

**ADDENDUM NO. 2**  
**LONG NECK ELEMENTARY SCHOOL**  
Millsboro, Delaware 19966

April 18, 2014

NOTICE: Attach this addendum to the project manual for this project. It modifies and becomes a part of the contract documents. Work or materials not specifically mentioned herein are to be described in the main body of the specifications and as shown on the drawings. Bidders shall acknowledge receipt of this addendum on the space provided on the Bid Form. Failure to do so may subject the bidder to disqualification.

**The time and location for the bid opening remains April 22, 2014 at 4:00 PM local time at the Indian River School District, District Office, 31 Hosier Street Selbyville, Delaware 19975.**

Whenever this Addendum modifies a portion of the Project Manual added information is shown in **Bold/Italicized** and deleted information is shown as ~~striketrough~~.

The contract documents for the above referenced project are amended as follows:

**CLARIFICATIONS**

1. Expansion joint starts at top of slab, and continues through roof. There is not a floor-floor expansion joint in the slab on grade.
2. Awning window in storefront shall be manufacturer's standard model (basis-of-design Kawneer GLASSVent w/ standard hardware).
3. All deliveries shall correspond to the construction schedule. No deliveries can be made prior to 9:00 AM, unless trucks can be unloaded and off site prior to 8:00 AM, due to student and staff arrivals. No deliveries can be made after 2:30 PM due to student and staff departures.

**CHANGES TO PROJECT MANUAL**

1. Section 011100 Summary of Work
  - a. REPLACE section with attached.
2. Section 012300 Alternates
  - a. REVISE Paragraph 3.1.A.1.2.b to read as follows: "Size: 12"x12" in corridors, and either 12"x12" or 24"x24" in other spaces."
3. Section 042000 Unit Masonry
  - a. REVISE paragraph 2.2.C.1 and 2.2.C.1.a as follows:
    1. Products: Subject to compliance with requirements, available products that may be incorporated into the work include, but are not limited to, the following:
      - a. Trenwythe; Trendstone Fairfield.

- b. ADD paragraph 2.4.B.1.a.3 as follows: "3. Boral Red Wirecut Bostonian Ironspot Modular."
  - c. ADD paragraph 2.4.B.1.b.3 as follows: "3. Redland; Harmar #870 Cool Grey Matt."
  - d. REMOVE paragraph 2.10.
  - e. REMOVE paragraph 3.15.
4. Section 074113 Standing Seam Metal Roofing
    - a. REPLACE section with attached.
  5. Section 081113 Hollow Metal Doors and Frames
    - a. REPLACE section with attached.
  6. Section 081416 Flush Wood Doors
    - a. REPLACE section with attached.
  7. Section 087100 Door Hardware
    - a. REPLACE section with attached.
  8. Section 088000 Glazing
    - a. REMOVE paragraph 2.4. (Fire-rated glazing not required.)
  9. Section 096723 Resinous Flooring
    - a. REVISE paragraph 2.2 to read "URETHANE FLOORING (EPX)"
    - b. REMOVE paragraph 2.3.
  10. Section 096813 Carpet Tile
    - a. ADD section.

## **CHANGES TO DRAWINGS**

1. G001 COVER SHEET
  - a. List of Drawings: REMOVE sheet PD101A.
2. S511 FRAMING SECTIONS AND DETAILS
  - a. Detail 1, REVISE per SSK-1.
  - b. Detail 5, REVISE per SSK-2.
3. S512 FRAMING SECTIONS AND DETAILS
  - a. Detail 6, REVISE per SSK-3
4. A100 OVERALL FIRST FLOOR AND ROOF PLANS
  - a. List of Drawings: REMOVE sheet PD101A.
5. A101 FIRST FLOOR PLAN, ENLARGED PLAN, AND INTERIOR ELEVATIONS
  - a. ADD dimensions at doors B199/1 and B199/2 as follows (from exterior face of wall at Toilet B159, going west): 8" (wall), 6'-4" (door), 2'-0" (wall), 6'-4" (door).
6. A104 CASEWORK AND FINISH PLAN, AND FINISH SCHEDULE

- a. Finish Schedule Legend: REVISE spec reference for CPT-1 from 096816 to 096813.
7. A201 EXTERIOR ELEVATIONS AND SECTIONS
- a. Detail 2: ADD louvers and BRK surrounding BRK-1 rowlock accent, per SKA-04.
  - b. Detail 3: REMOVE louvers and surrounding BRK-1 rowlock accent.
8. A501 WALL TYPES AND MISCELLANEOUS DETAILS
- a. ADD detail 6 "Roof Curb Detail", per SKA-03.
  - b. ADD detail 7 "Typical Rated Partition Marking Detail", per SKA-01.
9. A502 PLAN AND ROOF DETAILS
- a. Detail 1: REMOVE steel angle shown at end of roof deck, and show 6" C.F. framing extend to face of brick. Refer to Structural details, and Structural sketch issued via this addendum.
10. A601 DOOR SCHEDULE, AND DOOR AND WINDOW TYPES AND DETAILS
- a. Louver Type L-1: REVISE size and elevation per SKA-04. (Refer to lintel detail on S510.)
  - b. Door Type 'D': REVISE width of side stiles and top rail to 5". Coordinate top rail width with hardware as required.
  - c. Door Schedule: REPLACE per SKA-02.
    - i. REVISE finish at doors B199/1 and B199/2 to "PT".
    - ii. REVISE door hardware sets.
    - iii. Note: "SRO" refer to factory finished sliced red oak veneer.
11. PD101A FIRST FLOOR PLAN – AREA "A" – PLUMBING - DEMOLITION
- a. REMOVE drawing sheet from set.
12. M402 SCHEDULES - HVAC
- a. REVISE "Energy Recover Wheel Module Schedule with Remote Fans" volts designation from "120" to "208".
13. E102A MEZZANINE PLAN – AREA "A" – ELECTRICAL – NEW WORK
- a. REVISE branch circuit designation serving ERM-1 from "P1B1-27" to "P1A1-17, 29".
14. E403 SCHEDULE – ELECTRICAL
- a. Panelboard P1A1:
    - i. REVISE circuit #27 & #29 designations from "1", "20", (two (2) 1-pole circuit breakers) to "2", "15", (one (1) 2-pole circuit breaker).
- REVISE circuit "#27, #29" description to read "Energy Recovery Module (ERM-1)".

### **QUESTIONS AND ANSWERS**

Q: I do not see any specification(s) for "Awning Type" aluminum vent windows called out on A601. Please provide same and confirm that egress is not required as these are classrooms, each with only one door, and the vents shown are too small to meet egress requirements.

A: Awning windows shall be storefront manufacturer's standard window (basis-of-design Kawneer GLASSvent w/ standard hardware). Egress is not required per NFPA 101 14.2.11.1.2(1).

Q: Confirm water testing (pg. 084113-6) Paragraph 3.2 is required for this project. Typical costs between \$6,000 - \$7,500 seem contraindicated for a project with 8 small windows.

A: Testing shall be provided as specified.

Q: Wide stile doors have 5" vertical stiles and top rail, not 8" and 6" as shown on A601. Please clarify this is acceptable.

A: Intent is to have typical wide-stile doors. Top (and midrail) width shall be adjusted as required for hardware.

Q: Aluminum finish (pg. 084113-5) paragraph 2.8A1 states "as selected from manufacturer's full range of colors." Kawneer offers 15 standard paint finishes. EFCO offers 18 standard paint finishes. Will this be sufficient or should we figure a custom color?

A: Color shall match existing. If standard colors selections are able to accommodate that, custom is not required. Bidder may provide proposed standard sample to Architect for review and approval prior to bid, for confirmation.

Q: Please confirm that none of the HM1 hollow metal doors require fire rated glass. There is nothing on the door schedule to indicate any of these doors are fire rated. However, on pg. 088000-7 Paragraph 2.11 fire rated glazing is called out. Please verify that no fire rated glass is required for this project.

A: Fire-protection and fire-resistant rated glazing are not required for current scope of work.

Q: Please verify that finish hardware for two pairs of aluminum doors - B162A/1 and B167A/1 - is provided under Contract LNE-06 Glass and Glazing.

A: Yes.

Q: Re: Spec 074113 Standing Seam Roof Panels- Are we to assume that the owner will choose from the standard colors of the manufacturers listed for the new standing seam metal roof panels?

A: Color shall match existing. If standard colors selections are able to accommodate that, custom is not required. Bidder may provide proposed standard sample to Architect for review and approval prior to bid, for confirmation.

Q: There aren't any notes on Drawing PD101A for plumbing demo. Please advise if any demo is required.

A: There is no plumbing demolition.

Q: Drawing MD101A Note 3 states demo piping. What size pipe and what type (copper or steel) is to be demolished?

A: The pipe size is 1-1/2". Pipe material is unknown.

Q: Summary of Work for Contract LNE-04 Carpentry & General Work states "Contractor shall cut, cap, remove & dispose of fire protection. Piping sizes and locations are not shown on drawings. Is this required under this contract or should this be part of the Fire Protection contract?"

A: There is no fire protection demolition.

Q: Summary of Work for Contract LNE-04 Carpentry & General Work states "Provide expansion joint system at drywall and masonry construction" Drawing S101 shows 2" expansion joint system but it is not shown in the scope of work for the Concrete contract LNE-02. Which contract is to supply for the expansion joint for the Concrete Contract.

A: The expansion joint is above the slab on grade, so a floor-floor joint is not required.

Q: Drawing A502 Detail 1 shows a rake angle. What supports this rake angle?

A: Refer to attached sketches.

Q: Summary of Work for Contract LNE-04 Carpentry & General Work includes section 089000 Louvers and Vents. Summary of Work for Contract LNE-12 Mechanical states "supply louvers and vents related to the HVAC operations" and Louvers LV-1 and LV-2 are on M401 Louver Schedule. Please clarify which contract is to supply louvers.

A: Contract LNE-04 Carpentry and General Work.

Q: Has Drawing been submitted to Del Dot to see if a permit is required? Can there be an allowance for this cost?

A: The Drawings have been submitted to DelDOT and a permit will be required. Contract LNE-01 Sitework shall include a \$10,000 allowance in their Alternate No. 5 bid for the entrance permit cost.

Q: Pertaining to Drawing C-602 we request Detail for C-4 regarding not H-5 on grating.

A: DelDOT details cannot be provided on plans as they do not allow them. The construction details are public and can be found by going on line using the following link:

[http://www.deldot.gov/information/pubs\\_forms/const\\_details/index.shtml](http://www.deldot.gov/information/pubs_forms/const_details/index.shtml)

Q: A request from Penn Lighting Associates to substitute products manufactured by Philips/Daybrite in lieu of specified light fixtures for types A, A1/EM, B, C, and D.

A: None of the proposed substitutions are acceptable.

## **ATTACHMENTS**

Section 011100

Section 074113

Section 081113

Section 081416

Section 087100

Section 096813

Section 238126

SKA-01, SKA-02, SKA-03, SKA-04, dated 4/16/2014

SSK-1, SSK-2, SSK-3, dated 4/16/14

**END OF ADDENDUM NO. 2**

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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SECTION 011100 - SUMMARY OF WORK

1. RELATED DOCUMENTS

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

2. CONTRACTS

2.1 The work will be performed under separate prime contracts managed by the Construction Manager.

3. ALTERATIONS & COORDINATION

3.1 Contractor shall be responsible to coordinate their work with the work of others, including, but not limited to, the preparation of general coordination drawings, diagrams and schedules, and control of site utilization, from the beginning of activity, through project close-out and warranty periods.

4. KNOWLEDGE OF CONTRACT REQUIREMENTS

4.1 The Contractor and his Subcontractors, Sub-subcontractors and material men shall consult in detail the Contract Documents for instructions and requirements pertaining to the Work, and at his and their cost, shall provide all labor, materials, equipment and services necessary to furnish, install and complete the work in strict conformance with all provisions thereof.

4.2 The Contractor will be held to have examined the site of the Work prior to submitting his proposal and informed himself, his Subcontractors, Sub-subcontractors and material men of all existing conditions affecting the execution of the Work.

4.3 The Contractor will be held to have examined the Contract Documents and modifications thereto, as they may affect subdivisions of the Work and informed himself, his Subcontractors, Sub-subcontractors and material men of all conditions thereof affecting the execution of the Work.

4.4 The Scope of Work for the Contract is not necessarily limited to the description of each section of the Specifications and the illustrations shown on the Drawings. Include all minor items not expressly indicated in the Contract Documents, or as might be found necessary as a result of field conditions, in order to complete the Work as it is intended, without any gaps between the various subdivisions of work.

4.5 The Contractor will be held to be thoroughly familiar with all conditions affecting labor in the area of the Project including, but not limited to, Unions, incentive pay, procurements, living, parking and commuting conditions and to have informed his Subcontractors and Sub-subcontractors thereof.

5. CONTRACT DOCUMENTS INFORMATION

- 5.1 The Contract Documents are prepared in accordance with available information as to existing conditions and locations. If, during construction, conditions are revealed at variance with the Contract Documents, notify the Construction Manager immediately, but no more than three (3) days from the day the variance is first known. Failure to give timely notice shall operate to waive any claim Contractor might otherwise have for an adjustment to Contract Time or Sum as a consequence of such variance.
- 5.2 The Specifications determine the kinds and methods of installation of the various materials, the Drawings establish the quantities, dimensions and details of materials, the schedules on the Drawings give the location, type and extent of the materials.
- 5.3 Dimensions given on the Drawings govern scale measurements and large scale drawings govern small scale drawings, except as to anything omitted unless such omission is expressly noted on the large scale drawings.
- 5.4 The techniques or methods of specifying to record requirements varies throughout text, and may include "prescriptive", "open generic/descriptive", "compliance with standards", "performance", "proprietary", or a combination of these. The methods used for specifying one unit of work has no bearing on requirements for another unit of work.
- 5.5 Whenever a material, article or piece of equipment is referred to in the singular number in the Contract Documents, it shall be the same as referring to it in the plural. As many such materials, articles or pieces of equipment shall be provided as are required to complete the Work.
- 5.6 Whenever a material, article or piece of equipment is specified by reference to a governmental, trade association of similar standard, it shall comply with the requirements of the latest publication thereof and amendments thereto in effect on the bid date.
- 5.7 In addition to the requirements of the Contract Documents, Contractor's work shall also comply with applicable standards of the construction industry and those industry standards are made a part of Contract Documents by reference, as if copied directly into Contract Documents, or as if published copies were bound herein.
- 5.8 Where compliance with two (2) or more industry standards, contract requirements, or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, then the most stringent requirements, which are generally recognized to be also the most costly, is intended and will be enforced, unless specifically detailed language written into the Contract Documents clearly indicates that a less stringent requirement is to be fulfilled. Refer apparently equal but different requirements, and uncertainties as to which level of quality is more stringent, to Architect for decision before proceeding.

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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5.9 Reference standards referenced directly in Contract Documents or by governing regulations have precedence over non-reference standards which are recognized in industry for applicability of work.

5.10 Contractor's bid is based on the complete set of Contract Documents including documents not specifically issued as part of the bid pack but referenced in same.

**6. SCOPE OF WORK/GENERAL INFORMATION**

6.1 A Scope of Work for each contract to be awarded on the project follows in this section. When a Contract has been awarded to a Contractor, the successful Contractor will be listed after the title of the Contract. When no Contract has yet been awarded, no Contractor's name will be listed. Previous Scopes of Work include addendum changes.

6.2 Contractor is responsible for performing the work listed in the Summary of Work for his contract. Contractor is also responsible for knowing the work that has been assigned to preceding contracts. No additional compensation or extension of time will be allowed a Contractor due to his ignorance of the work assigned to his Contract or to other contracts which may affect his work. The Contractor is responsible, however, for all items which are covered in the Specifications and Drawings relating to their Contract if not specifically mentioned in the Summary of Work.

6.3 The Construction Manager will provide on site a source for temporary electric, temporary water and portable sanitation facilities only. It is each Contractor's responsibility to make the necessary connections, including all material for temporary electric and water. Please note that utility charges for office trailers will be the responsibility of the individual Contractors.

6.4 A dumpster will be provided on site for free use by Contractors to dispose of non-hazardous, common, work-related refuse. Clean-up is the responsibility of each Contractor. Clean up shall be performed on a daily basis. Contractors not complying will be advised in writing and back charged for all costs associated with the clean up of their work.

6.5 Contractors are reminded that there are limited storage areas available on site. Off site storage will be the responsibility of each individual Contractor.

6.6 Office trailer permits off site will be the responsibility of each individual Contractor. On site Contractor's field offices, one (1) per Contractor, if required, will be located as directed by the Construction Manager.

6.7 Contractor will be prepared to discuss and submit a detailed project schedule seven (7) days after receipt of Notice to Proceed and to begin its submittal process. The Project Schedule is an integral part of this contract. Certain construction sequences and priorities must take place in order to meet the target dates. Concentrated work periods will occur and each Contractor is responsible to staff the project as required by the current

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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- Construction Schedule or as directed by the Construction Manager. Contractor will cooperate with the Construction Manager in planning and meeting the required sequences of work and Project Schedule as periodically updated by the Construction Manager.
- 6.8 All bids must include insurance limits in accordance with Article 11 of the Section 007300 SUPPLEMENTARY CONDITIONS.
- 6.9 Hoisting, scaffolding and material handling is the responsibility of each Contractor, unless otherwise noted.
- 6.10 Contractor will be responsible for layout of its own work. The Construction Manager will provide benchmark and layout of the building line.
- 6.11 Contractor will be responsible to keep clean public roadways soiled by construction traffic on a daily basis. If cleaning is not done, the Construction Manager may perform the cleaning on an overtime basis and backcharge the Contractor responsible.
- 6.12 Contractor Scopes of Work and Schedule are interrelated. Familiarity with each is required.
- 6.13 The Construction Manager will provide testing services for soil, concrete, masonry and cold-formed steel framing and trusses. Other testing as required by the Contract Documents will be in accordance with the technical specifications and/or the individual scope of work. Refer to Specification Section 0014500 - QUALITY CONTROL.
- 6.14 Safety is the responsibility of each individual Contractor. The project will be governed under the guidelines of OSHA.
- 6.15 Inter-Contractor shop drawing distribution will be performed by the Construction Manager. Contractor is individually responsible for either coordinating his work with these distributed drawings or notifying the Construction Manager, in writing, of any discrepancies.
- 6.16 Coordination with other trades will be required. The Contractor will be required to attend periodic coordination meetings with other trades where requirements, conflicts and coordination issues will be discussed and resolved. Attendance when requested will be mandatory. If inter-Contractor coordination is not satisfactorily performed, the conflicting Contractors shall mutually share the cost to relocate and/or reinstall their work.
- 6.17 Contractor shall submit a schedule of values to the Construction Manager prior to the submission of their first invoice for approval on AIA G702/CMA, Application for Payment and G703, Continuation Sheet.
- 6.18 Contractor is expected to review and coordinate its Work with the complete set of

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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Contract Documents, including all items noted as by his trade whether or not shown on that particular set of drawings. Documents are available at the site for review.

- 6.19 Contractor is responsible for obtaining all necessary permits required for his work, including street permits. Unless otherwise noted, building permit shall be secured by the Construction Manager. Any subcontractor who will be restricting access to street, right of way or adjacent property must notify the Construction Manager 48 hours in advance.
- 6.20 Contractor's License: Submit a copy of all business licenses required by local and state agencies.
- 6.21 Contractor shall absorb, without additional compensation, any and all costs of working beyond normal hours to maintain job progress in accordance with the current construction schedule.
- 6.22 No asbestos or PCB's in or on any material or equipment will be accepted or allowed on this project. All hazardous materials will be treated in accordance with all State and Federal regulations.
- 6.23 Daily clean up of the work is the responsibility of each individual Contractor which includes broom cleaning of their debris as required. Contractor will be individually back charged by the Construction Manager for clean up not satisfactorily performed by the Contractor.
- 6.24 In the event asbestos is uncovered, the Contractor shall notify the Construction Manager of the areas requiring removal of asbestos. The Construction Manager shall then coordinate the removal with the Owner.
- 6.25 This project is to be constructed adjacent to and in existing buildings. Contractor shall exercise all due precautions to minimize noise, air pollution and any other construction hazards which in any way would cause discomfort or danger to the occupants of the existing building in the area.
- 6.26 Existing mechanical, electrical, plumbing, sprinkler, fire alarm, etc. systems will be shut off and locked out by the Owner as required by the Work. Tie-in's and modifications to those systems will be performed by the specific Contractor associated with the work as indicated in the Contract Documents. Re-energizing and re-start up of all systems should be performed by the Owner.
- 6.27 The Safety Cable System shall not be altered or removed without a written request submitted to the Project Manager with a copy to the Field Manager. It shall be the responsibility of each and every Contractor that is removing or altering the Safety Cable System to maintain the fall protection safety provided by the safety cable and not leave the area unprotected. Each and every Contractor shall be responsible to re-install the Safety Cable System immediately after work is completed. Each and every Contractor shall be responsible to re-install the Safety Cable System in accordance to OSHA

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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standards.

- 6.28 Normal work hours for this project are from 7:00 a.m. to 3:30 p.m. Any work to be performed outside of these hours must receive prior approval from the Construction Manager. Requests to work beyond normal work hours shall be submitted at least 48 hours prior.
- 6.29 Contractor is responsible for having a competent project superintendent/foreman on-site during all work performed under its contract.
- 6.30 In the event the Contractor has non-English speaking employees or subcontractors on the project, they shall have a superintendent or foreman on site, at all times, who speaks English and can communicate with Contractor's employees. Should the Contractor fail to meet this requirement, at any time, Construction Manager may direct all Work to stop until the proper supervision is on site. The Contractor will be responsible for maintaining the project work schedule and make up at its own expense, any delay to the Schedule resulting from the work stoppage.
- 6.31 Punch List Procedures: Contractor shall be given a copy of the punch list with his appropriate work identified. Contractor shall have nine (9) calendar work days to complete its punch list work. On the 10th day or as determined by the Construction Manager, the Construction Manager shall employ other contractors, as required, to complete any incomplete punch list work and retain from the appropriate Contractors retainage all costs incurred.
- 6.32 Contractor shall provide the necessary safety barricades and railings required to complete their work and comply with all OSHA, local code and contract specifications.

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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CONTRACT NO. LNE-01 - SITEWORK

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Division 31	Earthwork
Division 32	Exterior Improvements
Division 33	Utilities

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Provide sitework, storm, sanitary and water utilities, paving, curbs, walks and topsoil/seedling.
- Furnish, install, maintain and remove sediment control system including sediment control plan. Maintain sediment control until substantial completion established by DNREC.
- Clearing, grubbing and removal of trees, roots and stumps.
- Site demolition as shown on the Drawings.
- Topsoil stripping and stockpiling on site.
- Contractors should carefully review the soil borings as they relate to the extent of rubble to be removed and other man made obstructions. Saw cutting and removal of sidewalks, curbs, etc. in the performance of work is this Contractor's responsibility.
- Rough grading for area defined on site drawings for building, lawn areas, bituminous roads, parking and walkways. Preparation of subgrade for building slabs, walks and pavements.
- Furnish, install and maintain select fill under slab.
- Provide a certified construction reviewer (CCR) to perform inspections and provide written reports; signed and sealed by a professional engineer.
- Provide all DeIDOT permits related to work for this project.
- Remove/relocate utilities including, but not limited to water, sanitary, and storm.
- Furnish, install, maintain and remove temporary site fencing, temporary walks as shown

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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on the site plan.

- Proof rolling of limit of excavation.
- All utilities shall be brought to within +/- 5 feet of the building line by this Contractor. The connection and all utilities from +/- 5 feet and into the building shall be by others.
- Backfilling as detailed below is the responsibility of this Contractor. Soil types shall be in accordance with Del Dot standard specifications.
- It is the intent to use on site material and not imported fill. The use of this onsite material shall conform with the compaction requirements as specified on Civil drawings and in Specification Section 312000. If the on site material does not meet those requirements or if there is insufficient on site material available, this contractor shall import at no additional expense to the project sufficient material to complete the work.
- Provide perimeter protection of all excavated areas until suitably backfilled.
- Provide and maintain stabilized site entrance.
- Provide street cleaning of mud, etc. on a daily basis.
- Include all costs for temporary barricades, arrows, pedestrian protection, flagmen, etc. required to complete the work.
- Base bid shall include all standard dewatering measures; utilizing trenches, crocks, stone and portable pumping measures. This contractor to provide these measures as required to perform their work. Well pointing if necessary will be handled as a negotiated cost by the Owner.
- This Contractor shall provide and maintain all temporary access roads as detailed in Contract Documents, until completion of project.
- Chain link fences and gates.
- Pavement markings.
- Exterior signage.
- The Concrete Contractor shall furnish, install and maintain stone fill under slab. The Sitework Contractor shall leave the building pad site at subgrade to within +/- 1/4" in preparation to receive stone fill. The Mechanical and Electrical Contractors shall complete their work under the slab on grade and shall be responsible to return the pad to the subgrade elevation left by the Sitework Contractor. The Concrete Contractor shall then adjust the select material to final subgrade, fine grade the slab and place the vapor barrier and stone fill.

Indian River School District  
Referendum 2013  
Long Neck Elementary School

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- Daily clean up.
- *Removal of playground equipment, including foundations, and rubber mulch.*
- *Provide a 225' long by 12' wide by 12" thick temporary access road constructed of stabilized stone material, crushed concrete or asphalt millings. Location of the road shall be determined by the Construction Manager. Maintain access road throughout construction. Upon removal of the access road, all disturbed areas shall receive topsoil, seed and straw mulch.*
- *Furnish, install and remove 1,000' of temporary orange construction fencing as required by the Construction Manager.*

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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CONTRACT NO. LNE-02 - CONCRETE

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Division 3	Concrete
Section 072100	Thermal Insulation
Division 31	Earthwork

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Provide concrete foundations, slabs on grade and all reinforcing steel.
- This Contractor will be responsible for laying out all concrete work as shown on the structural and architectural drawings.
- This Contractor to furnish and install reinforcing steel, admixtures, curing compound, sealers as required in the Contract Documents.
- Perimeter insulation at foundation walls.
- Underslab vapor barrier, insulation, reglets, waterstops, control and construction joints (including required caulking at control and construction joints).
- Placement of related items furnished under other specification sections.
- All blockouts and embedments required by plans and specifications.
- This Contractor to furnish and install all sleeves for incoming utilities at the perimeter walls.
- Include all weather protection and water pumping as required. This Contractor is also responsible for any special procedures to ensure proper concrete mixing, placing, finishing, protection and curing during hot weather.
- Coordinate the "Notch" in the concrete slabs to allow for a future Contractor to easily install expansion joint details.
- ~~Provide dewatering after acceptance from Sitework Contractor until re-acceptance by the Sitework Contractor.~~ *Dewatering of work areas.*

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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- Provide and maintain perimeter fall protection at excavated areas per OSHA standards.
- Equipment bases and foundations shall be the responsibility of the Contractor providing the equipment.
- Asphalt concrete paving and Portland cement concrete paving, sidewalks and curbs shall be provided by others.
- All concrete testing will be completed by the Construction Manager, however, it will be the responsibility of this Contractor to furnish all samples.
- Provide specified sloping for floor drains as detailed (Drains to be furnished by Mechanical Contractor.)
- This Contractor shall provide written documentation that all concrete slabs are within the tolerance required by the contract documents. Testing and analysis to be paid for by this Contractor.
- Provide excavation and backfill for concrete foundations, concrete footings, wall footings, foundation walls and reinforcing steel for above.
- Backfilling is the responsibility of this Contractor. Soil types shall be in accordance with project documents.
- Provide off site disposal of all unsuitable excavated materials.
- The Concrete Contractor shall furnish, install and maintain stone fill under slab. The Sitework Contractor shall leave the building pad site at subgrade to within +/- 1/4" in preparation to receive stone fill. The Mechanical and Electrical Contractors shall complete their work under the slab on grade and shall be responsible to return the pad to the subgrade elevation left by the Sitework Contractor. The Concrete Contractor shall then adjust the select material to final subgrade, fine grade the slab and place the vapor barrier and stone fill.
- Daily clean up.

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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CONTRACT NO. LNE-03 - MASONRY

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Section 042000	Unit Masonry
Section 047200	Cast Stone Masonry
Section 072100	Thermal Insulation
Section 072110	Insulating Air Barrier System
Section 079200	Joint Sealants

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Provide masonry units, reinforcing, accessories and related work.
- Caulking of masonry to masonry and to dissimilar materials.
- Integral masonry flashings, expansion joints, insulation and other related items as required.
- Mock up as required.
- Grouting of door frames at masonry openings.
- Weather protection as required to perform the work and maintain the project schedule.
- Scaffolding as required to complete the work.
- Dewatering of work areas.
- Layout of the work including responsibility for all elevations and dimensions as they affect other Contractor's work.
- Lintels either required by this Contract or install loose lintels furnished by others.
- Fill at hollow concrete masonry units.
- Setting of reinforcing steel in block walls.
- Cast stone work.

Indian River School District  
Referendum 2013  
Long Neck Elementary School

---

- Temporary protection for final wash down/cleaning of masonry.
- Flashing Summary:  

Thru wall and cavity flashing below the roof line shall be by the Masonry Contractor.  
Thru wall and cavity flashing above the roof line shall be by the Roofing Contractor.
- Cutting, fitting and building into masonry work, embedments provided by others.
- Provide all firesafing and fire caulking as required. Work related to masonry work.
- Bond beams including reinforcing and fill.
- Furnish and install all masonry veneer anchors where required.
- Spray polyurethane foam building insulation and air/vapor barrier system.
- The Masonry Contractor will be responsible for masonry debris disposal off-site.
- Daily clean up.
- *Site inspections related to the spray insulation air/vapor barrier system. Submit inspection reports required by the Specifications.*
- *Provide specified warranties.*
- *All warranties begin at overall project substantial completion.*

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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CONTRACT NO. LNE-04 - CARPENTRY AND GENERAL WORK

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Division 2	Existing Conditions
Division 5	Metals
Division 6	Wood, Plastics, and Composites
Section 072100	Thermal Insulation
Section 079500	Expansion Control
Section 081113	Hollow Metal Doors and Frames
Section 081416	Flush Wood Doors
Section 087100	Door Hardware
Section 089000	Louvers and Vents
Section 092216	Non-Structural Metal Framing
Section 092900	Gypsum Board
Division 10	Specialties
Section 122113	Horizontal Louver Blinds

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Provide labor and materials to perform the work related to all carpentry and general work.
- Provide and maintain temporary dustproof partitions as shown on the Drawings. Remove all temporary partitions at the conclusion of the project or earlier, as directed by the Construction Manager.
- Provide all labor, material, trucking, equipment, hoisting, scaffolding, power, temporary facilities, permit fees, supervision, layout, clean up, etc. for the complete performance of all demolition work.
- This Contractor shall cut, cap, remove and properly dispose of fire protection, mechanical and electrical items scheduled to be removed as part of the Work. Safe-off of fire protection, mechanical and electrical items to be removed will be done by others.
- Provide structural steel and metal roof decking.
- Provide cold-formed metal trusses and framing.
- Provide engineered shop drawings for cold-formed metal trusses and framing.

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

---

- Provide loose lintels, handrails, railings, steel ladders and accessories.
- Provide fiberglass grating.
- Furnish loose steel lintels, angles, plates and embedded items to the Concrete and Masonry contractors.
- Miscellaneous rough hardware, iron shapes, framing and support angles.
- Galvanizing, as required.
- Field touch-up paint.
- No electrical power for welders will be provided.
- All rough carpentry related to the exterior skin of the building including wood nailers and blocking and exterior sheathing.
- All rough carpentry related to the interior of the building including blocking, wood nailers, etc. for the installation of fire extinguishers, doors, windows, toilet accessories, cabinets, toilet partitions, casework, millwork, etc. including fire treating, as required.
- Provide hollow metal doors, frames, finish hardware, and wood doors.
- Keying. All lock sets. Provide Owner with copy of pin schedule.
- Construction cylinders.
- All field trimming required to adjust to existing conditions.
- Louvers and vents
- Provide metal studs, insulation, gypsum wallboard, taping, and spackling.
- Thermal and acoustical batt insulation as required.
- Include fire taping and sealing as shown on the Drawings.
- Provide expansion joint systems, including joint covers, at drywall and masonry construction. Roof expansion joint systems will be provided by the Roofing Contractor.
- Scaffolding and lifts for this work.
- Comebacks and out-of-sequence work may be required and as such should be included.

Indian River School District  
Referendum 2013  
Long Neck Elementary School

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- Include all necessary field measurements.
- Provide all metal framing as indicated for back up of other materials.
- Provide metal furring.
- Marker boards, tack boards, and visual display rails.
- Interior signage.
- Fire extinguishers, cabinets and accessories.
- Toilet and bath accessories.
- Window treatments.
- Mirrors.
- Anchoring devices, fasteners, inserts and other related items associated with the installation of the above items.
- This Contractor shall include in the base bid 80 hours of Journeyman carpenter time and 80 hours of common labor time for work to be directed by the Construction Manager.
- This Subcontractor shall at a minimum provide and maintain for the length of the project, one temporary fire extinguisher for each 3,000 sq. ft of the protected building area. Fire extinguishers shall be 10lb, Multi-Purpose (ABC) dry chemical, UL labeled, with a rating of 3a:40bc.
- Furnish hold open closers with fire alarm interface: Power wiring by Electrical Contractor. Fire alarm ties in by Electrical Contractor.
- Daily clean up.
- *Provide temporary wood frames with reinforced poly for weather protection, in all of the window and door openings on the exterior elevations, until the windows and doors are ready to be installed. Remove and dispose of the temporary frames immediately prior to window and door installation. Provide temporary wood doors at the exterior doors, to include self-closing hardware and padlocks.*
- *Provide two temporary demising partitions, each seven feet in length, from the floor to the bottom chord of the roof truss. Each partition shall be sound attenuated with insulation and sealed to ensure no migration of sound, dust or odors. Provide ½" drywall on both sides. Occupant side shall receive a level 4 finish. Provide two single door openings, one for each partition, with panic hardware on the occupant side for emergency egress. Doors shall be standard duty hollow metal with an insulated core. Frames shall*

Indian River School District  
Referendum 2013  
Long Neck Elementary School

---

*be knock-down type. Remove and dispose of the temporary partitions and doors when directed by the Construction Manager.*

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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CONTRACT NO. LNE-05 - ROOFING

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Section 074113	Standing Seam Roof Panels
Section 075323	Ethylene-Propylene-Diene-Monomer (EPDM) Roofing
Section 076200	Sheet Metal Flashing and Trim
Section 077200	Roof Accessories
Section 077253	Snow Guards

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Provide a complete standing seam metal roofing assembly, including metal roof panels, underlayment, cover board and rigid insulation.
- Provide a complete EPDM roofing assembly, including a mechanically-fastened membrane, vapor retarder, cover board and rigid insulation.
- Caulking related to roofing, flashing and roof accessories.
- Metal drip edges.
- Metal soffit.
- Roof curbs.
- Provide expansion joints that are integral to the roof.
- Provide permanent patching of existing roofing systems at areas of demolition and building tie-in. All patching shall conform to original warranty requirements and documents.
- Gutters, downspouts and splash blocks.
- Metal fascia.
- Wood blocking shall be provided by others.
- Provide specified warranties.

Indian River School District  
Referendum 2013  
Long Neck Elementary School

---

- Flashing and sheet metal.
- Flashing Summary:  
  
Thru wall and cavity flashing below the roof line shall be by the Masonry Contractor.  
Thru wall and cavity flashing above the roof line shall be by the Roofing Contractor.
- Daily clean up.
- *Manufacturer's field service and inspections related to the metal roof panel assembly.  
Submit inspection reports required by the Specifications*
- *All warranties begin at overall project substantial completion.*

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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CONTRACT NO. LNE-06 – GLASS AND GLAZING

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Section 079200	Joint Sealers
Section 084113	Aluminum-Framed Entrances and Storefronts
Section 087100	Door Hardware
Section 088000	Glazing

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Provide aluminum framed entrances and storefronts.
- Provide manual aluminum door systems and handling.
- Finish hardware for aluminum doors only.
- All glass and glazing at exterior of building.
- Caulking related to the storefront system.
- Mock-ups as required by the Drawings and Specifications.
- Custom breakmetal trim and infill.
- Hoisting/scaffolding related to the work of this Contract.
- Field verify all rough openings.
- Caulk between the materials supplied under this section and the adjacent surfaces.
- Provide interior glass and glazing systems.
- Interior door and window glass.
- Provide specified warranties.
- Caulking related to interior glazing.
- Do not provide interior hollow metal frames. These items will be provided by others.

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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- Coordinate glass types with partition and door fire ratings. Contact Construction Manager with any discrepancies.
- Daily clean up.
- *Perform water spray test and submit inspection reports required by the Specifications.*
- *All warranties begin at overall project substantial completion.*

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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CONTRACT NO. LNE-07 - ACOUSTICAL CEILINGS

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Section 079500	Expansion Control
Section 095113	Acoustical Panel Ceilings

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Provide acoustical panel ceilings, suspension system and hangers.
- Supplemental suspension hangers at large ducts above ceilings and at openings for lighting fixtures.
- Ceiling expansion joints.
- Reflected ceiling layout.
- This Contractor shall cut openings in ceilings for sprinkler heads, lights, mechanical diffusers and grilles, etc.
- Attic stock.
- Daily clean up.
- *Include in the base bid 20 man hours for acoustical ceiling work to be used as directed by the Construction Manager.*

Indian River School District  
Referendum 2013  
Long Neck Elementary School

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CONTRACT NO. LNE-08 - FLOORING

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Section 093000	Tiling
Section 096513	Resilient Base and Accessories
Section 096519	Resilient Tile Flooring
Section 096723	Resinous Flooring
<i>Section 096813</i>	<i>Tile Carpeting</i>

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Provide flooring in accordance with the finish schedule and specifications.
- Prepare subfloor for finished flooring including leveling and patching.
- Resilient flooring.
- Resilient base.
- Resilient transition and reducer strips at edges of resilient flooring.
- Ceramic tile.
- Mortar.
- Grout.
- Resinous flooring and integral base.
- Substrate preparation prior to the installation of flooring as required by the Specifications.
- Cleaning and protection.
- Attic stock.
- Provide cutting and fitting around work of others.
- Daily clean up.

Indian River School District  
Referendum 2013  
Long Neck Elementary School

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- *Carpet tiles.*

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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CONTRACT NO. LNE-09 - PAINTING

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Section 079200	Joint Sealants
Section 099113	Exterior Painting
Section 099123	Interior Painting
Section 099600	High Performance Coatings
Division 21	Fire Protection
Division 22	Plumbing

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Provide all interior and exterior painting as indicated on the drawings and finish schedule.
- Sealing all interior joints between dissimilar materials that require sealants.
- Paint exposed piping and ductwork (sprinkler, plumbing, electrical) in accordance with the Drawings and Specifications.
- Provide supplementary ventilation as required in enclosed spaces.
- Paint and caulk all hollow metal frames and doors as shown on the door schedule.
- Prefinished items will not be painted by this Contractor.
- Protection of adjacent surfaces.
- Minor patching prior to application of finishes.
- Daily clean up.
- This Contractor to allow 40 man hours and all required paint materials for these man hours to be used as directed by the Construction Manager.
- Attic stock.
- Final coat of paint is to be installed after ceilings are installed, if directed by Construction Manager.

Indian River School District  
Referendum 2013  
Long Neck Elementary School

---

- *Paint the occupant side of the temporary demising walls, metal door and frame assemblies, color(s) TBD.*
- *Paint the new sprinkler main and electrical conduits that run exposed in the gymnasium, color(s) TBD.*

Indian River School District  
Referendum 2013  
Long Neck Elementary School

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CONTRACT NO. LNE-10 - INSTITUTIONAL CASEWORK

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials, and equipment for:

- Technical Specification sections:

Division 0      Bidding and Contract Requirements  
Division 1      General Requirements  
Section 123200 Institutional Casework

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Provide all cabinets, countertops, shelving, etc., listed in the casework schedule included in specifications and shown on the drawings. All work shall be pre-cut to receive items furnished by this contractor but installed by others.
- Provide all cutouts.
- Coordinate casework listed in specifications and drawings. Provide all items required by both.
- All countertops, cabinets and casework shall be field cut to size and shall have end panels.
- Provide grommets for cable pass thrus.
- Any items furnished as part of this Scope of Work that require mechanical or electrical rough ins or services that are different from those shown on the Contract Drawings shall be ~~so noted at the time of bid~~ **brought to the attention of the Construction Manager during the bidding period.** Failure to do so shall make this Contractor liable for costs of any changes required by same.
- Provide all caulking and sealants for proper installation and in accordance with public health regulation.
- Daily clean up.

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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CONTRACT NO. LNE-11 - FIRE PROTECTION

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Division 21	Fire Protection
Division 26	Electrical
Section 078413	Fire Protection, HVAC and Plumbing Penetration Firestopping

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Provide piping, fittings, couplings, valves and sprinkler heads.
- As-built drawings.
- Testing and inspections.
- Cutting and patching.
- Firesafing.
- Design.
- Flow and tamper switches to be supplied by this Contractor and wired by the Electrical Contractor. It is this Contractors responsibility to provide flow and tamper switches to meet applicable state and local codes.
- Pipe identification.
- Provide the necessary coordination with trade to avoid interferences with other work and make corrections at no extra charge.
- Daily clean up.
- Provide all cutting and patching associated with the tie-in of fire protection services required under this Contract.
- Provide safe-off of all existing piping, equipment and other fire protection items to be removed as part of the Work. The Carpentry and General Work Contractor shall cut, cap, remove and dispose of debris at an off site location.

Indian River School District  
Referendum 2013  
Long Neck Elementary School

---

- *Coordination drawings.*

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

---

CONTRACT NO. LNE-12 - MECHANICAL

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Section 033000	Cast-In-Place Concrete
Section 078413	Fire Protection, HVAC and Plumbing Penetration Firestopping
Division 22	Plumbing
Division 23	Heating Ventilating and Air Conditioning
Division 26	Electrical
Division 31	Earthwork

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Provide a complete mechanical, plumbing and piping system as indicated on the Drawings and in the Specifications.
- Division 26 of the specifications should be reviewed as it relates to the power wiring and other requirements for HVAC equipment including the coordination of furnishing and installing motor starters as provided in the specifications.
- This Contractor shall be responsible to designate an individual within his organization, intimately familiar with this project and assigned on site, to act as the System Start-up Coordinator. This individual must be pre-approved by the Construction Manager. This individual's responsibilities shall include, but not be limited to, coordinating the start-up of all mechanical equipment, including the coordination between the Electrical Contractor, the Controls Contractor, and all testing, adjusting and balancing work. This individual shall report on a weekly basis, in written form, to the Construction Manager. These reports shall include a summary of current conditions including manufacturers' start-ups, systems' deficiencies noted to date and the remediation of same, coordination issues between trades, system interfacing and forecasting, as necessary to project the completion of each individual system within the building.
- Excavation and backfill for underground mechanical/plumbing work is the responsibility of this Contractor. Soil types shall be in accordance with Del Dot standard specifications. Refer to Division 31 specifications.
- Backfilling is the responsibility of this Contractor. Soil types shall be in accordance with project documents.
- Equipment bases and housekeeping pads.

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

---

- Permits/meters.
- Pipe and duct insulation.
- Penetrations through wall, floors, etc. including cutting, patching and fire safing.
- Testing and balancing.
- Daily clean up.
- All guarantees and warranties to begin at the substantial completion of the entire project. Maintain equipment prior to substantial completion.
- Hoisting, rigging and scaffolding.
- ATC.
- Ductwork, grilles and diffusers.
- Roof drains.
- Louvers and vents related to HVAC operations.
- Coordinate damper size, location and type of damper with architectural drawings.
- Trap priming system.
- Attic stock.
- Roof curbs.
- All utilities will be brought to within +/- 5 feet of the building line by others. The Mechanical Contractor is responsible for connecting the utilities from +/- 5 feet outside the building line and completing the system within the building.
- ~~Install Owner pre-purchased equipment, if applicable.~~
- Access panels.
- As-built drawings.
- The Concrete Contractor shall furnish, install and maintain stone fill under slab. The Sitework Contractor shall leave the building pad site at subgrade to within +/- 1/4" in preparation to receive stone fill. The Mechanical and Electrical Contractors shall complete their work under the slab on grade and shall be responsible to return the pad to the

Indian River School District  
Referendum 2013  
Long Neck Elementary School

---

subgrade elevation left by the Sitework Contractor. The Concrete Contractor shall then adjust the select material to final subgrade, fine grade the slab and place the vapor barrier and stone fill.

- Provide all cutting and patching associated with the tie-in of mechanical services required under this Contract.
- Provide safe-off of all existing piping, equipment and other mechanical items to be removed as part of the Work. The Carpentry and General Work Contractor shall cut, cap, remove and dispose of debris at an off site location.
- *Coordination drawings.*
- *Demonstration and training.*
- *Operation and maintenance manuals.*

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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CONTRACT NO. LNE-13 - ELECTRICAL

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Section 033000	Cast-In-Place Concrete
Section 078413	Fire Protection, HVAC and Plumbing Penetration Firestopping
Division 23	Heating Ventilating and Air Conditioning
Division 26	Electrical
Division 28	Electronic Safety and Security
Division 31	Earthwork

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

- Provide a complete electrical system as indicated on the drawings, schedules and in the specifications.
- Division 23 of the specifications should be reviewed as it relates to the power wiring and other requirements for HVAC equipment including the coordination of furnishing and installing motor starters and controllers as detailed in the Specifications and on the Drawings.
- Excavation and backfill for underground electrical work as required below is the responsibility of this Contractor. Soil types shall be in accordance with Del DOT standard specifications.
- Backfilling is the responsibility of this Contractor. Soil types shall be in accordance with project documents.
- Concrete for duct banks, light standards, above ground conduit encasement, equipment bases and any other concrete work specifically related to the electrical work. Include requirements of Sussex County, State and local codes for concrete encasement.
- Temporary electric installation, maintenance and removal. Refer to Division 1, specification section 015113 - TEMPORARY ELECTRIC, for specific scope.
- Rough in and final connection and related work for equipment provided under other contracts (i.e. HVAC, sprinkler, motorized doors, etc.)
- Permits and inspections.

Indian River School District  
Referendum 2013  
Long Neck Elementary School

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- Penetrations through walls, floors, etc. including cutting, patching and fire safing.
- Testing.
- Daily clean up.
- The Concrete Contractor shall furnish, install and maintain stone fill under slab. The Sitework Contractor shall leave the building pad site at subgrade to within +/- 1/4" in preparation to receive stone fill. The Mechanical and Electrical Contractors shall complete their work under the slab on grade and shall be responsible to return the pad to the subgrade elevation left by the Sitework Contractor. The Concrete Contractor shall then adjust the select material to final subgrade, fine grade the slab and place the vapor barrier and stone fill.
- All guarantees and warranties to begin at the substantial completion of the entire project. Maintain equipment prior to substantial completion.
- Hoisting, rigging and scaffolding.
- Provide a complete fire alarm system. Water flow devices are supplied and installed by the Sprinkler Contractor and wired by this Contractor. Include tie-in to fire sprinkler flow and tamper switch. Furnish duct smoke detectors to the Mechanical Contractor for installation.
- Provide rough ins (back boxes, conduits, and pull strings) for special systems (CCTV, access control, intercom, intrusion detection, sound, security, clock system) as required. Coordinate rough ins for power for card access system. Provide cable tray system at IDF room.
- Grounding of building columns and interior spaces as required.
- Pull strings and boxes for voice/data boxes.
- As-built drawings.
- Attic stock.
- Provide all cutting and patching associated with the tie-in of electrical services required under this Contract.
- Provide safe-off of all existing wiring, lighting and other electrical items to be removed as part of the Work. The Carpentry and General Work Contractor shall cut, cap, remove and dispose of debris at an off site location.
- *Demonstration and training.*

Indian River School District  
Referendum 2013  
Long Neck Elementary School

---

- *Operation and maintenance manuals.*
- *Temporary electric service to the Construction Manager's field office.*

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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CONTRACT NO. LNE-14 - COMMUNICATIONS

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Section 260500	Common Work Results for Electrical
Section 260519	Conductors and Cables
Section 260526	Grounding and Bonding
Section 260528	Electrical Firestopping
Section 260529	Hangers and Supports
Section 260533	Raceways and Boxes
Section 260553	Electrical Identification
Section 262726	Wiring Devices
Section 270500	Common Work Results for Communications
Section 272000	Communications Equipment and Cabling

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

1. Provide all labor, equipment, accessories and materials for a complete functional Electronic Communication System and a complete and operable Network System.
2. Provide cabling, outlets, devices, equipment, fixtures, components, wiring, terminations and programming for the systems included in this Contract.
3. Provide backbone cabling, horizontal cabling, equipment racks, cable management system, uninterruptable power supplies, rack automatic transfer switches, switches and accessories, patch panels, patch cords, fiber enclosures, fiber optic patch cords, surge protection, backboards, optical fiber cable hardware, information outlets, voice over IP system and wireless access point system (WAP).
4. Provide penetrations through walls, floors, etc., including sleeves, cutting, patching and smoke/fire safing.
5. Provide access panels for required access to concealed components.
6. Provide coordination of the work of this contract with the Electrical Contractor, including final equipment locations.
7. Rough ins of backboxes and conduits in walls will be completed by the Electrical Contractor. The Communications Contractor shall coordinate box locations with final equipment

**Indian River School District  
Referendum 2013  
Long Neck Elementary School**

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locations. Cable tray within the MDF and IDF rooms will be provided by the Electrical Contractor. Supplemental ladder racks will be provided by the Communications Contractor as required.

8. Provide bridle rings, supporting hardware, cable ties, device and equipment support and hangers.
9. Provide grounding and bonding.
10. Provide cable color coding. Provide equipment, device and cable labeling and identification products.
11. Coordinate installations with Delaware Department of Technology and Information (DTI). DTI will configure all switches connected to the School's network.
12. Provide testing, inspections, startup service and certifications.
13. Provide demonstration and training.
14. Provide operation and maintenance manuals.
15. Provide daily clean up.
16. Provide attic stock, maintenance and extra materials.
17. All warranties begin at overall project substantial completion.
18. Provide all cutting and patching associated with the tie-in of communications services required under this Contract to the existing building.

END OF SECTION

DIVISION 23  
SECTION 238126  
VARIABLE REFRIGERANT VOLUME SPLIT SYSTEMS WITH HEAT RECOVERY (AIR COOLED  
SYSTEMS)  
TABLE OF CONTENTS

PART 1 GENERAL

- 1.1 RELATED DOCUMENTS
- 1.2 SUMMARY
- 1.3 DEFINITIONS
- 1.4 SUBMITTALS
- 1.5 SYSTEM DESCRIPTION
- 1.6 QUALITY ASSURANCE
- 1.7 DELIVERY, STORAGE AND HANDLING
- 1.8 WARRANTY
- 1.9 ALTERNATES

PART 2 PRODUCTS

- 2.1 MANUFACTURERS
- 2.2 OUTDOOR UNITS – AIR COOLED
- 2.3 BRANCH SELECTOR/HEAT RECOVERY BOX
- 2.4 INDOOR UNITS
- 2.5 CONTROL SYSTEM

PART 3 EXECUTION

- 3.1 EXAMINATION
- 3.2 INSTALLATION
- 3.3 CONNECTIONS
- 3.4 COMMISSIONING AND MANUFACTURER'S FIELD SERVICES
- 3.5 DEMONSTRATION

## SECTION 238126 - VARIABLE REFRIGERANT VOLUME SPLIT SYSTEMS WITH HEAT RECOVERY (AIR COOLED SYSTEMS)

## PART 1 GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. This Section includes Variable Refrigerant Volume Split Systems with Heat Recovery.
- B. Related Sections include the following:
  - 1. Division 23 Section *HVAC Piping, Fittings and Valves* for refrigerant piping materials.
  - 2. Division 23 Section *HVAC Insulation* for refrigerant pipe insulation requirements.
  - 3. Division 23 Section, *Vibration Controls for HVAC, Plumbing, & Fire Protection Equipment* for isolation materials.
  - 4. Division 23 Section, *Instrumentation & Controls of HVAC & Plumbing Systems* for temperature-control devices, and control wiring and control devices connected to indoor, outdoor and refrigerant distribution devices.
  - 5. Division 26 Section, *Disconnect Switches & Circuit Breakers* and circuit breakers for field installed disconnect switches.

## 1.3 DEFINITIONS

- A. *EER*: Cooling full load energy efficiency ratio.
- B. *IEER*: Cooling integrated (part load) energy efficiency ratio.
- C. *High Temperature COP*: Heating coefficient of performance at 42°F.
- D. *Low Temperature COP*: Heating coefficient of performance at 17°F.
- E. *SCHE*: Simultaneous cooling and heating efficiency.

## 1.4 SUBMITTALS

- A. Product Data: Include manufacturer's technical data for each model indicated, including rated capacities of selected model clearly indicated; dimensions; required clearances; shipping, installed, and operating weights; furnished specialties; accessories; and installation and startup instructions.
- B. Product data for Variable Refrigerant Volume units specified, including the following:
  - 1. Dimension and plans and elevation drawings including field piping, required clearances and locations of all field connections.

2. Certified fan-sound power ratings.
  3. Certified coil-performance rating with system operating conditions indicated.
  4. Motor ratings and electrical characteristics plus motor and fan accessories.
  5. Filters with performance characteristics.
  6. Outdoor air cooled heat pump unit.
  7. Summary of all auxiliary utility requirements such as electricity, refrigerant piping, and condensate piping. Summary shall indicate quality and quantity of each required utility.
  8. Branch selector box data.
  9. Refnet data.
  10. ARHI 1230 certification including EER, IEER, high temperature COP, low temperature COP, and SCHE.
- C. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection. Detail mounting, securing, and flashing of roof curb to roof structure for roof mounted units. Detail mounting and securing to concrete pads for grade mounted systems. Indicate coordinating requirements with roof membrane system or concrete pads and vibration isolation.
1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring.
- D. Field Test Reports: Indicate results of manufacturer's startup and testing requirements. Submit copies of checklists.
- E. Maintenance Data: For equipment to include in the maintenance manuals specified in Division 01.
- F. Warranties: Special warranties specified in this Section.

## 1.5 SYSTEM DESCRIPTION

- A. Furnish and install where indicated, a variable capacity, heat recovery air conditioning system. System shall be a Variable Refrigerant Volume Series split system as manufactured by Daikin, LG, Trane, Samsung, Johnson Controls, or approved equal. The system shall consist of multiple indoor units capable of cooling or heating, branch selector boxes, refrigerant joints to separate refrigerant flow between units and headers (refnets), a three pipe refrigeration distribution system using PID control, and an outdoor unit. The indoor units shall be connected to the outdoor units utilizing the specialized piping joints provided by the equipment manufacturer. The outdoor unit shall be direct expansion (DX), air-cooled heat recovery, multi-zone air-conditioning system with fixed speed and variable speed inverter driven compressors using R-410A refrigerant. The outdoor unit may connect to a connected indoor capacity up to 130% of the outdoor unit capacity. All zones are each capable of operating separately with individual temperature control. A dedicated hot gas pipe shall be provided to provide optimum heating operation performance.
- B. Operation of the system shall permit either individual cooling or heating of each indoor unit simultaneously or all of the indoor units associated with one branch cool/heat selector box. Each indoor unit or group of indoor units shall be able to provide set temperature

independently via a BMS interface. Provide all interlock wiring between system controllers and building automation system.

- C. Branch cool/heat selector boxes shall be located as shown on the drawing. The branch selector boxes shall have the capacity to control cooling and heating down stream of the box to each individual heat pump unit. The box shall consist of electronic expansion valves, refrigerant control piping and electronics to facilitate communications between the branch selector box and main processor and between the branch selector box and indoor units. The branch selector box shall control the operational mode of the subordinate indoor units. The use of electronic expansion valves ensures continuous heating during defrost, no heating impact during changeover and reduced sound levels.
- D. Manufacturer shall have five years prior experience making similar equipment as described in this specification.

#### 1.6 QUALITY ASSURANCE

- A. All equipment and systems shall be tested and certified in accordance with AHRI 1230 (Performance Rates of Variable Refrigerant Flow (VRF) Multi-Split Air Conditioning and Heat Pump Equipment) and bear the AHRI certification seal.
- B. Fabricate and label refrigeration system to comply with ASHRAE 15, *Safety Code for Mechanical Refrigeration*.
- C. Listing and Labeling: Provide electrically operated components specified in this Section that are listed and labeled.
  - 1. The Terms *Listed and Labeled*: As defined in the National Electrical Code, Article 100.
  - 2. Listing and Labeling Agency Qualifications: A *Nationally Recognized Testing Laboratory* as defined in OSHA Regulation 1910.7.
- D. Comply with NFPA 70 for components and installation.
- E. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL 1995 – Heating and Cooling Equipment and bear the Listed Mark.
- F. The system shall be factory tested for safety and function.
- G. Coordination: Coordinate layout and installation of indoor units, outdoor units, refrigerant piping, branch selector boxes, refnets, and other appurtenances with piping and ductwork and with other installations.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver outdoor and indoor units as factory assembled units with protective crating and covering.
- B. Coordinate delivery of units in sufficient time to allow movement into building or on to roof as indicated.

## 1.8 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: A written warranty, executed by the manufacturer and signed by the Contractor, agreeing to replace components that fail in materials or workmanship, within the specified warranty period, provided manufacturer's written instructions for installation, operation, and maintenance have been followed.
  - 1. Warranty Period: Compressors and Compressor Motor Contactors: Manufacturers standard, but not less than 6 years after date of Substantial Completion.

## 1.9 ALTERNATES

- A. Refer to Division 01 Section, "Alternates" for description of work under this section affected by alternates.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:
  - 1. Daikin, Samsung, Sanyo, LG, Johnson Controls, Trane, or approved equal.
- B. Basis of Design was a Daikin 3-pipe system. All scheduled capacities and efficiencies must be met. Cost of any electrical piping, design, insulation, additional branch selector boxes, heat recovery boxes, refnets, or other changes associated with other approved manufacturers shall be included in the bid and shall be the responsibility of the Contractor.

### 2.2 OUTDOOR UNITS – AIR COOLED

- A. The outdoor unit is designed specifically for use with variable refrigerant volume system components. The outdoor unit shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of scroll compressors, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separators, service ports, refrigerant regulator and all components for a complete functioning system.
- B. The outdoor unit shall be modular in design and should allow for side-by-side installation with minimum spacing.

- C. The following safety devices shall be included on the outdoor unit; high pressure switch, control circuit fuses, crankcase heaters, fusible plug, high pressure switch, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.
- D. Unit Cabinet: The outdoor unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.
- E. Fan: The unit shall have one or more propeller type, direct-drive fan motors that have multiple speed operation via a DC (digitally commutating) inverter. The condensing unit fan motor shall have multiple speed operation of the DC (digitally commutating) inverter type, and be of high external static pressure. A field setting switch to a maximum 0.32 in. WG pressure is available to accommodate field applied duct for indoor mounting of condensing units. The fan shall be a vertical discharge configuration and the motor shall have inherent protection and permanently lubricated bearings and be mounted.
- F. Condenser Coil: The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond. The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure high efficiency performance. The fins are to be covered with an anti-corrosion acrylic resin and hydrophilic film and pipe plates shall be treated with powdered polyester resin for corrosion prevention.
- G. Compressor: Unit shall contain both fixed speed scroll and variable speed inverter scroll compressors. Inverter scroll compressors shall be variable speed (PAM inverter) controlled which shall be capable of changing the speed to follow the variations in total cooling and heating load as determined by the suction gas pressure as measured in the condensing unit. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read and calculated. Each non-inverter compressor shall also be of the hermetically sealed scroll type. With each reading, the compressor capacity (INV frequency or STD ON/OFF) shall be controlled to eliminate deviation from target value. Compressors shall be spring mounted to avoid the transmission of vibration.

### 2.3 BRANCH SELECTOR/HEAT RECOVERY BOX

- A. Branch selector (BS)/heat recovery boxes shall be located as shown on the drawing. The BS/heat recovery box shall be furnished with at least 5 electronic expansion valves (EEV's), refrigerant control piping and electronics to facilitate communications between the BS/heat recovery box and main processor and between the BS/heat recovery box and indoor units. The BS box shall control the operational mode of the subordinate indoor units. The use of five EEV's shall control the direction of refrigerant flow and ensure continuous heating during defrost, no heating impact during changeover and reduced sound levels. The branch selector/heat recovery boxes shall be designed specifically for use with heat recovery system components. These selector/heat recovery boxes shall be factory assembled, wired, and piped and shall be run tested at the factory. Unit Cabinet shall have a galvanized steel plate casing. Each cabinet shall house a liquid gas separator and contain a tube in tube heat exchanger. The unit shall have sound absorption thermal insulation material made of flame and heat resistant foamed polyethylene. Each circuit shall have at least one branch selector/heat recovery box to facilitate simultaneous heating and cooling in the system. Multiple indoor units may be connected to a branch selector/heat recovery box provided they are within the

capacity range of the branch selector. The unit electrical power shall be as scheduled on the Contract Drawings. East branch selector shall support up to four heat pump units, each served by dedicated refrigerant suction and liquid piping. Each heat pump unit shall be able to individually operate in heating or cooling mode.

## 2.4 INDOOR UNITS

- A. Ceiling Cassette Indoor Unit - The unit shall be completely factory assembled and wired. The casing shall be galvanized sheet with grey heat insulation. This unit shall fit in the ceiling and have the capability of attaching a branch supply duct as well as a fresh air duct. The evaporator fan shall be an assembly with a high performance, fan direct driven by a single motor. The fans shall be statically and dynamically balanced and run on permanently lubricated bearings. The indoor unit shall have an adjustable air outlet system offering 4-way air flow, 3-way air flow, or 2-way air flow. The auto air swing vanes shall automatically swing up and down for uniform air distribution. Return air shall be filtered by a long-life filter to provide approximately, 2500 hours of use in a normal office environment before cleaning. The indoor unit shall be covered with a flat panel which protrudes only 1 inch below the ceiling to provide a neat and clean installation. The coils shall be of nonferrous construction with smooth plate fins bonded to copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tubes joints shall be brazed with phoscopper or silver alloy. The coils shall be pressure tested at the factory. A condensate pan shall extend under the coil and piping. An integral drain pan pump capable of lifting condensate 22 inches shall be provided. An integral booster heater shall not be provided to supplement the unit during the heating mode. The unit electrical power requirements shall be as scheduled on the contract drawings. Furnish with condensate overflow float switch that will shut down unit should a high condensate level condition be sensed.

## 2.5 CONTROL SYSTEM

- A. The control system shall consist of multiple microprocessors interconnected by a single non-polar two wire multiplex transmission system. Wiring shall be daisy chained from unit to unit direct. NO SPLICES. One microprocessor shall be factory wired and located within each indoor unit. It shall have the capability of sensing return air temperature and indoor coil temperature; receive and process commands from the remote controller. The microprocessor within the wall mounted remote controller shall provide automatic cooling and heating system changeover; display set point and room temperature; a 24 hour on/off timer so that automatic operation can be set on the timer at one hour intervals from one to twenty-four hours; have self-diagnostic function display; check mode for memory of most recent problem; and provide on-off and system/mode function switching. The heating system shall be controlled so that only warm air is discharged whenever the fan speed exceeds the very low (VLO) speed. Normal operation of the remote controller provides individual system control in which one remote controller and one indoor unit are installed in the same room. The control voltage between the indoor units and the outdoor unit shall be 16 volts D.C. 16 VDC shall be generated from the outdoor unit microprocessor board. The system shall be capable of automatic restart when power is restored after power interruption. System shall include twenty function self diagnostics including total hours of compressor run time. Compressor capacity shall be modulated automatically to maintain a constant suction pressure, while varying the refrigerant volume for the needs of the cooling or heating loads. Indoor units shall use PID control to control superheat.

- B. System Controller: Control system shall include a central controller for user interface with system. Controller shall include a Liquid Crystal Display (LCD) touch screen capable of controlling up to 10 outdoor units and 64 indoor unit groups (maximum 128 indoor units).
- C. System Controller shall be able to control the following functions:
  - 1. On/Off selection for each indoor unit group or zone that is defined with several indoor unit groups.
  - 2. Setpoint adjustment for each indoor unit group or zone.
  - 3. Fan speed adjustment for each indoor unit group or zone.
  - 4. Heat/cool/fan mode selection for each indoor unit group or zone.
  - 5. Automatic changeover and antifreeze/overheat protection.
  - 6. Forced shutdown terminals.
  - 7. Priority settings for restriction of local access for start/stop, heat/cool mode and setpoint adjustment (at local remote controllers).
  - 8. Setpoint limitation in both heating and cooling mode.
  - 9. Weekly schedule with start-up and shut off times, temperature settings, and operation modes; 16 operations/each day can be set in one schedule, and 8 different schedules are available for special working days, holidays, or period of non-use.
  - 10. Actual time display and setting.
  - 11. Reset ability for malfunction codes and filter maintenance warning.
  - 12. Maximum 13 months back up power supply to maintain the memory.
  - 13. Non systems units (e.g. energy recovery ventilator) can be started/stopped and general alarm/status reported using Digital Input or Digital Input/Output units, including interlock program.
  - 14. Controller must be BACnet compatible.
- D. Controller shall provide control transformer for 24 VAC supply voltage for controllers as required.
- E. Provide interface devices as required to interface to Building Automation System. ATC Interface shall allow monitoring of all points indicated on the point list.
- F. Furnish the controls with the necessary interfaces to communicate via BACnet/IP or LonWorks to a building automation system.
- G. All inputs and outputs on the manufacturer's controller shall be viewable via the interface.
- H. All set points and schedules shall be editable via the interface by the building automation system.
- I. In addition to standard inputs/outputs provide additional input/outputs as required to accomplish sequence of operation and items listed on point list.
- J. The manufacturer shall be responsible for assisting and participating in the integration of the equipment into the building automation system and shall provide programming, testing, verification, and on site personnel as required.

### PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine space for compliance with requirements for conditions affecting installation and performance of swimming pool dehumidification units. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Mount indoor and outdoor units as detailed on contract drawings and according to manufacturer's written instructions.
- B. Install all interlock and control wiring between indoor units, outdoor units thermostats, and condensate pumps.
- C. Supply initial charge of refrigerant and oil as required.
- D. Install indoor ceiling cassettes and ducted units on vibration isolators.
- E. Install outdoor units on concrete pads or on roof curbs as indicated on drawings.
- F. Comb out fins on condensing unit where deformed or bent. Replace or repair broken fins.
- G. Install condensate lift pumps, float switches, alarm, unit shut down wiring and detection block units per manufacturer's recommendations.
- H. Install system controller and interlock all indoor and outdoor units.
- I. Install lockable caps on all outdoor unit refrigerant service valves to prevent tampering.

### 3.3 CONNECTIONS

- A. Drawings indicate the general arrangement of piping, fittings, and specialties. The following are specific connection requirements:
  - 1. High/low pressure gas line, liquid and suction lines must be individually insulated between the outdoor and indoor units.
  - 2. Refrigerant Piping: conform to applicable requirements of Division 23 Section, *HVAC Piping, Fittings, and Valves*. Connect to supply and return coil tappings with shutoff valve and union or flange at each connection.
  - 3. Install refrigerant piping, refnets, Branch selector boxes, insulation, and control wiring as required by the manufacturer.
  - 4. Install isolation valves on all three pipes between outdoor unit and branch selector boxes.
  - 5. Install isolation valves on both pipes at every indoor unit.
- B. Electrical: Conform to applicable requirements in Division 26 Sections.
- C. Ground equipment.

1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

### 3.4 COMMISSIONING AND MANUFACTURER'S FIELD SERVICES

- A. Verify that installation is as indicated and specified. Provide factory authorized start-up and training.
- B. Complete manufacturer's installation and startup checks and perform the following:
  1. Inspect for visible damage to unit casing.
  2. Inspect for visible damage to compressor, air-cooled condenser coil, and fans.
  3. Verify that clearances have been provided for servicing.
  4. Check that labels are clearly visible.
  5. Clean condenser and inspect for construction debris.
  6. Verify that controls are connected and operable.
  7. Verify that filters are installed.
  8. Adjust vibration isolators.
  9. Verify all piping and branch selector boxes are insulated.
- C. Start unit according to manufacturer's written instructions.
  1. Complete startup sheets and attach copy with Contractor's startup report.
  2. Start-up units in close coordination with testing/balancing.
- D. Check and record performance of interlocks and protection devices; verify sequences.
- E. Operate unit for an initial period as recommended or required by manufacturer.
- F. Calibrate thermostats and humidity sensors.
- G. Check internal isolators.
- H. Start refrigeration and measure and record the following:
  1. Coil leaving-air, dry- and wet-bulb temperatures.
  2. Coil entering-air, dry- and wet-bulb temperatures.
  3. Refrigerant suction/discharge pressures.
  4. Indoor and outdoor unit amperage, voltage, and watts.
  5. Fan Rotation and RPM.
  6. Condensate pump operation.
  7. Condensate overflow safety switch operation.
  8. System controller operation.

### 3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel as specified below:

1. Review data in the maintenance manuals. Refer to Division 01 Section, *Contract Closeout*.
2. Review data in the maintenance manuals. Refer to Division 01 Section, *Operation and Maintenance Data*.
3. Schedule training with Owner, through Architect, with at least 7 days' advance notice.

END OF SECTION

## SECTION 096813 - TILE CARPETING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes modular carpet tile.
- B. Related Requirements:
  - 1. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
  - 2. Include installation recommendations for each type of substrate.
- B. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

## 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
  - 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
  - 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

## 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Carpet Tile: Full-size units equal to 100 percent of amount installed for each type indicated.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II or Master II certification level.
- B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104.

1.8 FIELD CONDITIONS

- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.9 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
  - 2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
  - 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE (CPT-1)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Tandus; Abrasive Action II or comparable product by one of the following:
  - 1. Mannington
  - 2. Shaw.
- B. Characteristics:

1. Color: As selected by Architect from manufacturer's full range.
2. Dye Method: 100 percent solution dyed.
3. Fiber Type: TDX Nylon.
4. Pile Characteristic: Accuweave patterned loop.
5. Tuft Density: 96 tufts per square inch.
6. Pile Height (average): .0187 inches.
7. Stitches: 8.0 per inch.
8. Gage: 1/12.
9. Backing System: Powerbond, or approved equivalent.
10. Size: 24 by 24 inches (610 by 610 mm).
11. Applied Soil-Resistance Treatment: Ensure.

## 2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
  1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
  2. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving carpet tile.
  3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

### 3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.

- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

### 3.3 INSTALLATION

- A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye lot integrity. Do not mix dye lots in same area.
- D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- G. Install pattern parallel to walls and borders.

### 3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
  - 2. Remove yarns that protrude from carpet tile surface.
  - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

## SECTION 087100 – DOOR HARDWARE

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes commercial door hardware for the following:
  - 1. Swinging doors.
  - 2. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
  - 1. Mechanical door hardware.
- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
  - 2. ICC/IBC - International Building Code.
  - 3. NFPA 70 - National Electrical Code.
  - 4. NFPA 80 - Fire Doors and Windows.
  - 5. NFPA 101 - Life Safety Code.
  - 6. NFPA 105 - Installation of Smoke Door Assemblies.
  - 7. State Building Codes, Local Amendments.
- D. Standards: All hardware specified herein shall comply with the following industry standards:
  - 1. ANSI/BHMA Certified Product Standards - A156 Series
  - 2. UL10C – Positive Pressure Fire Tests of Door Assemblies

## 1.2 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
  - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals

that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
  4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.
- D. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.
- E. Warranties and Maintenance: Special warranties and maintenance agreements specified in this Section.

### 1.3 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: Installers, trained by the primary product manufacturers, with a minimum 3 years documented experience installing both standard and electrified builders hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor in good standing by the manufacturers of the primary materials with a warehousing facility in Project's vicinity.

Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

1. Scheduling Responsibility: Preparation of door hardware and keying schedules.
- D. Source Limitations: Obtain each type and variety of Door Hardware specified in this Section from a single source, qualified supplier unless otherwise indicated.
1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
  2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- E. Regulatory Requirements: Comply with NFPA 70, NFPA 80, NFPA 101 and ANSI A117.1 requirements and guidelines as directed in the model building code including, but not limited to, the following:
1. NFPA 70 "National Electrical Code", including electrical components, devices, and accessories listed and labeled as defined in Article 100 by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
  2. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1 as follows:
    - a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
    - b. Door Closers: Comply with the following maximum opening-force requirements indicated:
      - 1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
      - 2) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
    - c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.
  3. NFPA 101: Comply with the following for means of egress doors:
    - a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
    - b. Thresholds: Not more than 1/2 inch high.
  4. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252 (neutral pressure at 40" above sill) or UL-10C.

- a. Test Pressure: Positive pressure labeling.
- F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
  - 1. Function of building, purpose of each area and degree of security required.
  - 2. Plans for existing and future key system expansion.
  - 3. Requirements for key control storage and software.
  - 4. Installation of permanent keys, cylinder cores and software.
  - 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
  - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
  - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
  - 3. Review sequence of operation narratives for each unique access controlled opening.
  - 4. Review and finalize construction schedule and verify availability of materials.
  - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

**1.5 COORDINATION**

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Related Division 08 Sections (Steel, Aluminum and Wood) doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

**1.6 WARRANTY**

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
  - 1. Structural failures including excessive deflection, cracking, or breakage.
  - 2. Faulty operation of the hardware.
  - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
  - 1. Five years for exit hardware.
  - 2. Twenty five years for manual surface door closers.

**1.7 MAINTENANCE SERVICE**

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Continuing Service: Beginning at Substantial Completion, and running concurrent with the specified warranty period, provide continuous (6) months full maintenance including repair and

replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door opening operation. Provide parts and supplies as used in the manufacture and installation of original products.

## PART 2 - PRODUCTS

### 2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
1. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
    - a. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
  - B. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

### 2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.
1. Quantity: Provide the following hinge quantity, unless otherwise indicated:
    - a. Two Hinges: For doors with heights up to 60 inches.
    - b. Three Hinges: For doors with heights 61 to 90 inches.
    - c. Four Hinges: For doors with heights 91 to 120 inches.
    - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
  2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
    - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
    - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
  3. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:

- a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the following applications:
  - 1) Out-swinging exterior doors.
  - 2) Out-swinging access controlled doors.
  - 3) Out-swinging lockable doors.
4. Acceptable Manufacturers:
  - a. Bommer Industries (BO).
  - b. Hager Companies (HA).
  - c. McKinney Products (MK).
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 certified continuous geared hinge with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Provide concealed flush mount (with or without inset), full surface, or half surface, in standard and heavy duty models, as specified in the Hardware Sets. Concealed continuous hinges to be U.L. listed for use on up to and including 90 minute rated door installations and U.L. listed for windstorm components where applicable. Factory cut hinges for door size and provide with removable service power transfer panel where indicated at electrified openings.
  1. Acceptable Manufacturers:
    - a. Bommer Industries (BO).
    - b. McKinney Products (MK).
    - c. Pemko Manufacturing (PE).

### 2.3 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified automatic, self-latching, and manual flush bolts and surface bolts. Manual flush bolts to be furnished with top rod of sufficient length to allow bolt location approximately six feet from the floor. Furnish dust proof strikes for bottom bolts. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
  1. Acceptable Manufacturers:
    - a. Burns Manufacturing (BU).
    - b. Rockwood Manufacturing (RO).
    - c. Trimco (TC).
- B. Door Push Plates and Pulls: ANS/BHMA A156.6 certified door pushes and pulls of type and design specified below or in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
  1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.

2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
  - a. Acceptable Manufacturers:
    - 1) Burns Manufacturing (BU).
    - 2) Rockwood Manufacturing (RO).
    - 3) Trimco (TC).

#### 2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
- C. Cylinders: Original manufacturer cylinders complying with the following:
  1. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
  2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
  3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
  4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
  5. Keyway: Match Facility Standard.
- D. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
  1. Removable Cores: Core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware. Provide removable core (small or large format) as specified in Hardware Sets.
- E. Security Cylinders: ANSI/BHMA A156.5, Grade 1, patented security cylinders and keys able to be used together under the same facility master or grandmaster key system. Cylinders are to be factory keyed.
  1. Acceptable Manufacturers:
    - a. Corbin Russwin (RU) - Pyramid PS Series (Interior).
    - b. Sargent Manufacturing (SA) - KESO Series (Exterior).
- F. Keying System: Each type of lock and cylinders to be factory keyed. Conduct specified "Keying Conference" to define and document keying system instructions and requirements. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner. Incorporate decisions made in keying conference, and as follows:

1. Existing System: Master key or grand master key locks to Owner's existing system.
- G. Key Quantity: Provide the following minimum number of keys:
1. Top Master Key: One (1)
  2. Change Keys per Cylinder: Two (2)
  3. Master Keys (per Master Key Group): Two (2)
  4. Grand Master Keys (per Grand Master Key Group): Two (2)
  5. Construction Keys (where required): Ten (10)
  6. Construction Control Keys (where required): Two (2)
  7. Permanent Control Keys (where required): Two (2)
- H. Construction Keying: Provide construction master keyed cylinders or temporary keyed construction cores where specified. Provide construction master keys in quantity as required by project Contractor. Replace construction cores with permanent cores. Furnish permanent cores for installation as directed under specified "Keying Conference".
- I. Key Registration List: Provide keying transcript list to Owner's representative in the proper format for importing into key control software.

## 2.5 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified mortise locksets furnished in the functions as specified in the Hardware Sets. Locksets to be manufactured with a corrosion resistant, stamped 12 gauge minimum formed steel case and be field-reversible for handing without disassembly of the lock body. Lockset trim (including knobs, levers, escutcheons, roses) to be the product of a single manufacturer. Furnish with standard 2 3/4" backset, 3/4" throw anti-friction stainless steel latchbolt, and a full 1" throw stainless steel bolt for deadbolt functions.
1. Acceptable Manufacturers:
    - a. Corbin Russwin Hardware (RU) – ML2000 Series.
    - b. No Substitution – Facility Standard.
- B. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified cylindrical (bored) locksets furnished in the functions as specified in the Hardware Sets. Lock chassis fabricated of heavy gauge steel, zinc dichromate plated, with through-bolted application. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt. Locks are to be non-handed and fully field reversible.
1. Acceptable Manufacturers:
    - a. Corbin Russwin Hardware (RU) – CL3300 Series.
    - b. No Substitution – Facility Standard.
- C. Lock Trim Design: As specified in Hardware Sets.

## 2.6 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
  2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
  3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
- B. Standards: Comply with the following:
1. Strikes for Mortise Locks and Latches: BHMA A156.13.
  2. Strikes for Bored Locks and Latches: BHMA A156.2.
  3. Strikes for Auxiliary Deadlocks: BHMA A156.5.
  4. Dustproof Strikes: BHMA A156.16.

## 2.7 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
  2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
    - a. Fire Exit Removable Mullions: Provide keyed removable mullions for use with fire exit devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252. Mullions to be used only with exit devices for which they have been tested.
  3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
  4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is not acceptable except in any case where the door light extends behind the device as in a full glass configuration.
  5. Flush End Caps: Provide heavy weight impact resistant flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.

6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty trim with cold forged escutcheons, beveled edges, and four threaded studs for thru-bolts.
    - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets. Provided free-wheeling type trim where indicated.
    - b. Where function of exit device requires a cylinder, provide an interchangeable core type keyed cylinder (Rim or Mortise) as specified in Hardware Sets.
  7. Vertical Rod Exit Devices: Provide and install interior surface and concealed vertical rod exit devices as Less Bottom Rod (LBR) unless otherwise indicated.
  8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
  9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
  10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
  11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Mounting rails to be formed from smooth stainless steel, brass or bronze architectural materials no less than 0.072" thick, with push rails a minimum of 0.062" thickness. Painted or aluminum metal rails are not acceptable. Exit device latch to be investment cast stainless steel, pullman type, with deadlock feature.
1. Acceptable Manufacturers:
    - a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
    - b. Von Duprin (VD) - 35A/98 XP Series.
    - c. Yale Locks and Hardware (YA) - 7000 Series.
- C. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish. Provide keyed removable feature, stabilizers, and mounting brackets as specified in the Hardware Sets. At openings designed for severe wind load conditions due to hurricanes or tornadoes, provide manufacturers approved mullion and accessories to meet applicable state and local windstorm codes.
1. Acceptable Manufacturers:
    - a. Corbin Russwin Hardware (RU) - 700/900 Series.
    - b. Von Duprin (VD) - 9954 Series.
    - c. Yale Locks and Hardware (YA) - M200 Series.

## 2.8 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
  2. Standards: Closers to comply with UL-10C and UBC 7-2 for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
  3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
  4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
    - a. Where closers are indicated to have mechanical dead-stop, provide heavy duty arms and brackets with an integral positive stop.
    - b. Where closers are indicated to have mechanical hold open, provide heavy duty units with an additional built-in mechanical holder assembly designed to hold open against normal wind and traffic conditions. Holder to be manually selectable to on-off position.
    - c. Where closers are indicated to have a cushion-type stop, provide heavy duty arms and brackets with spring stop mechanism to cushion door when opened to maximum degree.
    - d. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics. Provide drop plates or other accessories as required for proper mounting.
  5. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates, and through-bolt or security type fasteners as specified in the door Hardware Sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
1. Acceptable Manufacturers:
    - a. Corbin Russwin Hardware (RU) - DC8000 Series.
    - b. LCN Closers (LC) - 4040XP Series.
    - c. Norton Door Controls (NO) - 7500 Series.

## 2.9 ARCHITECTURAL TRIM

### A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Metal Protection Plates: ANSI/BHMA A156.6 certified metal protection plates (kick, armor, or mop), beveled on four edges (B4E), fabricated from the following:
  - a. Stainless Steel: 300 series, 050-inch thick, with countersunk screw holes (CSK).
4. Fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets.
5. Acceptable Manufacturers:
  - a. Burns Manufacturing (BU).
  - b. Rockwood Manufacturing (RO).
  - c. Trimco (TC).

#### 2.10 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
  1. Acceptable Manufacturers:
    - a. Burns Manufacturing (BU).
    - b. Rockwood Manufacturing (RO).
    - c. Trimco (TC).
- C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
  1. Acceptable Manufacturers:
    - a. Rixson Door Controls (RF).
    - b. Rockwood Manufacturing (RO).
    - c. Sargent Manufacturing (SA).

## 2.11 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
  - 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
  - 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Acceptable Manufacturers:
  - 1. Pemko Manufacturing (PE).
  - 2. Reese Enterprises, Inc. (RS).
  - 3. Zero International (ZE).

## 2.12 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

## 2.13 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

## 3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

## 3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
  - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
  - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
  - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

### 3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

### 3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

### 3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish, and provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

### 3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

### 3.8 DOOR HARDWARE SCHEDULE

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. Manufacturer's Abbreviations:

1. MK - McKinney

2. RO - Rockwood
3. RU - Corbin Russwin
4. SA - Sargent
5. RF - Rixson
6. NO - Norton
7. PE - Pemko

**Hardware Schedule**

**Set: 1.0 (NOT USED)**

3 Hinge	TA2714	US26D	MK
1 Cylindrical Lock (storeroom)	CL3357 PZD CTP	626	RU
1 Cylinder Core (Pyramid)	8027		RU
1 Door Closer	R7500	689	NO
1 Kick Plate	K1050 8" 4BE	US32D	RO
1 Door Stop	403 (or) 441CU	US26D	RO
1 Gasketing	S88BL		PE

**Set: 2.0 (NOT USED)**

3 Hinge	TA2714	US26D	MK
1 Cylindrical Lock (storeroom)	CL3357 PZD CTP	626	RU
1 Cylinder Core (Pyramid)	8027		RU
1 Door Closer	PR7500	689	NO
1 Kick Plate	K1050 8" 4BE	US32D	RO
1 Door Stop	403 (or) 441CU	US26D	RO
1 Gasketing	S88BL		PE

**Set: 3.0 (NOT USED)**

3 Hinge	TA2714	US26D	MK
1 Cylindrical Lock (privacy)	CL3320 PZD	626	RU
1 Door Closer	CLP7500	689	NO
1 Kick Plate	K1050 8" 4BE	US32D	RO
3 Silencer	608 (or) 609	GRY	RO

**Set: 4.0**

Doors: B160/1, B161/1, B163/1, B164/1, B165/1, B166/1, B168/1, B169/1

3 Hinge (heavy weight)	T4A3786	US26D	MK
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**LONG NECK ELEMENTARY – BID DOCS****2013157.01**

1 Cylindrical Lock (classroom intruder)	CL3352 PZD CTPD	626	RU
1 Cylinder Core (Pyramid)	8027		RU
1 Door Closer	PR7500	689	NO
1 Kick Plate	K1050 8" 4BE	US32D	RO
1 Door Stop	403 (or) 441CU	US26D	RO
1 Gasketing	S773BL		PE

**Set: 5.0**

Doors: B162/1, B167/1

6 Hinge (heavy weight)	T4A3786	US26D	MK
2 Push/Pull Bar Set	BF15847 T1	US32D	RO
2 Door Closer	PR7500	689	NO
2 Door Stop	403 (or) 441CU	US26D	RO
1 Threshold	166A MSES10SS		PE
1 Gasketing	S773BL		PE
2 Sweep	315CN		PE
2 Astragal	297AS		PE

**Set: 6.0**

Doors: B162A/1, B167A/1

2 Continuous Hinge	MCK-12HD - DOOR HEIGHT	CL	MK
1 Removable Mullion	900BKM - DOOR HEIGHT		RU
1 Exit Device (rim, dummy trim)	ED4200 P1050 M52	630	RU
1 Exit Device (rim, nightlatch)	ED4200 P1057 M52	630	RU
3 Cylinder (KESO, mortise)	82-72	US26D	SA
1 Cylinder (KESO, rim)	82-64	US26D	SA
2 Door Closer	PR7500	689	NO
2 Door Stop - HD Floor	471	US26D	RO
1 Threshold	270A MSES25SS		PE
2 Sweep	3452CNB		PE

Notes: Perimeter/meeting stile seals by door/frame supplier.

**Set: 7.0**

Doors: B199/1, B199/2

6 Hinge	TA2314	US32D	MK
1 Dust Proof Strike	570	US26D	RO
2 Flush Bolt	555 (or) 557	US26D	RO
1 Mortise Lock (storeroom)	ML2057 PSA SS078 LC	626	RU

DOOR HARDWARE

087100 - 18

**LONG NECK ELEMENTARY – BID DOCS****2013157.01**

1 Cylinder (KESO, mortise)	82-72	US26D	SA
2 Surface Overhead Stop	10-X36	630	RF
1 Threshold	270A MSES25SS		PE
1 Rain Guard	346C		PE
1 Gasketing	S773BL		PE
2 Sweep	3452CNB		PE
1 Astragal	S771C		PE
1 Astragal	357SP		PE

**Set: 8.0**

Doors: B162B/1

3 Hinge	TA2714	US26D	MK
1 Cylindrical Lock (storeroom)	CL3357 PZD CTP	626	RU
1 Cylinder Core (Pyramid)	8027		RU
1 Door Closer	PR7500	689	NO
1 Kick Plate	K1050 8" 4BE	US32D	RO
1 Door Stop	403 (or) 441CU	US26D	RO
3 Silencer	608 (or) 609	GRY	RO

**Set: 9.0**

Doors: B158/1, B159/1, B170/1, B171/1

3 Hinge	TA2714	US26D	MK
1 Cylindrical Lock (privacy)	CL3320 PZD	626	RU
1 Door Closer	PR7500	689	NO
1 Kick Plate	K1050 8" 4BE	US32D	RO
1 Door Stop	403 (or) 441CU	US26D	RO
3 Silencer	608 (or) 609	GRY	RO

END OF SECTION 087100

## SECTION 081416 - FLUSH WOOD DOORS

## PART 1 - GENERAL

## 1.1 SUMMARY

## A. Section Includes:

1. Solid core doors with wood veneer, hardboard or MDF faces.
2. Factory finishing wood doors.
3. Factory fitting wood doors to frames and factory machining for hardware.
4. Light frames and glazing installed in wood doors.

## B. Standards and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A208.1 – Wood Particleboard.
2. Intertek Testing Service (ITS Warnock Hersey) - Certification Listings for Fire Doors.
3. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
4. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
5. UL 10C - Positive Pressure Fire Tests of Door Assemblies; UL 1784 - Standard for Air Leakage Tests of Door Assemblies.
6. Window and Door Manufacturers Association - WDMA I.S.1-A Architectural Wood Flush Doors.

## 1.2 SUBMITTALS

## A. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, trim for openings, and WDMA I.S.1-A or AWS classifications. Include factory finishing specifications.

## B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the wood door supplier in order to prepare the doors and frames to receive the finish hardware items.

## C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.
5. Indicate fire protection ratings for fire rated doors.

## D. Samples for Initial Selection: For factory finished doors.

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.
2. Frames for light openings, 6 inches long, for each material, type, and finish required.

## E. Warranty: Sample of special warranties.

## 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, latest edition, "Industry Standard for Architectural Wood Flush Doors".
- C. Fire Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C (neutral pressure testing according to UL 10B where specified).
  - 1. Oversize Fire Rated Door Assemblies: For units exceeding sizes of tested assemblies provide manufacturer's construction label, indicating compliance to independent 3<sup>rd</sup> party certification agency's procedure, except for size.
  - 2. Temperature Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire test exposure.
  - 3. Smoke Control Door Assemblies: Comply with NFPA 105.
    - 1) Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
  - 4. Blocking: Indicate size and location of blocking in 45, 60 and 90 minute mineral core doors.
- D. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for receiving, handling, and installing flush wood doors.

## 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package pre-finished doors individually in plastic bags or cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on top rail with opening number used on Shop Drawings.

## 1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

## 1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
  - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
  - b. Telegraphing of core construction in wood face veneers exceeding 0.01 inch in a 3-inch span.
  - c. Telegraphing of core construction and delaminating of face in decorative laminate-faced doors.
2. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid Core Interior Doors: Life of installation according to manufacturer's written warranty.

## PART 2 - PRODUCTS

### 2.1 DOOR CONSTRUCTION – GENERAL

- A. WDMA I.S.1-A Performance Grade: Extra Heavy Duty; Aesthetic Grade: Premium.
- B. Fire Rated Doors: Provide construction and core as needed to provide fire ratings indicated.
  1. Category A Edge Construction: Provide fire rated door edge construction with intumescent seals concealed by outer stile (Category A) at 45, 60, and 90 minute rated doors. Comply with specified requirements for exposed edges.
  2. Pairs: Provide fire retardant stiles that are listed and labeled for applications indicated without formed steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
    - a. Where required or specified, provide formed steel edges and astragals with intumescent seals. Finish steel edges and astragals with baked enamel.

### 2.2 CORE CONSTRUCTION

- A. Particleboard Core Doors:
  1. Particleboard: Wood fiber based materials complying with ANSI A208.1 Particleboard standard. Grade LD-2.
  2. Adhesive: Fully bonded construction using Polyurethane (PUR) glue.
  3. Blocking: When through-bolted hardware is not used, provide wood blocking in particleboard core doors as follows:
    - a. 5-inch (125-mm) top-rail blocking, in doors indicated to have closers.
    - b. 5-inch (125-mm) mid-rail blocking, in doors indicated to have exit devices.
      - 1) Optional Cores for Blocking: Provide doors with either glued-wood-stave or structural-composite-lumber core instead of particleboard core for doors indicated to receive closers and exit devices.

4. Basis of Design:
  - a. Graham: PC, PC5

B. Mineral Core Doors:

1. Core: Non-combustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire protection rating indicated.
2. Blocking: Provide composite blocking with improved screw holding capability approved for use in doors of fire protection ratings indicated as needed to eliminate through-bolting hardware.
3. Edge Construction: At hinge stiles, provide laminated edge construction with improved screw holding capability and split resistance. Comply with specified requirements for exposed edges.
4. Basis of Design: Graham FD.

2.3 VENEERED DOORS FOR TRANSPARENT FINISH

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eggers Industries: Premium
2. Graham: GPD
3. Marshfield: Signature
4. VT Industries: Artistry

B. Interior Solid Core Doors:

1. Grade: Premium
2. Faces: Veneer grades as noted below; veneer minimum 1/50-inch (0.5mm) thickness at moisture content of 12% or less.
  - a. Plain Sliced Red Oak, A grade faces, to match existing.
3. Match between Veneer Leaves: Book match.
4. Assembly of Veneer Leaves on Door Faces: Running Match.
5. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
6. Vertical Edges: Matching same species as faces. Wood or composite material, one piece, laminated, or veneered. Minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors.
7. Horizontal Edges: Solid wood or structural composite material meeting the minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors
8. Construction: Five plies. Stiles and rails are bonded to core, then entire unit sanded before applying face veneers.
9. At doors over 40% of the face cut-out for lights and or louvers, furnish engineered composite lumber core.

2.4 LIGHT FRAMES AND GLAZING

A. Wood Beads for Light Openings in Wood Doors up to and including 20-minute rating:

1. Wood Species: Same species as door faces.
  2. Profile: Manufacturer's standard lipped profile. At wood core doors with 20-minute fire protection ratings, provide wood beads and metal glazing clips approved for such use.
- B. Metal Frames for Light Openings in Fire Rated Doors over 20-minute rating: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated.
- C. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with the flush wood door manufacturer's written instructions.

## 2.5 FABRICATION

- A. Factory fit doors to suit frame opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
1. Comply with requirements in NFPA 80 for fire rated doors.
- B. Factory machine doors for hardware that is not surface applied. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
  2. Metal Astragals: Factory machine astragals and formed steel edges for hardware for pairs of fire rated doors.
- C. Openings: Cut and trim openings through doors in factory.
1. Light Openings: Trim openings with moldings of material and profile indicated.
  2. Glazing: Comply with applicable requirements in Division 08 Section "Glazing."
  3. Louvers: Factory install louvers in prepared openings.
- D. Electrical Raceways: Provide flush wood doors receiving electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through wire transfer hardware or wiring harness specified in hardware sets in Division 08 "Door Hardware". Wire nut connections are not acceptable.

## 2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Transparent Finish: Provide a clear protective coating over the wood veneer allowing the natural color and grain of the selected wood species to provide the appearance specified. Stain is applied to the wood surface underneath the transparent finish to add color and design flexibility.
1. Grade: Premium.

2. Finish: Meet or exceed WDMA I.S. 1A TR6 Catalyzed Polyurethane finish performance requirements.
3. Staining: To match existing.
4. Sheen: Satin.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
  1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Hardware: For installation, see Division 8 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
  1. Install fire rated doors in corresponding fire rated frames according to NFPA 80.
- C. Factory Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

#### 3.3 ADJUSTING

- A. Operation: Re-hang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

## SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

## PART 1 - GENERAL

## 1.1 SUMMARY

## A. Section Includes:

1. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Light frames and glazing installed in hollow metal doors.

## B. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
9. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
10. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
11. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
12. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
13. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
14. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

## 1.2 SUBMITTALS

## A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

## B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

## C. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.

7. Details of moldings, removable stops, and glazing.
8. Details of conduit and preparations for power, signal, and control systems.

D. Samples for Verification:

1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C.
  1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
  2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
  3. Smoke Control Door Assemblies: Comply with NFPA 105.
    - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.
- E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

#### 1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

#### 1.6 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

#### 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. CECO Door Products.
  2. Curries Company.
  3. Steelcraft.

#### 2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

#### 2.3 STANDARD HOLLOW METAL DOORS

- A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

- B. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Design: Flush panel.
  2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.
    - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
  3. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
  4. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
  5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
  6. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- C. Basis of Design:
1. Curries Company 707 Series.

#### 2.4 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
1. Fabricate frames with mitered or coped corners.
  2. Fabricate frames, with the exception of slip-on drywall types, with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
  3. Frames for Steel Doors: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
  4. Frames for Wood Doors: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.
  5. Frames for Borrowed Lights: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.
  6. Basis of Design:
    - a. Curries Company M/CM Series.
- C. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

#### 2.5 FRAME ANCHORS

- A. Jamb Anchors:
1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
  2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.

- B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.
- C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

## 2.6 LIGHT OPENINGS AND GLAZING

- A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.
- B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.
- C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames
- D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.
- E. Glazing: Comply with requirements in Division 08 Section "Glazing" and with the hollow metal door manufacturer's written instructions.
  - 1. Factory Glazing: Factory install glazing in doors as indicated. Doors with factory installed glass to include all of the required glazing material.

## 2.7 ACCESSORIES

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

## 2.8 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C. Hollow Metal Doors:
  - 1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
  - 2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
  - 3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.

4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
  - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
9. Jamb Anchors: Provide number and spacing of anchors as follows:
  - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
    - 1) Two anchors per jamb up to 60 inches high.
    - 2) Three anchors per jamb from 60 to 90 inches high.
    - 3) Four anchors per jamb from 90 to 120 inches high.
    - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
  - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
    - 1) Three anchors per jamb up to 60 inches high.
    - 2) Four anchors per jamb from 60 to 90 inches high.
    - 3) Five anchors per jamb from 90 to 96 inches high.
    - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
    - 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".

- E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
  2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
  3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
  4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

## 2.9 STEEL FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

### 3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
  2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
  3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
  4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
    - a. Jamb and Head: 1/8 inch plus or minus 1/16 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

### 3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

END OF SECTION 081113

## SECTION 074113 - STANDING-SEAM METAL ROOFING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes

1. Standing-seam metal roof panels.
2. Metal soffit panels.

- B. Related Sections:

1. Section 077253 "Snow Guards" for prefabricated devices designed to hold snow on the roof surface, allowing it to melt and drain off slowly.

## 1.3 PREINSTALLATION MEETINGS

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

1. Meet with Owner, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of roof accessories and roof-mounted equipment.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review structural loading limitations of deck during and after roofing.
6. Review flashings, special details, drainage, penetrations, equipment curbs, and condition of other construction that affect metal panels.
7. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
8. Review temporary protection requirements for metal panel systems during and after installation.
9. Review procedures for repair of metal panels damaged after installation.
10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

## 1.4 ACTION SUBMITTALS

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

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
  - B. Shop Drawings:
    1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
    2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches (1:10).
  - C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.
    1. Include similar Samples of trim and accessories involving color selection.
  - D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
    1. Metal Panels: 12 inches (305 mm) long by actual panel width. Include clips, fasteners, closures, and other metal panel accessories.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
  - B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
  - C. Field quality-control reports.
  - D. Sample Warranties: For special warranties.
- 1.6 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For metal panels to include in maintenance manuals.
- 1.7 QUALITY ASSURANCE
- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer. Minimum ten years experience installing standing seam roofing.
  - B. Manufacturer Qualifications: Manufacturer shall have minimum ten years experience in fabrication of metal standing seam roof panels.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
  - B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.

#### 1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

#### 1.10 COORDINATION

- A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.
- B. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

#### 1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including rupturing, cracking, or puncturing.
    - b. Deterioration of metals and other materials beyond normal weathering.
  - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Substantial Completion.
- C. Special Weathertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
  - 1. Warranty Period: 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. Energy Performance: Provide roof panels that are listed on the EPA/DOE's ENERGY STAR "Roof Product List" for steep-slope roof products.
- B. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
  - 1. Wind Loads: As indicated on Drawings.
  - 2. Other Design Loads: As indicated on Drawings.
  - 3. Deflection Limits: For wind loads, no greater than 1/240 of the span.
- C. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 1680 at the following test-pressure difference:
  - 1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
- D. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:
  - 1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
- E. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.
- F. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
  - 1. Uplift Rating: UL 90.
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

## 2.2 STANDING-SEAM METAL ROOF PANELS

- A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
  - 1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.
- B. Integral-Standing-Seam Metal Roof Panels: Formed with integral ribs at panel edges and a flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and lapping and interconnecting side edges of adjacent panels.

1. Basis-of-Design Product: Subject to compliance with requirements, provide ATAS International, Inc.; 2” Field-Lok panel or comparable product by one of the following:
  - a. Architectural Metal Systems; a Nucor company.
  - b. ATAS International, Inc.
  - c. Cheney Flashing Company.
  - d. McElroy Metal, Inc.
  - e. Petersen Aluminum Corporation.
2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
  - a. Nominal Thickness: Minimum 0.028 inch (0.71 mm).
  - b. Exterior Finish: Two-coat fluoropolymer.
  - c. Color: To match existing.
3. Clips: Two-piece floating to accommodate thermal movement.
  - a. Material: 0.064-inch- (1.63-mm-) nominal thickness, zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
4. Panel Coverage: 15.25 inches.
  - a. Where existing panels are to be replaced, match existing 14.5 inches width, or replace panels from penetration to start of new work.
5. Panel Height: 2.0 inches (51 mm).
6. Panel Length: Continuous without end laps.

### 2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils (0.76 mm) thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
  1. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D 1970.
  2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.
  3. Products: Subject to compliance with requirements and manufacturer’s written approval, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Carlisle Residential, a division of Carlisle Construction Materials; WIP 300HT.
    - b. Grace Construction Products, a unit of W. R. Grace & Co.; Grace Ice and Water Shield HT.
    - c. Henry Company; Blueskin PE200 HT.
    - d. Kirsch Building Products, LLC; Sharkskin Ultra SA.
    - e. Metal-Fab Manufacturing, LLC; MetShield.
    - f. Owens Corning; WeatherLock Metal High Temperature Underlayment.
- B. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application, if required.

## 2.4 METAL SOFFIT PANELS

- A. General: Provide metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.
- B. Metal Soffit Panels: Match profile and material of existing metal soffit panels.
1. Finish: Match finish and color of existing metal soffit panels.
  2. Sealant: Factory applied within interlocking joint.
- C. Flush-Profile Metal Soffit Panels: Solid panels formed with vertical panel edges and intermediate stiffening ribs symmetrically spaced between panel edges; with flush joint between panels.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. AEP Span; a BlueScope Steel company.
    - b. Architectural Building Components.
    - c. ATAS International, Inc.
    - d. CENTRIA Architectural Systems.
    - e. Dimensional Metals, Inc.
    - f. Firestone Metal Products, LLC.
    - g. McElroy Metal, Inc.
    - h. Merchant & Evans Inc.
    - i. Metal-Fab Manufacturing, LLC.
    - j. Other roofing manufacturer listed above.
  2. Material: Same material, finish, and color as existing metal soffit panels.
  3. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
    - a. Nominal Thickness: 0.028 inch (0.71 mm) minimum.
    - b. Exterior Finish: Two-coat fluoropolymer.
    - c. Color: To match existing.
  4. Panel Coverage: 12 inches (305 mm) or 16 inches (406 mm).
  5. Rib spacing: To match existing.
  6. Panel Height: 0.875 inch (22 mm).

## 2.5 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645; cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.

2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
  3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Gutters: Formed from same material as roof panels, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- (2400-mm-) long sections, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Furnish gutter supports spaced a maximum of 36 inches (914 mm) o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match metal roof panels.
- E. Downspouts: Formed from same material as roof panels. Fabricate in 10-foot- (3-m-) long sections, complete with formed elbows and offsets, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Finish downspouts to match gutters.
- F. Roof Curbs: Fabricated from same material as roof panels, 0.048-inch (1.2-mm) nominal thickness; with bottom of skirt profiled to match roof panel profiles and with welded top box and integral full-length cricket. Fabricate curb subframing of 0.060-inch- (1.52-mm-) nominal thickness, angle-, C-, or Z-shaped steel sheet. Fabricate curb and subframing to withstand indicated loads of size and height indicated. Finish roof curbs to match metal roof panels.
1. Insulate roof curb with minimum 1-inch- (25-mm-) thick, rigid insulation.
- G. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- H. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
  2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
  3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

## 2.6 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
  - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
  - 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
  - 3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
  - 4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
  - 5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
  - 6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
    - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

## 2.7 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- 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 same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels and Accessories:
  - 1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.

1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.
  - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.
  1. Soffit Framing: Wire tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.

### 3.3 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches (152 mm) staggered 24 inches (610 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.
  1. Apply over the entire roof surface.
- B. Slip Sheet: Apply slip sheet over underlayment before installing metal roof panels, where required by manufacturer.
- C. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 076200 "Sheet Metal Flashing and Trim."

### 3.4 METAL PANEL INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
  1. Shim or otherwise plumb substrates receiving metal panels.
  2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
  3. Install screw fasteners in predrilled holes.
  4. Locate and space fasteners in uniform vertical and horizontal alignment.
  5. Install flashing and trim as metal panel work proceeds.

6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
  7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
  8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
- C. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.
- D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
1. Install clips to supports with self-tapping fasteners.
  2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
  3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
  4. Watertight Installation:
    - a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.
    - b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
- F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.
- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
  2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

- H. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches (914 mm) o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- I. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1524 mm) o.c. in between.
  - 1. Provide elbows at base of downspouts to direct water away from building.
  - 2. Connect downspouts to underground drainage system indicated.
- J. Roof Curbs: Install flashing around bases where they meet metal roof panels.
- K. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

### 3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

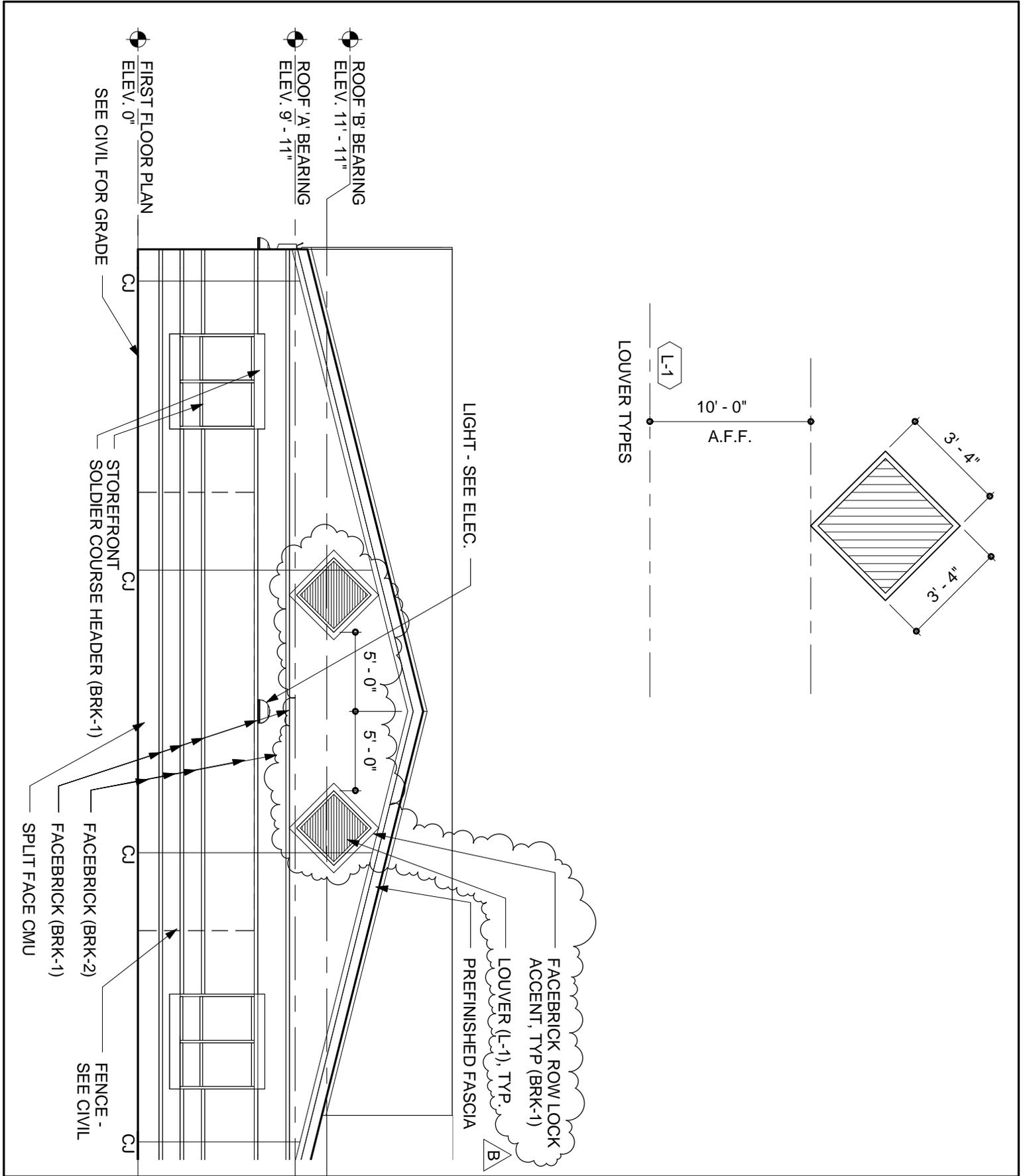
### 3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect metal roof panel installation, including accessories. Report results in writing.
- B. Remove and replace applications of metal roof panels where tests and inspections indicate that they do not comply with specified requirements.
- C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

### 3.7 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074113.16



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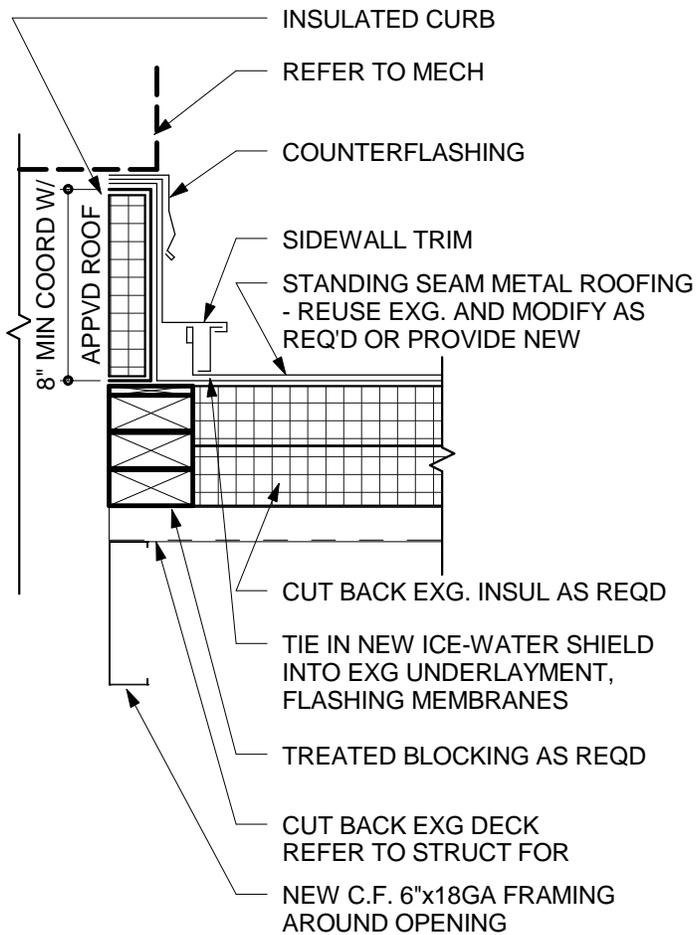
**LONG NECK ELEMENTARY**

26064 SCHOOL LANE  
 MILLSBORO, DELAWARE 19966

SOUTH ELEVATION - 2/A201 & LOUVER TYPE L-1 - A601

PROJECT NO.:	2013157.01
DATE:	MARCH 14, 2014
SCALE:	As indicated
DRAWN BY:	Author

**SKA-04**



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26064 SCHOOL LANE  
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ROOF CURB DETAIL - 6/A501

PROJECT NO.:	2013157.01
DATE:	MARCH 14, 2014
SCALE:	1 1/2" = 1'-0"
DRAWN BY:	Author

SKA-03

DOOR SCHEDULE																	
MARK	DOOR						FRAME						FIRE RATING	HDWE SET	COMMENTS		
	SIZE			MATL	TYPE	FIN	GLAZ	UNDER CUT	MATL	TYPE	FIN	DETAIL					
	WIDTH	HT	THICK									HEAD				JAMB	SILL
FIRST FLOOR PLAN																	
B158/1	3' - 0"	7' - 2"	1 3/4"	SCWD	A	SRO			HM		PT				9.0		
B159/1	3' - 0"	7' - 2"	1 3/4"	SCWD	A	SRO			HM		PT				9.0		
B160/1	3' - 0"	7' - 2"	1 3/4"	SCWD	B	SRO	1/4" Tempered		HM		PT				4.0		
B161/1	3' - 0"	7' - 2"	1 3/4"	SCWD	B	SRO	1/4" Tempered		HM		PT				4.0		
B162/1	6' - 0"	7' - 2"	1 3/4"	HM	D	Painted	1/4" Tempered		HM		PT				5.0	PAIR DOOR, EXIT DEVICE	
B162A/1	6' - 0"	7' - 2"	1 3/4"	ALUM	D	Metal Coating	1" Insulated		ALUM		-				6.0	PAIR DOOR, EXIT DEVICE	
B162B/1	3' - 0"	7' - 2"	1 3/4"	SCWD	A	SRO			HM		PT				8.0		
B163/1	3' - 0"	7' - 2"	1 3/4"	SCWD	B	SRO	1/4" Tempered		HM		PT				4.0		
B164/1	3' - 0"	7' - 2"	1 3/4"	SCWD	B	SRO	1/4" Tempered		HM		PT				4.0		
B165/1	3' - 0"	7' - 2"	1 3/4"	SCWD	B	SRO	1/4" Tempered		HM		PT				4.0		
B166/1	3' - 0"	7' - 2"	1 3/4"	SCWD	B	SRO	1/4" Tempered		HM		PT				4.0		
B167/1	6' - 0"	7' - 2"	1 3/4"	HM	D	Painted	1/4" Tempered		HM		PT				5.0	PAIR DOOR, EXIT DEVICE	
B167A/1	6' - 0"	7' - 2"	1 3/4"	ALUM	D	Metal Coating	1" Insulated		ALUM		-				6.0	PAIR DOOR, EXIT DEVICE	
B168/1	3' - 0"	7' - 2"	1 3/4"	SCWD	B	SRO	1/4" Tempered		HM		PT				4.0		
B169/1	3' - 0"	7' - 2"	1 3/4"	SCWD	B	SRO	1/4" Tempered		HM		PT				4.0		
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B171/1	3' - 0"	7' - 2"	1 3/4"	SCWD	A	SRO			HM		PT				9.0		
B199/1	6' - 0"	7' - 2"	1 3/4"	HM	A	Painted			HM		PT				7.0	PAIR DOOR	
B199/2	6' - 0"	7' - 2"	1 3/4"	HM	A	Painted			HM		PT				7.0	PAIR DOOR	

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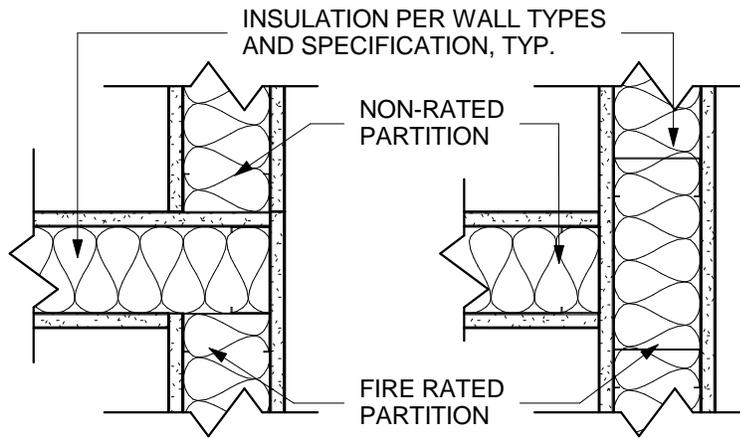


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DOOR SCHEDULE - A601

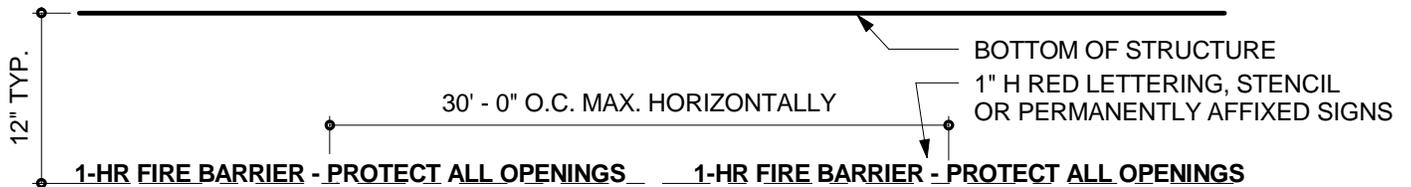
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 SCALE:  
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SKA-02

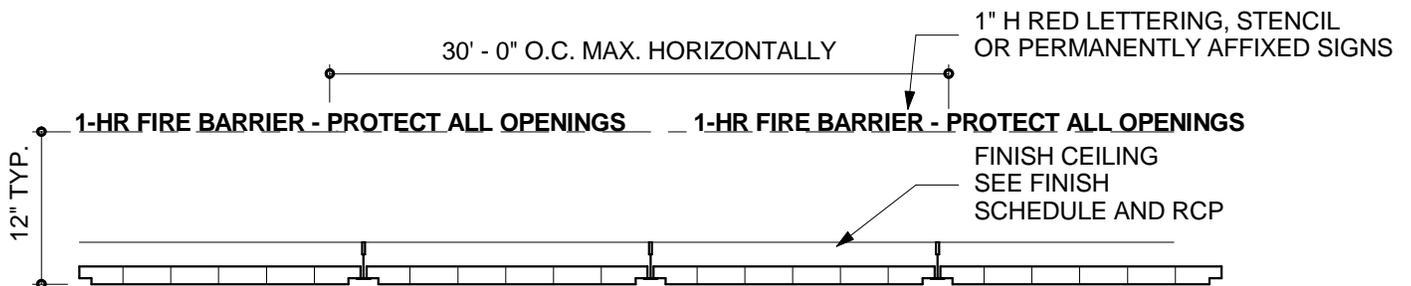


NOTE: SEE PLANS & WALL TYPES FOR TYPES & CONFIGURATION OF PARTITIONS AND SURROUNDING ELEMENTS

**8A. TYPICAL FIRE RATED PARTITION INTERSECTION DETAILS**



**8B. MARKING OF RATED PARTITIONS AND WALLS AT EXPOSED STRUCTURE**



**8C. MARKING OF RATED PARTITIONS AND WALLS AT FINISH CEILING**

NOTE:

1. PROVIDE MARKING ON BOTH SIDES OF RATED WALLS AND PARTITIONS.
2. WHERE CHANGE IN WALL OR PARTITION DIRECTION OCCURS, MARK EACH SEGMENT INDIVIDUALLY.
3. LOCATE MARKINGS TO BE VISIBLE ABOVE CEILING.
4. LETTERING SHALL READ AS FOLLOWS:  
 SMOKE PARTITION: " SMOKE PARTITION - PROTECT ALL OPENINGS "  
 1-HR FIRE BARRIER: " 1-HR FIRE BARRIER - PROTECT ALL OPENINGS "  
 2-HR FIRE WALL: " 2-HR FIRE WALL - PROTECT ALL OPENINGS "



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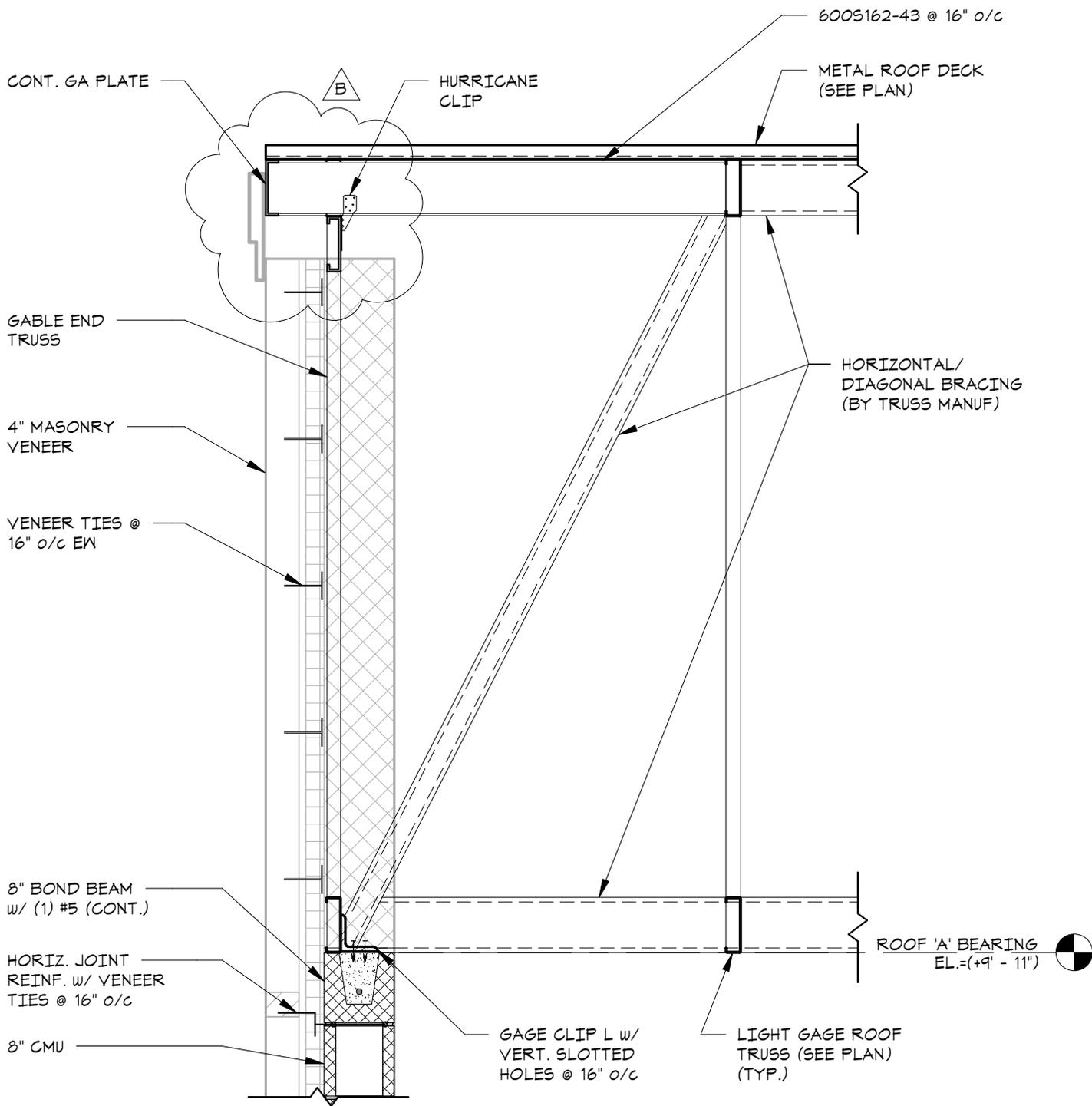
**LONG NECK ELEMENTARY**

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TYPICAL RATED PARTITION MARKING DETAIL - 7/A501

PROJECT NO.:	2013157.01
DATE:	MARCH 14, 2014
SCALE:	1 1/2" = 1'-0"
DRAWN BY:	JML

**SKA-01**



PROJECT TITLE:

## LONG NECK ELEMENTARY - ADDENDUM 2



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REFERENCE DRAWING:

6/5512

SCALE:

3/4" = 1'-0"

DRAWN BY:

BLC

JOB NO.:

217.398

DATE:

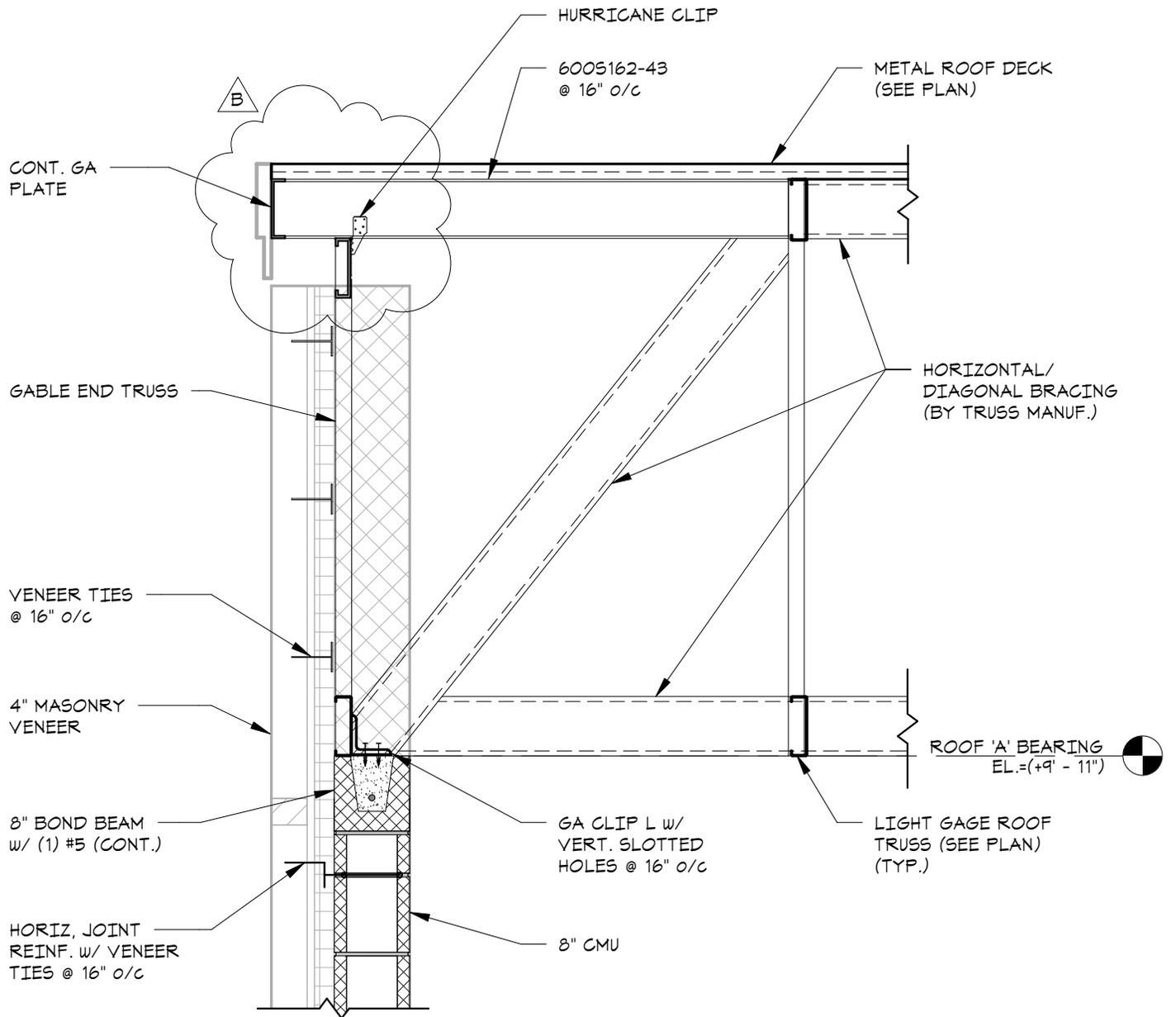
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55K-3



PROJECT TITLE:

## LONG NECK ELEMENTARY - ADDENDUM 2



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REFERENCE DRAWING:

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SCALE:

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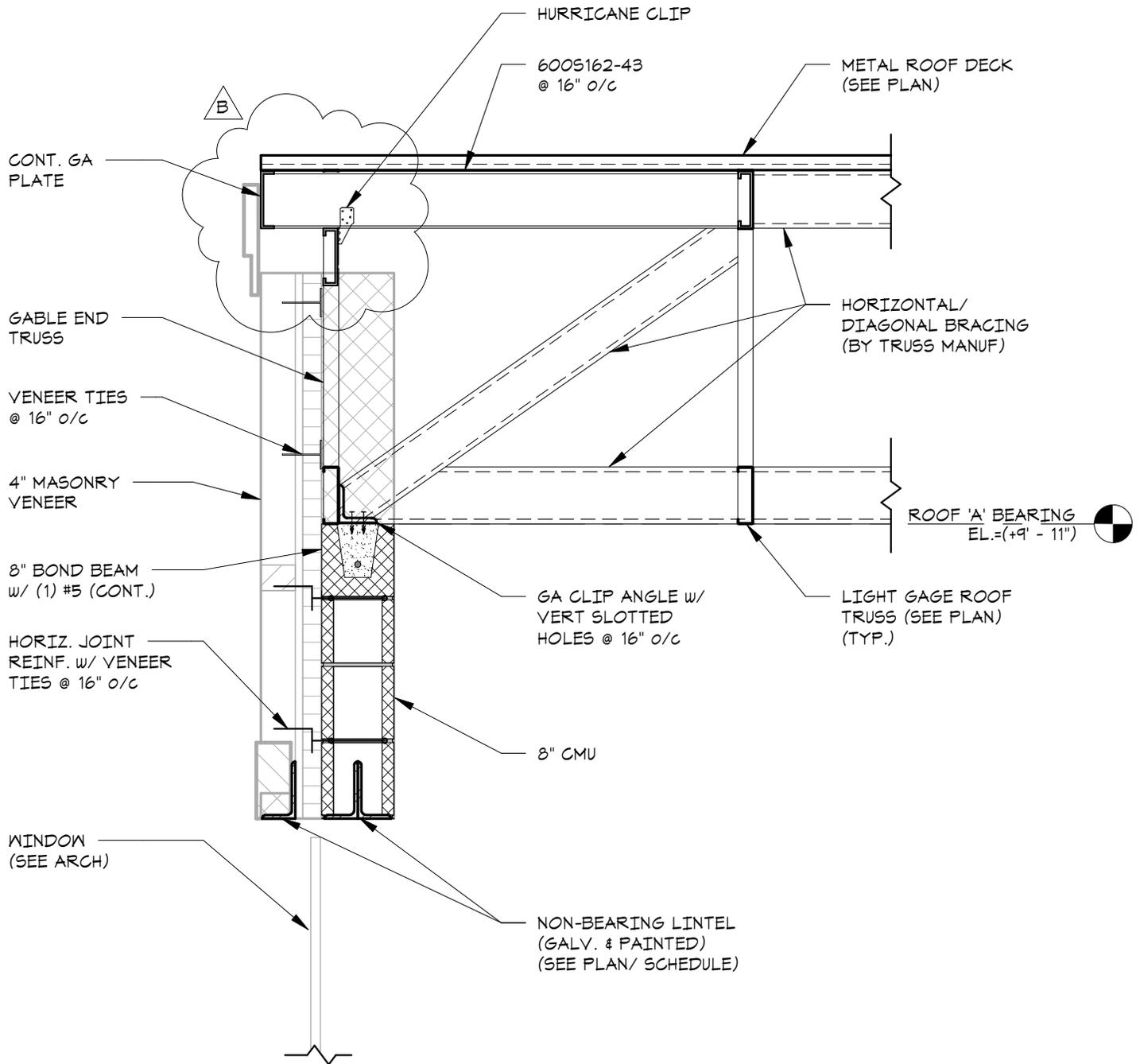
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DRAWING NO.:

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PROJECT TITLE:

LONG NECK ELEMENTARY - ADDENDUM 2



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3/4" = 1'-0"

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55K-1