

Discipline code	Sheet Group	Sheet Numbers	DATE	SCALE	ISSUED FOR BID PHASE 1	ISSUED FOR ADDENDUM NO. 1 PHASE 1	COMMENTS
					4/18/2013	4/29/2013	
			<b>SCOPE DOCUMENT NOTES</b>		•	•	
			<b>PROJECT MANUAL</b>		•	•	
			<b>ISSUE TYPE</b>		BID	BID	
			<b>Drawing Name</b>				
<b>G</b>	<b>0</b>		<b>GENERAL</b>				
G	0	00	COVER SHEET	-	•		
G	0	01	INDEX OF DRAWINGS	-	•	•	
G	0	02	ARCHITECTURAL ABBREVIATIONS, SYMBOLS & ARCHITECTURAL NOTES	-	•		
			ALTA/ASCM Land Title Survey by Gremley & Biedermann		•		<i>For Information Only</i>
<b>C</b>	<b>1</b>		<b>CIVIL</b>				
C	0	01	GENERAL NOTES	-	•		
C	0	02	SITE EXISTING CONDITIONS PLAN	-	•		
C	1	01	SITE DEMOLITION PLAN	-	•	•	
C	2	01	SITE DIMENSION PLAN	-	•	•	
C	3	01	SITE GRADING PLAN	-	•	•	
C	4	01	SITE DETAILS	-	•		
<b>L</b>	<b>01-</b>		<b>LANDSCAPE</b>				
LD	1	01	LANDSCAPE DEMOLITION PLAN	-	•		
L	1	01	LANDSCAPE AND FURNISHING PLAN	-	•		
<b>A</b>			<b>ARCHITECTURAL</b>				
	<b>1</b>		<b>FLOOR PLANS</b>				
A	1	00	BASEMENT FLOOR PLAN	1/16"	•		
A	1	01	OVERALL LEVEL 01 FLOOR PLAN	1/16"	•	•	
A	1	02	OVERALL LEVEL 02 FLOOR PLAN, MEZZANINE LEVEL - BUILDING A	1/16"	•		
A	1	03	OVERALL LEVEL 03 FLOOR PLAN, LEVEL 02 - BUILDING A	1/16"	•	•	



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			<b>SCOPE DOCUMENT NOTES</b>			•	•	
			<b>PROJECT MANUAL</b>			•	•	
			<b>ISSUE TYPE</b>			BID	BID	
			<b>Drawing Name</b>					
A	8	01-2	BUILDING A - STUDENT LEARNING CENTER DEMOLITION, NEW CONSTRUCTION & REFLECTED CEILING PLANS		VARIABLES	•	•	
A	8	01-3	BUILDING A - PRE-LAW NEW CONSTRUCTION PLAN		1/4"	•	•	
A	8	01-4	BUILDING A - GROUND FLOOR DEMOLITION PLAN & GIRL'S TOILET ROOM PLAN & DETAILS		-	•		
A	8	02-1	BUILDING B - FITNESS CENTER DEMOLITION & NEW CONSTRUCTION PLANS		VARIABLES	•	•	
A	8	02-2	BUILDING B - DRESSING & MULTI-PURPOSE ROOMS DEMOLITION & NEW CONSTRUCTION PLANS		1/4"	•	•	
A	8	02-3	BUILDING B - FITNESS CENTER, DRESSING & MULTI-PURPOSE ROOMS REFLECTED CEILING PLANS		1/4"	•	•	
A	8	02-4	BUILDING B - FITNESS CENTER, DRESSING & MULTI-PURPOSE ROOMS ELEVATIONS & DETAILS		VARIABLES	•	•	
A	8	03	BUILDING C - 1ST & 2ND FLOORS NEW BENCH CONSTRUCTION PLAN & DETAILS		VARIABLES	•	•	
A	8	04-1	BUILDING D - CAFETERIA DEMOLITION & NEW FLOOR PLANS		1/8"	•	•	
A	8	04-2	BUILDING D - CAFETERIA DEMOLITION & NEW REFLECTED CEILING PLANS		1/8"	•		
A	8	04-3	BUILDING D - CAFETERIA RAMP SECTIONS AND DETAILS		1/8"		•	NEW drawing
<b>ST</b>			<b>STRUCTURAL</b>					
S	0	01	STRUCTURAL NOTES		-	•	•	
S	6	04-1	BUILDING D - INTERIOR WALKWAY - GROUND FLOOR PLAN, SECTIONS AND DETAILS				•	NEW drawing
S	6	04-2	BUILDING D - INTERIOR WALKWAY - GROUND FLOOR PLAN, SECTIONS AND DETAILS				•	NEW drawing
S	6	11-1	BUILDING D - EXTERIOR WALKWAY - GROUND FLOOR FOUNDATION, FRAMING PLANS AND SECTIONS		1/4"	•		
S	6	11-2	BUILDING D - EXTERIOR WALKWAY - FRAMING SECTIONS AND DETAILS		-	•		
<b>M</b>			<b>MECHANICAL</b>					
M	0	0	MECHANICAL SYMBOLS AND ABBREVIATIONS		N.T.S.	•	•	
M	1	1A	BLDG A FIRST FLOOR VENTILATION DEMOLITION PLAN		1/8"	•		
M	1	2A	BLDG A SECOND FLOOR VENTILATION DEMOLITION PLAN		1/8"	•		
M	1	2B	BLDG B SECOND FLOOR VENTILATION DEMOLITION PLAN		1/8"	•		

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		<b>SCOPE DOCUMENT NOTES</b>			•	•	
		<b>PROJECT MANUAL</b>			•	•	
		<b>ISSUE TYPE</b>			BID	BID	
		<b>Drawing Name</b>					
M	3	0A	BLDG A BASEMENT VENTILATION PLAN	1/8"	•		
M	3	1A	BLDG A FIRST FLOOR VENTILATION PLAN	1/8"	•		
M	3	1C	BLDG C FIRST FLOOR VENTILATION PLAN	1/8"	•		
M	3	2A	BLDG A SECOND FLOOR VENTILATION PLAN	1/8"	•	•	
M	3	2B	BLDG B SECOND FLOOR VENTILATION PLAN	1/8"	•	•	
M	3	3A	BLDG A SECOND FLOOR VENTILATION PLAN	1/8"	•		
M	3	3B	BLDG B THIRD FLOOR VENTILATION PLAN	1/8"	•		
M	3	4A	BLDG A FOURTH FLOOR VENTILATION PLAN	1/8"	•		
M	3	5A	BLDG A FIFTH FLOOR VENTILATION PLAN	1/8"	•		
M	3	7A	BLDG A PENTHOUSE VENTILATION PLAN	1/8"	•		
M	4	2A	BLDG A SECOND FLOOR PIPING PLAN	1/8"	•		
M	4	3A	BLDG A THIRD FLOOR PIPING PLAN	1/8"	•		
M	4	4A	BLDG A FOURTH FLOOR PIPING PLAN	1/8"	•		
M	4	5A	BLDG A FIFTH FLOOR PIPING PLAN	1/8"	•		
M	4	6A	BLDG A SIXTH FLOOR PIPING PLAN	1/8"	•		
M	4	7A	BLDG A PENTHOUSE PIPING PLAN	1/8"	•		
M	5	0	MECHANICAL WATER RISER DIAGRAM BUILDING A	N.T.S.	•		
M	6	0	MECHANICAL SCHEDULES	N.T.S.	•	•	
M	6	1	MECHANICAL SCHEDULES	N.T.S.	•		
M	7	0	MECHANICAL DETAILS	VARIES	•		
<b>P</b>			<b>PLUMBING</b>				
P	0	0	PLUMBING NOTES, SYMBOLS, AND ABBREVIATIONS	N.T.S.	•		

Discipline code	Sheet Group	Sheet Numbers	DRAWING NAME	DATE	SCALE	ISSUED FOR BID PHASE 1	ISSUED FOR ADDENDUM NO. 1 PHASE 1	COMMENTS
			<b>SCOPE DOCUMENT NOTES</b>			•	•	
			<b>PROJECT MANUAL</b>			•	•	
			<b>ISSUE TYPE</b>			BID	BID	
			<b>Drawing Name</b>					
P	1	1B	BLDG B FIRST FLOOR PLUMBING DEMOLITION PLAN		1/8"	•	•	
P	1	2B	BLDG B SECOND FLOOR PLUMBING DEMOLITION PLAN		1/8"	•	•	
P	2	1A	BLDG A FIRST FLOOR PLUMBING PLAN		1/8"	•	•	
P	2	1B	BLDG B FIRST FLOOR PLUMBING PLAN		1/8"	•	•	
P	2	1D	BLDG D FIRST FLOOR NEW LINK PLUMBING PLAN		1/8"	•	•	
P	2	2A	BLDG A SECOND FLOOR PLUMBING PLAN		1/8"	•	•	
P	2	2B	BLDG B SECOND FLOOR PLUMBING PLAN		1/8"	•	•	
P	3	0	PLUMBING RISER DIAGRAM, SCHEDULES AND DETAILS		VARIES	•	•	
<b>F</b>			<b>FIRE PROTECTION</b>					
<b>E</b>			<b>ELECTRICAL</b>					
E	0	0	ELECTRICAL NOTES, SYMBOLS, AND ABBREVIATIONS		N.T.S.	•	•	
E	1	1A	BLDG A FIRST FLOOR ELECTRICAL DEMOLITION PLAN		1/8"	•	•	
E	1	2A	BLDG A SECOND FLOOR ELECTRICAL DEMOLITION PLAN		1/8"	•	•	
E	1	2B	BLDG B SECOND FLOOR ELECTRICAL DEMOLITION PLAN		1/8"	•	•	
E	2	0A	BLDG A BASEMENT ELECTRICAL POWER PLAN		1/8"	•	•	
E	2	0C	BLDG A BASEMENT ELECTRICAL POWER PLAN		1/8"	•	•	<i>NEW drawing</i>
E	2	1A	BLDG A FIRST FLOOR ELECTRICAL POWER PLAN		1/8"	•	•	
<del>E</del>	<del>2</del>	<del>1C</del>	<del>BLDG C FIRST FLOOR ELECTRICAL POWER PLAN</del>		<del>1/8"</del>	<del>•</del>	<del>•</del>	<del>DELETED drawing</del>
E	2	1D	BLDG D FIRST FLOOR NEW LINK ELECTRICAL POWER PLAN		1/8"	•	•	

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			<b>PROJECT MANUAL</b>			•	•	
			<b>ISSUE TYPE</b>			BID	BID	
			<b>Drawing Name</b>					
E	2	2A	BLDG A SECOND FLOOR ELECTRICAL POWER PLAN		1/8"	•	•	
E	2	2B	BLDG B SECOND FLOOR ELECTRICAL POWER PLAN		1/8"	•	•	
E	2	2D	BLDG D SECOND FLOOR ELECTRICAL POWER PLAN		1/8"		•	NEW drawing
E	2	3A	BLDG A THIRD FLOOR ELECTRICAL POWER PLAN		1/8"	•		
E	3	1D	BLDG D FIRST FLOOR NEW LINK ELECTRICAL LIGHTING PLAN		1/8"		•	NEW drawing
E	3	2A	BLDG A SECOND FLOOR ELECTRICAL LIGHTING PLAN		1/8"	•	•	
E	3	2B	BLDG B SECOND FLOOR ELECTRICAL LIGHTING PLAN		1/8"	•	•	
E	4	0	ELECTRICAL LOW VOLTAGE RISER DIAGRAM		N.T.S.	•		
E	5	0	ELECTRICAL SCHEDULES		N.T.S.	<del>•</del>		Not included in Phase 1
E	6	0	ELECTRICAL DETAILS		VARIES	•		
E	6	1	ELECTRICAL DETAILS		VARIES	<del>•</del>		Not included in Phase 1
E	6	2	ELECTRICAL DETAILS		VARIES	<del>•</del>		Not included in Phase 1
<b>ASB</b>			<b>ENVIRONMENTAL [CARNOW, CONIBEAR &amp; ASSOCIATES, LTD]</b>					
ASB	1	00	FIRST FLOOR ASBESTOS ABATEMENT – BUILDING D		-	•	•	
ASB	2	00	SECOND FLOOR ASBESTOS ABATEMENT – BUILDING A		-	•	•	
ASB	2	01	SECOND FLOOR ASBESTOS ABATEMENT – BUILDINGS B AND C		-	•	•	
ASB	2	02	SECOND FLOOR ASBESTOS ABATEMENT – BUILDING D		-	<del>•</del>		Not included in Phase 1
ASB	3	00	ROOF ASBESTOS ABATEMENT		-	•	•	
SMP	1	00	SOIL MANAGEMENT PLAN		-	•	•	
			<b>TOTAL # OF DRAWINGS</b>			<b>109</b>	<b>58</b>	

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The complete Project Manual for this project consists of the entire bound Volume No. 3 which is not to be separated for any reason. The Architect and Owner will not be responsible for any assumptions made by a Contractor or Subcontractor who does not receive a complete bound Project Manual containing all sections and documents listed in the Table of Contents.

The following listed documents comprise the Project Manual - Volume No. 3, for the Jones College Preparatory High School □ Renovation, Phase I. Where numerical sequence of Sections or Divisions is interrupted, such interruptions are intentional.

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01 73 29	Cutting and Patching	04/29/13

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02 41 20	Selective Demolition □ Hazardous Materials	04/18/13
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05 50 00	Metal Fabrications	04/18/13

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06 64 00	Plastic Paneling	04/18/13

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07 01 50.61	Roof Deck Repair	04/18/13
07 18 00	Traffic Coating	04/18/13
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26 05 11 Conductors and Cables for Electrical Systems 04/18/13  
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27 05 03 General Requirements for Communications 04/18/13  
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27 11 16	Communications Cabinets, Racks, and Enclosures	04/18/13
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31 23 18.15	Special, Non-Hazardous Special and Hazardous Waste Soil Removal and Disposal; by Carnow, Conibear, and Assoc.	04/18/13
31 23 23	Acceptance of Backfill, Topsoil, and CU Structural Soil by Carnow, Conibear, and Assoc.	04/18/13
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**APPENDIX A □For Reference**

Environmental Scope Sheets; dated April 12, 2013; by Carnow, Conibear, and Assoc.

**APPENDIX B □For Reference**

Limited Asbestos Survey; dated April 9, 2013; by Carnow, Conibear, and Assoc.  
 Limited Hazardous Material Survey; dated April 9, 2013; by Carnow, Conibear, and Assoc.  
 Limited Lead-Based Paint Assessment; dated April 9, 2013; by Carnow, Conibear, and Assoc.  
 Supplemental Limited Asbestos Survey; dated April 16, 2013; by Carnow, Conibear, and Assoc.  
**Supplemental Limited Asbestos Survey 2; dated April 25, 2013; by Carnow, Conibear, and Assoc.**  
**Supplemental Limited Lead-Based Paint Assessment; dated April 26, 2013; by Carnow, Conibear, and Assoc.**

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## SECTION 01 14 11

### CONSTRUCTION OPERATIONS AND SITE UTILIZATION PLAN

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. The Construction Operations Plan provides a coordinated construction environment to ensure an orderly, secure and safe operation within the existing school and the entire school property, consequently forming the basis for the Site Utilization Plan prepared by the General Contractor.
  - 1. The Commission Representative in direct coordination with CPS will administer the operations plan activities. All Construction Operating issues shall be channeled through and require approval by the Commission Representative in direct coordination with CPS and/or the Building Engineer and Principal.
  - 2. The Construction Operations Plan will be prepared based on the requirements of the project and in coordination with the existing school operations and program. The elements of this plan required for incorporation into the Site Utilization Plan are included in this section.
  - 3. The Construction Operations Plan shall be prepared with the understanding that all work must be strictly coordinated with other contractor's who will occupy the project site at the same time.

##### 1.2 SUBMITTALS

- A. Site Utilization Plan: Submit five (5) copies of the Site Utilization Plan required in Part 3.
  - 1. Submit Site Utilization Plan revisions as required in Part 3.

##### 1.3 CONSTRUCTION OPERATIONS AND SITE UTILIZATION PLAN

- A. Sequence of Work
  - 1. Submit sequence of Work, broken down into tasks for review.
- B. Existing: Maintain existing as follows:
  - 1. Maintain all exits at all times, while the school has occupants.
- C. Use of Site:
  - 1. Contractor shall not impede the operations of the school at any time.
- D. Area of Work:
  - 1. Full Site Area Access, Existing Building Renovations:

- a. All Work associated with the construction of all interior and exterior improvements including but not limited to the Building `B' parking lot shall commence June 27, 2013 and completed no later than August 12, 2013.
- b. All Work associated with the building envelope shall commence June 27, 2013 and be completed no later than August 12, 2013.
- c. All Work associated with the existing building **not requiring** remediation Work shall commence June 27, 2013 and be completed no later than August 12, 2013.
- d. All Work associated with the existing building **requiring** remediation Work shall commence upon completion of remediation Work and be completed no later than August 12, 2013.
- e. No Work shall take place in the existing building until environmental remediation Work has been completed in accordance with the contract documents. Environmental remediation will be permitted from June 27, 2013 through July 12, 2013.

#### 1.4 GENERAL REQUIREMENTS

- A. General Contractor shall review and be familiar with the site conditions through site visits.
- B. General Contractor to provide all temporary and permanent driveway apron and alley permits for the duration of the construction if required. The General Contractor is to pay all fees required for processing permits and is to contact and comply with all authorities and jurisdiction required for permitting.
- C. General Contractor shall provide snow removal and clear all debris in construction area.
- D. General Contractor is to provide all required permits for street access for truck delivery from the local and state jurisdiction.
- E. General Contractor shall be required to coordinate and complete the Work within the contractual completion date(s) for the Work as described within Division 00 Document "Supplemental Conditions," Time for Performance and this section. The General Contractor shall be also held responsible for meeting all related provisions as described within this section.
- F. General Contractor shall survey the site and photograph the area of construction operations. Upon completion of the Work the Contractor is to restore the area to the documented condition prior to the start of Work or as otherwise indicated in the Contract Documents.
- G. General Contractor is to replace all removed trees, bushes, ground covers and grass on the Chicago Public Schools' property used as part of the construction operations. Also concrete pavement walks and asphalt surfaces shall be restored to condition prior to construction.
- H. General Contractor shall coordinate Work with School during Mandatory State Testing periods. Test dates should be verified with the School. No Work shall be permitted in the existing facility or on the site during testing except as specifically approved by the Principal, Building Engineer, and Commission Representative. General Contractor must minimize noise in all other areas during these time periods, and if requested by the School, stop Work causing the noise until testing is completed. General Contractor shall bear all costs for any loss of time or production related to Mandatory State Testing.

- I. General Contractor shall coordinate and maintain all exit egress during construction as required by the City of Chicago code, other entities with jurisdiction, and as directed by CPS or their representatives. The General Contractor shall provide and maintain all materials and labor including barricades, construction fence, doors, partitions, and fire rated walls as required for safe egress. All costs for this Work shall be included in the Contract Base Bid regardless of whether it is indicated in the Contract Documents or not.
- J. No deliveries will be permitted to either the existing facility or the new addition between the hours of 8:30 to 9:30 AM and 2:30 to 4:30 PM.
- K. The Contractor is to set up and stage the entire project within the boundaries of the construction fence. The General Contractor is responsible for maintaining and modifying the fence as necessary and as approved in the Site Utilization Plan for the life of the project. Removal and disposal of the fence at the conclusion of the project is the responsibility of the General Contractor.
- L. The Building Engineer or other CPS staff as approved by CPS is required to be present at all times Work is in progress in the existing Building. The General Contractor shall be responsible for all overtime costs for the CPS staff member for Work outside of normal Working hours. Overtime arrangements for CPS staff includes weekends, holidays, and generally hours beyond that listed in Site Restrictions above. IUOE Local 143 Holidays are as follows (Saturday holidays are observed on Friday, Sunday holidays are observed on Monday):
  - 1. New Year's Day.
  - 2. Martin Luther King Jr.'s Birthday.
  - 3. Lincoln's Birthday.
  - 4. Presidents Day.
  - 5. Pulaski Day.
  - 6. Memorial Day.
  - 7. Independence Day.
  - 8. Labor Day.
  - 9. Columbus Day.
  - 10. Veterans Day.
  - 11. Thanksgiving.
  - 12. Friday after Thanksgiving.
  - 13. Christmas Day.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### **3.1 CONSTRUCTION OPERATIONS AND SITE UTILIZATION PLAN**

- A. Prior to Notice to Proceed the General Contractor is to prepare and submit to the Commission Representative, the Building Engineer, and the AOR for approval a Site Utilization Plan based on the Construction Operations requirements outlined in this section. Mobilization on-site is not to occur until approval of the Site Utilization Plan is obtained. If requested by the Contractor, a preliminary meeting to review site elements and Construction Operations with the

Commission Representative, AOR, and School staff prior to submission of the Site Utilization Plan shall be held.

- B. The Site Utilization Plan shall be provided in a full-size graphic drawing format (30 x 42 inches) on **11 x17 inch** prints/plots. Provide a separate plan for the site and for each floor of the existing building where Work is being performed. Modifications to the format and sheet size shall be permitted if pre-approved by the Commission Representative and if proposed modifications shall facilitate preparation, presentation and review of the Site Utilization Plan. Electronic copies of the Contract Document drawings as appropriate shall be provided for this purpose upon request. The Site Utilization Plan shall at a minimum include the following elements:
1. Title block information including School Name, Contract Number, General Contractor, Building floor/level information, and current plan date.
  2. Building footprint of both new (if applicable) and existing buildings, trees, landscaping, paving, drainage structures, existing and ornamental fencing and other important site features.
  3. Areas of staging for students and staff, student drop-off points, existing school entrances and exits, staff parking areas, and traffic patterns for both construction and non-construction vehicles.
  4. Denotation of the limits of construction and required construction fencing including any existing fencing to remain.
  5. Denotation of required covered construction barricade walkways
  6. Denotation of areas allowed for staging purposes: construction personnel parking, material storage, and construction trailer(s). Such activities are to only take place in areas designated.
  7. Denotation of any specific site conditions required to be observed such as keeping alleys clear next to adjacent properties, and any other issues listed on the Construction Operations Site Plan.
  8. Denotation of areas allowed for site access gates.
  9. Denotation of areas of Work within the existing building for the period of time covered by the Site Utilization Plan, coordinated with the Project Schedule. Each area should indicate planned beginning and end dates for Work in that area. Areas where all Work is completed are to be noted.
  10. Construction Worker ingress/egress, material staging areas in the existing building.
  11. Proposed locations of temporary protection, barricades, and temporary walls within the existing building.
  12. Denotation of all temporary exits and path of travel.
  13. Indication of specific areas and their required contractual completion dates. If overtime Work is required to meet the project dates it shall be at no additional cost to the Chicago Public Schools.

### 3.2 CONSTRUCTION OPERATIONS AND SITE UTILIZATION PLAN UPDATES

- A. The General Contractor is required to submit for approval updated Site Utilization Plans whenever conditions in the current approved plan have changed. Approval is required prior to proceeding on any changed conditions not previously approved. Requirements for updating include the following:

1. In coordination with the project schedule provide detailed information regarding Work in the existing building including phasing, vacation of existing in-use areas, and any other information requested by the Commission Representative, Principal, or Building Engineer.
2. Revision to the site plan to reflect changing conditions regarding construction fencing, ingress and egress, student and staff staging, construction deliveries, areas of stored materials, parking, and any other construction facility revisions.

**END OF SECTION**

## SECTION 01 35 59

### INDOOR AIR QUALITY REQUIREMENTS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings
- B. Book 1: Project Information, Instructions to Bidders, and Execution Documents
- C. Book 2: Standard Terms and Conditions for Construction Contracts

##### 1.2 SUMMARY

- A. Section includes general requirements and procedures for compliance with Indoor Air Quality goals.
  - 1. This project will track specific parameters identified herein but will not seek LEED certification.
  - 2. Materials data and information is to be submitted by the Contractor in accordance with the Technical Specifications.

##### 1.3 DEFINITIONS

- A. Commission Representative: the person assigned, in writing, by the Executive Director to be the Commission's Representative for the project
- B. LEED: Leadership in Energy & Environmental Design.

##### 1.4 SUBMITTALS

- A. General: Technical Specifications contain Indoor Environmental Quality requirements specific to the Work of each of these Sections. Submit in accordance with the project specifications.
- B. Indoor Air Quality Management Plans: Required as necessary to meet City and other regulatory requirements, and as specified herein. Plans shall include written narratives with back-up as indicated herein. Provide updates as part of monthly report.
  - 1. Construction Indoor-Air-Quality Management Plan to maintain indoor air quality during construction.
  - 2. Indoor Air Quality measures  Narrative description of applicable measures undertaken.



3. Product data on HVAC equipment indicating absence of CFC refrigerants and use of refrigerants with low ozone depletion and global warming potential.
4. Indoor Air Quality During Construction - Construction indoor-air-quality management plan based on SMACNA IAQ Guidelines for Occupied Buildings under Construction, 1995, Chapter 3.
  - a. Product data for temporary filtration media.
  - b. Product data for filtration media used during occupancy.
  - c. Provide documentation confirming that smoking was not allowed inside the building during construction. (no smoking on CPS property is a CPS requirement)
5. Low-Emitting Materials
  - a. Provide submittals for materials as follows for compliance with section 2.1: 1) Adhesives & Sealants; 2) Paints & Coatings; 3) Flooring Systems; 4) Composite Wood and Agrifiber Products.

## 1.5 QUALITY ASSURANCE

- A. Contractor's documentation shall be in compliance Technical Specifications.

## PART 2 - PRODUCTS

### 2.1 LOW-EMITTING MATERIALS

- A. The General Contractor shall review the manufacturers and products listed in the Technical Specifications, and verify compliance with the applicable guidelines below.
  1. Adhesives & Sealants: Provide product data and MSDS for adhesives and sealants used inside the weatherproofing system indicating VOC content of each product used. Indicate VOC content in g/L calculated according to 40 CFR 59, Subpart D (EPA Method 24). Comply with the following limits:
    - a. Wood Glues: 30 g/L.
    - b. Metal to Metal Adhesives: 30 g/L.
    - c. Adhesives for Porous Materials (Except Wood): 50 g/L.
    - d. Subfloor Adhesives: 50 g/L.
    - e. Plastic Foam Adhesives: 50 g/L.
    - f. Carpet Adhesives: 50 g/L.
    - g. Carpet Pad Adhesives: 50 g/L.
    - h. VCT and Asphalt Tile Adhesives: 50 g/L.
    - i. Cove Base Adhesives: 50 g/L.
    - j. Gypsum Board and Panel Adhesives: 50 g/L.
    - k. Rubber Floor Adhesives: 60 g/L.
    - l. Ceramic Tile Adhesives: 65 g/L.
    - m. Multipurpose Construction Adhesives: 70 g/L.
    - n. Fiberglass Adhesives: 80 g/L.
    - o. Contact Adhesive: 80 g/L.
    - p. Structural Glazing Adhesives: 100 g/L.

- q. Wood Flooring Adhesive: 100 g/L.
  - r. Structural Wood Member Adhesive: 140 g/L.
  - s. Special Purpose Contact Adhesive (contact adhesive that is used to bond melamine covered board, metal, unsupported vinyl, Teflon, ultra-high molecular weight polyethylene, rubber or wood veneer 1/16 inch or less in thickness to any surface): 250 g/L.
  - t. Top and Trim Adhesive: 250 g/L.
  - u. Plastic Cement Welding Compounds: 350 g/L.
  - v. ABS Welding Compounds: 400 g/L.
  - w. CPVC Welding Compounds: 490 g/L.
  - x. PVC Welding Compounds: 510 g/L.
  - y. Adhesive Primer for Plastic: 650 g/L.
  - z. Sheet Applied Rubber Lining Adhesive: 850 g/L.
  - aa. Aerosol Adhesive, General Purpose Mist Spray: 65 percent by weight.
  - bb. Aerosol Adhesive, General Purpose Web Spray: 55 percent by weight.
  - cc. Special Purpose Aerosol Adhesive (All Types): 70 percent by weight.
  - dd. Other Adhesives: 250 g/L.
  - ee. Architectural Sealants: 250 g/L.
  - ff. Nonmembrane Roof Sealants: 300 g/L.
  - gg. Single-Ply Roof Membrane Sealants: 450 g/L.
  - hh. Other Sealants: 420 g/L.
  - ii. Sealant Primers for Nonporous Substrates: 250 g/L.
  - jj. Sealant Primers for Porous Substrates: 775 g/L.
  - kk. Modified Bituminous Sealant Primers: 500 g/L.
  - ll. Other Sealant Primers: 750 g/L.
2. Paints & Coatings: Provide product data and MSDS for paints and coatings used inside the weatherproofing system indicating VOC content of each product used. Indicate VOC content in g/L calculated according to 40 CFR 59, Subpart D (EPA Method 24).

Or provide VOC content of each product used. Indicate VOC content in g/L calculated according to 40 CFR 59, Subpart D (EPA Method 24). Comply with the following limits:

- a. Flat Paints and Coatings: VOC not more than 50 g/L.
  - b. Nonflat Paints and Coatings: VOC not more than 150 g/L.
  - c. Primers: VOC not more than 50 g/L.
  - d. Anticorrosive and Antirust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
  - e. Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.
  - f. Clear Wood Finishes, Lacquers: VOC not more than 550 g/L.
  - g. Floor Coatings: VOC not more than 100 g/L.
  - h. Shellacs, Clear: VOC not more than 730 g/L.
  - i. Shellacs, Pigmented: VOC not more than 550 g/L.
  - j. Stains: VOC not more than 250 g/L.
3. Flooring Systems: Provide product data for carpet products showing compliance with the Carpet and Rug Institute's Green Label Plus program. Provide product data for vinyl, linoleum, rubber and laminate flooring showing compliance with the FloorScore program requirements.

4. Composite Wood and Agrifiber Products: Provide product data for products containing composite wood or agrifiber products or wood glues indicating that they do not contain urea-formaldehyde resin.

## PART 3 - EXECUTION

### 3.1 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT

- A. Comply with the intent of LEED Credit EQ 3.1: Comply with ALL provisions of SMACNA § "SMACNA IAQ Guideline for Occupied Buildings under Construction, 1995, Chapter 3."
  1. If Owner authorizes use of permanent heating, cooling, and ventilating systems during construction period as specified in Division 1 Section "Temporary Facilities and Controls," install filter media having a MERV 8 according to ASHRAE 52.2 at each return-air inlet for the air-handling system used during construction.
  2. Replace ALL air filters immediately prior to occupancy.
  3. SMACNA IAQ protocols as follows:
    - a. As air ducts, air handlers, air terminal units, grilles, diffusers, louvers, dampers, fans, filters and absorptive materials (gypsum board, ceiling tile, etc) have been delivered to the site, demonstrate method of protection while stored on site before installation.
    - b. As air ductwork has been partially installed, demonstrate method of protection to ensure zero entrainment of construction dust/debris into partially installed ductwork.
    - c. As air grilles, diffusers have been permanently installed; demonstrate method of protection to ensure zero entrainment of construction dust/debris into all air conveyance systems.
    - d. At end of each work day, demonstrate cleaning of floors to mitigate dust/debris accumulation.
  4. No smoking is allowed within the building and within 25 feet of building entrances once the building is enclosed. There is NO smoking on a School property.

### 3.2 MATERIAL AND CONSTRUCTION PROTECTION

- A. Deliver, store and handle products and materials using methods that will prevent damage and deterioration and in accordance with manufacturer's recommendations. Deliver to minimize long term storage in undamaged condition in manufacturer's original unopened, undamaged containers complete with labels and instructions. Store products and materials subject to damage by the elements under cover in a weather tight enclosure above ground with ventilation adequate to prevent condensation. Protect from freezing and moisture intrusion.
- B. Inspect materials and products promptly upon arrival at the site for damage, soiling, contaminates and dampness and reject as appropriate.

- C. Provide protection during the construction process to prevent moisture intrusion, freezing, dirt and debris within assemblies and extremes in temperature not common to the in-place use environment of the element. Do not allow food and drink or food and drink containers or material protective wrapping to be incorporated into the Work.
- D. Install Work in sequence with sufficient time for curing and drying of each element before subsequent work upon which such work depends.
- E. Promptly take measures to dry or remove and replace materials products and portions of the project that evidence absorption of moisture or are wet before incorporation proceeding with the work and incorporation or of such materials or products into the project.

**END OF SECTION**

## SECTION 01 73 29

### CUTTING AND PATCHING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes procedural requirements for cutting and patching.

##### 1.2 DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

##### 1.3 QUALITY ASSURANCE

- A. General: Contractor shall take reasonable care prior to all cutting and drilling in order to minimize unintended damage to concealed conduits, cables, pipes, reinforcing steel, etc. In circumstances where the absence of such concealed elements is not established conclusively, utilize detection and mapping technology, e.g., X-ray or Sub-surface Interface Radar (SIR), to locate any such elements that may be present before proceeding with the cutting or drilling work.
- B. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- C. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational Elements include the following:
  - 1. Air or smoke barriers.
  - 2. Fire-protection systems.
  - 3. Control systems.
  - 4. Communication systems.
  - 5. Conveying systems.
  - 6. Electrical wiring systems.
  - 7. Operating systems of special construction in Division 13 Sections.
- D. Miscellaneous Elements: Do not cut and patch elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Miscellaneous Elements include the following:
  - 1. Water, moisture, or vapor barriers.
  - 2. Membranes and flashings.

3. Exterior curtain-wall construction.
4. Equipment supports.
5. Piping, ductwork, vessels, and equipment.
6. Noise- and vibration-control elements and systems.

E. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

#### 1.4 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

### **PART 2 - PRODUCTS**

#### 2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing and In-Place Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, shall match the visual and functional performance of existing materials.

### **PART 3 - EXECUTION**

#### 3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to prevent interruption of services to occupied areas.
  - 1. If existing services to occupied areas must be interrupted, coordinate and receive approval of the interruption of services prior to starting work.

### 3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
  - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  - 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
  - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
  - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that shall eliminate evidence of patching and refinishing.

- a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
  - b. Restore damaged pipe covering to its original condition.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
- a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

**END OF SECTION**



## SECTION 02 26 11

### SUMMARY OF EXISTING ENVIRONMENTAL SITE CONDITIONS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings
- B. Book 1: Project Information, Instructions to Bidders, and Execution Documents
- C. Book 2: Standard Terms and Conditions for Construction Contracts
- D. Book 2a: Standard Terms and Conditions Procedures Manual

##### 1.2 APPLICABILITY

- A. This environmental summary is for information purposes only. Contractor shall become familiar with all site conditions prior to Work.

##### 1.3 INTRODUCTION

- A. Related Work
  - 1. All Work

##### 1.4 AVAILABLE ENVIRONMENTAL ASSESSMENT DOCUMENTS

- A. *Limited Lead-Based Paint Survey*, prepared by Carnow, Conibear & Assoc., Ltd., dated April 9, 2013.
- B. *Limited Asbestos Containing Materials Survey*, prepared by Carnow, Conibear & Assoc., Ltd., dated April 9, 2013.
- C. *Limited Hazardous Materials Survey*, prepared by Carnow Conibear & Assoc., Ltd. Dated April 9, 2013.
- D. *Supplemental Asbestos Containing Materials Survey*, prepared by Carnow Conibear & Assoc., Ltd., dated April 16, 2013.
- E. *Supplemental Asbestos Containing Materials Survey*, prepared by Carnow Conibear & Assoc., Ltd., dated April 26, 2013.
- F. *Supplemental Limited Lead-Based Paint Survey*, prepared by Carnow, Conibear & Assoc., Ltd., dated April 29, 2013.

## 1.5 SITE DESCRIPTION

- A. The renovation project area is located within the campus of William Jones College Preparatory High School located at 606 S. State Street in Chicago, Illinois. The campus consists of four buildings designated as A, B, C and D. A courtyard is located in the east central portion of the campus and a parking lot is located in the northwest portion of the campus.

## 1.6 SITE HISTORY

- A. No historical research of environmental records was included as part of the project except for review of the schools 2010 AHERA Asbestos Reinspection and Asbestos Management Plan.

## 1.7 ENVIRONMENTAL CONDITIONS

- A. No known subsurface environmental conditions have been identified in the project area. Note: fuel system piping associated with the emergency generator is located in northwest corner of Building A.
- B. Carnow, Conibear & Assoc., Ltd. reviewed previous asbestos inspection reports and conducted asbestos containing materials (ACM) surveys of proposed renovation areas within the site buildings. The reports issued on April 9, 16, and 26, 2013 identified ACM in various materials within and on the exterior of the building. Refer to these reports, and the Environmental Scope Sheets in Appendix A and ASB design drawings for further information.
- C. Carnow, Conibear & Assoc., Ltd. conducted limited lead based paint (LBP) surveys of the proposed renovation areas within the site buildings. The reports issued on April 9 and 26, 2013 indicated that lead paint was not identified in the renovation areas. Refer to these reports, and Environmental Scope Sheets in Appendix A for further information.
- D. Carnow, Conibear & Assoc., Ltd. conducted a limited hazardous materials survey of the proposed renovation areas within the site buildings. The report issued on April 9, 2013 indicated the presence of refrigerants within the buildings cooling systems, universal waste including PCB ballasts and mercury fluorescent bulbs, switches, thermostats, and gauges are present within the renovation areas. Refer to this report, and Environmental Scope Sheets in Appendix A for further information.
- E. Additionally, there is fuel piping associated with the emergency generator located in the northwest basement of Building A. Removal/reconfiguration of this piping, if required to complete project scope, will require both special handling and permitting.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

## SECTION 03 30 00

### CAST-IN-PLACE CONCRETE

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes cast-in-place concrete required to complete the work indicated on all the project construction drawings except for related sections.

##### 1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans.

##### 1.3 SUBMITTALS

- A. Product Data: Submit preprinted data for each type of manufactured material and product demonstrating compliance requested by the Architect.
- B. Design Mixes: Submit design mix for each concrete mix. Include field test data used to establish the required average strength in accordance with ACI 301. Review of design mixes and field test data will be for general information only. Production of concrete to comply with specified requirements is the responsibility of the contractor. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until each mix has been reviewed by the Architect.
  - 1. Indicate amounts of mix water to be withheld for later addition at Project site.
- C. Shop Drawings:
  - 1. Steel Reinforcement Shop Drawings: Submit details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
- D. Welding Certificates: Copies of certificates for welding procedures and personnel.
- E. LEED Submittals:
  - 1. LEED Credit MR 4.1: Submit product data for products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
    - a. Include statement indicating costs for each product having recycled content.

2. LEED Credit MR 5.1: Submit product data for products that have extracted, harvested, or recovered, as well as manufactured within 500 miles of the Project site.
  - a. Include a statement indicating the percentage by weight which is extracted, harvested, or recovered within 500 miles of the Project site.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
- C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."
- F. Publications: Comply with the latest edition of the following, except as modified by the Contract Documents. Maintain a copy of the latest edition of ACI 301, 117, 318, and 347 at the project site at all times. Where provisions of the above codes and standards are in conflict with the building code in force for the Project, the building code shall govern.
  1. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
  2. ACI 301, "Standard Specification for Structural Concrete."
  3. ACI 302,  Guide for Concrete Floor and Slab Construction.
  4. ACI 305,  Hot Weather Concreting
  5. ACI 306,  Cold Weather Concreting
  6. ACI 308,  Standard Practice for Curing Concrete
  7. ACI 318  Building Code Requirements for Structural Concrete
  8. ACI 347  Recommended Practice for Concrete Formwork
  9. ASTM C494 Standard Specification for Chemical Admixtures for Concrete
  10. AWS D12.1  Recommended Practices for Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction.
  11. CRSI  Manual of Standard Practice.
- G. Concrete Testing Service: The Owner will employ a testing laboratory to perform initial field quality control testing.
  1. Materials and installed Work may require testing and retesting, at anytime during the progress of the Work. Allow free access to material stockpiles and facilities at all times. Tests, not specifically indicated to be done at the Owner's expense, including the retesting of rejected materials and installed Work, shall be done at the Contractor's expense.

#### H. Pre-Concrete Conference

1. Conduct a meeting to review the detailed requirements for preparing the concrete design mixes and to review the drawings, specifications, and the project.
2. Require responsible representatives of every party who is concerned with the concrete work to attend the conference, including but not limited to the following:
  - a. Contractor's superintendent
  - b. Laboratory responsible for the concrete design mix
  - c. Laboratory responsible for the field quality control
  - d. Concrete subcontractor
  - e. Architect
  - f. Boards Authorized Representative
3. Type and print minutes from the meeting and distributed to all parties within 5 days of the meeting.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle steel reinforcement to prevent bending and damage.
  1. Avoid damaging coatings on steel reinforcement.

#### 1.6 PROJECT CONDITIONS

- A. Before commencing work, examine all adjoining work on which this work is in any way dependent for proper installation and workmanship and report to the Contractor any condition which prevents performing first class work.
- B. Protection of Footings Against Freezing: Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent subgrade against possibility of freezing; maintain cover for time period as necessary.
- C. Protect adjacent finish materials against spatter during concrete placement.
- D. Provide all barricades and safeguards at all pits, holes, shaft and stairway openings, and the like. Provide all safeguards as required by authorities having jurisdiction. Take full responsibility for safety precautions and methods.

### **PART 2 - PRODUCTS**

#### 2.1 FORM-FACING MATERIALS

- A. Formed Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
  1. Rust-free metal.
  2. Exterior-grade undamaged, unpatched plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

- a. Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.
  - b. Structural 1, B-B, or better, mill oiled and edge sealed.
  - c. B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.
3. Architecturally Exposed Concrete (exposed piers): Medium-density overlay, class 1 or better, mill-release agent treated and edge sealed.
- B. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes. Construct paper of fiber tubes of laminated plies using water-resistant adhesive with wax-impregnated exterior for weather and moisture protection. Provide units with sufficient wall thickness to resist plastic concrete loads imposed by concrete without deformation.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of the exposed concrete surface.
  2. Furnish ties that, when removed, will leave holes not larger than 1 inch (25 mm) in diameter in concrete surface.
  3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

## 2.2 STEEL REINFORCEMENT

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so post-consumer recycled content plus one-half of pre-consumer recycled content is not less than **25** percent.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- C. Epoxy-Coated Reinforcing Bars, applies to all: ASTM A 775/A 775M.
- D. Plain-Steel Wire: ASTM A 82, as drawn.
- E. Deformed-Steel Wire: ASTM A 496.
- F. Epoxy-Coated Wire: ASTM A 884/A 884M, Class A coated, plain-steel wire.
- G. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

1. Welded wire fabric maybe used in lieu of carbon steel fibers for interior slabs on grade and interior elevated concrete topping on metal deck when acceptable to the Architect.

H. Epoxy-Coated Welded Wire Fabric: ASTM A 884/A 884M, Class A, plain steel.

## 2.3 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.
4. Do not use wood, masonry, concrete or other similar supports.

B. Joint Dowel Bars: Plain-steel bars, ASTM A 615/A 615M, Grade 60 (Grade 420). Cut bars true to length with ends square and free of burrs.

C. Epoxy-Coated Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars.

D. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 755M.

E. Mechanical Reinforcement Couplers: ASTM A-519, Minimum tensile strength 100,000 psi

## 2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I. Type III cement may be used in lieu of Type I at Contractor's option, when acceptable to the Architect.

1. Use only one brand of cement throughout project, except as otherwise indicated.

B. Fly Ash: ASTM C618, Class C or F

C. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:

1. Class: Severe weathering region, but not less than 3S.
2. Nominal Maximum Aggregate Size: 3/4 inch (19 mm) unless otherwise indicated.

D. Water: Potable and complying with ASTM C 94.

## 2.5 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other

admixtures and cementitious materials. Do not use admixtures containing calcium chloride thycyanates or admixtures containing more than 0.1 percent chloride ions.

- B. Air-Entraining Admixture: ASTM C 260.
- C. Water-Reducing Admixture: ASTM C 494, Type A.
- D. High-Range, Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F.

## 2.6 WATERSTOPS

- A. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophylic material for adhesive bonding to concrete.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Volclay Waterstop-RX; Colloid Environmental Technologies Co.
    - b. Conseal CS-231; Concrete Sealants Inc.
    - c. Swellseal Joint; De Neef Construction Chemicals (U.S.) Inc.
    - d. Hydrotite; Greenstreak.
    - e. Mirastop; Mirafi Moisture Protection, Div. of Royal Ten Cate (USA), Inc.
    - f. Adeka Ultra Seal; Mitsubishi International Corporation.
    - g. Superstop; Progress Unlimited Inc.

## 2.7 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Drinkable.
- D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

## 2.8 RELATED MATERIALS

- A. Joint-Filler Strips: ASTM D 1752, cork or self-expanding cork.
- B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Reglets: Fabricate reglets of not less than 26 gage (0.0217-inch) (0.55-mm) thick galvanized steel sheet with 45 degree slot minimum 1" deep and ¼" wide and formed with upper lip bent back to engage concrete. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.



## 2.9 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
  4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6 mm).
1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
  3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand as recommended by topping manufacturer.
  4. Compressive Strength: Not less than 5700 psi (39 MPa) at 28 days when tested according to ASTM C 109/C 109M.

## 2.10 CONCRETE MIXES

- A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.
- C. Provide a minimum 28 day compressive strength of 4000 psi (27.7 MPa) and a maximum water-cementitious material ratio of 0.44, unless otherwise indicated.
- D. Footings and Foundation Walls: Proportion normal-weight concrete mix as follows unless otherwise indicated:
1. Compressive Strength (28 Days): 4000 psi (27.6 MPa) with a maximum water cementitious material ratio of 0.44 (non air-entrained).
  2. Maximum Slump at point of placement: 4 inches (100 mm).
  3. Maximum Slump for Concrete Containing High-Range Water-Reducing Admixture: 8 inches (200 mm) after admixture is added to concrete with 2- to 4-inch (50- to 100-mm) slump.

- E. **Slab-on-Grade: Proportion normal-weight concrete mix as follows unless otherwise indicated:**
1. **Exterior Exposed Concrete - Compressive Strength (28 Days): 5000 psi (34.5 MPa) with a maximum water-cementitious material ratio of 0.4 (air-entrained).**
  2. **Interior Concrete - Compressive Strength (28 Days): 4000 psi (27.6 MPa) with a maximum water-cementitious material ratio of 0.44.**
- F. Cementitious Materials:
1. For concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than Portland cement according to ACI 301 requirements.
  2. For all other concrete, limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:
    - a. Fly Ash: 25 percent by weight.
- G. Air Content: Use air-entraining admixture in exterior exposed concrete. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus 1 or minus 1.5 percent, unless otherwise indicated:
1. Air Content: 6 percent for 3/4-inch (19-mm) nominal maximum aggregate size.
- H. Do not air entrain concrete to trowel-finished interior floors and suspended slabs. Do not allow entrapped air content to exceed 3 percent.
- I. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
  2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
  4. Use corrosion-inhibiting admixture in concrete mixes where indicated.
- J. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method is used, use an independent testing facility acceptable to the Architect for preparing and reporting proposed mix designs.

## 2.11 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice." In the case of fabrication errors, do not rebend or straighten reinforcement.
- B. Unacceptable Materials: Reinforcement with any of the following defects will not be permitted in the Work:

1. Bar lengths, depths or bends exceeding specified fabrication tolerances.
2. Bends or kinks not indicated on the Drawings or final Shop Drawings
3. Bars with reduced cross section due to excessive corrosion or other cause.
4. Bars with damaged corrosion resistive coating (if specified).

## 2.12 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

## PART 3 - EXECUTION

### 3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads within acceptable deflection limits.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages, and inserts, and other features required.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
1. Class A, 1/8 inch (3 mm), for surfaces predominantly exposed to public view.
  2. Class B, 1/4 inch (6 mm), for course-textured concrete formed surfaces intended to receive plaster, stucco, or wainscoting.
  3. Class C, 1/2 inch (13 mm), for all other surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
1. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to

prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

- H. Chamfer exterior corners and edges of permanently exposed concrete with  $\frac{3}{4}$ " x  $\frac{3}{4}$ " strips (unless otherwise indicated) accurately formed and surfaced to produce uniform straight lines and tight edges. Unexposed corners may be formed square or chamfered.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items, including those under separate prime contracts (if any).
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with non-staining, rust preventative form-release agent, according to manufacturer's written instructions, before placing reinforcement. Rust stained steel formwork is not acceptable.
- M. Support form facing materials by structural members spaced sufficiently close to prevent deflection. Fit forms placed in successive units for continuous surfaces of accurate alignment, from irregularities and within allowable tolerances
- N. Elevate formwork as required for anticipated deflections due to weight and pressures of fresh concrete, shortening of formwork system, and construction loads.
- O. Carefully inspect falsework and formwork during and after concrete placement to determine abnormal deflection or signs of failure; make necessary adjustments to produce work of required dimensions.
- P. Form intersecting planes to provide true, clean-cut corners, with edge grain of plywood not exposed as form for concrete.
- Q. Forms for exposed Concrete:
  - 1. Drill forms to suit ties used and to prevent leakage of concrete mortar around tie holes.
  - 2. Do not use metal cover plates for patching holes or defects in forms.
  - 3. Provide sharp, clean corners at intersecting planes, without visible edges or offsets. Back joints with extra studs or girts to maintain true, square intersection.
  - 4. Use extra studs, walers and bracing to prevent bowing of forms between studs and to avoid bowed appearance of concrete. Do not use narrow strips of form material that will produce bow.
  - 5. Assemble forms so they may be readily removed without damage to exposed concrete surfaces.

### 3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 1. Install anchor rods, accurately located, to elevations required.
  - 2. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
  - 3. Install dovetail anchor slots in concrete structures as indicated.

### 3.3 REMOVING AND REUSING FORMS

- A. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.
- B. Leave formwork, for beam soffits, joists, slabs, and other structural elements, that supports weight of concrete in place until concrete has achieved 28-day design compressive strength.
- C. Determine compressive strength of in-place concrete by testing representative field- or laboratory-cured test specimens according to ACI 301.
  - 1. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- D. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- E. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

### 3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. At a spacing not to exceed 4'-0" on center in either direction. For slabs on grade, use supports not to exceed 4'-0" o.c. with sand plates or horizontal runners where base material will not support chair legs.
  2. Shop- or field-weld reinforcement according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least two mesh spacings. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
- F. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.

### 3.5 JOINTS

- A. **General:** Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. **Construction Joints:** Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  2. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
  3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
  4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  5. Space vertical joints in walls at not more than 60 feet in any horizontal direction. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
  6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. **Contraction Joints in Slabs-on-Grade:** Form weakened-plane contraction joints, sectioning concrete into 15-foot maximum perpendicular strips, and areas not exceeding 225 square feet. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:
1. **Sawed Joints:** Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete within 24-hours after initial floating, when cutting action will not tear, abrade, or otherwise damage surface, and before concrete develops random contraction cracks.

- D. **Isolation Joints in Slabs-on-Grade: Install joint-filler strips at all slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.**
1. **Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.**
  2. **Terminate full-width joint-filler strips not less than 1/2 inch (12 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants are indicated.**
  3. **Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.**

### 3.6 CONCRETE PLACEMENT

A. Pre-Placement Inspection:

1. Before concrete placement, check the lines and levels of erected formwork. Make corrections and adjustments to ensure proper size and location of concrete members and stability of forming systems. During concrete placement, check formwork and related supports to ensure that forms are not displaced and that completed Work will be within specified tolerances.
  2. Before placing concrete, inspect and complete the formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts involved in ample time to permit the installation of their Work; cooperate with other trades in setting such Work, as required.
  3. Thoroughly wet wood forms immediately before placing concrete, as required where form coatings are not used.
  4. Soil at bottom of foundation systems are subject to testing for soil bearing value by the testing laboratory, as directed by the Architect. Place concrete immediately after approval of foundation excavations.
  5. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.
  6. Remove soil, debris, standing water, ice, snow, loose mill scale or coating and other foreign matter from formwork and metal deck.
- B. Do not add water to concrete during delivery, at Project site, or during placement, unless indicated on trip ticket.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
- D. Deposit concrete in forms in horizontal layers no deeper than 24 inches (600 mm) and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
  2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches (150 mm)

into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.

- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
  2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
- F. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
  3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

### 3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections.
1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
  2. Do not apply rubbed finish to smooth-formed finish.
- C. Rubbed Finish: Apply one of the following to finished concrete exposed to view:
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.



2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part Portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white Portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
  3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part Portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white Portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

### 3.8 FINISHING FLOORS AND SLABS

- A. **General: Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.**
1. **F(F) defines the maximum floor curvature allowed over 24 in. Computed on the basis of successive 12 in. elevation differentials, F(F) is commonly referred to as the □Flatness F-Number□**
  2. **F(L) defines the relative conformity of the floor surface to a horizontal plane as measured over a 10 ft. distance, commonly referred to as the □Levelness F-Number□**
  3. **All floors shall be measured in accordance with ASTM E-1155 □Standard Test Method for Determining Floor Flatness and Levelness Using the □F Number□ System.**
  4. **All slabs shall achieve the specified overall tolerance. The minimum local tolerance (1/2 bay) shall be 2/3 of the specified tolerances.**
- B. **Trowel Finish: Apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings. Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E 1155/E 1155M for a randomly trafficked floor surface:**
1. **All other slab on grade overall values of flatness, F(F) 25; and levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and levelness, F(L) 15 other.**

### 3.9 MISCELLANEOUS CONCRETE ITEMS

- A. 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.

- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

### 3.10 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 301, ACI 306.1 for cold-weather protection, and with recommendations in ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive resilient sheet floor coverings. Cure concrete surfaces to receive other floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
  - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

### 3.11 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval. Comply with ACI 301.

- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland cement to two and one-half parts fine aggregate passing a No. 16 (1.2-mm) sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete but not less than 1 inch (25 mm) 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.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) 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 (6 mm) 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 (25 mm) 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 (19 mm) 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 (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

### 3.12 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mix, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
  3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
  4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
  5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
  6. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of five standard cylinder specimens for each composite sample.
  7. Compressive-Strength Tests: ASTM C 39
    - a. Test two specimens at 7 days, two at 28 days and one at 56 days if 28-day compressive strength has not yet been obtained.
    - b. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.

- C. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.
- G. Defective Work: Concrete work which does not conform to the specified requirements, including strength , tolerances, and finishes, shall be corrected at the Contractor's expense without extension of time . The contractor shall also be responsible for the cost of corrections to any other work affected by or resulting from corrections to the concrete work.

**END OF SECTION**

**SECTION 05 31 23**  
**STEEL ROOF DECKING**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section includes all steel roof deck.

1.2 SUBMITTALS

- A. Product Data: Submit copies of manufacturer's specifications and installation instructions. Include manufacturer's information as may be required to show compliance with these Specifications.
- B. Shop Drawings: Submit detailed drawings showing layout of deck panels, anchorage details and every condition requiring closure panels, supplementary framing, special jointing or other accessories.
- C. Calculations: Submit engineering calculations and manufacturer's data verifying that the specified deck meets the design requirements.
- D. LEED Submittals:
1. LEED Credit MR 4.1: Submit product data for products having recycled content indicating percentages by weight of post-consumer and pre-consumer recycled content.
    - a. Include statement indicating cost for each product having recycled content.
  2. LEED Credit MR 5.1: Submit product data for products that have been extracted, harvested, or recovered, as well as manufactured within 500 miles of the Project site.
    - a. Include a statement indicating the percentage by weight which is extracted, harvested, or recovered within 500 miles of the Project site.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the provisions of the following codes and standards, except as otherwise shown or specified to be more stringent:
1. AISI "Specification for the Design of Cold-Formed Steel Structural Members."
  2. AWS D1.3 "Structural Welding Code-Sheet Steel."
  3. SDI "Design Manual for Composite Decks, Form Decks and Roof Decks."
  4. FM "Loss Prevention Data 1-28."
- B. Qualification of Welding Work:
1. Qualify welding processes and welding operators in accordance with the AWS "Standard Qualification Procedure."

2. Decking welded in place is subject to inspection and testing. Remove Work found to be defective and provide new acceptable Work.
- C. FM Listing: Provide metal roof deck units, which have been evaluated by Factory Mutual System and are listed in "Factory Mutual Approval Guide" for "Class I" fire rated construction and □Class I-90□windstorm rating.
- D. Performance Requirements:
1. Compute the properties of metal roof deck sections on the basis of the effective design width as limited by the provisions of the AISI Specifications for deck depth and gage shown on the drawings.
  2. Design and fabricate deck for a maximum deflection of L/240 of the clear span under the total uniform dead and live loads indicated.
  3. Install and anchor roof deck units to resist gross uplift loading of 30 pounds per square foot. At overhangs, anchor to resist 45 pounds per square foot.

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site at such intervals to ensure uninterrupted progress of the Work.
- B. Deliver items to be incorporated in the Work of other trades in ample time to not delay that Work.
- C. Keep deck panels and accessories off the ground. Protect deck panels and accessories from corrosion and deterioration.
- D. Do not store materials on the structure in a manner that might cause distortion or damage to the members or the supporting structures. Repair or replace damaged materials or structures as directed.

### **PART 2 - PRODUCTS**

#### 2.1 MATERIALS

- A. Steel for Galvanized Finish: ASTM A 653, Structural Quality.
- B. Galvanizing: ASTM A 924, G 90
- C. Galvanizing Repair Paint: High zinc-dust content paint for repair of damaged galvanized surfaces.
- D. Flexible Closure Strips for Deck: Vulcanized, closed-cell, and synthetic rubber.

#### 2.2 FABRICATION

- A. General: Form deck units in lengths to span 3 or more supports with nested 2" end laps and nesting side laps. Provide deck configurations complying with SDI "Specifications and Commentary for Steel Roof Deck" of depth and flute width indicated on Drawings and as specified herein.

1. Provide galvanized steel deck, treated to receive paint where painting is scheduled.
- B. Roof Sump Pans: Fabricate from a single piece of not less than 14 gage galvanized sheet steel with level bottoms and sloping sides. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3" wide.
- C. Metal Closure Strips: Fabricate of not less than 20 gage galvanized sheet steel of the same quality as the deck units. Form to the configuration required to provide tight-fitting closures at open ends and sides of decking.
- D. Mechanical Side Lap Fasteners: Manufacturer's standard, corrosion-resistant, hexagonal washer head, self-tapping, carbon steel screws, No. 10 minimum diameter, Factory Mutual approved as a method for securing steel roof deck for Class indicated above.
- E. Provide ridge and valley plates, closure plates, filler plates, sump pans, etc., necessary to perform the Work, whether shown on drawings or not.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. General: Install roof deck units and accessories in accordance with SDI and manufacturer's recommendations and final Shop Drawings, and as specified herein. Brush-off contaminants, dirt and debris.
- B. Placing Deck Units:
  1. Place deck units on supporting steel framework and adjust to final position with ends bearing on supporting members and accurately aligned end to end before being permanently fastened. Lap ends not less than 2".
  2. Do not stretch or contract the sidelap interlocks. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.
  3. Work with structural steel erector in locating decking bundles to prevent overloading of structural members.
  4. Do not overload deck.
- C. Fastening Deck Units: Unless noted otherwise, comply with the following:
  1. Permanently fasten roof deck units to steel supporting members by not less than 5/8" diameter fusion welds, or elongated welds of equal strength, not less than 12" on center at supports. Use welding washers for 22 gage and thinner deck.
  2. Comply with AWS requirements and procedures for manual shielded metal-arc welding, the appearance and quality of welds, and the methods used in correcting welding work.
  3. Lock side laps between adjacent deck units at maximum 3" on center by screw mechanical fasteners, minimum 2 per span.
  4. Do not button punch or clinch sidelaps.
- D. Cutting and Fitting: Cut and fit roof deck units and accessories around other Work projecting through or adjacent to the roof decking. Provide neat, square and trim cuts.



E. Reinforcement at Openings:

1. Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking and support of other Work.
2. Reinforce roof decking around openings greater than 6" to less than 12" in any dimension by means of a flat steel sheet placed over the opening and fusion welded to the top surface of the deck. Provide steel sheet of the same quality as the deck units, not less than 20 gage, and at least 12" wider and longer than the opening. Provide welds at each corner and spaced not more than 12" on center along each side. Openings greater than 12" across the ribs shall be suitably reinforced with angles. See Structural Drawings.

F. Roof Sump Pans: Place roof sump pans over openings provided in the roof decking and weld to the top-decking surface. Space welds not more than 12" on center with at least one weld at each corner. Cut opening in the bottom of the roof sump to accommodate the drain size indicated.

G. Closure Strips: Provide flexible closure strips at all open uncovered ends and edges of roof decking, and in the voids between decking and other construction.

H. Roof Insulation Support: Provide metal closure strips for the support of roof insulation where the rib openings in the top surface of roof decking occur adjacent to edges and openings. Weld closure strips into position.

### 3.2 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction:

1. The Owner's testing service will inspect deck, deck fastening, and sidelap fastening.
2. Correct deficiencies in the work that inspections and laboratory test reports have indicated to not be in compliance with requirements. The Owner may have additional tests performed, at Contractor's expense, as may be necessary to reconfirm any non-compliance of the original Work, and as may be necessary to show compliance of corrected Work.

B. Contractor's Responsibilities

1. Notify Agency sufficiently in advance of operations to allow for his assignment of personnel and scheduling of tests.
2. Coordinate with Agencies' personnel, provide access to Work.
3. Furnish casual labor and facilities to provide access to Work to be tested to facilitate inspections and tests.

**END OF SECTION**

## SECTION 05 40 00

### COLD-FORMED METAL FRAMING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes cold formed metal framing indicated and as specified, including engineering.

##### 1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product information and installation instructions.
- B. Shop Drawings: Submit Shop Drawings for special components and installations not fully dimensioned or detailed in manufacturer's product data.
  - 1. Include placing drawings for framing members showing size and gauge designations, number, type, location and spacing. Indicate supplemental bracing, splines, accessories, and details as may be required for proper installation.
  - 2. Submit shop drawings for the system framing and connections with the supporting construction stamped and signed by a State of Illinois Licensed Structural Engineer.

##### 1.3 QUALITY ASSURANCE

- A. Component Design: Compute structural properties of members in accordance with AISI "Specification for the Design of Cold-Formed Steel Structural Members."
  - 1. Design the systems for the loads indicated and required by code.
  - 2. Design exterior wall systems to sustain load of 30 psf acting inward and outward (except 40 psf at corners) with a maximum deflection of L/600.
    - a. Maintain width of studs shown at exterior wall framing. Provide gauge and spacing required for design loads, but not greater than 16" o.c.
- B. Welding: Use qualified welders and comply with American Welding Society (AWS) D1.3 "Structural Welding Code-Sheet Steel".

##### 1.4 DELIVERY AND STORAGE

- A. Protect metal framing units from rusting and damage. Deliver to the Project Site in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade. Store off the ground in a dry ventilated space or protect with suitable waterproof coverings.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide cold-formed metal framing by one of the following:
  - 1. Consolidated Systems Inc., Columbia, SC 29202.
  - 2. TSN, Inc., Durham, NC 27709.
  - 3. Clark Dietrich Building Systems, Inc., West Chester, OH 45069.
  - 4. Marino/Ware, South Plainfield, NJ 07080.

### **2.2 METAL FRAMING**

- A. System Components:
  - 1. Provide manufacturer's standard minimum 18 gauge steel studs, steel runners (tracks), blocking, lintels, clip angles, shoes, reinforcements, fasteners, and accessories as recommended by manufacturer for the applications indicated, as needed to provide a complete metal framing system.
- B. Materials and Finishes: ASTM A1003/A 1003M, structural grade required by design, Type H. G60 metallic coating.
- C. Fasteners: Provide nuts, bolts, washers, screws, and other fasteners with corrosion-resistant plated finish.
- D. Electrodes for Welding: Comply with AWS Code and as recommended by stud manufacturer.
- E. Galvanizing Repair: Where galvanized surfaces are damaged, prepare surfaces and repair in accordance with procedures specified in ASTM A 780.

### **2.3 FABRICATION**

- A. Basic Requirements: Framing components may be prefabricated into panels prior to erection. Fabricate panels plumb, square, true to line and braced against racking with joints welded. Perform lifting of prefabricated panels in a manner to prevent damage or distortion in any members in the assembly.
- B. Cutting: Cut ends of member square to fit against abutting members.
- C. Fastenings: Attach components by welding, bolting, or screw fasteners.
  - 1. Wire tying of framing components is not permitted.

## **PART 3 - EXECUTION**

### **3.1 INSPECTION AND PREPARATION**

- A. Pre-Installation Conference: Prior to the start of installation of metal framing systems, meet at the Project Site with the installers of other Work, including door and window frames, and Mechanical and Electrical Work. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing Work.

### **3.2 INSTALLATION**

- A. Basic Requirements:

1. Install metal framing systems in accordance with manufacturer's printed or written instructions and recommendations.
2. Install continuous runner tracks sized to match studs. Align tracks accurately to the layout at base and tops of studs. Secure tracks as recommended by the stud manufacturer for the type of construction involved, except do not exceed 24" o.c. spacing. Provide fasteners at corners and ends of tracks.
3. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.
4. Where stud system abuts structural columns or walls, including masonry walls, anchor ends of stiffeners to supporting structure.
5. Install supplementary framing, blocking and bracing in the metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar Work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with the stud manufacturer's recommendations and industry standards in each case, considering the weight of loading resulting from the item supported.
6. Secure studs to top and bottom runner tracks by either welding or screw fastening at both inside and outside flanges.
7. Frame wall openings larger than 2'-0" square with double stud at each jamb of frame except where more than 2 are either shown or indicated in manufacturer's instructions. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of the wall. Secure stud system all around to wall opening frame in the manner indicated.
8. Install horizontal stiffeners in stud system, spaced (vertical distance) at not more than 4'-6" o.c.
9. Frame both sides of expansion joints with separate studs. Do not bridge the joint with components of stud system.

- B. Field Painting: Touch up shop-applied protective coatings damaged during handling and installation. Use galvanizing repair paint.

### **3.3 FIELD QUALITY CONTROL**

- A. Quality Control Testing During Construction:

1. The Owner's testing service may inspect welds

2. If, in the opinion of the Owner's testing service, based on reports of the testing service and inspection, additional testing will be required until satisfactory results are obtained at no additional cost to Owner. In such event, retesting will be paid by the Contractor.

B. Contractor's Responsibilities

1. Notify Agency sufficiently in advance of operations to allow for his assignment of personnel and scheduling of tests.
2. Coordinate with Agencies' personnel, provide access to Work.
3. Furnish casual labor and facilities to provide access to Work to be tested to facilitate inspections and tests.

**END OF SECTION**

## SECTION 06 10 53

### MISCELLANEOUS ROUGH CARPENTRY

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes carpentry required to complete the work as indicated and as specified.

##### 1.2 SUBMITTALS

- A. Wood Treatment Data:
  - 1. Fire-Retardant Treatment: Submit Certification by treating plant that treatment material complies with specified standard and other requirements.
  - 2. **Preservative Treatment: Submit Certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained and conformance with applicable standards.**
- B. Product Data: Submit product data for bituminous paint and each fastener and anchor demonstrating compliance with specifications.

##### 1.3 PRODUCT HANDLING

- A. Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar material.

##### 1.4 PROJECT CONDITIONS

- A. Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of nailers and similar supports to allow attachment of other work.

#### PART 2 - PRODUCTS

##### 2.1 LUMBER

- A. Lumber Standards: Comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee (ALSC) Board of Review.
- B. Grade Stamps: Factory-mark each piece of lumber with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
- C. Provide dressed lumber, S4S, unless otherwise indicated.

- D. Provide seasoned lumber with 19% maximum moisture content at time of dressing and shipment for sizes 2" or less in nominal thickness.
- E. Dimension (Framing) Lumber (Nominal 2" to 4" Thick): Construction grade or No. 1 grade according to size and species (unless drawings require better properties).
- F. Boards (1" Thick and Less): 15% maximum moisture content, "MC-15", or KD-15 Southern Pine, No. 2 Boards per SPIB, or Douglas Fir Construction Boards per WCLIB or WWPA rules.

## 2.1 CONSTRUCTION PANELS

- A. **Construction Panel Standards: Comply with either DOC PS 1 or DOC PS 2.**
- B. **Trademark: Factory-mark each construction panel with trademark evidencing compliance with grade requirements.**
- C. **Sheathing:**
  - 1. **Exposure Durability Classification: EXTERIOR, STRUCTURAL I Span Rating: As required to suit support spacing indicated.**

## 2.2 MISCELLANEOUS MATERIALS

- A. Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices.
- B. Bituminous Paint: Cold-applied asphalt emulsion with ASTM D 1187.

## 2.3 WOOD TREATMENT

- A. Fire-Retardant Treatment:
  - 1. Pressure impregnate lumber and plywood with fire-retardant chemicals to comply with AWWA C20 and C27, respectively; identify lumber with appropriate classification marking of Underwriters Laboratories, Inc., U.S. Testing, Timber Products Inspection or other testing and inspecting agency acceptable to authorities having jurisdiction.
    - a. Use all items inside building.
- B. **Preservative Treatment:**
  - 1. **Comply with applicable requirements of AWWA Standards C2 Lumber and C9 Plywood and of AWPB Standards listed below. Mark each treated item with the AWPB Quality Mark Requirements.**
  - 2. **Pressure-treat with ACQ (arsenic and chromium-free) preservatives to a minimum retention or 0.25 PCF. After treatment, kiln-dry lumber and plywood to a maximum moisture content, respectively, of 19% and 15%. Treat the following:**
    - a. **All wood items outside building enclosure.**

### **PART 3 - EXECUTION**

#### **3.1 BASIC INSTALLATION**

- A. Do not use lumber of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate the Work with a minimum of joints or the optimum jointing arrangement.
- B. Fit carpentry work to other Work. Scribe and cope as required for accurate fit.
- C. Set carpentry work accurately to required levels and lines with members plumb and true.
- D. Securely attach carpentry work to substrates by anchoring and fastening as shown and as required by recognized standards.
- E. Provide washers under bolt heads and nuts in contact with wood.
- F. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.
- G. Do not drive threaded friction-type fasteners; turn into place. Tighten bolts and lag screws at installation and retighten as required for tight connections prior to closing in or at completion of Work.
- H. Set wood framing accurately to required lines and levels. Provide framing members of sizes and on spacings shown, and frame openings as shown or, if not shown, comply with the recommendations of the NFPA (National Forest Products Association). Cut, join and tightly fit framing around other Work. Do not splice structural members between supports unless otherwise detailed.
- I. Anchor and nail as shown or, if not shown, to comply with the Recommended Nailing Schedule and other recommendations of NFPA.
- J. Blocking:
  - 1. Provide solid wood blocking built into gypsum drywall partitions and walls where shelving, cabinets, toilet partitions, accessories and similar are secured.
  - 2. Coordinate location with other Work. Refer to Shop Drawings of such Work, if any.
  - 3. Attach to substrates securely with anchor bolts or other attachment devices as shown and as required to support applied loading.
  - 4. Countersink bolts and nuts flush with surfaces, unless otherwise indicated.
  - 5. Build into masonry as Work progresses, cutting to fit masonry unit size involved.
  - 6. Anchor to formwork before concrete placement.

#### **3.2 INSTALLATION OF CONSTRUCTION PANELS**

- A. **Basic: Comply with the recommendations of APA Design/Construction Guide, Residential and Commercial, latest edition, of the American Plywood Association (APA). Provide thickness shown or, if not shown, provide as recommended by the APA for the spacing of supports and types of substrates involved in the Work.**



- B. **Install with face grain across supports, using panels continuous over 2 or more spans with end joints between panels staggered and located over center of supports.**
- C. **Allow 1/8" spacing at panel ends and edges unless otherwise recommended by panel manufacturer.**
- D. **Screw at 6" o.c. along panel edges and 12" o.c. at intermediate supports.**

**END OF SECTION**

## SECTION 07 41 13

### PREFORMED METAL ROOFING SYSTEM

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Preformed, prefinished, architectural metal roofing system, including the following:
  - 1. Preformed, prefinished, snap lock type standing seam, concealed fastener, metal roofing system.
  - 2. Underlayment membrane.
  - 3. Valley flashing, closures, trim, flashing, counterflashing and system required sheet metal fabrications to complete system.
  - 4. Associated sealant work required in conjunction with roofing system.
  - 5. All accessories, anchors, fasteners, sealants and miscellaneous items required for a complete watertight warranted metal roofing system installation.
  - 6. Manufacturer's ten (10) year written warranty for roofing system.

##### 1.2 SUBMITTALS

- A. Manufacturer's Literature: Materials description and installation instructions for metal roofing system, accessories and manufactured items.
- B. Shop Drawings:
  - 1. Roof Plans: Show layout of roof panels, locations of panel joints and laps. Locate and coordinate all penetrations through the roof system.
  - 2. Details of typical roofing system construction, include details of anchorage, fasteners and accessories, their spacing, material and size. Show details of penetrations, valley flashing, closures, counterflashing and fabricated accessories.
  - 3. Certification: Prior to submittal of shop drawings to Architect, submit to Manufacturer for review and approval certifying conformance with the Manufacturer's requirements and that a manufacturer's warranty will be issued upon final inspection of the installation by the Manufacturer's Representative.
- C. Samples:
  - 1. Color Samples for Initial Color Selection: 6 inch x 6 inch piece of metal roofing with color to match color selected by Architect.
  - 2. 12 inch x 12 inch samples of roof underlayment membrane.
  - 3. 24 inch x 24 inch system samples with all typical components of the system including attachment clip assembly and insulation, with finish and color specified.
- D. Warranty:
  - 1. Signed copies for roofing system.
  - 2. Signed copies for paint system.

### 1.3 QUALITY ASSURANCE

- A. Provide preformed metal roofing system by a firm having undivided responsibility for the design, engineering, fabrication and installation of the entire roofing system.
- B. Source Quality Control: Materials and products specified herein for the metal roof system are to be products of one manufacturer (except when noted otherwise) to ensure compatibility, uniformity and warranty of the metal roofing system.
- C. Provide materials and methods of installation in accordance with the current published instructions and specification of the Metal Roof System Manufacturer for the type of construction shown on the Drawings, except as hereafter modified and as approved by the Roof System Manufacturer.
- D. Fabricator/Installer Qualifications:
  - 1. The Fabricator/Installer of the roofing system is to be a firm having a minimum of five (5) years experience in the design, fabrication and installation of metal roofing systems similar to that shown on the Drawings and specified herein.
  - 2. The Fabricator/Installer is to be acceptable to the Metal Roofing System Manufacturer (certified installer).
  - 3. The Fabricator/Installer is to provide detailed written evidence of experience and manufacturer acceptance (certification) to the Architect upon request.
- E. Metal Roofing Fabricator/Installer Responsibilities:
  - 1. The Metal Roofing Fabricator/Installer is to submit shop drawings to the Metal Roof Manufacturer for review and approval prior to submitting to the Architect.
  - 2. Shop drawings submitted to the Architect are to indicate Metal Roof Manufacture® review, certification of approval and be signed by the Metal Roof Manufacturer. Shop drawings submitted to the Architect without such review and approval will be returned to the Metal Roof Fabricator/Installer not reviewed.
- F. Provide sheet metal fabrications of the roofing system conforming with the applicable recommended practices contained in the Architectural Sheet Metal and Air Conditioning Contractors National Association, Inc., (SMACNA), Manual, current edition.

### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle roofing system materials and accessories in such a manner as to prevent damage or deterioration in accordance with the manufacturer's recommendations.
- B. Provide packaged or wrapped materials in original containers and wrappings with seals unbroken and labels intact until time of installation.
- C. Store all materials above ground in a dry place under weatherproof covers.
- D. Immediately remove from the jobsite. damaged or otherwise unsuitable material, when so ascertained.

## 1.5 PROJECT/SITE CONDITIONS

### A. Preconstruction Meeting:

1. Arrange a meeting at the site with the Architect. Require subcontractors and Metal Roofing System Manufacturers' representative to attend.
2. Review project requirements (Drawings, Specifications and other Contract Documents).
3. Review required submittals, both completed and yet to be completed.
4. Review condition of substrate work, including structural loading limitations and similar considerations.
5. Review availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.
6. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions including the possibility of temporary conditions.
7. Review procedures needed for protection of roofing during remainder of construction period.
8. Review availability of each part of building and access requirements.
9. Establish a schedule for time for each area of work to be started and completed.

- B. Weather Conditions: Proceed with metal roofing work only when weather conditions are in compliance with manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with requirements and the manufacturer's specifications.

## 1.6 WARRANTY

- A. General: The Metal Roof System Manufacturer's representative is to inspect the installation of the roofing system, including insulation, and associated work of the system and upon approval a ten (10) year manufacturer's warranty is to be issued.

### B. Roof System:

1. The Metal Roof System Manufacturer is to warrant the metal roof system and associated roof work of the system to be free of faults and defects in accordance with the General Conditions, except that the Warranty will be extended by the Metal Roofing Manufacturer's ten (10) year written warranty.
2. Provide warranty covering both labor and material, without financial limits, to repair leaks, faults and defects of the metal roof system and associated work.
3. Provide copies of warranty signed by the Metal Roofing System Manufacturer and Installer, and submit to the Architect.

### C. Paint Finish:

1. The Metal Roof System Manufacturer is to warrant in writing the specified paint finish on the exterior surface of all system components to be free from faults and defects including fading, chipping, peeling, cracking, blistering or chalking in accordance with the General Conditions, except the warranty is to be for ten (10) years instead of one (1) year.
2. Provide warranty covering both labor and material (without limits to the cost) to replace roof system components which become defective in any of the categories listed above.
3. Provide copies of warranty signed by the Roofing System Manufacturer and submit to the Architect.

- D. This warranty is in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.

## **PART 2 - PRODUCTS**

### 2.1 ACCEPTABLE MANUFACTURERS

- A. AEP Span, Dallas, TX 75226.
- B. McElroy Metal, Inc., Bossier City, LA 71111.
- C. Metecno-Morin Corporation, Bristol, CT 06010.

### 2.2 SYSTEMS

- A. Provide preformed, prefinished, snap lock type standing seam, concealed fastener metal panel roof system consisting of steel roof panels, concealed clip anchor assemblies, trim, closures, valleys, , accessories, fasteners, metal fabrications and sealants. Provide all components of the roofing system as products of one manufacturer except as specified herein. Provide one of the following:
  - 1. AEP Span, Snap-Seam.
  - 2. McElroy, Medallion-Lok, Concealed Clip.
  - 3. Metecno-Morin Corp., SWL.

### 2.3 MATERIALS

- A. Roof Panels: Preformed, prefinished sheet steel conforming with ASTM A 755, structural quality, minimum 22 gage, stretcher and tensioned leveled, formed 16-1/2 to 18 inches wide x maximum 40 foot long panels, with protective coating of aluminum (55 percent) - zinc (45 percent), Galvalume, conforming with ASTM A 792 applied to thickness of not less than 1.9 mils.
- B. Flashing, closures, trim, counterflashing, gutters, downspouts, splash pans, corners, ridges, hips, miscellaneous fabrications and required sheet metal accessories: Formed of the same material and finish as specified for roof panels, gage as noted or indicated, but not less than that of roof panels or as required for each fabrication per SMACNA.
- C. Anchor Clips: Metal roof system manufacturer's standard fixed clips fabricated corrosive resistant steel.
- D. Pipe and Conduit Penetrations: Metal roof system manufacturer's standard flexible assembly consisting of a steel penetration enclosure and anchoring plate (finish to match roof panels, flexible (EPDM) compression seal and stainless steel clamping rings top and bottom.
- E. Fasteners: Sizes and lengths as required by performance requirements, conditions and substrates of the installation:

1. Non-exposed: Non-corrosive AISI Type 410 stainless steel cadmium plated hex head self-tapping/drilling screws as standard with the metal roofing system manufacturer.
  2. Exposed: High clamp up, low profile locking aluminum rivets coated with same type and color paint as specified for roofing panels as standard with metal roofing system manufacturer.
- F. Self-Adhering, High-Temperature Underlayment membrane Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C).
  2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C).
  3. Products: Subject to compliance with requirements, provide one of the following:
    - a. Carlisle Coatings & Waterproofing Inc.; CCW WIP 300HT.
    - b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
    - c. Henry Company; Blueskin PE200 HT.
    - d. Owens Corning; WeatherLock Metal High-Temperature Underlayment.
- G. Slip Sheet (if required by metal roofing manufacturer): Building paper, rosin sized unsaturated paper weighing approximately 6 lbs./100 sq.ft.
- H. Bituminous Paint: Asphalt emulsion ASTM D 1187, Type A.
- I. Sealants: Refer to Section 07 92 00 □ Joint Sealants.

## 2.4 FABRICATION

- A. General: Form and fabricate roof panels and accessories to the profiles and patterns shown on the Drawings, and as required for permanently waterproof and leakproof construction. Provide panels with factory of field applied sealant or gasket in seam to provide a water and weathertight seal. Provide for thermal expansion and contraction of the work. Seal all joints and laps as shown, and as required for watertight construction.
- B. Sheet Metal Fabrications: Provide and fabricate all flashing, closures, gutters, trim, and accessories as shown on the Drawings and required to complete the metal roof installations. Show all such fabrications and joint locations on the submitted shop drawings.
1. Fabricate to lengths shown on the Drawings, if not shown, not longer than 10 feet.
  2. Hem exposed edges not seamed, bend back 1/2 inch to unexposed side.
  3. Furnish edge strips and cleats where sheet metal extends over edges and where necessary to secure sheet metal work at fabrications.

## 2.5 FINISH OF STEEL

- A. Provide all metal roof panels and associated items of the system free of scratches, blemishes, or contaminants affecting the finish system.
- B. Finish Coating:

1. Exterior Face Finish Coat: Finish all exposed to view surfaces of roof panels and fabrications with panel manufacturer's standard finish, formulated using fluoropolymer resin base, containing not less than 70 percent Kynar 500 (Elf Atochem) resin, minimum 0.8 to 1.0 mil dry film thickness over not less than 0.2 mil dry film thickness of corrosion inhibitive primer.
  2. Interior Face Finish Coat: Apply primer to back side of roof panels and fabricated items of the roof installation with a minimum dry film thickness of 0.2 mil dry film thickness in manufacturer's standard color.
- C. Provide finish coating system factory applied in accordance with manufacturer's printed requirements and performance specifications.
- D. Color selection by the Architect from standard colors with a maximum of one color being utilized for the panels and fabricated items of the roof installation.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Examine all surfaces to receive the preformed metal roofing panels, fabrications and accessories. Verify all dimensions of in-place and subsequent construction. Coordinate the erection of the metal roofing system with metal decking and roof related or penetrations related to mechanical and electrical work and work of other trades. Installation of metal roofing system and associated construction constitutes acceptance of existing conditions.
- B. Install metal roofing system in accordance with the manufacturer's current printed installation instructions, specifications, the final reviewed shop drawings and the requirements stated herein.

#### **3.2 SYSTEM INSTALLATION**

- A. Underlayment Membrane:
1. Field: Install underlayment over entire roof insulation area. Install and adhere to substrate in accordance with manufacturer's printed instructions. Lap sides a minimum of 3 inches and ends of underlayment a minimum of 6 inches. If required by the metal roof manufacturer, install over underlayment a single layer of the specified slip sheet.
  2. Valleys and Ridges: In the valleys, install material a minimum of 36 inches wide and on the ridges, a minimum of 12 inches wide. Cut underlayment to lengths (4 to 6 feet). Peel off the release film and drape the sheet into place, allowing the membrane to locate and adhere in the valley center line or ridge peak first, working outward toward the edges. In valleys, start the application at the low point and work upwards. To assure waterproofing, overlap all sheets 6 inches at lap joints.
- B. Roof Panels:
1. Install and anchor metal roofing panels to the plywood roof deck construction using self-tapping non-corrosive screws as appropriate to the performance requirements and substrates.

2. Attach metal roof panels to the plywood decking plumb and in line anchored with concealed anchor clip and bearing plate assemblies. Maintain straight lines of end laps throughout the installation.
3. Seal standing seams and end laps of panels using manufacturer's standard sealant. Install manufacturer's standard end closures at valleys, eaves, hips and other openings of the roofing panels. Install roof panels to allow for expansion and contraction of the system.

C. Sheet Metal Fabrications:

1. Install fabricated closure trim for valleys, flashing, counterflashing and other associated items and fabrications of the system allowing for expansion and contraction of the material and the building.
2. Hem all exposed edges of fabrications 1/2 inch on undersides.
3. Install with concealed fasteners wherever possible. Exposed fasteners, when used, are to be shown on the submitted shop drawings and be subject to the Architect's review.
4. Separate dissimilar metals or sources of corrosive or galvanic action with a coat of bituminous paint or slip sheet. Do not allow coating to extend on to exposed to view surfaces.
5. Seal all joints of fabrications to assure a watertight installation.

3.3 JOINT SEALANTS

- A. Seal all perimeter joints of roofing system at abutting construction and at required joints within the roofing system in accordance with the metal roofing system manufacturer's requirements and Section 07 92 00 □Joint Sealants.

3.4 CLEANING AND PROTECTION

- A. Touch-up finish paint system of all imperfections as recommended by the manufacturer of finish paint system. Remove and replace any component on the installation that cannot be successfully repaired at no additional cost to the Owner.
- B. Just prior to final acceptance remove all temporary protective coverings and clean surfaces as recommended by manufacturer of finish paint system. Maintain in clean condition until final acceptance of the Work.
- C. Damaged Units: Replace panels and other components of the Work that have been damaged or have deteriorated beyond successful repair by finish touch-up or similar minor repair procedures at no additional cost to the Owner.

**END OF SECTION**



## SECTION 07 42 43

### COMPOSITE WALL PANELS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes engineering, fabrication and installation of metal panel system as indicated and as specified.

##### 1.2 SUBMITTALS

- A. Product Data: Submit complete printed data on panel system indicating features and products to be provided demonstrating specification compliance.
  - 1. Submit full line color charts for selections by Architect.
- B. Shop Drawings: Submit complete layout and installation drawings indicating method of attachment signed and sealed by a State of Illinois Licensed Structural Engineer.
- C. Samples: Submit mock-up at least 10" square consisting of two panel sections having corner bends and attachment devices.

##### 1.3 QUALITY ASSURANCE

- A. Fabricator: Experienced in the engineering of the panel system and attachment system.
- B. Installer: Experienced in the installation of the panel system and acceptance to the manufacturer.
- C. Regulatory Requirements: Verify and conform to requirements of authorities having jurisdiction.
  - 1. Flame spread rating of maximum 15 and smokes developed maximum 105 when tested in accordance with ASTM E 84.
- D. Preinstallation Conference: Conduct preconstruction conference at the project site in compliance with requirements of Division 01 Section □Project Management and Coordination.
  - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 2. Review methods and procedures related to metal wall panel installation, including manufacturer's written instructions.
  - 3. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
  - 4. Review flashings, special details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.
  - 5. Review temporary protection requirements for metal wall panel assembly during and after installation.

6. Review wall panel observation and repair procedures after metal wall panel installation.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Deflection and Thermal Movement: Provide systems that conform to the following criteria under wind loading of 30 psf inward and 30 psf outward except 40 psf at corners:
  1. Normal Deflection: Deflection of perimeter framing member not to exceed L/175 normal to plane of the wall; deflection of individual panels not to exceed L/60.
  2. Anchor Deflection: At connection points of framing members to anchors, anchor deflection in any direction not to exceed 1/16 inch.
  3. Thermal Movements: Allow for free horizontal and vertical thermal movement, due to expansion and contraction of components over a temperature range from 1°F to 180°F.
    - a. Buckling, opening of joints, undue stress on fasteners, failure of sealants, or any other detrimental effects of thermal movement will not be permitted.
    - b. Fabrication, assembly, and erection procedures shall take into account the ambient temperature range at the time of the respective operation.
- B. Water and Air Leakage: Provide systems that have been tested and certified to conform to the following criteria:
  1. Air Leakage: Not more than 0.06 cfm per square foot of wall area, when tested at 1.57 psf in accordance with ASTM E 283.
  2. Water Penetration: No water infiltration under static pressure when tested in accordance with ASTM E331 at a differential of 10% of inward acting design load, 6.24 psf minimum, after 15 minutes.
    - a. Water penetration is defined as the appearance of uncontrolled water in the wall.
    - b. Wall design shall feature provisions to drain to the exterior face of the wall a leakage of water at joints and any condensation that may occur within the construction.
- C. Structural: Provide systems that have been tested in accordance with ASTM E 330 at a design pressure of 40 psf and have been certified to be without permanent deformation or failures of structural members.

#### 1.5 DELIVERY, STORAGE, HANDLING

- A. Deliver in manufacturer's original unopened, undamaged containers or wrapping.
- B. Handle and install in exact accordance with manufacturer's recommendations.
- C. Remove and replace damaged panels.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURER

- A. Subject to compliance with drawing and specification requirements and availability, provide product and system of one of the following:

1. Mitsubishi.
2. Alusuisse Composites.
3. Reynolds Metals.
4. Citadel.

## 2.2 MATERIALS/FABRICATION

- A. Panels: Minimum 4 MM (0.157 inch) thick composed of a structural core of fire retardant thermoset polymer composite having an exterior skin of minimum 0.020" aluminum and an interior skin minimum of .010 aluminum.
- B. Accessories: Fabricated of non-corrosive metal to provide secure attachment to supporting construction as shown and as required to resist design loads.
- C. Sealant: One component polyurethane sealant as recommended by panel system manufacturer.

## 2.3 FABRICATION

- A. Fabricate panels to exact profiles and dimensions with sharp breaks and angles, which surfaces free of warp and buckle.
- B. Provide fully concealed attachment system without exposed trim.

## 2.4 FINISH

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
- B. High Performance Organic Coating: Polyvinylidene fluoride, 70% strength, thermocured system, composed of specially formulated primer and topcoats, complying with AAMA 2605.

# PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Erect panel system plumb, level and true to profile and location with uniform joints square and true to at corners.
- B. Provide fully concealed attachment system to meet performance requirements.
- C. Install attachment system required to support wall panels and to provide a complete weather tight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
  1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals
- D. Clip Installation: Attach panel clips to supports at each wall panel joint at locations, spacings, and with fasteners recommended by manufacturer. Attach routed-and-returned flanges of all panels to panel clips with manufacturer's standard fasteners.

1. Seal horizontal and vertical joints between adjacent panels with sealant backing and sealant.

3.2 CLEANING

- A. Clean installed system to provide uniform appearance.

**END OF SECTION**

## SECTION 07 92 00

### JOINT SEALANTS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

A. Section includes sealants for the following applications:

1. Interior **and exterior** joints in the following vertical surfaces and horizontal nontraffic surfaces:
  - a. **Joints in cast-in-place and precast concrete.**
  - b. **Control and expansion joints in unit masonry walls.**
  - c. **Joints in cast stone copings**
  - d. **Joints in sheet metal flashings and trim.**
  - e. Control and expansion joints on exposed interior surfaces of exterior walls.
  - f. Perimeter joints of exterior openings where indicated.
  - g. Vertical control joints on exposed surfaces of interior non-fire rated unit masonry and concrete walls and partitions.
  - h. Perimeter joints between interior wall surfaces and frames of interior doors, windows.
  - i. Joints between plumbing fixtures and adjoining walls, floors, and counters.
  - j. Other joints as indicated.
2. Interior joints in the following horizontal traffic surfaces:
  - a. Control and expansion joints in cast-in-place concrete slabs.
  - b. Other joints as indicated.
3. **Exterior joints in the following horizontal traffic surfaces:**
  - a. **Control, expansion, and isolation joints in cast-in-place concrete sidewalks adjacent to exterior walls/windows, precast clad-columns, and masonry privacy site walls**
  - b. **Joints between different materials listed above.**
  - c. **Other joints as indicated.**

##### 1.2 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

##### 1.3 SUBMITTALS

- A. Product Data: Submit complete printed data for each joint-sealant product indicated.

- B. Samples: Submit manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Field Adhesion Test Reports: Submit field adhesion test report log.
- D. **Preconstruction Field Test Reports: Submit preconstruction field test reports. Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.**

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates as follows:
  - 1. Locate test joints where indicated or, if not indicated, as directed by Architect.
  - 2. Conduct field tests for each type of elastomeric sealant and joint substrate indicated.
  - 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
  - 4. Test Method: Test joint sealants by hand-pull method described below:
    - a. Install joint sealants in 60-inch- (1500-mm-) long joints using same materials and methods for joint preparation and joint-sealant installation required for the completed Work. Allow sealants to cure fully before testing.
    - b. Make knife cuts from one side of joint to the other, followed by two cuts approximately 2 inches (50 mm) long at sides of joint and meeting cross cut at one end. Place a mark 1 inch (25 mm) from cross-cut end of 2-inch (50-mm) piece.
    - c. Use fingers to grasp 2-inch (50-mm) piece of sealant between cross-cut end and 1-inch (25-mm) mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
    - d. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.
  - 5. Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

## 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
  - 2. When joint substrates are wet.
- B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

## 1.7 WARRANTY

- A. Special Installer's Warranty: Submit written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Two years from date of Preliminary Acceptance.

## PART 2 - PRODUCTS

### 2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  - 1. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range for this characteristic.
- B. Elastomeric Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant in the Elastomeric Joint-Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class, and uses.
- C. Additional Movement Capability: Where additional movement capability is specified in the Elastomeric Joint-Sealant Schedule, provide products with the capability, when tested for

adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at the time of installation and remain in compliance with other requirements of ASTM C 920 for uses indicated.

- D. **Stain-Test-Response Characteristics:** Where elastomeric sealants are specified in the Elastomeric Joint-Sealant Schedule to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

## 2.2 ELASTOMERIC SEALANT MATERIALS

- A. **One-Part Hybrid Sealant (1-HYS): Low-Modulus, high movement, non-sag hybrid sealant.** Where joint sealants of this type are indicated, provide products complying with the following:

1. **Products: Provide the following:**

- a. **SoudaSeal 50LM; Soudal**
- b. **Approved equal. Product must be produced by the Manufacturer for a minimum of 5 years and the Manufacturer must have 10 years years experience manufacturing sealants.**

2. **Base: Silyl-terminated Polymer**

3. **Type and Grade: S (single component) and NS (nonsag)**

4. **Class: 50**

5. **Additional Movement Capability: 50 percent movement in extension and 50 percent movement in compression for a total of 100 percent movement.**

6. **Use Related to Exposure: NT (nontraffic).**

- B. **One-Part Silicone Sealant (1-SCS): Low-Modulus Nonacid-Curing Silicone Sealant :** Where joint sealants of this type are indicated, provide products complying with the following:

1. **Products: Provide one of the following :**

- a. 790; Dow Corning.
- b. Silpruf; GE Silicones.
- c. Omniseal; Sonneborn Building Products Div., Degussa.

2. **Type and Grade: S (single component) and NS (nonsag).**

3. **Class: 25.**

4. **Additional Movement Capability: 50 percent movement in extension and 50 percent movement in compression for a total of 100 percent movement.**

5. **Use Related to Exposure: NT (nontraffic).**

6. **Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.**

- C. **One-Part Mildew-Resistant Silicone (1-MRS): Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide; intended for sealing interior joints with nonporous substrates and in-service exposure to conditions of high humidity and temperature extremes.**



1. Products: Subject to compliance with requirements provide one of the following:
  - a. Dow Corning 786; Dow Corning Corp.
  - b. SCS 1700; General Electric Co.
  - c. 863 #345 White; Pecora Corp.
  - d. Tremsil 200 White; Tremco, Inc.
  
- D. Multi-Part Nonsag Urethane for Use NT (2-PUS1): Type M, Grade NS, Class 25, and complying with the following requirements for Uses:
  1. Uses NT, M, A and, as applicable to joint substrates indicated, O.
  2. Products: Subject to compliance with requirements provide one of the following:
    - a. Vulkem 227; Tremco.
    - b. Dualthane; W.R. Meadows.
    - c. Dynatrol II; Pecora.
    - d. Sonolastic NP2; Sonneborn Building Products Div. Degussa.
    - e. Dymeric; Tremco.
  
- E. Multi-Part Nonsag Urethane for Use T (2-PUS2): Type M; Grade NS; Class 25; uses T, M, G, A, and, as applicable to joint substrates indicated, O.
  1. Products: Subject to compliance with requirements, provide the following:
    - a. Vulkem 227; Tremco.
    - b. Dynatred; Pecora.
    - c. Sonolastic NP2; Sonneborn Building Products Div. Degussa.
    - d. THC-901; Tremco.
  
- F. **Multicomponent Self Leveling Urethane for Use NT (2-PUS3): Type M, Grade P, Class 25, use T, M, & O. Where joint sealants of this type are indicated, provide products complying with the following:**
  1. **Products: Provide the following:**
    - a. **THC-900/901; Tremco**
  2. **Type and Grade: M (Multicomponent) and P (Pourable)**
  3. **Class: 25**
  4. **Additional Movement Capability: 25 percent movement in extension and 25 percent movement in compression for a total of 50 percent movement.**
  5. **Use Related to Exposure: T (Traffic), M (Mortar), O (Other).**

### 2.3 LATEX JOINT SEALANTS

- A. Acrylic-Latex Sealant (ALS): Manufacturer's standard, one part, nonsag, acrylic, mildew-resistant, acrylic-emulsion sealant complying with ASTM C834, formulated to be paintable and recommended for exposed applications on interior exposures involving joint movement of not more than +5%.
  1. Products: Subject to compliance with requirements, provide one of the following:

- a. AC-20; Pecora.
  - b. Sonolac; Sonneborn Building Products Div.; Degussa.
  - c. Tremco Acrylic Latex 834; Tremco.
2. Contractor's Option: Silicone Emulsion Sealant: Manufacturer's standard one part, nonsag, mildew-resistant, silicone-emulsion sealant complying with ASTM C834 and ASTM C920, formulated to be paintable and recommended for exposed applications on interior locations involving joint movement of not more than +12-1/2%.
- a. Product: Subject to compliance with requirements, provide Performance Plus Silicone Sealant by Dow Corning Corp.
3. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

#### 2.4 JOINT SEALANT BACKING

- A. Provide sealant backings of material and type which are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
1. Type C: Closed-cell material with a surface skin, unless open cell is indicated or recommended by sealant manufacturer.
  2. Type O: Open-cell material.
  3. Type B: Bicellular material, **non-gassing** with a surface skin.
    - a. **Use at all joints unless noted otherwise or not recommended by sealant manufacture.**
    - b. **At locations recommended by sealant manufacture.**
- C. **Rectangular Sealant Backings: ASTM D 545, ASTM D 1752, Type II, ASTM D5249, Type II, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:**
1. **Closed-cell material, non-gassing, with a surface skin, unless open cell is indicated or recommended by sealant manufacturer.**
    - a. **Ceramar; W.R. Meadows**
    - b. **Approved Equal**
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.
- E. **Spray Foam: Polyurethane Moisture-cure, minimal expanding, no shrink, no post expansion, spray foam meeting ASTM E 84 Fire Test, Flame Spread 15 Smoke Developed**

**35, to insulate and stop air movement behind sealant and joint sealant backing at locations shown on the drawings:**

1. **SoudaFoam D&W; Soudal**
2. **Approved Equal**

2.5 MISCELLANEOUS MATERIALS

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

**PART 3 - EXECUTION**

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:
  1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  2. Clean porous joint substrate surfaces by ~~brushing~~, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:
    - a. Concrete.
    - b. Masonry.
    - c. Unglazed surfaces of ceramic tile.
  3. Remove laitance and form-release agents from concrete.

4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
  - a. Metal.
  - b. Glass.
  - c. Porcelain enamel.
  - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  1. Do not leave gaps between ends of sealant backings.
  2. Do not stretch, twist, puncture, or tear sealant backings.
  3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.
- E. Install sealants by proven techniques to comply with the following and at the same time backings are installed:
  1. Place sealants so they directly contact and fully wet joint substrates.
  2. Completely fill recesses provided for each joint configuration.
  3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealants from surfaces adjacent to joint.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
  - a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

### 3.4 FIELD QUALITY CONTROL

#### A. Field-Adhesion Testing: Field-test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed elastomeric sealant joints as follows:
  - a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each type of elastomeric sealant and joint substrate.
  - b. Perform one test for each 1000 feet (300 m) of joint length thereafter or one test per each floor per elevation.
2. Test Method: Test joint sealants by hand-pull method described below:
  - a. Make knife cuts from one side of joint to the other, followed by two cuts approximately 2 inches (50 mm) long at sides of joint and meeting cross cut at one end. Place a mark 1 inch (25 mm) from cross-cut end of 2-inch (50-mm) piece.
  - b. Use fingers to grasp 2-inch (50-mm) piece of sealant between cross-cut end and 1-inch (25-mm) mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
  - c. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.
3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field adhesion test log.
4. Inspect tested joints and report on the following:
  - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
  - b. Whether sealants filled joint cavities and are free from voids.
  - c. Whether sealant dimensions and configurations comply with specified requirements.
5. Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.

6. Repair sealants pulled from test area by applying new sealants following same procedures used to originally seal joints. Ensure that original sealant surfaces are clean and new sealant contacts original sealant.

### 3.5 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

### 3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Preliminary Acceptance. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

### 3.7 SEALANT SCHEDULE

TYPE	POLYMER	EXPOSURE/TRAFFIC	USES/APPLICATIONS
1-HYS	Hybrid	Exterior joints in vertical surfaces and non-traffic horizontal surfaces	<input type="checkbox"/> joints in cast-in-place and precast concrete. <input type="checkbox"/> Control and expansion joints in unit-masonry walls. <input type="checkbox"/> Joints in cast stone copings <input type="checkbox"/> <input type="checkbox"/> Other joints as indicated.
2 <input type="checkbox"/> PUS2	multicomponent self-leveling Urethane	Exterior joints in horizontal traffic surfaces	<input type="checkbox"/> Control, expansion, and isolation joints in sidewalks adjacent to exterior walls, columns, and masonry privacy site walls. <input type="checkbox"/> Joints between different materials listed above. <input type="checkbox"/> Other joints as indicated.
1-SCS	Silicone	Exterior joints in vertical surfaces and non-traffic horizontal surfaces	<input type="checkbox"/> Joints in sheet metal flashings and trim <input type="checkbox"/> Metal to Metal Joints <input type="checkbox"/> Metal to Masonry Joints <input type="checkbox"/> Metal to Concrete Joints (cast-in-place and precast) <input type="checkbox"/> Other joints as indicated.

TYPE	POLYMER	EXPOSURE/TRAFFIC	USES/APPLICATIONS
<b>1-SCS</b> or 2 <input type="checkbox"/> PUS1	Silicone or Two-part Urethane.	Interior <b>and exterior</b> moving joints in vertical surfaces and horizontal nontraffic surfaces	<input type="checkbox"/> Control and expansion joints on exposed interior <b>and exterior</b> surfaces of exterior walls. <input type="checkbox"/> Perimeter joints of exterior openings where indicated. <input type="checkbox"/> Joints between tops of non-fire rated walls and underside of floors and beams. <input type="checkbox"/> Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions. <input type="checkbox"/> Perimeter joints between interior wall surfaces and frames.
<b>1-MRS</b>	Mildew-Resistant Silicone	Interior wet areas	<input type="checkbox"/> Art room sinks
2 <input type="checkbox"/> PUS2	Two-Part Urethane	Interior horizontal traffic joints	<input type="checkbox"/> Paving and flooring control and expansion joints
ALS	Acrylic Latex Sealants	Interior	<input type="checkbox"/> Interior non-moving exposed sealants in gypsum drywall construction

**END OF SECTION**

## SECTION 08 41 26

### ALL GLASS ENTRANCES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. All glass entrance doors including finish and installation hardware and accessories for complete fabrication, assembly and installation.

##### 1.2 SUBMITTALS

- A. Manufacturer's Literature: Manufactured items and material description and installation instructions for products specified including all hardware and accessory items.
- B. Shop Drawings: Complete dimensioned elevations and floor plans, sections of typical and non-typical members, indicate steel support and bracing, and connections to building structure and fasteners and their spacing and full details of hardware accessories required.
  - 1. Show glass thickness and glazing details, indicate type and color of glass.
  - 2. Show dimensions, installation and erection details including connections, fasteners and welds (if any).
  - 3. Show location and position of doors, sidelites and hardware.
  - 4. Indicate all metal finishes.
- C. Samples:
  - 1. 6 inch x 6 inch pieces of glass specified for doors.
- D. Warranties: Signed copies for all-glass entrance door installations.

##### 1.3 QUALITY ASSURANCE

- A. Manufacturer/Fabricator's Responsibilities:
  - 1. Provide all glass entrances and associated items by a firm having undivided responsibility for the entire entrance fabrication and installation, except as otherwise specified herein.
  - 2. The Entrance Manufacturer/Fabricator's Representatives is required to inspect the entrance door installation to ensure conformance with this Section and to ensure warrantability of the doors, hardware, finish and the installation.
- B. Installer Qualifications: Engage an experienced installer as evidenced by not less than five (5) years consecutive experience and who has specialized in installing all glass entrances similar to those required for this Project and with a record of successful in-service performance.
- C. Provide all glass entrance doors and associated items of the installation in strict accordance with state and local building codes and ordinances, and conforming with applicable impact and wind load factors relative to fittings, glass and glazing.



D. Comply with the following:

1. Safety Glazing
  - a. FS DD-G-1403B
  - b. ANSI Z97.1
  - c. ANSI Z97.1a
  - d. U.S. Consumer Product Safety Commission Standard 16 CFR 1201 CI and CII
2. Glazing Material:
  - a. FS DD-G-451D
  - b. ANSI Z97.1

E. Installer Qualifications: Engage an experienced installer as evidenced by not less than five (5) years consecutive experience and who has specialized in installing all-glass entrances similar to those required for this Project and with a record of successful in-service performance.

F. Source Limitations: Obtain each type of all-glass entrance through one source from a single manufacturer.

#### 1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver all-glass entrance door components to the project site clearly marked for proper identification. Do not deliver to the project site until all adjacent construction is complete and support framing is in place.

B. Store all-glass entrance doors and associated items of the installation in accordance with manufacturer's instructions, above ground, in dunnage and protected from weather, construction activities and other cause of damage or loss.

C. Handle materials at the job site in such a manner as to prevent damage. Immediately removed from the job site damaged or otherwise unsuitable materials when so ascertained.

#### 1.5 PROJECT/SITE CONDITIONS

A. Field Measurements: Verify openings, dimensions and conditions of the installation at the project site prior to preparation of shop drawings and fabrication to ensure proper fitting of components. Show and note field verified dimensions and conditions on shop drawings. Coordinate locations and requirements for in place and subsequent construction.

#### 1.6 WARRANTIES

A. Provide manufacturer's written warranty stating that the complete all glass entrance installation will be free of faults and defects in accordance with the General Conditions, except the warranty period is to be for three (3) years instead of one (1) year. Faults and defects include, but are not limited to, the following:

1. Structural failures.
2. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
3. Failure of operating components to function normally.

B. Provide warranty signed by the Contractor, Subcontractor and Manufacturer.

- C. The above warranties are in addition to, and not a limitation of, other rights the Owner may under the Contract Documents.

## **PART 2 - PRODUCTS**

### 2.1 SYSTEMS

- A. Entrance DoorS: Full Top & Bottom Rails (Square Profile) stainless steel:
  - 1. Series 640, Blumcraft, Pittsburgh, PA 15213.
  - 2. Type FF Tempered Glass Doors, Arch Aluminum & Glass Co., Pompano Beach, FL 33069.
  - 3. Series 100, Inkan Limited, Brompton, On L6T 3Y3
  - 4. DRS Rails, Dorma Glas, Upper Marlboro, MD 20774.
  - 5. Wedge Lock Door and Side Lite Rails, C.R. Laurence Company of North America, Los Angeles, CA 90058.

### 2.2 MATERIALS

- A. Glass: ASTM C 1036 and ASTM C 1048, ½ inch thick tempered clear float glass.
- B. Aluminum Extrusions: ASTM B 221, 6063-T5 alloy and temper G.S. 10A-T5.
- C. Stainless Steel: ASTM A 666, Types 302/304; mill flattened, stretcher leveled sheet cladding not less than 0.04 inch thick, laminated to aluminum extrusions with No.8 mirror polished finish.
- D. Anchors and Fastenings: Manufacturer's standard concealed anchors and fastenings.
- E. Weather Stripping: Manufacturer's standard sweep-type weather stripping.
- F. Setting Blocks: Neoprene blocks, 70 to 90 type A durometer hardness.

### 2.3 HARDWARE

- A. General: Provide heavy-duty hardware units indicated in sizes, number, and type recommended by manufacturer for all-glass entrances indicated. For exposed parts, match fitting metal and finish.
- B. Closers: Center-hung, concealed floor closers complying with ANSI/BHMA A156.4, Grade 1 or Grade 2 requirements, including cases, bottom arms, top pivots, plates and accessories required for a complete installation, and as follows:
  - 1. Swing: Single acting.
  - 2. Hold Open: Selective.
  - 3. Positive Dead Stop: Coordinated with hold-open angle, if any, or at angle selected by Architect from manufacturer's standard options.
  - 4. Opening Force: Comply with the following maximum opening-force requirements for locations indicated:

- a. Exterior Doors: 15 lbf.
  - b. Interior Doors: 5 lbf.
- C. Concealed Overhead Holder: Manufacturer's standard heavy-duty, concealed overhead holder complying with ANSI/BHMA A156.8, Grade 1 requirements and with dead-stop setting coordinated with concealed floor closer.
- D. Exit Devices: Manufacturer's standard exit devices complying with UL 305 requirements and as follows:
- 1. Function: Operation by push-pull when inside operator is locked down (dogged); no outside operation.
  - 2. Latching: At head.
  - 3. Style: Concealed vertical rod in manufacturer's standard housing indicated.
  - 4. Provide exit devices on both leaves of pairs of doors.
  - 5. Basis-of Design Product: Panic Device: H-110, Blumcraft
- E. Threshold: Manufacturer's standard threshold with cutouts coordinated for operating hardware, with anchors and jamb clips; not more than ½ inch high with beveled edges providing a floor-level change with a slope of not more than 1:2.

## 2.4 FABRICATION

- A. Fabricate all-glass entrance doors to arrangements shown on the Drawings.
- B. Locate and provide holes and cutouts to receive hardware prior to tempering of glass. Cutting, drilling or other alterations of the glass panels after tempering is not allowed. Bevel and polish exposed edges of glass panels.
- C. Continuous Rails: Provide manufacturer's standard continuous horizontal fittings and as follows:
- 1. Rail Locations: As follows:
    - a. Door tops
    - b. Door bottoms.
  - 2. Rail Height: 3-1/2 - 4 inches
  - 3. Rail Style: Flat top, square profile.
  - 4. Material: Stainless-steel-clad aluminum.
- D. Fabricate door components with fully resilient settings for glass panels by use of elastomeric gaskets on both sides of the glass. Factory glaze doors. Glass panels are to be replaceable without dismantling the entrance system.
- E. Provide screws, miscellaneous fastening devices and internal components of stainless steel, or plated or corrosion-resistant materials of sufficient strength to perform the functions for which they are used. Fabricate door and members for assembly and installation using concealed fasteners. Exposed screws or fasteners are not allowed in the fabrication and installation of the entrances.
- F. Fabricate doors with replaceable weatherstripping on head and sill members.

- G. Wrap fabricated members and glass panels at the factory with protective covers which will remain in place until completion of the installation.

## 2.5 METAL FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range.
- C. Stainless Steel Finishes:
  - 1. Bright, Directional Polish: No. 4 finish.
  - 2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

## PART 3 - EXECUTION

### 3.1 INSPECTION

- A. Examine all conditions and surfaces of openings and verify dimensions at the site. Install entrance doors in accordance with the manufacturer's printed instructions and the final reviewed shop drawings. Installation of all-glass entrances, and related items constitutes acceptance of the existing conditions.

### 3.2 INSTALLATION

- A. Assemble and anchor the various components to the building construction to allow for expansion and contraction, maintaining a watertight condition for exterior installations. Separate aluminum and other corrodible surfaces from sources of corrosion of electrolytic action by bituminous paint or plastic shims.
- B. In general, conform with the field assembly and joining requirements specified for shop fabrication and the entrance manufacturer.
- C. Install items plumb, straight, square, level and in their proper elevation, plane and location, and in proper alignment with other work.
- D. Install all-glass entrance components in accordance with the following tolerances:
  - 1. Deviation from plumb, level or dimensioned angle is not to exceed 0.125 inch per 12 feet of length of any member, 0.25 inch in any total run in any line.

2. Deviation from theoretical position in plan or elevation, including deviation from plumb, level or dimensioned angle, is not to exceed 0.375 inch total at any location. Change in deviation is not to exceed 0.125 inch for any 12 foot run in any direction.
  3. Maximum offset from true alignment between two consecutive members placed end to end is not to exceed 0.062 inch.
- E. Adjust doors and hardware to provide a tight fit at contact points and at weatherstripping, for smooth operation weather tight closure. Lubricate hardware and other moving parts.

### 3.3 CLEANING AND PROTECTION

- A. After erection, cover and protect exposed portions of the entrances from damage.
- B. Just prior to final acceptance, remove protective coverings and clean surfaces with plain water, or if required with a solution of water and mild household detergent as recommended by the manufacturer.
- C. Remove and replace any component that cannot be successfully repaired at no additional cost to the Owner.

**END OF SECTION**

## SECTION 08 80 00

### GLAZING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes glazing shown and required to complete the Work not specified in other sections.

##### 1.2 PERFORMANCE REQUIREMENTS

A. **Delegated Design:**

1. **Design exterior glazing, including comprehensive analysis, using performance requirements, design criteria and industry standards indicated herein.**
2. **The glass manufacturer is responsible for the analysis and engineering of glass, as well as the fabrication and installation of the glazing.**

- B. **General: Provide glazing systems capable of withstanding normal thermal movement, wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, installation and defects in construction.**

- C. **Manufacturer's Engineering Analysis: For all glass for exterior openings, the glass manufacturer is to perform wind load and thermal stress analyses and is to demonstrate compliance of glass with performance requirements.**

- D. **Glass Design: Glass thicknesses indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:**

1. **Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:**
  - a. **Specified Design Wind Loads: Per applicable Chicago Building Code.**
  - b. **Impact Loads For Interior Installations: Per applicable code or herein referenced industry standard.**
2. **Maximum Lateral Deflection: For the following types of glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.**
  - a. **For monolithic glass lites heat treated to resist wind loads.**

E. **Point Supported Glass:**

3. **Provide glass which demonstrates that the stresses induced in the glass by the fittings are compatible with the strength of the glass and the specified performance criteria, especially at the holes.**
4. **Provide finite element calculations to show compliance.**
5. **Pre-stressing of the glass around holes, to a level which is compatible with the design and use of the fittings, is not permissible.**

F. **Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss and a temperature change (range) of 120 deg F ambient; 180 deg F, material surfaces.**

1.3 SUBMITTALS

- A. **Product Data:** Submit complete printed data on each type of glazing product.
- B. **Samples:** Submit minimum 6 square samples of each type of glazing product.
- C. **Certification:** Submit letter from manufacturer stating that wired glass complies with ANSI 97.1, 1984 including impact requirements.
- D. **Glazing Schedule:** submit a glazing schedule including elevations and glazing details utilizing the same designation as indicated on the drawings identifying types and thicknesses of glazing products and methods of installation.
- E. **Design Calculations: Provide design calculations showing conformance with the specified performance requirements prepared and certified by the glass manufacturer.**
  1. **Point Supported Glass: Finite element calculations, including stresses at holes.**
- F. **Wind Load and Thermal Stress Analyses: Copies of manufacturer's wind load and thermal stress analyses.**

1.4 QUALITY ASSURANCE

- A. **Installer:** Experienced in installation of glazing required.
- B. **Safety Glass:** Comply with ANSI Z97.1, the Safety Standard for Architectural Glazing Material Standard for Architectural Glazing Materials (16 CFR 1201) issued by the Consumer Product Safety Commission and requirements of authorities having jurisdiction.
- C. **Fire Resistance Rated glazing:** Provide wire glass products that are identical to those tested per NFPA 80 and ASTM E 163 (UL 9) and are labeled and listed by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
- D. **Structural Sealant Glazing: Comply with ASTM C 1401 for design and installation.**

## 1.5 DELIVERY, STORAGE AND HANDLING

- A. Protect materials during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

## 1.6 PROJECT CONDITIONS

- A. Condition of Other Work: The Glazier must examine the framing or glazing channel surfaces, backing, removable stop design, and the conditions under which the glazing is to be performed, and notify the Contractor of any conditions detrimental to the proper and timely completion of the Work. Start of work will evidence acceptance of conditions.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Primary Glass:
  - 1. Tempered Glass: ASTM C 1048, Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 1. (clear), Quality q3 (glazing select), kind FT (fully tempered).
- B. Clear Ceramic Glazing Material: Firelite Plus Clear Fire Rated Ceramic by Technical Products, Inc.
- C. Safety Mirror Glass: Mirror quality clear float glass with safety film applied to the back, silvered and back painted, manufacturer's 5 year warranty against spoilage.
- D. Glazing Materials:
  - 1. Compatibility: Select tapes of proven compatibility with other materials with which they will come into contact, including glass products and glazing channel substrates, under conditions of installation and service.
  - 2. Cellular Elastomeric Preformed Gaskets (CE-PG): Extruded or molded closed cell, integral-skinned neoprene of profile and hardness required to maintain seal; complying with ASTM C 509, Type II; black.
  - 3. Polyvinyl Chloride Foam Glazing Tape (PVC-GT): PVC foam tape with adhesive one side and one peel paper liner; Norseal U780, Norton or equal.
- E. Miscellaneous Glazing Materials:
  - 1. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
  - 2. Setting Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.
  - 3. Spacers: Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape and hardness recommended by glass and sealant manufacturers for application indicated.



4. Edge Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass.

## 2.2 FABRICATION

- A. Cut to size in the shop and key to glazing schedule
- B. Permanently mark each lite of safety glazing and fire resistive glazing where seen when installed on the lower right hand corner.

## 2.3 POINT SUPPORTED SPIDER GLASS FITTINGS

- A. **Provide specially designed and fabricated fittings for point support in holes for glass panels. Provide fittings with a tolerance capability, which will cope with the full range of movements and following:**
  1. **Thermal movements occurring as a result of differential coefficients of thermal expansion within the range specified. The components used within the system are to noiselessly withstand all thermal movements without any buckling, distortion, cracking, failure of joint seals or undue stress on the glass or fixing assemblies.**
  2. **Deflection of edge beams due to loading applied after the erection of the cladding to the magnitude specified.**
  3. **Maximum side sway of the structure due to wind load occurring to the magnitude specified or seismic movement to the degree specified.**
  4. **Deflection due to self-weight of the glass system.**
  5. **Upward and downward (Inward and Outward) movements due to the design wind loads specified.**
- B. **Provide fittings with exterior countersunk discs, flush countersunk bolts and articulated swivel bolts will be machine finished; socket head bolt will be with hexagonal shank, stainless steel Type 316.**
- C. **Bushings: Provide bushings of UV-resistant nylon.**
- D. **Gaskets: Provide gaskets of fully vulcanized fiber, neoprene or pre-cured silicone which accommodates rotational loads at the glass plane, with flexible disc/pads, exterior countersunk discs, flush countersunk bolts and articulated swivel bolts fabricated from solid machined 316 stainless steel as typical products of the specified system manufacturers.**
- E. **Acceptable Manufacturers:**
  1. **SADEV USA Inc., Keokuk, IA. 52632**
  2. **Novum Strcure LLC, Menomonee Falls, WI 53051**
  3. **Pilkington North America, Inc., Toledo, OH 43687**
  4. **C.R. Laurence Company of North America, Los Angeles, CA 90058.**

## 2.4 FABRICATION - POINT SUPPORTED GLASS

- A. **Glass Tolerances:**

1. **Provide squareness of panels tolerance within 3.0 mm of specified dimensions.**
2. **Provide edge lengths within 1.5 mm of specified dimensions.**
3. **Provide holes within 1.0 mm of specified locations. Bow shall be better than 0.1 percent.**

**B. Glass Holes:**

1. **Depending on fitting type, provide drilled holes be countersunk or straight through. Provide fittings of the type shown in the Drawings.**
2. **When glass is suspended, do not countersink fitting holes.**
3. **Clean edges of holes to be free of loose or ground materials.**
4. **Provide insulated glass units with holes fully sealed and warranted to perform under applied loads and conditions by the glass manufacturer.**

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Protect glass from edge damage at all times during handling, installation and operation of the building. Glass breakage during the guarantee period will be considered a form of faulty material or workmanship (resulting from edge damage), unless known to result from vandalism or other causes not related to materials and workmanship.
- B. Glazing channel dimensions must provide for necessary minimum bite on the glass, minimum edge clearance and adequate sealant thicknesses, with reasonable tolerances. The Glazier is responsible for correct glass size for each opening, within the tolerances and necessary dimensions established.

#### **3.2 INSTALLATION**

**A. Basic Requirements:**

1. Comply with combined recommendations of glazing product manufacturer and manufacturer of sealants and other materials used in glazing, except where more stringent requirements are shown or specified, and except where manufacturers' technical representatives direct otherwise.
2. Inspect each piece immediately before installation. Do not use pieces which have observable edge damage or face imperfections.
3. Do not attempt to cut, seam, nip or abrade glass which is tempered.
4. Clean the glazing channel, or other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to the substrate.
5. Install setting blocks of proper size at quarter points of sill rabbet.
6. Provide spacers inside and out, and of proper size and spacing, for all glass sizes larger than 50 united inches, except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass, and use thickness equal to sealant width; except with sealant tape, use thickness slightly less than final compressed thickness of tape.
7. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.

8. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
9. Install pressurized tapes and gaskets to protrude slightly out of the channel, so as to eliminate dirt and moisture pockets.

B. Glazing Systems:

1. Glaze lites in labeled assemblies in accordance with UL requirements.
2. Glaze balance of door lites and borrowed lights using setting blocks and PVC-GT or CE-PG having adhesive to stop between glass and stops both sides compressed 35 to 50%.

- C. Install mirrors using Palmer mirror mastic in exact accordance with recommendations and bottom supports of aluminum or stainless steel. Do not use reglets.

3.3 **INSTALLATION □ POINT SUPPORT GLASS FITTING SYSTEM**

- A. **Install glass panels and point support fittings in accordance with the final reviewed shop drawings and the manufacturer's printed installation instructions.**

- B. **Verify that support framing is within tolerances of point support spider fittings prior to glass panels installation.**

- C. **Install point system designed to accommodate the tolerances of the surrounding conditions and the supporting structure. Do not exceed the tolerances and clearances shown on the final reviewed shop drawings. Maintained parts of the system, when completed, within the following tolerances.**

1. **Maximum offset from true alignment between any two identical members abutting end to end in line to be 1/32 inch.**
2. **Maximum variation from plane or location shown on the final reviewed shop drawings, not greater than 1/8 inch per 12 foot length or 1/2 inch in any total length.**

- D. **Bolt Torque: Torque bolts to torques specified on shop drawings using a calibrated tool. Lock torque bolts into position to prevent back-off. Reset calibrations regularly to ensure an accurate torque.**

- E. **Provide spacers to separate the glass from attachment plates.**

- F. **Inspect each unit of glass immediately before installation. Do not install glass with significant impact damage at edges, scratches, abrasion of faces or any other evidence of damage.**

- G. **Set the glass in a manner that produces the greatest possible degree of uniformity in appearance. Face all glass, which has a dissimilar face with matching faces in the same direction.**

3.4 **CURE, PROTECTION AND CLEANING**

- A. Remove and replace glazing products which is broken, chipped, cracked, abraded or damaged in other ways during the construction period, including natural causes, accidents and vandalism.

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

**END OF SECTION**

## **SECTION 088700**

### **GLAZING FILM**

#### **PART 1 - GENERAL**

##### **1.1 SUMMARY**

- A. Section Includes: Provide glazing film applied to glass.
  - 1. Definition: Glazing film work is defined as adhesive application of a flexible plastic decorative glazing film to the surface of glass.
- B. Related Sections:
  - 1. Division 8 Section "Glazing"

##### **1.2 REFERENCES**

- A. American Society for Testing and Materials (ASTM): ASTM D 1004 - Graves Test

##### **1.3 SUBMITTALS**

- A. Product Data: Submit manufacturer's product specifications and installation instructions for type of material and application method required. Include certified test reports demonstrating that products comply with requirements.
- B. Samples: Submit the following samples:
  - 1. Two 12"x 12" samples of type of decorative glazing film required, adhered to a glass sample of the same type as to be used on the project.
  - 2. One of such samples shall remain on the jobsite for use in comparing the approved appearance to that being installed.
- C. Maintenance Data: Submit manufacturer's product maintenance and cleaning instructions.

##### **1.4 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Shall have produced a decorative glazing film for at least five years. Shall have completed projects of similar building type, size, and glass types.
- B. Installers Qualifications: Employ only manufacturer authorized installers, possessing a current certificate of training.
- C. Source Quality Control: Obtain decorative glazing film material from a single manufacturer.

- D. Statement of Application: Manufacturer and Installer shall evaluate proposed application of glazing film, and confirm in writing that the film is suitable for the application intended.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. All materials supplied shall be delivered to the job in original, unopened, sealed rolls with labels intact. Materials shall be inspected for damage, and the manufacturer informed of any discrepancies. Unsatisfactory materials shall not be used.

#### 1.6 WARRANTIES

- A. Manufacturer and Installer shall warrant and agree to replace defective glazing film, including failure to maintain its specified properties without cracking, crazing, peeling, loosening, fading, or discoloring for the following period after Substantial Completion.

- 1. Warranty Period: 10 years.

### **PART 2 - PRODUCTS**

#### 2.1 MANUFACTURERS

- A. Graphic Film:
  - 1. Manufacturers: Subject to compliance with requirements, provide the products by one of the following.
    - a. Llumar Film; Courtaulds Performance Films, Inc., Martinsville, VA.
    - b. Johnson Window Films.
    - c. 3M.
  - 2. Decorative Control Films: 2 mil vinyl film using pressure sensitive acrylic adhesive specifically designed for window film, resistant to distortion due to changing temperatures and able to withstand weathering, sunlight and UV and the following:
    - a. Colors and Patterns: As selected by Architect from manufacturer's full range.

### **PART 3 - EXECUTION**

#### 3.1 INSPECTION

- A. Manufacturer and Installer shall examine glass and conditions under which the decorative film is to be applied; correct any unsatisfactory conditions. Do not proceed until conditions have been corrected.

### 3.2 PREPARATION

- A. Thoroughly clean glass to which the decorative film is to be applied. Use cleaning devices which minimize static.

### 3.3 APPLICATION OF FILM

- A. Application: Apply film to glass in full accordance with manufacturer's instructions and recommendations, leaving a uniform margin, not greater than 1/8". Installation shall be without wrinkles, bubbles, trapped dirt particles, and other defects.

### 3.4 ADJUSTING AND CLEANING

- A. Remove and replace film which are damaged or defective.
- B. Wash glass/film on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion. Wash by method recommended by manufacturer. Demonstrate cleaning techniques to Commissioner's maintenance staff.
- C. All debris removed from site and disposed of legally.

**END OF SECTION**

## SECTION 09 65 19

### RESILIENT TILE FLOORING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes vinyl composition floor tile and accessories indicated and as specified.

##### 1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each product indicated.
- B. **Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.**
  - 1. **Show details of special patterns.**
- C. Samples for Initial Selection: For each type of transition strip intended for the Project.
- D. Samples for Verification: Full-size units of each color and pattern of resilient floor tile and transition strip required, showing full range of colors and patterns intended for the Project.
  - 1. For transition strips, samples are to be full height and not less than 12 inches long, of each color required.
- E. Maintenance Data: For each type of resilient floor tile to include in Operating and Maintenance Manual.
- F. Test Reports: Submit three (3) copies of test reports showing results of tests conducted on concrete substrates.

##### 1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain each type, color, and pattern of resilient tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- B. Fire-Test-Response Characteristics: As determined by testing identical resilient floor tile products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 w/sq. cm.

##### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original packages and containers with seals unbroken and bearing manufacturer's original labels, including manufacturer's name, product name, and directions for storing, handling, and use.



- B. Store flooring materials in dry interior spaces protected from the weather, with ambient temperature maintained between 65 deg F and 85 deg F, and with relative humidity maintained between 30 and 60 percent.
  - 1. Store tiles on flat surfaces.
  - 2. Limit stacking to five (5) boxes high.
- C. Move materials into spaces where they will be installed at least 48 hours prior to installation.

#### 1.5 PROJECT CONDITIONS

- A. Maintain ambient temperatures between 65 deg F and 85 deg F in spaces to receive tiles for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After installation period, maintain a temperature of not less than 55 deg F.
- B. Close spaces to traffic during floor tile installation and for not less than 48 hours after floor tile installation.
- C. Install floor tile after other finishing operations, including painting, have been completed.

#### 1.6 WARRANTY

- A. Manufacturer's Standard Warranty: Manufacturer agrees to replace resilient floor tile and transition strips that fail in performance or materials within specified warranty period.
  - 1. Warranty Period: Five (5) years from date of Final Acceptance or Substantial Completion.

### **PART 2 - PRODUCTS**

#### 2.1 RESILIENT TILE

- A. Vinyl Composition Floor Tile: ASTM F 1066, Class 2, through-pattern tile.
  - 1. Wearing Surface: Smooth.
  - 2. Thickness: 1/8 inch.
  - 3. Size: 12 by 12 inches.
  - 4. Color and Pattern: **Provide 3 colors to match existing. Pattern to match existing.**
  - 5. Manufacturer and Product: Subject to compliance with requirements, provide one of the following:
    - a. Armstrong World Industries, Inc.; Standard Excelon, Imperial Texture.
    - b. Congoleum Corporation; Alternatives.
    - c. Tarkett, Inc. (Azrock); Cortina Colors.
    - d. Knight Quartz Flooring; Quartz Concepts.

#### 2.2 INSTALLATION ACCESSORIES

- A. Primer: Non-staining type as recommended by flooring manufacturer.

- B. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by tile manufacturer for applications indicated.
  - 1. Gypsum based underlayments and patching compounds are not permitted.
- C. Adhesives: Water-resistant type recommended by tile manufacturer to suit resilient floor tile products and substrate conditions indicated.
- D. Transition Strips: Composed of homogeneous vinyl or rubber, with tapered or bullnose edge. Provide in color(s) selected by the Architect from manufacturer's full range, in height required to protect exposed edges of tiles, and in maximum available lengths to minimize joints.
- E. Floor Polish: Commercially available, commercial grade, non-slip, protective liquid floor polish as recommended in writing by floor tile manufacturer for extra heavy traffic areas.
  - 1. Selection of protective floor polish is to be coordinated with Owner's cleaning service and procedures.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine areas where installation of tiles will occur, with Installer present, to verify that substrates and conditions are satisfactory for tile installation and comply with tile manufacturer's requirements.
- B. Verify that substrates are free of cracks, ridges, depressions, scale, foreign deposits, dirt, oils, and other deleterious materials that could impair the adhesive bond of the floor tile.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Do not proceed with installation until unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Provide test results to Owner. Proceed with installation only after substrates pass testing.
  - 4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.

- a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 5 lb of water/1000 sq. ft. in 24 hours.
  - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75% relative humidity level measurement.
- C. Use trowelable leveling and patching compounds to fill cracks, holes, and depressions in substrates. Install in accordance with manufacturer's instructions.
- D. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
- E. Broom sweep and vacuum clean substrates to be covered by tiles immediately before tile installation. Ensure substrates are free of moisture, alkaline salts, carbonation, dust, dirt, grease and debris.
- F. Apply primer to concrete slabs, if recommended by flooring manufacturer, prior to application of adhesive. Apply primer in accordance with manufacturer's instructions.

### 3.3 INSTALLATION

- A. Comply with manufacturer's installation instructions for installing floor tile and accessories.
- B. Lay out tiles from center marks established with primary walls, discounting minor offsets, so tiles at opposite edges of room are of equal width unless noted otherwise on the Drawings. Adjust as necessary to avoid using cut widths that measure less than one-half tile. Install tiles square with room axis, unless otherwise indicated.
- C. Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged. Discard broken, cracked, chipped, or deformed tiles.
1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern).
  2. Tiles with directional arrows on their backs should be installed with the arrows pointing in the same direction.
- D. Scribe, cut, and fit tiles to butt tightly to vertical surfaces, and permanent fixtures including built-in furniture including cabinets, pipes, outlets, edgings, thresholds, door frames, and nosings.
- E. Extend tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles into door openings as necessary to ensure the transition strip at the edge of the tile is located beneath the door when in a closed position.
- F. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

- G. Use full spread of adhesive applied to substrate in compliance with tile manufacturer's directions including those for trowel notching, adhesive mixing, and adhesive open and working times.
- H. Adhere tiles to flooring substrates without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other substrate and surface imperfections in completed tile installation.

### 3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing floor tile installation:
  - 1. Remove adhesive and other surface blemishes using clean cloth and cleaner recommended by tile manufacturer.
  - 2. Sweep and vacuum floor thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
    - a. Do not wash or apply floor polishes to resilient floor tile until after adhesives have fully cured unless otherwise recommended by flooring manufacturer.
  - 4. Following tile manufacturer's recommended setting period, wash floor with a neutral cleaner, rinse thoroughly, and vacuum dry in accordance with tile manufacturer's written instructions.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by tile manufacturer to ensure the resilient tile flooring will be free of damage at Preliminary Acceptance, or Substantial Completion.
  - 1. Do not move heavy or sharp objects over newly installed floor tiles. Place plywood or hardboard panels over tiles and under objects while they are being moved, and slide or roll objects without moving panels.
- C. Immediately prior to Preliminary Acceptance, or Substantial Completion, remove protective covers and panels, thoroughly clean floor tile, and apply floor polish in accordance with manufacturer's instructions.
  - 1. Clean resilient floor tile in accordance with tile manufacturer's written instructions.
  - 2. Apply five (5) coats of protective floor polish to horizontal surfaces that are free from soil, visible adhesive, and surface blemishes using methods recommended in writing by floor polish manufacturer.
    - a. Use commercially available product acceptable to tile manufacturer.
  - 3. Cover tiles with undyed, untreated building paper until inspection for Preliminary Acceptance or Substantial Completion.

4. Do not move heavy or sharp objects over newly installed floor tiles. Place plywood or hardboard panels over tiles and under objects while they are being moved, and slide or roll objects without moving panels.

**END OF SECTION**

## SECTION 09 91 01

### PAINTING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes requirements for field painting of new **and existing** construction including the following:
  - 1. **Exterior and** interior exposed items and surfaces.
  - 2. Priming, and finish coats in addition to shop priming and surface treatment specified in other Sections.
- B. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.
  - 1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

##### 1.2 DEFINITIONS

- A. Standard coating terms defined in ASTM D 16 apply to this Section.

##### 1.3 SUBMITTALS

- A. Submit three (3) drawdowns of each product and color combination. Drawdowns shall be applied using a 4 mil wet drawdown bar on Leneta form WD plain white coated cards size 3-7/8" x 6"
  - 1. Label each card with the following:
    - a. Job name.
    - b. Date.
    - c. Product name.
    - d. Product number.
    - e. Color number as stated in the color schedule.
    - f. Name, address, and phone number of the supplying facility.

2. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
3. Provide a list of materials and applications for each coat of each sample. Label each sample for location and application.

B. Qualification Data: When requested, submit qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

#### 1.4 REGULATORY REQUIREMENTS

A. It shall be the responsibility of the contractor to comply with all applicable regulations, laws and building codes of all governing Federal, State and Local agencies.

#### 1.5 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

C. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample of each type of coating and substrate required on the Project. Comply with procedures specified in PDCA P5. Duplicate finish of approved prepared samples.

1. The Architect will select one room or surface to represent surfaces and conditions for each type of coating and substrate to be painted.
2. After permanent lighting and other environmental services have been activated, apply coatings in this room or to each surface according to the Schedule or as specified. Provide required sheen, color, and texture on each surface.
  - a. After finishes are accepted, the Architect will use the room to evaluate coating systems of a similar nature.
3. Final approval of colors will be from job-applied samples.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.

7. Color name and number.
8. VOC content.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.

1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

#### 1.7 **PROJECT CONDITIONS**

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 deg F and 90 deg F.

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 deg F and 90 deg F.

C. Do not apply paint in when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

#### 1.8 **WARRANTY**

A. **Warranty for Architecturally Exposed Steel designated to receive commercial blast cleaning, SSPC-SP6**

1. **Paint Manufacturer's standard warranty in which manufacturer agrees to provide replacement materials due to product deficiencies within the specified warranty period due to corrosion, loss of color, loss of adhesion, or loss of gloss.**

- a. **Warranty Period: 15 Years from date of preliminary acceptance or Substantial Completion.**

2. **Applicator's warranty covering defects related to improper or incomplete surface preparation, inadequate or excessive film thickness, and other defects caused by the applicator in which the applicator agrees to provide labor and materials to repair or replace the paint system within the specified warranty.**

3. **Warranty Period: 3 Years from date of preliminary acceptance or Substantial Completion.**



## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Manufacturers Names: The following manufacturers are referred to in the paint schedules by use of shortened versions of their names, which are shown in parentheses:
1. ICI Dulux/Devoe Coatings (ICI □Dulux).
  2. Benjamin Moore and Co. (Moore).
  3. PPG Industries, Pittsburgh Paints (PPG).
  4. The Sherwin-Williams Company (S-W).

### **2.2 PAINT MATERIALS, GENERAL**

- A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- B. Colors: Provide color selections made by the Architect.
- C. Paint System: The paint systems specified are intended to comply with the VOC and chemical component limits of green seal standard GS-11 (interior non-clear systems). Where the plant producer produces product that improve upon those of the specified product, provide the improved product. It is the intent that all components of the systems individually (primer/sealer, under coat, top coat) comply. Provide products that comply to the extent available or prepare a budget that will ensure compliance on a project wide basis. Anti-corrosive components may have a VOC limit of 250 G/L.

### **2.3 INTERIOR PAINT SCHEDULE**

- A. Concrete Masonry Units:
1. Block Filler (Unfinished Surfaces): Dry film thickness of not less than 5.0 mils (0.13 mm).
    - a. Moore: Moorcraft Super Craft Latex Block Filler #285.
    - b. ICI Dulux: #4000 Broxfil Heavy Duty Acrylic Block Filler.
    - c. PPG 6-7 Speedhide Latex Block Filler.
    - d. S-W: PrepRite Latex Block Filler B25W25.
  2. First and Second Coats: Two (2) full and separate coats, dry film thickness of not less than 2.5 mils (0.064).
    - a. Moore: Pristine Eco Spec Interior Latex Eggshell Enamel #223.
    - b. ICI Dulux: #LM9100 Lifemaster 2000 Flat.

- c. PPG: Pure Performance Interior Low Odor Zero VOC Premium Eggshell Latex 9-411 series.
- d. S-W: Harmony Interior Latex Eg-Shel B9W900 series.

B. Gypsum Board (Overhead Ceiling and Soffits):

- 1. Primer dry film thickness of not less than 1.2 mils (0.031 mm).
  - a. Moore: Pristine Eco Spec Interior Latex Primer Sealer #231.
  - b. ICI Dulux: #LM9116 Lifemaster 2000 Primer Sealer.
  - c. PPG: Pure Performance Interior Low Odor Zero VOC Premium Latex Primer 9-2.
  - d. S-W: Harmony Interior Primer B11WS00.
- 2. First and Second Coats: Two (2) full and separate coats, dry film thickness of not less than 2.5 mils (0.064 mm).
  - a. Moore: Pristine Eco Spec Interior Latex Flat #219.
  - b. ICI Dulux: #LM9100 Lifemaster 2000.
  - c. PPG: Pure Performance Interior Low Odor Zero VOC Premium Flat Latex, 91-110 series.
  - d. S-W: Harmony Interior Latex Flat B5W900 series.

C. Gypsum Board (elsewhere):

- 1. Primer: Dry film thickness of not less than 1.2 mils (0.031 mm).
  - a. Moore: Pristine Eco Spec Interior Latex Primer Sealer #231.
  - b. ICI Dulux: #LM9116 Lifemaster 2000 Primer Sealer.
  - c. PPG: Pure Performance Interior Low Odor Zero VOC Premium Latex primer 9-2.
  - d. S-W: Harmony Interior Primer B11WS00.
- 2. First and Second Coats: Two (2) full and separate coats, dry film thickness of not less than 2.8 mils (0.071 mm).
  - a. Moore: Pristine Eco Spec Interior Latex Eggshell Enamel #223.
  - b. ICI Dulux: #LM9300 Lifemaster 2000.
  - c. PPG: Pure Performance Interior Low Odor Zero VOC Premium Eggshell Latex, 9-411 series.
  - d. S-W: Harmony Interior Latex Eggshell B9W900 series.

D. Ferrous Metal (where scheduled Satin, Low-Luster Eggshell):

- 1. Primer: Dry film thickness of not less than 1.5 mils (0.038 mm).
  - a. Moore: M04 Acrylic Metal Primer.
  - b. ICI DuLux: #4020 Devflex DTM Waterborne Primer Finish.
  - c. PPG: Pitt-Tech Primer 90-715.
  - d. S-W: Pro-Cryl Universal Metal Primer B66-310 series.

2. First and Second Coats: Two (2) full and separate coats, dry film thickness of not less than 2.8 mils (0.071 mm).
  - a. Moore: Pristine Eco Spec Interior Latex Eggshell Enamel #223.
  - b. ICI Dulux: #LM9300 Lifemaster 2000 Eggshell Finish.
  - c. PPG: Pure Performance Interior Low Odor Zero VOC Premium Eggshell Latex 9-411 series.
  - d. S-W: ProClassic Water Borne B31 Series.
- E. Overhead Exposed Construction (Deck, Joists, Steel):
  1. One (1) coat flat dry fallout coating system to cover formulated for compatibility with all substrates by any paint manufacturer specified herein. Use 100% Acrylic, flash-rust-resistance dryfall.
    - a. Moore: Sweep-Up Spray Latex Flat M53.
    - b. ICI Dulux: #1280 Spraymaster Pro-Uni-Grip □ WB Aquacrylic Dryfall Flat (or non-flat if required to meet VOC limits).
    - c. S-W: Waterborne Acrylic Dryfall B42W2-Eg-Shel.
    - d. PPG: Speedhide Flat 6-713 Series Dryfall (or non-flat if required to meet VOC limits)
- F. **Fin Tube Radiator Enclosures:**
  1. **Manufacturers: Subject to compliance with requirements, provide products by one of the following:**
    - a. **AkzoNobel.**
    - b. **Coronado Industrial Coatings.**
    - c. **PPG.**
    - d. **Sherwin Williams.**
  2. **Use three (3) coat system best suited to substrate. Use heat resistant materials where required.**
  3. **Gloss: Satin.**
  4. **Color: As selected by Architect.**

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.
  1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
  2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
  - 1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

### 3.2 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.
  - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
  - 1. Provide barrier coats over incompatible primers or remove and reprime.
  - 2. Cementitious Materials: Prepare concrete, concrete masonry block, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
    - a. Use low dust emission wet methods to prepare the surface as recommended by the paint manufacturer.
    - b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's written instructions.
    - c. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.
  - 3. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent environmentally friendly or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.
    - a. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer and spot prime with rust-inhibitive metal primer recommended by the topcoat manufacturer.

Primer coats should be applied without delay, before rust reappears, with rust inhibitive primer.

- b. **At areas designated to receive commercial blast cleaning, clean per SSPC-SP6. All surfaces must be clean, dry, and free of contamination prior to coatings.**

D. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
3. Use only thinners approved by paint manufacturer and only within recommended limits.

### 3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the schedules.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
9. Sand lightly using low-dust emission wet methods between each succeeding enamel or varnish coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
2. Omit primer on metal surfaces that have been shop primed and touchup painted.
3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special

- attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Allow sufficient time between successive coats to permit proper drying as per manufacturer's recommendations.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
  2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
  3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as defined in these specifications and as recommended by the manufacturer (whichever is greater).
- E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and in occupied spaces.
- F. Mechanical items to be painted include, but are not limited to, the following:
1. Piping, pipe hangers, and supports.
  2. Heat exchangers.
  3. Tanks.
  4. Ductwork.
  5. Insulation.
  6. Motors and mechanical equipment.
  7. Accessory items.
- G. Electrical items to be painted include, but are not limited to, the following:
1. Conduit and fittings.
  2. Switchgear.
  3. Panelboards.
- H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- I. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.
- J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

- K. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

### 3.4 FIELD QUALITY CONTROL

- A. The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary during the period when paint is being applied:
  - 1. The Owner will engage the services of an independent testing agency to sample the paint material being used. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.
  - 2. The Owner may direct the Contractor to stop painting if test results show material being used does not comply with specified requirements. The Contractor shall remove noncomplying paint from the site, pay for testing, and repaint surfaces previously coated with the rejected paint. If necessary, the Contractor may be required to remove rejected paint from previously painted surfaces if, on repainting with specified paint, the 2 coatings are incompatible.

### 3.5 CLEANING

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site in accordance with the Waste Management plan.
  - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.
- B. The testing agency will perform on site and laboratory tests for the following characteristics as required by the board:
  - 1. ASTM D 3359 and D 6677 Adhesion Tests.
  - 2. Film thickness tests.
  - 3. Quantitative materials analysis.
  - 4. Apparent reflectivity.
  - 5. Washability.
  - 6. Dry Capacity.

### 3.6 PROTECTION

- A. Confine dust and odor emissions by using low-dust wet methods. If this is insufficient, the contractor must use barriers, containment and HEPA filtered negative air equipment to limit migration of dust and odors beyond the work areas. □
- B. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- C. **Protect building from damage from commercial blast cleaning. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.**
- D. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

### 3.7 EXTERIOR

#### A. Architecturally Exposed Steel:

1. **Verify shop paint system which was specified as zinc-rich. Provide compatible primer if differing producer.**
2. **Remove loose primer all rust and surface contaminates to ensure bond.**
3. **Spot Prime**
  - a. **ICI Dulux: ICI Devoe 302H Catha-Coat Reinforced Inorganic Zinc Primer.**
  - b. **Moore: Water Based Inorganic Zinc Primer M01/M02.**
  - c. **PPG: Moisture Cure Urethane Zinc-Rich Primer, UC95147/97-674 or Aquapon Zinc Rich Epoxy Primer 97-670.**
  - d. **MAB: Ply-Tile Epoxy Zinc-Rich Organic 011226/228/ 073294.**
  - e. **S-W: Corothane I Galvapal Zinc Primer.**
  - f. **Tnemec: 90-97 Theme-Zinc, Zinc-Rich Urethane.**
4. **Intermediate Coat □5.0 mils Dry Film Thickness**
  - a. **ICI Dulux: Devoe 220 Heavy Duty Epoxy Coating.**
  - b. **Moore: Polyamide Epoxy Hi-Build Gloss M36/M39.**
  - c. **PPG: Aquapon Epoxy HB Polyamide 97-Line.**
  - d. **MAB: Ply-Tile 520-W45 011998/092.**
  - e. **S-W: Macropoxy 646.**
  - f. **Tnemec: Series 66, Hi-Build Epoxoline, Epoxy-Polyamide.**
5. **Top Coat: 4.0 Mils Dry Film Thickness**
  - a. **ICI Dulux: Devoe 378 Devthane Aliphatic Urethane.**
  - b. **Moore: Aliphatic Acrylic Urethane Gloss M74/M75.**
  - c. **PPG: Pitthane High Build Urethane, 95-8400 Series.**
  - d. **MAB: Ply Thane 890 HS 020 Line.**
  - e. **S-W: Acrolon Multi-Mil.**
  - f. **Tnemec: Series 73. Endura-Shield III; High Build Acrylic Polyurethane**
6. **Protective Coat: 1.5 mil Dry Film Thickness**
  - a. **ICI Dulux: Devoe 379 Clear, Aliphatic Urethane.**
  - b. **Moore: Aliphatic Acrylic Urethane Gloss Clear Finish M74-00/M75.**
  - c. **PPG: Pitthane 35 Gloss Urethane Enamel, 95 Series.**
  - d. **MAB: Anti-Graffiti Coating 805-007/008.**
  - e. **S-W: Diamond Clad.**
  - f. **Tnemec: Series 76b Endura-Clear; Acrylic Polyurethane Clear Coat.**

#### B. Architecturally Exposed Steel designated to receive commercial blast cleaning, SSPC-SP6:



1. **Verify shop paint system which was specified as zinc-rich. Provide compatible primer if differing producer.**
2. **Prepare surface per SSPC-SP6 Commercial Blast Cleaning**
3. **All surfaces must be clean, dry, and free of contamination prior to application of coatings.**
- 4.
5. **Prime Coat □2.5 to 3.5 mils Dry Film Thickness**
  - a. **Tnemec: Series 90-97 Tneme-Zinc, apply one full coat.**
  - b. **Approved Equal if available from the following manufacturer.**
    - 1) **ICI Dulux**
    - 2) **Moore**
    - 3) **PPG**
    - 4) **MAB**
    - 5) **S-W**
6. **Intermediate Coat □2.0 to 3.0 mils Dry Film Thickness**
  - a. **Tnemec: Series 27 F.C. Typoxy, apply one full coat.**
  - b. **Approved Equal if available from the following manufacturer.**
    - 1) **ICI Dulux**
    - 2) **Moore**
    - 3) **PPG**
    - 4) **MAB**
    - 5) **S-W**
- 7.
8. **Top Coat: 2.0 to 3.0 Mils Dry Film Thickness**
  - a. **Tnemec: Series 1071V Fluoronar, apply one full coat.**
  - b. **Approved Equal if available from the following manufacturer.**
    - 1) **ICI Dulux**
    - 2) **Moore**
    - 3) **PPG**
    - 4) **MAB**
    - 5) **S-W.**

**END OF SECTION**

## **SECTION 10 51 14**

### **METAL LOCKERS - HIGH SCHOOLS**

#### **PART 1 - GENERAL**

##### 1.1 SUMMARY

- A. Section includes lockers indicated and as specified.

##### 1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's printed data including materials, accessories, construction, finishes, assembly, and installation instructions.
- B. Shop Drawings: Submit layout and dimensions of metal lockers. Indicate relationship to adjoining surfaces. Show locker elevations and details, fillers, trim, base, sloping tops, and accessories. Include locker numbering sequence. Indicate installation and anchorage requirements.
- C. Samples: Submit manufacturer's color charts showing a full range of available colors.

##### 1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain locker units and accessories from one manufacturer.

##### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver lockers until spaces to receive them are clean, dry, and ready for locker installation.
- B. Protect lockers from damage during delivery, handling, storage, and installation.

#### **PART 2 - PRODUCTS**

##### 2.1 MANUFACTURERS

- A. Manufacturer Qualifications: Lockers are custom manufactured lockers, not industry standard lockers. All lockers shall be manufactured to the Specification requirements stated herein. Manufacturers shall have not less than 5 years experience in metal locker manufacturing. Lockers and all locker components shall be manufactured in the United States of America to the extent available, provide lockers producer by one of the following:
  - 1. Art Metal Products.
  - 2. De Bourgh Manufacturing Co.
  - 3. List Industries.
  - 4. Lyon Metal Products Inc.

## 2.2 MATERIALS

- A. Steel Sheet: ASTM A 1008, commercial steel (CS) type B.
- B. Electrolytic Zinc-Coated Steel Sheet: ASTM A 591/A 591M-89, with full zinc coating, mill phosphatized.
- C. Fasteners: Cadmium- , zinc- or nickel-plated steel; slotless-type exposed bolt heads; self-locking nuts or lock washers for nuts on moving parts.
  - 1. Pop rivets are not allowed except on numbering plates and where specified.
- D. Equipment: Manufacturer's standard plated steel hooks or coat rods.

## 2.3 LOCKERS

- A. Body: Form backs, tops, bottoms, sides, and intermediate partitions of flanged 0.0598 inch (1.5 mm) (16 gauge) minimum steel sheet.
  - 1. Form exposed ends of nonrecessed lockers: 0.0598 inch (16 gauge) minimum steel sheet.
- B. Frames: Form channel frames of 0.0598 inch (16 gauge) minimum steel sheet. Form continuous integral strike on vertical frame members or weld 0.0897 inch (2.3 mm) minimum latch hooks to latch strike frame.
  - 1. Cross Frames: Form intermediate channel cross frames to double- or triple-tier lockers of 0.0598 inch (16 gauge) minimum steel sheet.
- C. Shelf: Form 0.0598-inch (1.5-mm) minimum steel sheet hat shelf in single-tier units.
- D. Door: One-piece steel sheet, flanged at all edges, constructed to prevent springing when opening or closing. Fabricate to swing 180 degrees. Installed door to frame gap shall not exceed 1/8" at hinge side and top and bottom of doors; 3/16" at strike side.
  - 1. Thickness: 0.0747 inch (1.9 mm) (14 gauge) minimum.
- E. Door Reinforcement: Reinforce inner face of door with a continuous full height door stiffener welded to inner door face at hinge side and to the top and bottom of door flange with .0478 inch (18 gauge).
- F. Louvered Vents: Doors shall have four vertical rows of standard inward punched V-shaped louvered vents for ventilation, to provide air flow and security by eliminating any view of the contents outside. Each perforation shall be 9/16" wide at the top; 1/4" long from top to bottom; and project in 1/32" from inner face of door. Continuous open type vents are not acceptable.
- G. Hinges: Doors shall be hinged at the right side of the locker face with continuous full length staked piano hinge allowing 180 degrees of swing. Hinges shall be of 0.0478" (18 gauge) minimum steel welded to locker doors and heavy gauge 3/8" riveted to locker frames. Rivets shall be spaced at 6 inch maximum center to center. Factory finish hinges shall match door color.

- H. Latches: Provide a recessed, single point, rigid, non-moving 0.1196" (11 gauge) minimum steel latch securely welded to door frame side panel with no less than 4 weld points providing secure eye for padlock hasp. A minimum of two welds to be at contact point to door frame and three at contact points of integral side panel. Door to be held in closed position by the use of a single magnetic catch in center of door return. Magnetic catch shall have "floating" multi-blade magnets to assure positive contact. Operation of door shall meet ADA requirements, and the force required shall be no greater than 5 lbs.
- I. Handles: Provide a rectangular, stamped, recessed, seamless cup of 0.0359" (20 gauge) minimum stainless steel. Inside cup dimensions shall be no less than 3-1/2" wide, 4" high and 1-1/4" deep. Cup shall have no additional punching beyond slot sized to accommodate padlock hasp. Provide adequate clearance for hasp to accommodate the use of a Master Lock #2010S padlock. Padlock by CPS; not to be included. Finger pull shall be a dimple, located on the strike side of cup, minimum 2" long, 1/2" wide and 1/8" to 1/4" deep.
  - 1. Mount the cup in the locker door in an embossed pocket at least the thickness of the cup. Cup shall be fastened at four corners to door by means of steel rivets.

## 2.4 ACCESSIBLE LOCKERS

- A. Provide single tier accessible lockers in quantity of 5% of total lockers to be installed. Accessible lockers shall have top and bottom shelves and coat hooks within the following reach ranges.
  - 1. Low shelf reach: 15 inches.
  - 2. High shelf reach: 54 inches.
- B. Hardware for accessible lockers shall comply with ADA Accessibility Guidelines 4.27.4 Operation. Controls and operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching or twisting of the wrist. The force required to activate controls shall be no greater than 5 lbs. The hardware shall be designed to provide resistance to overcome the closing device and not exceed 5 lbs. Touch latches, flush pulls, lever handles and U-shaped pulls are acceptable.

## 2.5 LOCKS

- A. Fabricate lockers to receive the following locking devices:
  - 1. Pad lock provided by Board.

## 2.6 LOCKER ACCESSORIES

- A. Equipment: Furnish each locker with the following items, unless otherwise shown:
  - 1. Single- Tier Units: 1 double-prong ceiling hook, and not fewer than 2 single-prong wall hooks. Rivet and weld to locker body or hat shelf.
- B. Number Plates: Manufacturer's standard etched, embossed, or stamped, nonferrous-metal number plates with numerals not less than 3/8 inch (9 mm) high. Number lockers in sequence indicated. Attach plates to each locker door, near top, centered, with at least 2 fasteners of same finish as number plate.

- C. Sloping Tops: Manufacturer's standard integral to each locker sloped top or separate and braced 12" o.c., not less than 0.0598 inch (1.5 mm) steel sheet. Provide closures at ends and sloped corner fillers.
- D. End Panels: Manufacturer's standard 0.0598 inch (1.5 mm) (16 gauge) minimum steel sheet end-finishing panels.
- E. Filler Panels: Fabricated from manufacturer's standard thickness, but not less than 0.036-inch (0.91-mm) nominal-thickness steel sheet.

## 2.7 FABRICATION

- A. Fabricate lockers square, rigid, and without warp, with metal faces flat and free of dents or distortion. Make exposed metal edges free of sharp edges and burrs, and safe to touch. Weld frame members together to form a rigid, 1 piece structure.
  - 1. Form locker body panels, doors, shelves and accessories from 1-piece steel sheet unless otherwise indicated.
  - 2. Preassemble lockers by MIG welding all joints, seams, and connections. Grind exposed welds flush.

## 2.8 FINISHES, GENERAL

- A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designating finishes.
- B. Finish all steel surfaces and accessories, except prefinished stainless-steel and chrome-plated surfaces.
- C. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering prior to shipment.
- D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within 1/2 of the range of approved samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved samples and they are assembled or installed to minimize contrast.

## 2.9 STEEL SHEET FINISHES

- A. Surface Preparation: Solvent-clean surfaces complying with SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel complying with SSPC-SP 5 (White Metal Blast Cleaning) or SSPC-SP 8 (Pickling), and phosphatize surfaces.
- B. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard baked-enamel finish consisting of a thermosetting topcoat. Comply with paint manufacturer's instructions for application and baking to achieve a minimum dry film thickness 1.3 to 1.5 mils.
  - 1. Color and Gloss: As selected by Architect (2) custom colors for color and gloss.

- C. TGIC Polyester Powder Coating System: Immediately after cleaning and pretreating, apply manufacturer's standard TGIC polyester powder coating. Comply with paint manufacturer's instructions for application and baking to achieve a minimum dry film thickness of 2 to 3 mils.
  - 1. Color and Gloss: As selected by Architect (2) custom colors for color and gloss.
- D. Provide baked-enamel finish or powder coating system at manufacturer's option.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install metal lockers complete with accessories according to manufacturer's recommendations. Install plumb, level, rigid, and flush.
- B. Assemble lockers with standard fasteners according to manufacturer's recommendations with no exposed fasteners on door faces and face frames.
- C. Connect together welded locker groups with standard fasteners according to manufacturer's recommendations, with no exposed fasteners on face frames.
- D. Anchor lockers to floors and walls at intervals recommended by manufacturer but no greater than 36 inches (910 mm). Install anchors through back-up reinforcing plates where necessary to avoid metal distortion, using concealed fasteners.
- E. Install recess trim to recessed lockers using concealed fasteners. Provide hairline joints and concealed splice plates.
- F. Install sloping top units to lockers using concealed fasteners. Provide hairline joints and concealed splice plates.
- G. Install boxed end panels to conceal exposed ends of non-recessed lockers.
- H. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.

#### **3.2 ADJUSTING, CLEANING, AND PROTECTION**

- A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices are operating properly.
- B. Clean interior and exposed exterior surfaces and polish stainless-steel and nonferrous metal surfaces.
- C. Protect lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit locker use during construction.

- D. Touch up marred finishes, or replace locker units that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

**END OF SECTION**

**ENVIRONMENTAL SCOPE  
PUBLIC BUILDING COMMISSION (PBC)**

Managing Environmental Consultant: Carnow, Conibear & Assoc., Ltd.Date: April 12, 2013Carnow Project # E12834U009-02PBC Project # 05267School: William Jones College Preparatory High SchoolSchool Code: 1060Room ID/Name: Building D—1<sup>st</sup> and 2<sup>nd</sup> Floor Mechanical Rooms

Substrate	Component	Walls				Ceiling	Floor	Response Action	Comments
		N	E	S	W				
-Any-	Tank Insulation	X	X	X	X	-X	-	<b><u>Asbestos- Abatement:</u></b>  Removal and Disposal per Specification 02-82-14.—	See Architect's drawings for locations of work and ASB-100 and ASB-200  All work shall be coordinated by the General Contractor.
Any	Pipe Insulation and Pipe Fitting Insulation	X	X	X	X	X		<b><u>Asbestos- Abatement:</u></b>  Removal and Disposal per Specification 02-82-14.	See Architect's drawings for locations of work and ASB-100 and ASB-200  All work shall be coordinated by the General Contractor.  Abatement Contractor to abate all asbestos pipe and pipe fitting insulation. Fiberglass pipe insulation to remain.—
Any	Breeching	X	X	X	X	X		<b><u>Asbestos- Abatement:</u></b>  Removal and Disposal per Specification 02-82-14.—	See Architect's drawings for locations of work and ASB-100  All work shall be coordinated by the General Contractor.

Signature: 

Designer: David J. Kedrowski, M.S., CIH

**CARNOW  
CONIBEAR**



**ENVIRONMENTAL SCOPE  
PUBLIC BUILDING COMMISSION (PBC)**

Managing Environmental Consultant: Carnow, Conibear & Assoc., Ltd.Date: April 12, 2013Carnow Project # E12834U009-02PBC Project # 05267School: William Jones College Preparatory High SchoolSchool Code: 1060Room ID/Name: Building D Throughout – 1<sup>st</sup> Floor Cafeteria, Kitchen, Storage Room, Room 111, 2<sup>nd</sup> Floor Corridor, Rooms 221, 221A, 222, 223B, 224, 224A and 225

Substrate	Component	Walls				Ceiling	Floor	Response Action	Comments
		N	E	S	W				
Any	Suspended Ceiling Tile					X		<p><b><u>Asbestos Abatement:</u></b></p> <p>Removal and Disposal per Specification 02 82 14.</p>	<p>See Architect's drawings for locations of work and ASB.100 and ASB.202</p> <p>All work shall be coordinated by the General Contractor.</p>
Any	Pipe Insulation and Pipe Fitting Insulation					X		<p><b><u>Asbestos Abatement:</u></b></p> <p>Removal and Disposal per Specification 02 82 14.</p>	<p>See Architect's drawings for locations of work and ASB.100 and ASB.202</p> <p>All work shall be coordinated by the General Contractor.</p> <p>Abatement Contractor to abate all asbestos pipe and pipe fitting insulation. Fiberglass pipe insulation to remain.</p>
Any	Duct Sealant	X	X	X	X	X		<p><b><u>Asbestos Abatement:</u></b></p> <p>Removal and Disposal per Specification 02 82 14.</p>	<p>See Architect's drawings for locations of work and ASB.100 and ASB.202</p> <p>All work shall be coordinated by the General Contractor.</p> <p>Material Located in Serving area and Kitchen</p>
Any	Hood Insulation	X	X	X	X	X		<p><b><u>Asbestos Abatement:</u></b></p> <p>Removal and Disposal per Specification 02 82 14.</p>	<p>See Architect's drawings for locations of work and ASB.100 and ASB.202</p> <p>All work shall be coordinated by the General Contractor.</p> <p>Material Located in Serving area</p>

Signature: 

Designer: David J. Kedrowski, M.S., CIH

**CARNOW  
CONIBEAR**



April 26, 2013

Mr. Ariel Vaca  
Public Building Commission of Chicago  
Richard J. Daley Center, Room 200  
50 West Washington Street  
Chicago, Illinois 60602

**Re: Supplemental Limited Asbestos Survey 2  
Jones College Prep  
606 South State Street  
Chicago, IL 60605**

Dear Mr. Vaca:

Carnow, Conibear & Assoc., Ltd. (Carnow Conibear) was retained by the Public Building Commission of Chicago (PBCC) to perform an asbestos-containing material survey prior to renovation activities at Jones College Prep located at 606 South State Street in Chicago, Illinois.

This purpose of this Supplemental Limited Survey was to identify suspect asbestos-containing materials that may be disturbed during planned renovation activities. This survey investigated the areas of proposed exterior repair work. Carnow Conibear understands work will entail removal/replacement of expansion joints between precast concrete panels on Buildings A, B, and D.

Prior to conducting the survey, Carnow Conibear reviewed the previous Asbestos Hazard Emergency Response Act (AHERA) Asbestos Re-inspection Findings and Recommendations report conducted on March 17, 2010, a previous Limited Asbestos Survey data prepared by Carnow Conibear dated April 9, 2013, and a Supplemental Limited Asbestos Survey dated April 16, 2013.

The asbestos inspection was conducted on April 24, 2013 by Mr. Michael Serio, Illinois Department of Public Health (IDPH) licensed asbestos building inspector (IDPH License # 100-18488). **Attachment A** provides the inspector's current license and accreditation.

Representative bulk samples were collected and submitted to STAT Analysis Corporation (STAT) for analysis. Bulk sample locations are presented on **Exhibit I**. The laboratory analytical results did not identify any asbestos containing materials in the samples. **Attachment B** provides the laboratory sample results and chain of custody documentation.

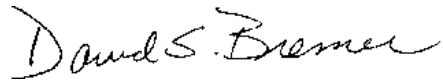
Please feel free to call David Bremer at (312) 762-2915 if you have any questions or require any additional information.

*Mr. Ariel Vaca*  
*Page 2*  
*April 26, 2013*

*Supplemental Limited Asbestos Survey 2*  
*Jones College Prep*  
*Chicago, IL 60605*

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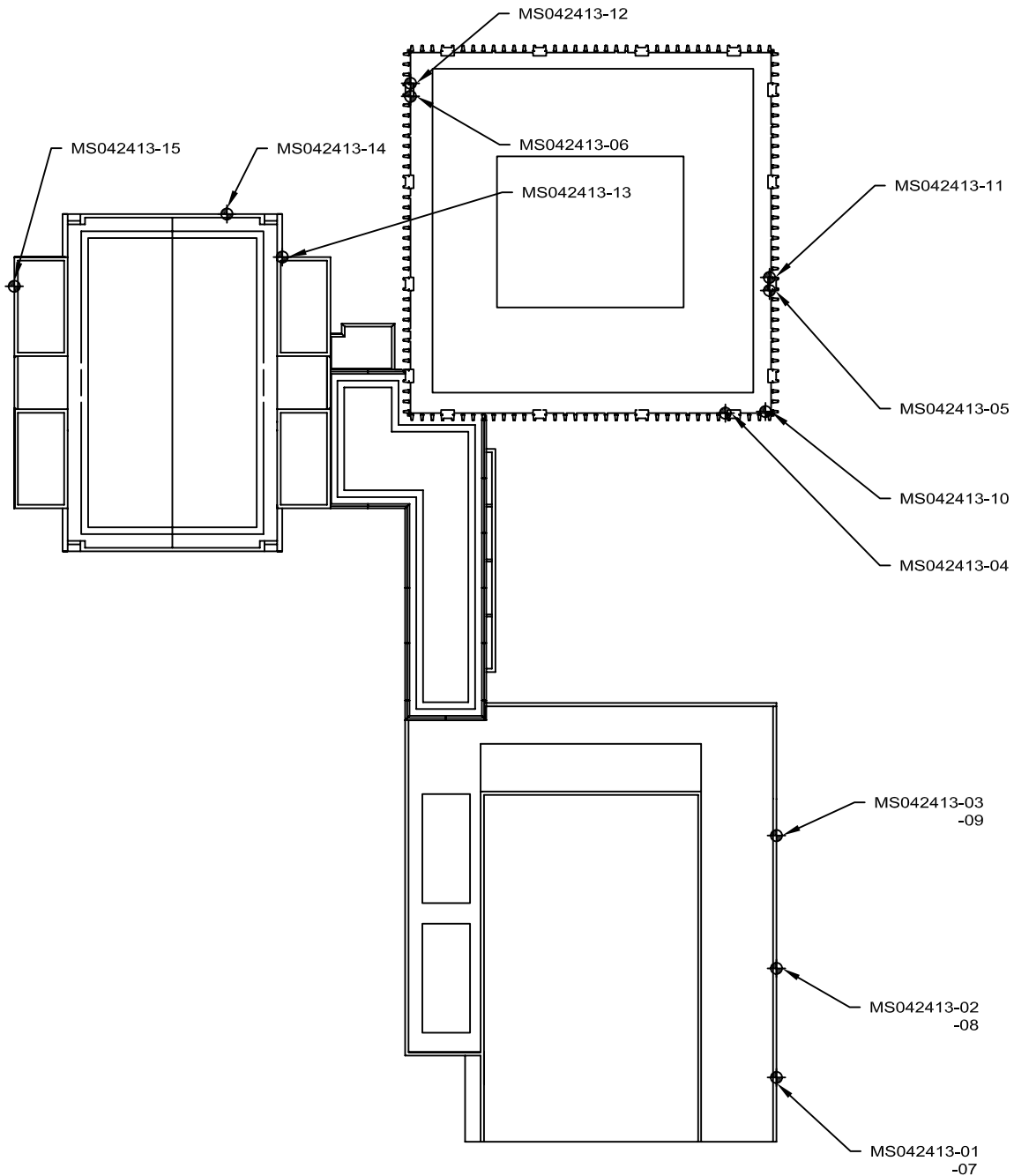
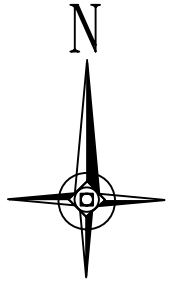
Sincerely,  
**CARNOW, CONIBEAR & ASSOC., LTD.**



David S. Bremer, CHMM, REM  
Director, Environmental Engineering

cc: Mr. Richard Schleyer - PBCC

**CARNOW  
CONIBEAR**



**LEGEND**



Bulk Sample Locations  
(Approximate)

Date: April 2013  
Scale: 1"= 50'  
Drawn by: NM  
Checked by: DSB

**Exhibit I: Bulk Sample Locations - Exterior**  
Jones College Prep  
606 South State Street  
Chicago, Illinois 60605

*Your Environmental Resource*

W:\\_comwprd\PBCC\Jones College Prep Renovation\Drawings\Roof Exhibit.dwg

Carnow, Conibear & Assoc., Ltd.  
Environmental Consulting Services  
600 W. Van Buren St., Suite 500, Chicago, IL 60607  
t: 312.782.4486 f: 312.782.5145  
www.ccaltd.com



**Attachment A**

# Michael Serio

Illinois Licensed Asbestos Building Inspector, Project Manager, & Air Sampling Professional



## ASBESTOS PROFESSIONAL LICENSE

ID NUMBER  
**100 - 18488**

ISSUED  
**4/11/2013**

EXPIRES  
**05/15/2014**

MICHAEL P SERIO  
3046 W LYNDAL ST  
CHICAGO, IL 60647

Environmental Health



### ENDORSEMENTS

### TC EXPIRES

INSPECTOR

2/20/2014

PROJECT MANAGER  
AIR SAMPLING PROFESSIONAL

12/13/2013

**Alteration of this license shall result in legal action**  
This license issued under authority of the State of Illinois  
Department of Public Health  
This license is valid only when accompanied by a valid  
training course certificate.



THIS CERTIFIES THAT  
Michael Serio

Has successfully completed the IL & IN Approved Asbestos Training Course and passed the Examination for purposes of accreditation under section 206 of Title II of the Toxic Substances Control Act (TSCA).  
Conducted by the Amerisafe Training Services, 3990 Enterprise Court, Aurora IL 60504. (630) 862-2650

CLASS DATES: 2/18/2013, 2/19/2013, 2/20/2013

LOCATION: Amerisafe

EXAMINATION: 2/20/2013

EXPIRATION: 2/20/2014

CERTIFICATE NUMBER: 106691X13S102845



**Attachment B**



**ASBESTOS ANALYSIS BY POLARIZED LIGHT MICROSCOPY**

Method: EPA-600/M4-82-020

Carnow, Conibear, & Associates  
 600 W. Van Buren Street, Suite 500  
 Chicago, IL 60607  
 Phone: (312) 782-4486  
 Fax: (312) 782-5145

Reference: E12824U009-02 Date Received: 04/24/2013  
 Location: Jones College Prep Chicago, IL Date Analyzed: 04/24/2013  
 Batch No.: 306203 Date Reported: 04/24/2013  
 Customer No.: 141 Turn Around Time: Immediate

Laboratory Sample	Customer Sample Number	Asbestos Components (%)	Non-Asbestos Components (%)
306203001	MS042413-01	ND	Binder 99-100%
306203002	MS042413-02	ND	Binder 99-100%
306203003	MS042413-03	ND	Binder 99-100%
306203004	MS042413-04	ND	Binder 99-100%
306203005	MS042413-05	ND	Binder 99-100%
306203006	MS042413-06	ND	Binder 99-100%
306203007	MS042413-07	ND	Binder 99-100%
306203008	MS042413-08	ND	Binder 99-100%
306203009	MS042413-09	ND	Binder 99-100%
306203010	MS042413-10	ND	Binder 99-100%
306203011	MS042413-11	ND	Binder 99-100%
306203012	MS042413-12	ND	Binder 99-100%
306203013	MS042413-13	ND	Binder 99-100%
306203014	MS042413-14	ND	Binder 99-100%
306203015	MS042413-15	ND	Binder 99-100%

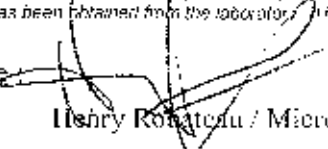
ND = Asbestos Not Detected (Not Present)    NA = Not Analyzed    NS = Not Submitted

Components of heterogeneous samples are analyzed per our Standard Operating Procedure, or per customer request.

The use of the NVLAP logo does not imply endorsement by NVLAP or any agency of the US Government.

*The information contained in this report and any attachments is confidential information intended only for the use of the individual or entities named above. The results of this report relate only to the samples tested. If you have received this report in error, please notify us immediately by phone. This report shall not be reproduced, except in its entirety, unless written approval has been obtained from the laboratory. This report remains property of STAT Analysis until payment is received in full (see invoice).*

Analyzed by Name


  
Hishy Romanu / Microscopist

STAT Analysis Corporation, 2242 West Harrison Street, Suite 200, Chicago, IL 60612-3766, Tel: (312) 733-0551, Fax: (312) 733-2386, STATinfo@STATAnalysis.com

# STAT Analysis Corporation

2242 W. Harrison, Suite 200, Chicago, Illinois 60612 Phone: (312) 733-0551 Fax: (312) 733-2386  
 e-mail address: STATinfo@STATAnalysis.com A/E/P accredited 101160 N.E.L.P. Lab code 101202-A

## CHAIN OF CUSTODY RECORD

Page: 1 of 2

Client: <u>CHAROL LOUISBERG</u>		Turn Around: Immediate <input checked="" type="checkbox"/> 1 Hrs <input type="checkbox"/> 8 Hrs <input type="checkbox"/> 2 Dns <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Days <input type="checkbox"/> 3 Days <input type="checkbox"/> 5 Days <input type="checkbox"/>	
Street Address: <u>6600 VAN BUREN SE 200</u>		Date Due: <u>ASAP</u> Time Due	
City, State, Zip: <u>Chicago IL 60607</u>		Note: Not all turn around times are available for all analysis.	
Phone: <u>312-907-0640</u>		Office Use Only Below	
Fax: _____		Batch No.: <b>306203</b>	
e-mail/Alt Fax: <u>DRBREMNER@CCLAC.COM</u>		Sample Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Project Number: <u>E12834 U004-02</u>		Checked by (initials): <u>DRB</u>	
Project Name: <u>Johns College Prep</u>		QC Performed (Date): <u>4/24/13</u>	
Project Location: <u>Chicago, IL</u>		Keenred By (initials): <u>DRB</u>	
Project Manager: <u>Mike Brenner</u>		Comments:	
P.O. Number: _____		Laboratory Sample No.	
Client Sample Number/Description: <u>Building D</u>		PCM Asbestos	
Date Taken: <u>4-24-13</u>		PCM Asbestos (Bulk)	
Time		PCM Point Count	
On   Off		PCM Gravimetric	
Rate (ppm)		TEM Air Asbestos	
Volume (Liters)		TEM Bulk Asbestos	
Wiped (ft <sup>2</sup> )		TEM Gravimetric Ash	
Area		TEM Microvac Ash	
Laboratory Sample No.		TEM Water	
Sample No.		Other	

Comments: Building D expansion work

-02 ↓

-03 ↓

-04 Building A Expansion work

-05 ↓

-06 ↓

-07 Building D Expansion work

-08 ↓

-09 ↓

-10 Building A Expansion work

-11 ↓

-12 ↓

-13 Building B Expansion work

Comments: Email Results to Dave Brenner - DRBREMNER@CCLACD.COM

Turn Around:  1 Hr  8 Hr  24 Hr  1 Day  2 Days  3 Days  5 Days

Note: Not all turn around times are available for all analysis.

Date Due: 4/25/13 Time Due:  Office Use Only Below

Relinquished by: [Signature] Date/Time: 4-22-13 11:00

Received by: [Signature] Date/Time: 4/25/13 11:00

Relinquished by: [Signature] Date/Time: [Blank]

Received by: [Signature] Date/Time: [Blank]

Relinquished by: [Signature] Date/Time: [Blank]

Received by: [Signature] Date/Time: [Blank]

Relinquished by: [Signature] Date/Time: [Blank]

Received by: [Signature] Date/Time: [Blank]

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Relinquished by: [Signature] Date/Time: [Blank]

Received by: [Signature] Date/Time: [Blank]

Relinquished by: [Signature] Date/Time: [Blank]

Received by: [Signature] Date/Time: [Blank]

Relinquished by: [Signature] Date/Time: [Blank]

Client: ANNOV CONCRETE

Street Address: 1600 W. Lincoln Ave. Ste 306

City, State, Zip: Chicago, IL 60612

Phone: 312-627-0640

Fax: [Blank]

e-mail/Alt. Fax: DBRENNER@CICA.IL.COM

Project Number: E-178340809-02

Project Name: Chicago College Prep

Project Location: Chicago

Project Manager: [Blank]

P.O. Number: [Blank]

Client Sample Number/Description: Building B (1-24-13)

Phase 1 - 15' d.

Batch No.: 306203

Sample Acceptable:  Yes  No

Checked by (analyst): [Signature]

QC by (analyst): [Signature]

Reported by (analyst): [Signature]

Comments: [Blank]

PCM Asbestos	
PLM Asbestos (Bulk)	<input checked="" type="checkbox"/>
PLM Point Count	
PLM Gravimetric	
TEM Air Asbestos	
TEM Bulk Asbestos	
TEM Gravimetric Asb	
TEM Microvac Asb	
ILM Water	
Other	

Comments: EMAIL Ready to go DBRENNER@CICA.IL.COM



April 26, 2013

Mr. Ariel Vaca  
Public Building Commission of Chicago  
Richard J. Daley Center, Room 200  
50 West Washington Street  
Chicago, Illinois 60602

**Re: Supplemental Limited Lead-Based Paint Assessment  
Jones College Prep Renovation  
606 South State Street  
Chicago, IL 60605**

Dear Mr. Vaca:

Carnow, Conibear & Assoc., Ltd. (Carnow Conibear) was retained by the Public Building Commission of Chicago (PBCC) to perform a limited lead-based paint (LBP) assessment prior to renovation activities at Jones College Prep located at 606 South State Street in Chicago, Illinois (**Exhibit I**). The sampling was limited to suspect painted structures that may be disturbed during planned renovation activities (PBCC Project No. 2013-47021-SIP) as indicated in drawings received from the architect (**Attachment A**). Sampling was conducted on April 26, 2013 by Mr. Michael Serio and Mr. Marcos Iwankiw, Illinois Department of Public Health (IDPH) licensed lead risk assessors (IDPH License # L-014764 and # L-001199, respectively).

Sampling of visible and accessible suspect lead-based painted components and/or surfaces was conducted following modified U.S. Department of Housing and Urban Development (HUD) guidelines of June 1995 for single family housing, Chapter 7: Lead-Based Paint Inspection 1997 Revision, and the EPA and HUD's Performance Characteristics Sheet for the RMD LPA-1 XRF lead paint analysis system. These guidelines apply to residential properties. Carnow Conibear modified these guidelines and tested typical major building components. The sampling was conducted with an XRF spectrum analyzer using a Co-57 isotope with a 12 millicurie source. Painted surfaces which indicate a concentration of 1.0 mg/cm<sup>2</sup> or greater are considered to be lead-based paint as defined by HUD. The survey results were recorded directly in the instrument memory during the field activities.

Lead-based paint, defined by HUD, was not identified on the walls, ceilings, and other substantial architectural components within the renovation areas.

See **Attachment B** for a complete testing log of all XRF measurements collected for this assessment and **Attachment C** for the risk assessors current license and accreditation.

## Conclusions

No lead-based paint was identified during the limited XRF sampling conducted within planned renovation areas.

If you have any questions or require any additional information please feel free to call me directly at (312) 762-2915.

Sincerely,

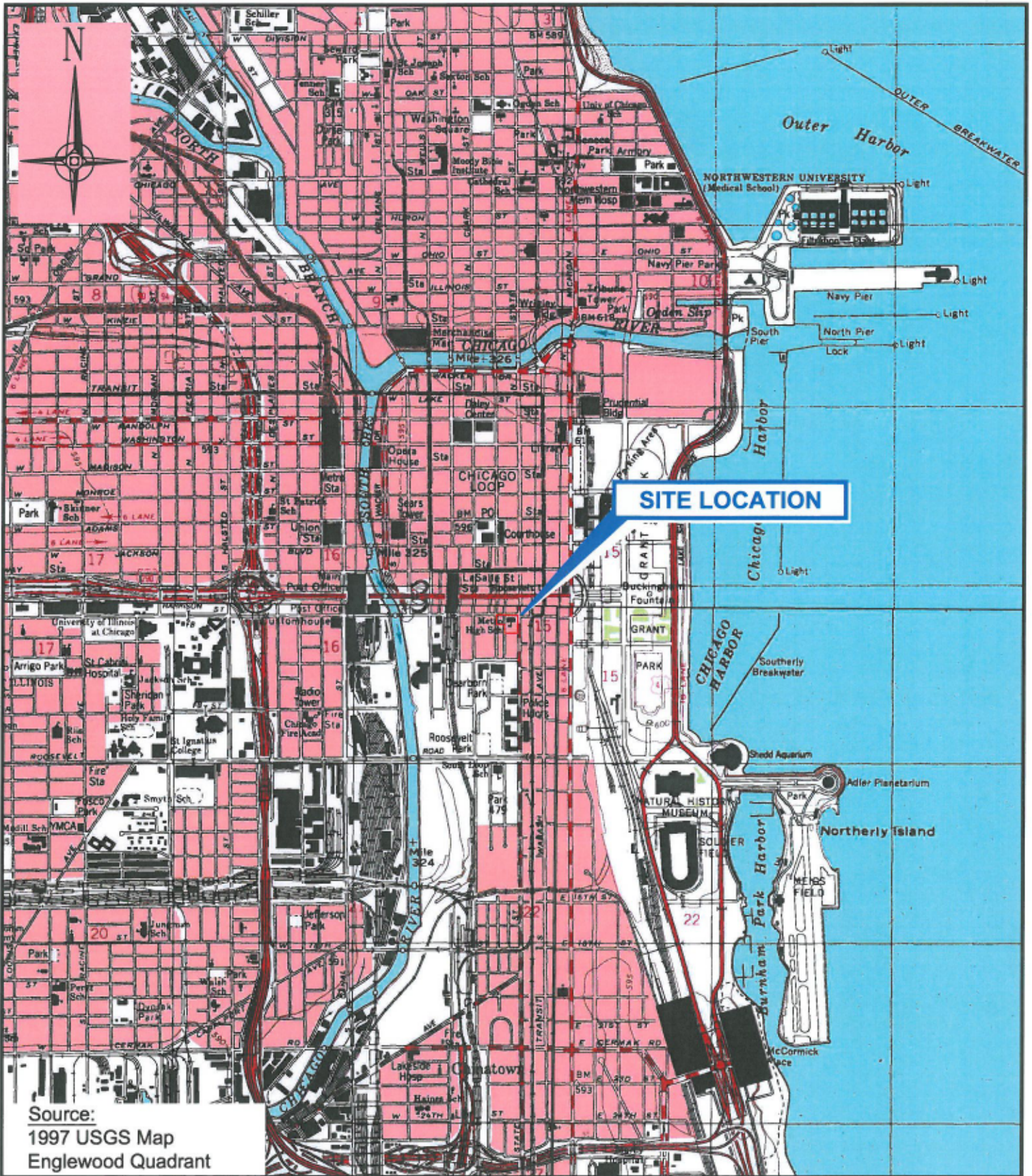
**CARNOW, CONIBEAR & ASSOC., LTD.**



David S. Bremer, CHMM, REM  
Director, Environmental Engineering

cc: Mr. Richard Schleyer - PBCC

**Exhibit I**  
**Site Location Map**



Source:  
1997 USGS Map  
Englewood Quadrant

Date: April 2013  
Scale: 1"=1,500'  
Drawn by: NM  
Checked by: DSB

**Exhibit I: Site Location Map**  
Jones College Prep  
606 South State Street  
Chicago, Illinois 60605

Your Environmental Resource

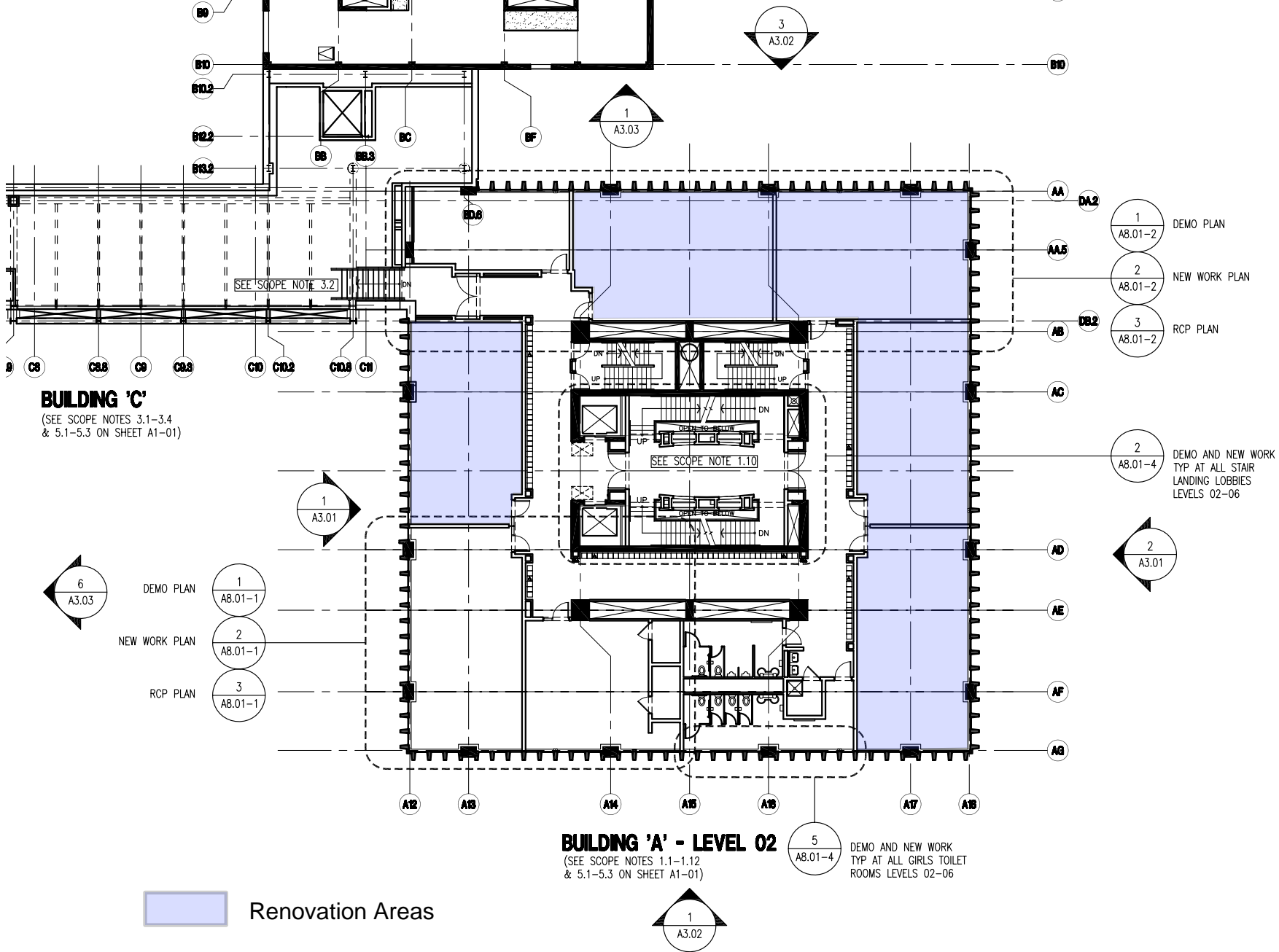
W:\\_com\p\BCC\Jones College Prep Renovation\Drawings\ChicagoReferenceMap.dwg

Carnow, Conibear & Assoc., Ltd.  
Environmental Consulting Services  
600 W. Van Buren St., Suite 500, Chicago, IL 60607  
t: 312.782.4486 f: 312.782.5145  
www.ccalltd.com

**CARNOW  
CONIBEAR**

**Attachment A**





**BUILDING 'C'**  
 (SEE SCOPE NOTES 3.1-3.4  
 & 5.1-5.3 ON SHEET A1-01)

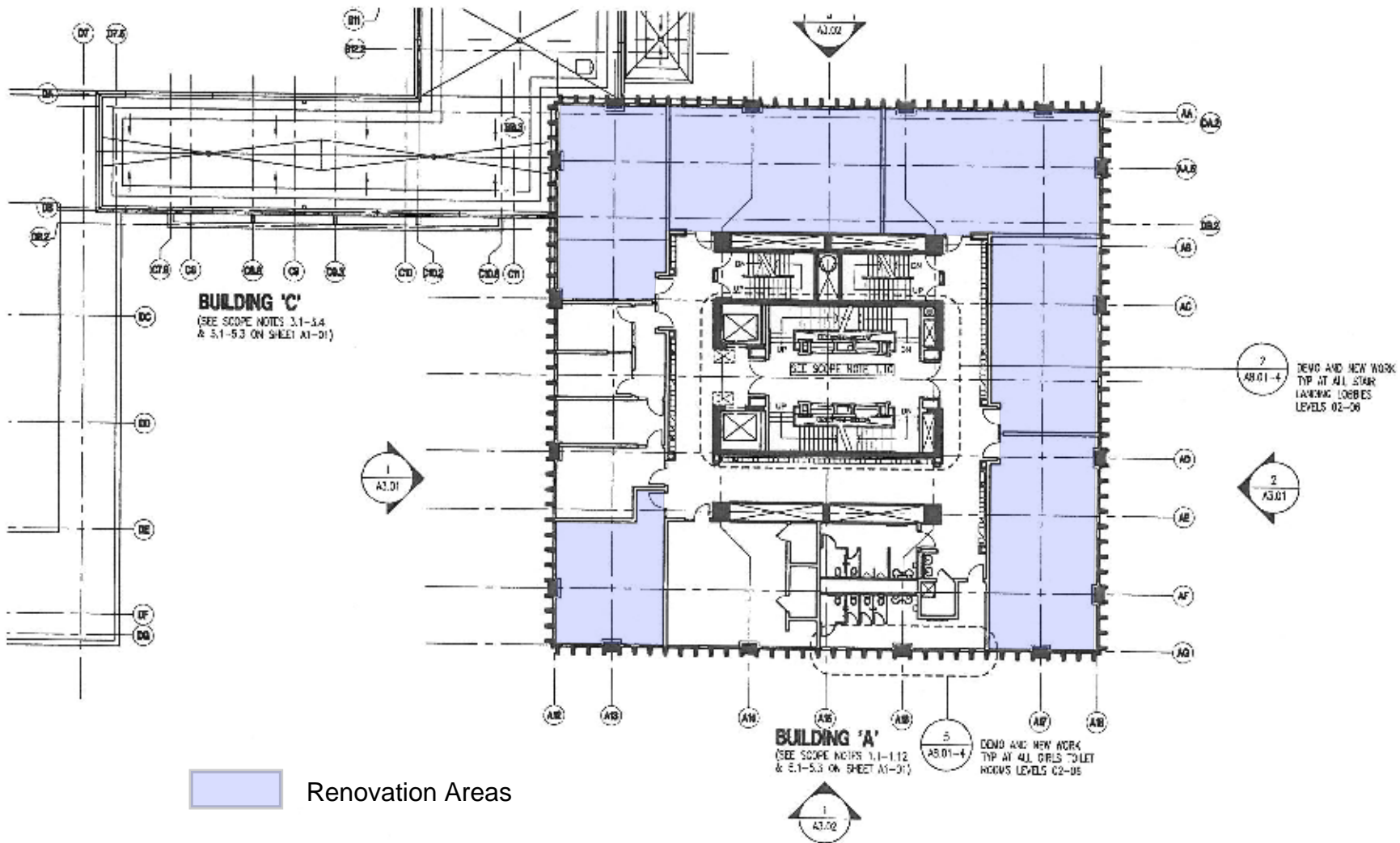
- 6 A3.03 DEMO PLAN
- 1 A8.01-1 NEW WORK PLAN
- 2 A8.01-1 RCP PLAN
- 3 A8.01-1

**BUILDING 'A' - LEVEL 02**  
 (SEE SCOPE NOTES 1.1-1.12  
 & 5.1-5.3 ON SHEET A1-01)

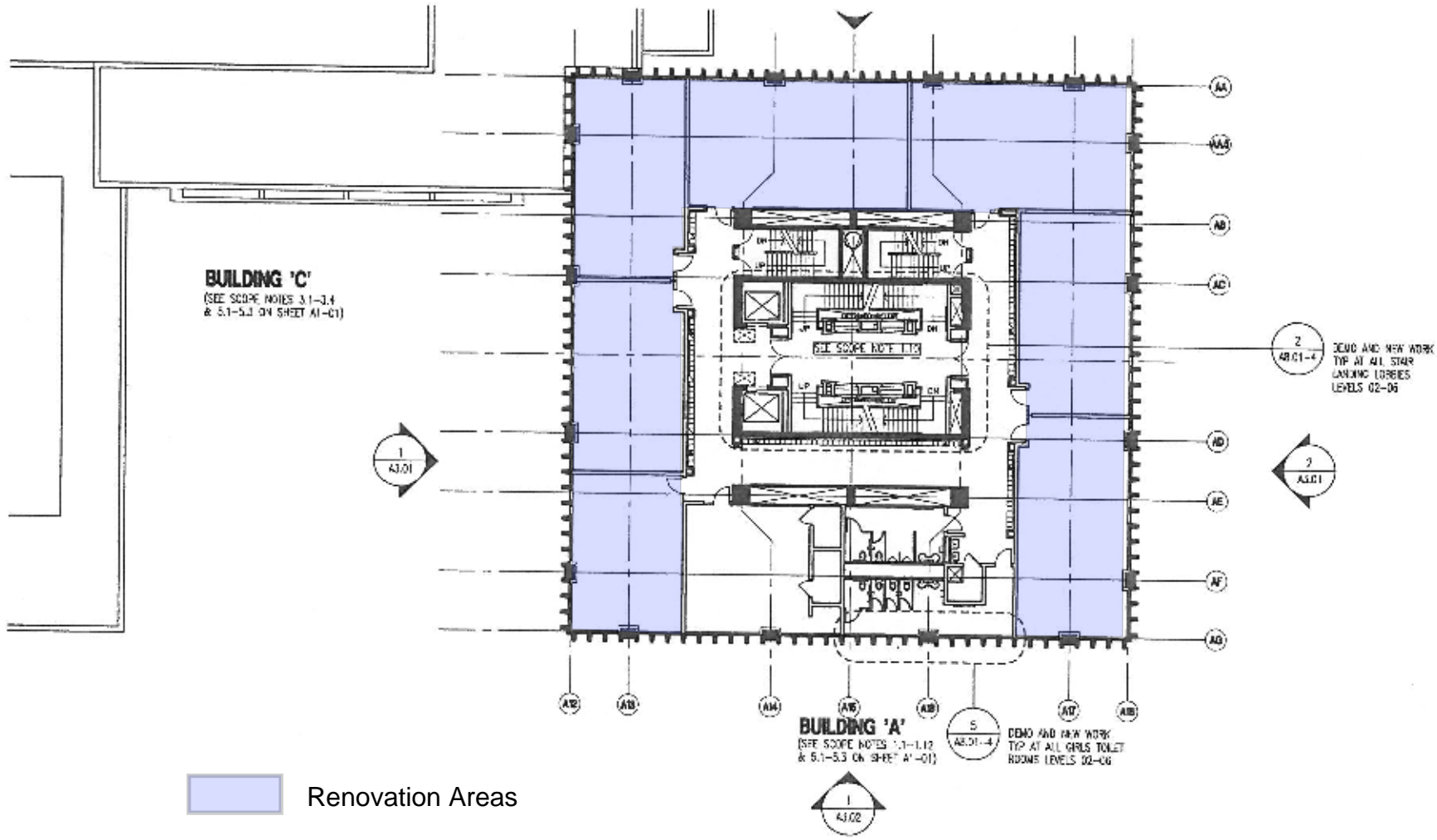
- 5 A8.01-4 DEMO AND NEW WORK  
 TYP AT ALL GIRLS TOILET  
 ROOMS LEVELS 02-06

Renovation Areas

**1** OVERALL LEVEL 03 FLOOR PLAN, LEVEL 02 - BUILDING 'A'  
 1/16" = 1'-0"



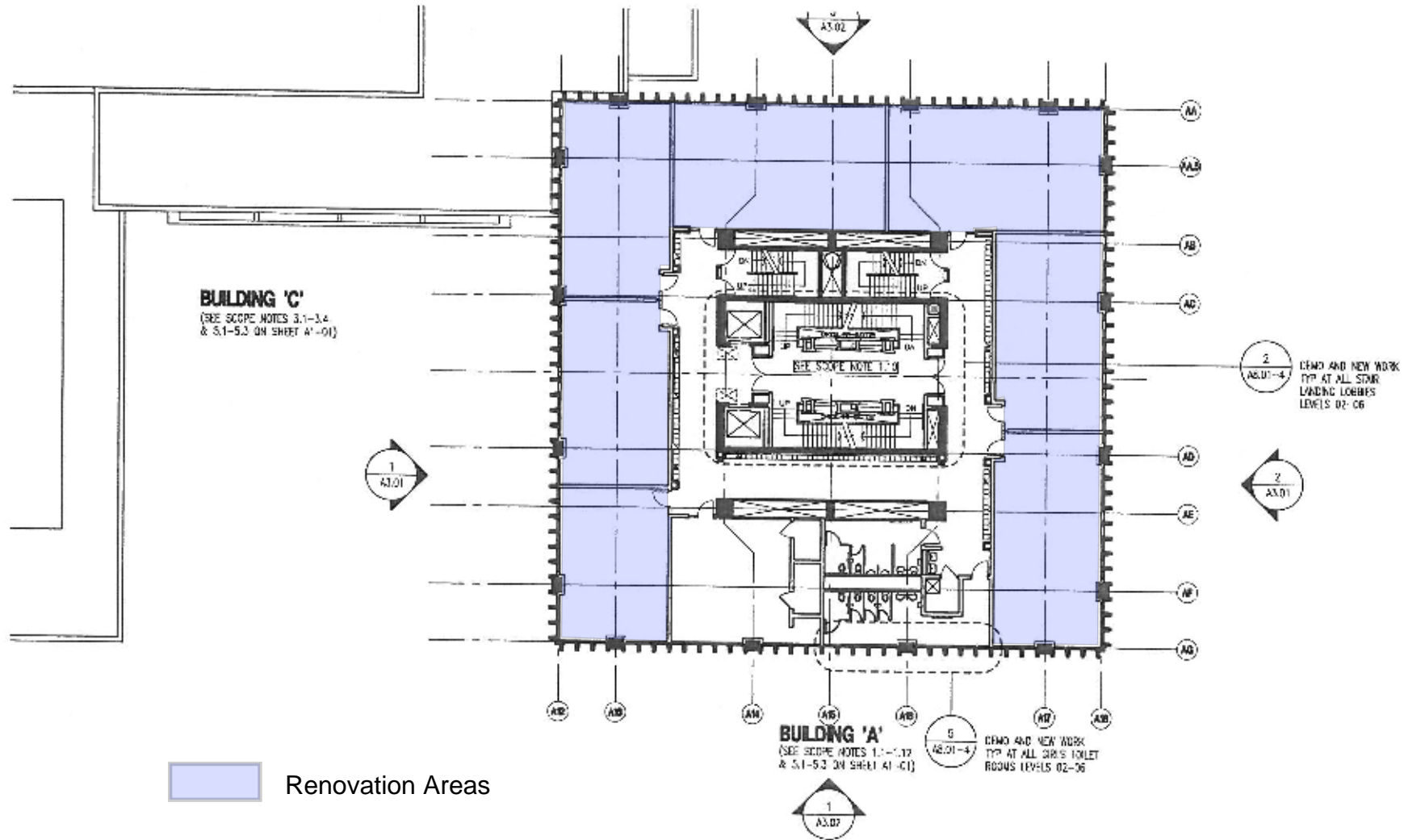
**1** LEVEL 03 FLOOR PLAN – BUILDING 'A', ROOF PLAN  
 1/16" = 1'-0"



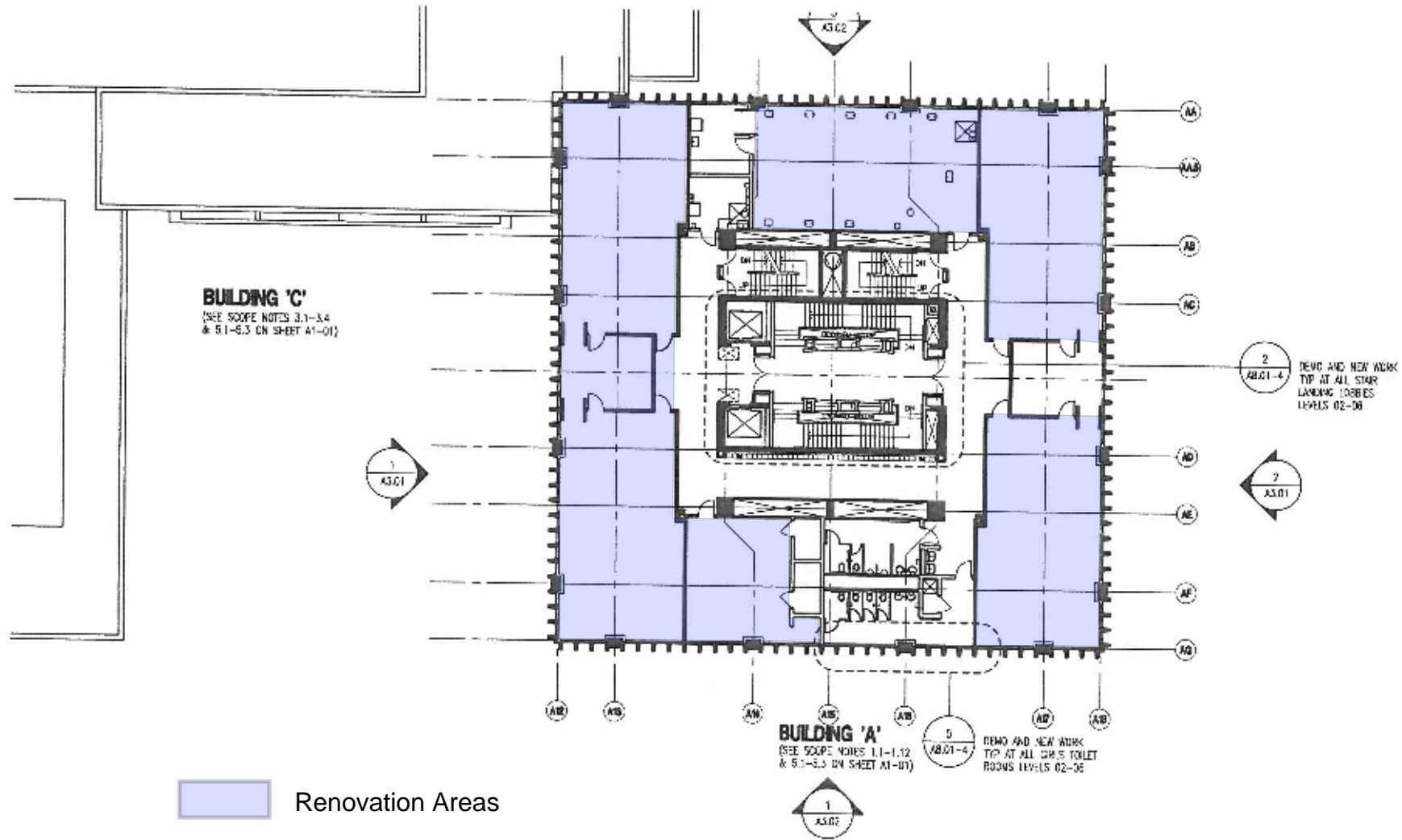
Renovation Areas

**1** LEVEL 04 FLOOR PLAN - BUILDING 'A'

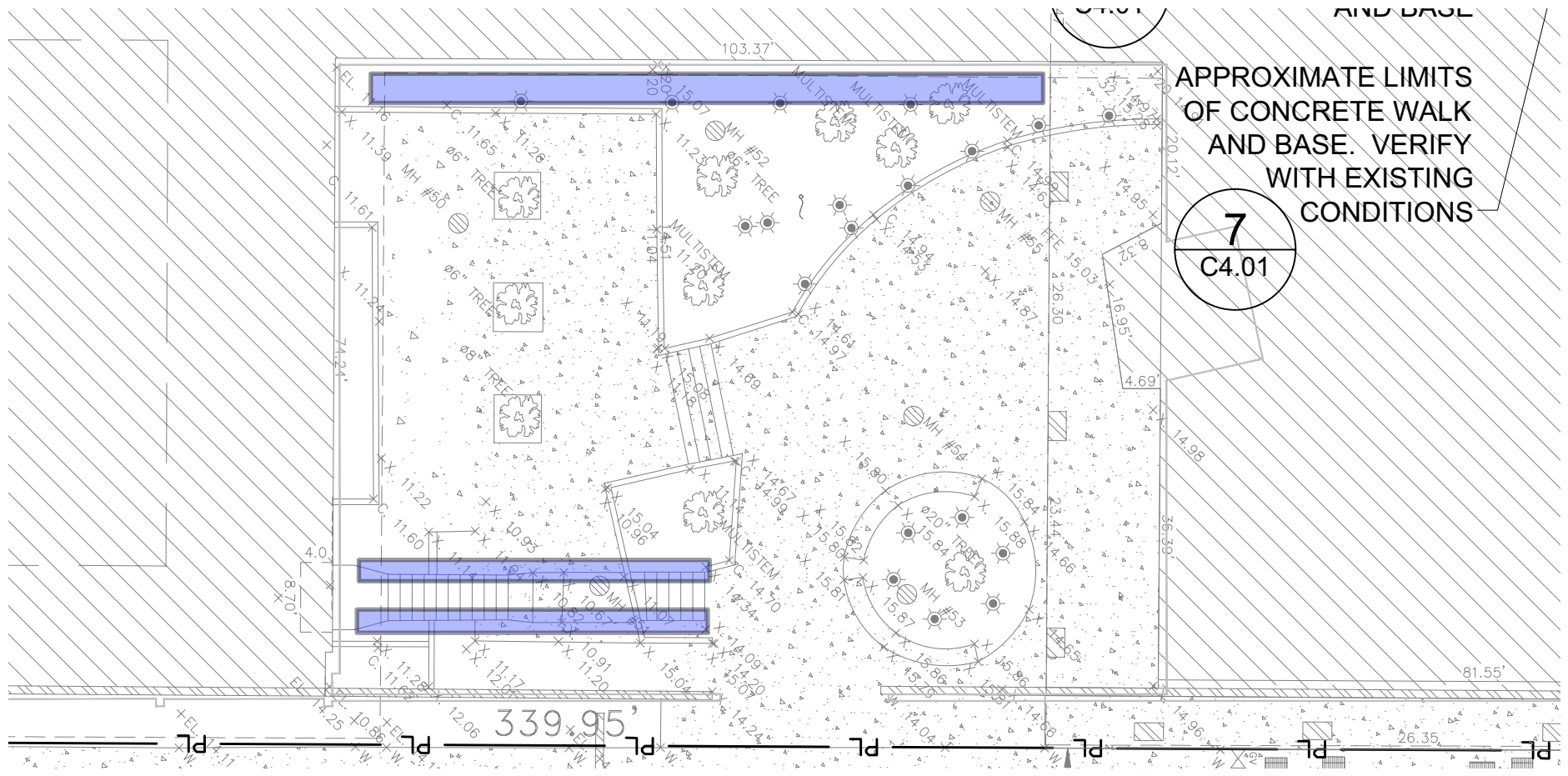
1/16" = 1'-0"



**1** LEVEL 05 FLOOR PLAN - BUILDING 'A'  
1/16" = 1'-0"




**1** LEVEL 06 FLOOR PLAN - BUILDING 'A'  
1/16" = 1'-0"



APPROXIMATE LIMITS  
OF CONCRETE WALK  
AND BASE. VERIFY  
WITH EXISTING  
CONDITIONS

7  
C4.01

 Renovation Areas

**Attachment B**



### XRF CALIBRATION CHECK TEST RESULTS

Client: Jones College Prep Date: 4-26-13  
 Address: 606 S. State St. IL, 60605  
 XRF Serial #: 1328  
 XRF Instrument: RMD's LFA-1  
 Inspector/License #: 14764 Sergio  
 XRF Unit File #: CF  
 Calibration Check Tolerance Used: +/- 0.3 mg/cm<sup>2</sup> on 1.0 mg/cm<sup>2</sup> RMD standard  
 Time Corrected Mode - Duration of Test is 70 seconds long

**CALIBRATION CHECK (Bare Wood)**

Calibration Time	1st Reading	2nd Reading	3rd Reading	Average Reading	Difference From Average & 0.0 mg/cm <sup>2</sup>	Acceptable Yes/No
70	-0.0	-0.1	-0.0	-0.0	-0.0	Yes

**CALIBRATION CHECK (Painted)**

Calibration Time	1st Reading	2nd Reading	3rd Reading	Average Reading	Difference Between Average & 0.0 mg/cm <sup>2</sup>	Acceptable Yes/No
70	1.7	1.8	1.7	1.7	0.7	Yes

**CALIBRATION CHECK (Painted)**

Calibration Time	1st Reading	2nd Reading	3rd Reading	Average Reading	Difference Between Average & 0.0 mg/cm <sup>2</sup>	Acceptable Yes/No
70	1.5	1.7	1.7	1.7	0.2	Yes

**CALIBRATION CHECK ( )**

Calibration Time	1st Reading	2nd Reading	3rd Reading	Average Reading	Difference Between Average & 0.0 mg/cm <sup>2</sup>	Acceptable Yes/No



Lead Based Paint XRF Data Sheet

Client: Jones College Building Address: 601 S State St  
 City: Chicago  
 State: IL  
 Inspector: M. SEREJO  
 Inspector's Signature: *M. Serejo*

XRF Serial #: 1528 XRF Instrument: AMD LPA-1 XRF Unit / File #: *FF*

XRF Test Shot #	Test Location	Surface	Component	Substrate	Color	Condition (F=Free, P=Paint, N=None)	XRF Reading (mg/100)	Estimated Damage	Classification (P=Positive, N=Negative)
7	Classroom 602	WALL - N		Brick	White	I F P	0.0		P (N)
8		E				I F P	0.0		P (N)
9		S				I F P	0.2		P (N)
10		W		Plaster		I F P	0.2		P (N)
11		Door to 601A		Metal	Brown	I F P	0.1		P (N)
12		Door to 601A			Black	I F P	0.0		P (N)
13		Door		WOOD	Greenish	I F P	0.1		P (N)
14		Door		Metal	Gray	I F P	0.0		P (N)
15		Window		Metal	Black	I F P	0.2		P (N)
16		Window		WOOD	White	I F P	0.2		P (N)
17		Window				I F P	0.2		P (N)
18		E				I F P	0.2		P (N)
19		S				I F P	0.1		P (N)
20		W				I F P	0.2		P (N)
21		Door to 601A		WOOD	Stain	I F P	0.0		P (N)
22		Door to 601A		Metal	Green	I F P	0.1		P (N)
23		Door to 601A		WOOD	Stain	I F P	0.0		P (N)
24		Window		Metal	Gray	I F P	0.2		P (N)
25		Window		WOOD	White	I F P	0.1		P (N)
26		E				I F P	0.1		P (N)
27		S				I F P	0.1		P (N)
28		W				I F P	0.1		P (N)
29		Door		WOOD	Stain	I F P	0.1		P (N)
30		Window		Metal	Gray	I F P	0.1		P (N)
31		Window		Cinder Block	White	I F P	0.2		P (N)
32		E			Red	I F P	0.1		P (N)

COPYRIGHT  
 CONFIDENTIAL

Lead Based Paint XRF Data Sheet

Client: Jesus College Prep Building Address: 606 S. State St. City: Chicago Inspection Date: 4-26-18

Area Description: 1328 State: IL Inspector: Saris License #: 18764

XRF Serial #: RMD\_LPA-1 XRF Unit /File #: 4 Inspector's Signature: [Signature]

XRF Test Sheet #	Test Location	Photo Log #	Component	Substrate	Color	Condition (Paint, Pigment, Surface)	XRF Reading (mg/cm²)	Estimated Garage	Classification (P=Positive, N=Negative, ND)
32	Classroom 504		WALL - S	Cubicle Block	White	I F P	0.2		P N
33			W	Concrete	↓	I F P	0.4		P N
34			Door	Wood	Stain	I F P	0.1		P N
35			↓ Frame	Metal	Green	I F P	0.0		P N
36	Classroom 503		WALL - W	Cubicle Block	Red	I F P	0.2		P N
37			E	↓	White	I F P	0.0		P N
38			S	Concrete	↓	I F P	0.2		P N
39			W	↓	↓	I F P	0.2		P N
40			Window frame	Metal	Green	I F P	0.4		P N
41			Door	Wood	Stain	I F P	0.1		P N
42			↓	Wood	Stain	I F P	0.2		P N
43	Classroom 502		E Frame	Metal	Gray	I F P	0.1		P N
44			W Wall	Concr Block	Red	I F P	0.2		P N
45			E	↓	White	I F P	0.2		P N
46			S	Concrete	↓	I F P	0.3		P N
47			W	Cubicle Block	↓	I F P	0.1		P N
48			Door	Wood	Varnish	I F P	0.1		P N
49	Classroom 505		↓ Frame	Metal	Gray	I F P	0.1		P N
50			N Wall	Concrete	White	I F P	0.4		P N
51			E	↓	↓	I F P	0.03		P N
52			S	Cubicle Block	Red	I F P	0.2		P N
53			W	↓	White	I F P	0.3		P N
54			Door	Wood	Stain	I F P	0.3		P N
55			↓ Frame	Metal	Gray	I F P	0.1		P N
56	Classroom 506		Window frame	↓	Black	I F P	0.1		P N
			WALL - W	Concrete	White	I F P	0.1		P N

CAINOW  
COMBEEAF

Lead Based Paint XRF Data Sheet

Client: St. Johns College Building Address: 600 S. State St. City: Chicago Inspection Date: 4-26-13

Area Description: \_\_\_\_\_ State: IL Inspector: SECS License #: 147714

XRF Serial # 328 XRF Instrument: FAMD LPA-1 XRF Unit/File #: 4 Inspector's Signature: Alison

XRF Scribble #	Post Location	Photo Label	Component	Substrate	Color	Condition (Paint Failure Pattern)	NRF Reading mg/cm <sup>2</sup>	Estimated Damage	Classification P=Positive N=Negative
57	Classroom 56		WALL	Cinderblock	white	I F P	0.2		P (N)
58			S		Red	I F P	0.1		P (N)
59			W		White	I F P	0.2		P (N)
60	Window frame		metal		Black	I F P	0.3		P (N)
61	Door		WOOD		Stain	I F P	0.1		P (N)
62			metal		Grey	I F P	0.1		P (N)
63	Classroom 401		N - WALL	Cinderblock	White	I F P	0.1		P (N)
64			E WALL	Cinderblock	White	I F P	0.3		P (N)
65			Roof cover	metal	Grey	I F P	0.02		P (N)
66			N - WALL	Cinderblock	Red	I F P	0.3		P (N)
67			S WALL		White	I F P	0.2		P (N)
68			Door	WOOD	Stain	I F P	0.0		P (N)
69	Classroom 402		Roof frame	metal	Grey	I F P	0.0		P (N)
70			N - WALL	Cinderblock	Red	I F P	0.4		P (N)
71			E WALL		White	I F P	0.2		P (N)
72			S WALL	Concrete		I F P	0.0		P (N)
73			Door	Cinderblock		I F P	0.2		P (N)
74			Roof	WOOD	Stain	I F P	0.2		P (N)
75			Roof frame	metal	Grey	I F P	0.3		P (N)
76	Classroom 407		WALLS & CEILING	metal	White	I F P	0.2		P (N)
77			WALLS & CEILING	Concrete	White	I F P	0.3		P (N)
78			Door	Cinderblock	Red	I F P	0.0		P (N)
79			Door		White	I F P	0.1		P (N)
80			Roof cover	metal	Grey	I F P	0.3		P (N)

CANON  
COPY

Area Description: 6065 State St City: Chicago Inspector: SEAL  
 XRF Series #: 328 Instrument: RMD LPA-1 XRF Unit/File #: 4 State: L  
 Inspector's Signature: M...

XRF Test Spot #	Foot Location	Photo Log #	Component	Substrate	Color	Condition L: Limit P: Pass F: Fail	XRF Reading mg/cm <sup>2</sup>	Estimated Percentage	Classification P: Positive N: Negative F: Fail
82	Classroom 407		Door	wood	Stain	F P	~0.2		P (N)
83	Classroom 405		J FRAME	metal	Gray	F P	0.1		P (N)
84			N WALL	CONCRETE	White	F P	~0.3		P (N)
85			E	Substrate	Red	F P	~0.2		P (N)
86			S		White	F P	~0.2		P (N)
87			W	Concrete	White	F P	~0.2		P (N)
88			Door	metal	GRAY	F P	~0.1		P (N)
89			Radiator cover	wood	Stain	F P	~0.2		P (N)
90			Door	metal	GRAY	F P	~0.2		P (N)
91	Classroom 305		J FRAME	metal	White	F P	~0.1		P (N)
92			N WALL	CONCRETE	White	F P	~0.2		P (N)
93			E	Substrate	Red	F P	~0.2		P (N)
94			S		White	F P	~0.3		P (N)
95			W	Concrete	Red	F P	~0.2		P (N)
96			Radiator cover	metal	GRAY	F P	~0.1		P (N)
97			Door	metal	GRAY	F P	~0.1		P (N)
98	Classroom 304		J FRAME	metal	GRAY	F P	~0.1		P (N)
99			N WALL	CONCRETE	Gray	F P	~0.1		P (N)
100			E	Substrate	Red	F P	~0.3		P (N)
101			S	Concrete	White	F P	~0.2		P (N)
102			W	Concrete	White	F P	~0.2		P (N)
103			Radiator cover	metal	Gray	F P	~0.3		P (N)
104			Door	metal	GRAY	F P	~0.1		P (N)
105	Classroom 308		J FRAME	metal	Gray	F P	~0.2		P (N)
106			N WALL	CONCRETE	Gray	F P	~0.1		P (N)
			E	Substrate	Red	F P	~0.4		P (N)
			W	Concrete	White	F P	~0.3		P (N)

CONTRACTOR  
 CONTRACTOR

Area Description: 666 S State St Chicago  
 Inspector: M. S. S. Inspector's Signature: M. S. S.  
 XRF Serial #: 1326 State: IL XRF Unit/File #: 4

XRF Test Sheet #	Test Location	Photo Log #	Component	Substrate	Color	Condition (Paint, Lead, etc)	XRF Reading (mg/m <sup>2</sup> )	Estimated Damage	Classification (P=Positive, N=Negative, etc)
107	Classroom 308		S WALL		Orange/Red	Lead	0.2		P
108			W ↓		White		0.2		P
109			Radial for Corer		White		0.2		P
110			Door		Gray		0.1		P
111			↓ Flame		Gray		0.2		P
112	Classroom 306		Al - WALL		Gray		0.3		P
113			↓		White		0.2		P
114			↓		White		0.1		P
115			↓		White		0.1		P
116			↓		White		0.1		P
117			Radial for Corer		White		0.4		P
118			Door		White		0.1		P
119	Classroom 302		W WALL		White		0.1		P
120			↓		White		0.1		P
121			↓		White		0.2		P
122			↓		White		0.2		P
123			↓		White		0.2		P
124			Radial for Corer		White		0.7		P
125			Door		White		0.0		P
126	Classroom 305		W WALL		White		0.1		P
127			↓		White		0.1		P
128			↓		White		0.1		P
129			↓		White		0.1		P
130			Radial for Corer		White		0.3		P
131			Door		White		0.0		P

CALMOR  
 COMPANY





XRF CALIBRATION CHECK TEST RESULTS

Client: CPS Date: 4-26-13

Address: Jones Prep.

XRF Serial #: 1264

XRF instrument: NMD's LPA-1

Inspector/L license #: 4 010413 1339

XRF Unit File #: M. Iwanicki

Calibration Check Tolerance Used: +/- 0.3 mg/cm<sup>2</sup> on 1. mg/cm<sup>2</sup> RMD standard

Time Corrected Mode - Duration of Test is seconds long

CALIBRATION CHECK (Bare Wood)

Calibration Time	1st Reading	2nd Reading	3rd Reading	Average Reading	Difference From Average & 0.0 mg/cm <sup>2</sup>	Acceptable Yes/No
<u>0.7</u>	<u>0.1</u>	<u>0.0</u>				

CALIBRATION CHECK (Painted)

Calibration Time	1st Reading	2nd Reading	3rd Reading	Average Reading	Difference Between Average & 0.0 mg/cm <sup>2</sup>	Acceptable Yes/No
<u>1.3</u>	<u>1.1</u>	<u>1.1</u>				

CALIBRATION CHECK (Painted)

Calibration Time	1st Reading	2nd Reading	3rd Reading	Average Reading	Difference Between Average & 0.0 mg/cm <sup>2</sup>	Acceptable Yes/No
<u>0.8</u>	<u>1.1</u>	<u>1.2</u>				

CALIBRATION CHECK ( )

Calibration Time	1st Reading	2nd Reading	3rd Reading	Average Reading	Difference Between Average & 0.0 mg/cm <sup>2</sup>	Acceptable Yes/No

XRF Test Shot #	Test Location	Photo Log #	Component	Substrate	Color	Condition (Fracture, Repairs, etc)	XRF Reading (ppm/cm)	Estimated Thickness	Classification (Positive vs. N/A)
1	Case West		Aluminum	Weld	Gray	F			N
2			Aluminum	Weld	Gray	F			N
3	Area East		Welds	Weld	White	F			N
4	North			Weld	White	F			N
5	South			Weld	White	F			N
6	East		Weld	Weld	White	F			N
7	West		Weld	Weld	White	F			N
8	South			Weld	White	F			N
9	North			Weld	White	F			N
10	East			Weld	White	F			N
11	West			Weld	White	F			N
12	South			Weld	White	F			N
13	North			Weld	White	F			N
14	East			Weld	White	F			N
15	West			Weld	White	F			N
16	South			Weld	White	F			N
17	North			Weld	White	F			N
18	East			Weld	White	F			N
19	West			Weld	White	F			N
20	South			Weld	White	F			N
21	North			Weld	White	F			N
22	East			Weld	White	F			N
23	West			Weld	White	F			N
24	South			Weld	White	F			N
25	North			Weld	White	F			N
26	East			Weld	White	F			N
27	West			Weld	White	F			N
28	South			Weld	White	F			N
29	North			Weld	White	F			N
30	East			Weld	White	F			N

CARROW  
 CONSULTING



Chem. 100 Building Address: 2105 Prep City: CHICAGO State: IL XRF Unit / File # 101010 1379 Inspector: M. F. [Signature] License # 1-1159

Area Description: 100 XRF Serial #: 1264 XRF Instrument: RMD LPA-1 XRF Unit / File # 101010 1379 Inspector: M. F. [Signature] License # 1-1159

Page: 1 of 1 Inspection Date: 4-26-73

XRF Test Sheet #	Test Location	Photo Log #	Component	Substrate	Color	Condition (Finish, P, F, or S)	XRF Reading (mg/cm²)	Estimated Damage	Classification (Positive, Negative, etc.)
19	Room West		WOOD	WOOD	GRAY	P	0.02		P (N)
20	Room West		WOOD	METAL	GRAY	P	0.02		P (N)
21	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)
22	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)
23	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)
24	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)
25	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)
26	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)
27	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)
28	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)
29	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)
30	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)
31	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)
32	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)
33	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)
34	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)
35	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)
36	Room West		WOOD	UNIDENTIFIED	GRAY	P	0.02		P (N)

CHICAGO  
CONCRETE

XRF Shot #	Test Location	Photo Log #	Component	Substrate	Color	Condition (Fair, Pass, Fail)	XRF Measuring Instrument	Estimated Damage	Classification (Positive, Negative, etc.)
37	WOOD		WOOD	WOOD	STEEL	F	D-1		P
38	WOOD		WOOD	WOOD	STEEL	F	D-1		P
39	WOOD		WOOD	WOOD	STEEL	F	D-1		P
40	WOOD		WOOD	WOOD	STEEL	F	D-1		P
41	WOOD		WOOD	WOOD	STEEL	F	D-1		P
42	WOOD		WOOD	WOOD	STEEL	F	D-1		P
43	WOOD		WOOD	WOOD	STEEL	F	D-1		P
44	WOOD		WOOD	WOOD	STEEL	F	D-1		P
45	WOOD		WOOD	WOOD	STEEL	F	D-1		P
46	WOOD		WOOD	WOOD	STEEL	F	D-1		P
47	WOOD		WOOD	WOOD	STEEL	F	D-1		P
48	WOOD		WOOD	WOOD	STEEL	F	D-1		P
49	WOOD		WOOD	WOOD	STEEL	F	D-1		P
50	WOOD		WOOD	WOOD	STEEL	F	D-1		P
51	WOOD		WOOD	WOOD	STEEL	F	D-1		P
52	WOOD		WOOD	WOOD	STEEL	F	D-1		P
53	WOOD		WOOD	WOOD	STEEL	F	D-1		P
54	WOOD		WOOD	WOOD	STEEL	F	D-1		P
55	WOOD		WOOD	WOOD	STEEL	F	D-1		P
56	WOOD		WOOD	WOOD	STEEL	F	D-1		P
57	WOOD		WOOD	WOOD	STEEL	F	D-1		P
58	WOOD		WOOD	WOOD	STEEL	F	D-1		P
59	WOOD		WOOD	WOOD	STEEL	F	D-1		P
60	WOOD		WOOD	WOOD	STEEL	F	D-1		P
61	WOOD		WOOD	WOOD	STEEL	F	D-1		P
62	WOOD		WOOD	WOOD	STEEL	F	D-1		P
63	WOOD		WOOD	WOOD	STEEL	F	D-1		P
64	WOOD		WOOD	WOOD	STEEL	F	D-1		P
65	WOOD		WOOD	WOOD	STEEL	F	D-1		P
66	WOOD		WOOD	WOOD	STEEL	F	D-1		P
67	WOOD		WOOD	WOOD	STEEL	F	D-1		P
68	WOOD		WOOD	WOOD	STEEL	F	D-1		P
69	WOOD		WOOD	WOOD	STEEL	F	D-1		P
70	WOOD		WOOD	WOOD	STEEL	F	D-1		P
71	WOOD		WOOD	WOOD	STEEL	F	D-1		P
72	WOOD		WOOD	WOOD	STEEL	F	D-1		P
73	WOOD		WOOD	WOOD	STEEL	F	D-1		P
74	WOOD		WOOD	WOOD	STEEL	F	D-1		P
75	WOOD		WOOD	WOOD	STEEL	F	D-1		P
76	WOOD		WOOD	WOOD	STEEL	F	D-1		P
77	WOOD		WOOD	WOOD	STEEL	F	D-1		P
78	WOOD		WOOD	WOOD	STEEL	F	D-1		P
79	WOOD		WOOD	WOOD	STEEL	F	D-1		P
80	WOOD		WOOD	WOOD	STEEL	F	D-1		P
81	WOOD		WOOD	WOOD	STEEL	F	D-1		P
82	WOOD		WOOD	WOOD	STEEL	F	D-1		P
83	WOOD		WOOD	WOOD	STEEL	F	D-1		P
84	WOOD		WOOD	WOOD	STEEL	F	D-1		P
85	WOOD		WOOD	WOOD	STEEL	F	D-1		P
86	WOOD		WOOD	WOOD	STEEL	F	D-1		P
87	WOOD		WOOD	WOOD	STEEL	F	D-1		P
88	WOOD		WOOD	WOOD	STEEL	F	D-1		P
89	WOOD		WOOD	WOOD	STEEL	F	D-1		P
90	WOOD		WOOD	WOOD	STEEL	F	D-1		P
91	WOOD		WOOD	WOOD	STEEL	F	D-1		P
92	WOOD		WOOD	WOOD	STEEL	F	D-1		P
93	WOOD		WOOD	WOOD	STEEL	F	D-1		P
94	WOOD		WOOD	WOOD	STEEL	F	D-1		P
95	WOOD		WOOD	WOOD	STEEL	F	D-1		P
96	WOOD		WOOD	WOOD	STEEL	F	D-1		P
97	WOOD		WOOD	WOOD	STEEL	F	D-1		P
98	WOOD		WOOD	WOOD	STEEL	F	D-1		P
99	WOOD		WOOD	WOOD	STEEL	F	D-1		P
100	WOOD		WOOD	WOOD	STEEL	F	D-1		P

CARBON  
 CONCRETE

Client: CPZ

Area Description: JONES ROAD

Building Address: 1266

City: Chicago

State: IL

Inspector: M. L. ...

License #: ...

Inspection Date: ...

XRF Test Shot #	Test Location	Fluorescence Log #	Component	Substrate	Color	Condition (Paint, Lead, PCB, etc.)	XRF Reading (Intensity)	Estimated Barium	Classification (P-P Positive, N-Negative)
50	North		WOOD	WOOD	Grey	F			P
51	↓		WOOD	WOOD	Grey	F			P
52	↓		WOOD	WOOD	Grey	F	0.0		P
53	East		WOOD	WOOD	Red Clay	F	0.2		P
54	West		WOOD	WOOD	Red Clay	F	0.1		P
55	South		WOOD	WOOD	Red Clay	F	0.1		P
56	South		WOOD	WOOD	Red Clay	F	0.1		P
57	South		WOOD	WOOD	Red Clay	F	0.1		P
58	South		WOOD	WOOD	Red Clay	F	0.1		P
59	South		WOOD	WOOD	Red Clay	F	0.1		P
60	South		WOOD	WOOD	Red Clay	F	0.1		P
61	South		WOOD	WOOD	Red Clay	F	0.1		P
62	South		WOOD	WOOD	Red Clay	F	0.1		P
63	South		WOOD	WOOD	Red Clay	F	0.1		P
64	South		WOOD	WOOD	Red Clay	F	0.1		P
65	South		WOOD	WOOD	Red Clay	F	0.1		P
66	South		WOOD	WOOD	Red Clay	F	0.1		P
67	South		WOOD	WOOD	Red Clay	F	0.1		P
68	South		WOOD	WOOD	Red Clay	F	0.1		P
69	South		WOOD	WOOD	Red Clay	F	0.1		P
70	South		WOOD	WOOD	Red Clay	F	0.1		P
71	South		WOOD	WOOD	Red Clay	F	0.1		P
72	South		WOOD	WOOD	Red Clay	F	0.1		P
73	South		WOOD	WOOD	Red Clay	F	0.1		P
74	South		WOOD	WOOD	Red Clay	F	0.1		P
75	South		WOOD	WOOD	Red Clay	F	0.1		P
76	South		WOOD	WOOD	Red Clay	F	0.1		P
77	South		WOOD	WOOD	Red Clay	F	0.1		P
78	South		WOOD	WOOD	Red Clay	F	0.1		P
79	South		WOOD	WOOD	Red Clay	F	0.1		P
80	South		WOOD	WOOD	Red Clay	F	0.1		P
81	South		WOOD	WOOD	Red Clay	F	0.1		P
82	South		WOOD	WOOD	Red Clay	F	0.1		P
83	South		WOOD	WOOD	Red Clay	F	0.1		P
84	South		WOOD	WOOD	Red Clay	F	0.1		P
85	South		WOOD	WOOD	Red Clay	F	0.1		P
86	South		WOOD	WOOD	Red Clay	F	0.1		P
87	South		WOOD	WOOD	Red Clay	F	0.1		P
88	South		WOOD	WOOD	Red Clay	F	0.1		P
89	South		WOOD	WOOD	Red Clay	F	0.1		P
90	South		WOOD	WOOD	Red Clay	F	0.1		P
91	South		WOOD	WOOD	Red Clay	F	0.1		P
92	South		WOOD	WOOD	Red Clay	F	0.1		P
93	South		WOOD	WOOD	Red Clay	F	0.1		P
94	South		WOOD	WOOD	Red Clay	F	0.1		P
95	South		WOOD	WOOD	Red Clay	F	0.1		P
96	South		WOOD	WOOD	Red Clay	F	0.1		P
97	South		WOOD	WOOD	Red Clay	F	0.1		P
98	South		WOOD	WOOD	Red Clay	F	0.1		P
99	South		WOOD	WOOD	Red Clay	F	0.1		P
100	South		WOOD	WOOD	Red Clay	F	0.1		P

CARBON COPY

Column: 100 Page: 5 of 7  
 Building Address: 3025 Papp City: Chicago Inspection Date: 12-13-97  
 XRF Serial #: 1204 State: IL Inspector: M. Sturmfels License #: 1-1139  
 XRF Instrument: AMD LPA-1 XRF Unit File #: 11/10/97

XRF Test Shot	Test Location	Photo Label	Component	Substrate	Color	Condition (F=Fair, G=Good, P=Poor, S=Severe)	XRF Measuring Program	Estimated Damage	Classification (P=Positive, N=Negative)
10	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
11	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
12	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
13	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
14	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
15	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
16	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
17	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
18	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
19	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
20	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
21	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
22	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
23	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
24	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
25	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
26	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
27	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
28	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
29	3025 PAPP		WOOD	WOOD	WOOD	F	100		P
30	3025 PAPP		WOOD	WOOD	WOOD	F	100		P

Inspector's Signature: M. Sturmfels  
 Classification: P=Positive, N=Negative  
 Estimated Damage: 100

Client: URS      Lead Insect Faint XRF Data Sheet      Page 6 of 7  
 Building Address: 1000 S. Dear      City: Chicago      Inspection Date: 04-26-13  
 Area Description: IL      State: IL      Inspector: M. D. ...      License #: 1-199  
 XRF Serial #: 164      XRF Instrument: RMD LPA-1      XRF Unit/File #: 04 0404 139      Inspector's Signature: [Signature]

XRF Test No.	Test Location	Photo Log #	Component	Substrate	Color	Condition F=Fair P=Poor SS=Severe	XRF Reading mg/cm	Estimated Damage	Classification P=Positive >10 N=Negative <10
76	SOFT		door	WOOD	GRAY	F P			P N
77			door	WOOD	GRAY	F P			P N
78			door	WOOD	GRAY	F P			P N
79			door	WOOD	GRAY	F P			P N
80			door	WOOD	GRAY	F P			P N
81			door	WOOD	GRAY	F P			P N
82			door	WOOD	GRAY	F P			P N
83			door	WOOD	GRAY	F P			P N
84			door	WOOD	GRAY	F P			P N
85			door	WOOD	GRAY	F P			P N
86			door	WOOD	GRAY	F P			P N
87			door	WOOD	GRAY	F P			P N
88			door	WOOD	GRAY	F P			P N
89			door	WOOD	GRAY	F P			P N
90			door	WOOD	GRAY	F P			P N
91			door	WOOD	GRAY	F P			P N
92			door	WOOD	GRAY	F P			P N
93			door	WOOD	GRAY	F P			P N
94			door	WOOD	GRAY	F P			P N
95			door	WOOD	GRAY	F P			P N
96			door	WOOD	GRAY	F P			P N
97			door	WOOD	GRAY	F P			P N
98			door	WOOD	GRAY	F P			P N
99			door	WOOD	GRAY	F P			P N
100			door	WOOD	GRAY	F P			P N

CARBON COPY



**Attachment C**

# Michael Serio

Illinois Licensed Lead Risk Assessor



Alteration of this license shall result in legal action

**RISK ASSESSOR CERTIFICATE EXPIRES**

**5/5/2014**

This license issued under authority of the State  
of Illinois -Department of Public Health

This license is valid only when accompanied by  
a valid training course certificate

If found return to 525 W. Jefferson St Springfield, IL 62761



# CERTIFICATE OF ACHIEVEMENT

## LEAD INSPECTOR'S TRAINING

Accredited by Illinois Department of Public Health

This is to certify that MICHAEL P. SERIO has completed the 24-HOUR LEAD INSPECTOR course and successfully passed the examination on 05/04/2011 with a minimum score of 70%. Training was in accordance with the Illinois Lead Poisoning Prevention Code 77 ILL ADM Code 845.30 and U.S. EPA Model Training Course Curriculum.



05/02/2011-05/04/2011

Course Dates:

05/04/2014

Expires:

1105LI03

Certificate Number:

A handwritten signature in black ink, appearing to read 'N Penef', is written over the printed name of the Director of Training.

Director of Training

Nicholas J. Penef

Doctor of Public Health

Phone Number: (312) 491-0081

FORM # L-010

# Marcos Iwankiw

Illinois Licensed Lead Risk Assessor

			<b>LEAD RISK ASSESSOR LICENSE</b>	
<b>LEAD ID</b>	<b>ISSUED</b>	<b>EXPIRES</b>		
001199	1/31/2013	1/31/2014		
Marcos Iwankiw 600 W. Van Buren Street, Suite 5 Chicago, IL 60607			 ILLINOIS LEAD PROGRAM Environmental Health	

Alteration of this license shall result in legal action  
**RISK ASSESSOR CERTIFICATE EXPIRES**  
12/16/2013

This license issued under authority of the State  
of Illinois -Department of Public Health

This license is valid only when accompanied by  
a valid training course certificate

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# Occupational Training & Supply, Inc.

7233 Adams Street • Willowbrook, IL 60527 • (630) 655-3900

*Marcos Iwankiw*

*has successfully completed the 8 hour Lead Risk Assessor Refresher course and has passed the competency exam with a minimum score of 70%. This course is accredited by the Illinois Department of Public Health in accordance with the Illinois Lead Poisoning Prevention Code.*

## *Lead Risk Assessor Refresher*

*Course Date: 12/16/2010  
Expiration Date: 12/16/2013*

*Exam Date: 12/16/2010  
Certificate: LRAR1012163024*

*Kathy DeSalvo*

*Kathy DeSalvo, Director*

2010