$15,741,760.00
ORIGINAL

BID OF JOE DANIELS CONSTRUCTION CO., INC.

2023

PROPOSAL, CONTRACT, BOND AND SPECIFICATIONS

FOR

MADISON PUBLIC MARKET

CONTRACT NO. 8595

MUNIS NO. 10069

IN

MADISON, DANE COUNTY, WISCONSIN

AWARDED BY THE COMMON COUNCIL
MADISON, WISCONSIN ON **OCTOBER 17, 2023**

CITY ENGINEERING DIVISION
1600 EMIL STREET
MADISON, WISCONSIN 53713

https://bidexpress.com/login

MADISON PUBLIC MARKET
CONTRACT NO. 8595

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Materials available within Bid Express:

Exhibit-A: Drawings, dated June 09, 2023
Exhibit-B: Specifications Volume 1, dated June 09, 2023
Exhibit-C: Specifications Volume 2, dated June 09, 2023
Exhibit-D: Specifications Volume 3, dated June 09, 2023
Exhibit-E: Contaminated Soils Map
Exhibit-F: Excavating, Loading, Hauling, and Disposal of Contaminated Soil
Exhibit-G: Lands For Work plan

Reference-1: Draft Topographic Survey
Reference-2: Draft ALTA Survey
Reference-3: Hazardous Materials Report – Asbestos and Lead
Reference-4: Geotechnical Exploration Report
Reference-5: Existing Conditions drawings
Reference-6: Facilities Bid Submittal Checklist

This Proposal, and Agreement have
been prepared by:

CITY ENGINEERING DIVISION
CITY OF MADISON
MADISON, DANE COUNTY, WISCONSIN

James M. Wolfe, P.E., City Engineer

JMW: bp

SECTION A: ADVERTISEMENT FOR BIDS AND INSTRUCTIONS TO BIDDERS

REQUEST FOR BID FOR PUBLIC WORKS CONSTRUCTION
CITY OF MADISON, WISCONSIN

A BEST VALUE CONTRACTING MUNICIPALITY

PROJECT NAME:	MADISON PUBLIC MARKET
CONTRACT NO.:	8595
SBE GOAL	15%
BID BOND	5%
SBE PRE BID MEETING	See Pre Bid Meeting info below
PREQUALIFICATION APPLICATION DUE (2:00 P.M.)	AUGUST 31, 2023
BID TALK – VIRTUAL (1:00 – 2:00 P.M.)	AUGUST 3, 2023
SITE TOUR (1:00 – 2:30 P.M.)	AUGUST 17, 2023
SITE TOUR (1:00 – 2:30 P.M.)	AUGUST 24, 2023
BID SUBMISSION (2:00 P.M.)	SEPTEMBER 7, 2023
BID OPEN (2:30 P.M.)	SEPTEMBER 7, 2023
PUBLISHED IN WSJ	JULY 20, 27, & AUGUST 3, 10, 17, 24 & 31, 2023

SBE PRE BID MEETING: Small Business Enterprise Pre-Bid Meetings are not being held in person at this time. Contractors can schedule one-on-one phone calls with Tracy Lomax in Affirmative Action to count towards good faith efforts. Tracy can be reached at (608) 266-6510 or by email, tlomax@cityofmadison.com.

BID TALK (VIRTUAL): The City of Madison Engineering Division is hosting virtual live (and later recording posted) sessions called "Bid Talks." This is an opportunity for you to learn about the project to help with your bid and estimating numbers. During our "Bid Talks" session for this project, the project staff will present information about the project specific to your bidding process. Staff will answer any questions you have. You will also be able to see who is attending. This meeting will be held in a more informal format, where you'll be able to ask questions and have a conversation. Please send your estimators and bidders to these Bid Talks, as they take the place of in-person site visits for specific projects. Registration prior is required. Please register by visiting the Madison Public Market project page at https://www.cityofmadison.com/engineering/projects/madison-public-market. A recording link will also be posted to the project page after the meeting.

SITE TOUR: The City of Madison will be holding two Pre-Bid Site Tours as indicated in the schedule above, at the existing facility, located at 202 N First St, Madison, WI. All bidding contractors are encouraged to attend. This will be an opportunity for bidding contractors to ask questions regarding the project and become fully aware of existing site conditions.

Please be aware of the following:

1. There is limited parking on the project site, on street parking is available on adjacent streets (E Dayton, E Mifflin).
2. All participants are required to sign-in with the City Project Manager prior to attending the site tour. Sign-ins will occur onsite at the Northwest entry of the 202 N First St facility.

- Contractors are highly encouraged to attend this meeting. Any questions/concerns presented will be recorded and published, in an addendum, to all bidding contractors.

PREQUALIFICATION APPLICATION: Forms are available on our website, www.cityofmadison.com/engineering/developers-contractors/contractors/how-to-get-prequalified. If not currently prequalified in the categories listed in Section A, an amendment to your Prequalification will need to be submitted prior to the same due date. Postmark is not applicable.

BIDS TO BE SUBMITTED: by hand to 1600 EMIL ST., MADISON, WI 53713 or online at www.bidexpress.com.

Bids may be submitted on line through Bid Express or in person at 1600 Emil St. The bids will be posted on line after the bid opening. If you have any questions, please call Alane Boutelle at (608) 267-1197, or John Fahrney at (608) 266-9091.

STANDARD SPECIFICATIONS

The City of Madison's Standard Specifications for Public Works Construction - 2023 Edition, as supplemented and amended from time to time, forms a part of these contract documents as if attached hereto.

These standard specifications are available on the City of Madison Public Works website, www.cityofmadison.com/engineering/developers-contractors/standard-specifications.

The Contractor shall review these Specifications prior to preparation of proposals for the work to be done under this contract, with specific attention to Article 102, "BIDDING REQUIREMENTS AND CONDITIONS" and Article 103, "AWARD AND EXECUTION OF THE CONTRACT." For the convenience of the bidder, below are highlights of three subsections of the specifications.

SECTION 102.1: PRE-QUALIFICATION OF BIDDERS

In accordance with Wisconsin State Statutes 66.0901 (2) and (3), all bidders must submit to the Board of Public Works proof of responsibility on forms furnished by the City. The City requires that all bidders be qualified on a biennial basis.

Bidders must present satisfactory evidence that they have been regularly engaged in the type of work specified herein and they are fully prepared with necessary capital, materials, machinery and supervisory personnel to conduct the work to be contracted for to the satisfaction of the City. All bidders must be pre-qualified by the Board of Public Works for the type of construction on which they are bidding prior to the opening of the bid.

In accordance with Section 39.02(9)(a)l. of the General Ordinances, all bidders shall submit in writing to the Affirmative Action Division Manager of the City of Madison, a Certificate of Compliance or an Affirmative Action Plan at the same time or prior to the submission of the proof of responsibility forms.

The bidder shall be disqualified if the bidder fails to or refuses to, prior to opening of the bid, submit a Certificate of compliance, Affirmative Action Plan or Affirmative Action Data Update, as applicable, as defined by Section 39.02 of the General Ordinances (entitled Affirmative Action) and as required by Section 102.11 of the Standard Specifications.

SECTION 102.4 PROPOSAL

No bid will be accepted that does not contain an adequate or reasonable price for each and every item named in the Schedule of Unit Prices.

A lump sum bid for the work in accordance with the plans and specifications is required. The lump sum bid must be the same as the total amounts bid for the various items and it shall be inserted in the space provided.

All papers bound with or attached to the proposal form are considered a part thereof and must not be detached or altered when the proposal is submitted. The plans, specifications and other documents designated in the proposal form will be considered a part of the proposal whether attached or not.

A proposal submitted by an individual shall be signed by the bidder or by a duly authorized agent. A proposal submitted by a partnership shall be signed by a member/partner or by a duly authorized agent thereof. A proposal submitted by a corporation shall be signed by an authorized officer or duly authorized

registered agent of such corporation, and the proposal shall show the name of the State under the laws of which such corporation was chartered. The required signatures shall in all cases appear in the space provided thereof on the proposal.

Each proposal shall be placed, together with the proposal guaranty, in a sealed envelope, so marked as to indicate name of project, the contract number or option to which it applies, and the name and address of the Contractor or submitted electronically through Bid Express (www.bidexpress.com). Proposals will be accepted at the location, the time and the date designated in the advertisement. Proposals received after the time and date designated will be returned to the bidder unopened.

SECTION 102.5: BID DEPOSIT (PROPOSAL GUARANTY)

All bids, sealed or electronic, must be accompanied with a Bid Bond (City of Madison form) equal to at least 5% of the bid or a Certificate of Annual/Biennial Bid Bond or certified check, payable to the City Treasurer. Bid deposit of the successful bidders shall be returned within forty-eight (48) hours following execution of the contract and bond as required.

MINOR DISCREPENCIES

Bidder is responsible for submitting all forms necessary for the City to determine compliance with State and City bidding requirements. Nothwithstanding any language to the contrary contained herein, the City may exercise its discretion to allow bidders to correct or supplement submissions after bid opening, if the minor discrepancy, bid irregularity or omission is insignificant and not one related to price, quality, quantity, time of completion or performance of the contract.

Bidders for this Contract(s) must be Pre-Qualified for at least one of the following type(s) of construction denoted by an ☒

Building Demolition

101 ☐ Asbestos Removal
120 ☐ House Mover
110 ☐ Building Demolition

Street, Utility and Site Construction

201 ☐ Asphalt Paving
205 ☐ Blasting
210 ☐ Boring/Pipe Jacking
215 ☐ Concrete Paving
220 ☐ Con. Sidewalk/Curb & Gutter/Misc. Flat Work
221 ☐ Concrete Bases and Other Concrete Work
222 ☐ Concrete Removal
225 ☐ Dredging
230 ☐ Fencing
235 ☐ Fiber Optic Cable/Conduit Installation
240 ☐ Grading and Earthwork
241 ☐ Horizontal Saw Cutting of Sidewalk
242 ☐ Hydro Excavating
243 ☐ Infrared Seamless Patching
245 ☐ Landscaping, Maintenance
246 ☐ Ecological Restoration
250 ☐ Landscaping, Site and Street
251 ☐ Parking Ramp Maintenance
252 ☐ Pavement Marking
255 ☐ Pavement Sealcoating and Crack Sealing
260 ☐ Petroleum Above/Below Ground Storage Tank Removal/Installation
262 ☐ Playground Installer
265 ☐ Retaining Walls, Precast Modular Units
270 ☐ Retaining Walls, Reinforced Concrete
275 ☐ Sanitary, Storm Sewer and Water Main Construction
276 ☐ Sawcutting
280 ☐ Sewer Lateral Drain Cleaning/Internal TV Insp.
285 ☐ Sewer Lining
290 ☐ Sewer Pipe Bursting
295 ☐ Soil Borings
300 ☐ Soil Nailing
305 ☐ Storm & Sanitary Sewer Laterals & Water Svc.
310 ☐ Street Construction
315 ☐ Street Lighting
318 ☐ Tennis Court Resurfacing
320 ☐ Traffic Signals
325 ☐ Traffic Signing & Marking
332 ☐ Tree pruning/removal
333 ☐ Tree, pesticide treatment of
335 ☐ Trucking
340 ☐ Utility Transmission Lines including Natural Gas, Electrical & Communications
399 ☐ Other_____

Bridge Construction

501 ☐ Bridge Construction and/or Repair

Building Construction

401 ☐ Floor Covering (including carpet, ceramic tile installation, rubber, VCT
402 ☐ Building Automation Systems
403 ☐ Concrete
404 ☐ Doors and Windows
405 ☐ Electrical - Power, Lighting & Communications
410 ☐ Elevator - Lifts
412 ☐ Fire Suppression
413 ☐ Furnishings - Furniture and Window Treatments
415 ☐ General Building Construction, Equal or Less than $250,000
420 ☐ General Building Construction, $250,000 to $1,500,000
425 ☒ General Building Construction, Over $1,500,000
428 ☐ Glass and/or Glazing
429 ☐ Hazardous Material Removal
430 ☐ Heating, Ventilating and Air Conditioning (HVAC)
433 ☐ Insulation - Thermal
435 ☐ Masonry/Tuck pointing
437 ☐ Metals
440 ☐ Painting and Wallcovering
445 ☐ Plumbing
450 ☐ Pump Repair
455 ☐ Pump Systems
460 ☐ Roofing and Moisture Protection
464 ☐ Tower Crane Operator
461 ☐ Solar Photovoltaic/Hot Water Systems
465 ☐ Soil/Groundwater Remediation
466 ☐ Warning Sirens
470 ☐ Water Supply Elevated Tanks
475 ☐ Water Supply Wells
480 ☐ Wood, Plastics & Composites - Structural & Architectural
499 ☐ Other_____

State of Wisconsin Certifications

1 ☐ Class 5 Blaster - Blasting Operations and Activities 2500 feet and closer to inhabited buildings for quarries, open pits and road cuts.
2 ☐ Class 6 Blaster - Blasting Operations and Activities 2500 feet and closer to inhabited buildings for trenches, site excavations, basements, underwater demolition, underground excavations, or structures 15 feet or less in height.
3 ☐ Class 7 Blaster - Blasting Operations and Activities for structures greater than 15 ' in height, bridges, towers, and any of the objects or purposes listed as "Class 5 Blaster or Class 6 Blaster".
4 ☐ Petroleum Above/Below Ground Storage Tank Removal and Installation (Attach copies of State Certifications.)
5 ☐ Hazardous Material Removal (Contractor to be certified for asbestos and lead abatement per the Wisconsin Department of Health Services, Asbestos and Lead Section (A&LS).) See the following link for application: www.dhs.wisconsin.gov/Asbestos/Cert. State of Wisconsin Performance of Asbestos Abatement Certificate must be attached.
6 ☐ Certification number as a Certified Arborist or Certified Tree Worker as administered by the International Society of Arboriculture
7 ☐ Pesticide application (Certification for Commercial Applicator For Hire with the certification in the category of turf and landscape (3.0) and possess a current license issued by the DATCP)
8 ☐ State of Wisconsin Master Plumbers License.

SECTION B: PROPOSAL

Please refer to the Bid Express Website at https://bidexpress.com look up contract number and go to Section B: Proposal Page

You can access all City of Madison bid solicitations for FREE at www.bidexpress.com

Click on the "Register for Free" button and follow the instructions to register your company and yourself. You will be asked for a payment subscription preference, since you may wish to bid online someday. Simply choose the method to pay on a 'per bid' basis. This requires no payment until / unless you actually bid online. You can also choose the monthly subscription plan at this time. You will, however, be asked to provide payment information. Remember, you can change your preference at anytime. You will then be able to complete your free registration and have full access to the site. Your free access does not require completion of the 'Digital ID' process, so you will have instant access for viewing and downloading. To be prepared in case you ever do wish to bid online, you may wish to establish your digital ID also, since you cannot bid without a Digital ID.

If you have any problems with the free registration process, you can call the bidexpress help team, toll free at 1-888-352-2439 (option 1, option1).

SECTION C: SMALL BUSINESS ENTERPRISE

Instructions to Bidders
City of Madison
SBE Program Information

2 Small Business Enterprise (SBE) Program Information

2.1 Policy and Goal

The City of Madison reaffirms its policy of nondiscrimination in the conduct of City business by maintaining a procurement process which remains open to all who have the potential and ability to sell goods and services to the City. It is the policy of the City of Madison to allow Small Business Enterprises (SBE) maximum feasible opportunity to participate in City of Madison contracting. The bidder acknowledges that its bid has been submitted in accordance with the SBE program and is for the public's protection and welfare.

Please refer to the "ADVERTISEMENT FOR BIDS" for the goal for the utilization of SBEs on this project. SBEs may participate as subcontractors, vendors and/or suppliers, which provide a commercially useful function. The dollar value for SBE suppliers or 'materials only' vendors shall be discounted to 60% for purposes of meeting SBE goals.

A bidder which achieves or exceeds the SBE goal will be in compliance with the SBE requirements of this project. In the event that the bidder is unable to achieve the SBE goal, the bidder must demonstrate that a good faith effort to do so was made. Failure to either achieve the goal or demonstrate a good faith effort to do so will be grounds for the bidder being deemed a non-responsible contractor ineligible for award of this contract.

A bidder may count towards its attainment of the SBE goal only those expenditures to SBEs that perform a commercially useful function. For purposes of evaluating a bidder's responsiveness to the attainment of the SBE goal, the contract participation by an SBE is based on the percentage of the total base bid proposed by the Contractor. The total base bid price is inclusive of all addenda.

Work performed by an SBE firm in a particular transaction can be counted toward the goal only if it involves a commercially useful function. That is, in light of industry practices and other relevant considerations, does the SBE firm have a necessary and useful role in the transaction, of a kind for which there is a market outside the context of the SBE Program, or is the firm's role a superfluous step added in an attempt to obtain credit towards goals? If, in the judgment of the Affirmative Action Division, the SBE firm will not perform a commercially useful function in the transaction, no credit towards goals will be awarded.

The question of whether a firm is performing a commercially useful function is completely separate from the question of whether the firm is an eligible SBE. A firm is eligible if it meets the definitional criteria and ownership and control requirements, as set forth in the City of Madison's SBE Program.

If the City of Madison determines that the SBE firm is performing a commercially useful function, then the City of Madison must then decide what that function is. If the commercially useful function is that of an SBE vendor / supplier that regularly transacts business with the respective product, then the City of Madison will count 60% of the value of the product supplied toward SBE goals.

To be counted, the SBE vendor / supplier must be engaged in selling the product in question to the public. This is important in distinguishing an SBE vendor / supplier, which has a regular trade with a variety of customers, from a firm which performs supplier-like functions on an ad hoc basis or for only one or two contractors with whom it has a special relationship.

A supplier of bulk goods may qualify as an eligible SBE vendor / supplier if it either maintains an inventory or owns or operates distribution equipment. With respect to the distribution equipment; e.g., a fleet of trucks, the term "operates" is intended to cover a situation in which the supplier leases the equipment on a regular basis for its entire business. It is not intended to cover a situation in which the firm simply provides drivers for trucks owned or leased by another party; e.g., a prime contractor, or leases such a party's trucks on an ad hoc basis for a specific job.

If the commercially useful function being performed is not that of a qualified SBE vendor / supplier, but rather that of delivery of products, obtaining bonding or insurance, procurement of personnel, acting as a broker or manufacturer's representative in the procurement of supplies, facilities, or materials, etc., only the fees or commissions will apply towards the goal.

For example, a business that simply transfers title of a product from manufacturer to ultimate purchaser; e. g., a sales representative who re-invoices a steel product from the steel company to the Contractor, or a firm that puts a product into a container for delivery would not be considered a qualified SBE vendor / supplier. The Contractor would not receive credit based on a percentage of the cost of the product for working with such firms.

Concerning the use of services that help the Contractor obtain needed supplies, personnel, materials or equipment to perform a contract: only the fee received by the service provider will be counted toward the goal. For example, use of a SBE sales representative or distributor for a steel company, if performing a commercially useful function at all, would entitle the Contractor receiving the steel to count only the fee paid to the representative or distributor toward the goal. This provision would also govern fees for professional and other services obtained expressly and solely to perform work relating to a specific contract.

Concerning transportation or delivery services: if an SBE trucking company picks up a product from a manufacturer or a qualified vendor / supplier and delivers the product to the Contractor, the commercially useful function it is performing is not that of a supplier, but simply that of a transporter of goods. Unless the trucking company is itself the manufacturer or a qualified vendor / supplier in the product, credit cannot be given based on a percentage of the cost of the product. Rather, credit would be allowed for the cost of the transportation service.

The City is aware that the rule's language does not explicitly mention every kind of business that may contribute work on this project. In administering these programs, the City would, on a case-by-case basis, determine the appropriate counting formula to apply in a particular situation.

2.2 Contract Compliance

Questions concerning the SBE Program shall be directed to the Contract Compliance Officer of the City of Madison Department of Civil Rights, Affirmative Action Division, 210 Martin Luther King, Jr. Blvd., Room 523, Madison, WI 53703; telephone (608) 266-6510.

2.3 Certification of SBE by City of Madison

The Affirmative Action Division maintains a directory of SBEs which are currently certified as such by the City of Madison. Contact the Contract Compliance Officer as indicated in Section 2.2 to receive a copy of the SBE Directory or you may access the SBE Directory online at www.cityofmadison.com/civil-rights/contract-compliance/targeted-business-enterprise-programs/targeted-business-enterprise.

All contractors, subcontractors, vendors and suppliers seeking SBE status must complete and submit the **Targeted Business Certification Application** to the City of Madison Affirmative Action Division by the time and date established for receipt of bids. A copy of the Targeted Business Certification Application is available by contacting the Contract Compliance Officer at the address and telephone indicated in Section 2.2 or you may access the Targeted Business Certification Application online at www.cityofmadison.com/civil-rights/contract-compliance/targeted-business-enterprise-programs/targeted-business-enterprise. Submittal of the Targeted Business Certification Application by the time specified does not guarantee that the applicant will be certified as a SBE eligible to be utilized towards meeting the SBE goal for this project.

2.4 Small Business Enterprise Compliance Report

2.4.1 Good Faith Efforts

Bidders shall take all necessary affirmative steps to assure that SBEs are utilized when possible and that the established SBE goal for this project is achieved. A contractor who self performs a portion of the work, and is pre-qualified to perform that category of work, may subcontract that portion of the work, but shall not be required to do so. When a bidder is unable to achieve the established SBE goal, the bidder must demonstrate that a good faith effort to do so was made. Such a good faith effort should include the following:

2.4.1.1 Attendance at the pre-bid meeting.

2.4.1.2 Using the City of Madison's directory of certified SBEs to identify SBEs from which to solicit bids.

2.4.1.3 Assuring that SBEs are solicited whenever they are potential sources.

2.4.1.4 Referring prospective SBEs to the City of Madison Affirmative Action Division for certification.

2.4.1.5 Dividing total project requirements into smaller tasks and/or quantities, where economically feasible, to permit maximum feasible SBE participation.

2.4.1.6 Establishing delivery schedules, where requirements permit, which will encourage participation by SBEs.

2.4.1.7 Providing SBEs with specific information regarding the work to be performed.

2.4.1.8 Contacting SBEs in advance of the deadline to allow such businesses sufficient time to prepare a bid.

2.4.1.9 Utilizing the bid of a qualified and competent SBE when the bid of such a business is deemed reasonable (i.e. 5% above the lowest bidder), although not necessarily low.

2.4.1.10 Contacting SBEs which submit a bid, to inquire about the details of the bid and confirm that the scope of the work was interpreted as intended.

2.4.1.11 Completion of Cover Page (page C-6), Summary Sheet (page C-7) and SBE Contact Reports (pages C-8 and C9) if applicable.

2.4.2 **Reporting SBE Utilization and Good Faith Efforts**

The Small Business Enterprise Compliance Report is to be submitted by the bidder with the bid: This report is due by the specified bid closing time and date. Bids submitted without a completed SBE Compliance Report as outlined below may be deemed non-responsible and the bidder ineligible for award of this contract. Nothwithstanding any language to the contrary contained herein, the City may exercise its discretion to allow bidders to correct or supplement submissions after bid opening, if the minor discrepancy, bid irregularity or omission is insignificant and not one related to price, quality, quantity, time of completion, performance of the contract, or percentage of SBE utilization.

2.4.2.1 If the Bidder meets or exceeds the goal established for SBE utilization, the Small Business Enterprise Compliance Report shall consist of the following:

2.4.2.1.1 **Cover Page,** Page C-6; and
2.4.2.1.2 **Summary Sheet,** C-7.

2.4.2.2 If the bidder does not meet the goal established for SBE utilization, the Small Business Enterprise Compliance Report shall consist of the following:

2.4.2.2.1 **Cover Page,** Page C-6;
2.4.2.2.2 **Summary Sheet,** C-7; and
2.4.2.2.3 **SBE Contact Report,** C-8 and C-9. (A separate Contact Report must be completed for each applicable SBE which is not utilized.)

2.5 Appeal Procedure

A bidder which does not achieve the established goal and is found non-responsible for failure to demonstrate a good faith effort to achieve such goal and subsequently denied eligibility for award of contract may appeal that decision to the Small Business Enterprises Appeals Committee. All appeals shall be made in writing, and shall be delivered to and received by the City Engineer no later than 4:30 PM on the third business day following the bidder's receipt of the written notification of ineligibility by the Affirmative Action Division Manager. Postmark not acceptable. The notice of appeal shall state the basis for the appeal of the decision of the Affirmative Action Division Manager. The Appeal shall take place in accordance with Madison General Ordinance 33.54.

2.6 SBE Requirements After Award of the Contract

The successful bidder shall identify SBE subcontractors, suppliers and vendors on the subcontractor list in accordance with the specifications. The Contractor shall submit a detailed explanation of any variances between the listing of SBE subcontractors, vendors and/or suppliers on the subcontractor list and the Contractor's SBE Compliance Report for SBE participation.

No change in SBE subcontractors, vendors and/or suppliers from those SBEs indicated in the SBE Compliance Report will be allowed without prior approval from the Engineer and the Affirmative Action Division. The contractor shall submit in writing to the City of Madison Affirmative Action Division a request to change any SBE citing specific reasons which necessitate such a change. The Affirmative Action Division will use a general test of reasonableness in approving or rejecting the contractor's request for change. If the request is approved, the Contractor will make every effort to utilize another SBE if available.

The City will monitor the project to ensure that the actual percentage commitment to SBE firms is carried out.

2.7 SBE Definition and Eligibility Guidelines

A Small Business Enterprise is a business concern awarded certification by the City of Madison. For the purposes of this program a Small Business Enterprise is defined as:

A. An independent business operated under a single management. The business may not be a subsidiary of any other business and the stock or ownership may not be held by any individual or any business operating in the same or a similar field. In determining whether an entity qualifies as a SBE, the City shall consider all factors relevant to being an independent business including, but not limited to, the date the business was established, adequacy of its resources for the work in which it proposes to involve itself, the degree to which financial, equipment leasing and other relationships exist with other ineligible firms in the same or similar lines of work. SBE owner(s) shall enjoy the customary incidents of ownership and shall share in the risks and profits commensurate with their enjoyment interests, as demonstrated by an examination of the substance rather than form or arrangements that may be reflected in its ownership documents.

B. A business that has averaged no more than $4.0 million in annual gross receipts over the prior three year period and the principal owner(s) do not have a personal net worth in excess of $1.32 million.

Firm and/or individuals that submit fraudulent documents/testimony may be barred from doing business with the City and/or forfeit existing contracts.

SBE certification is valid for one (1) year unless revoked.

SECTION D: SPECIAL PROVISIONS

MADISON PUBLIC MARKET
CONTRACT NO. 8595

It is the intent of these Special Provisions to set forth the final contractual intent as to the matter involved and shall prevail over the Standard Specifications and plans whenever in conflict therewith. In order that comparisons between the Special Provisions can be readily made, the numbering system for the Special Provisions is equivalent to that of the Specifications.

Whenever in these Specifications the term "Standard Specifications" appears, it shall be taken to refer to the City of Madison Standard Specifications for Public Works Construction and Supplements thereto.

SECTION 102.4 PROPOSALS

This bid consists of:

1. ITEM 90000, Madison Public Market - Adaptive Reuse
2. ITEM 90001, Excavating, Loading, Hauling, and Disposal of Contaminated Soil
    a. BASE BID TOTAL:_____
1. ITEM 90002, ALTERNATE NO. 1: Add Sectional Overhead Door
2. ITEM 90003, ALTERNATE NO. 2: Add Curtain Wall
3. ITEM 90004, ALTERNATE NO. 3: Photovoltaic Array

The contractor must do all of the following:

1. Provide a unit price for all bid items
2. Provide a total bid for each bid item
3. Provide a BASE BID TOTAL of all BASE BID items (#90000, #90001)
4. Provide a GRAND TOTAL of the BASE BID TOTAL plus Alternates (#90002, #90003, #90004)

SECTION 102.9 BIDDERS UNDERSTANDING

All Contractors are reminded that this is a Public Works contract for the City of Madison and is exempt from State Sales Tax. Refer to this section of the City Standard Specification for Public Works and Specification 00 62 76.13 in Exhibit B for more information.

SECTION 102.11 BEST VALUE CONTRACTING

This Contract shall be considered a Best Value Contract if the Contractor's bid is equal to or greater than $74,000 for a single trade contract; or equal to or greater than $360,500 for a multi-trade contract pursuant to MGO 33.07(7).

ARTICLE 103 AWARD AND EXECUTION OF THE CONTRACT

The Awarded Contractor shall completely execute the signing of all contract documents and submit them to City Engineering (1600 Emil St) prior to 12:00pm on Thursday, October 5, 2023. Delays in turning in the required completed contract documents will not adjust the project completion date.

Payment and Performance Bonds shall be dated no sooner than Wednesday October 4, 2023.

ARTICLE 104 SCOPE OF WORK

This contract is for the selective demolition and construction of the future Madison Public Market site and facility located at 202 N First St, Madison, WI. The work includes, but is not limited to, general site and building construction including civil, landscape, architectural, mechanical, electrical, plumbing, fire suppression, fire alarm, technology, and site utilities. This contract includes a potential for (3) alternates labeled as ITEM 90002, ITEM 90003, and ITEM 90004.

The scope of work for the bidding contractor and all sub-contractors includes the furnishing of all labor, materials, equipment, tools, and other services necessary to complete the work in accordance with the intent of this contract. All Contractors shall use properly functioning equipment capable of performing the tasks required. All Contractors shall furnish workers who perform quality work and who are experienced and knowledgeable in the work proposed.

In addition, the Contractors shall include all costs of disposal, equipment rental, utility service installations, temporary services, and any other costs whatsoever which may be required for execution of this contract.

SECTION 104.1 LANDS FOR WORK

Refer to Exhibit-G: Lands For Work plan.

SECTION 104.2 INTENT AND COORDINATION OF CONTRACT DOCUMENTS

The contract documents are complimentary of each other and consist of all of the following:

1. The City of Madison Standard Specifications for Public Works Construction, 2023 Edition
2. These Special Provisions including all plans and specifications as noted by the exhibits list below
3. EXHIBITS FOR BIDDING PURPOSES:
    a. Exhibit-A: Drawings, dated June 09, 2023
    b. Exhibit-B: Specifications Volume 1, dated June 09, 2023
    c. Exhibit-C: Specifications Volume 2, dated June 09, 2023
    d. Exhibit-D: Specifications Volume 3, dated June 09, 2023
    e. Exhibit-E: Contaminated Soils Map
    f. Exhibit-F: Excavating, Loading, Hauling, and Disposal of Contaminated Soil
    g. Exhibit-G: Lands For Work plan
4. EXHIBITS FOR BIDDING REFERENCE:
    a. Reference-1: Draft Topographic Survey
    b. Reference-2: Draft ALTA Survey
    c. Reference-3: Hazardous Materials Report – Asbestos and Lead
    d. Reference-4: Geotechnical Exploration Report
    e. Reference-5: Existing Conditions drawings
    f. Reference-6: Facilities Bid Submittal Checklist
5. All Addendums to the bidding documents

SECTION 105.5 INSPECTION OF WORK

The Contractor shall be responsible for coordinating all required regulatory inspections associated with items and installations during the execution of this contract.

SECTION 105.6 CONTRACTORS RESPONSIBILITY FOR WORK

The Contractor shall not take advantage of any discrepancy in the plans or specifications. This shall include but not be limited to apparent errors, omissions, and interpretations involving codes, regulations, and standards. Any Contractor who identifies such a discrepancy during the bidding process shall notify

the Project Architect and the City Project Manager of the discrepancy as soon as possible. Review Specification 01 31 13 Project Coordination for additional responsibilities.

SECTION 105.12 COOPERATION BY THE CONTRACTOR

202 N First St is an active City site. The site will continue to be used by City staff for Storage and Fueling needs. The Contractor shall expect vehicle and pedestrian traffic throughout the site and shall be prepared to accommodate City staff users. The Contractor shall be responsible for ensuring at the end of each day, that the work site is left clean, orderly, free of construction debris, barricades, etc. The Contractor may have to work around specific special events. Additionally, the Contractor shall be aware of maintenance activities that will occur throughout the duration of the Contract. The Contractor shall accommodate mowing, trash pickup, and other maintenance activities. Review **Exhibit-G: Lands For Work** for additional information.

SECTION 109.7 TIME OF COMPLETION

Work shall begin only after the contract is completely executed and the Start Work Letter (SWL) is received. It is anticipated that the start work letter shall be issued on or about November 7, 2023.

The Contractor shall have reached a level of Construction Closeout **NO LATER THAN** Friday, January 31, 2025. See Exhibit B, Specification 01 77 00 for the definition of Construction Closeout.

STANDARD BID ITEMS

Note: The Contractor shall be responsible for reviewing the descriptions, methods of measurement, and basis of payment of all standard bid items as described in the City of Madison Standard Specifications for Public Works Construction, 2023 Edition. The following Standard Bid Items described in these special provisions have been modified for this contract.

NON STANDARD BID ITEMS

ITEM 90000, Madison Public Market - Adaptive Reuse

DESCRIPTION

BID ITEM shall be for the following work:

- Selective site and building demolition as described in contact Exhibits
- Construction of site and building systems as described in contract Exhibits
- In Lieu of ITEM 90002, Leave in place existing Overhead Doors at East and West of South Hall (Openings marked 162B and 164), and retain all existing controls, electrical equipment and motors. Paint both sides of existing doors to match finish of new OVHD-1 doors as indicated on Drawing D201 – Demolition Elevations and as specified in Section 02 41 19 "Selective Demolition."
- In Lieu of ITEM 90003, Existing storefront and insulated translucent panel system running entire length of South Hall to remain as indicated on Drawing D201 – Demolition Elevations and as specified in Section 02 41 19 "Selective Demolition."
- In Lieu of ITEM 90004, Omit Photovoltaic Array and all related work – i.e. structural modifications, roof anchors, racking, panels, electrical connections inverters, disconnects, etc.

The Contractor shall be aware that the following work IS NOT included in this bid item:

- ITEM 90001
- ITEM 90002
- ITEM 90003

- ITEM 90004

METHOD OF MEASUREMENT
Bid Item shall be measured as LUMP SUM for a complete installation of the work described above.

BASIS OF PAYMENT
Bid Item shall be paid at the contract unit price for all labor, materials, equipment, and incidentals associated with completing the work described above. Partial payments for this bid item shall be permitted based on the percentage of bid item work completed on site.

ITEM 90001, Excavating, Loading, Hauling, and Disposal of Contaminated Soil

DESCRIPTION

BID ITEM shall be for the following work:

- Excavating, loading, hauling, and landfill disposal of contaminated soil at a Wisconsin DNR-licensed facility. Tipping fees shall be paid for by the Contractor. See Exhibit-E and Exhibit-F for additional requirements.
- Refer to Exhibit-E: Contaminated Soils Map
- Refer to Exhibit-F: Excavating, Loading, Hauling, and Disposal of Contaminated Soil

The Contractor shall be aware that the following work IS NOT included in this bid item:

- ITEM 90000
- ITEM 90002
- ITEM 90003
- ITEM 90004

METHOD OF MEASUREMENT
Bid Item shall be measured as LUMP SUM for a complete installation of the work described above.

BASIS OF PAYMENT
Bid Item shall be paid at the contract unit price for all labor, materials, equipment, and incidentals associated with completing the work described above. Partial payments for this bid item shall be permitted based on the percentage of bid item work completed on site.

ITEM 90002, ALTERNATE NO. 1: Add Sectional Overhead Door

DESCRIPTION

BID ITEM shall be for the following work:

- Demolish existing overhead doors at east and west end of South Hall and replace with new OVHD-1 doors as indicated on Drawing A201 – Building Elevations and as specified in Section 08 36 13 "Sectional Doors.

The Contractor shall be aware that the following work IS NOT included in this bid item:

- ITEM 90000
- ITEM 90001
- ITEM 90003
- ITEM 90004

METHOD OF MEASUREMENT

Bid Item shall be measured as LUMP SUM for a complete installation of the work described above as the BASE BID.

BASIS OF PAYMENT

Bid Item shall be paid at the contract unit price for all labor, materials, equipment, and incidentals associated with completing the work described above. Partial payments for this bid item shall be permitted based on the percentage of bid item work completed on site.

ITEM 90003, ALTERNATE NO. 2: Add Curtain Wall

DESCRIPTION

BID ITEM shall be for the following work:

- Demolish existing Storefront and Insulated Translucent Panel system back to rough masonry opening. Provide curtain wall CWAL-1 as indicated on Drawing A201 Building Elevations and as specified in Section 08 44 13 – Glazed Aluminum Curtain Walls".

The Contractor shall be aware that the following work IS NOT included in this bid item:

- ITEM 90000
- ITEM 90001
- ITEM 90002
- ITEM 90004

METHOD OF MEASUREMENT

Bid Item shall be measured as LUMP SUM for a complete installation of the work described above as the BASE BID.

BASIS OF PAYMENT

Bid Item shall be paid at the contract unit price for all labor, materials, equipment, and incidentals associated with completing the work described above. Partial payments for this bid item shall be permitted based on the percentage of bid item work completed on site.

ITEM 90004, ALTERNATE NO. 3: Photovoltaic Array

DESCRIPTION

BID ITEM shall be for the following work:

- Provide Photovoltaic Array and all related work as described in Drawings and Specifications.

The Contractor shall be aware that the following work IS NOT included in this bid item:

- ITEM 90000
- ITEM 90001
- ITEM 90002
- ITEM 90003

METHOD OF MEASUREMENT

Bid Item shall be measured as LUMP SUM for a complete installation of the work described above as the BASE BID.

BASIS OF PAYMENT

Bid Item shall be paid at the contract unit price for all labor, materials, equipment, and incidentals associated with completing the work described above. Partial payments for this bid item shall be permitted based on the percentage of bid item work completed on site.

POINT OF CONTACT

The Project Manager for City Engineering, Facility Management for this contract is:

Brent Pauba
PH: (608) 266-4092
Email: BPauba@CityofMadison.com
210 Martin Luther King Jr. Blvd
Room 115
Madison, WI 53703

The Construction Manager for City Engineering, Facility Management for this contract is:

Michael Schuchardt
PH: (608) 261-9249
Email: MSchuchardt@cityofmadison.com
210 Martin Luther King Jr. Blvd
Room 115
Madison, WI 53703

Department of Public Works
Engineering Division
James M. Wolfe, P.E., City Engineer

City-County Building, Room 115
210 Martin Luther King, Jr. Boulevard
Madison, Wisconsin 53703
Phone: (608) 266-4751
Fax: (608) 264-9275
engineering@cityofmadison.com
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Assistant City Engineer
Bryan Cooper, AIA
Gregory T. Fries, P.E.
Chris Petykowski, P.E.

Deputy Division Manager
Kathleen M. Cryan

Principal Engineer 2
John S. Fahrney, P.E.
Janet Schmidt, P.E.

Principal Engineer 1
Mark D. Moder, P.E.
Andrew J. Zwieg, P.E.

Financial Manager
Steven B. Danner-Rivers

August 11, 2023

ADDENDUM NO. 1
City of Madison, Engineering Division

CONTRACT NO. 8595
MADISON PUBLIC MARKET

This addendum is issued to modify, explain or correct the original Drawings, Specifications, or Contract Documents marked as **Madison Public Market, Contract #8595, as issued on July 20, 2023** and is hereby made a part of the contract documents.

Please acknowledge this addendum on page E1 of the contract documents and/or in Section E: Bidder's Acknowledgement on Bid Express.

Electronic version of these documents can be found on Bid Express at https://www.bidexpress.com/ and the City of Madison web site at http://www.cityofmadison.com/business/PW/contracts/openforBid.cfm

If you are unable to download plan revisions associated with the addendum, please contact the Engineering office at (608) 266-4751 to receive the material by another method.

For questions regarding this bid, contact:

Brent Pauba
PH: (608) 266-4092
Email: BPauba@CityofMadison.com
210 Martin Luther King Jr. Blvd
Room 115
Madison, WI 53703

Sincerely,

Bryan Cooper For:

James M. Wolfe, P.E.
City Engineer

This addendum modifies the following documents:

1. 8595 Contract.pdf
   - **A.** Page A-1
2. Exhibit-A_drawings.pdf
   - **A.** C000 "GENERAL NOTES"
   - **B.** C101 "DEMOLITION PLAN:
3. Exhibit-C_specifications_volume2.pdf
   - **A.** 07 53 23 EPDM Roofing
   - **B.** 11 40 00 Food Service Equipment

Please attach these Addendum documents to the Drawings and Project manual in your possession.

1. GENERAL CONTRACT CONDITIONS

A. Revise the following sections as stated below:

i. Page A-1: Section A: Instructions to Bidders

(1) REQUEST FOR SUBSTITUTIONS:

All requestors shall review Specification 00 43 25 Substitution Request Form (During Bidding) prior to submitting their substitution request. The deadline for receiving substitution requests shall be 5:00 PM on Friday, August 25, 2023. No additional substitution requests will be received after this deadline.

ii. Page A-1: Section A: Instructions to Bidders

(1) QUESTIONS AND CLARIFICATIONS:

Any questions or requests for clarifications regarding plans and specifications shall be submitted directly to the Project Architect and the City Project Managers via email.

See the contract information at the end of Section D-Special Provisions for names and email addresses.

Emails shall have "Contract 8595 – Request for Questions and Clarifications" in the subject line. The deadline for receiving questions and clarifications shall be 5:00 PM on Friday, August 25, 2023. No additional questions or requests for clarifications will be received after this deadline.

All responses shall be published in the form of an addendum.

2. GENERAL QUESTIONS AND ANSWERS

A. No change

3. ACCEPTABLE EQUIVALENTS

A. The following specifications have been updated with ACCEPTABLE EQUIVALENTS information. See section 4. SPECIFICATIONS of this document for more information.

i. 07 53 23 EPDM Roofing

4. SPECIFICATIONS

A. Replace the following sections with the attached updated sections.

i. 07 53 23 EPDM Roofing

(1) Part 2.1 "MANUFACTURERS", alternate manufacturers have been removed to reflect need to maintain existing roof manufacturer for warranty continuation.

ii. 11 40 00 Food Service Equipment
  (1) Part 4 "ITEM SPECIFICATIONS" Has been updated to correct discrepancies with FS drawings and schedules on FS101 and FS401.
    (a) Item 2 size and quantities have been revised
    (b) Item 16 size and quantities have been revised
    (c) Item 20 quantities have been revised
    (d) Item 25 quantities have been revised
    (e) "Convection Oven" noted as item 58 in drawings is corrected to be listed as Item 58 in specifications.

5. DRAWINGS

A. Replace the following sheets with the attached updated sheets.
  i. C000 "GENERAL NOTES"
    (1) Note 17 added.
  ii. C101 "DEMOLITION PLAN"
    (1) Added Plan Notation RE: Monitoring Well Decommissioning.

6. PROPOSAL

A. No Change

SECTION 07 53 23

ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

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. Roof system application at plaza pavers on pedestals system on composite concrete/metal deck substrate.
2. Roof system application at PV system and rack on metal deck substrate.
3. Adhered ethylene-propylene-diene-monomer (EPDM) roofing system **(ROOF-1)**.
4. Cover board
5. Roof insulation.
6. Thermal barrier.
7. Vapor Barrier.

B. Related Requirements:
1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
2. Section 06 10 00 "Rough Carpentry" for wood nailers, curbs, and blocking.
3. Section 070150.19 "Preparation for Reroofing" for protection of and repair of warranted existing roofing.

4. Section 07 62 00 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.
5. Section 07 92 00 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
6. Section 22 14 23 "Storm Drainage Piping Specialties" for roof drains.
7. Section 26 31 00 "Photovoltaic System Performance Requirements" for PV racking system.

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

B. Sheet Metal Terminology and Techniques: SMACNA Architectural Sheet Metal Manual.

1.4 SYSTEM DESCRIPTION (ROOF-1)

A. Basis of Design: Roof system over steel structural deck is composed of two layers of Firestone ISO 95+ GL fully adhered insulation over thermal barrier installed as an air barrier, one layer of Firestone ISOGARD HD cover board, Firestone fully adhered 90-mil RubberGard Platinum EPDM. 30-year Firestone Platinum Warranty provided.

B. Basis of Design: Roof system for work required and repair of existing warranted roof. Refer to Section 070150.19 - Preparation for Reroofing.

1. PV panels on racking system anchored to existing roof assembly where scheduled.

1.5 PREINSTALLATION MEETINGS

A. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

B. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. LEED Submittals:
   1. Product Data for Credit IEQ 4.1: For adhesives and sealants used inside the weatherproofing system, documentation including printed statement of VOC content.
   2. Building Life-Cycle Impact Reduction Statement for insulation and membrane.
   3. Building Product Disclosures – EPDs 3rd party statement for insulation and membrane..
C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:
   1. Base flashings and membrane terminations.
   2. Roof plan showing orientation of steel roof deck and orientation of roofing and fastening spacings and patterns for mechanically fastened roofing.
   3. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.
B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
   1. Submit evidence of complying with performance requirements.
C. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed by a qualified testing agency.
D. Research/Evaluation Reports: For components of roofing system, from ICC-ES.
E. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed by a qualified testing agency.
F. Field quality-control reports.
G. Sample Warranties: For manufacturer's special warranties.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.9 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for roofing system identical to that used for this Project.
B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
   1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.11 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.12 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
   1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, roofing accessories, and other components of roofing system.
   2. Warranty shall cover damage to roof membrane by installation of approved plaza deck and PV array components.
   3. Warranty Period: 30 years NDL from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain components including roof insulation fasteners for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

B. Basis-of-Design Product: Subject to compliance with requirements, provide Firestone Building Products. ~~or comparable product by one of the following:~~
   ~~1. Carlisle Golden Seal Total Roofing System as manufactured by Carlisle Syntec Systems.~~
   ~~2. Others as approved equals by Architect prior to Bid Solicitation.~~

(Addendum 1 dated 08/10/2023)

2.2 PERFORMANCE REQUIREMENTS (ROOF-1)

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
   1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
   2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. Roofing System Design: Tested by a qualified testing agency to resist the following uplift pressures:
   1. Corner Uplift Pressure: 120 lbf/sq. ft.
   2. Perimeter Uplift Pressure: 90 lbf/sq. ft.
   3. Field-of-Roof Uplift Pressure: 60 lbf/sq. ft.

D. Energy Star Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.

E. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.3 EPDM ROOFING (EPDM-1)

A. EPDM: ASTM D 4637, Type I, nonreinforced, uniform, flexible EPDM sheet.

1. Thickness: 90 mils, nominal.
2. Exposed Face Color: Black.

Physical Properties:	*ASTM Standard*	*Units*	*Performance Minimum*	*Typical Values 90 mil*
Tensile Strength, minimum	D 412 (Die C) D 826 (Modified)	Psi (MPa) Lbf/in (kN/m)	1305 (9.0) 51 (9)	1425 (9.8)
Factory Seam Strength, minimum	D 412 (Die C) D 624 (Die C)	 ---	Sheet Failure 300%	Sheet Failure 450%
Elongation, minimum	D 2240	%	150 (26.3)	200 (35.0)
Tear Resistance, minimum	D 1149	Lbf/in (kN/m)	65 ± 10	62
Shore A Durometer		---	No Cracks	No Cracks
Ozone Resistance 7 days/100 pphm @ 100 °F (37.8 °C) with 50% extension	D 573 D 412 (Die C) D 412 (Die C)	Psi (MPa) % Lbf/in (kN/m)	1205 (8.3) 200% 125 (21.9)	1415 (9.7) 290% 180 (31.5)
Heat Aging 28 days at 240 °F (116 °C) Tensile Strength Elongation Tear Resistance Linear Dimensional Change, maximum, %	D 624 (Die C) D 1204 D 2137 D 471 E 96	--- °F(°C) ± ±	±1.0 -49 (-45) +8, -2 2.0	<1.0 -63 (-53) +1.73 +1.93
Brittleness Temperature		±	±10	±10
Water Resistance Change in Weight after Immersion 7 days @ 150 °F (65.6 °C), %	D 412			

B. Recycling:

1. Contractor shall divert all of the following materials from disposal at the landfill
   a. Metals including edge metal, copings, counter flashings, expansion /control joint covers, and all non-contaminated metal pails.
   b. Plastics, including packaging materials, pails, and containers
   c. Cardboard, including packaging materials and roll cores
   d. Wood, including demolished nailers, demolished plywood, demolished wood plank decking, damaged pallets, and new wood or plywood scrap and pieces
2. Contractor shall package the debris as required by the recycler
3. Contractor shall transport the debris to approved recyclers.
4. Pallets in a condition to be reused shall not be land filled.
5. Metal or plastic pails and containers that are contaminated with adhesive, mastic, coatings, and similar materials are excluded.

2.4 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
   1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
   2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content:
      a. Plastic Foam Adhesives: 50 g/L.
      b. Single-Ply Roof Membrane Adhesives: 250 g/L.
      c. Single-Ply Roof Membrane Sealants: 450 g/L.
      d. Nonmembrane Roof Sealants: 300 g/L.
      e. Sealant Primers for Nonporous Substrates: 250 g/L.
      f. Sealant Primers for Porous Substrates: 775 g/L.
      g. Other Adhesives and Sealants: 250 g/L.

B. Sheet Flashing: 60-mil-thick EPDM, partially cured or cured, according to application.

C. Protection Sheet: Epichlorohydrin or neoprene nonreinforced flexible sheet, 55- to 60-mil- thick, recommended by EPDM manufacturer for resistance to hydrocarbons, non-aromatic solvents, grease, and oil.

D. Bonding Adhesive: Manufacturer's standard, water based.

E. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and 5-inch-wide minimum, butyl splice tape with release film.

F. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.

G. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

H. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, pre-punched.

I. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening membrane to substrate, and acceptable to roofing system manufacturer.

J. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, molded pipe boot flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

K. PV Racking Roof Anchor:
   1. Product: U-Anchor 2000 Single Ply as manufactured by Anchor products:
   2. Description: An integrated solution for fully adhered single ply membrane applications, consisting of an encapsulated U-Anchor plate with a 3/8 inch-16 S.S. fused to a 16 inches X16 inches membrane target. The target is welded to a fully adhered roof membrane. The Target shall be made from the same brand as the roofing material. Provide color to match roof membrane.

2.5 ROOF INSULATION (INSUL-4)

A. General: Preformed roof insulation boards manufactured or approved by EPDM roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Firestone Building Products Firestone ISO 95+ GL with fiberglass facer for fully adhered assembly or comparable product.

C. Polyisocyanurate Cover Board: ASTM C 1289, Type II, Class 1, Grade 3.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Firestone Building Products ISOGARD HD or comparable product.

D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.6 SUBSTRATE BOARD (THERMAL BARRIER AT STEEL DECK) (SHTG-1)

A. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum board or ASTM C 1278/C 1278M, fiber-reinforced gypsum board.
   1. Thickness: 1/2 inch (13 mm).
   2. Surface Finish: Factory primed.
   3. Products: Subject to compliance with requirements, provide one of the following:
      a. CertainTeed Corporation; GlasRoc Sheathing Type X.
      b. Georgia-Pacific Corporation; Dens Deck DuraGuard.
      c. National Gypsum Company; Gold Bond eXP Extended Exposure Sheathing.
      d. USG Corporation; Securock Glass Mat Roof Board.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate panel to roof deck.

C. Sealant and Flashing Tape: Installation accessories to provide a continuous plane of air/vapor barrier.

D. Air Barrier Accessories: Tape, sealants and coated fabric to establish an air barrier at the top surface of the thermal barrier which is continuous with building AVB system.

2.8 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation and cover board to another insulation layer as follows:
   1. Full-spread spray-applied, low-rise, two-component urethane adhesive.

D. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric, water permeable and resistant to UV degradation, type and weight as recommended by roofing system manufacturer for application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
   1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
   2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Steel Roof Deck:
   1. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053123 "Steel Roof Decking".

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.4 SUBSTRATE BOARD INSTALLATION (STEEL DECK)

A. Install underlayment board with long joints in continuous straight lines, with end joints staggered not less than 24 inches (610 mm) in adjacent rows.
   1. At steel roof decks, install underlayment board at right angle to flutes of deck.
      a. Locate end joints over crests of steel roof deck.
   2. Tightly butt substrate boards together.
   3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.
   4. Fasten substrate board to top flanges of steel deck according to recommendations in FM Global's "RoofNav" and FM Global Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification.
   5. Continuously seal side and end joints with tape.
   6. Completely seal substrate boards at terminations, obstructions, and penetrations to prevent air and moisture vapor movement into roofing system.

B. Air Barrier: Install thermal barrier with tape, sealants and coated fabric to establish an air barrier at the top surface for the thermal barrier continuous with building AVB system.

3.6 INSULATION INSTALLATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
   1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

G. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together adhere to insulation.
   1. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.
   2. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
   3. Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.7 ADHERED MEMBRANE ROOFING INSTALLATION

A. Adhere roofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll membrane roofing and allow to relax before installing.

B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.

C. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer, and allow to partially dry before installing roofing. Do not apply to splice area of roofing.

E. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeters.

F. Apply roofing with side laps shingled with slope of roof deck where possible.

G. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing terminations.
   1. Basis of Design: 3 inches QuickSeam™ Splice Tape and 5 inches QuickSeam Flashing OR 6 inches QuickSeam Splice Tape in side and end laps. QuickSeam Joint Covers are required at all joints and at angle changes 1:12 or greater.

H. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.

I. Spread sealant or mastic bed over deck-drain flange at roof drains, and securely seal membrane roofing in place with clamping ring.

3.8 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

F. PV Rack Anchor Installation:

1. Prepare the roof surface by removing all loose debris and clean the area in accordance with the roofing manufacture recommendations
2. Apply an approved Seam Slice Adhesive Primer to the roof membrane where the Double Sided Die Cut Adhesive will be placed and allow to dry before continuing.
3. Peel back half of the release liner exposing the adhesive.
4. Carefully align the Double Side Die Cut Adhesive and place into the desired position. Do not stretch or pull the adhesive.
5. Apply an approved Seam Slice Adhesive Primer to the underside of the U-Anchor 2400 Single Ply cover and allow to dry before continuing.
6. Remove the top release liner and place into position.
7. Center and place the U-Anchor 2000 over the Double Sided Die Cut Adhesive avoiding wrinkles.
8. Using a weighted membrane roller firmly roll the entire surface of the U-Anchor membrane cover to ensure a proper bond is achieved.
9. Firmly roll the perimeter edge to embed the perimeter edge of the membrane in the adhesive. If you are unable to embed the edge of the membrane into the adhesive cut edge sealant may be needed to prevent the membrane reinforcement from wicking moisture.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

C. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.10 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing 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 membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

END OF SECTION

SECTION 11 40 00
FOOD SERVICE EQUIPMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. This section constitutes a separate prime contract.

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

1.2 ABBREVIATIONS

ADA	Americans with Disabilities Act
AGA	American Gas Association
ASME	American Society of Mechanical Engineers
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
CFSP	Certified Food Service Professional
CM	Construction Manager
EC	Electrical Contractor
FEC	Food Service Equipment Contractor
HACCP	Hazard Analysis and Critical Control Point
HVAC	Heating, Ventilating and Air Conditioning Contractor
ID	Inside Diameter
MC	Mechanical Contractor
NFPA	National Fire Protection Association
NSF	National Sanitation Foundation
OD	Outside Diameter
OSHA	Occupational Safety & Health Administration
PC	Plumbing Contractor
UL	Underwriters Laboratories

1.3 RELATED WORK BY OTHERS

A. Construction Manager (CM)

1. Where applicable, provide transit level recesses for walk-in cooler/ freezer floors and other depressions. Provide finished flooring material and base inside and outside of walk-in coolers and freezers. Refer to Food Service Plans for details.

2. Where applicable, Provide concrete pads or floors for walk-in cooler(s)/ freezer(s) and/ or compressor(s) to be installed outside.
3. Where applicable, Furnish and install all flashing necessary to tie in walk-in cooler(s)/ freezer(s) to building.
4. Where applicable, Install floor trough(s) and drip pan(s) when furnished by FEC. Refer to Food Service Plans for details.
5. Where applicable, Furnish and install all necessary wall backing of size, type and locations as indicated on Food Service Plans.
6. Where applicable, Furnish and install necessary concrete pad(s) or roof curb(s) and associated penetrations for refrigeration equipment.

B. Plumbing Contractor (PC)
1. Provide rough-in and final connections of all services per local code requirements.
2. Flush all lines of foreign debris before connecting fixtures.
3. Provide all water supply lines, drain lines, drain fittings, floor drains, shut-off valves, traps and tailpieces.
4. Provide all reduced pressure devices, pressure reducing valves and backflow prevention devices except where included with equipment or furnished by FEC as part of item specs. Also refer to Food Service Equipment Schedule.
5. Provide all grease traps; coordinate water usage data with FEC. Note local codes may require grease (trap) interceptor for pot/ utensil wash sinks, dishmachines or drains for other grease producing food service equipment. Flush inset or exterior grease traps are recommended for all food service applications.
6. Install all faucets, pre rinse spray units, hose reel units, lever drains, vacuum breakers, check valves, flow control valves, water inlets, traps, filters, strainers, PRV valves, T/P gauges as furnished by FEC.
7. Make connections between sections of modular equipment such as range batteries, utility distribution systems, chef's tables, and exhaust hoods.
8. Provide condensate line piping for walk in cooler and freezer units. Note walk-in cooler condensate lines shall not pass through walk-in freezer compartments. Condensate line piping shall be trapped outside the cold room and installed per prevailing codes. PC shall use 1" copper tubing for condensate lines.
9. Provide sleeves for refrigerant piping and condensate piping wherever it passes through the walk in cooler or freezer wall, floor or ceiling. Pack sleeve with fiberglass and perma-gum after installation. Sleeves through floor shall project min. 3" above the finished floor. Sleeves through the walls shall be flush with walls.
10. Provide all conduit for beverage lines per local code requirements.

C. Electrical Contractor
1. Provide rough-in and final connections of all services per local code requirements.
2. Provide all outlets, receptacles, conduit, contactors, controllers, disconnects, switches, starters, etc., unless furnished as standard with the equipment or specifically included with the equipment in the itemized specifications.
3. Install electrical devices furnished with food service equipment. FEC must indicate such devices on electrical rough-in plans.
4. Make electrical connections between sections of modular equipment such as utility distribution systems; exhaust hoods, refrigeration systems, walk-in cooler and freezer units or chef's tables.
5. Where required by local codes, furnish and install shunt trips and/ or contactors with 120 Volt coils with contact ratings matching the electrical cooking appliance. EC to wire from the micro switch relay on the fire control system head to the shunt trips/ contactors.
6. Walk-in cooler and freezer refrigeration systems:
   a. Wire from cooler and freezer compressor time clocks to respective evaporator coils. Note unless otherwise specified, time clocks shall be furnished for cooler and freezer units.
   b. Wire to door assembly junction box, light(s), heated air vents, condensate drain line heaters (walk in freezer heat tape shall be applied under insulation) and audio/ visual alarms.
   c. Mount and connect all light fixtures furnished with walk in cooler(s)/ freezer(s).
7. Wet areas such as sinks, disposers, or dishwashers shall be wired with Sealtite Type EF conduit or equal, through water proof boxes.

D. Mechanical Contractor (MC)
1. Provide rough-in and final connections of all mechanical services.
2. Provide fans, ducts, dampers, starters, roof curbs, roof penetrations and sealing of penetrations, etc., necessary for operation of grease extracting hoods and condensate hoods.
3. Provide looped gas supply lines, gas pressure reducing and regulating valves for pressure above 14" W.C.
4. FEC to provide gas fire/ fuel shut-off solenoid valve(s) as part of hood fire suppression system to MC for installation.

5. Install all gas valves, gas hoses and gas pressure regulators furnished by FEC and indicated on Food Service Equipment Schedule.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing food service equipment, who has completed installations similar in design and extent to that indicated for this Project, and who has a record of successful in-service performance.
B. FEC shall comply with all federal, state and local laws and regulations governing health, safety, fire, mechanical and electrical requirements within the applicable jurisdiction.
C. When the Construction Documents call for higher standards or larger sizes than the regulations, the Construction Documents shall govern. When the regulations require higher standards or larger sizes than the Construction Documents, the regulations shall govern. Rulings and interpretations of the enforcing agencies shall be considered part of the regulations. No additional amounts shall be paid for compliance.
D. When the requirements of the drawings exceed the written specifications, the drawings shall govern and vice versa.
E. If because of jurisdictional trade agreements or other conditions, any work specified in the Construction Documents must be completed by others, sublet such work only to those who are qualified to do such work or make other arrangements at the expense of the FEC, subject to approval by the Architect.

1.5 APPLICABLE CODES & STANDARDS

A. Except as otherwise indicated, each item of equipment shall comply with the latest current edition of the following standards as applicable to the manufacturer, fabrication, and installation of the work in this section. Comply with all Federal, State and Municipal regulations and notifications, which bear on the execution of this work. Call to the attention of the Owner in writing any design conflict with the requirements of the Americans with Disabilities Act (ADA) during the Bid Process so resolution can be effected prior to the Contract Award.
   1. NSF Standards: Comply with applicable National Sanitation Foundation Standards and criteria and provide NSF "Seal of Approval" on each manufactured item and on major items of custom-fabricated work.
   2. UL/ ETL/ CSA Standards: For electrical components and assemblies, provide either UL/ ETL/ CSA listed products or, where no listing service is available, provide a complete index of the components used as selected from the UL/ ETL/ CSA "Recognized Component Index". For fire extinguishing systems comply with UL 300.
   3. ANSI Standards: Comply with applicable ANSI standards for electrical-powered and gas-burning equipment; for piping to compressed-gas cylinders; and for plumbing fitting, including vacuum breaker and air gaps, to prevent siphonage in water piping.
   4. AGA/ CGA: All gas fired equipment shall be AGA/ CGA approved, equipped to operate on type of gas available at the job site, and shall contain 100% automatic safety shut-off devices.
   5. NFPA Standards: Comply with NFPA Bulletin 96 for exhaust systems; with NFPA Bulletins 13, 17, 17A and 96 for fire extinguishing systems; and with NFPA 54, National Fuel Gas Code and NFPA 70, National Electric Code.
   6. ASME Code: Comply with ASME boiler code requirements for steam-generating and steam-heated equipment; provide ASME inspection, stamps, and certification of registration with National Board.
   7. SMACNA Guidelines: Where applicable provide seismic restraints for food service equipment to comply with the Sheet Metal and Air Conditioning Contractors National Association's (SMACNA) "Kitchen Equipment Fabrication Guidelines", appendix 1, "Guidelines for Seismic Restraints of Kitchen Equipment", unless otherwise indicated.
   8. ASHRAE: Provide mechanical refrigeration systems complying with the American Society of Heating, Refrigeration and Air Conditioning Engineers ASHRAE 15, "Safety Code for Mechanical Refrigeration".

1.6 SUBMITTALS

A. Submit food service equipment plan, rough-in plans, shop drawings and specification brochure booklet within 30 days of award of contract or as required by Architect. Submit one set photo copy print and one electronic PDF set to Food Service Consultant for review and approval. Corrected electronic documents will be returned to FEC for revision if necessary.
B. When drawings are approved, FEC shall submit assembled sets of plans as required by Architect.
C. When specification brochure booklets are approved submit assembled copies in quantity required by Architect. Each page is to be numbered and sequenced corresponding to the itemized specifications. Brochures are to include accessories and components used with each item.
D. Provide fully dimensioned rough-in plans at ¼" = 1'-0" scale showing all required services including; electrical, plumbing, mechanical and any related special conditions.

1. Plans are to indicate location, elevation, sized and type of water supplies, drains, gas lines, floor drains, site drains, electrical supplies, outlets, switches, ducts locations, exhaust and supply CFM and static pressure, etc. Include on each page a legend of commonly used symbols and abbreviations.
2. Special conditions shall include, but not be limited to, curbs, bases, recesses, sleeves, refrigeration lines, concealed wall backing, pass through openings, trenches, etc.
3. FEC may not use rough-in plans prepared by the Food Service Consultant for submittal with the required Construction Documents without permission from the Food Service Consultant. When such plans are re-used for Construction Documents it shall be the responsibility of FEC to verify all dimensions as well as electrical, plumbing and mechanical rough-ins and prevailing codes as they relate to the project.

E. Submit shop drawings showing plans, elevations and details for all fabricated items drawn at minimum ¾" scale.

F. After all drawings and buy out brochures have been approved and received by Owner & Architect, fabrication may begin. Approvals shall not relive FEC of the responsibility for conformance with the construction documents unless written approval is obtained from the Owner & Architect. Also, approvals shall not relieve FEC from conformance to state and local health code requirements.

PART 2 – PRODUCTS

2.1 GENERAL

A. Except as may be specified otherwise under individual item specification in "Equipment List" or "Equipment Schedule", all items of standard manufactured equipment furnished shall be complete in accordance with manufacturer's standard specifications for specific unit or model called for, including finishes, components, attachments, appurtenances, etc.

B. Qualified Custom Stainless Fabricators include:

1. Institutional Equipment Inc.
   704 Veterans Parkway, Unit B
   Bolingbrook, IL 60440
   (630) 771-0990 ph.
2. Nationwide Fabrication Inc.
   10923 Leroy Dr.
   Northglenn, CO 80233
   (303) 853-0107 ph.
3. Albers Commercial Kitchen Services
   200 W. Plato Blvd.
   St. Paul, MN 55107
   (651) 265-0603 ph.
4. Advance Tabco
   200 Heartland Blvd.
   Edgewood, NY 11717
   (800) 645-3166 ph.

2.2 FABRICATION OF METALWORK

A. Sanitation Standards

1. All equipment shall be produced in accordance with the National Sanitation Foundation (NSF) Standard 2 and bear the NSF seal.

B. Materials & Workmanship

1. All material shall be new, of prime quality and without flaws. The completed products shall be delivered to the owner in an undamaged condition.
2. Stainless Steel shall conform to American Society for Testing and Materials (ASTM) specification, Type 304, hardest workable temper, polished to a #4 satin finish on exterior and rolled finish on interior. Working surfaces, including welds, shall be smooth, free of warps, buckles, cracks, pits and scratches.
3. Steel other than stainless steel, where specified to body enclosures shall be prime grade, with steel sheet bonderized and zinc coated.
4. Grain shall run in the same direction on all horizontal and all vertical surfaces; where table or sink tops join at right angles, terminate the finish in a mitered edge; polish grain consistent in direction throughout the length of the backsplash and sink compartment.
5. Sound Deadening - underside of all stainless steel top for tables, counters, sinks, dish tables with angle or channel framework shall be coated with 1/8" thick water proof mastic material, non-asphalt base and NSF approved.

6. Reinforce metal at locations of hardware, anchorages and accessory attachments; wherever metal is less than 14 gauge or requires mortised application. Conceal reinforcements to the greatest extent possible. Weld in place on concealed faces.
7. Welding and Soldering
   a. Materials 18 gauge or heavier shall be welded.
   b. Seams and joints shall be welded and soldered in field unless otherwise indicated in item specifications.
   c. Welds must be ground smooth and polished to match original finish.
   d. Where galvanizing has been burned off, the weld shall be cleaned and touched up with high-grade aluminum paint.
8. Provide removable panels for access to mechanical and electrical service connections, which are concealed behind or within food service equipment, but only where access is not possible.
9. Provide closures where ends of fixtures, back splashes, shelves, etc. are open. Fill by forming the metal or welding sections if necessary to close off entire opening flush to walls or adjoining fixtures.
10. Reinforce work surfaces 30 inches on center (vertical and horizontal), with galvanizing or stainless steel concealed structural members. Reinforce members which are not self-reinforced, by formed edges.
11. Metal tops shall be one-piece welded construction, including field joints. Secure to a full perimeter channel frame and fasten top with stud bolts or tack welds.
12. Field Joints - for any field joints required because of size of fixture; butt joint, reinforce on underside with angles of same material, bolt together with non-corrosive bolts and nuts, field weld, grind and polish.

C. Metal and Gauges
1. Fabricate the following components in stainless steel from the gauge of metal as indicated:

a.	Table and counter tops	14 gauge
b.	Sinks and drainboards	14 gauge
c.	Shelves	16 gauge
d.	Front drawer and door panels	18 gauge (double pan type)
e.	Single pan doors and drawer fronts	16 gauge
f.	Enclosed base cabinets	18 gauge
g.	Enclosed wall cabinets	18 gauge
h.	Exhaust Hoods and Ventilators	18 gauge
i.	Pan-type inserts and trays	16 gauge
j.	Removable covers and panels	18 gauge
k.	Skirts and enclosure panels	18 gauge
l.	Closure and trim strips over 4" wide	18 gauge
m.	Hardware reinforcement	12 gauge
n.	Gusset plates	10 gauge

D. Pipe Bases
1. Construct pipe bases of 1 5/8" diameter, 16 gauge stainless steel tubing. Fit legs with polished stainless steel adjustable bullet feet to provide adjustment of approximately 1-1/2", without exposed threads.
2. Space legs to provide ample support for tops, precluding any possibility of bucking or sagging and in no case more than 6'-0" centers.

E. Legs and Crossrails
1. Legs and crossrails shall be 1 5/8" diameter stainless steel tubing. All intersections of rails and legs shall be welded and finished smooth. Bolts, screws or tack welds shall not be acceptable.
2. Leg sockets shall be 2" outside diameter (OD) stainless steel with set screw to secure the leg to the socket. They shall be welded to 14 gauge transverse top support channels.

F. Shelves
1. Construct solid shelves under pipe base tables of 16 gauge stainless steel, with 1 ½" turned down and under edges on exposed sides, and 2" turn up against walls or equipment. Fully weld to legs.
2. In fixtures with enclosed bases, turn up shelves on back and sides with ¼" minimum radius and feather slightly to ensure a tight fit to enclosure panels.

G. Sinks and Drainboards
1. All sinks and drainboards shall be constructed of 14 gauge stainless steel, unless otherwise specified, with all joints welded, ground and polished so no evidence of welding appears.
2. All vertical and horizontal corners shall be rounded to a ¾" radius with intersections meeting in spherical sections. Multiple compartment sinks shall be divided with double wall partitions having fully rounded corners. All corners of drainboards shall be rounded on inside to ¾" radius. All back and end splashes shall be rounded on inside to ¾" radius. Front corners of rolled rim shall be fully rounded on outside roll and be concentric with inside of roll.

3. Front face of multiple sinks shall be one continuous piece with no overlapping joints or open spaces between compartments.
4. Drainboards shall be pitched 1/8" x 12" toward sink compartments. Sinks and drainboards shall have 10" high back splashes and end splashes where appropriate. Back splashes shall be level and continuous and not follow pitch of drainboards.
5. Bottom of each compartment shall pitch to drain and be fitted with a cast brass 2" lever operated waste outlet, provided with a stainless steel strainer plate. Set lever waste into stamped recess in sink bottom to facilitate drainage.
6. All sinks shall be 14" deep unless otherwise specified on drawings or in item specifications.

H. Sinks set into Work Table or Work Counter
1. Sinks shall be constructed of 14 gauge stainless steel, unless otherwise specified, with all joints welded, ground and polished so no evidence of welding appears.
2. Bottom of sink compartment shall have vertical and horizontal corners rounded to ¾" radius and pitch to drain with size and type as indicated on plan and item specifications.

I. Dishtables
1. Top reinforcement and support shall consist of 14 gauge stainless steel transverse leg support channels and 14 gauge stainless steel longitudinal reinforcing channel. Also refer to 2.2 Section B for reinforcement detail.
2. Where tables enter dishmachines or pot washing machines provide turn down into machine as recommended by manufacturer and a flange at both the front and back splash forming a water tight joint across bottom on up both sides to top edge of dishtable.
3. Provide sound deadening as directed in 2.2 Section B for underside of dishtables.
4. Follow construction details as directed in 2.2 Section G.

J. Work Tables
1. Top reinforcement and support shall consist of 14 gauge galvanized transverse leg support channels and 14 gauge galvanized longitudinal reinforcing channel. Also refer to 2.2 Section B for reinforcement detail.
2. Where stainless steel tops are specified furnish 14 gauge polished stainless steel, finished in a #4 satin finish with all exposed edges rounded with no burrs. Tops shall be turned down 1 ½" and under ½" in channel shape on all exposed sides unless otherwise specified.
3. Where tables are located at building walls, they shall have minimum 6" high by 1" returned at 90 degrees to wall and turned down 1" at 90 degrees with all exposed ends closed ground and polished smooth. Provide heavy-duty "Z" clips for securing to building walls.
4. Provide sound deadening as directed in 2.2 Section B for underside of worktables.

K. Wood Table Tops
1. Where wood table tops are specified, top shall be 1 ¾" thick, sectional, hard rock, kiln dried maple construction. Top shall have 5" by 1" thick coved maple riser on back and ends unless otherwise indicated on plan or item specifications. Top shall be fully NSF approved.
2. Top shall be mounted on 14 gauge channels as indicated in 2.2 Section J.

L. Cabinet Base Construction
1. All cabinet type bases shall be of 16 gauge stainless steel, single wall, pan type, one piece welded construction with no visible joints or screw attachments showing. Entire unit to be braced with 14 gauge channels as indicated in 2.2 Section J.

M. Hinged Doors
1. Hinged doors for cabinet base counters shall be constructed of 18 gauge stainless steel front with 20 gauge stainless steel pan shaped backs, with all corners welded, ground and polished.
2. Unless otherwise specified all pull handles shall be Component Hardware, recessed door pull, full grip type, Model No. P63-1012 or approved equal.
3. All doors to be furnished with chrome plated heavy duty type cylinder lock by Component Hardware or approved equal.
4. All doors shall be provided with NSF approved stainless steel heavy duty lift off type hinges and Cabinet Catch, Friction Type with spring action nylon rollers by Component Hardware, Model No. M21-2580 or approved equal.

N. Drawer Assemblies
1. Drawer assemblies shall consist of removable drawer body mounted in a ball bearing slide assembly with fully enclosed housing.
2. Slide assembly shall consist of one pair of 200 pound stainless steel roller bearing extension slides, with side and back enclosure panels, front spacer angle, two drawer carrier angles, secured to slides and stainless front.
3. Drawer bodies for general storage shall be 20" x 20" x 5" deep with 18 gauge stainless steel or Royalite containers.

O. Over Shelves and Wall Shelves
1. Shelves shall be constructed of 16 gauge stainless steel with working sides turned down 1 ½" and ½" under in channel shape with resulting corners welded, ground and polished.
2. Back of Wall Shelves shall be turned up 1 ½" and coved. When 1 ½" turn up is specified at Back & Ends, Front edge of End splash shall be rounded and finished smooth.
3. Slant rack shelves used for dish racks shall have rolled front edge and 6" turn up at rear.
4. Brackets shall be 14 gauge stainless steel and be spaced to support shelf with its intended contents.

P. Wall Cabinets
1. Wall cabinets shall be of length and depth as shown on plans or indicated in item specifications. Cabinets to be 28" high, unless otherwise specified with sloped, dust proof tops. Exterior bottoms shall be of flush type construction.
2. Cabinet shall be constructed of 18 gauge stainless steel, all welded construction. Cabinet interiors shall be fabricated with fixed bottom and intermediate shelf unless otherwise specified.
3. Where specified doors shall be double wall construction with chrome plated pulls.

2.3 FABRICATION OF MILLWORK & CASE WORK

A. Counter Body shall be constructed of ¾" birch or fir. Particleboard may not be substituted for plywood panels. All plywood to be glued with water resistant resin glue.

B. Plastic laminate finish of interior shall be standard grade laminate white in color unless otherwise specified. All interior surfaces including underside of top shall be standard grade laminate finished. Exterior plastic laminate finish shall be standard grade laminate as specified by architect or owner. All exterior surfaces shall be plastic laminate finished including those units that may have backs or ends against the wall. Plastic laminate to be applied with minimum quantity seams based on use of largest sheet size available from manufacturer.

C. Where large openings are required in counter body, such as for floor drains or beverage tubing, fabricator shall provide stainless steel trim covers to conceal exposed plywood edge of counter base.

D. Where seam is exposed provide with 1 ½" wide x ½" thick plastic laminate trim strip. Trim shall be of height of counter base. Additional strips shall be provided so as to allow symmetrical appearance on counter front even if not required to cover seam.

E. Doors shall be constructed of birch, fir or particle board with plastic laminate finish on all surfaces. Provide chrome-faced locks all keyed alike. Provide Blum Mfg. concealed door hinges unless otherwise specified. Where specified provide slotted doors to allow for equipment ventilation. Each door shall have seven routed slots in door face ½" wide and painted to match laminate color front. Provide chrome wire pulls unless otherwise specified.

F. Where specified in lieu of toe base, furnish 6" high NSF approved stainless steel legs with adjustable bullet feet. Spacing shall be maximum 48" on center. Provide stainless steel backing plates in counter base.

G. Where specified with stainless steel legs and adjustable feet, furnish toe base which shall be removable ¾" thick birch or fir. Finish all surfaces with plastic laminate including front, back and all edges. Provide in maximum lengths to accommodate all counters. End returns on exposed counter sides shall be attached to front toe kick section to allow for one piece removal.

2.4 REFRIGERATION REQUIREMENTS

A. Refrigeration systems shall be installed by a knowledgeable, skilled and licensed refrigeration contractor, who shall perform the work according to ASHARE standards and the conditions of the contract documents. System shall be installed, charged, started, tested and fully operational.

B. Condensing units shall be securely mounted with adequate clearance for service. Condensing units located outside the building shall be installed on a curb or pad provided by the CM/ GC with refrigeration lines extending through a roof pitch pocket or wall sleeve provided by the CM/ GC. All refrigeration lines in the pitch pocket or sleeve to be sealed by the CM/ GC. Coordinate size of curb or pad with CM/ GC.

C. All systems shall be designed for thermostatic expansion valves and pressure switches shall operate on specified refrigerant.

D. Refrigeration lines shall conform to ASHARE or National Board of Fire Underwriters standards, whichever is greater. Piping shall be type "L" copper, cut with a tube cutter and sized. Use braising rod of no less than 15% silver. Fittings shall be wrought copper.

E. Piping shall be fitted with hangers at no more than 10 foot intervals horizontally and 6 foot intervals vertically. Provide an oil trap at the base of vertical risers in suction lines.

F. Insulate walk-in cooler/ freezer suction lines and freezer condensate lines with ¾" Armaflex. Walk in cooler condensate lines shall not pass through walk in freezer compartments. Walk in freezer heat tape shall be applied under the insulation.

G. Thermometers shall be installed on the exterior of each walk in cooler/ freezer near the door. Refrigeration contractor shall calibrate thermometers after three days of operation. Extend sensor capillaries away from the door and secure to the walls.

H. Furnish all specified lights in walk in cooler(s)/ freezer(s) for mounting and connection by EC. Provide bulbs suitable for the specified ambient temperature. Fluorescent light fixtures shall be surface mounted, NSF Listed, and UL Listed, suitable for wet and low temperature areas.

I. Clean, dehydrate and evacuate the system. Check the system for leaks over a 24 hour period at a vacuum of 5000 or less microns with no appreciable pressure drop. Liquid lines shall be pressurized according to prevailing refrigeration codes for 24 hours with a maximum decrease of 3 PSI.

J. **2009 EISA Compliance Conditions -** For Walk In Units installed after Jan. 1, 2009 Walk In Manufacturers shall include options/ accessories necessary to comply with HR6 – The Energy Independence and Security Act. These include increased R-Value insulation, new lighting and door hinging requirements, EC motors in evaporators and new requirements for glass doors or windows (if applicable).

PART 3 – EXCECUTION

3.1 SUPERVISION

A. FEC shall have a competent supervisor present at all times during progress of the Contractors work.

B. Verify the site conditions prior to installation and notify the Architect and/ or CM/ GC. in writing, of unsatisfactory conditions for proper installation of food service equipment.

C. Verify wall, column, door, window and ceiling locations and dimensions prior to approval of shop drawings. Fabrication and setting in place of custom equipment should not proceed until dimensions and conditions have been coordinated with fabrication details.

D. Verify that wall backing has been provided and is correct for wall supported equipment. Coordinate location for wall backing with CM/ GC. as required prior to installation of equipment.

E. Verify that ventilation ducts are of the correct characteristics and in the required locations as indicated on food service plans.

F. Verify that all utilities are available, of the correct characteristics and in the proper locations for final hook up of the equipment.

3.2 ASSEMBLY AND SETTING IN PLACE

A. Coordinate sequential setting in place and assembly of all equipment to ensure all utility connections are achieved.

B. Coordinate work and cooperate with other trades working at site toward the orderly progress of the project.

C. Keep premises free from accumulation of waste material and rubbish on a daily basis. Provide and maintain coverings or other appropriate protection for finished surfaces and other parts of equipment subject to damage during installation.

D. All food service equipment shall be assembled and set in place in accordance with manufacturers instructions.

E. Set non mobile items securely in place, leveled and adjusted to the correct height. Anchor to finished floor and/ or wall where indicated and where required for sustained operation and use without shifting or dislocation. Conceal anchorages wherever possible.

F. Complete field assembly joints by welding, bolting and gasketing, or similar methods as specified. Grind welds smooth and polish.

G. Provide closure plates and strips where required as per health code requirements.

H. Provide access holes and/or ferrules on equipment for piping, drains, electrical outlets, conduits, etc., as required to coordinate installation of kitchen and Food Service equipment work of the other contractors on project.

I. Provide sealants, Dow Corning 732 RTV or equal clear silicone around equipment to make joints air tight, water proof, vermin proof and sanitary per health code requirements. Wipe excess out of joint to fillet radius.

J. Repair of all damage to premises as result of this installation, and removal of all debris left by those engaged in installation.

3.3 CLEANING

A. Upon completion of installation in food service areas, remove protective coverings on equipment.

B. Collect any warranty cards and operation & maintenance manuals attached to or inside of equipment and submit to CM/ GC as described in Section III, 3.5.

C. Have all Food Service equipment fixtures broom cleaned and ready for operation when building is turned over to owner. All sanitizing of equipment shall be completed by owner unless otherwise indicated.

3.4 ADJUSTMENT, TESTING AND TRAINING

A. Test and adjust equipment, controls and safety devices to ensure proper working order and conditions.
B. Repair or replace equipment which is found to be defective.
C. When cleaning, testing and adjusting have been completed, arrange for demonstration times at Owner's convenience, but during normal working hours. Demonstrations shall be done by competent, trained personnel, thoroughly familiar with the operation, techniques of usage, capacities and maintenance of the equipment.

3.5 OPERATION AND MAINTENANCE MANUALS

A. Prior to demonstration of food service equipment the FEC shall submit three (3) set of Operation and Maintenance manuals to CM/ GC or Architect for approval. Manuals shall be in hard cover three ring binders and shall include replacement parts lists and a type written index sheet listing name, addresses and phone numbers of all authorized service agencies for appropriate equipment.

3.6 GUARANTEE

A. Equipment, parts and labor under this contract shall be guaranteed for a period of one (1) calendar year from date of final invoice.
B. Condensing units shall be further warranted on a prorated basis for an additional four- (4) years, exclusive of labor. Refrigeration warranties shall include replacement of refrigerant caused by a fault or leak in the system.

PART 4 – ITEM SPECIFICATIONS

Instructions to bidders:

1. Food Service Equipment Contractor to include cost to receive, deliver, uncrate and set in place all new food service equipment specified for final hook-ups by others.
2. Food Service Equipment Contractor shall furnish itemized bid form at specified due date.
3. Food Service Equipment Contractor shall be responsible for removal of all delivery packing material/ trash from site unless otherwise indicated by Owner & Construction Manager.
4. Food Service Equipment Contractor shall utilize authorized Custom Stainless Fabricators as indicated in General Specification Section 2.2. All other fabricators must be submitted for approval prior to bid due date.

ITEM # 1 WALK-IN COMBINATION BOX WITH REFRIGERATION
Manufacturer: Kolpak
Qty. One (1)

1. Combination walk-in cooler/freezer
Freezer Compartment Interior Dimensions: 14'-5 1/2" x 7'-4" x 8'-6 1/4"
Walls: 4" Class 1 - Foamed in place Urethane
Interior and Exterior: Galvalume - Embossed 26 Ga
Ceiling: 4" Class 1 - Foamed in place Urethane
Floor Application: 4" Class 1 - Foamed in place Urethane
Type: Standard 1000# ERA
Floor Finish: Galvanized - Smooth -16Ga.
Two (2) ea Light Fixture - Kason 1809 LED 115V/220V
One (1) PC199LOP-2E, 2 HP, RLow Temp Standard Pre-Charged,Air Cooled Hermetic Condensing Unit
Amps: 18.1, Ambient Temperature: 91
Includes Fan Cycle Controls, Amps: 18.1, Ambient Temperature: 91
One (1) EL26-090-2EC-PR-4, RLow Temp, Electric Defrost, Amps: 9.8
Door: 34" x 78" Left Swing Out
Interior and Exterior Door Frame: Galvalume - Embossed 26 Ga
One (1) Kason Handle 28 with Locking Assembly
One (1) Kason Heated Pressure Relief 1825
One (1) Freezer Alarm to Cooler Door
One (1) Light Centered Over Door Opening
Stainless Steel 14 ga threshold
One (1) Heater Wire
Three (3) Kason 1346 Brushed Chrome Adjustable / Spring Assisted Hinge
One (1) Kason 1803 LED w/Bulb, Globe & Nightlight 120V
One (1) Deluxe Display By ArcticFox™ with Battery Backup
Cooler Interior Dimensions: 14'-5 1/2" x 20'-6 1/2" x 8'-6 1/4"
Walls: 4" Class 1 - Foamed in place Urethane

Interior and Exterior: Galvalume - Embossed 26 Ga
Ceiling: 4" Class 1 - Foamed in place Urethane
Floor Application with Vinyl U Shape Flat Bottom Wall Screet
Four (4) Kason 1809 LED 115V/220V Light Fixture
Door: 34" x 78" Left Swing Out
Recessed 8"
Interior and Exterior door frame: Galvalume - Embossed 26 Ga.
Alum .063 Diamond Tread 48" High Kickplate on interior and exterior of door and door frame
One (1) Kason 28 with Locking Assembly Handle
One (1) Light Centered Over Door Opening
Two (2) Kason 1346 Brushed Chrome Adjustable / Spring Assisted Hinge
One (1) Kason 1803 LED Light Fixture w/Bulb, Globe & Nightlight 120V
One (1) Deluxe Display By ArcticFox™ with Battery Backup

ITEM # 2 SECURITY SHELVING
Manufacturer: Metro
Qty. One (1) Lot

1. ~~Seven (7) SEC33K3 Super Erecta® Security Unit, stationary, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection, 38-1/2"W x 21-1/2"D x 66-13/16"H, no intermediate shelves~~
Eight (8) SEC33K3 Super Erecta® Security Unit, stationary, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection, 38-1/2"W x 21-1/2"D x 66-13/16"H, no intermediate shelves (Addendum 1 dated 08/10/23)
2. ~~Twenty-One (21) 1836NK3 Super Erecta® Shelf, wire, 36"W x 18"D, plastic split sleeves are included in each carton, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection~~
Twenty-Four (24) 1836NK3 Super Erecta® Shelf, wire, 36"W x 18"D, plastic split sleeves are included in each carton, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection (Addendum 1 dated 08/10/23)
3. ~~Four (4) SEC35EC Super Erecta® Security Unit, mobile, chrome plated finish, 52-3/4"W x 21-1/2"D x 68-1/2"H, no intermediate shelves, (2) 5MP/5MPB casters, NSF~~
Three (3) SEC35EC Super Erecta® Security Unit, mobile, chrome plated finish, 52-3/4"W x 21-1/2"D x 68-1/2"H, no intermediate shelves, (2) 5MP/5MPB casters, NSF (Addendum 1 dated 08/10/23)
4. ~~Twelve (12) 1848NC Super Erecta® Shelf, wire, 48"W x 18"D, chrome plated finish, plastic split sleeves are included~~
Nine (9) 1848NC Super Erecta® Shelf, wire, 48"W x 18"D, chrome plated finish, plastic split sleeves are included (Addendum 1 dated 08/10/23)

ITEM # 3 WALK-IN FREEZER
Manufacturer: Kolpak
Qty. One (1)
1. Included in Item #1

ITEM # 4 SECURITY SHELVING
Manufacturer: Metro
Qty. One (1) Lot
1. Six (6) SEC33K3 Super Erecta® Security Unit, stationary, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection, 38-1/2"W x 21-1/2"D x 66-13/16"H, no intermediate shelves
2. Eighteen (18) Super Erecta® Shelf, wire, 36"W x 18"D, plastic split sleeves are included in each carton, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection

ITEM # 5-7 SPARE NO.

ITEM # 8 WALK-IN COMBINATION COOLER/FREEZER
Manufacturer: Kolpak
Qty. One (1)
1. Combination Cooler/Freezer
Cooler Interior Dimensions: 6'-0" x 8'-1" x 8'-6 1/4"
Walls: 4" Class 1 - Foamed in place Urethane

Interior and Exterior: Galvalume - Embossed 26 Ga
Ceiling: 4" Class 1 - Foamed in place Urethane
Interior and Exterior: Galvalume - Embossed 26 Ga
Floor Application: 4" Class 1 - Foamed in place Urethane
Type: Standard 1000# ERA
Floor Finish: Galvanized - Smooth -16Ga.
One (1) Kason 1809 LED Light Fixture 115V/220V
One (1) PC149LOP-2EP, 1 1/2 HP, RLow Temp
Plus w/Headmaster Pre-Charged Air Cooled Hermetic Condensing Unit
Amps: 12.6, Ambient Temperature: 91
Includes Head Pressure Control Valve
One (1) EL26-066-2EC-PR-4, RLow Temp, Electric Defrost, Amps: 9.8
Door: 34" x 78" Right Swing Out
Recessed 8"
Interior and Exterior Door and Door Frame Galvalume - Embossed 26 Ga
Alum Diamond Tread Kickplate.063, 48" High
One (1) Kason 28 with Locking Assembly Handle
One (1) Kason1825 Heated Pressure Relief Vent
One (1) Light Centered Over Door Opening
Stainless Steel 14 ga Threshold,
Three (3) Kason 1346 Brushed Chrome Adjustable / Spring Assisted Hinge
One (1) Kason 1803 LED w/Bulb, Globe & Nightlight 120V
One (1) Deluxe Display By ArcticFox™ with Battery Backup
Freezer Interior Dimensions: 8'-2" x 8'-1" x 8'-6 1/4"
Walls: 4" Class 1 - Foamed in place Urethane
Interior and Exterior: Galvalume - Embossed 26 Ga
Ceiling: 4" Class 1 - Foamed in place Urethane
Interior and Exterior: Galvalume - Embossed 26 Ga
Floor Application: Screed, Vinyl U Shape for Male Bottom Walls
10'-0" Sq. Ft. Wainscot Aluminum Diamond Tread .063, 48"H across the exposed front of box
One (1) Kason 1809 LED Light Fixture, 115V/220V
One (1) PC69MOP-2EP, 3/4 HP, RMedium Temp
Plus w/Headmaster Pre Charged Air Cooled Hermetic Condensing Unit,
Amps: 7.4, Ambient Temperature: 95
Includes Head Pressure Control Valve (Headmaster), Amps: 7.4,
One (1) AM26-073-1EC-PR-4, RMedium Temp, Air Defrost, Amps: 1.6
Door: 34" x 78" Right Swing Out
Recessed 8"
Interior and Exterior Door and Door Frame: Galvalume - Embossed 26 Ga
Kickplate, Alum .063 Diamond Tread 48" High
One (1) Kason 28 Handle with Locking Assembly
One (1) ea Light Centered Over Door Opening
Three (3) Kason 1346 Brushed Chrome Adjustable / Spring Assisted Hinge
One (1) ea Light Fixture - Kason 1803 LED w/Bulb, Globe & Nightlight 120V
One (1) Deluxe Display By ArcticFox™ with Battery Backup

ITEM # 9	BUN / PAN RACK
Manufacturer:	Advance Tabco
Qty.	Seven (7)
Model:	PR20-3K-X

1. Mobile Bun Pan Rack, full height, open sides, with 1-1/2" ribbed angle, capacity 20 - 18" x 26" sheet pans, bolted extruded aluminum frame, front loading, 69-1/4" high
2. Seven (7) PRC-1-1 heavy duty plastic rack cover with clear front

ITEM # 10 WALK-IN COOLER SHELVING
Manufacturer: Focus Foodservice
Qty. One (1) Lot

1. Twelve (12) FGN074G Post, 74"H, mobile, grooved at 1" increments, Sanigard™ anti-microbial protection, for wet or dry storage, green epoxy finish
2. Eight (8) FF2448G Wire Shelf, 800 lb. weight capacity, 24"W x 48"L, for wet or dry storage, zinc underplated steel wire, green epoxy coated finish
3. Four (4) FF1842G Wire Shelf, 800 lb. weight capacity, 18"W x 42"L, for wet or dry storage, zinc underplated steel wire, green epoxy coated finish

ITEM # 11 WALK-IN FREEZER
Manufacturer: Custom
Qty. One (1)
1. Included in Item #8

ITEM # 12 WALK-IN FREEZER SHELVING
Manufacturer: Focus Foodservice
Qty. One (1) Lot
1. Twelve (12) Post, 74"H, mobile, grooved at 1" increments, Sanigard™ anti-microbial protection, for wet or dry storage, green epoxy finish
2. Four (4) Wire Shelf, 800 lb. weight capacity, 18"W x 42"L, for wet or dry storage, zinc underplated steel wire, green epoxy coated finish
3. Eight (8) Wire Shelf, 800 lb. weight capacity, 18"W x 48"L, for wet or dry storage, zinc underplated steel wire, green epoxy coated finish

ITEM # 13-15 SPARE NO.

ITEM # 16 MOBILE STORAGE SHELVING
Manufacturer: Focus Foodservice
Qty. One (1) Lot
1. Twelve (12) FGN074G Post, 74"H, mobile, grooved at 1" increments, zinc plated leveling feet, for dry storage, chromate finish
2. Three (3) FSCASTS5 Caster Set, 5" (12.7 cm) dia., (2) swivel & (2) swivel with brake & bumper, adds 6"H to unit, 250 lbs. capacity per caster, heavy duty, non-marking tread, polyurethane
3. ~~Eight (8) FF2448CWire Shelf, 800 lb. weight capacity, 24"W x 48"L, for dry storage, zinc plated steel wire, chromate finish, clear coat~~
   Eight (8) FF1848CWire Shelf, 800 lb. weight capacity, 18"W x 48"L, for dry storage, zinc plated steel wire, chromate finish, clear coat
   (Addendum 1 dated 08/10/23)
4. Four (4) FF2436C Wire Shelf, 800 lb. weight capacity, 24"W x 36"L, for dry storage, zinc plated steel wire, chromate finish, clear coat

ITEM # 17 HAND SINK
Manufacturer: John Boos
Qty. Three (3)
Model: PBHS-W-1410-SSLR-X
1. Pro-Bowl Wall Mount Hand Sink, 14"W x 10" front-to-back x 5" deep bowl, splash mount faucet holes with 4" centers, 1-7/8" drain opening with basket drain, with left & right side splashes, includes mounting bracket, all stainless steel construction
2. Three (3) PBF-4SM-3GLF-X Heavy Duty Faucet, splash mount, 3-1/2" gooseneck spout, 4" centers, 1/4 turn ceramic cartridges, color coded hot/cold indicators, integral check valve, 1/2" NPT, chrome finish
3. Three (3) Pair PB-SMMK-90 ADA Wrist Blades, stainless steel, (1 pair), use with heavy duty faucets
4. Three (3) PB-SMMK-90 Splash Mount Faucet Mounting Kit, includes (2) 1/2" supply nipples, (2) retainer nuts, (2) lock washers, (2) rubber washers and (2) male & female short 90° elbows

ITEM # 18 WASTE CONTAINERS
Manufacturer: BY OTHER
Qty. Eleven (11)

ITEM # 19 SOAP AND TOWEL DISPENSERS
Manufacturer: BY OTHER
Qty. Three (3)

ITEM # 20 BUSSING UTILITY TRANSPORT CART
Manufacturer: Lakeside Manufacturing
~~Qty. Three (3)~~
Qty. Eight (8)
(Addendum 1 dated 08/10/23)
Model: 311A

1. Light Duty Utility Cart, 3-tier, open base, 300 lbs capacity, 15-1/2" x 24" shelf size, 11-3/4" shelf clearance, (1) push handle with bumpers, (2) bumpers on front legs, allergen-safe purple bumpers, welded angle frame, stainless steel construction, 3-1/2" swivel casters

ITEM # 21 ICE MACHINE AND BIN
Manufacturer: Follett LLC
Qty. One (1)
Model: HCC1010ABS

1. Horizon Elite™ Chewblet® Ice Machine, with RIDE® remote ice delivery equipment, air-cooled, self-contained condenser, for filling Follett ice storage bins, up to 1100 lb production of Chewblet® ice in 24 hoursy
2. 208-230/60/1, 11.0 amps, NEMA 6-15P
3. Ten Foot (10'-0"L) #00174896 Insulated Polywire Transport Tube, for installations requiring more than the standard 10' length
4. One (1) #00174896 Wall Mount Bracket, for Horizon Elite /W and /W RIDE model ice machines
5. One (1) #DEV860SG-48-75 Ice-Device™ with SmartCART™ 75, 860 lb. bin storage capacity, with front chute, poly liner, SmartGATE ice shield, poly door with PowerHinge™ door hinge, full stainless steel exterior and base, ABS/poly top custom cut for ice machine, includes 82 oz plastic ice scoop, paddle and rake set, and (1) polyethylene cart with hinged lid and (3) polyethylene Totes ice carriers, each carrier holds 25 lb/75 lb total per cart, for cube or Chewblet ice only,
6. One (1) #00978957 High Capacity Water Filter System for use with all Follett ice machines and ice and water dispensers, filtration capacity
7. One (1) #00978965 Replacement Primary Cartridge, for Follett high capacity water filter system filtration capacity, single cartridge
8. One (1) #00130211 Replacement Pre-Filter Cartridge, for Follett high capacity carbonless high capacity or standard capacity water filter systems, single cartridge
9. One (1) case of (12) #010838652 Nu-Calgon IMS-III Sanitizer
10. One (1) case of (6) #01149954 SafeCLEAN Plus, liquid – environmentally responsible ice machine cleaner

ITEM # 22 FLOOR TROUGH
Manufacturer: Advance Tabco
Qty. One (1)
Model: FTG-1248

1. 48"W x 12"D x 4" deep, 14 gauge 304 stainless steel, includes stainless steel subway grating constructed from 3/16" x 1" bars, removable stainless steel strainer basket, 4" O.D. waste pipe 3"L, pitched towards waste

ITEM # 23 SPARE NO.

ITEM # 24 MOBILE WORK TABLE
Manufacturer: Advance Tabco
Qty. Eight (8)
Model: SS-304

1. Model 22985 Work Table, 48"W x 30"D, 14 gauge 304 stainless steel top, 18 gauge adjustable stainless steel undershelf, stainless steel legs
2. Eight (8) TA-255B heavy duty casters with brakes on all wheels
3. Eight (8) OTS-12-48 Table mounter overshelfsingle, 48"W x 12"D, 18 gauge 430 stainless steel; mount as shown on FS plan
4. Eight (8) 449699 Square edge on overshelf
5. Eight (8) set, 78003 Casters, expanding adapter, for 1-5/8" dia. O.D. tube/table legs, 400 lb capacity per caster, set of (4), (2) casters with brakes

ITEM # 25 ONE (1) COMPARTMENT SINK
Manufacturer: Advance Tabco
~~Qty. Three (3)~~
Qty. Four (4)
(Addendum 1 dated 08/10/23)
Model: FC-1-1620

1. Single compartment sink without drainboards, bowl size 16" x 20" x 14" deep, 16 gauge 304 stainless steel, tile edge splash, rolled edge, 8" OC faucet holes, stainless steel legs with adjustable side cross-bracing, 1" adjustable stainless steel bullet feet
2. Three (3) K-4 Support Bracket, for lever waste drain handle
3. Three (3) K-495 Turn Down Backsplash with wall clips
4. Six (6) K-488 Flanged Bullet Foot, on front legs only
5. Three (3) T&S Brass B-0231 Sink Mixing Faucet, 12" swing nozzle, wall mounted, 8" centers on sink faucet with 1/2" IPS eccentric flanged female inlets, lever handles
6. Three (3) T&S Brass B-0199-01 Aerator, non-splash, 55/64" -27 female aerator threads, fits goosenecks & nozzles
7. Three (3) T&S Brass B-0230-K Installation Kit, (2) 1/2" NPT nipples, lock nuts & washers, (2) short "Ell" 1/2" NPT female x male
8. Three (3) T&S Brass B-0230-KIT Inlet Kit, 1/2" NPT nipple, close elbows, 24" flex supply hoses

ITEM # 26 WASTE CONTAINERS
Manufacturer: BY OTHER

ITEM # 27 PASS-THRU SHELF
Manufacturer: Advance Tabco
Qty. One (1)
Model: PA-18-96

1. Pass-Thru Shelf, 96"W x 18"D, bull nose front & rear with square sides, 18/430 stainless steel, 1-5/8" stainless steel tubing post, galvanized hat channel, includes: 3" x 4" stainless steel L-brackets to secure to wall. Work surface will be 1-1/2" higher than the wall it rests on.
2. One (1) TA-22A Square edge on pass-thru shelf

ITEM # 28-30 SPARE NO.

ITEM # 31 SHELVING, WALL MOUNTED
Manufacturer: Advance Tabco
Qty. One (1)
Model: WS-12-48-16

1. Model 463683 Shelf, wall-mounted, 48"W x 12"D, 1-5/8" bullnose front edge, 1-1/2"H rear up-turn, 16/304 satin finish stainless steel
2. One (1) TA-22A Square edge on wall shelf

ITEM # 32 CLEAN DISHTABLE
Manufacturer: Advance Tabco
Qty. One (1)
Model: DTC-S30-72R

1. Clean Dishtable, straight design, left-to-right operation, 10-1/2"H backsplash, 3" rolled front & side rims, stainless steel legs & crossrails, 71"W x 30"D x 34"H, 14/304 stainless steel
2. One (1) K-495 Turn Down Backsplash with wall clips
3. Two (2) K-488 Model 70195 Flanged Bullet Foot

ITEM # 33 DISHWASHER
Manufacturer: Hobart
Qty. One (1)
Model: AM16T-BASX-2

1. Dishwasher, door type, tall chamber (27"), high temp sanitizing, (field convertible to single phase), 60 racks/hour, straight-thru or corner, digital controls, Sense-A-Temp™ booster, electric tank heat, pumped rinse, pumped drain, auto-fill, stainless steel tank, frame, doors & feet, sheet pan rackENERGY STAR®
2. Startup by Factory Trained Technician - Confirmation of correct machine and utility installation; performance check to ensure machine is operating to factory specifications; adjustments as needed, and customer demo. For installations within 100 miles of a Hobart Service Office during normal business hours with appropriate notice; beyond 100 miles contact Hobart Service. See Hobart Service for complete details
3. One (1) DWT-AM16 Drain water tempering (single valve) kit with Pumped Drain Air Gap for BAS and Tall models
4. One (1) WTRHAMARREST-AM16 Water Hammer Arrestor – Assembly includes ¾" brass pressure regulator, pressure gauge, shock arrestor and garden hose adapter

ITEM # 34 CONDENSATE HOOD
Manufacturer: By Others

ITEM # 35-37 SPARE NO.

ITEM # 38 SOILED DISHTABLE
Manufacturer: Advance Tabco
Qty. One (1)
Model: DTS-S30-84L

1. Soil Dishtable, left-to-right, 10-1/2"H backsplash, with pre-rinse sink, stainless steel legs with crossrails front to back, 83"W, 14/304 stainless steel, Includes prerinse basket with slide bar
2. Turn Down Backsplash with wall clips
3. Two (2) K-488 Flanged Bullet Foot
4. One (1) K-452 Control Bracket 8" x 12"
5. One (1) T&S Brass B-0455 Vacuum Breaker Unit, 1/2" IPS piping, slip flanges for mounting on 45° surface, 6" between piping
6. One (1) T&S Brass B-0131-B EasyInstall Pre-Rinse Unit, wall mount mixing faucet with 8" adjustable centers, quarter-turn Eterna cartridges with spring checks, lever handles with color coded indexes, 26" EasyInstall riser with overhead swivel arm, 20" flexible stainless steel hose with heat-resistant gray handle & hold down ring, 1.15 GPM spray valve (B-0107), finger hook, 6" adjustable wall bracket, polished chrome-plated brass faucet body, 1/2" NPT female inlets, CSA
7. One (1) T&S Brass B-0230-K Installation Kit, (2) 1/2" NPT nipples, lock nuts & washers, (2) short "Ell" 1/2" NPT female x male
8. One (1) T&S Brass B-230-KIT Inlet Kit, 1/2" NPT nipple, close elbows, 24" flex supply hoses
9. One (1) T&S Brass B-0156 Add-on Faucet, for Pre-Rinse Units, 12" nozzle, includes 3" nipple

ITEM # 39 DISPOSER W/ PRE-RINSSE SPRAYER
Manufacturer: InSinkErator
Qty. One (1)
Model: SS-200-5-MRS

1. Disposer Package, sink mount system, with #5 adaptor for 3.5" to 4" sink opening, 2 HP motor, stainless steel construction, includes syphon breaker, solenoid valve, flow control valve, manual reverse switch, adjustable leg kit
2. 208V/60/1PH, 7.7 amps

ITEM # 40 WALL SHELF
Manufacturer: Advance Tabco
Qty. One (1)
Model: WS-12-48-16

1. Wall-mounted shelf, 48"W x 12"D, 1-5/8" bullnose front edge, 1-1/2"H rear up-turn, 16/304 satin finish stainless steel
2. One (1) TA-22A Square edge on overshelf or wall shelf
3. One (1) TA-60 reduce length as shown on plan

ITEM # 41-44 SPARE NO.

ITEM # 45 SHELVING, WALL MOUNTED
Manufacturer: Advance Tabco
Qty. One (1)
Model: WS-12-48-16 (463683)

1. Model 463683 Shelf, wall-mounted, 48"W x 12"D, 1-5/8" bullnose front edge, 1-1/2"H rear up-turn, 16/304 satin finish stainless steel, NSF
2. One (1) TA-22A Square edge on overshelf or wall shelf

ITEM # 46 FOUR (4) COMPARTMENT SINK
Manufacturer: Advance Tabco
Qty. One (1)
Model: FC-4-1824-18RL

1. Fabricated Sink, 4-compartment, 18" right & left drainboards, bowl size 18" x 24" x 14" deep, 16 gauge 304 stainless steel, tile edge splash, rolled edge, (2) sets of 8" OC faucet holes, stainless steel legs with adjustable side cross-bracing, 1" adjustable stainless steel bullet feet, overall 30"D
2. Four (4) K-4 Support Bracket, for lever waste drain handle, (1) support required for each lever drain
3. One (1) K-495 Turn Down Backsplash with wall clips
4. Four (4) K-488 Flanged Bullet Foot
5. One (1) T&S Brass B-0133-12-CRBJK EasyInstall Pre-Rinse Unit, with add-on faucet, splash/wall mount, 8" OC, 44" flexible stainless steel hose with B-0107-J spray valve, 18" riser, add-on faucet with 12" swing spout, lever handles, Cerama cartridges with check valves, 6" wall bracket, 1/2" NPT male elbow installation kit, low lead
6. One (1) T&S Brass B-0231 Sink Mixing Faucet, 12" swing nozzle, wall mounted, 8" centers on sink faucet with 1/2" IPS eccentric flanged female inlets, lever handles
7. One (1) T&S Brass B-0230-KIT Inlet Kit, 1/2" NPT nipple, close elbows, 24" flex supply hoses
8. Four (4) T&S Brass B-3952 Waste Valve, twist handle, 3-1/2" sink opening, 2" drain outlet

ITEM # 47-49 SPARE NO.

ITEM # 50 KITCHEN HOOD AND ST/ST WALL PANELING
Manufacturer: By Others

ITEM # 51 FIRE SUPPRESSION SYSTEM
Manufacturer: By Others

ITEM # 52 CONVECTION OVEN
Manufacturer: Blodgett Oven
Qty. One (1)
Model: ZEPH-100-G DBL

1. Zephaire Convection Oven, gas, double-deck, standard depth, capacity (5) 18" x 26" pans per compartment, (SSI-D) solid state infinite controls with digital timer, two speed fan, flue connector, dependent glass doors, interior light, stainless steel front, sides & top, 6" stainless steel legs, 100,000 BTU
2. Natural gas
3. Two (2) 115V/60/1PH, 6.0 amps, 2-wire with ground, cord & plug, 1/2 hp
4. SSI-D Top Oven: Solid State infinite with digital timer, standard
5. SSI-D Bottom Oven: Solid State infinite with digital timer, standard
6. One (1) set 4" low profile plate casters
7. One (1) Gas manifold for double ovens
8. One (1) Dormont 1675BPQ2SR48 Blue Hose™ Moveable Gas Connector Hose Assembly, 3/4" inside dia., 48" long, covered with stainless steel braid, coated with blue antimicrobial PVC, (1) SnapFast® QD, (2) Swivel MAX®, (1) Snap'N Go, coiled restraining cable with hardware, 160,000 BTU/hr minimum flow capacity

ITEM # 53 TILTING SKILLET BRAISING PAN
Manufacturer: Crown
Qty. One (1)
Model: GS-40

1. Tilting Skillet, gas, 40 gallon capacity, manual tilt, electronic ignition, high temp safety cut-off, removable pour strainer, etched interior markings, stainless steel construction, tubular legs, adjustable bullet feet front, adjustable flanged feet rear, 125,000 BTU
2. Natural Gas
3. 120V/50/60/1Ph cord and plug
4. One (1) PC-3 Pan Carrier
5. One (1) SF-12 12" single pantry faucet
6. One (1) FB Faucet bracket
7. One (1) Dormont 1675BPQ2SR48 Blue Hose™ Moveable Gas Connector Hose Assembly, 3/4" inside dia., 48" long, covered with stainless steel braid, coated with blue antimicrobial PVC, (1) SnapFast® QD, (2) Swivel MAX®, (1) Snap'N Go, coiled restraining cable with hardware, 160,000 BTU/hr minimum flow capacity

ITEM # 54 TILTING KETTLE
Manufacturer: Crown
Qty. One (1)
Model: GLT-40

1. Tilting Kettle, gas, 40 gallon capacity, 2/3 jacket, thermostatic control, electronic ignition, crank tilt, faucet bracket, 316 stainless steel interior liner, stainless steel exterior, console & 1-5/8" diameter legs, flanged feet, 100,000 BTU, CSA Star, CSA Flame, NSF
2. Natural Gas
3. 120V/50/60/1Ph cord and plug
4. One (1) TVT-2 2" tangent draw off valve includes perforated strainer (location as per spec)
5. One (1) TPS-2 Perforated Strainer, for 2" draw-offs, standard
6. One (1) PC-4 Pan Support, for 20-100 gallon tilting kettles
7. One (1) SF-18 18" single pantry faucet
8. One (1) Dormont 1675BPQ2SR48 Blue Hose™ Moveable Gas Connector Hose Assembly, 3/4" inside dia., 48" long, covered with stainless steel braid, coated with blue antimicrobial PVC, (1) SnapFast® QD, (2) Swivel MAX®, (1) Snap'N Go, coiled restraining cable with hardware, 160,000 BTU/hr minimum flow capacity

ITEM # 55 FLOOR TROUGH
Manufacturer: Advance Tabco
Qty. One (1)
Model: FTG-2436
1. Floor Trough, 36"W x 24"D x 4" deep, 14 gauge 304 stainless steel, includes stainless steel subway grating constructed from 3/16" x 1" bars, removable stainless steel strainer basket, 4" O.D. waste pipe 3"L, pitched towards waste

ITEM # 56 FLOOR TROUGH
Manufacturer: Advance Tabco
Qty. One (1)
Model: FTG-2436
1. Floor Trough, 36"W x 24"D x 4" deep, 14 gauge 304 stainless steel, includes stainless steel subway grating constructed from 3/16" x 1" bars, removable stainless steel strainer basket, 4" O.D. waste pipe 3"L, pitched towards waste, NSF

ITEM # 57 SPARE NO.

~~ITEM # 52 CONVECTION OVEN~~
ITEM # 58 CONVECTION OVEN
Addendum 1 dated 08/10/23)
Manufacturer: Blodgett Oven
Qty. One (1)
Model: ZEPH-100-G DBL
1. Zephaire Convection Oven, gas, double-deck, standard depth, capacity (5) 18" x 26" pans per compartment, (SSI-D) solid state infinite controls with digital timer, two speed fan, flue connector, dependent glass doors, interior light, stainless steel front, sides & top, 6" stainless steel legs, 100,000 BTU
2. Natural gas
3. Two (2) 115V/60/1PH, 6.0 amps, 2-wire with ground, cord & plug, 1/2 hp
4. SSI-D Top Oven: Solid State infinite with digital timer, standard

5. SSI-D Bottom Oven: Solid State infinite with digital timer, standard
6. One (1) set 4" low profile plate casters
7. One (1) Gas manifold for double ovens
8. One (1) Dormont 1675BPQ2SR48 Blue Hose™ Moveable Gas Connector Hose Assembly, 3/4" inside dia., 48" long, covered with stainless steel braid, coated with blue antimicrobial PVC, (1) SnapFast® QD, (2) Swivel MAX®, (1) Snap'N Go, coiled restraining cable with hardware, 160,000 BTU/hr minimum flow capacity

ITEM # 59 THERMOSTATIC GRIDDLE
Manufacturer: Southbend
Qty. One (1)
Model: 436D-3T

1. Ultimate Restaurant Range, gas, 36" griddle, thermostatic controls, standing pilot, (1) standard oven with battery spark ignition, includes (1) rack, 22-1/2" flue riser with shelf, stainless steel front, sides, shelf & casters, 2 locking, 109,000 BTU
2. One (1) 22.5" high flue riser, with heavy duty shelf
3. Natural Gas
4. Battery spark ignition
5. One (1) Dormont 1675BPQ2SR48 Blue Hose™ Moveable Gas Connector Hose Assembly, 3/4" inside dia., 48" long, covered with stainless steel braid, coated with blue antimicrobial PVC, (1) SnapFast® QD, (2) Swivel MAX®, (1) Snap'N Go, coiled restraining cable with hardware, 160,000 BTU/hr minimum flow capacity

ITEM # 60 CHARBROILER
Manufacturer: Southbend
Qty. One (1)
Model: 436D-3C

1. Ultimate Restaurant Range, gas, 36" charbroiler, standing pilot, (1) standard oven with battery spark ignition, includes (1) rack, 22-1/2" flue riser with shelf, stainless steel front, sides, shelf & casters, 141,000 BTU
2. 22.5" high flue riser, with heavy duty shelf, standard
3. Natural Gas
4. 10" riser in lieu of standard 22.5" high back riser
5. One (1) Dormont 1675BPQ2SR48 Blue Hose™ Moveable Gas Connector Hose Assembly, 3/4" inside dia., 48" long, covered with stainless steel braid, coated with blue antimicrobial PVC, (1) SnapFast® QD, (2) Swivel MAX®, (1) Snap'N Go, coiled restraining cable with hardware, 160,000 BTU/hr minimum flow capacity

ITEM # 61 6 BURNER RANGE
Manufacturer: Southbend
Qty. One (1)
Model: X-4361D

1. Restaurant Range, gas, 36", (6) non-clog burners, standard grates, standing pilot, (1) standard oven with battery spark ignition, includes (1) rack, 22-1/2" flue riser with shelf, stainless steel front, sides, shelf & casters, 243,000 BTU
2. Natural Gas
3. One (1) Dormont 1675BPQ2SR48 Blue Hose™ Moveable Gas Connector Connector Hose Assembly, 3/4" inside dia., 48" long, covered with stainless steel braid, coated with blue antimicrobial PVC, (1) SnapFast® QD, (2) Swivel MAX®, (1) Snap'N Go, coiled restraining cable with hardware, 160,000 BTU/hr minimum flow capacity

ITEM # 62 KITCHEN HOOD
Manufacturer: By Other

ITEM # 63-65 SPARE NO.

ITEM # 64 STAINLESS STEEL PANELS AND END CAPS.
Manufacturer: By Other

Department of Public Works
Engineering Division
James M. Wolfe, P.E., City Engineer

City-County Building, Room 115
210 Martin Luther King, Jr. Boulevard
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Deputy Division Manager
Kathleen M. Cryan

Principal Engineer 2
John S. Fahrney, P.E.
Janet Schmidt, P.E.

Principal Engineer 1
Mark D. Moder, P.E.
Andrew J. Zwieg, P.E.

Financial Manager
Steven B. Danner-Rivers

August 24, 2023

ADDENDUM NO. 2
City of Madison, Engineering Division

CONTRACT NO. 8595
MADISON PUBLIC MARKET

This addendum is issued to modify, explain or correct the original Drawings, Specifications, or Contract Documents marked as **Madison Public Market, Contract #8595, as issued on July 20, 2023** and is hereby made a part of the contract documents.

Please acknowledge this addendum on page E1 of the contract documents and/or in Section E: Bidder's Acknowledgement on Bid Express.

Electronic version of these documents can be found on Bid Express at https://www.bidexpress.com/ and the City of Madison web site at http://www.cityofmadison.com/business/PW/contracts/openforBid.cfm

If you are unable to download plan revisions associated with the addendum, please contact the Engineering office at (608) 266-4751 to receive the material by another method.

For questions regarding this bid, contact:

Brent Pauba
PH: (608) 266-4092
Email: BPauba@CityofMadison.com
210 Martin Luther King Jr. Blvd
Room 115
Madison, WI 53703

Sincerely,

Bryan Cooper For:

James M. Wolfe, P.E.
City Engineer

This addendum modifies the following documents:

1. No change to any published documents.
2. (1) new reference documents attached

Please attach these Addendum documents to the Drawings and Project manual in your possession.

1. GENERAL CONTRACT CONDITIONS

A. No change

2. GENERAL QUESTIONS AND ANSWERS

A. Will site-visit sign-in sheets be published?

i. Yes. See the attached sign-in sheets for August 17 and August 24 site visits.

3. ACCEPTABLE EQUIVALENTS

A. No change

4. SPECIFICATIONS

A. No change

5. DRAWINGS

A. No change

6. PROPOSAL

A. No change

Madison Public Market
Contract 8595
SITE TOUR
Thursday, August 17, 2023, (1:00 – 2:30 P.M.)

ATTENDEES
PLEASE SIGN-IN

NAME	COMPANY	EMAIL	PHONE
Mark Brusberg	Daniels	mark.brusberg@danielsco.com	608-271-4800
Jake Cates	Daniels	Jake.Cates@danielsco.com	608-235-1859
Josh Nelson	Integrity	jnelson.its@gmail.com	262-798-1453
Shane Barrett	KVA Electric	shane@kva-electric.com	608-475-9768
Patrick Mayew	Riley Const.	Patrick@Rileycon.com	262-945-2278
Sam Swan	Duffek Construction	SSwan@duffekconstruction.com	262-282-6639
Matt Hamilton	HJ Pertzborn	mhamilton@hjpertzborn.com	608-256-3900
Rob Canino	Best Defense	rob@bestdefense.com	414-758-6669
Eliot Bergeland	Pipers Mechanical	eliotb@pipersmechanical.com	608-831-5454
Ryan Vanden Avond	Harker Htg	ryanv@harkerheating.com	608-509-3713
Eric Steinhoff	HJ Pertzborn	esteinhoff@hjpertzborn.com	608-514-5714

Madison Public Market
Contract 8595
SITE TOUR
Thursday, August 17, 2023, (1:00 – 2:30 P.M.)

ATTENDEES
PLEASE SIGN-IN

NAME	COMPANY	EMAIL	PHONE
Ryan Tydrich	Robinson Brothers	ryant@gmail.com	608-575-7783
NATHAN SPARBEL	* SELECT DEMO ROBINSON BROTHERS	nathane@robinsonbros.com	608-212-5076
Matt Prescott	Tr. North	mprescott@tr-north.com	608-204-2455
KEVIN JUDD	INTEGRAL BUILDING SYS.	kevin@ibsystems inc.com	608.669-3501
Sean Chambers	Alliance Conc Sawing	schambers@ alliancesawing.com	847-783-6585
Steve Ingalls	Project Elect		
Luke Anderson	Pieper	luke.anderson@pieper	609-475-2379
Ian Stanosek-Rockwood	Southport	istanosekrock@southportheaty.com	262-515-6170
Ted Maleseviich	Sure-Fire	edwardm@surefireinc.com	920-485-4883
Diana Etmanczyk	Monona Plumbing	detmanczyk@mononaptp.com	608.444.7316

Madison Public Market
Contract 8595
SITE TOUR
Thursday, August 24, 2023, (1:00 – 2:30 P.M.)

ATTENDEES
PLEASE SIGN-IN

NAME	COMPANY	EMAIL	PHONE
Tony Muhlstein	DesignBuild F.P.	tonym@dbfp.net	608 482-0821
Vinny Iacobucci	Riley Construction	VINCENTI@RILEYCON.COM	262 658-4381
Jeff Zuhn	Riley Construction	jeffz@rileycon.com	262 620-9671
Clayton Tibbetts	Hooper Corp	CTibbetts@Hoopercorp.com	608-516-5537
Terry Theis	MALY ROOFING	Terryt@malyroofing.com	608-249-7463
Hector Rivera	Rivera Construction	RiveraConstructionWI@gmail.com	407-928-2545
Nick Hicks	Midwest Electric	nhicks@mwelectric.net	262-365-4709
Kevin Powers	NAMC	KPowers@namcinc.com	608-842-3919
Carson Holin	Hooper Corp	CHolin@hoopercorp.com	608-852-2393
Kyle Wehrwein	Hooper Corp	KWehrwein@hoopercorp.com	608-268-2168
Chris Soulier	TS Masonry Inc	chris@tsmasonry.net	608-513-9816

Madison Public Market
Contract 8595
SITE TOUR
Thursday, August 24, 2023, (1:00 – 2:30 P.M.)

ATTENDEES
PLEASE SIGN-IN

NAME	COMPANY	EMAIL	PHONE
Phil Budde	T.S. Masonry	Phil@TSMasonry.Net	608-279-7209
Mark Brusberg	Daniels	mark.brusberg@danielsco.com	608-271-4800
Brett Bacci	Interstate	Brett@interstatesawwi.com	414-750-7369
Aaron Burlingame	Interstate	aaron@interstatesawing.com	715-315-0006
Jerry Roach	Tri-North	JRoach@tri-north.com	608 204-7213
Matt Bock	[illegible]	[illegible]ler inc.com	847 613 8499

Department of Public Works
Engineering Division
James M. Wolfe, P.E., City Engineer

City-County Building, Room 115
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Madison, Wisconsin 53703
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Assistant City Engineer
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Gregory T. Fries, P.E.
Chris Petykowski, P.E.

Deputy Division Manager
Kathleen M. Cryan

Principal Engineer 2
John S. Fahrney, P.E.
Janet Schmidt, P.E.

Principal Engineer 1
Mark D. Moder, P.E.
Andrew J. Zwieg, P.E.

Financial Manager
Steven B. Danner-Rivers

August 31, 2023

ADDENDUM NO. 3
City of Madison, Engineering Division

CONTRACT NO. 8595
MADISON PUBLIC MARKET

This addendum is issued to modify, explain or correct the original Drawings, Specifications, or Contract Documents marked as **Madison Public Market, Contract #8595, as issued on July 20, 2023** and is hereby made a part of the contract documents.

Please acknowledge this addendum on page E1 of the contract documents and/or in Section E: Bidder's Acknowledgement on Bid Express.

Electronic version of these documents can be found on Bid Express at https://www.bidexpress.com/ and the City of Madison web site at http://www.cityofmadison.com/business/PW/contracts/openforBid.cfm

If you are unable to download plan revisions associated with the addendum, please contact the Engineering office at (608) 266-4751 to receive the material by another method.

For questions regarding this bid, contact:

Brent Pauba
PH: (608) 266-4092
Email: BPauba@CityofMadison.com
210 Martin Luther King Jr. Blvd
Room 115
Madison, WI 53703

Sincerely,

James M. Wolfe, P.E.
City Engineer

This addendum modifies the following documents:

1. 8595 Contract.pdf
   - **A.** Page A-1

Please attach these Addendum documents to the Drawings and Project manual in your possession.

1. **GENERAL CONTRACT CONDITIONS**
   - **A.** Remove and replace Section A: Advertisement for Bids and Instructions to Bidders (Pages A-1 & A-2).
     - **i.** PREQUALIFICATION APPLICATION DUE (2:00 P.M.) date revised to September 7, 2023
     - **ii.** BID SUBMISSION (2:00PM) date revised to September 14, 2023
     - **iii.** BID OPEN DATE (2:30PM) date revised to September 14, 2023
     - **iv.** PUBLISHED IN WSJ dates revised to include September 7, 2023

2. **GENERAL QUESTIONS AND ANSWERS**
   - **A.** No change

3. **ACCEPTABLE EQUIVALENTS**
   - **A.** No change

4. **SPECIFICATIONS**
   - **A.** No change

5. **DRAWINGS**
   - **A.** No change

6. **PROPOSAL**
   - **A.** No change

SECTION A: ADVERTISEMENT FOR BIDS AND INSTRUCTIONS TO BIDDERS

REQUEST FOR BID FOR PUBLIC WORKS CONSTRUCTION
CITY OF MADISON, WISCONSIN

A BEST VALUE CONTRACTING MUNICIPALITY

PROJECT NAME:	MADISON PUBLIC MARKET
CONTRACT NO.:	8595
SBE GOAL	15%
BID BOND	5%
SBE PRE BID MEETING	See Pre Bid Meeting info below
PREQUALIFICATION APPLICATION DUE (2:00 P.M.)	SEPTEMBER 7, 2023
BID TALK – VIRTUAL (1:00 – 2:00 P.M.)	AUGUST 3, 2023
SITE TOUR (1:00 – 2:30 P.M.)	AUGUST 17, 2023
SITE TOUR (1:00 – 2:30 P.M.)	AUGUST 24, 2023
BID SUBMISSION (2:00 P.M.)	SEPTEMBER 14, 2023
BID OPEN (2:30 P.M.)	SEPTEMBER 14, 2023
PUBLISHED IN WSJ	JULY 20, 27, & AUGUST 3, 10, 17, 24 & 31, & SEPTEMBER 7, 2023

SBE PRE BID MEETING: Small Business Enterprise Pre-Bid Meetings are not being held in person at this time. Contractors can schedule one-on-one phone calls with Tracy Lomax in Affirmative Action to count towards good faith efforts. Tracy can be reached at (608) 266-6510 or by email, tlomax@cityofmadison.com.

BID TALK (VIRTUAL): The City of Madison Engineering Division is hosting virtual live (and later recording posted) sessions called "Bid Talks." This is an opportunity for you to learn about the project to help with your bid and estimating numbers. During our "Bid Talks" session for this project, the project staff will present information about the project specific to your bidding process. Staff will answer any questions you have. You will also be able to see who is attending. This meeting will be held in a more informal format, where you'll be able to ask questions and have a conversation. Please send your estimators and bidders to these Bid Talks, as they take the place of in-person site visits for specific projects. Registration prior is required. Please register by visiting the Madison Public Market project page at https://www.cityofmadison.com/engineering/projects/madison-public-market. A recording link will also be posted to the project page after the meeting.

SITE TOUR: The City of Madison will be holding two Pre-Bid Site Tours as indicated in the schedule above, at the existing facility, located at 202 N First St, Madison, WI. All bidding contractors are encouraged to attend. This will be an opportunity for bidding contractors to ask questions regarding the project and become fully aware of existing site conditions.

Please be aware of the following:

1. There is limited parking on the project site, on street parking is available on adjacent streets (E Dayton, E Mifflin).
2. All participants are required to sign-in with the City Project Manager prior to attending the site tour. Sign-ins will occur onsite at the Northwest entry of the 202 N First St facility.

- Contractors are highly encouraged to attend this meeting. Any questions/concerns presented will be recorded and published, in an addendum, to all bidding contractors.

PREQUALIFICATION APPLICATION: Forms are available on our website, www.cityofmadison.com/engineering/developers-contractors/contractors/how-to-get-prequalified. If not currently prequalified in the categories listed in Section A, an amendment to your Prequalification will need to be submitted prior to the same due date. Postmark is not applicable.

Department of Public Works
Engineering Division
James M. Wolfe, P.E., City Engineer

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Madison, Wisconsin 53703
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Assistant City Engineer
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Janet Schmidt, P.E.

Principal Engineer 1
Mark D. Moder, P.E.
Andrew J. Zwieg, P.E.

Financial Manager
Steven B. Danner-Rivers

September 7, 2023

ADDENDUM NO. 4
City of Madison, Engineering Division

CONTRACT NO. 8595
MADISON PUBLIC MARKET

This addendum is issued to modify, explain or correct the original Drawings, Specifications, or Contract Documents marked as **Madison Public Market, Contract #8595, as issued on July 20, 2023** and is hereby made a part of the contract documents.

Please acknowledge this addendum on page E1 of the contract documents and/or in Section E: Bidder's Acknowledgement on Bid Express.

Electronic version of these documents can be found on Bid Express at https://www.bidexpress.com/ and the City of Madison web site at http://www.cityofmadison.com/business/PW/contracts/openforBid.cfm

If you are unable to download plan revisions associated with the addendum, please contact the Engineering office at (608) 266-4751 to receive the material by another method.

For questions regarding this bid, contact:

Brent Pauba
PH: (608) 266-4092
Email: BPauba@CityofMadison.com
210 Martin Luther King Jr. Blvd
Room 115
Madison, WI 53703

Sincerely,

James M. Wolfe, P.E.
City Engineer

This addendum modifies the following documents:

1. 8595 Contract.pdf
2. Exhibit-A_drawings.pdf
3. Exhibit-B_specifications_volume1.pdf
4. Exhibit-C_specifications_volume2.pdf
5. Exhibit-D_specifications_volume3.pdf

Please attach these Addendum documents to the Drawings and Project manual in your possession.

1. GENERAL CONTRACT CONDITIONS

A. No change

2. GENERAL QUESTIONS AND ANSWERS

A. *"Per Section 01 10 00 Summary, 1.3 Work By Owner, C. Concurrent Work, The owner shall install Bale-1 and Lift-1 as per the drawings and Section 11 51 00 and 11 13 19 respectively. Per Section 11 13 19 Stationary Loading Dock Equipment, Item 1.2A states that the owner is to provide and install LIFT-1 but per Section 11 51 01 Owner Provided Equipment Responsibility Matrix, LIFT-1 and BALE-1 are listed as being installed by the GC. Please confirm which is correct"*

i. **LIFT-1 and BALE-1 are to be purchased by the owner and installed by the GC. 11 51 00 "Owner Provided equipment as issued in 09-June 2023 "Bid Documents" is correct. Section 01 10 00 "Summary" has been corrected via this addendum.**

B. *"Per Section 01 10 00 Summary, 1.3 Work By Owner, D. Subsequent Work, The owner shall furnish and install all kitchen equipment per the Food Service Drawings and Specification Section 11 40 00. Per Section 11 40 00, Food Service Equipment it clearly states what each trade is responsible for providing but does not confirm via this spec section that the owner is responsible for providing and installing the food service equipment. Per Plan Sheet FS104 Equipment List, there exists a conflict with the two previous mentioned spec sections as there is equipment listed to be furnished by the City and Installed by the GC and also equipment furnished and installed by the GC. Please confirm owner will provide and install the food service equipment or if GC is to furnish and install."*

i. **The Equipment List Responsibility Matrix on sheet FS101 as issued in 09-June-2023 "Bid Documents" is correct. The discrepancy in section 01 10 00 "Summary" has been corrected via this addendum.**

C. *"Per Section 01 74 19 Construction Waste Management and Disposal, 3.2 Hazardous and Toxic Waste, A, The owner shall be responsible under separate contract for removal of any asbestos related materials. Please confirm abatement is complete and supply the necessary all clear letter of post abatement inspection which will be required for DNR notice of demolition."*

i. **Asbestos abatement is complete. Necessary documentation for DNR Notice of Demolition shall be delivered to the awarded General Contractor.**

D. *"Please confirm extents of cleaning of existing interior surfaces via specification or drawing notating requirements as this is not currently defined in the construction documents but is noted as required prior to painting of the interior surfaces."*

i. **The surface preparation requirements for existing surfaces to receive new paint are described in 09 91 23 "Interior Painting". 'A'-series Finish Plans, Interior Elevations, RCPs and other drawings and details note which surfaces are to receive new finishes. Coordinate with Floor and Demolition plans to determine location of existing walls which are to be prepped per 09 91 23.**

ii. We have added finish tags to A700's and A500' drawings to clarify notations between the two. This is for coordination clarity only. Work clouded in this addendum does not represent the only extent of painting at existing surfaces. Coordinate with full Architectural set per 2.4.1.

E. *"One additional item that I just came across as it relates to the resinous flooring. Section 09 67 23 Resinous Flooring calls for EPOXY-1 to the a 4-part decorative flake system with the basis of design being the Tennant Flake DB system. Sheet G002 calls for EPOXY-1 to be a Sherwin Williams product Resuflor MPE, PT & Resutile HTS 100 (Satin). Please confirm the desired intent as there is conflicts between the documents."*

i. **Tennant Epoxy Flooring was purchased by Sherwin Williams. Sheet G002 is correct. Section 09 67 23 "Resinous Flooring" has been corrected via this addendum with equivalent Sherwin Williams system.**

F. *"Please confirm project schedule given the current lead times of electrical gear range anywhere from 60 to 70 weeks from receipt of order. Receipt of order will take 4 weeks from award of contract to low responsible bidder. If GC is awarded per timeline as noted in the contract per Section 109.7 for start work letter to be issued by November 7, 2023, electrical gear would be delivered on or about April 8, 2025. GC would need 16 weeks post delivery of electrical gear to complete all installation, startup, commissioning, testing and turnover resulting in a completion date of the project on or about July 31, 2025, which would result in Contract Closeout being August 31st, 2025, 7 months later than as required per Section 109.7 Time of Completion."*

i. **Under Sec. 109.8 of the Standard Specifications, should the Contractor find it impossible to complete the work on or before the time for completion as specified in the contract, the Contractor may make a written request for an extension of time, which extension may be granted if the Board of Public Works finds that the work is delayed because of conditions beyond the control of the Contractor. The City is aware of extended lead times for some electrical gear and, should Contractor be unable to secure necessary equipment due to supply chain issues outside of the control of the Contractor, will work with the awarded Contractor to develop an equitable schedule for long procurement times related to specific electrical gear and related work (i.e. installation, startup, commissioning, and testing) if it is proven that delivery dates cannot meet the specified schedule. While an extension of time may be granted under Sec. 109.8, all other building elements shall be completed per the current Construction Closeout date listed in the Contract under SECTION 109.7 TIME OF COMPLETION.**

ii. **See Section 4 SPECIFICATIONS of this document where specification 26 23 00 is deleted and specification 26 24 13 is added.**

G. *"Can you verify the roofing system that will be used to patch and flash into the existing roofing on the building at 202 N. First Street. The new curb flashings and roof patching will not get a separate roof warranty, they will be part of the existing roof warranty already in place."*

i. **Project assumes that existing roof is Firestone 60 mil TPO Roofing, white, fully adhered.**

ii. **Note that 2013 Re-roof documents included in Bid Reference 5 "Drawings and Existing Conditions" notes the existing roofing as EPDM. This Reference document is incorrect.**

H. *"I need to know where the walk-in condensing units are being located and what an estimated line run will be in order to give an accurate quote for those items".*

i. **FS condensing equipment is located on roof and labeled in 'A' series drawings.**

I. *"In the spec (Section 263100- Photovoltaic System, 2.5 Roof Attachment), it lists two options for a flat roof install, the first one, U-Anchor EPDM (should be for TPO), is a system that has a bolt that will penetrate the roof membrane and requires a TPO patch at each penetration. The second one is for a Rack system that only requires a ballast weight to hold it down, SolarDock, (no penetrations, no patch). Which system*

should be included? Also, if it's the U-Anchor, who will be supplying and installing the anchors? We would be doing the TPO patching."

i. **Photovoltaic System shown in drawings and specifications is a basis of design only. The actual design of Photovoltaic System, including racking and anchors, shall be performed by General Contractor's photovoltaic system subcontractor. The type of anchor used is up to them and will depend on the proposed weight of the system as there are limits, described in the Structural Criteria and Loading schedule on S001, on what additional roof loads the structure can support.**

ii. **If possible, the racking and anchorage should be designed as a ballasted system. As noted, the system weight must conform to the Structural Design and Loading Criteria on S001.**

iii. **Coordinate with your Bidding General Contractor and their preferred Photovoltaic Subcontractor to determine which anchor type they will use. In the event that TPO patch fittings are required, the quantity of such should be determined in coordination with the bidding contractor and reflected in their overall bid.**

iv. **Anchor types used must maintain existing roof warranty**

J. *"Per drawing table of contents, several drawings are missing, please provide the following drawings:"*

i. **These drawings appeared in the sheet list by error. The Cover Sheet has been re-issued with a corrected sheet list via this Addendum.**

K. *"Per demolition spec a 2hr firewatch is required; this seems excessive, can this be reduced to a 30 minute firewatch?"*

i. **Firewatch may be reduced to 30 Minutes.**

L. *"Spec 071416 references a drainage mat but no drainage mat can be seen in any of the drawing details, please provide drainage mat locations."*

i. **Drainage mat is not used, provide water proofing manufacturers protection course to protect waterproofing during backfilling pe 07 14 16**

M. *"Please confirm the intent of the waterproofing is to excavate the top 2 feet of soil and waterproof the existing foundation to 2' below grade at all locations? Does this apply to the ancillary building as well?"*

i. **Yes, as a part of installation of new envelope system at lower extent of main building, Water Proofing shall be installed to 2' below grade.**

ii. **No, Ancillary building envelope is only being recoated. No waterproofing is planned at ancillary building.**

N. *"Documents are conflicting as to provides LIFT-1, please clarify who provides and installs this item."*

i. **See question and answer "2.1" above.**

O. *"Who is responsible for providing the bike repair station? Contractor or owner?"*

i. **The General Contractor shall provide and install the specified bike repair station.**

P. "Please confirm per DPW standard spec the contractor is responsible for builders risk insurance. Is there any additional equipment that needs to be captured under the policy?"

i. **See the Public Works specification for insurance requirements.**

Q. *"Please provide retaining wall tow of wall elevations on the landscaping plans"*

i. **See Updated Sheet L200**

R. *"Please provide a drawing depicting heavy duty vs light duty pavement, we are unsure what the intended scope is based on plan comments."*

i. See Updated Sheets L001, L002, L100. L200

S. *"Please clarify is the standard duty pavement is 3 or 4 inches of asphalt? There is conflicting information in the documents"*
i. See Updated Sheet L100

T. *"We were unable to locate the concrete-2 floor finish, where is this intended to occur?"*
i. CONC-2 is not a finish. It is only used to denote an existing concrete floor VS a new concrete floor assembly – for instance, RM125 on 1/A102S.
ii. New finishes installed over existing concrete floors are described in A700's

U. *"Is the plant maintenance truly an entire season as described in the spec? we have never seen a maintenance plan for that long of a duration and want to confirm that this is truly intended for the project."*
i. **Plant maintenance period is for the entire growing season as outlined in section 32 93 00. Plantings installed prior to June 15 shall be maintained for the duration of the growing season (until November 1). Plantings installed after September 1 shall be maintained for the remainder of the growing season (until November 1) AND for the entire growing season of the following year (April 1 – November 1).**

V. *"C405 mentions a membrane around the stormtech chambers, stormtech does not provide this membrane, please advise what material the membrane should be."*
i. See Attachment: "8595_C405-Construction Details-5_Addendum-4.pdf"

W. *"Who is responsible for temporary utility consumption charges during construction? Owner or contractor?"*
i. The Contractor is responsible for temporary utility consumption charges.

X. *"I am wondering if we might be able to bid this with a tilt up that is a lower tilt, at 10 Degrees."*
i. Per Drawing notes and 26 31 00, Photovoltaic System as described in these drawings is a basis of design. Bidding contractor may propose any photovoltaic system that meets the requirements of the project drawings and specifications.
ii. Note that there are limits to what the existing roof structure can accommodate. Please refer to "Structural Criteria and Loads" on S001. A ballasted system may be difficult to achieve given the limitations.
iii. Note that photovoltaic system, as designed, considers key placement factors and any revisions should accommodate these:
(1) 10' min. clearance from roof edges
(2) Acceptable access lanes between rows
(3) Not be located – to all extents possible – around exhaust hood fans.

Y. *"Volume damper specifies dampers with frames and blade & jamb seals. Volume dampers are typical used for balancing, not positive shut off like control dampers. Can we provide volume dampers standard balancing dampers?"*
i. **Bid Documents call for good-quality manual balancing dampers from reputable manufacturers. They should remain as specified.**

Z. *"Section 03 10 30 Maintenance of Cast-In-Place Concrete reference EPOXY-2 under the Section Summary. A product is not called out on G002 nor in Section 09 67 23 Resinous Flooring. This is open to bidder interpretation and very vague. Additionally, this specification references that the GC is responsible*

to coordinate and ensure that the existing floor coating is cleanable to a point of passing a Department of Health inspection. How will this be achieved given that the existing floor coating is laden with oil, grease, diesel fuel and dirt? Please provide specification of existing floor coating so GC's can understand if and how it can be cleaned to achieve the desired result."

i. **EPOXY-2 has been removed from 03 10 30 via this addendum. It was meant to describe a product to be used in rehabilitating concrete floors.**

ii. **Rather than specify a product, section 03 10 30 describes a process for repairing and rehabilitating damaged floors. Acceptable manufacturers and products, based on performance characteristics and testing, are noted in 03 10 30 Part 2.**

AA. *"Please confirm desired intent of LEED Certification of the project. Specification Section 01 81 13 lists the goal as LEED Gold but at the pre-bid meeting it was stated that the goal is LEED Silver. Also provide Specification Section 01 81 13.14 as it relates to LEED Sustainability requirements mentioned throughout the specifications"*

i. **The Project is targeting LEED Gold. LEED Silver is the minimum required for all city projects.**

ii. References to 01 81 13.14 throughout Project Manual shall refer to this section 01 81 13."

BB. *"Specification Section 03 35 43 Polished Concrete Flooring references there exists a Design Reference Sample. Please provide photos of the reference sample to understand the desired level of finish*

i. **See modifications to 03 35 43 as issued in this addendum**

ii. **Samples / Mockups for concrete finishing will be reviewed per 03 35 43, 1.5, C**

iii. **Acceptable level of finishing shall be selected as per 03 35 43, 2.1**

CC. *"Specification Section 07 71 00 Roof Specialties notes to provide the roof copings per G002 material ID list. Roof Copings are not listed on the G002 material ID list and the specifications suggest that the copies are to be Metal Era and not shop fabricated steel copings. Please provide Basis of Design for products of this specification section."*

i. **Roof copings may be any manufactured product or formed assembly satisfying performance requirements noted in 07 71 00.**

ii. **Roof Copings colored to match PT-3D (RAL 7043)**

DD. *Specification Section 08 80 00 Glazing does not call for Bird Glazing as required per City of Madison. Please confirm locations at which bird glass will be required.*

i. **Project Design, Specification and Approvals began prior to adoption of Bird Safe Glass Ordinance. Project does not include Bird Safe Glass and is approved as such.**

3. ACCEPTABLE EQUIVALENTS

A. Air-Cooled Condensers Substitution Request

i. **Request Approved**. Multistack added to list of manufacturers. See Section 4 Specifications, J of this document for an updated specification.

B. Scroll-Water Chillers Substitution Request

i. **Request Approved**. Multistack added to list of manufacturers. See Section 4 Specifications, K of this document for an updated specification.

C. Rain Water Harvesting Substitution Request

i. **Request Approved.** RMS Rainwater Management Solutions added to list of manufacturers. See Section 4 Specifications, I of this document for an updated specification.

4. SPECIFICATIONS

- **A.** 00 01 10 Table of Contents
  - **i.** Delete section 07 53 23
  - **ii.** Add section 07 54 23
  - **iii.** Add section 22 16 35
  - **iv.** Delete Section 26 23 00
  - **v.** Add Section 26 24 13
- **B.** 01 10 00 Summary
  - **i.** Part 1.3, C, 1 Revised
  - **ii.** Part 1.3, C, 4 Added
  - **iii.** Part 1.3, D, 1 Revised
  - **iv.** Part 1.3, D, 2 Added
- **C.** 03 01 30 Maintenance of Cast in Place Concrete
  - **i.** Removed obsolete "EPOXY-2" reference.
- **D.** 03 30 00 Cast-in-place Concrete
  - **i.** Part 1.4/A/1, revise from Owner to GC for responsibility to employ an Inspection Agency.
- **E.** 03 35 43 Polished Concrete Finishing
  - **i.** Removed Part 1.3
- **F.** 07 54 23 Thermoplastic-Polyolefin (TPO) Roofing
  - **i.** Added Section
- **G.** 09 67 23 Resinous Flooring
  - **i.** Remove Part 1.1, A, 3
  - **ii.** Remove Part 2.3
- **H.** 11 13 19 Stationary Loading Dock Equipment
  - **i.** Revised Part 1.2
- **I.** 22 13 65 Rainwater Harvesting System for Non-portable Toilet Supply
  - **i.** Added Section
- **J.** 23 63 13 Air-cooled Refrigerant Condensers
  - **i.** Revised Part 1.7, A
  - **ii.** Revised Part 2.1, A
  - **iii.** Revised Part 2.2, G, I
- **K.** 23 64 23 Scroll Water Chillers
  - **i.** Revised Part 2.1, A
- **L.** 26 24 13 Switchboards
  - **i.** Added Section
- **M.** 26 31 00 Photovoltaic System Performance Requirements
  - **i.** Revised Part 2.5, A, B
- **N.** 31 23 00 Foundation Excavating and Backfilling
  - **i.** Part 1.4/A/1, revise from Owner to GC for responsibility to employ an Inspection Agency.
- **O.** 31 26 00 Steel Helical Piles
  - **i.** Part 1.4/A/1, revise from Owner to GC for responsibility to employ an Inspection Agency.

5. DRAWINGS

- **A. G000-"COVER"**
  - **i.** Corrected sheet list to remove sheets included by mistake in Bid Documents issuance Sheet List
- **B. G002-"MATERIAL ID REFERENCES"**
  - **i.** Deleted EPDM-1
  - **ii.** Added TPO-1
- **C. G003-"TYPES AND SYSTEMS"**
  - **i.** Removed references to EPDM-1, throughout. Replaced with TPO-1
- **D. C201 "EROSION CONTROL PLAN"**

i. Storm pipe and storm structure removed from the MMSD parking lot.
ii. Sidewalk crossing MMSD driveway removed.

E. **C101 "UTILITY PLAN"**
   i. Storm pipe and storm structure removed from the MMSD parking lot.
   ii. Sidewalk crossing MMSD driveway removed.
F. **C201 "CONSTRUCTION DETAIS-5"**
   i. Liner Note with specifications for liner added for clarification.
G. **S101S "FOUNDATION PLAN – SOUTH"**
   i. Revise helical pile load schedule.
H. **L001 "FIRE ACCESS"**
   i. Modified extents of asphalt replacement at MMSD driveway apron
I. **L002 "SEMI TRAILER TURNING TEMPLATE AND VISION TRIANGLES"**
   i. Modified extents of asphalt replacement at MMSD driveway apron
J. **L100 "LAYOUT PLAN"**
   i. Modified extents of asphalt replacement at MMSD driveway apron
   ii. Added clarifying labels to pavement types along Johnson St.
   iii. Added 'CFCI' note to bike repair station callout. Contractor is responsible for providing this bike repair station. See detail 8/L501 for additional information.
   iv. Added pavement hatches and legend to clarify extents of different pavement types
K. **L200 "GRADING PLAN"**
   i. Modified extents of asphalt replacement at MMSD driveway apron, and modified grading
   ii. Added Top of Wall Elevations to all remaining seatwalls. The overall heights of these walls vary from 1-3', but the TW elevations should remain constant.
L. **L300 "TREE PLANTING PLAN"**
   i. Modified lawn seed extents adjacent to MMSD building
M. **L311 "DETAIL PLANTING PLAN"**
   i. Modified lawn seed extents adjacent to MMSD building
N. **L312 "DETAIL PLANTING PLAN"**
   i. Modified lawn seed extents adjacent to MMSD building
O. **L501 "HARDSCAPE DETAILS"**
   i. Modified Standard Duty Asphalt Detail 6/L501 to 3" thickness to match layout plan callouts
P. **D101N-"LEVEL 1 DEMOLITION"**
   i. Updated Demolition Notes related to removal / salvage of existing glass wall
Q. **D101S-"LEVEL 1 DEMOLITION"**
   i. Updated Demolition Notes related to removal / salvage of existing glass wall
R. **D102N-"MEZZANINE LEVEL DEMOLITION"**
   i. Updated Demolition Notes related to removal / salvage of existing glass wall
S. **D102S-"MEZZANINE LEVEL DEMOLITION"**
   i. Updated Demolition Notes related to removal / salvage of existing glass wall
T. **D103N-"ROOF DEMOLITION"**
   i. Updated Demolition Notes related to removal / salvage of existing glass wall
U. **D201-"DEMOLITION ELEVATIONS"**
   i. Updated Demolition Notes related to removal / salvage of existing glass wall
V. **A101S-"LEVEL 1 – SOUTH"**
   i. Removed scope related to salvage and reconstruction of glass wall sliding panels in south hall
W. **A103-"ROOF PLAN"**
   i. Revised Add Alternate 3 Notes clarifying PV system anchoring
X. **A103N-"ROOF PLAN – NORTH"**
   i. Revised Add Alternate 3 Notes clarifying PV system anchoring
Y. **A103S-"ROOF PLAN – SOUTH"**

i. Revised Add Alternate 3 Notes clarifying PV system anchoring

Z. A121S-"LEVEL 1 REFLECTED CEILING PLAN – SOUTH"

i. Removed scope related to salvage and reconstruction of glass wall sliding panels in south hall

AA. A353-"EXTERIOR DETAILS"

i. Added Notes clarifying PV system anchoring

ii. Revised Material ID tag "EPDM-1" to "TPO-1"

BB. A503-"INTERIOR ELEVATIONS - SOUTH HALL"

i. Removed scope related to salvage and reconstruction of glass wall sliding panels in south hall

CC. A535-"INTERIOR WALL SECTIONS"

i. Removed scope related to salvage and reconstruction of glass wall sliding panels in south hall

DD. A553-"INTERIOR DETAILS"

i. Removed scope related to salvage and reconstruction of glass wall sliding panels in south hall

EE. A554-"INTERIOR DETAILS"

i. Removed scope related to salvage and reconstruction of glass wall sliding panels in south hall

FF. A701N-"LEVEL 1 FINISH PLAN-NORTH"

i. Modified finish plan general notes clarifying painting of existing CMU walls and CONC-1 polished concrete floors

GG. A701S-"LEVEL 1 FINISH PLAN-SOUTH"

i. Modified finish plan general notes clarifying painting of existing CMU walls and CONC-1 polished concrete floors

HH. A702S-"MEZZANINE LEVEL-NORTH"

i. Modified finish plan general notes clarifying painting of existing CMU walls and CONC-1 polished concrete floors

6. PROPOSAL

A. No change

4. SPECIFICATIONS

DOCUMENT 00 00 05 - TABLE OF CONTENTS

VOLUME I (DIVISIONS 00 – 01)

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

INTRODUCTORY INFORMATION

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 10 00

SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Work by Owner.
2. Future work.
3. Owner-furnished products.
4. Coordination with occupants.
5. Specification and drawing conventions.

B. Related Requirements:
1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
2. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

B. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.
1. Reconstruction of streets, sidewalks and right-of-ways along E Johnson and E 1st Streets shall have been completed.
2. Owner shall decommission and remove from project site, any equipment noted on drawings to be 'removed by Owner'. Including used oil reservoirs and other pieces of equipment related to the building's former use as a City Fleet Services Garage.

C. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with Work under this Contract.
1. Owner shall furnish, **for Contractor install** BALE-1 and LIFT-1 as indicated and provided for in Drawings and Specified in Division 11 Section 11 51 00 and Section 11 13 19 respectively.

(Addendum 4 dated 09/05/23)

2. Owner shall coordinate with Owner's Trash Services Vendor to select final compacting dumpster equipment (DUMP-1 as noted in drawings and Master Equipment List) and shall provide coordinating information as required. Owner's Trash Services Vendor shall provide equipment compatible with design provisions for space and electrical at trash enclosure.
3. Contractor shall allow Owner access during work hours to construction for installation of A/V and IT equipment.
4. **Owner shall Furnish, for Contractor install, any equipment noted as such in Food Service (FS) drawings and Specifications Section 11 40 00 Food Service Equipment, and Specifications Section 11 51 00 Master Equipment List.**

a. **Contractor is responsible for determining suitable installation timeline for any equipment noted as Owner Furnished, Contractor Installed. Contractor shall coordinate with Owner to ensure timely delivery, by Owner, of Owner Provided Equipment to satisfy requirements of Contractors Construction Schedule.**

(Addendum 4 dated 09/05/23)

D. Subsequent Work: Owner will perform the following additional work at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory Work under this Contract.

1. Owner shall furnish and install ~~all~~ **any** kitchen equipment noted as such on food service (FS) drawings and Specifications Section 11 40 00 - Food Service Equipment. Note that ONLY equipment noted specifically **as such** in these locations shall be Owner Furnished and Installed. Equipment described elsewhere shall be furnished and Installed by GC.

(Addendum 4 dated 09/05/23)

2. **Note that, Per Paragraph 1.3, 4 of this Specifications Section, some Owner Provided, Contractor Installed Equipment may be installed after Substantial Completion.**

(Addendum 4 dated 09/05/23)

3. Owner shall install balance of all equipment noted as Owner installed as noted on Master Equipment List (Section 11 51 00).

1.4 OWNER-FURNISHED PRODUCTS

A. Owner will furnish products indicated. The Work of the GC includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and making building services connections.

B. Owner-Furnished Products:

1. Refer to Drawings and MEP specifications.

1.5 COORDINATION WITH OCCUPANTS

A. 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.

1.6 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:

1. 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. 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 01 10 00

SECTION 03 01 30

MAINTENANCE OF 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:
   1. Removal of deteriorated and contaminated SOG concrete surfaces and patching as required ~~(EPOXY-2)~~.

(Addendum 4 dated 09/05/23)

B. Related Requirements:
   1. Section 01 81 13 "Sustainable Design Requirements" for submittal and product requirements.
   2. Section 03 30 00 "Cast-In-Place Concrete" for concrete requirements.
   3. Section 03 35 43 "Polished Concrete Finishing".
   4. Section 01 43 39 – Mockups for description of construction required to complete a mockup submittal for review.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, chemical composition, physical properties, test data, and mixing, preparation, and application instructions.

B. Sustainability:
   1. Health Product Declaration. Submit complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open Standard.
   2. Product Data for Credit IEQ 4.1: For adhesives and sealants used inside the weatherproofing system, documentation including printed statement of VOC content.
      a. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
   3. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
   4. Regional Materials: Products shall be manufactured within 500 miles of Project site.
   5. Product Data: Certification of product manufacturing origin.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Each manufactured bonding-agent, cementitious and patching-mortar, manufacturer shall employ factory-trained technical representatives who are available for consultation and Project-site inspection and assistance at no additional cost.

B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer to apply packaged patching-mortar materials and polymer sealers.

C. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Removal and Patching: Remove and repair an approximately 50 sq. ft. area of deteriorated concrete.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's written instructions for minimum and maximum temperature requirements and other conditions for storage.

B. Store cementitious materials off the ground, under cover, and in a dry location.

C. Store aggregates covered and in a dry location; maintain grading and other required characteristics and prevent contamination.

1.7 FIELD CONDITIONS

A. Cold-Weather Requirements for Cementitious Materials: Do not apply unless concrete-surface and air temperatures are above 40 deg F and will remain so for at least 48 hours after completion of Work.

B. Cold-Weather Requirements for Cementitious Materials: Comply with the following procedures:

1. When air temperature is below 40 deg F, heat patching-material ingredients and existing concrete to produce temperatures between 40 and 90 deg F.
2. When mean daily air temperature is between 25 and 40 deg F, cover completed Work with weather-resistant insulating blankets for 48 hours after repair or provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.
3. When mean daily air temperature is below 25 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.

C. Hot-Weather Requirements for Cementitious Materials: Protect repair work when temperature and humidity conditions produce excessive evaporation of water from patching materials. Provide artificial shade and wind breaks, and use cooled materials as required. Do not apply to substrates with temperatures of 90 deg F and above.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations: Obtain each color, grade, finish, type, and variety of product from single source with resources to provide products of consistent quality in appearance and physical properties.

B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

2.2 BONDING AGENTS

A. Latex Bonding Agent: ASTM C 1059/C 1059M, Type I at interior locations.

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. Latex Bonding Agent, Type I (Redispersible):
      1) Dayton Superior Corporation; Superior Concrete Bonder (J-41) Conspec, Weldtite.
      2) Euclid Chemical Company (The), an RPM company; Euco Weld, Tammsweld.
      3) L&M; Everweld
      4) W. R. Meadows, Inc.; Intralok.

2.3 PATCHING MORTAR

A. Patching Mortar, General:

1. Only use patching mortars that are recommended by manufacturer for each applicable horizontal use orientation.
2. Product shall be suitable for polishing. Refer to Section 03 35 43 "Polished Concrete Finishing".

3. Color and Aggregate Texture: Provide patching mortar and aggregates of colors and sizes necessary to produce patching mortar that matches existing, adjacent, exposed concrete. Blend several aggregates if necessary to achieve suitable matches.
4. Coarse Aggregate for Patching Mortar: ASTM C 33, washed aggregate, Size No. 8, Class 5S. Add to patching-mortar mix only as permitted by patching-mortar manufacturer.

B. Polymer-Modified, Cementitious Patching Mortar: Packaged, dry mix for repair of concrete and that contains a latex additive as either a dry powder or a separate liquid that is added during mixing.
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. Dayton Superior Corporation; Recrete 20.
   b. Euclid Chemical Company (The); an RPM company; Eucopatch.
   c. L&M; Fastrak 15.
   d. W. R. Meadows, Inc; Meadow Patch 20.
2. Compressive Strength: Not less than 4000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.4 OTHER MATERIALS

A. Portland Cement: ASTM C 150, Type I, II, or III unless otherwise indicated.

2.5 MIXES

A. General: Mix products, in clean containers, according to manufacturer's written instructions.
1. Do not add water, thinners, or additives unless recommended by manufacturer.
2. When practical, use manufacturer's premeasured packages to ensure that materials are mixed in proper proportions. When premeasured packages are not used, measure ingredients using graduated measuring containers; do not estimate quantities or use shovel or trowel as unit of measure.
3. Do not mix more materials than can be used within time limits recommended by manufacturer. Discard materials that have begun to set.

B. Dry-Pack Mortar: Mix patching-mortar dry ingredients with just enough liquid to form damp cohesive mixture that can be squeezed by hand into a ball but is not plastic.

C. Concrete: Comply with Section 03 30 00 "Cast-in-Place Concrete."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Notify Architect seven days in advance of dates when areas of deteriorated or delaminated concrete will be located.

B. Refer to Drawings for areas requiring resurfacing.

C. Determine depth of contaminated concrete floor surface by sample coring.

3.2 PREPARATION

A. Ensure that supervisory personnel are on-site and on duty when concrete maintenance work begins and during its progress.

B. Preparation for Removal of Deteriorated Concrete: Examine construction to be repaired to determine best methods to safely and effectively perform concrete maintenance work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed in the course of repair.
1. Verify that affected utilities have been disconnected and capped.
2. Inventory and record the condition of items to be removed for reinstallation or salvage.
3. Protect floors and other surfaces along haul routes from damage, wear, and staining.

C. Concrete Removal:
1. Saw-cut perimeter of areas indicated for removal to a depth of at least 1/2 inch.
2. Remove deteriorated and delaminated concrete by breaking up and dislodging from reinforcement.
3. Remove additional concrete if necessary to provide a depth of removal of at least 1 inch over entire removal area.
4. To be confirmed by core samples and mock-up.
5. Thoroughly clean removal areas of loose concrete, dust, and debris.

3.3 APPLICATION

A. General: Comply with manufacturer's written instructions and recommendations for application of products, including surface preparation.

B. Latex Bonding Agent, Type I: Apply to concrete by brush roller or spray. Allow to dry before placing patching mortar or concrete.

C. Placing Patching Mortar: Place as follows unless otherwise recommended in writing by manufacturer:
   1. Provide forms where necessary to confine patch to required shape.
   2. Wet substrate and forms thoroughly and then remove standing water.
   3. General Placement: Place patching mortar by troweling toward edges of patch to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch. At fully exposed reinforcing bars, force patching mortar to fill space behind bars by compacting with trowel from sides of bars.
   4. Finishing: Allow surfaces of lifts that are to remain exposed to become firm and then finish to a surface matching adjacent concrete as approved by mock-up.
   5. Curing: Wet-cure cementitious patching materials, including polymer-modified cementitious patching materials, for not less than seven days by water-fog spray or water-saturated absorptive cover.

D. Concrete: Place according to Section 03 30 00 "Cast-in-Place Concrete" and as follows:
   1. Pretreatment: Apply epoxy bonding agent to reinforcement and concrete substrate.
   2. Standard Placement:
      a. At unformed surfaces, screed concrete to produce a surface that when finished with patching mortar will match required profile and surrounding concrete.
   3. Wet-cure concrete for not less than seven days by leaving forms in place or keeping surfaces continuously wet by water-fog spray or water-saturated absorptive cover.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. All items required for executing and completing the cast-in-place concrete work and related work shown on the drawings or specified herein. Work shall include installation of items furnished in other sections of these specifications.

B. Concrete paving, walks, and curbs are specified in Division 3 or 32.

C. Structural notes indicated on the drawings regarding cast-in-place concrete shall be considered a part of this specification.

1.2 RELATED WORK

A. Pertinent Sections of Division 01.
B. Section 03 10 00 - Concrete Formwork.
C. Section 03 20 00 - Concrete Reinforcement.
D. Section 05 31 00 - Steel Deck.

1.3 REFERENCES

A. Codes and Standards: Comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified. Where any provision of other pertinent codes and standards conflict with this specification, the more stringent provision shall govern.

1. ACI 117 - Specification for Tolerances for Concrete Construction and Materials.
2. ACI 301 - Specifications for Structural Concrete.
3. ACI 302.1R - Guide to Concrete Floor and Slab Construction.
4. ACI 302.2R - Guide for Concrete Slabs that Received Moisture-Sensitive Flooring Materials.
5. ACI 304R - Guide to Measuring, Mixing, Transporting, and Placing Concrete.
6. ACI 305.1 - Specification for Hot Weather Concreting.
7. ACI 306.1 - Guide to Cold Weather Concreting.
8. ACI 308R - Guide to External Curing of Concrete.
9. ACI 309R - Guide for Consolidation of Concrete.
10. ACI 318 - Building Code Requirements for Structural Concrete.
11. ACI 347R - Guide to Formwork for Concrete.
12. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
13. ASTM C33 - Standard Specification for Concrete Aggregates.
14. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
15. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
16. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
17. ASTM C138 - Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.
18. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
19. ASTM C150 - Standard Specification for Portland Cement.
20. ASTM C157 - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
21. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
22. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
23. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
24. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
25. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
26. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
27. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
28. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
29. ASTM C1017 - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
30. ASTM C1059 - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
31. ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic Cement Concrete.
32. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation.
33. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
34. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
35. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting.
36. ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
37. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Inspection.

38. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
39. Concrete Reinforcing Steel Institute (CRSI) - Manual of Standard Practice.

1.4 TESTING AND INSPECTION

A. Inspection and Testing:

1. The ~~Owner~~ **GC** shall employ an Inspection Agency to perform the duties and responsibilities specified below. **(Addendum 4 dated 09/05/23)**

2. Refer to architectural, civil, mechanical, and electrical specifications for testing and inspection requirements of non-structural components.

3. Work performed on the premises of a fabricator approved by the building official need not be tested and inspected per the table below. The fabricator shall submit a certificate of compliance that the work has been performed in accordance with the approved plans and specification to the building official and the Architect and Engineer of Record.

4. Duties of the Inspection Agency:

   a. Perform all testing and inspection required per the Testing and Inspection Schedule indicated below.

   b. Furnish inspection reports to the building official, the Owner, the Architect, the Engineer of Record, and the General Contractor. The reports shall be completed and furnished within 48 hours of inspected work.

   c. Submit a final signed report stating whether the work requiring Inspection was, to the best of the Inspection Agency's knowledge in conformance with the approved plans and specifications.

5. Structural Component Testing and Inspection Schedule for Section 03 30 00 is as follows:

Concrete and Concrete Placement	Continuous	Periodic	Referenced Standard
Review of proposed mix design and supporting test results		X	
Inspect anchors cast in concrete		X	ACI 318: 17.8.2
Inspect anchors post-installed in hardened concrete members.			
A. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads.	X		ACI 318: 17.8.2.4
B. Mechanical anchors and adhesive anchors not defined in row above.		X	ACI 318: 17.8.2
Verify use of required design mix		X	ACI 318: Ch. 19, 26.4.3, 26.4.4
Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	X		ASTM C172, ASTM C31, ACI 318: 26.4, 26.12
Inspection of concrete placement for proper application techniques	X		ACI 318: 26.5
Verify maintenance of specified curing temperature and techniques.		X	ACI 318: 26.5.3-26.5.5
Verify in-situ concrete strength prior to removal of shores and forms from beams and structural slabs		X	ACI 318: 26.11.2

B. Sampling and testing requirements:

1. Maintain records verifying materials used are of the specified and accepted types and sizes and are in conformance with the requirements of the Contract Documents.

2. Use of testing services will not relieve the Contractor of the responsibility to furnish materials and construction in full compliance with the Contract Documents.

3. Take samples of fresh concrete at the job site for each mix design placed each day. Sampling and testing shall be done after the final addition and proper mixing of any water or admixtures that are added on site.

   a. Personnel and testing equipment shall meet the requirements of ASTM E329.

   b. Testing Frequency: Obtain at least one composite sample for each 150 cu. yd. or 5,000 sq. ft. of surface area, whichever is less or fraction thereof of each concrete mixture placed each day.

      1) On a given project, if the total volume of concrete is such that the frequency of testing required above would provide less than five strength tests for a given class of concrete, tests shall be made from at least five randomly selected batches or from each batch if fewer than five batches are used.

   c. A strength test shall be the average of the strengths of two 6x12 inch or three 4x8 inch cylinders made from the same sample of concrete and tested at 28 days.

4. For each sample of fresh concrete, perform the following duties:

   a. Measure and record slump in accordance with ASTM C143.

   b. Measure and record temperature in accordance with ASTM C1064.

      1) Provide one test hourly when air temperature is 40°F and below and when 80°F and above, and one test for each composite sample.

   c. Measure and record air content by volume in accordance with either ASTM C231 or ASTM C173.

   d. Mold three 6x12 inch or four 4x8 inch cylinders (laboratory cylinders) in accordance with ASTM C31 to be laboratory-cured. Protect from moisture loss and maintain at 60°F to 80°F for 24 to 48 hours before moving. Deliver cylinders to testing laboratory for curing and testing.

   e. Mold one cylinder (field cylinder) in accordance with ASTM C31 to be field-cured. Field cylinder shall be placed as near as possible to the in-place concrete from which it was taken, protected, and cured in the same manner. Deliver field-cured cylinder to testing laboratory, and measure and record compressive strength in accordance with ASTM C39. Field cylinder shall be used to determine if concrete footings, walls, or piers have reached the required compressive strength for steel erection to begin.

5. Measure and record compressive strength in accordance with ASTM C39 for laboratory cylinders. Test one laboratory cylinder at 7 days and all other cylinders at 28 days. Acceptance is based on the average of the two 6x12 inch or three 4x8 inch laboratory cured 28-day tests. Notify Architect in the event strength levels do not meet the acceptance requirements of ACI 318.

   a. Any additional cylinders molded for Contractor to have a compressive strength test done before seven days shall be at the Contractor's expense.

6. Prepare and submit test reports to the Architect, Engineer, Contractor, and Supplier. Reports shall be completed and furnished within 48 hours of testing. Refer to description in Submittals.

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. Should the strength of any grade of concrete for any portion of work, as indicated by molded test cylinders, fall below the minimum 28-day compressive strength specified on the drawings, upon approval of the Structural Engineer of Record (SEOR), the concrete supplier shall adjust the concrete mix for remaining portion of construction so that the resulting concrete meets the minimum strength requirements.

1.5 SUBMITTALS

A. Concrete Materials: Submit information on concrete materials as listed below.

1. Cementitious materials: Submit type, class, producer name, and certification not more than 90 days old of compliance with applicable ASTM standard.

2. Aggregates: Submit type, pit or quarry location, producer name, gradations, specific gravity, water content, and certification not more than 90 days old.

3. Admixtures: Submit product data sheet. Product data shall include: dosages and performance data, brand names, producers, chloride ion concentrations, and certifications of compliance with applicable ASTM standard. Certifications shall not be more than 90 days old.

4. Water: Submit name of source.

B. Product Data: Prepare and submit product and performance data for materials and accessories, including patching compounds, joint systems, curing compounds, finish materials and other concrete related items.

C. Testing Agency Qualifications: When requested, the proposed testing agencies shall submit data on qualifications for acceptance.

D. Concrete Mix Design:

1. Concrete mix design submittals shall be submitted to the SEOR for review and approval at least 14 days prior to placing concrete.

2. Submit concrete mixture proportions and characteristics for each concrete mix. Include standard deviation analysis or trial batch data with mix design. Submit historical field test data to demonstrate the average compressive strength for approval. Concrete mix proportions, materials, and handling methods for field test data or trial batches shall be the same as used for the work. Include the following information for each mix design:

   a. Water/cementitious materials ratio.
   b. Slump per ASTM C143
   c. Air content per ASTM C231 or ASTM C173
   d. Unit weight of concrete per ASTM C138
   e. Compressive strength at 28 days per ASTM C39

3. If trial batches are used, submit representative samples of each proposed ingredient to independent testing laboratory for use in preparation of mix design.

4. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments. Indicate amounts of mix water to be withheld for later addition at Project site.

5. Provide a record copy of the final mix designs and test results to the testing agency prior to commencement of the concrete work.

E. Test Reports: Submit laboratory test reports for concrete materials, mix design, compressive strength, slump, air content, and temperature. Each report shall indicate date of sampling, date of test, mix design, and location of concrete in structure.

F. Repair Methods: When stains, rust, efflorescence, and surface deposits must be removed, submit the proposed method of removal.

G. Certificates: Submit written certification regarding the design mix from the ready-mix supplier and the admixture manufacturer stating all concrete and admixtures do not contain chloride ions in excess of concentrations specified herein.

H. Placement Notification: Notify the Architect at least 24 hours in advance of concrete placement.

I. Adjustments: Submit any adjustments to mixture proportions or changes in materials, suppliers, or sources, along with supporting documentation, during the course of the work.

J. Cold Weather Procedure Submittal: Refer to Cold Weather Concreting article in Part 3 for more information.

K. Record Documents: Accurately record actual locations of embedded utilities and components that are concealed from view.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Cementitious materials: Store cementitious materials in dry weather tight buildings, bins, or silos that exclude contaminants.

B. Aggregates: Store and handle aggregate in a manner that will avoid segregation and prevent contamination with other materials or other sizes of aggregates. Store aggregates so as to drain freely.

C. Admixtures: Protect stored admixtures against contamination, evaporation, or damage. Protect liquid admixtures from freezing and temperature changes, which would adversely affect their performance. Handle chemical admixtures in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement: Portland cement shall conform to ASTM C150, Type I Normal, and be a standard brand of Portland cement. Use one brand of cement throughout project, unless approved in writing by the Engineer. Cement, which conforms to ASTM C150 Type II, may be used if it also meets the requirements of ASTM C150 Type I. Cement used in concrete shall be of the same brand and type as the cement used in the concrete represented by the submitted field test data or used in the trial mixtures. Maintain consistent cement color throughout project unless directed otherwise by architectural requirements.

1. Total replacement of Portland cement by supplementary cementitious materials in design mixture shall not exceed 50% (by weight).

B. Supplementary Cementitious Materials

1. Fly Ash: Fly ash shall conform to ASTM C618, Class C or Class F. Replacement of Portland cement by fly ash shall not exceed the following (percentages are by weight):

a. Concrete Flatwork: 20 percent.
b. Mass Concrete (more than two feet thick): 50 percent.

c. All other concrete: 25 percent.
d. Concrete to be placed in cold weather as defined herein: No fly ash allowed unless the cold weather procedure submitted has compensated for the increased setting time and decreased rate of strength gain due to cold weather and fly ash.

2. Slag Cement: ASTM C989, Grade 100 or 120.

a. Ground Granulated Blast-Furnace Slag Limit: 50% by weight of total cementitious materials.

b. In mass concrete more than 2 feet thick, the usage rate may be 80% by weight of total cementitious materials.

3. Combined Fly Ash and Ground Granulated Blast-Furnace Slag:

a. Supplementary Cementitious Materials Limit: 50% with fly ash not exceeding 25% by weight of total cementitious materials.

b. In mass concrete more than 2 feet thick: 80% with fly ash not exceeding 50% by weight of total cementitious materials.

C. Coarse Aggregate for Normal Weight Concrete: Comply with ASTM C33. Provide coarse aggregate from a single source for exposed concrete. Gradations shall be similar to that described in the following table:

COARSE AGGREGATE GRADATIONS							
SIEVE SIZE - PERCENT PASSING							
Grade No.	1-1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 16
4	90-100 Note 1	20-55	0-15	---	0-5		---
57	100	95-100	---	25-60	0-10	0-10	---
67		100	90-100	---	20-55	0-10	---
89	---	---	---	100	90-100	20-55	0-10

1. Shall be 100 percent passing the 2" sieve.

D. Fine Aggregate for Normal Weight Concrete: Comply with ASTM C33. Provide fine aggregate from a single source for exposed concrete. Fine aggregate shall consist of washed sand. Gradations shall be similar to that described in the following table:

FINE AGGREGATE GRADATIONS							
SIEVE SIZE - PERCENT PASSING							
Grade No.	3/8	No. 4	No. 8	No. 16	No. 50	No. 80	No. 100
FA	100	95-100	80-100	50-85	5-30	---	0-10

E. Do not use aggregates containing deleterious substances that could cause spalling on any exterior exposed surface. These include, but are not limited to the following:

1. Organic impurities.
2. Ferrous metals.
3. Soluble salts.

4. Coal, lignite, or other lightweight materials.
5. Soft particles.
6. Clay lumps and friable particles.
7. Cherts of less than 2.40 specific gravity.

F. Water: Mixing water for concrete shall meet the requirements of ASTM C94. Water shall be clean and free from injurious amounts of acids, alkalis, organic materials, chloride ions and oils deleterious to concrete or reinforcing steel.

G. Testing agency shall be given access to plants and stockpiles to obtain samples for testing for compliance with the Contract Documents.

2.2 ADMIXTURES

A. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures. Calcium chloride thiocyanates or admixtures containing intentionally added chlorides are not permitted.

B. Water Reducing Admixture: Material shall comply with ASTM C494, Type A. Acceptable manufacturers and products include:

1. BASF Corporation - MasterPozzolith Series or MasterPolyheed Series.
2. Euclid Chemical Company - Eucon WR Series.
3. Sika Chemical Corp. - Plastocrete 161.
4. GRT – Polychem 400 NC.
5. Grace Construction Products - WRDA 82.

C. High Range Water Reducing Admixture (superplasticizer): Material shall comply with ASTM C494, Type F or Type G. Acceptable manufacturers and products include:

1. BASF Corporation - MasterRheobuild 1000 or MasterGlenium Series.
2. Euclid Chemical Company - Eucon 37 or Plastol Series.
3. Sika – ViscoCrete 2100.
4. GRT – Melchem.
5. Grace Construction Products - Mira 110.

D. High Range Water Reducing, Slump Retaining Admixture: Material shall comply with ASTM C494, Type F or Type G. Acceptable manufacturers and products include:

1. BASF Corporation - MasterGlenium 7700.
2. Euclid Chemical Company - Eucon 537, Eucon 1037, or Plastol Series.
3. Sika – Sikament 686.
4. GRT – Melchem – M.
5. Grace Construction Products – ADVA FLEX.

E. Non-Chloride Accelerator: Material shall comply with ASTM C494, Type C or Type E, and not contain a higher chloride ion concentration than municipal drinking water. Acceptable manufacturers and products include:

1. BASF Corporation - MasterSet FP 20 or MasterSet AC 534.
2. Euclid Chemical Company - Accelguard Series.
3. Sika Chemical Corp. - Sika Rapid-1.
4. GRT – Polychem HE.
5. Grace Construction Products – Lubricon NCA.

F. Air Entraining Admixture: Air entraining admixture shall comply with ASTM C260, and be certified by the manufacturer to be compatible with other admixtures to be used. Acceptable manufacturers and products include:

1. BASF Corporation - MasterAir Series.
2. Euclid Chemical Company - Air-Mix or AEA Series.

3. Sika Chemical Corporation - Sika-Aer.
4. GRT – Polychem VR.
5. Grace Construction Products - Darex II or Daravair 1000.

G. Admixtures used in concrete shall be the same brand, type, and dosage used in concrete represented by field test data or used in trial mixes.

2.3 CURING PRODUCTS

1. Moisture Retaining Cover: Plastic Film: Use 6 mil polyethylene film sheet materials that meet the requirements of ASTM C171.

2. White burlap-polyethylene sheet meeting ASTM C171.

3. Reinforced Curing Paper complying with ASTM C171.

4. Moisture Retaining Fabric: A naturally colored, non-woven, polypropylene fabric with a 4-mil, non-perforated reflective (white) polyethylene coating containing stabilizers to resist degradation from ultraviolet light. Fabric shall exhibit low permeability and high moisture retention. Acceptable manufacturers and products include:

    a. PNA Construction Technologies, Inc.: Hydracure S16.
    b. PNA Construction Technologies, Inc.: Hydracure M5.
    c. Reef Industries Incorporated: Transguard 4000.

B. Dissipating Resin Curing Compound: Clear, waterborne, membrane-forming curing compound complying with ASTM C309, Type 1, Class B shall be composed of hydrocarbon resins and dissipating agents that begin to break down upon exposure to ultraviolet light and traffic approximately 4 to 6 weeks after application, providing a film that is removable with standard degreasing agents, and mechanized scrubbing actions so as to not impair the later addition of applied finishes.

1. Curing compounds used on interior enclosed environments shall be a water-borne product and VOC compliant as required by the U.S. EPA Architectural Coating Rule.

C. Non-dissipating Curing Compound: Clear, membrane-forming curing compound complying with ASTM C309, Type 1, Class B.

1. Curing compounds used on interior enclosed environments shall be a water-borne product and VOC compliant as required by the U.S. EPA Architectural Coating Rule.

D. Curing and Sealing Compound: Clear, membrane-forming curing and sealing compound complying with ASTM C309, Type 1, and ASTM C1315, Type 1, Class A. Compound shall dry to a clear finish, resist yellowing due to ultraviolet degradation and provide a long-lasting finish that has high resistance to chemicals, oil, grease, deicing salts, and abrasion.

1. Curing and sealing compounds used on interior enclosed environments shall be a water-borne product and VOC compliant as required by the U.S. EPA Architectural Coating Rule.

2.4 MISCELLANEOUS MATERIALS

A. Patching Mortar: Non-shrink, non-slump, non-metallic, quick setting. Acceptable manufacturers and products:

1. Euclid Chemical Company - Eucospeed.
2. BASF Corporation - MasterEmaco N 424.
3. Adhesive Technologies. - Hard Rok Vertipatch.
4. W.R. Meadows - Speed Crete (Red Line).
5. Dayton Superior – Re-Crete 20 minute.
6. SpecChem - Precast Patch.

B. Cement Grout: Mix 1 part Portland cement, 2-1/2 to 3 parts fine aggregate, and enough water for required consistency. Depending on use, consistency may range from mortar consistency to a mixture that will flow under its own weight. Do not mix more than the amount that can be used within 30 minutes. Retempering is not permitted. Use for leveling, preparing setting pads, beds, construction joints (with liquid bonding admixture) and similar uses. Do not use for grouting under bearing plates or structural members in place.

C. Dry-Pack: Mix 1 part Portland cement, 2 parts fine aggregate, and enough water to hydrate cement and provide a mixture that can be molded with the hands into a stable ball (a stiff mix). Do not mix more than the amount that can be used within 30 minutes.

D. Expansion Joint Material: Preformed, resilient, non-extruding asphalt-impregnated fiber conforming to ASTM D1751. Thickness of expansion joint material shall be 1/2" unless noted otherwise on the drawings.

E. Magnesium phosphate patching cement specially designed for cold weather grouting and anchoring. Acceptable Manufacturer:

1. BASF Corporation - MasterEmaco T545.
2. Euclid Chemical Company - Eucospeed MP.

F. Vapor Retarder: ASTM E 1745, Class A, not less than 10 mils (0.25 mm) thick. Acceptable manufacturers and products:

1. Stego Industries, LLC - Stego Wrap.
2. W.R. Meadows, Inc. - Perminator.
3. Raven Industries - Vapor Block
4. Insulation Solutions - Viper VaporCheck II.

G. Penetrating Liquid Floor Treatment: Chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces. Acceptable manufacturers and products:

1. BASF Corporation - MasterKure HD 200WB.
2. Conspec Marketing & Manufacturing Co., Inc. - Intraseal
3. Curecrete Chemical Co., Inc. - Ashford Formula
4. Dayton Superior Corporation - Day-Chem Sure Hard (J-17)
5. Euclid Chemical Company - Eucosil
6. L&M Construction Chemicals, Inc. - Seal Hard
7. Vexcon Chemicals, Inc - Vexcon Starseal PS
8. SpecChem - SpecHard

H. Control Joint Filler: Flexible, single-component polyurethane sealant with backer rod compliant with ASTM C 920, Type S, Grade P, Class 25. Apply sealant per manufacturers written recommendations. Acceptable manufacturers and products:

1. Dayton Superior – Perma 230 SL.
2. Euclid Chemical Company – Eucolastic I.
3. BASF Corporation - MasterSeal SL 1.

2.5 STRENGTH AND PROPERTIES

A. Concrete Mix Designs: Refer to drawings for specified compressive strength. Proportion concrete mixes according to the properties in the following tables. The concrete supplier may produce a mix at a lower water-cement ratio to allow for adjustment of slump at the site by adding water. The addition of site water shall be in accordance with ASTM C94, and the total water-cement ratio shall not exceed the value specified below.

Class	Coarse Aggregate Gradation	Fine Aggregate Gradation	Range of Slump	Max. w/c	Air Content	Other Requirements
A	57 or 67	FA	1" to 4"	0.40	5% to 8%	
B	57 or 67	FA	1" to 4"	0.45	5% to 8%	
C	57 or 67	FA	1" to 4"	0.50	—	
D	57 or 67	FA	4" to 6"	0.50	—	Use water reducing admixture to achieve slump specified
E	4 or 57	FA	1" to 4"	0.50	—	
F	4 or 57	FA	5" to 8"	0.50	—	Use retarder
G	89	FA	5" to 8"	0.50	—	
H	Lightweight	FA	5" max	0.5	4% to 7%	Maximum 107-116 pcf dry density

Note: w/c = water-cementitious materials ratio.

B. Schedule of Concrete Classes: Provide concrete of the specified class according to the following schedule.

1. Footings: Class E
2. Exterior foundation walls and piers: Class B
3. Interior piers: Class C
4. Interior slabs on grade: Class D
5. Interior slab on metal decks: Class D
6. Unless noted otherwise: Class B

C. Slump of Superplasticized Concrete: Concrete containing high-range water reducing admixtures (superplasticizer) shall have 8" maximum slump, unless otherwise approved by Structural Engineer.

D. Accelerators: Add non-chloride accelerator to all concrete slabs placed at air temperatures below 50°F only when approved in the mix design. Use of admixtures will not relax cold weather placement requirements.

E. Water Reducer: Add water reducing admixture or high range water reducing admixtures (superplasticizers) as follows:

1. All pumped concrete.
2. Fiber reinforced concrete.
3. As required for placement or workability.
4. As required by high temperatures, low humidity, or other adverse placement conditions.
5. Concrete with water-cementitious materials ratio below 0.50.

F. No other admixtures shall be used unless approved by SEOR.

G. Chlorides: Admixtures or other ingredients including aggregates containing calcium chloride or more than 0.05% chloride ions by weight shall not be used.

H. Workability: Concrete shall have a workability such that it will fill the forms without voids, honeycombs, or rock pockets with proper vibration without permitting materials to separate or excess water to collect on the surface.

I. Concrete Temperatures: Minimum concrete temperature of fresh concrete varies in relation to average air temperature over a 24-hour period as follows:

1.	Air temperature below 0°F	Concrete temperature 70°F min.
2.	Air temperature 0°F to 30°F	Concrete temperature 65°F min.
3.	Air temperature 30°F to 50°F	Concrete temperature 50°F min.
4.	Air temperature above 50°F	No minimum temperature

The maximum temperature of concrete at the time of delivery shall be 90°F. When concrete temperature exceeds 90°F, concrete supplier shall attempt to reduce temperature by shading aggregates and cement and cooling mix water. When these methods fail to reduce concrete temperature below 90°F, supplier shall use ice in the water to reduce the concrete temperature. Use set retarding admixtures only when approved in the mix design.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify requirements for concrete cover over reinforcement.

B. Verify that anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

C. Do not place concrete until data on materials and mix designs have been approved, Architect has been notified, and all other affected trades have coordinated their work.

D. Remove snow, ice, frost, water, mud, and other foreign material from surfaces, reinforcing bars and embedded items against which concrete will be placed.

E. Prepare previously placed concrete by cleaning with sandblasting, steel brush, or water blast to expose aggregate to minimum 1/4" amplitude.

F. Sandblast all existing concrete surfaces older than 28 days against which concrete is to be placed, unless directed otherwise in writing by Architect/Engineer.

3.2 SLABS

A. Slab on Grade:

1. All interior slabs on grades shall have a polyethylene vapor retarder conforming to ASTM E1745. Lap all joints minimum 6" and seal edges with adhesive tape. Fit vapor retarder around utilities and seal with adhesive tape as required. Place, protect, and repair vapor-retarder sheets according to ASTM E 1643 and manufacturer's written instructions.

2. Refer to drawings and Section 31 23 00 for required sub-grade preparation beneath slabs on grade.

3. Where vapor retarder is not used below slab on grade, wet sub-grade below slab prior to placing concrete. Subgrade shall be moist with no free water and no muddy or soft spots.

4. Saw cut control joints: Cut with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. Control joints shall be located along column lines, with intermediate joints spaced at a maximum distance of 36 times the slab thickness, unless noted otherwise. Control joints shall be continuous, not staggered or offset. Slab panels shall have a maximum length to width ratio of 1.5 to 1. Provide additional control joints at all reentrant or isolated corners formed in the slab on grade. Refer to drawings for typical control joint detail.

5. Provide isolation joints around each column and along foundation walls. Form isolation joints with 1/2" expansion joint material. Extend isolation joint material full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

6. Depress slabs as required for mats architectural finishes. Obtain layout and locations from Architect.

7. Verify completion of all under slab work with mechanical and electrical trades before placing slabs.

8. Slope slabs as indicated on drawings and to provide positive drainage. Slope slab keeping bottom level and varying top. Maintain minimum thickness of concrete as indicated on drawings. Refer to floor finishes for tolerances.

B. All supported slabs, including slabs-on-steel decking and cast-in-place concrete slabs:

1. Supported slabs have deflections that may cause areas of concrete to have thicknesses greater than indicated on the drawings. Contractor is expected to provide that volume as needed to finish the floor at the specified elevation. If specified floor finish tolerances are not achieved during the concrete floor construction the Contractor shall install, at no cost to the project, a self-leveling cementitious underlayment (BASF Corporation - MasterTop 110 SL or approved equivalent) to correct the floor flatness and levelness.

3.3 CONSTRUCTION JOINTS

A. Slabs: Where slab pour is to receive a subsequent topping or additional concrete, expose aggregate in top surface by brooming in two directions at right angles to each other.

B. Vertical: Locate vertical construction joints in walls not farther than a maximum of 100 feet on center. Coordinate joint locations with architectural design.

C. Horizontal: Locate horizontal joints in walls at underside of slabs and at the top of slabs and footings unless otherwise indicated. At least 24 hours shall elapse between placing concrete in a wall and placing concrete in an area supported by the walls, unless approved in writing by Structural Engineer.

D. Reinforcing: Stop all welded wire reinforcement and/or reinforcing at construction joint in slabs on grade and provide dowel bars as detailed. Provide reinforcement at other construction joints as detailed. Roughen and thoroughly clean the surface of the concrete, remove all laitance, and wet the surface before placing new concrete against the joint. Slush vertical joints with a neat cement grout before placing new concrete. Roughen entire surface at construction joints to remove surface paste and expose aggregate.

3.4 CONCRETE PLACEMENT

A. Place concrete as continuously as possible until placement is complete. Do not place against concrete that has attained initial set, except at authorized joints. If, for any reason, concrete pour is delayed for more than 45 minutes, bulkhead off pour at last acceptable construction joint. Immediately remove excess concrete and clean forms.

B. Do not begin to place concrete during periods of rain, sleet or snow unless adequate protection is provided.

C. No concrete shall be cast onto or against sub-grades containing free water, frost, ice or snow. If earth at bottom of forms has dried out, rewet so the soil is moist, but free of standing water and mud.

D. Notify the architect in advance if concrete is to be pumped.

E. Do not place concrete until all reinforcement is in place, forms have been thoroughly cleaned and approval has been given.

F. Do not accept concrete delivered to the job site more than 90 minutes after initial mixing.

G. Concrete from its point of release to mixers, hoppers, or conveyances, shall not be permitted to drop more than 5 feet (10 feet for concrete containing high range water reducers). Deposit concrete directly into conveyances and directly from conveyances to final points of deposit. Sufficient transportation equipment in good working order shall be on hand before work begins. All conveying equipment must be clean and kept clean during concreting operations. Take every possible precaution to prevent segregation or loss of ingredients.

H. Regulate rate of placement so concrete surface is kept level throughout; a minimum being permitted to flow from one area to another. Use tremie heads spaced at approximately 10-foot intervals for placing concrete in walls. Control rate of placement consistent with form design.

I. Deposit concrete in one continuous operation until section being placed has been completed. For slab thicknesses greater than 12 inches, prevent excessive segregation of aggregate and high temperatures in accordance with ACI 304 and ACI 308. Place concrete in wall forms in layers not greater than 12 inches in depth, each layer being compacted by internal vibration before succeeding layer is placed.

J. Place concrete as near as possible to its final position to prevent segregation or loss of materials. Do not use vibrators to transport concrete within forms. Consolidate concrete in walls, columns, beams and slabs or joist construction thicker than 8" with internal vibrators (8,000 to 12,000 VPM). Slabs less than 8" thick may be consolidated with internal vibrators (9,000 to 13,500 VPM) or vibrating screeds supported on forms, boards or rails, approved by SEOR, supplement vibration by forking or spading by hand along surfaces adjacent to forms and construction joints. Be sure an adequate number of operating vibrator units are on hand to properly consolidate quantity of concrete to be placed, including spares for emergency use.

1. Vertically insert and remove handheld vibrators at constant intervals 18 to 30 inches apart. Vibrate concrete the maximum amount and time required for complete consolidation, without segregation, and release of entrapped air bubbles, but in no instance exceed 15 seconds per square foot of exposed surface.

K. Re-tempering of concrete shall not be permitted. Concrete that has stood more than 15 minutes after leaving the mixer shall be discarded.

L. Exercise care in placing concrete over waterproof membranes, rigid insulation and/or protection boards to avoid damaging those materials. Report damage immediately, and do not proceed until damage is repaired.

M. Remove loose debris from hardened surfaces of previous pours, thoroughly wet and slush with a neat cement grout immediately before placing new concrete, or apply bonding compound to surface and let dry before placing new concrete.

N. Protect existing concrete work to be exposed to view and other finished materials from damage and staining resulting from concreting operations. Handle concrete carefully to avoid dripping and spillage. Remove spilled concrete from existing surfaces immediately. Covering sills, ledges, and other surfaces with protective coverings may be necessary to protect the work.

O. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

P. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor rods for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

Q. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.5 CONCRETE FINISHES AND TOLERANCES

A. Exposed Smooth Formed Surfaces: Remove forms and perform necessary repairs and patch to produce surface finish-3.0 as specified in ACI 301. Apply the following to smooth-formed finished concrete exposed to view in the finished work. Confirm finishes with architect prior to concrete placement by submitting shop drawings indicating locations of all types of finishes.

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.

B. 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.

3.6 CONCRETE SLAB FINISHES AND TOLERANCES

A. Trowel Finish:

1. Screed concrete to an even plane, float, then power trowel the surface.

2. Hand trowel the surface smooth and free of trowel marks. Continue hand troweling until a ringing sound is produced as the floor is troweled.

3. Provide trowel finish as indicated on the drawings and at the following locations:

   a. Concrete floors exposed in finished work unless otherwise indicated.
   b. Slabs to receive curing compounds and sealers.
   c. Slabs to receive resilient flooring or carpet.
   d. Slabs to receive waterproof membranes.

B. Fine Broom Finish:

1. Screed concrete to an even plane, float, then power trowel the surface. Provide fine hair broom finish perpendicular to slope, free of loose particles, ridges, projections, voids and concrete droppings.

2. Provide fine broom finish as indicated on the drawings and at the following locations:

   a. Stoop slabs.
   b. Raised curbs and walkway areas.
   c. Slabs to receive thin set ceramic tile.

C. Broom Finish:

1. Screed concrete to an even plane and then float. Immediately after concrete has received a floated finish, give the concrete surface a coarse transverse scored texture by drawing a coarse broom across the surface.

2. Provide as indicated on the drawings and at the following locations:

   a. ADA ramp slabs.
   b. Exterior walkway slabs.

D. Floor Finish Tolerances: Floor finish tolerances shall be measured by placing a freestanding (unleveled) 10-foot straightedge anywhere on the slab and allowing it to rest upon two high spots within 72 hours after placement of slab and removal of shoring (if present). The gap at any point between the straightedge and the floor (and between the high spots) shall not exceed:

1. Slab on Grade: 1/4"

E. Slab Drainage: Finish all concrete slabs to proper elevations to ensure that all surface moisture will drain freely to floor drains, and that no puddle areas exist. Contractor shall bear the cost of corrections to provide positive drainage.

F. Special Tolerances for Concrete Slabs: No abrupt change in vertical elevation of 1/4" or more is acceptable at the interface between slabs and within areas where pedestrian traffic is expected:

3.7 CONCRETE CURING

A. Freshly placed concrete shall be protected from premature drying and excessively hot temperatures.

B. Concrete other than high-early strength shall be maintained above 50°F and in a moist condition for at least the first 7 days after placement, except when special curing is used. Special curing procedures shall not be used without written permission from the SEOR.

C. Formed surfaces shall be cured by leaving the formwork in place during the curing period.

D. Protect concrete from excessive changes in temperature during the curing period and at the termination of the curing process. Changes in the temperature of the concrete shall be as uniform as possible and shall not exceed 5°F in any one hour or 50°F in any 24-hour period.

E. Protect concrete from injury from the elements until full strength is developed. Protect from mechanical injury.

F. During cold weather construction, all footings shall be protected from frost penetration until the building is enclosed and temporary heat is provided.

3.8 SLAB CURING

A. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface. Use one of the methods described below.

B. Moisture-Retaining-Cover Curing for Concrete Floors Not Exposed in Final Condition: Cover concrete surface with waterproof sheet material as soon as finishing operations are complete and the concrete is sufficiently hard to be undamaged by covering. The cover shall be placed flat on the concrete surface, avoiding wrinkles. Sprinkle concrete with water as necessary during application of covering. Place in widest practicable width, with sides and ends lapped at least 12 inches, and seal with waterproof tape or adhesive. Verify that the concrete is continuously wet under the sheets; otherwise, add water through soaker hoses under the sheets. Weight down covering to prevent displacement. Immediately repair any holes or tears during the curing period using polyethylene sheet and waterproof tape. Curing process shall be maintained for a minimum of 7 days.

C. Moisture-Retaining-Fabric Curing for Concrete Floors to Remain Exposed: Cover concrete surface with moisture retaining fabric as soon as finishing operations are complete and the concrete is sufficiently hard to be undamaged by covering. The cover shall be installed in accordance with manufacturer's written recommendations, in largest practical widths. Wet the slab to rejection, then thoroughly wet fabric side of cover and install with poly side up. Lap over adjacent covers a minimum of 18". Wet all laps and outside edges to prevent displacement and to ensure intimate contact with concrete and adjacent covers. Rewet as necessary and protect covers from damage during curing process.

1. After minimum 7-day cure, remove moisture retaining fabric in sections.

2. A maximum of 3,500 square feet of concrete curing cover may be removed at any one time. At no time shall the exposed area be permitted to dry prior to completion of the floor scrubbing process.

3. Using a high-powered floor scrubber capable of a minimum 80 pounds head pressure, and a mild citrus-based detergent that does not damage or mar the surface in any way, scrub the floor to remove any minerals or soluble salts that may have accumulated at the floor surface. Rinse area thoroughly with clean fresh water. Remove water and allow floor to dry. If whitening occurs during drying, repeat scrubbing process before floor dries until no whitening occurs during drying.

4. All areas of the floor shall remain wet during floor scrubbing process. Expose only the amount of floor surface that can be cleaned before any drying occurs without exceeding the maximum allowable exposed area.

D. Curing Compound: Apply uniformly in continuous operation by low pressure spray equipment or roller as soon as finishing operations are complete, free water on the surface has disappeared and no water sheen can be seen. Follow the manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period. Verify compatibility of the curing compound with paint, finishes, or toppings that require positive bond to the concrete. If curing compound is not compatible with paint finishes or toppings, utilize a dissipating curing compound and remove in accordance with the manufacturer's recommendations.

3.9 PENETRATING LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

B. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs in accordance with manufacturer's written instructions.

C. Do not apply to concrete that is less than seven days old.

D. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

3.10 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

B. Do not fill joints until construction traffic has permanently ceased.

C. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

D. Install semi-rigid joint filler in saw-cut joints and in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.11 APPLICATION OF FLOOR SEALER - FINISH COAT

A. Give concrete floors as indicated in Room Finish Schedule and where exposed in finished Work, second coat of curing and sealing compound immediately prior to Substantial Completion.

B. Clean floors and apply sealer strictly according to manufacturer's instructions. Dilution and coverage shall be as recommended by the manufacturer. Apply sealer evenly.

3.12 COLD WEATHER CONCRETING

A. Definition: Cold weather shall be defined as a period when for more than three successive days the average daily outdoor temperature drops below 40°F. The average daily temperature is the average of the highest and lowest temperature during the period from midnight to midnight. When temperatures above 50°F occur during more than half of any 24-hour duration, the period shall not be regarded as cold weather.

B. All cast-in-place concrete work occurring during cold weather shall conform to all requirements of ACI 306.1, "Standard Specification for Cold Weather Concreting", published by the American Concrete Institute, Detroit, Michigan, except as modified by the contract documents or this specification.

C. Planning: The General Contractor, concrete contractor, concrete supplier and the architect shall have a pre-construction conference to outline the cold weather concreting operations concerning the placing, finishing, curing and protection of the concrete during cold weather. Pre-construction conference shall occur before cold weather is expected to occur.

D. Detailed procedure submittal: Concrete contractor shall prepare and submit for review detailed procedures for the production, transportation placement, protection, curing and temperature monitoring of concrete during cold weather. Include procedures to be implemented upon abrupt changes in weather conditions. Do not begin cold weather concreting until these procedures have been reviewed and approved.

E. Mixing: Concrete flatwork poured in cold weather shall be proportioned to obtain a lower slump to minimize the amount of bleed water during finishing. All bleed water should be skimmed off flatwork prior to troweling. Concrete that will be exposed to cycles of freezing and thawing while saturated should be properly air entrained as outlined in this specification.

F. Protection of Concrete: Cure and protect concrete against damage from freezing for a minimum period of 72 hours, unless approved by the structural engineer. The protection period may be reduced according to ACI 306.1 requirements. Concrete contractor shall submit a letter of request to reduce the protection period, by outlining the method used to achieve the reduction per ACI 306.1.

1. When practical for the construction schedule, formwork shall be insulated and remain in place for at least the required protection period.

G. Concrete Temperatures: The minimum temperature of concrete immediately after placement shall be as specified in the following table.

Section Size	Minimum temperature of concrete as placed and maintained during the protection period	Maximum gradual decrease in surface temperature during any 24 hours after the end of the protection.	Mixing Temperatures		
			Above 30°F	0 to 30°F	Below 0°F
< 12 in	55°F	50°F	60°F	65°F	70°F
12-36 in	50°F	40°F	55°F	60°F	65°F
36-72 in	50°F	30°F	50°F	55°F	60°F
> 72 in	50°F	20°F	45°F	50°F	55°F

H. Mixing Temperatures: As the ambient air temperature decreases the concrete mixing temperature shall be increased to compensate for the heat lost in the period between mixing and placement. The concrete supplier shall use one or both of the following methods for increasing the concrete temperature.

1. Heating the mixing water to a temperature necessary to offset the temperature losses during transport. Supplier shall not heat water to temperatures in excess of 140°F, without taking special precautions as outlined in ACI 306.

2. Heating the aggregate with a circulated steam piping system.

I. Temperature measurements: The Contractor shall be responsible for monitoring and recording the concrete temperatures during placement and throughout the protection period.

1. Inspection personnel shall keep a record of the date, time, outside air temperature, temperature of concrete as placed, and weather conditions.

2. Temperature of the concrete and the outside air shall be recorded at regular intervals but not less than twice in a 24-hour period. The record shall include temperatures at several points within the enclosure and on the concrete surface of sufficient frequency to determine a range of temperatures.

3. Inspection agency shall submit the temperature logs to the Architect for permanent job records.

3.13 HOT WEATHER PROTECTION

A. Definition: Hot weather shall be defined as any combination of high ambient temperature, low relative humidity, high winds and intense solar radiation that leads to higher than usual evaporation. The table below defines low relative humidity based on air temperature. For a given air temperature, if the relative humidity is equal to or less than the specified minimum, provisions for hot weather concreting shall be as follows:

Air Temperature	Minimum Relative Humidity
105°F	90%
100°F	80%
95°F	70%
90°F	60%
85°F	50%
80°F	40%
75°F	30%

B. Scheduling: When hot weather is expected, adjust concrete placement schedules to avoid placing or finishing during the period from noon until 3:00 pm. When possible, slab pours should be delayed until the building is enclosed to protect the concrete from wind and direct sunlight, Construction schedule shall account for 7-day moist curing period.

C. Mixing: Concrete supplier shall adjust mix designs and admixtures to minimize slump loss. Concrete shall be mixed at a water-cement, which is lower than the specified maximum to allow for the adjustment of slump by addition of water in the field. Water reduction shall be accomplished without reducing initial slump by increasing dosage of water reducing admixture.

D. Preparation: Do not order concrete earlier than is required to avoid delays. Cool forms, subgrades and reinforcing bars with water spray from fog nozzle prior to concrete placement.

E. Delivery: Site traffic shall be coordinated and delivery times scheduled to minimize waiting times for concrete trucks.

F. Placement: Preparations shall be made to place and consolidate the concrete at the fastest possible rate. Maintain a continuous flow of concrete to the job site to avoid development of cold joints, during placement of slabs, apply fog spray to prevent moisture loss without causing surplus water to stand on concrete surface.

G. Finishing: Finish concrete as fast as practical. Continue fogging concrete during finishing. Where fogging is not possible, apply sprayable moisture-retaining film between finishing passes.

H. Curing: Formed concrete shall be covered with a waterproof material to retain moisture. Flat work shall be moisture cured as described in this specification. Moist curing shall continue for at least 7 days.

3.14 FIELD QUALITY ASSURANCE

A. Independent Testing Agency and Special Inspector shall each perform their prescribed inspection, sampling, and testing services as described in Part 1 of this specification section.

B. In cases where samples have not been taken or tests conducted as specified or strength of laboratory test cylinders for a particular portion of the structure fails to meet requirements of ACI 301, for evaluation of concrete strength, Structural Engineer shall have the right to order compressive or flexural test specimens or both be taken from the hardened concrete according to ASTM C42, load tests according to ACI 318, or such other tests as may be necessary to clearly establish the strength of the in situ concrete, and such tests shall be paid for by the Contractor. Where cores have been cut from work, Contractor shall fill void with dry-pack and patch the finish the match the adjacent existing surfaces.

3.15 REPAIR OF DEFECTIVE AREAS

A. All repair of defective areas shall be made, with prior approval of Architect and SEOR as to method and procedure, in accordance with Section 5 of ACI 301, except specified bonding compound must be used. Cosmetic repairs of minor defects in exposed concrete surfaces shall be in a manner acceptable to the Architect. Defective areas shall be deemed when:

1. Tests on core or prism specimens fail to show specified strengths.
2. Not formed as indicated or detailed.
3. Not plumb or level where so indicated or required to receive subsequent work.
4. Not true to intended grades and levels.
5. Cut, filled, or resurfaces, unless under direction of the SEOR.
6. Debris is embedded therein.
7. Not fully in conformance with provisions of the drawings.
8. Damaged by hot or cold weather conditions.
9. Mixing time exceeds 90 minutes from ready-mix plant to the time of deposit.

B. Patch form tie holes at the following locations:

1. Unfinished exposed concrete (not scheduled for painting, plus at board formed concrete finish).

2. All other areas: Prime voids with bonding compound and fill with patching mortar. Strike flush without overlap, float to uniform texture to match adjacent surfaces.

3. Exposed areas scheduled for spray texture:

   a. Remove projections and protrusions: 1/16" or larger.
   b. Remove continuous ridges 1/32" or larger.
   c. Fill voids and pin holes.

4. Exposed areas scheduled for paint or epoxy:

   a. Remove projections, ridges, and other protrusions 1/32" or larger.
   b. Fill voids and pin holes 1/16" or larger.

5. Exposed areas not scheduled for paint or other finishes:

   a. Remove projections, ridges and other protrusions not conforming to requirements specified under Section 03 10 00.
   b. Fill voids and pin holes not conforming to requirements specified under Section 03 10 00.

C. All structural repairs shall be made, with prior approval of the Architect/Engineer, as to method and procedure, using the specified epoxy adhesive and/or epoxy mortar.

D. 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 in solid concrete but not less than 1 inch in depth. 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.

E. 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 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 mix 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.

3.16 CEMENT GROUT AND DRY-PACK

A. Cement Grout: Thoroughly mix sufficient quantities to avoid combining different batches of grout mix. Ensure that grout completely fills all spaces and voids. Level, screed, or cut flush excess grout to produce smooth, neat, even exposed surfaces.

B. Dry-Pack: Thoroughly blend dry ingredients prior to mixing with water. Forcibly pack mixture to complete fill voids and spaces.

3.17 CLEANING

A. Clean exposed concrete to remove laitance, efflorescence and stains.

END OF SECTION

SECTION 03 35 43

POLISHED CONCRETE FINISHING

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 polished concrete finishing, including scoring, grouting and sealing.
B. Related Sections:
   1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
   2. As placed horizontal concrete: Refer to Section 03 30 00 – Cast-In-Place Concrete.

~~1.3 DEFINITIONS~~

~~A. Design Reference Sample: Sample designated by Architect in the Contract Documents that reflects acceptable surface quality and appearance of polished concrete.~~

(Addendum 4 dated 05 September 2023)

1.4 ACTION SUBMITTALS

A. Product Data: Manufacturer's technical data, including Material Safety Data Sheet (MSDS) and installation instructions, for each product specified.
B. LEED Submittals:
   1. Indoor Environmental Quality
      a. Product Data for Credit IEQ 4.2: For interior field-applied traffic coatings, documentation including printed statement of VOC content.
C. Polishing Schedule: Submit plan showing polished concrete surfaces and schedule of polishing operations for each area of polished concrete before start of polishing operations. Include locations of all joints, including construction joints.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 10 years of documented experience producing the specified products.
B. Installer Qualifications: Minimum 5 years of documented experience with work of similar scope and complexity required by this Project.
C. Mockups: Build mockups to demonstrate typical joints, surface finish, tolerances, and standard of workmanship. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
   1. Mockup: Refer to Section 01 43 39 – Mockups for description of construction required to complete a mockup submittal for review.

2. Construct an 8 feet by 8 feet for each mockup at location indicated on the Drawings.
3. Provide individual mockups for each gloss level required.
   a. Mock-up to demonstrated LVL 1 ground finish and LVL 2 honed
   b. Existing Epoxy tie in to new Polished Concrete
   c. Mock-up Finish: Unsealed concrete.
   d. Mock-up Finish: Sealed concrete with non-slip additive.
4. Construct mockup using materials, processes, and techniques required for the work. Incorporate representative scored joints according to Project requirements.
5. Mockup to be sealed by the Installer who will actually perform the work for the Project.
6. Notify Architect and Owner a minimum of seven calendar days in advance of the date scheduled for each mockup construction.
7. Obtain the Architect's and Owner's acceptance of each mockup prior to commencement of the work.
8. Each mockup to remain until completion of the work to serve as a quality control standard for the work. Provide suitable protections to preclude damage to mockup.
9. Demonstrate curing, finishing, and protecting of polished concrete.
10. Test section shall be prepared and treated as specified to verify and approve the suitability of the product for the intended purpose. The entire surface of the test section shall be inspected after completion to verify and approve the adequacy of the wet and dry slip resistance.
11. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 PREINSTALLATION CONFERENCE

A. Seven calendar days prior to scheduled date of installation, conduct a meeting at Project site to discuss requirements, including application methods. Attendees to include Architect, Owner, Contractor, Installer, and manufacturer's authorized field representative.

PART 2 - PRODUCTS

2.1 POLISHING

A. Polished New Placed Concrete **(CONC-1)**:
   1. LVL 1 ground finish or LVL 2 honed as required for a consistent finish.
   2. Level as approved by mock-up.

B. Polished Existing Concrete **(CONC-2)**: Finish level as approved by mock-up.
   1. LVL 1 ground finish or LVL 2 honed as required for a consistent finish.
   2. Level as approved by mock-up.

2.2 LIQUID FLOOR TREATMENTS

A. Chemically Reactive Liquid Floor Hardener: Clear, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and is suitable for polished concrete surfaces.
   1. Product: Consolideck LS as manufactured by Prosoco
   2. Form: Clear, water-like liquid.
   3. pH: 11.0
   4. Active Content: 14.5 percent
   5. Total Solids: 14.5 percent
   6. VOC Content: 0 grams per Liter. Complies with all known national, state and district AIM VOC regulations.
   7. Flash Point: Not flammable
   8. Freeze Point: 32 degrees Fahrenheit (0 degrees Celsius)

B. Liquid Floor Sealer: Clear, solvent solution of neat silane materials and proprietary components; that penetrates surface, and is suitable for polished concrete surfaces.
   1. Product: SLX100® Water & Oil Repellent <350 as manufactured by Prosoco
   2. Form: Clear liquid, slight solvent odor
   3. Specific Gravity: 0.913
   4. Active Content: 93 percent
   5. pH: not applicable
   6. Flash Point: 80 degrees F (27 degrees C) ASTM D 3278
   7. Freeze Point: less than -22 degrees F (less than -30 degrees C)
   8. VOC Content: Reactive Penetrating Sealer: maximum content is 350 grams per Liter.
   9. Alternate: Consolideck® PolishGuard as manufactured by Prosoco.

C. Non-Slip Additive:
   1. Increte Systems SHUR-GRIP:
      a. Composition: Clear spherical polypropylene powder.
      b. Particle Size: 50 Mesh.
      c. Application: 8 fluid oz/ gallon of sealer.

D. Liquid Floor Sealer: Copolymer lithium silicate hardener.
   1. Product: Consolideck® LSGuard as manufactured by Prosoco.
   2. Form: Opaque white liquid
   3. Specific Gravity: 1.08
   4. pH: 11.0
   5. Active Content: 22 percent
   6. Total Solids: 22 percent (ASTM D2369)
   7. VOC Content: less than 100 g/L. Complies with all known national, state and district AIM VOC regulations.
   8. Flash Point: greater than 212 degrees Fahrenheit (greater than 22 degrees Celsius) ASTM D3278
   9. Freeze Point: 32 degrees Fahrenheit (0 degrees Celsius)

2.3 SCORED JOINT GROUT

A. Sanded grout using liquid acrylic grout additive

B. Sand-Portland Cement Grout: Consisting of white or gray cement and white or colored aggregate as required to produce color indicated.

C. High-Performance Tile Grout: ANSI A118.7.
   1. Polymer Type: Acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.
   2. Grout Color: To be determined with mock-up construction.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which the concrete work will be performed and identify conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

B. Quality Control:
   1. Each batch of concrete shall comply with the approved design mix.
   2. Each batch shall be batched, transported, placed, finished and cured consistent with conditions documented for the approved mock-up.
   3. Each batch of concrete shall to be tested for finish quality and any non-compliance with the mock-up is to be reported to Architect.

C. Interior Applications: Concrete substrates shall have a moisture vapor emission rate of less than 5 lbs./1000 sq. ft. per 24 hour based on a 72 hour test period according to ASTM F 1869.

3.2 SCHEDULE OF FINISHES

A. Application: Toilet rooms, and food service areas.
   1. Finish: Sealed polished concrete with non-slip additive.

B. Application: General areas scheduled for polished concrete.
   1. Finish: Unsealed polished concrete.

3.3 PREPARATION

A. Surface Preparation:
   1. The surface of the concrete shall be lightly mechanically abraded to remove weak cement paste and contaminants. The final surface preparation should approximate a Concrete Surface Profile of 1, (CSP1 as designated by the International Concrete Repair Institute, Alexandria, Virginia). Methods for mechanical abrasion include:
      a. Pressure Washing: Use a pressure washer equipped with a fan tip and rated for a minimum pressure capability of 4000 psi.
      b. Scrubbing with a rotary floor machine with a brush.
      c. Light sanding of the surface.
   2. Rinse concrete substrates until rinse water is completely clean.
   3. Surfaces shall be tested to receive sealer by spotting with water. Water should immediately darken the substrate and be readily absorbed. If water beads and does not penetrate or only penetrates in some areas, perform additional surface preparation and testing. On denser concrete floors, sand lightly to open up surfaces. Retest and continue surface preparation until water spots immediately darken and uniformly penetrate concrete surfaces.

3.4 POLISHING

A. Polished New Concrete: Finish level as approved by mock-up.
   1. Class B - Fine aggregate (salt and pepper) Finish. (Fine aggregate exposure with little or no medium aggregate at random locations).
   2. Level: As approved by mock-up.

B. Apply polished concrete finish system to cured and prepared slabs to match accepted mockup.
   1. Machine grind floor surfaces to receive polished finishes level and smooth.
      a. Remove existing coatings (for thick coatings, use a 16- or 20-grit diamond abrasive or more aggressive tool specifically for coating removal).
      b. Seal cracks and joints with an epoxy or other semi-rigid filler.
      c. Grind with a 30- or 40-grit metal-bonded diamond.
      d. Grind with an 80-grit metal-bonded diamond.
      e. Grind with a 150-grit metal-bonded diamond (or finer, if desired).
   2. Apply a chemical hardener to densify the concrete.
   3. Continue polishing with progressively finer-grit diamond polishing pads to gloss level, to match approved mockup.
      a. Polish with a 100- or 200-grit resin-bond diamond, or a combination of the two.
      b. Polish with a 400-grit resin-bond diamond.
      c. Polish with an 800-grit resin-bond diamond.
   4. Control and dispose of waste products produced by grinding and polishing operations.

C. Scoring: Score decorative jointing in concrete surfaces 1/8 inch deep with diamond blades to match pattern indicated. Rinse until water is clear.
   1. Joint Width and Pattern: Refer to Drawings.
   2. Grout joints.
   3. Grout joints before sealing application.

3.5 SEALING APPLICATION

A. Apply sealer and non-slip additive according to manufacturer's printed instructions. Maintain a wet edge at all times.

B. Allow sealer to completely dry before applying additional coats.

C. Apply second coat of sealer at 90 degrees to the direction of the first coat using the same application method and rates.

D. Seal horizontal joints in areas subject to pedestrian traffic.

END OF SECTION

SECTION 07 54 23

THERMOPLASTIC-POLYOLEFIN (TPO) ROOFING

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. Adhered Thermoplastic-Polyolefin (TPO) Roofing **(ROOF-1)**.
2. Roof system application at PV system and rack on metal deck substrate.
3. Cover board
4. Roof insulation.
5. Thermal barrier.

B. Related Requirements:
1. Section 01 81 13.14 “Sustainable Design Requirements” for submittal and product requirements.
2. Section 06 10 00 "Rough Carpentry" for wood nailers, curbs, and blocking.
3. Section 07 01 50.19 “Preparation for Reroofing” for protection of and repair of warranted existing roofing.
4. Section 07 62 00 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.
5. Section 07 92 00 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
6. Section 22 14 23 "Storm Drainage Piping Specialties" for roof drains.
7. Section 26 31 00 "Photovoltaic System Performance Requirements" for PV racking system.

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

B. Sheet Metal Terminology and Techniques: SMACNA Architectural Sheet Metal Manual.

1.4 SYSTEM DESCRIPTION (ROOF-1)

A. Basis of Design: Roof system over steel structural deck is composed of two layers of Firestone ISO 95+ GL fully adhered insulation over thermal barrier installed as an air barrier, one layer of Firestone ISOGARD HD cover board, Firestone fully adhered 60-mil UltraPly TPO - White. 20-year Firestone Warranty provided.

B. Basis of Design: Roof system for work required and repair of existing warranted roof. Refer to Section 070150.19 - Preparation for Reroofing.

C. PV panels on racking system anchored to existing roof assembly where scheduled.

1.5 PREINSTALLATION MEETINGS

A. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

B. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. LEED Submittals:

1. Product Data for Credit IEQ 4.1: For adhesives and sealants used inside the weatherproofing system, documentation including printed statement of VOC content.
2. Building Life-Cycle Impact Reduction Statement for insulation and membrane.
3. Building Product Disclosures – EPDs 3rd party statement for insulation and membrane..

C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:
   1. Base flashings and membrane terminations.
   2. Roof plan showing orientation of steel roof deck and orientation of roofing and fastening spacings and patterns for mechanically fastened roofing.
   3. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.
B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
   1. Submit evidence of complying with performance requirements.
C. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed by a qualified testing agency.
D. Research/Evaluation Reports: For components of roofing system, from ICC-ES.
E. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed by a qualified testing agency.
F. Field quality-control reports.
G. Sample Warranties: For manufacturer's special warranties.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.9 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for roofing system identical to that used for this Project.
B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
   1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.11 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.12 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
   1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, roofing accessories, and other components of roofing system.

2. Warranty shall cover damage to roof membrane by installation of approved plaza deck and PV array components.
3. Warranty Period: 20 years NDL from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain components including roof insulation fasteners for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.
B. Basis-of-Design Product: Subject to compliance with requirements, provide Firestone Building Products

2.2 PERFORMANCE REQUIREMENTS (ROOF -1)

A. General Performance: Installed roofing system and flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings shall remain watertight.
   1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
   2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746, ASTM D4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.
C. Roofing System Design: Tested by a qualified testing agency to resist the following uplift pressures:
   1. Corner Uplift Pressure: 120 lbf/sq. ft.
   2. Perimeter Uplift Pressure: 90 lbf/sq. ft.
   3. Field-of-Roof Uplift Pressure: 60 lbf/sq. ft.
D. ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
E. Energy Performance: Roofing system shall have a minimum three-year aged reflectance solar reflectance of not less than 0.55 and an emissivity of not less than 0.75 when tested according to CRRC-1.
F. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.3 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING (TPO-1)

A. TPO Sheet: ASTM D6878/D6878M, internally fabric- or scrim-reinforced TPO sheet.
   1. Source Limitations: Obtain components for roofing system from roof membrane manufacturer or manufacturers approved by roof membrane manufacturer.
   2. Thickness: 60 mils (1.5 mm), nominal.
   3. Exposed Face Color: White.
B. Recycling:
   1. Contractor shall divert all of the following materials from disposal at the landfill.
      a. Metals including edge metal, copings, counter flashings, expansion /control joint covers, and all non-contaminated metal pails.
      b. Plastics, including packaging materials, pails, and containers.
      c. Cardboard, including packaging materials and roll cores.
      d. Wood, including demolished nailers, demolished plywood, demolished wood plank decking, damaged pallets, and new wood or plywood scrap and pieces.
   2. Contractor shall package the debris as required by the recycler.
   3. Contractor shall transport the debris to approved recyclers.
   4. Pallets in a condition to be reused shall not be land filled.
   5. Metal or plastic pails and containers that are contaminated with adhesive, mastic, coatings, and similar materials are excluded.

2.4 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
   1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.
B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, of same color as TPO sheet.
C. Prefabricated Flashings: As recommended by roof membrane manufacturer.
D. Bonding Adhesive: Manufacturer's standard, water based.
E. Slip Sheet: Manufacturer's standard, of thickness required for application.
F. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.
H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.5 ROOF INSULATION (INSUL-4)

A. General: Preformed roof insulation boards manufactured or approved by EPDM roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Firestone Building Products Firestone ISO 95+ GL with fiberglass facer for fully adhered assembly or comparable product.
C. Polyisocyanurate Cover Board: ASTM C 1289, Type II, Class 1, Grade 3.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Firestone Building Products ISOGARD HD or comparable product.
D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.6 SUBSTRATE BOARD (THERMAL BARRIER AT STEEL DECK) (SHTG-1)

A. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum board or ASTM C 1278/C 1278M, fiber-reinforced gypsum board.
   1. Thickness: 1/2 inch (13 mm).
   2. Surface Finish: Factory primed.
   3. Products: Subject to compliance with requirements, provide one of the following:
      a. CertainTeed Corporation; GlasRoc Sheathing Type X.
      b. Georgia-Pacific Corporation; Dens Deck DuraGuard.
      c. National Gypsum Company; Gold Bond eXP Extended Exposure Sheathing.
      d. USG Corporation; Securock Glass Mat Roof Board.
B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate panel to roof deck.
C. Sealant and Flashing Tape: Installation accessories to provide a continuous plane of air/vapor barrier.
D. Air Barrier Accessories: Tape, sealants and coated fabric to establish an air barrier at the top surface of the thermal barrier which is continuous with building AVB system.

2.7 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.
B. Fasteners: Factory-coated steel fasteners with metal or plastic plates 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.
C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
   1. Full-spread, spray-applied, low-rise, two-component urethane adhesive.

D. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric; water permeable and resistant to UV degradation; type and weight as recommended by roofing system manufacturer for application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
   1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
   2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

B. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053123 "Steel Roof Decking".

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 INSTALLATION OF ROOFING, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions.

B. Complete terminations and base flashings and provide temporary seals 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.

C. Install roof membrane and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing roofing system.

3.4 SUBSTRATE BOARD INSTALLATION (STEEL DECK)

A. Install underlayment board with long joints in continuous straight lines, with end joints staggered not less than 24 inches (610 mm) in adjacent rows.
   1. At steel roof decks, install underlayment board at right angle to flutes of deck.
      a. Locate end joints over crests of steel roof deck.
   2. Tightly butt substrate boards together.
   3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.
   4. Fasten substrate board to top flanges of steel deck according to recommendations in FM Global Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification.
   5. Continuously seal side and end joints with tape.
   6. Completely seal substrate boards at terminations, obstructions, and penetrations to prevent air and moisture vapor movement into roofing system.

3.5 INSULATION INSTALLATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
   1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

G. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together adhere to insulation.
   1. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.
   2. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
   3. Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.6 INSTALLATION OF ADHERED ROOFING

A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

B. Unroll roof membrane and allow to relax before installing.

C. Start installation of roofing in presence of roofing system manufacturer's technical personnel and Owner's testing and inspection agency.

D. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

E. Bonding Adhesive: Apply to substrate and underside of roof membrane at 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.

G. Apply roof membrane with side laps shingled with slope of roof deck where possible.

H. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings, to ensure a watertight seam installation.
   1. Test lap edges with probe to verify seam weld continuity. Apply 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.
   3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

I. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.7 INSTALLATION OF BASE FLASHING

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with 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.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

F. PV Rack Anchor Installation:
   1. Prepare the roof surface by removing all loose debris and clean the area in accordance with the roofing manufacture recommendations
   2. Apply an approved Seam Slice Adhesive Primer to the roof membrane where the Double Sided Die Cut Adhesive will be placed and allow to dry before continuing.
   3. Peel back half of the release liner exposing the adhesive.
   4. Carefully align the Double Side Die Cut Adhesive and place into the desired position. Do not stretch or pull the adhesive.
   5. Apply an approved Seam Slice Adhesive Primer to the underside of the U-Anchor 2400 Single Ply cover and allow to dry before continuing.
   6. Remove the top release liner and place into position.
   7. Center and place the U-Anchor 2000 over the Double Sided Die Cut Adhesive avoiding wrinkles.
   8. Using a weighted membrane roller firmly roll the entire surface of the U-Anchor membrane cover to ensure a proper bond is achieved.

9. Firmly roll the perimeter edge to embed the perimeter edge of the membrane in the adhesive. If you are unable to embed the edge of the membrane into the adhesive cut edge sealant may be needed to prevent the membrane reinforcement from wicking moisture.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

C. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.9 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of 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 09 67 23
RESINOUS FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
1. Resinous flooring systems **(EPOXY-1)**.
2. Concrete floor patch/sealer **(SL-1)**.
3. ~~Sealed cast in place concrete **(CONC-1)**~~

(Addendum 4 dated 09/05/23)

B. Related Requirements:
1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
2. Section 03 30 00 "Cast-in-Place Concrete" for concrete forming and finishing to receive resinous flooring.
3. Section 03 35 43 "Polished Concrete Finishing" for sealer components as part of the floor polishing system.
4. Section 09 91 23 "Interior Painting" for resinous floor painting of floor graphics.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Sustainability:
1. Indoor Environmental Quality
a. Product Data for Credit IEQ 4.2: For interior field-applied traffic coatings, documentation including printed statement of VOC content.
C. Samples: For each type of exposed finish required.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.
1. Product Test Reports: Test data for traffic coating products and traffic coating system, by qualified testing agency, indicating proposed traffic coating meets performance requirements.
2. Warranty: Sample of unexecuted manufacturer and installer special warranties.
3. Field quality control reports.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Refer to Section 01 78 43 - Spare Parts and Extra Materials for submittal procedures.
   2. CONC-1: Provide repair kit for 900 sq ft of each material and color applied.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Applicator regularly engaged, for a minimum of 5 years, in application of resinous flooring systems of similar type to that specified.
   2. Employ persons trained for application of resinous flooring systems.

B. Mockups: Apply mockups of each coating system (COAT-#) system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Mockup: Refer to Section 01 43 39 – Mockups for description of construction required to complete a mockup submittal for review.
   2. Architect will select one surface to represent surfaces and conditions for application of each finish system.
      a. Existing EPOXY tie into new EPOXY-1.
      b. Epoxy system to demonstrate traffic coating pattern
      c. Other Items: Architect will designate items or areas required.
   3. Final approval of color selections will be based on mockups.
      a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
   4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
      a. Retain subparagraph below if the intention is to make an exception to the default requirement in Section 01 40 00 "Quality Requirements" for demolishing and removing mockups.
   5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

C. Close spaces to traffic during resinous flooring application and for 24 hours after application unless manufacturer recommends a longer period.

1.9 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace traffic coating that fails in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Adhesive or cohesive failures.
      b. Abrasion or tearing failures.
      c. Surface crazing or spalling.
      d. Intrusion of water, oils, gasoline, grease, salt, deicer chemicals, or acids into deck substrate.
   2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 RESINOUS FLOORING SYSTEM (EPOXY-1)

A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, and resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base where scheduled.

B. Basis-of-Design Product: Subject to compliance with requirements, provide **Sherwin Williams Resuflor systems comparable to specified Tennant Flake DB. Tennant Coatings Incorporated products as manufactured by Sherwin Williams** or comparable product by one of the following:

(Addendum 4 dated 09/05/23)

C. Manufacturers:
1. Advanced Polymer Technology Corporation.
2. BASF Corporation; Construction Systems.
3. Neogard; a division of Jones-Blair, Inc.
4. Tremco Incorporated.

D. Tennant Flake DB.
1. First Broadcast Coat with decorative vinyl flake (micro): Eco-MPE pigmented, 10-12 mils.
2. Second Broadcast Coat with decorative vinyl flake (micro): Eco-MPE, 15 mils.
3. Grout Coat: Eco-TCP, 15 mils.
4. Topcoat: Eco-TCP, 8 mils.
5. Color: As selected by Architect from manufacturer's full range.

E. Eco-MPE: A neutral, two-component, high solids epoxy.
1. Percent Solids, by weight (by volume), ASTM D1475, A + B: 95.45 (94.56).
2. Volatile Organic Compound-VOC, ASTM D3960, Mixed A + B: 0.41 lb./gal (49 g/L).
3. Abrasion Resistance, mg loss, Taber Abraser, C-17 Taber Abrasion Wheel, 1,000 gram load, 1,000 revolutions, ASTM D4060: 83.1.
4. Coefficient of Friction-COF, James Friction Tester, ASTM D2047: 0.59-0.62.
5. Adhesion to Concrete, ASTM D5441: 732 psi (4.48 MPa) concrete failed.
6. Adhesion to Concrete, ASTM D7234: 450 psi (3.10 MPa) concrete failed.
7. Compressive Strength, ASTM D695: 13,500 psi (93.079 MPa).
8. Tensile Strength, ASTM D2370: 8,000 psi (55.158 MPa).
9. Percent Elongation, ASTM D2370: 5.
10. Shor D Hardness, ASTM D2240: 80-85 @ 0 sec, 75-80 @ 15 sec.

F. Eco-TCP: A two-component, high solids, thick coat polyaspartic.
1. Percent Solids, by weight (by volume), ASTM D1475, A + B: 91.59 (91.47).
2. Volatile Organic Compounds-VOC, ASTM 3960: 0.30 lb./gal (37 g/L).
3. Abrasion Resistance, mg loss, Taber Abraser (CS-17 Taber Abrasion Wheel, 1,000 gram load, 1,000 revolutions), ASTM D4060: 43.
4. Wet Static Coefficient of Friction, BOT 3000, ANSI/NFSI B101.1: 0.99.
5. Resistance to Yellowing, As measured using ASTM D2244 after 1000 consecutive hours UV exposure in QUV, ASTM G154, <20 increase of yellowing units (CIE Lab Δb
6. Tensile Strength, ASTM D2370: 6,913 psi (47.66 MPa).
7. Percent Elongation, ASTM D2370: 8.
8. Thermal Stability/Heat resistance, MIL-D-3134J Section 4.6.3: No slip/flow, softening or change in appearance.
9. Water Absorption, 24-hour immersion, ASTM C413: 0.2 percent weight increase.

G. Decorative Flake: Water-based resin material, inorganic minerals, additives, integrally pigmented.
1. Shape: Random.
2. Size: Micro.
3. Surface Texture: Smooth.
4. Color: Selected by Architect.

2.2 CONCRETE FLOOR PATCH/ SEALER (SL-1).

A. Existing floor repair and finish:

B. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin Williams Resuflor systems comparable to specified Tennant Eco-HF 250 and Eco-FPE. Tennant Coatings Incorporated products as manufactured by Sherwin Williams or comparable product by one of the following:

C. Manufacturers:
1. Advanced Polymer Technology Corporation.
2. BASF Corporation; Construction Systems.
3. Neogard; a division of Jones-Blair, Inc.
4. Tremco Incorporated.

(Addendum 4 dated 09/05/23)

A. Patching:
1. Eco-HF 250: High-performance, three-component epoxy resurfacers designed for trowel-patching potholes in concrete floors.
a. Abrasion Resistance, mg loss ASTM D4060* 85 Taber Abraser.
b. Coefficient of Friction (COF) James Friction Tester ASTM D2047 >0.7.
c. Compressive Strength, psi (kPa) ASTM D695 15,000 (103,500).
d. Shore D Hardness ASTM D2240 80-85 @ 0 sec. 75-80 @ 15 sec
e. UV/Light Stability: Will turn yellow or amber over time.

f. VOC Compliance: Solvent-free; 0.0 VOC.

2. Eco-FPE: Three component, quick-setting epoxy resurfacers, is designed for trowel-patching small cracks and holes in concrete floors.
   a. Compressive Strength, psi (kPa) ASTM D695 >15,000 (103,500)
   b. Shore D Hardness ASTM D2240 80-85 @ 0 sec 75-80 @ 15 sec
   c. UV/Light Stability Will turn yellow or amber over time.
   d. VOC Compliance: Solvent-free; 0.0 VOC.

B. Finish:
   1. As selected by Architect from standard and custom colors. Intent is to match existing.

C. Sealing:
   1. Eco-PT: Epoxy topcoat applied to patching products to provide a sealed traffic ready floor.
   2. Complies with SCAQMD VOC regulations--<100 g/L.
   3. Application Thickness, wet mils [mm] - 5-8 (0.13-0.20 mils) per coat. One coat.

~~2.3 SEALED CAST IN PLACE CONCRETE (CONC-1):~~

~~A. Finish: Eco-PT: Epoxy topcoat used over primer and build coat to provide a sealed traffic ready floor. Application Thickness, wet mils [mm] - 5-8 (0.13-0.20 mils) per coat. One coat.~~

~~B. Primer: Eco-MPE. 3 mils (0.08 mm) wet/dry film. One coat.~~

~~C. Build Coat: Eco-MPE. 10 mils (0.25 mm) wet/dry film. One coat.~~

(Addendum 4 dated 09/05/23)

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
   1. Roughen concrete substrates as follows:
      a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup. Steel shot blast concrete to a minimum surface profile of ICRI 310.2R, CSP 5.
      b. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more stringent.
   2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
   3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
   4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

D. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

3.2 APPLICATION

A. Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
   1. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.

B. Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Integral Cove Base (where scheduled – refer to drawings): Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions. Round internal and external corners.
   1. Integral Cove Base: 4 inches high.

D. Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended by manufacturer.

1. Aggregates: Broadcast aggregates at rate recommended by manufacturer and, after resin is cured, remove excess aggregates to provide surface texture indicated.

E. Topcoats: Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer and to produce wearing surface indicated.

F. Protect resinous flooring from damage and wear during the remainder of construction period.

END OF SECTION

SECTION 11 13 19

STATIONARY LOADING DOCK EQUIPMENT

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. Recessed SCISSOR LIFT provided and installed by Owner (LIFT-1).~~

2. **Recessed SCISSOR LIFT provided by Owner and installed by Contractor (LIFT-1).**

(Addendum 2 dated 08/31/2023)

3. Owner to provide lift manufacturer's "bumper post" to be installed by Contractor **(BOLL-1)**
4. Light-communication systems.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Inspect and discuss electrical roughing-in, equipment bases, and other preparatory work specified elsewhere.

1.4 DEFINITIONS

A. Operating Range: Maximum amount of travel above and below the loading dock level.

B. Working Range: Recommended amount of travel above and below the loading dock level for which loading and unloading operations can take place.

1.5 SUBMITTALS

A. Product and Shop Drawing information provided by Owner to Contractor for rough-in and pit construction.

B. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for stationary loading dock equipment.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

C. Shop Drawings: For stationary loading dock equipment.

1. Include plans, elevations, sections, details, and attachments to other work.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of anchors and field connection.

D. Light-Communication Systems:

1. Product Data.
2. Shop Drawings.
3. Include diagrams for power, signal, and control wiring.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. 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.

2.2 RECESSED SCISSOR LIFT (LIFT-1)

A. General: Recessed, hinged-lip-type dock levelers designed for permanent installation in concrete pits preformed in the edge of loading platform; of type, function, operation, capacity, size, and construction indicated; and complete with controls, safety devices, and accessories required.

B. Platform:

1. Platform Size: As indicated on Drawings.
2. Frame: Clean-pit type, designed to support leveler at sides of pit, with no supports at front of pit floor.
3. Owner to provide lift manufacturer's "bumper post" **(BOLL-1)** to be installed by Contractor.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical systems for loading dock equipment to verify actual locations of connections before equipment installation.

C. Examine walls and floors of pits for suitable conditions where recessed loading dock equipment is to be installed. Pits shall be plumb and square and properly sloped for drainage from back to front of loading dock.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate size and location of loading dock equipment indicated to be attached to or recessed into concrete or masonry, and furnish anchoring devices with templates, diagrams, and instructions for their installation.

B. Clean recessed pits of debris.

3.3 INSTALLATION

A. General: Install loading dock equipment as required for a complete installation.

1. Rough-in electrical connections.

END OF SECTION

SECTION 22 13 65

RAINWATER HARVESTING SYSTEM FOR NON-POTABLE TOILET SUPPLY

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included: Furnish and install a complete rainwater harvesting system. The system shall be designed to automatically collect rainwater roof runoff. The water shall be treated and used for toilet flushing.

B. System shall contain all components necessary to process, store and pressurize the harvested water including, but not limited to:
   1. Cascade Pre-Filtration
   2. Main Storage Tanks
   3. Treatment Pump
   4. Final Filtration System
   5. UV Sanitation System
   6. Municipal Make-Up System
   7. Pressurization Pumps
   8. Residual Chlorine System
   9. Bladder Tank
   10. Rainwater Control System

C. Related Requirements:
   1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

1.2 PROCESS OVERVIEW

A. Rainwater Collection: Rainwater shall be collected from a total 31,000 square feet of rooftop and pre-filtered through a hydraulic-jump filter. After pre-filtration, rainwater will enter a the first of two 6,500-gallon HDPE tanks ganged together to provide a total of nearly 13,000-gallons of rainwater storage. Water from the second tank shall be drawn through a floating filter in the tank via a flooded suction pump and conveyed

through the Wahaso RW-UV25-500 processing equipment (final filtration and sterilization) to a Processed Water Holding Tank. Processed water shall then be pressurized to non-potable lines serving toilets in the building. A chlorine injection system provides a small amount of disinfectant residual to protect water quality down steam. All processing equipment will be skid-mounted and located in a utility area. All system functions and tracking shall be operated by Wahaso WCS 200 control system, located in the utility area. The system shall automatically add municipal water when the cistern is empty or any critical operational issue is encountered.

B. Filtration:
   1. The captured water will be pre-filtered through a cascade hydraulic jump filter that will screen out all particulates larger than 90 microns at a rate up to 240 GPM. Sediment and other suspended solids are flushed out during higher rain flow events.

C. Water Storage, Monitoring, and Control:
   1. Harvested water shall be stored in two 6,500-gallon black HDPE tanks ganged together to provide a total of nearly 13,000-gallons.

D. Water Transfer:
   1. A 25-GPM flooded suction pump on the treatment skid shall send water from the cisterns through the water treatment system and into the Processed Water Holding Tank (PWHT).

E. Water Treatment:
   1. Wahaso RW-UV30-500 system shall provide two-stage mechanical filtration and sanitation via U.V.

F. Processed Water Holding Tank
   1. Processed water shall be held in a 500-gallon polyethylene tank and include a make-up system and recirculation through sanitation system to maintain water quality.

G. Pressurization
   1. Skid-mounted duplex pumps shall provide required pressurization of 40 GPM @ 35 PSI,

H. System Monitoring and Control:
   1. A master control system shall be included to monitor and data log system operational parameters. The control system shall control tank level and equipment operation per custom software and shall provide alarms to the Building Automation System.
   2. A Visual Display shall interface with the control system and additional communication software shall interface with the Building Automation System.
   3. All control panels shall be NEMA 12 and UL Listed.

I. All system components shall be skid mounted and pre-plumbed, wired, and tested prior to shipment. Vendor shall provide on-site supervision support, operations manual, and operator training for building maintenance staff.

1.3 SUBMITTALS

A. Provide all submittals, including the following, as specified in Division 1.

B. Contractor's Drawings: Submit shop drawings, including arrangement and erection drawings of the water harvesting equipment and control equipment; installation templates; schematic control diagrams, electrical connection diagrams, and complete description of the control system.

C. Quality Control Submittals: Submit the following:
   1. Manufacturer's certified performance and material records as specified.

D. Operation and Maintenance Manuals: Submit Operation and Maintenance (O&M) instructions for the water harvesting equipment.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle all water harvesting equipment as specified in Division 1 and as follows:
   1. Protect all electrical equipment from the weather during transit and storage by suitable means, including shrink wrapping or hand wrapping and taping.
   2. Equipment Skids shall be suitably packaged in crates for safe transit and storage on site in advance of installation.
   3. Installation Manual shall be provided with equipment and separate from O & M manuals.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. All water harvesting equipment shall be provided by the Contractor through a single vendor with a minimum of five years of experience in building similar systems;

B. Basis-of-Design Product: Subject to compliance with requirements, provide Water Harvesting Solutions (WAHASO) or comparable product by one of the following:
   1. Highdro® Rainwater Harvesting Systems as engineered and manufactured by Highland Tank.
   2. Approved Equal. **3. RMS Rainwater Management Solutions (Added Addendum 4 dated 09/05/2023)**

C. Delegated Design: Vendor shall engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design the rainwater harvesting system and its integration into the building plumbing system.
   1. Acceptable component manufacturers are listed below. Other manufacturers of equivalent products shall be submitted for approval.

D. The Contractor, through the vendor, shall have the responsibility of matching all components and providing a fully functional system.

2.2 HYDRAULIC FILTER

A. General: Provide a filter. Filter to be suitable for in tank or external applications. Body to be injection molded with a 12-inch inlet, 8-inch filtered outlet and 12-inch bypass for high flows. The self-cleaning action from the turbulent hydraulic jump reduces maintenance requirements. Average efficiency to be 98%.

B. Filter(s) must be designed to meet the flow rate that will allow debris and sediment to be captured in order to keep the cistern clean. This is imperative for the proper function of the downstream equipment.

C. Capacity and Characteristics:
   1. Filtered Flow Rate: Up to 240 GPM for 100% capture
   2. High Flow Bypass Rate (Max): 1674 GPM
   3. Filtration: 800-micron
   4. Inlet: 12 inches
   5. Treated Water Outlet: 8 inches
   6. Bypass Outlet: 12 inches
   7. Quantity: 1

D. Approved Manufacturer: PURAIN DN 300 or approved equal.

2.3 MAIN STORAGE CISTERNS

A. General: Main storage cistern shall be capable of holding up to 13,000 gallons (1,740 ft3) and will be provided by the manufacturer. Two 6,500-gallon HDPE flat-bottom tanks shall be ganged together to achieve the total storage capacity. Each tank to be 153" tall and 120" in diameter and black in color.

B. Tank Fittings
   1. 18" Manway
   2. 8" Filtered Water Inlet in Tank A with 8" Smoothing Inlet
   3. 8" Equalization Fittings at Base of Tank A & B
   4. 8" Fittings at Top of Tank A & B for Overflow to Storm System
   5. 4" Fittings for U-Vent
   6. 2" Fitting at base of Tank B to Transfer Pump.
   7. 2" Fitting at top of Tank B for Level Sensor

2.4 RAINWATER TRANSFER TO PROCESSING SKID

A. General: A submersible transfer pump shall be provided and located in the cistern. Pump will transfer water through the processing skid and to the day tank.

B. Capacity and Characteristics:
   1. Water Transfer Pump Capacity: 25 GPM @ 35 PSI
   2. Number of Pumps: One
   3. Discharge Pipe Size: 2-inch FNPT.
   4. Motor Horsepower: 1.0
   5. Electrical Characteristics:
      a. Volts: 460
      b. Phases: 3
      c. Hertz: 60

C. Manufacturer: Grundfos CM Series or approved equal.

2.5 FINAL FILTRATION

A. General: Wahaso RW-UV25-250 treatment skid shall provide a two-step filtration system containing a mechanical self-cleaning and bag filters mounted on the processing skid.

B. **Mechanical Filter:** Filter to include 20 second backflush cycle that is activated by differential pressure or time-based duration. Filter to screen to 50 microns. Requires 2" drain line to sewer system for effluent (by others).

C. Approved Manufacturer: Tekleen or approved equal.

D. Bag Filter: Provide Bag Filter Final Filtration, 5 micron: HDPE housing and 5 µ filter bag. Differential pressure sensor to alert Rainwater Control System when bag requires changing.

E. Approved Manufacturer: Pentair 420 Series or approved equal.

F. Both filters shall be mounted to Wahaso processing skid.

2.6 UV SANITATION SYSTEM

A. General: Provide a UV sanitation system mounted on common skid with all plumbing and electrical connections pre-fabricated prior to delivery. Includes alarms for UV malfunction and automatic changeover to domestic water in the event of such malfunction.

B. Design: The Wahaso UV Sanitation System, shall be in compliance with the following design criteria:
   1. System shall be capable of sanitizing water at a rate of 25 GPM
   2. All materials shall be non-corrosive.
   3. Electrical Requirements: 120V single phase, 60 Hz

C. A recirculation pump shall move water stored in the PWHT past the UV system to maintain sanitation of treated water. Grundfos CM Series 1 HP 30 GPM @ 20 PSI

D. Mounted to Wahaso processing skid.

E. Manufacturer: Viqua Pro 30 series.

2.7 DAY TANK

A. Provide skid-mounted Processed Water Holding Tank, (Day Tank), as described below.
B. Provide a 550 Gallon, (2,080 liters), 48" diameter x 75", high flat bottom closed top High Density Polyethylene Tank. Tank designed for water with a specific gravity of 1.9. Include an 18" manway with a screw-on lid and the following fittings:
   a. 2-inch threaded half-coupling for level sensor
   b. 2-inch threaded half-coupling for treated water inlet at top
   c. 2-inch threaded half-coupling for vent
   d. 3-inch inlet and fittings for air-gap funnel
   e. 2-inch flanged outlet for water out to re-pressurization pumps
   f. 1-1/2-inch threaded half-coupling for service drain.
C. All fittings shall be thermal plastic welded to tank with triple bead welds.
D. Mounted to Wahaso processing skid.

2.8 MUNICIPAL MAKE-UP SYSTEM

A. General: System shall include a method to automatically add water from the municipal water supply to the PWHT when the cistern is empty or a critical function of the treatment system fails. The Rainwater Control System shall monitor water levels in the cistern and PWHT and critical functions and add municipal make-up as needed to maintain a minimum level in the PWHT.
B. Municipal water from a 2" line addition shall be regulated by a solenoid valve through an air gap funnel at the top of the PWHT.
C. Valve to be 2" brass body 115VAC normally closed solenoid valve rated for 100% duty cycle.
D. Approved Manufacturer: Burkert 5282 or equal.

2.9 BLADDER TANK

A. General: Provide a diaphragm-type expansion tank to repressurization system to accept and hold pressurized water from the repressurization pumps. The tank shall maintain minimum operating pressure necessary to provide harvested water to the irrigation system.
B. Furnish and install a 52.0-gallon pre-charged vertical steel expansion tank with integral, heavy duty butyl blend diaphragm and lined dome as part of the repressurization system. The tank shall have a 1" NPTF system connection, and a 0.302"-32 charging valve connection to facilitate on-site charging of the tank to meet system requirements.
C. Air and water connections shall be brazed to the tank and each tank shall be equipped with an outlet pressure gauge.
D. Manufacturer: AA Tank or approved equal.

2.10 PROCESSING SKID

A. Filtration components, sanitation components and controls shall be mounted on a high-density polyethylene skid. Skid shall be constructed of ¾" HDPE with internal rib supports and side skirts with fork lift access on all 4 sides. All piping to be Schedule 80 PVC.

2.11 REPRESSURIZATION PUMPS

A. General: Duplex Pumps shall convey water from the PWHT to the non-potable supply lines to toilets in the facility. Repressurization shall each include two (2) cast iron and 304SS construction pumps with Variable speed pressure booster pumping system controls and ANSI 150 Flanged Suction and Discharge Fittings. Pumps shall be multistage design. Supply voltage shall be 460 VAC 3 phase.
   1. Each pump shall be capable of producing 40 GPM @35 PSI.
   2. Control Panel shall include Alarm Package, Run/Fault lights. System to run on lead-lag configuration.
   3. Other controls shall include Variable Speed Drives with controls and interface to RWCS Main Panel and BAS System. Hydro-pneumatic diaphragm surge tank shall be included.
   4. All pumps shall be pre-plumbed, pre-wired and tested prior to shipment.

B. Capacity and Characteristics:
   1. System Capacity: 40 GPM @ 35 PSI
   2. Number of Pumps: Two
   3. Discharge Pipe Size: 2-inch FNPT
   4. Motor Horsepower: 3.0
   5. Electrical Characteristics:
      a. Volts: 460
      b. Phases: 3
      c. Hertz: 60

C. Mounted to Wahaso processing skid.

D. Approved manufacturer: Grundfos CR Series or approved equal.

2.12 CHLORINE INJECTION SYSTEM

A. A small amount of liquid chlorine shall be injected into the pressurized non-potable outlet to maintain a low-level residual at the toilet fixtures

B. System shall pump liquid chlorine from a 5-gallon or 50-gallon container (supplied locally) at an adjustable, metered rate. At the point of injection, a Venturi mixer shall thoroughly mix the chlorine with the pressurized stream.

2.13 OTHER COMPONENTS

A. Cistern Level Sensors: Provide stainless steel submersible pressure transmitter length to suit cistern depth. Install sensor in 1-1/2 inch PVC, schedule 80 pipe open at bottom. *Flowline Delta Span LD-32 or equal.*

B. Flow Meters: Provide paddlewheel flow meter for harvested water used and municipal water used. Meter to have digital mA output, low flow capability, polypropylene body. *Signet or approved equal.*

2.14 RAINWATER CONTROL SYSTEM

A. General: Provide Rainwater Control system with monitor to control Supply Tank levels, Pumps and Valves. System to include Wahaso Series 20 Control Logic Software as described below.
   1. Specific Operating Data and alarm conditions as required by the Building Automatic System (BAS) shall be provided through MODBUS communication protocol as specified by the Engineer. Bacnet available at additional cost.
   2. A Touch Screen Display shall allow pages of system information to be displayed and levels of security by specific security code access will allow operators and management to change system operating parameters. Touch Screen Display shall be capable of remote viewing through network connection.
   3. All Controls to be housed in a NEMA 12 UL Listed Enclosure.

B. Data Input Points shall include:
   1. Differential Pressure - Bag Filtration
   2. Main Storage Tank Level
   3. Discharge Pressure - Pump
   4. Municipal Water Valve Position
   5. UV Light Bulb Usage (hours)
   6. Chlorine Supply Low Level Alert
   7. Motor fault alarms – all drive motors
   8. Hours run monitor – all drive motors and filters
   9. Manual-Off-Auto Control Switches for all drives and automatic valves
   10. Emergency Stop

C. Control Output Points shall include:
   1. Municipal Valve – Open/Close
   2. Pump - Run
   3. BAS Mod-Bus Interface Communications

D. Data Log: Process Controller shall function as a datalogger to log the following parameters:
   1. Monthly and Year to Date Rainwater Harvested
   2. Tank Volume in Gallon Units for Main Storage Tank
   3. Volume of Harvested Water sent to Toilet Fixtures
   4. Volume of Municipal Make Up required

5. Hours run for all pump motors
6. Automatic pump alternation
7. Flow rates, pressure outputs and alarms on pumps
8. Historical Log of Alarm History

E. Touch Screen: The Process Controller shall communicate with the Touch Screen. The Touch Screen shall be security level protected and programmed to display overall system operations, alarm states, maintenance instructions and logged data. The Touch Screen shall be a 7" full-color display and shall include graphics to show the following:

1. Water Level in cistern and PWHT
2. Pump Discharge Pressure
3. Green/Red indicator for Valve Open or Valve Closed Position for all automatic valves
4. Green/Red indicator for pump run status
5. UV Light Bulb Usage
6. Low Chlorine Level Alert
7. Alarm Condition Alerts
8. Separate Pages for information on each major component accessed by pressing the touch screen on that item
9. Separate Page for Alarms History
10. Separate Page for Data Logged for required parameters.
11. Security accessed pages for maintenance information
12. Security accessed pages for changing critical set points

F. Manufacturer: Wahaso WCS-200 or approved equal.

2.15 BUILDING-AUTOMATION-SYSTEM INTERFACE

A. The following data information shall be available to the Building Automation System through the Wahaso control system with MODBUS protocol. Bacnet available at additional cost.

1. Main Storage Tank Volume level in Gallons
2. Differential Pressures of Bag Filter
3. Condition - Alarms
4. Discharge Pressure of Repressurization Pump
5. UV Light Bulb Usage
6. Status of UV System, normal or alarm
7. Low Chlorine Level Alert
8. Other information that shall be available includes:
   a. Hours Run for all motors.
   b. Volume of Municipal Water required for make up
   c. Data logging for daily water harvested
   d. Maintenance Alerts for filters

PART 3 - EXECUTION

3.1 INSTALLATION & TESTING

A. Install all rainwater harvesting equipment in accordance with manufacturer's recommendations and approved shop drawings as specified in Division 1.

B. Piping and Accessories: Install all piping connections and accessories, as specified or shown on Contract Drawings, in accordance with respective manufacturer's recommendations.

C. Manufacturer's Service Representative: Provide services of qualified representative or vendor to inspect installation, make any necessary adjustments, test equipment, and instruct operating personnel in operation and maintenance of water harvesting equipment.

3.2 OPERATIONS & MAINTENANCE TRAINING

A. System manufacturer shall provide Operation and Maintenance manuals customized to the system. Manufacturer to include and provide on-site training to site personnel on system operation and maintenance and provide on-going operational support throughout the Warranty period.

3.3 WARRANTY

A. Manufacturer shall provide a warranty on the entire system for a period of one year from the commission date or 90 days after system delivery, whichever comes first. Warranty shall cover all components and controls provided by the Manufacturer and include time and travel necessary for system repair.

B. Manufacturer warrants the treated water shall achieve the NSF-350 or IAPMO Water Reuse Standard water quality on a consistent basis throughout the warranty period.

END OF SECTION

SECTION 236313

AIR-COOLED REFRIGERANT CONDENSERS

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

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

1.2 SYSTEM DESCRIPTON

A. Outdoor-mounted, air-cooled condenser suitable for refrigerant R-410A or R-134a on the ground or rooftop installation. The 09DPS unit shall have one refrigeration circuit and the 09DPM unit shall have two independent refrigeration circuits capable of field conversion to single circuit. Unit shall have air-cooled coils, propeller-type condenser fans, a control box, and shall discharge condenser air vertically upward as shown on certified drawings. Unit shall be used in refrigeration circuit with 30MPA or 30HXA air-cooled condenserless chillers.

1.3 ACTION SUBMITTALS

A. Product Data: For each air-cooled refrigerant condenser. Include rated capacities, operating characteristics, furnished specialties, and accessories. Include equipment dimensions, weights and structural loads, required clearances, method of field assembly, components, and location and size of each field connection.

B. LEED Submittals:

1. Product Data for Prerequisite EA 2: Documentation indicating that units comply with applicable requirements in ASHRAE/IESNA 90.1.
2. Product Data for Credit EA 4: Documentation indicating that air-cooled refrigerant condensers and refrigerants comply.

1.4 QUALITY ASSURANCE

A. Unit construction shall comply with latest edition of ASHRAE 15 Safety Code, UL 1995, and ASME applicable codes (U.S.A. codes).
B. Unit shall be manufactured in a facility registered to ISO 9001 Manufacturing Quality Standard.
C. Base unit shall be constructed in accordance with UL standards and CSA.
D. Unit cabinet shall be capable of withstanding 500-hour salt-spray exposure per ASTM B117 (scribed specimen).
E. Design pressure shall be 650 psig.
F. Unit shall be functional checked at the factory.
G. Unit shall be rated using refrigerants R-410A and R-134a. Ratings shall be listed at minimum (5° F subcooling) and maximum (15° F subcooling) refrigerant charge.
H. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

1.5 COORDINATION

A. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Section 077200 "Roof Accessories."
B. Coordinate location of refrigerant piping and electrical rough-ins.

1.6 DELIVERY, STORAGE AND HANDLING

A. Unit shall be shipped as single package and shall be stored and handled per unit manufacturer's recommendations.

1.7 WARRANTY:

A. **Special Warranty: Manufacturer agrees to repair or replace components of air cooled condensers that fail in materials or workmanship within specified warranty period.**
   1. Extended warranties include, but are not limited to, the following:
      a. Compete condenser including refrigerant and oil charge.
      b. Parts and labor.
   2. Warranty Period: Five years from date of Substantial Completion (Addendum 4 dated 05 September 2023).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   1. Carrier Corporation; a unit of United Technologies Corp.
   2. **MultiStack (Addendum 4 dated 05 September 2023).**

2.2 EQUIPMENT

A. General:
   1. Factory assembled, single-piece, air-cooled remote condenser. Contained within the unit enclosure shall be all factory wiring, piping, controls, nitrogen holding charge, and special features required prior to field start-up.
B. Unit Cabinet:
   1. Cabinet shall be galvanized steel casing with a baked enamel powder or pre-painted finish.
   2. Cabinet shall be capable of withstanding 500-hr salt spray test in accordance with ASTM (U.S.A.) B-117 standard.
   3. Control box access panels shall be removable for service access.
   4. Lifting holes shall be provided to facilitate rigging.
C. Fans:
   1. Condenser fans shall be direct-drive propeller type, discharging air vertically upward.
   2. All condenser fan motors shall be totally enclosed 3-phase type with permanently lubricated ball bearings, class F insulation and internal, automatic-reset thermal overload protection.
   3. Shafts shall have inherent corrosion resistance.
   4. Fan blades shall be statically and dynamically balanced.
   5. Condenser-fan openings shall be equipped with PVC-coated steel wire safety guards.
D. Condenser Coils:

1. Coil shall be air-cooled microchannel heat exchanger (MCHX) and shall have a series of flat tubes containing a series of multiple, parallel flow microchannels layered between the refrigerant manifolds. Microchannel coils shall consist of a two-pass arrangement. Coil construction shall consist of aluminum alloys for the fins, tubes and manifolds in combination with a corrosion-resistant coating on the tubes.
2. Tubes shall be cleaned, dehydrated, and sealed.
3. Assembled condenser coils shall be leak tested and pressure tested at 650 psig.

E. Refrigeration Components:
1. Refrigeration circuit components shall include liquid line temperature relief device and nitrogen holding charge.

F. Controls and Safeties:
1. Unit controls shall include:
   a. Unit shall have a temperature fusible plug for safety on each refrigerant circuit.
   b. Self-contained low voltage control circuit.
   c. Cycle condenser fans to maintain proper head pressure control.

G. Operating Characteristics:
1. Unit shall be capable of rejecting the required heat at the required cfm and be capable of operating down to moderate ambient temperatures with standard factory supplied fan cycling.
2. Head pressure fan cycling control utilizes temperature switches for 09DP018-035 and 065 units.
3. Head pressure fan cycling control utilizes temperature and pressure switches for 09DP040-060 and 075-130 units.
4. ~~Operation to –20 F shall be possible with Motormaster® head pressure control.~~ (**Addendum 4 dated 05 September 2023)**

H. Electrical Requirements:
1. A dual power supply of the correct voltage shall be required for each series unit. A 3-phase power circuit voltage and a 24 volt single-phase control circuit shall be required.
2. The number of control circuits shall depend on the unit application, whether it is matched with one unit or two units.
3. Power supplies for all units shall enter the control box through factory-punched entrance holes in the control box shelf.
4. Terminal blocks shall be supplied for field wiring connections.
5. Units shall utilize electromechanical fan cycling head pressure controls to control proper head pressure.

I. Special Features:
~~1. Low Ambient Control:~~
   ~~a. Control shall regulate fan motor speed in response to the saturated condensing temperature of the unit. The control shall be capable of operating with outdoor temperatures at –20 F.~~
   ~~b. Motormaster® low ambient control shall be available as a factory installed option or field installed accessory for all units.~~
~~2. Optional E-Coated MCHX Condenser Coil:~~
   a. ~~E-coated aluminum microchannel coils shall have a flexible epoxy polymer coating uniformly applied to all coil external surface areas without material bridging between fins or louvers. Coating process shall ensure complete coil encapsulation, including all exposed fin edges. E-coat thickness of 0.8 to 1.2 mil with top coat having a uniform dry film thickness from 1.0 to 2.0 mil on all external coil surface areas, including fin edges, shall be provided. E-coated coils shall have superior hardness characteristics of 2H per ASTM D3363-00 and cross-hatch adhesion of 4B-5B per ASTM D3359-02. E-coated products shall have superior impact resistance with no cracking, chipping or peeling per NSF/ANSI 51-2002 Method 10.2 (U.S.A. Standards). E-coated aluminum microchannel coils shall be capable of withstanding an 8,000-hour salt spray test in accordance with the ASTM (American Society for Testing and Materials) (U.S.A.) B 117 Standard.~~ (**Addendum 4 dated 05 September 2023)**
3. Sound Reduction:
   a. Low sound fan for sound reduction is available as a factory-installed option or field-installed accessory for all units.
   b. Low sound fans shall be direct driven, 9-blade, airfoil cross-section type with reinforced polymer construction and shrouded axial fan. Fan shall be statically and dynamically balanced with inherent corrosion resistance.
4. Non-Fused Disconnect:
   a. A non-fused disconnect is available as a factory- installed option for all units having single point power connection units.
5. High Short Circuit Current Rating (SCCR):

a. The optional high SCCR interrupt capability shall allow the unit to tolerate a ~~65~~ **35 kvA** (**Addendum 4 dated 05 September 2023)** (208/230v, 380v and 460-v units) or 25 kA (575-v units) short circuit current for a brief period of time while protecting downstream components. The high SCCR option shall provide a higher level of protection than the standard unit (option for 60 Hz only). High interrupt shall be available as factory-installed option on all units.

6. Security Grilles/Hail Guards:
   a. Units shall be supplied with factory-installed or field-installed louvered, sheet metal panels which securely fasten to the unit to provide condenser coil protection against hail and physical damage.
7. Vibration Isolation Pads:
   a. Neoprene vibration isolation pads (24 in. x 3 in. x 1/4 in.) shall be available for field installation to reduce vibration transmission from the compressor through the floor and into the conditioned space.
8. Wind Baffle Kit:
   a. Field-installed accessory kit shall provide wind baffles for use with low ambient temperature operation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of air-cooled refrigerant condensers.
B. Examine roughing-in for refrigerant piping systems to verify actual locations of piping connections before equipment installation.
C. Examine walls, floors, and roofs for suitable conditions where air-cooled condensers will be installed.
D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install units level and plumb, firmly anchored in locations indicated; maintain manufacturer's recommended clearances.
B. Equipment Mounting:
   1. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."
C. Maintain manufacturer's recommended clearances for service and maintenance.
D. Loose Components: Install electrical components, devices, and accessories that are not factory mounted.

3.3 CONNECTIONS

A. Piping installation requirements are specified in Section 232113 "Hydronic Piping" and Section 232116 Hydronic Piping Specialties." Drawings indicate general arrangement of piping, fittings, and specialties.
B. Install piping adjacent to machine to allow service and maintenance.
C. Refrigerant Piping: Connect piping to unit with pressure relief, service valve, filter-dryer, and moisture indicator on each refrigerant-circuit liquid line. Refrigerant piping and specialties are specified in Section 232300 "Refrigerant Piping."

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.
   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections, and to assist in testing.
B. Tests and Inspections:
   1. Perform electrical test and visual and mechanical inspection.
   2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
   3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Complete manufacturer's starting checklist.
   4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
   5. Verify proper airflow over coils.
C. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.

D. Air-cooled refrigerant condensers will be considered defective if they do not pass tests and inspections.
E. Prepare test and inspection reports.

3.5 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.
1. Complete installation and startup checks according to manufacturer's written instructions and perform the following:
a. Inspect for physical damage to unit casing.
b. Verify that access doors move freely and are weathertight.
c. Clean units and inspect for construction debris.
d. Verify that all bolts and screws are tight.
e. Adjust vibration isolation and flexible connections.
f. Verify that controls are connected and operational.

2. Lubricate bearings on fan motors.
3. Verify that fan wheel is rotating in the correct direction and is not vibrating or binding.
4. Start unit according to manufacturer's written instructions and complete manufacturer's startup checklist.
5. Measure and record airflow and air temperature rise over coils.
6. Verify proper operation of capacity control device.
7. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.
8. After startup and performance test, lubricate bearings.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain air-cooled refrigerant condensers.

END OF SECTION

SECTION 236423

SCROLL WATER CHILLERS

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 SYSTEM DESCRIPTION

A. Microprocessor controlled liquid-cooled condenserless liquid chiller utilizing scroll type compressors.

1.3 ACTION SUBMITTALS

A. Product Data: Include refrigerant, rated capacities, operating characteristics, furnished specialties, and accessories.
   1. Performance at ARI standard conditions and at conditions indicated.
   2. Performance at ARI standard unloading conditions.
   3. Minimum evaporator flow rate.
   4. Refrigerant capacity of water chiller.
   5. Oil capacity of water chiller.
   6. Fluid capacity of evaporator.
   7. Characteristics of safety relief valves.

1.4 QUALITY ASSURANCE

A. Unit performance shall be rated per AHRI (Air-Conditioning, Heating and Refrigeration Institute) Standard 550/590 and 551/591, latest edition (U.S.A.) at standard rating conditions.

B. All units shall be ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) 90.1 compliant.

C. Unit construction shall comply with ANSI (American National Standards Institute)/ASHRAE 15 Safety Standard (latest revision) and NEC (National Electrical Code).

D. Unit shall be certified in accordance with ISO (International Organization for Standardization) 9001 manufacturing quality standard.

E. Unit shall be ETL and ETL, Canada certified.

1.5 DELIVERY, STORAGE AND HANDLING

A. Unit shall be shipped factory-assembled with all piping and wiring, pre-charged with a holding charge of nitrogen and shall be stored and handled according to manufacturer's recommendations.

B. Unit controls shall be capable of withstanding 150 F storage temperatures in the control compartment.

C. Chiller and starter should be stored indoors, protected from construction dirt and moisture. An inspection should be conducted under shipping tarps, bags, or crates to be sure water has not collected during transit. Protective shipping covers should be kept in place until machine is ready for installation. The inside of the protective cover should meet the following criteria:
   1. Temperature is between 40 F and 120 F.
   2. Relative humidity is between 10% and 80% (non-condensing).

1.6 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   1. Carrier Corporation; a unit of United Technologies Corp.
   2. **MultiStack (Addendum 4 dated 05 September 2023)**

2.2 EQUIPMENT

A. General:
   1. Single-piece liquid chiller consisting of compressor(s), BPHE (brazed-plate heat exchanger) evaporator, controls, safeties, and any hardware required before start-up.

B. Unit Cabinet:
   1. Frame shall be of heavy-gage galvanized steel with an electrostatically applied baked enamel finish.
   2. The unit shall pass through a standard 36-inch door and shall not exceed 57 inches in length.

C. Compressor:
   1. Fully hermetic scroll type compressors.
   2. Direct drive, 3500 rpm, protected by line break device, suction gas cooled motor.
   3. External vibration isolation - rubber in shear.
   4. Staging of compressors shall provide unloading capability. Digital compressor unloading shall be provided for further staging capacity..

D. Evaporator:
   1. Evaporator shall be rated for a maximum refrigerant pressure of 505 psig for sizes 015 and 020, 565 psig for sizes 030 to 045, and 653 psig for sizes 050 to 071, and shall be tested for a maximum water-side pressure of 300 psig.
   2. Shall be single-pass, ANSI type 316 stainless steel, brazed plate construction.
   3. Shall be insulated with 3/4-inch closed-cell, polyvinyl-chloride foam with a maximum K factor of 0.28.
   4. Unit shall be provided with a factory-installed flow switch.
   5. Unit shall be provided with entering and leaving chilled water temperature sensors and water pressure access port.
   6. A strainer with a minimum of 40 mesh must be installed within 10 ft of the heat exchanger fluid inlet to prevent debris from clogging the heat exchanger. This strainer shall be required and shall be available as an accessory.

E. Refrigerant Components:
   1. Each chiller shall contain the following: sight glass; filter drier; liquid line isolation valve; expansion valve; and charging port.
   2. Expansion valve TXV thermostatic expansion valve shall be located within 12 inches of the evaporator with no bend between expansion valve and evaporator in accordance with evaporator manufacturer recommendation.

F. Controls, Safeties and Diagnostics:
   1. Controls:
      a. Unit controls shall include the following minimum components:
         1) Microprocessor.
         2) Power and control circuit terminal blocks.
         3) ON/OFF control switch.
         4) Thermistor is installed to measure evaporator entering and leaving fluid temperatures.
         5) Terminal block for temporary and/or permanent interface to the Carrier Comfort Network® or similar building system control.
      b. Microprocessor with non-volatile memory. Battery backup system shall not be accepted.
      c. Control transformer to serve all controllers, contactors, relays, and control components.

d. Replaceable solid-state relay panels and controllers.
e. Pressure transducers (used to calculate saturated suction temperature and saturated condensing temperature).
f. Provision for field installation of accessory sensor to measure compressor return gas temperature (suction gas thermistor).
g. Terminals shall be provided in the control box for wiring of accessory field-installed condenser temperature sensors.
h. Unit controls shall be capable of performing the following functions:
1) Capacity control based on leaving chilled fluid temperature and compensated by rate of change of return-fluid temperature.
2) Limiting of the chilled fluid temperature pulldown rate at start-up to 1° F per minute to prevent excessive demand spikes (charges) at start-up.
3) Seven-day time schedule.
4) Leaving chilled fluid temperature reset from return fluid.
5) Dual chiller control for parallel chiller applications (common leaving chilled water sensor required).
6) Timed maintenance scheduling to signal maintenance activities.

2. Diagnostics:
a. The control panel shall include, as standard, a scrolling marquee display capable of indicating the safety lockout condition by displaying a code for which an explanation may be scrolled at the display.
b. Information included for display shall be:
1) Compressor lockout.
2) Loss of charge.
3) Low fluid flow.
4) Evaporator freeze protection.
5) Thermistor malfunction.
6) Entering and leaving-fluid temperature.
7) Circuit suction and discharge pressure.
8) Time of day.
c. Display module, in conjunction with the microprocessor, must also be capable of displaying the output (results) of a service test. Service test shall verify operation of every switch, thermistor, and compressors before chiller is started.
d. Diagnostics shall include the ability to review a list of the 20 most recent alarms with clear language descriptions of the alarm event. Display of alarm codes without the ability for clear language descriptions shall be prohibited.
e. An alarm history buffer shall allow the user to store no less than 20 alarm events with clear language descriptions, time and date stamp event entry.
f. The chiller controller shall include a connection port for communicating with the local equipment network and the Carrier Comfort Network (CCN) system.
g. The control system shall allow software upgrade without the need for new hardware modules.

3. Safeties:
a. Unit shall be equipped with sensors and all necessary components in conjunction with the control system to provide the unit with the following protections:
1) Loss of refrigerant charge protection.
2) Low fluid flow detection.
3) Low chilled fluid temperature protection.
4) Low control voltage (to unit) protection.
5) High-pressure switch.
6) Reverse rotation.
7) Overcurrent protection.
8) Loss of phase.
b. Compressors shall be equipped with the following protections:
1) High discharge temperature protection.
2) Electrical overload through the use of definite-purpose contactors and motor overload protection through internal compressor overload or external current overload.
3) Circuit breakers shall open all 3 phases in the event of an overload in any one phase (single-phasing condition).
4) Circuit breakers for short circuit protection.

G. Operating Characteristics:
1. Unit shall be capable of starting with up to 95 F fluid temperature entering the evaporator.

2. Unit shall be capable of operating with variable evaporator fluid flow, up to 10% change in flow rate per minute.

H. Electrical Requirements:
1. Single-point electrical power connection with compressors factory-wired to a terminal block in the control panel. Compressor sensors and system pressure transducers shall be factory-wired to the unit controller.
2. Control interface shall be accessed through low voltage terminal strip or terminal strip.

I. Chilled Water Circuit:
1. Chilled water circuit shall be rated for 300 psig.
2. Solid-state flow switch with integral relay shall be factory installed and wired.

J. Special Features:
a. Sound Enclosure Panels:
b. This acoustic package shall be either factory-installed or field-installed and shall entirely enclose the compressor section to further reduce radiated sound.
c. Vibration Isolators (Springs):
d. Vibration isolators shall be field-installed before the unit is set into its final location and shall reduce vibration transmission through the mounting area of the chiller.

2. Non-Fused Disconnect:
a. The non-fused disconnect shall be factory installed and shall disconnect all power to the unit (including control circuit power).
b. Strainer:
c. A Y strainer shall be available in sizes 1.5 to 6 in. with a minimum of 40 mesh for field installation.

3. Remote Enhanced Display:
a. Unit shall be supplied with indoor-mounted, remote, 40-character per line, 16-line display panel for field installation.

4. Energy Management Module (EMM):
a. A factory or field-installed module shall provide the following energy management capabilities: 4 to 20 mA signals for leaving fluid temperature reset, cooling set point or demand limit control; 2-point demand limit control (from 15% to 100%) activated by a remote contact closure; and discrete input for "Ice Done" indication for ice storage system interface. EMM shall be capable of:
1) Leaving temperature reset from space temperature, outdoor temperature, or 4 to 20 mA signal.
2) Demand limit or load shed via field-supplied 4 to 20 mA signal or 2-step discrete contact closure.

5. BACnet Translator Control:
a. Unit shall be supplied with field-installed interface between the chiller and a BACnet Local Area Network (LAN, i.e., MS/TP EIA-485).
b. Digital Compressor Option:
c. Shall provide factory-installed digital compressor to provide additional steps of capacity (not available on sizes 015, 050-071).

6. Compressor Insulation:
a. Compressor insulation is designed to insulate scroll compressors and prevent water vapor from condensing on the colder compressor surface.
b. Compressor Sound Blankets:
c. Units can be ordered with acoustically insulated sound blankets installed around the compressors to reduce radiated sound levels.

7. Water Manifold Piping Option:
a. Shall provide piping that allows more than one chiller module to be piped together in parallel. Combination valves shall also be provided.

8. BACnet Communication Option:
a. Shall provide factory-installed communication capability with a BACnet MS/TP network. Allows integration with i-Vu® Open control system or a BACnet building automation system.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Before water chiller installation, examine roughing-in for equipment support, anchor-bolt sizes and locations, piping, and electrical connections to verify actual locations, sizes, and other conditions affecting water chiller performance, maintenance, and operations.
   1. Water chiller locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 WATER CHILLER INSTALLATION

A. Install water chillers on support structure indicated.

B. Equipment Mounting:
   1. Install water chillers on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
   2. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."

C. Maintain manufacturer's recommended clearances for service and maintenance.

D. Charge water chiller with refrigerant if not factory charged and fill with oil if not factory installed.

E. Install separate devices furnished by manufacturer and not factory installed.

3.3 CONNECTIONS

A. Comply with requirements in Section 232113 "Hydronic Piping" and Section 232116 Hydronic Piping Specialties." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Comply with requirements in Section 232300 "Refrigerant Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

C. Install piping adjacent to chiller to allow service and maintenance.

D. Evaporator Fluid Connections: Connect to evaporator inlet with shutoff valve, strainer, flexible connector, thermometer, and plugged tee with pressure gage. Connect to evaporator outlet with shutoff valve, balancing valve, flexible connector, thermometer, plugged tee with pressure gage, flow meter, and drain connection with valve. Make connections to water chiller with a union, flange, or mechanical coupling.

E. Refrigerant Pressure Relief Valve Connections: For water chillers installed indoors, extend vent piping to the outside without valves or restrictions. Comply with ASHRAE 15.

F. Connect each drain connection with a union and drain pipe and extend pipe, full size of connection, to floor drain. Provide a shutoff valve at each connection if required.

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

B. Inspect field-assembled components, equipment installation, and piping and electrical connections for proper assemblies, installations, and connections.

C. Complete installation and startup checks according to manufacturer's written instructions and perform the following:
   1. Verify that refrigerant charge is sufficient and water chiller has been leak tested.
   2. Verify that pumps are installed and functional.
   3. Verify that thermometers and gages are installed.
   4. Operate water chiller for run-in period.
   5. Check bearing lubrication and oil levels.
   6. Verify that refrigerant pressure relief device for chillers installed indoors is vented outside.
   7. Verify proper motor rotation.
   8. Verify static deflection of vibration isolators, including deflection during water chiller startup and shutdown.
   9. Verify and record performance of water chiller protection devices.
   10. Test and adjust controls and safeties. Replace damaged or malfunctioning controls and equipment.

D. Prepare a written startup report that records results of tests and inspections.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain water chillers.

END OF SECTION

SECTION 262413

SWITCHBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Switchboards.
2. Surge protection devices.
3. Disconnecting and overcurrent protective devices.
4. Instrumentation.
5. Control power.
6. Accessory components and features.

1.2 COORDINATION

A. Coordinate layout and installation of switchboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.3 ACTION SUBMITTALS

A. Product Data:
1. Switchboards.
2. Overcurrent protective devices.
3. Surge protection devices.
4. Ground-fault protection devices.
5. Accessories.
6. Other components.

7. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

B. Shop Drawings: For each switchboard and related equipment.
1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types for types other than UL 50E, Type 1.
3. Detail bus configuration, current, and voltage ratings.
4. Detail short-circuit current rating of switchboards and overcurrent protective devices.
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
6. Include time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Include selectable ranges for each type of overcurrent protective device.
7. Include schematic and wiring diagrams for power, signal, and control wiring.

C. Field Quality-Control Submittals:
1. Field Quality-Control Reports:
a. Test procedures used.
b. Test results that comply with requirements.
c. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturers' Published Instructions: Record copy of official installation and testing instructions issued to Installer by manufacturer for the following:
1. Handling, storing, and providing temporary heat.
2. Mounting accessories and anchoring devices.
3. Testing and adjusting overcurrent protective devices.

1.5 CLOSEOUT SUBMITTALS

A. Warranty documentation.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Spare Parts: Furnish to Owner spare parts, for repairing switchboards, that are packaged with protective covering for storage on-site and identified with labels describing contents. Include the following:
1. Control-Power Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than two of each size and type.
2. Fuses for Fused Power-Circuit Devices: Equal to 10 percent of quantity installed for each size and type but no fewer than three of each size and type.
3. Indicating Lights: Equal to 10 percent of quantity installed for each size and type but no less than one of each size and type.

B. Special Tools: Furnish to Owner proprietary equipment, keys, and software required to operate, maintain, repair, adjust, or implement future changes to switchboards, that are packaged with protective covering for storage on-site and identified with labels describing contents. Include the following:
1. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver switchboards in sections or lengths that can be moved past obstructions in delivery path.

B. Remove loose packing and flammable materials from inside switchboards and install temporary electric heating (250 W per section) to prevent condensation.

C. Handle and prepare switchboards for installation in accordance with NECA 400 and NEMA PB 2.1.

1.8 WARRANTY

A. Special Manufacturer Extended Warranty: Manufacturer warrants that switchboard performs in accordance with specified requirements and agrees to provide repair or replacement of components that fail to perform as specified within extended-warranty period.
1. Extended-Warranty Period: Three years from date of Substantial Completion; full coverage for labor, materials, and equipment.

PART 2 - PRODUCTS

2.1 SWITCHBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Square D; Schneider Electric USA.
   2. Siemens
   3. ABB

B. Source Limitations: Obtain switchboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

C. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.

D. Comply with NEMA PB 2.

E. Comply with NFPA 70.

F. Comply with UL 891.

G. Front-Connected, Front-Accessible Switchboards:
   1. Main Devices: Panel Fixed, individually mounted.
   2. Branch Devices: Panel mounted.
   3. Sections front and rear aligned.

H. Indoor Enclosures: Steel, UL 50E, Type 1.

I. Enclosure Finish for Indoor Units: Factory-applied finish in manufacturer's standard gray finish over rust-inhibiting primer on treated metal surface.

J. Barriers: Between adjacent switchboard sections.

K. Insulation and isolation for main bus of main section and main and vertical buses of feeder sections.

L. Service Entrance Rating: Switchboards intended for use as service entrance equipment may contain from one to six service disconnecting means with overcurrent protection, neutral bus with disconnecting link, grounding electrode conductor terminal, and main bonding jumper.

M. Bus Transition and Incoming Pull Sections: Matched and aligned with basic switchboard.

N. Hinged Front Panels: Allow access to circuit breaker, metering, accessory, and blank compartments.

O. Buses and Connections: Three phase, four wire unless otherwise indicated.
   1. Provide phase bus arrangement A, B, C from front to back, top to bottom, and left to right when viewed from front of switchboard.
   2. Phase- and Neutral-Bus Material:
      a. Hard-drawn copper of 98 percent conductivity, silver-plated.
   3. Copper feeder circuit-breaker line connections.
   4. Ground Bus: 1/4 by 2 inch hard-drawn copper of 98 percent conductivity, equipped with mechanical or compression connectors for feeder and branch-circuit ground conductors.
   5. Main-Phase Buses and Equipment-Ground Buses: Uniform capacity for entire length of switchboard's main and distribution sections. Provide for future extensions from both ends.
   6. Disconnect Links:
      a. Isolate neutral bus from incoming neutral conductors.
      b. Bond neutral bus to equipment-ground bus for switchboards utilized as service equipment or separately derived systems.
   7. Neutral Buses: 100 percent of ampacity of phase buses unless otherwise indicated, equipped with mechanical connectors for outgoing circuit neutral cables. Brace bus extensions for busway feeder neutral bus.
   8. Isolation Barrier Access Provisions: Permit checking of bus-bolt tightness.

P. Future Devices: Equip compartments with mounting brackets, supports, bus connections, and appurtenances at full rating of circuit-breaker compartment.

2.2 SURGE PROTECTION DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Square D; Schneider Electric USA.
   2. Siemens
   3. ABB

B. SPDs: Listed and labeled in accordance with UL 1449, Type 1.

C. Features and Accessories:
1. Indicator light display for protection status.
2. Surge counter.

D. Peak Surge Current Rating: Minimum single-pulse surge current withstand rating per phase may not be less than 200 kA. Peak surge current rating must be arithmetic sum of ratings of individual MOVs in each mode.

E. SCCR: Equal or exceed 200 kA.

F. Nominal Rating: 20 kA.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.
1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 100 A and larger.
2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front- mounted, field-adjustable trip setting.
3. Electronic trip circuit breakers with RMS sensing; field-replaceable rating plug or field- replicable electronic trip; and the following field-adjustable settings:
a. Instantaneous trip.
b. Long- and short-time pickup levels.
c. Long and short time adjustments.
d. Ground-fault pickup level, time delay, and I squared t response, where indicated on drawings.
4. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30 mA trip).
5. MCCB Features and Accessories:
a. Standard frame sizes, trip ratings, and number of poles.
b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor material.
c. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

2.4 INSTRUMENTATION

A. Instrument Transformers: NEMA EI 21.1, and the following:
1. Potential Transformers: NEMA EI 21.1; 120 V, 60 Hz, single, tapped, or double secondary; disconnecting type with integral fuse mountings. Burden and accuracy must be consistent with connected metering and relay devices.
2. Current Transformers: NEMA EI 21.1; 5 A, 60 Hz, secondary; bar or window type; double secondary winding and secondary shorting device. Burden and accuracy must be consistent with connected metering and relay devices.
3. Control-Power Transformers: Dry type, mounted in separate compartments for units larger than 3 kVA.
4. Current Transformers for Neutral and Ground-Fault Current Sensing: Connect secondary wiring to ground overcurrent relays, via shorting terminals, to provide selective tripping of main and tie circuit breaker. Coordinate with feeder circuit-breaker, ground-fault protection.

B. Multifunction Digital-Metering Monitor: Microprocessor-based unit suitable for three- or four- wire systems and with the following features:
1. Switch-selectable digital display of the following values with maximum accuracy tolerances as indicated:
a. Phase Currents, Each Phase: Plus or minus 0.5 percent.
b. Phase-to-Phase Voltages, Three Phase: Plus or minus 0.5 percent.
c. Phase-to-Neutral Voltages, Three Phase: Plus or minus 0.5 percent.
d. Megawatts: Plus or minus 1 percent.
e. Megavars: Plus or minus 1 percent.
f. Power Factor: Plus or minus 1 percent.
g. Frequency: Plus or minus 0.1 percent.
h. Accumulated Energy, Megawatt Hours: Plus or minus 1 percent; accumulated values unaffected by power outages up to 72 hours.
i. Megawatt Demand: Plus or minus 1 percent; demand interval programmable from five to 60 minutes.
2. Mounting: Display and control unit flush or semiflush mounted in instrument compartment door.

2.5 CONTROL POWER

A. Control Circuits:
   1. 120 V(ac), supplied through secondary disconnecting devices from control-power transformer.

2.6 ACCESSORY COMPONENTS AND FEATURES

A. Mounting Accessories: For anchors, mounting channels, bolts, washers, and other mounting accessories, comply with requirements in manufacturer's instructions.

PART 3 - EXECUTION

3.2 EXAMINATION

A. Receive, inspect, handle, and store switchboards in accordance with NECA 400 and NEMA PB 2.1.
   1. Lift or move panelboards with spreader bars and manufacturer-supplied lifting straps following manufacturer's published instructions.
   2. Use rollers, slings, or other manufacturer-approved methods if lifting straps are not furnished.
   3. Protect from moisture, dust, dirt, and debris during storage and installation.
   4. Install temporary heating during storage in accordance with manufacturer's published instructions.

B. Examine switchboards before installation. Reject switchboards that are moisture damaged or physically damaged.

C. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance of the Work or that affect performance of equipment.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Installation Pathway: Remove and replace access fencing, doors, lift-out panels, and structures to provide pathway for moving switchboards into place.

3.4 INSTALLATION

A. Comply with manufacturer's published instructions.

B. Reference Standards:
   1. Switchboards and Accessories: Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NECA 400.
   2. Consult Engineer for resolution of conflicting requirements.

C. Special Techniques:
   1. Equipment Mounting: Install switchboards on concrete base, 4 inch nominal thickness. Comply with requirements for concrete base specified in Section 260529 "Hangers and Supports for Electrical Systems."
      a. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18 inch centers around full perimeter of concrete base.
      b. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
      c. Place and secure anchorage devices. Use setting drawings, templates, diagrams, published instructions, and directions furnished with items to be embedded.
      d. Install anchor bolts to elevations required for proper attachment to switchboards.
      e. Anchor switchboard to building structure at top of switchboard if required or recommended by manufacturer.
   2. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, straps and brackets, and temporary blocking of moving parts from switchboard units and components.
   3. Operating Instructions: Frame and mount printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.
   4. Install filler plates in unused spaces of panel-mounted sections.
   5. Install overcurrent protective devices, surge protection devices, and instrumentation.
      a. Set field-adjustable switches and circuit-breaker trip ranges.

3.5 CONNECTIONS

A. Bond conduits entering underneath switchboard to equipment ground bus with bonding conductor sized in accordance with NFPA 70.

B. Support and secure conductors within switchboard in accordance with NFPA 70.

C. Extend insulated equipment grounding cable to busway ground connection and support cable at intervals in vertical run.

3.6 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

B. Switchboard Nameplates: Label each switchboard compartment with nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

C. Device Nameplates: Label each disconnecting and overcurrent protective device and each meter and control device mounted in compartment doors with nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

D. Service Equipment Label: Labeled, by qualified electrical testing laboratory recognized by authorities having jurisdiction, for use as service equipment for switchboards with one or more service disconnecting and overcurrent protective devices.

3.7 FIELD QUALITY CONTROL

A. Field tests and inspections must be witnessed by Tenant.

B. Tests and Inspections:

1. Acceptance Testing:
   a. Test insulation resistance for each switchboard bus, component, connecting supply, feeder, and control circuit. Open control and metering circuits within switchboard and remove neutral connection to surge protection and other electronic devices prior to insulation test. Reconnect after test.
   b. Test continuity of each circuit.
2. Test ground-fault protection of equipment for service equipment in accordance with NFPA 70.
3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
4. Correct malfunctioning units on-site where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
5. Perform the following infrared scan tests and inspections, and prepare reports:
   a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform infrared scan of each switchboard. Remove front panels so joints and connections are accessible to portable scanner.
   b. Follow-up Infrared Scanning: Perform additional follow-up infrared scan of each switchboard 11 months after date of Substantial Completion.
   c. Instruments and Equipment:
      1) Use infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
6. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

C. Nonconforming Work:

1. Switchboard will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

D. Collect, assemble, and submit test and inspection reports, including certified report that identifies switchboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

E. Manufacturer Services:

1. Engage factory-authorized service representative to support field tests and inspections.

3.8 ADJUSTING

A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as specified in Section 260573.16 "Coordination Studies."

3.9 PROTECTION

A. Temporary Heating: Apply temporary heat, to maintain temperature in accordance with manufacturer's published instructions, until switchboard is ready to be energized and placed into service.

END OF SECTION 262413

SECTION 26 31 00

PHOTOVOLTAIC SYSTEM PERFORMANCE REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes general performance requirements that apply to installing a roof mounted solar electric (PV) system for this project

B. Contractor is the Designer of Record for this system. Contractor is required to provide a Structural PE (Professional Engineer) Stamp for the structural design and an Electrical PE Stamp for the overall system design.

C. Both the structural and electrical stamps are to be provided from experienced PV designers with at least 5 similar completed projects.

D. Contractor is required to have experience with at least 5 similar completed PV projects.

E. Product specifications included in this section are the Basis for Design. Design substitutions shall meet the minimum performance requirements defined in this section. Contractor shall select number of inverters and perform string sizing.

F. Related Work and Requirements:

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

G. Incentive Paperwork:

1. Contractor to provide support with Owner's application for Focus on Energy incentives.

1.2 DEFINITIONS

A. MPPT: Maximum power point tracking.

B. STC: Standard test conditions, 1000 W/m2, 1.5 air mass, and 25°C cell temperature.

C. NABCEP: North American Board of Certified Energy Practitioners

D. PTC: PV USA Test Conditions, 1000 W/m2, 1.5 air mass, 20°C air temperature, and 1 meter/sec. wind speed.

E. Voc: Open circuit voltage

F. Isc: Short circuit current.

1.3 SUBMITTALS

A. Experience: Submit resumes for individuals involved with the design and construction of the PV System. Submit references and summaries of five similar projects that these individuals have completed.

B. Product Data: For each type of component indicated below. Include rated capacities, operating characteristics, and furnished specialties and accessories. All product data submittals shall be submitted for review by Owner prior to purchasing any materials or equipment.
   1. Solar panels
   2. Combiner boxes and fuses
   3. Grid tied inverters, including efficiency data.
   4. Solar panel structural system, including rail, clamps, and brackets.
   5. Manufacturer's installation instructions.

C. 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. All shop drawings shall be submitted for review by Owner prior to purchasing any materials or equipment.
   1. Dimensioned AutoCAD plan drawings of equipment including solar panel array, inverters, disconnects, combiner boxes, metering, and electrical routing.
   2. Provide AutoCAD drafted three-line wiring diagram of solar PV system indicating ratings of all panels and inverters, wire and conduit types and sizes, and disconnects.
   3. Wiring Diagrams: Power, signal, and control wiring.

D. Design Calculations
   1. The following design calculations shall be performed by Contractor and submitted for review by Owner prior to purchasing any materials or equipment.
      a. Electrical calculations, including string sizing, inverter selection, and voltage losses.
      b. Structural calculations, including rail spans, wind and snow loading, required ballast weights, and roof strength calculations.

E. Permitting and Agreements
   1. The following permits and agreements shall be prepared by Contractor on behalf of the Owner. All approved permits and agreements shall be submitted for review by Owner prior to purchasing any materials or equipment.
      a. Utility interconnection agreement
      b. Building permit
      c. Electrical permit

F. As built drawings:
   1. Dimensioned AutoCAD plan drawings of equipment including solar panel array, inverters, disconnects, combiner boxes, metering, and electrical routing.
   2. Provide AutoCAD drafted three-line diagram of solar PV system indicating ratings of all panels and inverters, wire and conduit types and sizes, and disconnects.

G. Field quality-control test reports.
   1. Include voltages and power output for each string. Measure and record solar intensity during testing. Include time, date, and weather conditions of test.

H. Operation and Maintenance Data: For panels, inverter, metering, and monitoring. In addition to items specified in Division 01 include the following:
   1. Instructions for operating equipment.
   2. Identification of operating limits which may result in hazardous or unsafe conditions.
   3. Document ratings of equipment and each major component.
   4. Technical Data Sheets.
   5. Wiring Diagrams.
   6. Parts list.

I. Warranty: Copies of all manufacturer's and installer's warranties.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Maintenance Proximity: Not more than four hours' normal travel time from Installer's place of business to Project site.
   2. Installer must have PV Installer certification through NABCEP.

B. Source Limitations: Obtain panels from a single manufacturer, of a single type and rating. Obtain inverters from a single manufacturer, of a single type and a single rating.

C. 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.

D. Comply with NFPA 70 and all applicable state and local codes

1.5 COORDINATION

A. Coordinate metering and interconnection agreement with electric utility. Contractor shall pay all interconnection fees including the application review fee, engineering review fee, and distribution system study fee. Contractor shall submit all required forms to utility.

1.6 WARRANTY

A. Installer must provide a two year installation warranty covering any defects of the installation.
B. Panel Warranty Period:
   1. 5 years workmanship warranty.
   2. 10 year 90% linear power output warranty.
   3. 25 year 80% linear power output warranty.
C. Inverter Warranty Period: 15 year warranty.

PART 2 - PRODUCTS

2.1 SOLAR PANELS

A. Available Manufacturers: Subject to compliance with performance requirements, manufacturers offering products that may be incorporated into the Work include:
   1. Heliene
   2. CertainTEED
   3. LG Solar
   4. Hanwha Q-cells
   5. Canadian Solar
B. If an alternate product is proposed, bid is to document how the proposed solution is more cost effective to the owner. Due to the fast-changing nature of the photovoltaic industry, alternates may be necessary and will be considered. Follow substitution request procedure per 01 25 13.
C. Capacities and Characteristics:
   1. All panels shall be of a single type from a single manufacturer.
   2. Power Output Ratings: STC rated power of approximately 450 watts.
   3. DC Array size of 200 kW +/- 5%
   4. AC Energy Produced between 240,000 and 270,000 kWh/yr based on the following assumptions:
      a. http://pvwatts.nrel.gov/pvwatts.php (PV Watts version 1) for 200 N. First St., Madison, Wisc.
      b. Module Type: Standard
      c. Array Type: Fixed (roof mount)
      d. System Losses: 14%
      e. Tilt: 20 degrees
      f. Azimuth: 215 degrees
      g. DC to AC Size Ratio: 1.2
      h. Inverter Efficiency: 96%
      i. Ground Coverage Ratio: 0.4
   5. Power tolerance of less than 5% variation (maximum minus minimum). Minimum tolerance of -0%.
   6. Manufactured in the U.S., Mexico or Canada
   7. Nameplates: To identify electrical characteristics, manufacturer's name and address, and model and serial number of component.
   8. Module efficiency: minimum 17.00%
   9. 60-cell
D. Materials and construction
   1. Monocrystalline or Polycrystalline
   2. Junction box with bypass diodes.
   3. Output Connections: Factory wired separate positive and negative leads sized per division 26 wire requirements with locking quick disconnects, rated for use in direct sunlight. Shall meet all requirements of NEC article 690.33.
   4. Anodized aluminum frame with drainage holes and grounding holes.
   5. Operating temperature range of -40°C to +85°C.
   6. Withstand 1" diameter hail at 50 mph without damage.
   7. Load rated at 5400 Pa (113 psf) when used with two rail system.

2.2 INVERTERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include:
   1. SMA
   2. Fronius
   3. Solar Edge with P600 Optimizers (1 Optimizer per 2 panels) – Basis of Design

B. If an alternate product is proposed, bid is to document how the proposed solution is more cost effective to the owner. Due to the fast-changing nature of the photovoltaic industry, alternates may be necessary and will be considered. Follow substitution request procedure per 01 25 13.

C. Standards
1. IEEE 1547
2. UL 1741 – anti-islanding.

D. Electrical characteristics
1. AC kW rating: Minimum DC-to-AC ratio of 1.2
a. Provide (4) inverters rated for a total of 200 kW DC input
2. Output voltage: 480VAC (-12%, +10%), 3 phase.
3. Frequency: 60 Hz sine wave
4. Input voltage: Coordinated with solar array.
5. Max Voc: Coordinated with solar array.
6. Max DC current: Coordinated with solar array.
7. Startup voltage: Coordinated with solar array.
8. Output power factor: Unity
9. DC to AC conversion efficiency:
a. 97.5% CEC rated efficiency
10. A/C and D/C rapid shutdown compliant with NEC 2017

E. Features
1. Transformerless design.
2. Forward facing DC disconnect
3. DC side ground fault protection.
4. Inverter must limit power output to nameplate value. If connected to an array capable of producing more than the inverter's capacity, the inverter must limit the power without damage.
5. Maximum power point tracking over the range of voltages of the array, at the ambient temperatures of the site.
6. User navigable display.
7. LED status lights on enclosure.
8. Communication port for diagnostics and communication port for communication with multiple inverters and internet interface device.
9. NEMA 3R enclosure

2.3 PV WIRING

A. Type PV-WIRE, #10AWG, from array to combiner box, and where used as a jumper for connection between panels.

B. UV-Stabilized Cable Ties:
1. Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, Type 6/6 nylon.
2. Minimum Width: 3/16 inch (5 mm).
3. Tensile Strength at 73 °F (23 °C), According to ASTM D 638: 12,000 psi (82.7 MPa).
4. Temperature Range: -40 to +185 °F (-40 to +85 °C).
5. Color: Black.

C. Ampacity of PV source circuits shall be a minimum of 156% of the sum of parallel strings short circuit currents.
1. Shall be sized to limit voltage drop to 1.5% from array to inverter during full production at MPPT voltage at maximum ambient temperature.
2. Shall be in metallic conduit from combiner box, if installed, to inverter.

2.4 COMBINER BOX

A. If needed, Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include:
1. Blue Oak
2. SMA
3. MidNite solar

B. If an alternate product is proposed, bid is to document how the proposed solution is more cost effective to the owner. Due to the fast-changing nature of the photovoltaic industry, alternates may be necessary and will be considered. Follow substitution request procedure per 01 25 13.

C. Capacities and Characteristics:
1. DC current and voltage ratings coordinated with array.
2. Positive and negative combiner blocks.
a. Number of poles coordinated with array.

3. DC voltage fuses in fingersafe fuse holder.

D. Materials and construction
1. Powder coated steel, NEMA 3R enclosure.
2. Knockouts
3. Stainless steel hardware.

2.5 RACKING & ROOF ATTACHMENT & ROOF PENETRATIONS

A. **Racking and Roof System Design must meet Structural and Architectural requirements. See structural roof loading requirements and Architectural roof penetration requirements specific to this project. (Addendum 4 dated 09/05/2023).**

B. Tilt Angle of Panels: 20 degrees from horizontal **as basis of design. (Addendum 4 dated 09/05/23)**

C. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include:
1. Products for systems on flat roofs:
a. Anchor Products, http://www.anchorp.com/ , U-anchor 2000 EPDM
2. Products for ballasted systems on flat roofs:
a. Schletter Windsafe
b. SolarDock
c. Iron Ridge
3. Products for pitched roofs:
a. S-5 Clamps (for standing seam installations)
1.) Use S-5-U, S-5-S, or the required clamp for the specific roofing product.
2.) S-5 mini clamps are not acceptable.
b. EcoFasten GreenFasten or QuickFoot (for composite shingle installations)

2.6 METERING

A. Refer to Division 26 specifications.

2.7 INTERNET BASED MONITORING

A. Provide standard package from inverter manufacturer and connect to the City Network. Coordinate with Owner. Contractor is required to test monitoring to confirm it is functioning.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of electrical connections. Verify actual locations of connections before panel installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ARRAY REQUIREMENTS

A. Install panels on racking designed for solar (PV) panels.

B. Coordinate installation with roof shop drawings.

C. Structural Performance: Installation shall withstand all local wind and snow loads, and all local building department requirements.

D. If applicable, Slip sheet is to be used between ballasted racking and roof membrane

E. All fastening hardware must be stainless steel.

F. All materials must be metallurgically compatible where different materials are in contact with each other.

G. Roof penetrations shall be made watertight using methods that are standard to the roofing industry, are approved by the roofing manufacturer, and that protect the warranty of the roof.

H. The panels shall be connected in arrays with the following characteristics:
1. Total DC peak STC rated power of all panels in the array shall be minimum 125 kW. The panels shall be divided into even arrays between the inverters.
2. The panels shall be installed only in the area outlined on the architectural roof drawing.
3. If an alternate layout is proposed, bid is to document how the proposed solution is more cost effective to the owner. Follow substitution request procedure per 01 25 13.
4. If needed, Each array shall be provided with a combiner box.
5. The panels shall be installed with long axis running north south as shown on architectural roof drawing.
6. PV panel cables may be installed exposed where routed directly behind panels, but all cables shall be installed in a section of conduit where crossing part of the roof not under a panel.

Conduit running across roof shall be supported on roof using Cooper B-Line Dura-Blok or equivalent.

7. All PV panel cables shall be installed in a neat and workmanship like manner. Excess wire shall be coiled and bundled neatly and supported securely in an area where they are not subject to environmental degradation, such as from wind, sun, and animals. Attach PV panel cables to racking with zip-ties listed for use in direct sunlight.
8. Panels shall be connected in series and parallel to match voltage and current ratings of inverter, across all ambient temperatures common to site (-25°C to 40°C).
   a. Open circuit voltage of array on coldest day of year in full sunlight shall not exceed maximum operating voltage rating of inverter, panels, or any other equipment.
   b. Open circuit voltage on warmest day of year in morning sunlight conditions (200W/m2 irradiance) shall exceed inverter startup voltage. Voltage under operating MPPT conditions, minus any voltage drop over conductors, shall exceed minimum inverter input voltage.
   c. Available short circuit current multiplied by 1.25 shall not exceed ratings for the inverter or any panels.
   d. All series strings of panels shall have same performance characteristics.

3.3 ELECTRICAL INSTALLATION

A. Ground equipment according to Division 26
   1. Size grounding conductors per NEC articles 250 and 690.
   2. All conductive equipment enclosures must be grounded.
   3. All panel frames must be grounded.
      a. The removal of any panel shall not interrupt a grounded conductor to another photovoltaic source circuit.

B. Install wiring, combiner boxes, conduit, disconnects, inverter, web based monitoring hardware, sensors and other equipment according to Division 26.

C. Connect wiring according to Division 26.

3.4 IDENTIFICATION

A. Identify and label system components according to Division 26.
   1. Provide a unique label for each inverter, PV output circuit, combiner box, PV Source circuit, and panel. Labeling shall match labeling shown on as-built diagram and plan provided by contractor.

B. Provide all labeling required by NEC article 690, including, but not limited to:
   1. Label disconnects capable of being energized from both directions as such.
   2. Provide plaque at utility service disconnect per article 690.56B. Field verify exact location.
   3. Label each photovoltaic disconnecting means per NEC article 690.53.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections as indicated below and prepare test reports. Correct any deficiencies.
   1. Visually inspect all connections.
   2. Visually inspect all supports.
   3. Measure Voc of each individual string of panels under full sunlight.
      a. Verify Voc of all strings are balanced.
      b. Verify measured Voc against calculated Voc for the ambient temperature. Extrapolate Voc to temperatures expected at site, and verify they are within inverters ratings.
   4. Measure Isc of each string of panels.
   5. Verify correct operation of inverter.
   6. Verify correct operation of complete system.
   7. Replace any defective panels. Panels shall be replaced at contractor's expense.

3.6 DEMONSTRATION

A. Simulate power outage by interrupting normal source, and demonstrate that system disconnects from utility.

B. Provide owner's maintenance personnel with minimum two hour training session and in compliance with Div 1 Training Requirements.
   1. Provide training on function of each piece of equipment.
   2. Provide training on maintaining the system.
   3. Explain means of disconnecting the system, and principals of operation and safety.

END OF SECTION

SECTION 31 23 00
FOUNDATION EXCAVATING AND BACKFILLING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Foundation, excavating, and backfilling within five feet of the building perimeter. Work shall include, but not be limited to, the following items:

1. Removal of all unacceptable soil.
2. Furnish and install acceptable fill.
3. Prepare subgrade for footings and slab on grade.

B. The following items are not a part of this specification:

1. Utility trenching and related backfilling outside the building footprint.
2. Subgrade for exterior walks and paving.

C. Structural notes indicated on the drawings regarding foundation excavating and backfilling shall be considered part of this specification.

1.2 RELATED WORK

A. Pertinent Section of Division 01.
B. Pertinent Sections of Division 31.

1.3 REFERENCES

A. Codes and Standards: Comply with the provisions of the following codes, specifications and standards, except where more stringent requirements are shown or specified. Where any provisions of other pertinent codes and standards conflict with this specification, the more stringent provision shall govern.

1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.
3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using the Modified Effort.
4. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

5. ASTM D2940 - Standard Specification for Graded Aggregate Material for Bases or Subbases for Highways or Airports.
6. ASTM D4253 - Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
7. ASTM D4254 - Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
8. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
9. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
10. Wisconsin Department of Transportation (WisDOT): WisDOT Standard Specifications for Road and Bridge Construction.

1.4 TESTING AND INSPECTION

A. Inspection and Testing:

1. The ~~Owner~~ **GC** shall employ an Inspection Agency to perform the duties and responsibilities specified below. **(Addendum 4 dated 09/05/23)**

2. Refer to architectural, civil, mechanical, and electrical specifications for testing and inspection requirements of non-structural components.

3. Duties of the Inspection Agency:

   a. Perform all testing and inspection required per the Testing and Inspection Schedule indicated below.

   b. Furnish inspection reports to the building official, the Owner, the Architect, the Engineer of Record, and the General Contractor. The reports shall be completed and furnished within 48 hours of inspected work.

   c. Submit a final signed report stating whether the work requiring Inspection was, to the best of the Inspection Agency's knowledge in conformance with the approved plans and specifications.

4. Structural Component Testing and Inspection Schedule for Section 31 23 00 is as follows:

Foundation Preparation	Continuous	Periodic
Verify materials below shallow footings are adequate to achieve the design bearing capacity.		X
Verify excavations are extended to proper depth and have reached proper material.		X
Perform classification and testing of compacted fill materials.		X
Verify use of proper materials, densities, and lift thicknesses during placement and compaction of compacted fill.	X	
Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly.		X

B. Minimum testing frequency and locations:

1. Laboratory Testing:

   a. Granular fill: One representative gradation test for each type of material.

b. Cohesive soils: One representative set of Atterberg limits and moisture density test for each type of material used.

c. Non-cohesive soils: One representative moisture density test for each type of material used.

2. Field Testing:

a. The Inspector shall determine the location of testing.

b. Testing of final utility trench backfill shall begin at a depth of 2 feet above the top of the pipe.

c. In-place field density test and moisture content tests shall be performed as follows:

1) Fills not within the influence of building foundations and slab on grade: Per civil specifications.

2) Fills within the influence of building foundations and slab on grade, the following criteria shall apply: One test for each 8-inch vertical lift of compacted fill placed per 2,500 square feet of fill area (minimum of two tests per lift per structure for areas smaller than 5,000 square feet).

d. Additional testing may be required by the Inspector if noncompliance or a change in conditions occurs.

e. If a test fails, the Contractor shall rework the material, recompact and retest as necessary until specific compaction is achieved in all areas of the trench. All costs associated with this work, including retesting, shall be the responsibility of the Contractor.

1.5 SUBMITTALS

A. Material Test Reports: Provide the Owner and Architect with the on-site material test reports from the Inspection Agency indicating the interpreting test results for compliance with this specification.

1.6 PROTECTION

A. Contractor shall provide for design, permits and installation of all cribbing, bracing, shoring and other methods required to safely retain earth banks and excavations.

B. Notify the Architect immediately and discontinue work in affected area if adjacent existing footings are encountered during excavation. Underpin other adjacent structures that may be damaged by excavation work, including service utilities and pipe chases.

C. Notify the Architect of unexpected subsurface conditions and discontinue work in affected areas until notification to resume.

D. Protect benchmarks, existing structures, fences, sidewalks, paving, curbing, etc., from excavation equipment and vehicular traffic.

E. Maintain and protect above and below grade utilities that are to remain.

F. Provide temporary heating or protective insulating materials to protect subgrades and foundations soils against freezing temperatures or frost during cold weather conditions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide borrow soil materials when sufficient acceptable soil materials are not available from excavations.

B. Acceptable soils shall comply with the following:

1. Meet ASTM D2487 soil classification groups GW, GP, GM, SW, SP, SM or a combination of these group symbols;

2. Be free of rock or gravel larger than 3 inches in any dimension;

3. Be free of debris, waste, frozen materials, vegetation and other deleterious materials;

4. Have a liquid limit less than 45 and a plasticity index less than 20.

5. Be approved by the Inspection Agency.

C. Unacceptable soils shall be defined as following:

1. ASTM D2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, PT or a combination of these group symbols.

2. Unacceptable soils also to include acceptable soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Free-Draining Granular Fill: Free-draining granular fill shall comply with the following:

1. Be a naturally or artificially graded mixture of natural or crushed gravel, crushed stone.

2. Be clean and free of fines.

3. Comply with ASTM D2940.

4. Be uniformly graded as follows:

COARSE AGGREGATE GRADATIONS						
SIEVE SIZE - PERCENT PASSING						
Grade No.	1-1/2"	1"	3/4"	1/2"	3/8"	No. 4
CA7	100	95 ± 5	-	45 ± 15	-	5 max

5. Be approved by the Inspection Agency.

E. Engineered Fill and Utility Base Course shall comply with the following:

1. Be a naturally or artificially graded mixture of natural or crushed gravel, crushed stone, natural or crushed sand;

2. Comply with ASTM D2940;

3. Be uniformly graded as follows:

COARSE AGGREGATE GRADATIONS						
SIEVE SIZE - PERCENT PASSING						
Grade No.	1-1/2"	1"	1/2"	No. 4	No. 16	No. 200
CA6	100 to 90	95 ± 5	75 ± 15	43 ± 13	25 ± 15	8 ± 4

4. Be approved by the Inspection Agency.

F. Material Applications: Provide and install material meeting with the above requirements as follows:

1. General fill: Acceptable soils.

2. Backfill at over-excavated areas beneath footings: Engineered fill.

3. Sub-grade layer beneath slabs-on-grade: Refer to drawings.

PART 3 - EXECUTION

3.1 PREPARATION

A. Identify and verify required lines, levels, contours and benchmark elevations for the work are as indicated.

B. Protect plant life, lawns, other features and vegetation to remain as a portion of the final landscaping.

C. Free groundwater is not expected during excavation. Contractor shall provide for de-watering of excavations from surface water, ground water or seepage.

D. Identify known underground utility locations with stakes and flags.

3.2 EXCAVATION

A. All excavations shall be safely and properly backfilled.

B. All abandoned footings, utilities and other structures that interfere with new construction shall be removed.

C. All unacceptable material and organic material shall be removed from below all proposed slabs-on-grade and the exposed natural soil shall be proof rolled and the compaction verified by the soils testing firm prior to placing fill. Proof-roll with a loaded tandem dump truck, loaded ready-mix truck, roller, or equivalent weight vehicle. Materials exhibiting weakness, such as those exhibiting rutting or pumping, shall be removed and replaced with acceptable compacted fill material.

D. Do not excavate within the 45-degree bearing splay of any adjacent foundations.

E. Remove lumped subsoil, boulders and rock up to 1/3 cubic yard (measured by volume). Provide Owner with unit price per cubic yard for obstructions larger than 1/3 cubic yard.

F. Outside 45-degree bearing splay of foundations, correct areas over excavated with aggregate at no additional cost to the Owner.

G. Within the 45-degree bearing splay of foundations, correct areas over excavated with 2000 psi concrete fill at no additional cost to the Owner. Notify the Architect prior to performing such work.

H. Hand trim final excavation to remove all loose material.

I. Contractor shall form all dams and perform other work necessary for keeping the excavation clear of water during the progress of the work and, at his own expense, shall pump or otherwise remove all surface and perched water which accumulates in the excavations. Perched water that cannot be de-watered in 48 hours of continuous pumping at a minimum rate of 60 gpm in dry weather shall be considered ground water.

J. Stockpile excavated material in the area designated and remove excess material not being used, from the site.

3.3 BACKFILLING

A. Verify foundation perimeter drainage system is complete and has been inspected prior to backfilling against foundation walls.

B. Support pipe and conduit during placement and compaction of bedding fill.

C. Systematically backfill to allow necessary time for natural settlement. Do not backfill over porous, wet, spongy or frozen subgrade surfaces.

D. Backfill areas to contours and elevations with unfrozen materials.

E. Unless noted otherwise on the drawings, make grade changes gradual.

F. Unless noted otherwise on the drawings, slope grade away from the building a minimum of 2 inches in 10 feet.

G. Contractor shall procure the approval of the subgrade from the Inspection Agency prior to the start of any filling or bedding operations.

H. Do not begin any backfill operations against any concrete walls until the concrete has achieved its specified strength.

I. Do not backfill against below grade walls without necessary bracing to support the walls or until supporting slab or framing is installed and has been anchored to the wall per the drawings.

J. Place and mechanically compact granular fill in continuous layers not to exceed loose lifts of 10 inch depth.

K. Employ a placement method that does not disturb or damage adjacent utilities, vapor barriers, foundation perimeter drainage and foundation waterproofing.

L. All surplus fill materials are to be removed from the site.

M. Fill material stockpiles shall be free of unacceptable soil materials.

N. After work is complete, remove all excess stockpile material and repair stockpile area to its original condition.

3.4 COMPACTION

A. Compact all fill that will support building footings or floor slabs to 95 percent of the maximum dry density in accordance with ASTM D1557. For relative cohesionless fill materials, where the percent passing the #200 sieve is less than 10 and the moisture density curve indicates only slight sensitivity to changing moisture content, compaction requirements should be changed to 75 percent relative density in accordance with ASTM D4253 and ASTM D4254.

B. Compact all fills that support paving and landscape per civil specifications.

3.5 FOUNDATIONS

A. Each footing excavation should be cleared of all obstructions and other organic or deleterious materials.

B. Localized areas of unstable or unacceptable material may be discovered during the stripping and excavation operation and may require over-excavation and backfilling. The Inspection Agency shall be present during the proof rolling to evaluate any localized areas and make recommendations regarding over-excavation, backfilling and recompaction of these areas. Fill placement and compaction shall be inspected and tested by the Inspection Agency.

C. Footing elevations shown on the drawings designate a minimum depth of footing where an appropriate soil bearing pressure is expected. Footings, piers and/or walls shall be lowered or extended as required to reach soil meeting the design bearing pressure. This work shall be performed per the recommendations of the Inspection Agency.

D. All footing excavations shall be recompacted by hand-operated, vibratory compaction equipment, except where compaction will degrade the integrity of subgrade soils. In these instances, bottom of footing excavations should be hand-trimmed to remove loosened material.

E. All excavation and recompacted surfaces shall be inspected and tested to a depth of 2.0 feet below the excavated elevation by the Inspection Agency. Additional field density tests should be performed for each one foot of fill material placed. Any areas not in compliance with the compaction requirements should be corrected and re-tested prior to placement of fill material.

F. For foundation areas where over excavation is performed, place and mechanically compact Engineered fill material in continuous layers not to exceed loose lifts of 10 inch depth.

3.6 SLAB-ON-GRADE

A. All disturbed areas after the clearing and stripping operation should be proof-rolled and recompacted with a heavy vibratory drum roller (approved by the Inspection Agency) in the static mode. The compactor should make a minimum of 10 passes, with a minimum of one foot overlap of each pass. The compactor speed should be less than 0.2 MPH.

B. The Inspection Agency shall monitor proof-rolling and compaction operations. This area should then be tested for compaction to a depth of 2.0 feet below the compacted surface prior to the placement of any structural fill material.

C. Refer to drawings for required sub-grade preparation beneath slabs-on-grade.

3.7 UTILITY TRENCH BACKFILL (AT SLAB-ON-GRADE LOCATIONS)

A. Excavate and backfill utility trenches under wall footings as shown on the drawings.

B. Place utility base course on subgrades free of mud, frost, snow, or ice.

C. Place and compact utility base course on trench bottoms and where indicated.

D. Lay underground utilities on 6" sand bedding, which meets the acceptable criteria of Section 2.1,B.

E. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

F. After connection joints are made, any misalignment can be corrected by tamping the sand around the utilities.

G. Place and compact initial backfill of acceptable sand to a height of 6 inches over the utility pipe or conduit in 6 inches layer meeting specified compaction requirements.

H. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit.

I. Place and compact final backfill using acceptable soil to final subgrade elevation meeting specified compaction requirements.

J. Backfill voids with acceptable soil while installing and removing shoring and bracing.

K. Inspection Agency shall monitor, and test compacted backfill to verify final compaction meets the specified requirement.

3.8 TOLERANCES

A. Top surface of backfilling under paved areas: Plus or minus ½ inch from required elevation.

B. Top surface of general backfilling: Plus or minus 1 inch from required elevation.

END OF SECTION

SECTION 31 26 00
STEEL HELICAL PILES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. All items required for executing and completing the steel helical pile work and related work shown on the drawings or specified herein.

B. Structural notes indicated on the drawings regarding steel helical piles should be considered a part of this specification.

1.2 RELATED WORK

A. Pertinent Sections of Division 01.
B. Section 03 20 00 - Concrete Reinforcement.
C. Section 03 30 00 - Cast-in-Place Concrete.
D. Section 31 23 00 - Foundation Excavating and Backfilling.

1.3 REFERENCES

A. Codes and Standards: Comply with the provisions of the following codes, specifications, and standards except where more stringent requirements are shown or specified. Where any provisions of other pertinent codes and standards conflict with this specification, the more stringent provision shall govern.

1. ASCE 20 - Standard Guidelines for the Design and Installation of Pile Foundations.
2. ASME B18.2.1 - Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series).
3. ASTM A29 - Standard Specification for General Requirements for Steel Bars, Carbon and Alloy, Hot-Wrought.
4. ASTM A36 - Standard Specification for Carbon Structural Steel.
5. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
6. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

7. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
8. ASTM A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
9. ASTM A252 - Standard Specification for Welded and Seamless Steel Pipe Piles.
10. ASTM A320 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for Low-Temperature Service.
11. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
12. ASTM A513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
13. ASTM A536 - Standard Specification for Ductile Iron Castings.
14. ASTM A572 - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
15. ASTM A618 - Standard Specification for Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing.
16. ASTM A656 - Standard Specification for Hot-Rolled Structural Steel, High-Strength Low-Alloy Plate with Improved Formability.
17. ASTM A958 - Standard Specification for Steel Castings, Carbon and Alloy, with Tensile Requirements, Chemical Requirements Similar to Standard Wrought Grades.
18. ASTM A1018 - Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Carbon, Commercial, Drawing, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
19. ASTM D1143 - Standard Test Methods for Deep Foundations Under Static Axial Compressive Load.
20. ASTM D3689 - Standard Test Methods for Deep Foundations Under Static Axial Tensile Load.
21. ASTM D3966 - Standard Test Methods for Deep Foundations Under Lateral Load.
22. ASTM F3125 - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength, Inch Dimensions.
23. AWS B2.1 - Specification for Welding Procedure and Performance Qualification.
24. AWS D1.1 - Structural Welding Code - Steel.
25. AWS D1.4 - Structural Welding Code – Reinforced Steel.
26. ICC AC358 - Acceptance Criteria for Helical Piles Systems and Devices.
27. OSHA Excavation Safety Guidelines.
28. SAE J429 - Mechanical and Material Requirements for Externally Threaded Fasteners.

1.4 TESTING AND INSPECTION

A. Inspection and Testing:

1. The ~~Owner~~ **GC** shall employ an Inspection Agency to perform the duties and responsibilities specified below. **(Addendum 4 dated 09/05/23)**

2. Refer to architectural, civil, mechanical, and electrical specifications for testing and inspection requirements of non-structural components.

3. Work performed on the premises of a fabricator approved by the building official need not be tested and inspected per the table below. The fabricator shall submit a certificate of compliance that the work has been performed in accordance with the approved plans and specification to the building official and the Architect and Engineer of Record.

4. Duties of the Inspection Agency:

   a. Perform all testing and inspection required per approved testing and inspection program.

b. Furnish inspection reports to the building official, the Owner, the Architect, the Engineer of Record, and the General Contractor. The reports shall be completed and furnished within 48 hours of inspected work.

c. Submit a final signed report stating whether the work requiring Inspection was, to the best of the Inspection Agency's knowledge in conformance with the approved plans and specifications.

5. Structural Component Testing and Inspection Schedule for Section 31 26 00 is as follows:

Steel Helical Piles	Continuous	Periodic
Verify element materials, sizes, and lengths comply with the requirements.	X	
Determine capacities of test elements and conduct additional load tests, as required.	X	
Inspect driving operations and maintain complete and accurate records for each element.	X	
Verify placement locations and plumbness, confirm type and size of jack, record pressure per foot of penetration, determine required penetration to achieve design capacity, record tip and butt elevations and document any damage to foundation element.	X	
For steel elements, perform additional inspections in accordance with Sections 03 20 00 and 05 12 23.		

1.5 DEFINITIONS

A. A partial list follows:

1. Bearing Stratum: The soil or highly weathered rock layer that provides the axial tension resistance for the installed helical pile.

2. Brackets: Cap plate, angle, thread bar, or other termination device that is bolted or welded to the end of a helical pile after completion of installation to facilitate attachment to structures or embedment in cast-in-place concrete.

3. Crowd: Axial compressive force or pressure applied to the helical pile as needed during installation to ensure the pile advances into the ground a minimum of 80% of the distance equal to the helix pitch for each revolution.

4. Deflection: The axial displacement of the pile as measured at the pile head under applied load.

5. Effective Torsional Resistance: The average installation torque typically taken over a distance equal to the last three diameters of penetration of the largest helix plate as close to or in the specified bearing stratum.

6. Extension Section: Helical pile component connecting the lead section to the load transfer device. Extension sections may be plain without helix plates or helical including one or more helix plates.

7. Factored Load: Service load times the required load factor.

8. Geotechnical Capacity: The maximum load that can be resisted through the bearing of the helix plates in the soil or highly weathered rock in which they are embedded as characterized by the available subsurface soils, rock and groundwater information, and geotechnical testing data, without exceeding the specified performance criteria.

9. Helical Pile: Consists of one or more helix plates attached to a central shaft and load transfer device for attachment to a structure. May also include surface coating or other corrosion protection means.

10. Helical Anchor: Same as a Helical Pile. Term generally used when axial tension is the primary service load.

11. Helix Plate (Helices): Generally round steel plate formed into a helical spiral and welded to the central steel shaft.

12. Installation Angle: Angle of inclination between the longitudinal axis of the helical pile and the horizontal.

13. Lead Section: The first helical pile component installed into the soil. It consists of one or more helical plates welded to the central steel shaft.

14. Limit State: A condition beyond which a helical pile component or interface becomes no longer useful for its intended function (serviceability limit state) or to be unsafe (strength limit state).

15. Loads: Forces or other actions as defined that must be resisted by the piles. Permanent loads are those loads in which variations over time are rare or of small magnitude. All other loads are variable loads. Refer also to Service Load below.

16. Load Factor: A factor that accounts for deviations of the actual load from the service load (load resistance factor design).

17. Load Test: A procedure to test the capacity and relation of load to deflection by applying a compression, tension, and/or lateral load on the helical pile.

18. Mechanical Strength: The maximum compressive, tension, and/or lateral load capable of being resisted by the structural elements of a helical pile.

19. Pile Design Professional: Individual or firm responsible for the design of helical piles, helical anchors, and brackets.

20. Reveal: The distance from ground surface to the end of the last installed extension of a pile, measured along the pile's longitudinal axis.

21. Pitch: The distance measured along the axis of the shaft between the leading and trailing edges of the helix plate.

22. Safety Factor: The ratio of the ultimate resistance to the service load used for the design of any helical pile component or interface.

23. Service Load: The total magnitude of the unfactored loads, determined by the Owner's Representative, that must be resisted by the piles.

24. Torque: The measure of the rotational force times the moment arm needed to overcome the shear strength of the soil measured in ft-lb. Torque is used as an empirical approach for predicting the ultimate capacity of a helical pile.

25. Ultimate Resistance: Limit state based on the lesser of mechanical strength or geotechnical capacity of the helical pile defined as the point at which no additional load can be applied without exceeding the specified performance criteria.

1.6 QUALITY ASSURANCE

A. Fabrication and Installation Qualifications:

1. All welding of structural steel shall be performed by operators who have been recently qualified as prescribed in "Qualification Procedures" of the American Welding Society (AWS).

2. The Steel Helical Pile Contractor shall be fully experienced in all aspects of helical pile design and construction, and shall furnish all necessary materials, skilled labor, and supervision to carry out the contract. The Contractor shall not have less than five (5) years of continuous experience in fabrication and installation of steel helical pile work. Job supervisor shall have a minimum of three (3) years of method specific experience.

3. Upon request of the Architect/Engineer, Helical Pile Contractor shall submit evidence of successful installation of steel helical piles under similar project scope and size.

4. The Steel Helical Pile Contractor shall not sublet the whole or any part of the contract without the express permission in writing of the Owner.

5. Inspector shall keep a record or log of each pile as installed. Records shall show location, top and bottom elevations, shaft diameters, date installed, type of strata encountered, rated load capacity, grout pressure attained and any other pertinent information. A copy of this record shall be submitted to the Architect and Structural Engineer for their record files.

6. Helical Pile Contractor shall schedule and provide time and means for the Inspection Agency to inspect, take samples, and make tests.

B. Design:

1. Helical pile design shall be designed to meet the specified loading as shown on the drawings and deflection criteria of 1/2" differential settlement and 1" total settlement. Calculations and drawings required from the Helical Pile Contractor shall be submitted to the Architect/Engineer.

2. Helical pile design shall include overall pile length, helix length, and helix configuration. If static load testing is performed, pile design to include a minimum factor of safety of 2.0. If static load testing is not performed, pile design to include a minimum factor of safety of 3.0.

3. Except where noted in the drawings, all pile components shall be designed to provide a minimum safety factor for mechanical strength of 2.0.

4. Except where noted in the drawings, all piles shall be designed and installed to provide a minimum safety factor for ultimate applied load resistance of 2.0 a maximum axial deflection at service load of 1 inch and must satisfy the deflection criteria as stated on the drawings.

5. Except where noted in the drawings, each pile shall be designed to meet a corrosion service life of 50 years.

6. The helical pile design shall take into account pile spacing, soil stratification, long-term soil consolidation, corrosion, settlement, and strain compatibility issues as are present for the project.

7. The helical pile top attachment shall effectively distribute the design load to the concrete foundations such that the concrete bearing stress does not exceed those in the ACI Building Code and the bending stress in the steel plates does not exceed AISC allowable stresses for steel members.

8. If on-site load testing is to be performed, the piles shall be designed such that the maximum test load does not exceed 90% of the manufacturer's rated mechanical strength of any pile component or load transfer device.

1.7 BID REQUIREMENTS

A. Steel Helical Piles: Bids shall be provided for the lump sum amount based on the number of piles, estimated length, and total footage as shown in the drawings and/or specifications.

B. The Pile Contractor shall examine the construction site and conditions under which piles are to be installed, and notify the General Contractor and Architect in writing prior to bidding of any conditions detrimental to proper and timely completion of work.

C. Helical Pile Length: Base the length of the helical piles on the length listed on the drawings and in the Geotechnical Engineering Report. The elevation identifying the bottom of the shaft is an approximate length for consistent bidding purposes only. The actual length will be determined in the field from the actual elevation of the bearing stratum to be verified by the Inspection Agency.

D. Unit prices shall be issued to the Architect prior to construction as part of the submittal package.

E. Adjustments in the Contract Price will be made due to changes in the number and length of piles, based on unit prices established in Section 01 21 00 - Allowances as follows:

1. Payment for helical piles will be made on the total length of helical piles installed and accepted. Actual length and shaft diameter may change due to job conditions. Adjusted payment will be made based on net variations to the total quantities, based on design dimensions.

2. Provide the following unit costs if additions to, or deductions from, work, are required and authorized in writing by Architect/Engineer:

   a. Additional length of helical pile ($/per foot)
   b. Subtracted length of helical pile ($/per foot)
   c. Load test (lump sum per test)

1.8 SUBMITTALS

A. Shop drawings:

1. Prepare and submit to the Architect/Engineer, for review and approval, working drawings and relevant structural design calculations for the helical pile system or systems intended for use. All design submittal shall be sealed by a Registered Professional Engineer currently licensed in the state where the project is located.

2. Product Data:

   a. Product designations for helix sections, extension sections, and all ancillary products to be supplied at each helical pile location.
   b. Evaluation approved by the applicable building code authority (e.g., International Code Council Evaluation Services (ICC-ES)).
   c. Corrosion protection and pile top attachment.

d. Manufacturer's published mechanical strengths for the pile assemblies, including load transfer devices per current ICC-ES report, calculations, and/or full-scale testing.

3. Design Data:

a. Calculated geotechnical capacity of piles based on geotechnical information. The design submittal prepared by the pile designer shall indicate that the selected piles can be installed to achieve the performance requirements.
b. Minimum effective torsional resistance criteria.
c. Maximum allowable installation torque of pile.
d. Proposed production quality control plan, including method and equipment to be used to measure torsional resistance during installation.
e. Procedures and acceptance criteria for any proposed performance and/or proof testing.

4. Submit a detailed description of the construction procedures proposed for use to the Architect/Engineer for review. This shall include a schedule of major equipment resources.

5. The working drawings shall include helical pile installation details giving:

a. Helical pile number, location, and pattern by assigned identification number
b. Helical pile design load
c. Type and size of central steel shaft
d. Number and diameter of helix plates
e. Minimum overall length
f. Minimum effective installation torque
g. Inclination of helical pile
h. Helical pile attachment to structure relative to grade beam, pile cap, etc.
i. Cutoff elevation

6. Submit shop drawings for all structural steel, including the helical pile components, corrosion protection system, pile top attachment, and helix details, to the Architect/Engineer for review and approval.

7. Submit for review and acceptance the proposed helical pile load testing procedure. The testing program shall be provided two (2) weeks prior to starting the load testing. This helical pile verification load testing proposal shall be in general conformance with ASTM D1143 and/or D3689, and shall indicate the minimum following information:

a. Type and accuracy of apparatus for measuring load
b. Type and accuracy of apparatus for applying load
c. Type and accuracy of apparatus for measuring the pile deformation
d. Type and capacity of reaction load system, including sealed design drawings
e. Hydraulic jack calibration report

8. Submit to the Architect/Engineer calibration reports for each test jack, pressure gauge, and master pressure gauge to be used. The calibration tests shall have been performed by an independent testing laboratory, and tests shall have been performed within one year of the date submitted. Testing shall not commence until the Architect/Engineer has approved the jack, pressure gauge, and master pressure gauge calculations.

9. Work shall not begin until the appropriate submittals have been received, reviewed, and approved in writing by the Architect/Engineer. Note that any additional time required due to incomplete or unacceptable submittals shall not be cause for delay or impact claims. All costs associated with incomplete or unacceptable submittals shall be the responsibility of the Contractor.

10. Welding certificates.

11. Unit costs: Submit as outlined in this section.

12. The Contractor shall submit to the Architect copies of calibration reports for each torque indicator or torque motor, and all load test equipment to be used on the project. The calibration tests shall have been performed within 45 working days of the date submitted. Helical pile installation and testing shall not proceed until the Architect/Engineer has received the calibration reports. These calibration reports shall include, but are not limited to, the following information:

    a. Name of project and Contractor
    b. Name of testing agency
    c. Identification (serial number) of device calibrated
    d. Description of calibrated testing equipment
    e. Date of calibration
    f. Calibration data

13. Installation Reports: The installing contractor shall provide the Owner, or his authorized representative, copies of individual helical pile installation records within 24 hours after each installation is completed. Formal copies shall be submitted within 48 hours after installation. These installation records shall include, but are not limited to, the following information:

    a. Name of project and Contractor
    b. Name of Contractor's supervisor during installation
    c. Date and time of installation
    d. Installation equipment type and operator name
    e. Type of torque indicator used
    f. Location of helical pile or helical anchor by grid location, diagram, or assigned identification number
    g. Pile reveal
    h. Type and configuration of lead section with length of shaft and number and size of helical bearing plates
    i. Type and configuration of extension sections with length and number and size of helical bearing plates, if any
    j. Final elevation of top of shaft and cutoff length, if any
    k. Total length of installed pile
    l. As-built installation angle of pile
    m. Torque measurements at three-foot depth intervals
    n. Final installation torque
    o. Effective torsional resistance and calculated geotechnical capacity based on effective torsional resistance and/or as derived from the pre-production test program
    p. Comments pertaining to interruptions, obstructions, or other relevant information
    q. Unless specified otherwise on the drawings or by local codes, the pile design professional, or an inspection agency accepted by the Architect/Engineer, shall observe and document at least 10 percent of helical pile and helical anchor installations.

B. Post Construction:

1. The following records shall be prepared for the Owner. The records shall be completed within 24 hours after each pile installation is completed. The records shall include the following minimum information:

    a. Pile drilling duration and observations
    b. Information on soil and rock encountered, including description of strata, water, etc.

c. Approximate final tip elevation
d. Cutoff elevation
e. Rated load capacities
f. Description of unusual installation behavior or conditions
g. Any deviations from the intended parameters
h. Torque attained, where applicable
i. Pile materials and dimensions
j. Helical pile test records, analysis, and details

2. Submit as-built drawings showing the location of the piles, their depth and inclination, and details of their composition.

1.9 SUBSURFACE CONDITIONS

A. The Geotechnical Report, including logs of soil borings as shown on the boring location plan, shall be considered to be representative of the in-situ subsurface conditions likely to be encountered on the project site. Said Geotechnical Report shall be used as the basis for helical pile design using generally accepted engineering judgment and methods.

B. The Geotechnical Report shall be provided for purposes of bidding. If, during helical pile installation, subsurface conditions of a type and location are encountered of a frequency that were not reported, inferred, and/or expected at the time of preparation of the bid, the additional costs required to overcome such conditions shall be considered as extras to be paid for by the Owner.

1.10 PILE LOAD TESTING

A. If pile testing is required, the Installing Contractor shall furnish all labor, equipment, and pre-production helical piles necessary to accomplish the testing as shown in the previously submitted and approved pile design submittals. The Installing Contractor shall apply the specified loads for the specified durations and record the specified data for the specified number of piles. No deviations from the test plan(s) will be allowed without explicit approval in writing from the Owner/Owner's Representative. Pile testing shall be in accordance with the load testing procedures and performance requirements deemed suitable for the application by the Owner/Owner's Representative, or pile designer.

B. Helical Pile Compression Tests:

1. Compression tests shall be performed following the "quick test" procedure described in ASTM D1143 specifications.

2. Load tests shall be observed and documented by the Inspection Agency.

3. Unless otherwise shown on the drawings, the maximum test load shall be 200% of the allowable load shown on the drawings.

4. The locations of helical piles to be tested shall be determined by the Contractor, unless noted on the drawings.

5. Installation methods, procedures, equipment, products, and final installation torque shall be identical to the production helical piles to the extent practical, except where otherwise approved by the Owner or Architect/Engineer.

6. A load test shall be deemed acceptable provided the maximum test load is applied without helical pile failure and the deflection of the pile head at the design load is less than 1-inch, unless noted otherwise on the drawings. Failure is defined when continuous jacking is required to maintain the load.

C. Helical Anchor Tension Tests:

1. Contractor shall perform the number of proof load tests shown on the drawings.

2. Proof load tests shall be performed following the procedure described in ASTM D3689 specifications.

3. Proof load tests shall be observed and documented by the Inspection Agency.

4. Unless otherwise shown on the drawings, the maximum test load shall be 150% of the allowable load shown on the drawings.

5. The locations of helical anchors to be tested shall be determined by the Contractor, unless shown on the drawings.

6. Installation methods, procedures, equipment, products, and final installation torque shall be identical to the production anchors to the extent practical, except where otherwise approved by the Owner or Architect/Engineer.

7. A proof load test shall be deemed acceptable provided the maximum test load is applied without helical anchor failure. Failure is when continuous jacking is required to maintain the load.

D. Helical Pile Lateral Load Tests:

1. Contractor shall perform the number of lateral load tests shown on the drawings.

2. Lateral load tests shall be performed following the "free head" procedure described in ASTM D3966 specifications.

3. Lateral load tests shall be observed and documented by the Inspection Agency.

4. Unless otherwise shown on the drawings, the maximum test load shall be 200% of the allowable lateral load shown on the drawings.

5. The locations of test helical piles shall be determined by the Contractor, unless shown on the drawings.

6. Installation methods, procedures, equipment, products, and final installation torque shall be identical to the production piles to the extent practical, except where otherwise approved by the Owner or Architect/Engineer.

7. A lateral load test shall be deemed acceptable provided the lateral deflection of the pile head measured at the ground surface at the maximum test load is equal to or less than 1-inch.

E. If a load test fails the foregoing acceptance criteria, the Contractor shall modify the helical pile or helical anchor design and/or installation methods and retest the modified pile or anchor as directed by the Owner or Architect/Engineer. These modifications include, but are not limited to, de-rating the load capacity, modifying the installation methods and equipment, increasing the minimum final installation torque, changing the helical configuration, or changing the product (e.g., duty). Modifications that require changes to the structure shall have prior review and acceptance of the Owner. Any modifications of design or construction procedures, and any retesting required, shall be at the Contractor's expense.

F. The Contractor shall provide the Owner and Architect/Engineer copies of load test reports confirming configuration and construction details within one (1) week after completion of the load tests. This written documentation will either confirm the load capacity as required on the working drawings or propose changes based on the results of the tests. At a minimum, the documentation shall include, but is not limited to, the following information:

1. Name of project and installing contractor
2. Name of installing contractor's supervisor during installation
3. Name of third party test agency, if any
4. Type of test, pre-production or production test
5. Date, time, and duration of test
6. Unique identifier and location of helical pile tested
7. Test procedure (ASTM D1143, D3689, or D3966)
8. List of any deviations from procedure
9. Test criteria, performance or proof
10. Description of calibrated testing equipment and test setup
11. Testing equipment calibration data
12. Type and configuration of helical pile or helical anchor including lead section, number and type of extension sections, and manufacturer's product identification numbers
13. Load steps and duration of each load increment
14. Incremental and cumulative pile-head movement at each load step
15. Comments pertaining to test procedure, equipment adjustments, or other relevant information
16. Reaction frame/pile installation and verification data, as required by Owner or pile designer
17. Incremental and cumulative pile-head movement at each load step
18. Signatures as required by local jurisdiction

1.11 DELIVERY, STORAGE AND HANDLING

A. All helical pile, helical anchor, and bracket assemblies shall be free of structural defects and protected from damage. Store helical piles, helical anchors, and bracket assemblies on wood pallets or supports to keep from contacting the ground. Damage to materials shall be cause for rejection.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. AB Chance Company, a subsidiary of Hubbel Corp., 210 North Allen Street, Centralia, MO 65240-1395; or Aluma-Form/Dixie, 3625 Old Getwell Road, Memphis, TN 38118.
B. Foundation Supportworks®, Inc., 12330 Cary Circle, Omaha, NE 68128.
C. Pier Tech Systems, 17813 Edison Avenue, Suite 100, Chesterfield, MO 63005.
D. Magnum Piering, Inc., 6082 Schumacher Park Drive, West Chester, OH 45069.
E. Helical Anchors, Inc., 5101 Boone Avenue North, Minneapolis, MN 55428.
F. Techno Metal Post/Techno Pieux, 1005 Richards Rd., Hartland, WI 53029.

PART 3 - EXECUTION

3.1 SITE CONDITIONS

A. Prior to commencing helical pile installation, the Contractor shall inspect the work of all other trades and verify that all said work is completed to the point where helical piles may commence without restriction.

B. The Contractor shall verify that all helical piles may be installed in accordance with all pertinent codes and regulations regarding such items as underground obstructions, right-of-way limitations, utilities, etc.

C. In the event of a discrepancy, the Contractor shall notify the Architect/Engineer. The Contractor shall not proceed with helical pile installation in areas of discrepancies until said discrepancies have been resolved. All costs associated with unresolved discrepancies shall be the responsibility of the Owner.

3.2 INSTALLATION

A. Before entering a construction site to begin work, the Installing Contractor shall provide proof of insurance coverage as stated in the general specifications and/or contract.

B. Installing Contractor shall furnish and install all helical piles per the project plans and approved pile design submittals. In the event of conflict between the project plans and the approved pile design documentation, the Installing Contractor shall not begin construction on any affected items until such conflict has been resolved.

C. The Installing Contractor shall conduct construction operations in a manner to ensure the safety of persons and property in the vicinity of the work. Personnel shall comply with safety procedures that are both in accordance with OSHA standards and specified in established project safety plan.

D. The Installing Contractor or Owner shall request marking of underground utilities by an underground utility location service, as required by law, and shall avoid contact with all marked underground facilities. It is the responsibility of the Owner to provide to the Installing Contractor all private utility information.

E. The portion of the construction site occupied by the Installing Contractor, his/her equipment, and his/her material stockpiles shall be kept reasonably clean and orderly.

F. Installation of helical piles may be observed by representatives of the Owner for quality assurance purposes. The Installing Contactor shall notify the Owner's Representative at least 24 hours prior to pile installation operations. All helical pile sections and ancillary products shall be marked as necessary to allow correlation with the pile design submittals before shipment from the manufacturer.

G. The helical pile installation technique shall be such that it is consistent with the geotechnical, logistical, environmental, and load carrying conditions of the project. The lead section shall be positioned at the location as shown on the pile design drawings. Inclined helical piles can be positioned perpendicular to the ground to assist in initial advancement into the soil before the required installation angle shall be established. After initial penetration, the required installation angle shall be established. The helical pile sections shall be engaged and advanced into the soil in a smooth, continuous manner at a rate of rotation of 5 to 25 rpm. Sufficient crowd shall be applied to uniformly advance the helical pile sections a minimum of 80% of the distance equal to the pitch of the helix plate per revolution. The rate of rotation and magnitude of crowd shall be adjusted for different soil conditions and depths. Extension sections shall be provided to obtain the required minimum overall depth/length and minimum effective torsional resistance as shown on the project plans.

3.3 TERMINATION CRITERIA

A. The specified minimum overall depth/length criteria and minimum effective torsional resistance criterion must be satisfied prior to terminating the helical pile installation. In the event any helical pile fails to meet these production quality control criteria, the following pre-qualified remedies are authorized:

1. If the installation fails to meet the minimum effective torsional resistance criterion at the minimum embedment depth/length:

a. Continue the installation to greater depth/length in the specified bearing stratum until the effective torsional resistance criterion is met, provided continued installation does not exceed any applicable maximum length. or,

b. Demonstrate acceptable pile performance through load testing. or,

c. Replace the pile with one having a different helix configuration. The replacement pile must not exceed any applicable maximum embedment length and either be embedded to a length that places its last helix at least three times its own diameter beyond the position of the first helix of the replaced pile and meet the minimum effective torsional resistance criterion, or pass load testing.

2. If the torque measured during installation reaches the helical pile's allowable torque rating prior to reaching the minimum embedment depth/length criterion, with approval from the Owner/Owner's Representative, terminate the installation, then proceed with one of the following recommended actions:

a. Replace the pile with one having a shaft with a higher torsional strength rating. This replacement pile must be installed to satisfy the minimum embedment depth/length criterion. It must also be embedded to a depth/length that places its last helix at least three times its own diameter beyond the position of the first helix of the replaced pile without exceeding any applicable maximum embedment depth/length requirements, and it must meet the minimum effective torsional resistance criterion. or,

b. Replace or modify the pile with one having a different helix configuration. This replacement or modified pile must be installed to satisfy the minimum embedment depth/length criterion. It must also be embedded to a depth/length that places its last helix at least three times its own diameter beyond the position of the first helix of the replaced pile without exceeding any applicable maximum embedment depth/length requirements, and it must meet the minimum effective torsional resistance criterion. or,

c. If allowed or approved by the Owner/Owner's Representative, remove and reinstall the pile at a position at least three times the diameter of the largest helix away from the initial location. Original minimum embedment depth/length and effective torsional resistance criteria must be met for the repositioned pile. This pile repositioning may require the installation of additional helical piles with service loads adjusted for these spacing changes.

3. If the installation reaches a specified maximum embedment depth/length without achieving the minimum effective torsional resistance criterion:

a. If approved by the Owner/Owner's Representative, remove and reinstall the pile at a position at least three times the diameter of the largest helix away from the initial location. Original minimum installation depth/length and effective torsional resistance criteria must be met for the repositioned pile. This pile repositioning may require the installation of additional helical piles with service loads adjusted for these spacing changes. or,

b. Demonstrate acceptable pile performance through load testing. or,

c. Reduce the load capacity of the helical pile and install additional pile(s) as necessary. The reduced capacity and additional pile location shall be subject to the approval of the Owner/Owner's Representative. or,

d. Replace the pile with one having a different helix configuration. This replacement pile must be embedded to a depth/length that places its last helix at least three times its own diameter beyond the position of the first helix of the replaced pile. This replacement pile must be installed to satisfy the minimum embedment depth/length criterion, and it must meet the minimum effective torsional resistance criterion.

4. If a helical pile fails to meet acceptance criteria in a load test:

   a. Install the pile to a greater depth/length and installation torque and re-test, provided any maximum embedment depth/length criterion is not exceeded. or,

   b. Replace the pile with one having more and/or larger helix plates. It must be embedded to a depth/length that places its last helix at least three times its own diameter beyond the position of the first helix of the replaced pile without exceeding any applicable maximum embedment depth/length requirements. This replacement pile must be re-tested. or,

   c. If approved by the Owner's Representative, de-rate the load capacity of the helical pile and install additional piles. Additional piles must be installed at positions at least three times the diameter of the largest helix away from any other pile locations and approved by the Owner's Representative. Piles installed in cohesive soils shall not be spaced closer than four helix diameters.

5. Load testing to qualify a helical pile under any of the remedial actions outlined in Article 1.9 shall not be used to satisfy load testing frequency requirements shown in the project plans or the approved design submittals.

6. If a helical pile fails a production quality control criterion for any other reason, including damage during installation, any proposed remedy must be approved by the Owner/Owner's Representative prior to implementation.

3.4 TOLERANCES

A. When helical pile placement is shown on the project plans, production piles shall be placed such that the pile head is within 3 inches laterally and longitudinally and 1/2 inch vertically to plan; and the pile shaft alignment is within 1 degree of the installation angle shown on the project plans.

3.5 CLEANUP

A. The Installing Contractor shall remove any and all material, equipment, tools, building materials, concrete forms, debris, or other items belonging to the Installing Contractor or used under the Installing Contractor's direction.

END OF SECTION

5. DRAWINGS

SECTION E: BIDDERS ACKNOWLEDGEMENT

MADISON PUBLIC MARKET
CONTRACT NO. 8595

Bidder must state a Unit Price and Total Bid for each item. The Total Bid for each item must be the product of quantity, by Unit Price. The Grand Total must be the sum of the Total Bids for the various items. In case of multiplication errors or addition errors, the Grand Total with corrected multiplication and/or addition shall determine the Grand Total bid for each contract. The Unit Price and Total Bid must be entered numerically in the spaces provided. All words and numbers shall be written in ink.

1. The undersigned having familiarized himself/herself with the Contract documents, including Advertisement for Bids, Instructions to Bidders, Form of Proposal, City of Madison Standard Specifications for Public Works Construction - 2023 Edition thereto, Form of Agreement, Form of Bond, and Addenda issued and attached to the plans and specifications on file in the office of the City Engineer, hereby proposes to provide and furnish all the labor, materials, tools, and expendable equipment necessary to perform and complete in a workmanlike manner the specified construction on this project for the City of Madison; all in accordance with the plans and specifications as prepared by the City Engineer, including Addenda Nos. _____ through _____ to the Contract, at the prices for said work as contained in this proposal. (Electronic bids submittals shall acknowledge addendum under Section E and shall not acknowledge here)
2. If awarded the Contract, we will initiate action within seven (7) days after notification or in accordance with the date specified in the contract to begin work and will proceed with diligence to bring the project to full completion within the number of work days allowed in the Contract or by the calendar date stated in the Contract.
3. The undersigned Bidder or Contractor certifies that he/she is not a party to any contract, combination in form of trust or otherwise, or conspiracy in restraint of trade or commerce or any other violation of the anti-trust laws of the State of Wisconsin or of the United States, with respect to this bid or contract or otherwise.
4. I hereby certify that I have met the Bid Bond Requirements as specified in Section 102.5. *(IF BID BOND IS USED, IT SHALL BE SUBMITTED ON THE FORMS PROVIDED BY THE CITY. FAILURE TO DO SO MAY RESULT IN REJECTION OF THE BID).*
5. I hereby certify that all statements herein are made on behalf of Joe Daniels Construction Co., Inc. (name of corporation, partnership, or person submitting bid) a corporation organized and existing under the laws of the State of Wisconsin a partnership consisting of _____; an individual trading as _____; of the City of Madison State of Wisconsin; that I have examined and carefully prepared this Proposal, from the plans and specifications and have checked the same in detail before submitting this Proposal; that I have fully authority to make such statements and submit this Proposal in (its, their) behalf; and that the said statements are true and correct.

SIGNATURE Samuel J. Daniels

President

TITLE, IF ANY

Sworn and subscribed to before me this 14th day of September, 20 23

(Notary Public or other officer authorized to administer oaths)

My Commission Expires 07/17/2024

KEEA I. SAINSBURY NOTARY PUBLIC STATE OF WISCONSIN

Bidders shall not add any conditions or qualifying statements to this Proposal.

Contract 8595 – Joe Daniels Construction Co., Inc.

Section E: Bidder's Acknowledgement
This section is a required document for the bid to be considered complete. There are two methods for completing the Bidder Acknowledgement Report. Method one: The report can be downloaded, completed, and uploaded to this site to be included with your electronic bid. Method two: The report can be downloaded from the site and submitted by hand to the City of Madison. Either method of submission requires that the Bidder Acknowledgement Report be received by the bid due date.

Please select the method of submission below. The form is in the section below to download and upload to the site or download and submit by hand.

Please check the box in the Upload section if submitting the report by hand.

Method of Submittal for Bidder Acknowledgement (click in box below to choose) *
I will download Bidder Acknowledgement Downloadable Document, complete, and upload online.

The bidder acknowledges receipt of the following addenda to the contract for the above designated project. Please check the appropriate box for each addendum reviewed. If no addenda have been issued, then no boxes are required to be checked.

Any addenda issues after 12:00 P.M. on the Tuesday proceeding the bid due date shall include a provision extending the bid due date.

Addendum Acknowledgement

Acknowledge each Addenda reviewed by checking the appropriate checkboxes below.

- [x] Addendum 1*
- [x] Addendum 2*
- [x] Addendum 3*
- [x] Addendum 4*
- [ ] Addendum 5
- [ ] Addendum 6

Section F: Best Value Contracting (BVC)

This section is a required document for the bid to be considered complete. There are two methods for completing the Best Value Contracting (BVC) form. Method one: The form can be filled out online and submitted to this site to be included with your electronic bid. Method two: The form can be downloaded from the site and submitted by hand to the City of Madison.

Please select the method of submission below. The form can be found below for filling out online or download and submit by hand.

Please check the box in the Upload section if submitting the report by hand.

Method of Submittal for BVC (click in box below to choose) *
I will submit Bid Express fillable online form (BVC).

Section F: Best Value Contracting (BVC) Fillable Online Form
Best Value Contracting
1. The Contractor shall indicate the non-apprenticeable trades used on this contract.
Trucking

2. Madison General Ordinance (M.G.O.), 33.07(7), does provide for some exemptions from the active apprentice requirement. Apprenticeable trades are those trades considered apprenticeable by the State of Wisconsin. Please check applicable box if you are seeking an exemption.

☐ Contractor has a total skilled workforce of four or less individuals in all apprenticeable trades combined.

☐ No available trade training program; The Contractor has been rejected by the only available trade training program, or there is no trade training program within 90 miles.

☐ Contractor is not using an apprentice due to having a journey worker on layoff status, provided the journey worker was employed by the contractor in the past six months.

☐ First time contractor on City of Madison Public Works contract requests a onetime exemption but intends to comply on all future contracts and is taking steps typical of a "good faith" effort.

☐ Contractor has been in business less than one year.

☐ Contractor doesn't have enough journeyman trade workers to qualify for a trade training program in that respective trade.

☐ An exemption is granted in accordance with a time period of a "Documented Depression" as defined by the State of Wisconsin.

3. The Contractor shall indicate on the following section which apprenticeable trades are to be used on this contract. Compliance with active apprenticeship, to the extent required by M.G.O. 33.07(7), shall be satisfied by documentation from an applicable trade training body; an apprenticeship contract with the Wisconsin Department of Workforce Development or a similar agency in another state; or the U.S Department of Labor. This documentation is required prior to the Contractor beginning work on the project site.

☐ The Contractor has reviewed the list and shall not use any apprenticeable trades on this project.

LIST APPRENTICABLE TRADES (check all that apply to your work to be performed on this contract)

- ☐ BRICKLAYER
- ☑ CARPENTER
- ☐ CEMENT MASON / CONCRETE FINISHER
- ☐ CEMENT MASON (HEAVY HIGHWAY)
- ☐ CONSTRUCTION CRAFT LABORER
- ☐ DATA COMMUNICATION INSTALLER
- ☐ ELECTRICIAN
- ☐ ENVIRONMENTAL SYSTEMS TECHNICIAN / HVAC SERVICE TECH/HVAC INSTALL / SERVICE
- ☐ GLAZIER
- ☐ HEAVY EQUIPMENT OPERATOR / OPERATING ENGINEER
- ☐ INSULATION WORKER (HEAT and FROST)
- ☐ IRON WORKER
- ☐ IRON WORKER (ASSEMBLER, METAL BLDGS)
- ☐ PAINTER and DECORATOR
- ☐ PLASTERER
- ☐ PLUMBER
- ☐ RESIDENTIAL ELECTRICIAN
- ☐ ROOFER and WATER PROOFER
- ☐ SHEET METAL WORKER
- ☐ SPRINKLER FITTER
- ☐ STEAMFITTER
- ☐ STEAMFITTER (REFRIGERATION)
- ☐ STEAMFITTER (SERVICE)
- ☐ TAPER and FINISHER
- ☐ TELECOMMUNICATIONS (VOICE, DATA and VIDEO) INSTALLER-TECHNICIAN
- ☐ TILE SETTER

MADISON PUBLIC MARKET
CONTRACT NO. 8595

Small Business Enterprise Compliance Report

This information may be submitted electronically through Bid Express or submitted with bid in sealed envelope.

Cover Sheet

Prime Bidder Information

Company: Joe Daniels Construction Co., Inc.

Address: 919 Applegate Road, Madison, WI 53713

Telephone Number: 608/271-4800 Fax Number: 608/271-4570

Contact Person/Title: Samuel J. Daniels - President

Prime Bidder Certification

I, Samuel J. Daniels (Name), President (Title) of

Joe Daniels Construction Co., Inc. (Company) certify that the information

contained in this SBE Compliance Report is true and correct to the best of my knowledge and belief.

Witness' Signature Keea I. Sainsbury

Bidder's Signature Samuel J. Daniels

September 14, 2023

Date

MADISON PUBLIC MARKET
CONTRACT NO. 8595

Small Business Enterprise Compliance Report

Summary Sheet

SBE Subcontractors Who Are NOT Suppliers

Name(s) of SBEs Utilized	Type of Work	% of Total Bid Amount
Rivera Construction	Drywall/Paint/EIFS	3.22 %
		%
Asmara Cleaning	Construction Cleaning	.05 %
		%
Garage Door Express	OH Door	.69 %
		%
		%
		%
		%
		%
		%
		%
		%
		%
Subtotal SBE who are NOT suppliers:		3.96 %

SBE Subcontractors Who Are Suppliers

Name(s) of SBEs Utilized	Type of Work	% of Total Bid Amount
		%
		%
		%
		%
		%
		%

Subtotal Contractors who are suppliers: -0- % x 0.6 = -0- % (discounted to 60%)

Total Percentage of SBE Utilization: 3.96 %.

DANIELS
CONSTRUCTION

September 14, 2023

Affirmative Action Department
Madison Municipal Building
215 Martin Luther King Jr. Blvd.
Madison, WI 53701-1626

Re: Madison Public Market
Contract #8595

On the above listed project, we intend to perform the following work with our own workforce.

Select Demolition, Concrete Formwork, Concrete Reinforcement, Cast-in-Place Concrete, CFSF Systems, Rough Carpentry, Int. Architectural Woodwork, Wood-Veneer Cabinets, Flush Wood Paneling, Soils for Earthwork, Site Clearing/Removals, Foundation Excavation/Backfilling, Trenching & Backfilling, Water Utility/Sanitary Utility/Storm Utility Piping.

Sincerely,

Samuel J. Daniels
President

Kis

919 Applegate Road | Madison, WI 53713

608.271.4800 608.271.4570 www.danielsco.com

MADISON PUBLIC MARKET

CONTRACT NO. 8595
DATE: 9/7/23

		Joe Daniels Construction Co., Inc.	
Item	Quantity	Price	Extension
Section B: Proposal Page - Base Bid			
90000 - MADISON PUBLIC MARKET - ADAPTIVE REUSE (EXCLUDING ATERNATES 1, 2 AND 3) - Lump Sum	1.00	$14,989,510.00	$14,989,510.00
90001 - EXCAVATING, LOADING, HAULING AND DISPOSAL OF CONTAMINATED SOIL - TONS	4000.00	$50.00	$200,000.00
Base Bid Total			$15,189,510.00
Section B: Proposal Page - ALTERNATE NO. 3: Photovoltaic Array			
90004 - ALTERNATE NO. 3: Photovoltaic Array. Provide Photovoltaic Array and all related work as described in Drawings and Specifications - Lump Sum	1.00	$552,250.00	$552,250.00
Grand Total			$15,741,760.00

Department of Public Works
Engineering Division
Robert F. Phillips, P.E., City Engineer

City-County Building, Room 115
210 Martin Luther King, Jr. Boulevard
Madison, Wisconsin 53703
Phone: (608) 266-4751
Fax: (608) 264-9275
engineering@cityofmadison.com
www.cityofmadison.com/engineering

Deputy City Engineer
Gregory T. Fries, P.E.

Deputy Division Manager
Kathleen M. Cryan

Principal Engineer 2
John S. Fahrney, P.E.
Christopher J. Petykowski, P.E.
Janet Schmidt, P.E.

Principal Engineer 1
Christina M. Bachmann, P.E.
Mark D. Moder, P.E.
James M. Wolfe, P.E.

Facilities & Sustainability
Bryan Cooper, Principal Architect

Land Information & Official Map Manager
Eric T. Pederson, P.S.

Financial Manager
Steven B. Danner-Rivers

BIENNIAL BID BOND

Joe Daniels Construction Co., Inc.
(a corporation of the State of WI)
(individual), (partnership), (hereinafter referred to as the "Principal") and
The Cincinnati Insurance Company
a corporation of the State of Ohio (hereinafter referred to as the "Surety") and licensed to do business in the State of Wisconsin, are held and firmly bound unto the City of Madison, Wisconsin (hereinafter referred to as the "City"), in the sum equal to the individual proposal guaranty amounts of the total bid or bids of the Principal herein accepted by the City, for the payment of which the Principal and the Surety hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of this obligation is that the Principal has submitted to the City certain bids for projects from the time period of 1/1/2022 through 12/31/2023.

If the Principal is awarded the contract(s) by the City and, within the time and manner required by law after the prescribed forms are presented for its signature, the Principal enters into (a) written contract(s) in accordance with the bid(s), and files with the City its bond(s) guaranteeing faithful performance and payment for all labor and materials, as required by law, or if the City rejects all bids for the work described, then this obligation shall be null and void; otherwise , it shall remain in full force and effect.

In the event the Principal shall fail to execute and deliver the contract(s) or the performance and payment bond(s), all within the time specified or any extension thereof, the Principal and Surety agree jointly and severally to pay to the City within ten (10) calendar days of written demand a total equal to the sum of the individual proposal guaranty amounts of the total bid(s) as liquidated damages.

The Surety, for value received, hereby agrees that the obligations of it and its bond shall be in no way impaired or affected by any extension of time within which the City may accept a bid, and the Surety does hereby waive notice of any such extension.

This bond may be terminated by the Surety upon giving thirty (30) days written notice to the City of its intent to terminate this bond and to be released and discharged therefrom, but such termination shall not operate to relieve or discharge the Surety from any liability already accrued or which shall accrue before the expiration of such thirty (30) day period.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, on the day and year set forth below.

PRINCIPAL

Joe Daniels Construction Co., Inc.
COMPANY NAME AFFIX SEAL

November 11, 2021
DATE

By: _____
SIGNATURE AND TITLE

Samuel J. Daniels - Corporate Secretary

SURETY

The Cincinnati Insurance Company
COMPANY NAME AFFIX SEAL

November 11, 2021
DATE

By: _____
SIGNATURE AND TITLE

Kathryn A. Weidner, Attorney-in-Fact

This certifies that I have been duly licensed as an agent for the Surety in Wisconsin under National Provider No. 6497333 for the year 2021 and appointed as attorney in fact with authority to execute this bid bond, which power of attorney has not been revoked.

November 11, 2021
DATE

_____
AGENT SIGNATURE

740 Regent Streey
ADDRESS

Madison, WI 53715
CITY, STATE AND ZIP CODE

262-446-6036
TELEPHONE NUMBER

Note to Surety and Principal: Any bid submitted which this bond guarantees may be rejected if the Power of Attorney form showing that the Agent of Surety is currently authorized to execute bonds on behalf of Surety is not attached to this bond.

THE CINCINNATI INSURANCE COMPANY
THE CINCINNATI CASUALTY COMPANY

Fairfield, Ohio

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That THE CINCINNATI INSURANCE COMPANY and THE CINCINNATI CASUALTY COMPANY, corporations organized under the laws of the State of Ohio, and having their principal offices in the City of Fairfield, Ohio (herein collectively called the "Companies"), do hereby constitute and appoint

Patrick A. McKenna; Judith A. Walker; Brooke L. Parker; Elizabeth Mosca; David Zenobi; Kathryn A. Weidner and/or Jay A. Zahn

of Madison, Wisconsin their true and legal Attorney(s)-In-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and deliver on behalf of the Companies as Surety, any and all bonds, policies, undertakings or other like instruments, as follows: Any such obligations in the United States, up to Thirty Million and No/100 Dollars ($30,000,000.00).

This appointment is made under and by authority of the following resolutions adopted by the Boards of Directors of The Cincinnati Insurance Company and The Cincinnati Casualty Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the President or any Vice President be hereby authorized, and empowered to appoint Attorneys-in-Fact of the Company to execute any and all bonds, policies, undertakings, or other like instruments on behalf of the Corporation, and may authorize any officer or any such Attorney-in-Fact to affix the corporate seal; and may with or without cause modify or revoke any such appointment or authority. Any such writings so executed by such Attorneys-in-Fact shall be binding upon the Company as if they had been duly executed and acknowledged by the regularly elected officers of the Company.

RESOLVED, that the signature of the President or a Vice President and the seal of the Company may be affixed by facsimile on any power of attorney granted, and the signature of the Secretary and the Seal of the Company may be affixed by facsimile to any certificate of any such power and any such power of certificate bearing such facsimile signature and seal shall be valid and binding on the Company. Any such power so executed and sealed and certified by certificate so executed and sealed shall, with respect to any bond or undertaking to which it is attached, continue to be valid and binding on the Company.

IN WITNESS WHEREOF, the Companies have caused these presents to be sealed with their corporate seals, duly attested by their President or a Senior Vice President this 19th day of December, 2018.

THE CINCINNATI INSURANCE COMPANY
THE CINCINNATI CASUALTY COMPANY

STATE OF OHIO)SS:
COUNTY OF BUTLER)

On this 19th day of December, 2018 before me came the above-named President or Vice President of The Cincinnati Insurance Company and The Cincinnati Casualty Company, to me personally known to be the officer described herein, and acknowledged that the seals affixed to the preceding instrument are the corporate seals of said Companies and the corporate seals and the signature of the officer were duly affixed and subscribed to said instrument by the authority and direction of said corporations.

Keith Collett, Attorney at Law
Notary Public – State of Ohio
My commission has no expiration date.
Section 147.03 O.R.C.

I, the undersigned Secretary or Assistant Secretary of The Cincinnati Insurance Company and The Cincinnati Casualty Company, hereby certify that the above is the Original Power of Attorney issued by said Companies, and do hereby further certify that the said Power of Attorney is still in full force and effect.

Given under my hand and seal of said Companies at Fairfield, Ohio, this 3rd day of January , 2022 .

SECTION H: AGREEMENT

THIS AGREEMENT made this _____ day of _____ in the year Two Thousand and Twenty-Three between **JOE DANIELS CONSTRUCTION CO., INC.** hereinafter called the Contractor, and the City of Madison, Wisconsin, hereinafter called the City.

WHEREAS, the Common Council of the said City of Madison under the provisions of a resolution adopted **OCTOBER 17, 2023**, and by virtue of authority vested in the said Council, has awarded to the Contractor the work of performing certain construction.

NOW, THEREFORE, the Contractor and the City, for the consideration hereinafter named, agree as follows:

1. **Scope of Work.** The Contractor shall, perform the construction, execution and completion of the following listed complete work or improvement in full compliance with the Plans, Specifications, Standard Specifications, Supplemental Specifications, Special Provisions and contract; perform all items of work covered or stipulated in the proposal; perform all altered or extra work; and shall furnish, unless otherwise provided in the contract, all materials, implements, machinery, equipment, tools, supplies, transportation, and labor necessary to the prosecution and completion of the work or improvements:

MADISON PUBLIC MARKET
CONTRACT NO. 8595

2. **Completion Date/Contract Time.** Construction work must begin within seven (7) calendar days after the date appearing on mailed written notice to do so shall have been sent to the Contractor and shall be carried on at a rate so as to secure full completion SEE SPECIAL PROVISIONS, the rate of progress and the time of completion being essential conditions of this Agreement.

3. **Contract Price.** The City shall pay to the Contractor at the times, in the manner and on the conditions set forth in said specifications, the sum of **FIFTEEN MILLION SEVEN HUNDRED FORTY-ONE THOUSAND SEVEN HUNDRED SIXTY AND NO/100** (**$15,741,760.00**) Dollars being the amount bid by such Contractor and which was awarded to him/her as provided by law.

4. **Affirmative Action.** In the performance of the services under this Agreement the Contractor agrees not to discriminate against any employee or applicant because of race, religion, marital status, age, color, sex, disability, national origin or ancestry, income level or source of income, arrest record or conviction record, less than honorable discharge, physical appearance, sexual orientation, gender identity, political beliefs, or student status. The Contractor further agrees not to discriminate against any subcontractor or person who offers to subcontract on this contract because of race, religion, color, age, disability, sex, sexual orientation, gender identity or national origin.

   The Contractor agrees that within thirty (30) days after the effective date of this agreement, the Contractor will provide to the City Affirmative Action Division certain workforce utilization statistics, using a form to be furnished by the City.

   If the contract is still in effect, or if the City enters into a new agreement with the Contractor, within one year after the date on which the form was required to be provided, the Contractor will provide updated workforce information using a second form, also to be furnished by the City. The second form will be submitted to the City Affirmative Action Division no later than one year after the date on which the first form was required to be provided.

   The Contractor further agrees that, for at least twelve (12) months after the effective date of this contract, it will notify the City Affirmative Action Division of each of its job openings at facilities in Dane County for which applicants not already employees of the Contractor are to be considered. The notice will include a job description, classification, qualifications and application procedures

and deadlines. The Contractor agrees to interview and consider candidates referred by the Affirmative Action Division if the candidate meets the minimum qualification standards established by the Contractor, and if the referral is timely. A referral is timely if it is received by the Contractor on or before the date started in the notice.

Articles of Agreement
Article I

The Contractor shall take affirmative action in accordance with the provisions of this contract to insure that applicants are employed, and that employees are treated during employment without regard to race, religion, color, age, marital status, disability, sex, sexual orientation, gender identity or national original and that the employer shall provide harassment free work environment for the realization of the potential of each employee. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation and selection for training including apprenticeship insofar as it is within the control of the Contractor. The Contractor agrees to post in conspicuous places available to employees and applicants notices to be provided by the City setting out the provisions of the nondiscrimination clauses in this contract.

Article II

The Contractor shall in all solicitations or advertisements for employees placed by or on behalf of the Contractors state that all qualified or qualifiable applicants will be employed without regard to race, religion, color, age, marital status, disability, sex, sexual orientation, gender identity or national origin.

Article III

The Contractor shall send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding a notice to be provided by the City advising the labor union or worker's representative of the Contractor's equal employment opportunity and affirmative action commitments. Such notices shall be posted in conspicuous places available to employees and applicants for employment.

Article V

The Contractor agrees that it will comply with all provisions of the Affirmative Action Ordinance of the City of Madison, including the contract compliance requirements. The Contractor agrees to submit the model affirmative action plan for public works contractors in a form approved by the Affirmative Action Division Manager.

Article VI

The Contractor will maintain records as required by Section 39.02(9)(f) of the Madison General Ordinances and will provide the City Affirmative Action Division with access to such records and to persons who have relevant and necessary information, as provided in Section 39.02(9)(f). The City agrees to keep all such records confidential, except to the extent that public inspection is required by law.

Article VII

In the event of the Contractor's or subcontractor's failure to comply with the Equal Employment Opportunity and Affirmative Action Provisions of this contract or Section 39.03 and 39.02 of the Madison General Ordinances, it is agreed that the City at its option may do any or all of the following:

1. Cancel, terminate or suspend this Contract in whole or in part.

2. Declare the Contractor ineligible for further City contracts until the Affirmative Action requirements are met.

3. Recover on behalf of the City from the prime Contractor 0.5 percent of the contract award price for each week that such party fails or refuses to comply, in the nature of liquidated damages, but not to exceed a total of five percent (5%) of the contract price, or ten thousand dollars ($10,000), whichever is less. Under public works contracts, if a subcontractor is in noncompliance, the City may recover liquidated damages from the prime Contractor in the manner described above. The preceding sentence shall not be construed to prohibit a prime Contractor from recovering the amount of such damage from the non-complying subcontractor.

Article VIII

The Contractor shall include the above provisions of this contract in every subcontract so that such provisions will be binding upon each subcontractor. The Contractor shall take such action with respect to any subcontractor as necessary to enforce such provisions, including sanctions provided for noncompliance.

Article IX

The Contractor shall allow the maximum feasible opportunity to small business enterprises to compete for any subcontracts entered into pursuant to this contract. (In federally funded contracts the terms "DBE, MBE and WBE" shall be substituted for the term "small business" in this Article.)

5. Substance Abuse Prevention Program Required. Prior to commencing work on the Contract, the Contractor, and any Subcontractor, shall have in place a written program for the prevention of substance abuse among its employees as required under Wis. Stat. Sec. 103.503.

6. **Contractor Hiring Practices.**

Ban the Box - Arrest and Criminal Background Checks. (Sec. 39.08, MGO)

This provision applies to all prime contractors on contracts entered into on or after January 1, 2016, and all subcontractors who are required to meet prequalification requirements under MGO 33.07(7)(l), MGO as of the first time they seek or renew pre-qualification status on or after January 1, 2016. The City will monitor compliance of subcontractors through the pre-qualification process.

a. **Definitions.** For purposes of this section, "Arrest and Conviction Record" includes, but is not limited to, information indicating that a person has been questioned, apprehended, taken into custody or detention, held for investigation, arrested, charged with, indicted or tried for any felony, misdemeanor or other offense pursuant to any law enforcement or military authority.

"Conviction record" includes, but is not limited to, information indicating that a person has been convicted of a felony, misdemeanor or other offense, placed on probation, fined, imprisoned or paroled pursuant to any law enforcement or military authority.

"Background Check" means the process of checking an applicant's arrest and conviction record, through any means.

b. **Requirements.** For the duration of this Contract, the Contractor shall:

1. Remove from all job application forms any questions, check boxes, or other inquiries regarding an applicant's arrest and conviction record, as defined herein.

2. Refrain from asking an applicant in any manner about their arrest or conviction record until after conditional offer of employment is made to the applicant in question.

3. Refrain from conducting a formal or informal background check or making any other inquiry using any privately or publicly available means of obtaining the arrest or conviction record of an applicant until after a conditional offer of employment is made to the applicant in question.

4. Make information about this ordinance available to applicants and existing employees, and post notices in prominent locations at the workplace with information about the ordinance and complaint procedure using language provided by the City.

5. Comply with all other provisions of Sec. 39.08, MGO.

c. Exemptions: This section shall not apply when:

1. Hiring for a position where certain convictions or violations are a bar to employment in that position under applicable law, or

2. Hiring a position for which information about criminal or arrest record, or a background check is required by law to be performed at a time or in a manner that would otherwise be prohibited by this ordinance, including a licensed trade or profession where the licensing authority explicitly authorizes or requires the inquiry in question.

To be exempt, Contractor has the burden of demonstrating that there is an applicable law or regulation that requires the hiring practice in question, if so, the contractor is exempt from all of the requirements of this ordinance for the position(s) in question.

MADISON PUBLIC MARKET
CONTRACT NO. 8595

IN WITNESS WHEREOF, the Contractor has hereunto set his/her hand and seal and the City has caused this contract to be sealed with its corporate seal and to be executed by its Mayor and City Clerk on the dates written below.

Countersigned:

Keea I. Sainsbury 10/18/2023

Witness Keea I. Sainsbury Date

Keea I. Sainsbury 10/18/2023

Witness Keea I. Sainsbury Date

JOE DANIELS CONSTRUCTION CO., INC.

Company Name

10/18/2023

President Samuel J. Daniels Date

10/18/2023

Secretary Joseph A. Daniels Date

CITY OF MADISON, WISCONSIN

Provisions have been made to pay the liability that will accrue under this contract.

Finance Director Date

Witness Date

Witness Date

Approved as to form:

City Attorney Date

Mayor Date

City Clerk Date

BOND NO.: 3296878

SECTION I: PAYMENT AND PERFORMANCE BOND

LET ALL KNOW BY THESE DOCUMENTS PRESENTED, that we **JOE DANIELS CONSTRUCTION CO., INC.** as principal, and The Cincinnati Insurance Company Company of Cincinnati, Ohio as surety, are held and firmly bound unto the City of Madison, Wisconsin, in the sum of **FIFTEEN MILLION SEVEN HUNDRED FORTY-ONE THOUSAND SEVEN HUNDRED SIXTY AND NO/100** ($**15,741,760.00**) Dollars, lawful money of the United States, for the payment of which sum to the City of Madison, we hereby bind ourselves and our respective executors and administrators firmly by these presents.

The condition of this Bond is such that if the above bounden shall on his/her part fully and faithfully perform all of the terms of the Contract entered into between him/herself and the City of Madison for the construction of:

MADISON PUBLIC MARKET
CONTRACT NO. 8595

in Madison, Wisconsin, and shall pay all claims for labor performed and material furnished in the prosecution of said work, and save the City harmless from all claims for damages because of negligence in the prosecution of said work, and shall save harmless the said City from all claims for compensation (under Chapter 102, Wisconsin Statutes) of employees and employees of subcontractor, then this Bond is to be void, otherwise of full force, virtue and effect.

Signed and sealed this 18th day of October, 2023

Countersigned:

Witness Keea I. Sainsbury

Secretary Joseph A. Daniels - Corporate Secretary

JOE DANIELS CONSTRUCTION CO., INC.
Company Name (Principal)

President Samuel J. Daniels Seal no seal

Approved as to form:

City Attorney

The Cincinnati Insurance Company
Surety Seal
☒ Salary Employee ☐ Commission

By Attorney-in-Fact , Kathryn A. Weidner

This certifies that I have been duly licensed as an agent for the above company in Wisconsin under National Producer Number 6497333 for the year 2023, and appointed as attorney-in-fact with authority to execute this payment and performance bond which power of attorney has not been revoked.

October 18, 2023
Date

Agent Signature

THE CINCINNATI INSURANCE COMPANY
THE CINCINNATI CASUALTY COMPANY

Fairfield, Ohio

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That THE CINCINNATI INSURANCE COMPANY and THE CINCINNATI CASUALTY COMPANY, corporations organized under the laws of the State of Ohio, and having their principal offices in the City of Fairfield, Ohio (herein collectively called the "Companies"), do hereby constitute and appoint

Patrick A. McKenna; Judith A. Walker; Brooke L. Parker; David Zenobi; Kathryn A. Weidner; Jay A. Zahn; Jenny L. Hirth and/or Lynn E. Potter

of Madison, Wisconsin
their true and legal Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and deliver on behalf of the Companies as Surety, any and all bonds, policies, undertakings or other like instruments, as follows:

Any such obligations in the United States, up to
Thirty Million and No/100 Dollars ($30,000,000.00).

This appointment is made under and by authority of the following resolutions adopted by the Boards of Directors of The Cincinnati Insurance Company and The Cincinnati Casualty Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the President or any Senior Vice President be hereby authorized, and empowered to appoint Attorneys-in-Fact of the Company to execute any and all bonds, policies, undertakings, or other like instruments on behalf of the Corporation, and may authorize any officer or any such Attorney-in-Fact to affix the corporate seal; and may with or without cause modify or revoke any such appointment or authority. Any such writings so executed by such Attorneys-in-Fact shall be binding upon the Company as if they had been duly executed and acknowledged by the regularly elected officers of the Company.

RESOLVED, that the signature of the President or any Senior Vice President and the seal of the Company may be affixed by facsimile on any power of attorney granted, and the signature of the Secretary or Assistant Vice-President and the Seal of the Company may be affixed by facsimile to any certificate of any such power and any such power of certificate bearing such facsimile signature and seal shall be valid and binding on the Company. Any such power so executed and sealed and certified by certificate so executed and sealed shall, with respect to any bond or undertaking to which it is attached, continue to be valid and binding on the Company.

IN WITNESS WHEREOF, the Companies have caused these presents to be sealed with their corporate seals, duly attested by their President or any Senior Vice President this 16th day of March, 2021.

THE CINCINNATI INSURANCE COMPANY
THE CINCINNATI CASUALTY COMPANY

STATE OF OHIO)SS:
COUNTY OF BUTLER)

On this 16th day of March, 2021 before me came the above-named President or Senior Vice President of The Cincinnati Insurance Company and The Cincinnati Casualty Company, to me personally known to be the officer described herein, and acknowledged that the seals affixed to the preceding instrument are the corporate seals of said Companies and the corporate seals and the signature of the officer were duly affixed and subscribed to said instrument by the authority and direction of said corporations.

Keith Collett, Attorney at Law
Notary Public – State of Ohio
My commission has no expiration date.
Section 147.03 O.R.C.

I, the undersigned Secretary or Assistant Vice-President of The Cincinnati Insurance Company and The Cincinnati Casualty Company, hereby certify that the above is the Original Power of Attorney issued by said Companies, and do hereby further certify that the said Power of Attorney is still in full force and effect.

Given under my hand and seal of said Companies at Fairfield, Ohio, this 18th day of October, 2023.