Documents and/or as specifically required by sections of the Technical Specifications.
- 2. PAYMENT FOR TESTING

a)

- Include within the Contract Sum an amount sufficient to cover all testing, re-testing, and inspections required by the Contract documents and/or the Technical Specifications. Additionally pay for all testing and inspections required by all governmental agencies having jurisdiction.
 - 1) The Owner will pay for any testing and inspecting specifically requested by the Owner's Representative which are over and above those described in Paragraph 1.a) above.
 - 2) When initial tests (over and above those defined by 1.a) above) requested by the Owner's Representative indicate non-compliance with the Contract Documents, costs of initial tests associated with that non-compliance will be deducted by the Owner from the Contract Sum, and subsequent retesting occasioned by the non-compliance shall be performed by the same testing laboratory and the costs thereof shall be paid by the Contractor.
- 3. WAIVER OF INSPECTION AND/OR TESTS
 - a) Specified inspections and/or tests may be waived only by the specific written approval of the Owner's Representative, and <u>such waivers</u> will be expected to result in credit to the Owner equal to normal cost of such inspection and/or test.

SECTION 014200 - REFERENCE STANDARDS AND DEFINITIONS

- A. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed for performance of a required construction activity the Contractor shall obtain copies directly from the publication source.
 - 2. Although copies of standards needed for enforcement of requirements may be included as part of required submittals the Architect reserves the right to require the Contractor to submit additional copies as necessary for enforcement of requirements.
- B. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents they mean the recognized name of the trade association standards generating organization authority having jurisdiction or other entity applicable to the context of the text provision. Refer to the Encyclopedia of Associations, published by Gale Research Co. available in most libraries.
- C. Definitions: Architect, Owner's Representative, and Owner's Project Manager
 - 1. <u>ARCHITECT:</u> The Architect shall be the person or entity designated by the Owner as the Owner's Representative and shall be identified as such in the Agreement Between Owner and Contractor, and is referred to throughout the Contract Documents as if singular in number and masculine in gender.
 - 2. <u>OWNER'S REPRESENTATIVE</u>: The duties of the Owner's Representative as listed in the Project Manual, include but are not limited to, construction phase observation and technical administration services.
 - a) LIMITS OF AUTHORITY: The Owner's Representative shall be authorized to provide approvals and interpretations concerning the plans, specifications and progress of the Work as bid, but is not authorized to change the scope of the Work on behalf of the Owner.
 - 3. <u>OWNER'S PROJECT MANAGER</u>: The Owner's Project Manager will represent, act on behalf of, and provide interface between the Owner and the Contractor in respect to contract administration and/or other matters which affect the scope of the Work.
 - a) Unless defined otherwise in the Project Manual, the Owner's Project Manager shall be a designated member of the Planning, Design, and Construction Division of the Peoria Park District.
 - b) The Owner's Project Manager will also be the Owner's Representative and will provide construction phase observation and technical administration services, if a consultant Architect has not been engaged to do so, by the Owner.

SECTION 015000 - TEMPORARY FACILITIES & CONTROLS

A. MOBILIZATION

1.

- 1. Furnish all labor, tools, materials, equipment, and incidentals necessary for preparatory work.
- 2. Provide and establish personnel, equipment, supplies, materials, offices or buildings, and other facilities necessary to work on the project.
- 3. Demobilize all of the above and remove temporary facilities at the completion of the project.

B. BARRIERS, PROTECTION OF SITE AND PROPERTY

- GENERAL
 - a) Owner's improvements to remain, existing utilities, as well as adjacent site improvements shall be protected from damage by barriers, guards and coverings. Damaged work shall be replaced or repaired to condition prevailing at time of signing of contract, at no additional cost to Owner.

- b) Provide 6' high, continuous chain link or orange plastic (used materials acceptable) construction fence to prohibit unauthorized personnel or public entry from the site of the Work. (Substitutions may be considered; submit request in writing to the Owner's Representative.)
- c) Contractor shall provide, erect and maintain additional planking, fences, protective canopies, railings, shoring, lights, warning signs, etc., as needed for the protection of adjacent property and the public.

2. LANDSCAPE PROTECTION

- a) All live, healthy trees, shrubs, etc. on the site or on the street fronts of the site, not specified to be removed and not interfering with installation of new work required hereunder, shall be protected against injury from construction operations.
- b) All shade trees which are to remain and which are liable to damage during the building operations, shall be properly boxed and protected from damage during the course of construction work as directed by the Park District. No site-related work shall occur until the required tree protection (fencing, boxing, etc.) has been installed and approved by the Owner or his representative.
 - LIQUIDATED DAMAGES: The Owner reserves the right to charge the Contractor for damage to existing trees, and to deduct the charges from the amounts due the Contractor, based on the following schedule:
 - aa) Broken limbs 1" or over in diameter:
 - biolitation of the second mathematical second second

\$150 per caliper inch of tree, per each injury

\$100 per tree/per foot within dripline,

or within 20' minimum if applicable

\$50 per caliper inch of limb

- nicking, gouging, etc. 3. BARRIERS/CONSTRUCTION FENCE MATERIALS
 - a) 2" open mesh chain link fence, 72" high minimum, galvanized, with appropriately sized posts; gates where indicated.
 - b) Alternate barrier fencing materials may be acceptable, however, no additional payments will be made on account of approval of alternate barrier/safety fencing materials.
 - c) Materials may be new or used, if in serviceable condition.
- 4. WATCHMAN SERVICE
 - a) The Owner will not be responsible for loss due to theft or other damage which is not covered under Property Insurance. The Contractor shall make such arrangements for watchman service as he considers necessary and he shall be responsible for all loss or damage of his property, equipment, material, etc., at the site, and he shall make good such damage or loss without any additional cost to the Owner.
- 5. EXISTING IMPROVEMENTS PROTECTION
 - a) The Contractor shall be entirely responsible for all injuries to water pipes, electric conduits or cables, drains, sewers, gas mains, poles, telephones and telegraph lines, streets, pavements, sidewalks, curbs, culverts, retaining walls, building walls, foundation walls, or other structures of any kind met with during the progress of the Work, and shall be liable for damages to public or private property resulting therefrom.

CONSTRUCTION ACCESS, ROADS, AND PARKING AREAS

- 1. CONTRACTOR'S USE OF PREMISES
 - a) The Contractor shall require that all personnel who will enter upon the Owner's property certify their awareness of and familiarity with the requirements of this Section.
- 2. CONSTRUCTION ACCESS
 - a) To avoid traffic conflict with vehicles of the Owner's employees and customers, and to avoid over-loading of streets and driveways elsewhere on the Owner's property, limit the access of trucks and equipment to the route shown (IF SHOWN) on the Drawings as "Access Route". If access route is not shown on the Drawings, coordinate construction access and routes with the Owner's Project Manager.
 - b) Do not permit such vehicles to park on any street or other area of the Owner's property except in the area shown on the Drawings as "Contractor's Parking Area". If not shown on the drawings, the Contractor's Parking Area shall be as designated by the Owner's Project Manager.
 - c) Provide adequate protection for curbs and sidewalks over which trucks and equipment pass to reach the job site.

SECURITY

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C.

a) Restrict the access of all persons entering upon the Owner's property in connection with the Work to the Access Route and to the actual site of the Work.

D. TEMPORARY ENVIRONMENTAL CONTROLS

- GENERAL
 - a) Provide temporary environmental controls at the site of the Work to ensure that construction operations have no harmful effects on adjacent properties and on members of the public who may come in proximity to the Work, and/or the employees of the Owner who are engaged in regular daily tasks and operations and are unable to be relocated to another work site during construction operations.
 - b) Owner reserves the right to stop the Work, at the Contractor's expense, until the Contractor provides necessary control measures for the conditions listed below; additionally, the Owner reserves the right to perform or have performed necessary control measures, should the Contractor refuse to do so at the time requested and to deduct the cost of those expenses from the amount due the Contractor.
- 2. DUST CONTROL
 - a) Provide dust control materials to minimize dust from construction operations. Prevent air-borne dust from dispersing into the atmosphere. WATER CONTROL
 - a). Control surface water to prevent damage to the project, the site and adjoining properties.
 - Control fill, grading, and ditching to direct surface drainage away from excavations, pits, tunnels, and other construction areas; direct drainage to proper runoff channels or storm drainage utilities.
 - b) Provide, operate and maintain hydraulic equipment of adequate capacity to control surface water.
 - c) Dispose of drainage water in a manner to prevent flooding, erosion silting, or runoff of silt or sediment or other damage to all portions of the site or to adjoining properties.
- 4. RODENT CONTROL
 - a) Provide rodent control to prevent infestation of construction or storage areas.
 - 1) Use methods and materials which will not adversely affect conditions at the site or on adjoining properties.
- 5. DEBRIS CONTROL
- a) Maintain all areas free of extraneous debris, waste, and rubbish.
- 6. POLLUTION CONTROL

- a) Prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.
- b) Provide equipment and personnel, perform emergency measures to contain all spillages, and to remove contaminated soils or liquids.
 - 1) Excavate and dispose of all contaminated earth off-site. Replace with suitable compacted fill and topsoil.
- c) Take special measures, as necessary, to prevent harmful substances from entering public waters, including lakes, streams, intermittent drainage channels, and storm or sanitary sewers.

7. EROSION CONTROL

- a) Plan and execute construction and earthwork in a manner to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation.
 - 1) Schedule the Work to minimize the areas of bare soil exposed at one time, if possible.
 - 2) Provide temporary control measures such as berms, dikes, and drains to prevent runoff of silt or sediment from the site.
 - 3) Comply with Section 015713.

E. PROJECT IDENTIFICATION AND SIGNAGE

1. GENERAL

2

- a) Provide and install project identification sign, if located and/or called out on the Drawings.
- SUBMITTALS
- a) Provide shop drawing(s) of proposed sign/sign installation to Owner's Representative for approval, prior to installation
- 3. INSTALLATION
 - a) Provide project sign as detailed on Drawingsb) If not detailed on Drawings provide project id
 - If not detailed on Drawings provide project identification sign per the following minimum requirement:
 - 1) Content
 - aa) Name of project
 - bb) Name of Owner
 - cc) Name of Architect(s) and major consultants
 - dd) Names of Contractor and major subcontractors
 - ee) Allow additional 200 characters of text explaining the project
 - 2) Construction
 - aa) Size: 4' x 8'
 - bb) Materials: Min. 5/8" AC DFPA Exterior Plywood, with (2) 4" x 4" x 12' long pressure treated post supports
 - cc) Paint: paint front and back, seal edges, provide content as approved by Owner's Representative. Conform to recognized sign painting standards in selection of paint materials. Use only professional sign painter with three years minimum experience to apply sign graphics and lettering.
 - Install sign in a manner consistent with length of time of construction operations. Remove sign and fill post holes at project completion.

F. FIELD OFFICES

1. TEMPORARY FACILITIES

Provide and pay for temporary (new, or used if in serviceable condition) facilities and controls needed for the Work, if called out on the Drawings, which may include, but are not necessarily limited to:

- a) Temporary utilities such as heat, water, electricity, and telephone;
- b) Field office for the Contractor's personnel (required if shown on the Drawings; otherwise at the Contractor's option and expense).
 - Conform with requirements for Engineer's Field Office Type B, as defined in Article 646.04 of the Standard Specifications for Road and Bridge Construction Illinois Department of Transportation.
- c) Sanitary facilities;
- d) Enclosures such as tarpaulins, barricades, and canopies;
- e) Temporary fencing of the construction site;
- f) Project sign.

1)

- Comply with Federal, State, and local codes and regulations.
 -) Maintain temporary facilities and controls in proper and safe condition throughout the progress of the work. The Contractor is responsible for conformance with all safety codes and regulations for all Work under his jurisdiction, including that of Sub-Contractors.
- 3. Locate temporary facilities as shown on the Drawings, or as approved by the Owner's Representative if not shown on the Drawings.

SECTION 015713 - EROSION & SEDIMENT CONTROL

A. RELATED DOCUMENTS

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

B. SUMMARY

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- 1. This Section includes the following:
 - a) Site erosion and sediment control
 - b) Silt fencing
 - c) Ditch checks
 - d) Erosion control blankets
 - e) Culvert and inlet protection
 - f) Stabilized entrance
 - Related Sections include the following:
 - a) Division 31 Earthwork.
 - b) Division 32 Exterior Improvements.

3. Erosion and Sediment Control Statement: The Peoria Park District takes the issue of construction related erosion and sediment control extremely seriously. The Peoria Park District is a community leader in the conservation and protection of our area's natural resources. This project will be watched closely by both staff and citizens for compliance with erosion and sediment control regulations and specifications.

C. OUALITY ASSURANCE

- Materials and methods of construction shall comply with the following standards:
 - Illinois Department of Transportation a)
 - b) City of Peoria

1)

- PRODUCTS D.
 - Silt Fencing 1.
 - Fabric for silt fencing shall consist of woven or nonwoven filaments of polypropylene, polyester, or polyethylene. Fabric shall be resistant a) to degradation by ultraviolet light and heat exposure. Fabric shall be rot, insect, and mildew proof, and have a high resistance to tearing.
 - Fabric shall comply with the following physical properties:
 - Grab tensile strength (lb) ASTM D4632 aa)
 - 200 (min) Grab elongation @ break (%) - ASTM D4632 bb) 12 Burst strength (psi) - ASTM D751 250 (min) cc) dd) Trapezoidal tear strength (lb) - ASTM D4533 75 ee) Width (ft) 3.5 (min) ff) Weight (oz/sq. yd) - ASTM D3776 4.0Equivalent opening size 30 (nonwoven) gg) (EOS) sieve no. - Corps of Engrs. CS-02215 50 (woven) hh)
 - Ditch Checks 2.
 - Ditch checks will consist of silt fencing with the addition of wire reinforcement. a)
 - Wire shall be 9 gauge. b)
 - Alternate: Straw bales may be used in lieu of silt fencing c)
 - 3. Posts

4

5.

a)

a)

- Posts shall be standard "T" or "U" steel posts or wood with a minimum cross section of 3 square inches. Posts shall be a minimum of 60" in length. Posts shall be driven a minimum of 24" into the ground.
- Erosion Control Blankets
 - Excelsior Blanket: Excelsior blanket shall consist of a machine produced mat of wood excelsior of 80% 6" or longer fiber length. The wood from which the excelsior blanket is cut shall be properly cured to achieve adequately curled and barbed fibers.
 - The blanket shall be of consistent thickness, with the fiber evenly distributed over the entire area of the blanket. The excelsior 1) blanket shall be covered on the top side with a 90 day biodegradable extruded plastic mesh netting having an approximate minimum opening of 16 x 16 mm (5/8 x 5/8 in.) to an approximate maximum opening of 50 x 25 mm (2 x 1 in.). The netting shall be substantially adhered to the excelsior blanket by a knitting process using biodegradable thread or by an applied degradable adhesive. The netting shall be substantially adhered to the excelsior by a knitting process using biodegradable thread. The netting shall be entwined with the excelsior blanket for maximum strength and ease of handling. 2)
 - The excelsior blanket shall comply with the following:
 - Minimum width, +25 mm (1 in.)aa)
 - Minimum mass + 10% bb)
 - cc) Minimum length of roll, approximately
 - The excelsior blanket shall be smolder resistant.
 - Culvert And Inlet Protection

3)

- Culvert protection shall consist of a ditch check immediately upstream of every culvert entrance. Ditch check shall be installed to protect a) culvert interior from sedimentation.
- b) Inlet protection shall consist of purpose made devices by:
 - Dandy Products, Inc. P. O. Box 1980 Westerville, Ohio 43086-1980 Phone: 1-800-591-2284 Fax: 740-881-2791 www.dandyproducts.com dlc@dandyproducts.com

or

NILEX, Inc. 15171 E. Fremont Drive Centennial, CO 80112 Phone: 1-800-537-4241 Fax: 303-766-1110 www.nilex.com denver@nilex.com

- "Or Equal" substitutions may be made with prior approval of Owner's Representative. c)
- 6. Stabilized Entrance
 - Stabilized entrance shall consist of coarse aggregate laid over geotextile fabric. a)
 - Dimensions: 70' long by 14' wide. b)
 - Geotextile Fabric: as per requirements of "silt fencing". c)
 - d) Aggregate: IDOT Class CA-1, CA-2, cA-3, or CA-4.
- E. EXECUTION
 - Site Erosion And Sediment Control 1.

600 mm (24 in.)

45 m (150 ft)

0.34 kg/sm (0.63 lb/sq yd)

- a) Contractor is responsible for fulfilling terms of City of Peoria Erosion Control Permit and all applicable portions of the "Erosion, Sediment, and Stormwater Control Ordinance of the City of Peoria".
- b) Install control devices as shown on erosion control plan.
- c) Install additional measures as needed to control erosion and sedimentation on the site.
- 2. Silt Fencing Installation
 - a) Install silt fencing according to details in plans. The silt fence shall be entrenched to a minimum depth of 8".
 - b) The silt fence shall be installed on the contour, with the ends extending up-slope.
 - c) Install silt fencing before commencing site clearing work.
 - Ditch Check Installation

3.

6.

- a) Install ditch checks according to details in plans.
- b) Install ditch checks at locations shown on plans.
- c) Install additional ditch checks as needed to control erosion within drainage swales as site conditions and weather dictate.
- d) Install ditch checks immediately after swales are graded.
- 4. Erosion Control Blankets Installation
 - a) Install erosion control blankets as needed to control erosion in drainage swales and at the direction of the Owner's Representative.
- b) Anchor stakes shall be driven at a spacing of 2 feet on center.
- 5. Culvert And Inlet Protection Installation
 - a) Install culvert protection at upstream entrances to all culverts.
 - b) Install culvert protection to intercept waterborne silt and sediment and prevent it from entering culvert pipes.
 - c) Install immediately after culvert installation.
 - d) Install inlet protection according to manufacturer's written instructions at each inlet immediately after inlet construction.
 - Stabilized Construction Entrance Installation
 - a) Install stabilized construction entrance and other approved measures as necessary to limit tracking of soil on to all paved surfaces.
 - b) Comply with all City of Peoria codes limiting tracking of soil on to City streets.

7. Maintenance

- a) Inspect silt fences after each rainfall. Repair fencing, failures, end runs, and erosion cuts immediately.
- b) Remove soil from silt fencing after each rainfall.
- c) Erosion control maintenance and repair shall be considered incidental to the contract.
- d) Tracked soil and sediment shall be removed from all paved surfaces on a daily basis.
- e) Replace or provide new erosion and sediment control measures as needed during construction to provide protection to site and surrounding property for the entire time of construction, or until project is complete.
- 8. Close-Out
 - a) Remove silt fencing and other erosion and sediment control devices after lawn or seeding has been established.
 - b) Soil deposits remaining in place after silt fence is no longer required shall be dressed to conform to existing grade, and seeded with appropriate seed material.

SECTION 016000 - PRODUCT REQUIREMENTS

- A. MATERIALS AND EQUIPMENT
 - 1. STANDARD SPECIFICATIONS
 - a) Reference herein to known standard specifications of governmental agencies or technical societies shall refer to the latest edition of such specifications, adopted and published at date of these Specifications.
 - 2. MANUFACTURED ARTICLES
 - All manufactured articles, materials and equipment to be incorporated in the work shall be new (unless otherwise specified) and of the quality specified and shall be used, erected, installed, connected, cleaned and conditioned as directed by and in conformity with job conditions to produce the best results obtainable.
 - 1) Field measurements for all special products and materials which requires close tolerances or fitting into other items or components of the Work shall be taken on the job by the party furnishing the materials.
 - 3. QUALITY ASSURANCE
 - a) Per the Supplementary Instructions to Bidders, the Bidder by submission of a signed bid form, agrees to install products and equipment by brand and model name or names specified in the Technical Specifications, Divisions 02-35. Substitutions are allowed only in conformance to the following:
 - 1) <u>Proprietary Specification Requirement</u>: Where only a single product or manufacturer is named, provide the product indicated. No substitutions will be permitted.
 - Semiproprietary Specification Requirement: Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted
 - aa) Where either of the two cases above prevail, and the named product is accompanied by "or approved equal" substitutions will be allowed only upon written approval of the Owner's Representative <u>prior to submission of bids</u>.
 - 3) <u>Non-Proprietary Specification Requirement</u>: When the Specifications lists products or manufacturers that are available and are accompanied by "or equal", the Contractor may propose any available product that complies with the Specifications' requirements; however, the Owner's Representative shall determine if the produced item complies with those requirements.
 - 4) <u>Descriptive Specification Requirement</u>: Where Specifications describe a product or assembly listing exact characteristics required, with or without use of a brand, trade, or model name, provide a product or assembly that provides the characteristics and otherwise complies with the Contract Documents.
 - 5) <u>Performance Specification Requirement</u>: Where Specifications require compliance with performance requirements, provide products or assembly that comply with these requirements and are recommended by the manufacturer for the application indicated.
 - 6) <u>Compliance with Standards, Codes, and Regulations</u>: Where the Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standard, code, or regulation specified.
 - b) VISUAL MATCHING AND SELECTION. Where the Specifications require matching an established sample or call for "as selected", the Owner's Representative's decision will be final on whether a proposed product matches satisfactorily.

B. STORAGE AND PROTECTION

1. GENERAL

- a) Contractor shall provide and maintain:
 - 1) Storage for materials and equipment to be installed in Project.
 - 2) Protection and security for stored materials and equipment, on and off site.
 - 3) Protection of existing on-site elements to remain.
 - 4) Protection of adjacent properties improvements
- METHODS

2

- a) Store off grade and cover with impervious material all moisture or water vulnerable materials.
- b) Store finished products and equipment in an enclosed building, on or off site.
- c) Maintain integrity of shipping cartons until ready for installation.
- d) Provide separate storage for combustible and non-combustible products.
- e) Follow storage recommendations of product and equipment manufacturers.
- f) Other methods shall be subject to Owner's prior written approval.
- 3. The Contractor shall maintain an emergency phone number where a contact person can be notified at any time, Sundays and holidays included, of an emergency condition due to the work which requires immediate repair or protection.

C. SUBSTITUTIONS

1.

- 1. See "SECTION 016000 A. MATERIALS AND EQUIPMENT" for requirements pertaining to substitution of specified materials, products, equipment, etc.
- 2. Contractor may propose substitute materials, products, equipment, etc., after award of the Bid; however, such proposals are expected to result in a cost savings to the Owner and/or higher quality Work at no additional cost to the Owner.

D. WARRANTIES AND BONDS

- GENERAL
 - a) This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.
 - b) Warranties for the Work and products and installations of each Contractor shall be one (1) year unless specified otherwise in the individual Sections of Divisions 02 through 35.
 - c) Disclaimers and Limitations:
 - Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and Contractors required to countersign special warranties with the Contractor.
 - 2) The responsibility of the Contractor in respect to the required warranties shall not be relieved or limited in any way by the failure of installed components, equipment, materials, etc., due to naturally occurring and/or re-occurring conditions at the site or area of the Work including, but not limited to:
 - aa) ground and soil conditions, especially as related to frost heave;
 - bb) high wind velocities (except those exceeding velocities normally used for calculating wind loading at the site of the Work);
 - cc) rain and water damage (unless caused by winds exceeding normal design limits);
 - dd) ice/snow loading on structures
 - ee) and other naturally occurring or re-occurring site conditions
 - 3) The Contractor shall notify the Owner's Representative, prior to the award of the contract, of any part or component of the Work that is, in his opinion, not designed to accommodate the existing, naturally occurring, or re-occurring conditions of the site, and whether or not a change in the proposed methods of construction, types of equipment, etc., will affect the bid price.
 - aa) Should the proposed change in construction methods, equipment type, etc., result in additional expense, the Owner reserves the right to request proposals from the other bidders and to make award the contract based on the bid amount which includes the proposed change.

2. WARRANTY REQUIREMENTS

- a) Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- b) Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- c) Replacement cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- d) Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights or remedies.
 - aa) Rejection of Warranties: The Owner reserves the rights to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- e) The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.
- f) For specific warranty requirements related to landscape materials, refer to the applicable Section.
- 3. SUBMITTALS

- a) Submit written warranties to the Owner's Representative prior to the date certified for Substantial Completion. If the Owner's Representative's Certificate of Substantial Completion designates a commencement date for warranties other that the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Owner's Representative.
 - When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Owner's Representative within fifteen days of completion of that designated portion of the Work.
- b) Form of Submittal: At Final Completion, compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, Subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- c) Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
- d) Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
- e) Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS", the project title or name, and the name of the Contractor.
- f) When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

SECTION 017300 - EXECUTION

A. GEOTECHNICAL DATA

- 1. If the Owner has caused borings or other subsurface investigations to be made, the data or report pursuant to these investigations will be included in the Project Manual, as an Appendix, and labeled as such.
- 2. The Owner and Owner's Representative do not guarantee the accuracy or validity of the data, nor do they assume any responsibility for the Contractor's interpretation of the data.
- 3. The Contractor's may, at his option, perform additional subsurface investigation, however, it shall be at the Contractor's sole expense.

B. FIELD ENGINEERING

Provide such field engineering services as are required for proper completion of the Work including, but not limited to:

- 1. Establishing and maintaining lines and levels
- 2. Structural design of shores, forms, and similar items provided by the Contractor as part of his means and methods of construction.
- 3. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks and control points. Preserve permanent reference points during construction.

C. COORDINATION OF TRADES AND SUB-CONTRACTORS

- 1. The Contractor shall be responsible for the proper fitting of all work and for the coordination of the operation of all trades, sub-contractors, or materials and men engaged upon the work. He shall be prepared to guarantee to each of his subcontractors the dimensions which may be required for fitting of their work to all surrounding work and shall do, or cause his agents to do, all cutting, fitting, adjusting and patching necessary to make the several parts of the work come together properly and fit the work to receive, or be received by that of other contractors.
- 2. When two or more prime contracts are being executed at one time in such manner that the work on one contract may interfere with the work of another, the Owner's Representative shall decide which contractor shall cease work and which shall continue, or whether the work on both contracts may progress at the same time and in what manner.
 - a) The Contractor shall not cause any unnecessary hindrance or delay to any other contractors on the premises, and shall be responsible for all damages done to the work of other contractors caused by him or by his employees.

D. REFERENCE AND CONTROL POINTS PROVIDED BY OWNER

In addition to layout procedures provided by the Contractor for proper performance of the Contractor's responsibilities:

- 1. Locate and protect existing control points before starting work on the site.
- 2. Preserve permanent reference points during progress of the Work.
- 3. Do not change or relocate reference points or items of the Work without specific approval from the Owner's Representative.
- 4. Promptly advise the Owner's Representative when a reference point is lost or destroyed, or requires relocation because of other changes in the Work.
- 5. Upon direction of the Owner's Representative, require the field engineer to replace reference stakes or markers.
- 6. Locate such replacement according to the original survey control.

E. REFERENCE AND CONTROL POINTS PROVIDED BY THE CONTRACTOR

- 1. If not provided by the Owner (and defined as the responsibility of the Owner in the Contract Documents) establish sufficient general reference points in the form of permanent bench marks, grade stakes or other markers as will enable the Contractor to proceed with the Work.
- 2. The Contractor may lay out his own work, or cause the Work to be laid out by a qualified party such as a Registered Land Surveyor or a Professional Engineer, as necessary.
- 3. The Contractor shall establish and be responsible for all lines, elevations and measurements of the structure utilities, installations, and other Work executed by him under the contract.
 - a) Exercise proper precautions to verify the figures and dimensions shown on the drawings before laying out the work; be responsible for any error resulting from failure to exercise such precaution.

SECTION 017329 - CUTTING AND PATCHING

A. CHASES AND OPENINGS

- 1. The Contractor is responsible for the provision and/or coordination of all chases, openings and recesses required by work of his own forces, subcontractors or separate contractors.
 - a) Each subcontractor or separate contractor shall be responsible for furnishing advance information to the General Contractor as to exact dimensions and locations of such chases and openings, and shall provide and set in place all necessary sleeves, inserts and forms.

- b) Openings shall be accurately located, neatly cut, and no larger than necessary. Provide all rebuilding, patching, refinishing and painting required to restore the construction to original condition.
- 2. Provide shoring, bracing, and support as required to maintain structural integrity of the project.
- 3. Provide protection from cutting and patching operations as required for other portions of the project; protect the Work and existing improvements in proximity to the cutting and patching operations from the elements.

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT & DISPOSAL

A. PERIODIC CLEANING 1. Each Contractor sh

- Each Contractor shall clean up after his own work as needed and/or ensure that sub-contractors clean up after their work and remove
 - accumulations of waste, debris, and rubbish caused by construction operations.
 - a) Remove all waste, rubbish and debris on a daily basis (if needed), as they accumulate, and after completion of the Work.

B. PROJECT COMPLETION

- On completion of the project, the entire job shall be cleaned up and left in perfect condition, including adjacent areas.
- a) Marred surfaces shall be patched or repaired and touched up to match adjoining surfaces.
- b) All rubbish shall be removed from the site before acceptance.
- c) New surfaces and/or exposed elements of the Work shall be protected from stain and marring. These surfaces shall be cleaned to the satisfaction of the Owner's Representative or replaced if said stains or mars are unable to be completely removed

C. GOVERNMENTAL REGULATIONS

. Conduct cleaning and disposal operations in compliance with Federal, State and local ordinances and anti-pollution laws and regulations.

SECTION 017700 - PROJECT CLOSEOUT

A. GENERAL

1.

- Work includes:
- 1. Substantial Completion.
- 2. Final Completion
- 3. Closeout submittals.
- 4. Instruction

B. SUBSTANTIAL COMPLETION

- 1. Prepare and submit the list ("punch-list") required by the first sentence of Paragraph 9.8.2 of the General Conditions.
 - a) Within a reasonable time after receipt of the list the Owner's Representative will inspect to determine status of completion. Should the Owner's Representative determine that the Work is not Substantially Complete:
 - 1) The Owner's Representative will so notify the Contractor, in writing, giving the reasons therefore.
 - 2) Remedy the deficiencies and notify the Owner's Representative when ready for reinspection.
 - 3) The Owner's Representative will reinspect the Work.
 - b) When the Owner's Representative concurs that the Work is Substantially Complete:
 - 1) The Owner's Representative will prepare a "Certificate of Substantial Completion" on AIA form G704, accompanied by the Contractor's list of items to be completed or corrected, as verified and approved by the Owner's Representative.
 - 2) The Owner's Representative will submit the Certificate to the Owner and to the Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.

C. FINAL COMPLETION

1.

- Prepare and submit the notice required by the first sentence of Paragraph 9.10.1 of the General Conditions.
 - a) Verify that the Work is complete including, but not necessarily limited to, the items mentioned in Paragraph 9.8.2 of the General Conditions. Certify that:
 - 1) the Contract Documents have been reviewed;
 - 2) the Work has been inspected for compliance with the Contract Documents;
 - 3) the Work has been completed in accordance with the Contract Documents;
 - 4) equipment and systems have been tested as required, and are operational;
 - 5) the Work is completed and ready for final inspection.

b) The Owner's Representative will make a final inspection to verify status of completion and if all "punch-list" items have been completed, and upon receipt of the Contractor's Final Application for Payment, issue a Certificate of Final Completion. Should the Owner's Representative determine that the Work is incomplete or defective:

- 1) The Owner's Representative will so notify the Contractor, in writing, listing the incomplete or defective work.
- 2) Remedy the deficiencies promptly, and notify the Owner's Representative when ready for reinspection.
- c) FINAL APPLICATION FOR PAYMENT
 - 1) Submit a final Application for Payment to the Owner's Representative, showing all adjustments to the Contract Sum.
 - If needed, the Owner's Representative will prepare a final Change Order showing adjustments to the Contract Sum which were not made previously by Change Orders.
 - 3) Include final waivers of lien from the Contractor, sub-contractors, and major suppliers.
 - 4) Final payment will not be released until all close-out submittals have been made, final cleaning has been performed, and required instruction(s) to Owner's personnel have been accomplished.

D. CLOSEOUT SUBMITTALS

- 1. When the Owner's Representative determines that the Work is acceptable under the Contract Documents, he will request the Contractor to make closeout submittals. Closeout submittals include, but are not necessarily limited to:
 - a) Project record documents described in "Section 017839".
 - b) Operation and maintenance manuals/data as described in "Section 017823".

- Warranties and bonds as described in "Section 016000". c)
- d) Keys and keying schedule;
- Spare parts and materials extra stock; e)
- Evidence of compliance with requirements of governmental agencies having jurisdiction including, but not necessarily limited to: f)
 - Certificates of Inspection, as required 1)
 - Certificate(s) of Occupancy 2)
- Certificates of Insurance for products and completed operations; g) h)
 - Evidence of payment and release of liens.
 - Consent of Surety to Final Payment 1)
 - Contractor's Final Waiver of Lien 2)
 - 3) Separate releases or Waivers of Lien for sub-contractors, suppliers and others with lien rights against the Owner, together with a list of those parties.
- i) List of subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends, and holidays.

SECTION 017823 - OPERATING/MAINTENANCE MANUALS & INSTRUCTION

A. GENERAL

- 1. Compile operating/product data and related information appropriate for Owner's maintenance and operation of products and equipment provided under the Contract.
- Instruct Owner's personnel in operation and maintenance of products, equipment and systems. 2.
- 3. OPERATIONS AND MAINTENANCE DATA REQUIRED:
 - Operating and maintenance manuals are required for each area of Work which is listed below, if that area of Work is included within the a) scope of Work of the project:
 - 1) HVAC
 - 2) Plumbing - including water supply, sewage and waste disposal
 - Electrical 3)
 - 4) Fire sprinkler system
 - 5) Communications equipment and systems
 - Materials and finishes 6)
 - 7) Flooring

В. OPERATIONS/MAINTENANCE MANUALS - FORM OF SUBMITTAL

- Prepare operating and maintenance manuals in the form of an instructional manual, utilizing heavy-duty, durable 3-ring vinyl covered loose-leaf 1. binders, for use by the Owner's operating personnel. Organize into suitable sets of manageable size. Where possible, assemble instructions for similar equipment into a single binder. Provide when drawings or diagrams are required as part of the manual.
- Provide sturdy manila or kraft envelope, accordion type file folder, or cardboard file boxes, properly labeled, of sufficient size to contain all 2 submittals
- 3 Submit one copy of data in final form at least fifteen days before final inspection. This copy will be returned within fifteen days after final inspection, with comments. After final inspection make corrections or modifications to comply with the Owner's Representative's comments and submit three copies of each approved manual to the Owner's Representative
- 4 WARRANTIES, BONDS AND SERVICE CONTRACTS
 - Provide a copy of each warranty, bond or service contract in the appropriate manual for the information of the Owner's operating a) personnel. Provide written data outlining procedures to be followed in the event of product failure. List circumstances and conditions that would affect validity of the warranty or bond. Provide list for each product containing name, address, and phone number of:
 - Contractor. 1)
 - 2) Subcontractor.
 - 3) Maintenance contractor, as appropriate.
 - 4) Local supply source for parts and replacement.
 - Identify area of responsibility of each contractor.

C. MANUAL FOR MATERIALS AND FINISHES

b)

- 1. Submit two (2) copies of complete manual in final form.
- Refer to individual Specification Sections for additional requirements on care and maintenance of materials and finishes. 2.
- 3. Content for products, applied materials and finishes:
 - Manufacturer's data, giving full information on products. a)
 - Catalog number, size, composition. 1)
 - 2) Color and texture designations.
 - 3) Information for re-ordering special-manufactured products.
- 4. Instructions for care and maintenance.
 - Manufacturer's recommendations for types of cleaning agents and methods. a)
 - Cautions against cleaning agents and methods detrimental to product. b)
 - Recommended cleaning and maintenance schedule. c)
- Moisture-Protection and Weather-Exposed Products: Provide complete manufacturer's data with instructions on inspection, maintenance and 5. repair of products exposed to the weather or designed for moisture-protection purposes.
- 6. Manufacturer's Data: Provide manufacturer's data giving detailed information, including the following, as applicable:
 - Applicable standards. a)
 - b) Chemical composition.
 - Installation details. c)
 - d) Inspection procedures.
 - e) Maintenance information.
 - f) Repair procedures.

D. INSTRUCTION 1. Instruct t

2.

- Instruct the Owner's personnel in proper operation and maintenance of systems, equipment, and similar items which were provided as part of the Work including, but not limited to;
 - a) Mechanical
 - b) Water supply
 - c) Electrical service/distribution and lighting
 - d) Other items or systems as required in individual sections of the Technical Specifications
- Instructions for the Owner's Personnel: For instruction of the Owner's operating and maintenance personnel, use experienced instructors thoroughly trained and experienced in the operation and maintenance of the equipment or system involved.

SECTION 017839 - PROJECT RECORD DOCUMENTS (AS-BUILTS)

A. DOCUMENTS REQUIRED AT SITE

- 1. The Contractor shall maintain at the job site one copy of all Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders, and other Contract modifications.
 - a) Each of these project record documents shall be clearly marked "Project Record Copy"
 - b) Shall be maintained in good condition
 - c) shall be available at all times for inspection by the Park District, and shall not be used for construction purposes.
- B. Project-record drawings shall be marked up to show significant changes made during construction progress, referenced to visible and accessible features of the structures. Project-record drawings shall be kept current and no work shall be concealed until required information has been recorded.
- C. Record-documents shall be submitted in satisfactory condition to the Park District at the completion of the project. FINAL COMPLETION OF THE PROJECT WILL NOT BE ATTAINED, AND FINAL PAYMENT WILL BE WITHHELD, UNTIL PROJECT "AS-BUILTS" ARE SUBMITTED TO AND APPROVED BY THE OWNER'S REPRESENTATIVE.

END OF GENERAL REQUIREMENTS

Project Manual for

LAKEVIEW GYMNASIUM RENOVATION

Lakeview Recreational Center Peoria Park District 2218 N. Prospect Road Peoria, IL 61603

OWNER:

ARCHITECT & MECHANICAL:

Peoria Park District 1314 N. Park Road Peoria, IL 61603

apace**Design** Architects + Engineers 2112 E. War Memorial Drive Peoria, IL 61614-8002 Project No. 24929.04

ELECTRICAL ENGINEER:

STRUCTURAL ENGINEER:

CIVIL ENGINEER:

Keith Engineering Design Inc. 707 N.E. Jefferson Ave. Peoria, IL 61603

Hanson Professional Services Inc. 7625 N. University St. Suite 200 Peoria, IL 61614

Mohr and Kerr 5901 N. Prospect, Ste. 6B Peoria, IL 61614

DATE:

05 June 2017

SET NO.



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apaceDesign Architects + Engineers Project No. 2014909.01

PROJECT MANUAL FOR: Lakeview Gymnasium Renovation Lakeview Recreational Center Peoria Park District 2218 N. Prospect Road Peoria, IL 61603 OWNER: Peoria Park District 1314 N. Park Road Peoria, IL 61603 ARCHITECT & MECHANICAL: apace**Design** Architects + Engineers 2112 E. War Memorial Drive Peoria, IL. 61614-8002 CIVIL ENGINEER: Mohr and Kerr 5901 N. Prospect, Ste. 6B Peoria, IL 61614 Keith Engineering Design Inc. ELECTRICAL ENGINEER: 707 N.E. Jefferson Ave. Peoria, IL 61603 STRUCTURAL ENGINEER: Hanson Professional Services Inc. 7625 N. University St. Suite 200

DATE:

07 September 2017

Peoria, IL 61614

<u>NOTE</u>: THESE SPECIFICATIONS UTILIZE THE (UPDATED) 2004 CSI MASTERFORMAT. CERTAIN DIVISION NUMBERS HAVE CHANGED FROM THE PREVIOUS FORMAT.

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312000 EARTH MOVING FOR STRUCTURES

SPECIFIERS: apaceDesign Architects + Engineers
Architectural: Benjamin L. Kauffman
Mechanical: Mark A. Cordes
Tel.: (309) 685-4722 Fax: (309) 685-4784

Keith Engineering Design Electrical: Tracy D. Caulkins Tel.: (309) 938-4005 Fax: (309) 214-0063

Hanson Professional Services Structural: Tom DeJarld Tel.: (309) 691-0902 Fax: (309) 691-1327

Mohr and Kerr Civil: Steve Kerr Tel: (309) 692-8500 Fax: (309) 692-8501

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Project information.
 - 2. Work covered by Contract Documents.
 - 3. Phased construction.
 - 4. Work under separate contracts.
 - 5. Access to site.
 - 6. Coordination with occupants.
 - 7. Work restrictions.
 - 8. Specification and drawing conventions.
 - 9. Miscellaneous provisions.
- B. Related Requirements:
 - Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
- 1.2 PROJECT INFORMATION
 - A. Project Identification: Lakeview Gymnasium Renovation, 2014909.01.
 1. Project Location: 1013 W. Lake Ave., Peoria, IL 61614.
 - B. Owner: Peoria Park District, 1125 W. Lake Ave., Peoria, IL 61614.1. Owner's Representative: Becky Fredrickson, 309-686-3386.
 - C. Architect: apaceDesign Architects + Engineers, 2112 E. War Memorial Drive, Peoria, IL 61614, 309-685-4722.
- 1.3 WORK COVERED BY CONTRACT DOCUMENTS
 - A. The Work of Project is defined by the Contract Documents and consists of the following:
 - Project consists of partial building demolition and renovation of the existing recreational facility. Abatement of hazardous material is included. Site/utility work, masonry, carpentry, misc. structural, plumbing, HVAC, electrical, roofing, and interior finishes are associated with the renovation of the facility.
 - B. Type of Contract.1. Project will be constructed under a single prime contract.

1.4 WORK UNDER SEPARATE CONTRACTS

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts. B. Concurrent Work: Owner has awarded or will award separate contract(s)or perform the work in-house for the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.

1. Fine grading, seeding, landscaping, and playground equipment.

1.5 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Limits: Confine construction operations to project work limited. Connections of utilities may be required beyond project limited and shall be coordinated with Owner a minimum 72 hours in advance and require a written notice to proceed from the Owner.
 - 2. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials, unless Owner's approves areas in writing.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.6 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and existing, adjacent building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's dayto-day operations. Maintain existing exits unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 - 2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.
 - Facility will remain open during construction of the project. Take extra precautions to ensure patrons safety. Hours of operation are from 8:00 AM - 8:00 PM.
- B. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the

Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

- 1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
- 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
- 3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
- 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.7 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 - 2. Obtain Architect's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.
- F. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.
- 1.8 SPECIFICATION AND DRAWING CONVENTIONS
 - A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

- Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
- 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.
- PART 2 PRODUCTS (Not Used)
- PART 3 EXECUTION (Not Used)
- END OF SECTION 011000

SECTION 012300 - ALTERNATES

- PART 1 GENERAL
- 1.1 SUMMARY
 - A. Section includes administrative and procedural requirements for alternates.
- 1.2 DEFINITIONS
 - A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.
- PART 2 PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Add Alternate No. 1: Sprinkler System (Misc. Rooms).

- 1. Alternate: All work required to provide and install a sprinkler system in Rooms 112, 113, 114, 117, 118, and 119. See fire protection plans, details, etc.
- B. Add Alternate No 2: Sprinkler System (Gymnasium).
 - 1. Alternate: All work to provide and install a sprinkler system in the existing Gymnasium. See fire protection plans, details, etc.

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

- 1.1 SUMMARY
 - A. Section includes administrative and procedural requirements for substitutions.
 - B. Related Requirements:
 - 1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
- 1.2 DEFINITIONS
 - A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- 1.3 ACTION SUBMITTALS
 - A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use CSI Form 13.1A.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

- i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
- j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
- k. Cost information, including a proposal of change, if any, in the Contract Sum.
- 1. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
- m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.
- PART 2 PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - Requested substitution will not adversely affect Contractor's construction schedule.
 - c. Requested substitution has received necessary approvals of authorities having jurisdiction.
- d. Requested substitution is compatible with other portions of the Work.
- e. Requested substitution has been coordinated with other portions of the Work.
- f. Requested substitution provides specified warranty.
- g. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed.

PART 3 - EXECUTION (Not Used)

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

- 1.1 SUMMARY
 - A.Section includes administrative and procedural requirements for handling and processing Contract modifications.
- 1.2 MINOR CHANGES IN THE WORK
 - A.Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions".
- 1.3 PROPOSAL REQUESTS
 - A.Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - Work Change Proposal Requests issued by Architect are not 1. instructions either to stop work in progress or to execute the proposed change.
 - Within time specified in Proposal Request or 20 days, when not 2. otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - Include a list of quantities of products required or a. eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - Include costs of labor and supervision directly attributable с. to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - Quotation Form: Use CSI Form 13.6D, "Proposal Worksheet e. Summary, " and Form 13.6C, "Proposal Worksheet Detail".
 - B.Contractor-Initiated Work Change Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
 - Include a statement outlining reasons for the change and the 1. effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - Include a list of quantities of products required or eliminated 2. and unit costs, with total amount of purchases and credits to be

made. If requested, furnish survey data to substantiate quantities.

- Indicate applicable taxes, delivery charges, equipment rental, 3. and amounts of trade discounts.
- 4. Include costs of labor and supervision directly attributable to the change.
- Include an updated Contractor's construction schedule that 5. indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- Comply with requirements in Section 012500 "Substitution 6. Procedures" if the proposed change requires substitution of one product or system for product or system specified.
- 7. Work Change Proposal Request Form: Use CSI Form 13.6A, "Change Order Request (Proposal)," with attachments CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail".

1.4 ADMINISTRATIVE CHANGE ORDERS

- A.Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B.Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.
- 1.5 CHANGE ORDER PROCEDURES
 - A.On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.
 - Change Orders are written documents describing changes in the 1. Work, in the Contract Sum, in the Contract Time of Completion, or any combination thereof. Change Orders must be signed by both the Owner and the Architect/Owner's Representative prior to proceeding with the Work subject to the Change Order. **REQUESTS** FOR "EXTRA'S" OR OTHER ADDITIONAL PAYMENTS OVER AND ABOVE THE CURRENT CONTRACT SUM WILL NOT BE CONSIDERED WITHOUT THE PRIOR, WRITTEN APPROVAL OF BOTH THE OWNER AND THE OWNER'S REPRESENTATIVE.
 - PROCESSING CHANGE ORDERS. a.
 - 1. Orders will be dated and will be numbered in sequence.
 - 2. The Change Order will describe the change or changes, or will refer to the Proposal Requests or Field Orders involved.
 - 3. The Owner's Representative will issue three copies of each Change Order to the Contractor.
 - 4. The Contractor promptly shall sign all three copies and return them to the Owner's Representative.

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- 5. The Owner and Owner's Representative will retain two signed copies in their files, and will forward one signed copy to the Contractor.
- 6. Should the Contractor disagree with the stipulated change in Contract Sum or change in Contract Time of Completion, or both:
 - i. The Contractor promptly shall return all three of the Change Orders, unsigned by him, to the Owner's Representative with a letter signed by the Contractor stating the reason or reasons for the Contractor's disagreement.
 - ii. The Contractor's disagreement with the Change Order shall not in any way relieve the Contractor of his responsibility to proceed with the change as ordered and to seek settlement of the dispute under pertinent provisions of the Contract Documents.
- 1.6 CONSTRUCTION CHANGE DIRECTIVE
 - A.Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - Construction Change Directive contains a complete description of 1. change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
 - B.Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
- PART 2 PRODUCTS (Not Used)
- PART 3 EXECUTION (Not Used)

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Section 012200 "Unit Prices" for administrative requirements governing the use of unit prices.
 - 3. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 4. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.
- 1.2 SCHEDULE OF VALUES
 - A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
 - B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange schedule of values consistent with format of AIA Document G703.
 - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.

- a. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
- 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
- 5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
- 6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
- 7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
- 8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
- 9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.
- 1.3 APPLICATIONS FOR PAYMENT
 - A. Applications for Payment
 - 1. Progress payments will be made only if specifically called for in the Agreement. In all other cases, the Contractor may submit an Application for Payment (3 copies) upon Substantial Completion (95% of the Contract Sum), with the balance of the Contract Sum to be paid at Final Completion.
 - a. Paragraph #52 of the Supplementary Conditions defines the documentation required for each payment request.
 - b. Applications for payment shall be delivered to the Owner's Project Manager at: Department of Planning, Design, and Construction, Peoria Park District, Bradley Park Equipment Services, 1314 N. Park Road, Peoria, IL 61604
 - B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
 - C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
 - D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of

Contractor. Architect will return incomplete applications without action.

- 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
- 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
 - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit conditional final or full waivers.
 - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 - 1. List of subcontractors.
 - 2. Schedule of values.
 - 3. Contractor's construction schedule (preliminary if not final).
 - 4. Schedule of unit prices.
 - 5. Submittal schedule (preliminary if not final).
 - 6. List of Contractor's staff assignments.
 - 7. List of Contractor's principal consultants.
 - 8. Copies of building permits.
 - 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 - 10. Initial progress report.
 - 11. Report of preconstruction conference.
 - 12. Certificates of insurance and insurance policies.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

- 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 - 1. Evidence of completion of Project closeout requirements.
 - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 - 3. Updated final statement, accounting for final changes to the Contract Sum.
 - 4. AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
 - 5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
 - 6. AIA Document G707-1994, "Consent of Surety to Final Payment."
 - 7. Evidence that claims have been settled.
 - 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 - 9. Final liquidated damages settlement statement.
- PART 2 PRODUCTS (Not Used)
- PART 3 EXECUTION (Not Used)

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

- 1.1 SUMMARY
 - Section includes administrative provisions for coordinating Δ construction operations on Project including, but not limited to, the following:
 - 1. Coordination drawings.
 - 2. Requests for Information (RFIs).
 - 3. Project Web site.
 - 4. Project meetings.

в. Related Requirements:

- 1. Section 011200 "Multiple Contract Summary" for a description of the division of work among separate contracts and responsibility for coordination activities not in this Section.
- Section 017300 "Execution" for procedures for coordinating 2. general installation and field-engineering services, including establishment of benchmarks and control points.

1.2 DEFINITIONS

RFI: Request from Owner, Architect, or Contractor seeking information Α. required by or clarifications of the Contract Documents.

1.3 INFORMATIONAL SUBMITTALS

- Subcontract List: Prepare a written summary identifying individuals or Α. firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.

1.4 GENERAL COORDINATION PROCEDURES

- Coordination: Coordinate construction operations included in different Α. Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - Schedule construction operations in sequence required to obtain 1. the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - Coordinate installation of different components to ensure maximum 2. performance and accessibility for required maintenance, service, and repair.

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- Make adequate provisions to accommodate items scheduled for later 3. installation.
- Prepare memoranda for distribution to each party involved, outlining в. special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - Prepare similar memoranda for Owner and separate contractors if 1. coordination of their Work is required.
- Administrative Procedures: Coordinate scheduling and timing of C. required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's construction schedule.
 - Preparation of the schedule of values. 2.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.
 - 8. Startup and adjustment of systems.

1.5 COORDINATION DRAWINGS

- Α. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
 - Content: Project-specific information, drawn accurately to a 1. scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - Indicate functional and spatial relationships of components a. of architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- Β. Coordination Drawing Organization: Organize coordination drawings as follows:
 - 1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid.
 - Plenum Space: Indicate subframing for support of ceiling and wall 2. systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings.

- Mechanical Rooms: Provide coordination drawings for mechanical 3. rooms showing plans and elevations of mechanical, plumbing, fireprotection, fire-alarm, and electrical equipment.
- Structural Penetrations: Indicate penetrations and openings 4. required for all disciplines.
- 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
- Review: Architect will review coordination drawings to confirm 6. that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility.
- 1.6 REQUESTS FOR INFORMATION (RFIs)
 - General: Immediately on discovery of the need for additional Α. information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 - Architect will return RFIs submitted to Architect by other 1. entities controlled by Contractor with no response.
 - Coordinate and submit RFIs in a prompt manner so as to avoid 2. delays in Contractor's work or work of subcontractors.
 - Content of the RFI: Include a detailed, legible description of item в. needing information or interpretation and the following:
 - Project name. 1.
 - 2. Project number.
 - 3. Date.
 - 4. Name of Contractor.
 - 5. Name of Architect.
 - 6. RFI number, numbered sequentially.
 - 7. RFI subject.
 - 8. Specification Section number and title and related paragraphs, as appropriate.
 - 9. Drawing number and detail references, as appropriate.
 - 10. Field dimensions and conditions, as appropriate.
 - 11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 - 12. Contractor's signature.
 - 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - RFI Forms: AIA Document G716. C.
 - Architect's Action: Architect will review each RFI, determine action D. required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
 - The following RFIs will be returned without action: 1.
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.

- Requests for coordination information already indicated in c. the Contract Documents.
- Requests for adjustments in the Contract Time or the Contract d. Sum.
- Requests for interpretation of Architect's actions on e. submittals.
- f. Incomplete RFIs or inaccurately prepared RFIs.
- 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
- 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
 - а If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized Е. by the RFI number. Submit log weekly. Use CSI Log Form 13.2B.
 - 1. Project name.
 - 2. Name and address of Contractor.
 - 3. Name and address of Architect.
 - 4. RFI number including RFIs that were dropped and not submitted.
 - 5. RFI description.
 - 6. Date the RFI was submitted.
 - 7. Date Architect's response was received.
- On receipt of Architect's action, update the RFI log and immediately F. distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
 - Identification of related Minor Change in the Work, Construction 1. Change Directive, and Proposal Request, as appropriate.
 - Identification of related Field Order, Work Change Directive, and 2. Proposal Request, as appropriate.

PROJECT MEETINGS 1.7

- General: Schedule and conduct meetings and conferences at Project site Α. unless otherwise indicated.
 - Attendees: Inform participants and others involved, 1. and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 - Agenda: Prepare the meeting agenda. Distribute the agenda to all 2. invited attendees.
 - 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- Preconstruction Conference: Schedule and conduct a preconstruction в. conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.

- Attendees: Authorized representatives of Owner, Architect, and 1. their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
- Agenda: Discuss items of significance that could affect progress, 2. including the following:
 - Tentative construction schedule. а.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for RFIs.
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - Distribution of the Contract Documents. i.
 - j. Submittal procedures.
 - k. Preparation of record documents.
 - 1. Use of the premises and existing building.
 - m. Work restrictions.
 - n. Working hours.
 - Owner's occupancy requirements. ο.
 - p. Responsibility for temporary facilities and controls.
 - q. Procedures for moisture and mold control.
 - r. Procedures for disruptions and shutdowns.
 - s. Construction waste management and recycling.
 - t. Parking availability.
 - u. Office, work, and storage areas.
 - v. Equipment deliveries and priorities.
 - w. First aid.
 - x. Security.
 - y. Progress cleaning.
- Minutes: Entity responsible for conducting meeting will record 3. and distribute meeting minutes.
- Preinstallation Conferences: Conduct a preinstallation conference at C. Project site before each construction activity that requires coordination with other construction.
 - Attendees: Installer and representatives of manufacturers and 1. fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - q. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility problems.

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- k. Time schedules.
- 1. Weather limitations.
- Manufacturer's written instructions. m.
- n. Warranty requirements.
- o. Compatibility of materials.
- p. Acceptability of substrates.
- q. Temporary facilities and controls.
- r. Space and access limitations.
- Regulations of authorities having jurisdiction. s.
- t. Testing and inspecting requirements.
- u. Installation procedures.
- v. Coordination with other work.
- w. Required performance results.
- x. Protection of adjacent work.
- y. Protection of construction and personnel.
- Record significant conference discussions, agreements, 3. and disagreements, including required corrective measures and actions.
- Reporting: Distribute minutes of the meeting to each party 4. present and to other parties requiring information.
- Do not proceed with installation if the conference cannot be 5. successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at biweekly intervals.
 - Attendees: In addition to representatives of Owner and Architect, 1. each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - Agenda: Review and correct or approve minutes of previous 2. progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - Contractor's Construction Schedule: Review progress since the a. last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - Review schedule for next period. 1)
 - Review present and future needs of each entity present, b. including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.

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- 9) Progress cleaning.
- 10) Quality and work standards.
- Status of correction of deficient items.
 Field observations.
- 13) Status of RFIs.
- 14) Status of proposal requests.
- 15) Pending changes.
- 16) Status of Change Orders.
- 17) Pending claims and disputes.
- 18) Documentation of information for payment requests. Minutes: Entity responsible for conducting the meeting will 3. record and distribute the meeting minutes to each party present and to parties requiring information.
 - Schedule Updating: Revise Contractor's construction schedule a. after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- PART 2 PRODUCTS (Not Used)
- PART 3 EXECUTION (Not Used)

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- Section includes administrative and procedural requirements for Α. documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's construction schedule.
 - 2. Construction schedule updating reports.
 - 3. Daily construction reports.
 - 4. Site condition reports.

1.2 DEFINITIONS

- Activity: A discrete part of a project that can be identified for Α. planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- CPM: Critical path method, which is a method of planning and в. scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- Critical Path: The longest connected chain of interdependent C. activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- Float: The measure of leeway in starting and completing an activity. D.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.

1.3 INFORMATIONAL SUBMITTALS

- Format for Submittals: Submit required submittals in the following Α. format: 1. PDF electronic file.
- в. Construction Schedule Updating Reports: Submit with Applications for Payment.
- Daily Construction Reports: Submit at weekly intervals. C.
- Site Condition Reports: Submit at time of discovery of differing D. conditions.

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COORDINATION 1.4

- Coordinate Contractor's construction schedule with the schedule of Α. values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - Secure time commitments for performing critical elements of the 1. Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.
- PART 2 PRODUCTS
- CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL 2.1
 - Time Frame: Extend schedule from date established for commencement of Α. the Work to date of final completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
 - в. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 - Activity Duration: Define activities so no activity is longer 1. than 20 days, unless specifically allowed by Architect.
 - 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - Submittal Review Time: Include review and resubmittal times 3. indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 - Startup and Testing Time: Include no fewer than 15 days for 4. startup and testing.
 - Substantial Completion: Indicate completion in advance of date 5. established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 - Punch List and Final Completion: Include not more than 30 days 6. for completion of punch list items and final completion.
 - Constraints: Include constraints and work restrictions indicated in C. the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 - Phasing: Arrange list of activities on schedule by phase. 1.
 - 2. Work under More Than One Contract: Include a separate activity for each contract.
 - 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 - 4. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.

- e. Use of premises restrictions.
- f. Provisions for future construction.
- g. Seasonal variations.
- h. Environmental control.
- 5. Work Stages: Indicate important stages of construction for each major portion of the Work.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- Upcoming Work Summary: Prepare summary report indicating activities Ε. scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
 - 1. Unresolved issues.
 - 2. Unanswered Requests for Information.
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
 - 5. Pending modifications affecting the Work and Contract Time.
- Recovery Schedule: When periodic update indicates the Work is 14 or F. more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule.
- 2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)
 - Gantt-Chart Schedule: Submit a comprehensive, fully developed, Α. horizontal, Gantt-chart-type, Contractor's construction schedule within 30 days of date established for commencement of the Work.
 - Preparation: Indicate each significant construction activity в. separately. Identify first workday of each week with a continuous vertical line.
 - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.3 REPORTS

- Daily Construction Reports: Prepare a daily construction report Α. recording the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - List of separate contractors at Project site. 2.
 - 3. Approximate count of personnel at Project site.
 - 4. Equipment at Project site.
 - 5. Material deliveries.
 - 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 - 7. Accidents.
 - 8. Meetings and significant decisions.
 - 9. Unusual events.
 - 10. Stoppages, delays, shortages, and losses.
 - 11. Meter readings and similar recordings.
 - 12. Emergency procedures.
 - 13. Orders and requests of authorities having jurisdiction.

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- 14. Change Orders received and implemented.
- 15. Construction Change Directives received and implemented.
- 16. Services connected and disconnected.
- 17. Equipment or system tests and startups.
- 18. Partial completions and occupancies.
- 19. Substantial Completions authorized.
- Site Condition Reports: Immediately on discovery of a difference в. between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.
- PART 3 EXECUTION
- 3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE
 - Contractor's Construction Schedule Updating: At monthly intervals, Α. update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - Revise schedule immediately after each meeting or other activity 1. where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - Include a report with updated schedule that indicates every 2. change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate final completion percentage for each activity.
 - Distribution: Distribute copies of approved schedule to Architect в. Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - When revisions are made, distribute updated schedules to the same 2. parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
 - 1. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 2. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 3. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 4. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action.
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.3 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Electronic copies of digital data files of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed

because of need to review submittals concurrently for coordination.

- a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
- D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.
 - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 - 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 - 3. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Construction Manager.
 - e. Name of Contractor.
 - f. Name of subcontractor.
 - g. Name of supplier.
 - h. Name of manufacturer.
 - i. Submittal number or other unique identifier, including revision identifier.
 - Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
 - j. Number and title of appropriate Specification Section.
 - k. Drawing number and detail references, as appropriate.
 - 1. Location(s) where product is to be installed, as appropriate.
 - m. Other necessary identification.
 - 4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
 - 5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.

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- a. Transmittal Form for Paper Submittals: Provide locations on form for the following information:
 - 1) Project name.
 - 2) Date.
 - 3) Destination (To:).
 - 4) Source (From:).
 - 5) Name and address of Architect.
 - 6) Name of Construction Manager.
 - 7) Name of Contractor.
 - 8) Name of firm or entity that prepared submittal.
 - 9) Names of subcontractor, manufacturer, and supplier.
 - 10) Category and type of submittal.
 - 11) Submittal purpose and description.
 - 12) Specification Section number and title.
 - 13) Specification paragraph number or drawing designation and generic name for each of multiple items.
 - 14) Drawing number and detail references, as appropriate.
 - 15) Indication of full or partial submittal.
 - 16) Transmittal number, numbered consecutively.
 - 17) Submittal and transmittal distribution record.
 - 18) Remarks.
 - 19) Signature of transmitter.
- E. Options: Identify options requiring selection by Architect.
- F. Deviations: Identify deviations from the Contract Documents on submittals.
- G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.
- PART 2 PRODUCTS
- 2.1 SUBMITTAL PROCEDURES
 - A. General Submittal Procedure Requirements:
 - 1. Action Submittals: Submit three paper copies of each submittal unless otherwise indicated. Architect will return one copy.
 - Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Architect will not return copies.

- 3. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a notarized statement on original paper copy certificates and certifications where indicated.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 - 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 - 5. Submit Product Data before or concurrent with Samples.
 - 6. Submit Product Data in the following format:
 - a. Three paper copies of Product Data unless otherwise indicated. Architect will return one copy.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 - Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
 - 3. Submit Shop Drawings in the following format:
 - a. Three opaque copies of each submittal. Architect and Construction Manager will retain two copies; remainder will be returned.

- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 - 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 - 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 - 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 - 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.
 - 1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 - 1. Submit product schedule in the following format:
 - a. Three paper copies of product schedule or list unless otherwise indicated. Architect will return one copy.

- F. Coordination Drawings Submittals: Comply with requirements specified in Section 013100 "Project Management and Coordination."
- G. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."
- H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures.
- I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."
- J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."
- K. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."
- L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by

manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

- T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
- U. Schedule of Tests and Inspections: Comply with requirements specified in Section 014000 "Quality Requirements."
- V. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- W. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- X. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- Y. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- 2.2 DELEGATED-DESIGN SERVICES
 - A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
 - B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

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PART 3 - EXECUTION

- 3.1 CONTRACTOR'S REVIEW
 - A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
 - B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."
 - C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-assurance and control services required by Architect, Owner or authorities having jurisdiction are not limited by provisions of this Section.
 - 3. Specific test and inspection requirements are not specified in this Section.

1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect or Construction Manager.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
 - 1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

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- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.3 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.4 INFORMATIONAL SUBMITTALS

- A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
 - 2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.

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B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

1.5 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:
 - 1. Name, address, and telephone number of representative making report.
 - 2. Statement on condition of substrates and their acceptability for installation of product.
 - 3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - 4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - 5. Other required items indicated in individual Specification Sections.
- C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.

- c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
- d. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.
- 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 6. Demolish and remove mockups when directed unless otherwise indicated.
- K. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections.
- 1.7 QUALITY CONTROL
 - A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 - 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
 - B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
 - 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these qualitycontrol services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

- 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
- 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
- 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
- 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 - Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 - 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 - 6. Do not perform any duties of Contractor.
- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 7. Security and protection for samples and for testing and inspecting equipment at Project site.
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- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- 1.8 SPECIAL TESTS AND INSPECTIONS
 - A. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections and as follows:
 - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
 - 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 - Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 - 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - 6. Retesting and reinspecting corrected work.
- PART 2 PRODUCTS (Not Used)
- PART 3 EXECUTION
- 3.1 TEST AND INSPECTION LOG
 - A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
 - B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.
- 3.2 REPAIR AND PROTECTION
 - A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as

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invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

- PART 1 GENERAL
- 1.1 SUMMARY
 - Section includes requirements for temporary utilities, support Α. facilities, and security and protection facilities.
 - в. Related Requirements: Section 011000 "Summary" for work restrictions and limitations on 1. utility interruptions.
- USE CHARGES 1.2
 - General: Installation and removal of and use charges for temporary Α. facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to Architect, testing agencies, and authorities having jurisdiction.
 - Water and Sewer Service from Existing System: Water from Owner's Β. existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
 - С. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- INFORMATIONAL SUBMITTALS 1.3
 - Site Plan: Show temporary facilities, utility hookups, staging areas, Α. and parking areas for construction personnel.
 - в. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
 - Fire-Safety Program: Show compliance with requirements of NFPA 241 and C. authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire prevention program.
- 1.4 OUALITY ASSURANCE
 - Electric Service: Comply with NECA, NEMA, and UL standards and Α. regulations for temporary electric service. Install service to comply with NFPA 70.
 - Tests and Inspections: Arrange for authorities having jurisdiction to в. test and inspect each temporary utility before use. Obtain required certifications and permits.

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- Accessible Temporary Egress: Comply with applicable provisions in [the с. U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines] [and] [ICC/ANSI A117.1].
- 1.5 PROJECT CONDITIONS
 - Temporary Use of Permanent Facilities: Engage Installer of each Α. permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- PART 2 PRODUCTS
- 2.1 MATERIALS
 - Α. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 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. Provide galvanized-steel bases for supporting posts.
- 2.2 TEMPORARY FACILITIES
 - Field Offices, General: Prefabricated or mobile units with serviceable Α. finishes, temperature controls, and foundations adequate for normal loading.
 - Common-Use Field Office: Of sufficient size to accommodate needs of в. Owner, Architect and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly.
 - C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
- 2.3 EQUIPMENT
 - Fire Extinguishers: Portable, UL rated; with class and extinguishing Α. agent as required by locations and classes of fire exposures.
 - HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, в. 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.
 - Heating Units: Listed and labeled for type of fuel being 2. consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
 - Permanent HVAC System: If Owner authorizes use of permanent HVAC 3. system for temporary use during construction, provide filter with MERV of eight at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 017700 "Closeout Procedures".

PART 3 - EXECUTION

- 3.1 INSTALLATION, 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. 1. Locate facilities to limit site disturbance as specified in
 - Section 011000 "Summary."
 - Provide each facility ready for use when needed to avoid delay. Do not в. remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- TEMPORARY UTILITY INSTALLATION 3.2
 - Α. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
 - Sewers and Drainage: Provide temporary utilities to remove effluent Β. lawfully.
 - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
 - Water Service: Connect to Owner's existing water service facilities. C. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
 - Sanitary Facilities: Provide temporary toilets, wash facilities, and D. 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.
 - Heating and Cooling: Provide temporary heating and cooling required by Ε. construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
 - Ventilation and Humidity Control: Provide temporary ventilation F. 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.
 - G. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

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- Lighting: Provide temporary lighting with local switching that н. 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.
- Telephone Service: Provide temporary telephone service in common-use I. facilities for use by all construction personnel. Install one telephone line(s) for each field office.
 - 1. Provide additional telephone lines for the following:
 - a. Provide a dedicated telephone line for each facsimile machine in each field office.
 - 2. At each telephone, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.
 - e. Architect's office.
 - f. Engineers' offices.
 - q. Owner's office.
 - h. Principal subcontractors' field and home offices.
 - Provide superintendent with cellular telephone or portable two-3. way radio for use when away from field office.
- 3.3 SUPPORT FACILITIES INSTALLATION
 - General: Comply with the following: Α.
 - 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 - 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
 - в. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - Protect existing site improvements to remain including curbs, 1. pavement, and utilities.
 - Maintain access for fire-fighting equipment and access to fire 2. hydrants.
 - Parking: Use designated areas of Owner's existing parking areas for C. construction personnel.
 - Dewatering Facilities and Drains: Comply with requirements of D. authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 - Dispose of rainwater in a lawful manner that will not result in 1. flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 - Remove snow and ice as required to minimize accumulations. 2.

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- Project Signs: Provide Project signs as indicated. Unauthorized signs Ε. are not permitted.
 - Identification Signs: Provide Project identification signs as 1. indicated on Drawings.
 - Temporary Signs: Provide other signs as indicated and as required 2. to inform public and individuals seeking entrance to Project. a. Provide temporary, directional signs for construction
 - personnel and visitors.
 - Maintain and touchup signs so they are legible at all times. 3.
- F. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- Lifts and Hoists: Provide facilities necessary for hoisting materials G. and personnel.
 - Truck cranes and similar devices used for hoisting materials are 1. considered "tools and equipment" and not temporary facilities.
- SECURITY AND PROTECTION FACILITIES INSTALLATION 3.4
 - Α. 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.
 - Environmental Protection: Provide protection, operate temporary в. 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.
 - Temporary Erosion and Sedimentation Control: Provide measures to С. prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
 - Stormwater Control: Comply with requirements of authorities having D. jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
 - Tree and Plant Protection: Install temporary fencing located as Ε. indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
 - Pest Control: Engage pest-control service to recommend practices to F. 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. Perform control operations lawfully, using environmentally safe materials.

- Site Enclosure Fence: Before construction operations begin, furnish G. and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
 - Extent of Fence: As required to enclose entire Project site or 1. portion determined sufficient to accommodate construction operations.
 - Maintain security by limiting number of keys and restricting 2. distribution to authorized personnel. Furnish one set of keys to Owner.
 - 3. Fence shall include opaque fabric or blanket to not allow direct line of site into project area from public area.
- н. 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. Watchman Service 1.
 - The Owner will not be responsible for loss due to theft or a. other damage which is not covered under Property Insurance. The Contractor shall make arrangements for watchman service as he considers necessary and he shall be responsible for all loss or damage of his property, equipment, material, etc. at the site, and he shall make good such damage or loss without any additional cost to the Owner.
- Barricades, Warning Signs, and Lights: Comply with requirements of I. authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- Temporary Egress: Maintain temporary egress from existing occupied J. facilities as indicated and as required by authorities having jurisdiction.
- Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, Κ. other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
- Temporary Fire Protection: Install and maintain temporary fire-L. protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire prevention program.
 - Prohibit smoking in construction areas. 1.
 - Supervise welding operations, combustion-type temporary heating 2. units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - Develop and supervise an overall fire-prevention and -protection 3. 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.
 - Provide temporary standpipes and hoses for fire protection. Hang 4. hoses with a warning sign stating that hoses are for fire-

protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

- 3.5 MOISTURE AND MOLD CONTROL
 - Contractor's Moisture Protection Plan: Avoid trapping water in Α. finished work. Document visible signs of mold that may appear during construction.
 - Exposed Construction Phase: Before installation of weather barriers, в. when materials are subject to wetting and exposure and to airborne mold spores, protect materials from water damage and keep porous and organic materials from coming into prolonged contact with concrete.
 - Partially Enclosed Construction Phase: After installation of weather С. 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:
 - Do not load or install drywall or other porous materials or 1. components, or items with high organic content, into partially enclosed building.
 - 2. Keep interior spaces reasonably clean and protected from water damage.
 - 3. Discard or replace water-damaged and wet material.
 - Discard, replace, or clean stored or installed material that 4. begins to grow mold.
 - 5. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
 - Controlled Construction Phase of Construction: After completing and D. sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 - Control moisture and humidity inside building by maintaining 1. effective dry-in conditions.
 - Remove materials that can not be completely restored to their 2. manufactured moisture level within 48 hours.
- OPERATION, TERMINATION, AND REMOVAL 3.6
 - Supervision: Enforce strict discipline in use of temporary facilities. Α. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
 - Maintenance: Maintain facilities in good operating condition until в. removal.
 - Maintain operation of temporary enclosures, heating, cooling, 1. humidity control, ventilation, and similar facilities on a 24hour basis where required to achieve indicated results and to avoid possibility of damage.
 - Temporary Facility Changeover: Do not change over from using temporary C. security and protection facilities to permanent facilities until Substantial Completion.

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- Termination and Removal: Remove each temporary facility when need for D. 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. Owner reserves right to take possession of Project identification signs.
 - At Substantial Completion, repair, renovate, and clean permanent 2. facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
 - 1. Warranties for the Work and products and installations of each Contractor shall be one (1) year unless specified otherwise in the individual sections of Divisions 02 through 35.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for requests for substitutions.

1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will

notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

- a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
- b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.
- 1.4 QUALITY ASSURANCE
 - A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- 1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING
 - A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
 - B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
 - C. Storage:
 - 1. Store products to allow for inspection and measurement of quantity or counting of units.
 - 2. Store materials in a manner that will not endanger Project structure.
 - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 6. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 - 1. Manufacturer's Standard Form: Modified to include Projectspecific information and properly executed.
 - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 - 3. Refer to other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Warranty Requirements
 - 1. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
 - 2. Reinstatement of Warranty: When Work covered has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
 - 3. Replacement cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
 - 4. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights, and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - a. Rejection of Warranties: The Owner reserves the rights to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
 - 5. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

- D. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."
- PART 2 PRODUCTS
- 2.1 PRODUCT SELECTION PROCEDURES
 - A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Architect will make selection.
 - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 - B. Product Selection Procedures:
 - 1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - 3. Products:
 - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
 - b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
 - 4. Manufacturers:
 - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
 - b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the

manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

- 5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
- 2.2 COMPARABLE PRODUCTS
 - A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
 - 1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - 3. Evidence that proposed product provides specified warranty.
 - 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 - 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Coordination of Owner-installed products.
 - 6. Progress cleaning.
 - 7. Starting and adjusting.
 - 8. Protection of installed construction.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for limits on use of Project site.
 - Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
- 1.2 INFORMATIONAL SUBMITTALS
 - A. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
 - B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
 - C. Certified Surveys: Submit two copies signed by land surveyor.
- 1.3 QUALITY ASSURANCE
 - A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
 - B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their

capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

- 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
- 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- PART 2 PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of inplace materials.
- PART 3 EXECUTION
- 3.1 EXAMINATION
 - A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 - Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and waterservice piping; underground electrical services, and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
 - B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

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C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level and plumb, of every major element as the Work progresses.
 - 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
- C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.
- 3.6 CUTTING AND PATCHING
 - A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
 - B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
 - C. Temporary Support: Provide temporary support of work to be cut.
 - D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
 - E. Adjacent Occupied Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 - 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

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3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements"
- 3.9 PROTECTION OF INSTALLED CONSTRUCTION
 - A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
 - B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Section 013233 "Photographic Documentation" for submitting final completion construction photographic documentation.
 - 2. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 4. Section 017900 "Demonstration and Training" for requirements for instructing Owner's personnel.

1.2 ACTION SUBMITTALS

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.
- 1.3 CLOSEOUT SUBMITTALS
 - A. Certificates of Release: From authorities having jurisdiction.
 - B. Certificate of Insurance: For continuing coverage.
 - C. Field Report: For pest control inspection.
- 1.4 MAINTENANCE MATERIAL SUBMITTALS
 - A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.
- 1.5 SUBSTANTIAL COMPLETION PROCEDURES
 - A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

- B. Submittals Prior to Substantial Completion: Complete the following a minimum of ten days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, keys and keying schedule, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
 - 5. Submit test/adjust/balance records.
 - 6. List of subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times, including nights, weekends, and holidays.
 - 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of ten days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Advise Owner of pending insurance changeover requirements.
 - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 3. Complete startup and testing of systems and equipment.
 - 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 - 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
 - 6. Advise Owner of changeover in heat and other utilities.
 - 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 - 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 9. Complete final cleaning requirements, including touchup painting.
 - 10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of ten days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify

Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

- 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
- 2. Results of completed inspection will form the basis of requirements for final completion.

1.6 FINAL COMPLETION PROCEDURES

- A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
 - 1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
 - 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 - 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 - 4. Submit pest-control final inspection report and warranty.
 - 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings.
- B. Inspection: Submit a written request for final inspection to determine acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
- 1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)
 - A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 - 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 - 3. Submit list of incomplete items in the following format:
 - a. Three paper copies unless otherwise indicated. Architect will return one copy.

1.8 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, three-ring, vinylcovered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 - 4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.
- PART 2 PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.
- PART 3 EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

- a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
- b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
- c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
- d. Remove tools, construction equipment, machinery, and surplus material from Project site.
- e. Remove snow and ice to provide safe access to building.
- f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
- g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
- h. Sweep concrete floors broom clean in unoccupied spaces.
- i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
- j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
- k. Remove labels that are not permanent.
- 1. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
- o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
- p. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.
- 3.2 REPAIR OF THE WORK
 - A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
 - B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that

cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

- 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
- 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
- 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
- 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- Section includes administrative and procedural requirements for Α. preparing operation and maintenance manuals, including the following:
 - Operation and maintenance documentation directory. 1.
 - 2. Emergency manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Product maintenance manuals.
 - 5. Systems and equipment maintenance manuals.
- 1.2 CLOSEOUT SUBMITTALS
 - Manual Content: Operations and maintenance manual content is specified Α. in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
 - Format: Submit operations and maintenance manuals in the following Β. formats:
 - PDF electronic file. Assemble each manual into a composite 1. electronically indexed file. Submit on digital media acceptable to Architect.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - Enable inserted reviewer comments on draft submittals. b.
 - Three paper copies. Include a complete operation and maintenance 2. directory. Enclose title pages and directories in clear plastic sleeves. Architect will return zero copies.
 - Manual Submittal: Submit each manual in final form prior to requesting C. inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
 - Correct or revise each manual to comply with Architect's 1. comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

- REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS 2.1
 - Α. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information.

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- Organization: Unless otherwise indicated, organize each manual into a в. separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- Title Page: Include the following information: С.
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor.
 - 6. Name and contact information for Construction Manager.
 - 7. Name and contact information for Architect.
 - 8. Name and contact information for Commissioning Authority.
 - 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 - 10. Cross-reference to related systems in other operation and maintenance manuals.
- Table of Contents: List each product included in manual, identified by D. product name, indexed to the content of the volume, and crossreferenced to Specification Section number in Project Manual.
- Manual Contents: Organize into sets of manageable size. Arrange Ε. contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- Manuals, Electronic Files: Submit manuals in the form of a multiple F. file composite electronic PDF file for each manual type required.
 - Electronic Files: Use electronic files prepared by manufacturer 1. where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - File Names and Bookmarks: Enable bookmarking of individual 2. documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- Manuals, Paper Copy: Submit manuals in the form of hard copy, bound G. and labeled volumes.
 - Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf 1. binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - Identify each binder on front and spine, with printed title а. "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate

Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.

- Dividers: Heavy-paper dividers with plastic-covered tabs for each 2. section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
- Protective Plastic Sleeves: Transparent plastic sleeves designed 3. to enclose diagnostic software storage media for computerized electronic equipment.
- Drawings: Attach reinforced, punched binder tabs on drawings and 4. bind with text.
 - If oversize drawings are necessary, fold drawings to same a. size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

EMERGENCY MANUALS 2.2

- Content: Organize manual into a separate section for each of the Α. following:
 - 1. Type of emergency.
 - 2. Emergency instructions.
 - 3. Emergency procedures.
- Type of Emergency: Where applicable for each type of emergency в. indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 - 1. Fire.
 - 2. Flood.
 - 3. Gas leak.
 - 4. Water leak.
 - 5. Power failure.
 - 6. Water outage.
 - 7. System, subsystem, or equipment failure.
 - 8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- Emergency Procedures: Include the following, as applicable: D.
 - 1. Instructions on stopping.
 - 2. Shutdown instructions for each type of emergency.
 - 3. Operating instructions for conditions outside normal operating limits.
 - 4. Required sequences for electric or electronic systems.
 - 5. Special operating instructions and procedures.

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2.3 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 - 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 - 2. Performance and design criteria if Contractor is delegated design responsibility.
 - 3. Operating standards.
 - 4. Operating procedures.
 - 5. Operating logs.
 - 6. Wiring diagrams.
 - 7. Control diagrams.
 - 8. Piped system diagrams.
 - 9. Precautions against improper use.
 - 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
 - 1. Product name and model number. Use designations for products indicated on Contract Documents.
 - 2. Manufacturer's name.
 - 3. Equipment identification with serial number of each component.
 - 4. Equipment function.
 - 5. Operating characteristics.
 - 6. Limiting conditions.
 - 7. Performance curves.
 - 8. Engineering data and tests.
 - 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
 - 1. Startup procedures.
 - 2. Equipment or system break-in procedures.
 - 3. Routine and normal operating instructions.
 - 4. Regulation and control procedures.
 - 5. Instructions on stopping.
 - 6. Normal shutdown instructions.
 - 7. Seasonal and weekend operating instructions.
 - 8. Required sequences for electric or electronic systems.
 - 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For

each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

- Product Information: Include the following, as applicable: С.
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- Maintenance Procedures: Include manufacturer's written recommendations D. and the following:
 - Inspection procedures. 1.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- Repair Materials and Sources: Include lists of materials and local Ε. sources of materials and related services.
- Warranties and Bonds: Include copies of warranties and bonds and lists F. of circumstances and conditions that would affect validity of warranties or bonds.
- 2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS
 - Content: For each system, subsystem, and piece of equipment not part Α. of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
 - Source Information: List each system, subsystem, and piece of в. equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
 - Manufacturers' Maintenance Documentation: Manufacturers' maintenance С. documentation including the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins.
 - Drawings, diagrams, and instructions required for maintenance, 2. including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - List of items recommended to be stocked as spare parts. 4.
 - Maintenance Procedures: Include the following information and items D. that detail essential maintenance procedures:
 - 1. Test and inspection instructions.

- 2. Troubleshooting guide.
- 3. Precautions against improper maintenance.
- Disassembly; component removal, repair, and replacement; and 4. reassembly instructions.
- 5. Aligning, adjusting, and checking instructions.
- 6. Demonstration and training video recording, if available.
- Ε. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
- Spare Parts List and Source Information: Include lists of replacement F. and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- Maintenance Service Contracts: Include copies of maintenance G. agreements with name and telephone number of service agent.
- Warranties and Bonds: Include copies of warranties and bonds and lists н. of circumstances and conditions that would affect validity of warranties or bonds.
- PART 3 EXECUTION
- MANUAL PREPARATION 3.1
 - Emergency Manual: Assemble a complete set of emergency information Α. indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
 - Product Maintenance Manual: Assemble a complete set of maintenance в. data indicating care and maintenance of each product, material, and finish incorporated into the Work.
 - Operation and Maintenance Manuals: Assemble a complete set of С. operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - Manufacturers' Data: Where manuals contain manufacturers' standard D. printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - Drawings: Prepare drawings supplementing manufacturers' printed data Е. to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation. 1. Do not use original project record documents as part of operation
 - and maintenance manuals.
F. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
- B. Related Requirements:
 - 1. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
- 1.2 CLOSEOUT SUBMITTALS
 - A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set of marked-up record prints.
 - 2. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit one paper-copy set of marked-up record prints.
 - Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal:
 - 1) Submit three paper-copy sets of marked-up record prints.
 - 2) Submit PDF electronic files of scanned record prints and three sets of prints.
 - 3) Print each drawing, whether or not changes and additional information were recorded.
 - B. Record Specifications: Submit one paper copy and one annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
 - C. Record Product Data: Submit one paper copy and annotated PDF electronic files and directories of each submittal.
- PART 2 PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

- a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
- b. Record data as soon as possible after obtaining it.
- c. Record and check the markup before enclosing concealed installations.
- 2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
- 3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
- 4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 - 1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - 2. Format: Annotated PDF electronic file.
 - 3. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 - 4. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as paper copy and scanned PDF electronic file(s) of marked-up paper copy of Specifications.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

- 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
- 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as paper copy and scanned PDF electronic file(s) of marked-up paper copy of Product Data.
- PART 3 EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's and Construction Manager's reference during normal working hours.

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and training video recordings.

1.2 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

1.3 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
 - At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals and in PDF electronic file format on compact disc.

1.4 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

1.5 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit

instruction program until operation and maintenance data has been reviewed and approved by Architect.

- PART 2 PRODUCTS
- 2.1 INSTRUCTION PROGRAM
 - A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
 - B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 - 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
 - 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
 - 4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.

- j. Operating procedures for system, subsystem, or equipment failure.
- k. Seasonal and weekend operating instructions.
- 1. Required sequences for electric or electronic systems.
- m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

3.2 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 - 2. Owner will furnish an instructor to describe Owner's operational philosophy.
 - 3. Owner will furnish Contractor with names and positions of participants.

- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 1. Schedule training with Owner with at least seven days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- 3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS
 - A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
 - B. Video Recording Format: Provide high-quality color video recordings with menu navigation in format acceptable to Architect.

END OF SECTION 017900

SECTION 024116 - STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of buildings and site improvements.
 - 2. Abandoning in-place and removing below-grade construction.
 - 3. Disconnecting, capping or sealing, and removing site utilities.
 - 4. Salvaging items for reuse by Owner.

1.2 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.3 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.

1.4 INFORMATIONAL SUBMITTALS

- A. Engineering Survey: Submit engineering survey of condition of building.
- B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
 - Adjacent Buildings: Detail special measures proposed to protect adjacent buildings to remain including means of egress from those buildings.
- C. Schedule of building demolition activities with starting and ending dates for each activity.
- D. Predemolition photographs or video.

E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician.

1.5 CLOSEOUT SUBMITTALS

A. Inventory of items that have been removed and salvaged.

1.6 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by EPAapproved certification program.

1.7 FIELD CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.
- B. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
 - 1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
 - 2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
 - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.
- C. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- D. Hazardous Materials: Hazardous materials will be encountered in the Work. Lawfully abate and dispose of hazardous materials.
- E. On-site storage or sale of removed items or materials is not permitted.
- F. Arrange demolition schedule so as not to interfere with Owner's onsite operations or operations of adjacent occupied buildings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

2.2 SOIL MATERIALS

- A. Satisfactory Soils: Comply with requirements in Section 312000 "Earth Moving."
- PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Inventory and record the condition of items to be removed and salvaged.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.
- B. Salvaged Items: Comply with the following:
 - 1. Clean salvaged items of dirt and demolition debris.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Utilities to be Disconnected: Locate, identify, disconnect, and seal or cap off utilities serving buildings and structures to be demolished.
 - 1. Owner will arrange to shut off utilities when requested by Contractor.
 - 2. Arrange to shut off utilities with utility companies.
 - 3. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
 - 4. Cut off pipe or conduit a minimum of 24 inches (610 mm) below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.

5. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.4 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- B. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
- C. Existing Utilities to Remain: Maintain utility services to remain and protect from damage during demolition operations. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
- D. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 015000 "Temporary Facilities and Controls."
 - 1. Protect adjacent buildings and facilities from damage due to demolition activities.
 - 2. Protect existing site improvements, appurtenances, and landscaping to remain.
 - 3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
 - 4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
 - 6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
 - 7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
- E. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.5 DEMOLITION

A. General: Demolish indicated buildings and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:

- 1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
- 2. Maintain fire watch during and for at least two hours after flame-cutting operations.
- 3. Maintain adequate ventilation when using cutting torches.
- Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.
 - 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
- C. Explosives: Use of explosives is not permitted.
- D. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- E. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- F. Salvage: Items to be removed and salvaged are indicated on Drawings.
- G. Demolish foundation walls and other below-grade construction.
 - 1. Remove below-grade construction, including basements, foundation walls, and footings, completely. U.O.N coordinate with structural.
- H. Existing Utilities: Demolish existing utilities and below-grade utility structures.
- I. Hydraulic Elevator Systems: Demolish and remove elevator system, including cylinder, plunger, well assembly, steel well casing and liner, oil supply lines, and tanks.
- J. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements in Section 312000 "Earth Moving."

- K. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.
- L. Promptly repair damage to adjacent buildings caused by demolition operations.
- 3.6 CLEANING
 - A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - B. Do not burn demolished materials.
 - C. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.

END OF SECTION 024116

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
 - 1. Footings.
 - 2. Foundation walls.
 - 3. Slabs-on-grade.
- B. Related Sections:
 1. Section 312000 "Earth Moving" for drainage fill under slabs-ongrade.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - 1. Location of construction joints is subject to approval of the Architect.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, manufacturer, testing agency, upon request.
 1. Aggregates.
- B. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- C. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications (engaged and paid for by Owner): An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
 - Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- F. Concrete Testing Service: Owner shall engage and pay for a qualified independent testing agency to perform material evaluation tests.

- 1.7 DELIVERY, STORAGE, AND HANDLING
 - A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement where applicable.

1.8 WARRANTY

- A. Moisture Vapor Reduction Admixture (MVRA):
 - 1. MVRA must be installed according to, and in compliance with, the manufacturer's published data sheet to include, but not limited to:
 - a. Dosing instructions.
 - b. Onsite representation requirements.
 - c. Use of an ASTM E 1745 vapor retarder installed following ASTM E 1643 and ASTM F710 guidelines; slabs on deck do not require a vapor retarder.
 - 2. Manufacturer's Warranty: To include:
 - a. Term: Life of the concrete; 10years.
 - b. Repair and/or removal of failed flooring or roofing.
 - c. Placement of a topical moisture remediation system.
 - d. Replacement of flooring/roofing materials like original installed to include material and labor.
 - 3. Adhesion Warranty: MVRA Manufacturer shall provide an adhesion warranty to match the term of the adhesive and/or primer manufacturer's material defect warranty upon MVRA manufacturer's acceptance of field bond test.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 1. Plywood, metal, or other approved panel materials.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

- 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- E. Form Ties: Factory-fabricated, removable or snap-off metal or glassfiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type I gray. Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class F or C.
- B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.
 - 1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M and potable.

2.5 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
- C. Moisture Vapor Reduction Concrete Admixture:
 - 1. Products:
 - a. Concure Systems Admixture by Concure Systems, Phoenix, AZ. Phone 800-820-7171.
 - b. Barrier One International moisture vapor reduction admixture; 522 S. Hunt Club Blvd. #303, Apopka, FL 32703, Phone 407-374-0210.
 - 2. Utilize in all interior concrete flatwork.
 - 3. Manufacturer's technical representative shall be on site during all mixing and placing of products. Include cost of representative on site in bid price.
 - 4. Accessory Materials: Crack Fill Binder.

2.6 VAPOR RETARDERS

- A. Sheet Vapor Retarder: ASTM E 1745, Class A, except with a permeance of less than 0.01 perms [grains/(ft² · hr · inHg)] per ASTM E 1745 Section 7. Thickness: 15 mils minimum. Maintain permeance of less than 0.01 perms after mandatory conditioning tests per ASTM E 154 Sections 8, 11, 12, and 13. Include manufacturer's recommended adhesive or pressure-sensitive tape.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Stego Industries, LLC; Stego Wrap 15 mil Calss A.
 - b. Grace Construction Products, W. R. Grace & Co.; Florprufe 120.
 - c. Insulation Solutions, Inc.; Viper VaporCheck II 15-mil.
 - d. Meadows, W. R., Inc.; Perminator 15 mil.
 - e. Raven Industries Inc.; Vapor Block 15.

2.7 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A, compatible with finish flooring where scheduled.

2.8 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphaltsaturated cellulosic fiber.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, aromatic polyurea with a Type A shore durometer hardness range of 90 to 95 per ASTM D 2240.
- C. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.9 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 - Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 1. Fly Ash: 25 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducingadmixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, , concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
 - 4. Moisture Vapor Reduction Admixture: For use in all interior slabs on ground.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings and foundation walls: Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: 4000 psi at 28 days.
 - 2. Maximum Water-Cementitious Materials Ratio: 0.50.
 - 3. Slump Limit: 4 inches or 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
 - 4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
- B. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: 4000 psi at 28 days.
 - Minimum Cementitious Materials Content: 540 lb/cu. yd. for 3/4inch nominal maximum aggregate size.
 - 3. Slump Limit: 4 inches, plus or minus 1 inch (25 mm).
 - 4. Moisture Vapor Reduction Admixture: For mix designs ranging from 0.42 to 0.52 w/cm, dose at 14 ounces per 100 pounds of total cementitious materials. Remove an equal amount of water from the mix. Add separately from other admixtures at the tail end of the load. Mix designs below 0.42 and above 0.52 may require adjustment. Comply with admixture manufacturer's requirements.

2.12 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.13 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- PART 3 EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 2. Class C, 1/2 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - Install reglets to receive waterproofing and to receive throughwall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength.
 - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR RETARDERS

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.
 - 2. Unroll vapor retarder with the longest dimension parallel with the direction of the concrete pour.
 - 3. Lap vapor retarder over footings and/or seal to foundation walls.
 - 4. Seal all penetrations (including pipes, conduits, and electrical floor boxes) per manufacturer's instructions.
 - 5. No penetration of the vapor retarder is allowed except for reinforcing steel and permanent utilities.
 - 6. Repair damaged areas by cutting patches of vapor retarder, overlapping damaged area 6 inches, and taping all four sides with tape.

3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 - 1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.

- 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
- 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
- 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
- 5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
- 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- 7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 - Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
 - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

- 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
- 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
- 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- F. Hot-Weather Placement: Comply with ACI 301 and as follows:
 - 1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.8 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to exterior concrete surfaces exposed to public view, or to be covered with a coating or covering material applied directly to concrete.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
 - 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.9 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 - 2. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.
- C. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated where ceramic or quarry tile is to be installed by either

thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.

- 1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- D. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.10 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations:
 - 1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 - Construct concrete bases 4 inches high unless otherwise indicated; and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.
 - 3. Minimum Compressive Strength: 4000 psi at 28 days.
 - 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
 - 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base, and anchor into structural concrete substrate.

3.11 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
 - 3. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.12 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.
- 3.13 CONCRETE SURFACE REPAIRS
 - A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
 - B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
 - C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
 - D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 2. After concrete has cured at least 14 days, correct high areas by grinding.
 - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written

instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

- 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
- 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.
- 3.14 FIELD QUALITY CONTROL
 - A. Testing: Owner will engage and pay for a qualified testing agency to perform field tests and prepare test reports.
 - B. Inspections: Owner will engage and pay for a special inspector to perform building code-required inspections.
 - C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - Testing Frequency: Obtain at least one composite sample for each 50 cu. yd. or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

- 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
- 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
- 5. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
- Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
- 7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
- 8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- 9. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- 10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- 11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
- 12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- D. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 48 hours of finishing.

END OF SECTION 033000

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Structural steel.
 - 2. Grout.
 - 3. Loose steel lintels.
 - 4. Loose bearing and leveling plates.

1.3 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.4 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication of structural-steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment Drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each

weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.

4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer, fabricator, and testing agency, upon request.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Product Test Reports: For the following:
 - 1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 2. Direct-tension indicators.
 - 3. Tension-control, high-strength, bolt-nut-washer assemblies.
 - 4. Shear stud connectors.
 - 5. Shop primers.
 - 6. Nonshrink grout.
- E. Source quality-control reports, upon request.

1.7 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code Steel."
 - 1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.
- B. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC 303.
 - 2. AISC 360.
 - 3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using
pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

- 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 - 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.
- PART 2 PRODUCTS
- 2.1 STRUCTURAL-STEEL MATERIALS
 - A. W-Shapes: ASTM A 992/A 992M.
 - B. Channels, Angles-Shapes: ASTM A 36/A 36M.
 - C. Plate and Bar: ASTM A 36/A 36M.
 - D. Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade B, structural tubing.
 - E. Welding Electrodes: Comply with AWS requirements.
- 2.2 BOLTS, CONNECTORS, AND ANCHORS
 - A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, (ASTM A 563M, Class 8S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers; all with plain finish.
 - 1. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with plain finish.
 - B. Anchor Rods: ASTM F 1554, Grade 36, straight.
 - 1. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
 - 2. Plate Washers: ASTM A 36/A 36M carbon steel.
 - 3. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
 - 4. Finish: Plain.
 - C. Threaded Rods: ASTM A 36/A 36M.

- 1. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
- 2. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardenedcarbon steel.
- 3. Finish: Plain.
- D. Post-Installed Anchors to Concrete and Masonry.
 - 1. Expansion anchors:
 - a. Hilti Kwik Bolt TZ
 - b. ITW Red Head Trubolt + Seismic Wedge
 - c. Powers Power Stud + SD2
 - d. Simpson Strong-Bolt Wedge
 - e. Anchors shall be plain, uncoated except provide stainless steel anchors where support is galvanized.
 - 2. Adhesive anchors:
 - a. Hilti HIT RE 500-DS
 - b. Red Head Epcon G5
 - c. Powers PE 1000+
 - d. Simpson Set XP
 - e. Anchors shall be plain, uncoated except provide stainless steel anchors where support is galvanized.

2.3 PRIMER

- A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.
- B. Galvanizing Repair Paint: ASTM A 780/A 780M.

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factorypackaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30minute working time.

2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.
 - 1. Camber structural-steel members where indicated.
 - 2. Fabricate beams with rolling camber up.
 - 3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
 - 4. Mark and match-mark materials for field assembly.
 - 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

- 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 2, "Hand Tool Cleaning
- F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headedstud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.
- G. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened unless noted otherwise.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
 - 2. Surfaces to be field welded.
 - 3. Surfaces of high-strength bolted, slip-critical connections.
 - 4. Galvanized surfaces.

- Surface Preparation: Clean surfaces to be painted. Remove loose rust в. and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
 - 1. SSPC-SP 2, "Hand Tool Cleaning." 2. SSPC-SP 3, "Power Tool Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 - 1. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.8 GALVANIZING

- Α. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
 - Fill vent and drain holes that are exposed in the finished Work 1. unless they function as weep holes, by plugging with zinc solder and filing off smooth.
 - 2. Galvanize lintels and shelf angles attached to structural-steel frame and located in exterior walls.
 - 3. Where noted.

2.9 SOURCE QUALITY CONTROL

- Testing and Special Inspections Agency: Contractor will engage and Α. pay for the services of a qualified independent third-party testing and inspecting agency to perform shop tests and inspections and prepare test reports.
 - An exception to this requirement for special inspections is 1. provided where the fabricator is approved in accordance with Paragraph 1704.2.2 of the International Building Code (IBC), which states in part that: "Special inspections required by this code are not required where the work is done on the premises of a fabricator registered and approved to perform such work without special inspection. Approval shall be based upon review of the fabricator's written procedural and quality control manuals and periodic auditing of fabrication practice by an approved special inspection agency." The qualification for 'fabricator exemption' stated in Chapter 17 of IBC follow very closely with that required of AISC Certified Fabricators. However, AISC Certification does not automatically qualify the Fabricator for the 'fabricator exemption' permitted by Chapter 17. Such exemption must be approved by the authority having jurisdiction (building official). Each approved fabricator that is exempt from Special Inspection of shop fabrication and implementation procedures per section 1704.2 of IBC must submit a Fabricator's Certificate of Compliance at the completion of fabrication.

- Provide testing agency with access to places where structuralsteel work is being fabricated or produced to perform tests and inspections.
- 3. Perform Structural Tests and Special Inspections in accordance with Paragraphs 1704.2 and 1704.3, and Table 1704.3 of IBC.
- B. Correct deficiencies in Work that test reports indicate does not comply with the Contract Documents.
- C. Bolted Connections: Inspect and test shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - 1. Liquid Penetrant Inspection: ASTM E 165.
 - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - 3. Ultrasonic Inspection: ASTM E 164.
 - 4. Radiographic Inspection: ASTM E 94.
- E. In addition to visual inspection, test and inspect shop-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - 1. Perform bend tests if visual inspections reveal either a lessthan-continuous 360-degree flash or welding repairs to any shear connector.
 - 2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.
- F. Prepare test and inspection reports.

2.10 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts for grouting.
- B. Galvanize plates when installed below grade.
- C. Leveling plates are not permitted for columns.

2.11 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening

unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 6 inches unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.

2.12 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as need to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Bearing Plates and Leveling Plates: Clean concrete- and masonrybearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if

protruding, cut off flush with edge of plate before packing with grout.

- 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- 5. Leveling plates are not permitted for columns.
- C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headedstud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

3.4 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions secured to and rigidly braced from building structure.
- C. Support steel girders on solid grouted masonry, concrete, or steel columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of columns.
- D. Install columns on concrete footings with grouted base plates. Position and grout column base plates.
- E. Grout base plates of columns supporting steel girders after girders are installed and leveled.

- 3.5 INSTALLING POST-INSTALLED ANCHORS
 - A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
 - B. Install in accordance with manufacturer's instructions and recommendations and as required by applicable code.
 - C. The adhesive anchors selected from paragraph 2, above, shall be supplied as an entire system. The system shall include, but is not limited to, the new adhesive cartridge, a clean mixing nozzle, extension tube, a dispensing gun, and all manufacturer recommended supplies for properly cleaning the drilled hole.
 - D. Adhesive anchors shall be installed by qualified personnel trained to install adhesive anchors.
 - E. Anchor holes shall be thoroughly cleaned prior to adhesive injection, as required by the manufacturer's printed installation instructions.
 - F. Drilled and cleaned anchor holes shall be protected from contamination until the adhesive is installed.
 - G. Unless otherwise indicated on the manufacturer's printed installation instructions, adhesive shall be dispensed through a tube or cartridge extension, beginning at the maximum depth of the hole and withdrawn as adhesive is injected, followed by insertion and rotating the anchor to specified depth. Where necessary, spaces around anchors at the surface shall be sealed at horizontal to vertically overhead locations to prevent loss of adhesive during curing.
 - H. Anchors to be installed in the adhesive shall be clean, oil-free, and free of loose rust, paint or other coatings.
 - I. Installed adhesive anchors shall be securely fixed in-place to prevent displacement while the adhesive cures. Unless shown otherwise on the drawings, anchors shall be installed perpendicular to the concrete surface. Anchors displaced before full adhesive cure shall be considered damaged and replaced at the Contractor's expense.
 - J. Reinforcing bars or all-threaded bars shall not be bent after being adhesively embedded in hardened, sound concrete, unless permitted by the Engineer.
 - K. Apply anchor items neatly, with anchor mounted plumb and level unless otherwise indicated.
 - L. Wedge Anchors, Heavy-Duty Sleeve Anchors, and Undercut Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in part to be fastened. Set anchors to manufacturer's recommended torque, using a torque wrengh. Following attainment of 10% of the specified torque, 100% of the specified torque shall be reached within 7 or fewer complete turns of the nut. If the specified torque is not achieved

within the required number of turns, the anchor shall be removed and replaced unless otherwise directed by the Engineer.

- М. Cartridge Injection Adhesive Anchors: Clean all holes per manufacturer instructions to remove loose material and drilling dust prior to installation of adhesive. Inject adhesive into holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive. Follow manufacturer recommendations to ensure proper mixing of adhesive components. Sufficient adhesive shall be injected in the hole to ensure that the annular gap is filled to the surface. Remove excess adhesive from the surface. Shim anchors with suitable device to center the anchor in the hole. Do not disturb or load anchors before manufacturer specified cure time has elapsed.
- Capsule Anchors: Perform drilling and setting operations in accordance Ν. with manufacturer instructions. Clean all holes to remove loose material and drilling dust prior to installation of adhesive. Remove water from drilled holes in such a manner as to achieve a surface dry condition. Capsule anchors shall be installed with equipment conforming to manufacturer recommendations. Do not disturb or load anchors before manufacturer specified cure time has elapsed.
- Observe manufacturer recommendations with respect to installation Ο. temperatures for cartridge injection adhesive anchors and capsule anchors.

3.6 FIELD CONNECTIONS

- High-Strength Bolts: Install high-strength bolts according to RCSC's Α. "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
- Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, в. appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - Comply with AISC 303 and AISC 360 for bearing, alignment, 1. adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 - 2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
 - Assemble and weld built-up sections by methods that maintain true 3. alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

3.7 FIELD QUALITY CONTROL

Α. Special Inspections: Owner will engage and pay for a qualified special inspector to perform the following special inspections:

- 1. Verify structural-steel materials and inspect steel frame joint details.
- 2. Verify weld materials and inspect welds.
- 3. Verify connection materials and inspect high-strength bolted connections.
- B. Testing Agency: Owner will engage pay for a qualified testing agency to perform tests and inspections.
- C. Bolted Connections: Inspect and test bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.
 - 1. In addition to visual inspection, test and inspect field welds for moment connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - c. Ultrasonic Inspection: ASTM E 164.
 - d. Radiographic Inspection: ASTM E 94.
- E. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - 1. Perform bend tests if visual inspections reveal either a lessthan-continuous 360-degree flash or welding repairs to any shear connector.
 - Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.
- F. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.8 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780/A 780M.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shoppainted surfaces.
 - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

END OF SECTION 051200

SECTION 054000 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Exterior non-load-bearing wall framing.
 - 2. Delegated structural design of system.

B. Related Requirements:

- 1. Section 051200 "Structural Steel Framing" for loose steel lintels and bearing plates.
- Section 092216 "Non-Structural Metal Framing" for interior nonload-bearing, metal-stud framing and ceiling-suspension assemblies.
- 3. Section 054400 "Cold-Formed Metal Trusses" for roof trusses.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cold-formed steel framing product and accessory.
- B. Shop Drawings:
 - 1. Include layout, spacings, sizes, thicknesses, and types of coldformed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
 - Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
- C. Delegated-Design Submittal: For cold-formed steel framing.
 - 1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by a licensed Illinois Structural Engineer responsible for their preparation. Include costs of professional design services and preparation of complete shop drawings in price.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each listed product, for tests performed by a qualified testing agency.

- 1. Vertical deflection clips.
- 2. Miscellaneous structural clips and accessories.
- B. Research Reports: For non-standard cold-formed steel framing, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

- 2. AWS D1.3/D1.3M, "Structural Welding Code Sheet Steel."
- B. Fabricator and Erector qualifications: An experienced fabricator and erector who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a licensed Illinois Structural Engineer, shall be the responsibility of the Contractor.
- D. Professional Engineer Qualifications: A licensed Illinois Structural Engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.
- PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage and pay for the services of a qualified licensed Illinois Structural Engineer, as defined in Section 014000 "Quality Requirements," to design cold-formed steel framing.
- B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
 - 1. Design Loads: As determined by building code.
 - 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:

- Exterior Non-Load-Bearing Framing: Horizontal deflection of: a. 1) At masonry cladding/wall locations: 1/600 of the wall
 - height. At non-masonry cladding/wall locations: 1/360 of the 2)
 - wall height.
- Design framing systems to provide for movement of framing members 3. located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
- Design framing system to maintain clearances at openings, to 4. allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
 - a. Upward and downward movement of 3/4 inch
- Design exterior non-load-bearing wall framing to accommodate 5. horizontal deflection without regard for contribution of sheathing materials.
- Cold-Formed Steel Framing Design Standards: C.
 - Floor and Roof Systems: AISI S210. 1.
 - 2. Wall Studs: AISI S211.
 - 3. Headers: AISI S212.
 - 4. Lateral Design: AISI S213.
- AISI Specifications and Standards: Unless more stringent requirements D. are indicated, comply with AISI S100 and AISI S200.
 - Comply with AISI's "Standard for Cold-Formed Steel Framing -1. Header Design."
- COLD-FORMED STEEL FRAMING, GENERAL 2.2
 - Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic Α. coated, of grade and coating weight as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: G90
 - Vertical Deflection and в. Steel Sheet for Drift Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: G60.
- 2.3 EXTERIOR NON-LOAD-BEARING WALL FRAMING
 - Steel Studs: Manufacturer's standard C-shaped steel studs, of web Α. depths indicated, punched, with stiffened flanges, and as follows:

- 1. Minimum Base-Metal Thickness: 0.0428 inch, unless thicker (not thinner) is determined from delegated design.
- 2. Flange Width: 1-5/8 inches minimum unless wider is determined from delegated design.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: Matching steel studs.
- C. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0428 inch, unless thicker (not thinner) is determined from delegated design..

2.4 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 - 1. Supplementary framing.
 - 2. Bracing, bridging, and solid blocking.
 - 3. Web stiffeners.
 - 4. Anchor clips.
 - 5. End clips.
 - 6. Foundation clips.
 - 7. Gusset plates.
 - 8. Stud kickers and knee braces.
 - 9. Joist hangers and end closures.
 - 10. Hole reinforcing plates.
 - 11. Backer plates.

2.5 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.
- C. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70,

greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

- D. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, selfdrilling, self-tapping, steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- E. Welding Electrodes: Comply with AWS standards.

2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780.
- B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, with fluid consistency and 30-minute working time.
- D. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.
- E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.7 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by no fewer than three exposed screw threads.

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- Fasten other materials to cold-formed steel framing by welding, 4. bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
- Reinforce, stiffen, and brace framing assemblies to withstand Β. handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- с. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
 - Spacing: Space individual framing members no more than plus or 1. minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - Squareness: Fabricate each cold-formed steel framing assembly to 2. a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

- Examine supporting substrates and abutting structural framing for Α. compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- в. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab.

3.3 INSTALLATION, GENERAL

- Cold-formed steel framing may be shop or field fabricated for Α. installation, or it may be field assembled.
- Install cold-formed steel framing according to AISI S200 and to В. manufacturer's written instructions unless more stringent requirements are indicated.
- Install shop- or field-fabricated, cold-formed framing and securely C. anchor to supporting structure.
- Install cold-formed steel framing and accessories plumb, square, and D. true to line, and with connections securely fastened.
 - 1. Cut framing members by sawing or shearing; do not torch cut.

- Fasten cold-formed steel framing members by welding, screw 2. fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - Comply with AWS D1.3/D1.3M requirements and procedures for a. welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- Install framing members in one-piece lengths unless splice connections Ε. are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- н. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- Fasten hole reinforcing plate over web penetrations that exceed size Ι. of manufacturer's approved or standard punched openings.
- J. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
 - Space individual framing members no more than plus or minus 1/8 1. inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
- 3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION
 - Install continuous tracks sized to match studs. Align tracks Α. accurately and securely anchor to supporting structure as indicated.
 - Fasten both flanges of studs to bottom track unless otherwise в. indicated. Space studs as follows:
 - Stud Spacing: 16 inches or as indicated. 1.
 - C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
 - Isolate non-load-bearing steel framing from building structure to D. prevent transfer of vertical loads while providing lateral support.

- 1. Install two-component top deflection tracks and anchor to building structure.
- 2. Connect vertical deflection clips to studs and anchor to building structure.
- 3. Connect drift clips to cold-formed metal framing and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
 - 1. Top Bridging: Install row of horizontal bridging within 12 inches deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 FIELD QUALITY CONTROL

- A. Field and shop welds may be subject to testing and inspecting. Thirdparty inspector would be engaged and paid for by Owner.
- B. Testing agency will report test results promptly and in writing to Contractor and Architect.
- C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Miscellaneous steel framing and supports.
 - 2. Metal ladders.

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Paint products.
 - 2. Grout.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
- C. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design ladders.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- D. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.

E. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- C. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting," Section 099123 Interior Painting," and Section 099600 "High-Performance Coatings."
- B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- D. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.
- C. Weld corners and seams continuously to comply with the following:

- 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
- 2. Obtain fusion without undercut or overlap.
- 3. Remove welding flux immediately.
- 4. At exposed connections, finish exposed welds and surfaces smooth and blended.
- D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Locate joints where least conspicuous.
- E. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- F. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

2.7 METAL LADDERS

- A. General:
 - 1. Comply with ANSI A14.3.
 - 2. For elevator pit ladders, comply with ASME A17.1/CSA B44.

B. Steel Ladders:

- 1. Space siderails 18 inches (457 mm) apart unless otherwise indicated.
- Siderails: Continuous, 3/8-by-2-1/2-inch (9.5-by-64-mm) steel flat bars, with eased edges.
- 3. Rungs: 1-inch- (25-mm-) square steel bars.
- 4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
- 5. Provide nonslip surfaces on top of each rung.
- 6. Prime ladders, including brackets and fasteners, with primer specified in Section 099600 "High-Performance Coatings."

2.8 FINISHES, GENERAL

A. Finish metal fabrications after assembly.

2.9 STEEL AND IRON FINISHES

- A. Shop prime iron and steel items unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with primers specified in Section 099123 "Interior Painting".
- B. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
 - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 3. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- C. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to inplace construction.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

END OF SECTION 055000

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- Α. Section Includes:
 - 1. Rooftop equipment bases and support curbs.
 - 2. Wood blocking, cants, and nailers.
 - 3. Utility shelving.
 - 4. Plywood backing panels.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

1.3 INFORMATIONAL SUBMITTALS

- Evaluation Reports: For the following, from ICC-ES: Α.
 - 1. Preservative-treated wood.
 - Fire-retardant-treated wood. 2.
 - 3. Power-driven fasteners.

PART 2 - PRODUCTS

- 2.1 WOOD PRODUCTS, GENERAL
 - Lumber: DOC PS 20 and applicable rules of grading agencies indicated. Α. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Dress lumber, S4S, unless otherwise indicated.
 - Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal (38в. mm actual) thickness or less, 19 percent for more than 2-inch nominal (38-mm actual) thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

by Pressure Process: A. Preservative Treatment AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

- 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
- Kiln-dry lumber after treatment to a maximum moisture content of 19 в. percent. Do not use material that is warped or does not comply with requirements for untreated material.
- Mark lumber with treatment quality mark of an inspection agency C. approved by the ALSC Board of Review.
- Application: Treat items indicated on Drawings, and the following: D.
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - Wood sills, sleepers, blocking, and similar concealed members in 2. contact with masonry or concrete.
 - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 - 4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
 - Wood floor plates that are installed over concrete slabs-on-5. grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Α. Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
 - Exterior Type: Treated materials shall comply with requirements 1. specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 - 2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
 - Design Value Adjustment Factors: Treated lumber shall be tested 3. according to ASTM D 5664, and design value adjustment factors shall be calculated according to ASTM D 6841. For enclosed roof framing, framing in attic spaces, and where high-temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.

- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- C. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- D. Application: Treat all miscellaneous carpentry unless otherwise indicated.
 - 1. Concealed blocking.
 - 2. Roof framing and blocking.
 - 3. Wood cants, nailers, curbs, equipment support bases, blocking, and similar members in connection with roofing.
 - 4. Plywood backing panels.
- 2.4 MISCELLANEOUS LUMBER
 - A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Rooftop equipment bases and support curbs.
 - 4. Cants.
 - 5. Grounds.
 - 6. Utility shelving.
 - B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.
 - C. Utility Shelving: Lumber with 15 percent maximum moisture content of eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Premium or No. 2 Common (Sterling) grade; NeLMA, NLGA, WCLIB, or WWPA.
 - D. Concealed Boards: 15 percent maximum moisture content of the following species and grades:
 - 1. Mixed southern pine or southern pine, No. 2 grade; SPIB.
 - 2. Eastern softwoods, No. 2 Common grade; NELMA.
 - 3. Northern species, No. 2 Common grade; NLGA.
 - 4. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, fireretardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

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- Where carpentry is exposed to weather, in ground contact, 1. pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
- Screws for Fastening to Metal Framing: ASTM C 1002, length as Β. recommended by screw manufacturer for material being fastened.
- Power-Driven Fasteners: Fastener systems with an evaluation report С. acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.7 MISCELLANEOUS MATERIALS

- Α. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).
- PART 3 EXECUTION
- 3.1 INSTALLATION, GENERAL
 - Α. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction, " unless otherwise indicated.
 - Set carpentry to required levels and lines, with members plumb, true в. to line, cut, and fitted. Fit carpentry accurately to other construction. Locate nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
 - Install plywood backing panels by fastening to studs; coordinate С. locations with utilities requiring backing panels. Install fireretardant-treated plywood backing panels with classification marking of testing agency exposed to view.
 - Do not splice structural members between supports unless otherwise D. indicated.
 - Comply with AWPA M4 for applying field treatment to cut surfaces of Ε. preservative-treated lumber.
 - F. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International 2. Residential Code for One- and Two-Family Dwellings.
 - 3. ICC-ES evaluation report for fastener.

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3.2 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061053

SECTION 064116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Plastic-laminate-clad architectural cabinets.
 - 2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, and attachment details.
- C. Samples: For each exposed product and for each color and texture specified.

1.3 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of products.
- PART 2 PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of cabinets indicated for construction, finishes, installation, and other requirements.
- B. Grade: Custom.
- C. Type of Construction: Frameless.

- D. Door and Drawer-Front Style: Flush overlay.
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
 - 1. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - a. Abet Laminati Inc.
 - b. Formica Corporation.
 - c. Lamin-Art, Inc.
 - d. Pionite; a Panolam Industries International, Inc. brand.
 - e. Wilsonart.
- F. Laminate Cladding for Exposed Surfaces:
 - 1. Horizontal Surfaces: Grade HGL.
 - 2. Postformed Surfaces: Grade HGP.
 - 3. Vertical Surfaces: Grade VGS.
 - 4. Edges: Grade VGS.
 - 5. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.
- G. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- H. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
 - 1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.
- I. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As indicated by laminate manufacturer's designations.
 - 2. Match Architect's sample.
 - 3. As selected by Architect from laminate manufacturer's full range in the following categories:
 - a. Wood grains, matte finish.
 - b. Patterns, matte finish.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
 - 1. Wood Moisture Content: 4 to 9 percent.
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of

architectural cabinet and quality grade specified unless otherwise indicated.

- 1. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
- 2. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.
- 2.3 CABINET HARDWARE AND ACCESSORIES
 - A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.
 - B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening, self-closing.
 - C. Back-Mounted Pulls: BHMA A156.9, B02011.
 - D. Wire Pulls: Back mounted, solid metal, 4 inches (100 mm) long, 5/16 inch (8 mm) in diameter.
 - E. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
 - F. Shelf Rests: BHMA A156.9, B04013; metal.
 - G. Drawer Slides: BHMA A156.9.
 - 1. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-overtravelextension type; zinc-plated-steel ball-bearing slides.
 - For drawers more than 3 inches (75 mm) high, but not more than 6 inches (150 mm) high and not more than 24 inches (600 mm) wide, provide Grade 1HD-100.
 - 3. For drawers more than 6 inches (150 mm) high or more than 24 inches (600 mm) wide, provide Grade 1HD-100.
 - H. Door Locks: BHMA A156.11, E07121.
 - I. Drawer Locks: BHMA A156.11, E07041.
 - J. Door and Drawer Silencers: BHMA A156.16, L03011.
 - K. Grommets for Cable Passage: 2-inch (51-mm) OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
 - 1. Color: To be selected by Architect from manufacturer's full range.
 - L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 - 1. Dark, Oxidized, Satin Bronze, Oil Rubbed: BHMA 613 for bronze base; BHMA 640 for steel base; match Architect's sample.

- 2. Satin Stainless Steel: BHMA 630.
- M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesive for Bonding Plastic Laminate: Contact cement.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.5 FABRICATION

- A. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- B. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.
- B. Grade: Install cabinets to comply with quality standard grade of item to be installed.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm) using concealed shims.
- 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
- 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch (38-mm) penetration into wood framing, blocking, or hanging strips, No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish, or toggle bolts through metal backing or metal framing behind wall finish.

END OF SECTION 064116

SECTION 070150.19 - PREPARATION FOR REROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Full tear-off of roof system at areas indicated on Drawings.
 - 2. Removal of flashings and counterflashings.

1.2 ALLOWANCES

A. Allowance for removal of existing wet insulation, and replacement with

1.3 PREINSTALLATION MEETINGS

A. Preliminary Roofing Conference: Before starting removal Work, conduct conference at Project site.

1.4 INFORMATIONAL SUBMITTALS

- A. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations.
 - 1. Submit before Work begins.

1.5 FIELD CONDITIONS

- A. Existing Roofing System: Built-up asphalt and spray foam roofing.
- B. Owner will occupy portions of building immediately below reroofing area.
 - 1. Conduct reroofing so Owner's operations are not disrupted.
 - 2. Provide Owner with not less than 72 hours' written notice of activities that may affect Owner's operations.
 - 3. Coordinate work activities daily with Owner so Owner has adequate advance notice to place protective dust and water-leakage covers over sensitive equipment and furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below work area.
 - 4. Before working over structurally impaired areas of deck, notify Owner to evacuate occupants from below affected area.

- a. Verify that occupants below work area have been evacuated before proceeding with work over impaired deck area.
- C. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.
- D. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
- E. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.
 - 1. The results of an analysis of test cores from existing roofing system are available for Contractor's reference.
- F. Limit construction loads on existing roof areas.
- G. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.
 - 1. Remove only as much roofing in one day as can be made watertight in the same day.

PART 2 - PRODUCTS

- 2.1 AUXILIARY REROOFING MATERIALS
 - A. General: Use auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of new roofing system.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Seal or isolate windows that may be exposed to airborne substances created in removal of existing materials.
- B. Shut off rooftop utilities and service piping before beginning the Work.
- C. Test existing roof drains to verify that they are not blocked or restricted.
 - 1. Immediately notify Architect of any blockages or restrictions.
- D. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work.

- 1. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.
- E. During removal operations, have sufficient and suitable materials onsite to facilitate rapid installation of temporary protection in the event of unexpected rain.
- F. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday.
 - 1. Prevent debris from entering or blocking roof drains and conductors.
 - a. Use roof-drain plugs specifically designed for this purpose.
 - b. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.
 - 2. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new roofing system, provide alternative drainage method to remove water and eliminate ponding.
 - a. Do not permit water to enter into or under existing roofing system components that are to remain.

3.2 ROOF TEAR-OFF

- A. Notify Owner each day of extent of roof tear-off proposed for that day.
- B. Lower removed roofing materials to ground and onto lower roof levels, using dust-tight chutes or other acceptable means of removing materials from roof areas.
- C. Remove pavers and accessories from roofing.
 - 1. Store and protect pavers and accessories for reuse in manner not to exceed structural loading limitations of roof deck.
 - 2. Discard cracked pavers.
- D. Full Roof Tear-off: Where indicated on Drawings, remove existing roofing and other roofing system components down to the existing roof deck.
 - 1. Remove substrate board, vapor retarder, roof insulation, and cover board.
 - 2. Remove base flashings and counter flashings.
 - 3. Remove perimeter edge flashing and gravel stops.
 - 4. Remove copings.
 - 5. Remove expansion-joint covers.
 - 6. Remove flashings at pipes, curbs, mechanical equipment, and other penetrations.
 - 7. Remove roof drains indicated on Drawings to be removed.
 - 8. Remove wood blocking, curbs, and nailers.

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- 9. Bitumen and felts that are firmly bonded to concrete decks are permitted to remain if felts are dry.
 - a. Remove unadhered bitumen, unadhered felts, and wet felts.
- 10. Remove excess asphalt from steel deck.
 - a. A maximum of 15 lb/100 sq. ft. (0.72 kg/sq. m) of asphalt is permitted to remain on steel decks.
- 11. Remove fasteners from deck.

3.3 DECK PREPARATION

- A. Inspect deck after tear-off of roofing system.
- B. If broken or loose fasteners that secure deck panels to one another or to structure are observed, or if deck appears or feels inadequately attached, immediately notify Architect.
 - 1. Do not proceed with installation until directed by Architect.
- C. If deck surface is unsuitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect.
 - 1. Do not proceed with installation until directed by Architect.
- D. Provide additional deck securement as indicated on Drawings.
- E. Replace steel deck as directed by Architect.
- F. Prepare and paint steel deck surface.
- G. Replace plywood roof sheathing as directed by Architect.

3.4 BASE FLASHING REMOVAL

- A. Remove existing base flashings.
 - 1. Clean substrates of contaminants, such as asphalt, sheet materials, dirt, and debris.
- B. Do not damage metal counterflashings that are to remain.
 - Replace metal counterflashings damaged during removal with counterflashings specified in Section 076200 "Sheet Metal Flashing and Trim.".
- C. Inspect parapet sheathing, wood blocking, curbs, and nailers for deterioration and damage.
 - 1. If parapet sheathing, wood blocking, curbs, or nailers have deteriorated, immediately notify Architect.

D. When directed by Architect, replace parapet framing, wood blocking, curbs, and nailers to comply with Section 061053 Miscellaneous Rough Carpentry."

END OF SECTION 070150.19

SECTION 074213.19 - INSULATED METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Foamed-insulation-core metal wall panels.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
- C. Samples: For each type of metal panel indicated.

1.5 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Warranties: Samples of special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

- 1. Warranty Period: Two years from date of Substantial Completion.
- в. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

- 2.1 PERFORMANCE REQUIREMENTS
 - Structural Performance: Provide metal panel systems capable of Α. withstanding the effects of the following loads, based on testing according to ASTM E 72:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
 - Deflection Limits: For wind loads, no greater than 1/240 of the 3. span.
 - в. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
 - Water Penetration under Static Pressure: No water penetration when С. tested according to ASTM E 331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
 - Thermal Movements: Allow for thermal movements from ambient and D. surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 1. deg F (100 deg C), material surfaces.
 - Ε. Fire-Test-Response Characteristics: Provide metal wall panels and system components with the following fire-test-response characteristics, as determined by testing identical panels and system components per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.

- 1. Fire-Resistance Characteristics: Provide materials and construction tested for fire resistance per ASTM E 119.
- 2. Radiant Heat Exposure: No ignition when tested according to NFPA 268.
- 3. Potential Heat: Acceptable level when tested according to NFPA 259.
- Surface-Burning Characteristics: Provide wall panels with a flame-spread index of 25 or less and a smoke-developed index of 450 or less, per ASTM E 84.

2.2 FOAMED-INSULATION-CORE METAL WALL PANELS

- A. General: Provide factory-formed and -assembled metal wall panels fabricated from two metal facing sheets and insulation core foamed in place during fabrication, and with joints between panels designed to form weathertight seals. Include accessories required for weathertight installation.
 - 1. Insulation Core: Modified isocyanurate or polyurethane foam using a non-CFC blowing agent, with maximum flame-spread and smokedeveloped indexes of 25 and 450, respectively.
 - a. Closed-Cell Content: 90 percent when tested according to ASTM D 6226.
 - b. Density: 2.0 to 2.6 lb/cu. ft. (32 to 42 kg/cu. m) when tested according to ASTM D 1622.
 - c. Compressive Strength: Minimum 20 psi (140 kPa) when tested according to ASTM D 1621.
 - d. Shear Strength: 26 psi (179 kPa) when tested according to ASTM C 273/C 273M.
- B. Concealed-Fastener, Foamed-Insulation-Core Metal Wall Panels: Formed with tongue-and-groove panel edges; designed for sequential installation by interlocking panel edges and mechanically attaching panels to supports using concealed clips or fasteners.
 - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
 - a. CENTRIA Architectural Systems.
 - b. Insulated Panel Systems (IPS).
 - c. Kingspan Insulated Panels.
 - d. MBCI; a division of NCI Group, Inc.
 - e. <u>Metl-Span</u>.
 - 2. Metallic-Coated Steel Sheet: Facings of zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - a. Nominal Thickness: 0.034 inch (0.86 mm).
 - b. Exterior Finish: Two-coat fluoropolymer.

- 1) Color: As selected by Architect from manufacturer's full range.
- c. Interior Finish: Siliconized polyester.
 - 1) Color: As selected by Architect from manufacturer's full range.
- Backer Board: On back side of exterior facing. 3.
- Snap-on Batten: Same material, finish, and color as exterior 4. facings of wall panels.
- Panel Coverage: 36 inches (914 mm) nominal. 5.
- 6. Panel Thickness: 2.5 inches (64 mm).
- Thermal-Resistance Value (R-Value): R-17 (U-0.060) according to 7. ASTM C 1363.

2.3 MISCELLANEOUS MATERIALS

- Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, Α. metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- Panel Accessories: Provide components required for a complete, в. weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - Closures: Provide closures at eaves and rakes, fabricated of same 1. metal as metal panels.
 - 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 - 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- Panel Fasteners: Self-tapping screws designed to withstand design D. loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

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- Panel Sealants: Provide sealant type recommended by manufacturer that Е. are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - Sealant Tape: Pressure-sensitive, 100 percent solids, gray 1. polyisobutylene compound sealant tape with release-paper backing; 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
 - 2. Joint Sealant: ASTM C 920; as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.4 FABRICATION

- General: Fabricate and finish metal panels and accessories at the Α. factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- в. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- Fabricate metal panel joints with factory-installed captive gaskets or С. separator strips that provide a weathertight seal and prevent metalto-metal contact, and that minimize noise from movements.
- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

2.5 FINISHES

- Panels and Accessories: Α.
 - Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish 1. containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 0.8 mil (0.02 mm) for topcoat.
 - Concealed Finish: Apply pretreatment and manufacturer's standard 3. white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

PART 3 - EXECUTION

3.1 PREPARATION

Α. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.2 INSULATED METAL WALL PANEL INSTALLATION

- Α. General: Apply continuous ribbon of sealant to panel joint on concealed side of insulated metal wall panels as vapor seal; apply sealant to panel joint on exposed side of panels for weather seal.
 - Fasten foamed-insulation-core metal wall panels to supports with 1. fasteners at each lapped joint at location and spacing and with fasteners recommended by manufacturer.
 - Apply panels and associated items true to line for neat and 2. weathertight enclosure. Avoid "panel creep" or application not true to line.
 - 3. Provide metal-backed washers under heads of exposed fasteners on weather side of insulated metal wall panels.
 - Locate and space exposed fasteners in uniform vertical and 4. horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
 - 5. Provide sealant tape at lapped joints of insulated metal wall panels and between panels and protruding equipment, vents, and accessories.
 - 6. Apply a continuous ribbon of sealant tape to panel side laps and elsewhere as needed to make panels weathertight.
 - 7. Apply snap-on battens to exposed-fastener, insulated-core metal wall panel seams to conceal fasteners.
- Foamed-Insulation-Core Metal Wall Panels: Fasten metal wall panels to в. supports with concealed clips at each joint at location and spacing and with fasteners recommended by manufacturer. Fully engage tongue and groove of adjacent panels.
 - 1. Install clips to supports with self-tapping fasteners.
- Accessory Installation: Install accessories with positive anchorage to C. building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where D. possible, and set units true to line and level. Install work with laps, joints, and seams that are permanently watertight.

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3.3 CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION 074213.19

SECTION 075423 - THERMOPLASTIC-POLYOLEFIN (TPO) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- Α. Section Includes:
 - 1. Adhered thermoplastic polyolefin (TPO) roofing system.
 - 2. Mechanically fastened, thermoplastic polyolefin (TPO) roofing system.
 - 3. Loosely laid and ballasted, thermoplastic polyolefin (TPO) roofing system.
 - 4. Substrate board.
 - 5. Roof insulation.
 - 6. Cover board.
 - 7. Walkways.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - For insulation and roof system component fasteners, include copy 1. of FM Approvals' RoofNav listing.
- Shop Drawings: Include roof plans, sections, details, and attachments в. to other work, including the following:
 - 1. Layout and thickness of insulation.
 - 2. Base flashings and membrane termination details.
 - 3. Flashing details at penetrations.
 - 4. Tapered insulation layout, thickness, and slopes.
 - Roof plan showing orientation of steel roof deck and orientation 5. of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
 - Insulation fastening patterns for corner, perimeter, and fieldб. of-roof locations.
 - Tie-in with adjoining air barrier. 7.
- C. Samples: For the following products:
 - 1. Roof membrane and flashings, of color required.
 - 2. Walkway pads or rolls, of color required.
- Wind Uplift Resistance Submittal: For roofing system, indicating D. compliance with wind uplift performance requirements.

1.3 INFORMATIONAL SUBMITTALS

Manufacturer Certificates: Α.

- Performance Requirement Certificate: Signed by roof membrane 1. manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - Submit evidence of compliance with performance requirements. a.
- 2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.
- Product Test Reports: For roof membrane and insulation, for tests в. performed by a qualified testing agency, indicating compliance with specified requirements.
- C. Research reports.
- D. Field Test Reports:
 - 1. Concrete internal relative humidity test reports.
 - 2. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.
- Field quality-control reports. Ε.
- F. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

- Maintenance data. Α.
- Certified statement from existing roof membrane manufacturer stating в. that existing roof warranty has not been affected by Work performed under this Section.

1.5 QUALITY ASSURANCE

- Manufacturer Qualifications: A qualified manufacturer that is listed Α. in FM Approvals' RoofNav for roofing system identical to that used for this Project.
- Installer Qualifications: A qualified firm that is approved, в. authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.6 WARRANTY

- Special Warranty: Manufacturer agrees to repair or replace components Α. of roofing system that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- Accelerated Weathering: Roof membrane shall withstand 2000 hours of Α. exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
- Impact Resistance: Roof membrane shall resist impact damage when в. tested according to ASTM D 3746, ASTM D 4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- Wind Uplift Resistance: Design roofing system to resist the following C. wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:
 - 1. Zone 1 (Roof Area Field): 60 lbf/sq. ft.
 - Zone 2 (Roof Area Perimeter): 75 lbf/sq. ft. 2.
 - a. Location: From roof edge to 4'-0'' inside roof edge.
 - 3. Zone 3 (Roof Area Corners): 75 lbf/sq. ft.
 - a. Location: 4'-0" in each direction from building corner.
- D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.
 - Fire/Windstorm Classification: Class 1A-120. 1.
 - 2. Hail-Resistance Rating: MH.
- Е. ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
- Energy Performance: Roofing system shall have an initial solar F. reflectance of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.
- Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for G. application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- Fire-Resistance Ratings: Comply with fire-resistance-rated assembly н. designs indicated. Identify products with appropriate markings of applicable testing agency.

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- THERMOPLASTIC POLYOLEFIN (TPO) ROOFING 2.2
 - TPO Sheet: ASTM D 6878/D 6878M, internally fabric- or scrim-Α. reinforced, TPO sheet.
 - Manufacturers: Subject to compliance with requirements provide 1. products by one of the following]:
 - CertainTeed Corporation. a.
 - b. Georgia-Pacific Building Products.
 - National Gypsum Company. c.
 - d. USG Corporation.
 - 2. Thickness: 60 mils (1.5 mm), nominal.
 - 3. Exposed Face Color: White.
- 2.3 AUXILIARY ROOFING MATERIALS
 - General: Auxiliary materials recommended by roofing system Α. manufacturer for intended use and compatible with other roofing components.
 - 1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.
 - в. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils (1.4 mm) thick, minimum, of same color as TPO sheet.
 - С. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
 - Bonding Adhesive: Manufacturer's standard, water based. D.
 - Slip Sheet: Manufacturer's standard of thickness required for Ε. application.
 - Metal Termination Bars: Manufacturer's standard, predrilled stainless F. steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
 - Fasteners: Factory-coated steel fasteners and metal or plastic plates G. complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.
 - Miscellaneous Accessories: Provide pourable sealers, preformed cone н. and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.4 SUBSTRATE BOARDS

Substrate Board: ASTM C 1396/C 1396M, Type X gypsum board. Α.

- Thickness: 5/8 inch (16 mm). 1.
- Substrate Board: ASTM C 1177/C 1177M, Β. glass-mat, water-resistant gypsum board or ASTM C 1278/C 1278M, fiber-reinforced gypsum board.
 - Manufacturers: Subject to compliance with requirements, provide 1. products by one of the following:
 - CertainTeed Corporation. a.
 - Georgia-Pacific Building Products. b.
 - National Gypsum Company. c.
 - d. USG Corporation.
 - 2. Thickness: 1/2 inch (13 mm) thick.
 - 3. Surface Finish: Factory primed.
- с. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

2.5 ROOF INSULATION

- Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Α. Grade 2, felt or glass-fiber mat facer on both major surfaces.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - Atlas EPS; a Division of Atlas Roofing Corporation. a.
 - b. Atlas Roofing Corporation.
 - Carlisle SynTec Incorporated. с.
 - Dyplast Products. d.
 - Firestone Building Products. e.
 - f. Flex Membrane International Corp.
 - GAF. g.
 - h. Hunter Panels.
 - Insulfoam-a division of Carlisle Construction Materials Inc. i.
 - j. Johns Manville; a Berkshire Hathaway company.
 - k. Rmax, Inc.
 - Size: 48 by 48 inches (1219 by 1219 mm). 2.
 - Thickness: 3.
 - Base Layer: 1-1/2 inches (38 mm). a.
 - Upper Layer: See drawings. Shall not exceed layers of 2" max. b.
- Tapered Insulation: Provide factory-tapered insulation boards. в.
 - Material: Match roof insulation. 1.
 - Minimum Thickness: 1/4 inch (6.35 mm). 2.
 - 3. Slope:
 - Roof Field: 1/4 inch per foot (1:48) unless otherwise а. indicated on Drawings.

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Saddles and Crickets: 1/2 inch per foot (1:24) unless b. otherwise indicated on Drawings.

2.6 INSULATION ACCESSORIES

- Fasteners: Factory-coated steel fasteners with metal or plastic plates Α. complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
- Insulation Adhesive: Insulation manufacturer's recommended adhesive в. formulated to attach roof insulation to substrate or to another insulation layer as follows:
 - Bead-applied, low-rise, one-component or multicomponent urethane 1. adhesive.
 - Full-spread, spray-applied, low-rise, two-component urethane 2. adhesive.
- Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum С. board or ASTM C 1278/C 1278M fiber-reinforced gypsum board.
 - 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
 - Thickness: 1/2 inch (13 mm). 2.
 - 3. Surface Finish: Factory primed.
- Protection Mat: Woven or nonwoven polypropylene, polyolefin, or D. polyester fabric; water permeable and resistant to UV degradation; type and weight as recommended by roofing system manufacturer for application.

2.7 WALKWAYS

- Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 Α. inch (5 mm) thick and acceptable to roofing system manufacturer.
 - 1. Size: Approximately 36 by 60 inches (914 by 1524 mm).
 - 2. Color: Contrasting with roof membrane.

PART 3 - EXECUTION

3.1 EXAMINATION

- Α. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 - Verify that minimum concrete drying period recommended by roofing 1. system manufacturer has passed.

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- Verify that concrete substrate is visibly dry and free of 2. moisture, and that minimum concrete internal relative humidity is not more than 75 percent, or as recommended by roofing system manufacturer, when tested according to ASTM F 2170.
 - Test Frequency: One test probe per each 1000 sq. ft. (93 a. sq. m), or portion thereof, of roof deck, with not less than three tests probes.
 - Submit test reports within 24 hours after performing tests. b.
- Verify that concrete-curing compounds that will impair adhesion 3. of roofing components to roof deck have been removed.
- Verify that joints in precast concrete roof decks have been 4. grouted flush with top of concrete.

3.2 PREPARATION

- Α. Perform fastener-pullout tests according to roof system manufacturer's written instructions.
 - Submit test result within 24 hours after performing tests. 1.
 - Include manufacturer's requirements for any revision to a. previously submitted fastener patterns required to achieve specified wind uplift requirements.

3.3 ROOFING INSTALLATION, GENERAL

- Install roofing system according to roofing system manufacturer's Α. written instructions, FM Approvals' RoofNav assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.
- Complete terminations and base flashings and provide temporary seals в. to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning Work on adjoining roofing.

SUBSTRATE BOARD INSTALLATION 3.4

- Install substrate board with long joints in continuous straight lines, Α. with end joints staggered not less than 24 inches (610 mm) in adjacent rows.
 - At steel roof decks, install substrate board at right angle to 1 flutes of deck.
 - Locate end joints over crests of steel roof deck. a.
 - Tightly butt substrate boards together. 2.
 - Cut substrate board to fit tight around penetrations and 3. projections, and to fit tight to intersecting sloping roof decks.
 - Fasten substrate board to top flanges of steel deck according to 4. recommendations in FM Approvals' RoofNav assembly requirements

and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification.

- Fasten substrate board to top flanges of steel deck to resist 5. uplift pressure at corners, perimeter, and field of roof according to roofing system manufacturers' written instructions.
- Loosely lay substrate board over roof deck. 6.

3.5 INSULATION INSTALLATION

- Coordinate installing roofing system components so insulation is not Α. exposed to precipitation or left exposed at end of workday.
- Comply with roofing system and roof insulation manufacturer's written в. instructions for installing roof insulation.
- C. Installation Over Metal Decking:
 - Install base layer of insulation with joints staggered not less 1. than 24 inches (610 mm) in adjacent rows, end joints staggered not less than 12 inches (305 mm) in adjacent rows and with long joints continuous at right angle to flutes of decking.
 - Locate end joints over crests of decking. a.
 - Where installing composite and noncomposite insulation in two b. or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
 - Trim insulation neatly to fit around penetrations and c. projections, and to fit tight to intersecting sloping roof decks.
 - Make joints between adjacent insulation boards not more than d. 1/4 inch (6 mm) in width.
 - At internal roof drains, slope insulation to create a square e. drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - Trim insulation so that water flow is unrestricted. 1)
 - Fill gaps exceeding 1/4 inch (6 mm) with insulation. f.
 - Cut and fit insulation within 1/4 inch (6 mm) of nailers, g. projections, and penetrations.
 - Mechanically attach base layer of insulation and substrate h. board using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
 - Fasten insulation according to requirements in FM 1) Approvals' RoofNav for specified Windstorm Resistance Classification.
 - 2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
 - Install upper layers of insulation and tapered insulation with 2. joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation.

- Staggered end joints within each layer not less than 24 a. inches (610 mm) in adjacent rows.
- Install with long joints continuous and with end joints b. staggered not less than 12 inches (305 mm) in adjacent rows.
- Trim insulation neatly to fit around penetrations and c. projections, and to fit tight to intersecting sloping roof decks.
- Make joints between adjacent insulation boards not more than d. 1/4 inch (6 mm) in width.
- At internal roof drains, slope insulation to create a square e. drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - Trim insulation so that water flow is unrestricted. 1)
- Fill gaps exceeding 1/4 inch (6 mm) with insulation. f.
- Cut and fit insulation within 1/4 inch (6 mm) of nailers, g. projections, and penetrations.
- Adhere each layer of insulation to substrate using adhesive h. according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - Set each layer of insulation in a uniform coverage of 2) full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
- Installation Over Concrete Decks: D.
 - Install base layer of insulation with joints staggered not less 1. than 24 inches (610 mm) in adjacent rows, end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - Where installing composite and noncomposite insulation in two a. or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
 - Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof b. decks.
 - Make joints between adjacent insulation boards not more than c. 1/4 inch (6 mm) in width.
 - At internal roof drains, slope insulation to create a square d. drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - Trim insulation so that water flow is unrestricted. 1)
 - Fill gaps exceeding 1/4 inch (6 mm) with insulation. e.
 - Cut and fit insulation within 1/4 inch (6 mm) of nailers, f. projections, and penetrations.
 - Loosely lay base layer of insulation units over substrate. g.

- Adhere base layer of insulation to vapor retarder according h. to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - Set insulation in ribbons of bead-applied insulation 1) adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
- Install upper layers of insulation and tapered insulation with 2. joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation.
 - Staggered end joints within each layer not less than 24 a. inches (305 mm) in adjacent rows.
 - Install with long joints continuous and with end joints b. staggered not less than 12 inches (305 mm) in adjacent rows.
 - Trim insulation neatly to fit around penetrations and с. projections, and to fit tight to intersecting sloping roof decks.
 - Make joints between adjacent insulation boards not more than d. 1/4 inch (6 mm) in width.
 - At internal roof drains, slope insulation to create a square e. drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - Trim insulation so that water flow is unrestricted. 1)
 - Fill gaps exceeding 1/4 inch (6 mm) with insulation. f.
 - Cut and fit insulation within 1/4 inch (6 mm) of nailers, g. projections, and penetrations.
 - Adhere each layer of insulation to substrate using adhesive h. according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - Set each layer of insulation in ribbons of bead-applied 1) insulation adhesive, firmly pressing and maintaining insulation in place.
 - Set each layer of insulation in a uniform coverage of 2) full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.6 INSTALLATION OF COVER BOARDS

- Install cover boards over insulation with long joints in continuous Α. straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction.
 - Trim cover board neatly to fit around penetrations and 1. projections, and to fit tight to intersecting sloping roof decks.
 - 2. At internal roof drains, conform to slope of drain sump.

- Trim cover board so that water flow is unrestricted. a.
- Cut and fit cover board tight to nailers, projections, and 3. penetrations.
- Adhere cover board to substrate using adhesive according to FM 4. Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - Set cover board in ribbons of bead-applied insulation a. adhesive, firmly pressing and maintaining insulation in place.
 - b. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
- в. Install slip sheet over cover board and beneath roof membrane.

3.7 ADHERED ROOFING INSTALLATION

- Adhere roof membrane over area to receive roofing according to roofing Α. system manufacturer's written instructions.
- Unroll roof membrane and allow to relax before installing. в.
- Start installation of roofing in presence of roofing system C. manufacturer's technical personnel.
- Accurately align roof membrane, and maintain uniform side and end laps D. of minimum dimensions required by manufacturer. Stagger end laps.
- Bonding Adhesive: Apply to substrate and underside of roof membrane at Ε. rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.
- F. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.
- Apply roof membrane with side laps shingled with slope of roof deck G. where possible.
- Seams: Clean seam areas, overlap roof membrane, and hot-air weld side н. and end laps of roof membrane and sheet flashings, to ensure a watertight seam installation.
 - Test lap edges with probe to verify seam weld continuity. Apply 1. lap sealant to seal cut edges of roof membrane and sheet flashings.
 - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
 - Repair tears, voids, and lapped seams in roof membrane that do 3. not comply with requirements.

Spread sealant bed over deck-drain flange at roof drains, and securely Ι. seal roof membrane in place with clamping ring.

3.8 BASE FLASHING INSTALLATION

- Install sheet flashings and preformed flashing accessories, and adhere Α. to substrates according to roofing system manufacturer's written instructions.
- Apply bonding adhesive to substrate and underside of sheet flashing at в. required rate, and allow to partially dry. Do not apply to seam area of flashing.
- Flash penetrations and field-formed inside and outside corners with С. cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- Terminate and seal top of sheet flashings and mechanically anchor to Ε. substrate through termination bars.

3.9 WALKWAY INSTALLATION

- Flexible Walkways: Α.
 - 1. Install flexible walkways at the following locations:
 - a. Retain one or more subparagraphs below. Revise to suit Project.
 - Perimeter of each rooftop unit. b.
 - Between each rooftop unit location, creating a continuous c. path connecting rooftop unit locations.
 - d. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
 - e. Top and bottom of each roof access ladder.
 - Between each roof access ladder and each rooftop unit f. location or path connecting rooftop unit locations.
 - Locations indicated on Drawings. g.
 - h. As required by roof membrane manufacturer's warranty requirements.
 - Provide 6-inch (76-mm) clearance between adjoining pads. 2.
 - Heat weld to substrate or adhere walkway products to substrate 3. with compatible adhesive according to roofing system manufacturer's written instructions.

PROTECTING AND CLEANING 3.10

Protect roofing system from damage and wear during remainder of Α. construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Formed roof-drainage sheet metal fabrications.
 - 2. Formed low-slope roof sheet metal fabrications.
 - Formed wall sheet metal fabrications. 3.

1.2 ACTION SUBMITTALS

- Product Data: For each type of product. Α.
- в. Shop Drawings: For sheet metal flashing and trim.
 - Include plans, elevations, sections, and attachment details. 1.
 - 2. Distinguish between shop- and field-assembled work.
 - 3. Include identification of finish for each item.
 - 4. Include pattern of seams and details of termination points, expansion joints and expansion-joint covers, direction of expansion, roof-penetration flashing, and connections to adjoining work.
- С. Samples: For each exposed product and for each color and texture specified.
- 1.3 INFORMATIONAL SUBMITTALS
 - Product certificates. Α.
 - в. Product test reports.
 - Sample warranty. C.
- 1.4 CLOSEOUT SUBMITTALS
 - A. Maintenance data.

QUALITY ASSURANCE 1.5

Fabricator Qualifications: Employs skilled workers who custom Α. fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

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- For copings and roof edge flashings that are SPRI ES-1 tested, 1. shop shall be listed as able to fabricate required details as tested and approved.
- Mockups: Build mockups to verify selections made under Sample в. submittals to demonstrate aesthetic effects and to set quality standards for fabrication and installation.
 - 1. Build mockup of typical roof edge eave, including gutter, fascia, fascia trim, expansion drip edge, approximately 2 feet long.

1.6 WARRANTY

- Special Warranty on Finishes: Manufacturer agrees to repair finish or Α. replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: 20 years from date of Substantial Completion.
- PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- General: Sheet metal flashing and trim assemblies shall withstand wind Α. loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The в. NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- Thermal Movements: Allow for thermal movements from ambient and C. surface temperature changes.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

- General: Protect mechanical and other finishes on exposed surfaces Α. from damage by applying strippable, temporary protective film before shipping.
- Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel Β. sheet according to ASTM A 653/A 653M, G90 (Z275) coating designation prepainted by coil-coating process to comply with ASTM A 755/A 755M.

- 1. Exposed Coil-Coated Finish:
 - Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer a. finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- 2. Color: As selected by Architect from manufacturer's full range.

2.3 UNDERLAYMENT MATERIALS

- Self-Adhering, High-Temperature Sheet: Minimum 30 mils (0.76 mm) Α. thick, consisting of a slip-resistant polyethylene- or polypropylenefilm top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
 - Manufacturers: Subject to compliance with requirements, available 1. manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - Carlisle Coatings & Waterproofing Inc. a.
 - GCP Applied Technologies Inc. (formerly Grace Construction b. Products).
 - Owens Corning. с.
 - Thermal Stability: ASTM D 1970; stable after testing at 240 deg F 2. (116 deg C) or higher.
 - 3. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C) or lower.

2.4 MISCELLANEOUS MATERIALS

- General: Provide materials and types of fasteners, solder, protective Α. coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.
- Fasteners: Wood screws, annular threaded nails, self-tapping screws, в. self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - Exposed Fasteners: Heads matching color of sheet metal using a. plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.

- b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
- с. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
- Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 2. stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.
- C. Solder:
 - 1. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead with maximum lead content of 0.2 percent.
- Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene D. compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
- Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; Ε. of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl F. rubber sealant; polyisobutylene plasticized; heavy bodied for hookedtype expansion joints with limited movement.
- Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing G. compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

2.5 FABRICATION, GENERAL

- General: Custom fabricate sheet metal flashing and trim to comply with Α. details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - Obtain field measurements for accurate fit before shop 1. fabrication.
 - Form sheet metal flashing and trim to fit substrates without 2. excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - Conceal fasteners and expansion provisions where possible. Do not 3. use exposed fasteners on faces exposed to view.
- Expansion Provisions: Form metal for thermal expansion of exposed в. flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.

- Sealant Joints: Where movable, nonexpansion-type joints are required, С. form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- Fabricate cleats and attachment devices from same material as D. accessory being anchored or from compatible, noncorrosive metal.
- Fabricate cleats and attachment devices of sizes as recommended by Е. cited sheet metal standard for application, but not less than thickness of metal being secured.
- Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and F. seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- 2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS
 - Hanging Gutters: Fabricate to cross section required, complete with Α. end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- (2400-mm-) long sections. Furnish flat-stock gutter brackets and gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.
 - Downspouts: Fabricate rectangular downspouts to dimensions indicated, в. complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.
 - 1. Hanger Style: See Drawings.
 - 2. Fabricate from the following materials:
 - Galvanized Steel: 0.022 inch (0.56 mm) thick. а.
 - Parapet Scuppers: Fabricate scuppers to dimensions required, with C. closure flange trim to exterior, 4-inch- (100-mm-) wide wall flanges to interior, and base extending 4 inches (100 mm) beyond cant or tapered strip into field of roof. Fabricate from the following materials:
 - 1. Galvanized Steel: 0.028 inch (0.71 mm) thick.
 - D. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape required, complete with outlet tubes. Fabricate from the following materials:
 - 1. Galvanized Steel: 0.028 inch (0.71 mm) thick.
 - Ε. Splash Pans: Fabricate to dimensions and shape required and from the following materials:
 - 1. Stainless Steel: 0.019 inch (0.48 mm) thick.

- LOW-SLOPE ROOF SHEET METAL FABRICATIONS 2.7
 - Α. Roof Edge Flashing and Fascia Cap: Fabricate in minimum 96-inch-(2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long sections. Furnish with 6-inch- (150-mm-) wide, joint cover plates. Shop fabricate interior and exterior corners.
 - 1. Fabricate from the Following Materials:
 - a. Galvanized Steel: 0.028 inch (0.71 mm) thick.
 - Copings: Fabricate in minimum 96-inch- (2400-mm-) long, but not в. exceeding 12-foot- (3.6-m-) long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and interior leg. Miter corners, fasten and seal watertight. Shop fabricate interior and exterior corners.
 - Fabricate from the Following Materials: 1.
 - Galvanized Steel: 0.040 inch (1.02 mm) thick. a.
 - Base Flashing: Shop fabricate interior and exterior corners. Fabricate C. from the following materials:
 - 1. Galvanized Steel: 0.028 inch (0.71 mm) thick.
 - D. Counterflashing and Flashing Receivers: Fabricate from the following materials:
 - 1. Galvanized Steel: 0.022 inch (0.56 mm) thick.
 - Roof-Penetration Flashing: Fabricate from the following materials: Ε.
 - 1. Galvanized Steel: 0.028 inch (0.71 mm) thick.
 - Roof-Drain Flashing: Fabricate from the following materials: F.
 - 1. Stainless Steel: 0.016 inch (0.40 mm) thick.

2.8 WALL SHEET METAL FABRICATIONS

- Through-Wall Flashing: Fabricate continuous flashings in minimum 96-Α. inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections, under copings, and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches (150 mm) beyond each side of wall openings; and form with 2-inch- (50-mm-) high, end dams. Fabricate from the following materials:
 - 1. Stainless Steel: 0.016 inch (0.40 mm) thick.
- Wall Expansion-Joint Cover: Fabricate from the following materials: в. 1. Galvanized Steel: 0.028 inch (0.71 mm) thick.
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PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by Α. underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller. Cover underlayment within 14 days.

3.2 INSTALLATION, GENERAL

- General: Anchor sheet metal flashing and trim and other components of Α. the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - Install sheet metal flashing and trim true to line, levels, and 1. slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 - Install sheet metal flashing and trim to fit substrates and to 2. result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - Space cleats not more than 12 inches (300 mm) apart. Attach each 3. cleat with at least two fasteners. Bend tabs over fasteners.
 - 4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
 - Torch cutting of sheet metal flashing and trim is not permitted. 5.
- Metal Protection: Where dissimilar metals contact each other, or where в. metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
 - Underlayment: Where installing sheet metal flashing and trim 1. directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.
 - Form expansion joints of intermeshing hooked flanges, not less 1. than 1 inch (25 mm) deep, filled with sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.

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- Fasteners: Use fastener sizes that penetrate substrate not less than D. recommended by fastener manufacturer to achieve maximum pull-out resistance.
- Conceal fasteners and expansion provisions where possible in exposed Ε. work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- Rivets: Rivet joints in uncoated aluminum where necessary for G. strength.
- ROOF-DRAINAGE SYSTEM INSTALLATION 3.3
 - General: Install sheet metal roof-drainage items to produce complete Α. roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.
 - Hanging Gutters: Join sections with joints sealed with sealant. в. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.
 - Install gutter with expansion joints at locations indicated, but 1. not exceeding, 50 feet (15.24 m) apart. Install expansion-joint caps.
 - Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints. C. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches (1500 mm) o.c.
 - Splash Pans: Install where downspouts discharge on low-slope roofs. D. Set in elastomeric sealant compatible with the substrate or manufacturer's recommendations.
 - Parapet Scuppers: Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or Ε. tapered edge strips, and under roofing membrane.
 - Conductor Heads: Anchor securely to wall, with elevation of conductor F. head rim at minimum of 1 inch (25 mm) below scupper discharge.
 - Expansion-Joint Covers: Install expansion-joint covers at locations G. and of configuration indicated. Lap joints minimum of 4 inches (100 mm) in direction of water flow.

ROOF FLASHING INSTALLATION 3.4

General: Install sheet metal flashing and trim to comply with Α. performance requirements, sheet metal manufacturer's written

installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate.
- Copings: Anchor to resist uplift and outward forces according to C. recommendations in cited sheet metal standard unless otherwise indicated.
- Pipe or Post Counterflashing: Install counterflashing umbrella with D. close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
- Ε. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm).
- Roof-Penetration Flashing: Coordinate installation of roof-penetration F. flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.
- 3.5 WALL FLASHING INSTALLATION
 - General: Install sheet metal wall flashing to intercept and exclude Α. penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- 3.6 CLEANING AND PROTECTION
 - Α. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
 - Clean and neutralize flux materials. Clean off excess solder. в.
 - C. Clean off excess sealants.
 - Remove temporary protective coverings and strippable films as sheet D. metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

END OF SECTION 076200

SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Roof curbs.
 - 2. Roof hatches.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of roof accessory.
- B. Shop Drawings: For roof accessories.
- C. Samples: For each exposed product and for each color and texture specified.
- 1.3 INFORMATIONAL SUBMITTALS
 - A. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within 20 years from date of Substantial Completion.
- PART 2 PRODUCTS

2.1 ROOF CURBS

A. Roof Curbs: Internally reinforced roof-curb units capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings, bearing continuously on roof structure, and capable of meeting performance requirements; with welded or mechanically fastened and sealed corner joints, straight sides, and integrally formed deck-mounting flange at perimeter bottom.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Adaptable Air Products.
 - b. AES Industries, Inc.
 - c. Air Balance; a division of MESTEK, Inc.
 - d. Bristolite Daylighting Systems, Inc.
 - e. Conn-Fab Sales, Inc.
 - f. Curbs Plus, Inc.
 - g. Custom Solution Roof and Metal Products.
 - h. Greenheck Fan Corporation.
 - i. KCC International Inc.
 - j. Lloyd Industries, Inc.
 - k. LMCurbs.
 - 1. Louvers & Dampers, Inc.; a division of Mestek, Inc.
 - m. Metallic Products Corp.
 - n. Milcor; Commercial Products Group of Hart & Cooley, Inc.
 - o. Pate Company (The).
 - p. Plenums Incorporated.
 - q. Roof Curb Systems.
 - r. Roof Products and Systems (RPS); a division of Hart & Cooley, Inc.
 - s. Roof Products, Inc.
 - t. Thybar Corporation.
 - u. Vent Products Co., Inc.
- B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.
- C. Material: Aluminum sheet, 0.125 inch (3.17 mm) thick.
 - 1. Finish: Two-coat fluoropolymer.
 - 2. Color: As selected by Architect from manufacturer's full range.
- D. Construction:
 - 1. Curb Profile: Manufacturer's standard compatible with roofing system.
 - 2. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.
 - 3. Fabricate curbs to minimum height of 12 inches (305 mm) above roofing surface unless otherwise indicated.
 - 4. Top Surface: Level top of curb, with roof slope accommodated by sloping deck-mounting flange.
 - 5. Sloping Roofs: Where roof slope exceeds 1:48, fabricate curb with perimeter curb height tapered to accommodate roof slope so that top surface of perimeter curb is level. Equip unit with water diverter or cricket on side that obstructs water flow.
 - 6. Insulation: Factory insulated with 1-1/2-inch- (38-mm-) thick glass-fiber board insulation.
 - 7. Liner: Same material as curb, of manufacturer's standard thickness and finish.
 - Nailer: Factory-installed wood nailer along top flange of curb, under top flange on side of curb, continuous around curb perimeter.

- 9. Wind Restraint Straps and Base Flange Attachment: Provide wind restraint straps, welded strap connectors, and base flange attachment to roof structure at perimeter of curb, of size and spacing required to meet wind uplift requirements.
- 10. Platform Cap: Where portion of roof curb is not covered by equipment, provide weathertight platform cap formed from 3/4-inch (19-mm) thick plywood covered with metal sheet of same type, thickness, and finish as required for curb.
- 11. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as curb.
- 12. Damper Tray: Provide damper tray or shelf with opening less than interior curb dimensions indicated of size indicated.

2.2 ROOF HATCH

- A. Roof Hatches: Metal roof-hatch units with lids and insulated doublewalled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, straight sides, and integrally formed deckmounting flange at perimeter bottom. Basis-of-Design Product: Bilco Type E-50 TB.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Acudor Products, Inc.
 - b. AES Industries, Inc.
 - c. Babcock-Davis.
 - d. Bilco Company (The).
 - e. Bristolite Daylighting Systems, Inc.
 - f. Custom Solution Roof and Metal Products.
 - g. Dur-Red Products.
 - h. Hi Pro International, Inc.
 - i. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - j. KCC International Inc.
 - k. Lexcor; a division of Luxsuco corp.
 - 1. Menzies Metal Products.
 - m. Metallic Products Corp.
 - n. Milcor; Commercial Products Group of Hart & Cooley, Inc.
 - o. O'Keeffe's Inc.
 - p. Pate Company (The).
 - q. Precision Ladders, LLC.
 - r. Williams Bros. Corporation of America (The).
- B. Type and Size: Single-leaf lid, 36 by 36 inches (900 by 900 mm).
- C. Loads: Minimum 40-lbf/sq. ft. (1.9-kPa) external live load and 20-lbf/sq. ft. (0.95-kPa) internal uplift load.
- D. Hatch Material: Aluminum sheet.
 - 1. Thickness: 0.079 inch (2.01 mm).
 - 2. Finish: Two-coat fluoropolymer.
 - 3. Color: As selected by Architect from manufacturer's full range.

- E. Construction:
 - 1. Insulation: Polyisocyanurate board.

a. R-Value: 20 according to ASTM C 1363.

- Nailer: Factory-installed wood nailer continuous around hatch perimeter.
- 3. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
- 4. Curb Liner: Manufacturer's standard, of same material and finish as metal curb.
- 5. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
- 6. Fabricate curbs to minimum height of 12 inches (305 mm) above roofing surface unless otherwise indicated.
- 7. Sloping Roofs: Where slope or roof deck exceeds 1:48, fabricate curb with perimeter curb height that is tapered to accommodate roof slope so that top surfaces of perimeter curb are level. Equip hatch with water diverter or cricket on side that obstructs water flow.
- F. Hardware: Spring operators, hold-open arm, stainless-steel spring latch with turn handles, stainless-steel butt- or pintle-type hinge system, and padlock hasps inside and outside.
 - 1. Provide two-point latch on lids larger than 84 inches (2130 mm).
- G. Safety Railing System: Roof-hatch manufacturer's standard system including rails, clamps, fasteners, safety barrier at railing opening, and accessories required for a complete installation; attached to roof hatch and complying with 29 CFR 1910.23 requirements and authorities having jurisdiction.
 - 1. Height: 42 inches (1060 mm) above finished roof deck.
 - Posts and Rails: Galvanized-steel pipe, 1-1/4 inches (31 mm) in diameter or galvanized-steel tube, 1-5/8 inches (41 mm) in diameter.
 - Flat Bar: Galvanized steel, 2 inches (50 mm) high by 3/8 inch (9 mm) thick.
 - 4. Maximum Opening Size: System constructed to prevent passage of a sphere 21 inches (533 mm) in diameter.
 - 5. Self-Latching Gate: Fabricated of same materials and rail spacing as safety railing system. Provide manufacturer's standard hinges and self-latching mechanism.
 - 6. Post and Rail Tops and Ends: Weather resistant, closed or plugged with prefabricated end fittings.
 - 7. Provide weep holes or another means to drain entrapped water in hollow sections of handrail and railing members.
 - 8. Fabricate joints exposed to weather to be watertight.
 - 9. Fasteners: Manufacturer's standard, finished to match railing system.
 - 10. Finish: Manufacturer's standard.

- a. Color: As selected by Architect from manufacturer's full range.
- H. Ladder-Assist Post: Roof-hatch manufacturer's standard device for attachment to roof-access ladder.
 - 1. Operation: Post locks in place on full extension; release mechanism returns post to closed position.
 - 2. Height: 42 inches (1060 mm) above finished roof deck.
 - 3. Material: Stainless steel.
 - 4. Post: 1-5/8-inch- (41-mm-) diameter pipe.
 - 5. Finish: Manufacturer's standard baked enamel or powder coat.
 - a. Color: As selected by Architect from manufacturer's full range.

2.3 METAL MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation.
 - 1. Exposed Coil-Coated Finish: Prepainted by the coil-coating process to comply with ASTM A 755/A 755M. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer Finish: AAMA 621. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
 - 2. Baked-Enamel or Powder-Coat Finish: After cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of 2 mils (0.05 mm).
 - 3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil (0.013 mm).
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.
 - 1. Exposed Coil-Coated Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer Finish: AAMA 2605. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
 - 2. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil (0.013 mm).

- C. Aluminum Extrusions and Tubes: ASTM B 221 (ASTM B 221M), manufacturer's standard alloy and temper for type of use, finished to match assembly where used; otherwise mill finished.
- D. Stainless-Steel Sheet and Shapes: ASTM A 240/A 240M or ASTM A 666, Type 304.
- E. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized according to ASTM A 123/A 123M unless otherwise indicated.
- F. Steel Tube: ASTM A 500/A 500M, round tube.
- G. Galvanized-Steel Tube: ASTM A 500/A 500M, round tube, hot-dip galvanized according to ASTM A 123/A 123M.
- H. Steel Pipe: ASTM A 53/A 53M, galvanized.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, thickness and thermal resistivity as indicated.
- C. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPA C2; not less than 1-1/2 inches (38 mm) thick.
- D. Underlayment:
 - Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBSmodified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
 - 2. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
- E. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
- F. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.

- G. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.
- PART 3 EXECUTION

3.1 INSTALLATION

- A. General: Verify dimensions of roof openings for roof accessories. Install roof accessories according to manufacturer's written instructions.
 - 1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
 - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
 - 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.
- C. Seal joints with elastomeric or butyl sealant as required by roof accessory manufacturer.

3.2 REPAIR AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.
- B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 099113 "Exterior Painting."
- C. Clean exposed surfaces according to manufacturer's written instructions.
- D. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- Section includes: Α.
 - 1. Interior standard steel doors and frames.
 - 2. Exterior standard steel doors and frames.

1.3 ACTION SUBMITTALS

- Product Data: For each type of product. Α.
- в. 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.
- Product Schedule: For hollow-metal doors and frames, prepared by or С. under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.
- 1.4 INFORMATIONAL SUBMITTALS
 - A. Product test reports.
- PART 2 PRODUCTS

2.1 MANUFACTURERS

- Α. <u>Manufacturers</u>: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Ceco Door Products; an Assa Abloy Group company.
 - 2. Curries Company; an Assa Abloy Group company.

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- Republic Doors and Frames. 3.
- Security Metal Products Corp. 4.
- Steelcraft; an Ingersoll-Rand company. 5.

2.2 PERFORMANCE REQUIREMENTS

- Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled Α. by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - Smoke- and Draft-Control Assemblies: Provide assemblies with 1. gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
 - Temperature-Rise Limit: At vertical exit enclosures and exit 2. passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
- в. 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.
- Thermally Rated Door Assemblies: Provide door assemblies with U-factor С. of not more than 0.50 deg Btu/F x h x sq. ft. when tested according to ASTM C 518.

INTERIOR STANDARD STEEL DOORS AND FRAMES 2.3

- Construct hollow-metal doors and frames to comply with standards Α. indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- Heavy-Duty Doors and Frames: SDI A250.8, Level 2; SDI A250.4, Level B. В.
 - 1. Doors:
 - Type: As indicated in the Door and Frame Schedule. a.
 - Thickness: 1-3/4 inches (44.5 mm). b.
 - с. Face: Uncoated steel sheet, minimum thickness of 0.042 inch (1.0 mm).
 - d. Edge Construction: Model 2, Seamless.
 - e. Core: Manufacturer's standard.
 - 2. Frames:
 - a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
 - Sidelite Frames: Fabricated from same thickness material as b. adjacent door frame.

c. Construction: Full profile welded.

2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

- Α. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3; SDI A250.4, Β. Level A.
 - 1. Doors:
 - Type: As indicated in the Door and Frame Schedule. а.
 - Thickness: 1-3/4 inches (44.5 mm). b.
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A60 (ZF180) coating.
 - Edge Construction: Model 2, Seamless. d.
 - Top Edge Closures: Close top edges of doors with flush e. closures of same material as face sheets. Seal joints against water penetration.
 - Bottom Edges: Close bottom edges of doors where required for f. attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
 - q. Core: Polyurethane.
 - 2. Frames:
 - Materials: Metallic-coated steel sheet, minimum thickness of a. 0.053 inch (1.3 mm), with minimum A60 (ZF180) coating.
 - Construction: Full profile welded. b.

2.5 BORROWED LITES

- Fabricate of metallic-coated steel sheet, minimum thickness of 0.053 Α. inch (1.3 mm).
- Construction: Full profile welded. в.
- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.
- D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.6 FRAME ANCHORS

Α. Jamb Anchors:

- Type: Anchors of minimum size and type required by applicable 1. door and frame standard, and suitable for performance level indicated.
- 2. 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 (610 mm) of frame height above 7 feet (2.1 m).
- 3. Postinstalled Expansion Anchor: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- Floor Anchors: Provide floor anchors for each jamb and mullion that Β. extends to floor.
- Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type C. anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at top of underlayment.
- Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating D. 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.

MATERIALS 2.7

- Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Α. Type B; suitable for exposed applications.
- Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), в. 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.
- Inserts, Bolts, and Fasteners: Hot-dip galvanized according to D. ASTM A 153/A 153M.
- Ε. 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 hollowmetal frames of type indicated.
- Mineral-Fiber Insulation: ASTM C 665, F. 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.
- Glazing: Comply with requirements in Section 088000 "Glazing." G.

FABRICATION 2.8

- Door Astragals: Provide overlapping astragal on one leaf of pairs of Α. doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- в. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 - Sidelite Frames: Provide closed tubular members with no visible 1. face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding, or by rigid mechanical anchors.
 - Provide countersunk, flat- or oval-head exposed screws and bolts 2. for exposed fasteners unless otherwise indicated.
 - Door Silencers: Except on weather-stripped frames, drill stops to 3. receive door silencers as follows. Keep holes clear during construction.
 - Single-Door Frames: Drill stop in strike jamb to receive a. three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- Hardware Preparation: Factory prepare hollow-metal doors and frames to C. receive templated mortised hardware, and electrical wiring; 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 preparing hollow-metal doors and frames for hardware.
- Glazed Lites: Provide stops and moldings around glazed lites where D. indicated. Form corners of stops and moldings with mitered hairline joints.
 - Provide stops and moldings flush with face of door, and with 1. beveled stops unless otherwise indicated.
 - Multiple Glazed Lites: Provide fixed and removable stops and 2. moldings so that each glazed lite is capable of being removed independently.
 - Provide fixed frame moldings on outside of exterior and on secure 3. side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 - Coordinate rabbet width between fixed and removable stops with 4. glazing and installation types indicated.
 - Provide stops for installation with countersunk flat- or oval-5. head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

2.9 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.

PART 3 - EXECUTION

3.1 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. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. 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 without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
 - 2. Fire-Rated Openings: Install frames according to NFPA 80.
 - 3. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 4. Solidly pack mineral-fiber insulation inside frames.
 - Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
 - 6. 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.

- Installation Tolerances: Adjust hollow-metal frames to the 7. following tolerances:
 - Squareness: Plus or minus 1/16 inch (1.6 mm), measured at a. door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - Alignment: Plus or minus 1/16 inch (1.6 mm), measured at b. jambs on a horizontal line parallel to plane of wall.
 - Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite с. face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.
- Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in в. frames, within clearances specified below.
 - 1. Non-Fire-Rated Steel Doors: Comply with SDI A250.8.
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - 3. Smoke-Control Doors: Install doors according to NFPA 105.
- с. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

CLEANING AND TOUCHUP 3.3

- Prime-Coat Touchup: Immediately after erection, sand smooth rusted or Α. damaged areas of prime coat and apply touchup of compatible airdrying, rust-inhibitive primer.
- Metallic-Coated Surface Touchup: Clean abraded areas and repair with в. galvanizing repair paint according to manufacturer's written instructions.
- C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid-core doors with wood-veneer faces.
 - 2. Factory finishing flush wood doors.
 - 3. Factory fitting flush wood doors to frames and factory machining for hardware.
- B. Related Requirements:
 - 1. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
 - 1. Dimensions and locations of blocking.
 - 2. Dimensions and locations of mortises and holes for hardware.
 - 3. Dimensions and locations of cutouts.
 - 4. Undercuts.
 - 5. Requirements for veneer matching.
 - 6. Doors to be factory finished and finish requirements.
 - 7. Fire-protection ratings for fire-rated doors.
- C. Samples: For wood veneer door faces and factory-finished doors.

1.3 INFORMATIONAL SUBMITTALS

- A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.
- PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

 Algoma Hardwoods, Inc.

- 2. General Veneer Manufacturing Co.
- 3. Graham Wood Doors; ASSA ABLOY Group company.
- 4. Marshfield DoorSystems, Inc.
- 5. Mohawk Flush Doors, Inc.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards.
 - 1. Provide AWI Quality Certification, WI Certified Compliance Labels indicating that doors comply with requirements of grades specified.
- B. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are 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.
 - 1. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
 - 2. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
 - 3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
- C. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.
- D. Particleboard-Core Doors:
 - 1. Particleboard: ANSI A208.1, Grade LD-1 or Grade LD-2, made with binder containing no urea-formaldehyde.
 - 2. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
 - 3. Provide doors with glued-wood-stave or structural-compositelumber cores instead of particleboard cores for doors indicated to receive exit devices.
- E. Structural-Composite-Lumber-Core Doors:
 - 1. Structural Composite Lumber: WDMA I.S.10.
 - a. Screw Withdrawal, Face: 700 lbf (3100 N).
 - b. Screw Withdrawal, Edge: 400 lbf (1780 N).

F. Mineral-Core Doors:

1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.

- 2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
- 3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
- 2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH
 - A. Interior Solid-Core Doors:
 - 1. Grade: Premium, with Grade A faces.
 - 2. Species: Match existing.
 - 3. Match between Veneer Leaves: Match existing.
 - 4. Assembly of Veneer Leaves on Door Faces: Match existing.
 - 5. Core: Particleboard.
 - 6. Construction: Seven plies, either bonded or nonbonded construction.

2.4 LIGHT FRAMES AND LOUVERS

- A. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fireprotection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.
- B. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch- (1.2-mm-) thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated.
- C. Metal Louvers:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Air Louvers Inc.; a Division of the Activar Construction Products Group.
 - b. Anemostat Products; a Mestek company.
 - c. L & L Louvers, Inc.
 - d. Louvers & Dampers, Inc.; a division of Mestek, Inc.
 - e. McGill Architectural Products.
 - 2. Metal and Finish: Hot-dip galvanized steel, 0.040 inch (1.0 mm) thick, with baked-enamel- or powder-coated finish.

2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 1. Comply with NFPA 80 requirements for fire-rated doors.

- B. Factory machine doors for hardware that is not surface applied.
- C. Openings: Factory cut and trim openings through doors.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
 - 3. Louvers: Factory install louvers in prepared openings.

2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors that are indicated to receive transparent finish.
- C. Transparent Finish:
 - 1. Grade: Premium.
 - 2. Finish: AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" System 5, conversion varnish.
 - 3. Staining: Match existing.
 - 4. Effect: Filled finish.
 - 5. Sheen: Satin.
- PART 3 EXECUTION
- 3.1 INSTALLATION
 - A. Hardware: For installation, see Section 087100 "Door Hardware."
 - B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
 - 1. Install fire-rated doors according to NFPA 80.
 - 2. Install smoke- and draft-control doors according to NFPA 105.
 - C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
 - D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

END OF SECTION 081416

SECTION 08 35 13 - WOOD ACCORDION FOLDING DOORS

PART 1 GENERAL

1.1 SUMMARY

- Α. Section Includes: 1. Wood accordion folding doors.
- Β. Related Sections: 1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SYSTEM DESCRIPTION

- Performance Requirements: Class 1 fire retardant door panel core Α. material.
- 1.3 SUBMITTALS
 - Submittals for Review: Α.
 - Shop Drawings: Indicate opening sizes, jamb, sill, and head 1. conditions.
 - 2. Product Data: Manufacturer's descriptive literature for door units, and hardware.
 - 3. Samples:
 - Color chips illustrating manufacturer's full range of available a. colors and finishes.
 - Closeout Submittals: Β. Operation and Maintenance Data. 1.

1.4 QUALITY ASSURANCE

- Manufacturer Qualifications: Primary products supplied by single Α. manufacturer with minimum 5 years experienced in fabrication of accordion folding wood doors.
- Installer Qualifications: Minimum 2 years experience in work of this Β. Section.
- Regulatory Requirements: Comply with applicable accessibility code for С. door opening force.
- 1.5 DELIVERY, STORAGE AND HANDLING
 - Do not deliver doors until proper protection can be provided, and until Α. needed for installation.
 - Store products in manufacturer's unopened packaging until ready for Β. installation.
- 1.6 PROJECT CONDITIONS
 - Α. Maintain temperature and humidity within manufacturer's recommended limits.

Do not install products under environmental conditions outside Β. manufacturer's limits.

1.7 WARRANTIES

- Α. Provide manufacturer's standard limited warranty against manufacturing defects.
- PART 2 PRODUCTS

2.1 MANUFACTURERS

- Α. Contract Documents are based on products by Woodfold Mfg., Inc. (www.woodfold.com)
- Substitutions: Under provisions of Division 01. Β.

2.2 ACCORDION FOLDING UTILITY DOORS

- Source: Series 140 door. Α.
- Components: Β.
 - Track: 1-1/8 x 1 inch aluminum, pre-punched for screw fasteners for 1. surface mounting.
 - 2. Roller assembly: Nylon wheels with Lexan axles; riveted to hinge, single trolley at alternate panels.
 - Hinge assembly: 18 gage steel, continuous pin, riveted to top and 3. bottom of door panel, with automatic stop at full extension.
 - 4. Panels: 1/4 inch thick medium density fiberboard with rabbeted edge for panel connector.
 - 5. Panel Connectors: Continuous non-rigid vinyl, inserted and glued into panel rabbet.
 - Handle: Rigid molded polyvinyl chloride, full length of door, with 6. molded finger pull front side.
 - 7. Latching: Magnetic catch, with strike plate.
- Finishes: С.
 - Panels: Vinyl laminate, wood grain pattern on sight-exposed face; 1. utility grade back face, manufacturer's option. To be selected by Architect from Manufacturer's full range of colors.
 - Aluminum: Manufacturer's standard finish, in color complementing 2. panel finish.

part 3 EXECUTION

- 3.1 INSTALLATION
 - Install door assembly in accordance with manufacturer's instructions. Α.
 - в. Anchor to adjacent construction without distortion or stress.
 - С. Fit and align door assembly including hardware, level and plumb, to provide smooth operation.

3.2 ADJUSTING

A. Adjust doors for smooth operation throughout full operating range.

END OF SECTION

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- 1. Section Includes:
 - 1. Standard Builders Hardware
 - 2. Hardware for Aluminum Doors
 - 3. Thresholds and Weatherstripping
 - 4. Templates
 - 5. Hardware Schedule
 - 6. Keying System
- 2. Related Sections:
 - 1. Division 0 Section "Product Data and Samples"
 - 2. Division 8 Section "Steel Doors and Frames"
 - 3. Division 8 Section "Flush Wood Doors"
 - 4. Division 8 Section "Aluminum Entrances and Storefront"

1.2 REFERENCES:

A. Reference and Standards: Where cited, and except as modified by Project

Specifications, applicable standards of following organizations apply:

- 1. American National Standards Institute (ANSI)
- 2. Builders Hardware Manufacturers Association (BHMA)
- 3. Door Hardware Institute (DHI)
- 4. National Fire Protection Association (NFPA)
- 5. Steel Door Institute (SDI)
- 6. Underwriters Laboratories (UL)
- 1.3 SYSTEM DESCRIPTION:
 - A. Performance Requirements:
 - Provide hardware for fire-rated openings in compliance with NFPA 80.
 - 2. Provide hardware tested and listed by Underwriters Laboratories or other approved testing agency.

1.4 SUBMITTALS:

- A. Make submittals in accord with Section 01340.
- B. Hardware Schedule: Submit six copies of a typed vertical style hardware schedule on 8-1/2 x 11 sheets. Schedule openings by door number and locations. Indicate door and frame material, dimensions, hand, degree of opening, label condition and special information. Hardware items shall include product description and number, finish, hand, size, keying, template and special requirements. The scheduling sequence and format shall be as recommended by DHI.

- C. Samples: Upon Architect / Engineer's request, submit samples showing function, finish, and design of proposed hardware items. Samples remain suppliers property and will be returned to him prior to project completion.
- D. Samples and Templates: Furnish to manufacturer of wood and metal doors and frames as required for proper hardware reinforcement and preparation of their work. If required, furnish physical hardware to the door and frame manufacturer for application.
- E. Catalog Cuts: Submit two sets of each type of hardware item used.
- F. Keying Schedule: Submit keying system schedule after approval by Owner.
- G. Include with Schedule Submittal:
 - 1. Riser diagrams complete with door and frame elevations and operational description of openings scheduled with electrified hardware.
 - Wiring diagrams showing point to point terminations.
 Note: Schedules submitted without above requirements will be considered Incomplete and will not be reviewed.
- H. Certifications: Arrange for hardware supplier to visit site and certify following:
 - 1. Hardware is installed and operating in a satisfactory manner.
 - 2. Hardware installed is as listed on approved door hardware submittal, including changes and revisions approved by Architect during construction.
 - 3. Submit certifications in writing addressed to Owner in care of Architect.
- I. Contract Close-Out Submittal:
 - 1. Provide the following material clearly tabbed and organized:
 - a. Final hardware schedule
 - b. Final key schedule and bitting list
 - c. Wiring diagrams including detailed point to point wiring and power requirements.
 - d. Catalog Cuts
 - e. Warrantees

1.5 QUALITY ASSURANCE:

- A. Qualifications:
 - 1. Contractor is responsible for:
 - a. Proper application and fit of door and specialty hardware in locations as indicated on drawings or as specified.
 - b. Items not specifically mentioned, but necessary to complete work are to be furnished matching in quality and finish of specified items in similar locations.
 - c. Coordinate dimensions between hardware items.

- d. Furnish and install only hardware items listed on approved door hardware submittal.
- 2. Contractor's selection of hardware supplier:
 - a. Select recognized builders hardware supplier who has been furnishing hardware in area of project for a period not less than five years.
 - Recognized supplier to have on staff an Architectural Hardware Consultant (AHC) certified by the Door and Hardware Institute.
 - c. Hardware supplier's AHC to be available at all reasonable times during course of work to meet personally with Owner, Architect or Contractor for hardware consultation.
- B. Pre Installation Conference: Arrange for hardware supplier to meet With installer and discuss installation of hardware, templates and any unique hardware applications.
- 1.6 DELIVERY, STORAGE AND HANDLING:
 - A. Delivery: Deliver items in manufacturer's original package. Each item Individually packaged and carefully marked for intended opening and use. Each item complete with necessary screws, bolts, keys, instructions, and where necessary, installation templates.
 - B. Storage: Protect materials on the job and during installation. Provide a secure, locked, dry storage area or room in the building. Store off the floor on temporary shelving.
 - C. Handling: Handle items in a manner to prevent damage. Marred, defaced, damaged, and defective items will be rejected.

1.7 WARRANTY:

- A. Special Warranties: Submit manufacturer's standard written product warranty signed by manufacturer's authorized official, guaranteeing to repair or replace defective products during following warranty periods.
 - 1. Door Closers 30 Year Warranty
 - 2. Exit Devices 3 Year Warranty

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Catalog numbers of manufacturers listed in Column 1 have been used in the hardware sets to establish quality required. Manufacturers listed in Columns 2 & 3 are approved substitutes. B. It is the intent that approved door hardware be provided for every door on the project. Doors inadvertently omitted from the schedule shall be provided with hardware equal to doors of similar function.

ITEM	1	2	3
Hinges	 Hager	Stanley	—
Pivots	Ives	Rixson	
Locks	Schlage	No Substitute	
Exit Devices	Von Duprin	No Substitute	
Closers	LCN	No Substitute	
Push, Pull, Kickplates	Hager	Hiawatha	Rockwood
Overhead Stops	GJ	Rixson	ABH
Stops, Flush Bolts	Hager	Ives	Rockwood
Weatherstrip,	Pemko	Hager	National
Thresholds			

C. Designations: Following abbreviations to identify list manufacturers.

ABH	Architectural Builders Hdwe., Elk Grove Village, IL
GJ	Glynn-Johnson Corp., Indianapolis, IN
Hager	C. Hager & Sons, St. Louis, MO
Hiawatha	Hiawatha Metalcraft, Bloomington, MN
Ives	Ives, Indianapolis, IN
LCN	LCN Closers, Princeton, IL
McKinney	McKinney, Scranton, PA
National	National Guard, Memphis, TN
Pemko	Pemko Mfg., Memphis, TN
Rixson	Rixson Corp., Charlotte, NC
Rockwood	Rockwood Mfg., Rockwood, PA
Schlage	Schlage San Francisco CA
Stanley	Stanley Hdwe., New Britain, CT
Von Duprin	Von Duprin, Indianapolis, IN

2.2 MATERIALS:

- A. Screws, Fasteners, and Tools:
 - 1. Finish exposed fasteners to match item fastened. Make fasteners of the same metal as item fastened, except use stainless steel for aluminum items.
- B. Hinges:
 - Interior door hinges: steel, plated .134 minimum thickness except as noted. Provide heavy weight .180 minimum thickness on doors wider than 3'0. Exterior door hinges: heavy weight .180 minimum thickness. Hinge size 4-1/2 x 4-1/2 unless otherwise noted in this schedule.
 - 2. Provide quantities as follows unless otherwise noted in the schedule:
 - a. For doors up to 60 inches in height, provide 1 pair of hinges; for doors 60 inches to 90 inches in height, provide 1-1/2 pairs of hinges; for doors over 90 inches and up to 120 inches in height, provide 1 additional hinge for each 30 inches of height.

3. Manufacturers / Series:

Hager	Stanley		
BB1279	FBB179		
BB1168	FBB168		
BB1191	FBB191		
BB1199	FBB199		

- C. Pivots:
 - 1. Manufacturers / Series

Ives	Rixson		
7215	195		
7215-INT	M19		

- D. Locks and Latches
 - 1. Locks and latches: Heavy duty mortise type, in accord with ANSI / BHMA standard A156.13 1994, Series 1000, Grade 1.
 - 2. Manufacturers / Series:

Schlage

- L Series 03A
- 3. Provide knurled levers on doors leading to hazardous areas. Hazardous areas as defined by the Illinois Accessibility Code.
- E. Exit Devices:
 - 1. Provide Von Duprin exit devices with features, functions and options as shown in the hardware sets.
 - 2. Exit Devices: Of the push pad design with grooved interior mechanism case. Device shall incorporate a fluid dampener which decelerates the push pad on its return stroke eliminating most noise associated with the device operation. Provide glass bead kits to provide clearance for raised glass trim.
 - 3. The mechanism case shall be anodized aluminum. Center case and end cap covers shall be powder coated for corrosion resistance.
- F. Closers:
 - 1. Provide LCN door closers with features, functions and options shown in the hardware sets.
 - 2. Materials and construction: High strength cast iron cylinder with full rack and pinion action. Spring power adjustable to 50%. Provide separate non-critical screw valves for regulation of latch speed, sweep speed, and back check. Hydraulic fluid type requiring no seasonal adjustment for temperatures ranging from 120 degrees F to -30 degrees F.

- 3. Provide brackets, drop plates, spacer blocks, and accessories required to insure proper installation.
- 4. Parallel arms: Extra duty forged steel main arm, forearm and shoe.
- 5. Provide door closers on fire labeled openings.
- 6. Closers shall not utilize pressure relief valves.
- G. Pull Plates:
 - 1. Pull plates: 4 x 16 .050 stainless steel. Grip one inch diameter solid bar stock 8 inch CTC.
 - 2. Manufacturers / Series:

Hager	Hiawatha	Rockwood	
34G	200F x 535B	110 x 70	

- H. Push Plates:
 - Push plates: 8 inches wide x 16 inches high (except reduce width to one inch less than lock stile when required). Stainless Steel .050 thick.
- I. Kickplates:
 - Kickplates: .050 stainless steel 10 inches high (except reduce height ½ inch less than bottom rail when required) x 2 inches less than door width on singles and 1 inch less on pairs. Fasteners full threaded, countersunk, undercut, sheet metal screws.
- J. Stops, Flush Bolts, Dust Proof Strikes:
 - 1. Manufacturers / Series:

Hager	Ives	
232W	WS407CVX	
241F	436	
	282D	458
280X	DP2	

- K. Door Bottoms and Weatherstripping, Thresholds:
 - 1. Manufacturers / Series:

Pemko	Hager	National	
315CN	750S	200AN	
S88D	726S	5050B	
171A	412S	425E	

2.3 FINISHES:

	US SYI	MBOL	ANSI	SYMBOI	L DESC	RIPTION
Pivots	US26D		626		Sati	n Chrome
Hinges, Exterior	US32D		630		Sati	n Stainless Steel
Hinges, Interior	US26D		652		Sati	n Chrome
Exit Devices	US26D		626		Sati	n Chrome
Locks	US26D		626		Sati	n Chrome
Closers	AL		689		Alum	. Powder Coat
O.H. Holders		US32D		630		Satin Stainless Steel
Stops, Flush Bolts	S	US26D		626		Satin Chrome
Push, Pull, Kickpla	tes	US32D		630		Satin Stainless Steel

2.4 KEYS AND KEYING:

A. Cylinders: Key to owners existing system as required.

- B. Keys: Standard bow embossed on one side. Provide cut keys as follows:
 - 1. Master keys 10 each, maximum
 - 2. Change keys 6 each per change, maximum
 - 3. Control keys 2 each, maximum

C. Stamp each key with key symbol.

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Verify doors and frames are ready to receive work and dimensions are as indicated on shop drawings or as instructed by manufacturers.
- B. Verify power supply is available to electrically operated devices.
- C. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION:

- A. General:
 - 1. Install each hardware item in accordance with each manufacturer's instructions and recommendations.
 - 2. Install no hardware until substrate finishes are complete.
 - 3. Wherever cutting and fitting is required to install hardware onto or into surfaces, which are later to be painted or otherwise finished, install each item completely then remove and stored during application of finishes;
 - Reinstall upon completion of finishing operations.
 - 4. Set items level, plumb and true to line and location.
 - 5. Adjust and reinforce attachment substrate as necessary for a Secure installation.
 - 6. Drill and countersink items not factory prepared for fasteners.
 - 7. Space fasteners and anchors per manufacturer's instructions and in accordance with industry standards.

- 8. Do not install hardware on doors, which have been improperly prepared.
- 9. Attach wall mounted hardware to concealed wall blocking. Do not install wall mounted hardware where wall blocking has not been installed and arrange for blocking to be installed before proceeding.
- Fire-Rated Openings: Β.
 - 1. In addition to previous requirements, conform to NFPA 80 and BOCA covering installations of fire door assemblies.
 - 2. Refer to instructions from door and frame manufacturer's regarding special hardware installation requirements, including function holes, undercutting and minimum clearances between hardware cutouts.
- Installation Templates, Instruction Sheets and Schedules: Retain C. copies of templates, instruction sheets, schedules, installation details and similar data regarding hardware, maintenance and servicing. See Part 1 under Contract Closeout Submittals for assembly and distribution of data.
- Mounting Heights: Heights given are centerline heights ups from finish D. floor unless stated: Heights given "Number to Number" indicate one height within limits given. Where heights of items are not listed, install in accord with recommendations of DHI.
 - 1. Bottom Hinge 10 to 13 inches from floor 6 to 8 inches from head
 - 2. Top Hinge
 - Intermediate Hinge 3.
 - Lock Lever 4.
 - 5. Deadlocks
 - Push Bar 6.
 - 7. Push Plate
 - 8. Pull
 - 9. Hinges:
 - Hang doors within following tolerances: 1/8" maximum a. between door and frame, and 1/8" maximum between meeting edges of pairs of doors.

Equally spaced

48 inches

42 inches

45 inches

42 inches

36 to 40-5/16 inches

- Provide under door clearance at fire assemblies per NFPA b. 80.
- 10. Locks: Install only curved lip strikes and dust box behind each strike.
- Exit Devices: 11.
 - a. Center exit device cases on door stiles, and equally spaced from each door edge, unless required otherwise by manufacturer's templates or instructions.
- 12. Closers:
 - Install closers to permit maximum degree of door swing a. allowed by job conditions. Follow manufacturer's instructions.
13. Door Stops:

- a. Install stops to permit maximum degree of door swing allowed by job conditions.
- b. Locate floor stops so as not to create a tripping hazard, and to catch door at a point 6 inches in from latch edge, but in no case further than 1/3 door width measured from latch edge.
- c. Wall stops intended for knobs and levers are to be located centered on spindle.
- 14. Doorplates: (Armor, Kick and Mop Plates)
 - a. Armor and kick plates: Install on push side of single acting doors.
 - b. Unless otherwise indicated install ¼ inch up from door bottom.
- 15. Threshold:
 - a. Scribe and cut to fit profiles of door jambs with mitered corners and precision made joints.
 - b. Join units with concealed welds or concealed mechanical devices.
 - c. Cut smooth openings for mullions, bolts and similar items.
 - d. At exterior doors and elsewhere as indicated, set thresholds in bed of butyl rubber sealant, completely fill voids to exclude moisture.
 - e. At exterior doors, install bevel of threshold aligned with exterior face of door, unless indicated otherwise by detail or threshold manufacturer's instructions.
 - f. Install thresholds level.
 - g. Do not install thresholds over carpet. At fire rated doors do not install the thresholds over any finish material, unless material is noncombustible, e.g. ceramic tile, terrazzo or concrete.

3.3 FIELD QUALITY CONTROL:

- A. Manufacturer's Field Service:
 - Closer: After air handling system has been balanced arrange for closer to be finally adjusted by person trained by closer manufacturer or closer manufacturer's representative.
 - a. Adjust closer to take 3 seconds minimum for door to swing from a 70 degree position to 3" from latching position.
 - b. Adjust closer not to exceed 5 lbs. opening force.Exception: Fire doors as required to close & latch.

3.4 ADJUSTING:

- A. Adjusting & Cleaning:
 - 1. Adjust and check each item of hardware and each door to insure proper operation and function of each unit.

- 2. Lubricate moving parts with graphite-type lubricant unless otherwise recommended by manufacturer.
- 3. Replace hardware, which cannot be lubricated and adjusted to operate freely and smoothly.
- 4. Final Adjustment:
 - a. Whenever hardware installation is made more than 1 month prior to acceptance of work, make final adjustment and check of hardware during week immediately prior to acceptance, unless otherwise directed by Architect.
 - b. Clean and re-lubricate operation items as necessary to restore proper functioning and finish of hardware and doors.
 - c. Make final adjustment of locksets and closers to compensate for operation of heating and ventilating systems under supervision of manufacturer's representative.

3.5 PROTECTION AND CLEANING:

- A. Installed Hardware: Protect door hardware against damage.
- B. Installed Doors:
 - 1. Do not prop doors open using any item wedged between hinge jamb and door.
 - 2. Use only rubber stops, cardboard or rope.
 - 3. Do not use unprotected wood wedges under wood doors.
 - 4. Do not use bare wire or other unprotected means of securing doors in open position, which may mar door or hardware.
- C. Job Acceptance: Prior to acceptance of job, clean hardware surfaces on both interior and exterior doors of mortar, plaster, paint caulking and other contaminants. Replace hardware damaged after installation where finish cannot be restored after cleaning.

3.6 DEMONSTRATION:

- A. Instructions: Provide instruction in operation and maintenance of key control System.
- 3.7 HARDWARE SCHEDULE:
 - A. Provide and install hardware conforming to project specifications in sets according to the following schedule.

HARDWARE SET 01 Doors 01 Each Pair to Have:

Hinges BB1199 NRP
Exit Device CD99DT x 990DT
Exit Device CD99NL x 990NL
Key Removable Mullion KR4954
Mortise Cylinders

Rim Cylinder 1 2 Closers 4111-H-SPRING CUSH 2 Kickplates 1 Threshold 171A 2 Door Sweep 315CN 1 Weatherstrip S88D 1 Mullion Weatherstrip 5110BL 1 Rain Drip 346C HARDWARE SET 02 Doors 02, 03, 09, 14 Each Door to Have: Hinges BB1168 1 Classroom Lock L9070 Closer 4111-H 1 1 Kickplate 1 Wall Stop 232W HARDWARE SET 03 Doors 04, 05, 15 Each Door to Have: All hardware provided by door manufacturer HARDWARE SET 04 Doors 06 Each Pair to Have: Hinges BB1279 2 FlushBolt 282D Dust Proof Strike 280X 1 1 Lockset L9080 1 Closer 4111-H-SPRING-CUSH 1 Wall Stop 232W HARDWARE SET 05 Door 07 Each Door to Have: Hinges BB1168 Classroom Lock L9070 1 Closer 4111-H-SPRING-CUSH 1 1 Kickplate HARDWARE SET 06 Doors 08, 12 Each Pair to Have: 2 Pivot Set 7215 2 Intermediate Pivot 7215-INT 1 Exit Device CD99DT x 696DT 1 Exit Device CD99NL x 696NL 1 Key Removable Mullion KR4954 3 Mortise Cylinders 1 Rim Cylinder 2 Closers 4111-H-SPRING CUSH 2 Drop Plates 4110-18CNS 2 Stop Spacer 4110-61

Project No. 2014909.01 2 Shoe Support 4110-30 Threshold 171A 1 Door Sweep 315CN 2 Mullion Weatherstrip 5110BL 1 1 Rain Drip 346C Weatherstrip integral with Frame HARDWARE SET 07 Door 10 Each Door to Have: Hinges BB1279 1 Lockset L9050 1 Wall Stop 232W HARDWARE SET 08 Door 11 Each Door to Have: 1 Double Acting Spring Pivot- Bommer 7112 1 Blank Wrap-Around Don-Jo 90-CW-S (installed on top lead edge of door) HARDWARE SET 09 Door 13 Each Door to Have: Hinges BB1199 NRP 1 Exit Device 99EO Closer 4111-H-SPRING CUSH 1 Kickplate 1 1 Threshold 171A 1 Door Sweep 315CN 1 Weatherstrip S88D 1 Rain Drip 346C HARDWARE SET 10 Door 16 Each Door to Have: Hinges BB1279 Storeroom Lock L9080 1 1 Closer 4011-H Kickplate 1 Wall Stop 232W 1

END SECTION 08710

apaceDesign Architects + Engineers

SECTION 088100 - METAL WINDOW PANELS

PART 1 - GENERAL

1.01 - Scope

- The Panels required are as manufactured by Mapes Architectural Panels, LLC, Lincoln, NE. Panels consist of metal skins laminated to stabilizer substrates with an insulating core material. Panels are designed to be glazed into a window system or curtain wall system.
- 2. Related Work
 - 1. Section 079200 Caulking
 - 2. Section 089000 Storefront/Curtain Wall
- 1.02 Quality Assurance
 - 1. Panel manufacturer shall have a minimum of 25 years experience.
 - 2. Field measurements shall be taken prior to completion of manufacturing and cutting.
 - 3. Maximum deviation from vertical and horizontal alignment of installed panels is 1/8" (3mm) in 20' (6m) non-commutative.

1.03 - References

- 1. American Society of Testing Materials (ASTM)
 - A. E330-84: Structural Performance of Exterior Windows, Curtain Walls and Doors under the influence of wind loads.
 - B. D1781-76: Climbing Drum Peel Test for Adhesives.
 - C. D3363-74: Method for Film Hardness by Pencil Test.
 - D. D2794-90: Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
 - E. D3359-90: Method for Measuring Adhesion by the tape test.

1.04 - Substitutions

- The materials and products specified in this section establish a minimum standard of required function, design, appearance quality and warranty to be met by any proposed substitution.
- No substitutions will be considered unless a written request for approval has been submitted by the bidder and received by the architect 10 days prior to the bid date.

1.05 - Submittals

- 1. Submittals shall be in conformance with section 013300.
- 2. Samples:
 - A. Panel makeup 2 samples 10"x10"
 - B. Two samples of each color and finish texture 3"x5"

- 3. Submission Drawings: Indicate thickness, dimension and components of parts. Detail glazing methods, framing and tolerances to accommodate thermal movement.
- 4. Affidavit certifying materials meet all requirements as specified.
- 5. 2 copies of manufacturers standard literature for specified material.

1.06 - Delivery, Storage and Handling

- 1. Protect finish and edge in accordance with panel manufacturer's recommendations.
- 2. Store materials in accordance with panel manufacturer's recommendations.

PART 2 - PRODUCTS

2.01 - Panels - Laminated

- 1. Laminated metal faced MapeSpan panels as manufactured by Mapes Industries, Inc.
- 2. Acceptable alternatives: Panels having similar composite construction and finish providing manufacturer has a minimum of 25 years panel laminating experience and comparable published warranties.
- 2.02 Finish
 - 1. Finishes
 - 2. Exterior: Exterior Spandrel Glass
 - 3. Interior: Standard Kynar
 - 4. Color as selected by architect.

2.03 - Panel Fabrication

- 1. Exterior Substrate: N/A
- 2. Core: Polystyrene
- 3. Interior Substrate: Cement Board
- Tolerances .8% of panels dimension length and width (+/-) 1/16" thickness
- 5. Panel Thickness 1"
- 6. R-Value 4.23
- 7. U-Value 0.24

2.04 - Accessories

- Recommended for use as an infill panel component in window and curtain wall systems. Related material to complete installation as recommended by the manufacturer.
- Seals against moisture intrusion as recommended by the manufacturer. Polyurethane and silicone based sealant with a 20 year life are recommended.

PART 3 - EXECUTION

3.01 - Installation

1. Panel surfaces shall be free from defects prior to installation.

3.02 - Execution

- 1. Erect panels plumb, level and true.
- 2. Glaze panels securely and in accordance with approved shop drawings and manufacturers instructions to allow for necessary thermal movement and structural support.
- 3. Do not install panels that are observed to be defective including warped, bowed, dented, scratched and delaminating components.
- 4. Weatherseal all joints as required using methods and materials as previously specified.
- 5. Separate dissimilar metals using gasketed fasteners and blocking to eliminate the possibility of electrolytic reaction.

3.03 - Adjusting and Cleaning

- 1. Remove masking film as soon as possible after installation. Masking intentionally left in place after panel installation will be the responsibility of the contractor.
- 2. Weep holes and drainage channels must be unobstructed and free from dirt and sealant.

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Non-load-bearing steel framing systems for interior partitions.
 - 2. Suspension systems for interior ceilings and soffits.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of code-compliance certification for studs and tracks.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C 645.
 - 1. Steel Studs and Tracks:

- a. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
 - 1) CEMCO; California Expanded Metal Products Co.
 - 2) Custom Stud.
 - 3) Jaimes Industries.
 - 4) MarinoWARE.
 - 5) MBA Building Supplies.
 - 6) MRI Steel Framing, LLC.
 - 7) Phillips Manufacturing Co.
 - 8) <u>SCAFCO Steel Stud Company</u>.
 - 9) Steel Construction Systems.
 - 10) Steel Network, Inc. (The).
 - 11) <u>Telling Industries</u>.
- b. Minimum Base-Metal Thickness: 0.0329 inch (0.836 mm).
- c. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Where indicated, provide one of the following:
 - Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 1-1/2-inch (38-mm) minimum vertical movement.
 - a. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - 1) CEMCO; California Expanded Metal Products Co.
 - 2) <u>ClarkDietrich Building Systems</u>.
 - 3) <u>Fire Trak Corp</u>.
 - 4) <u>MarinoWARE</u>.
 - 5) SCAFCO Steel Stud Company.
 - 6) Steel Construction Systems.
 - 7) Steel Network, Inc. (The).
 - 8) Super Stud Building Products Inc.
 - 2. Single Long-Leg Track System: ASTM C 645 top track with 2-inch-(51-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
 - 3. Double-Track System: ASTM C 645 top outer tracks, inside track with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
 - 4. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - a. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - 1) Blazeframe Industries.

- 2) CEMCO; California Expanded Metal Products Co.
- 3) ClarkDietrich Building Systems.
- 4) <u>MarinoWARE</u>.
- 5) MBA Building Supplies.
- 6) <u>Metal-Lite</u>.
- 7) <u>Perfect Wall, Inc</u>.
- 8) SCAFCO Steel Stud Company.
- 9) Steel Construction Systems.
- 10) Steel Network, Inc. (The).
- 11) <u>Telling Industries</u>.
- D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - 1. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - a. Blazeframe Industries.
 - b. CEMCO; California Expanded Metal Products Co.
 - c. <u>ClarkDietrich Building Systems</u>.
 - d. Fire Trak Corp.
 - e. MarinoWARE.
 - f. Metal-Lite.
 - g. Perfect Wall, Inc.
 - h. SCAFCO Steel Stud Company.
 - i. <u>Steel Construction Systems</u>.
 - j. Steel Network, Inc. (The).
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 - 1. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - a. ClarkDietrich Building Systems.
 - b. MarinoWARE.
 - c. MRI Steel Framing, LLC.
 - d. SCAFCO Steel Stud Company.
 - e. Steel Construction Systems.
 - 2. Minimum Base-Metal Thickness: 0.0329 inch (0.836 mm).
- F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch (1.367-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
 - 1. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - a. ClarkDietrich Building Systems.
 - b. <u>MarinoWARE</u>.
 - c. MRI Steel Framing, LLC.
 - d. SCAFCO Steel Stud Company.
 - e. Steel Construction Systems.

- 2. Depth: As indicated on Drawings.
- 3. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 - 1. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - a. ClarkDietrich Building Systems.
 - b. Jaimes Industries.
 - c. MarinoWARE.
 - d. MRI Steel Framing, LLC.
 - e. SCAFCO Steel Stud Company.
 - f. Steel Construction Systems.
 - 2. Minimum Base-Metal Thickness: 0.0329 inch (0.836 mm).
 - 3. Depth: As indicated on Drawings.
- H. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
 - 1. Depth: 3/4 inch (19 mm).
 - 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch (0.8 mm).
 - Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048inch- (1.21-mm-) diameter wire.
- I. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-metal thickness of 0.0179 inch (0.455 mm), and depth required to fit insulation thickness indicated.
 - 1. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
 - a. ClarkDietrich Building Systems.
 - b. MarinoWARE.
 - c. MRI Steel Framing, LLC.
 - d. SCAFCO Steel Stud Company.
 - e. Steel Construction Systems.

2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21mm-) diameter wire.
- B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.

- C. Flat Hangers: Steel sheet, 1 by 3/16 inch (25 by 5 mm) by length indicated.
- D. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch (1.367 mm) and minimum 1/2inch- (13-mm-) wide flanges.
 - 1. Depth: 1-1/2 inches (38 mm).
- E. Furring Channels (Furring Members):
 - Cold-Rolled Channels: 0.0538-inch (1.367-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
 - 2. Steel Studs and Tracks: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.0329 inch (0.836 mm).b. Depth: 3-5/8 inches (92 mm).
 - 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
 - a. Minimum Base-Metal Thickness: 0.0329 inch (0.836 mm).

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 - 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
 - 1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
 - Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.
- PART 3 EXECUTION
- 3.1 INSTALLATION, GENERAL
 - A. Installation Standard: ASTM C 754.
 - 1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
 - 2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
 - 3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.

- Gypsum Board Assemblies: Also comply with requirements in 4. ASTM C 840 that apply to framing installation.
- В. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- Install supplementary framing, and blocking to support fixtures, с. equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- Do not bridge building control and expansion joints with non-load-Ε. bearing steel framing members. Frame both sides of joints independently.
- 3.2 INSTALLING FRAMED ASSEMBLIES
 - Install framing system components according to spacings indicated, but Α. not greater than spacings required by referenced installation standards for assembly types.
 - Where studs are installed directly against exterior masonry walls or В. dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
 - Install studs so flanges within framing system point in same С. direction.
 - D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 - Slip-Type Head Joints: Where framing extends to overhead 1. structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
 - Install two studs at each jamb unless otherwise indicated. a.
 - Install cripple studs at head adjacent to each jamb stud, b. with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - Other Framed Openings: Frame openings other than door openings 3. the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 - 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and

to make partitions continuous from floor to underside of solid structure.

- a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
- 5. Sound-Rated Partitions: Install framing to comply with soundrated assembly indicated.

E. Direct Furring:

- 1. Screw to wood framing.
- 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
- F. Z-Shaped Furring Members:
 - Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches (610 mm) o.c.
 - 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
 - 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.3 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

- Where width of ducts and other construction within ceiling plenum 2. produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - Size supplemental suspension members and hangers to support a. ceiling loads within performance limits established by referenced installation standards.
- Wire Hangers: Secure by looping and wire tying, either directly 3. to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
- Flat Hangers: Secure to structure, including intermediate framing 4. members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
- Do not attach hangers to steel roof deck. 5.
- Do not attach hangers to permanent metal forms. Furnish cast-in-6. place hanger inserts that extend through forms.
- 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
- 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- Fire-Resistance-Rated Assemblies: Wire tie furring channels to D. supports.
- Ε. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
 - 2. Exterior gypsum board for ceilings and soffits.
 - 3. Tile backing panels.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each texture finish indicated on same backing indicated for Work.

PART 2 - PRODUCTS

- 2.1 PERFORMANCE REQUIREMENTS
 - A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
 - B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 - 1. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. <u>CertainTeed Corporation</u>.

- c. Continental Building Products, LLC.
- d. Georgia-Pacific Building Products.
- e. <u>National Gypsum Company</u>.
- f. PABCO Gypsum.
- g. Temple-Inland Building Products by Georgia-Pacific.
- h. USG Corporation.
- 2. Thickness: 5/8 inch (15.9 mm).
- 3. Long Edges: Tapered and featured (rounded or beveled) for prefilling.
- B. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
 - 1. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. CertainTeed Corporation.
 - c. Continental Building Products, LLC.
 - d. Georgia-Pacific Building Products.
 - e. National Gypsum Company.
 - f. PABCO Gypsum.
 - g. Temple-Inland Building Products by Georgia-Pacific.
 - h. USG Corporation.
 - 2. Thickness: 1/2 inch (12.7 mm).
 - 3. Long Edges: Tapered.
- C. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
 - 1. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. <u>CertainTeed Corporation</u>.
 - c. <u>Continental Building Products, LLC</u>.
 - d. Georgia-Pacific Building Products.
 - e. <u>National Gypsum Company</u>.
 - f. PABCO Gypsum.
 - g. Temple-Inland Building Products by Georgia-Pacific.
 - h. <u>USG Corporation</u>.
 - 2. Core: 5/8 inch (15.9 mm), Type X.
 - 3. Long Edges: Tapered.
 - 4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- 2.4 EXTERIOR GYPSUM BOARD FOR CEILINGS AND SOFFITS
 - A. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M, with fiberglass mat laminated to both sides and with manufacturer's standard edges.

- 1. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. <u>CertainTeed Corporation</u>.
 - c. <u>Continental Building Products, LLC</u>.
 - d. <u>Georgia-Pacific Building Products</u>.
 - e. <u>National Gypsum Company</u>.
 - f. Temple-Inland Building Products by Georgia-Pacific.
 - g. <u>USG Corporation</u>.
- 2. Core: 5/8 inch (15.9 mm), Type X.

2.5 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.
 - 1. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Georgia-Pacific Building Products.
 - c. National Gypsum Company.
 - d. Temple-Inland Building Products by Georgia-Pacific.
 - e. <u>USG Corporation</u>.
 - 2. Core: 5/8 inch (15.9 mm), Type X.
 - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- B. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
 - 1. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - a. C-Cure.
 - b. CertainTeed Corporation.
 - c. Custom Building Products.
 - d. FinPan, Inc.
 - e. James Hardie Building Products, Inc.
 - f. National Gypsum Company.
 - g. <u>USG Corporation</u>.
 - 2. Thickness: 5/8 inch (15.9 mm).
 - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

- 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
- 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
- B. Exterior Trim: ASTM C 1047.
 - 1. Material: Hot-dip galvanized-steel sheet, plastic, or rolled zinc.
 - 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. Expansion (Control) Joint: One-piece, rolled zinc with Vshaped slot and removable strip covering slot opening.

2.7 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
 - 2. Exterior Gypsum Soffit Board: Paper.
 - 3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
 - 4. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.

- 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.
- D. Joint Compound for Exterior Applications:
 - 1. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.
- E. Joint Compound for Tile Backing Panels:
 - 1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
 - 2. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.8 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- C. 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.
- D. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 - 1. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - a. Accumetric LLC.
 - b. Everkem Diversified Products, Inc.
 - c. Franklin International.
 - d. Grabber Construction Products.
 - e. Hilti, Inc.
 - f. Pecora Corporation.
 - g. Specified Technologies, Inc.
 - h. USG Corporation.
- E. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

F. Vapor Retarder: As specified in Section 072600 "Vapor Retarders."

PART 3 - EXECUTION

- 3.1 APPLYING AND FINISHING PANELS
 - A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
 - B. Comply with ASTM C 840.
 - C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
 - D. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
 - E. Prefill open joints, rounded or beveled edges, and damaged surface areas.
 - F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
 - G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 3: Where indicated on Drawings.
 - 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
 - 5. Level 5: Where indicated on Drawings.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
 - H. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
 - I. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
 - J. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.2 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 092900

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes acoustical panels and exposed suspension systems for interior ceilings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
- C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, and coordinated with each other, using input from installers of the items involved.
- B. Product test reports.
- C. Research reports.
- D. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A according to ASTM E 1264.
 - 2. Smoke-Developed Index: 50 or less.

2.2 ACOUSTICAL PANELS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. American Gypsum.
 - 2. Armstrong World Industries, Inc.
 - 3. CertainTeed Corporation.
 - 4. Chicago Metallic Corporation.
 - 5. Rockfon (Roxul Inc.).
 - 6. Tectum Inc.
 - 7. USG Corporation.
- B. Acoustical Panel Standard: Manufacturer's standard panels according to ASTM E 1264.
- C. Classification: Square tegular, fine texture
- D. Color: White.
- E. Light Reflectance (LR): 0.90.
- F. Ceiling Attenuation Class (CAC): 26.
- G. Noise Reduction Coefficient (NRC): 0.90.
- H. Articulation Class (AC): 200.
- I. Edge/Joint Detail: Reveal sized to fit flange of exposed suspensionsystem members.
- J. Thickness: 1 inch (25 mm).
- K. Modular Size: 24 by 24 inches (610 by 610 mm).

2.3 METAL SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed Corporation.
 - 3. Chicago Metallic Corporation.
 - 4. USG Corporation.
- B. Metal Suspension-System Standard: Manufacturer's standard, directhung, metal suspension system.
- C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 (Z90) coating designation; with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges.

- 1. Structural Classification: Heavy-duty system.
- 2. End Condition of Cross Runners: Override (stepped) type.
- 3. Face Design: Flat, flush.
- 4. Cap Material: Cold-rolled steel.
- 5. Cap Finish: Painted white.

2.4 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Hold-Down Clips: Manufacturer's standard hold-down.
- C. Impact Clips: Manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.
- D. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical panels in place during a seismic event.

2.5 METAL EDGE MOLDINGS AND TRIM

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed Corporation.
 - 3. Chicago Metallic Corporation.
 - 4. Fry Reglet Corporation.
 - 5. Gordon, Inc.
 - 6. USG Corporation.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated.
- B. Layout openings for penetrations centered on the penetrating items.

3.2 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C 636/C 636M, seismic design requirements, and manufacturer's written instructions.
- B. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
 - 3. Install hold-down, impact, and seismic clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.

END OF SECTION 095113

SECTION 09 60 00 - ROBBINS[®] PULASTIC[®] Classic 110 POLYURETHANE FLOOR SYSTEM -BASIS OF DESIGN

- Part 1-GENERAL
- 1.01 DESCRIPTION

A. Scope

- 1. The complete installation of Robbins PULASTIC Classic 110 polyurethane surfacing over high-performance resilient base mat, by Robbins, Inc. of Cincinnati, Ohio, including adhesives, resilient base mat, polyurethane sealer, polyurethane structure layer, surface topcoat, and court markings.
- B. Related work specified under other sections. (A cross-reference should be incorporated in these sections.)
 - 1. Concrete and Concrete Finishing......Section 03300
 - a. Concrete Slab Depression: a total of 11mm, equal to system thickness, (0.433 inches).
 - b. Surface Finish: steel troweled and finished smooth.
 - c.Concrete Tolerance: 1/8" (3mm) in radius of 10' (3m). Floor Flatness and Floor Levelness (FF and FL) numbers are not recognized.
 - d. NO CURING AGENTS OR SEALERS ARE TO BE APPLIED TO THE CONCRETE SLAB.
 - - a. Concrete subfloors on or below grade shall be adequately waterproofed beneath the slab and at the perimeter walls and on the earth side of below grade walls by general contractor using suitable type membrane. b. Sand-Poly-Sand slab construction is not an acceptable construction.

1.02 QUALITY ASSURANCE

- A. Floor System Supplier Qualifications
 - 1. Supplier shall be an established firm experienced in field and have been in business for a minimum of ten (10) years; Robbins, Inc. or an approved equal.
 - 2. Formulator shall be ISO-9001 certified for quality control, and ISO-14001 certified for environmental care, and provide copy of Certification document upon request.
- B. Floor Contractor/Installer Qualifications and Certifications
 - 1. Floor Contracting Company and field personnel shall be trained by supplier on proper installation and finishing process, and have a minimum of 5-years experience of similar projects in size and scope.

C. System Industry Approvals

apaceDesign Architects + Engineers ROBBINS® PULASTIC® Classic 110 Project No. 2014909.01 POLYURETHANE FLOOR SYSTEM BASIS OF DESIGN Section 096000
1. Floor system shall be approved according to the EN 14904 Standard, in Category P1, and provide copy of Approval upon request. 2. Floor system shall be approved by F.I.V.B. (International Volleyball Federation), and provide copy of Approval upon request. 3. Floor system shall be approved by F.I.B.A. (International Basketball Federation), and provide copy of Approval upon request.

4. Floor system shall be approved by I.H.F. (International Handball Federation), and provide copy of Approval upon request.

D. System Technical Data:

Technical Data			
Character	Point-elastic		
Classification	P1		EN 14904
Nominal thickness	11 mm	(0.4331 inches)	
Shock Absorption	28%		EN 14808
Shock Absorption (DIN)	(35%)		(DIN 18032-91)
Vertical Deformation	1.4 mm		EN 14809
Linear Friction (dry)	98		EN 13036-4
Linear Friction (damp)	0.3		Leroux
Ball Bounce	98 %		EN 12235
Gloss	3%		EN 2813
Resistance to rolling	≥1500 N		EN 1569
load			
Resistance to impact	≥800 gr @ 10°C		EN 1517
	≥1200 gr @ 17°C		EN 1517
Resistance to	0.35 mm @ 5 min		EN 1516
indentation			
	0.15 mm @ 24 hrs		EN 1516
Resistance to wear	150 mg		EN ISO 2813
Flammability	Bfl-S1		EN 13501-1
V.O.C. content -	Solvent free		
Adhesive			
V.O.C. content -	0.01 gr/lit (EU)		2004/42/EG
Topcoat			
	45 gr/lit (US)		ASTM D 3960
Adhesive composition	Free of solvents an	nd heavy metals	
Resin composition	Free of solvents ar	nd heavy metals	
Elongation at break -	150%		DIN 53455
Structure			
Tensile Strength -	8 N/mm2	(1,160 psi)	DIN 53455
Structure			
Tear Strength -	25 N/mm	(142 pli)	DIN 53455
Structure			
Colour fastness	8 (excellent)		DIN 54004

1.03 SUBMITTALS

A. Manufacturer's Product Data

- 1. Submit three (3) Robbins Pulastic Classic 110 Floor System specification sheets.
- B. Concrete Guidelines

- 1. Submit three (3) copies of Recommendations for correct preparation, finishing and testing of concrete subfloor surfaces to receive granulated base mat and polyurethane floor system.
- C. Samples
 - 1. Submit one (1) sample of Pulastic Classic 110
 - 2. Submit one (1) Pulastic Topcoat Standard Color Chart
 - 3. Submit one (1) Pulastic Linepaint Color Chart
- D. Maintenance Literature
 - 1. Submit copy of Pulastic Maintenance Instructions.
- E. References
 - 1. Submit Letter attesting that Floor Contractor and Field Personnel have been properly trained to perform work per specifications and contract. 2. Reference list of three individual for whom installer has worked on
 - projects of similar size and magnitude.
- 1.04 DELIVERY, STORAGE AND HANDLING
- A. Delivery of Materials
 - 1. Material shall not be delivered or installed until all masonry, painting, plastering, tile work, marble and terrazzo work are completed and all overhead mechanical work, lighting, backstops, scoreboards are installed. Room temperature shall be at least 55 degrees Fahrenheit, and ambient relative humidity shall be 75% or less. In-slab relative humidity shall be 80% or less.
 - 2. Area where materials are to be stored should be maintained at least 55 degrees Fahrenheit and under 75% relative humidity by the General Contractor.

*please refer to Robbins Technical Services "Concrete Guide Specification" for further information regarding conditions and requirements of concrete prior to installation.

- 1.05 JOB CONDITIONS-SEQUENCE
- A. Do not install floor system until concrete has been cured 60 days and the requirements in paragraph 1.01 and 1.04 are obtained.
- B. General Contractor is responsible to ensure slab is clean and free of all dirt and debris prior to floor installation beginning.
- C. Permanent heat, light and ventilation shall be installed and operating during and after installation. Environmental temperatures must average a minimum of 65 degrees Fahrenheit for one full week proceeding, throughout, and 72 hours following application.
- D. After floors are finished, area to be kept locked by general contractor to allow curing time for the paint and finish system(s). No other trades are

to be allowed on floor until it is accepted in writing by owner or owner's authorized agent.

1.06 GUARANTEE

- A. Guarantee shall not cover damage caused in whole or in part by casualty, ordinary wear and tear, abuse, use for which material is not designed, faulty construction of the building, settlement of the building walls, failure of the other contractors to adhere to specifications, separation of the concrete slab and excessive dryness or excessive moisture from humidity, spillage, migration through the slab or wall, or any other source.
- B. Robbins, Inc. hereby warrants the Pulastic Classic 110 material to be free from manufacturing defects for a period of 2 years. This warranty is in lieu of all other warranties, expressed or implied including but not limited to any warranty of merchantability or fitness for a particular purpose, and of any other obligations on the part of Robbins. In the event of breach of any warranty, the liability of Robbins shall be limited to repairing or replacing Pulastic Classic 110 material and system components supplied by Robbins and proven to be defective in manufacture, and shall not include any other damages, either direct or consequential.

Part 2-PRODUCTS

- 2.01 Basis of Design Product Robbins Pulastic Classic 110
- A. Other Manufacturers may be utilized if approved in writing by Architect before bidding.
- B. Robbins PULASTIC
 - 1. Adhesive
 - a. Pulastic Tacly Adhesive: a two-component polyurethane adhesive
 - 2. Shock Pad
 - a. Shock Pad, a granulated rubber/polyurethane mat 9mm thick.
 - 3. Pad Sealer
 - a. Pulastic EG Sealer: a two-component polyurethane sealer
 - 4. Polyurethane Resin
 - a. Pulastic GM1500 Compound: a pigmented two-component polyurethane resin
 - 5. Coating
 - a. Pulastic Coating 221W: a pigmented, two-component, water-dispersed polyurethane surface coating.

- 1) Color Options: Color to be selected by Architect from manufacturer's full range of colors.
- 6. Game line Paint
 - a. Pulastic Linepaint: a pigmented, two-component polyurethane paint. 1) Color Options: Color to be selected by Architect from manufacturers full range of colors.

Part 3-EXECUTION

3.01 INSPECTION

- A. Inspect concrete slab for proper levelness tolerance, dryness, and possible contamination, (see Part 1 -Sec 1.01 and Sec. 1.04) and report any discrepancies to the general contractor and architect in writing.
- B. All work required to put the concrete subfloors in acceptable condition shall be the responsibility of the general contractor. C. Subfloor shall be broom cleaned by general contractor.
- D. General Contractor will notify the flooring installation company to proceed with the installation after concrete slab specifications are met.
- E. Installer shall perform tests for moisture and adhesion prior to application and report adverse conditions to the general contractor in writing.
- F. Installer shall document all working conditions provided in General Specifications prior to commencement of installation.
- 3.02 INSTALLATION
- A. Robbins Pulastic
 - 1. Shock Pad
 - a. Mix two-component Tacly Adhesive according to supplier's instructions and spread adhesive using ROBBINS PULASTIC notched trowel.
 - b. Unroll polyurethane/rubber granulated base mat into freshly applied adhesive. Seams shall be in virtual contact with absence of compression fit. Roll surface of base mat with a medium-size roller.
 - 2. Sealer
 - a. Mix two-component EG Sealer according to supplier's instructions and spread sealer over base mat using a straight trowel. Allow to cure minimum 12 hours before proceeding.
 - 3. Structure Layer
 - a. Mix two-component ROBBINS PULASTIC GM1500 pigmented polyurethane resin and spread over EG Sealer according to supplier's instructions. Allow to cure minimum 12 hours before proceeding.

- b. Mix two-component ROBBINS PULASTIC GM1500 pigmented polyurethane resin and apply at proper thickness according to supplier's instructions. Allow to cure minimum 12 hours before proceeding.
- 4. TopCoat
 - a. Mix two-component ROBBINS PULASTIC Coating 221W and apply using ROBBINS PULASTIC lambswool roller(s) according to suppliers instructions. Allow 24 to 48 hours curing time before proceeding.
- 5. Gamelines
 - a. Mix two-component ROBBINS PULASTIC PU-Linepaint according to supplier's instructions.
 - b. Line painting should be in accordance with supplier's directions.
 - c. Color of court markings shall be chosen from ROBBINS PULASTIC PU-Linepaint standard colors.
 - d. Consult architectural drawings for game line locations and chosen colors.
- B. Perimeter Molding (Optional):
 - 1. Install a rubber base, anchored to the walls with standard base cement.
- 3.03 CLEANING
 - 1. Clean up all unused materials and debris and remove from the premises. Dispose of empty containers in accordance with federal and local regulations.
- 3.04 PROTECTION
 - 1. Cure Time
 - a. No traffic or other trades shall be allowed on the surface for a period of one week following completion to allow for complete and proper cure of the finish.
 - 2. Other Trades
 - a. It shall be the responsibility of the general contractor to protect the surface from damage by other trades before acceptance by the owner or the owner's authorized agent.
 - 3. Safety
 - a. No smoking, open flames or sparks from electrical equipment or any other source shall be permitted during the installation process, or in areas where materials are stored

SECTION 096400 - WOOD FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Factory-finished wood flooring.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of floor assembly and accessory. Include plans, sections, and attachment details. Include expansion provisions and trim details.
- C. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Hardwood Flooring: Comply with NWFA A500 for species, grade, and cut.
 - 1. Certification: Provide flooring that carries NWFA grade stamp on each bundle or piece.
- B. Maple Flooring: Comply with applicable MFMA grading rules for species, grade, and cut.
 - 1. Certification: Provide flooring that carries MFMA mark on each bundle or piece.
- C. Softwood Flooring: Comply with WCLIB No. 17 grading rules for species, grade, and cut.

2.2 FACTORY-FINISHED WOOD FLOORING

- A. Solid-Wood Flooring: Kiln dried to 6 to 9 percent maximum moisture Retain option in "Engineered-Wood Flooring" Paragraph below if required for LEED-NC, LEED-CI, or LEED-CS Credit IEQ 4.4, which prohibits composite wood products containing urea formaldehyde.
- B. Engineered-Wood Flooring: HPVA EF, meeting requirements for composite wood products.

- 1. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - a. Anderson Hardwood Floors.
 - b. Armstrong World Industries, Inc.
 - c. Bellawood.
 - d. Boen Hardwood Flooring Inc.
 - e. Bruce Hardwood; Armstrong.
 - f. Carlisle Wide Plank Floors.
 - g. EcoTimber.
 - h. Johnsonite; a Tarkett company.
 - i. Mannington Mills, Inc.
 - j. Nydee Flooring.
 - k. Oregon Lumber Company.
 - 1. Wood Flooring International.
 - m. Yesteryear Floorworks Company.
- 2. Species: White oak.
- 3. Grade: Clear.
- 4. Thickness: 1/2 inch (13 mm).
- 5. Construction: Five ply.
- 6. Face Width: 3 inches (76 mm).
- 7. Length: Manufacturer's standard.
- 8. Edge Style: Micro Edge.
- 9. Finish: UV urethane.
 - a. Color: As selected by Architect in manufacturer's full range.

2.3 ACCESSORY MATERIALS

- A. Vapor Retarder: Concure Vapor Barrier Plus or approved equal.
- B. Wood Flooring Adhesive: Mastic recommended by flooring and adhesive manufacturers for application indicated.
- C. Trowelable Leveling and Patching Compound: Latex-modified, hydrauliccement-based formulation approved by wood flooring manufacturer.
- D. Fasteners: As recommended by manufacturer, but not less than that recommended in NWFA's "Installation Guidelines."
- E. Thresholds and Saddles: To match wood flooring. Tapered on each side.
- F. Reducer Strips: To match wood flooring. 2 inches (51 mm) wide, tapered, and in thickness required to match height of flooring.
- G. Cork Expansion Strip: Composition cork strip.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Concrete Slabs:
- 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisturevapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - Relative Humidity Test: Using in situ probes, ASTM F 2170.
 Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

3.2 PREPARATION

- A. Concrete Slabs:
 - Grind high spots and fill low spots to produce a maximum 1/8-inch (3-mm) deviation in any direction when checked with a 10-foot (3m) straight edge.
 - 2. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.
 - 3. Remove coatings, including curing compounds, and other substances on substrates that are incompatible with installation adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- B. Broom or vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. Comply with flooring manufacturer's written installation instructions, but not less than applicable recommendations in NWFA's "Installation Guidelines."
- B. Provide expansion space at walls and other obstructions and terminations of flooring as required by manufacturer.
- C. Vapor Retarder: Comply with the following for vapor retarder installation:
 - 1. Wood Flooring Nailed to Wood Subfloor: Install flooring over a layer of asphalt-saturated felt.
- D. Engineered-Wood Flooring: Set in adhesive.

3.4 PROTECTION

- A. Protect installed wood flooring during remainder of construction period with covering of heavy kraft paper or other suitable material. Do not use plastic sheet or film that might cause condensation.
 - 1. Do not move heavy and sharp objects directly over kraft-papercovered wood flooring. Protect flooring with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Thermoset-rubber base.
 - 2. Rubber molding accessories.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.
- PART 2 PRODUCTS
- 2.1 PERFORMANCE REQUIREMENTS
- 2.2 THERMOSET-RUBBER BASE
 - A. <u>Manufacturers</u>: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Burke Mercer Flooring Products; a division of Burke Industries Inc.
 - 2. <u>Flexco</u>.
 - 3. Johnsonite; a Tarkett company.
 - 4. Roppe Corporation, USA.
 - B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
 - 1. Style and Location:
 - a. Style B, Cove: Provide in areas indicated.
 - C. Thickness: 0.125 inch (3.2 mm).
 - D. Height: 4 inches (102 mm).
 - E. Lengths: Coils in manufacturer's standard length.
 - F. Outside Corners: Preformed.

- G. Inside Corners: Preformed.
- H. Colors: As selected by Architect from manufacturer's fill range of color.

2.3 RUBBER MOLDING ACCESSORY

- A. <u>Manufacturers</u>: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Roppe Corporation, USA.
 - 2. VPI Corporation.
- B. Description: Rubber nosing for carpet, nosing for resilient floor covering, reducer strip for resilient floor covering, joiner for tile and carpet, transition strips.
- C. Profile and Dimensions: As selected by Architect from manufacturer's full range of colors.
- D. Locations: Provide rubber molding accessories in areas indicated, or at all transitions between flooring finishes.
- E. Colors and Patterns: As selected by Architect from manufacturer's full range of colors.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portlandcement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

- C. Do not install resilient products until materials are the same temperature as space where they are to be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.

3.3 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Cover resilient products subject to wear and foot traffic until Substantial Completion.

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid vinyl floor tile.
 - 2. Rubber floor tile.
 - 3. Vinyl composition floor tile.
- 1.2 ACTION SUBMITTALS
 - A. Product Data: For each type of product.
 - B. Samples: For each exposed product and for each color and pattern specified.
- 1.3 CLOSEOUT SUBMITTALS
 - A. Maintenance data.
- 1.4 QUALITY ASSURANCE
 - A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation.
- PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- 2.2 SOLID VINYL FLOOR TILE (SVT)
 - A. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following: Basis-of-Design Product: "Johnsonite Cortina Grande"

- 1. Altro Group.
- 2. American Biltrite.
- 3. Armstrong World Industries, Inc.
- 4. Congoleum Corporation.
- 5. Ecomoso, Centiva Vinyl Flooring.
- 6. <u>Gerflor</u>.
- 7. IVC US.
- 8. Johnsonite; a Tarkett company.
- 9. Mannington Mills, Inc.
- 10. Patcraft; a division of Shaw Industries, Inc.
- 11. Philadelphia Commercial; a division of Shaw Industries, Inc.
- 12. Polyflor, Ltd.; distributed by Gerbert Limited.
- 13. Shaw Contract Group; a Berkshire Hathaway company.
- 14. TOLI International.
- 15. VPI Corporation.
- B. Tile Standard: ASTM F 1700.
 - 1. Class: Class I, Monolithic Vinyl Tile.
- C. Thickness: 0.125 inch (3.2 mm).
- D. Size: 16 by 16 inches.
- E. Colors and Patterns: Selected by Architect from manufacturer's full range of colors.
- 2.3 RUBBER FLOOR TILE (RUB)
 - A. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following: Basis-of-Design "Ecore Ecosurfaces".
 - 1. American Biltrite.
 - 2. DINOFLEX® Recycled Rubber Surfaces.
 - 3. Ecosurfaces.
 - 4. Flexco.
 - 5. Johnsonite; a Tarkett company.
 - 6. Mannington Mills, Inc.
 - 7. Nora Systems, Inc.
 - 8. PRF USA Inc.
 - 9. R.C.A. Rubber Company (The).
 - 10. VPI Corporation.
 - B. Tile Description: A non-laminated, single ply, rubber surface made from a formulation of high quality post-consumer recycled rubber granules encapsulated in a wear and water resistant elastomeric network with multiple colored reprocessed EPSM rubber. Material surfaces shall contain water based protective polyurethane clear coat.
 - C. Wearing Surface: Smooth.
 - D. Thickness: 0.25-inches.
 - E. Size: 24 by 24 inches (610 by 610 mm).

F. Colors and Patterns: As selected by Architect from manufacturer's full range of colors.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portlandcement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
 - 4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisturevapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - Relative Humidity Test: Using in-situ probes, ASTM F 2170.
 Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.
- D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

- E. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- F. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.2 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles square with room axis.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles in pattern of colors and sizes indicated.

- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

SECTION 096600 - 1/8" DECORATIVE BROADCAST EPOXY FLOORING SYSTEM

- PART 1 GENERAL
 - A. Work Included
 - Furnish necessary material, labor, and equipment required to prepare designated areas and install a 1/8" Decorative Broadcast Epoxy Flooring System.
- 1.2 RELATED WORK
 - A. Drawings and general provisions of contract including General and Special Conditions and Division I, excepting special Submittal and Quality Assurance provisions in this section.
- 1.3 QUALITY ASSURANCE
 - A. Manufacturer's Qualifications
 - 1. Obtain 1/8" Decorative Broadcast Epoxy Flooring System materials from a single manufacturer with a minimum of 5 years verifiable experience providing materials of the type specified in this section.
 - B. Contractor's Qualifications
 - 1. Installation must be performed by a manufacturer approved contractor with skilled mechanics having not less than three (3) years satisfactory experience in the installation of the type of system as specified in this section, and must be approved in writing by the manufacturer of the 1/8" Decorative Broadcast Epoxy Flooring System.
 - C. Floor System Thickness Verification
 - 1. At the owner's discretion and under his supervision the contractor shall take (2) 1" random cores per 1,000 sq. ft. through the system into the substrate to verify proper system thickness. Cored areas less than specified thickness shall be removed and replaced or increased in thickness by the installing contractor, in a manner that does not affect the performance or integrity of the system. Cored areas which comply with the recommended system thickness shall be built-up to match the surrounding surface elevation prior to applying the seal coat(s). Cores taken and patched will be noticeable; therefore, cores should be taken from areas where aesthetics are less critical. Cost associate with repair of cored areas that comply with specification thickness are the responsibility of the owner.

1.4 WARRANTY

A. The contractor and the manufacturer shall furnish a standard guarantee of the 1/8" Decorative Broadcast Epoxy Flooring System for a period of one year after installation. The labor and material guarantee shall include loss of bond and wear-through to the concrete substrate from normal use.

- в. Not included in the warranty are damage due to structural design deficiencies including but not limited to slab cracking from lateral, vertical or rotational movement, and gouging or other damage due to fork lifts, other equipment, delamination caused by vapor transmission, Acts of God, or other elements beyond the scope of protection of this system nor causes not related to the system materials.
- In case of a warranty claim, the owner will notify the manufacturer С. and contractor in writing within 30 days of the first appearance of problems covered under this warranty. The owner will provide free and unencumbered access to the area during normal working hours for warranty rework. Property protection is also the owner's responsibility. Remedy is limited to direct repair of the 1/8" Decorative Broadcast Epoxy Flooring System.
- SUBMITTAL 1.5
 - System Data Α.
 - Submit manufacturer's specifications on cured system and 1. individual components of the 1/8" Decorative Broadcast Epoxy Flooring System, including physical properties and performance properties and tests described in part 2.01 B and submit Material Safety Data Sheets. Each individual component of the system will be evaluated on the basis of these standards. For any tests not listed in the manufacturer's standard nationally published data, the manufacturer must supply the missing data accompanied by the independent testing laboratory's test results which prove compliance in accordance with the referenced standard(s). Furnish (3) sets of this information. Manufacturer's standard color chart shall also be submitted and must afford the owner color selection from at least (10) standard colors and computerized custom color matching shall be available upon request. Furnish (3) sets of this information.
 - The contractor shall submit a 6" x 6" cured system sample which the в. contractor has made for verification purposes and finish texture approval.
 - С. Contractor Experience
 - The contractor shall furnish a list of projects using either specified material or equivalent that they have installed during 1. the last (5) years. Information shall include: project name, square footage, owner contact name with owner's address and phone number. Also, the contractor shall furnish résumés detailing the experience of key project personnel including supervisors and mechanics.
 - It is the intention of this Section to provide the products as named. D. Substitutions will be considered only when received by the Architect, Engineer or Design Professional through a bidding Prime Contractor at least ten days prior to the date set for receipt of bids. Upon receipt of any such submission, the Architect, Engineer or Design Professional will determine whether or not the proposed product is an equal. In the event the Architect, Engineer or Design Professional determines that a proposed system is an approved equal, he will issue an addendum and

notify all bidders at least 48 hours prior to receipt of bids. No substitutions will be considered after contract bid date.

- The contractor shall submit a copy of the manufacturer's packing slip, Е. tagged for this specific job, along with calculations, signed by an officer of the primary material supplier demonstrating that the quantity of material furnished for the project will achieve the specified coverage and mil thickness.
- MATERIAL DELIVERY, HANDLING AND STORAGE 1.6
 - Α. Primary system materials shall be delivered in the manufacturer's undamaged, unopened containers. Each container shall be clearly marked with the following:
 - 1. Product name(s) and/or Number(s).
 - 2. Manufacturer's name.
 - 3. Component designation (A, B, etc.).
 - 4. Product Mix Ratio.
 - 5. Health and Safety Information.
 - 6. CHEMTREC Emergency Response Information
 - Provide equipment and personnel to handle the materials by methods в. which prevent damage.
 - The contractor shall promptly inspect direct jobsite material C. deliveries to assure that quantities are correct, comply with requirements and are not damaged.
 - The contractor shall be responsible for materials furnished by him, D. and he shall replace, at his own expense, such materials that are found to be defective in manufacture or that have become damaged in transit, handling or storage.
 - Store material(s) in accordance with manufacturer's instructions, with Ε. seals and labels intact and legible. Maintain temperatures within the required range. Do not use materials which exceed the manufacturer's maximum recommended shelf life.

JOB CONDITIONS 1.7

- The contractor shall visit the jobsite prior to the installation of Α. the 1/8" Decorative Broadcast Epoxy Flooring System to evaluate substrate condition, including substrate moisture transmission, quantity and severity of cracking, and the extent of repairs needed. Substrate imperfections should be repaired only after mechanical preparation of the substrate. Surface preparation reveals most imperfections requiring repair. Concrete substrates shall be tested to verify that the moisture vapor transmission of the substrate does not exceed the 1/8" Decorative Broadcast Epoxy Flooring System manufacturers' recommendations. Cost associated with repair, leveling and remediation of the substrate are the responsibility of the provider of the substrate.
- The contractor should exercise care during surface preparation and в. system installation to protect surrounding substrates and surfaces, as

well as in-place equipment. The contractor shall prepare the substrate to remove laitance and open the surface. This shall be achieved by light brush grit blasting. Surface profile achieved shall be similar to medium grit sandpaper and free from bond-inhibiting contaminants.

- Sub floor tolerances are specified in Section 033000 (in accordance C. with ACI 302). Each drain in the installation area must be working and raised or lowered to the actual finished elevation of the 1/8" Decorative Broadcast Epoxy Flooring System.
- D. System must be protected by the General Contractor or, as a separate bid item, by the installing contractor until it is inspected and turned over to the owner.
- Ε. The minimum slab temperature must be conditioned to 60 degrees F before commencing installation, during installation, and for at least 72 hours after installation is complete. The substrate temperature must be at least 5 degrees F above the dew point during installation.
- F. Maintain lighting at a minimum uniform level of 50 or more foot candles in areas where the 1/8" Decorative Broadcast Epoxy Flooring System is being installed. It is the recommendation of the manufacturer that the permanent lighting be in place and working during the installation.
- Leaks from pipes and other sources must be corrected prior to the G. installation of the 1/8" Decorative Broadcast Epoxy Flooring System.
- PART 2 PRODUCTS

2.1 MATERIALS

- A. System Overview:
 - 1. The General Polymers Ceramic Carpet #400, 1/8" Decorative Broadcast Epoxy Flooring System, as manufactured by Sherwin-Williams, consists of 3579 Standard Primer / Binder as the primer, 3561 Epoxy Resin Glaze as the binder resin, 5900F ESTES Colored Quartz Aggregate, and 3745 Self-Leveling Epoxy as the grout.
- Select seal coat: в. 1. 4409 WB Polyurethane Satin

C.	Typical Physical Properties	
	Color	Pre-Blended Standard Colors Custom Color Blends Available
	Hardness @ 24 hours Shore D ASTM D 2240	70/65
	Compressive strength ASTM C 579	12,000 psi
	Tensile Strength	
	ASTM C 307	2,500 psi
	ASTM D 638	6,000 psi

Abrasion Resistance 90-100 milligrams lost ASTM D 4060, CS-17 Wheel, 1,000 cycles Flexural Strength 4,500 psi ASTM C 580 10,000 psi ASTM D 790 Adhesion 300 psi ACI 503R concrete failure Flammability Self-extinguishing over concrete Resistance Elevated Tempera-No slip or flow at required tures temperature of 158°F MIL-D-3134J

Withstands 16 ft-lbs without cracking, delaminating or chipping

ASTM C = Mortar system ASTM D = Resin only

Impact Resistance

MIL-D-3134J

PART 3 - EXECUTION

- 3.1 SURFACE PREPARATION
 - A. For thorough instructions regarding preparation of concrete substrates consult "Instruction for Concrete Surface Preparation" (Form G-1).
- 3.2 INSTALLATION
 - A. General
 - 1. Apply each component of the 1/8" Decorative Broadcast Epoxy Flooring System in compliance with manufacturer's written installation instructions and strictly adhere to mixing and installation methods, recoat windows, cure times and environmental restrictions. The 1/8" Decorative Broadcast Epoxy Flooring System is to be installed directly over non-moving control joints and cracks which have been treated with EPO-FLEX epoxy, and the 1/8" Decorative Broadcast Epoxy Flooring System will terminate at the edge of isolation and expansion joints as designated by the Architect, Engineer or Design Professional. Integral cove base shall be installed where specified in the drawings.
 - B. Cracks
 - 1. After preparation, evaluation of quantity and severity of cracks in concrete will determine the needed repairs. Original bid assumes repair and treatment of 100 linear feet of cracks and control joints. Additional treatment is considered excessive and must be bid on a per linear foot basis. For information pertaining to the treatment of cracks in concrete substrates, consult Manufacturer's publication, Concrete 102.
 - C. Control Joints
 - 1. Original bid assumes repair and treatment of 100 linear feet of cracks and control joints. Additional treatment is considered

excessive and must be bid on a per linear foot basis. For information pertaining to the treatment of control joints in concrete substrates, consult Manufacturer's publication, Concrete 103.

- D. Isolation/Expansion and Other Joints Subject to Movement
 - All expansion joints must be honored through the flooring system. For information pertaining to the above, consult Manufacturer's publication, Concrete 105.
- E. System Primer 1. 3579 Standard Primer / Binder
- F. First Broadcast1. 3561 Epoxy Resin Glaze2. 5900F ESTES Colored Quartz Aggregate
- G. Second Broadcast
 1. 3561 Epoxy Resin Glaze
 2. 5900F ESTES Colored Quartz Aggregate
- H. Grout Coat 1. 3745 Self-Leveling Epoxy
- I. Select Seal Coat
 1. 4409 WB Polyurethane Satin
- 3.3 CURING, CLEANING AND PROTECTION
 - A. Cure the 1/8" Decorative Broadcast Epoxy Flooring System materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of the installation and prior to completion of the curing process.
 - B. Protect the 1/8" Decorative Broadcast Epoxy Flooring System from damage and wear during other phases of the construction operation, using temporary coverings as recommended by the manufacturer, if required. Remove temporary covering just prior to final inspection.
 - C. Clean the 1/8" Decorative Broadcast Epoxy Flooring System just prior to final inspection, using materials and procedures suitable to the system manufacturer.
 - D. Some cleaners will affect the color, gloss or texture of your polymer floor surfaces. To determine how your cleaner will perform, first test each cleaner, in a small area, utilizing your cleaning technique. This precaution will demonstrate the effect of your cleaner and technique. If no deleterious effects are observed, continue with the procedure. If deleterious effects do occur, modify the cleaning material and/or procedure. For recommendations regarding types of cleaners, contact the 1/8" Decorative Broadcast Epoxy Flooring System manufacturer.

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes modular carpet tile.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For carpet tile installation, plans showing the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Carpet tile type, color, and dye lot.
 - 3. Type of subfloor.
 - 4. Type of installation.
 - 5. Pattern of installation.
 - 6. Pattern type, location, and direction.
 - 7. Pile direction.
 - 8. Type, color, and location of insets and borders.
 - 9. Type, color, and location of edge, transition, and other accessory strips.
 - 10. Transition details to other flooring materials.
- C. Samples: For each exposed product and for each color and texture required.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranty.
- 1.4 CLOSEOUT SUBMITTALS
 - A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

1.6 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- PART 2 PRODUCTS
- 2.1 CARPET TILE (CPT.T)
 - A. <u>Manufacturers</u>: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following: Basis-of-Design: Shaw Contract Group, Style: "Lineweight Tile" 5T114.
 - 1. Atlas Carpet Mills, Inc.
 - 2. Beaulieu Group LLC.
 - 3. Bentley Prince Street, Inc.
 - 4. Interface, LLC.
 - 5. J&J Invision; J&J Industries, Inc.
 - 6. <u>Mannington Mills, Inc</u>.
 - 7. Mohawk Group (The); Mohawk Carpet, LLC.
 - 8. Patcraft; a division of Shaw Industries, Inc.
 - 9. Philadelphia Commercial; a division of Shaw Industries, Inc.
 - 10. Shaw Contract Group; a Berkshire Hathaway company.
 - 11. Tandus; a Tarkett company.
 - B. Color: As selected by Architect from manufacturer's full range.
 - C. Pattern: Large, Geometric.
 - D. Fiber Content: 100 percent nylon.
 - E. Pile Characteristic: Level-loop and cut-and-loop pile.
 - F. Pile Thickness: 0.187 inches.
 - G. Stitches: 10 stiches per inch.
 - H. Gage: 5/64.
 - I. Primary Backing/Backcoating: Synthetic non-woven.
 - J. Secondary Backing: Closed Cell Cushion.
 - K. Backing System: Flex-Aire Cushion Modular.
 - L. Size: 24 by 254 or 24 by 36 inches, depending on pattern selected.
 - M. Applied Treatments:

1. Soil-Resistance Treatment: Manufacturer's standard treatment.

N. Performance Characteristics:

- 1. Appearance Retention Rating: Severe traffic, 3.5 minimum according to ASTM D 7330.
- 2. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm according to NFPA 253.
- 3. Dry Breaking Strength: Not less than 100 lbf (445 N) according to ASTM D 2646.
- 4. Delamination: Not less than 3.5 lbf/in. (0.6 N/mm) according to ASTM D 3936.
- 5. Dimensional Tolerance: Within 1/32 inch (0.8 mm) of specified size dimensions, as determined by physical measurement.
- Dimensional Stability: 0.2 percent or less according to ISO 2551 (Aachen Test).
- 7. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
- 8. Colorfastness to Light: Not less than 4 after 60 AFU (AATCC fading units) according to AATCC 16, Option E.
- 9. Electrostatic Propensity: Less than 3.5 kV according to AATCC 134.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydrauliccement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressuresensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
- PART 3 EXECUTION

3.1 EXAMINATION

- A. Concrete Slabs:
 - 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisturevapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - Relative Humidity Test: Using in situ probes, ASTM F 2170.
 Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

3.2 PREPARATION

- A. General: Comply with CRI's "CRI Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, openbottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.

- I. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.
- J. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
 - 1. Concrete.
 - 2. Concrete masonry units (CMUs).
 - 3. Steel and iron.
 - 4. Galvanized metal.
 - 5. Gypsum board.

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Sustainable Design Submittals:
- C. Samples: For each type of paint system and each color and gloss of topcoat.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. <u>Manufacturers</u>: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Behr Process Corporation.
 - 2. <u>Benjamin Moore & Co</u>.
 - 3. <u>California Paints</u>.
 - 4. Conco Paints.
 - 5. Coronado Paint; Benjamin Moore Company.
 - 6. Diamond Vogel Paints.
 - 7. Dulux (formerly ICI Paints); a brand of AkzoNobel.
 - 8. <u>Dunn-Edwards</u> Corporation.
 - 9. Duron, Inc.
 - 10. Frazee Paint; Comex Group.
 - 11. <u>Glidden Professional</u>.
 - 12. Kelly-Moore Paint Company Inc.
 - 13. Kwal Paint; Comex Group.
 - 14. M.A.B. Paints.
 - 15. McCormick Paints.
 - 16. Parker Paint; Comex Group.
 - 17. PPG Architectural Coatings.
 - 18. Pratt & Lambert.
 - 19. Rodda Paint Co.
 - 20. Rust-Oleum Corporation; a subsidiary of RPM International, Inc.
 - 21. Sherwin-Williams Company (The).
 - 22. Valspar Corporation Architectural (Pro).
 - 23. Vista Paint Corporation.
 - 24. Zinsser; Rust-Oleum Corporation.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Exterior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Fiber-Cement Board: 12 percent.
 - 3. Masonry (Clay and CMUs): 12 percent.
 - 4. Wood: 15 percent.
 - 5. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

- A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
 - 1. Latex System MPI EXT 3.1A:
 - a. Prime Coat: Primer, alkali resistant, water based, MPI #3.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, gloss (MPI Gloss Level 6), MPI #119.
- B. Concrete Substrates, Traffic Surfaces:
 - 1. Latex Floor Paint System MPI EXT 3.2A:
 - a. Prime Coat: Floor paint, latex, matching topcoat.
 - b. Intermediate Coat: Floor paint, latex, matching topcoat.
 - c. Topcoat: Floor paint, latex, low gloss (maximum MPI Gloss Level 3), MPI #60.
 - 2. Clear Water-Based Sealer System MPI EXT 3.2H:
 - a. Prime Coat: Sealer, water based, matching topcoat.
 - b. Intermediate Coat: Sealer, water based, matching topcoat.
 - c. Topcoat: Sealer, water based, for concrete floors, MPI #99.

C. CMU Substrates:

- 1. Latex System MPI EXT 4.2A:
 - a. Prime Coat: Block filler, latex, interior/exterior, MPI #4.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, low sheen (MPI Gloss Level 3-4), MPI #15.
- D. Steel and Iron Substrates:
 - 1. Water-Based Light Industrial Coating System MPI EXT 5.1C:
 - a. Prime Coat: Primer, alkyd, anti-corrosive for metal, MPI #79.b. Topcoat: Light industrial coating, exterior, water based, gloss (MPI Gloss Level 6), MPI #164.
- E. Galvanized-Metal Substrates:

- 1. Water-Based Light Industrial Coating System MPI EXT 5.3J:
 - a. Prime Coat: Primer, galvanized, water based, MPI #134.
 - b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
 - c. Topcoat: Light industrial coating, exterior, water based, gloss (MPI Gloss Level 6), MPI #164.
- F. Exterior Gypsum Board Substrates:
 - 1. Latex System MPI EXT 9.2A:
 - a. Prime Coat: Primer, latex for exterior wood (reduced), MPI #6.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, low sheen (MPI Gloss Level 3-4), MPI #15.

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete.
 - 2. Concrete masonry units (CMUs).
 - 3. Steel and iron.
 - 4. Galvanized metal.
 - 5. Wood.
 - 6. Gypsum board.
 - 7. Cotton or canvas insulation covering.
 - 8. ASJ insulation covering.

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

B. Samples: For each type of paint system and in each color and gloss of topcoat.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Behr Process Corporation.
 - 2. Benjamin Moore & Co.
 - 3. California Paints.
 - 4. Conco Paints.
 - 5. Coronado Paint; Benjamin Moore Company.
 - 6. Diamond Vogel Paints.
 - 7. Dulux (formerly ICI Paints); a brand of AkzoNobel.
 - 8. Dunn-Edwards Corporation.
 - 9. Duron, Inc.
 - 10. Frazee Paint; Comex Group.
 - 11. Glidden Professional.
 - 12. HEMPEL A/S.
 - 13. Kelly-Moore Paint Company Inc.
 - 14. Kwal Paint; Comex Group.
 - 15. M.A.B. Paints.
 - 16. McCormick Paints.
 - 17. Parker Paint; Comex Group.
 - 18. PPG Architectural Coatings.
 - 19. Pratt & Lambert.
 - 20. Rodda Paint Co.
 - 21. Rust-Oleum Corporation; a subsidiary of RPM International, Inc.
 - 22. Sherwin-Williams Company (The).
 - 23. United Gilsonite Laboratories.
 - 24. Valspar Corporation Architectural (Pro).
 - 25. Vista Paint Corporation.
 - 26. Zinsser; Rust-Oleum Corporation.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Interior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

- For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Fiber-Cement Board: 12 percent.
 - 3. Masonry (Clay and CMUs): 12 percent.
 - 4. Wood: 15 percent.
 - 5. Gypsum Board: 12 percent.
 - 6. Plaster: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
 - 1. High-Performance Architectural Latex System MPI INT 3.1C:
 - a. Prime Coat: Primer, alkali resistant, water based, MPI #3.
 - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 3), MPI #139.
- B. Concrete Substrates, Traffic Surfaces:
 - 1. Latex Floor Enamel System MPI INT 3.2A:
 - a. Prime Coat: Floor paint, latex, matching topcoat.
 - b. Intermediate Coat: Floor paint, latex, matching topcoat.
 - c. Topcoat: Floor paint, latex, low gloss (maximum MPI Gloss Level 3), MPI #60.
 - 2. Water-Based Concrete Floor Sealer System MPI INT 3.2G:
 - a. First Coat: Sealer, water based, for concrete floors, matching topcoat.
 - b. Topcoat: Sealer, water based, for concrete floors, MPI #99.
- C. CMU Substrates:
 - 1. High-Performance Architectural Latex System MPI INT 4.2P:
 - a. Prime Coat: Primer, alkali resistant, water based, MPI #3.
 - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 3), MPI #139.
- D. Steel Substrates:
 - 1. High-Performance Architectural Latex System MPI INT 5.1R:
 - a. Prime Coat: Primer, alkyd, anti-corrosive, for metal, MPI #79.
 - b. Prime Coat: Shop primer specified in Section where substrate is specified.
 - c. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.

- d. Topcoat: Latex, interior, high performance architectural, semi-gloss (MPI Gloss Level 5), MPI #141.
- 2. Water-Based Dry-Fall System MPI INT 5.1C:
 - a. Prime Coat: Primer, alkyd, anti-corrosive, for metal, MPI #79.
 - b. Topcoat: Dry fall, latex, flat, MPI #118.
- E. Galvanized-Metal Substrates:
 - 1. High-Performance Architectural Latex System MPI INT 5.3M:
 - a. Prime Coat: Primer, galvanized, water based, MPI #134.
 - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural, semi-gloss (MPI Gloss Level 5), MPI #141.
 - 2. Water-Based Dry-Fall System MPI INT 5.3H:
 - a. Prime Coat: Dry fall, water based, for galvanized steel, matching topcoat.
 - b. Topcoat: Dry fall, water based, for galvanized steel, flat (MPI Gloss Level 1), MPI #133.
- F. Wood Substrates: Exposed framing.
 - 1. High-Performance Architectural Latex System MPI INT 6.2B:
 - a. Prime Coat: Primer, latex, for interior wood, MPI #39.
 - b. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 3), MPI #139.
- G. Gypsum Board Substrates:
 - 1. High-Performance Architectural Latex System MPI INT 9.2B:
 - a. Prime Coat: Primer sealer, latex, interior, MPI #50.
 - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (MPI Gloss Level 4), MPI #140.
- H. Cotton or Canvas and ASJ Insulation-Covering Substrates: Including pipe and duct coverings.
 - 1. Latex System MPI INT 10.1A:
 - a. Prime Coat: Primer sealer, latex, interior, MPI #50.

- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior (MPI Gloss Level 2), MPI #44.

SECTION 116623 - GYMNASIUM EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Basketball equipment.
 - 2. Safety pads.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For gymnasium equipment.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each exposed product and for each item and color specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Court layout plans, drawn to scale, and coordinated with floor inserts, game lines, and markers applied to finished flooring.
- B. Product certificates.
- C. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of gymnasium equipment that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 25 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Basketball backstops and anchors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.2 BASKETBALL EQUIPMENT

- A. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - 1. AALCO Manufacturing.
 - 2. ADP Lemco.
 - 3. Arizona Courtlines, Inc.
 - 4. Basketball Products International.
 - 5. Bison, Inc.
 - 6. Douglas Industries, Inc.
 - 7. Draper Inc.
 - 8. IPI by Bison.
 - 9. Jaypro Sports, LLC.
 - 10. L. A. Steelcraft Products, Inc.
 - 11. P. W. Athletic Mfg. Co.
 - 12. Performance Sports Systems.
 - 13. Porter Athletic Equipment Company.
 - 14. Schelde North America.
 - 15. Spalding Equipment.
- B. General: Provide equipment complying with requirements in NFHS's "NFHS Basketball Rules Book."
- C. Provide manufacturer's recommended connections complying with Section 055000 "Metal Fabrications" of size and type required to transfer loads to building structure.
- D. Overhead-Supported, Backstops:
 - 1. Stationary Type: Manufacturer's standard assembly.
 - 2. Folding Type: Manufacturer's standard assembly for side-folding backstop, with hardware and fittings to permit folding.
 - 3. Goal Height Adjuster: Adjustable from 8 to 10 feet (2.40 to 3.05 m) to top of ring with gear-drive mechanism, locking in any position within adjustment range, with visible height scale attached to side of framing.
 - a. Operation: Electric with integral gear-drive motor, with limit switches preset to goal heights and the following:
- E. Wall-Mounted Backstops: Complete assembly extending from wall, including support framing to building structure, bracing, cables, support chains, pulleys, fittings, hardware, pipe anchors, equipment pads, and fasteners.
 - 1. Folding Type: Provide manufacturer's standard assembly for sidefolding backstop, with hardware and fittings to permit folding.
 - a. Finish: Manufacturer's standard polyester powder-coat finish.
 - 2. Goal Height Adjuster: Adjustable from 8 to 10 feet (2.4 to 3 m) with gear-drive mechanism, locking in any position within adjustment range, with visible height scale attached to side of framing.
 - a. Operation: Electric with integral gear-drive motor, with limit switches preset to goal heights, and one detachable electric control device(s).
- F. Backstop Safety Device: Designed to limit free fall if support cable, chains, pulleys, fittings, winch, or related components fail.
- G. Winch: Hoist, consisting of heavy-duty, fully enclosed worm-gear; brake; cable drum; cable; and fittings, for mounting on wall with equipment mounting board; designed to move and hold backboard in any raised or lowered position.
- H. Backstop Electric Operator: Provide operating machine of size and capacity recommended by manufacturer for equipment specified, with electric motor and factory-prewired motor controls, starter, gearreduction unit, and remote controls. Coordinate wiring requirements and electrical characteristics with building electrical system.
 - 1. 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.
 - 2. Motor Electrical Characteristics:
 - a. Horsepower: 3/4 hp.
 - b. Voltage: 115 V ac, single phase, 60 hertz.
 - Remote-Control Station(s): NEMA ICS 6, Type 1 enclosure for surface mounting and momentary-contact, three-position, switchoperated control with up, down, and off functions.
 - a. Key Switch: Provide two keys per station.
 - 4. Limit Switches: Adjustable switches, interlocked with motor controls and set to automatically stop basketball equipment at fully retracted and fully lowered positions.
- I. Basketball Backboards:
 - 1. Shape and Size:
 - a. Rectangular, 72 by 48 inches (1800 by 1200 mm).

- 2. Backboard Material: With predrilled holes or preset inserts for mounting goals, and as follows:
 - Glass: Not less than 1/2-inch- (13-mm-) thick, transparent tempered glass complying with impact testing requirements in 16 CFR 1201 Category II or ANSI Z97.1 Class A for safety glazing.
 - 1) Rim-Restraining Device: Complying with NCAA and NFHS rules and designed to ensure that basket remains attached if glass backboard breaks.
- 3. Target Area and Border Markings: Permanently etched in white color, marked in pattern and stripe width according to referenced rules.
- J. Goal Mounting Assembly: Compatible with goal, backboard, and support framing.
- K. Basketball Goals: Complete with flanges, braces, attachment plate, and evenly spaced loops welded around underside of ring.
 - 1. Double-rim basket ring.
 - 2. Type: Movable, breakaway design with manufacturer's standard breakaway mechanism and rebound characteristics identical to those of fixed, nonmovable ring.
 - 3. Finish: Polyester powder-coat finish.
- L. Basketball Nets: 12-loop-mesh net, between 15 and 18 inches (380 to 460 mm) long, sized to fit rim diameter, and as follows:
 - 1. Cord: Made from white nylon.
- M. Backboard Safety Pads: Designed for backboard thickness indicated and extending continuously along bottom and up sides of backboard and over goal mounting and backboard supports as required by referenced rules.
 - 1. Color: As selected by Architect from manufacturer's full range.

2.3 SAFETY PADS

- A. <u>Manufacturers</u>: Subject to compliance with requirements, provide products by one of the following:
 - 1. AALCO Manufacturing.
 - 2. ADP Lemco.
 - 3. American Athletic, Inc.
 - 4. Bison, Inc.
 - 5. Douglas Industries, Inc.
 - 6. Draper Inc.
 - 7. IPI by Bison.
 - 8. Jaypro Sports, LLC.
 - 9. Performance Sports Systems.
 - 10. Porter Athletic Equipment Company.
 - 11. Schelde North America.

12. Spalding Equipment.

- B. Safety Pad Surface-Burning Characteristics: ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- C. Pad Coverings: Provide safety pad fabric covering that is fabricated from puncture- and tear-resistant, PVC-coated polyester or nylon-reinforced PVC fabric, not less than 14-oz./sq. yd (475-g/sq. m) and treated with fungicide for mildew resistance; with surface-burning characteristics indicated, and lined with fire-retardant liner.
- D. Wall Safety Pads: Padded wall wainscot panels designed to be attached in a continuous row; each panel section consisting of fill laminated to backer board with visible surfaces fully covered by seamless fabric covering, free of sag and wrinkles and firmly attached to back of backer board.
 - Backer Board: Not less than 3/8-inch- (9.5-mm-) thick fireretardant-treated plywood according to AWPA U1, UCFA Fire Retardant Interior.
 - 2. Fire-Resistive Fill: Manufacturer's standard.
 - 3. Size: Each panel section, 24 inches (610 mm) wide by not less than 60 inches (1524 mm) long.
 - 4. Number of Modular Panel Sections: Eight.
 - 5. Installation Method: Manufacturer's standard.
 - Fabric Covering Color(s): As selected by Architect from manufacturer's full range for one color(s).
- E. Column Safety Pads: Pads covering exposed columns to height indicated, consisting of not less than 1-1/4-inch- (32-mm-) thick, multipleimpact-resistant, closed-cell, polyethylene-foam filler, covered on both sides and all edges by fabric covering with backer board and manufacturer's standard anchorage to column.
 - 1. Length: Each pad not less than 72 inches (1800 mm).
 - Fabric Covering Color(s): Match color of wall safety pads color(s).
- F. Cut-out Trim: Provide manufacturer's standard flanged cut-out trim kits for fitting pads around switches, receptacles, and other obstructions.
 - 1. Color: Gray.

2.4 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for use and finish type indicated.
 - 1. Extruded Bars, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
 - 2. Cast Aluminum: ASTM B 179.

3. Flat Sheet: ASTM B 209 (ASTM B 209M).

- B. Steel: Comply with the following:
 - 1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
 - 2. Steel Tubing: ASTM A 500/A 500M or ASTM A 513, cold formed.
 - 3. Steel Sheet: ASTM A 1011/A 1011M.
- C. Support Cable: Manufacturer's standard galvanized-stranded-steel wire rope. Provide fittings complying with wire rope manufacturer's written instructions for size, number, and installation method.
- D. Support Chain and Fittings: For chains used for overhead lifting, provide Grade 80 heat-treated alloy steel chains, complying with ASTM A 391/A 391M, with commercial-quality, hot-dip galvanized steel connectors and hangars.
- E. General-Purpose Chain: For chains not used for overhead lifting, provide carbon steel chain, complying with ASTM A 413/A 413M, Grade 30 proof coil chain or other grade recommended by gymnasium equipment manufacturer. Provide coating type, chain size, number, and installation method complying with manufacturer's written instructions.
- F. Castings and Hangers: Malleable iron, complying with ASTM A 47/A 47M; grade required for structural loading.
- G. Softwood Plywood: DOC PS 1, exterior.
- H. Particleboard: ANSI A208.1.
- I. Equipment Wall-Mounted Board: Manufacturer's standard.
- J. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard corrosion-resistant or noncorrodible units; concealed; tamperproof, vandal- and theft-resistant design.
- K. Grout: ASTM C 1107/C 1107M with minimum strength recommended in writing by gymnasium equipment manufacturer.
- PART 3 EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions and competition rules indicated for each type of gymnasium equipment. Complete equipment field assembly where required.
- B. Permanently Placed Gymnasium Equipment and Components: Install rigid, level, plumb, square, and true; anchored securely to supporting structure; positioned at locations and elevations indicated; in proper relation to adjacent construction; and aligned with court layout.
- C. Connections: Connect electric operators to building electrical system.

- D. Removable Gymnasium Equipment and Components: Assemble in place to verify that equipment and components are complete and in proper working order. Instruct Owner's designated personnel in properly handling, assembling, adjusting, disassembling, transporting, storing, and maintaining units. Disassemble removable gymnasium equipment after assembled configuration is approved by Owner, and store units in location indicated on Drawings.
- E. Adjust movable components of gymnasium equipment to operate safely, smoothly, easily, and quietly, free from binding, warp, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and moving parts.

3.2 CLEANING

A. After completing gymnasium equipment installation, inspect components. Remove spots, dirt, and debris and touch up damaged shop-applied finishes according to manufacturer's written instructions.

3.3 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain gymnasium equipment.

SECTION 116653 - GYMNASIUM DIVIDERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fold-up divider systems.
 - Radius-fold divider systems.
 - 3. Peak-fold divider systems.
 - 4. Roll-up divider systems.
 - 5. Top-roll divider systems.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For gymnasium dividers.
- C. Samples: For each exposed product and for each item and color specified.
- 1.3 CLOSEOUT SUBMITTALS
 - A. Operation and maintenance data.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

PART 2 - PRODUCTS

2.1 WALK-DRAW DIVIDER SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AALCO Manufacturing.
 - 2. ADP Lemco.
 - 3. Arizona Courtlines, Inc.
 - 4. Douglas Industries, Inc.
 - 5. Draper Inc.
 - 6. IPI by Bison.
 - 7. Jaypro Sports, LLC.
 - 8. Performance Sports Systems.
 - 9. Porter Athletic Equipment Company.

10. Spalding Equipment.

2.2 FOLD-UP DIVIDER SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AALCO Manufacturing.
 - 2. ADP Lemco.
 - 3. Arizona Courtlines, Inc.
 - 4. Draper Inc.
 - 5. IPI by Bison.
 - 6. Jaypro Sports, LLC.
 - 7. Performance Sports Systems.
 - 8. Porter Athletic Equipment Company.
 - 9. Spalding Equipment.
- B. Divider Curtain System: Electrically operated, upward folding, cable suspended, and as follows:
 - 1. Top Hem: Double-thickness mesh or solid vinyl for continuous pipe batten.
 - 2. Outer Edge Hems: Triple turned and welded.
 - 3. Bottom Curtain Pocket: 6 inches (152 mm) with manufacturer's standard pipe batten with padding.
 - 4. Support Cables: Galvanized-stranded-steel wire rope, fittings, and grommets.
 - 5. Support Chain and Fittings: Hardened alloy steel chain rated for lifting loads, with commercial-quality, corrosion-resistant steel connectors and hangers.
 - 6. Curtain Battens and Drive Pipe: Steel pipe or tubing.

2.3 MATERIALS

- A. Support Chain and Fittings: For chains used for overhead lifting, provide Grade 80 heat-treated alloy steel chains, complying with ASTM A 391/A 391M, with commercial-quality, hot-dip galvanized or zinc-plated steel connectors and hangers.
- B. General-Purpose Chain: For chains not used for overhead lifting, provide carbon steel chain, complying with ASTM A 413/A 413M, Grade 30 proof coil chain or other grade recommended by gymnasium divider manufacturer. Provide coating type, chain size, number, and installation method complying with manufacturer's written instructions.
- C. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard corrosion-resistant or noncorrodible units; concealed.

2.4 ELECTRIC OPERATORS

A. General: Factory-assembled electric operation system of size and capacity recommended and provided by gymnasium divider manufacturer

for gymnasium dividers specified, with electric motors, thermaloverload protection, factory-prewired motor controls, control devices, and accessories required for proper operation. Include wiring from control stations to motors. Coordinate operator wiring requirements and electrical characteristics with building electrical system.

- 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.
- C. Limit Switches: Adjustable switches, interlocked with motor controls and set to automatically stop dividers at fully extended and fully retracted positions.
- D. Key Switch Control System: NEMA ICS 6; Type 1 enclosure; momentarycontact, three-position switch-operated control. Provide one key per station.

2.5 DIVIDER CURTAINS

- A. Upper Curtain, Mesh: Woven mesh of polyester yarn coated with vinyl, weighing not less than 9 oz./sq. yd. (305 g/sq. m).
 - 1. Mesh Color: As selected by Architect from full range of industry colors and color densities.
- B. Lower Curtain, Solid: Woven polyester fabric coated with vinyl, 22 oz./sq. yd. (745 g/sq. m), 10-foot (3.0-m) height above floor.
 - Fabric Color(s): One color(s), as selected by Architect from full range of industry colors and color densities.
- C. Hems: Folded and electronically welded.
- D. Seams: Electronically welded.
- E. Overall Curtain Height: Floor to ceiling, within installation clearances required.
- F. Bottom of Curtain: Approximately 2 inches (50 mm) above finished floor.
- G. Divider Curtain Flame-Resistance Ratings: Passes NFPA 701, Test 2.

2.6 DIVIDER ACCESSORIES

- A. Safety Lock: Locks drive system when speed exceeds manufacturer's recommended speed.
- B. Audible Motion Alarm: Provide alarm with intermittent warning tone when curtain is raised or lowered.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions.
- B. Gymnasium Dividers and Components: Install level, plumb, square, and true; anchored securely to supporting structure; positioned at locations and elevations indicated; in proper relation to adjacent construction; and aligned with court layout.
- C. Connections: Connect automatic operators to building electrical system.
- D. Adjust movable components of gymnasium dividers to operate safely, smoothly, easily, and quietly, free from binding, warp, distortion, uneven tension, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and moving parts.
- E. Limit Switch Adjustment: Set and adjust upper and lower limit controls.

3.2 CLEANING

A. After completing gymnasium divider installation, inspect components. Remove spots, dirt, and debris and touch up damaged shop-applied finishes according to manufacturer's written instructions.

3.3 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain gymnasium dividers.

SECTION 123661.16 - SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

Solid surface material countertops.
 Solid surface material backsplashes.
 Solid surface material end splashes.
 Solid surface material apron fronts.
 Solid surface material sinks.

1.2 ACTION SUBMITTALS

- A. Product Data: For countertop materials and sinks.
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
- C. Samples: For each type of material exposed to view.
- PART 2 PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
 - 1. <u>Manufacturers</u>: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Affinity Surfaces; a brand of Domain Industries, Inc.
 - b. Avonite Surfaces.
 - c. E. I. du Pont de Nemours and Company.
 - d. Formica Corporation.
 - e. LG Chemical, Ltd.
 - f. Meganite Inc.
 - g. Samsung Chemical USA, Inc.
 - h. Swan Corporation (The).
 - i. Transolid Div of Trumbull Industries.
 - j. Wilsonart.
 - 2. Type: Provide Standard type unless Special Purpose type is indicated.
 - 3. Integral Under Counter Mount Sink Bowls: Comply with CSA B45.5/IAPMO Z124. Provide integral overflow.

- 4. Colors and Patterns: As selected by Architect from manufacturer's full range.
- B. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
- C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.2 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
 - 1. Grade: Premium.
- B. Configuration:
 - 1. Front: See Drawings.
 - 2. Backsplash: Straight, slightly eased at corner.
 - 3. End Splash: Matching backsplash.
- C. Countertops: 3/4-inch-(19-mm-) thick, solid surface material with front edge built up with same material.
- D. Backsplashes: 1/2-inch- (12.7-mm-) thick, solid surface material with wood-trimmed edges.
- E. Joints: Fabricate countertops without joints.
- F. Cutouts and Holes:
 - 1. Under Counter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.

2.3 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.
- B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."
- PART 3 EXECUTION

3.1 INSTALLATION

A. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer.

- B. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- C. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions.
- D. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
- E. Install backsplashes and end splashes by adhering to wall and countertops with adhesive.
- F. Install aprons to backing and countertops with adhesive.
- G. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- H. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661.16

SECTION 210529 - SUPPORTS AND ANCHORS FOR FIRE SUPPRESSION

- PART 1 GENERAL
- 1.01 WORK INCLUDES
 - Base Bid: Δ
 - Contractor Provide: 1.
 - Supports for sprinkler pipe. a.
 - Sleeves, seals and firestopping for sprinkler pipe. b.
 - Escutcheons on sprinkler pipe. c.
 - Penetrations in existing and new walls required for fire d. sprinkler pipe.
 - Sprinkler main shown on west and north side of old gym. e.
 - New sprinklers shown for Gymnasium 100. f.
 - Revision to sprinklers in rooms 101 to 111 and room 200. g.
 - Alternate Bids: Β.
 - 1. Alternate Bid 1: Supports required for installation of sprinklers in rooms 119, 118, 117, 114, 113, and 112.
 - 2. Alternate Bid 2: Supports required for installation of sprinklers in existing Gym.
- 1.02 RELATED WORK
 - Specified Elsewhere: Α.
 - 210553 Identification for Fire Suppression Pipe and Equipment. 1.
 - 211100 Fire Protection Piping. 2.
 - 3. 211313 - Wet Pipe Sprinkler System.
- 1.03 SYSTEM DESCRIPTION
 - Α. Definitions:
 - 1. Fire suppression pipe includes that for wet pipe.
 - Fire suppression pipe is also called fire sprinkler pipe, fire 2. extinguishing water and fire protection water.
 - Description: Β.
 - 1. The existing metal building which contains Gym 100 is a preengineered steel building with a limit to the structural loading which can be added. The allowable weight of the sprinkler system used in this space should be no more than 0.4 lbs/sq. ft.

1.04 REFERENCES

- AISC American Institute of Steel Construction. Α.
- ASTM F708 Design and Installation of Rigid Pipe Hangers. в.
- C. ASTM E814 - Fire Stop Sealant.
- NFPA 13 Installation of Sprinkler Systems. D.

1.05 SUBMITTALS

- Submit under provisions of Section 013300. Α.
- в. Product Data: Provide manufacturers catalog data including load capacity and firestopping capability. Submit installation techniques to be used for intumescent putty sealants.

- Design Data: Indicate load carrying capacity of auxiliary strut. Indicate C. the square foot weight addition to the building structure.
- 1.06 REGULATORY REQUIREMENTS
 - Supports for sprinkler piping shall conform with NFPA 13. Α.

PART 2 - PRODUCTS

2.01 MANUFACTURER & PERFORMANCE

Unless otherwise specified the manufacturer's number specified or Α. scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.

PIPE HANGERS AND SUPPORTS 2.02

- Acceptable Manufacturers. Α.
 - 1. B-Line.
 - 2. Grip Strut.
 - 3. Fee and Mason.
 - 4. Grinnel.
 - 5. Unistrut.
 - 6. Anvil International.
- Hanger Description: в.
 - Clamps for attachment to bar joists and beams shall be C-clamps with 1. retaining straps or steel or malleable iron adjustable beam clamps equal to B-Line Figure B-3036 with B-3360 services strap and Figure B-3040.
 - 2. Strut supports shall be primed 16, 14 or 12 gauge rolled carbon steel with galvanized die-formed accessory clamps and fasteners.
 - 3. "J-Hooks" for 2" pipe and smaller shall be 1/4" thick by 1-1/4" wide steel rated for 200 lbs each.
 - 4. Hold down straps shall be die-stamped of galvanized sheet steel or formed of galvanized malleable iron.
- С. Fire Protection Piping:
 - 1. Conform to NFPA 13 and FM Global Requirements.
 - Hangers for Pipe Sizes 1" to 4": Carbon steel, adjustable swivel. 2.

2.03 ACCESSORIES

- Hanger Rods: Mild steel continuous threaded. Α.
- в. Auxiliary Steel and Trapeze Hangers.
 - Shall be Schedule 40 steel pipe or rolled steel shapes complying 1. with AISC manual.
 - 2. Manufactured struts shall be rolled of 12, 14, or 16 gauge material to meet loading required or as noted on Drawings or otherwise specified. It shall have a hot dipped galvanized or epoxy coating or shall be prime painted.
 - Auxiliary strut shall be counted as part of the weight of supported 3. in Gym 100.
- C. Acceptable Products.

- 1. B-Line.
- 2. Uni-strut.
- 3. Grip Strut.
- 2.04 ANCHORS
 - Masonry or concrete type for pipe or equipment supports. Shall be wedge Α. type with either studs or National coarse female thread. Alternative type shall be self drilling expansion type. Anchors shall be U. L. listed.
 - Masonry or concrete type for securing escutcheons to masonry shall be в. "nail-in" type. Unit shall consist of broad head on hollow zinc alloy core with steel drive pin. Provide with dielectric washer.
- 2.05 SLEEVES
 - Sleeves for Pipes Through Walls Rated at less than one hour. At a minimum Α. shall be 24 gauge galvanized steel or PVC pipe.
 - в. Sleeves for Pipes Through Walls Rated at one hour or greater or all masonry walls. Schedule 40 or standard weight galvanized steel pipe.
 - Sleeves for pipes through exterior masonry walls. Schedule 40 solid PVC. С.
 - D. Core drilled openings in solid masonry do not require sleeves.

2.06 SEALANTS

- A. Fire Stopping Shall comply with UL1479 and ASTM E0814. Shall have an installed F rating of two hours.
- B. Fire stopping for metal pipe and conduit shall be tube or trowel applicable and shall remain pliable. Material shall be waterproof or paintable with latex paint.
- C. Exterior moisture sealant Shall be non-hardening silicone type rated for temperatures of -40 degrees F to 250 degrees F. Material shall be available in white, gray, brown, and black colors. Material shall be sunlight resistant.
- D. Interior sealant shall be silicone type rated for temperatures of 0 degrees F to 250 degrees F. Material shall be available in white, clear, gray, brown or black.
- E. Manufacturer

		Fire Stop	Exterior	Interior
		(Metal)	Sealant	Sealant
1.	Tremco	Fyre-shield	Spectrum 2	Spectrum 1
2.	3M	Fire Dam	2000	FS-195
			150	FS-195
3.	General		SCS1000	SCS1000
	Electric			
4.	Dow Corning		999A	999A
5.	Hilti	FS601		
б.	Nelson	CLK		
7.	Pecora		864	AC-20
8.	Rectorseal	Metacaulk 950		

2.08 ESCUTCHEONS

A. For piping - Shall be chrome finished split faced plastic.

- For multiple pipes or where holes for single pipe are over large or offset. Β. 1. Utilize pre-painted aluminum sheet fabricated to cover entire hole and
 - seal within 1/4" of the pipe or pipe covering. Holes shall be hole sawed or punched. Holes shall be round. 2.
- PART 3 EXECUTION
- 3.01 APPLICATION
 - Fire Sprinkler Pipe: Α. 1. Shall be supported in accord to NFPA 13.

3.02 PREPARATION

- Coordination of Trades/Owner: Α.
 - 1. Locate sleeves in conjunction with concrete and masonry trades. Determine exact elevation and lateral position.
 - 2. At contractor's option core drill openings in floors and core drill or cut in sleeves in walls.

3.03 ANCHORS

- Use anchors in concrete or masonry walls and floors. Α.
- в. Drill hole clean of loose material. Install anchor, flush with surface. Size hole in accord to manufacturers' recommendation. Physically test anchor by pulling against it. Loose anchors will not be accepted.
- 3.04 PIPE HANGERS AND SUPPORTS
 - Α. Utilize hangers in accord to Application paragraphs.
 - Place hangers within 12" of each horizontal elbow. Β.
 - Use hangers with 1-1/2" minimum vertical adjustment. C.
 - Support vertical piping such that it cannot be deflected more than 1/4" D. from center by hand pressure.
 - Where several pipes can be installed in parallel and at same elevation, Ε. provide multiple or trapeze hangers.
 - F. Support riser piping independently of connected horizontal piping.
 - Locate hangers for pipe movement without disengagement of supported pipe. G.
 - Η. Provide auxiliary steel to span structure where required. Provide in accord to Paragraph 3.06 below, except where details or weight restrictions dictate differently.
 - Secure upper attachment from the top of steel joists, and the top or Ι. bottom of steel beams.
 - Do not use perforated hangers strap. J.
- 3.05 SLEEVES, SEALS, FIRESTOPPING & ESCUTCHEONS
 - Α. Provide firestopping at all new penetrations between floors except as noted.

- See Architectural Drawings for the location of walls with a fire в. resistance rating of one hour or greater or which extend continuously to the roof deck, or which are designated as smoke barriers.
- Boiler room and storage room walls shall have new penetrations fire-C. stopped as noted below.
- Size sleeves large enough to allow for movement due to expansion and D. contraction.
- Locate wall sleeves exactly as desired. If trade installs its own sleeve Ε. after masonry work is complete, sleeve shall be mortared tight into wall. Openings installed in concrete floors and walls and masonry walls shall be cored drilled. Extend sleeves through floors one inch above finished floor level. Caulk sleeves.
- Where steel pipe penetrates walls with fire resistance rating of 1 hour or F. greater or which are designated as a smoke barrier use fire stopping caulk between pipe and sleeve.
- Exterior wall penetrations shall be sealed with colored silicone between G. pipe and sleeve. Pack interior of sleeve with fiberglass batt.
- Provide escutcheon on exposed interior penetrations. Secure escutcheons н. into place with bead of sealant under. Wipe away exposed sealant.
- The annular area around pipe which penetrate walls which extend I. continuously to the roof deck but which are un-rated shall be packed tightly with fiberglass batt, or shall be sealed tightly with caulking.
- J. Sleeves passing through upper levels shall terminate 1" above the floor.
- Provide sleeves around existing pipe which is built into new walls. Use Κ. 24 gauge galvanized steel round duct.
- 3.06 AUXILIARY STEEL AND EQUIPMENT SUPPORTS
 - Hanging Equipment and Materials: Α.
 - Shall be supported from tops of steel joists, from the top or upper 1. side of wood joists, from concrete decking, or from the bottom or top of steel beams.
 - Auxiliary steel shall be sized in accord to NFPA 13 requirements for 2. fire protection piping.
 - Equipment supports shall be as shown on drawings, and specified. в.
 - C. Paint supports for equipment and pipe gray.
 - Remove rust, scale and protective coatings before painting. Paint with D. one coat of primer and two top coats. Apply per manufacturer's instructions.

SECTION 210553 - IDENTIFICATION FOR FIRE SUPRESSION PIPE AND EQUIPMENT

- PART 1 GENERAL
- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Contractor Provide:
 - a. Pipe labels.
 - b. Valve tags.
 - c. Equipment labels.
- 1.02 RELATED WORK
 - A. Specified Elsewhere.
 1. 211100 Fire Protection Piping.
 2. 211313 Wet Pipe Sprinkler Systems.
- 1.03 REFERENCES
 - A. ANSI B13.1 Scheme for the Identification of Piping Systems.
- 1.04 SUBMITTALS
 - A. Submit under provisions of Section 013300.
 - B. Submit list of wording, symbols, letter size, and color coding for identification.
 - C. Product Data: Provide manufacturers catalog literature for each product required.
 - D. Manufacturer's Installation Instructions: Indicate special procedures, and installation.
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 NAMEPLATES
 - A. Description: Laminated three-layer plastic with engraved black letters on light contrasting background color. Lettering shall be 1/4" tall. Placard size shall accommodate message without abbreviation. Placard shall be rectangular. Multiple lines shall be utilized to minimize length to height ratio.
- 2.03 PIPE LABELS
 - A. Shall have flexible PVC or vinyl backer at either snaps over pipe or is strap-on with draw ties, or glues to itself.

- B. Background shall be yellow.
- C. Letters shall be nominally 1/2" for pipe up to 1"; 3/4" for outside diameters up to 2-3/8" and 1-1/4" tall for larger pipe.
- Acceptable Manufacturers: D.

 - Brady Bradysnap/strap-on.
 EMED Kwik Coil/wrap-around.
 - 3. Seton Setmark/markers-on-a-roll.
- 2.04 VALVE LABELS
 - Shall be constructed of nameplates scheduled above. Include description of zone Α. served. I.E., "Gymnasium Sprinkler".
- PART 3 EXECUTION
- 3.01 PREPARATION
 - A. Painted, paper or rubber surfaces shall be wiped clean.
- 3.02 INSTALLATION
 - Install plastic nameplates with corrosive-resistant mechanical fasteners. Α.
 - B. Identify zone valves with plastic nameplates. Use names specified.
 - С. Identify main piping, concealed or exposed, wrap around pipe labels. Use names which match those already in use by Owner. If existing pipe is not labeled match those shown on Drawings. Install in clear view and align with axis of piping. Locate identification on each side of wall penetrations and near each equipment take off. Locate on minimum of 50'-0" centers on straight runs without branches and take-offs.

SECTION 211100 - FIRE PROTECTION PIPING

PART 1 - GENERAL

- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Contractor Provide:
 - a. Pipe, fittings, valves, and connections for sprinkler systems.
 - c. Revisions to existing sprinkler systems.
 - d. Fire watch in Contractor's sections of partially occupied space.
 - B. Alternate Bids:
 - 1. Alternate Bid 1: Contractor provide pipe required for installation of sprinklers in rooms 119, 118, 117, 113, and 112.
 - 2. Alternate Bid 2: Contractor provide pipe required for installation of sprinklers in existing Gym.
- 1.02 RELATED WORK
 - A. Specified Elsewhere:
 - A. 210553 Identification for Fire Suppression Pipe and Equipment.
 - B. 210529 Supports and Anchors for Fire Suppression.
 - C. 211313 Wet Pipe Sprinkler Systems.
 - B. By Owner:
 - 1. Owner will maintain a "fire watch" in spaces where sprinkler systems are removed from service and the space is partially occupied by the Owner.
- 1.03 QUALITY ASSURANCE
 - A. Installers shall have full knowledge of manufacturer's installation instructions.
 - B. Listed pipe and valves shall be visibly marked with name of listing Agency.
- 1.04 REGULATORY REQUIREMENTS
 - A. ANSI/ASME B16.1 Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800.
 - B. ANSI/ASME B16.3 Malleable Iron Threaded Fittings, Class 150 and 300.
 - C. ANSI/ASME B16.5 Pipe Flanges and Flanged Fittings.
 - D. ANSI/ASME B36.10 Welded and Seamless Wrought Steel Pipe.
 - E. ANSI/ASTM A135 Electric-Resistance-Welded Steel Pipe.
 - F. ANSI/AWWA C110 Ductile Iron and Gray Iron Fittings.
 - G. ASTM A53 Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless.
 - H. ASTM A120 Pipe, Steel, Black and Hot-Dipped, Zinc-coated (Galvanized) Welded and Seamless, for Ordinary Uses.

- I. ASTM A234 Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.
- J. ASTM A795 Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
- K. NFPA 13 Installation of Sprinkler Systems.
- 1.05 SUBMITTALS
 - A. Product data shall include manufacturers name and type of pipe and joint compound and tape.
 - B. Provide Material Safety Data Sheets for all joint compounds and lubricants.
- 1.06 QUALITY ASSURANCE
 - A. Valves: Bear UL and FM label or marking. Provide manufacturer's name and pressure rating marked on valve body.
 - B. Piping shall be marked with UL and FM, labeling pressure rating, size and material number.
- 1.07 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver and store valves in shipping containers, with labeling in place.
 - B. Provide temporary protective coating on cast iron and steel valves.
 - C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- 1.08 DESCRIPTION
 - A. Definitions: 1. FM = FM Global = Factory Mutual Insurance.
 - B. Existing Piping:
 - 1. Pipe 2" and larger is Hickman Schedule 10 with UL/FM grooved fittings and couplings.
 - 2. Pipe 1-1/2" and smaller is Hickman Schedule 40 with 300# ductile iron threaded fittings.
 - 3. The existing use of Schedule 10 pipe is not a reason to use Schedule 10 pipe for new pipe.
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 SPRINKLER AND STANDPIPE PIPING, ABOVE GROUND

- A. Steel Pipe: Sizes 2-1/2" and larger shall be U.L. listed FM approved Schedule 40 meeting ASTM 135. ASTM A53; ASTM A120; ASTM A795; Pipe 1" to 2" in size shall be Schedule 40 black complying with ASTM A53 and ASTM A120.
 - 1. Malleable Iron Fittings: ANSI/ASME B16.3, screwed type.
 - Mechanical Grooved Couplings: Shall be UL and FM listed for sprinkler systems. Malleable iron housing clamps to engage and lock. Elastomeric EPDM sealing gasket, steel bolts, nuts, and washers.
 - Acceptable Products grooved fittings.
 a. Victaulic Firelock.
 - b. Anvil International Gruvlok.
 - c. Smith-Cooper International.
 - d. Star Pipe Products.
 - e. Bull Moose Tube Co.
- 2.03 BALL VALVES
 - A. Up to and including 2" one piece body, chrome plated brass ball, teflon or nylon seats and stuffing box ring, lever handle, threaded ends. Unit shall be UL listed and FM approved.
 - B. Manufacturers:

1.	Potter-Roemer	Model 4400 Series.
2.	Victaulic	Model 722 Series.
3.	Nibco	Model KT-580 - 70 Series.
4.	Stockham	Forged Brass 600 Series Ball
5.	Milwaukee	Equivalent.
б.	Apollo	Equivalent.

PART 3 - EXECUTION

3.01 SEQUENCING/SCHEDULING

- A. Shutdown of Existing Sprinkler Systems
 - 1. Shall be minimized in duration.
 - 2. Determine schedule for shutting down systems. Request permission from Owner a minimum of one week in advance.
 - 3. In case sprinkler system can be put back into operation notify Owner immediately.
- B. Work with other contractor's to minimum time when sprinkler system is shut down. Obtain work schedules from ventilating, heating, plumbing and general contractors. Remain in contact with these contractors.
- 3.02 REMOVAL OF EXISTING CONSTRUCTION
 - A. Determine which materials should be removed, re-used and maintained. Clearly mark these items before removal begins.
 - B. Remove and dispose of designated branch main fittings and pipe.
- 3.03 PREPARATION
 - A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
 - B. Remove scale and foreign material, from inside and outside, before assembly.
- 3.04 INSTALLATION

- A. Install piping in accordance with NFPA 13 for sprinkler systems.
- B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- C. Install piping to conserve building utility space, and not interfere with use of space and other work.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- F. Slope piping and arrange systems to drain at low points.
- G. Do not penetrate building structural members unless indicated.
- H. Provide sleeves when penetrating fire rated walls. Seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required. Refer to Section 210529.
- I. Die cut screw joints with full cut standard taper pipe threads with nontoxic joint compound applied to male threads only.
- J. Install valves with stems upright or horizontal, not inverted. Remove protective coatings after installation.
- K. Provide ball valves for drain down and test service.
- L. Use Schedule 40 steel pipe and threaded fittings for pipe 2" and smaller. Use Schedule 40 steel pipe and grooved fittings for piping 2-1/2" and larger.
- M. Position drain valves in accessible locations.
- N. Provide test connection as required by FM and NFPA 13.
- O. Display coupons (pipe cut outs) made for grooved tees and branch connections by suspending them with wire from main pipe adjacent to the fittings.

SECTION 211313 - WET PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

- 1.01 WORK INCLUDES
 - A. Base Bid
 - 1. Contractor Provide:
 - a. Wet pipe sprinkler system in Gym 100.
 - b. Modifications to portions of existing wet pipe sprinkler system.
 - c. Main pipe on West and North sides of existing wet pipe sprinkler system.
 - d. Main pipe on West and North sides of existing gymnasium with zone valves for future gym connection.
 - e. Replacement of siamese connection with new "Storz" connection.
 - B. Alternate Bids:
 - 1. Alternate Bid 1 Contractor provide portion of wet pipe sprinkler system serving rooms 119, 118, 117, 114, 113, and 112.
 - 2. Alternate Bid 2 Contractor provide portion of wet pipe sprinkler system serving existing gymnasium.
- 1.02 RELATED WORK
 - A. Specified Elsewhere: 1. 211100 - Fire Protection Piping.

1.03 REFERENCES

- A. NFPA 13 Installation of Sprinkler Systems.
- 1.04 SYSTEM DESCRIPTION
 - A. System to provide coverage for building areas shown on Drawings.
 - B. Provide system to NFPA 13 light hazard for all areas but rooms designed as storage which shall be NSPA 13 Ordinary Hazard Occupancy.
 - C. Piping shall be sized in accordance with hydraulic calculations and routed essentially as shown on Drawings. Volumetric and pressure data are noted on site plan shown on sheet FP-100.
 - D. Interface system with building fire and smoke alarm system.
 - E. Fire department connections, drains and test stations shall be as shown.
- 1.05 SUBMITTALS
 - A. Submit under provisions of Section 013300. Provide submittals for A/E, Owner (Park District Risk Management Agency), and KFPS (Kodiak Fire Protection) (PDRMA's review).
 - B. Shop Drawings: Indicate hydraulic calculations, detailed pipe layout, hangers and supports, components and accessories. Indicate system controls. Show head locations. Drawing plans shall be at a scale of 1/8"/ft or larger. Sections shall be at a scale or 1/4"/ft. Provide drawing plans and sections per NFPA 13. If layout is changed from contract drawings, provide certification from the other trades that coordination items have been considered and new locations are acceptable to all parties. Drawings shall be signed and dated by designer. PDF files of plans will be made available upon request. AutoCAD files will be

made available for free to the successful bidders' fire sprinkler subcontractor upon receipt of a signed waiver of responsibility.

- C. Product Data: Provide data on sprinkler heads including required Sprinkler Identification Number (SIN), valves, and specialties, including manufacturers catalogue information. Submit performance ratings rough-in details, weights, support requirements, and piping connections.
- D. Installer's Certificate: Certify that system has been tested and meets or exceeds specified requirements and code requirements. Provide for each test specified.
- E. Submit Designers NICET Certification Number.

1.06 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 017839.
- B. Record actual locations of sprinkler heads and deviations of piping from drawings. Indicate drain and test locations.
- C. Submit two copies each of Record Drawings and Test Certificates to the Owner's Representative. Submit an PDF file copy.
- 1.07 OPERATION AND MAINTENANCE DATA
 - A. Submit under provisions of Section 017823.
 - B. Maintenance Data: Include components of system, servicing requirements, Record Drawings, inspection data, telephone number of service contractor.
 - C. Provide a copy of NFPA 25 with inspection maintenance and testing requirements for the installed system highlighted and page marked.
- 1.08 QUALITY ASSURANCE
 - A. Perform Work in accordance with NFPA 13 and PDRMA requirements.
 - B. Equipment and Components: Bear UL label or marking.
- 1.09 QUALIFICATIONS
 - A. Sprinkler system designer shall have Level 3 certificate from National Institute for Certification of Engineering Technologies (NICET).
- 1.10 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver, store, protect, and protect products to site under provisions of Section 016000.
 - B. Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.
- 1.11 EXTRA MATERIALS.
 - A. Provide extra sprinkler heads under provisions of NFPA 13.
 - B. Provide suitable wrenches for each head type.
 - C. Provide metal storage cabinet in location designated.

PART 2 - PRODUCTS

2.01 MANUFACTURER & PERFORMANCE

A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.

2.02 SPRINKLER HEADS

- A. Unless otherwise specified or noted heads shall be frangible glass bulb quick response standard coverage type. All shall be listed by Underwriters Laboratories and approved by Factory Mutual Insurance for their designated use. All shall be rated for 175 psi maximum working pressure. All sprinklers used for this work shall be of the same manufacturer.
- B. Concealed Type: (For areas with ceilings)
 - 1. Shall be two piece design with a removable cover plate assembly and a matching support and drop down deflector. Construction shall be of brass, bronze and/or chrome plated steel.
 - 2. Cover plate shall have a minimum of 1/2" of adjustment. Cover plate shall drop away at temperatures of 135 degrees F for all spaces except where head is adjacent to a diffuser or within a skylight. Cover plate shall drop away at temperatures of 165 degrees F when next to a diffuser or within a skylight.
 - Sprinkler bulb shall shatter at temperatures of 155 degrees F for spaces not adjacent to diffusers and 200 degrees F for spaces adjacent to diffusers.
 - Discharge coefficient shall be 5.6. Connection shall be 1/2" or 3/4" or 1" NPT.
 - 5. Color of plate shall be white painted.
- C. Exposed Heads:
 - 1. Shall be usable with light or ordinary hazard occupancy.
 - 2. Shall have rough bronze finish in unfinished rooms and white or black painted finish in finished spaces.
 - 3. Shall have wire cage in Gymnasiums.
 - 4. Shall have 5.6 discharge coefficient with 1/2" NPT connection.
 - 5. Shall have upright or pendent style deflector.
 - Shall discharge at 155 degrees F temperatures except where placed near registers or diffusers within where discharge shall be 200 degrees F.
- D. Side Wall Heads:
 - 1. Shall have recessed escutcheon and horizontal deflector.
 - 2. Shall be white painted.
 - 3. Shall have discharge coefficient of 5.6.
 - 4. Shall discharge at 155 degrees F temperatures.
- F. Acceptable Products:

		Concealed	Exposed	Side Wall
1.	Reliable	G4A	F1FR	F1FR56 DH 80 Series
2.	Тусо	RF-II	TY-FRB	TY-FRB
3.	Viking	VK-404	VK-302/300	VK-306

2.03 PIPING SPECIALTIES

- A. Check Valve: Shall be ductile iron on cast iron with grooved connections, swing type check flapper with ground seat.
- B. Fire Department Connection: Shall be 5" Stortz connection with 4" NPT connection and hard aluminum cap and chain. Finish shall be rough chrome plated. Escutcheon shall be labeled in accord to drawings. Unit shall be UL and FM listed.
- C. Automatic Drain: Shall be orifice or ball type with union connection, 1/2" connection size, straight or angle construction.
- D. Pressure Gauge: Shall be polished brass 3-1/2" diameter bourdon tube type with 30-3000 psi range and 1/4" NPT connection. Provide with stopcock and drain. Unit shall be UL and FM listed.
- E. Acceptable Products

		<u>System</u> Sensor	Potter	Victaulic	Croker
1.	Check Valve				
2.	Automatic Drain			779 Series	
3.	Storz		5795 Series		

PART 3 - EXECUTION

3.01 PREPARATION

A. Coordinate work of this Section with other affected work.

3.02 APPLICATION

- A. Sprinkler Head Use:
 - 1. Use concealed type heads where ever lay-in or plaster ceilings are provided.
 - 2. Use exposed heads with in spaces without ceilings.
 - 3. Use brass exposed upright head in store rooms and equipment rooms. Provide cage around head where head in Gymnasium space.
 - 4. Use painted upright heads in where structure is exposed in finish spaces. Furnish pre-painted color as selected by the Architect/Owner. Use black for blacked out ceilings and white where ceilings are painted white.

3.03 INSTALLATION

- A. Install devices in accord with manufacturers instructions and NFPA 13.
- B. Locate fire department connection in place of existing fire department connection.
- C. Install sprinkler heads in areas with ceilings after painting is complete and ceilings are installed. Sprinkler heads shall be centered on 24 x 24 module of tile unless noted otherwise. Do not place center on 48" dimension. See plan for head locations escutcheons shall fully cover opening in ceiling.
- D. If heads are installed prior to painting, apply masking tape or paper cover to ensure sprinkler heads do not receive field paint finish. Remove after area painting is complete.
- E. Flush entire piping system of foreign matter.

- F. Hydrostatically test entire system to 200 psig for two hours, witnessed by Architect/Engineer.
- G. Flow test system to note response time of fire alarm system; test to be witnessed by Architect/Engineer.
- H. Provide sprinkler head rack and wrench for each type of sprinklers installed on project.
- I. All head runout connections shall be made from the top of the main or branch main. Provide return for pendent heads.

SECTION 220529 - SUPPORTS AND ANCHORS FOR PLUMBING

- PART 1 GENERAL
- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Plumbing Contractor Provide:
 - a. Supports for plumbing pipe and equipment.
 - b. Sleeves, seals and firestopping for plumbing piping.
 - c. Escutcheons on plumbing piping.
 - d. Penetrations required in existing walls and floors.
 - e. Removal of existing unused hangers and supports.
- 1.02 RELATED WORK
 - A. Specified Elsewhere:
 - 1. 220700 Plumbing Insulation.
 - 2. 221100 Domestic Water Piping.
 - 3. 221119 Domestic Water Piping Specialties.
 - 4. 221300 Sanitary Piping.
 - 5. 221319 Sanitary Waste Pipe Specialties.
 - 6. 223300 Water Heaters.
 - 7. 224000 Plumbing Fixtures.
- 1.03 SYSTEM DESCRIPTION
 - A. Definitions:
 - 1. Plumbing piping includes domestic hot, cold and hot water return piping, non-potable, water piping, and waste and vent piping.
 - Description: 1. drainage, sanitary, waste and vent pipe, and cold water, hot water and hot water return pipe are revised in this work.
- 1.04 REFERENCES

B

- A. AISC American Institute of Steel Construction.
- B. ASME B31.9 Building Services Piping
- C. ASTM F708 Design and Installation of Rigid Pipe Hangers.
- D. ASTM E814 Fire Stop Sealant.
- 1.05 SUBMITTALS
 - A. Submit under provisions of Section 013300.
 - B. Product Data: Provide manufacturers catalog data including load capacity and firestopping capability. Submit installation techniques to be used for intumescent putty sealants. Submit pipe supports not listed in this specification.
- 1.06 REGULATORY REQUIREMENTS
 - A. Conform to Illinois Plumbing Code for support of plumbing piping.
- 1.07 COORDINATION
 - A. Sleeves:1. Coordinate placement with masonry and concrete trades.

- 2. Sleeves installed after wall and floor construction are acceptable per this specification.
- B. Insulation:
 - 1. It is not acceptable for piping with cold surfaces not to be insulated through hangers. Provide hangers specified for insulation to be large enough to pass insulation through or to have built in layers of insulating material that can be sealed to.
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 PIPE HANGERS AND SUPPORTS
 - A. Acceptable Manufacturers.
 - 1. B-Line.
 - 2. Grip Strut.
 - 3. Fee and Mason.
 - 4. Grinnel.
 - 5. Unistrut.
 - B. Hanger Description:
 - Clamps for attachment to bar joists and beams shall be C-clamps with retaining straps or steel or malleable iron adjustable beam clamps equal to B-Line Figure B-3036 with B-3360 services strap and Figure B-3040.
 - 2. Strut supports shall be primed 14 or 12 gauge rolled carbon steel with galvanized die-formed accessory clamps and fasteners.
 - 3. "J-Hooks" for 2" pipe and smaller shall be 1/4" thick by 1-1/4" wide steel rated for 200 lbs each.
 - 4. Hold down straps shall be die-stamped of galvanized sheet steel or formed of galvanized malleable iron.
 - C. Plumbing Piping:
 - 1. Conform to ASME B31.9 ASTM F708 and Illinois Plumbing Code.
 - Hangers for Pipe Sizes 1-1/2" and Over: Carbon steel, adjustable, clevis.
 - 3. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods and neoprene inserts.
 - 4. Vertical Support: Steel riser clamp or steel strut with accessory clips and neoprene inserts.
 - 5. Rough-in Supports: Pressure treated lumber at least 3/4" thick x 3-1/2" wide or 1-1/2" x 1-1/2" without flaws.
 - 6. Floor Hold Downs: Hold down straps as specified.
 - Hangers for Pipe Sizes 1/2" to 1-1/2", Carbon steel, adjustable swivel.
 - 8. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
 - 9. Preformed straps shall be copper sheet or molded heat resistant PVC or nylon in a semicircular shape for an individual pipe with mounting ears. Install with black drywall screws.
 - 10. Wall Supports for Horizontal Pipe: "J-Hooks" or struts, see drawing.
 - 11. Neoprene inserts for insulated pipe shall be full depth of insulation specified.

2.03 ACCESSORIES

- A. Hanger Rods: Mild steel continuous threaded.
- B. Auxiliary Steel and Trapeze Hangers.
 - 1. Shall be Schedule 40 steel pipe or rolled steel shapes complying with AISC manual.
 - 2. Manufactured struts shall be rolled of 12, 14, or 16 gauge material to meet loading required or as noted on Drawings or otherwise specified. It shall have a hot dipped galvanized or epoxy coating or shall be prime painted.
- C. Acceptable Products.
 - 1. B-Line.
 - 2. Uni-strut.
 - 3. Grip Strut.
- 2.04 ANCHORS
 - A. Masonry or concrete type for pipe or equipment supports. Shall be wedge type with either studs or National coarse female thread. Alternative type shall be self drilling expansion type. Anchors shall be U. L. listed.
 - B. Masonry or concrete type for securing escutcheons to masonry shall be "nail-in" type. Unit shall consist of broad head on hollow zinc alloy core with steel drive pin. Provide with dielectric washer.
- 2.05 SLEEVES
 - A. Sleeves for Pipes Through Walls Rated at less than one hour. Schedule 40 PVC or 22 gauge galvanized sheet steel.
 - B. Sleeves for Pipes Through Walls Rated at one hour or greater or all masonry walls. Schedule 40 or standard weight galvanized steel pipe.
 - C. Sleeves for pipes through exterior masonry walls. Schedule 40 solid PVC.

2.06 SEALANTS

- A. Fire Stopping Shall comply with UL1479 and ASTM E0814. Shall have an installed F rating of two hours.
- B. Fire stopping for metal pipe and conduit shall be tube or trowel applicable and shall remain pliable. Material shall be waterproof or paintable with latex paint.
- C. Fire stopping for plastic pipe and insulated pipe shall be intumescent type. It shall be capable of expansion of ten times its original volume when contacted with fire temperatures.
- D. Exterior moisture sealant Shall be non-hardening silicone type rated for temperatures of -40 degrees F to 250 degrees F. Material shall be available in white, gray, brown, and black colors. Material shall be sunlight resistant.
- E. Interior sealant shall be silicone type rated for temperatures of 0 degrees F to 250 degrees F. Material shall be available in white, clear, gray, brown or black.
- F. Manufacturer

Fire Stop Fire Stop Exterior Interior

		(Metal)	Plastic	Sealant	Sealant
1.	Tremco	Fyre-shield	Tremstop	Spectrum 2	Spectrum 1
2.	3M	Fire Dam	MPS-	2000	FS-195
			Series	150	FS-195
3.	General Electric			SCS1000	SCS1000
4.	Dow Corning			999A	999A
5.	Hilti	FS601	FS611/635		
б.	Nelson	CLK	CMP		
7.	Pecora			864	AC-20
8.	Rectorseal	Metacaulk 950	Metacaulk 880		

2.07 ESCUTCHEONS

- A. For piping Shall be chrome finished split faced plastic.
- B. For multiple pipes or where holes are over large or offset.
 - 1. Utilize pre-painted aluminum sheet fabricated to cover entire hole and seal within 1/4" of the pipe or pipe covering.
 - 2. Holes shall be hole sawed or punched. Holes shall be round.

PART 3 - EXECUTION

3.01 APPLICATION

- A. Plumbing Pipe:
 - 1. Shall be supported in accord to the Illinois Plumbing Code and this specification.
 - 2. Plastic pipe 2" and less shall be supported on 5'-0" centers.
 - 3. Copper tube 1" and smaller shall be supported independent of fixtures and at a maximum of 5'-0" centers. Larger copper tube shall be supported at maximum of 10'-0" centers.
 - 4. Hot and cold water pipes shall be supported with clevis type hangers or on trapeze hangers. Provide insulation shields where pipe is insulated.
 - 5. Where cold water pipe passes through strut clamps. Provide neoprene inserts or oversized pipe sleeves that pass insulation continuously.
- B. Hanger Rod:
 - 1. Hanger rod size shall be: 3/8" for pipe up to 2" in size and loads up to 360 lbs; 1/2" for pipe 2-1/2" to 3" and loads up to 600 lbs.

3.02 PREPARATION

- A. Coordination of Trades/Owner:
 - 1. Locate sleeves in conjunction with concrete and masonry trades. Determine exact elevation and lateral position.
 - 2. At contractor's option core drill openings.
 - 3. Do not do noisy work while occupants are present.
- 3.03 ANCHORS
 - A. Use anchors in concrete or masonry walls and floors.
 - B. Drill hole clean of loose material. Install anchor, flush with surface. Size hole in accord to manufacturers' recommendation. Physically test anchor by pulling against it. Loose anchors will not be accepted.
- 3.04 PIPE HANGERS AND SUPPORTS
 - A. Utilize hangers in accord to Application paragraphs.
- B. Install hangers to provide minimum 1/2" space between finished covering and adjacent work.
- C. Place hangers within 12" of each horizontal elbow.
- D. Use hangers with 1-1/2" minimum vertical adjustment.
- E. Support vertical piping such that it cannot be deflected more than 1/8" from center by hand pressure.
- F. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- G. Support riser piping independently of connected horizontal piping.
- H. Provide copper plated hangers and supports for copper piping. Provide hard neoprene inserts secured with strut. Insert shall completely cover pipe and match insulation thickness as closely as manufactured standards allow.
- I. Locate hangers for pipe movement without disengagement of supported pipe.
- J. Provide "rough-in" supports in chases. Support pipe from studding. Use wood blocking. Pipes shall be fastened to the wood blocking by copper or nylon straps specified. Use of drop ear elbows and tees is also acceptable.
- K. Provide auxiliary steel to span structure where required. Provide in accord to Paragraph 3.06 below.
- L. Secure upper attachment from the top of steel joists, and the top or bottom of steel beams.
- M. Do not use perforated hangers strap.
- 3.05 SLEEVES, SEALS, FIRESTOPPING & ESCUTCHEONS
 - A. Provide firestopping at all new penetrations between floors.
 - B. See Architectural Drawings for the location of walls and floors with a fire resistance rating of one hour or greater or which extend continuously to the roof deck, or which are designated as smoke barriers.
 - C. Furnace room, boiler room and storage room walls shall have penetration firestopped as noted below.
 - D. Size sleeves or core drill openings large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
 - E. Place sleeves in forms at location desired. Locate wall sleeves exactly as desired. If trade installs its own sleeve after masonry work is complete, sleeve shall be mortared tight into wall. Openings installed in existing concrete floors and walls shall be core drilled. Extend sleeves through floors one inch above finished floor level. Caulk sleeves.
 - F. Where plastic pipe penetrates walls with fire resistance rating of 1 hour or greater or which are designated as a smoke barrier pack annulus with intumscent putty. Size sleeve in accord to intumescent putty manufacturer.

- G. Where steel or copper pipe penetrates walls with fire resistance rating of 1 hour or greater or which are designated as a smoke barrier use fire stopping caulk between pipe and sleeve.
- H. Exterior wall penetrations shall be sealed with colored silicone between pipe and sleeve. Pack interior of sleeve with fiberglass batt.
- I. Provide escutcheon on exposed interior penetrations. Secure escutcheons into place with bead of sealant under. Wipe away exposed sealant.
- J. The annular area around pipe which penetrate walls which extend continuously to the roof deck but which are un-rated shall be packed tightly with fiberglass batt, or shall be sealed tightly with caulking.
- L. Sleeves passing through slab on grade construction shall be terminated at finish floor level. Sleeves passing through existing upper level floors shall terminate 2" above floor level. Mortar and seal into core drilled openings.
- M. Provide sleeves around existing pipe which is built into new walls. Use 24 gauge galvanized steel round duct.
- 3.06 AUXILIARY STEEL AND EQUIPMENT SUPPORTS
 - A. Hanging Equipment and Materials:
 - 1. Shall be supported from tops of steel joists, from the top or upper side of wood joists, from concrete decking, or from the bottom or top of steel beams.
 - 2. Auxiliary steel shall be manufactured strut, rolled steel shapes or schedule 40 steel piping. Strut shall be sized in accord to the manufacturer's literature unless shown otherwise on Drawings. Rolled shapes or pipe supports shall be in accord to the following chart.

PIPE	LOAD	30″	60″	90″	120″
SIZE	POUNDS	SPAN	SPAN	SPAN	SPAN
< 3″	<u><</u> 474	1″	1-1/2″	2-1/2″	3″
		1"x1"x1/4"	1-1/2″x1-	2"x2"x1/4"	3″x3″x1/4″
			1/2″x1/4″		
4″	586	1-1/4"	1-1/2″	2-1/2″	3″
		1-1/2″x1-	2"x2"x1/4"	3″x3″x1/4″	3″x3″x5/16″
		1/2″x1/4″			
б″	921	1-1/4"	2″	2-1/2″	4 "
		1-1/2″x1-	2"x2"x1/4"	3″x3″x1/4″	4"x4"x1/4"
		1/2″x1/4″			

3. Auxiliary Steel Chart (Pipe Diameter and Angle Size)

B. Equipment supports shall be as shown on drawings, and specified.

SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPE AND EQUIPMENT

- PART 1 GENERAL
- 1.01 WORK INCLUDES
 - A. Base Bid: 1. Contractor Provide: a. Pipe stencils and/or labels. b. Valve tags.
- 1.02 RELATED WORK
 - A. Specified Elsewhere.
 1. 220700 Plumbing Insulation.
 2. 221100 Domestic Water Piping.
 3. 221300 Sanitary Piping.
- 1.03 REFERENCES
 - A. ANSI B13.1 Scheme for the Identification of Piping Systems.
- 1.04 SUBMITTALS
 - A. Submit under provisions of Section 013300.
 - B. Submit list of wording, symbols, letter size, and color coding for mechanical identification.
 - C. Product Data: Provide manufacturers catalog literature for each product required.
 - D. Manufacturer's Installation Instructions: Indicate special procedures, and installation.
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 STENCILS
 - A. Stencils: With clean cut symbols and letters of following size:
 - 3/4" to 2" Outside Diameter of Insulation or Pipe: 8" long color field, 1/2" high letters.
 - 2-1/2" to 6" Outside Diameter of Insulation or Pipe: 12" long color field, 1-1/4" high letters.
 - B. Stencil Paint: (Shall be latex enamel colors conforming to application noted below.)

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- 2.04 PIPE LABELS
 - A. Shall have flexible PVC or vinyl backer at either snaps over pipe or is strap-on with draw ties, or glues to itself.
 - B. Background shall be yellow.
 - с. Letters shall be nominally 1/2" for pipe up to 1"; 3/4" for outside diameters up to 2-3/8" and 1-1/4" tall for larger pipe.
 - Acceptable Manufacturers: D.

 - Brady Bradysnap/strap-on.
 EMED Kwik Coil/wrap-around.
 - 3. Seton Setmark/markers-on-a-roll.
- 2.05 VALVE LABELS
 - Shall be white nylon, metal, or vinyl "write-on" type with draw band attachment Α. in 2" x 3" to 3" x 5" size.
 - Label shall identify space valve serves. I.E., "Multi-Purpose Room Β. Sinks"; "Water Cooler and Sink CW". Lettering shall be typed or neatly lettered manually with an indelible black pen. Numbered tags and framed schedule are absolutely not wanted and will not be accepted as a substitute for specified tags.
 - Acceptable Products: C.
 - 1. Emedco Jumbo Tag Seal
 - Brady 65000 Series
 Seton Write on Tag
- PART 3 EXECUTION
- 3.01 PREPARATION
 - Sand or steel wool ferrous pipe smooth removing factory applied lacquer Α. coatings. Wipe free of dust.
 - Painted, paper or rubber surfaces shall be wiped clean. Use solvent as Α. recommended by insulation manufacturer where it applies.

3.02 INSTALLATION

- A. Identify valves in equipment rooms which are remote from the spaces and devices they control. Use names as determined by the Owner or as otherwise specified. DO NOT SUPPLY A VALVE SCHEDULE.
- D. Identify piping, concealed or exposed, with pipe labels. Use names which match those already in use by Owner. If existing pipe is not labeled match those shown on Drawings. Install in clear view and align with axis of piping. Locate identification on each side of wall penetrations and near each equipment take off. Locate on minimum of 50'-0'' centers on straight runs without branches and take-offs.

SECTION 220700 - PLUMBING INSULATION

- PART 1 GENERAL
- 1.01 WORK INCLUDES
 - A. Base Bid: 1. Contractor Provide: a. Insulation of domestic water piping.
- 1.02 RELATED WORK
 - A. Specified Elsewhere:
 - 1. 225290 Supports and Anchors for Plumbing.
 - 2. 220553 Identification for Plumbing Piping and Equipment
 - 3. 221100 Domestic Water Piping.

1.03 SYSTEM DESCRIPTION

- A. Definitions:
 - 1. Domestic water piping includes hot, soft cold, cold, return, high temperature, and chilled potable water piping.
- B. Description:
 - 1. Existing cold and hot water piping is being nominally revised to accommodate building demolition, the relocation of water softeners, the elimination of showers, and the provision of hydrants and water cooler.
- 1.04 QUALITY ASSURANCE
 - A. Material shall have UL listings stamped on material or packing containers.
 - B. Inspect finished insulation to assure specified tolerance is met. A/E will verify. If A/E notes tolerances are exceeded, entire system shall be re-inspected and corrections made.
- 1.05 REGULATORY REQUIREMENTS
 - A. ASTM C177 Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
 - B. ASTM C534 Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
 - C. ASTM C547 Standard Specification for Mineral Fiber Preformed Pipe Insulation.
 - D. ASTM D1667 Flexible Cellular Materials Vinyl Chloride Polymers and Copolymers (Closed Cell Foam).
 - E. ASTM E84 Surface Burning Characteristics of Building Materials.
 - F. ASTM E96 Water Vapor Transmission of Materials.
 - G. ASHRAE 90-1-2012 Energy Efficient Design of New Buildings Except Low Rise Residential Buildings.
 - H. International Energy Conservation Code 2015.
- 1.06 SUBMITTALS
 - A. Submit under provisions of Section 013300.

- B. Product Data: Provide product description, list of materials and thickness for each service, and locations. Show compliance with all specified standards. Show K-Value, maximum temperature, permeability, surface burning characteristics, flame spread and smoke density. Provide MSDS sheets for adhesives and paints. Show material is asbestos free. Submit product data for covers and accessories.
- C. Manufacturer's Installation Instructions: Indicate procedures which ensure acceptable workmanship and installation standards will be achieved.
- D. Provide name of insulating contractor and value of insulation work on Contractor's Schedule of Values.
- 1.07 QUALIFICATIONS
 - A. Installer: Workman skilled in performing the work of this section.
- 1.08 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver materials to site in original factory packaging, labeled with manufacturer's identification, including product density fire ratings and thickness. Keep separated.
 - B. Store insulation in original wrapping and protect from weather and construction traffic.
 - C. Protect insulation against dirt, water, chemical, and mechanical damage.
- 1.09 ENVIRONMENTAL REQUIREMENTS
 - A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
 - B. Maintain temperature during and after installation for minimum period of 24 hours.
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 FIBERGLASS
 - A. Shall conform to ASTM C547 Type 1, at 100 degrees F. K-value shall be no more than .25 BTU/hr/in degrees F. Material shall be rated for temperatures up to 650 degrees F. Jacket or insulation shall not promote microbial growth per ASTM C 1338.
 - B. Vapor barrier shall be fiberglass reinforced foil faced scrim craft paper. Jacket permeance shall be limited to .02 perm, per ASTM E96 procedure A.
 - C. Flame spread shall be no more than 25. Smoke developed rating shall be no more than 50. These per ASTM E 84.

- Accessory fitting covers shall be .02" thick PVC with flame spread and D smoke developed ratings as noted above.
- Insulation shall be premolded to thickness listed in application table. Ε. Vapor barrier shall have pre-glued adhesive strips. If staples are required by the manufacturer, the system shall include a vapor barrier cover for the staples.
- F. Acceptable Products:

		Insulation	Covers
1.	Knauf	1000 degrees pipe insulation	
2.	Johns-Manville	Micro-Lok	
3.	Owen-Corning	SSL-II	
4.	Zeston		Losmoke Covers

2.03 CELLULAR FOAM

- Insulation: ASTM C534; flexible, cellular elastomeric, molded tube or Α. sheet:
 - 1. K Value: ASTM C177 .28 at 75 degrees F.
 - 2. Minimum Service Temperature: 40 degrees F.

 - Maximum Service Temperature: 220 degrees F.
 Maximum Moisture Absorption: ASTM D1056; 3.0 percent pipe by volume, 6.0 percent sheet by volume.
 - Moisture Vapor Transmission: ASTM E96; 0.20 perm inches. 5.
 - 6. Maximum Flame Spread: ASTM E84; 25.
 - 7. Maximum Smoke Developed: ASTM E84;50.
 - 8. Connection: Waterproof vapor barrier adhesive.
- Acceptable Products: Β.
 - 1. Armstrong AP Armaflex.
 - 2. Johns-Manville Rubatex.
 - 3. Hallstead Mitchell Insul-Tube.
- PART 3 EXECUTION
- 3.01 ENVIRONMENTAL CONDITIONS
 - Α. Work shall be done when temperatures are within the limits set by the manufacturer.
- 3.02 PREPARATION
 - Verify that piping has been tested before applying insulation materials. Α.
 - Verify that surfaces are clean, foreign material removed, and dry. в.
- 3.03 INSTALLATION
 - Install materials in accordance with manufacturer's instructions. Α.
 - On exposed piping, locate insulation and cover seams in least visible Β. locations.
 - Insulated cold pipes conveying fluids below ambient temperature: (cold С. water).
 - 1. Maintain vapor barrier, align insulation and seal without gaps.
 - Insulate fittings, joints, and valves with insulation of like 2. material and thickness as adjacent pipe. Miter angles.

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- 3. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations.
- 4. Insulate entire system including fittings, and valves.
- 5. Seal inserts at strut supports to adjacent insulation.
- D. For insulated pipes conveying fluids above ambient temperature: (Hot water and hot water return).
 - 1. Where pipe is exposed insulate in same manner as for cold water, except that valves and unions need not be covered.
 - 2. Within ceiling spaces and chases insulate main piping and branch piping. Valves, fittings, and unions need not be insulated.
- E. Provide galvanized shields at all pipe hangers.
- F. Finish insulation at supports, protrusions, and interruptions.
- G. All joints shall be made with adhesive. Raw edges shall not be exposed except for overlaps. Do not use duct or electricians tape on closed cell foam insulation.
- 3.04 APPLICATION

	PIPING SYSTEMS	INSULATION	PIPE SIZE	THICKNESS Inch
A.	Domestic hot water, and hot water return pipe.	Fiberglass	All Sizes	1″
В.	Domestic Cold Water Pipe and Soft Cold Water Pipe	Fiberglass	4" and less	1/2"
C.	Domestic Cold Water Unions and Valves.	Cellular Foam	Any Size	1/2″
D.	Elbows and Tees	Fiberglass Sections w/ PVC Covers	4" and less	-

3.05 FIELD QUALITY CONTROL

A. No gaps will be allowed in cold pipe insulation. No more than 1-12" x 1/16" gap per 100 feet of insulated hot pipe will be allowed.

SECTION 221100 - WATER PIPING

PART 1 - GENERAL

- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Contractor Provide:
 - a. Revisions to cold water and cold soft water mains.
 - b. Installation of existing water softener.
 - c. Revised branch domestic water piping and connections.
 - d. Removal of existing "dead end" pipe left.

1.02 DESCRIPTION

A. Definitions

- 1. Domestic Water Includes hot, cold and hot water return.
- 2. Plumbing Contractor = Plumbing Subcontractor or Plumbing Trade.
- 3. Domestic water mains is that piping used in corridors to convey water to points of use.
- 4. Domestic water branch pipe is that pipe used in rooms with fixtures.

1.03 RELATED WORK

- A. Specified Elsewhere:
 - 1. 220529 Supports and Anchors for Plumbing.
 - 2. 220553 Identification for Plumbing Piping and Equipment.
 - 3. 220700 Plumbing Insulation.
 - 4. 221110 Domestic Water Piping Specialties.
 - 5. 224000 Plumbing Fixtures.
 - 6. 223300 Water Heaters.

1.04 REFERENCES

- A. ASME B16.22 Wrought Copper and Bronze Solder-Joint Pressure Fittings
- B. ASME B16.51 Copper and Copper Alloy Press-Connect Pressure Fittings.
- C. ASME B16.18 Cast Copper Alloy Solder Joint Pressure Fittings.
- D. ASTM B32-92 Solder Metal.
- E. ASTM B88 Seamless Copper Water Tube.

1.05 SUBMITTALS

- A. Submit under provisions Section 013300.
- B. Product Data: Provide data on valves and piping accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
- C. Tests:
 1. Provide a witnessed pressure test of water piping.
- D. Schedule of Values:1. Provide a separate dollar value of all water piping work used on this job as part of the Schedule of Values.
- 1.06 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 017839.
- B. Record actual locations of valves. Record changes to main pipe locations. Locate in relation to walls and surfaces which extend beyond concealing surfaces. Record locations of valves concealed above ceilings on the reflected ceiling plan or light fixture plan.
- C. Obtain A/E review of record documents before or at each pay progress meeting.
- 1.07 QUALITY ASSURANCE
 - A. Valves: Manufacturer's name and pressure rating marked on valve body.
- 1.08 REGULATORY REQUIREMENTS
 - A. Perform Work in accordance with State of Illinois Plumbing Code.
- 1.09 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver, store, protect and handle products to site under provisions of Section 016000.
 - B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
 - C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
 - D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 WATER PIPING, ABOVE GRADE
 - A. Copper Tubing: ASTM B88, Type L, hard drawn.
 - 1. Fittings: ASME B16.18, cast bronze, or ASME B16.22, wrought copper and bronze.
 - 2. Joints: ASTM B32-92, solder, lead-free and antimony-free.
 - 3. Acceptable Products: <u>Solder</u> a. Taracorp b. Oatey
 Silver.
 - 4. At Contractor's option fittings shall be wrought copper press connected type with EPDM "O"-Ring type gaskets. Fittings shall have indicators that verify connections have been made. Fittings shall be rated for operating pressures of 200 psi and temperature ranges of -

20 degrees F to 250 degrees F. Fittings shall comply with ASME B16.51.

5. Acceptable Products:

		Press Fittings	Solder Fittings
a.	Viega	ProPress	
b.	Apollo	Xpress	
c.	Mueller	StreamlinePRS	Streamline
d.	Nibco		WROT/Cast 0198

- B. CPCV Pipe:
 - 1. Pipe shall meet ASTM Standards D1784 and F441.
 - 2. Fittings shall meet ASTM Standards D1784, F437 and F439.
 - 3. Adaptors shall be threaded male type with brass threads and socket type CPVC cement type insert.
 - 4. Joints shall be solvent cement.
 - 5. Use Schedule 40 pipe for sections over 12" long. Use Schedule 80 threaded nipples.
- 2.03 FLANGES, UNIONS, AND COUPLINGS
 - A. Pipe Size 2" and Under:1. Copper tube and pipe: 150 psig bronze unions with soldered joints.
 - B. Dielectric Connections: Brass flange with copper solder end, gaskets, dielectric flange bolt inserts, washers and stainless steel bolts.
- 2.04 VALVES
 - A. Ball Valves up to and including 3": Bronze 600# wog, 150# swp two piece body, stainless steel or chrome plated full port bronze ball, teflon seats and stuffing box ring, lever handle, solder or threaded ends.
 - B. Swing Check up to and including 2": Bronze body rated for 150 # wog with wye configuration, bronze disc, integral seat and threaded or solder ends.
 - C. Vertical Check: Bronze body rated for 200 psig with straight configuration, soft seat, stainless steel or bronze spring and bronze plug.
 - D. Acceptable Products:

		Ball	Swing Check	Vertical Check
1.	Apollo	Model 77 Series		61-500 Series
2.	Watts	Model 6800 Series	WCV	
3.	Milwaukee	Model BA 400 Series	515	

- E. Plastic ball valves 1-1/4" and smaller shall be CPVC with union nuts on both ends and either threaded or socket solvent weld connections at the contractors option. Valve shall have full port design Teflon seats, lever handle with stein extension for specified insulation and EPDM o-ring.
- F. Acceptable Products:
 - 1. NIBCO Chemtrol Tru-Bloc.
 - 2. LASCO
- 2.07 STRAINERS
 - A. Shall be lead free bronze construction acceptable by NSF. Strainer screen shall be No. 20 stainless steel mesh. Pressure rating shall be 150 psig.

- B. Sizes 2" and smaller shall have female NPT ends.
- C. Acceptable Products:
 - 1. Febco LF650A
 - 2. Conbraco 85-5-5-5 Series
 - 3. Watts Series 777
 - 4. Zurn Wilkins SXL or YBXL Series
- PART 3 EXECUTION
- 3.01 EXAMINATION
 - A. Examine areas and conditions under which plumbing piping is to be installed.
 - B. Verify existing piping at new connection points is in sound condition.
 - C. Verify placement of fixtures and equipment to determine locations of rough-in connections.
 - D. Correct any unsatisfactory conditions before beginning installing piping products of this section. Commencement of installation indicated acceptance of conditions.
- 3.02 PREPARATION
 - A. Ream pipe and tube ends. Remove burrs.
 - B. Remove scale and dirt, on inside and outside, before assembly.
 - C. Prepare piping connections to equipment with unions.
 - D. Valves:
 - 1. Remove shipping materials.
 - 2. Examine valve (interior and exterior) to verify that valve is clean and corrosion free.
 - 3. Verify that valves operable through full open and close positions.
- 3.03 DEMOLITION
 - A. Removal for reuse.
 - 1. Disconnect existing piping where new piping is shown for reconnection carefully by dis-assembling joints or by squarely cutting, for rethreading, soldering or otherwise connecting.
 - 2. Cap open end of pipe temporarily if to be reused or permanently if not shown for reuse.
- 3.04 INSTALLATION
 - A. Install in accordance with manufacturer's instructions.
 - B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
 - C. Route piping in orderly manner and maintain gradient.
 - D. Install piping to conserve building space and not interfere with use of space. Install pipe parallel or at right angles to building walls. Diagonal runs shall be as shown on drawings.
 - E. Group piping whenever practical at common elevations.

- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Install fittings at changes in direction. Install swing joints at branch connections to mains.
- G. Conceal pipe where new chases and walls and firring are provided. Pipe on existing wall is exposed.
- H. Connecting components of unequal size: Install standard reducers or increasers, correctly sized for application indicated.
- I. Clearances:
 - 3. Provide adequate space around piping to allow proper application of insulation.
 - 4. Finished piping insulation minimum clearance: 1", all around.
- J. Support and anchor pipe as specified in Section 220529.
- K. Joints:
 - 1. Copper Pipe:
 - a. Press Fittings:
 - 1) Shall be made in accord with fitting manufacturer's
 - instruction using tools recommended by that manufacturer.
 - b. Sweat Fittings:
 - 1) Solder shall be full depth of fitting socket.
 - 2) Joints shall be "wiped" and form a neat fillet.
- L. Domestic Water Piping System:
 - 1. Install on interior side of building insulation.
 - 2. Pitch: 1/32"-per-foot (1/4 percent) or greater to drain point. Do not trap. Provide valves at drain point.
 - 3. General-purpose valves:
 - a. Install valves with stems horizontal or above horizontal. Do not install inverted.
 - b. Position valves to allow easy access. Provide additional support where required.
 - c. Provide valves as shut offs to all equipment and as indicated.
 - d. Allow clearance for insulation at handles.
 - 4. Connections:
 - a. Piping runouts to fixtures: Install runouts to fixtures. Size piping, as required.
 - b. Mechanical equipment: Provide connections to equipment as required.
- 3.05 APPLICATION
 - A. Install unions downstream of valves and at equipment or apparatus connections. Use in accessible locations only.
 - B. Install valves for shut-off to isolate equipment and in vertical risers. See drawings for other locations.

C. Application Chart:

Use	Desc	ription			Ріре Туре
1.	All	Domestic	Water	Pipe	Copper
	Exce	ept as not	zed		

Fitting Type Sweat Solder or Press Connection

Solvent Weld

 Cold water piping CPVC serving water coolers and sinks

3.06 ERECTION TOLERANCES

A. Slope water piping and arrange to drain at low points.

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Contractor Provide:
 - a. Wall and roof hydrants.
 - b. Thermostatic mixing valves at each existing lavatory.
 - c. Hot water maintenance pump.
 - d. Water treatment devices at new water coolers.
 - e. Laundry Box.
 - f. Access door for plumbing.
- 1.02 DESCRIPTION
 - A. Definitions:
 1. Plumbing Contractor = Plumbing Subcontractor for this work.
 - B. Frost proof hydrants shall be located as shown.
 - C. New point of use thermostatic mixing valves shall be installed to replace function of existing removed global hempered water valves.
 - D. A domestic hot water circulating pump shall be provided to circulate water to new branch locations.
- 1.03 RELATED WORK
 - E. Specified Elsewhere:
 1. 221100 Water Piping.
 2. 224000 Plumbing Fixtures.
- 1.04 REFERENCES
 - A. ANSI/ASSE 1019 Wall Hydrants, Frost Proof Automatic Draining Anti-Backflow Types.
 - B. ASSE 1017 "Temperature Actuated Mixing Valve for Hot Water Distribution Systems.
- 1.05 SUBMITTALS
 - A. Submit under provisions of Section 013300.
 - B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
 - C. Manufacturer's Installation Instructions: Indicate assembly and support requirements.
 - D. Submit line item price for hydrants, mixing valves, pumps and treatment devices on Schedule of Values. Identify supplier vendor.
- 1.06 PROJECT RECORD DOCUMENTS
 - A. Submit under provisions of Section 017839 (the General Conditions).

- 1.07 OPERATION AND MAINTENANCE DATA
 - A. Submit under provisions of Section 017823.
 - B. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.
- 1.08 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver, store, protect and handle products to site under provisions of Section 016000.
 - B. Accept specialties on site in original factory packaging. Inspect for damage.
- 1.09 EXTRA MATERIALS
 - A. Furnish under provisions of Section 017700.
 - B. Provide two loose keys for each wall hydrant.
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 HYDRANTS
 - A. Acceptable Products:

			Exposed
		Roof	Modular
1.	Woodford	RHY2-MS	65 Series

- B. Modular Wall Hydrant: ANSI/ASSE 1019 and 1052; non-freeze, self-draining type with rough chrome, with modular horizontal or vertical plate, hose thread spout, lockshield, removable key, and integral vacuum breaker.
- C. Roof Hydrant: Shall have 1" galvanized steel pipe casing with 3/8" galvanized steel pipe operating rod. Valve shall be bronze plunger type with 1/8" drain hole, 3/4" NPT INLET. Head shall be lever activated with 3/4" hose connection adjustable linkage, locking feature and bucket hook. Unit shall be entirely serviceable from above. Include boot cover, hydrant support, roof pitch correction shim, under deck flange and mounting bolts. Provide with vacuum breaker.

2.03 THERMOSTATIC MIXING VALVES

A. Thermostatic mixing values for use with lavatories shall be lead-free construction of, or combination of, brass, bronze, stainless steel and synthetic material. Value shall have minimum flow capacity range of .50 gpm to 6.00 gpm. Temperature shall be adjustable up through 110 degrees F. Device shall be approved per ASSE 1070. Single lavatory devices shall have hot and cold inlets and tempered water and cold water outlets. Metallic exterior portions shall be chrome or nickel plated.

B. Acceptable Products:

		Single Lavatory
		Туре
1.	Leonard	Model 105
2.	Bradley	S59 Series
3.	Zurn Wilkens	SW3870XLT-4P
4.	Watts	USG-B

- 2.04 DOMESTIC HOT WATER TEMPERATURE MAINTENANCE
 - A. Hot water circulating pumps shall:
 - 1. Be of bronze and stainless steel construction and rated for use with potable water at 125 psig and 220 degrees F.
 - 2. Have sweat, union or flanged connections.
 - 3. Motor shall be replaceable cartridge type or shall be oil lubricated. Motor position shall be adjustable.
 - 4. Be 120v and a maximum of 1/25 hp.
 - 5. Be capable of moving four gpm against 12' of head.
 - B. Acceptable Products:
 - 1. Bell and Gossett NBF-9U/LW.
 - 2. Taco 008BC.
 - 3. Grundfos UP15-42B7.
- 2.05 SPECIALIZED VALVES
 - A. Balance Valve: Calibrated, plug type with precision machined orifice, readout valves equipped with integral check valves and gasketed caps, calibrated nameplate and indicating pointer. Provide with drain kit. Provide with solder, NPT or flanged connections as required to mate pipe.
 - B. Acceptable Products:
- Balance Valve
- 1. Wilkens ---
- 2. Watts CSM-61
- 3. Conbraco --

2.06 LAUNDRY SPECIALTIES

- A. Recessed Laundry:
 - 1. Box shall be made of painted steel or PVC.
 - 2. Shall have connection for 1-1/2" PVC stand piping.
 - 3. Shall have duel ball/cylinder valves operated with a single lever or individually with 3/4" hose connections. Inlet connections shall be combination male NPT or copper sweat.
 - 4. Provide piston type water hammer arrestors.
- B. Acceptable Products:

	Ball Valve Box
1. Guy Gray	WB200
2. Oatey	38800 Series

- 2.07 ACCESS PANEL
 - A. Door and frame shall have:1. Continuous piano hinge.

- 2. Minimum of a 13/16" wide margin around door.
- 3. Continuous, angular 14-gauge wire frame.
- 4. Channel or angle reinforced 16-gauge door.
- 5. All components shall be finished for field applied painting.
- B. Provide steel, flush mounted, screwdriver operated, spring loaded cam latches on top and bottom.
- Acceptable Products: с.
 - 1. ELMDOR.
 - 2. Milcor.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- Thermostatic Mixing Valves: в.
 - 1. Shall be located under lavatories tight under decks.
 - 2. Shall be adjusted to maintain 105 to 110 degrees F at lavatory faucets.
 - 3. Individual lavatory units shall be connected between stops and faucets with stainless steel flexible connections.
- Domestic hot water circulating pump shall be installed (as shown on C. drawings). It shall be installed in vertical pipe. It shall draw water from the end of the hot water system and return it to the cold side of the water heater through a check valve.
- Water Treatment Devices: D.
 - 1. Install a water filter upstream of each electric water cooler.
 - 2. Install a water filter upstream of the cold water connections to each counter sink faucet.
 - 3. Conceal filters under sink counter tops. Mount tight to underside of top. Secure to wall or top.
 - 4. Conceal water cooler filters within chase spaces or at 7'-0" above the floor adjacent to water cooler.
 - 5. Mount filters and conditioners so that cartridges can be changed.
 - 6. Secure filter and conditioner mounting brackets to blocking, struts, or standoffs so that pipe joints do not bear the torque of loosening filter bowls from filter caps.
- E. Recess laundry box into existing wall. Coordinate cut and patch of wall of accommodate.

SECTION 221300 - SANITARY PIPING

PART 1 - GENERAL

- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Contractor Provide:
 - a. Revision of sanitary sewer and vent systems.
 - b. Exploration work to locate existing under floor and underground sanitary piping including depth and horizontal location.
 - c. All cutting of existing concrete slabs and excavation and backfill required to access and utilize existing piping.

1.02 DESCRIPTION

- A. Definitions
 - 1. Sanitary piping includes waste and vent piping in building and piping service piping outside of building.
 - 2. Plumbing Contractor = Plumbing Subcontractor or Plumbing Trade.

1.03 RELATED WORK

- A. Specified Elsewhere:
 - 1. 220529 Supports and Anchors for Plumbing.
 - 2. 220553 Identification for Plumbing Piping and Equipment.
 - 3. 220700 Plumbing Insulation.
 - 4. 221300 Sanitary Waste Piping Specialties.
 - 5. 224000 Plumbing Fixtures.
 - 6. 221419 Sanitary Equipment.

1.04 REFERENCES

- A. ANSI B31.9 Building Service Piping.
- B. ASTM A74 Cast Iron Soil Pipe and Fittings.
- C. ASTM C564 Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- D. ASTM D1785 Poly Vinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- E. ASTM D2466 Poly Vinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40.
- F. ASTM D2564 Solvent Cements for Poly Vinyl Chloride (PVC) Plastic Pipe and Fittings.
- G. ASTM D2729 Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings.
- H. ASTM D2855 Making Solvent-Cemented Joints with Poly Vinyl Chloride (PVC) Pipe and Fittings.

1.05 SUBMITTALS

- A. Submit under provisions Section 013300.
- B. Product Data: Provide data on no hub connectors and piping accessories. Provide manufacturers catalog information.

- 1.06 PROJECT RECORD DOCUMENTS
 - A. Submit under provisions of Section 017839 (the General Conditions).
 - B. Record actual locations of underfloor pipe. Record both lateral and vertical locations. Locate in relation to walls and surfaces which extend beyond concealing surfaces.
 - C. Obtain A/E review of record documents before or at each pay progress meeting.
- 1.07 REGULATORY REQUIREMENTS
 - A. Perform Work in accordance with State of Illinois Plumbing Code.
- 1.08 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver, store, protect and handle products to site under provisions of Section 016000.
 - B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
 - C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.
- 1.09 ENVIRONMENTAL REQUIREMENTS
 - A. Do not utilize solvent weld products when dry wall sanding is underway.

PART 2 - PRODUCTS

- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 PLASTIC PIPING FOR WASTE AND VENT
 - D. PVC Pressure Pipe ASTM D1785.
 - 1. Fittings: ASTM D2466.
 - 2. Connections solvent weld ASTM D5264.
 - E. Non-Pressure PVC Pipe: Solid (not foam core) Schedule 40 DWV ASTM D 1785; ASTM D-2665.
 - 1. Fittings: PVC.
 - 2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.03 CAST IRON PIPE

A. Cast iron "no hub" pipe conforming to ASTM A74 or A-888-11 as confirmed by an accredited third party organization.
1. Fittings shall be "no-hub" type.

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- Joints shall be one piece neoprene gaskets with full stainless steel 2. housings and stainless steel band clamps. Assembly shall comply with ASTM C564-78 or IAPMO.
- Connector Fittings: в.
 - 1. Shall be "no-hub" type.
 - Shall be one piece neoprene gaskets with full stainless steel 2.
 - housings and stainless steel band clamps. Assembly shall comply with ASTM and CISPI 310.
- Acceptable Products: C.
 - 1. Charlotte Figure NH-1.
 - 2.
 - Clamp-All Hi-Torq 80/125. Tyler No hub coupling assembly. 3. Tyler
 - 4. New Age

PART 3 - EXECUTION

- 3.01 EXAMINATION
 - Examine areas and conditions under which waste and vent piping is to be Α. installed.
 - Verify that excavations are to required grade, dry, and not overв. excavated, and are free of debris or stones.
 - Verify existing piping at new connection points is in sound condition. C.
 - Verify placement of fixtures and equipment to determine locations of D. rough-in connections.
 - Correct any unsatisfactory conditions before beginning installing piping Ε. products of this section. Commencement of installation indicated acceptance of conditions.

3.02 PREPARATION

- Ream pipe and tube ends. Remove burrs. Bevel PVC pipe. Α.
- Remove scale and dirt, on inside and outside, before assembly. в.
- Prepare piping connections to equipment with flanges or unions. C.

3.03 DEMOLITION

- Removal for reuse. Α.
 - Disconnect existing piping where new piping is shown for reconnection 1. carefully by dis-assembling joints or by squarely cutting.
 - Cap open end of pipe temporarily if to be reused or permanently if 2. not shown for reuse.
 - Abandon pipe left under floors. Plug open ends with a rubber test 3. plug topped minimum of 3" of concrete.
 - 4. Disconnect and cap main waste pipe under floor where branch pipe is removed from service. Use cast iron "no hub" cap with "no hub" type coupling.
- Flooring Cutting: Β.
 - 1. Existing concrete floors shall be saw cut at least 2 inches through before concrete material is broken up and removed.
 - Minimize extent of removal work; however, provide sufficient removal 2. to access piping.

- 3.04 EXCAVATION, BEDDING AND BACKFILL
 - A. Excavate existing fill and material to locate existing piping and to install new. Granular materials shall be saved for reuse providing it is not polluted with mud or building debris.
 - B. Install new underfloor piping on compacted granular cradle bedding. Install at least 3 inches of bedding above top of pipe. Use clean pgravel or sand as bedding.
 - C. Remaining backfill shall be what was removed from excavation less debris or shall be bedding material.

3.05 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Route piping in orderly manner and maintain gradient.
- C. Install piping to conserve building space and not interfere with use of space. Install pipe parallel or at right angles to building walls. Diagonal runs shall be as shown on drawings.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Install fittings at changes in direction.
- F. Conceal pipe where new chases and walls and firring are provided. Pipe on existing wall is exposed.
- G. Connecting components of unequal size: Install standard reducers or increasers, correctly sized for application indicated. Do not use bushings.

1. Do not reduce size of drainage piping in the direction of flow.

- H. Clearances:
 - 1. Provide adequate space around piping to allow proper application of insulation.
 - 2. Finished piping insulation minimum clearance: 1", all around.
- I. Support and anchor pipe as specified in Section 220529.
- J. Joints:
 - 1. Cast iron soil pipe:
 - a. No-hub (hubless) joints:
 - 1. Comply with the requirements of CISPI Standard 310.
 - 2. PVC pipe:
 - a. Solvent-welded joints:
 - 3. Conform to requirements of ASTM D 2855.
 - 4. Poly propylene pipe: Conform to manufacturer's instructions.
- K. Soil, Waste, and Vent System:
 - 1. Pitch: Pitch pipe in accord to Plumbing Code of the State of Illinois.
 - 2. Underground Building Drains:
 - a. Locate connection of sewer pipe to existing pipe.
 - b. Start drain installation at system's lowest point. Maintain alignment and grade indicated and provide uninterrupted continuity of invert.
 - c. Install piping with hub on upstream end of pipe.

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d. Comply with manufacturer's instructions for installation of gaskets. Use only recommended lubricants and sealants.

3.06 APPLICATION

A. Application Chart:

Use	Description	Pipe Type	Fitting Type
1.	Sanitary Pipe Above and	NO Hub Cast Iron	Stainless Steel Band
	Below Ground	Match existing under floor pipe	Туре
2.	Sanitary and Vent Pipe (Above and below ground for new connections)	Schedule 40 PVC	Solvent Weld

SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

- 1.01 WORK INCLUDES
 - A. Base Bid: 1. Contractor Provide: a. Cleanouts.

1.02 DESCRIPTION

A. Definitions:

- 1. Plumbing Contractor = Plumbing Subcontractor for this work.
- 2. Finished areas are those with floors other than unstained concrete and include areas like toilet rooms.
- 3. Unfinished areas are those with floors that are unstained and sealed concrete which do not have any other surface finish like tile or sheet vinyl. Unfinished spaces include requirement and water heater and water heater softener rooms.
- 4. Description:
 - a. Work includes demolition of existing sanitary pipe systems. Cleanouts shall be added to avoid "dead end, uncleanable" sections of pipe.

1.03 RELATED WORK

- A. Specified Elsewhere:
 - 1. 220529 Supports and Anchors for Plumbing.
 - 2. 220700 Plumbing Insulation.
 - 3. 221300 Sanitary Piping.
 - 4. 224000 Plumbing Fixtures.

1.04 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- 1.05 PROJECT RECORD DOCUMENTS
 - A. Submit under provisions of Section 017839.
 - B. Record actual locations of cleanouts.
- 1.06 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver, store, protect and handle products to site under provisions of Section 016000.
 - B. Accept specialties on site in original factory packaging. Inspect for damage.
- 1.07 COORDINATION
 - A. With other trades:
 - 1. Set heights of cleanouts before concrete work is done.
 - 2. Coordinate with finish floor trades.

PART 2 - PRODUCTS

2.01 MANUFACTURER & PERFORMANCE

A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.

2.02 CLEANOUTS

- A. Floor Cleanouts (FCO) Shall:
 - 1. Be of cast iron construction.
 - 2. Have an adjustable top and a bronze or PVC tapered plug.
 - 3. Have gasketed or no-hub outlet.
 - 4. Have satin nickel bronze scoriated cover.
- B. Wall Cleanouts (WCO) Shall:
 - 1. Shall have brass plug tapped for screw.
 - 2. Shall have chrome plated brass or brushed stainless steel cover with stainless steel screw.
 - 3. Shall utilize test tee or spigot adaptor.

PART 3 - EXECUTION

- 3.01 PREPARATION
 - A. Coordinate forming of floor construction to receive cleanouts to required top elevations.
 - Drains in toilet rooms and work rooms shall be minimum 1/8" below finished floor at room perimeter.
 - 2. Drains in showers shall be minimum of 1/2" below level of shower floor perimeter or shall be set down 1/4" per foot from perimeter.
 - 3. Protect drain strainer from construction.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Extend floor cleanouts to finished floor surface. Extend wall cleanouts to break inner surface of drywall or backer board. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system. Ensure plug can be removed from the opening.

SECTION 221419 - PLUMBING EQUIPMENT

PART 1 - GENERAL

- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Contractor Provide:
 - a. Replacement water heater.
 - b. Relocation of existing water softener.
 - c. Commissioning of water heater.
 - d. Recommissioning of existing water softener.
- 1.02 RELATED WORK
 - A. Specified Elsewhere:
 - 1. 221100- Water Piping.
 - 2. 221119 Domestic Water Piping Specialties.
 - 3. 224000 Plumbing Fixtures.
- 1.03 REFERENCES
 - A. ANSI/ASHRAE 90A Energy Conservation in New Building Design.
 - B. ANSI/NFPA 54 National Fuel Gas Code.
 - C. ANSI/NFPA 70 National Electrical Code.

1.04 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data:
 - 1. Include dimension drawings of water heaters indicating dimensions, accessory components and connections to other equipment and piping.
 - 2. Provide electrical characteristics and connection requirements.
 - 3. Provide data on all accessory components.
- C. Manufacturer's Installation Instructions.
- D. Provide a separate line items and costs on the Schedule of Values for water heater work and relocation of water softener.
- 1.05 OPERATION AND MAINTENANCE DATA
 - A. Submit under provisions of Section 017823.
 - B. Include the following information:
 - 1. Instructions for starting and operating equipment.
 - 2. Operating limits which, if exceeded, may result in hazardous or unsafe conditions.
 - 3. Cleaning, preventive maintenance, and lubrication schedule and procedures.
 - 4. List of special tools, maintenance materials, and parts.
 - 5. Guide for troubleshooting of operating problems.
- 1.06 REGULATORY REQUIREMENTS
 - A. Perform Work in accordance with Illinois Plumbing Code.

B. Ensure products and installation of specified products are in conformance with recommendations and requirements of the following organizations:

- 1. American Gas Association (AGA).
- 2. National Sanitation Foundation (NSF).
- 3. American Society of Mechanical Engineers (ASME).
- 4. National Electrical Manufacturers' Association (NEMA).
- 5. Underwriters Laboratories (UL).
- 1.07 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver, store, protect and handle products to site under provisions of Section 016000.
 - B. Keep water heater covers protected from dents and scratches.

1.08 WARRANTY

- A. Provide three-year warranty. Warranty shall include full tank.
- B. Warranty: Include coverage of domestic water heaters.

PART 2 - PRODUCTS

2.01 MANUFACTURER & PERFORMANCE

- A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 POWER VENTED COMMERCIAL GAS FIRED WATER HEATERS
 - A. Manufacturers: See Drawing Schedule.
 - B. Type: Automatic, power vented natural gas-fired, vertical storage, with non condensing burner capable of delivering a minimum efficiency of 83%.
 - C. Tank: Glass lined, thermally insulated to meet ASHRAE 90.1, encased in corrosion-resistant steel jacket; baked-on enamel finish; floor shield and legs. Provide with built-in heat trap, burner site glass. Insulation shall be non CFC foam.
 - D. Power vent shall be 120 volt, centrifugal type capable of operating with a maximum of 180 feet of equivalent pipe. Provide with a minimum 6'-0" long power cord for receptacle connection.
 - E. Accessories: Brass water connections and dip tube, drain valve, highdensity magnesium anode, and ASME rated temperature and pressure relief valve.
 - F. Approval: By AGA as automatic storage water heater for operation at 140 degrees F.
- 2.03 WATER HEATER ACCESSORIES
 - A. Vacuum relief valve shall be of brass construction with a 1/2" male NPT connection. It shall be rated for a water working pressure of 200 psig

and a working temperature of 250 degrees F. It shall have venting capacity of 13 cfm.

- B. Temperature/Pressure Relief Valves:
 - 1. Shall be ASME rated.
 - 2. Shall be self-closing poppet style.
 - 3. Shall have thermostatic relief element actuated at 210 degrees F.
 - 4. Shall have pressure relief element actuated at 125 psig.
 - 5. Shall be self-closing.
 - 6. Shall be sized to accommodate full heater input capacity.
- C. Acceptable Products:

		T&P Valve	Vacuum Relief
1.	Conbraco	18 Series	37-101
2.	Watts	L Series	N36
3.	Wilkins	TP Series	VR10

PART 3 - EXECUTION

- 3.01 WATER HEATER INSTALLATION
 - A. Install water heaters in accordance with manufacturer's instructions and to AGA, NSF, ANSI/NFPA 54, UL, and Illinois Plumbing Code requirements.
 - B. Coordinate with plumbing piping and related fuel piping gas venting and electrical work to achieve operating system.
 - C. Provide vacuum breaker.
 - D. Isolate heaters with valves.
 - E. Pipe heaters to allow future removal.
 - F. Start-up and commissioning shall be supervised by a factory representative.
- 3.02 WATER SOFTENER
 - A. Installation:
 - 1. Provide all materials and devices required for a complete functioning and code worthy system.
 - 2. Install on existing housekeeping pad or floors.
 - 3. Provide with service valves on inlet and outlet and provision for manual bypass.
 - 4. Pipe brine water and backwash water in PVC pipe. Terminate backwash over an existing drain.
 - B. Commissioning:
 - 1. Install salt and fill.
 - 2. Set regeneration time. Set brine dosage timer.
 - 3. Show how to reset machine after power failure.

SECTION 224000 - PLUMBING FIXTURES

PART 1 - GENERAL

- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Plumbing Contractor Provide:
 - a. Electric water cooler and trim.
 - b. Blocking in walls to support electric water coolers.
 - c. Counter sinks and trim.
 - d. Designated Toilet Seats.
 - e. Urinal and Flush Valves in Men's Toilets.
 - f. New faucets, stops, risers and waste trim for new lavatories in designated Men's and Women's Toilets.
- 1.02 RELATED WORK
 - A. Specified Elsewhere:
 - 1. 123661 Solid Surfacing Countertops.
 - 2. 220529 Supports and Anchors for Plumbing.
 - 3. 221100 Water Piping.
 - 4. 221119 Domestic Water Piping Specialties.
 - 5. 221300 Sanitary Piping.
 - 6. 221319 Sanitary Piping Specialties.
- 1.03 DESCRIPTION
 - A. Definitions:
 - 1. Plumbing Contractor = Plumbing Subcontractor for this work.
 - Trim includes those devices which are attached to fixtures and are integral with the fixture function. Examples are as follows:
 a. Sink and lavatory trim includes faucets, sprayers, basket strainers, tail pieces, p-traps, stops and risers.
 - 3. Sinks have bowls with drains over which faucets deliver domestic hot and cold water.
 - B. Architectural drawings show symbols where most fixtures are located. The symbol is not necessarily the correct graphic representation. This specification defines fixture type. See Paragraph 3.10.
- 1.04 REFERENCES
 - A. ANSI/ASME All2.6.1 Supports for Off-the-Floor Plumbing Fixtures for Public Use.
 - B. ASME A112.18.1 Finished and Rough Brass Plumbing Fixture Fittings.
 - C. ANSI/ARI 1010 Drinking-Fountains and Self-Contained, Mechanically-Refrigerated Drinking-Water Coolers.
- 1.05 REGULATORY REQUIREMENTS
 - A. Illinois Plumbing Code.
 - B. Illinois Accessibility Code/ADA.

1.06 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data: Provide catalogue illustrations of fixtures, sizes, roughin dimensions, utility sizes, trim, and finishes.
- C. Provide certifications that ADA requirements and specified standards are met.
- D. Provide separate line items for Contractors Schedule of Values.
- 1.07 OPERATION AND MAINTENANCE DATA
 - A. Submit under provisions of Section 017823.
 - B. Maintenance Data: Include fixture trim exploded view and replacement parts lists.
- 1.08 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver, store, protect and handle products to site under provisions of Section 016000.
 - B. Accept fixtures on site in factory packaging. Inspect for damage. Institute procedures for replacement of damaged fixtures immediately.
 - C. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.
- 1.09 COORDINATION
 - A. Rough-in coordination shall be made using reviewed and accepted product data and shop drawings.
 - B. Provide dimensions to drywall trades of such items as electric water coolers so that floor depressions and stud spacing can be coordinated.
- 1.10 WARRANTY See Paragraph 14 of General Conditions
 - A. Provide two year warranty for water cooler compressor.
- 1.11 EXTRA MATERIALS
 - A. Furnish under provisions of Section 017823.
 - B. Provide 2 water cooler filters in addition to that installed.
- 1.12 RECORD DRAWINGS See 1.07
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most

cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items included in the written description, the model number shall be modified as required to most closely meet the described requirements.

2.02 COUNTER SINKS

- A. Bowl:
 - Shall be minimum of 1.1 millimeter type 302 or 304 nickel bearing stainless steel with radius vertical coved corners and integral faucet deck. Underside shall be fully undercoated. Deck shall have 2 faucet holes on 4" centers. Drain openings shall be 3-1/2". Provide hidden compression screwdriver operated fasteners on minimum of 8" centers around perimeter of sink rim.
 - Sink SK-1 shall be 25" x 22" x 5" to 6-1/2" deep. Drain connection shall be 3-1/2" toward rear of bowl. Exact bowl depth and hand of rear drain connection is at Contractors option.
- B. Trim:
 - Tail piece and P-trap shall be fully removable with slip joints and compression nuts. Material shall be 17 gauge chrome plated cast brass. Size shall be 1-1/2".
 - 2. Drain baskets shall be chrome plated brass or stainless steel with neoprene stopper, 1-1/2'' connection with other parts all metal.
 - 3. Insulation for SK-1 trim shall be molded PVC type held in place with nylon draw bands.
 - 4. Supplies and stops shall be chrome plated type with chrome plated flexible connectors, wheel handles, solder inlet and compression female outlet.
- C. Faucet shall be deck mounted with 4" center set, goose neck swivel spout with soft flow aerator. Outlet shall be minimum of 7" above sink deck and extend minimum of 5" from center of faucet. Valves shall be quarter turn type. Deck cover shall be gasketed to sink. Handles shall be 4" paddle type.
- D. Acceptable Products (Sinks):

		SK-1
1.	Elkay	GECR 25 x 21
2.	Just	SL-ADA-22x25-A-GR

H. Acceptable Products (Faucets):

SK-1

- 1. Chicago 895-317LESAB-GN8A
- 2. Zurn Z812B4-XL

2.03 ELECTRIC WATER COOLER

A. Electric water coolers EWC-1 shall cool eight gallons of 80 degrees F water to 50 degrees F water in one hour. They shall have 120 volt 1/5 Hp hermetic compressor. Water wetted sections shall be lead free. Bubbler shall be chrome plated brass. Refrigerant shall be 134A. Unit shall be certified by the manufacturer to meet ADA. requirements. Controls shall work from front or sides. Controls shall be mechanical without a need for electric connection to deliver water. Top shall be stainless steel. Sides shall be stainless steel, painted or vinyl in the manufacturer's color options as selected by $A/E\,.$

- B. High-low duplex water coolers shall meet requirements noted above except that the two fountains shall share a single compressor and storage tank. Upper level unit shall have extension apron. Upper level unit shall have a bottle filler.
- C. Furnish with 10" tall stainless steel wall shield directly over decks. Round corners and grind edges.
- D. Bottle filler shall be configured to fit over upper level. Bottle filler to be constructed of polished stainless steel and antimicrobial plastic. Shall have sensor activated laminar flow outlet and maximum "time off" feature. Provide with replaceable cartridge type filter of a minimum of 300 gallon capacity.
- E. Acceptable Product:

		Double	Bottle Filler	
1.	Elkay	EMABFT Series	EZH2O	
2.	Halsey Taylor	HACG8B Series	HTHB	

- 2.04 WATER CLOSETS
 - A. Seats:
 - 1. Seats shall be institutional form curved solid grade white antimicrobial plastic with integral bumpers and open front. Hinges shall be stainless steel non-hold open type. Bolts shall be stainless with conical self-centering locking nuts and washers.
 - B. Acceptable Products (Seats)

		Institutional	
1.	Centoco	1500CC	
2.	Zurn	Z5956SS-EL	
3.	Bemis	3155C	
4.	Comfort Seats	C108C-AM	

- 2.05 Flush Valves
 - A. Flush valves shall be exposed chrome plated diaphragm type with antimicrobial handle. Valve shall include vacuum breaker, integral stop, clogresistant bypass and volume regulator. Provide extension to match mounting height shown.
 - B. Provide with fully chromed wall flange.
 - C. Flush valves for urinals match 1.0 gallon/flush requirement and spud size of urinals.
 - D. Acceptable Products:

Hoodpoable Histadob					
		Urinal			
1.	Sloan	Royal			
2.	Zurn	Z-6003AV	Series		

2.06 LAVATORY

- A. New Lavatories shall be specified in 12 36 61.
- B. Lavatory Faucets
 - Faucets shall have lead-free cast brass chrome plated body. Spouts shall extend a minimum of 4". Configuration shall be 4" center set deck mount. Valve handles shall be chrome plated and color indexed. Faucet connections shall be 1/2" NPT. Faucet valves shall be interchangeable with those for sink faucets where cartridge has the same action.
 - 2. Faucets shall be two handle type of 90 or 180 degree valve action and washerless valves. Valve handles shall be color coded for temperature, shall be brass lever type and shall meet ADA. Handles shall be 4" paddle type. Faucet bodies shall be chrome plated brass without external plastic parts. Faucet connections shall be 1/2" NPT type. Faucet shall be repairable from top of deck. Valves shall have 1/4 turn non-rising stem action using replaceable machined brass cartridges. Aerator shall be 0.5 gpm.
 - 3. Acceptable Products:

a. Chicago

Lavatories				
Abov	<i>ie</i>	Deck		
Two	Ha	andle		
802	Se	eries		

- C. Drainage trim shall be chrome plated 17 gauge cast brass with swivel connections. Furnish with wall escutcheons. Tail piece for new lavatories shall be straight type with strainer. Acceptable Products - McGuire, Engineered Brass Company, Cambridge Brass, or Zurn Specification Traps.
- D. Supplies and stops shall be chrome plated angle type with chrome plated flexible connectors, wheel handle and connections to match piping and faucets. Furnish with wall escutcheons. Acceptable Products - McGuire, Engineered Brass Company, Cambridge or Zurn Specification Supplies.
- E. Handicapped Lavatory Trim Covers
 - 1. Shall conform to ADA requirements.
 - Shall be molded vinyl or vinyl covered foam sheeting formed to P-Trap, tail pieces (straight or offset) off set and stops.

Pro-Extreme or Handi-Shield

Institutional

Skal & Gard

Insul Guard

- 3. Acceptable Products:
 - a. Plumberex
 - b. Engineered Brass Company
 - c. TCI Products
 - d. Zurn
- PART 3 EXECUTION
- 3.01 EXAMINATION
 - A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
 - B. Verify that electric power is available and of the correct characteristics.

3.02 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.03 DEMOLITION

- A. For Reuse:
 - 1. Shall be inventoried before demolition begins. Copies of inventory shall be supplied to the Owner and the Architect/Engineer. Inventory shall include an assessment of the condition.
 - 2. Disconnect water and waste connections.

3.04 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install each fixture with trap, easily removable for servicing and cleaning.
- C. Provide chrome plated flexible supplies to fixtures with specified stops, reducers, and escutcheons. Mount stops to drop eared elbows screwed to blocking.
- D. Coordinate cutting of cabinet tops cabinet trade. Furnish template. Secure sink rim. Provide bead of sealant under sink rim.
- E. Tuck backsplash 1/2" below water cooler deck. Secure with adhesive around exposed perimeter. Install bottle filler above lowest water cooler.
- H. Provide 2x treated wood blocking or 18 gauge galvanized steel sheet to support, electric water coolers, faucets. Wood blocking shall back hanger and span all contact points.
- 3.05 INTERFACE WITH OTHER PRODUCTS
 - A. Review sink counter and casework. Verify available sink opening sizes. Verify space for filter arrays within walls and cabinets.
 - B. Review lavatory counter assemblies. Verify sink tail piece requirements to accommodate accessibility requirements.
- 3.06 ADJUSTING
 - A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.
- 3.07 CLEANING
 - A. At completion clean plumbing fixtures and equipment.
- 3.08 PROTECTION OF FINISHED WORK
 - A. Do not permit use of fixtures.
- 3.09 FIXTURE HEIGHTS
A. Install fixtures to heights above finished floor as indicated.

B. Electric Water Cooler:1. Upper 40" to center of spout.2. Lower 36" to center of spout.

3.10 FIXTURE ROUGH-IN SCHEDULE

	HOT WATER	COLD WATER	WASTE	VENT
Kitchen Sinks	1/2″	1/2″	2″	1-1/2″
Electric Water Cooler		1/2″	1-1/2″	1-1/2″
Urinal		3/4"	2″	2″

END OF SECTION 224000

SECTION 230130 - HVAC AIR DUCT CLEANING

PART 1 - GENERAL

- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Contractor Provide:
 - a. Cleaning of existing return air duct that currently serves Dectron unit.
 - b. Cleaning portions of existing supply and return duct serving remodeled spaces.
 - c. Access openings and closures in existing duct.
 - d. Removal and replacement of existing lay-in ceilings as required to access existing duct.
- 1.02 RELATED WORK
 - A. Specified Elsewhere:
 - 1. 230720 HVAC Ductwork Insulation.
 - 2. 233400 Fans.
 - 3. 233100 Ductwork.
 - 4. 233300 Air Duct Accessories.
 - 5. 233600 Air Terminal Units.
 - 6. 233713 Diffusers, Registers and Grills.
 - 7. 237482 Packaged, Heating/Cooling/Heat Recovery Units.

1.03 SYSTEM DESCRIPTION

- A. Existing systems shall be revised and reworked to meet requirements of new Architectural layouts.
- B. Definitions:
 - 1. Ventilating Contractor = Ventilating Subcontactor.
 - 2. Supply Ductwork That duct downstream of coils, heaters and similar air conditioning equipment and which discharges to a space.
 - 3. Exhaust Ductwork That duct downstream of exhaust registers and grilles which discharges to the out-of-doors.
 - 4. Return Ductwork That duct upstream of coils or heaters or similar air conditioning equipment and which is downstream of room air intakes.
 - 5. Outside Air Ductwork That duct between outside air intakes and conditioning equipment.
 - 6. Relief Air Duct 0 That duct between the out-of-doors and return air fans.
 - 7. Visible behind grilles diffusers and register means able to be seen by an individual who is sitting in a chair or standing on the floor through the louvers or blades of the diffuser grille or register.
 - 8. Concealed duct is that above ceilings or within walls.

1.04 QUALITY ASSURANCE

- A. Installers and Fabricators shall be fully familiar with S.M.A.C.N.A Construction Standards.
- B. Duct cleaning contractors shall be certified by the NADCA a similarly Nationally recognized group, or shall have a minimum of a 5-year history or doing this type of work.

- 1.05 REGULATORY REQUIREMENTS AND STANDARDS
 - A. NADCA 01-2013 Mechanical Cleaning of Non Porous Air Conveyance System Components.
 - B. SMACNA HVAC Duct Construction Standards Metal and Flexible.
 - C. International Mechanical Code 2012.

1.06 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data:
 - 1. Provide data for manufactured access doors.
 - 2. Provide material safety data sheets for cleaning agents.
- C. Duct Cleaning:
 - 1. Provide photograph files of duct, fan and coil cleaning.
 - 2. Provide a separate line item the contractors Schedule of Values for each building where duct-cleaning work is specified.

1.07 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 017839.
- B. Record locations of access doors added for duct cleaning.

PART 2 - PRODUCTS

- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.

PART 3 - EXECUTION

3.01 SEQUENCING AND SCHEDULING

- A. Coordinate work with other trades and Contractors. Review Drawings of other Contracts to determine interaction between trades.
- B. Review extent of existing systems with Owner. Note where systems serve both areas under construction and not under construction. Do duct cleaning work after dry wall finishing is complete but before ceilings are reinstalled.
- C. Access to work shall be coordinated with General Contractor and the Owner. 1. Duct cleaning work shall be scheduled during normal working hours.

3.02 CLEANING

- A. Access:
 - 1. Use entries created by installation of new duct and removal of existing ducts, grilles, registers and diffusers.

- 2. Provide access doors per Section 233300 or as noted below, in mains which are not otherwise accessible.
- 3. Remove and replace lay-in ceilings in areas not otherwise under construction.
- 4. Remove and replace existing ceiling grilles, registers and diffusers to access existing overhead ductwork.
- Install additional access panels in duct at obstructions in duct which include dampers, turning vanes and risers. Access panels shall be installed within reach of accessible ceilings.
- 6. Access panels shall be type specified.
- B. Protection of System:
 - 1. Seal downstream and upstream duct from cleaning operation.
- C. Cleaning:
 - 1. Cleaning hall be done in a manner similar to that outlined in NADCA 01-2013 and as written below.
 - 2. Loose materials shall be removed from system.
 - 3. Designated ductwork shall be cleaned free of visible contaminants on all interior surfaces. Where existing liner is present all contaminants shall be mechanically swept and vacuumed leaving only a stain. The stain shall not contain contaminants which can be dislodged with a stiff nylon brush or a vacuum cleaner.
 - 4. Above floor duct shall be cleaned using dry processes.
 - 5. Screens on outdoor air intakes and exhausts shall be mechanically brushed so that no blockage is visible on either side of the screen.
 - 6. Dispose of all dirt, dung, leaves, scrap paper, bodies, skeletons, feathers and similar debris in accord to Section 01561.
- D. Documentation:
 - 1. Photograph of condition of each main duct before and after cleaning operation is completed. Photos shall be clearly labeled.
 - 2. Final sketches and photographs shall be turned over to the A/E before payment for cleaning work is approved.

3.03 FIELD QUALITY CONTROL

A. Coordinate duct-cleaning activity with Owner. Owner or Architect/Engineer will make spot inspections to verify work is per specification. Owner's spot inspection will not constitute a final approval of work. Dirty areas found after Owners inspections will need to be cleaned. A determination by the Owner that work is not being performed to standards and specification will cause a need for all previous cleaning work to be redone.

3.04 ACCESS TO EXISTING DUCT

- A. Lay-in Ceilings:
 - 1. Remove ceiling panels and cross tees as required to access work.
 - 2. Store removed materials on-site. Protect from damage.
 - 3. Determine existing damage before work commences. Document degree with Owner and A/E.
 - 4. Replace ceiling material broken during access, demolition, or installation operations.
 - 5. Replace ceiling components to original condition when complete.
 - 6. Temporarily secure items as lighting, speakers, diffusers, etc. where cross tees are removed.

SECTION 230529 - SUPPORTS AND ANCHORS FOR HVAC

- PART 1 GENERAL
- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Contractor Provide:
 - a. Pipe and equipment hangers and supports for HVAC equipment and revised heating water piping and new refrigerant and natural gas pipe.
 - b. Sleeves and seals, and firestopping for penetrations involving new and existing pipe.
 - c. Penetrations required in existing walls, floors and roofs.
 - d. Supports for equipment and duct.
 - e. Sleeves, seals and firestopping for penetrations involving ducts.
 - f. Curbs for roof fans and rectangular duct penetrations.
 - g. Roof support curbs for ACCU condensing units and piping.
- 1.02 RELATED WORK
 - A. Specified Elsewhere:
 - 1. 230710 HVAC Piping and Equipment Insulation.
 - 2. 230720 HVAC Ductwork Insulation.
 - 3. 231123 Facility Natural Gas Piping/Digester Gas Piping.
 - 4. 233400 Fans.
 - 5. 233100 Ductwork.
 - 6. 238126 Split System Air Conditioners.
- 1.03 SYSTEM DEFINITION
 - A. HVAC piping includes natural gas, refrigeration, and condensate drain piping.
- 1.04 REFERENCES
 - A. AISC American Institute of Steel Construction.
 - B. ASME B31.2 Fuel Gas Piping
 - C. ASME B31.9 Building Services Piping
 - D. ASTM F708 Design and Installation of Rigid Pipe Hangers.
 - E. ASTM E814 Fire Stop Sealant.

1.05 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data: Provide manufacturers catalog data including load capacity and firestopping capability. Submit installation techniques to be used for intumescent putty sealants.
- C. Provide a separate line item and cost on the Schedule of Values.
- 1.06 REGULATORY REQUIREMENTS
 - A. International Mechanical Code 2012 for support of HVAC piping.

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1.07 COORDINATION

- A. Sleeves:
 - 1. Sleeves installed after wall and floor construction are acceptable per this specification.
- B. Insulation:
 - 1. It is not acceptable for piping with cold surfaces not to be insulated through hangers. Provide hangers specified for insulation to pass through or be sealed to
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 PIPE HANGERS AND SUPPORTS
 - A. Acceptable Manufacturers.
 - 1. B-Line.
 - 2. Grip Strut.
 - 3. Fee and Mason.
 - 4. Grinnel.
 - 5. Unistrut.
 - B. Hanger Description:
 - Clamps for attachment to bar joists and beams shall be C-clamps with retaining straps or steel or malleable iron adjustable beam clamps equal to B-Line Figure B-3036 with B-3360 services strap and Figure B-3040.
 - 2. Strut supports shall be primed 14 or 12 gauge rolled carbon steel with galvanized die-formed accessory clamps and fasteners.
 - 3. "J-Hooks" for 2" pipe and smaller shall be 1/4" thick by 1-1/4" wide steel rated for 200 lbs each.
 - 4. Hold down straps shall be die-stamped of galvanized sheet steel or formed of galvanized malleable iron.
 - C. Copper and Steel HVAC Pipe: (Heating Water, Refrigerant and Natural Gas)
 - 1. Conform to ASME B31.9 and ASTM F708.
 - 2. Hangers for Pipe Sizes 2" and under: Carbon steel, adjustable, Clevis. Hangards for refrigerant pipe shall be copper plated.
 - 3. Multiple or Trapeze Hangers: Steel strut or channels with spacers and hanger rods.
 - 4. Vertical Support: Steel riser clamp.
 - 5. Galvanized pipe shall utilize galvanized hangers.
 - 6. Wall Support: "J-Hooks", struts.
 - D. Plastic HVAC Pipe (Condensate Drain Pipe):
 - 1. Hangers shall be a vertically adjustable strap or clevis type hanger crossing ceilings.
 - 2. Shall be vertical struts crossing walls or floors.

2.03 ACCESSORIES

- A. Hanger Rods: Mild steel continuous threaded national coarse thread.
 - 1. Nuts shall be SAE Grade 3 minimum with cadmium plating and national coarse thread.
 - 2. Lock washers shall be cadmium plated split spring type sized for the rod.
- B. Auxiliary Steel and Trapeze Hangers.
 - 1. Shall be Schedule 40 steel pipe or rolled steel shapes complying with AISC manual.
 - 2. Manufactured struts shall be rolled of 12, 14, or 16 gauge material to meet loading required or as noted on Drawings or otherwise specified. It shall have a hot dipped galvanized coating.
- C. Acceptable Products.
 - 1. B-Line.
 - 2. Uni-strut.
 - 3. Grip Strut.
- 2.04 ANCHORS
 - A. Masonry or concrete type for pipe or equipment supports. Shall be wedge type with either studs or National coarse female thread. Alternative type shall be self drilling expansion type. Anchors shall be U. L. listed.
 - B. Masonry or concrete type for securing escutcheons to masonry shall be "nail-in" type. Unit shall consist of broad head on hollow zinc alloy core with steel drive pin. Provide with dielectric washer.
- 2.05 EQUIPMENT CURBS AND SUPPORTS
 - A. Curbs shall:
 - 1. Be of straight sided welded galvanized steel construction.
 - 2. Have 1-1/2" fiberglass insulation.
 - 3. Have 2" x 2" treated wood nailer.
 - B. Curb Adaptors
 - 1. Shall be custom fabricated steel type specifically made to adapt the existing curb to the new rooftop unit.
 - 2. Shall have all exterior horizontal and vertical surfaces insulated on the inside.
 - 3. Shall have auxiliary openings and devices detailed.
 - 4. Shall have continually welded joints.
 - C. Pipe Penetrations shall:
 - 1. Have sunlight resistant ABS plastic curb cap.
 - 2. Have sunlight resistant EPDM rubber boots of stepped size for penetration of pipe.
 - 3. Have stainless steel worm gear tightened band clamps.
 - 4. Have 16 gauge welded galvanized steel cap with integral sleeves.
 - D. Roof pipe supports shall be loose set type manufactured specifically for use on single ply membrane roofs. Unit shall meet the requirements of the membrane roof manufacturer listed in this specification construct of recycled rubber or sunlight resistant plastic material and galvanized steel strut.
 - E. Acceptable Manufacturers:
 - 1. Pate.
 - 2. Thy.
 - 3. B-Line.

2.06 FLASHING

A. Curb flashing shall be as detailed on drawings.

2.07 SLEEVES

- A. Sleeves for Pipes Through Walls Rated at less than one hour. 22 gauge galvanized steel.
- B. Sleeves for Pipes Through Walls Rated at one hour or greater or all masonry walls. Schedule 40 or standard weight galvanized steel pipe.
- C. Sleeves for Ductwork: Galvanized steel.
- D. Sleeves for pipes through exterior masonry walls. Schedule 40 solid PVC.

2.08 SEALANTS

- A. Fire Stopping Shall comply with UL1479 and ASTM E0814. Shall have an installed F rating of two hours.
- B. Fire stopping for metal pipe and conduit shall be tube or trowel applicable and shall remain pliable. Material shall be waterproof or paintable with latex paint.
- C. Fire stopping for plastic pipe and insulated pipe and cables shall be intumescent type. It shall be capable of expansion of ten times its original volume when contacted with fire temperatures.
- D. Exterior moisture sealant Shall be non-hardening silicone type rated for temperatures of -40 degrees F to 250 degrees F. Material shall be available in white, gray, brown, and black colors. Material shall be sunlight resistant.
- E. Interior sealant shall be silicone type rated for temperatures of 0 degrees F to 250 degrees F. Material shall be available in white, clear, gray, brown or black.
- F. Manufacturer

	Fire Stop	Fire Stop	Exterior	Interior
	(Metal)	Plastic	Sealant	Sealant
Tremco	Fyre-shield	Tremstop	Spectrum 2	Spectrum 1
3M	Fire Dam	MPS-21	2000	FS-195
			150	FS-195
General Electric	·		SCS1000	SCS1000
Dow Corning			999A	999A
Hilti	FS601	FS611/635		
Nelson	CLK	CMP		
Pecora			864	AC-20
Rectorseal	Metacaulk	Metacaulk		
	950	880		
	Tremco 3M General Electric Dow Corning Hilti Nelson Pecora Rectorseal	Fire Stop (Metal)TremcoFyre-shield3MFire DamGeneral ElectricDow CorningHiltiFS601NelsonCLKPecoraRectorsealMetacaulk950	Fire StopFire Stop(Metal)PlasticTremcoFyre-shieldTremstop3MFire DamMPS-21General ElectricDow CorningHiltiFS601FS611/635NelsonCLKCMPPecoraRectorsealMetacaulk950880	Fire StopFire StopExterior(Metal)PlasticSealantTremcoFyre-shieldTremstopSpectrum 23MFire DamMPS-2120003MFire DamMPS-212000General ElectricSCS1000Dow Corning999AHiltiFS601FS611/635NelsonCLKCMPPecora864RectorsealMetacaulkMetacaulk950880

2.09 ESCUTCHEONS

- A. For ductwork Shall be galvanized angle sized to overlap entire opening.
- B. For piping Shall be chrome finished split faced plastic.
- C. For multiple pipes or where holes are over large or offset.1. Utilize pre-painted aluminum sheet fabricated to cover entire hole and seal within 1/4" of the pipe or pipe covering.

2. Holes shall be hole sawed or punched. Holes shall be round.

PART 3 - EXECUTION

3.01 APPLICATION

- A. HVAC Pipe:
 - 1. Hanger and support spacing on copper tubing shall be: 5'-0'' maximum for tube 3/4'' and smaller.
 - 2. Hanger and support spacing on steel piping shall be: 5'-0'' for 1/2'' and smaller. 8'-0'' maximum for pipe 3/4'' to 1" and 12'-0'' maximum for pipe over 1-1/4''.
 - 3. PVC drain piping 1" diameter and less shall be supported and restrained on 2'-0" centers. PVC piping 1-1/4" 2" shall be supported on 4'-0" centers.
 - 4. Gas pipe shall be supported with clevis hangers, supported by rods with beam clamps. Support on specified roof supports on roofs.
- C. Hanger Rod:
 - 1. Hanger rod size shall be: 3/8" for pipe up to 2" in size and loads up to 360 lbs; 1/2" for pipe 2-1/2" to 3" and loads up to 600 lbs.

3.02 PREPARATION

- A. Coordination of Trades/Owner:
 - 1. Locate sleeves in conjunction with concrete and masonry trades. Determine exact elevation and lateral position.
 - 2. At contractor's option core drill openings in floors and core drill or cut in sleeves in walls.

3.03 ANCHORS

- A. Use anchors in concrete or masonry walls and floors.
- B. Drill hole clean of loose material. Install anchor, flush with surface. Size hole in accord to manufacturers' recommendation. Physically test anchor by pulling against it. Loose anchors will not be accepted.
- 3.04 PIPE HANGERS AND SUPPORTS
 - A. Utilize hangers in accord to Application paragraphs.
 - B. Install hangers to provide minimum 1/2" space between finished covering and adjacent work.
 - C. Place hangers within 12" of each horizontal elbow.
 - D. Use hangers with 1-1/2" minimum vertical adjustment. Provide lock nuts and washers for hanger rod at all hangers. Provide additional lock nut and washer on clevis hanger cross bolts.
 - E. Support vertical piping such that it cannot be deflected more than 1/8" from center by hand pressure.
 - F. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
 - G. Support riser piping independently of connected horizontal piping.
 - H. Insulate copper pipe from steel hangers. Provide hard neoprene inserts secured with strut. Insert shall completely cover pipe and match insulation thickness as closely as manufactured standards allow.

- I. Locate hangers for pipe movement without disengagement of supported pipe.
- J. Provide auxiliary steel to span structure where required. Provide in accord to Paragraph 3.06 below.
- K. Secure upper attachment from the top of steel joists, and the top or bottom of steel beams. Provide lock nut and washer on each set screw and hanger rod attachments.
- L. Do not use perforated hanger strap.
- 3.05 SLEEVES, SEALS, FIRESTOPPING & ESCUTCHEONS
 - A. Provide firestopping at all new penetrations between floors except as noted.
 - B. See Architectural Drawings for the location of walls with a fire resistance rating of one hour or greater or which extend continuously to the roof deck, or which are designated as smoke barriers.
 - C. Boiler room and storage room walls and floors shall have penetrations firestopped as noted below.
 - D. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
 - E. Where plastic pipe penetrates walls with fire resistance rating of 1 hour or greater or which are designated as a smoke barrier pack annulus with intumscent putty. Size sleeve in accord to intumescent putty manufacturers.
 - F. Where uninsulated steel or copper pipe penetrates walls with fire resistance rating of 1 hour or greater or which are designated as a smoke barrier use fire stopping caulk between pipe and sleeve.
 - G. Exterior wall penetrations shall be sealed with colored silicone between pipe and sleeve. Pack interior of sleeve with fiberglass batt.
 - H. Provide escutcheon on exposed interior penetrations. Secure escutcheons into place with bead of sealant under. Wipe away exposed sealant.
 - I. The annular area around duct and fire dampers which penetrates fire rated walls shall be packed tightly with mineral wool and sealed with fire stop caulk, drywall compound or metal escutcheon angles.
 - J. The annular area around ducts and pipe which penetrate walls which extend continuously to the roof deck but which are un-rated shall be packed tightly with fiberglass batt, or shall be sealed tightly with caulking.
 - K. Sleeves passing through slab on grade construction shall be terminated at finish floor level. Sleeves penetrating above grade floors shall be terminated 1" above floor level.
 - L. Provide sleeves around existing pipe which is built into new walls. Use 24 gauge galvanized steel round duct.
- 3.06 AUXILIARY STEEL AND EQUIPMENT SUPPORTS
 - A. Hanging Equipment and Materials:
 - 1. Shall be supported from tops of steel joists, from concrete decking, or from the bottom or top of steel beams.

- 2. Auxiliary steel shall be manufactured strut, rolled steel shapes or schedule 40 steel piping. Strut shall be sized in accord to the manufacturer's literature unless shown otherwise on Drawings. Rolled shapes or pipe supports shall be in accord to the following chart.
- 3. Auxiliary Steel Chart (Pipe Diameter and Angle Size)

PIPE	LOAD	30″	60″	90″	120″
SIZE	POUNDS	SPAN	SPAN	SPAN	SPAN
< 3″	<u><</u> 474	1″	1-1/2″	2-1/2″	3″
		1"x1"x1/4"	1-1/2″x1-	2"x2"x1/4"	3″x3″x1/4″
			1/2″x1/4″		
4″	586	1-1/4"	1-1/2″	2-1/2″	3″
		1-1/2″x1-	2"x2"x1/4"	3″x3″x1/4″	3″x3″x5/16″
		1/2"x1/4"			

B. Equipment supports shall be as shown on drawings, and specified.

3.07 EQUIPMENT CURBS AND SUPPORTS

- A. Shall be installed by roofing tradesmen.
- B. For penetrations minimize cut through roof deck.
- C. Where insulated pipe pass through boots add additional layer of insulation material and compress through next size smaller cone.
- D. Make attachments to curbs through counter flashing with stainless steel lug bolts or drive screws.
- E. Loose roof supports specified shall be installed so pipe and conduit share support. Install in accord to roof manufacture's requirement.

END OF SECTION 230529

SECTION 230553 - IDENTIFICATION FOR HVAC PIPE AND EQUIPMENT

- PART 1 GENERAL
- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Contractor Provide:
 - a. Pipe stencils and labels.
 - b. Valve tags.
 - c. Equipment labels.
 - d. Control wiring labels.
- 1.02 RELATED WORK
 - Specified Elsewhere. Α.
 - 1. 230710 HVAC Pipe and Equipment Insulation.
 - 231123 Facility Terminal Units. 2.
 - 233600 Air Terminal Units. 3.
 - 4. 237482 Packaged Heating/Cooling/Heat Recovery Units.
 - 238126 Split System Air Conditioners. 5.
- 1.03 REFERENCES
 - ANSI B13.1 Scheme for the Identification of Piping Systems. Α.

1.04 SUBMITTALS

- A. Submit under provisions of Sections 013300.
- Submit list of wording, symbols, letter size, and color coding for HVAC в. pipe and equipment identification.
- C. Product Data: Provide manufacturers catalog literature for each product required.
- D. Manufacturer's Installation Instructions: Indicate special procedures, and installation.
- Ε. Provide a separate line item and cost on the Schedule of Values.

PART 2 - PRODUCTS

- 2.01 MANUFACTURER & PERFORMANCE
 - Α. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 NAMEPLATES
 - Description: Laminated three-layer plastic with engraved black letters on Α. light contrasting background color. Lettering shall be 1/4" tall. Placard size shall accommodate message without abbreviation. Placard shall be rectangular. Multiple lines shall be utilized to minimize length to height ratio.

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2.03 STENCILS

- Stencils: With clean cut symbols and letters of following size: Α. 3/4" to 2" Outside Diameter of Insulation or Pipe: 8" long color 1. field, 1/2" high letters.
- Stencil Paint: Shall be latex enamel colors conforming to application Β. noted below.
- 2.04 WIRE LABELS
 - Shall be self adhesive strips with single numbers or letters. Strips Α. shall be vinyl and measures a minimum of 1/4" x 1-1/2".
 - Background shall be yellow or white. Β.
 - C. Letters shall be nominally 0.10".
 - D. Acceptable Manufacturers: 1. Seton - Wire markers.
- 2.05 PIPE LABELS
 - Shall have flexible PVC or vinyl backer at either snaps over pipe or is Α. strap-on with draw ties, or glues to itself.
 - B. Background shall be yellow.
 - с. Letters shall be nominally 1/2" for pipe up to 1"; 3/4" for outside diameters up to 2-3/8".
 - Acceptable Manufacturers: D.

 - Brady Bradysnap/strap-on.
 EMED Kwik Coil/wrap-around.
 - 3. Seton Setmark/markers-on-a-roll.
- 2.05 VALVE LABELS
 - Shall be white nylon, metal, or vinyl "write-on" type with draw band attachment Α. in 2" x 3" to 3" x 5" size.
 - в. Label shall identify equipment valve serves. Lettering shall be typed or neatly lettered manually with an indelible black pen. Do not assign tags.
 - Acceptable Products: С.
 - 1. Emedco Jumbo Tag Seal
 - Brady 65000 Series
 Seton Write on Tag
- PART 3 EXECUTION
- 3.01 PREPARATION
 - Sand or steel wool ferrous pipe smooth removing factory applied lacquer Α. coatings. Wipe free of dust.
 - Α. Painted, paper or rubber surfaces shall be wiped clean. Use solvent as recommended by insulation manufacturer where it applies.
 - Clean wire ends free of lubricants and dirt. C.

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3.02 INSTALLATION

- Install plastic nameplates with corrosive-resistant mechanical fasteners. Α.
- в. Identify HVAC equipment with plastic nameplates. Use names provided by Owner or as shown on Drawings. Extend sequence of existing names.
- С. Identify valves in equipment rooms which are remote from the spaces and devices they control. Use names as determined by the Owner or as otherwise specified.
- D. Tag automatic controls, instruments, and relays. Key to control schematic.
- Identify piping, concealed or exposed, with stenciled painting. Use names D. which match those already in use by Owner. If existing pipe is not labeled match those shown on Drawings. Install in clear view and align with axis of piping. Locate identification on each side of wall penetrations and near each equipment take off. Locate on minimum of 50'-0" centers on straight runs without branches and take-offs.
- Identify cabling, concealed or exposed, with markers. Use plan English F. names like "Boiler Control Cable".

3.02 APPLICATION

- Fans, Roof Top Units, Ductless Split System (indoor and outdoor units): Α.
- в. Valves:
 - 1. Tag remote natural gas valves. Valves within sight of controlled item do not require a tag. Identify what devices will be shut down.
- C. Pipe:
 - 1. Label pipe supported along side other pipe in exposed spaces. Label pipe on a minimum of 50'-0" centers and on both sides of walls.
- Wire Labels: D.
 - 1. Tag automatic controls, instruments, and relays. Key to control schematic. Tag connection point with indelible pen.

END OF SECTION 230553

SECTION 230593 - TESTING ADJUSTING & BALANCING FOR HVAC

PART 1 - GENERAL

- WORK INCLUDES 1.01
 - Α. Base Bid:
 - 1. Contractor Provide:
 - a. Test and balance existing supply system.
 - Test and balance new RTU systems. b.
 - c. Test and balance new fans serving exhaust and transfer systems.
 - Provide pretest evaluation of existing systems and those shown as d. new on drawings. List questions for A/E which may be required before balance work can be completed.
 - Provide retesting required in Paragraph 1.04.D. e.
 - Test and adjust airflow to new VAV terminals and existing VAV f. terminals where airflow is revised.
 - g. Obtain temperature measurements across heating and cooling apparatus once for heating season and once for cooling season.
 - Balance outside air dampers to minimums shown on RTU schedule. h.
 - Balance reports for systems completed in early phases of the work i. and turned over to the Owner.
 - j. Measure gas consumption rate using utility meter for each furnace installed as part this work. See Section 230800.
 - Coordinate fan speed with roof top unit manufacturer's and к. commissioning agent.
 - Measure inlet and outlet air temperature and running load amperes 1. of each air cooled condensing unit operating with condensing fang
- 1.02 RELATED WORK
 - Specified Elsewhere: Α.
 - 1. 230800 Commissioning of HVAC Systems.
 - 230900 Temperature Controls. 2.
 - 233100 Ductwork. 3.
 - 233300 Air Duct Accessories. 4.
 - 233400 Fans. 5.
 - 233600 Air Terminal Units. 6.
 - 7. 233713 Diffusers, Registers and Grilles.
 - 237482 Packaged Heating/Cooling/Heat Recovery Units 8.
 - 238126 Split System Air Conditioners. 9

1.03 SYSTEM DESCRIPTION

- Summary: Α.
 - Test and Balance shall: 1.
 - a. Verify exhaust airflow in toilet rooms.
 - b. Verify air flow at new and existing VAV boxes.
 - c. Distribute air around supply diffusers and registers.
 - Balance flow distribution so that space temperatures are d. homogenous.
 - Verify duct does not leak and that fans and equipment are e. functioning per design and manufacturer's performance data.
 - Verify loads on air cooled condensing units. f.
 - g. Verify burner capacity on roof top unit burners.
 - Ventilating work for this project is essentially the redistribution 2. of existing air flows to different areas. It also includes some revisions to existing fans and balancing of new fans.

- в. Intent of work is to:
 - Balance flow distribution so that space temperatures are homogeneous. 1. Verify duct does not leak and that fans and equipment are functioning 2. per design and manufacturer's performance data.
 - 3. Verify ventilation and exhaust flows are as specified.
 - 4. Leave the Owner with a functioning system.
- С. Definitions:
 - 1. Air balance testing and adjusting air system components to achieve design parameters or to evenly distribute available air. Includes both flow and temperature measurements recording of measurements, and adjustment of system to achieve specified air flows.
 - Calibration Comparison of the measured values of an instrument with 2. a known quantity.
 - Testing measurement of temperatures, gas flow, electric current and 3. voltage which show how much work an air conditioner is doing or how much heat a furnace is providing.
- QUALITY ASSURANCE 1.04
 - Personnel doing work on site shall have certifications noted above. Α.
 - C. Instrumentation used for testing and balancing shall be calibrated no more than one month before date of use.
 - Owner and Architect/Engineer reserve the right to pick ten different D. measurements to be remade after the test and balance report is submitted. If five of the ten selected measurements are found to be more than 50 percent different than those submitted in the report the entire balance report shall be redone.
 - Payment for at least twenty percent balance work will not be made until Ε. building has been turned over to the Owner. Contractor will not be paid for report submittals which contain acceptable balance reports for fans later found to be running backwards or similarly obvious problems. Payment will not be made for final reports which simply list problems without also providing solutions.
 - F. The A/E will compare measured fan characteristics against the manufacturer's published fan curves and tabulated data. Test data which falls outside of the manufacturer's published curves may require retesting subject the A/E review.
- 1.05 REGULATORY REQUIREMENTS AND STANDARDS
 - AABC National Standards for Total System Balance. Α.
 - B. ADC Test Code for Grilles, Registers, and Diffusers.
 - C. ASHRAE 111 - Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air-conditioning, and Refrigeration Systems.
 - D. NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.
 - SMACNA HVAC Systems Testing, Adjusting, and Balancing. Ε.
 - SMARTA Sheet Metal, Air Conditioning and Roofing Contractors Trade F. Association of Illinois.

G. TABIC - Testing and Balancing Institute for Certification.

1.06 SUBMITTALS

- Submit name and qualification certificate of air balance technician who Α. actually does work. Do this at least ten working days before work is to be done.
- B. Test Reports: Indicate data on standardized form following AABC. SMACNA, SMARTA or TABIC.
- C. Provide written certification from installing contractors systems are in correct working condition and ready for test.
- Field Reports: Indicate deficiencies in systems that would prevent proper D. testing, adjusting, and balancing of systems and equipment to achieve specified performance.
- Prior to commencing work, submit report forms or outlines indicating Ε. adjusting, balancing, and equipment data required.
- Submit PDF file draft copies of report for review prior to final F. acceptance of Project. Provide final copies for A/E and for inclusion in operating and maintenance manuals.
- Submit cost of balance work as line item on contractors schedule of G. values. Provide name of balance contractor that time.
- н. Provide reports in soft cover, letter size, three-hole binder manuals, complete with index page, with cover identification at front and side.
- Include detailed procedures, agenda, sample report forms prior to I. commencing system balance.
- 1.07 PROJECT CONDITIONS
 - Building/Construction Conditions: Α.
 - 1. All portions of systems shall be complete before balance work is begun. Ceilings shall be in place. Grilles and diffusers shall be in place.
 - Ambient Conditions: R
 - 1. Temperature measurements across furnace heat exchangers shall be made when ambient temperatures are 50 degrees F or less.
 - Temperature measurements across cooling coils shall be made when 2. ambient temperatures are 75 degrees F or greater.
 - Balance work which does not involve heating or cooling apparatus 3. shall be accomplished when ambient temperatures are above 20 degrees F and less than 80 degrees F.
- 1.08 SEQUENCING
 - Do not do work until systems are complete. Α.
 - Work with temperature installer to balance devices under all operational в. sequences.
 - Where systems are completed early for partial Owner occupancy, complete С. the balance report for those areas at the time the systems are turned over for Owner use.

- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE
 - A. Not Used.
- PART 3 EXECUTION
- 3.01 EXAMINATION
 - Verify that systems are complete and operable before commencing work. Α. Ensure the following conditions:
 - 1. Systems are started and operating in a safe and normal condition.
 - Temperature control systems are installed complete and operable. 2.
 - 3. Proper thermal overload protection is in place for electrical equipment.
 - 4. Final filters are clean and in place.
 - 5. Duct systems are clean of debris.
 - 6. Fans are rotating correctly.
 - 7. Fire and volume dampers are in place and open.
 - 8. Air coil fins are cleaned and combed.
 - 9. Access doors are closed and duct end caps are in place.
 - 10. Air outlets are installed and connected.
 - 11. Duct system leakage is minimized.
 - Submit field reports immediately by telephone, email or facsimile. Report в. defects and deficiencies noted during performance of services which prevent system balance. Do not report defects and deficiencies in written reports except as preliminary situations for which remedies were found.
- PREPARATION 3.02
 - Provide instruments required for testing, adjusting, and balancing Α. operations. Make instruments available to Architect/Engineer to facilitate spot checks during testing.
 - Provide additional balancing devices as required. в.
- 3.03 FIELD QUALITY CONTROL
 - Air Handling Systems: Adjust to within plus or minus five (5) percent of Α. design for supply systems and plus or minus five percent of design for return and exhaust systems.
 - Air Outlets and Inlets: Adjust outlets and inlets in space to within plus Β. or minus five percent of design.
- 3.04 ADJUSTING
 - A. Ensure recorded data represents actual measured or observed conditions.
 - Permanently mark settings of dampers, valves, and other adjustment devices в. allowing settings to be restored.
 - After adjustment, take measurements to verify balance has not been С. disrupted or that such disruption has been rectified.
 - Leave systems in proper working order, replacing covers, closing access D. doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

- Ε. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.
- 3.05 AIR SYSTEM PROCEDURE
 - Adjust air handling and distribution systems to provide required or design Α. supply, return, and exhaust air quantities.
 - Measure air quantities at air inlets and outlets, with calibrated flow Β. hood. Do not use velocity traverse of duct without approval of the A/E.
 - C. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
 - Use volume control devices to regulate air quantities only to extend that D adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and volume extractors. Do not use register dampers for adjustment without permission from the A/E.
 - Vary total system air quantities by adjustment of fan speeds. Provide Ε. drive changes required. Vary branch air quantities by damper regulation.
 - Measure static air pressure conditions on roof top energy recovery units F. including filter and coil pressure drops, and total pressure across the fan. Make allowances for loading of filters.
 - Adjust outside air automatic dampers, outside air, return air, and exhaust G. dampers for design conditions. See Schedule on Drawings.
 - Measure temperature conditions across outside air, return air, and exhaust Η. dampers to check leakage.
 - Measure static pressure, fan speed and air flow for transfer and exhaust I. fans.
- 3.06 TESTING AND BALANCING
 - Motors 1/3 Horsepower and Larger: Α.
 - 1. Check and record full load amperes.
 - 2. Report any motors which are overloaded, defective, or operating within their service safety factor.
 - At Fans: Β.
 - 1. Measure:
 - a. Air flow.
 - b. Total static pressure.
 - c. RPM.
 - С. VAV Boxes
 - 1. Measure
 - a. Air flow at maximum flow condition.
 - Air flow at minimum flow position. b.
 - Static pressure across air valve and heating coil. c.
 - D. ACCU's:
 - Measure for cooling mode. 1.
 - a. Compressor and fan current draw.
 - b. Ambient temperature intake.
 - c. Discharge air temperature.

Ε. All work for related equipment shall be done on the same day and time.

3.08 REPORTS

- Α. Report forms:
 - 1. Title Page:
 - a. Project name and location.
 - b. name of test and balance technician.
 - c. Report date.
 - Summary Comments: 2.
 - a. Final performance.
 - b. Notable characteristics of system.
 - c. Nomenclature used throughout report.
 - d. Test conditions.
 - 3. Instrument List:
 - a. Instrument.
 - b. Manufacturer.
 - c. Model number.
 - d. Serial number.
 - e. Range.
 - f. Calibration date.
 - 4. Electric Motors:
 - a. Manufacturer.
 - b. Model/Frame.
 - HP/BHP. с.
 - d. Phase, voltage, current, both nameplate and actual.
 - e. RPM.
 - Service factor. f.
 - g. Starter size, rating, heater elements.
 - h. Sheave Make/Size/Bore.
 - 5. V-Belt Drive:
 - a. Identification/location.
 - b. Required driven RPM.
 - c. Driven sheave, diameter and RPM.
 - d. Belt, size and quantity.
 - e. Motor sheave diameter and RPM.
 - f. Center to center distance, maximum, minimum, and actual.
 - 6. Roof Top Units:
 - a. Location.
 - b. Manufacturer.
 - c. Unit number.
 - d. Air flow, specified and actual.
 - Outside air flow, specified and actual. e.
 - Total static pressure across fan. f.
 - g. Total external static pressure across air handling unit and/or furnace including coils.
 - h. Airside static pressure drop across coils.
 - Sheave Make/Size/Bore. i.
 - j. Static pressure across heat recovery wheels.
 - Exhaust and make up airflow across heat recovery wheels. k.
 - 1. Gas flow measurement of burners.
 - Air temperature rise across furnace heat exchangers. m.
 - n. Number of Belts/Make/Size.
 - o. Fan RPM.
 - Current Loading (AMPS) of Motors of all fans. p.

- 7. Transfer Exhaust Fan Data:
 - a. Location.
 - b. Manufacturer.
 - c. Unit number.
 - d. Air flow, specified and actual.
 - e. Total static pressure specified and actual.
 - f. Sheave Make/Size/Bore.
 - g. Number of Belts/Make/Size.
 - h. Fan RPM.
 - i. Current loading of motor.

8. ACCUS:

- a. Unit number and use.
- b. Ambient inlet temperature.
- c. Discharge temperature.

- d. Voltage and electric current.e. Calculation of cooling capacity.f. Suction temperature of fully loaded unit.
- g. Comparison with manufacturer's rating.

END OF SECTION 230593

SECTION 230720 - HVAC DUCTWORK INSULATION

PART 1 - GENERAL

1.01 WORK INCLUDES

- A. Base Bid:
 - 1. Contractor Provide:
 - a. Insulation on supply ductwork.
 - b. Re-insulation of existing duct.
 - c. Cover existing duct in gymnasium.
 - d. Miscellaneous insulation boards on ACCU curbs and RTU #1 adaptor curb.
 - e. At Contractor's option insulate and cover galvanized steel duct used on exterior of building.

1.02 RELATED WORK

A. Specified Elsewhere: 1. 233100 - Ductwork.

1.03 SYSTEM DESCRIPTION

- A. Definitions:
 - 1. Supply air ductwork is all duct which is downstream of heating or cooling coils.
 - 2. Round duct is that duct with a round or oval cross-section.
 - 3. "Exterior" means outside the envelope of the building exposed to the elements.
 - 2. Outside air ductwork is all duct which connects louvers to the intake side of equipment or mixing boxes or plenums.
 - 3. Energy recovery duct is that duct between heat recovery units and furnace intakes.
- B. Description of work:
 - 1. Expose round cooling supply duct shall be double wall as specified in 233100.
 - 2. Supply duct above ceiling shall be blanket covered per this spec.
 - 3. Existing duct in Gym shall be covered per this specification.

1.04 QUALITY ASSURANCE

- A. Materials shall be stamped with ASTM and UL listings.
- B. Inspect to be certain tolerance are met. A/E will verify. If tolerance are not found to be met at any one part of the system the entire system shall be re-inspected.
- C. Installer: Workman skilled in performing the work of this section.
- 1.05 REGULATORY REQUIREMENTS
 - A. ASTM C518 Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - B. ASTM C553 Mineral Fiber Blanket and Felt Insulation.
 - C. ASTM C612 Mineral Fiber Block and Board Thermal Insulation.
 - D. ASTM E84 Surface Burning Characteristics of Building Materials.

ASTM E96 - Water Vapor Transmission of Materials. Ε.

1.06 SUBMITTALS

- Submit under provisions of Section 013300. Α.
- Product Data: Provide product description, list of materials and в. thickness for each service, and locations. Show compliance to referenced standards. Show K-Value, density, permeability flame spread, and surface burning characteristics. Provide MSDS data on all adhesives and cleaners. Show accessories will match insulation.
- C. Manufacturer's Installation Instructions: Indicate procedures which ensure acceptable workmanship and installation standards will be achieved. Submit these for grease duct, hot duct and plenum enclosures.
- D. Provide a separate line item and cost on the Schedule of Values for Duct Insulation.
- DELIVERY, STORAGE, AND HANDLING 1.07
 - See Section 016000. Α.
 - в. Deliver materials to site in original factory packaging, labeled with manufacturer's density and thickness. Keep materials separated until installed or removed from site.
 - C. Store insulation in original wrapping and protect from weather and construction traffic.
 - D. Protect insulation against dirt, water, chemical, and mechanical damage.

PART 2 - PRODUCTS

2.01 MANUFACTURER & PERFORMANCE

Unless otherwise specified the manufacturer's number specified or Α. scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.

2.02 GLASS FIBER

- Composite Surface Burning Characteristics by UL 723: Α.
 - 1. Flame Spread 25.
 - Smoke Developed 50. 2.
- в. Flexible Insulation: flexible, non-combustible blanket:
 - 1. K value: ASTM C518, .27 at 75 degrees F.

 - Maximum service temperature: 250 degrees F.
 Maximum moisture absorption: less than three percent by volume.
 - Kraft paper reinforced vapor barrier jacket with glass fiber yarn 4. bonded to aluminized film. Limit moisture vapor transmission to .04 permeability.
 - 5. Density 1.0 lb./cubic foot.
- Board Insulation: Semi-rigid board type: С. 1. K value: ASTM C177: .26 at 100 degrees F Semi - rigid board type.

- 2. Maximum service temperature: ASTM C411 450 degrees F.
- Jacket Fiberglass reinforced foil. Maximum permeability by ASTM 3.
- E96. .02 perm puncture resistance by ASTM D-781 50 units.
- 4. Compressive Strength 25 lb./sq. ft. by ASTM C165.
- 5. Density 3 lb./cu. ft.
- Vapor Barrier Tape: D.
 - 1. Compatible with wrap submitted.
 - Premium grade foil fiberglass scrim and kraft paper laminate in 2. diamond pattern with high tack adhesive. Shall be able to conform to irregular surfaces. Backing shall conform to UL Standard 723.

Acce	eptable Products:	Flexible	Board
1.	Certainteed.	Duct wrap	
2.	Knauf.	Duct wrap	FSK
3.	Schuller.	Microlite	
4.	Owens Corning Fiberglas.	Type 100	700 Series
	Acce 1. 2. 3. 4.	<pre>Acceptable Products: 1. Certainteed. 2. Knauf. 3. Schuller. 4. Owens Corning Fiberglas.</pre>	Acceptable Products:Flexible1. Certainteed.Duct wrap2. Knauf.Duct wrap3. Schuller.Microlite4. Owens Corning Fiberglas.Type 100

- F. Weather Barrier:
 - 1. Shall be 13 ply laminate of fabric with outer foil jacket.
 - 2. Shall have fully adhered pre-glued backing.
 - 3. Shall perform at temperature ranges of -30 degrees F to +248 degrees F.
 - 4. Shall have 0.0 permeability.
 - 5. Shall be applicable in temperatures of 10 degrees F.
- Acceptable Product: G. 1. Venture Clad

CELLULAR FOAM 2.03

- Insulation: ASTM C534; flexible, cellular elastomeric sheet. Α.
 - 1. K Value: ASTM C177 .28 at 75 degrees F.
 - 2. Minimum Service Temperature: 40 degrees F.

 - Maximum Service Temperature: 40 degrees F.
 Maximum Service Temperature: 220 degrees F.
 Maximum Moisture Absorption: ASTM D1056; 6.0 percent by volume.
 Moisture Vapor Transmission: ASTM E96; 0.20 perm inches.

1579 CW 13.

- 6. Maximum Flame Spread: ASTM E84; 25.
- 7. Maximum Smoke Developed: ASTM E84; 50/
- 8. Connection: Waterproof vapor barrier adhesive.

R Recommended Protective Finish

- 1. Shall be usable indoors and outdoors.
- 2. Shall be white in color with possible tinting.
- 3. Shall be water based latex material resistant to cracking and heavy cold weather flexibility.

Finich

- 4. Shall be ultraviolet resistant.
- C. Acceptable Products:

			I THITOH
1.	Armstrong	AP Armaflex.	WB Finish
2.	Aeroflex	Aerocell	Aerocoat
3.	K-Flex	Insul-Sheet	K-Flex 374

PART 3 - EXECUTION

- 3.01 ENVIRONMENTAL REQUIREMENTS
 - Maintain ambient temperatures and conditions required by manufacturers of Α. adhesives, mastics, and insulation cements.

B. Maintain ambient temperature limits during and after installation for minimum period of two hours.

3.02 PREPARATION

- A. Remove construction dirt and dust from duct to be insulated before insulation work is done.
- B. Verify duct has been sealed and leak tested.
- 3.03 INSTALLATION
 - A. Install materials in accordance with manufacturer's instructions.
 - B. Insulated ductwork conveying air below ambient temperature: (supply duct)1. Provide insulation with vapor barrier jackets.
 - 2. Finish with vapor barrier tape of the highest quality specified.
 - 3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
 - 4. Insulate entire system including fittings, joints, flanges, and flexible connections.
 - C. Blanket insulation shall be wrapped tightly around circumference of ductwork. Edges shall be lapped and stapled. Circumferential joints shall be taped.
 - D. Board insulation shall be adhered to duct with accessory cement. Insulation on the bottom of duct shall be impaled over pins welded or glued to the duct.
 - E. Foam Plastic Installation:
 - 1. Shall be fully adhered with manufactures standard cement.
 - 2. Cut edges shall not be exposed. Miter corners.
 - 3. Finish with two coats of specified paint.
 - F. Exterior Duct Insulation:
 - 1. Apply using two layers of board insulation specified.
 - 2. The inner layer shall not have a vapor barrier.
 - 3. The outer layer shall have a vapor barrier.
 - 4. Impale both layers over pins which are welded or adhered to the duct. At Contractor's option secure inner layer with malleable galvanized wire or stripping wrapped around duct and tied. Secure outer layer in same manner except ties shall be depressed in a shallow cutout under the vapor barrier and that cutout be covered with vapor barrier tape.
 - 5. Augment these instructions as required by the manufacturer's instructions.
 - 6. Cover the insulation entirely with the exterior wrap specified. Do this in accord to that manufacturer's instructions.
- 3.04 APPLICATION

A.	DUCTWORK Supply & Return Duct Exposed to out of doors	THICKNESS Inch 2″ board	FINISH Vapor Barrier Specified
в.	Concealed Supply Duct	1-1/2" Blanket	Vapor Barrier Specified
C.	Existing Gymnasium	1/2" Cellular Foam	Paint

END OF SECTION 230720

SECTION 230800 - COMMISSIONING OF HVAC

PART 1 - GENERAL

- 1.1 SUMMARY
 - A. Work Includes:
 - 1. Contractor shall:
 - a. Commission and start each roof top unit per Section 237482.
 - b. Verify gas flow rates for each RTU are clocked per Section 230593.
 - c. Verify electrical connections are made to motorized equipment.
 - d. Commission and start each fan.
 - e. Commission and start each new VAV box.
 - f. Commission and start up each ECM motor drivers fan (TF1, TF2, TF3, and EF1).
 - g. Deliver manufacturers executed startup checklists to the Architect/Engineer and Owner.
 - h. Coordination with Test and Balance Technician.
 - B. Related Sections:
 - 1. 23 05 93 Testing Adjusting & Balancing For HVAC.
 - 2. 23 09 00 Temperature Controls.
 - 3. 23 74 82 Packaged Heating/Cooling heat Recovery.
 - 4. 23 81 26 Split System Air Conditioners.

1.2 DEFINITIONS

- A. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
- B. HVAC&R: Heating, Ventilating, Air Conditioning, and Refrigeration.
- C. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.
- 1.3 INFORMATIONAL SUBMITTALS
 - A. Certificates of readiness.
 - B. Certificates of completion of installation, prestart, and startup activities.
- 1.4 ALLOWANCES
 - A. See individual sections.
- 1.5 CONTRACTOR'S RESPONSIBILITIES
 - A. Perform commissioning tests at the direction of the Architect/Engineer.
 - B. Attend construction phase controls coordination meeting.

- C. Attend testing, adjusting, and balancing review and coordination meeting.
- D. Participate in HVAC&R systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the Architect/Engineer.
- E. Provide information requested by the Architect/Engineer for final commissioning documentation.
- F. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.
- 1.6 ARCHITECT/ENGINEER RESPONSIBILITIES
 - A. Review Project-specific construction checklists and commissioning process test procedures for actual HVAC&R systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.
 - B. Observe commissioning testing.
 - C. Verify testing, adjusting, and balancing of Work are complete.

1.7 COMMISSIONING DOCUMENTATION

- A. Provide the following information to the Architect/Engineer for inclusion in the commissioning plan:
 - 1. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
 - 2. Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for HVAC&R systems, assemblies, equipment, and components to be verified and tested.
 - 3. Certificate of readiness, signed by the Contractor, certifying that HVAC&R systems, assemblies, equipment, components, and associated controls are ready for testing.
 - 4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
 - 5. Certificate of readiness certifying that HVAC&R systems, subsystems, equipment, and associated controls are ready for testing.
 - 6. Test and inspection reports and certificates.
 - 7. Corrective action documents.
 - 8. Verification of testing, adjusting, and balancing reports.
- B. Contractor's Schedule of Values:
 - 1. Provide a separate cost for commissioning cooling equipment in the cooling season.
 - 2. Provide a separate cost for commissioning heating equipment in the heating season.

1.8 COORDINATION

A. Commission verification for the Architect/Engineer and Owner shall be done one time for heating equipment and one time for cooling equipment. Time shall be arranged a minimum of one week before absolute need with a three week warning the meeting will be required. apaceDesign Architects + Engineers Project No. 2014909.01

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

- 3.1 TESTING PREPARATION
 - A. Certify that HVAC&R systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
 - B. Certify that HVAC&R instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.
 - C. Certify that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.
 - D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle and alarm conditions).
 - E. Inspect and verify the position of each device and interlock identified on checklists.
 - F. Check safety cutouts, alarms, and interlocks with smoke control and lifesafety systems during each mode of operation.
 - G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the Architect/Engineer.
 - H. Verify electrical connections have been made in accord to manufacturer's instructions.
- 3.2 Testing AND BALANCING VERIFICATION
 - A. Prior to performance of testing and balancing Work, provide copies of reports, sample forms, checklists, and certificates to the Architect/Engineer.
 - B. Notify the Architect/Engineer at least ten days in advance of testing and balancing Work, and provide access for the Architect/Engineer to witness testing and balancing Work.
- 3.3 GENERAL TESTING REQUIREMENTS
 - A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the Architect/Engineer.
 - B. Testing shall include all work noted in paragraphs 1.1.A.1.a through g.
 - C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.
 - D. The Architect/Engineer shall review testing plans, procedures, and checklists for HVAC&R systems, subsystems, and equipment.

- E. Tests will be performed using conditions approximating design conditions.
- F. The Architect/Engineer may direct that set points be altered when simulating conditions is not practical.
- G. The Architect/Engineer may direct that sensor values be simulated when set points are not practical.
- H. If tests cannot be completed because of a deficiency outside the scope of the HVAC&R system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.
- I. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.
- 3.4 HVAC & R systems, subsystems, and equipment Testing Procedures
 - A. HVAC&R Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Section 230900.
 - B. Energy Supply System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of gas systems and equipment at the direction of the Architect/Engineer. The Architect/Engineer shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.
 - C. Refrigeration System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of refrigerant compressors and condensers, and other refrigeration systems. The Architect/Engineer shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

END OF SECTION 23 08 00
SECTION 230900 - TEMPERATURE CONTROLS

PART 1 - GENERAL

1.01 WORK INCLUDES

- A. Base Bid:
 - 1. Contractor Provide:
 - a. Sensors and controls to operate all HVAC devices specified herein.
 - b. Computer software and hardware required to operate HVAC systems.
 - c. Software, graphics and hardware design to provide for sequence of operation points list herein specified.
 - d. Miscellaneous assorted control connections and wiring and devices to make system function.
 - e. All wire conduit tubing and cable required to complete systems.
 - f. Removal of existing controls now attached to equipment and structure for removal.
 - g. Commissioning and startup of control systems and the equipment they control for both heating and cooling systems.

1.02 RELATED WORK

- A. Specified Elsewhere:
 - 1. 23 05 93 Testing, Adjusting Balancing for HVAC.
 - 2. 23 08 00 Commissioning of HVAC Systems.
 - 3. 23 34 23 Fans.
 - 4. 23 81 26 Split System Air Conditioners.

1.03 REFERENCES

- A. ANSI/NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum).
- B. ANSI/NFPA 90A Installation of Air Conditioning and Ventilation Systems.

1.04 SYSTEM DESCRIPTION

- A. Definition:
 - 1. Temperature Control Temperature Control Subcontractor.
 - 2. BAS Building Automation System = EMS Energy Management System.

B. Existing Temperature Control System:

- 1. Existing Building Automation System is a Delta Orca Series modular control installed in 2003 and maintained in working until this time.
- 2. Existing controls serve Air Handling Unit in second floor Mechanical Room, its associated air cooled condensing unit, heating coil pumps and VAV boxes. It shall be preserved in this function.
- 3. Existing controls serve the 2-existing second floor heating water boiler their associated pumps and building wide heating water pumps. These controls shall be preserved for this function.
- 4. Existing controls serve the former swimming pool space (Dectron) unit. These controls shall be disconnected and removed and traces of their existence be removed from existing system graphics.
- 5. Existing controls serve the 2 air supply units and heaters and associated exhaust fans which now serve the Old Gymnasium. These controls shall be disconnected and removed and traces of their existence be removed from existing system graphics.
- Existing controls which serve current toilet room fan, originally EF-2, shall remain to control the new fan which serves the revised toilet room/locker room spaces.

- 7. Existing controls which serve the air make up unit and the wall exhaust fan in the pool storage room shall be removed and traces of their existence removed from existing system graphics.
- 8. Existing controls for exhaust fans serving upper level toilet rooms and lobby toilets (EF #4 and EF #1) shall remain in their current condition.
- C. New Temperature Control System
 - 1. Shall serve new equipment noted on the Drawings, and described within the Sequence of Operation.
 - 2. Does not need to communicate with the existing Temperature Control System.
 - 3. Shall not re-use any part of the existing temperature control system which were removed from service. It shall be altogether new and capable of being serviced and maintained for the foreseeable future. It shall be capability of being expanded to accommodate the needs of the existing systems noted above to be retained. (See scanned points list attached at the end of this section).
- D. It is the intention of this specification all controls systems shall work. They shall be provided with all necessary devices, software and labor required to provide the specified "Sequence of Operation".
- E. New control systems shall consist of a system of integrated direct digital and electric controls which will control the HVAC systems with consideration to room temperature, outdoor temperature, room humidity, and carbon dioxide levels. System shall be capable of sensing conditions and anticipating adjustments to the HVAC equipment which shall maintain room temperatures within two degrees F. System shall also be capable of monitoring and recording all data. System shall be "web accessible" by Owner through User names and passwords. Every system shown on drawings or included in the points list or sequence of operation shall be represented graphically by the system.
- 1.05 SUBMITTALS
 - A. Submit under provisions of Section 01 33 23.
 - B. Shop Drawings: Indicate complete operating data, system drawings, wiring diagrams, and written detailed operational description of sequences.
 - C. Product Data: Include description and engineering data for each control system component. Include sizing as requested.
 - D. Schedule of Values:
 - 1. Shall list the name of the business entity whose employees actually perform the work listed in this section.
 - 2. Separate line items with applicable costs shall be listed for each of the following:
 - a. Submission of shop drawings and product data.
 - b. Software programming labor.
 - c. Creation of graphic representation.
 - d. Material and equipment costs.
 - e. Installation labor of materials and equipment.
 - f. Startup/commissioning of control systems.
 - g. Training of Owner's personnel and preparation of training materials and maintenance manuals.
 - E. Special Tools and Software:
 - 1. All special tools, passwords, graphic interpretations, software applications and training needed by the Owner to adjust any of the operating parameters noted in the sequence of operation shall be included.
 - 2. Special Wrenches: Provide three sets of special wrenches needed to access adjustable sensors and thermostats.

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- 3. Software Applications: Provide software tools needed to change such items as operating schedule, temperature set points, "trending setup and output", pressure alarm points, status, carbon dioxide set points, humidity set points.
- 1.06 PROJECT RECORD DOCUMENTS
 - A. Submit record documents under provisions of Section 01 78 39.
 - B. Accurately record actual location of control components, including safety devices, thermostats, and sensors.
 - C. Revise shop drawings to reflect actual installation and operating sequences.
- 1.07 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 01 78 23.

- B. Include systems descriptions, set points, and controls settings and adjustments.
- C. Include inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.
- D. Format and Content:
 - 1. The manual shall include data for only those controllers and systems actually installed. Manufacturer's standard publications shall be highlighted to reflect the system actually used and edited to delete the systems, controllers and equipment not actually used. A cover sheet or sheets which define the correct equipment is acceptable but does not fill the requirements noted above for editing and highlighting.
 - The manual shall be 8-1/2" x 11" paper size, or shall be bound into an 8-1/2" x 11" folder. There shall also be a PDF file made available.
 - 3. There shall be a separate section for each type of equipment. Equipment names used for the work shall be noted on maintenance manuals.
- 1.08 OWNER INSTRUCTION AND COMMISIONING
 - A. System Operation:
 - Controls and equipment which is controlled shall be fully operational and tested by the respective trades which installed the devices. Corrective work shall be performed. Contractor shall review work of all related trades. Work like "bumping" motors, energizing controls, opening valves to determine if systems will function shall be completed. Notify equipment installers of non-functioning items. This shall be done prior to substantial completion.
 - 2. Contractor shall list schedule items required from the Owner so that programming can be completed. Allow a minimum of one week for the Owner to provide this schedule.
 - 3. Obtain from the Owner a list of those individuals who are authorized to provide schedules to the contractor and to receive instructions regarding system operation.
 - B. Owner Instruction:
 - 1. Instruction shall be provided on at least two separate times with a one week minimum period between.
 - 2. Notify the Owner at least two weeks before instructional sessions are needed. Coordinate instructional time at Owner's convenience during normal workday.

- 3. Simply telling whomever of the Owner's personnel who may be on site when the hardware installation is complete does not meet this specification.
- C. Training Material:
 - 1. Shall include description of each operating mode of the system.
 - 2. Shall include a glossary of terms which are particular to the project and operation of the systems.
 - 3. Shall include troubleshooting potential problems.
 - 4. Shall include photographs and drawings of the systems as they are actually installed.
 - 5. Shall utilize the same identification symbols as actually installed.
 - 6. Shall include instruction in reading control shop drawings.
 - 7. Shall cover routine maintenance. Provide separate reproducible check lists for daily, weekly, monthly and yearly maintenance.
 - 8. Include name and telephone number of trained individual who will answer questions on the project.
- D. Training Medium:
 - 1. Provide instruction in written form. Supply at least two printed copies for use by the Owner. Provide a PDF file copy.
 - Provide at least two copies of a video of an instructional session for this particular project. Video shall be collected on removable "zip" drive.
 - 3. Video shall include images of actual installation. Individual components shall be pointed out. Each component shall be shown on the video for at least five seconds or the length of time the instructor is describing the components function.
 - 4. The video shall be made either during one set of training sessions or independently of a training session at the Contractor's option. The audio portion of the video shall be "dubbed" onto the tape so that equipment noise is not heard while instructions are being repeated.
 - 5. The video and booklet shall be made in the English Language.
- E. Obtain a signed attendance sheet for each training session. Turn a copy of these sheets over to the Peoria Park District Engineering Office, the Peoria Park District User, and the Arachitect/Engineer.

1.09 QUALIFICATIONS

- A. Installing Contractor:
 - 1. Shall have local service capability which can service a control problem within two hours of being called by the Owner.
 - 2. Shall have the "In-House" capability of writing and installing software and creating graphics for controllers' installed with modifiable software.
- 1.10 SEQUENCING AND SCHEDULING
 - A. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.
 - B. Coordinate work and ensure system is completed and commissioned by Date of Substantial Completion.
 - C. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.
- 1.11 WARRANTY

A. Provide two years warranty for all parts and labor beginning with the date of substantial completion.

1.12 COORDINATION

- A. Temperature control system protocol shall be carefully coordinated with that provided by Roof Top Unit and Ductless System manufacturers. This is not a directive for those units to be furnished by the controls contractor.
- PART 2 PRODUCTS

2.01 MANUFACTURER & PERFORMANCE

- A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 COMPOSITE SYSTEMS
 - A. Systems shall consist of direct digital controllers integrated with electronic sensors and electric/electronic operators.
 - B. Systems shall be complete with separate zone controls and sensors for each VAV box, fan coil unit, transfer fan, and exhaust fan.
 - C. Systems shall have full intercommunication between device controllers with central monitoring, adjustability and program adjustment. Systems shall utilize controllers which are BAC net based and listed by BTL (BACnet Testing Laboratory). Controllers shall be adjustable through their software to provide the Sequence of Operation listed below. Systems shall have graphics programs which show all primary equipment and their associated dampers and accessories. Each HVAC device shown on drawings or listed in the sequence of operation and the control points list shall have its own graphic representation.
 - D. Control shall be in accord to sequence of operation specified. System shall be accessible through a website from any computer the Owner wishes to authorize.
 - E. Wiring shall be in accord to Division 26, except that plenum rated low voltage multi-conductor cable shall be used above ceilings and within wall cavities. Cable for electric signal shall be no less than 18 gauge. Cable for electronic signal shall be shielded and acceptable to the control system manufacturer. Jacket color shall not be red or blue or green.
 - F. "Wireless" controllers shall be used only after onsite testing is conducted which proves all locations proposed for wireless sensors are addressable. All repeaters and power supplies needed shall be included.
 - G. Acceptable Products:
 - 1. Andover
 - 2. Automated Logic
 - 3. Delta
 - 4. Reliable

2.03 SENSORS

- A. Sensors shall have analog output for input to direct digital controller. Sensor and lead shall be moisture, humidity, temperature and sunlight resistant.
- B. Sensors shall be provided with enclosures as required to shield them against extraneous inputs. i.e., sunlight on a temperature sensor.
- C. Sensor supports shall be corrosion resistant and shall hold the device at the location noted by the control manufacturer as the most effective location for the work to be accomplished.
- D. Electronic Thermostat Sensors:
 - 1. Shall have minimum of two hour override which can temporarily reset conditions to an occupied mode.
 - 2. Shall have display which shows space temperature and set point temperature.
 - 3. Shall have minimum operating range of 45 of 90 degrees F.
- E. Carbon Dioxide Sensors:
 - 1. Shall be mountable within an enclosure like that of a temperature sensor.
 - 2. Shall operate continuously without a local set point control.
 - 3. Shall operate with non-dispearsive infrared technology repeatable to within \pm 20 parts per million over a 0 \circledast 2000 parts per million range.
 - 4. Shall be adaptable for duct mounting.
 - 5. Shall have a 4 to 20 miliampere, 0-5 volt or 0-10 volt output for interface to control system.
 - 6. Shall operate with a 24 volt input with a maximum current draw of 100 milliamps.
- F. Electric Line Voltage Freeze Protection Thermostats:
 - 1. Shall have NEMA 1 enclosure.
 - 2. Shall have DPDT switch action.
 - Contacts shall be rated for an 8 ampere inductive load minimum at 120 volts. Set point shall be 35 degrees F.
 - 4. Shall have a 15 to 25-foot capillary of which the set point temperature on any foot will cause the contacts to open.
 - 5. Shall have a manual reset.
 - 6. Be reset manually.
 - 7. Have capillary sensor of which any part sensing a temperature below 35 degrees F will shut down fan.
- G. Electric Line Voltage Wall Mounted Thermostats.
 - 1. Shall be rated for 15 amperes @ 120 volts.
 - 2. Shall have single pole double throw action.
 - 3. Shall have minimum of 46 to 84 degree range.
 - 4. Shall have plastic NEMA 1 enclosure with finished face plate and adjustment knob or lever.
 - 5. Acceptable Products:
 - a. Honeywell T6051A1016
 - b. Powers 134-1084

2.04 CONTROLLERS

A. Shall be stand-alone type with communication to central unit through communications buss.

- B. For RTU units shall be capable of operating modulating burners, staged and digital control refrigerant compressors, hot gas reheat outside air damper/return dampers, heat recovery wheels and cooling coils.
- C. For VAV Boxes shall be capable of measuring airflow, modulating valve position, staging or modulating reheat (for future).

2.05 DAMPER ACTUATORS

- A. General: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return.
- B. Actuators shall be spring return when electric power is lost. They shall have 95 degrees rotation. Actuators shall operate with 24 volts. Actuator shall have torque rating to accommodate 25 square feet of damper with a loading of 5" lbs/sq ft at differential pressures of 2.0" of water gauge. Provide operators with adjustable limit switches, for status determination.

2.06 GUARDS AND COVERS

A. Metal covers shall be high abuse type with hinged lid, key lock and solid back plate. Cover shall be perforated or have integral grill. Size shall be minimum of requirement of sensor installed.

2.07 SEQUENCE OF OPERATION

- A. Ductless Split System Air Conditioner/Heat Pump Units (FCU 1, 2, 3, 4, & 5):
 - Cooling function shall be locked out when space served is in heating mode.
 - Shall operate in coding mode when space served is calling for cooling.
 - Shall operate as a heat pump when outdoor temperatures are above 35 degrees F (adjustable).
 - 4. Shall operate on designated schedule with two hour override capability.
- B. Roof Top Units:
 - 1. Supply Fan Operations:
 - a. Energize in morning when activity begins. Subject to smoke detector contacts and freeze protection contacts.
 - b. Freeze alarm shall directly shut off fan and shall alarm DDC operator station. Smoke detector contacts shall shut off fans electrically allowing for a remote reset through the DDC operating station.
 - c. De-energize in evening when space work activity stops.
 - d. Cycle as required maintaining minimum and maximum space temperatures.
 - e. Fan shall start at slower speed and gradually speed up until operating at full volumetric flow. Volume shall decrease as return air temperature approaches room set point temperature (whether heating or cooling).
 - 2. Transfer/Exhaust Fans:
 - Inline transfer and exhaust fans in space around Gym shall energize upon a call for heat when outdoor temperatures are less than 20 degrees F. Fans shall operate at full speed until space temperature approaches within 1 degree of setpoint temperature.
 - 3. Heat Recovery Wheels
 - a. Shall be energized when supply fans are operating.

- b. Minimum outside air dampers and relief dampers shall modulate open as carbon dioxide levels in return air intake rise above 700 parts per million and remain fully open until carbon dioxide levels fall below 650 parts per million. Return air fan speed shall modulate as dampers modulate.
- 4. Outside Air, Return Air, and Relief Dampers:
 - a. Be modulated to provide space cooling when outdoor temperatures will allow. (Free-Cooling.)
 - b. Be returned to a return only position during periods when the space is not occupied.
 - c. Be opened to minimum position to accommodate toilet room exhaust air flows.
- 5. Heating:
 - a. Gas burners shall fire and modulate as required to maintain a discharge temperature of 90-100 degrees as supply fan speed increase.
- 6. Mechanical Cooling:
 - a. Shall be locked out when outdoor temperatures are below 55 degrees F.
 - b. Operate compressors after verification AHU flow exists.
 - c. Stage and modulate compressors to maintain space temperature.
 - d. Maintain an elapsed time function for each compressor in each air cooled condensing unit. Equalization of "runtime" is not a requirement. Selection of order of compressor operation shall be selectable through the Energy Management System by the Owner.
- C. VAV Box Control
 - New VAV boxes shall open to maximum flow level to achieve cooling set point. It shall modulate close when space temperature approaches within 2 degrees F. (Adjust as required).
 - 2. Existing VAV boxes shall operate as they were originally set up.
- D. Transformer Room Exhaust Fan1. Fan shall energize at space temperatures above 78 degrees.
- PART 3 EXECUTION
- 3.01 EXAMINATION
 - A. Verify that systems are ready to receive work.
 - B. Beginning of installation means installer accepts existing conditions.

3.02 DEMOLITION

- A. For Disposal:
 - 1. Remove existing control instruments. Dispose of in a lawful manner.
 - 2. Remove tubing, wire and conduit where exposed within space. Abandon conduit, tubing and wire left in walls that are not otherwise demolished.
 - 3. Disconnect tubing at mains and cap or solder shut.
 - 4. Disconnect wire at control source and pull from conduits.
- 3.03 INSTALLATION
 - A. Install in accordance with manufacturer's instructions.
 - B. Run cabling exposed only in mechanical rooms, storage rooms and like, in neat manner supported from piping or conduit or structure. Cabling in other spaces shall be contain.

- C. Mount thermostats and sensors with pads and operable levers, dials and buttons no lower than 50" and no higher than 54". Room sensors in the same building shall be mounted to match thermostats. Room sensors without operable parts shall be set with bottom at 54" to 56".
- D. Mount outdoor sensors indoors, with sensing elements outdoors with sun shield.
- E. Mount controls adjacent to associated equipment on vibration free walls. Provide engraved plastic nameplates for instruments.
- F. Provide junction boxes for wire connections. Secure individual wires above ceilings to ductwork or structure. No wire shall rest on ceilings. Provide surface raceways on inaccessible finished wall or ceiling surfaces within occupied spaces. Provide EMT conduit in equipment rooms.
- G. All wire ends shall be labeled and coded to match installation drawings. Wires extending to remote switches and thermostats shall be labeled or coded to indicate line side and switched side.
- H. After completion of installation, test and adjust control equipment. Submit data showing set points and final adjustments of controls.
- I. Provide all software input and troubleshooting to make system work.

END OF SECTION 230900

YWCA Lakeview Addition Control Panel Checkout

Panel:	CP100		Local Panel:	none	Power Panel	RPT
Panel Part No:	DCU050 & DBB060		Encl. Part No:	497318 & DBA769-2	Power Circuit:	17
Mechanical Dwgs:	M - Series		Exp. Slot 1: Exp. Slot 2:	DEB100-1	PnI XFMR 100A:	LE121 (96VA)
Panel Location:	Mechanical Room 20	06	Exp. Slot 3:	none	XFMR 100B:	LE121 (96VA)
Modem: U.S. Robotics 56k	C C		Comm. Card:	DXC052-2		an and " an art particle station are supported in 🖬
Panel Part No:	Serial No:	Firmwar	e:	Hardware:		
DCU050						
DBB060				_		
DEB100-1						

Address	Point Name	XFMR	Jumper	Comments
		INPUTS		
PULSE				V
100.Al1	OA TMP		10K	
100.AI2	HW PRI SUP TMP		10K	
100.AI3	HW SEC SUP TMP		10K	
100.AI4	HW RET TMP		10K	
100.BI5	BLR-1 PRF		10K	
100.BI6	BLR-1 ALM		10K	
100.BI7	BLR-2 PRF		10K	
100.BI8	BLR-2 ALM		10K	
100.BI9	HW PMP-1 PRF		10K	
100.BI10	HW PMP-2 PRF		10K	
100.Al11	HW DP CUH-1	100B	5VDC	
100.AI12	HW DP VAV 1-6	100B	5VDC	
100.BI13	AHU-1 SF VFD PRF		10K	
100.BI14	AHU-1 SF VFD ALM		10K	
100.BI15	AHU-1 HW PMP PRF		10K	
100.AI16	AHU-1 SAT		10K	
NOTE: INPUTS	101 THROUGH 108 ARE ON THE LEFT-F	AND SIDE OF THE FI	RST EXPANSIO	ON BOARD (GRAY TERMINAL STRIP).
100.AI101	AHU-1 MAT		10K	
100.AI102	AHU-1 STP	100B	5VDC	
100.BI103	AHU-1 LTDE		10K	15.
100.BI104	AHU-1 SMK ALM		10K	
100.BI105 🥌	POOL HTG PMP-1 PRF		10K	
100.BI106 🧧	POOL HTG PMP-2 PRF		10K	
100.BI107 🦳	POOL 1 AUX HTG		10K	
100.BI108	POOL 2 AUX HTG		10K	

		OUTPUTS		
100.BO1	BLR-1 ENB		n/a	
	i/o module DPM065-50			
100.BI17	POOL WTR HTG ON		10K	
100.AO2	BLR-1 HTG	100B	n/a	
	i/o module DPM065-50			
100.BI18 🥃	POOL 2 WTR HTG ON		10K	
100.BO3	BLR-2 ENB		n/a	
	i/o module DPM065-50			
100.BI19	RTU-1 GEN ALM		10K	
100.AO4	BLR-2 HTG	100B	n/a	
	i/o module DPM065-50			
100.Bl20	RTU-1 BLOWER OFF		10K	
100.BO5	HW PMP-1 ENB		n/a	
	i/o module DPM065-50			
100.Bl21	RTU-1 LTDE		10K	
100.BO6	HW PMP-2 ENB		n/a	
100.BO7	AHU-1 SF VFD ENB	_	n/a	
100.AO8	AHU-1 SF VFD SPD	_	n/a	
100.BO9	AHU-1 HW PMP ENB		n/a	
100.AO10	AHU-1 HW VLV	100B	n/a	
100.AO11	AHU-1 CLG	100B	n/a	
100.AO12	AHU-1 MAD	100B	n/a	
100.AO13	AHU-1 REL DPR	100B	n/a	
100.BO14	EF-2 ENB		n/a	
100.BO15	EF-4 ENB		n/a	
100.BO16	AUX HTG 1 ENB		n/a	
				-
NOTE: OUTPU	TS 101 THROUGH 108 ARE ON THE LEFT-H	AND SIDE OF THE F	IRST EXPA	NSION BOARD (GRAY TERMINAL STRIP).
100.BO101	AUX HTG 2 ENB		n/a	
100.BO102	POOL HTG PMP-1 ENB		n/a	
100.BO103	POOL HTG PMP-2 ENB		n/a	
100.AO104	unused		n/a	
100.AO105	unused		n/a	
100.AO106	unused		n/a	
100.AO107	unused		n/a	
100.AO108	unused		n/a	
		-	IVa	

YWCA Lakeview Addition Control Panel Checkout

Panel:	CP101	Local Panel:	none	Power Panel
Panel Part No:	DAC633	Encl. Part No:	none	Power Circuit:
Mechanical Dwgs:	M - Series			Pnl XFMR 101A: LE119 (75VA)
Panel Location: Modem: Located in CF	AHU-2 2100			101B: LE119 (75VA)
Panel Part No: DAC633	Serial No:	Firmware:	Hardware:	
DAC633				

Address	Point Name	XFMR	Jumper	Comments
		INPUTS		
PULSE			T	
101.BI1	AHU-2 SF PRF		10K	
101.Al2	AHU-2 SAT		10K	
101.BI3	AHU-2 SMK ALM		10K	
101.Al4	AHU-2 MAT		10K	
101.AI5	unused		10K	
101.AI6	unused		10K	
101.Al101	AHU-2 RMT			Software point only
		OUTPUTS		
101.BO1	AHU-2 SF ENB		1	Internal 24 VAC
101.BO2	WEST EF ENB			Internal 24 VAC
101.BO3	unused		n/a	
101.AO4	AHU-2 HTG	101B	n/a	
101.AO5	unused		n/a	
101.AO6	AHU-2 MAD	101B	n/a	
	LINKNE	MENU CONFIGU	JRATIO	N
Menu	Description	Setting	Default	Comments
DEG	Temperature Unit Settings	F		Fahrenheit = F & Celsius = C
DSP	LCD Display Code Setting	1.0		No Value, available for remote programming
LNT	LinkNet Communication Setting	On		On = LinkNet & Off = MS/TP
DNA	DNA Setting	On		Derived Network Addressing
ADD	Device Address	1		Limited to 1 to 12
BAU	Network Speed	76.8 KB		Baud Rate (9.6, 19.2, 38.4, 76.8 KB)

YWCA Lakeview Addition Control Panel Checkout

Panel:	CP102	Local Panel:	none	Power Panel:
Panel Part No:	DAC633	Encl. Part No:	none	Power Circuit:
Mechanical Dwgs:	M - Series			Pnl XFMR 102A: LE119 (75VA)
				440100 (Filter)
Panel Location:	AHU-3			102B: LE119 (75VA)
Modem: Located in CF	2100			
Panel Part No:	Serial No:	Firmware:	Hardware:	A.
DAC633				

Address	Point Name	XFMR	Jumper	Comments
		INPUTS		
PULSE		1		
102.BI1	AHU-3 SF PRF		10K	
102.AI2	AHU-3 SAT		10K	
102.BI3	AHU-3 SMK ALM		10K	
102.AI4	AHU-3 MAT		10K	
102.AI5	unused		10K	
102.Al6	unused		10K	
102.Al102	AHU-3 RMT			Software point only
		OUTPUTS		
102.BO1	AHU-3 SF ENB	-		Internal 24 VAC
102.BO2	EAST EF ENB			Internal 24 VAC
102.BO3	unused		n/a	
102.AO4	AHU-3 HTG	102B	n/a	
102.AO5	unused		n/a	
102.AO6	AHU-3 MAD	102B	n/a	
	LINKNE	T MENU CONFIG	URATIO) N
Menu	Description	Setting	Default	Comments
DEG	Temperature Unit Settings	F		Fahrenheit = F & Celsius = C
DSP	LCD Display Code Setting	1.0		No Value, available for remote programming
LNT	LinkNet Communication Setting	On		On = LinkNet & Off = MS/TP
DNA	DNA Setting	On		Derived Network Addressing
ADD	Device Address	1		Limited to 1 to 12
BAU	Network Speed	76.8 KB		Baud Rate (9.6, 19.2, 38.4, 76.8 KB)

YWCA Lakeview Addition LinkNet BACStat Network

BACStats Connected To:	С
BACStat Part Number:	D
Mechanical Dwgs:	M

CP101 - 110 DNS-14 M - Series

Mechanical Room 206

DCU Location:

XFMR Part No.

Power Panel/Circuit

See Network Drawing 00B See Plans for Locations

Address	Point Name	Value	Comments
	Typical Al	HU/ VAV Room	Sensor
xxx = Contr	ol Panel Number		
	-		
xxx.Al1	ROOM TEMPERATURE (INPUT 1, 10K)	n/a	
xxx.AV1	OUTPUT 1	n/a	
xxx.AV2	OUTPUT 2	n/a	
xxx.AV3	OUTPUT 3	n/a	
xxx.AV4	KEYPRESS	n/a	
xxx.AV5	EXTERNAL OBJECT VALUE (I.e. OAT)	n/a	
xxx.AV6	ROOM SETPOINT	71 (default)	
xxx.AV7	MINIMUM ADJUSTABLE DAY SETPOINT	65 (default)	
xxx.AV8	MAXIMUM ADJUSTABLE DAY SETPOINT	77 (default)	
xxx.AV12	Application	none	
xxx.AV13	Algorithm mode	0	ARROW BUTTONS DISPLAY SETPOINT
xxx.AV15	Display		
xxx.AV16	AI1 CALIBRATION	0.0 (default)	
xxx.AV30	BAUD RATE	76,800 (default)	
xxx.AV31	PIN	DEFAULT	DO NOT CHANGE THE DEFAULT PIN CODE
her a second second second			
MENU CON	IFIGURATION:		
DEG	TEMPERATURE UNITS SETTING	F	
DSP	DISPLAY SETTINGS	1	
Lnt	LINKNET SETTING	ON	
DNA	DYNAMIC NETWORK ADDRESSING	ON	
Add	DEVICE ADDRESS	1	
SYS	SYSTEM NUMBER	n/a	
ArE	AREA NUMBER	n/a	
OEM	OEM NUMBER	n/a	
BAU	NETWORK SPEED	(default)	

YWCA Lakeview Addition Bill of Material

System Origina	:		Network Layout 12.16.02	_	Eng: NDT Revised:
Devic	e	Qty.	Part Number	Manufacturer	Description
				OPERATOR WOR	KSTATION (OWS)
				CONTROL PA	ANEL CP-100
CBL	100A	1	CBL931-2	Delta Controls	25-pin cable, Modem to DCU, 7-Pin
CP	100	5	DPM065-50	Delta Controls	Input Plug-In Module
CP	100	1	DEB100-1	Delta Controls	I/O Expansion Board, 8IP, 8OP (No Module Support)
ENC	100	1	497318	Siemens	Enclosure, NEMA Type 1, 24h x 24w x 9d
ENC	100	1	DBA769-2	Delta Controls	Backplane and Rails only for Standard ORCA Enclosure
LFT	100A	1	440100	Delta Controls	Line Filter
PNL	100	1	DCU050R-V3	Delta Controls	ORCA Delta Control Unit, Version 3
PNL	100	1	DBB060	Delta Controls	ORCA Base I/O Board
TRM	100A	1	TRM768	Delta Controls	RS-485 Network Terminator
TRM	100B	1	TRM768	Delta Controls	RS-485 Network Terminator
XFMR	100A	1	LE121	Lectro	Transformer, 120/24 VAC, 96VA, CB, 1-hub
XFMR	100B	1	LE121	Lectro	Transformer, 120/24 VAC, 96VA, CB, 1-hub
XFMR	100C	1	LE121	Lectro	Transformer, 120/24 VAC, 96VA, CB, 1-hub
XFMR	100D	1	LE121	Lectro	Transformer, 120/24 VAC, 96VA, CB, 1-hub
			_		
				CONTROL PA	ANEL CP-101
CP	101	1	DAC-633	Delta Controls	V3 Programmable Zone Controller, 6AI, 3BO, 3AO
LFT	101A	1	440100	Delta Controls	Line Filter
XFMR	101A	1	LE121	Lectro	Transformer, 120/24 VAC, 96VA, CB, 1-hub
XFMR	101B	1	LE121	Lectro	Transformer, 120/24 VAC, 96VA, CB, 1-hub
				CONTROL PA	ANEL CP-102
CP	102	1	DAC-633	Delta Controls	V3 Programmable Zone Controller, 6AI, 3BO, 3AO
LFT	102A	1	440100	Delta Controls	Line Filter
XFMR	102A	1	LE121	Lectro	Transformer, 120/24 VAC, 96VA, CB, 1-hub
XFMR	102B	1	LE121	Lectro	Transformer, 120/24 VAC, 96VA, CB, 1-hub

SECTION 231123 - FACILITY NATURAL GAS PIPING/DIGESTER GAS PIPING

- PART 1 GENERAL
- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Contractor Provide:
 - a. Removal of designated exisintg gas pipe.
 - c. Connection of natural gas pipe togas dryer, water heater, and roof top units.
 - d. Relief piping from equipment regulators.
 - e. Reroute of existing gas pipe as required by new construction.
 - f. Temporary removal and replacement of existing pipe to accommodate new roofing work.

1.02 RELATED WORK

A. Specified Elsewhere:
1. 230529 - Supports and Anchors for HVAC.
2. 237481 - Packaged Heating Cooling/Heat Recovery Units.

1.03 REFERENCES

- A. The International National Mechanical Code (BOCA) 2012.
- B. The International Fuel Gas Code (BOCA) 2012.
- C. NFPA 54 National Fuel Gas Code.
- 1.04 DESCRIPTION
 - A. The existing Ameren Service at the front of the building delivers natural gas at 2 psi. Operating connected load of natural gas equipment incuded about 4,700 CFH.
- 1.05 SUBMITTALS
 - A. Submit under provisions of Section.
 - B. Submit six copies of product data. Clearly note which devices described in the data area proposed for the work.
 - C. Provide manufacturers literature on gas regulators. Show capacity, pressure drop, spring range and construction. Provide UL listing for valves.
 - D. Provide manufacturers installation and maintenance data for regulators.
 - E. Submit line item price for natural gas work on Schedule of Values. Identify supplier vendor and sub contractor.

1.06 WARRANTY

- A. Warranty material and workmanship for period on one year starting with date of substantial completion.
- 1.07 QUALITY ASSURANCE

A. Provide welding certificates for tradesman actually doing work.

1.08 COORDINATION

- A. With Owner:
 - Interruption of Owner's existing service shall be at Owner's convenience. Owner may require work be performed during nights or weekends. Interruption periods shall be minimized.
 - 2. Assist Owner to purge existing gas pipe and relight existing equipment pilots.
 - 3. Do not leave existing systems disconnected when ambient temperatures are expected to fall below 50 degrees F.
- B. With General Trades:
 - 1. Schedule newpiing to accommodate replacement of roofing under existing roof top pipe.
- PART 2 PRODUCTS

2.01 MANUFACTURER & PERFORMANCE

- A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 PIPING
 - A. Above grade pipe 2" and smaller shall be schedule 40 black steel made in accord with ASTM A-53 or A-120. Fittings shall be black malleable iron with threaded connections. Connections shall be made with teflon paste.

2.03 VALVES

- A. Stop Valves 2" and smaller shall:
 - 1. Be bronze body with threaded ends.
 - 2. Be two piece ball type with teflon seats and packing.
 - 3. Be UL listed for use with natural gas.
- B. Regulator Valves shall:
 - 1. Be rated to provide capacity and pressure reduction shown on the Drawings.
 - 2. Have capability of positive dead end lock-up.
 - 3. Have capacity of accepting a 65 psi emergency exposure.
 - 4. Have surge arrestor and dust cap.
 - 5. Have field replaceable spring and adjustable spring range.
 - 6. Have built in relief valves.
- D. Acceptable Products:

		Regulator	Stop Valve 2"
		Valve	and Smaller
1.	Sensus	043 Series	
2.	Nibco		TFP 600
3.	Apollo		80 Series
4.	Watts		FBV-1
5.	Red & White		RW 5200 Series

- 6.
 Hammond
 -- 8901 (?)

 7.
 Maxitrol
 325 Series
 --
- PART 3 EXECUTION
- 3.01 APPLICATION
 - A. Above grade gas and gas vent pipe shall be black steel specified.
 - B. Gas piping shall be used for two psig main and for low pressure connection downstream of regulators.
 - C. Galvanized fittings shall not be used.
- 3.02 EQUIPMENT CONNECTIONS
 - A. Equipment shall be connected only on low side of regulator.
 - B. Equipment shall be connected through a stop valve, union and dirt leg in that order. Dirt leg shall always be made at a change in direction. A dirt leg dropping form the runout of an in-line tee is not acceptable.
 - C. Final equipment connection shall be full size of opening. Do not bush or reduce connection size.
 - D. Drop sizes shall be as shown on drawings.
 - E. Where individual regulators are provided at equipment regulator shall be positioned downstream of stop valve and upstream of union.
 - F. Provide all fittings and adaptors required to connect equipment.
- 3.03 REGULATORS
 - A. Vents from regulators located inside of buildings shall be piped full size to out of doors, unless shown otherwise on drawings. Do not reduce. Terminate vent with screened elbow turned down.
 - B. Regulators shall be located out of doors wherever possible.

3.04 PIPING

- A. Piping shall be squarely cut and threaded with sufficient thread to penetrate fitting and valve a minimum of four turns.
- B. Piping shall be reamed and deburred. Oil and metal shavings shall be wiped or blown out of each piece before assembly.
- C. Pipe shall be supported in accord to Section 230529. Pipe shall have supports within 2'-0" of each change in direction. Pipe shall be supported independently of equipment and regulator valves.
- D. Changes in pipe size shall be made with reducing tees or reducing couplings. Do not use bushings.
- E. Drops shall always be made from the branch connection of a tee. "Bullheaded tees" shall not be installed.

- F. No unions or running threads shall be installed above ceilings.
- G. Fire stop penetrations through rated walls per Section 230529. Caulk penetrations through outside wall with silicone matching building color. Penetrations made through concrete or masonry walls shall be sleeved with Schedule 40 PVC or coredrilled opening. Seal per Section 230529.
- H. Install gas equipment furnished, by the Owner or other trades in accord to the manufacturer's instructions provided with that equipment and as specified.
- I. Cooridnate painting of pipe with General Trades.

END OF SECTION 231123

SECTION 233100 - DUCTWORK

PART 1 - GENERAL

1.01 WORK INCLUDES

- A. Base Bid:
 - 1. Contractor Provide:
 - a. Demolition of designated existing duct.
 - b. Provision of new supply, return, and existing duct.
 - c. Provide inspections, pressure tests and remedial work specified.
 - d. Modifications to existing duct as noted.
 - e. Provide incidental sheet metal required for installation of dampers and doors and other duct accessories.
 - f. Removal and replacement of existing lay-in ceilings as required to access existing duct, not exposed by General Contractor removal.
 - g. Close wall openings left where duct is removed.
 - h. Removal of existing air supply units, fans, and other ducted equipment as noted.
 - i. Removal of existing fabric duct from the site.

1.02 RELATED WORK

- A. Specified Elsewhere:
 - 1. 230529 Supports and Anchors for HVAC.
 - 2. 230593 Testing, Adjusting and Balancing for HVAC.
 - 3. 230720 Ductwork Insulation.
 - 4. 233000 Air Duct Accessories.
 - 5. 233713 Diffusers, Registers and Grilles.

1.03 SYSTEM DESCRIPTION

- A. Definitions:
 - 1. Ventilating Contractor = Ventilating Subcontactor.
 - 2. Supply Ductwork That duct downstream of coils, heaters and similar air conditioning equipment and which discharges to a space.
 - 3. Exhaust Ductwork That duct downstream of exhaust registers and grilles which discharges to the out-of-doors.
 - 4. Return Ductwork That duct upstream of coils or heaters or similar air conditioning equipment and which is downstream of room air intakes.
 - 5. Outside Air Ductwork That duct between outside air intakes and conditioning equipment.
 - 6. Relief Air Duct That duct between the out-of-doors and return air fans.
 - 7. Energy recovery duct is that duct between energy recovery devices and intakes upstream of heating and/or cooling coils.
 - 8. Exposed duct is that which can be seen from the floor of public and employee spaces. It does not include equipment rooms, garages, storage rooms or utility spaces.
 - 9. Visible behind grilles diffusers and register means able to be seen by an individual who is sitting in a chair or standing on the floor through the louvers or blades of the diffuser grille or register.
 - 10. Concealed duct is that above ceilings or within walls.
 - 11. Exterior duct is that duct exposed to ambient "out of doors" conditions.

- B. Description:
 - 1. Existing Gymnasium Duct shall be modified to operate with a new roof top unit. Exterior supply and return duct shall be added to connect RTU to existing duct from out of doors. At Contractors option, exterior supply duct shall be with foam plastic insulation.
 - 2. New Gymnasium Existing fabric duct shall be removed. Existing Dectron Unit shall be removed. Duct between Dectron Unit and fabric duct shall be modified to accommodate new use.
- 3. Existing AHU system serving pool locker rooms and offices shall be modified to accommodate reallocation of building spaces.
- 4. Miscellaneous duct in spaces north and west of the existing Gym shall be moved.
- 5. Miscellaneous existing chimney's and stacks will be removed.
- 6. Spaces to west and north of the existing gym shall be heated by borrowing hot air from the Gymnasium roof top unit.
- 1.04 QUALITY ASSURANCE
 - A. Installers and Fabricators shall be fully familiar with S.M.A.C.N.A Construction Standards.
- 1.05 REGULATORY REQUIREMENTS AND STANDARDS
 - A. NFPA 90A Installation of Air Conditioning and Ventilating Systems.
 - B. SMACNA HVAC Duct Construction Standards Metal and Flexible.
 - D. UL 181 Factory-Made Air Ducts and Connectors.
 - E. International Mechanical Code 2012.

1.06 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data:
 - 1. Provide data for manufactured duct and fittings.
 - 2. Provide material safety data sheets for sealants.
- C. Shop Drawings:
 - 1. Provide fabrication and assembly drawings.
 - 2. Show dimensions and pressure ratings.
 - 3. Shall all fittings.
- D. Installation Manuals1. Provide these for exterior duct.
- E. Submit line item price for duct installation on Schedule of Values. Identify supplier vendor and sub-contractor.
- 1.07 PROJECT RECORD DOCUMENTS
 - A. Submit under provisions of Section 017839.
 - B. Record actual locations of ducts and changes in duct size.
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE

apaceDesign Architects + Engineers Project No. 2014909.01

A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.

2.02 MATERIALS

- A. Galvanized Steel Ducts: ASTM A525 and ASTM A527 galvanized steel sheet, lock-forming quality, having G60 zinc coating of in conformance with ASTM A90.
- B. Steel Ducts: ASTM A366.
- C. Flexible Ducts:
 - 1. Construction:
 - a. Liner for low-pressure applications shall be polyethylene or fiber reinforced foil mechanically secured to a galvanized steel helix. It shall be rated for 6" WG positive and 1" WG negative.
 - b. Insulation shall be 1-1/2" fiberglass bound to a polyethylene or fiber reinforced foil vapor barrier. Vapor barrier shall have a permeability no greater than .10 perm; and smoke developed rating less than 50 and flame spread of less than 25.
 - 2. Maximum Velocity: 4000 fpm.
 - 3. Temperature Range: 20 degrees F to 175 degrees F.
 - 3. Manufacturers:

		6″ Pressure
a.	Flexmaster	Type 5M
b.	Hart & Cooley	F116
c.	Thermaflex	M-KE

- D. Fasteners: Rivets, bolts, or sheet metal screws. Match material type of metal.
- E. Flexible Duct Elbow Supports:
 - 1. Shall be used in place of steel elbows for 6" and 8" duct.
 - 2. Shall be UL classified per UL 2043.
 - 3. Shall install over the top of flexible duct jackets.
- F. Sealants shall be flexible setting water based, water resistant type compatible with ducts sealed. Shall have flame spread no more than 5.0 when .020" thick. Shall have anti-microbial agents. Material shall be listed and labeled in accordance to UL 181 A, B or C as applicable.
- 2.03 STEEL DUCTWORK FABRICATION
 - A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated. Duct shall be able to accommodate pressures of plus/minus 2" of water gauge without collapse or leaks. Minimum gauges shall be in accord to SMACNA and ASHRAE standard except as noted on Drawings.
 - B. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide airfoil turning vanes. Provide these whether or not they are shown on the drawings.
 - C. Increase duct sizes gradually, not exceeding 30 degrees divergence.

- D. Provide standard 45 degrees lateral wye takeoffs unless otherwise indicated where 90 degrees conical tee connections may be used.
- E. Exposed duct shall be made with a minimum of joints and seams. Joint clip ends shall be removed where they overlap the width and/or height of the duct. Longitudinal seams shall be sealed and hammered tight per installation paragraph below.
- F. Remove excess sealant, fabrication and installation marks, stamps and labels, and printed steel manufacturer's labels from the outer surfaces of exposed ductwork.
- G. Apply duct liner specified before fabrication.
- 2.04 MANUFACTURERED DUCTWORK AND FITTINGS
 - A. Manufacture in accordance with SMACNA HVAC Duct Construction Standards -Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated. Shall be rated for positive pressure of 6" of water gauge.
 - B. Low Pressure Duct:
 - 1. Longitudinal sections shall be rolled to snap together. Ends shall be fluted and ribbed.
 - 2. Elbows shall be adjustable type with a minimum of four gores for duct 10" diameter smaller and five gores for larger duct.
 - 3. Duct shall be rated for 2" positive pressure.
 - C. Spiral Ducts:
 - 1. Manufacturers:
 - a. Linx (Lindab).
 - b. Norlock.
 - c. Semco.
 - d. United McGill.
 - 2. Machine made from round spiral lockseam duct with light reinforcing corrugations; fittings manufactured of sheet metal at least two gauges heavier than duct.

2.05 EXTERIOR DUCT

- A. Material Requirements
 - 1. Shall apply to all rectangular duct and fittings designated for out door use.
 - 2. Material shall e CFC/HCFC free closed cell phenolic foam faced on both sides with 1 mil aluminum foil, reinforced with glass scrim. An additional 1000 micron high impact resistant, ultraviolet stable an infrared reflective titanium infused vinyl shall be fully laminated to both sides of the insulation board.
 - 3. Insulation panels shall have an aged R-value of no less than 8.1. Thickness shall be no less than 1" thick. Conductivity shall be no less than .13 Btu x in/hr x sq. ft. x degrees F @ 75 degrees F.
 - 4. Permeability shall be no more than 0.00 perms when tested to ASTM E96/E96M, Procedure A.
 - 5. All new materials shall pass U.L. test for bacteria growth.
 - 6. Noise reduction coefficient shall be a minimum of 0.05 per ASTM C423.
 - 7. All interior liner shall bear markings required by UL181.
 - 8. Minimum compressive strength shall be no less than 28 psi.
 - 9. Density shall be between 3.43 and 3.75 pounds per cubic foot at 10 percent compression.
 - 10. Manufactured insulated panel with glass scrim, foil and foam shall pass U.L. Burning Test 181 with flame spread index of no more than 25

and a smoke developed index of no more than 50. End connections shall be aluminum type flanges.

- 11. Assembly shall be rated for continuous temperatures of 185 degrees F.
- B. Closure Materials
 - 1. V-grove adhesive silicone.
 - 2. 1000 micron high impact titanium infused vinyl preformed factory made seamless corners. Overlap corner seams and welded titanium infused vinyl seams.
- C. Fabrication Sealing System
 - 1. Aluminum scrim with woven glass fiber with U.V. stable vinyl cladding.
 - 2. Seam covers shall be a minimum of 2-7/8''.
 - 3. Sealants shall be low VOC.
 - 4. Color shall be white.
 - 5. Shall be water, mold, and mildew resistant.
- D. Duct Connectors:
 - 1. Shall be Grip Flange type of as required by the manufacturer for the service shown. All flanges shall be sealed air tight and covered with flange covers.
- E. Fabrication
 - 1. Shall be done by trained and locally licensed firms in strict compliance with manufacturers requirements.
 - 2. Firms shall be able to show proof of licensure and training for individuals actually doing work.
 - 3. Fabricate duct to accommodate pressure of 4" positive pressure and 3" negative pressure; velocities of up to 4000 feet per minute and temperatures up to 176 degrees F.
 - 4. Use flanges for field connections.
 - 5. Seal all cuts into foam.
 - 6. Cover all flanges.
 - 7. Elbows and transitions shall be made with turning vanes in a manner equivalent to that noted for fabricated sheet metal.
 - 8. All fabrication work shall be in accord to the manufacturer's standards.
- F. Manufacturer:
 - 1. Kingspan Insulation of Atlanta Georgia.

2.06 DUCT LINER

- A. Composite Surface Burning Characteristics by UL 723.
 - 1. Flame Spread 25.
 - 2. Smoke Developed 50.
- B. Physical Description flexible edge coated inorganic fiber blanket.
 - 1. Density: 1.5 lb per cubic foot. Thickness shall be $\frac{1}{2}$ unless noted otherwise.
 - 2. K Value: ASTM C177 .27 at 75 degrees F.
 - 3. Maximum Service Temperature: 220 degrees F.
 - 4. Maximum Moisture Absorption: Less than 3 percent by volume.
 - 1. Flexible edge coated mat faced fiberglass which do not require
 - "buttering" of transverse cuts to contain fiber release.
 - 2. Sound absorption coefficient at 1000 cycles per second shall be no less than .60.
 - 3. Shall be erosion resistant at air velocities of 6000 ft./minute.
 - 4. Shall be Greenguard Air Quality Certified.

- C. Acceptable Products:
 - Fiberglass1. SchullerPermacoate/Linacoustic
 - 2. Knauf Sonic XP
 - 3. Certainteed Ultra Lite
 - 4. Johns-Manville Lina-Coustic
 - 5. Owens Corning Aeroflex Plus

PART 3 - EXECUTION

- 3.01 REMOVAL OF EXISTING CONSTRUCTION
 - A. Ductwork designated for removal shall:
 - 1. Be removed such that duct and equipment to remain is not damaged.
 - 2. Be removed from the site.
 - 3. Fabric duct shall be removed from the site.
 - B. Removals for ductwork shall include all hangers and supports. Where branch ducts are removed from mains which remain provide a patch of the same material as the existing duct. If existing duct is lined provide liner in the patch.
 - C. Where duct removal leaves openings.
 - 1. Patch opening on both sides of wall with drywall or galvanized steel sheet. Pack void with fiberglass batt insulation.

3.02 APPLICATION

- A. Galvanized Steel Duct:
 - 1. Use for all transfer duct.
 - 2. Use for transitions to adapt to existing duct.
 - 3. Use for duct outside the building as a Contractor's option to using "Exterior Duct" material specified.
 - 4. Use for supply and return duct within the building.
- B. Galvanized steel duct shall be used throughout except as noted below.
- C. Line return air duct within 25' of fans and at roof top units. Line transfer duct downstream and upstream of transfer fans. Line interior of RTU #1 and RTU #2 return plenums in curbs.
- D. Use flexible duct between diffusers and hard duct. Limit to a maximum of 5'-0'' long except where shown otherwise.
- E. Use spiral formed manufactured duct where round duct is shown.
- 3.05 INSTALLATION
 - A. Install liner and manufactured duct in accordance to manufacturers instruction except where this specification requires additional work. Liner shall prevent ducted air from contacting the metal of the duct. It shall be fully adhered to the duct. Fabricated pieces shall be allowed to defumigate before being delivered to the site.
 - B. Duct seams and joints shall be hammered, rolled or sealed airtight. All transverse and longitudinal joints in supply, return and exhaust ducts shall be sealed with sealant specified. Corners on fittings and connections to equipment shall be sealed tight. Joints in adjustable round elbows shall be sealed tight. No leaks will be allowed.

- C. Apply duct sealant according to manufacturer's instruction. Allow sealant material to acclimate before application. Do not install when space temperature is less than 40 degrees F. Remove excess material on exposed duct.
- D. Provide openings in ductwork where required to accommodate thermometers and controllers.
- E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- F. Use crimp joints with bead for joining round duct.
- G. Use double nuts and lock washers on threaded rod supports.
- H. Connect flexible ducts to metal ducts with adhesive plus sheet metal screws or draw bands. Where flexible duct approaches a diffuser neck at an angle less than 30 degrees to the horizontal, provide a fixed or adjustable 90 degrees elbow at the diffuser neck and screw or rivet and seal thereto. Bends in flexible duct tighter than 1-1/2 diameters in centerline radius are not permitted. The duct liner shall be cut short within the insulation. The duct insulation shall be extended over the elbow and diffuser neck and secured.
- During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- J. Flanged connections shall have reinforced bolted corners and spring steel clips around full perimeter.
- K. Sharp corners on standing seams and supports shall be bent over and ground smooth.
- L. Paint duct visible behind grilles, diffusers or registers flat black. Paint is not required on lined duct.
- M. Transfer Ducts:
 - 1. Where building walls rise through ceiling to structure provide transfer ducts.
 - 2. Where shown, connect flexible duct(s) through transfer opening to act as sound trap.
- N. Insulation of exterior duct shall be done in accord to manufacturer's standard.
- 3.06 FIELD QUALITY CONTROL
 - A. Visual Inspection Contractor shall provide visual inspection of work as it progresses to insure supports, sizes, configuration and tightness specified is maintained. A/E will occasionally inspect for same qualities.
 - B. If Testing and Balancing performed in Section 230593 shows fan horsepower and pressure curves do not match the volumetric readings obtained at the inlets and outlets the ducts, the ducts shall be re-inspected visually.
 - C. Whenever Testing and Balancing or Owner inspections determine there may be leaks in the duct system, seal openings found. Redoing Test and Balance work is an acceptable method of proving duct is airtight.

- 3.07 ACCESS TO EXISTING DUCT
 - A. Lay-in Ceilings:
 - 1. Remove ceiling panels and cross tees as required to access work.
 - 2. Store removed materials on-site. Protect from damage.
 - 3. Determine existing damage before work commences. Document degree with Owner and A/E.
 - 4. Replace ceiling material broken during access, demolition, or installation operations.
 - 5. Replace ceiling components to original condition when complete.
 - 6. Temporarily secure items as lighting, speakers, diffusers, etc. where cross tees are removed.

END OF SECTION 233100

SECTION 233300 - AIR DUCT ACCESSORIES

- PART 1 GENERAL
- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Contractor Provide:
 - a. Turning vanes.
 - b. Duct access doors.
 - c. Control dampers.
 - d. Volume controls.
 - e. Flexible connections.
- 1.02 RELATED WORK
 - A. Specified Elsewhere:1. 233100 Ductwork.
- 1.03 REGULATORY REQUIREMENTS AND STANDARDS
 - A. International Mechanical Code 2012.
 - B. NFPA 90A Installation of Air Conditioning and Ventilating Systems.
 - C. SMACNA HVAC Duct Construction Standards Metal and Flexible.

1.04 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data: Provide for dampers, access doors, turning vanes and hardware used.
- C. Submit line item price for accessories on Schedule of Values. Identify supplier vendor.
- 1.05 PROJECT RECORD DOCUMENTS
 - A. Submit under provisions of Section 017839.
 - B. Record actual locations of access doors.
- 1.06 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver, store, protect and handle products to site under provisions of Section 016000.
 - B. Protect dampers from damage to operating linkages and blades.
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written

description, the model number shall be modified as required to most closely meet the described requirements.

- 2.02 TURNING VANES
 - Shall be used only where long radius elbow will not fit. Α.
 - в. Construct of galvanized steel in a double wall air foil configuration.
 - С. Blade runners shall mount on top and bottom of turn. Blades shall snap into runner on a 1-1/2" nominal spacing.
- 2.03 DUCT ACCESS DOORS
 - Conventional access doors shall be of double wall steel construction with Α. 1" insulation. Provide with piano hinge. Provide one cam lock for doors less than 16" wide and two for larger doors. Provide with foam gaskets and lock down tabs. Door and frame shall be 22 gauge galvanized steel.
 - B. Acceptable Products:

		Conventional
1.	Cesco	Model CAD
2.	National Control Air	Model AD
3.	Nailor	Model OBS Series
4.	Ruskin	Model ADH-22
5.	Vent Products	Ventlock
б.	Safe Air	SAH

- 2.04 FLEXIBLE DUCT CONNECTIONS
 - Fabricate in accordance with SMACNA HVAC Duct Construction Standards -Α. Metal and Flexible, and as indicated.
 - в. Connector: Fabric crimped into metal edging strip.
 - 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq. yd.
 Net Fabric Width: Approximately 3" wide.
 Metal: 1" wide, 24 gage galvanized steel.

 - Fabric for connections exposed to weather shall be resistant to ultra 4. violet light.
- 2.05 VOLUME CONTROL DEVICES
 - Fabricate in accordance with SMACNA HVAC Duct Construction Standards -Α. Metal and Flexible, and as indicated.
 - в. High efficiency take off shall:
 - 1. Include a round butterfly damper.
 - Have an inlet at least 25% larger than the outlet. 2.
 - Have a round or rectangular inlet with tab connections and a backing 3. angle.
 - C. Single Blade Dampers: Fabricate for duct sizes up to 12" x 20". Provide end bearings in all sizes except those 10" and smaller.
 - D. Manual Damper Operators:
 - Shall be lockable quadrant type for use in accessible ductwork. Quadrant shall have graduations, and set screw let lever handle. Rods shall be 3/8" square key stock.
 - E. Volume Extractors:

- 1. Shall be factory assembled in size and adjoining duct take off.
- 2. Shall have rod or worm gear operators accessible from the duct exterior.
- PART 3 EXECUTION

3.01 DEMOLITION

- A. Carefully Removal:
 - 1. Unbolt existing damper operators and return to the Owner.
 - 2. Protect duct and louver which is not to be removed.

3.02 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, NFPA 96 and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 233100 for duct construction.
- B. Provide duct access doors for inspection and cleaning at control dampers, and elsewhere as indicated. Review locations prior to fabrication. Provide 6 x 6 access doors downstream of VAV boxes.
- C. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.
- D. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly See Section 233713. Install minimum two duct widths from duct take-off.

END OF SECTION 233300

SECTION 233423 - FANS

PART 1 - GENERAL

- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Contractor Provide:
 - a. Roof mounted exhaust fans for revised locker toilet rooms.
 - b. Inline centrifugal transfer and exhaust fans.
 - c. Centrifugal ceiling fan.
- 1.02 RELATED WORK
 - A. Specified Elsewhere:
 - 1. 233100 Ductwork.
 - 2. 233300 Air Duct Accessories.
 - 3. 230593 Testing, Adjusting and Balancing for HVAC.
- 1.03 REFERENCES
 - A. AMCA 99 Standards Handbook.
 - B. AMCA 211 Laboratory Methods of Testing Fans for Rating Purposes.
 - C. AMCA 261 Directory of Products Licensed to bear the AMCA Certified Ratings Seal.
 - D. AMCA 300 Test Code for Sound Rating Air Moving Devices.
 - E. AMCA 311 Method of Publishing Sound Ratings for Air Moving Devices.
 - F. NEMA MG1 Motors and Generators.
 - G. NFPA 70 National Electrical Code.
 - H. UL 705 Power Ventilators.

1.04 DESCRIPTION

- A. Definition:
 1. Ventilating Contractor = Ventilating Subcontractor for this work.
- 1.05 SUBMITTALS
 - A. Submit under provisions of Section 013300.
 - B. Product Data: Provide data on fans and accessories including fan curves with specified operation point clearly plotted, sound power levels at rated capacity, and electrical characteristics and connection requirements. Fan curves are required. Single points will not be acceptable.
 - C. Manufacturer's Installation Instructions.
 - D. Submit line item price for fans on Schedule of Values. Identify supplier vendor.
- 1.06 OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Section 017823.
- B. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.07 COORDINATION

- A. With Electrical Trades:
 - 1. Deliver switches, thermostats, speed controls, damper operators for installation.
 - 2. Confirm rough-in location of devices.
- B. With General Trades:
 - 1. Locate roof and wall penetrations.
 - 2. Provide curb adaptor and sleeves for installation.
- 1.08 RECORD DRAWINGS See 1.07
- PART 2 PRODUCTS

2.01 MANUFACTURER & PERFORMANCE

- A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 PRODUCT REQUIREMENTS
 - A. Performance Ratings: Conform to AMCA 211 and bear the AMCA Certified Rating Seal.
 - B. Sound Ratings: AMCA 311, tested to AMCA 300, and bear the AMCA Certified Sound Rating Seal.
 - C. Fabrication: Conform to AMCA 99.
 - D. UL Compliance: UL listed and labeled, designed, manufactured, and tested in accordance with UL 705.
- 2.03 ROOF FANS
 - A. Hooded Centrifugal Fans:
 - Shall have spun aluminum hood and venturi and an aluminum base, with 16 gauge 1/2" mesh birdscreen.
 - 2. Drive shall be direct as scheduled. Drive shall be rated for 150 percent of motor horsepower; bearings for 1/2 horsepower and less shall be sealed type rated for 200,000 hours.
 - 3. Motor shall be high efficiency drip proof type. Motors 1/2 horsepower and less shall have permanently lubricated bearings.
 - 4. Electrical Components:
 - a. Provide electrical wireway from under curb cap to motor compartment.
 - b. Provide motor speed control to match motor.
 - c. Provide NEMA disconnect under hood.

- Wheel shall be backward inclined centrifugal, non-sparking with a 5. cast hub. Vanes shall be riveted or welded. Assemble shall be statically and dynamically balanced.
- в. Acceptable Products:

	-	Hooded
3.	Greenheck	G

- 4. Loren Cook ACE
- 5. Twin City BCRD
- С. Accessories:
 - Gravity actuated dampers shall have aluminum blades, nylon bearings 1. and felt edge seals.
 - 2. Curb adaptors shall constructed of 16 to 14 gauge aluminum. It shall match new fan curb covers.
- CENTRIFUGAL FANS 2.04
 - Centrifugal In-line Fans: Α.
 - 1. Fan wheel:
 - Non-overloading backward inclined. Mechanically fastened and/or а. welded. Statically and dynamically balanced. Keyed to drive shaft.
 - Motor: ECM type capable of variable speed input: 2.
 - Thermal overload protection. a.
 - 3. Fan drive:
 - Direct keyed to motor shaft. a.
 - 4. Fan housing:
 - Housing shall be constructed of structural steel members with a. removable galvanized steel closure panels.
 - Housing shall be lined with coated fiberglass acoustical liner. b.
 - 5. Mounting provisions:
 - Weld structural angles to fan housing for rod hangers. a.
 - Furnish rubber in shear isolators for mounting brackets. b.
 - 6. Acceptable Products:
 - a. Loren Cook SQN b. Greenheck SO

 - Greenheck SQ Twin City QSL OSL/TSL с.
 - Centrifugal Ceiling Fans: Β.
 - Fan wheel shall be forward curved; Mechanically fastened and/or welded; Statically and dynamically balanced; Keyed to motor shaft.
 - Motor: Totally enclosed, fan cooled NEMA motor with thermal overload 2. protections.
 - 3. Fan drive shall be direct driven from motor.
 - Fan housing shall be constructed of galvanized steel with minimum of 4. 1/2" of coated fiberglass acoustical liner.
 - Electrical Characteristics and Components: 5.
 - Motor: Shall be open drip proof type with built-in thermal protection. Shall be capable of accepting speed control. Shaft a. bearings shall be permanently lubricated.
 - Wiring Terminations: Provide terminal lugs to match branch b. circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.
 - Disconnect Switch: Cord and plug in housing for thermal overload c.
 - protected motor. Provide accessories noted on Drawings. Discharge grille shall be "Brick Vent Type". It shall be constructed of castor fabricated aluminum. It shall have an d. integral insect screen and lower drip edge. Finish shall be manufacturer's standard as selected by the Architect/Engineer.

- 6. Grille: Punched aluminum or steel with baked white enamel finish. Fasteners shall be screw type.
- 7. Backdraft damper shall be integral with fan discharge.
- C. Acceptable Products:
 - 1. Cook Gemini
 - 2. Greenheck SP
 - 3. Twin City T&TL Series
- PART 3 EXECUTION
- 3.01 INSTALLATION
 - A. Install in accordance with manufacturer's instructions.
 - B. Roof Fans:
 - 1. Secure with stainless steel lag screws to roof curb. Adapt existing curbs with pressure treated wood and aluminum flashing.
 - 2. Extend ducts into roof curb.
 - 3. Install resilient isolators in continuous strips under full perimeter of curb.
 - 4. Install backdraft dampers on inlet to roof fans.
 - 5. Assemble damper motors.
 - C. In-line Fans:
 - 1. Support from structure above. Use equipment supports specified in 220529. Support independently from ceiling and ductwork.
 - 2. Provide flexible connections on fans rated at 1/4 horsepower and above.
 - D. Ceiling Fans:
 - 1. Support in accord to manufacturer's direction. Use neoprene isolators at fan support points with hangar rod through to ceiling steel or auxiliary strut.
 - E. Circulation Fans:1. Support in accord to detail on the Drawings.
 - F. Do not operate fans for any purpose until duct work is clean, filters in place, bearings lubricated, and fan has been test run under observation.

END OF SECTION 233423
SECTION 233600 - AIR TERMINAL UNITS

- PART 1 GENERAL
- 1.01 WORK INCLUDES
 - A. Base Bid:1. Contractor Provide:a. Variable air volume boxes and controls.
- 1.02 RELATED WORK
 - A. Specified Elsewhere:
 - 1. 230593 Testing, Adjusting and Balancing for HVAC.
 - 2. 230130 Ductwork.
 - 3. 233000 Air Duct Accessories.
- 1.03 REFERENCES
 - A. SMACNA HVAC Duct Construction Standard Metal and Flexible.
 - B. NFPA 70 National Electrical Code.
 - C. NFPA 90A Installation of Air Conditioning and Ventilating Systems.
- 1.04 DESCRIPTION
 - A. Definitions:
 1. Ventilating Contractor = Ventilating Subcontractor.
- 1.05 SUBMITTALS
 - A. Submit under provisions of Section 013300. Contractor's shall examine submittals furnished by suppliers and determine if submittals are complete an accurate before forwarding them to the A/E. Submittals for this section shall include:
 - 1. A space by space schedule showing each variable air volume box with its particular cfm, zone number, pressure drop, noise coefficients.
 - 2. Dimensional data of boxes and accessories.
 - 3. Temperature control diagrams.
 - B. Submittals without evidence of contractor verification or without schedules will be returned to contractors before A/E reviews them further.
 - C. Submit line item price for VAV boxes on Schedule of Values. Identify supplier vendor.
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 AIR TERMINALS (High Pressure Type)

- Shall be pressure independent, 100 percent shut-off low leakage type rated Α. for operational pressures of 2" to 4" of water gauge with excursion pressures of 5" of water.
- Construction shall be of 22 gauge galvanized steel. Lining shall be matte Β. faced 1" fiberglass liner meeting NFPA-90A and UL 181 requirements or liner shall be fabric faced natural fiber meeting NFPA 90 for fire resistance and ASTM G21 and G22 for microbial inhibitor.
- C. Controls shall include static and flow probes, volume control, room temperature sensor, and Belimo Model LM24SR motor. Unit shall be 24 volt. Devices shall be mounted on unit exterior. Provide separate room thermostat.
- D. Configuration shall include round collar inlet with butterfly damper and rectangular drive clip outlet connections.
- E. Configurations needed for this renovation are cooling only.
- F. Acceptable Products:
 - 1. Krueger LMH Series. ESV Series.
 - 2. Titus
 - 3.Carrier35E Series.4.PriceSXV Series.
- PART 3 EXECUTION
- 3.01 DEMOLITION
 - A. For Reuse:
 - 1. Remove existing duct. Leave existing VAV boxes and coils intact. Disconnect fasteners and sealant. Do not warp or break device.
- 3.02 INSTALLATION
 - Install in accordance with manufacturer's instructions. Adjust position Α. as required to accommodate the installation of the temperature controller. Installing the box up-side-down is acceptable.
 - B. Install new VAV boxes in locations shown on drawings. Install where operator is accessible. Assemble or reassemble factory and/or Owner supplied parts as required to make VAV box fully operational. Provide 6" x 6" inspection access panel immediately downstream of VAV box. Identify each box with an indelible marker.
 - C. Interconnect low voltage controls with plenum rated cable. Strap cable to conduit or ductwork with stick on cable ties.
 - D. Locate thermostats in each zone at light switch height.

END OF SECTION 233600

SECTION 233713 - DIFFUSERS, REGISTERS AND GRILLES

- PART 1 GENERAL
- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Contractor Provide:
 - a. Demolition of existing grilles and diffusers.
 - b. New diffusers, registers and returns.
 - c. Modifications to existing Gymnasium nozzle type diffusers.
- 1.02 RELATED WORK
 - A. Specified Elsewhere:
 - 1. 230593 Testing Adjusting and Balancing for HVAC.
 - 2. 233100 Ductwork.
 - 3. 233000 Air Duct Accessories.
- 1.03 REFERENCES
 - A. ADC 1062 Certification, Rating and Test Manual.
 - B. AMCA 500 Test Method for Louvers, Dampers and Shutters.
 - C. ARI 650 Air Outlets and Inlets.
 - D. ASHRAE 70 Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.
 - E. SMACNA HVAC Duct Construction Standard Metal and Flexible.
 - F. NFPA 70 National Electrical Code.
 - G. NFPA 90A Installation of Air Conditioning and Ventilating Systems.
- 1.04 DESCRIPTION
 - A. Definition:
 - 1. Ventilating Contractor = Ventilating Subcontractor.
 - 2. Register Is a grille with an attached damper.
 - 3. Register, Grille and Diffuser Dimensions Size = A x B where A = Width and B = Height.

1.05 SUBMITTALS

- A. Submit under provisions of Section 013300 1.05. Contractor's shall examine submittals furnished by suppliers and determine if submittals are complete an accurate before forwarding them to the A/E. Submittals for this section shall include:
 - 1. A room by room schedule showing each device, its model, its neck size, the outside dimensions of the airway, number and direction of throw and mounting type.
- B. Submittals without evidence of contractor verification or without schedules will be returned to contractors before A/E reviews them further.
- C. Submit layouts on duct drawings.

- D. Submit line item price for grilles on Schedule of Values. Identify supplier vendor.
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 REGISTERS, GRILLES AND DIFFUSERS
 - All units: Α.
 - Shall have a minimum over lap margin of 1". 1.
 - 2. Shall have off-white baked enamel finish.
 - 3. Shall have accessory mounts to match ceiling or wall finish type shown on Architectural Drawings.
 - Directional (louvered) diffusers shall: Β.
 - 1. Be "snap-in" louvered core type with 1, 2, 3 or 4 way discharge pattern.
 - 2. Be of welded steel construction with hair line joints.
 - 3. Have flat overlap margin for surface mount on ductwork and 23-3/4 x 23-3/4 white pans for lay-in ceilings.
 - 4. Have square to round adaptors where used with round duct.
 - 5. Have adjustable vane or flap at the perimeter of the discharge which can direct air horizontally or vertically.
 - Ceiling return transfer and exhaust grilles shall be constructed with C. rolled steel face bars set at .67" to 3/4" centers with a welded and gusseted 18 gauge steel frame. Provide intermediate mullions to limit face bar span to a maximum of 12".
 - D. Sidewall register shall have individually adjustable vertical front bars on 1/2" centers and horizontal rear bars set on .667" to .75" centers. Front bars shall be 14 gauge rolled steel. Rear bars shall be 24 gauge. Bars shall be rolled steel in an airfoil shape. Construct frame of 18 gauge steel with welded gussetted joints. Provide with face mounted, counter sunk mounting screw holes.
 - Drum louvers shall be constructed of aluminum or steel with adjustable Ε. cylindrical drums which can pivot a minimum 60 degrees. Face bars shall be individually adjustable. Frame shall be welded steel or extruded aluminum.
 - Square Panel (Plaque) Ceiling Diffusers shall have: F.
 - 1. Blank center panel.
 - 2. Shallow curved back pan with round neck collar.
 - 3. Aerodynamic shaped edge on center panel.
 - 4. Removable directional baffles.
 - 5. 24" x 24" lay-in panel for units less than 24" square. Device shall fit standard 15/16" grid.
 - 6. Steel construction.
 - 7. 18 gauge center pan.
 - 8. Provide without damper.

- G. Side wall return and transfer grilles have straight face bars set at 0 degrees on .5" to .67" centers. Bars shall be 14 gauge. Frame shall be 16 or 18 gauge with welded and gusseted construction. Bars shall run the short dimension and have mullions on a minimum of 6" on center. Provide with counter punched mounting holes.
- H. Acceptable Products:

Manufacturers Type		Krueger	Price	Titus
1.	Directional Ceiling	SHPC	SMDA	TDCA
	Diffusers			
2.	Ceiling Exhaust,	S80H/S580H	530 Series	350R Series
	Return & Transfer			
	Grilles			
3.	Sidewall Supply	800/5880	520 Series	300 Series
	Registers			
4.	Drum Louvers	Series DPL	Series HCD	DL
5.	Panel Diffusers	PLQ	SPD Series	OMNI
6.	Sidewall Return	S480	97S	30RS
	Grilles & Transfer			
	Grilles			

PART 3 - EXECUTION

3.01 DEMOLITION

A. For Reuse:

- 1. Remove existing grilles, registers, louvers and diffusers by disconnecting fasteners and sealant. Do not warp or break device.
- B. For Removal from Site:
 - 1. Do not damage duct shown to remain.
 - 2. Remove all dirt which may drop from diffuser and duct.

3.02 PREPARATION

- A. Determine position of diffusers, grilles and registers.
- B. Check if discharge pattern covers room space.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- C. Install diffusers to ductwork with air tight connection.
- D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.
- E. Paint ductwork visible behind air outlets and inlets matte black.
- F. Adjust rear and face bars of adjustable grilles and registers to deflect air into occupied zones.

END OF SECTION 233713

SECTION 235100 - BREECHING CHIMNEYS & STACKS

- PART 1 GENERAL
- 1.01 WORK INCLUDES
 - A. Base Bid:1. Contractor Provide:a. PVC vent pipe for new water heater.
- 1.02 RELATED WORK
 - A. Specified Elsewhere:1. 221419 Plumbing Equipment.
- 1.03 REFERENCES
 - A. ANSI Z223.1 (NFPA 54) The National Fuel Gas Code.
 - B. ASTM D1785-12 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedule 40, 80, and 120.
 - C. ASTM D2466-15 Standard Specification for Poly (Vinyl Chloride) Plastic Pipe Fittings, Schedule 40.
 - D. ASTM D2564-12 Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
 - E. ASTM D2855-96 Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl) (PVC) Pipe and Fittings.
- 1.04 DEFINITIONS
 - A. Vent: That portion of a venting system designed to convey flue gases directly outdoors from a vent connector or from an appliance when a vent connector is not used.
- 1.05 DESIGN REQUIREMENTS
 - A. Water heater vents shall be constructed in accord to manufacturer's instructions for water heater selected.

1.06 SUBMITTALS

- A. Submit product data under provisions of Section 013300.
- B. Submit verification of communication between subcontractors that water heater manufacturer's requirements have been forwarded to the ventilation subcontractor.
- 1.07 REGULATORY REQUIREMENTS
 - A. Conform to the International Fuel Gas Code for installation of natural gas burning appliances and equipment.
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE

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- A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 POWER VENTED GAS WATER HEATER VENTS
 - A. Shall be fabricated of Schedule 40 solid core PVC pipe made per ASTM 1785-12.
 - B. Fittings shall be long radium sanitary type complying with ASTM D2466-16 with solvent weld connections made in accord to ASTM D2564-12 and ASTM D2855-96.
- PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Level and plumb vents. Terminate outside wall minimum of 9" roof in accord to NFPA 90A.
- C. Clean vents during installation, removing dust and debris.
- D. At appliances provide slip coupling permitting removal of appliances without removal or dismantling of vent.

END OF SECTION 235100

SECTION 237482 - PACKAGED HEATING/COOLING/HEAT RECOVERY UNITS

- PART 1 GENERAL
- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Contractor Provide:
 - a. Packaged cooling/heat recovery units.
 - b. Startup of units by manufacturer.
 - c. Coordination with Temperature Controls Contractor.
- 1.02 RELATED WORK
 - A. Specified Elsewhere:
 1. 233100 Ductwork.
 2. 230593 Testing, Adjusting and Balancing for HVAC.
- 1.03 REFERENCES
 - A. AHRI 340/360 Unitary Large Equipment.
 - B. AHRI Standard 1060 Rating Air to Air Energy Recovery Ventilation.
 - C. ASHRAE 90.1 2013 Energy Efficient Design of New Buildings except Low Rise Residential Buildings
- 1.04 DESCRIPTION
 - A. Definition: 1. Packaged Cooling/Heat Recovery Units = Rooftop Units (RTU).
- 1.05 SUBMITTALS FOR REVIEW
 - A. Submit in accord to Section 0133000. Clearly show which equipment applies to this work.
 - B. Product Data: Provide capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections. Provide complete power and control wiring diagrams. Show field and factory wiring. Provide charts or curves showing for volumetric capacity relating to external static pressure. Submit equipment "startup" checklist with initial submittal.
 - C. Submit manufacturer's installation instructions. Indicate assembly, support details, connection requirements, and include start-up instructions. Note acceptable manufacturers unitize difference connection methods. Work with A/E to determine installed method suitable for equipment selected.
 - D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing and list and telephone numbers of service personnel. Data shall be made specific to the equipment supplied with this project. Information pertinent to supplied equipment shall be high lighted with yellow markers or non-pertinent information shall be struck out.
 - E. Submit line item price for grilles on Schedule of Values. Identify supplier vendor.

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1.06 REGULATORY REQUIREMENTS

- A. Listed and classified by Underwriters' Laboratories, Inc. and the American Refrigeration Institute.
- 1.07 DELIVERY, STORAGE, AND PROTECTION
 - A. Protect units from physical damage until roof mounting curbs are in place.
- 1.08 QUALITY CONTROL
 - A. Equipment startup:
 - 1. Shall be performed by factory trained and certified technicians.
 - 2. Shall work through manufacturer's check list before machines are started.
 - 3. Equipment startup and training shall be listed as a separate line item on the Contractor's Schedule of Values and Pay Request.

1.09 WARRANTY

- A. Provide one year parts and labor warranty from date of Substantial Completion.
- B. Provide five year parts only warranty on compressor starting with date of shipment.
- C. Provide a minimum parts warranty of 15 years from date of shipment for stainless steel heat exchangers and 10-years from date of shipment for aluminized steel heat exchangers.
- 1.10 EXTRA MATERIALS
 - A. Provide one set of filters at start up of units and one set of filters before air balance test.
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 BASIS OF DESIGN
 - A. Is as noted on drawing schedule, Units of other manufacture shall be capable of meeting performance requirements scheduled with electrical connections shown, and shall also fit the allocated space. Added costs required for using other units shall be included by the bidder. Contractor in submitting bid, agrees no additions will be required for different equipment.

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2.03 PACKAGED HEATING/COOLING/HEAT RECOVERY UNITS

- A. General: Package units having gas heat, electric refrigeration, and heat recovery sections. Units shall be factory assembled in a maximum of one section. Completed unit shall undergo a factory run test prior to shipment. It shall be shipped with full charge of refrigerant and
- B. Description: Self-contained, packaged, factory assembled and prewired, consisting of cabinet and frame, supply fan, exhaust fan, heat recovery wheel, controls, air filters, natural gas burner and heat exchanger, refrigerant cooling coil and compressor, condenser coil, condenser fan, and supports.

C. General Construction:

- 1. Cabinet: Double wall heavy gauge galvanized steel with baked enamel finish, hinged access doors at filters, fans and compressors and controls. Latches shall be "tool-free" quick fasteners. Provide with fork lift and crane lifting provisions. Doors shall be double wall.
- 2. Insulation: Shall be R-13 insulation with no exposed edges.
- 3. Exterior finish shall include a base primer with a high quality polyester resin top coat in an off white, light grey, or beige color. Outer surface shall be able to withstand a 750 hour salt spray test made in accord to ASTM B117. Provide labels which identify lift points and caution and service areas. All component spaces shall be labeled.
- 4. Unit shall be assembled upon a base rail which over hangs curb or adaptor curb with positive water run off. Curbs and adaptor curbs shall be double wall insulated construction in the configuration shown on drawings details.

D. Fans

- 1. Access to fans shall be through hinged and labeled access doors.
- 2. Fan wheels shall be backward curved or airfoil centrifugal type.
- 3. Fan drive shall be either belt or direct driven.
- 4. Motors shall be premium efficiency type capable of accepting variable frequency drive input.
- 5. Motors and drives shall have bearings rated for 200,000 hour service. Lubricatable bearing points shall be extended to accessible location within the unit.
- 6. Fan wheels and drives shall be statically and dynamically balanced. Fan shall be mounted on rubber in shear or spring loaded isolators.
- 7. Fan motors shall be factory wired with VFD drives. Drives shall have capability of manual or control system inputs. Fans shall be capable of modulating between a minimum of 35 to 100% full volume.
- E. Evaporator Coil:
 - 1. Provide copper tube aluminum fin coil assembly with galvanized drain pan and connection.
 - 2. Provide thermostatic expansion valves. Provide liquid line dryer.
 - 3. Provide stainless steel drain pain with positive slope complying with ASHRAE 62.1.
- E. Compressors:
 - 1. Provide hermetic digital scroll compressors, 3600 rpm maximum, resiliently mounted with positive lubrication, crankcase heater, high and low pressure safety controls, motor overload protection, suction and discharge service valves refrigerant site glasses and gage ports.

- 2. At least one compressor shall be digital or inverter driven. Total unit capacity shall be capable of a 10 to 100% modulation range.
- 3. Compressors shall be located in their own compartment and be independently serviceable.
- 4. Provide five minute timed off circuit to delay compressor start. (Anti recycle timer).
- 5. Provide compressor lock out at ambient temperatures of 35 degrees or less.
- 6. System shall be charged with R-410A and compatible oil.
- G. Condenser Coil:
 - 1. Provide copper tube aluminum fin coil assembly with sub-cooling rows.
 - 2. Provide direct drive vertical discharge propeller fans, resiliently mounted with fan guard, motor overload protection, wired to operate with compressor.
 - 3. Propeller fans shall have variable speed drives.
 - 4. Provide coil guards.

H. Heating Section Shall:

- 1. Have a stainless steel tubular heat exchanger.
- 2. Heat using natural gas fuel at pressures between 5" and 14" water gauge.
- 3. Ignite with an electronic igniter and shall include a UL listed gas train with high and low gas pressure switches and electric lockout of gas valve until gas purge is complete.
- 4. Utilize a modulating gas valve output to a minimum of 30 percent of total. Combustion air blowers shall match modulation rates.
- 5. Shall operate with a call for heat from the temperature control system specified in Section 230900.
- I. Hot Gas Reheat
 - 1. Shall operate with the lead compressors refrigeration circuit.
 - 2. Shall include refrigerant hot gas coil down stream of cooling coil.
 - Shall include an adjustable temperature controller, modulating valves, supply air sensor and shall accept input from humidistat or building automation system to trigger operation during excess humidity conditions.
- J. Outdoor/Return Air Section
 - 1. Dampers: Provide outside and return dampers with damper operator and control package to automatically vary outside air quantity. Outside air damper to fail to closed position.
 - 2. Gaskets: Provide tight fitting dampers with edge gaskets maximum leakage five percent at 2" (500 Pa) pressure differential.
 - 3. Damper Operator: 24 volt modulating action with spring return.
 - 4. Provide outside intake hood for full capacity of unit. Fit with $1/2" \times 1/2"$ bird screen.
- K. Operating Controls:
 - 1. Shall be able to accept output from DDC control systems specified in Section 230900.
 - 2. Shall be capable of operating economizer dampers, energy recovery wheel fans and compressors.
 - 3. Shall have barrier strip for connections to temperature control and safety interlocks.
 - 2. Shall have timed exhaust frost control complete with sensors and relays.
 - 3. Have smoke detector shutdown in return air stream and supply air, prewired to a barrier strip.

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- 4. For scheduled units shall include variable frequency drives for both the supply and return exhaust/return fans. Drives shall match with motors and operate with controls specified in Section 230900.
- L. Energy Wheel:
 - 1. Shall be certified in accord to ARI Standard 1060.
 - 2. Shall be made in removable segments.
 - 3. Shall utilize silica desicant gell permanently bonded to a synthetic fiber based media.
 - 4. Shall transfer both sensible and latent loads.
 - 5. Shall have stainless steel rotor and be mounted within a slide out track.
 - 6. Wheel shall be gear or sprocket belt driven.
 - 7. Wheel motors shall have integral overload protection.
 - 8. Wheels shall have rotation sensors with dry contact output.
- M. Electrical Connections:
 - 1. Provide contactors, disconnect and over current protection for each individual motor. All shall be factory wired to a single point power connection with disconnect means for the entire unit.
 - 2. Provide 24 volt control transformer as required to operate devices specified.
 - 3. Provide a non-fused disconnect or breaker sized for the entire unit.
 - 4. Provide "single phase" or "brown-out" protection for each compressor supply fan or exhaust fan motor.
- N. Curbs shall be minimum of 36" tall as detailed on drawings. Curbs shall be constructed to match the pitch of the building. Provide with an acoustical solid bottom. Curb adaptors shall match existing Dectron curb. Existing curb is 27'-9" x 7'-0" (field verify actual size). Curb cap not under new RTU. Shall positively shed water.
- 0. Filters:
 - 1. Shall have access door at filters.
 - 2. Shall have gasketed filter frames.
 - 3. Shall have modular cardboard frame of 24" x 24" x 2" or 23" x 12" x 2" nominal size.
 - 4. Media shall be pleated type meeting ASHRAE 52.1 for 25-30 percent efficiency.
- P. Acceptable Products: Aaon or Daikin as noted on drawings.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Coordination and Meetings: Verify existing conditions prior to beginning work. Work with General Contractor to locate penetrations.
- B. Verify that wall is ready to receive work and opening dimensions are as needed.
- C. Verify that proper power supply is available.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with International Mechanical Code 96.

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3.03 STARTUP

- A. Owner Training: Certified manufacturer's representative shall meet with Owner's representative two separate time to explain system operation and controls of specific units supplied for this project. Second session shall be just before final payment is made to contractor. Session shall utilize operation manuals.
- B. Provide a sign-up sheet for training sessions. Obtain signature of all those trained. Coordinate date and time of training session with Owner's representative. Ad hoc sessions with whomever maybe available at an uncoordinated session are not acceptable.
- C. Start-up shall be performed according to manufacturer's instruction modified as required by circumstances of installation.
- D. Consult with Owner to determine the operating schedule of the building. Program the fan to operate continuously during those periods.

3.04 PROTECTION

A. Do not allow use of equipment to provide temporary heating/cooling to space until all plaster and drywall work, sanding and painting is complete. Do not operate without filters in place.

END SECTION 237482

SECTION 238126 - SPLIT SYSTEM AIR CONDITIONERS

PART 1 - GENERAL

- 1.01 WORK INCLUDES
 - A. Base Bid:
 - 1. Contractor Provide:
 - a. Refrigerant suction and liquid pipe and accessories.
 - b. Ductless air-conditioning heat pump unit and control, including
 - fan coils and air-cooled condensing unit.
 - c. Condensate drain piping.

1.02 RELATED WORK

- A. Specified Elsewhere:
 - 1. 230593 Testing, Adjusting and Balancing.
 - 2. 230800 Commissioning of HVAC.
 - 3. 230900 Temperature Controls.

1.03 REFERENCES

- A. ANSI/ASHRAE 15 Safety Code for Mechanical Refrigeration.
- B. ANSI/ASHRAE 90A 2007 Energy Conservation in new Building Design. (Except Low Rise Residential Buildings)
- C. UL 1995 Central Cooling Air Conditioners.
- 1.04 DESCRIPTION
 - A. Definitions: 1. HVAC Contractor = Heating Contractor = Heating Subcontractor for this work.
- 1.05 QUALIFICATIONS
 - A. For Work with Refrigerant:
 - 1. Workers shall be certified in accord to the US EPA Refrigerant Certification Program.
 - 2. Technicians shall be employed by a service company regularly engaged for refrigeration service work.
 - 3. Installers shall be acceptable to the manufacturer of the equipment being installed.
- 1.06 SUBMITTALS
 - A. Submit shop drawings under provisions of Section 013300.
 - B. Submit manufacturer's standard drawings indicating components, assembly, dimensions, weights and loadings, required clearances, and location and size of field connections. Include schematic layouts showing condensing units, cooling coils, refrigerant piping, and accessories required for complete system. Include electric power and control schematics, control schematics shall include air flow switches and solenoid valves.
 - C. Submit product data indicating rated capacities, operating characteristics, weights specialties and accessories, electrical nameplate data, and wiring diagrams.

- D. Submit copy of US EPA Refrigerant Certification Program Certificates for actually performing refrigeration work.
- E. Submit line item price for ductless split system units on Schedule of Values. Identify supplier vendor.
- 1.07 OPERATION AND MAINTENANCE DATA
 - A. Submit operation and maintenance data under provisions of Section 017823.
 - B. Include start-up instructions, maintenance instructions, parts lists, controls, and accessories. Coordinate with requirements noted in 230800 and 230900.
- 1.08 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver products to site under provisions of Section 016000.
 - B. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.
 - C. Protect units on site from physical damage. Protect coils.

1.09 WARRANTY

- A. Provide manufacturer's standard warranty for parts and or compressors as currently published by the manufacturer.
- PART 2 PRODUCTS
- 2.01 MANUFACTURER & PERFORMANCE
 - A. Unless otherwise specified the manufacturer's number specified or scheduled is listed merely as an aid to prospective bidders. In most cases it is an incomplete number and relies upon the written description to fully define the item. Where model numbers define a single manufactured item which does not include the items include in the written description, the model number shall be modified as required to most closely meet the described requirements.
- 2.02 MANUFACTURERS
 - A. See Schedule on Drawings.
- 2.03 AIR COOLED COMPRESSOR CONDENSING/HEAT PUMP UNITS
 - A. Units: Self-contained, packaged, factory assembled and pre-wired units suitable for outdoor use consisting of cabinet, compressors, condensing coil and fans, integral sub-cooling coil, controls, liquid receiver, and inlet and outlet screens.
 - B. Construction and Ratings: In accordance with ARI 210/240. Testing shall be in accordance with ASHRAE 14.
 - C. See Schedule on Drawings for performance requirements.
 - D. House components in welded steel frame with galvanized steel panels with weather resistant, baked enamel finish.
 - E. Mount contactors, and controls in weatherproof panel provided with removable access doors.

- F. Coils: Aluminum fins mechanically bonded to seamless copper tubing. Provide sub-cooling circuits. Air test under water to 425 psig, and dehydrate. Seal with holding charge of nitrogen or refrigerant.
- G. Coil Guard: Shall be Expanded metal, Louvered, or PVC coated steel wire.
- H. Fans and Motors:
 - 1. Horizontal discharge direct driven propeller type condenser fans with fan guard on discharge. Propeller shall be statically and dynamically balanced, and keyed to motor shaft.
 - 2. Weatherproof motors suitable for outdoor use, single phase inverter drive, with permanent lubricated ball bearings and built in current and thermal overload protection. Fan Motor shall be mounted to unit frame with spider braces.
- I. Compressors:
 - 1. Shall be inverter driven, rotary type.
 - 2. Shall be rated for continuous cooling operation down to 50 degrees F, and heating operation between 65 degrees F and 0 degrees F.
 - 5. Shall be mounted on rubber in shear dampening vibration isolators.
- J. Refrigerant Circuit:
 - 1. Provide compressors with refrigerant circuits, factory supplied and piped.
 - 2. Provide gauge ports and electronic expansion valves.
 - 3. Unit shall operate with refrigerant R-410A.
- K. Controls and Electrical Connections:
 - 1. Shall be in weatherproof steel enclosure, containing power and control wiring, factory wired with single point power connection.
 - 2. Provide contactor, Anti-short cycle timer, and speed controls. Provide manual reset current overload protection. Provide condenser fan controls; Provide operational controls for fan coil units.
 - 3. Provide the following safety controls arranged so that operating any one will shut down machine and require manual reset:
 - a. High discharge pressure switch manual reset for each compressor.4. Provide the following controls:
 - a. Thermostat located in room. It shall modulate compressors speed,
 - and activates solenoid valves in refrigerant circuit.
 - Periodic pump-out timer to pump down on high evaporator refrigerant pressure.
 - c. Remote control shall be programmable type. It shall regulate temperature and time. It shall modulate and cycle compressor.
 - d. It shall prevent compressor from short cycling.
 - e. Provide built in temperature sensors in each fan coil.

2.04 PIPE & SPECIALTIES

- A. Pipe:
 - 1. Shall be flexible ACR copper tubing complying with ASTM B280.
 - 2. Fittings shall wrought copper type complying with ASME B16.22.
 - 3. Joints shall be made with brazing alloy with melting range of 1190 to 1480 degrees F.
 - 4. Provide premade line sets with flair nut type of connections. Recharge these with dry nitrogen or R-410A. Both lines shall be insulated with continuous white color foam plastic Armaflex AP or equal Rubatex insulation of thickness satisfactory to the International Energy Conservation Code 2016 Edition.
- B. Charging Valves:

- 1. Shall have brass caps and removable valve core with integral ball check.
- 2. Shall have forged brass body with solder connection.

2.05 DUCTLESS FAN COIL

- A. Under Ceiling Configuration shall:
 - 1. Be rectangular in shape with long width, shallow depth and short height.
 - 2. Have end mounted motorized discharge grille and filtered upper intake grille.
- B. Lay-in Ceiling Configuration (Cassette):
 - 1. Shall be configured to fit into a standard 24" x 24" lay-in ceiling grid.
 - 2. Shall have 4-way directional discharge grille and central bottom return grille.
- C. Casing shall be high impact plastic or powder coated extruded aluminum. Frame shall be steel with integral mounting points.
- D. Fans shall be forward curved double width, double inlet wheels. These shall be keyed directly to inverter driven motors. Fan electrical connection shall be made through the outdoor heat pump unit.
- E. Filter shall be washable type.
- F. Drain shall be pipe nipple from insulated drain pan.
- G. Controls shall be wired type using temperature sensor installed in fan coil. Controllers shall be capable of being programmed for 7-day operation with a "holiday" mode.
- 2.06 ACCEPTABLE PRODUCTS (See Drawing Schedules.)
- PART 3 EXECUTION
- 3.01 INSTALLATION
 - A. Install in accordance with manufacturer's instructions.
 - B. Provide connection to refrigeration piping system and evaporators. Comply with ANSI/ASHRAE 15. Mount thermostat 4'-6" above floor at location shown on the Drawings.
 - C. Install units on supports in accord to Section 230529. Mount to pad on neoprene isolator pads. Level units by shimming neoprene pads. Mount units to curbs in accord to drawing detail.
 - D. Piping:
 - 1. Route substantially as shown on the drawings.
 - 2. Minimize use of 90 degree changes in direction. Field bend annealed pipe. Make changes in direction with long radius bends.
 - 3. Secure piping to structure. Isolate copper pipe from steel hangers.
 - 4. Insulate suction piping in accord to Section 230710. Allow room to accommodate insulation.
 - 5. Bundle liquid piping together with suction piping when sizes are 0.5" diameter or less. Use nylon draw-bands.
 - 6. Secure vertical piping to walls with strut hangers per Section 230529.

- 7. Locate charging valves and electronic expansion valves as pre-piped by the manufacturer.
- 8. Joints shall be made with manufacturer's flare nut connection.
- 9. Fill system in accord to manufacturer's requirements.
- E. Condensate Drain Piping:
 - 1. Shall pitch at no less than 1/8" in 2'. Upstream of pump.
 - 2. Hang per Section 230529.
- F. Commissioning:1. Shall be completed by factory trained personnel.
- 3.02 MANUFACTURER'S FIELD SERVICES
 - A. Shall be performed by factory trained service personnel. Contractors personnel and manufacturers representatives are acceptable if they can provide official proof of training.
 - B. Provide initial and cooling season start-up, and winter season shut down during first year of operation, including routine servicing and check out.
 - C. Supply initial charge of refrigerant and oil for each refrigerant circuit. Replace losses of refrigerant and oil.
 - D. Inspect and test for refrigerant leaks at the end of the first cooling season. Repair leaks found, and replace refrigerant.
- 3.03 SCHEDULES: See Drawings.

END OF SECTION 238126

SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 SUMMARY

- A. Contractor Provide Base Bid:
 - 1. Labor and materials for complete electrical systems. These materials include, but are not limited to: circuit breakers, devices, boxes, conduit, conductors, connectors, fittings, and anchors, as required and indicated in these specifications and/or shown on the Electrical Drawings.
 - 2. Power connections and control equipment and wiring as required for equipment provided under other sections or by Owner.
 - 3. All minor system components reasonably required for the proper functioning and/or safe operation of the systems and to meet all related codes and ordinances.
 - 4. Required system and component testing as required in these specifications and/or related codes and ordinances.
 - 5. Coordination with other trade contractors.
 - 6. Rough-ins for future system requirements.
 - 7. Sleeves for raceways and cables.

1.02 RELATED WORK

- A. Specified elsewhere:
 - 1. 260519 Low-Voltage Electrical Power Conductors and Cables
 - 2. 260526 Grounding and Bonding for Electrical Systems
 - 3. 260529 Hangers and Supports for Electrical Systems
 - 4. 260533 Raceway and Boxes for Electrical Systems
 - 5. 260553 Identification for Electrical Systems
 - 6. 260923 Lighting Control Devices
 - 7. 262200 Low-Voltage Transformers
 - 8. 262726 Wiring Devices
 - 9. 262816 Enclosed Switches and Circuit Breakers
 - 10. 265100 Interior Lighting
 - 11. 265600 Exterior Lighting
 - 12. 270500 Common Work Results for Communications
 - 13. 271500 Communications Horizontal Cabling
- 1.03 REFERENCES LATEST EDITIONS
 - A. NFPA 70 National Electrical Code.
 - B. NFPA 72 National Fire Alarm Code.
 - C. NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems.
 - D. Americans With Disabilities Act (ADA).
 - E. International Building Code (IBC).
 - F. Illinois Accessibility Code.
 - G. Illinois Energy Conservation Code (IECC).
 - H. All other Contract Documents including Construction Drawings.

1.04 VERIFICATION OF POINTS

- A. Before submitting his bid, Contractor shall visit the site to carefully verify all exposed points of existing utilities and new connections. Contractor shall verify concealed or buried points of connection as near as possible. Verify these points, as to locations, size, type, depth, operating characteristics, and complications; including, but not limited to:
 - 1. Present site conditions.
 - 2. Present electrical utility distribution system and requirements.
 - 3. Work associated with equipment provided under other sections or by Owner.

PART 2 - PRODUCTS

- 2.01 GENERAL REQUIREMENTS
 - A. Provide all information requested.
 - B. When two or more items of same material or equipment are required they shall be of the same manufacturer. Product manufacturer uniformity does not apply to raw materials, bulk materials, wire, conduit, fittings, sheet metal, steel bar stock, welding rods, solder, fasteners, motors for dissimilar equipment units, and similar items used in Work, except as otherwise indicated.
 - C. Provide products compatible within systems, with interconnected systems, and with other connected items.
 - D. Provide permanent operational data nameplate on each item of power operated equipment, indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and similar essential data. Locate nameplates in an accessible location.
- 2.02 PRODUCT OPTIONS AND SUBSTITUTIONS
 - A. Options and Substitutions shall be done per the Division 1 instructions.
 - B. All product substitutions shall include any incurred costs by the Contractor, any sub-contractor, other trades, Owner, or Owner's consultants. No increase in cost or contract shall be allowed for modifications or corrections, due to approval of Contractor requested or submitted substitutions.
- 2.03 ELECTRICAL SUBMITTALS
 - A. Submit per specification Division 1.
 - B. Electrical equipment submittals shall include a clear item description not just catalog number.
 - C. Catalog pages must be clearly marked to indicate the exact product being proposed with all necessary accessories and options identified and selected.
- 2.04 DELIVERY, STORAGE AND HANDLING
 - A. Deliver products to project site with proper identification, including; names, model numbers, types, grades, compliance labels, and similar

information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage, and handling.

- B. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage.
- C. Coordinate deliveries of electrical materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installations.
- PART 3 EXECUTION
- 3.01 COORDINATION
 - A. Coordinate all work per requirements of Division 1.
 - B. See mechanical and architectural specifications, drawings, and submittals, for work concerning the connection of electrical power and any required controls.
 - C. Contractor shall verify electrical characteristics and requirements (name plate data) of equipment furnished by others (FBO) for proper coordination and equipment operation. Contractor shall confirm requirements of final equipment furnished by others (FBO) and shall select associated electrical devices accordingly. Before any work is installed, and before any equipment is purchased. The Contractor shall carefully check specifications and plans for every trade and job condition, and any lack of coordination between his work, the plans, specifications, or job conditions shall be immediately reported to the Architect/Engineer in writing.
 - D. Contractor shall coordinate equipment connection requirements with approved equipment submittals, prior to rough-in.
- 3.02 ROUGH-IN
 - A. Verify final locations and electrical characteristics for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
 - B. Refer to equipment specifications, of other divisions, for rough-in requirements.
 - C. Coordinate rough-ins for Owner provided equipment.
- 3.03 ELECTRICAL INSTALLATIONS
 - A. Comply with NECA 1.
 - B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounted items.
 - C. Coordinate electrical equipment and materials installation with other building components.
 - D. Right-of-way: Give to piping systems installed at a required slope.
 - E. Verify all dimensions by field measurements.

- F. Arrange for chases, slots, and openings in other building components to allow for electrical installations.
- G. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
 - 1. Sleeves for raceways and cables: Steel pipe sleeves ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
 - Grout: Nonmetallic, shrinkage-resistant, ASTM C 1107, factorypackaged nonmetallic aggregate, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.
 - 3. Sleeve installation for electrical penetrations:
 - a. Electrical penetrations occur when raceways, cables, and wireways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
 - b. Concrete slabs and walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
 - c. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 - d. Fire-rated assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
 - e. Cut sleeves to length for mounting flush with both surfaces of walls.
 - f. Extend sleeves installed in floors 2 inches above finished floor level, unless noted otherwise.
 - g. Seal space outside of sleeves with grout for penetrations of concrete and masonry. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
 - h. Interior penetrations of non-fire-rated walls and floors shall be sealed in the annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.
 - i. Fire-rated-assembly penetrations shall maintain the indicated fire rating of the walls, partitions, ceilings, or floors at point of raceway or cable penetrations, using sleeves with firestop materials.
 - j. Roof-penetration sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing unites applied in coordination with roofing work.
 - k. Above-ground, exterior wall penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 - Underground, exterior wall penetrations: Install PVC pipe sleeves. Size sleeves for 1-inch annular clear space between sleeve and raceway or cable for installing mechanical sleeve seals.
- H. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work.
- I. Coordinate the cutting and patching of building components to accommodate the installation of electrical equipment and materials.

- J. Where mounting heights are not detailed or dimensioned, install electrical services and overhead equipment to provide the maximum headroom possible.
- K. Install electrical equipment for compliance with code-required clearances and to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
- L. Provide access panels and doors for electrical items behind finished surfaces or otherwise concealed.
- M. Coordinate the installation of electrical materials and equipment above ceilings with suspension system, mechanical equipment, other systems and structural components.
- N. Drawings for work under Division 260000 are Diagrammatic and are intended to convey scope of work and indicate general arrangement of conduit, boxes, equipment, and other work included in the contract.
 - 1. See details and schedules on drawings and specifications for meanings of abbreviations, additional requirements, and information. Check civil, architectural, structural, mechanical, and other electrical drawings for scale, space limitations, beams, door swings, windows, ductwork, coordination, and additional information, and report any discrepancies or conflicts to Architect/Engineer prior to submitting bid.
 - 2. The Contractor shall install and completely wire all equipment furnished by others (FBO) in accordance with the Manufacturer's wiring diagrams and as required for a complete operating installation. Contractor shall verify and coordinate electrical characteristics and requirements of (FBO) equipment prior to ordering associated equipment or rough-in of conduit and wiring to avoid conflicts.

3.04 RECORD DOCUMENTS

- A. Provide record documents as required by this Article and Division 1 specifications.
- B. Mark Drawings to indicate revisions to conduit size and location both exterior and interior, actual equipment locations, dimensioned to column lines, concealed equipment dimensioned to column lines, distribution and branch electrical circuitry, fuse and circuit breaker size and arrangements, support and hanger details, Change Orders, and concealed control system devices.
- C. Accurately mark locations of underground, or under floor electrical conduits and conductors. Provide dimensions from fixed points of reference.
- D. On-site record mark ups shall be monitored for compliance with record keeping requirements.
- 3.05 OPERATION AND MAINTENANCE DATA
 - A. Procedures and requirements for preparation and submittal of maintenance manuals shall be done as required by Division 1.
 - B. In addition to the information required by Division 1 specifications, include the following information when requested:

- 1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.
- 2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions.
- 3. Maintenance procedures for routine preventative maintenance and troubleshooting, disassembly, repair, and reassembly, aligning and adjusting instructions.

3.06 WARRANTIES

- A. Procedures and submittal requirements for warranties shall be done, as required by the Division 1 specifications, and as pertains to specific warranties. See individual equipment specifications for warranty requirements.
- B. Compile and assemble the warranties specified in Division 260000 into a file folder labeled for this project.
- C. Provide complete warranty information, for each product or equipment item, to include date of beginning of warranty or bond; duration of warranty or bond; and names, addresses, and telephone numbers and procedures for filing a claim and obtaining warranty services.
- D. Except as modified in individual specification sections:
 - 1. All materials and workmanship shall be warranted for 1 year.
 - 2. All warranties begin upon official date of substantial completion, allowing Owner's beneficial use of the work.
 - 3. Warranted materials shall be provided for replacement within 30 days of notice of failure to Contractor (or as specifically allowed by Owner's Representative).
 - 4. The first year of warranted items shall include materials and labor for replacement/repair and shall be responded to, within 10 working days of notice of problem to Contractor.
 - 5. Warranty material replacements shall not diminish Owner's stock of extra items.

3.07 CLEANING

- A. General requirements for final cleaning shall be done as required by Division 1.
- B. Maintain clean work space with daily cleanup of all occupied areas.

3.08 TESTING

- A. Provide testing and documented results as required by each specification section or applicable codes, laws, and ordinances.
- B. Provide testing and documented results as required or recommended by manufacturer(s) for certification or warranty.

3.09 FIRE STOPPING

- A. Fire stop all penetrations made through rated walls, floors, and partitions of any kind.
- B. Fire stopping materials shall comply with UL1479 and ASTM E814 and shall have an installed "F" rating of 2 hours.

- C. Fire stopping materials in finished areas shall be paintable.
- D. Fire stopping materials for cables outside of conduit or for plastic conduit shall be intumescent type and shall be capable of expansion at least 3 times its original volume when contacted with fire temperature.

END OF SECTION 260500

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.
 - 3. Conductors required for all new general power services, feeders, and branch circuits required or indicated.
 - 4. Conductors required for connections to both motorized and nonmotorized equipment requiring power.

1.2 RELATED WORK

- A. Specified Elsewhere:
 - 1. 260500 Common Work Results for Electrical
 - 2. 260526 Grounding and Bonding for Electrical Systems
 - 3. 260529 Hangers and Supports for Electrical Systems
 - 4. 260533 Raceway and Boxes for Electrical Systems
 - 5. 260553 Identification for Electrical Systems
 - 6. 260923 Lighting Control Devices
 - 7. 262200 Low-Voltage Transformers
 - 8. 262726 Wiring Devices
 - 9. 262816 Enclosed Switches and Circuit Breakers
 - 10. 265100 Interior Lighting
 - 11. 265600 Exterior Lighting
- B. Work by Other trades, Owner, or other contracts:
 - Installation of cabling for low-voltage system applications:
 a. Mechanical systems temperature controls.

1.3 SUBMITTALS

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

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Alcan Products Corporation; Alcan Cable Division.
 - 2. American Insulated Wire Corp.; a Leviton Company.
 - 3. General Cable Corporation.
 - 4. Senator Wire & Cable Company.
 - 5. Southwire Company.
- B. Copper Conductors: Comply with NEMA WC 70.
- C. Conductor Insulation: Comply with NEMA WC 70 for Type THHN-THWN.
- D. Multiconductor Cable: Not permitted except for pre-manufactured fixture or equipment connections (not to exceed 6'-0" in length).
- E. Cables Not Allowed:
 - 1. Armored Cable (AC).
 - 2. Flat Cable Assemblies (FC).
 - 3. Flat Conductor Cable (FCC).
 - 4. Integrated Gas Spacer Cable (IGS).
 - 5. Metal Clad Cable (MC) (except where otherwise noted).
 - 6. Mineral-Insulated, Metal-Sheathed Cable (MI).
 - 7. Nonmetallic-Sheathed Cable (NM, NMC, NMS).

2.2 CONNECTORS AND SPLICES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Hubbell Power Systems, Inc.
 - 3. Ideal Industries, Inc.
 - 4. O-Z/Gedney; EGS Electrical Group LLC.
 - 5. 3M; Electrical Products Division.
 - 6. Tyco Electronics Corp.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

- 3.1 CONDUCTOR MATERIAL APPLICATIONS
 - A. Feeders: Copper. Stranded for all conductors.
 - B. Branch Circuits: Copper. Stranded, minimum #12 AWG, for all conductors.
- 3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS
 - A. Service Entrance: Type XHHW, single conductors in raceway.
 - B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.
 - C. Feeders Concealed in Ceilings and Walls, Partitions: Type THHN-THWN, single conductors in raceway.
 - D. Feeders Below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
 - E. Exposed Branch Circuits: Type THHN-THWN, single conductors in raceway.
 - F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway. Metal-clad cable is not permitted, except for light fixture connection whips and final equipment connections.
 - G. Branch Circuits Below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
 - H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain-relief device at terminations to suit suspended applications.
 - I. Class 1 Control Circuits: Type THHN-THWN, minimum #14 AWG, in raceway.
 - J. Class 2 Control Circuits: Type THHN-THWN, minimum #18 AWG, in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

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- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than non-spliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.
- 3.5 FIELD QUALITY CONTROL
 - A. Perform tests and inspections and prepare test reports.
 - B. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - C. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
 - D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

Α. This Section includes methods and materials for grounding systems and equipment.

1.2 RELATED WORK

Α.	Spec	ified Elsewhere:
	1.	260500 - Common Work Results for Electrical
	2.	260529 - Hangers and Supports for Electrical Systems
	3.	260533 - Raceway and Boxes for Electrical Systems
	4.	260923 - Lighting Control Devices
	5.	262200 - Low-Voltage Transformers
	б.	262726 - Wiring Devices
	7.	262816 - Enclosed Switches and Circuit Breakers
	8.	265100 - Interior Lighting
	9.	265600 - Exterior Lighting
	10.	270500 - Common Work Results for Communications
	11.	271500 - Communications Horizontal Cabling

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- Operation and Maintenance Data: For grounding to include the в. following in emergency, operation, and maintenance manuals:
 - 1. Instructions for periodic testing and inspection of grounding features at ground rings and grounding connections for separately derived systems based on NETA MTS and NFPA 70B.
 - Tests shall be to determine if ground resistance or impedance a. values remain within specified maximums, and instructions shall recommend corrective action if they do not.
 - b. Include recommended testing intervals.

QUALITY ASSURANCE 1.4

- Electrical Components, Devices, and Accessories: Listed and labeled Α. as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- Comply with UL 467 for grounding and bonding materials and equipment. в.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- Α. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- Bare Copper Conductors: Β.
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
 - Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 4. inch in diameter.
 - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - Bonding Jumper: Copper tape, braided conductors, terminated with 6. copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
 - Tinned Bonding Jumper: Tinned-copper tape, braided conductors, 7. terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.2 CONNECTORS

- Listed and labeled by a nationally recognized testing laboratory Α. acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- Bolted Connectors for Conductors and Pipes: Copper or copper alloy, в. bolted pressure-type, with at least two bolts. 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. UL Listed compression connection is acceptable.

2.3 GROUNDING ELECTRODES

Α. Ground Rods: Copper-clad steel; 10' by minimum 5/8" inches in diameter.

PART 3 - EXECUTION

3.1 APPLICATIONS

- Conductors: Install stranded conductors unless otherwise indicated. Α.
- Underground Grounding Conductors: Install bare tinned-copper В. conductor, No. 3/0 AWG minimum.

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- Bury at least 24 inches below grade. 1.
- С. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted or one-shot compression connectors.
 - 2. Underground Connections: Welded or one-shot compression connectors.
 - 3. Connections to Structural Steel: Welded or one-shot compression connectors.

EQUIPMENT GROUNDING 3.2

- Install insulated equipment grounding conductors with all feeders and Α. branch circuits.
- в. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Receptacle circuits.
 - 3. Single-phase motor and appliance branch circuits.
 - 4. Flexible raceway runs.
- Air-Duct Equipment Circuits: Install insulated equipment grounding С. conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

3.3 INSTALLATION

- Grounding Conductors: Route along shortest and straightest paths Α. possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- Ground Rods: Drive rods until tops are 24 inches below finished floor в. or final grade, unless otherwise indicated.
 - Interconnect ground rods with grounding electrode conductor below 1. grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
 - For grounding electrode system, install at least three rods 2. spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- Bonding Straps and Jumpers: Install in locations accessible for С. inspection and maintenance, except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - Bonding to Equipment Mounted on Vibration Isolation Hangers and 2. Supports: Install so vibration is not transmitted to rigidly mounted equipment.

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- 3. Use exothermic-welded or one-shot compression connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.
- D. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- E. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections and prepare test reports:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at individual ground rods. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - 3. Prepare dimensioned drawings locating each ground rod and ground rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- B. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
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C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- Α. This Section includes the following:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.

1.2 RELATED WORK

- Specified Elsewhere: Α.
 - 1. 260500 Common Work Results for Electrical
 - 2. 260526 Grounding and Bonding for Electrical Systems
 - 3. 260533 Raceway and Boxes for Electrical Systems
 - 4. 265100 Interior Lighting
 - 5. 270500 Common Work Results for Communications
 - 271500 Communications Horizontal Cabling 6.

1.3 DEFINITIONS

- EMT: Electrical metallic tubing. Α.
- в. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.
- PVC/RNC: Polyvinylchloride/Rigid nonmetallic conduit. D.
- ENC: Electrical Non-metallic tubing. Ε.

PERFORMANCE REQUIREMENTS 1.4

- Α. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- в. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- Rated Strength: Adequate in tension, shear, and pullout force to с. resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

SUBMITTALS 1.5

A. Product Data: For the following: 1. Slotted steel support systems. apaceDesign Architects + Engineers HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS Project No. 2014909.01 Section 260529

- 2. Manufactured block roof conduit supports.
- 3. Fabricated slotted steel (strut) equipment support frame roof attachment method shall be submitted for approval.
- 1.6 QUALITY ASSURANCE
 - A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code Steel."
 - B. Comply with NFPA 70.

1.7 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.
- B. Coordinate electrical work with the installation of roof curbs, equipment supports, and roof penetrations.
- PART 2 PRODUCTS
- 2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS
 - A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.
 - g. Wesanco, Inc.
 - 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 4. Channel Dimensions: Selected for applicable load criteria.
 - B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
 - C. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
 - D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor

gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

- Ε. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- Mounting, Anchoring, and Attachment Components: Items for fastening F. electrical items or their supports to building surfaces include the following:
 - Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated 1. steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - Available Manufacturers: Subject to compliance with a. requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - Cooper B-Line, Inc.; a division of Cooper Industries. 1)
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti Inc.
 - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - MKT Fastening, LLC. 5)
 - 2. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 - 3. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 - Through Bolts: Structural type, hex head, and high strength. 4. Comply with ASTM A 325.
 - Toggle Bolts: All-steel springhead type. 5.
 - Hanger Rods: Threaded steel. 6.
 - Rubber roof block conduit supports with slotted steel system 7. attachement.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- Description: Welded or bolted, structural-steel shapes, shop or field Α. fabricated to fit dimensions of supported equipment.
- PART 3 EXECUTION

3.1 APPLICATION

- Comply with NECA 1 and NECA 101 for application of hangers and Α. supports for electrical equipment and systems except if requirements in this Section are stricter.
- Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Β. Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

- Multiple Raceways or Cables: Install trapeze-type supports fabricated C. with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - Secure raceways and cables to these supports with two-bolt 1. conduit clamps, single-bolt conduit clamps, or single-bolt conduit clamps using spring friction action for retention in support channel.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- Comply with NECA 1 and NECA 101 for installation requirements except Α. as specified in this Article.
- в. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- Strength of Support Assemblies: Where not indicated, select sizes of C. components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- Mounting and Anchorage of Surface-Mounted Equipment and Components: D. Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - To Wood: Fasten with lag screws or through bolts. 1.
 - To New Concrete: Bolt to concrete inserts. 2.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - To Existing Concrete: Expansion anchor fasteners. 4.
 - To Steel: Welded threaded studes complying with AWS D1.1/D1.1M, 5. with lock washers and nuts, Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69, or Spring-tension clamps.
 - To Light Steel: Sheet metal screws. 6.
 - Items Mounted on Hollow Walls and Nonstructural Building 7. Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- Drill holes for expansion anchors in concrete at locations and to Е. depths that avoid reinforcing bars.

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3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

A. Any required concrete bases and pads for electrical equipment shall be furnished and installed by the Electrical Contractor. Include all materials and labor necessary in bid proposal. Coordinate the exact location and dimensions of electrical equipment requiring concrete pads with other trades.

3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

- 1.1 SUMMARY
 - A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- 1.2 RELATED WORK
 - Α. Specified Elsewhere: 1. 260500 - Common Work Results for Electrical 2. 260519 - Low-Voltage Electrical Power Conductors and Cables 3. 260526 - Grounding and Bonding for Electrical Systems 4. 260529 - Hangers and Supports for Electrical Systems 5. 260533 - Raceway and Boxes for Electrical Systems 6. 260923 - Lighting Control Devices 7. 262200 - Low-Voltage Transformers 8. 262726 - Wiring Devices 9. 262816 - Enclosed Switches and Circuit Breakers 10. 265100 - Interior Lighting 11. 265600 - Exterior Lighting 12. 270500 - Common Work Results for Communications 13. 271500 - Communications Horizontal Cabling
- 1.3 DEFINITIONS
 - EMT: Electrical metallic tubing. Α.
 - в. ENT: Electrical nonmetallic tubing.
 - C. FMC: Flexible metal conduit.
 - IMC: Intermediate metal conduit. D.
 - LFMC: Liquid-tight flexible metal conduit. Ε.
 - F. LFNC: Liquid-tight flexible nonmetallic conduit.
 - G. RSC/RGC: Rigid steel/Rigid galvanized conduit.
 - н. PVC/RNC: Polyvinylchloride/Rigid nonmetallic conduit.
 - I. HDPE: High Density Polyethylene conduit.

QUALITY ASSURANCE 1.4

- Electrical Components, Devices, and Accessories: Listed and labeled Α. as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- Comply with NFPA 70. в.
- PART 2 PRODUCTS

2.1 METAL CONDUIT AND TUBING

- Α. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Alflex Inc.
 - 3. Allied Tube & Conduit; a Tyco International Ltd. Co.
 - 4. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - 5. Electri-Flex Co.
 - 6. Manhattan/CDT/Cole-Flex.
 - 7. Maverick Tube Corporation.
 - 8. O-Z Gedney; a unit of General Signal.
 - 9. Wheatland Tube Company.
- Rigid Steel Conduit: ANSI C80.1. в.
- IMC: ANSI C80.6. C.
- EMT: ANSI C80.3. D.
- Е. FMC: Zinc-coated steel or aluminum.
- F. LFMC: Flexible steel conduit with PVC jacket.
- Fittings for Conduit (Including all Types and Flexible and G. Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
 - 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
 - 2. Fittings for EMT: Steel or die-cast, set-screw or compression type.

2.2 NONMETALLIC CONDUIT AND TUBING

- Available Manufacturers: Subject to compliance with requirements, Α. manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - 3. Arnco Corporation.
 - 4. CANTEX Inc.

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- 5. CertainTeed Corp.; Pipe & Plastics Group.
- 6. Condux International, Inc.
- 7. ElecSYS, Inc.
- 8. Electri-Flex Co.
- 9. Carlon Electrical Products; Thomas & Betts Corporation.
- 10. Manhattan/CDT/Cole-Flex.
- 11. RACO; a Hubbell Company.
- B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
- C. Fittings for RNC: NEMA TC 3; match to conduit or tubing type and material.
- D. ENT: Corrugated PVC
- E. HDPE: Smooth wall, Schedule 40, continuous length.
- F. LFNC: Liquid-tight Flexible Nonmetallic Conduit shall not be used on this project without prior approval.

2.3 METAL WIREWAYS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper B-Line, Inc.
 - 2. Hoffman.
 - 3. Square D; Schneider Electric.
- B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, unless otherwise indicated.
- C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Screw-cover type unless specifically noted otherwise on the drawings.
- E. Finish: Manufacturer's standard enamel finish.

2.4 SURFACE RACEWAYS

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.
 - Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Thomas & Betts Corporation.
 - b. Walker Systems, Inc.; Wiremold Company (The).

- Wiremold Company (The); Electrical Sales Division. c.
- в. Surface Nonmetallic Raceways: Not used on this project, unless specifically approved otherwise.

2.5 BOXES, ENCLOSURES, AND CABINETS

- Manufacturers: Subject to compliance with requirements, provide Α. products by one of the following:
 - Cooper Crouse-Hinds; Div. of Cooper Industries, Inc. 1.
 - 2. EGS/Appleton Electric.
 - 3. Erickson Electrical Equipment Company.
 - 4. Hoffman.
 - 5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
 - 6. O-Z/Gedney; a unit of General Signal.
 - 7. RACO; a Hubbell Company.
 - 8. Robroy Industries, Inc.; Enclosure Division.
 - Scott Fetzer Co.; Adalet Division. 9.
 - 10. Spring City Electrical Manufacturing Company.
 - 11. Thomas & Betts Corporation.
 - 12. Walker Systems, Inc.; Wiremold Company (The).
 - 13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.
- Sheet Metal Outlet and Device Boxes: NEMA OS 1. в.
- Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy or C. aluminum, Type FD, with gasketed cover.
- D. Metal Floor Boxes: Not used on this project, unless specifically approved otherwise.
- Small Sheet Metal Pull and Junction Boxes: NEMA OS 1. Ε.
- Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge F. cover with flush latch, unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
- G. Cabinets:
 - 1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - Hinged door in front cover with flush latch and concealed hinge. 2.
 - 3. Key latch to match panelboards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- Α. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
 - 1. Exposed Conduit:
 - a. On Roof: EMT with compression fittings
 - On exterior wall above 36" above grade: Rigid steel or IMC b. conduit, or schedule 80 PVC per drawings.
 - Concealed Conduit, Aboveground: RNC, Type EPC-40-PVC above 36". 2. Use schedule 80 for service conductors.
 - Underground Conduit: RNC, Type EPC-40-PVC, direct buried. 3.
 - Underground Service Conductor Conduit Elbows : RNC type EPC-80-4. PVC, direct buried.
 - 5. Underground Fiber Optic Cable Conduit: HDPE, schedule 40, continuous length, directional bore or trench installation.
 - Connection to Vibrating Equipment (Including Transformers and 6. Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 7. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- в. Comply with the following indoor applications, unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. Exposed, Not Subject to Severe Physical Damage: EMT.
 - 3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 - 5. Damp or Wet Locations: Rigid steel conduit or IMC.
 - 6. Raceways for Communications Cable in Spaces Used for Environmental Air: EMT.
 - 7. Raceways for Concealed General Purpose Distribution of Low-Voltage and Communications Cable: EMT.
 - 8. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, nonmetallic in damp or wet locations.
- Minimum Raceway Size: 3/4-inch trade size. C.
- Raceway Fittings: Compatible with raceways and suitable for use and D. location.
 - Rigid and Intermediate Steel Conduit: Use threaded rigid steel 1. conduit fittings, unless otherwise indicated.

3.2 INSTALLATION

- Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or Α. in this Article are stricter.
- Keep raceways at least 6 inches away from parallel runs of flues and в. steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

- Complete raceway installation before starting conductor installation. C.
- D. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- Install no more than the equivalent of three 90-degree bends in any Ε. conduit run except for communications conduits, for which fewer bends are allowed.
- Conceal conduit and EMT within finished walls, ceilings, and floors, F. unless otherwise indicated.
- Raceway Terminations at Locations Subject to Moisture or Vibration: G. Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- Install pull wires in empty raceways. Use polypropylene or н. monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- Flexible Conduit Connections: Use maximum of 72 inches of flexible Ι. conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - Use LFMC in damp or wet locations subject to severe physical 1. damage.
 - 2. Use LFMC in damp or wet locations not subject to severe physical damage.
- J. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

- Direct-Buried Conduit: Α.
 - Excavate trench bottom to provide firm and uniform support for 1. conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches in nominal diameter.
 - Install structural backfill. 2.
 - After installing conduit, install flowable fill, top soil, and 3. compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. After placing controlled backfill to within 18 inches of finished grade, make final conduit connection at end of run and complete backfilling with compaction equal to or greater than area being excavated. Firmly hand tamp top soil backfill above flowable fill, to prevent settling.
 - Install manufactured duct elbows for stub-ups at poles and 4. equipment and at building entrances through the floor, unless otherwise indicated. Provide RGS factory elbows or encase PVC elbows for stub-up ducts throughout the length of the elbow.
- в. Directional Bore:

- 1. Locate and mark all existing underground utilities.
- 2. Hand dig at crossing locations of other utilities.
- 3. Excavate at stub-up locations and backfill as noted above.

3.4 PROTECTION

- Provide final protection and maintain conditions that ensure coatings, Α. finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- Α. This Section includes the following:
 - 1. Identification for raceway.
 - 2. Identification for conductors.
 - 3. Warning labels and signs.
 - 4. Instruction signs.
 - 5. Equipment identification labels.
 - 6. Device circuit labels.
 - 7. Panel circuit directories.
 - 8. Miscellaneous identification products.

1.2 RELATED WORK

- Α. Specified Elsewhere:
 - 1. 260500 - Common Work Results for Electrical
 - 260533 Raceway and Boxes for Electrical Systems 2.
 - 3. 262200 Low-Voltage Transformers
 - 4. 262726 Wiring Devices
 - 5. 262816 Enclosed Switches and Circuit Breakers
 - 270500 Common Work Results for Communications 6.
 - 271500 Communications Horizontal Cabling 7.

1.3 QUALITY ASSURANCE

- Comply with NFPA 70. Α.
- Comply with 29 CFR 1910.145. в.

1.4 COORDINATION

- Coordinate identification names, abbreviations, colors, and other Α. features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- Coordinate installation of identifying devices with completion of в. covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 WARNING LABELS AND SIGNS

- Comply with NFPA 70 and 29 CFR 1910.145. Α.
- Self-Adhesive Warning Labels: Factory printed, multicolor, pressureв. sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.
- Electrical Panel Warning labels shall include, but are not limited to, C. the following legends:
 - Workspace Clearance Warning: "WARNING OSHA REGULATION AREA 1. IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."
 - 2. OSHA/NFPA 70E Arc-Flash hazard warning label: "WARNING; ARC-FLASH HAZARD; APPROPRIATE PPE REQUIRED; FAILURE TO COMPLY CAN RESULT IN DEATH OR INJURY; REFER TO NFPA 70E"

2.2 INSTRUCTION SIGNS

- Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch Α. thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.
 - 1. Engraved legend with black letters on white face.
 - 2. Punched or drilled for mechanical fasteners.
 - 3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.
- 2.3 EQUIPMENT IDENTIFICATION LABELS/PANEL NAME PLATES
 - Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Α. Adhesive backed, with white letters on a dark-gray or black background. Minimum letter height shall be 3/8 inch.
 - в. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Division 26 Section "Identification for Electrical Systems."
 - Panelboard Nameplates: Label each panelboard with a nameplate C. complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
 - Device Nameplates: Label each branch circuit device in distribution D. panelboards with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

Е.

DEVICE PLATE LABELS 2.4

- Embossed, clear adhesive tape, with 1/4" high black (depending on Α. cover plate color selection) lettering with circuit number and panel identification for electrical devices (receptacles and switches). Labels shall be located on the face of the device cover plate, unless noted otherwise.
- в. All labels shall be machine made and printed.

MISCELLANEOUS IDENTIFICATION PRODUCTS 2.5

- Α. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength: 50 lb, minimum.
 - 3. Temperature Range: Minus 40 to plus 185 deg F.
 - 4. Color: Black, except where used for color-coding.
- Fasteners for Labels and Signs: Self-tapping, stainless-steel screws в. or stainless-steel machine screws with nuts and flat and lock washers.
- C. Panel Circuit Directories:
 - Create a directory to indicate installed circuit loads after 1. balancing panelboard loads; incorporate Owner's existing room designations. Obtain approval before installing.
 - Use a computer or typewriter to create directory; handwritten 2. directories are not acceptable.
 - Directories must include sufficient load descriptions to comply 3. with NEC 408.4.
 - Panel breaker spaces shall be numbered with a single-pole breaker 4. taking up one space, 2-pole breakers taking up two spaces, and 3pole breakers using three or more spaces. Space numbers shall be sequential with odd digits used on left side of panel (number 1 at top) and even digits used on right side of panel (number 2 at top).
 - 5. Install on inside of panel door in clear sleeve/pocket.

PART 3 - EXECUTION

3.1 APPLICATION

- Power-Circuit Conductor Identification: For primary and secondary Α. conductors No. 1/0 AWG and larger in vaults, pull and junction boxes, manholes, and handholes use color-coding conductor tape marker tape. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.
- Branch-Circuit Conductor Identification: Where there are conductors в. for more than three branch circuits in same junction or pull box, use color-coding conductor tape. Identify each ungrounded conductor according to source and circuit number. Clearly write circuit identifications on junction box cover plates.

- Panel Warning Labels: Apply NEC-required clear work space and arcс. flash risk warning labels on every electrical branch and distribution panel, where work is being done, located in a space considered "unfinished".
- Wiring Device Labels: Apply circuit identification labels on all D. cover plates of new or updated electrical wiring devices.
- Ε. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each Systems include power, lighting, control, communication, system. signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 - 1. Labeling Instructions:
 - Indoor Equipment: Self-adhesive, engraved, laminated acrylic a. or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2inch- high label; where 2 lines of text are required, use labels 2 inches high.
 - Elevated Components: Increase sizes of labels and letters to b. those appropriate for viewing from the floor.
 - Equipment to Be Labeled: 2.
 - a. Panelboards, electrical cabinets, and enclosures.
 - Electrical switchgear and switchboards. b.
 - c. Disconnect switches.
 - d. Enclosed circuit breakers.
 - e. Motor starters.
 - f. Contactors.

3.2 INSTALLATION

- Α. Verify identity of each item before installing identification products.
- Location: Install identification materials and devices at locations в. for most convenient viewing without interference with operation and maintenance of equipment.
- Apply identification devices to surfaces that require finish after С. completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- System Identification Color Banding for Raceways and Cables: Each Ε. color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

- Color-Coding for Phase and Voltage Level Identification, 600 V and F. Less: Use the colors listed below for ungrounded service, feeder, and branch-circuit conductors.
 - 1. Color shall be factory applied to conductor jacket or, for sizes larger than No. 10 AWG if authorities having jurisdiction permit, field applied.
 - Colors for 208/120-V Circuits: 2.
 - a. Phase A: Black.
 - b. Phase B: Red.
 - Phase C: Blue. с.
 - 3. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 - 4. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- Underground-Line Warning Tape: During backfilling of trenches install G. continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches overall.

END OF SECTION 260553

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following lighting control devices:1. Indoor occupancy sensors.

1.2 RELATED WORK

- A. Specified Elsewhere:
 - 1. 260500 Common Work Results for Electrical
 - 2. 260533 Raceway and Boxes for Electrical Systems
 - 3. 262726 Wiring Devices
 - 4. 265100 Interior Lighting
 - 5. 265600 Exterior Lighting

1.3 DEFINITIONS

- A. LED: Light-emitting diode.
- B. PIR: Passive infrared.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show installation details for occupancy and light-level sensors.
 1. Interconnection diagrams showing field-installed wiring.
- C. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.6 COORDINATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 INDOOR OCCUPANCY SENSORS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings.
- B. General Description: Wall- or ceiling-mounting, solid-state units with a separate relay unit.
 - Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 25 minutes.
 - Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit.
 - 3. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.
 - 4. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outlet box.
 - Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
 - 5. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
 - 6. Bypass Switch: Override the on function in case of sensor failure.
 - 7. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc; keep lighting off when selected lighting level is present.
- C. PIR Type: Ceiling mounting; detect occupancy by sensing a combination of heat and movement in area of coverage.
 - 1. Detector Sensitivity: Detect occurrences of 6-inch- minimum movement of any portion of a human body that presents a target of not less than 36 sq. in..
 - 2. Detection Coverage (Room): Detect occupancy anywhere in a circular area of 1000 sq. ft. when mounted on a 96-inch- high ceiling.
 - 3. Detection Coverage (Corridor): Detect occupancy within 90 feet when mounted on a 10-foot- high ceiling.
- D. Ultrasonic Type: Ceiling mounting; detect occupancy by sensing a change in pattern of reflected ultrasonic energy in area of coverage.
 - 1. Detector Sensitivity: Detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
 - Detection Coverage (Small Room): Detect occupancy anywhere within a circular area of 600 sq. ft. when mounted on a 96-inchhigh ceiling.

- 3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inchhigh ceiling.
- 4. Detection Coverage (Large Room): Detect occupancy anywhere within a circular area of 2000 sq. ft. when mounted on a 96-inchhigh ceiling.
- 5. Detection Coverage (Corridor): Detect occupancy anywhere within 90 feet when mounted on a 10-foot- high ceiling in a corridor not wider than 14 feet.
- Е. Dual-Technology Type: Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic detection methods in area of coverage. Particular technology or combination of technologies that controls on-off functions shall be selectable in the field by operating controls on unit.
 - 1.
 - Sensitivity Adjustment: Separate for each sensing technology. Detector Sensitivity: Detect occurrences of 6-inch- minimum 2. movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
 - 3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inchhigh ceiling.

2.2 CONDUCTORS AND CABLES

- Power Wiring to Supply Side of Remote-Control Power Sources: Not Α. smaller than No. 12 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."
- Classes 2 and 3 Control Cable: Multiconductor cable with strandedв. copper conductors not smaller than No. 18 AWG or as specifically required by the manufacturer.
- C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG or as specifically required by the manufacturer.

PART 3 - EXECUTION

SENSOR INSTALLATION 3.1

Install and aim sensors in locations to achieve not less than 90 Α. percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.2 WIRING INSTALLATION

Wiring within Enclosures: Comply with NECA 1. Separate power-limited Α. and nonpower-limited conductors according to conductor manufacturer's written instructions.

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- Size conductors according to lighting control device manufacturer's в. written instructions, unless otherwise indicated.
- C. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.3 FIELD QUALITY CONTROL

- Perform the following field tests and inspections and prepare test Α. reports:
 - 1. After installing sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
 - Operational Test: Verify operation of each lighting control 2. device, and adjust time delays.
- в. Lighting control devices that fail tests and inspections are defective work.

3.4 ADJUSTING

Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting Α. sensors to suit occupied conditions. Provide up to two visits to Project for this purpose.

3.5 DEMONSTRATION

A. Provide demonstration of products specified in this Section

END OF SECTION 260923

SECTION 262200 - LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following types of dry-type transformers rated 600 V and less, with capacities up to 1000 kVA:
 - 1. Distribution transformers.

1.2 RELATED WORK

A. Specified Elsewhere:
1. 260500 - Common Work Results for Electrical
2. 260529 - Hangers and Supports for Electrical Systems
3. 260533 - Raceway and Boxes for Electrical Systems
4. 262816 - Enclosed Switches and Circuit Breakers

1.3 SUBMITTALS

- A. Product Data: Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer indicated.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Power Wiring Diagrams.
- C. Source quality-control test reports.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For transformers to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each transformer type through one source from a single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with IEEE C57.12.91, "Test Code for Dry-Type Distribution and Power Transformers."

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- 1.5 DELIVERY, STORAGE, AND HANDLING
 - A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.
- 1.6 COORDINATION
 - A. Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
 - B. Coordinate installation of wall-mounting and structure-hanging supports with actual transformer provided.
- PART 2 PRODUCTS
- 2.1 MANUFACTURERS
 - A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ABB.
 - 2. Eaton Electrical Inc.; Cutler-Hammer Products.
 - 3. G.E. Industrial.
 - 4. Hammond Power Solutions.
 - 5. Square D; Schneider Electric.
- 2.2 GENERAL TRANSFORMER REQUIREMENTS
 - A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.
 - B. Cores: Grain-oriented, non-aging silicon steel.
 - C. Coils: Continuous windings without splices except for taps.
 - 1. Internal Coil Connections: Brazed or pressure type.
 - 2. Coil Material: Copper.

2.3 DISTRIBUTION TRANSFORMERS

- A. Comply with NEMA ST 20, and list and label as complying with UL 1561.
- B. Cores: One leg per phase.

- C. Enclosure: Ventilated, NEMA 250, Type 2.
 - 1. Core and coil shall be encapsulated within resin compound, sealing out moisture and air.
- D. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and two 2.5 percent taps below normal full capacity.
- E. Insulation Class: 220 deg C, UL-component-recognized insulation system with a maximum of 115 deg C rise above 40 deg C ambient temperature.
- F. Energy Efficiency for Transformers Rated 15 kVA and Larger:

1. Complying with NEMA TP 1, Class 1 efficiency levels.

- 2. Tested according to NEMA TP 2.
- G. Low-Sound-Level Requirements: Minimum of 3 dBA less than NEMA ST 20 standard sound levels when factory tested according to IEEE C57.12.91.

2.4 IDENTIFICATION DEVICES

- A. Nameplates: Engraved, laminated-plastic or metal nameplate for each distribution transformer, mounted with corrosion-resistant screws. Nameplates and label products are specified in Division 26 Section "Identification for Electrical Systems."
- 2.5 SOURCE QUALITY CONTROL
 - A. Test and inspect transformers according to IEEE C57.12.91.
- PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine conditions for compliance with enclosure- and ambienttemperature requirements for each transformer.
- B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.
- C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.
- D. Verify that ground connections are in place and requirements in Division 26 Section "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance shall be 5 ohms at location of transformer.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Construct concrete bases and anchor floor-mounting transformers according to manufacturer's written instructions.

3.3 CONNECTIONS

- A. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- B. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- C. Remove and replace units that do not pass tests or inspections and retest as specified above.
- D. Test Labeling: On completion of satisfactory testing of each unit, attach a dated and signed "Satisfactory Test" label to tested component.

3.5 ADJUSTING

- A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.
- B. Output Settings Report: Prepare a written report recording output voltages and tap settings.

3.6 CLEANING

A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

END OF SECTION 262200

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

- 1.1 SUMMARY
 - A. This Section includes the following:
 - 1. Receptacles and switches shown and/or required for all general power and lighting.
 - 2. Special dedicated purpose receptacles as indicated or required by equipment.
 - 3. Device and blank box cover plates.
 - Receptacles with: 4.
 - Integral GFCI protection. a.
 - b. Tamper resistance feature.c. Isolated ground feature.

 - d. Surge protection feature.

1.2 RELATED WORK

- Specified Elsewhere: Α.
 - 1. 260500 Common Work Results for Electrical
 - 2. 260533 - Raceway and Boxes for Electrical Systems
 - 3. 260923 Lighting Control Devices

1.3 DEFINITIONS

- EMI: Electromagnetic interference. Α.
- GFCI: Ground-fault circuit interrupter. в.
- Pigtail: Short lead used to connect a device to a branch-circuit C. conductor.
- RFI: Radio-frequency interference. D.

1.4 REFERECNES

- A. NECA Standard of Installation.
- NEMA WD 1 General Requirements for Wiring Devices. в.
- NEMA WD 6 Wiring Device Dimensional Requirements. С.
- NFPA 70 National Electrical Code D.
- A.D.A Americans with Disabilities Act Ε.

F. UL 1449 2nd Edition - Standard for Safety for Transient Voltage Surge Suppressors.

1.5 SUBMITTALS

- A. Division 1 Submittals: Procedures for submittals.
- B. Product Data: For each type of product indicated, provide manufacturer's catalog information showing dimensions, colors, and configurations for all devices and device covers. Submittals shall include intended lettering for all engraved/heat-stamped device cover plates.
- C. Samples: One for each type of device and wall plate specified, in each color specified, when requested.
- D. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

1.7 CREGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Provide products listed and classified by Underwriters Laboratories, Inc., or other Nationally Recognized Testing Agency acceptable to the Authority Having Jurisdiction, as suitable for the purpose specified and indicated.
- C. NEMA Stds. Pub. WD 1 General Purpose Wiring Devices and WD 5 Specific-Purpose Wiring Devices.

1.8 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.1. Cord and Plug Sets: Match equipment requirements.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: As indicated on the drawings.

2.2 STRAIGHT BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
- B. Where tamper-resistant devices are required by associated codes, provide devices that require phase and neutral blades to be inserted at simultaneously to cause shutter mechanism to open.

2.3 GFCI RECEPTACLES

- A. General Description: Straight blade, feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

2.4 SWITCHES

A. General Duty, flush, single-pole, 2-pole, 3-way, and 4-way toggle or rocker switches, 20-ampere, 120/277-volt, AC rated with mounting yoke insulated from mechanism. Equip with plaster ears, switch handle, and side-wired screw terminals.

2.5 WALL PLATES

- A. Provide device cover plates for single and combination wiring devices (or blank boxes), of types, sizes, and with ganging and cutouts as required or indicated.
 - 1. Select plates that mate and match wiring devices to those attached.
 - 2. Construct with metal screws for securing plates to devices; screw heads colored to match finish of plates.
 - 3. Cover plates in finished areas shall be unbreakable nylon or high-impact thermoplastic, colored to match wiring devices and selected from colors listed under general device requirements, approved by Architect.
 - 4. Plates shall have factory formed beveled edges.
 - 5. Cover plates in unfinished Spaces: Galvanized steel.
 - 6. Material for Damp Locations: Thermoplastic with spring-loaded lift cover, and listed and labeled for use in "wet locations." Cover shall be capable of closure "while-in-use".

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2.6 FINISHES

- A. Color: Wiring device catalog numbers in Section text or material schedules may not designate device color.
 - 1. Wiring Device and cover plate colors shall be selected by architect from manufacturers' colors identified in drawings' Material Schedule.
 - 2. Coordinate selection of wiring device and cover plate colors.
- PART 3 EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.
- B. Coordination with Other Trades:
 - 1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
 - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 - 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
 - 1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
 - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 - 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
 - 4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtailing existing conductors is permitted provided the outlet box is large enough.
- D. Device Installation:
 - 1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
 - 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
- 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
- 4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
- 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
- 6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
- 7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
- 8. Tighten unused terminal screws on the device.
- 9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.
- E. Receptacle Orientation:
 - 1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.
- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multi-gang wall plates.
- H. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 IDENTIFICATION

- A. Comply with Division 26 Section "Identification for Electrical Systems."
 - 1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with clear background with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
 - 1. Test Instruments: Use instruments that comply with UL 1436.
 - 2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.
- B. Tests for Convenience Receptacles:
 - 1. Line Voltage: Acceptable range is 105 to 132 V.
 - 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.

- 3. Ground Impedance: Values of up to 2 ohms are acceptable.
- 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
- 5. Using the test plug, verify that the device and its outlet box are securely mounted.
- 6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

END OF SECTION 262726

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

- Α. Section Includes:
 - 1. Fusible switches.
 - 2. Non-fusible switches.
 - 3. Enclosures.

1.2 RELATED WORK

- Specified Elsewhere: Α.
 - 1. 260500 Common Work Results for Electrical
 - 2. 260526 Grounding and Bonding for Electrical Systems
 - 3. 260529 Hangers and Supports for Electrical Systems
 - 4. 260533 Raceway and Boxes for Electrical Systems
 - 5. 262200 Low-Voltage Transformers
 - 6. 265100 Interior Lighting

1.3 DEFINITIONS

- NC: Normally closed. Α.
- NO: Normally open. в.
- С. SPDT: Single pole, double throw.

1.4 SUBMITTALS

- Shop Drawings: For enclosed switches and circuit breakers. Include Α. plans, elevations, sections, details, and attachments to other work. 1. Wiring Diagrams: For power, signal, and control wiring.
- Operation and Maintenance Data: For enclosed switches and circuit в. breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data, " include the following:
 - 1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

QUALITY ASSURANCE 1.5

Α. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

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- Product Selection for Restricted Space: Drawings indicate maximum в. dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- Electrical Components, Devices, and Accessories: Listed and labeled С. as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- Comply with NFPA 70. D.

1.6 PROJECT CONDITIONS

- Environmental Limitations: Rate equipment for continuous operation Α. under the following conditions unless otherwise indicated:
 - 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
 - 2. Altitude: Not exceeding 6600 feet.

COORDINATION 1.7

- Coordinate layout and installation of switches, circuit breakers, and Α. components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- PART 2 PRODUCTS

2.1 NONFUSIBLE SWITCHES

- General duty, Single Throw, 240-V ac, 100 A and Smaller: UL 98 and Α. NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- в. Accessories:
 - Equipment Ground Kit: Internally mounted and labeled for copper 1. and aluminum ground conductors.
 - 2. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.2 FUSIBLE SWITCHES

- Heavy duty, NEMA 3R, 3-pole with solid neutral, Single Throw, 240-Α. V ac, 800 A: UL 98 and NEMA KS 1, service entrance rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- Accessories: Β.
 - Equipment Ground Kit: Internally mounted and labeled for copper 1. and aluminum ground conductors.

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2.3 ENCLOSURES

- Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, Α. NEMA 250, and UL 50, to comply with environmental conditions at installed location.
 - Indoor, Dry and Clean Locations: NEMA 250, Type 1. 1.
 - 2. Outdoor Locations: NEMA 250, Type 3R.
 - 3. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
 - Indoor Locations Subject to Dust, Falling Dirt, and Dripping 4. Noncorrosive Liquids: NEMA 250, Type 12.

PART 3 - EXECUTION

3.1 EXAMINATION

- Examine elements and surfaces to receive enclosed switches and circuit Α. breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- Proceed with installation only after unsatisfactory conditions have в. been corrected.

3.2 INSTALLATION

- Install individual wall-mounted switches and circuit breakers with Α. tops at uniform height unless otherwise indicated.
- Temporary Lifting Provisions: Remove temporary lifting eyes, в. channels, and brackets and temporary blocking of moving parts from enclosures and components.
- Install fuses in fusible devices. С.
- Comply with NECA 1. D.

3.3 IDENTIFICATION

- Comply with requirements in Division 26 Section "Identification for Α. Electrical Systems."
 - Identify field-installed conductors, interconnecting wiring, and 1. components; provide warning signs.
 - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

- Perform tests and inspections. Α.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

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- Acceptance Testing Preparation: в.
 - 1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - Perform each visual and mechanical inspection and electrical test 1. stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 3. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- Enclosed switches and circuit breakers will be considered defective if D. they do not pass tests and inspections.

3.5 ADJUSTING

Adjust moving parts and operable components to function smoothly, and Α. lubricate as recommended by manufacturer.

END OF SECTION 262816

SECTION 265100 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior lighting fixtures, lamps, and ballasts.
 - 2. LED light engines and drivers.
 - 3. Exit signs.
 - 4. Lighting fixture supports.

1.2 RELATED WORK

A. Specified Elsewhere:

- 1. 260500 Common Work Results for Electrical
- 2. 260526 Grounding and Bonding for Electrical Systems
- 3. 260529 Hangers and Supports for Electrical Systems
- 4. 260533 Raceway and Boxes for Electrical Systems
- 5. 260923 Lighting Control Devices
- 6. 265600 Exterior Lighting

1.3 DEFINITIONS

- A. BF: Ballast factor.
- B. CCT: Correlated color temperature.
- C. CRI: Color-rendering index.
- D. LER: Luminaire efficacy rating.
- E. Lumen: Measured output of lamp and luminaire, or both.
- F. Luminaire: Complete lighting fixture, including ballast housing if provided.
- G. PF: Power factor.

1.4 SUBMITTALS

- A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
 - 1. Physical description of lighting fixture including dimensions.
 - 2. Ballast or LED driver, including BF, PF. Provide ballast or driver information for each type of fixture, after receipt of fixtures on project site. Record each fixture type ballast and driver manufacture and model.

- 3. Energy-efficiency data.
- 4. Life, output (lumens, CCT, and CRI), and energy-efficiency data for lamps.
- 5. Photometric data and adjustment factors, when requested for submittal review or other necessary product evaluations, based on laboratory tests, complying with IESNA Lighting Measurements Testing & Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.
 - a. Manufacturer Certified Data: Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
- B. Installation instructions: Provide to installer.
- C. Operation and Maintenance Data: For lighting equipment and fixtures to include in operation and maintenance manuals.
 - 1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.
- D. Warranty: Sample of warranty.

1.5 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.
- 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.
- C. Comply with NFPA 70.

1.6 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.7 WARRANTY

- A. Warranty for light fixtures: Manufacturer's standard form in which manufacturer of lighting unit agrees to repair or replace components failing in materials or workmanship within specified warranty period.
 - 1. Warranty Period for LED fixtures: Five years from date of Substantial Completion.

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1.8 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Package label identification shall include the related fixture designation(s) that component applies.
1. Plastic Diffusers and Lenses: One for every 100 of each type and rating installed. Furnish at least one of each type.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products indicated on Drawings.
- 2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS
 - A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
 - B. Metal Parts: Free of burrs and sharp corners and edges.
 - C. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.
 - D. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
 - E. Diffusers:
 - Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - a. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
 - b. UV stabilized.
 - 2. Glass: Annealed crystal glass unless otherwise indicated.
 - F. Factory-Applied Labels: Comply with UL 1598. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles.
 - 1. Label shall include the following lamp and ballast characteristics:
 - a. Input wattage.
 - b. Input voltage/voltage range.
 - c. Manufacturer and complete model number.
 - d. CCT and CRI.

2.3 EXIT SIGNS

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- A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
- B. Internally Lighted Signs:
 1. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.

2.4 LIGHTING FIXTURE SUPPORT COMPONENTS

- A. Comply with Division 26 Section "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
- C. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.
- D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.
- E. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage.
- F. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- G. Aircraft cable: stranded, sized per luminaire manufacturer requirements, adjustable suspension length grips. Provide length to allow minimum 12" additional length beyond originally identified suspension.
- PART 3 EXECUTION

3.1 INSTALLATION

- A. Lighting fixtures:
 1. Set level, plumb, and square with ceilings and walls unless otherwise indicated.
- B. Temporary Lighting: If it is necessary, and approved by Architect, to use permanent luminaires for temporary lighting, install and energize the minimum number of luminaires necessary. When construction is sufficiently complete, remove the temporary luminaires, disassemble, clean thoroughly, install new lamps, and reinstall.
- C. Remote Mounting of Drivers: Distance between the driver and fixture shall not exceed that recommended by driver manufacturer. Verify, with driver manufacturers, maximum distance between driver and luminaire.

- D. Lay-in Ceiling Lighting Fixtures Supports: Use grid as a support element.
 - 1. Install ceiling support system rods or wires for each fixture. Locate not more than 6 inches from lighting fixture corners.
 - 2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.
 - 3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.
- E. Suspended Lighting Fixture Support:
 - 1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
 - 3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
 - 4. Do not use grid as support for pendant luminaires. Connect support wires or rods to building structure.
- F. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.2 IDENTIFICATION

- A. Install labels with panel and circuit numbers on concealed junction and outlet boxes. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
- 3.3 FIELD QUALITY CONTROL
 - A. Test all fixtures for proper operation and light output. Test all dimmed fixtures with the associated dimming control to verify compatibility.

3.4 ADJUSTING

 A. Occupancy Adjustments: When requested, within 12 months of date of Substantial Completion, provide on-site assistance in adjusting aimable luminaires to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose. Some of this work may be required after dark.
 Adjust aimable luminaires in the presence of Architect.

END OF SECTION 265100

SECTION 265600 - EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Exterior LED luminaires with LEDs and drivers.
2. Accessories.

1.2 RELATED WORK

- A. Specified Elsewhere:
 - 1. 260500 Common Work Results for Electrical
 - 2. 260529 Hangers and Supports for Electrical Systems
 - 3. 260533 Raceway and Boxes for Electrical Systems
 - 4. 260923 Lighting Control Devices
 - 5. 265100 Interior Lighting

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color-rendering index.
- C. LER: Luminaire efficacy rating.
- D. Luminaire: Complete lighting fixture, including LED driver.

1.4 SUBMITTALS

- A. Product Data: For each luminaire and support component, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and the following:
 - 1. Physical description of luminaire, including materials, dimensions, effective projected area, and verification of indicated parameters.
 - 2. Details of attaching luminaires and accessories.
 - 3. Details of installation and construction.
 - 4. Luminaire materials.
 - 5. Photometric data, in IES format, based on laboratory tests of each luminaire type, complete with indicated driver, lensing, and accessories.
 - a. Manufacturer Certified Data: Photometric data shall be certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
 - 6. Drivers, including energy-efficiency data.
 - 7. Light engine including life, output, CCT, CRI, lumens, and energy-efficiency data.

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- 8. Means of attaching luminaires to supports, and indication that attachment is suitable for components involved.
- B. Operation and Maintenance Data: For luminaires to include in operation and maintenance manuals.
- C. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.
- 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.
- C. Comply with IEEE C2, "National Electrical Safety Code."
- D. Comply with NFPA 70.

1.6 WARRANTY

- A. Manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within specified warranty period. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs or alterations from special warranty coverage.
 - 1. Warranty Period for Luminaires: Five years from date of Substantial Completion.
 - 2. Warranty Period for Metal Corrosion: Two years from date of Substantial Completion.
 - 3. Warranty Period for Paint Color Retention: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products indicated on Drawings.

2.2 GENERAL REQUIREMENTS FOR LUMINAIRES

A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction.

- B. Metal Parts: Free of burrs and sharp corners and edges.
- C. Sheet Metal Components: Corrosion-resistant aluminum unless otherwise indicated. Form and support to prevent warping and sagging.
- D. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.
- E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit access without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during maintenance and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.
- F. Exposed Hardware Material: Stainless steel.
- G. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
- H. Light Shields: Metal baffles, factory installed and field adjustable, arranged to block light distribution to indicated portion of normally illuminated area or field.
- I. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:
 - 1. White Surfaces: 85 percent.
 - 2. Specular Surfaces: 83 percent.
 - 3. Diffusing Specular Surfaces: 75 percent.
- J. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.
- K. Luminaire Finish: Manufacturer's standard paint applied to factoryassembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.
- L. Factory-Applied Finish for Aluminum Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
 - 2. Class I, Color Anodic Finish: AA-M32C22A42/A44 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.
 - a. Color: Natural Aluminum as selected by the Architect.

2.3 GENERAL REQUIREMENTS SUPPORT COMPONENTS

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- A. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless-steel fasteners and mounting bolts unless otherwise indicated.
- B. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.
 1. Materials: Shall not cause galvanic action at contact points.
- PART 3 EXECUTION

3.1 LUMINAIRE INSTALLATION

- A. Fasten luminaire to indicated structural supports.
- B. Adjust luminaires that require field adjustment or aiming.
- 3.2 FIELD QUALITY CONTROL
 - A. Inspect each installed fixture for damage. Replace damaged fixtures and components.
 - B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.
 - 1. Verify operation of photoelectric controls.

END OF SECTION 265600

SECTION 27 0500 - COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.1 SUMMARY

Section Includes:

- 1. Communications equipment coordination and installation.
- 2. Sleeves for pathways and cables.
- 3. Grout.
- 4. Common communications installation requirements.

1.2 RELATED WORK

Specified Elsewhere: 1. 260500 - Common Work Results for Electrical 2. 260526 - Grounding and Bonding for Electrical Systems 3. 260529 - Hangers and Supports for Electrical Systems 260533 - Raceway and Boxes for Electrical Systems 4. 271500 - Communications Horizontal Cabling 5.

1.3 DEFINITIONS

EPDM: Ethylene-propylene-diene terpolymer rubber.

NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

Product Data: For sleeve seals.

COORDINATION 1.5

Coordinate arrangement, mounting, and support of communications equipment:

- 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
- 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
- To allow right of way for piping and conduit installed at 3. required slope.
- So connecting pathways, cables, wireways, and cable trays will be 4. clear of obstructions and of the working and access space of other equipment.

Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

Coordinate location of access panels and doors for communications items that are behind finished surfaces or otherwise concealed.

Coordinate sleeve selection and application with selection and application of firestopping.

PART 2 - PRODUCTS

2.1 SLEEVES FOR PATHWAYS AND CABLES

Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

Sleeves for Rectangular Openings: Galvanized sheet steel.

- Minimum Metal Thickness: 1.
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
 - For sleeve cross-section rectangle perimeter equal to, or b. more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.2 GROUT

Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factorypackaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR COMMUNICATIONS INSTALLATION

Comply with NECA 1.

Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both communications equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR COMMUNICATIONS PENETRATIONS

Communications penetrations occur when pathways, cables, wireways, or cable trays penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

Cut sleeves to length for mounting flush with both surfaces of walls.

Extend sleeves installed in floors 2 inches above finished floor level.

Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and pathway or cable, unless indicated otherwise.

Seal space outside of sleeves with grout for penetrations of concrete and masonry

Promptly pack grout solidly between sleeve and wall so no voids 1. remain. Tool exposed surfaces smooth; protect grout while curing.

Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint.

Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pathway and cable penetrations. Install sleeves and seal pathway and cable penetration sleeves with firestop materials.

Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.

Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between pathway or cable and sleeve for installing mechanical sleeve seals.

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FIRESTOPPING 3.3

Apply firestopping to penetrations of fire-rated floor and wall assemblies for communications installations to restore original fireresistance rating of assembly.

END OF SECTION 270500

SECTION 271500 - COMMUNICATIONS HORIZONTAL CABLING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pathways.
 - 2. UTP cabling.
 - 3. Cable connecting hardware, patch panels, and cross-connects.
 - 4. Telecommunications outlet/connectors.
 - 5. Cabling system identification products.
 - 6. Cable management system.

1.2 RELATED WORK

- Specified Elsewhere: Α.
 - 1. 260500 Common Work Results for Electrical
 - 2. 260526 - Grounding and Bonding for Electrical Systems
 - 3. 260529 Hangers and Supports for Electrical Systems
 - 4. 260533 Raceway and Boxes for Electrical Systems
 - 5. 262726 Wiring Devices
 - 6. 270500 Common Work Results for Communications

1.3 DEFINITIONS

- BICSI: Building Industry Consulting Service International. Α.
- Cross-Connect: A facility enabling the termination of cable elements в. and their interconnection or cross-connection.
- C. EMI: Electromagnetic interference.
- IDC: Insulation displacement connector. D.
- LAN: Local area network. Ε.
- Outlet/Connectors: A connecting device in the work area on which F. horizontal cable or outlet cable terminates.
- G. UTP: Unshielded twisted pair.

HORIZONTAL CABLING DESCRIPTION 1.4

Horizontal cable and its connecting hardware provide the means of Α. transporting signals between the telecommunications outlet/connector and the horizontal cross-connect located in the communications equipment room. This cabling and its connecting hardware are called "permanent link," a term that is used in the testing protocols.

- TIA/EIA-568-B.1 requires that a minimum of two telecommunications 1. outlet/connectors be installed for each work area.
- Horizontal cabling shall contain no more that one transition 2. point or consolidation point between the horizontal cross-connect and the telecommunications outlet/connector.
- 3. Bridged taps and splices shall not be installed in the horizontal cabling.
- A work area is approximately 100 sq. ft., and includes the components в. that extend from the telecommunications outlet/connectors to the station equipment.
- The maximum allowable horizontal cable length is 295 feet. C. This maximum allowable length does not include an allowance for the length of 16 feet to the workstation equipment. The maximum allowable length does not include an allowance for the length of 16 feet in the horizontal cross-connect.

1.5 PERFORMANCE REQUIREMENTS

General Performance: Horizontal cabling system shall comply with Α. transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

SUBMITTALS 1.6

- Product Data: For each type of product indicated. Α.
 - For network cable, include the following installation data for 1. each type used:
 - a. Nominal OD.
 - b. Minimum bending radius.
 - c. Maximum pulling tension.
- Shop Drawings: в.
 - System Labeling Schedules: Electronic copy of labeling 1. schedules, in software and format selected by Owner.
 - 2. Cabling administration drawings and printouts.
 - Wiring diagrams to show typical wiring schematics, including the 3. following:
 - a. Cross-connects.
 - b. Patch panels.
 - с. Patch cords.
 - 4. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.
- Qualification Data: For Installer, qualified layout technician, С. installation supervisor, and field inspector.
- D. Source quality-control reports.
- Ε. Field quality-control reports.

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QUALITY ASSURANCE 1.7

- Installer Qualifications: Cabling Installer must have personnel Α. certified by BICSI on staff.
 - Layout Responsibility: Preparation of Shop Drawings and Cabling 1. Administration Drawings by an RCDD.
 - 2. Installation Supervision: Installation shall be under the direct supervision of Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.
 - 3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
- Surface-Burning Characteristics: As determined by testing identical в. products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - Smoke-Developed Index: 50 or less. 2.
- Electrical Components, Devices, and Accessories: Listed and labeled C. as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.
- Е. Grounding: Comply with ANSI-J-STD-607-A.
- 1.8 DELIVERY, STORAGE, AND HANDLING
 - Test cables upon receipt at Project site. Α. 1. Test each pair of UTP cable for open and short circuits.
- 1.9 PROJECT CONDITIONS
 - Environmental Limitations: Do not deliver or install cables and Α. connecting materials until 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.

1.10 COORDINATION

- Coordinate layout and installation of telecommunications pathways and Α. cabling with Owner's telecommunications and LAN equipment and service suppliers.
- Coordinate telecommunications outlet/connector locations with location в. of power receptacles at each work area.

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1.11 EXTRA MATERIALS

- Furnish extra materials that match products installed and that are Α. packaged with protective covering for storage and identified with labels describing contents.
 - 1. Connecting Blocks: One of each type.
 - 2. Device Plates: One of each type.

PART 2 - PRODUCTS

2.1 PATHWAYS

- Α. General Requirements: Comply with TIA/EIA-569-A.
- Cable Support: NRTL labeled for support of Category 6 cabling, в. designed to prevent degradation of cable performance and pinch points that could damage cable.
 - 1. Support brackets with cable tie slots for fastening cable ties to brackets.
 - 2. Lacing bars, spools, J-hooks, and D-rings.
 - 3. Straps and other devices.
- Conduit and Boxes: Comply with requirements in Division 26 Section C. "Raceway and Boxes for Electrical Systems." Flexible metal conduit shall not be used.
 - Outlet boxes shall be no smaller than 4-11/16 inches wide, 4-1. 11/16 inches high, and 2-1/2 inches deep.

2.2 BACKBOARDS

Backboards: Plywood, fire-retardant treated, 3/4 by 48 by 48 inches. Α. Comply with requirements in Division 06 Section "Rough Carpentry" for plywood backing panels.

2.3 UTP CABLE

- Manufacturers: Subject to compliance with requirements, provide Α. products by one of the following:
 - 1. Belden-KRONE Inc.; Electronics Division.
 - 2. Berk-Tek; a Nexans company.
 - 3. HellermannTytan
 - 4. Mohawk; a division of Belden CDT.
 - 5. Panduit
 - 6. SYSTIMAX Solutions; a CommScope, Inc. brand.
 - 7. Siemon Co. (The).
- Description: 100-ohm, 4-pair UTP, formed into 25-pair, binder groups в. covered with a blue thermoplastic jacket.
 - 1. Comply with ICEA S-90-661 for mechanical properties.
 - 2. Comply with TIA/EIA-568-B.1 for performance specifications.
 - 3. Comply with TIA/EIA-568-B.2, Category 6.

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- Listed and labeled by an NRTL acceptable to authorities having 4. jurisdiction as complying with UL 444 and NFPA 70 for the following types:
 - Communications, Plenum Rated: Type CMP, complying with a. NFPA 262.

2.4 UTP CABLE HARDWARE

- Manufacturers: Subject to compliance with requirements, provide Α. products by one of the following:
 - CommScope Inc. 1.
 - 2. KRONE Incorporated.
 - 3. Panduit
 - 4. Siemon Co. (The).
- в. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-B.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.
- C. Connecting Blocks: 110-style IDC for Category 6. Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.
- Cross-Connect: Modular array of connecting blocks arranged to D. terminate building cables and permit interconnection between cables. 1. Number of Terminals per Field: One for each conductor in assigned cables.
- Ε. Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.
 - 1. Number of Jacks per Field: One for each four-pair UTP cable indicated.
- Jacks and Jack Assemblies: F. Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.
- Patch Cords: Factory-made, four-pair cables in quantities and lengths G. as described in formulas on the drawings; terminated with eightposition modular plug at each end.
 - Patch cords shall have bend-relief-compliant boots and color-1. coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.
 - 2. Patch cords shall have color-coded boots for circuit identification.

2.5 TELECOMMUNICATIONS OUTLET/CONNECTORS

Jacks: 100-ohm, balanced, twisted-pair connector; four-pair, eight-Α. position modular. Comply with TIA/EIA-568-B.1.

- Workstation Outlets: Four-port-connector assemblies mounted in single в. faceplate.
 - Plastic Faceplate: High-impact plastic. Coordinate color with 1. Division 26 Section "Wiring Devices."
 - For use with snap-in jacks accommodating any combination of UTP, 2 optical fiber, and coaxial work area cords. a. Flush mounting jacks, positioning the cord at a 45-degree angle.
 - Legend: Snap-in, clear-label covers and machine-printed paper 3. inserts.

GROUNDING 2.6

- Comply with requirements in Division 26 Section "Grounding and Bonding Α. for Electrical Systems" for grounding conductors and connectors.
- в. Comply with ANSI-J-STD-607-A.

2.7 IDENTIFICATION PRODUCTS

- Comply with TIA/EIA-606-A and UL 969 for labeling materials, including Α. label stocks, laminating adhesives, and inks used by label printers.
- Comply with requirements in Division 26 Section "Identification for в. Electrical Systems."

2.8 SOURCE QUALITY CONTROL

- Factory test UTP cables according to TIA/EIA-568-B.2. Α.
- Factory-sweep test coaxial cables at frequencies from 5 MHz to 1 GHz. в. Sweep test shall test the frequency response, or attenuation over frequency, of a cable by generating a voltage whose frequency is varied through the specified frequency range and graphing the results.
- Cable will be considered defective if it does not pass tests and C. inspections.
- Prepare test and inspection reports. D.

PART 3 - EXECUTION

3.1 WIRING METHODS

Wiring Method: Install cables in raceways and cable trays except Α. within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, in attics, and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.

- Install plenum cable routed open with J-Hooks specifically 1. designed for communications cabling in environmental air spaces, including plenum ceilings.
- Comply with requirements for raceways and boxes specified in 2. Division 26 Section "Raceway and Boxes for Electrical Systems."
- Wiring Method: Conceal conductors and cables in accessible ceilings, в. walls, and floors.
- Wiring within Enclosures: Bundle, lace, and train cables to terminal C. points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

INSTALLATION OF PATHWAYS 3.2

- Α. Comply with requirements for demarcation point, pathways, cabinets, and racks specified in Division 27 Section "Communications Equipment Room Fittings." Drawings indicate general arrangement of pathways and fittings.
- Comply with TIA/EIA-569-A for pull-box sizing and length of conduit в. and number of bends between pull points.
- Comply with requirements in Division 26 Section "Raceway and Boxes for С. Electrical Systems" for installation of conduits and wireways.
- Install manufactured conduit sweeps and long-radius elbows whenever D. possible.
- Pathway Installation in Communications Equipment Rooms: Ε.
 - Position conduit ends adjacent to a corner on backboard where a 1. single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
 - 2. Secure conduits to backboard when entering room from overhead.
 - 3. Extend conduits 3 inches above finished floor.
 - Install metal conduits with grounding bushings and connect with 4. grounding conductor to grounding system.

3.3 INSTALLATION OF CABLES

- Comply with NECA 1. Α.
- General Requirements for Cabling: в.
 - 1. Comply with TIA/EIA-568-B.1.
 - 2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
 - 3. Install 110-style IDC termination hardware unless otherwise indicated.
 - 4. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.

- Cables may not be spliced. Secure and support cables at 5. intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
- 6. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
- Bundle, lace, and train conductors to terminal points without 7. exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
- Do not install bruised, kinked, scored, deformed, or abraded 8. cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
- 9. Cold-Weather Installation: Bring cable to room temperature before unreeling. Heat lamps shall not be used for heating.
- 10. In the communications equipment room, install a 10-foot- long service loop on each end of cable.
- 11. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
- UTP Cable Installation: C.
 - 1. Comply with TIA/EIA-568-B.2.
 - 2. Do not untwist UTP cables more than 1/2 inch from the point of termination to maintain cable geometry.
- Open-Cable Installation: D.
 - Install cabling with horizontal and vertical cable guides in 1. telecommunications spaces with terminating hardware and interconnection equipment.
 - Suspend UTP cable not in a wireway or pathway a minimum of 8 2. inches above ceilings by cable supports not more than 48 inches apart.
 - Cable shall not be run through structural members or in contact 3. with pipes, ducts, or other potentially damaging items.
- Group connecting hardware for cables into separate logical fields. Ε.
- Separation from EMI Sources: F.
 - Comply with BICSI TDMM and TIA/EIA-569-A for separating 1. unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
 - Separation between open communications cables or cables in 2. nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 a. inches.
 - Electrical Equipment Rating between 2 and 5 kVA: A minimum b. of 12 inches.
 - Electrical Equipment Rating More Than 5 kVA: A minimum of 24 c. inches.
 - Separation between communications cables in grounded metallic 3. raceways and unshielded power lines or electrical equipment shall be as follows:

- Electrical Equipment Rating Less Than 2 kVA: A minimum of 2a. 1/2 inches.
- Electrical Equipment Rating between 2 and 5 kVA: A minimum b. of 6 inches.
- Electrical Equipment Rating More Than 5 kVA: A minimum of 12 c. inches.
- 4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - Electrical Equipment Rating Less Than 2 kVA: No requirement. a.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.
- 5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
- Separation between Communications Cables and Fluorescent 6. Fixtures: A minimum of 5 inches.

3.4 GROUNDING

- Install grounding according to BICSI TDMM, "Grounding, Bonding, and Α. Electrical Protection" Chapter.
- в. Comply with ANSI-J-STD-607-A.
- Locate grounding bus bar to minimize the length of bonding conductors. С. Fasten to wall allowing at least 2-inch clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
- Bond metallic equipment to the grounding bus bar, using not smaller D. than No. 6 AWG equipment grounding conductor.

3.5 IDENTIFICATION

- Identify system components, wiring, and cabling complying with Α. TIA/EIA-606-A. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
 - 1. Administration Class: 1.
 - 2. Color-code cross-connect fields. Apply colors to voice and data service backboards, connections, covers, and labels.
- Using cable management system software specified in Part 2, develop в. Cabling Administration Drawings for system identification, testing, and management. Use unique, alphanumeric designation for each cable and label cable, jacks, connectors, and terminals to which it connects with same designation. At completion, cable and asset management software shall reflect as-built conditions.

- Comply with requirements in Division 09 Section "Interior Painting" C. for painting backboards. For fire-resistant plywood, do not paint over manufacturer's label.
- Paint and label colors for equipment identification shall comply with D. TIA/EIA-606-A for Class 2 level of administration, including optional identification requirements of this standard.
- Ε. Cable Schedule: Post in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.
- Cabling Administration Drawings: Show building floor plans with F. cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors. Follow convention of TIA/EIA-606-A. Furnish electronic record of all drawings, in software and format selected by Owner.
- Cable and Wire Identification: G.
 - Label each cable within 4 inches of each termination and tap, 1. where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
 - 2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
 - Exposed Cables and Cables in Cable Trays and Wire Troughs: Label 3. each cable at intervals not exceeding 15 feet.
 - 4. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
 - Individually number wiring conductors connected to terminal a. strips, and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with name and number of particular device as shown.
 - Label each unit and field within distribution racks and b. frames.
 - Identification within Connector Fields in Equipment Rooms and 5. Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.
 - Uniquely identify and label work area cables extending from the б. MUTOA to the work area. These cables may not exceed the length stated on the MUTOA label.
- Labels shall be preprinted or computer-printed type with printing area Η. and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA-606-A.
 - 1. Cables use flexible vinyl or polyester that flex as cables are bent.

FIELD QUALITY CONTROL 3.6

- Α. Perform tests and inspections.
- Tests and Inspections: Β.
 - 1. Visually inspect UTP cable jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.
 - Visually confirm Category 6, marking of outlets, cover plates, 2. outlet/connectors, and patch panels.
 - Visually inspect cable placement, cable termination, grounding 3. and bonding, equipment and patch cords, and labeling of all components.
 - Test UTP backbone copper cabling for DC loop resistance, shorts, 4. opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.
 - Test instruments shall meet or exceed applicable requirements a. in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - 5. UTP Performance Tests:
 - Test for each outlet and MUTOA. Perform the following tests a. according to TIA/EIA-568-B.1 and TIA/EIA-568-B.2:
 - 1) Wire map.
 - 2) Length (physical vs. electrical, and length requirements).
 - 3) Insertion loss.
 - 4) Near-end crosstalk (NEXT) loss.
 - Power sum near-end crosstalk (PSNEXT) loss. 5)
 - 6) Equal-level far-end crosstalk (ELFEXT).
 - 7) Power sum equal-level far-end crosstalk (PSELFEXT).
 - 8) Return loss.
 - 9) Propagation delay.
 - 10) Delay skew.
 - Final Verification Tests: Perform verification tests for 6. UTP systems after the complete communications cabling and workstation outlet/connectors are installed.
 - a. Data Tests: These tests assume the Information Technology Staff has a network installed and is available to assist with testing. Connect to the network interface device at the demarcation point. Log onto the network to ensure proper connection to the network.
- Document data for each measurement. Data for submittals shall be C. printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.

- End-to-end cabling will be considered defective if it does not pass D. tests and inspections.
- E. Prepare test and inspection reports.

3.7 DEMONSTRATION

Train Owner's maintenance personnel in cable-plant management Α. operations, including changing signal pathways for different workstations, rerouting signals in failed cables, and keeping records of cabling assignments and revisions when extending wiring to establish new workstation outlets. Include training in cabling administration software.

END OF SECTION 271500

SECTION 312010 - EARTH MOVING FOR STRUCTURES

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. See Civil Drawings for earth moving requirements for the site (i.e., approximately five feet outside of the building footprint).

1.2 SUMMARY

- A. Section Includes:
 - 1. Preparing subgrades for slabs-on-grade.
 - 2. Excavating and backfilling for buildings and structures.
 - 3. Drainage course for concrete slabs-on-grade.
 - 4. Excavating and backfilling trenches for utilities and pits for buried utility structures within building limits.
 - 5. Testing
- B. Related Sections:
 - 1. Section 015000 "Temporary Facilities and Controls" for temporary controls, utilities, and support facilities; also for temporary site fencing if not in another Section.
 - 2. Section 033000 "Cast-in-Place Concrete" for granular course if placed over vapor retarder and beneath the slab-on-grade.
 - 3. Divisions 21, 22, 23, 26, 27, 28, and 33 Sections for installing underground mechanical and electrical utilities and buried mechanical and electrical structures.

1.3 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- C. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

- Drainage Course: Aggregate layer supporting the slab-on-grade that D. also minimizes upward capillary flow of pore water.
- Ε. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 - Bulk Excavation: Excavation more than 10 feet (3 m) in width and 2. more than 30 feet (9 m) in length.
 - Unauthorized Excavation: Excavation below subgrade elevations or 3. beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- Fill: Soil materials used to raise existing grades. F.
- G. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. (0.76 cu. m) for bulk excavation or 3/4 cu. yd. (0.57 cu. m) for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
 - Excavation of Footings, Trenches, and Pits: Late-model, track-1. mounted hydraulic excavator; equipped with a 42-inch- (1065-mm-) wide, maximum, short-tip-radius rock bucket; rated at not less than 138-hp (103-kW) flywheel power with bucket-curling force of not less than 28,700 lbf (128 kN) and stick-crowd force of not less than 18,400 lbf (82 kN) with extra-long reach boom; measured according to SAE J-1179.
 - Bulk Excavation: Late-model, track-mounted loader; rated at not 2. less than 230-hp (172-kW) flywheel power and developing a minimum of 47,992-lbf (213.3-kN) breakout force with a general-purpose bare bucket; measured according to SAE J-732.
- Structures: Buildings, footings, foundations, retaining walls, slabs, н. tanks, curbs, mechanical and electrical appurtenances, or other manmade stationary features constructed above or below the ground surface.
- I. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- Utilities: On-site underground pipes, conduits, ducts, and cables, as J. well as underground services within buildings.

1.4 INFORMATIONAL SUBMITTALS

Α. Qualification Data: For qualified testing agency. apaceDesign Architects + Engineers Project No. 2014909.01

- B. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:
 - 1. Classification according to ASTM D 2487.
 - 2. Laboratory compaction curve according to ASTM D 698.

1.5 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications engaged and paid for by Owner): Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

1.6 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.
- C. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures, specified in Section 015000 "Temporary Facilities and Controls," and Section 311000 "Site Clearing," are in place.
- D. The following practices are prohibited within protection zones (around existing trees and plants):
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- E. Do not direct vehicle or equipment exhaust towards protection zones.
- F. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
 - 1. Liquid Limit: 45 or less.
 - 2. Plasticity Index: 25 or less.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
 - Unsatisfactory soils also include satisfactory soils not maintained within -2 and +3 percentage points of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- E. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- F. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- G. Drainage Course: Narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.
- H. Sand: ASTM C 33; fine aggregate.
- I. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 CONTROLLED LOW-STRENGTH MATERIAL

- A. Controlled Low-Strength Material: Self-compacting, flowable concrete material produced from the following:
 - 1. Portland Cement: ASTM C 150, Type I.
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- 2. Fly Ash: ASTM C 618, Class C or F.
- 3. Normal-Weight Aggregate: ASTM C 33, 3/4-inch (19-mm) nominal maximum aggregate size.
- 4. Water: ASTM C 94/C 94M.
- 5. Air-Entraining Admixture: ASTM C 260.
- B. Produce conventional-weight, controlled low-strength material with 140-psi (965-kPa)compressive strength when tested according to ASTM C 495.

2.3 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:
 - 1. Red: Electric.
 - 2. Yellow: Gas, oil, steam, and dangerous materials.
 - 3. Orange: Telephone and other communications.
 - 4. Blue: Water systems.
 - 5. Green: Sewer systems.
- PART 3 EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
 - 1. Provide, pay for, and maintain appropriate pumping equipment as is necessary to keep excavations free of standing water.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
 - 2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches (600 mm) outside of concrete forms other than at footings.
 - b. 12 inches (300 mm) outside of concrete forms at footings.
 - c. 6 inches (150 mm) outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 6 inches (150 mm) beneath bottom of concrete slabs-on-grade.
 - f. 6 inches (150 mm) beneath pipe in trenches, and the greater of 24 inches (600 mm) wider than pipe or 42 inches (1065 mm) wide.
- B. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Architect. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents. Changes in the Contract Time may be authorized for rock excavation.
 - 1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.
 - a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.

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- Rock excavation includes removal and disposal of rock. Remove 2. rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:
 - 24 inches (600 mm) outside of concrete forms other than at а. footings.
 - 12 inches (300 mm) outside of concrete forms at footings. b.
 - 6 inches (150 mm) outside of minimum required dimensions of c. concrete cast against grade.
 - Outside dimensions of concrete walls indicated to be cast d. against rock without forms or exterior waterproofing treatments.
 - 6 inches (150 mm) beneath bottom of concrete slabs-on-grade. e.
 - 6 inches (150 mm) beneath pipe in trenches, and the greater f. of 24 inches (600 mm) wider than pipe or 42 inches (1065 mm) wide.

EXCAVATION FOR STRUCTURES 3.5

- Α. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - Excavations for Footings and Foundations: Do not disturb bottom 1. of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 - Excavation for Underground Tanks, Basins, and Mechanical or 2. Utility Structures: Excavate to elevations and Electrical dimensions indicated within a tolerance of plus or minus 1 inch (25 mm). Do not disturb bottom of excavations intended as bearing surfaces.

3.6 EXCAVATION FOR UTILITY TRENCHES

- Excavate trenches to indicated gradients, lines, depths, Α. and elevations.
 - Beyond building perimeter, excavate trenches to allow 1. installation of top of pipe below frost line.
- Excavate trenches to uniform widths to provide the following clearance в. on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit unless otherwise indicated.
 - 1. Clearance: 12 inches (300 mm) each side of pipe or conduit.

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- C. Trench Bottoms: Excavate trenches 4 inches (100 mm) deeper than bottom of pipe and conduit elevations to allow for bedding course. Handexcavate deeper for bells of pipe.
 - Excavate trenches 6 inches (150 mm) deeper than elevation 1. required in rock or other unyielding bearing material to allow for bedding course.

SUBGRADE INSPECTION 3.7

- Notify Architect and Owner's Representative when excavations have Α. reached required subgrade.
- If Owner's Representative determines that unsatisfactory soil is в. present, continue excavation and replace with compacted backfill or fill material as directed.
- Proof-roll subgrade below the building slabs with a pneumatic-tired C. and loaded 10-wheel, tandem-axle dump truck weighing not less than 25 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - Completely proof-roll subgrade in one direction. Limit vehicle 1. speed to 3 mph (5 km/h).
 - Excavate soft spots, unsatisfactory soils, and areas of excessive 2. pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
- Authorized additional excavation and replacement material will be paid D. for, via Change Order, according to Contract provisions for changes in the Work.
- Ε. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.8 UNAUTHORIZED EXCAVATION

- Fill unauthorized excavation under foundations or wall footings by Α. extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2,500 psi (17.2 MPa), may be used when approved by Architect.
 - Fill unauthorized excavations under other construction, pipe, or 1. conduit as directed by Architect.

3.9 STORAGE OF SOIL MATERIALS

Stockpile borrow soil materials and excavated satisfactory soil Α. materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

Stockpile soil materials away from edge of excavations. Do not 1. store within drip line of remaining trees.

3.10 BACKFILL

- Place and compact backfill in excavations promptly, but not before Α. completing the following:
 - Construction below finish grade including, where applicable, 1. subdrainage, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Testing and inspecting underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
 - 6. Removing temporary shoring and bracing, and sheeting.
 - Installing permanent or temporary horizontal bracing on 7. horizontally supported walls.
- Place backfill on subgrades free of mud, frost, snow, or ice. в.
- 3.11 UTILITY TRENCH BACKFILL
 - Place backfill on subgrades free of mud, frost, snow, or ice. Α.
 - Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for В. bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
 - Trenches under Footings: Backfill trenches excavated under footings C. and within 18 inches (450 mm) of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 033000 "Cast-in-Place Concrete"
 - Backfill voids with satisfactory soil while removing shoring and D. bracing.
 - Place and compact initial backfill of satisfactory soil, free of Ε. particles larger than 1 inch (25 mm) in any dimension, to a height of 12 inches (300 mm) over the pipe or conduit.
 - Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of 1. piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
 - F. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches (300 mm) over the pipe or conduit. Coordinate backfilling with utilities testing.
 - Place and compact final backfill of satisfactory soil to final G. subgrade elevation.

- Controlled Low-Strength Material: Place final backfill of controlled н. low-strength material to final subgrade elevation.
- Install warning tape directly above utilities, 12 inches (300 mm) I. below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.
- 3.12 SOIL FILL
 - Plow, scarify, bench, or break up sloped surfaces steeper than Α. 1 vertical to 4 horizontal so fill material will bond with existing material.
 - Place and compact fill material in layers to required elevations as Β. follows: 1
 - Under steps and ramps, use engineered fill.
 - 2. Under building slabs, use engineered fill.
 - 3. Under footings and foundations, use engineered fill.
 - Under footings and foundations, use select granular fill, see C. following paragraph "COMPACTION OF SOIL BACKFILLS AND FILLS."
- SOIL MOISTURE CONTROL 3.13
 - Α. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - Do not place backfill or fill soil material on surfaces that are 1. muddy, frozen, or contain frost or ice.
 - Remove and replace, or scarify and air dry, otherwise 2. satisfactory soil material that exceeds optimum moisture content by 3 percent and is too wet to compact to specified dry unit weight.
- 3.14 COMPACTION OF SOIL BACKFILLS AND FILLS
 - Place backfill and fill soil materials in layers not more than 8 Α. inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.
 - Place backfill and fill soil materials evenly on all sides of в. structures to required elevations, and uniformly along the full length of each structure.
 - Beneath footings, if weaker soil deposits are exposed at the design C. bearing elevation or are within a depth equivalent to the foundation width below the bearing elevation, they are to be removed and replaced with select granular fill.
 - The width of foundation undercuts should exceed footing 1. dimensions by at least 6 inches along each side for every foot of

overdig as measured at the base of the excavation. Replacement material should consist of crushed limestone having a maximum size of 3 inches and a minimum size of 1/4 inch and containing no fines. Illinois Department of Transportation (IDOT) gradation specifications for CA-1, CA-3, CA-5 and CA-7 meet these criteria. The structural fill should be spread in 12 inch layers loose thickness with each layer densified using vibratory compaction equipment. Each lift of should be observed and tested.

- D. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
 - Under structures and building slabs, , scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill soil material at 97 percent.
 - 2. For utility trenches, compact each layer of initial and final backfill soil material at 97 percent.

3.15 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.
- 3.16 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE
 - A. Place drainage course on subgrades free of mud, frost, snow, or ice.
 - B. On prepared subgrade, place and compact drainage course under cast-inplace concrete slabs-on-grade as follows:
 - 1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 - 2. Place drainage course 6 inches (150 mm) or less in compacted thickness in a single layer.
 - 3. Place drainage course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
 - 4. Compact each layer of drainage course to required cross sections and thicknesses with a minimum of two passes of a plate-type vibratory compactor.

3.17 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage and pay for a qualified special inspector to perform the following special inspections:
 - 1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
 - 2. Determine that fill material and maximum lift thickness comply with requirements.
 - 3. Determine, at the required frequency, that in-place density of compacted fill complies with requirements.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities, in addition to the tests below. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect. Additional tests will be performed at the following locations and frequencies:

 Isolated Spread Footings: At least one test for every location.
 - Continuous Wall Footings: at least on test for every 20 feet or less of wall length, but no fewer than two tests.
- D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 - Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 1000 sq. ft. (186 sq. m) or less of paved area or building slab, but in no case fewer than three tests.
 - 2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 20 feet or less of wall length, but no fewer than two tests.
 - 3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 100 feet (46 m) or less of trench length, but no fewer than two tests.
- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.18 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

- Scarify or remove and replace soil material to depth as directed 1. by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - Restore appearance, quality, and condition of finished surfacing 1. to match adjacent work, and eliminate evidence of restoration to greatest extent possible.
- Comply with requirements of Storm Water Pollution Prevention Plan D. (SWPPP).
- 3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS
 - Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them Α. off Owner's property.

END OF SECTION 312010

ATTACHMENT A.6 INSURANCE REQUIREMENTS ROUTINE CONSTRUCTION, MAINTENANCE AND REPAIR PROJECTS

Contractor shall obtain insurance of the types and in the amounts listed below.

A. COMMERCIAL GENERAL AND UMBRELLA LIABILITY INSURANCE

Contractor shall maintain commercial general liability (CGL) and, if necessary, commercial umbrella insurance with a limit of not less than \$1,000,000 each occurrence. If such CGL insurance contains a general aggregate limit, it shall apply separately to this project/location.

CGL insurance shall be written on Insurance Services Office (ISO) occurrence form CG 00 01 10 93, or a substitute form providing equivalent coverage, and shall cover liability arising from premises, operations, independent contractors, products-completed operations, personal injury and advertising injury, and liability assumed under an insured contract (including the tort liability of another assumed in a business contract).

Owner shall be included as an insured under the CGL, using ISO additional insured endorsement CG 20 10 or a substitute providing equivalent coverage, and under the commercial umbrella, if any. This insurance shall apply as primary insurance with respect to any other insurance or self-insurance afforded to Owner.

There shall be no endorsement or modification of the CGL limiting the scope of coverage for liability arising from pollution, explosion, collapse, or underground property damage.

B. CONTINUING COMPLETED OPERATIONS LIABILITY INSURANCE

Contractor shall maintain commercial general liability (CGL) and, if necessary, commercial umbrella liability insurance with a limit of not less than \$1,000,000 each occurrence for at least one (1) year following substantial completion of the work.

Continuing CGL insurance shall be written on ISO occurrence form CG 00 01 10 93, or substitute form providing equivalent coverage, and shall, at minimum, cover liability arising from products-completed operations and liability assumed under an insured contract.

Continuing CGL insurance shall have a products-completed operations aggregate of at least two times its each occurrence limit.

Continuing commercial umbrella coverage, if any, shall include liability coverage for damage to the insured's completed work equivalent to that provided under ISO form CG 00 01.

C. BUSINESS AUTO AND UMBRELLA LIABILITY INSURANCE

Contractor shall maintain business auto liability and, if necessary, commercial umbrella liability insurance with a limit of not less than \$1,000,000 each accident. Such insurance shall cover liability arising out of any auto including owned, hired and non-owned autos.

Business auto insurance shall be written on Insurance Services Office (ISO) form CA 00 01, CA 00 05, CA 00 12, CA 00 20, or a substitute form providing equivalent liability coverage. If necessary, the policy shall be endorsed to provide contractual liability coverage equivalent to that provided in the 1990 and later editions of CA 00 01.

D. WORKERS COMPENSATION INSURANCE

Contractor shall maintain workers compensation as required by statute and employers liability insurance. The commercial umbrella and/or employers liability limits shall not be less than \$1,000,000 each accident for bodily injury by accident or \$1,000,000 each employee for bodily injury by disease.

If Owner has not been included as an insured under the CGL using ISO additional insured endorsement CG 20 10 under the Commercial General and Umbrella Liability Insurance required in this Contract, the Contractor waives all rights against Owner and its officers, officials, employees, volunteers and agents for recovery of damages arising out of or incident to the Contractor's work.

E. GENERAL INSURANCE PROVISIONS

1. Evidence of Insurance. Prior to beginning work, Contractor shall furnish Owner with a certificate(s) of insurance and applicable policy endorsement(s), executed by a duly authorized representative of each insurer, showing compliance with the insurance requirements set forth above.

All certificates shall provide for 30 days written notice to Owner prior to the cancellation or material change of any insurance referred to therein. Written notice to Owner shall be by certified mail, return receipt requested.

Failure of Owner to demand such certificate, endorsement or other evidence of full compliance with these insurance requirements or failure of Owner to identify a deficiency from evidence that is provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

Owner shall have the right, but not the obligation, of prohibiting Contractor or any subcontractor from entering the project site until such certificates or other evidence that insurance has been placed in complete compliance with these requirements is received and approved by Owner.

Failure to maintain the required insurance may result in termination of this Contract at Owner's option.

With respect to insurance maintained after final payment in compliance with a requirement above, an additional certificate(s) evidencing such coverage shall be promptly provided to Owner whenever requested.

Contractor shall provide certified copies of all insurance policies required above within 10 days of Owner's written request for said copies.

- 2. Acceptability of Insurers. For insurance companies which obtain a rating from A.M. Best, that rating should be no less than A VII using the most recent edition of the A.M. Best's Key Rating Guide. If the Best's rating is less than A VII or a Best's rating is not obtained, the Owner has the right to reject insurance written by an insurer it deems unacceptable.
- **3. Cross-Liability Coverage.** If Contractor's liability policies do not contain the standard ISO separation of insureds provision, or a substantially similar clause, they shall be endorsed to provide cross-liability coverage.
- 4. Deductibles and Self-Insured Retentions. Any deductibles or self-insured retentions must be declared to the Owner. At the option of the Owner, the Contractor may be asked to eliminate such deductibles or self insured retentions as respects the Owner, its officers, officials, employees, volunteers and agents or required to procure a bond guaranteeing payment of losses and other related costs including but not limited to investigations, claim administration and defense expenses.
- **5. Subcontractors.** Contractor shall cause each subcontractor employed by Contractor to purchase and maintain insurance of the type specified above. When requested by the Owner, Contractor shall furnish copies of certificates of insurance evidencing coverage for each subcontractor.

F. INDEMNIFICATION

To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner and the Architect and their officers, officials, employees, volunteers and agents from and against all claims, damages, losses and expenses including but not limited legal fees (attorney's and paralegal's fees and court costs), arising

out of or resulting from the performance of the Contractor's work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or injury to or destruction of tangible property, other than the work itself, including the loss of use resulting therefrom and (2) is caused in whole or I part by any wrongful or negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, except to the extent it is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this Paragraph. Contractor shall similarly protect, indemnify and hold and save harmless the Owner, its officiens, officials, employees, volunteers and agents against and from any and all claims, costs, causes, actions and expenses including but not limited to legal fees, incurred by reason of Contractor's breach of any of its obligations under, or Contractor's default of, any provision of the Contract.

SAMPLE LIABILITY INSURANCE ENDORSEMENT

The following spaces preceded by an asterisk (*) need not be completed if this endorsement and policy have the same inception date.

This endorsement changes the policy. Please read it carefully.

AUTOMATIC ADDITIONAL INSUREDS

The following provision is added to (SECTION II), Who Is An Insured.

5. Any entity you are required in a written contract (hereinafter called Additional Insured) to name as an insured is an insured but only with respect to liability arising out of your premises, "your work" for the Additional Insured, or acts or omissions of the Additional Insured in connection with the general supervision of "your work" to the extent set forth below.

a. The Limits of Insurance provided on behalf of the Additional Insured are not greater than those required by such contract.

- b. The coverage provided to the Additional Insured(s) is not greater than that customarily provided by the policy forms specified in and required by the contract.
- c. All insuring agreements, exclusions and conditions of this policy apply.
- d. In no event shall the coverages or Limits of Insurance in this Coverage Form be increased by such contract.

Except when required otherwise by contract, this insurance does not apply to:

- 1) "Bodily injury" or "property damage" occurring after
 - a) All work on the project (other than service, maintenance or repairs) to be performed by or on behalf of the Additional Insured(s) at the site of the covered operations has been completed; or
 - b) That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.
- "Bodily injury" or "property damage" arising out of any act or omission of the Additional Insured(s) or any of their employees, other than the general supervision of work performed for the Additional Insured(s) by you.
- 3) "Property damage" to
 - a) Property owned, used or occupied by or rented to the Additional Insured(s);
 - b) Property in the care, custody or control of the Additional Insured(s) or over which the Additional Insured(s) is for any purpose exercising physical control; or

c) "Your work" for the Additional Insured(s).

With respect to Additional Insureds who are architects, engineers or surveyors, this insurance does not apply "bodily injury", "property damage", "personal injury" or "advertising injury" arising out of the rendering of or the failure to render any professional services by or for you, including:

- a) The preparing, approving, or failing to prepare or approve maps, drawings, opinions, reports, surveys, change orders, designs or specifications; and
- b) Supervisory, inspection or engineering services.

Any coverages provided hereunder shall be excess over any other valid and collectible insurance available to the Additional Insured(s) whether primary, excess, contingent or on any other basis unless a contract specifically requires that this insurance be primary or you request that it apply on a primary basis.

No person or organization is an Additional Insured with respect to the conduct of any current or past partnership or joint venture that is not shown as a Named Insured in the Declarations.

END OF ATTACHMENT A.6

TABLE A-1:ASBESTOS INSPECTION RESULTSJuly, 2016 (Rev. 1)

Client: Peoria Pa	rk District Bldg. Address: 1013 W. 1	Lake, Peoria,, 1	L (Lakeview Rec. Cente	er - West End Bldg Demo)	Inspector: Brad McKee, CIH
Homogeneous Area / Sample ID	Description / Location	Probable Quantity	Asbestos Containing Material? (Y/N)	Lab Reported Asbestos Content	F – (Friable) NF-I (Non-friable, Category I) NF-II (Non-friable, Category II)
TPA 1.3	Hard Fittings on F/G Pipe Insulation. Throughout	TBV	V	10 % Chrysotile, 2% Amosite	F
MFA 1-3	9x9 Floor Tile (cream w/ dark streaks) & Mastic, Auditorium, Classrooms, storage, stair landings	TBV	Y	2%, 2%, Chrysotile	NF-I
MFB 1-3	12x12 Floor Tile (Wheat) & Mastic, Office, SE Hall, non- demo portion of building, basement S. room west of room 6	TBV	Y	2%, 2%, Chrysotile	NF-I
SPA 1-3	Hard Plaster coat on gypsum hoard ceilings & soffits		N		
MDA 1-3	Drywall & Joint compound basement		N		
MFC 1-3	12x12 floor tile (off-white with dark chips), basement rooms 4, 5, 6, 7 8		N		
MFD 1-3	Linoleum (grey) over MFC, Basemen room 5		N		
MCA 1-3	1x1 ceiling tile (fissures, spline), 1 st fl. Hall		N		
MCB 1-3	2x4 ceiling tile (light texture), rooms 1, 2, 7 basement hall		N		
MCC 1-3	2x2 ceiling tile (fissures & pinholes)		N		
MCD 1-3	2x4 ceiling tile (gouges), basement rooms 6, 8		N		
MMA 1-3	Mortar Base of quarry tile, kitchen		N		
MMB 1-3	Mortar Base of ceramic floor tile, restrooms		N		
MMC 1-3	Adhesive of ceramic wall tile, restrooms		N		
MMD 1-3	Carpet Mastic		N		
MME 1-3	Fire Brick, fireplace, Auditorium		N		
MMF 1-3	Cement Plaster, exterior overhang and walkway		N		
MMG 1-3	Rolled roofing, with tar and silver coat		N		
	Inspected on July 15, 2016				
Page 1 of 1					

NOTES: All estimated quantities must be field verified by Contractors prior to submitting bid and notifying Illinois EPA or IDPH. TBV means "To Be Verified" by Asbestos Contractors. It is the responsibility of Owner/Operators to follow all applicable Federal, State and Local asbestos regulations. Quantities do not include areas potentially affected by ACM debris or inaccessible locations. See also Laboratory results.

For those samples analyzed by PLM that resulted in asbestos minerals in amounts of greater than zero percent (0%) "none detected" and less than or equal to ten percent (10%), it is recommended having representative samples of homogeneous areas analyzed by Transmission Electron Microscopy (TEM) methods. Furthermore, it is recommended by EPA and others that TEM analytical methods be utilized for Homogeneous Areas that contain organic binders (i.e., floor tiles, mastics, roofing, etc.) and were initially determined negative (none detected) by PLM methods for asbestos content.

Prepared by McKee Environmental, Inc. 309-275-1900 Project Number: 16-5444M1 AsbestosNESHAP-PeoriaParkDist-LakeviewRecCenter-WestEndBldgDemo-1013wLake-PeoriaIL-PLMSummaryTable-July2016-rev1

EMSL	EMSL Analytical, Inc. 2001 East 52nd St. Indianapolis, IN 46205 Tel/Fax: (317) 803-2997 / (317) 803-3047 http://www.EMSL.com / indianapolislab@emsl.com	EMSL Order: Customer ID: Customer PO: Project ID:	161612742 BLMC50
Attention:	Brad Mckee	Phone:	(309) 275-1900
	McKee Environmental Inc.	Fax:	
	430 Grimm Road	Received Date:	07/15/2016 10:30 AM
	Congerville, IL 61729	Analysis Date:	07/21/2016
		Collected Date:	07/14/2016
Project:	PEORIA PARK DIST, LAKEVIEW REC CENTER, DEMO WEST E	ND (7/14/16)	

EMSL Order: 161612742

Sample Description Appearance % Fbrous % Non-Fibrous % Non-Fibrous TJA1 White Forus 20% Cellulose 68% Non-fibrous (Other) 2% Amounts 10% Compacing 10% Compacing TJA2 Positive Stop (Not Analyzed) 10% Compacing 10% Compacing 598727-0000 Forus Positive Stop (Not Analyzed) 10% Amalyzed) 598727-0000 Mon-Fibrous 100% Non-fibrous (Other) None Detected 1988727-0000 MoneGeneous 100% Non-fibrous (Other) None Detected 1988727-0000 MoneGeneous 100% Non-fibrous (Other) None Detected				Asbestos		
TJA1 Write fbroads 20% Cellulose 68% Non-fibroaus (Other) 2% Amostie 1% Chryosine 15412756.0001 Homogeneous Positive Stop (Not Analyzed) 17JA2 Forstander Stop (Not Analyzed) 17JA3 Positive Stop (Not Analyzed) 15412756.0001 Mont Fibrous Positive Stop (Not Analyzed) 15412756.0001 Mont Fibrous Positive Stop (Not Analyzed) 15412756.0001 Mont Fibrous None Fibrous 15412756.0001 Mont Fibrous None Fibrous <th>Sample</th> <th>Description</th> <th>Appearance</th> <th>% Fibrous</th> <th>% Non-Fibrous</th> <th>% Туре</th>	Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Туре
Spin 224-2001 Homogeneous Positive Stop (Not Analyzed) Spin 2242-0002 TuA2 Positive Stop (Not Analyzed) Spin 2242-0003 Positive Stop (Not Analyzed) None Entrous Spin 14 Finish Coat White Non-Fibrous 100% Non-fibrous (Other) None Detected Spin 14 Finish Coat White Non-Fibrous 100% Non-fibrous (Other) None Detected Spin 14 Finish Coat White Non-Fibrous 90% Non-fibrous (Other) None Detected Spin 1242-20004 Homogeneous 90% Non-fibrous (Other) None Detected Spin 2242-0004 Homogeneous 90% Non-fibrous (Other) None Detected Spin 2242-0005 Homogeneous 90% Non-fibrous (Other)	TJA1		White Fibrous	20% Cellulose	68% Non-fibrous (Other)	2% Amosite 10% Chrysotile
TJA2 Positive Stop (Not Analyzed) 15/12/24-0004 File Positive Stop (Not Analyzed) 15/15/14-0004 While Mono-Fibrous 100% Non-fibrous (Other) None Detected 16/15/24-0004 Mono-Fibrous 90% Non-fibrous (Other) None Detected 16/15/24-0005 Mono-Fibrous 90% Non-fibrous (Other)	161612742-0001		Homogeneous			
Instant second Positive Stop (Not Analyzed) Positive Stop (Not Analyzed) Interview Stop (Not Analyzed) Interview Stop (Not Analyzed) Positive Stop (Not Analyzed) Interview Stop (Not Analyzed) Interview Stop (Not Analyzed) Positive Stop (Not Analyzed) Positive Stop (Not Analyzed) Interview Stop (Not Analyzed) Positive Stop (Not Analyzed) Positite Positive	TJA2					Positive Stop (Not Analyzed)
TJA3 Positive Stop (Not Analyzed) 1505270001 White Non-Florous Hangemeter Jeant / coating Jayer included in analyzet 100% Non-florous (Other) None Detected 90% Non-florous (Other) SPA1-Finish Coat Hangemeter Jeant / coating Jayer included in analyzet Gray Non-Florous Homogeneous 10% Perilite 90% Non-florous (Other) None Detected 90% Non-florous (Other) SPA2-Finish Coat Hangemeter Jeant / coating Jayer included in analyzet Gray Non-Florous Homogeneous 10% Non-florous (Other) None Detected 90% Non-florous (Other) SPA2-Finish Coat Hangemeter Jeant / coating Jayer included in analyzet Gray Non-Florous Homogeneous 10% Non-florous (Other) None Detected 90% Non-florous (Other) SPA2-Finish Coat Hangemeter Jeant / coating Jayer included in analyzet Gray Non-Florous Non-Florous 10% Non-florous (Other) None Detected 90% Non-florous (Other) SPA3-Finish Coating Jayer included in analyzet Homogeneous 10% Non-florous (Other) None Detected 90% Non-florous (Other) SPA3-Finish Coating Jayer included in analyzet Homogeneous 10% Non-florous (Other) None Detected 90% Non-florous (Other) SPA3-Finish Coating Jayer included in analyzet Homogeneous 10% Non-florous (Other) None Detected 90% Non-florous (Other) SPA3-Finish Coating Jayer included in analyzet Homogeneous 10% Non-florous (Other) None Detected 10% None florous (Other) SPA3-Finish Coating Jayer included in analyzet <td< td=""><td>161612742-0002</td><td></td><td></td><td></td><td></td><td></td></td<>	161612742-0002					
1961272420004 White Mon-Fibrous Homogeneous White Non-Fibrous (Other) None Detected Non-Fibrous Non-Fibrous None Detected Non-Fibrous None-Fibrous None-Fibrous None-Fibrous None-Fibrous (Other) None Detected Non-Fibrous Non-Fibrous None-Fibrous Non-Fibrous None-Fibrous None-Fib	TJA3					Positive Stop (Not Analyzed)
SPA1-Finish Coat White Non-Fibrous Homogeneous 100% Non-dibrous (Other) None Detected SPA1-Fase Coat Gray Non-Fibrous 10% Perilte 90% Non-fibrous (Other) None Detected SPA1-Fase Coat Mon-Fibrous 10% Non-fibrous (Other) None Detected SPA1-Fase Coat Mon-Fibrous 10% Non-fibrous (Other) None Detected SPA2-Finish Coat Gray Non-Fibrous 10% Non-fibrous (Other) None Detected SPA2-Finish Coat Mon-Fibrous 10% Non-fibrous (Other) None Detected SPA3-Finish Coat Mon-Fibrous 10% Non-fibrous (Other) None Detected SPA3-Finish Coat Brown/White 10% Non-fibrous (Other) None Detected SPA3-Finish Coatin Jayer included in analysis Infereoras Infereoras Infereoras <	161612742-0003					
ifeir 2742-0004 Gray Non-Fbrous 90% Non-fbrous (Other) None Detected Non-Fbrous 90% Non-fbrous (Other) None Detected Non-Fbrous Non-Fbrous Non-Fbrous Non-Fbrous (Other) None Detected Non-Fbrous Non-Fbrous Non-Fbrous Non-Fbrous Non-Fbrous (Other) None Detected Non-Fbrous Non	SPA1-Finish Coat		White Non-Fibrous		100% Non-fibrous (Other)	None Detected
Integrately paint / coating layer included in analysis SPA1-Base Coat SPA2-Finish Coat Non-Fibrous Homogeneous Homogeneous SPA2-Finish Coat Non-Fibrous Homogeneous SPA2-Base Coat SPA2-Finish Coat Non-Fibrous SPA2-Base Coat Non-Fibrous SPA2-Base Coat Non-Fibrous SPA2-Base Coat Non-Fibrous SPA3-Finish Coat Non-Fibrous SPA3-Fibrous SPA3	161612742-0004		Homogeneous			
SPA1-Base Coat Gray 10% Perille Non-Ebrous 9742-2004A Homogeneous 90% Non-Ebrous (Other) SPA2-Finish Coat Write 100% Non-Ebrous (Other) Non-Fibrous Homogeneous SPA2-Base Coat Gray 10% Perilte SPA2-Base Coat Gray 10% Non-Fibrous (Other) SPA3-Finish Coat Write 100% Non-fibrous (Other) Non-Fibrous Homogeneous Non-Fibrous SPA3-Finish Coat Write 100% Non-fibrous (Other) Inseparable paint / coating layer included in analysis Homogeneous SPA3-Base Coat Gray 10% Perille Non-Fibrous 90% Non-fibrous (Other) None Detected Inseparable paint / coating layer included in analysis Homogeneous 90% Non-fibrous (Other) MDA1-Dyrwall Brown/White 100% Non-fibrous (Other) None Detected Fibrous 10% Non-fibrous (Other) None Detected Non-Fibrous Inseparable paint / coating layer included in analysis Non-Fibrous Non-Fibrous <td< td=""><td>Inseparable paint / coa</td><td>ting layer included in analysis</td><td></td><td></td><td></td><td></td></td<>	Inseparable paint / coa	ting layer included in analysis				
Instruction Indirigeneous SPA2-Finish Coat White Non-Fibrous is Homogeneous 100% Non-fibrous (Other) None Detected SPA2-Finish Coat White Non-Fibrous 100% Non-fibrous (Other) None Detected SPA2-Base Coat Gray Non-Fibrous 90% Non-fibrous (Other) None Detected SPA2-Finish Coat White Non-Fibrous 90% Non-fibrous (Other) None Detected SPA3-Finish Coat White Non-Fibrous 100% Non-fibrous (Other) None Detected SPA3-Finish Coat White Non-Fibrous 100% Non-fibrous (Other) None Detected SPA3-Base Coat Gray Non-Fibrous 90% Non-fibrous (Other) None Detected SPA3-Fibrous 90% Non-fibrous (Other) None Detected None Detected SPA3-Fibrous Brown/White Fibrous 100% Non-fibrous (Other) None Detected SPA3-Fibrous Brown/White Fibrous 100% Non-fibrous (Other) None Detected SPA3-Fibrous Brown/White Fibrous 100% Non-fibrous (Other) None Detected SPA3-Fibrous Brown/White Fibrous 20% Cellulose 70% Gypsum None Detected SPA3-F	SPA1-Base Coat		Gray Non-Fibrous		10% Perlite 90% Non-fibrous (Other)	None Detected
SPA2-Fairs Coat Non-Fibrous Homogeneous (Other) None Detected Non-Fibrous Homogeneous (Other) None Detected Non-Fibrous Homogeneous 15/15/2742-00054 Gray Non-Fibrous 90% Non-fibrous (Other) None Detected 15/15/12/200054 Homogeneous 15/15/2742-00054 Homogeneous 15/15/0005 Homogeneous 15/15/0005 Homogeneous 15/15/0005 Homogeneous 15/15/2742-00054 Homogeneous 15/15/0005 Heterogeneous 15/15/0005 Homogeneous 15/15/0005 Heterogeneous 15/15/0005 Heterogeneous 15/15/0005 Heterogeneous 15/15/0005 Heterogeneous 15/15/0005 Heterogeneous 15/15/0005 Heterogeneous 15/15/200000 Heterogeneous 15/15/200000 Heterogeneous 15/15/200000 Heterogeneous 15/15/200000 Heterogeneous 15/15/200000 Heterogeneous 15/15/200000 Heterogeneous 15/15/15/15/15/15/15/15/15/15/15/15/15/1	161612742-0004A		Homogeneous			News Data dad
Initingeneous paint / coating layer included in analysis Gray Non-Fibrous 10% Perlite S0% Non-fibrous (Other) None Detected SPA2-Base Coat Gray Non-Fibrous 90% Non-fibrous (Other) None Detected SPA3-Finish Coat White Non-Fibrous 100% Non-fibrous (Other) None Detected SPA3-Finish Coat White Non-Fibrous 10% Perlite S0% Non-fibrous (Other) None Detected Inseparable paint / coating layer included in analysis SPA3-Fibrous 10% Perlite S0% Non-fibrous (Other) None Detected SPA3-Finish Coat Gray Non-Fibrous 90% Non-fibrous (Other) None Detected Inseparable paint / coating layer included in analysis Brown/White Fibrous 10% Non-fibrous (Other) None Detected SPA3-Finish Coat Mon-Fibrous 100% Non-fibrous (Other) None Detected 10% Non-fibrous (Other) None Detected SPA3-Finish Coat Non-Fibrous 100% Non-fibrous (Other) None Detected 10% Non-fibrous (Other) None Detected Fibrous Inseparable paint / coating layer included in analysis Non-Fibrous 10% Non-fibrous (Other) None Detected Inseparable paint / coating layer included in analysis Inseparable paint / coating layer included in analysis 10% Non-fibrous (Other)	SPA2-Finish Coat		White Non-Fibrous		100% Non-fibrous (Other)	None Detected
SPA2-Base Coat Gray Non-Fibrous 10% Perlite 90% Non-fibrous (Other) None Detected SPA3-Finish Coat White Non-Fibrous 100% Non-fibrous (Other) None Detected SPA3-Finish Coat White Non-Fibrous Homogeneous 100% Non-fibrous (Other) None Detected Inseparable paint / coating layer included in analysis SPA3-Base Coat Gray Non-Fibrous 10% Perlite Non-Fibrous (Other) None Detected SPA3-Base Coat Gray Non-Fibrous Gray Non-Fibrous 10% Perlite 90% Non-fibrous (Other) None Detected SPA3-Base Coat Gray Non-Fibrous Brown/White Fibrous 100% Non-fibrous (Other) None Detected MDA1-Dirywall Brown/White Fibrous 100% Non-fibrous (Other) None Detected MDA1-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected MDA2-Drywall Brown/White Fibrous 20% Cellulose 10% Non-fibrous (Other) None Detected MDA2-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected MDA2-Joint Compound White Non-Fibrous 10% Non-fibrous (Other) None Detected MDA2-Joint Compound White Non-Fibrous 20% Cellulose 5% Non-fibrous (Other) None Detected	Inseparable paint / coa	ting laver included in analysis	Homogeneous			
Instant and the second seco	SPA2-Base Coat		Gray Non-Fibrous		10% Perlite 90% Non-fibrous (Other)	None Detected
SPA3-Finish Coat White Non-Fibrous Homogeneous 100% Non-fibrous (Other) None Detected SPA3-Finish Coat Non-Fibrous Homogeneous 10% Perlite 90% Non-fibrous (Other) None Detected SPA3-Base Coat Gray Non-Fibrous 10% Perlite 90% Non-fibrous (Other) None Detected MDA1-Drywall Brown/White Fibrous 100% Non-fibrous (Other) None Detected MDA1-Drywall Brown/White Fibrous 100% Non-fibrous (Other) None Detected MDA1-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected MDA2-Joint Compound White Fibrous 100% Non-fibrous (Other) None Detected MDA2-Drywall Brown/White Fibrous 20% Cellulose 10% Non-fibrous (Other) None Detected MDA2-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected MDA2-Joint Compound White Non-Fibrous 10% Non-fibrous (Other) None Detected MDA2-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected MDA2-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected MDA2-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected<	161612742-0005A		Homogeneous			
Homogeneous Intseparable paint / coating layer included in analysis Gray Non-Fibrous 10% Perilte 90% Non-fibrous (Other) None Detected SPA3-Base Coat Gray Non-Fibrous 90% Non-fibrous (Other) None Detected MDA1-Drywall Brown/White Fibrous 100% Non-fibrous (Other) None Detected #161612742-0007 Heterogeneous 100% Non-fibrous (Other) None Detected MDA1-Drywall Brown/White Fibrous 100% Non-fibrous (Other) None Detected #161612742-0007 White Non-Fibrous 100% Non-fibrous (Other) None Detected MDA1-Drywall Brown/White Fibrous 100% Non-fibrous (Other) None Detected #161612742-0007A Heterogeneous None Fibrous None Detected MDA2-Drywall Brown/White Fibrous 20% Cellulose 70% Gypsum 10% Non-fibrous (Other) None Detected #161612742-0008 Heterogeneous 10% Non-fibrous (Other) None Detected None Detected MDA2-Drywall Brown/White Fibrous 20% Cellulose 70% Gypsum 10% Non-fibrous (Other) None Detected #161612742-0008 Homogeneous 100% Non-fibrous (Other) None Detected None Detected <	SPA3-Finish Coat		White Non-Fibrous		100% Non-fibrous (Other)	None Detected
SPA3-Base Coat Gray Non-Fibrous 10% Perlite 90% Non-fibrous (Other) None Detected MDA1-Drywall Brown/White Fibrous 100% Non-fibrous (Other) None Detected MDA1-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected MDA1-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected MDA1-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected MDA2-Drywall Brown/White Fibrous 20% Cellulose 70% Gypsum 10% Non-fibrous (Other) None Detected MDA2-Drywall Brown/White Fibrous 20% Cellulose Heterogeneous 70% Gypsum 10% Non-fibrous (Other) None Detected MDA2-Joint Compound White Heterogeneous 20% Cellulose 70% Gypsum 10% Non-fibrous (Other) None Detected MDA2-Joint Compound White Heterogeneous 100% Non-fibrous (Other) None Detected MDA2-Joint Compound White Heterogeneous 100% Non-fibrous (Other) None Detected MDA3-Joint Compound White Homogeneous 100% Non-fibrous (Other) None Detected MDA3-Drywall Brown/White Fibrous 20% Cellulose S% Non-fibrous (Other) None Detected	161612742-0006 Inseparable paint / coa	ting layer included in analysis	Homogeneous			
IB1812742-0006A Homogeneous MDA1-Drywall Brown/White Fibrous 100% Non-fibrous (Other) None Detected MDA1-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected IB1812742-0007 Heterogeneous 100% Non-fibrous (Other) None Detected IB1812742-0007A Homogeneous 100% Non-fibrous (Other) None Detected IB1812742-0007A Homogeneous 100% Non-fibrous (Other) None Detected MDA2-Drywall Brown/White Fibrous 20% Cellulose 10% Non-fibrous (Other) None Detected MDA2-Joint Compound White Heterogeneous 100% Non-fibrous (Other) None Detected MDA2-Joint Compound White Heterogeneous 100% Non-fibrous (Other) None Detected MDA2-Joint Compound White Homogeneous 100% Non-fibrous (Other) None Detected MDA2-Joint Compound White Homogeneous 20% Cellulose 75% Gypsum 5% Non-fibrous (Other) None Detected MDA3-Drywall Brown/White Fibrous 20% Cellulose 75% Gypsum 5% Non-fibrous (Other) None Detected IB1812742-0009 Heterogeneous 5% Non-fibrous (Other) None Detected 5% Non-fibrous (Other) <td>SPA3-Base Coat</td> <td></td> <td>Gray Non-Fibrous</td> <td></td> <td>10% Perlite 90% Non-fibrous (Other)</td> <td>None Detected</td>	SPA3-Base Coat		Gray Non-Fibrous		10% Perlite 90% Non-fibrous (Other)	None Detected
MDA1-Drywall Brown/White Fibrous 100% Non-fibrous (Other) None Detected 161612742-0007 Heterogeneous 100% Non-fibrous (Other) None Detected MDA1-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0007A Homogeneous 100% Non-fibrous (Other) None Detected 161612742-0007A Brown/White Fibrous 20% Cellulose 70% Gypsum 10% Non-fibrous (Other) None Detected 161612742-0008 Heterogeneous 100% Non-fibrous (Other) None Detected MDA2-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0008 Heterogeneous 100% Non-fibrous (Other) None Detected 161612742-0008A Hoterogeneous 100% Non-fibrous (Other) None Detected 161612742-0008A White Inseparable paint / coating layer included in analysis 100% Non-fibrous (Other) None Detected MDA3-Drywall Brown/White Fibrous 20% Cellulose SW Non-fibrous (Other) None Detected 161612742-0009 Heterogeneous 5% Non-fibrous (Other) None Detected	161612742-0006A		Homogeneous			
Initialization Heterogeneous MDA1-Joint Compound White Non-Fibrous Homogeneous 100% Non-fibrous (Other) None Detected Inseparable paint / coating layer included in analysis Homogeneous 20% Cellulose 70% Gypsum 10% Non-fibrous (Other) None Detected MDA2-Drywall Brown/White Fibrous 20% Cellulose 70% Gypsum 10% Non-fibrous (Other) None Detected MDA2-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected MDA2-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected Inseparable paint / coating layer included in analysis Mone Geneous 100% Non-fibrous (Other) None Detected MDA3-Drywall Brown/White Fibrous 20% Cellulose Fibrous 75% Gypsum 5% Non-fibrous (Other) None Detected Inseparable paint / coating layer included in analysis Homogeneous 5% Non-fibrous (Other) None Detected Inseparable paint / coating layer included in analysis Brown/White Fibrous 20% Cellulose Fibrous 75% Gypsum 5% Non-fibrous (Other) None Detected Inseparable paint / coating layer included in analysis Heterogeneous 5% Non-fibrous (Other) None Detected	MDA1-Drywall		Brown/White Fibrous		100% Non-fibrous (Other)	None Detected
MDA1-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0007A Homogeneous Homogeneous Non-Fibrous None Detected Inseparable paint / coating layer included in analysis Brown/White Fibrous 20% Cellulose Tobus 70% Gypsum 10% Non-fibrous (Other) None Detected 161612742-0008 Heterogeneous 10% Non-fibrous (Other) None Detected MDA2-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0008A Homogeneous 100% Non-fibrous (Other) None Detected Inseparable paint / coating layer included in analysis Homogeneous None Detected MDA3-Drywall Brown/White Fibrous 20% Cellulose S% Non-fibrous (Other) None Detected 161612742-0009 Heterogeneous 75% Gypsum S% Non-fibrous (Other) None Detected	161612742-0007		Heterogeneous			
Inseparable paint / coating layer included in analysis Homogeneous MDA2-Drywall Brown/White Fibrous 20% Cellulose Tobus 70% Gypsum 10% Non-fibrous (Other) None Detected 161612742-0008 Heterogeneous 10% Non-fibrous (Other) None Detected MDA2-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0008A Homogeneous 100% Non-fibrous (Other) None Detected Inseparable paint / coating layer included in analysis Homogeneous 100% Non-fibrous (Other) None Detected MDA3-Drywall Brown/White Fibrous 20% Cellulose 5% Non-fibrous (Other) None Detected 161612742-0009 Heterogeneous 10% Non-fibrous (Other) None Detected	MDA1-Joint Compo	bund	White Non-Fibrous		100% Non-fibrous (Other)	None Detected
Inseparable paint / coating layer included in analysis MDA2-Drywall Brown/White Fibrous 20% Cellulose Towns 70% Gypsum 10% Non-fibrous (Other) None Detected MDA2-Joint Compound White Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0008A Homogeneous 100% Non-fibrous (Other) None Detected Inseparable paint / coating layer included in analysis Homogeneous 10% Son-fibrous (Other) None Detected MDA3-Drywall Brown/White Fibrous 20% Cellulose S% Non-fibrous (Other) None Detected 161612742-0009 Heterogeneous 5% Non-fibrous (Other) None Detected	161612742-0007A		Homogeneous			
MDA2-Drywall Brown/White 20% Cellulose 70% Gypsum None Detected Fibrous 10% Non-fibrous (Other) 10% Non-fibrous (Other) None Detected MDA2-Joint Compound White 100% Non-fibrous (Other) None Detected Non-Fibrous Non-Fibrous 100% Non-fibrous (Other) None Detected 181612742-0008A Homogeneous 100% Non-fibrous (Other) None Detected Inseparable paint / coating layer included in analysis Brown/White 20% Cellulose 75% Gypsum None Detected MDA3-Drywall Brown/White 20% Cellulose 75% Gypsum None Detected 10612742-0009 Heterogeneous 5% Non-fibrous (Other) None Detected	Inseparable paint / coa	ting layer included in analysis				
Interruption Heterogeneous MDA2-Joint Compound White Non-Fibrous Homogeneous 100% Non-fibrous (Other) None Detected 181612742-0008A Homogeneous Homogeneous None Detected Inseparable paint / coating layer included in analysis Brown/White Fibrous 20% Cellulose 5% Non-fibrous (Other) None Detected 181612742-0009 Heterogeneous 5% Non-fibrous (Other) None Detected	MDA2-Drywall		Brown/White Fibrous	20% Cellulose	70% Gypsum 10% Non-fibrous (Other)	None Detected
MDA2-Joint Compound White 100% Non-fibrous (Other) None Detected Non-Fibrous Non-Fibrous Non-Fibrous 161612742-0008A Homogeneous Inseparable paint / coating layer included in analysis Brown/White 20% Cellulose MDA3-Drywall Brown/White 20% Cellulose Fibrous 5% Non-fibrous (Other) 161612742-0009 Heterogeneous	161612742-0008		Heterogeneous			
Homogeneous Homogeneous Inseparable paint / coating layer included in analysis Brown/White 20% Cellulose 75% Gypsum None Detected MDA3-Drywall Brown/White 20% Cellulose 5% Non-fibrous (Other) 161612742-0009 181612742-0009 Heterogeneous 5% Non-fibrous (Other) 161612742-0009	MDA2-Joint Compo	bund	White Non-Fibrous		100% Non-fibrous (Other)	None Detected
MDA3-Drywall Brown/White 20% Cellulose 75% Gypsum None Detected Fibrous 5% Non-fibrous (Other) 181612742-0009 Heterogeneous	161612742-0008A	ting laver included in analysis	Homogeneous			
Fibrous 5% Non-fibrous (Other) 161612742-0009 Heterogeneous	MDA3-Drywall	ang layor moladoù in analysis	Brown/White	20% Cellulose	75% Gypsum	None Detected
	161612742-0009		Fibrous Heterogeneous		5% Non-fibrous (Other)	



SampleDescriptionAppearance% Fibrous% Non-Fibrous (Other)None DetectedNon-FibrousNon-Fibrous100% Non-Fibrous (Other)None DetectedNon-FibrousNon-Fibrous100% Non-Fibrous (Other)2% OrbysotileNon-FibrousBarge06% Non-Fibrous (Other)2% OrbysotileNon-FibrousNon-Fibrous06% Non-Fibrous (Other)None DetectedNon-FibrousNon-Fibrous00% Non-Fibrous (Other)None DetectedNon-FibrousNon-Fibrous100% Non-Fibrous (Other)None DetectedNon-FibrousNon-FibrousNone DetectedNone DetectedNon-FibrousNon-Fibrous100% Non-Fibrous (Other)None DetectedNon-FibrousNon-FibrousNone Detected </th <th></th> <th></th> <th></th> <th>Non-Asbe</th> <th>Asbestos</th>				Non-Asbe	Asbestos	
MDA3-sint CompoundWhile Non-Ebrous Introogeneous100% Non-Abrous (Other)None Detected Non-Ebrous introogeneousMFA1-Flor Impactate part classing layer included in analyze MFA1-MassicBege96% Non-Abrous (Other)2% ChrysofileMFA1-Flor Impactate part classing layer included in analyze MFA1-MassicBege96% Non-Abrous (Other)2% ChrysofileMFA1-MassicBiole Non-Borous96% Non-Abrous (Other)2% Chrysofile2% ChrysofileMFA1-MassicBiole Non-Borous96% Non-Abrous (Other)2% ChrysofileMFA1-MassicBiole Non-Flor MFA1-Massic96% Non-Abrous (Other)2% ChrysofileMFA2-MassicBiole Non-Flor MFA1-Massic96% Non-Abrous (Other)2% ChrysofileMFA3-Flor MFA1-MassicBiole Non-Flor Mon-Flor MFA1-Massic96% Non-Abrous (Other)2% ChrysofileMFA3-Flor MFA3-F	Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
Horse-Brouge Non-Florous Horse-Brouge 96% Non-Horous (Other) 2% Chrysotile MAT-Floor Tile Balage 96% Non-Horous (Other) 2% Chrysotile MFA Horogeneous Mercentee Positive Stop (Not Analyzed) MFA Mercentee Secondee Secondee MFA Balage 96% Non-Horous (Other) 2% Chrysotile MFA Non-Forous Secondee 2% Chrysotile MFB Mercentee 96% Non-Horous (Other) 2% Chrysotile MFB Mercentee 96% Non-Horous (Other) 2% Chrysotile MFB Mercentee 96% Non-Horous (Other) 2% Chrysotile MFB Mon-Forous Positive Stop (Not Analyzed) MFB Mon-Forous Positive Stop (Not Analyzed) MFB Mon-Forous Positive Stop (Not Analyzed) <	MDA3-Joint Compo	und	White		100% Non-fibrous (Other)	None Detected
Interactional processing space includes a part of the sessing includes	161612742 00004		Non-Fibrous			
MEFA1-Floor Tile Beige Non-Florous 98% Non-florous (Other) 2% Chysolite INMERA-WORD Homogeneous 98% Non-florous (Other) 2% Chysolite INMERA-Mastic Black Non-Florous 98% Non-florous (Other) 2% Chysolite MFA2 Positive Stop (Not Analyzes) 5% (27) MFA3 Footile 5% (27) MFA3 Positive Stop (Not Analyzes) MFA3 Footile 5% (27) MFA3 Positive Stop (Not Analyzes) MFA3 Mon-Florous Footile MFA3 Positive Stop (Not Analyzes) MFA3 Mon-Florous 98% Non-florous (Other) 2% Chrysolite MFA3 Mon-Florous 98% Non-florous (Other) 2% Chrysolite MFB3 Mon-Florous 98% Non-florous (Other) 2% Chrysolite MFB4 Mon-Florous 98% Non-florous (Other) 2% Chrysolite MFB2 Footile Footile Footile Footile MFB4 Mon-Florous 100% Non-florous (Other) None Detected MFC1-Floor Tile Beige Non-Florous	Inseparable paint / coati	ing layer included in analysis	nomogeneous			
Non-Florous Non-Florous Bits is Positive Stop (Not Analyzed) selectrate.com Homogenous Homogenous Positive Stop (Not Analyzed) Selectrate.com Positive Stop (Not Analyzed) selectrate.com Non-Forous Bits is Positive Stop (Not Analyzed) Selectrate.com Positive Stop (Not Analyzed) selectrate.com Non-Forous Bits is Bits is Bits is Positive Stop (Not Analyzed) selectrate.com Non-Forous Bits is Bits is Bits is Positive Stop (Not Analyzed) selectrate.com Non-Forous Bits is Bits is Bits is Positive Stop (Not Analyzed) selectrate.com Non-Forous Bits is Bits is Bits is Bits is Positive Stop (Not Analyzed) selectrate.com Non-Forous Bits is Bits is Non-Forous Selectrate is <	MFA1-Floor Tile		Beige		98% Non-fibrous (Other)	2% Chrysotile
Homogeneous Homogeneous MATA-Mastic Black Non-Fibrous 98% Non-fibrous (Other) 2% Chrysottle MATA-Mastic Monopeneous Positive Slop (Not Analyzes) StristZrecord Monopeneous MFB1-Mastic Black Non-Fibrous 98% Non-fibrous (Other) 2% Chrysottle StristZrecord Homogeneous Positive Slop (Not Analyzes) StristZrecord Homogeneous Non-Fibrous MFC1-Mastic Positive Slop (Not Analyzes)			Non-Fibrous		, , , , , , , , , , , , , , , , , , ,	2
MRAT-Master Black Sets Non-Ritrous (Other) 2% Chrysolle NMRAZ Homogeneous Homogeneous Featility Stop (Not Analyzed) ISSE274-2671 Homogeneous Featility Stop (Not Analyzed) ISSE274-2671 Homogeneous Featility Stop (Not Analyzed) ISSE274-2671 Mon-Farous Sets Non-fibrous (Other) 2% Chrysolle ISSE274-2673 Mon-Farous Sets Non-fibrous (Other) 2% Chrysolle ISSE274-2674 Mon-Farous Positive Stop (Not Analyzed) ISSE274-2674 ISSE274-2674 Mon-Farous Non-Farous Positive Stop (Not Analyzed) ISSE274-2674 Mon-Farous Non-Farous ISSE274-2674 ISSE274-2674 Monogeneous ISSE274-2674 None Detected Non-Farous<	161612742-0010		Homogeneous			
Instrumentation Number of the start of the	MFA1-Mastic		Black		98% Non-fibrous (Other)	2% Chrysotile
MFA2 Positive Stop (Not Analyzed) seterate of the stop (Not Analyzed) seterate of t	161612742-0010A		Homogeneous			
Instrumental set of the set of t	MFA2					Positive Stop (Not Analyzed)
telest2r24.001 MFA3 Positive Stop (Not Analyzed) ###52746.001 MFB1-Mastic MFB1-Mastic MFB1-Mastic MFB1-Mastic MFB1-Mastic MFB1-Mastic MFB2 ##85724.003 MFB1-Mastic MFB1-Mastic MFB2 ##85724.003 MFB1-Mastic MFB2 ##85724.003 MFB1-Mastic MFB2 ##85724.003 MFD2-Mastic MFD1-Flooring ##85724.003 MFD1-Flooring ##85724.003 MFD1-Flooring ##85724.003 MFD1-Flooring ##85724.003 MFD1-Flooring ##85724.003 MFD1-Flooring ##85724.003 MFD1-Flooring ##85724.003 MFD1-Flooring ##85724.003 MFD2-Mastic MFD2-Mas						
MFA3 Positive Stop (Not Analyzed) 16/17/24-2012 MFB1-Floor Tile Beige 98% Non-fbrous (Other) 2% Chrysotile 16/17/24-2013 Black 98% Non-fbrous (Other) 2% Chrysotile 16/17/24-2013 Black 98% Non-fbrous (Other) 2% Chrysotile 16/17/24-2013 Mono-Fbrous 98% Non-fbrous (Other) 2% Chrysotile 16/17/24-2014 Homogeneous Positive Stop (Not Analyzed) 16/17/24-2014 Homogeneous Positive Stop (Not Analyzed) 16/17/24-2015 Positive Stop (Not Analyzed) None Detected 16/17/24-2015 Mono-Fbrous Positive Stop (Not Analyzed) 16/17/24-2015 Mono-Fbrous 100% Non-fbrous (Other) None Detected 16/17/24-2015 Monogeneous 100% Non-fbrous (Other) None Detected 16/17/24-2015 Monogeneous 100% Non-fbrous (Other) None Detected 16/17/24-2017 Homogeneous 100% Non-fbrous (Other) None Detected 16/17/24-2017 Homogeneous 100% Non-fbrous (Other) None Detected 16/17/24-2017	161612742-0011					
#619279-0972 MFB I-Roor Tile Beige Non-Fibrous Non-Fibrous Other) 2% Chrysotile #619279-0073 Mono-Fibrous Non-Fibrous Other) 2% Chrysotile #619279-0073 Black Non-Fibrous Other) 2% Chrysotile #619279-0073 Mono-Fibrous Other) 2% Chrysotile #619279-0073 Mono-Fibrous Other) 2% Chrysotile #619279-0074 Mono-Fibrous Other) Positive Stop (Not Analyzed) #619279-0075 MFB3 Positive Stop (Not Analyzed) #619279-0076 Mono-Fibrous Other) None Detected #619279-0076 Mono-Fibrous Other) None Detected #619279-0076 Mono-Fibrous Other) None Detected #619279-0077 Mono-Fibrous Other) None Detected #619279-0078 Mono-Fibrous Other) None Detected #619279-0077 Mono-Fibrous Other) None Detected #619279-0078 Mono-Fibrous Other) None Detected #619279-0077 Mono-Fibrous Other) None Detected #619279-0078 Mono-Fibrous Other) None Detected #619279-0077 Mono-Fibrous Other) None Detected #619279-0077	MFA3					Positive Stop (Not Analyzed)
MFB1-Floor Tile Beige Non-Florous 98% Non-florous (Other) 2% Chrysotile 19/07726-0073 Homogeneous 98% Non-florous (Other) 2% Chrysotile 19/07726-0073 Homogeneous 98% Non-florous (Other) 2% Chrysotile 19/07726-0073 Homogeneous Positive Stop (Not Analyzed) 19/07726-0074 Homogeneous Positive Stop (Not Analyzed) 19/07726-0074 MFB3 Positive Stop (Not Analyzed) 19/07826-0076 Homogeneous Positive Stop (Not Analyzed) 19/07826-0076 Homogeneous Non-Florous (Other) None Detected 19/07826-0076 Homogeneous None Florous (Other) None Detected 19/07826-0076 Homogeneous None Florous (Other) None Detected 19/07826-0076 Homogeneous None Florous (Other) None Detected 19/07726-00776 Homogeneous None Florous (Other) None Detected 19/07726-00778 Homogeneous None Florous (Other) None Detected 19/07726-00778 Homogeneous Non-Florous (Other) None Detected 19/07726-00778 <td< td=""><td>161612742-0012</td><td></td><td></td><td></td><td></td><td></td></td<>	161612742-0012					
Non-Fibrous Bison Bison 98% Non-fibrous (Other) 2% Chrysotile NMFB1-Mastic Bison 98% Non-fibrous (Other) 2% Chrysotile 19882742-0013A Homogeneous Positive Stop (Not Analyzed) 19882742-0013A Homogeneous Positive Stop (Not Analyzed) 19882742-0013A Homogeneous Positive Stop (Not Analyzed) 19882742-0014 MFB3 Positive Stop (Not Analyzed) 19882742-0015 MFC1-Floor Tile Beige 100% Non-fibrous (Other) None Detected 19882742-0016 Homogeneous Non-Fibrous None Detected None Detected 19882742-0016 Homogeneous Non-Fibrous None Detected None Detected 19882742-0016 Homogeneous Non-Fibrous None Detected None Detected 19882742-0017A Homogeneous Non-Fibrous None Detected None Detected 19882742-0017A Homogeneous Non-Fibrous None Detected None Detected 19882742-0017A Homogeneous Non-Fibrous None Detected None Detected	MFB1-Floor Tile		Beige		98% Non-fibrous (Other)	2% Chrysotile
Internet in the integration of the integration			Non-Fibrous			
MFB1-Mastic Bisk 99% Non-Hibrous (Other) 2% Chrysolite isrem2742-0013A Homogeneous Positive Stop (Not Analyzed) isrem2742-0013A Homogeneous Positive Stop (Not Analyzed) isrem2742-0014 Positive Stop (Not Analyzed) Isrem2742-0014 MFB3 Positive Stop (Not Analyzed) isrem2742-0015 Mon-Fibrous (Other) None Detected MFC1-Mastic Non-Fibrous Non-Fibrous (Other) None Detected isrem2742-0016 Homogeneous 100% Non-fibrous (Other) None Detected isrem2742-0017 Homogeneous 100% Non-fibrous (Other) None Detected MFC2-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected istem2742-0017 Homogeneous Homogeneous Homogeneous MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected istem2742-0018 Homogeneous Homogeneous	161612742-0013		Homogeneous			
Interspace Hemogeneous MFE2 Positive Stop (Not Analyzed) isfei2742-0014 Positive Stop (Not Analyzed) isfei2742-0014 Positive Stop (Not Analyzed) Isfei2742-0015 Positive Stop (Not Analyzed) Isfei2742-0015 Positive Stop (Not Analyzed) Isfei2742-0015 Interspace Stop (Not Analyzed) Isfei2742-0015 Non-Fibrous Isfei2742-0016 Beige Non-Fibrous 100% Non-fibrous (Other) None Detected Isfei2742-0015 Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected Isfei2742-0016 Homogeneous Interspace Stop (Not Analyzed) Interspace Stop (Not Analyzed) Isfei2742-0017 Homogeneous Interspace Stop (Not Analyzed) Non-Fibrous (Other) None Detected Isfei2742-0017 Homogeneous Interspace Stop (Non-fibrous (Other) None Detected Non-Fibrous Isfei2742-0017 Homogeneous Interspace Stop (Non-fibrous (Other) None Detected Non-Fibrous Interspace Stop (Non-fibrous (Other) None Detected Non-Fibrous Isfei2742-0018 Homogeneous Interspace Stop (No	MFB1-Mastic		Black Non-Fibrous		98% Non-fibrous (Other)	2% Chrysotile
MFB2 Positive Stop (Not Analyzed) 18/15/274-2014 Positive Stop (Not Analyzed) 16/15/274-2015 Positive Stop (Not Analyzed) 16/15/274-2015 Positive Stop (Not Analyzed) 16/15/20015 International Stop (Not Analyzed) 16/15/20015 Beige Non-Fibrous 16/15/20016 Beige Non-Fibrous 16/15/20016 Yellow Non-Fibrous (Other) None Detected 16/15/274-2015A Homogeneous None Fibrous 16/15/274-2015A Homogeneous None Potected 16/15/274-2015A Homogeneous None Potected MFC2-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected 16/15/274-2017A Homogeneous None-Fibrous None Potected 16/15/274-2017A Homogeneous None-Fibrous None Potected 16/15/274-2017A Homogeneous None Potected None Potected 16/15/274-2017A Homogeneous None Potected None Potected 16/15/274-2017A Homogeneous None Potected None Potected 16/15/274-2017B Fibrous 100% Non-fibrous (Other) None Detected 16/15/274-2017B Homogeneous None Potected None Potected 16/15/274-2017B Homogeneous None Potected </td <td>161612742-0013A</td> <td></td> <td>Homogeneous</td> <td></td> <td></td> <td></td>	161612742-0013A		Homogeneous			
Testitive Stop (Not Analyzed) MFB3 Positive Stop (Not Analyzed) 100% Non-fibrous (Other) None Detected MFC1-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected MFC1-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFC2-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected MFC2-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected MFC2-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected MFC2-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected None Detected MFC3-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected None Detected MFD1-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected None Detected None M	MFB2					Positive Stop (Not Analyzed)
MFB3 Positive Stop (Not Analyzed) Infer 2274-2015 MFC1-Rice Tile Beige Non-Fibrous (Other) None Detected Fibrous (Other) Non-Fibrous (Other) None Detected Fibrous (Other) Non-Fibrous (Other) None Detected Fibrous (Other) Non-Fibrous (Other) None Detected Fibrous						
MFB3 Positive stop (NOL Alriaryzed) 16167242-0015 MFC1-Filor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected MFC1-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFC2-floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected MFC2-floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected MFC2-floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected MFC2-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFD1-Fibrous Homogeneous 100% Non-fibrous (Other) None Detected MFD1-Fibrous Homogeneous 100% Non-fibrous (Other) None Detected MF01-Fibrous Mon-Fibrous 100% Non-fibrous (Other) None Detected 16167242-001A Homogeneous Homogeneous Homogeneous MFD1-Fibrous Gray <td>161612742-0014</td> <td></td> <td></td> <td></td> <td></td> <td></td>	161612742-0014					
1#1812742-0015 MFC1-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected 1#1812742-0016 Homogeneous 100% Non-fibrous (Other) None Detected MFC1-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFC2-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected MFC2-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected MFC2-Mastic Vellow Non-Fibrous 100% Non-fibrous (Other) None Detected 1#1812742-00174 Homogeneous 100% Non-fibrous (Other) None Detected MFC3-Mastic Vellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow Homogeneous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected M	MFB3					Positive Stop (Not Analyzed)
MFC1-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0016 Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0016A Homogeneous 100% Non-fibrous (Other) None Detected 161612742-0016A Homogeneous 100% Non-fibrous (Other) None Detected 161612742-0016A Homogeneous 100% Non-fibrous (Other) None Detected 161612742-0017A Homogeneous 100% Non-fibrous (Other) None Detected 161612742-0017A Homogeneous None Detected None Detected 161612742-0017A Homogeneous None-Fibrous (Other) None Detected 161612742-0018 Gray (Fibrous (Other) None Detected None Fibrous (Other) None Detected 161612742-0019 Heterogeneous International (Fibrous (Other) None Detected 161	161612742-0015					
Non-Fibrous Homogeneous MFC1-Mastic Yellow 100% Non-fibrous (Other) None Detected it/si2742-0016A Homogeneous 100% Non-fibrous (Other) None Detected MFC2-Floor Tile Beige 100% Non-fibrous (Other) None Detected it/si2742-0016A Monogeneous 100% Non-fibrous (Other) None Detected it/si2742-0017 Homogeneous 100% Non-fibrous (Other) None Detected it/si2742-0017A Homogeneous 100% Non-fibrous (Other) None Detected it/si2742-0018 Homogeneous 100% Non-fibrous (Other) None Detected it/si2742-0019 Heterogeneous 100% Non-fibrous (Other) None Detected it/si2742-0019 Heterogeneous 100% Non-fibrous (Other) None Detected it/si2742-0019A Homogeneous 100% Non-fibrous (Other)	MFC1-Floor Tile		Beige		100% Non-fibrous (Other)	None Detected
MFC1-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected Non-Fibrous Anon-Fibrous 100% Non-fibrous (Other) None Detected Non-Fibrous 161612742-0018 100% Non-fibrous (Other) None Detected Non-Fibrous 161612742-0018 100% Non-fibrous (Other) None Detected Non-Fibrous 161612742-0019 100% Non-fibrous (Other) None Detected 161612742-0020 161612742-0020 161612742-0020 161612742-0020 161612742-0020 161612742-0020 161612742-0020 1616127	161612742-0016		Non-Fibrous Homogeneous			
Inter C Frances Non-Fibrous Non-Fibrous Non-Fibrous 151512742-0016A Homogeneous 100% Non-fibrous (Other) None Detected MFC2-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected 161512742-0017 Homogeneous 100% Non-fibrous (Other) None Detected MFC2-Floor Tile Son-Fibrous 100% Non-fibrous (Other) None Detected 161512742-0017 Homogeneous 100% Non-fibrous (Other) None Detected MFC3-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow 100% Non-fibrous (Other) None Detected MFD1-Flooring Gray 40% Cellulose 60% Non-fibrous (Other) None Detected 161612742-0018 Homogeneous 100% Non-fibrous (Other) None Detected MFD1-Flooring Gray 40% Cellulose 60% Non-fibrous (Other) None Detected 161612742-0019 Heterogeneous 100% Non-fibrous (Other) None Detected 161612742-0019A Homogeneous 100% Non-fibrous (Other) None Detected 161612742-0020 <td>MEC1 Mastic</td> <td></td> <td>Vellow</td> <td></td> <td>100% Non fibrous (Other)</td> <td>None Detected</td>	MEC1 Mastic		Vellow		100% Non fibrous (Other)	None Detected
Interse Homogeneous MFC2-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected None Detected Interse Homogeneous 100% Non-fibrous (Other) None Detected MFC2-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected Interse Homogeneous 100% Non-fibrous (Other) None Detected MFC3-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected Interse Homogeneous Homogeneous None Detected MFC3-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected Intersezee Homogeneous Homogeneous None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected Intersezee Homogeneous Homogeneous None Detected None Detected MFD1-Flooring Gray 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Flooring Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MF02-Flooring Gray 40% Cellulose			Non-Fibrous			None Delected
MFC2-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0017 Homogeneous 100% Non-fibrous (Other) None Detected MFC2-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFC3-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFD1-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD1-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous Non-Fibrous None Detected	161612742-0016A		Homogeneous			
Interference Non-Fibrous MFC2-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFD1-Flooring Gray Fibrous 40% Cellulose Fibrous 60% Non-fibrous (Other) None Detected MFD1-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose Homogeneous 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose Homogeneous 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose Heterogeneous 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 100% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Homogeneous 100% Non-fibrous (Other) None Detected	MFC2-Floor Tile		Beige		100% Non-fibrous (Other)	None Detected
Mindightedus Holindightedus MFC2-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFC3-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFD1-Flooring Gray Fibrous 40% Cellulose Non-Fibrous (Other) None Detected MFD1-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected 100% Non-fibrous (Other) None Detected	161612742-0017		Non-Fibrous Homogeneous			
MIP C2-MidSitC Non-Fibrous Non-Fibrous 161612742-0017A Homogeneous MFC3-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0018 Homogeneous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0018 Homogeneous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0018A Homogeneous 60% Non-fibrous (Other) None Detected MFD1-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected 161612742-0019 Heterogeneous 100% Non-fibrous (Other) None Detected 161612742-0019A Homogeneous 100% Non-fibrous (Other) None Detected 161612742-0020 Heterogeneous 100% Non-fibrous (Other) None Detected 161612742-0020 Heterogeneous 100% Non-fibrous (Other)	MEC2 Mastic		Vellow		100% Non fibrous (Other)	None Detected
16/16/12742-0017A Homogeneous MFC3-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) Homogeneous None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) Non-Fibrous None Detected MFC1-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) Non-Fibrous None Detected MFD1-Flooring Gray Fibrous 40% Cellulose Heterogeneous 60% Non-fibrous (Other) None Detected MFD1-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow			Non-Fibrous			None Delected
MFC3-Floor Tile Beige Non-Fibrous 100% Non-fibrous (Other) None Detected 16112742-0018 Homogeneous 100% Non-fibrous (Other) None Detected MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected 16112742-0018A Homogeneous 100% Non-fibrous (Other) None Detected MFD1-Flooring Gray Fibrous 40% Cellulose Fibrous 60% Non-fibrous (Other) None Detected MFD1-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose Non-Fibrous 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose Non-Fibrous 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose Fibrous 60% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 40% Cellulose Fibrous 60% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 40% Cellulose Fibrous 60% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFD2-Mastic Homogeneous 100% Non-fibrous (Other) None Detected	161612742-0017A		Homogeneous			
Non-Fibrous I61612742-0018 Homogeneous MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0018A Homogeneous 60% Non-fibrous (Other) None Detected 161612742-0018A Homogeneous 60% Non-fibrous (Other) None Detected 161612742-0019 Gray Heterogeneous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD1-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected 161612742-0019A Homogeneous 100% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected 161612742-0020 Heterogeneous 100% Non-fibrous (Other) None Detected Mone 161612742-0020 Heterogeneous 100% Non-fibrous (Other) None Detected Mone 161612742-0020A Homogeneous 100% Non-fibrous (Other) None Detected Mone	MFC3-Floor Tile		Beige		100% Non-fibrous (Other)	None Detected
MFC3-Mastic Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0018A Homogeneous 60% Non-fibrous (Other) None Detected MFD1-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected 161612742-0019 Heterogeneous 100% Non-fibrous (Other) None Detected MFD1-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Heterogeneous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Heterogeneous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0020 Heterogeneous 100% Non-fibrous (Other) None Detected	161612742-0018		Non-Fibrous Homogeneous			
Nin Connection Non-Fibrous 161612742-0018A Homogeneous MFD1-Flooring Gray 161612742-0019 Heterogeneous MFD1-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) MFD1-Mastic Brown/Yellow Non-Fibrous 161612742-0019A Homogeneous MFD2-Flooring Gray 40% Cellulose 60% Non-fibrous (Other) None Detected Non-Fibrous 161612742-0019A MFD2-Flooring Gray 40% Cellulose 60% Non-fibrous (Other) None Detected Non-Fibrous 161612742-0019A MFD2-Flooring Gray 40% Cellulose Fibrous 161612742-0020 MFD2-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected Non-Fibrous 161612742-0020A	MEC3-Mastic		Yellow		100% Non-fibrous (Other)	None Detected
International light Homogeneous MFD1-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected International light Heterogeneous 100% Non-fibrous (Other) None Detected MFD1-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected International light Homogeneous 100% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected 100% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected 100% Non-fibrous (Other) None Detected 161612742-0020A Homogeneous 100% Non-fibrous (Other) None Detected 100% Non-fibrous (Other) None Detected			Non-Fibrous			
MFD1-Flooring Gray Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected 161612742-0019 Heterogeneous MFD1-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0019A Homogeneous 100% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose Non-Fibrous 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose Non-Fibrous 60% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0020A Homogeneous 100% Non-fibrous (Other) None Detected	161612742-0018A		Homogeneous			
161612742-0019 Heterogeneous MFD1-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0019A Homogeneous 40% Cellulose Fibrous 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray Fibrous 40% Cellulose Fibrous 60% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0020A Homogeneous 100% Non-fibrous (Other) None Detected	MFD1-Flooring		Gray	40% Cellulose	60% Non-fibrous (Other)	None Detected
MFD1-Mastic Brown/Yellow 100% Non-fibrous (Other) None Detected Non-Fibrous Homogeneous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray 40% Cellulose 60% Non-fibrous (Other) None Detected 161612742-0020 Heterogeneous Heterogeneous Non-Fibrous (Other) None Detected MFD2-Mastic Brown/Yellow 100% Non-fibrous (Other) None Detected Non-Fibrous Homogeneous 100% Non-fibrous (Other) None Detected 161612742-0020A Homogeneous 100% Non-fibrous (Other) None Detected	161612742-0019		Fibrous Heterogeneous			
Non-Fibrous 40% Cellulose 60% Non-fibrous (Other) None Detected 161612742-0019A Homogeneous 40% Cellulose 60% Non-fibrous (Other) None Detected MFD2-Flooring Gray 40% Cellulose 60% Non-fibrous (Other) None Detected 161612742-0020 Heterogeneous 100% Non-fibrous (Other) None Detected MFD2-Mastic Brown/Yellow 100% Non-fibrous (Other) None Detected 161612742-0020A Homogeneous 100% Non-fibrous (Other) None Detected	MED1-Mastic		Brown/Yellow		100% Non-fibrous (Other)	None Detected
Inflatizate-20019A Homogeneous MFD2-Flooring Gray 40% Cellulose 60% Non-fibrous (Other) None Detected Fibrous Heterogeneous Heterogeneous Non-Fibrous (Other) None Detected MFD2-Mastic Brown/Yellow 100% Non-fibrous (Other) None Detected Non-Fibrous Homogeneous 100% Non-fibrous (Other) None Detected			Non-Fibrous			
MFD2-Flooring Gray 40% Cellulose 60% Non-fibrous (Other) None Detected 161612742-0020 Heterogeneous Heterogeneous Non-Fibrous (Other) None Detected MFD2-Mastic Brown/Yellow Non-Fibrous 100% Non-fibrous (Other) None Detected 161612742-0020A Homogeneous 100% Non-fibrous (Other) None Detected	161612742-0019A		Homogeneous			
Hibrous 161612742-0020 Heterogeneous MFD2-Mastic Brown/Yellow Non-Fibrous 161612742-0020A Homogeneous	MFD2-Flooring		Gray	40% Cellulose	60% Non-fibrous (Other)	None Detected
MFD2-Mastic Brown/Yellow 100% Non-fibrous (Other) None Detected Non-Fibrous Homogeneous Homogeneous	161612742-0020		Hibrous Heterogeneous			
Init D2-initiation Down relieve Non-Fibrous 161612742-0020A Homogeneous	MED2-Mastic		Brown/Vellow		100% Non-fibrous (Other)	None Detected
161612742-0020A Homogeneous			Non-Fibrous			
	161612742-0020A		Homogeneous			

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		Non-Asbestos			Asbestos	
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Туре	
MFD3-Flooring		Gray	40% Cellulose	60% Non-fibrous (Other)	None Detected	
161612742-0021		Fibrous Heterogeneous				
MFD3-Mastic		Brown Non-Fibrous		100% Non-fibrous (Other)	None Detected	
161612742-0021A		Homogeneous				
MMA1		Gray Non-Fibrous		10% Quartz 90% Non-fibrous (Other)	None Detected	
161612742-0022		Homogeneous				
MMA2		Gray Non-Fibrous		10% Quartz 90% Non-fibrous (Other)	None Detected	
161612742-0023		Homogeneous				
MMA3		Gray Non-Fibrous		10% Quartz 90% Non-fibrous (Other)	None Detected	
161612742-0024		Homogeneous				
MMB1		White Non-Fibrous		10% Quartz 90% Non-fibrous (Other)	None Detected	
161612742-0025		Homogeneous				
MMB2		Gray Non-Fibrous		20% Quartz 80% Non-fibrous (Other)	None Detected	
161612742-0026		Homogeneous				
MMB3		Gray Non-Fibrous		10% Quartz 90% Non-fibrous (Other)	None Detected	
161612742-0027		Homogeneous				
MMC1		Yellow Non-Fibrous		100% Non-fibrous (Other)	None Detected	
101012742-0028		Homogeneous			New Datastad	
MMC2		Non-Fibrous		100% Non-fibrous (Other)	None Detected	
101012142-0029		Nelleur		100% New Sharve (Other)	Nega Datastad	
MMC3		Yellow Non-Fibrous		100% Non-fibrous (Other)	None Detected	
101012142-0030		Nelleur		100% New Sharve (Other)	Nega Datastad	
MMD1		Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected	
MAD2		Vellew		100% Non fibrous (Other)	None Detected	
161612742-0032		Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected	
ММДЗ		Yellow		100% Non-fibrous (Other)	None Detected	
161612742-0033		Non-Fibrous Homogeneous			None Delected	
MMF1		White		100% Non-fibrous (Other)	None Detected	
161612742-0034		Non-Fibrous Homogeneous				
MME2		White		100% Non-fibrous (Other)	None Detected	
161612742-0035		Non-Fibrous Homogeneous				
MME3		White		100% Non-fibrous (Other)	None Detected	
161612742-0036		Non-Fibrous Homogeneous				
MMF1-Texture		White Non-Fibrous		10% Quartz 90% Non-fibrous (Other)	None Detected	
161612742-0037 Inseparable paint / coating	g layer included in analysis	Homogeneous				



		Non-Asbestos			Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Туре
MMF1-Cement		Gray		20% Quartz	None Detected
161612742-0037A		Non-Fibrous Homogeneous		80% Non-fibrous (Other)	
MMF2-Texture		White		10% Quartz	None Detected
161612742-0038		Non-Fibrous Homogeneous		90% Non-fibrous (Other)	
MMF2-Cement		Grav		20% Quartz	None Detected
		Non-Fibrous		80% Non-fibrous (Other)	
161612742-0038A		Homogeneous			
MMF3-Texture		White Non-Fibrous		10% Quartz 90% Non-fibrous (Other)	None Detected
161612742-0039		Homogeneous			
Inseparable paint / coating	g layer included in analysis				
MMF3-Cement		Gray Non-Fibrous		20% Quartz 80% Non-fibrous (Other)	None Detected
161612742-0039A		Homogeneous			
MMG1		Black/Silver Fibrous	20% Glass	80% Non-fibrous (Other)	None Detected
161612742-0040		Heterogeneous			
MMG2		Black/Silver Fibrous	20% Glass	80% Non-fibrous (Other)	None Detected
161612742-0041		Homogeneous			
MMG3		Black/Silver Fibrous	20% Glass	80% Non-fibrous (Other)	None Detected
161612742-0042		Homogeneous			
MCA1		Gray/White Fibrous	40% Cellulose 40% Min. Wool	15% Perlite 5% Non-fibrous (Other)	None Detected
161612742-0043		Homogeneous			
MCA2		Gray/White Fibrous	40% Cellulose 40% Min, Wool	15% Perlite 5% Non-fibrous (Other)	None Detected
161612742-0044		Homogeneous			
MCA3		Gray/White	40% Cellulose 40% Min, Wool	15% Perlite 5% Non-fibrous (Other)	None Detected
161612742-0045		Homogeneous			
MCB1		Gray/White	40% Cellulose	15% Perlite	None Detected
		Fibrous	40% Min. Wool	5% Non-fibrous (Other)	
161612742-0046		Homogeneous	4004 0 11 1		N. 5
MCB2		Gray/White Fibrous	40% Cellulose 40% Min. Wool	15% Perlite 5% Non-fibrous (Other)	None Detected
161612742-0047		Homogeneous			
MCB3		Gray	40% Cellulose	15% Perlite	None Detected
161612742-0048		Homogeneous	40% 101111. 00001	5% Non-librous (Other)	
MCC1		Gray/White	50% Cellulose	15% Perlite	None Detected
161612742-0049		Fibrous	30% Min. Wool	5% Non-fibrous (Other)	
MCC2		Gray/White	50% Cellulose	15% Perlite	None Detected
MOOZ		Fibrous	30% Min. Wool	5% Non-fibrous (Other)	
161612742-0050		Homogeneous			
MCC3		Gray/White Fibrous	50% Cellulose 30% Min. Wool	15% Perlite 5% Non-fibrous (Other)	None Detected
161612742-0051		Homogeneous			
MCD1		Gray/White Fibrous	40% Cellulose 40% Min. Wool	15% Perlite 5% Non-fibrous (Other)	None Detected
161612742-0052		Homogeneous			



			Non-Asbes	Asbestos	
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
MCD2		Gray/White	40% Cellulose	15% Perlite	None Detected
		Fibrous	40% Min. Wool	5% Non-fibrous (Other)	
161612742-0053		Homogeneous			
MCD3		Gray/White	40% Cellulose	15% Perlite	None Detected
		Fibrous	40% Min. Wool	5% Non-fibrous (Other)	
161612742-0054		Homogeneous			

Analyst(s)

Jadda Moffett (45) Jason Stuhr (20)

Vebard

Richard Harding, Laboratory Manager or Other Approved Signatory

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Samples analyzed by EMSL Analytical, Inc. Indianapolis, IN NVLAP Lab Code 200188-0, AZ0939, CA 2575, CO AL-15132, TX 300262

Initial Report From: 07/21/2016 13:16:46



September 2, 2017

Peoria Park District Mr. Michael Friberg, RLA, ASLA Planning, Design & Construction Division 1314 N. Park Road Peoria, IL 61604

RE: Limited Asbestos Bulk Sampling & PLM Results Lakeview Rec. Center – Renovation by Gym & Roofing MEI Project #17-5444 M2

Dear Mike:

Pursuant to your request, McKee Environmental, Inc. (MEI) performed **limited** follow-up bulk sampling and analysis of suspect asbestos-containing materials for the renovation by the Gym located at the Lakeview Rec. Center, 1013 W. Lake, Peoria, Illinois. The undersigned, who is an IEPA accredited and IDPH Licensed Asbestos Inspector, collected 21 bulk samples on August 17 and 9 roofing bulk samples on August 24, 2017. The bulk samples were sent to a laboratory for Polarized Light Microscopy (PLM) analysis. The laboratory, which is NVLAP accredited, analyzed the bulk samples by EPA Method 600/R-93/116 and found the following PLM results (see table below and attached Lab PLM analysis report).

Sample	Date	Description	Location	Lab Reported
No.				PLM Result
170817-MMI 1-3	8/17/17	Carpet Mastic	Restroom/office, N. of Gym	ACM (2% chrysotile)
170824-MML 1-3	8/17/17	Flashing	Lower N. Roof	ACM (2% chrysotile)
170817-SPB 1-3	8/17/17	Hard Plaster Ceilings	Shower/Restroom areas N. of gym	None Detected
170817-MDB 1-3	8/17/17	Drywall & Joint Compound	Walls N & W of gym	None Detected
170817-MCE 1-3	8/17/17	2x2 ceiling tile (fissures & pinholes)	Restrooms W. of gym	None Detected
170817-MCF 1-3	8/17/17	2x2 ceiling tile (gouges & pinholes)	Hall by gym	None Detected
170817-MCG 1-3	8/17/17	2x2 ceiling tile (small fissures/pinholes)	Locker, custodial rooms N. of gym	None Detected
170817-MMH 1-3	8/17/17	Mortar Base of ceramic tile	Shower & Restroom areas	None Detected
170824-MMJ 1-3	8/24/17	Built-up Roof	High Roof	None Detected
170824-MMK 1-3	8/24/17	Built-up Roof	Lower N. Roof	None Detected

As you are likely aware, any disturbance of asbestos-containing building materials (ACBM) or suspect ACBM including by renovations and demolition, must be performed by qualified individuals according to the Illinois Department of Public Health, Illinois EPA and OSHA regulations.

McKee Environmental, Inc. appreciates the opportunity to assist you in providing a safe and healthful work environment for our community. Should you have any questions, please contact the undersigned at your earliest convenience.

Respectfully,

McKEE ENVIRONMENTAL, INC.

Brad L. Mckee

Brad L. McKee, CIH President Attachments

MSL	EMSL Analytical, Inc. 6340 CastlePlace Dr. Indianapolis, IN 46250 Tel/Fax: (317) 803-2997 / (317) 803-3047	EMSL Order: Customer ID: Customer PO:	161715530 BLMC50
SM	http://www.EMSL.com / indianapolislab@emsl.com	Project ID:	
Attention:	Brad Mckee	Phone:	(309) 275-1900
	McKee Environmental Inc.	Fax:	
	430 Grimm Road	Received Date:	08/21/2017 10:00 AM
	Congerville, IL 61729	Analysis Date:	08/28/2017
		Collected Date:	
Project:	Peoria Park Dist: Lakeview Rec Center E. Renovation by Gym (8/17	//17)	

			Asbestos		
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Туре
SPB-01-Finish Coat		White		100% Non-fibrous (Other)	None Detected
161715530-0001		Non-Fibrous Homogeneous			
SPB-01-Base Coat		Grav		20% Quartz	None Detected
		Non-Fibrous		80% Non-fibrous (Other)	
161715530-0001A		Homogeneous			
SPB-02-Finish Coat		White Non Eibroug		100% Non-fibrous (Other)	None Detected
161715530-0002		Homogeneous			
SPB-02-Base Coat		Gray		100% Non-fibrous (Other)	None Detected
404745500 00004		Non-Fibrous			
161715530-0002A		Homogeneous			New Defected
SPB-03-Finish Coat		vvnite Non-Fibrous		100% Non-fibrous (Other)	None Detected
161715530-0003		Homogeneous			
SPB-03-Base Coat		Gray		20% Quartz	None Detected
161715520 00024		Non-Fibrous		80% Non-fibrous (Other)	
		Brown/W/bite	25% Cellulose	65% Gupsum	None Detected
WDB-01-Diywali		Fibrous		10% Non-fibrous (Other)	None Delected
161715530-0004		Heterogeneous			
MDB-01-Joint		White		100% Non-fibrous (Other)	None Detected
Compound		Non-Fibrous Homogeneous			
161715530-0004A		Hemogeneous			
Inseparable paint / coati	ing layer included in analysis				
MDB-02-Drywall		Brown/White	20% Cellulose	70% Gypsum	None Detected
161715530-0005		Fibrous Heterogeneous		10% Non-fibrous (Other)	
MDB-02-Joint		White		100% Non-fibrous (Other)	None Detected
Compound		Non-Fibrous			
404745500 00054		Homogeneous			
Inseparable paint / coati	ng layer included in analysis				
MDB-03-Drywall		Brown/White	25% Cellulose	70% Gypsum	None Detected
-		Fibrous		5% Non-fibrous (Other)	
161715530-0006		Heterogeneous			
MDB-03-Joint		White Non-Fibrous		100% Non-fibrous (Other)	None Detected
Compound		Homogeneous			
161715530-0006A Inseparable paint / coati	ng layer included in analysis				
MCE-01		Gray/White	40% Cellulose	15% Perlite	None Detected
		Fibrous	40% Min. Wool	5% Non-fibrous (Other)	
161/15530-0007		Homogeneous	400/ 0-11-1		Name Detroited
MCE-02		Gray/White Fibrous	40% Cellulose 40% Min Wool	15% Perlite 5% Non-fibrous (Other)	None Detected
161715530-0008		Homogeneous			



			Asbestos		
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Туре
MCE-03		Gray/White Fibrous Homogeneous	40% Cellulose 40% Min. Wool	15% Perlite 5% Non-fibrous (Other)	None Detected
MCF-01		Gray/White Fibrous Homogeneous	40% Cellulose 40% Min. Wool	15% Perlite 5% Non-fibrous (Other)	None Detected
MCF-02		Gray/White Fibrous	40% Cellulose 40% Min. Wool	15% Perlite 5% Non-fibrous (Other)	None Detected
MCF-03		Gray/White Fibrous	40% Cellulose 40% Min. Wool	15% Perlite 5% Non-fibrous (Other)	None Detected
MCG-01		Gray/White Fibrous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
MCG-02		Gray/White Fibrous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
MCG-03		Gray/White Fibrous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
MMH-01		Gray Non-Fibrous Homogeneous		20% Quartz 80% Non-fibrous (Other)	None Detected
MMH-02		Gray Non-Fibrous Homogeneous		20% Quartz 80% Non-fibrous (Other)	None Detected
MMH-03 161715530-0018		Gray Non-Fibrous Homogeneous		20% Quartz 80% Non-fibrous (Other)	None Detected
MMI-01		Tan Fibrous	10% Cellulose	88% Non-fibrous (Other)	2% Chrysotile
MMI-02		nomogeneous			Positive Stop (Not Analyzed)
161715530-0020					
MMI-03					Positive Stop (Not Analyzed)
161715530-0021					

Analyst(s)

Craig Nixon (8) Paul Rihm (17)

Vehand

Richard Harding, Laboratory Manager or Other Approved Signatory

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Samples analyzed by EMSL Analytical, Inc. Indianapolis, IN NVLAP Lab Code 200188-0, AZ0939, CA 2575, CO AL-15132, TX 300262

Initial report from: 08/28/2017 12:03:23

EMSL	EMSL Analytical, Inc. 6340 CastlePlace Dr. Indianapolis, IN 46250 Tel/Fax: (317) 803-2997 / (317) 803-3047 http://www.EMSL.com / indianapolislab@emsl.com	EMSL Order: Customer ID: Customer PO: Project ID:	161716124 BLMC50
Attention:	Brad Mckee	Phone:	(309) 275-1900
	McKee Environmental Inc.	Fax:	
	430 Grimm Road	Received Date:	08/28/2017 9:45 AM
	Congerville, IL 61729	Analysis Date:	08/31/2017
		Collected Date:	08/24/2017
Project:	Peoria Park Dist - Lakeview Rec Center Gym Roofing (8/24/17)		

EMSL Order: 161716124

		Non-Asbestos			Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Туре
MMJ1-Roofing		Black	10% Cellulose	90% Non-fibrous (Other)	None Detected
161716124-0001		Homogeneous			
MMJ1-Insulation		Yellow Non Eibroug		100% Non-fibrous (Other)	None Detected
161716124-0001A		Homogeneous			
MMJ1-Tar Paper		Black Fibrous	60% Cellulose	40% Non-fibrous (Other)	None Detected
161716124-0001B		Homogeneous			
MMJ2-Roofing		Black Non-Fibrous	10% Cellulose	90% Non-fibrous (Other)	None Detected
161716124-0002		Homogeneous			
MMJ2-Insulation		Yellow Non-Fibrous		100% Non-fibrous (Other)	None Detected
161716124-0002A		Homogeneous			
MMJ2-Tar Paper		Black Fibrous	60% Cellulose	40% Non-fibrous (Other)	None Detected
161716124-0002B		Homogeneous			
MMJ3-Roofing		Black Non-Fibrous	10% Cellulose	90% Non-fibrous (Other)	None Detected
161716124-0003		Homogeneous			
MMJ3-Insulation		Yellow Non-Fibrous		100% Non-fibrous (Other)	None Detected
161716124-0003A		Homogeneous			
MMJ3-Tar Paper		Black Fibrous	60% Cellulose	40% Non-fibrous (Other)	None Detected
161716124-0003B		Homogeneous			
MMK1-Roofing		Black Non-Fibrous	10% Cellulose	90% Non-fibrous (Other)	None Detected
161716124-0004		Homogeneous			
MMK1-Insulation		Yellow Non-Fibrous		100% Non-fibrous (Other)	None Detected
161716124-0004A		Homogeneous			
MMK1-Tar Paper		Black Fibrous	60% Cellulose	40% Non-fibrous (Other)	None Detected
161716124-0004B		Homogeneous			
MMK2-Roofing		Black Non-Fibrous	10% Cellulose	90% Non-fibrous (Other)	None Detected
161716124-0005		Homogeneous			
MMK2-Insulation		Yellow Non-Fibrous		100% Non-fibrous (Other)	None Detected
161716124-0005A		Homogeneous			
MMK2-Tar Paper		Black Fibrous	60% Cellulose	40% Non-fibrous (Other)	None Detected
161716124-0005B		Homogeneous			
MMK3-Roofing		Black Non-Fibrous	10% Cellulose	90% Non-tibrous (Other)	None Detected
101/10124-0006		Homogeneous			



		Non-Asbestos			<u>Asbestos</u>
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
MMK3-Insulation		Yellow Non-Fibrous		100% Non-fibrous (Other)	None Detected
161716124-0006A		Homogeneous			
MMK3-Tar Paper		Black Fibrous	60% Cellulose	40% Non-fibrous (Other)	None Detected
		N//site			New Petersterd
MML1-Insulation		White Non-Fibrous Homogeneous		100% Non-tibrous (Other)	None Detected
		Black	E% Collulano	01% Non fibrous (Other)	2º/ Chrysotile
MML1-Rooting		Non-Fibrous	2% Glass	91% Non-librous (Other)	2% Chrysotile
161716124-0007A		Homogeneous			
MML1-Backing		Brown Fibrous	98% Cellulose	2% Non-fibrous (Other)	None Detected
161716124-0007B		Homogeneous			
MML2-Insulation		White Non-Fibrous		100% Non-fibrous (Other)	None Detected
161716124-0008		Homogeneous			
MML2-Roofing					Positive Stop (Not Analyzed)
161716124-0008A					
MML2-Backing		Brown Fibrous	98% Cellulose	2% Non-fibrous (Other)	None Detected
161716124-0008B		Homogeneous			
MML3-Insulation		White Non-Fibrous		100% Non-fibrous (Other)	None Detected
161716124-0009		Homogeneous			
MML3-Roofing					Positive Stop (Not Analyzed)
161716124-0009A					
MML3-Backing		Brown Fibrous	98% Cellulose	2% Non-fibrous (Other)	None Detected
161716124-0009B		Homogeneous			

Analyst(s)

Paul Rihm (17) Ross Matlock (8)

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Initial report from: 08/31/2017 12:07:58