



## **ADDENDUM**

Project: **Grosse Pointe Public School System  
Defer Elementary School (15425 Kercheval Ave.)  
Greenhouse Replacement**

Project No.: **0720**

Date: **February 20, 2021**

Addendum Number: **#2**

Each Bidder's proposal amount shall include the work described herein.

This Addendum is hereby made a part of the Contract Documents. Unless otherwise indicated, the work described herein shall comply with, and be equal in all respects to the original Specification and Drawings accompanying same. Include incidental work required to properly complete the work, whether stated herein or not.

### **SPECIFICATION REVISIONS**

ADD – Information is added (italicized and bolded).

CHANGE – Items are struck through and changed information added (italicized and bolded).

DELETE – Items are struck through (italicized and bolded).

#### **Section 13 3413 – Glazed Structures**

**ADD:** Under Part 2 Products, Section 2.01 Manufacturers

2. **Crystal Structures, a division of Sunshine Rooms, Inc; Model No. Straight Eave:  
[www.sunshinerooms.com/#sle](http://www.sunshinerooms.com/#sle).**

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**SECTION 13 3413  
GLAZED STRUCTURES  
ADDENDUM #2**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Greenhouses.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete for slabs.
- B. Section 07 6200 - Sheet Metal Flashing and Trim: Base and sill flashing installation.
- C. Section 07 9200 - Joint Sealants: Sealing joints between glazed structures and adjacent construction.
- D. Section 01 2300 - Alternates: Alternate descriptions.

**1.03 DEFINITIONS**

- A. Greenhouse: A glazed enclosure described by the following criteria:

**1.04 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).
- C. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- D. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- E. AAMA AG-13 - AAMA Glossary 2013.
- F. AAMA/NSA 2100 - Specifications for Sunrooms 2019.
- G. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015.
- H. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.
- K. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles 2020.
- L. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer 2015.
- M. ASTM C793 - Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants 2005 (Reapproved 2017).
- N. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants 2018.
- O. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers 2005 (Reapproved 2015).
- P. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- Q. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems 2016.

- R. ASTM C1135 - Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants 2015.
- S. ASTM C1184 - Standard Specification for Structural Silicone Sealants 2018, with Editorial Revision.
- T. ASTM C1249 - Standard Guide for Secondary Seal for Sealed Insulating Glass Units for Structural Sealant Glazing Applications 2018.
- U. ASTM C1401 - Standard Guide for Structural Sealant Glazing 2014.
- V. AWS D1.2/D1.2M - Structural Welding Code - Aluminum 2014, with Errata.
- W. ICC-ES AC04 - Acceptance Criteria for Sandwich Panels 2019.
- X. IGMA TB-3001 - Guidelines for Sloped Glazing 2001.

#### **1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets for each product to be used.
- C. Shop Drawings: Include project-specific information not fully detailed in manufacturer's standard product data, including, but not limited to plans, elevations, and details.
  - 1. Indicate adjacent construction, opening dimensions, tolerances, profiles, product components, anchorages, and accessories.
  - 2. Indicate fastener locations, glazing, and hardware arrangements.
  - 3. Include schedule identifying each unit, with marks or numbers referencing drawings.
- D. Samples:
  - 1. Metal Finish Selection: Two for color selection of framing members, representing manufacturer's standard range.
    - a. Minimum Sample Size: 2 inches by 3 inches.
  - 2. Glazing: Two of each type.
    - a. Minimum Sample Size: 12 inches by 12 inches.
- E. Manufacturer's Instructions:
  - 1. Storage and handling requirements and recommendations.
  - 2. Preparation instructions and recommendations.
  - 3. Installation methods.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.
- H. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project:
  - 1. See Section 01 6000 - Product Requirements for additional provisions.

#### **1.06 QUALITY ASSURANCE**

- A. Designer Qualifications: Perform structural design under direct supervision of Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least ten years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of type specified and with at least ten years of documented experience.
- D. Copies of Documents at Project Site: Maintain at project site one copy of each referenced document that prescribes execution requirements.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in manufacturer's original packaging with manufacturer's name and product identification intact and legible.

- B. Store products in manufacturer's original unopened packaging, covered to protect from weather, damage, precipitation, and construction dirt until ready for installation.

#### 1.08 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimal installation results.
- B. Do not install products under environmental conditions outside manufacturer's absolute limits.
- C. Do not perform structural silicone sealant work when ambient air temperature is below 10 degrees F.

#### 1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within five year period after Date of Substantial Completion.
- C. Provide extended warranty period for the following components:
  - 1. Aluminum Framing Finishes. Provide framing system manufacturer's standard warranty for finish type selected.
    - a. For stock AAMA 2603 finishes, provide warranty for coating cracking and pulling integrity for 10 years from date of application.
  - 2. Glazing: Provide glazing manufacturer's standard warranty against defective materials, delamination, seal failure, and other defects in manufacturing.
    - a. Insulating Glass Units: Provide 15 year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.
    - b. Laminated Glass: Provide 15 year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Greenhouses:
  - 1. Solar Innovations, Inc.: [www.solarinnovations.com/#sle](http://www.solarinnovations.com/#sle).
  - 2. **Crystal Structures, a division of Sunshine Rooms, Inc; Model No. Straight Eave: [www.sunshinerooms.com/#sle](http://www.sunshinerooms.com/#sle).**
  - 3. Substitutions: See Section 01 6000 - Product Requirements.

#### 2.02 GLAZED STRUCTURE APPLICATIONS

- A. Installation: Attached to side of existing structure as extension.
- B. Greenhouse:
  - 1. Roof Shape: Gable, straight eave, single-bay.
    - a. Roof Slope: As indicated on drawings.
  - 2. Framing: Coated aluminum.
  - 3. Wall System: Coated aluminum framing with glazing type GLN2 -Insulating Glass Units - vision glass, double glazed.
  - 4. Roof System: Mill-finish aluminum framing with glazing type GLN1 -Insulating Glass Units - sloped, glazing laminated.
  - 5. Layout and Dimensions: As indicated on drawings.

#### 2.03 DESIGN CRITERIA

- A. Design structural framing that is capable of transferring moments and forces into foundations. Framing members to be considered include rafters, purlins, and vertical mullions. Use design loads stipulated by applicable building code requirements.
  - 1. *Refer to Drawing Sheet A20 Floor Plans.*

#### 2.04 COMPONENTS

- A. Framing System: Manufacturer's standard for indicated roof shape and bay width, using coated aluminum for primary and secondary structural members.

1. Thickness of framing members based on design loading, cross sectional configuration, and fabrication requirement.
- B. Glazing Systems: Base and cap system.
  1. Double Glazing: Double-pane glass units with sealed edges.
    - a. Type GLN2 - Insulating Glass Units: Vision glass, double glazed.
      - 1) Applications: Use at sidewalls and endwalls.
      - 2) Space between lites filled with dry hermetic air.
      - 3) Outboard Lite: Fully tempered float glass, 3/16 inch thick, minimum.
        - (a) Tint: Clear.
        - (b) Coating: Self-cleaning type, on #1 surface.
      - 4) Inboard Lite: Fully tempered float glass, 3/16 inch thick, minimum.
        - (a) Tint: Clear.
        - (b) Coating: High Performance Low-E , on #3 surface.
      - 5) Total Thickness: 1 inch.
      - 6) Solar Heat Gain Coefficient (SHGC): 0.33, maximum.
      - 7) Visible Light Reflectance, Outside: 15 percent, maximum.
      - 8) Glazing Method: Dry glazing method, gasket glazing.
    - b. Type GLN1 - Insulating Glass Units: Sloped glazing, laminated; IGMA TB-3001.
      - 1) Applications: Exterior sloped glazing at 15 degrees or more from vertical, unless otherwise indicated.
      - 2) Space between lites filled with dry hermetic air.
      - 3) Outboard Lite: Fully tempered float glass, 3/16 thick, minimum.
        - (a) Tint: Clear.
        - (b) Coating: Self-cleaning type, on #1 surface.
      - 4) Laminated Inboard Lite, Outer Pane: Annealed float glass, 1/8 inch thick, minimum.
        - (a) Tint: Clear.
        - (b) Coating: High Performance Low-E , on #3 surface.
      - 5) Interlayer: Polyvinyl butyral (PVB); 0.060 inch thick.
      - 6) Laminated Inboard Lite, Inner Pane: Annealed float glass, 1/8 inch thick, minimum.
        - (a) Tint: Clear.
      - 7) Total Thickness: 1 inch.
      - 8) Solar Heat Gain Coefficient (SHGC): 0.33, maximum.
      - 9) Visible Light Reflectance, Outside: 15 percent, maximum.
      - 10) Glazing Method: Dry glazing method, gasket glazing.
  - C. Flashings and Closures: Manufacturer's standard for specified system.

## 2.05 MATERIALS

- A. Aluminum Extrusions: Alloy and temper 6063-T5, 6063-T6, or 6061-T6 members complying with ASTM B221 (ASTM B221M), with minimum thickness 1/8 inch for structural members and 1/16 inch for nonstructural members.
- B. Internal Reinforcing for Aluminum Framing Members:
  1. Carbon Steel: ASTM A36/A36M.
  2. Structural Aluminum: ASTM B308/B308M.
  3. Shapes and sizes based on structural calculations to suit installation.
  4. Shop coat steel components after fabrication with manufacturer recommended primer.
- C. Insulated Panels: Expanded polystyrene; provide at filler panels and sheet metal members.
- D. Float Glass: Provide float-glass-based glazing unless noted otherwise.
  1. Fully Tempered Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 criteria.
  2. Impact Resistant Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 criteria; Class B/Category I.
  3. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind and snow load design.

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- E. Glazing Gaskets: Compression-type design, replaceable, EPDM, complying with ASTM C864 requirements.
    - 1. Compatible with glazing sealant.
    - 2. Profile and hardness as required to maintain uniform pressure for watertight seal.
    - 3. Color: Black.
  - F. Flashings: Metal and finish matching system framing components, with thickness as recommended by manufacturer for conditions encountered.
    - 1. Secured using concealed fastening method.
    - 2. Secured using exposed fasteners with neoprene washers and head finished to match.
  - G. Glazing Setting Blocks, Edge Blocks, and Spacers: Manufacturer's standard, compatible with glazing type.
  - H. Structural Sealant Glazing (SSG) Adhesive: Manufacturer's standard neutral curing, silicone sealant formulated for SSG applications in compliance with ASTM C1184 and structural glazing industry guidelines, ASTM C1401.
    - 1. Comply with ASTM C920; Type M - Multicomponent, Grade NS, Class 50, Use NT, G, and A.
    - 2. Ultimate Tensile Strength: Minimum of 50 psi when tested in accordance with ASTM C1135 under the following conditions.
      - a. Exposure to air temperatures of 190 degrees F and minus 20 degrees F.
      - b. Water Immersion for seven days, minimum.
      - c. Exposure to weathering for 5,000 hours, minimum.
    - 3. Sealant Design Tensile Strength: 20 psi, maximum.
    - 4. Hardness: 20 to 60 with Type A-2 durometer when tested in accordance with ASTM C661.
    - 5. Color: Black.
    - 6. Volatile Organic Compound (VOC) Content: Less than 20 g/L.
    - 7. Tested for compatibility with glazing accessories in accordance with ASTM C1087, tested for accelerated weathering in accordance with ASTM C793, and complying with insulating glass secondary sealant design standards of ASTM C1249.
    - 8. Manufacturers:
      - a. Dow Corning Construction: [www.dowcorning.com/#sle](http://www.dowcorning.com/#sle).
      - b. Tremco Inc: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
      - c. Substitutions: See Section 01 6000 - Product Requirements.
  - I. Weatherseal Sealant: Silicone, with adhesion complying with ASTM C794; compatible with glazing accessories.
  - J. Anchors and Fasteners: Recommended by manufacturer.
    - 1. Aluminum and stainless steel of type which will not cause electrolytic action or corrosion.
    - 2. Zinc cadmium-plated fasteners may be used if acceptable to manufacturer.
    - 3. Finish exposed fasteners to match aluminum frame.

## 2.06 GREENHOUSE ALTERNATES

- A. Cooling
  - 1. Evaporative Cooler(s) – Supply and mount evaporative cooler(s) as shown on approved greenhouse shop drawings. Coolers to be manufacturer by Champion or Essick Air or greenhouse manufacturer approved equal and sized accordingly to structure requirements by greenhouse manufacturer. Size and models to be represented on approved greenhouse shop drawings. Greenhouse contractor will supply ducting into greenhouse base upon approved greenhouse shop drawings.
  - 2. High Pressure Fogging System – High pressure fogging system to perform dual duty in humidity control and assist in cooling function. System to be installed with centrally located pump station and individual growth chamber zones as shown on approved greenhouse shop drawings. High pressure fogging is not a one source cooling solution, but provided assistance to the cooling system while providing its primary duty in humidification of greenhouse.

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- B. Heating
    - 1. Nature Gas Or Lp Heater(S) – Supply and mount heater as shown on approved shop drawings. Gas heater to be manufactured by Modine or greenhouse manufacturer approved equal. Gas heater to be sized and located by greenhouse manufacturer and represented on approved greenhouse shop drawings.
  - C. Humidification
    - 1. Atomizing Fan(S) – Supply and mount atomizing / fogging fan(s) as shown on approved greenhouse shop drawings. Atomizing fan(s) to be sized and located by greenhouse manufacturer. Atomizing fan(s) shall be manufactured by Jaybird Manufacturing or greenhouse manufacturer approved equal.
    - 2. High Pressure Fogging System – High pressure fogging system to perform dual duty in humidity control and assist in cooling function. System to be installed with centrally located pump station and individual growth chamber zones as shown on approved greenhouse shop drawings.
  - D. Water System(s)
    - 1. Drip Irrigation – Supply and mount bench mounted drip irrigation system. Drip irrigation system shall be manufactured by Dramm, Phytotronics based on final design), or greenhouse manufacturer approved equal. System shall provide adequate nozzles and tool to install future nozzles shall be supplied with system. Installed nozzles shall be outfitted with a shut-off mechanism for the individual nozzles.
    - 2. Misting Irrigation – Supply and mount bench mounted misting irrigation. Misting irrigation system shall be manufactured by Dramm, Phytotronics (based on final design), or greenhouse manufacturer approved equal. System shall provide adequate coverage for bench area and individual nozzle shut-off mechanisms.
  - E. Environmental Control System
    - 1. Supply and mount a full-functioned control system with electrical control cabinets built specifically for the greenhouse based on the approved greenhouse shop drawings. Control system shall be capable of controlling each zone independently using interior zone data and exterior data that is supplied by a weather station included in the control system. Greenhouse system shall include computer hook up software package. System shall include complete electrical drawings and prints for final hook-up. Greenhouse control system shall be represented on the approved shop drawings for system mounting location.

## **2.07 FABRICATION**

- A. Perform major fabrication tasks at manufacturing location and not on site.
- B. Remove burrs and rough edges on metal items prior to finish application.
- C. Install gaskets and glazing tapes at factory to greatest extent possible.
- D. Disassemble glazed structure only to extent necessary due to shipping and handling limitations.
- E. Weld aluminum members in accordance with AWS D1.2/D1.2M.
- F. Use isolation membrane materials to separate dissimilar metals to prevent galvanic corrosion/action between materials.
- G. Rigidly fit and secure joints and corners of extruded framing members with internal reinforcement; fabricate rigid joints with connections that are flush, hairline, and weather resistant.
- H. Fabricate components to allow for expansion and contraction with minimum clearance and shim spacing around perimeter of assembly.
- I. Drain to exterior any water entering exterior joints, condensation occurring in glazing channels, or migrating moisture occurring within system.
- J. Prepare components to receive concealed anchorage devices, and ensure that fasteners will be concealed upon completion of installation.

- K. Adhere glass to glazing frames with structural adhesive and cure under controlled conditions in shop. Field glazing of frames to glass is not acceptable.

## **2.08 FINISHES**

- A. Aluminum Finishes:
  - 1. Pigmented Organic Coatings: AAMA 2603; polyester or acrylic baked enamel finish; both interior and exterior surfaces.
  - 2. Color: As selected from manufacturer standard color samples.

## **2.09 ACCESSORIES**

- A. Felt Backing Tape: Separation and cushioning white strip.
  - 1. Width: 1-1/2 inches.
- B. Insect Screens: Manufacturer's standard.
  - 1. Provide screen at operable windows.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Inspect work related and/or adjacent to glazed structure construction.
- B. Do not begin installation until substrates have been properly prepared in compliance with drawings and approved by glazed structure manufacturer.
- C. Notify Architect of unsatisfactory preparation conditions and do not begin work until they have been rectified.
- D. Thoroughly clean surfaces and substrates prior to installation.
  - 1. Prepare surfaces using method recommended by manufacturer for achieving best result for substrate under project conditions.
- E. Start of installation constitutes acceptance of project conditions.

### **3.02 GLAZED STRUCTURE AND ENVELOPE INSTALLATION**

- A. Install in accordance with shop drawings and manufacturer's instruction and installation manual(s).
- B. Separate dissimilar materials using nonconductive tape, paint, or other material not visible in finished work.
- C. Provide attachments and shims to permanently fasten system to building structure.
- D. Maintain dimensional tolerances and alignment with adjacent work.
- E. Anchor securely in place, allowing for required movement, including expansion and contraction.
- F. Install glazing sealants, including surface preparation in accordance with manufacturer's instructions and best industry practices.
- G. Install base flashings in accordance with Section 07 6200.
- H. Set sill members in bed of sealant. Set other members with internal sealants to provide weather tight construction.
- I. Install flashings, bent metal closures, corners, gutters, and other accessories as required or detailed.
- J. Clean surfaces and install weather-barrier sealants in accordance with sealant manufacturer's instructions and guidelines.
- K. Touch up damaged finishes so repair is imperceptible from distance of 6 feet, and remove and replace components that cannot be acceptably touched up.

### **3.03 TOLERANCES**

- A. Maximum Variation from Plumb, Level, or Line: 1/8 inch per 10 feet, or 3/8 inch total in overall dimension.
- B. Alignment of Two Adjoining Members Abutting in Plane: Within 1/16 inches.



#### **3.04 ADJUSTING AND CLEANING**

- A. Adjust hardware for proper operation. Lubricate using suitable lubricant compatible with door and frame coatings.
- B. Remove temporary coverings and means of protection of adjacent work areas.
- C. Repair or replace damaged installed products.
- D. Clean abraded finish surfaces and touch up with air dry paint, using means and methods approved and furnished by manufacturer, in color matching factory-applied finishes.
- E. Remove from project site, and legally dispose of, construction debris associated with this work.

#### **3.05 PROTECTION**

- A. Touch-up, repair, or replace damaged products before Date of Substantial Completion.
- B. Protect installed products until completion of project.

**END OF SECTION**