

**ADDENDUM NO. 2**

March 07, 2012

The Cottage at Thornapple  
2580 Nashville Road  
Hastings, MI 49058

**Owner:**

Barry County / Thornapple Manor  
2700 Nashville Road  
Hastings, MI 49058

**Architect:**

Eckert Wordell, L.L.C.  
161 E. Michigan Avenue, Suite 200  
Kalamazoo, MI 49007

**Construction Manager:**

CM Contracting  
310 Custer Drive  
Battle Creek, MI 49017

Project No. 2011-11-021

**Contents**

1.	Narrative	3 pages
2.	Specification Sections	23 0800
3.	Sketches	ASK 01-05
4.	Full Sheets	None
5.	Miscellaneous Attachments	None

DISTRIBUTION TO: Bidders, Owner, Construction Manager, Architect, Civil Engineer, Structural Engineer, Mechanical Engineer, Electrical Engineer and Food Service Consultant.

The Contract Documents shall be amended and/or revised by Addendum hereinafter specified and all Work affected by Addendum shall be included.

Except as may be otherwise described, labor and material for the Work hereinafter specified shall conform to all requirements of the Original Contract Documents.

**GENERAL ITEMS**

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ADM2-G1      **BID DATE**

1.    **THE REVISED BID DATE IS NOW WEDNESDAY, MARCH 21, 2012 AT 2:00 P.M. EDT.**

**SPECIFICATIONS**

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ADM2-SP1      SECTION 00 0100 TABLE OF CONTENTS

1.    ADD - 23 0800 COMMISSIONING

ADM2-SP2      SECTION 00 3000 TRADE PACKAGES SCOPE OF WORK

1.    REFER to Trade Package 06B. ADD the following:  
  
         08 5213 Aluminum-Clad Wood Casement Windows
2.    REFER to Trade Package 22A. ADD the following:  
  
         9. The cost of commissioning is not included in this package.
3.    REFER to Trade Package 31A. ADD the following:  
  
         11. Removal and re-installation of existing guardrail.

ADM2-SP3      SECTION 09 5426 WOOD PANEL CEILINGS

1.    REFER to Paragraph 2.1. REVISE and ADD the following:
  - A. ~~Ceiling panels: Armstrong World Industries, Inc. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries, Inc. or comparable product by one of the following:~~
    1. *WoodTrends*
  - B. ~~Suspension Systems: Armstrong World Industries, Inc. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries, Inc. or comparable product by one of the following:~~
    1. *WoodTrends*

ADM2-SP4      SECTION 23 0800 COMMISSIONING

1.    ADD section in its entirety.
2.    A commissioning agent will be hired by the Owner per the attached specifications.

ADM2-SP5      SECTION 23 5200 BOILERS

1.    REFER to Paragraph 2.1. ADD the following:  
  
         D. *RBI*

ADM2-SP6 SECTION 28 2300 VIDEO SURVEILLANCE

1. REFER to Paragraph 1.6.A. REVISE the following:
  2. Interior, Controlled Environment: System components, except central-station control unit, installed in temperature-controlled interior environments shall be rated for continuous operation in ambient temperatures of 36 to 122 deg F dry bulb and 20 to ~~90~~ 80 percent relative humidity, noncondensing. NEMA 250, Type 1 enclosures.
  3. Exterior Environment: System components installed in locations exposed to weather shall be rated for continuous operation in ambient temperatures of minus 30 to plus 122 deg F dry bulb and 20 to ~~90~~ 80 percent relative humidity, condensing. Rate for continuous operation when exposed to rain as specified in NEMA 250, winds up to 85 mph. NEMA 250, Type 4X enclosures.
2. REFER to Paragraph 2.3.A. REVISE the following:
  1. Axis M32 Network Camera Series. *(Indoor Use)*
  2. Axis P33-VE Network Camera Series. *(Outdoor Use)*

3. REFER to Paragraph 2. ADD the following:

**2.6 VIDEO ARCHIVING EQUIPMENT**

- A. *Provide one hard drive large enough to store a minimum of 3 months of recorded video. Hard drive should be a RAID level 0.*

**DRAWINGS**

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**ARCHITECTURAL**

ADM2-A1 REFER TO SHEET A920

1. ADD dashed lines to window types indicating which windows to be operable. Refer to ASK-01-ASK-05.

**ELECTRICAL**

ADM2-E1 REFER TO SHEET E100

1. REVISE Quazite box dimensions to be 24" x 36" x 36".

ADM2-E2 REFER TO SHEET E300

1. REVISE – Generator to be separately derived system with generator bonded and 4-pole ATS switches.

END OF ADDENDUM NO. 2



## SECTION 23 0800– COMMISSIONING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes requirements that apply to the commissioning process

#### 1.2 DEFINITIONS

- A. DID: Design Intent Document. A document that details the functional requirements of a project and the expectations of how it will be used and operated. The include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.
- B. BoD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the DID and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- C. CxA: Commissioning Authority.
- D. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources and documentation requirements of the commissioning process.

#### 1.3 GENERAL PROVISIONS

- A. Attention is directed to the Contract, General Conditions, and all sections within Division 1 – General Requirements that are hereby made part of this Section of the Commissioning Specifications.
- B. Examine all Sections of the Specifications for requirements that affect work under this Section.
- C. This Section of the Contract is set aside to incorporate current Commissioning contract requirements and to be the document by which this Section of the Contract will be built into the Final Commissioning Report.
- D. Commissioning: Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the Owner's operational needs. This is achieved by beginning in the design phase and documenting design intent and continuing through construction, acceptance and the warranty period with actual verification of performance. The commissioning process encompasses and coordinates the traditionally separate functions of system documentation, equipment start-up, control system calibration, testing and balancing, performance testing and training.
- E. Commissioning Objective: To have the Contractor complete a comprehensive system readiness process followed by system demonstration to the Commissioning Team with the Commissioning Firm providing the documentation/verification of the building systems that they perform in accordance with the requirements of the contract documents.



1.4 SUBMITTALS

- A. Commissioning Plan
- B. Commissioning Report
- C. Certificates of Readiness
- D. Certificates of Completion

1.5 COMMISSIONING PROCESS (CONSTRUCTION PHASE UP THRU WARRANTY PHASE OF PROJECT)

- A. The Owner shall champion the commissioning process with the Commissioning Firm to commission the building systems to the quality standards and procedures specified herein.
- B. The General Contractor (or Construction Manager) shall work closely with the Commissioning Firm in establishing and maintaining the schedule of commissioning events for the commissioning of systems and activities noted below.
- C. Commissioning of the selected systems shall consist of demonstration and documentation of system readiness prior to demonstration using the PFPT checklists. The PFPT shall be developed and provided to the Contractors by the Commissioning Firm and shall be used in concert with the suggested manufacturer start-up checklists as part of contract start-up.
- D. Commissioning of the selected systems shall consist of demonstration of the interactive system operation through the use of finalized Functional Performance Test (FPT) narratives. The FPT narratives shall be completed with input during the Construction Phase from the Contractor and used to verify operation per design intent through all modes and conditions. Facility staff shall participate and receive on-the-job training during the Functional Performance Testing.
- E. Prior to Project Closeout, the Commissioning Firm shall work with the Contractor to compile the Re-Commissioning Management Manual.
- F. In the Post-Construction Phase, the Commissioning Firm shall facilitate a 10-month Warranty/Project Closeout meeting.

1.6 SYSTEMS TO BE COMMISSIONED (LIST SYSTEMS TO BE COMMISSIONED)

- A. Systems to be commissioned shall be listed below. Systems include all interconnected components and are not limited to the equipment listed within this specification.
  - 1. Heating, Ventilating, and Air Conditioning:
    - a. Central Hydronic Systems
      - 1) Chillers
      - 2) Boilers
      - 3) Pumps
      - 4) Piping
    - b. Central Air Handling Systems:
      - 1) AHU-1,2
      - 2) Humidification System for AHU-1,2
      - 3) Filters
    - c. Terminal Units:
      - 1) VAV Box Coils
      - 2) Cabinet Heaters



- 3) Unit Heaters
- 4) Radiant Ceiling Panels
- d. Ventilation Systems
  - 1) Exhaust Fans
  - 2) Ductwork
- 2. Plumbing Systems
- 3. Fire Suppression Systems
- 4. Fire Alarm Systems
- 5. Medical Gas Systems
- 6. Nurse Call Systems
- 7. Lighting Controls Systems
- 8. Power Distribution Systems

## 1.7 COMMISSIONING ACTIVITIES

### A. Construction Phase:

- 1. Draft Pre-functional Performance Test Checklists for insert into the Commissioning Report.
- 2. Draft Functional Performance Test narratives for insert into the Commissioning Report.
- 3. Facilitate a Commissioning Team Kick-off Meeting with handouts referencing Commissioning Task Schedule to provide a Commissioning Education Platform to the Commissioning Team.
- 4. Participate in regularly scheduled commissioning field coordination meetings facilitated by the Commissioning Firm at 4-6 week intervals (1-2 week intervals the last three months prior to completion) with the Contractor, Subcontractor, installing trade subcontractors, ATC subcontractor and TAB subcontractor. The purpose of the meetings will be to review the status of commissioning activities, schedule future activities, and resolve commissioning process issues.
- 5. Respond to comments on submittals that have been reviewed for commissionability.
- 6. Respond to comments on mechanical and electrical coordination drawings that have been reviewed for commissionability.
- 7. Observe and document Pre-Functional Performance Tests for systems being commissioned.
- 8. Observe and document Functional Performance Tests for systems being commissioned.
- 9. Participate in System Education/Training

### B. Post-Construction Phase:

- 1. Facilitate in a Warranty/Project Closeout meeting at month 10.
- 2. Perform seasonal/deferred functional performance testing.
- 3. Complete Final Commissioning Report document.

## 1.8 QUALITY ASSURANCE

- A. Commissioning contractors must contact the Engineer and obtain approval at least 5 working days prior to the date of bidding.

## PART 2 - PRODUCT

### 2.1 COMMISSIONING DOCUMENTATION

- A. The Trade Contractors shall provide the following documentation for inclusion in the commissioning report:
  - 1. Startup Reports
  - 2. Completed Pre-Functional Test Checklists (blank checklists are provided by the CxA).



3. Certificate of Readiness certifying that installation, prestart checks, and startup procedures have been completed (blank certificates are provided by the CxA).
4. Certificate of Completion certifying that systems, subsystems, equipment, and associated controls are ready for testing (blank certificates are provided by the CxA).
5. Test and Inspection Reports and Certificates

- B. The CxA shall provide the following documentation for inclusion in the commissioning report:
1. A commissioning plan that outlines the process for delivery and review of submittals, system manuals, process and schedule for completing pre-functional checklists, startup reports, and functional testing.
  2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
  3. Certificates of Readiness.
  4. Certificates of Completion
  5. Test and Inspection Reports and Certificates.
  6. Corrective Action Log
  7. Verification of Testing, Adjusting, and Balancing Reports.

## 2.2 COMMISSIONING TEAM

- A. The Commissioning Team shall consist of representatives from the following parties involved in the design and construction of this facility:
1. Owner's Project Manager
  2. Owner's Facility Manager
  3. Commissioning Firm
  4. Design Team Professionals (*associated with system to be commissioned*)
  5. General Contractor (or *Construction Manager*)
  6. Testing Adjusting & Balancing (TAB) Contractor
  7. Installation Contractors (*associated with system to be commissioned*)
  8. Equipment Manufacturers (*associated with system to be commissioned*)



## 2.3 COMMISSIONING RESPONSIBILITY MATRIX

Work Description	TAB	Mech Contr	Elec Contr	Temp Cntrl Contr	GC	CxA	Architect Engineer	Owner's Rep.
Develop Cx Plan				S	S	P	S	S
Coordinate Cx Activities				S	S	P		
Prepare Construction Checklist Packages / Prefunctional Checklists						P		
Complete Construction Checklist Packages / Prefunctional Checklists	S	S	S	S	P			
Start-up and Debug	S	S	S	S	P	S		S
Prepare FPT's				S		P	S	
Preform FPT's		S	S	P		S		
Prepare Final Cx Report						P		
Review Cx Report							P	S
TAB Work	P	S	S	S				
Verify TAB Report Validity	S					P	S	
Owner Training		S	S	S	P			
Prepare Operating Manual		S	S	S	P	S	S	

P = Primary Responsibility  
S = Support Role

## 2.4 PRE-FUNCTIONAL PERFORMANCE TESTS NARRATIVES

1. The Pre-Functional Performance Test Checklists will be included in the Commissioning Plan. The Commissioning Plan will be distributed at the "Kickoff" Commissioning Mtg.
2. Using the enhanced Pre-Functional Performance Test Checklists, the Contractor and/or installation Subcontractor shall complete the Pre-Functional Test and submit the completed sign forms and other appropriate start-up sheets, but limited to the equipment manufacturer's start-up sheets. Subcontractor shall submit the completed forms, initialed by the technician in-charge and attach other appropriate start-up sheets including but not limited to equipment manufacturer's start-up sheets. TAB contractor's field reports, etc., prior to the start of the Owner demonstration of the Functional Performance Tests.

## 2.5 FUNCTIONAL PERFORMANCE TEST NARRATIVES

1. The Contractor shall review and comment on the test actions specified in the Draft Functional Performance Test Narratives located in the Commissioning Plan and return documents to the Commissioning Firm prior to system commissioning.





2. The Commissioning Firm shall revise the Functional Performance Test Narratives during the Construction Phase to incorporate any changes required to comply with the approved submittals and any contract document changes. The revised Functional Performance Test Narratives shall be issued as Final and Approved for Executed Documents.
3. The Contractor shall use the Functional Performance Test format to test the systems prior to demonstrating the Functional Performance Test to the Owner, Facility Manager and Commissioning Firm. The Contractor shall submit a completed and signed Final Functional Performance Test form as evidence that the Contractor and/or the installation Subcontractor have tested the systems.
4. The Contractor shall use the Final Functional Performance Test Narrative format to commission the building systems demonstrating the Functional Performance to the Owner. During the Owner demonstration all deficiencies that can be corrected within 10 minutes, may be completed. Any corrective measures that will require more than a 10-minute corrective measure, will be documented by then Commissioning Firm on a Corrective Action Log for re-testing at a later, scheduled date.
5. The Contractor shall respond to the CxA's Corrective Action Log depicting non-compliant system demonstration items to be corrected within (2) business days after receipt of Corrective Action Log. CxA shall distribute log via email to Contractor within (2) business days after demonstration of systems to Owner to ensure their ability to comply. Upon CxA's receipt of executed Corrective Action Log from Contractor, re-testing of system will be scheduled upon notifying Owner of such intent.
  - a. **The Contractor will be backcharged for CxA re-testing for manufacturer defects and/or the system requires more than one re-test.**
  - b. The Contractor shall, with the Owner's approval, back charge the system installation Subcontractor for any additional costs incurred by the Owner for re-testing including, but not limited to, additional consultant fees. Contractor shall reimburse the Owner.

## PART 3 - EXECUTION

### 3.1 COMMISSIONING GOALS

- A. The goal is to test/demonstrate the building systems to verify and document that they perform in accordance with the requirements of the contract documents and the BoD.
  1. A comprehensive, reusable Commissioning, Re-Commissioning, and Retro-Commissioning Plan
  2. Documented benefits from the Commissioning process
  3. A Commissioning Specification/Plan that defines the trade contractors' responsibilities as part of the commissioning process.
  4. Pre-Functional Performance Tests narratives to document the startup of equipment and systems and for future operation and maintenance information.
  5. Functional Performance Tests narratives to document the system performance, verification process and for future Re-Commissioning, and Retro-Commissioning Plan(s), as well as a lesson plan for system training in the future.
  6. A Re-Commissioning Management Manual for sustainable facility management.

### 3.2 COMMISSIONING TEAM MEMBER RESPONSIBILITIES

- A. Owner Project Manager
  1. Champion the commissioning process
  2. Provide the Design Intent Document to the CxA and the Design Professionals.
  3. Review and comment on any revisions to the Basis of Design Document.



4. Provide the Basis of Design Document, prepared by the Design Professional and approved by the Owner, to the CxA, and each contractor for use in developing the Commissioning Plan, systems manual, and operation and maintenance training plan.
  5. Attend commissioning specific coordination meetings
  6. Participate in Pre-Functional Performance Testing
  7. Participate in Functional Performance Testing
  8. Facilitate the Commissioning process.
  9. Participate in system education/training.
- B. Owner Facility Manager
1. Periodically visit the construction site to become familiar with the project equipment/system installation.
  2. Attend all commissioning coordination meetings.
  3. Review equipment, system and control submittals for compliance with Design Intent Document.
  4. Work with other commissioning team members to review CMMS preventive maintenance work order system.
  5. Work with other commissioning team members with system education/training.
  6. Witness and, to the greatest extent possible, participate in the following commissioning activities:
    - a. Initial equipment startup
    - b. Testing, adjusting and balancing
    - c. Component tests
    - d. Pre-functional Performance Tests
    - e. Functional Performance Test
  7. Work with the Commissioning Team with interface of automatic control systems with existing building automation system.
  8. Work with other Commissioning Team Members to complete equipment, panel and valve bar code/labeling and tagging.
  9. Work with Commissioning Firm to develop the Re-Commissioning Management Manual.
- C. Commissioning Firm
1. Organize and lead the commissioning team.
  2. Coordinate and direct the commissioning activities.
  3. Provide a commissioning plan.
  4. Convene commissioning team meetings.
  5. Coordinate commissioning activities onto the project schedule with General Contractor.
  6. Receive and review construction documentation (Requests for Information, Bulletins, Change Orders etc.) for impact on commissioning process.
  7. Maintain Pending Issues and Deferred Seasonal Test Log.
  8. Review equipment, system and control submittals for compliance with Basis of Design Document.
  9. Provide an outline to the Trades Contractors what materials are required in the O&M documentation and assist in the assignment of someone who will organize the collection of this process.
  10. Work with other commissioning team members to review O&M Manuals.
  11. Work with other commissioning team members to establish CMMS preventive maintenance work order system.
  12. Work with other commissioning team members with system education/training and provide written verification that training was conducted for all commissioning features and systems. Training program needs to address all training/education aspects as per LEED certification compliance.
  13. Work with other commissioning team members to complete equipment, panel and valve bar code labeling/and tagging.



14. Each component, equipment or system shall be commissioned per LEED Certification Compliance.
15. Installation observation according to the Basis of Design Document and the verification that no other systems compromise operation.
16. Startup and checkout of equipment shall be completed by the contractor and documented per the manufacturer's instructions and contract documents.
17. The Commissioning Firm shall apply a sampling method of start-up observation for systems to be commissioned. Ensure that all points are reading and reporting as expected and visually verify operation.
18. Witness and observe to the greatest extent possible, participate in the following commissioning activities:
  - a. Initial equipment startup
  - b. Testing and balancing
  - c. Component tests
  - d. Pre-functional Performance Tests
19. Work with building automation system contractor to create and maintain system trending data
20. Facilitate Functional Performance Tests by testing each Sequence of Operation for each system.
21. Maintain Corrective Action Logs
22. Maintain Commissioning Pending Issues Log.
23. Compile test data, inspection reports, and certificates; Include them in the commissioning report.

D. Design Professionals

1. Fulfill construction administration per their contract with the Architect or Owner.

E. General Contractor

1. Champion and support the commissioning process.
2. Attend commissioning coordination meetings.
3. Manage the master scheduling process with regard to timing and duration of the commissioning activities.
4. Manage the master prefunctional test checklists, master shop drawing log, data retrieval log, O&M Manuals and training schedule log.
5. Immediately following the acceptance of each submittal and no later than 60-days from submittal acceptance, the Contractor's equipment supplier shall complete the Data Retrieval form included within Division 1 as an integral part of the submission process. Included with this form shall be also be the operation and maintenance requirements noted within the Division 1 Specification. In addition, the Contractor shall submit the equipment website where the O&M data can be located.
6. Contractor shall provide a separate area within the Construction Trailer for the assembly of the O&M Manuals. An all-inclusive Table of Contents shall be displayed for the subcontractors to highlight open items and scheduled due dates of O&M insertions. The O&M Manuals will be built on a construction progress basis and will be reflective of each equipment/system that has been accepted and installed thus being in a completed state prior to demonstration of equipment/systems to Owner. Contractor shall assign a Project Coordinator to monitor this process thru to completion.
7. Coordinate the completion and delivery of shop drawings, data retrieval log and O&M Manuals prior to system demonstration to allow Facility staff to reference during system education/training provided by the Contractor and observed by the Commissioning Firm.
8. Ensure that Contractor correct deficiencies and make necessary adjustments to O&M Manuals and as-built drawings for applicable issues in any testing.
9. General Contractor/Construction Manager shall provide Commissioning Firm with normal cut sheets and submittals of equipment/systems to be commissioned.
10. Coordinate equipment, panel and valve tagging process.
11. Contractor shall coordinate the individual databases (rooms, equipment, valves, panels and components) with the Owner's CMMS operator prior to production of labels. Each



database shall be in Microsoft Excel for ease of downloading into the CMMS by the Owner.

12. Contractor shall follow Label Installation Procedures as so noted in Division 1.
13. Coordinate and schedule all equipment and system education/training.
14. Coordinate and schedule all testing compliance and maintain test log for equipment distribution and systems.
15. Coordinate and schedule Pre-Functional Performance Test and notify Commissioning Firm at least one (1) week prior to scheduled date.
16. Coordinate and schedule the contractor's initial Functional Performance Tests.
17. Coordinate and schedule Functional Performance Test demonstrations to the Owner and the Commissioning Firm at least two (2) weeks prior to scheduled date. Notify Commissioning Firm of any changes of scheduled testing giving Commissioning Firm at least 48-hour notice of change.
18. Coordinate and schedule deferred/seasonal tests in the appropriate season. All heating sequences to be tested in the winter and all cooling sequences in the summer.
19. Coordinate and schedule retest activities.
20. Ensure that commissioning activities are being scheduled into the Master Project Schedule and labeled as "Start-up" (PFPT) and "Demonstration of Systems" (FPT) and such schedule is distributed to Commissioning Team.

F. Installation Contractors

1. Trade Contractors required to participate in the commissioning process are as follows:
  - a. HVAC
  - b. Sheet Metal
  - c. Building Automation
  - d. Electrical
  - e. Plumbing
  - f. Equipment Manufacturers required to participate in the commissioning process that provides self-contained building automation equipment.
2. Attend commissioning coordinating meetings
3. Cooperate with the CxA for resolution of issues recorded in the issues log.
4. Complete the Pre-Functional Test and submit the completed sign forms and other appropriate start-up sheets.
  - a. Complete the Pre-Functional Tests **as work is completed** and provide copies to the CxA or CM on a regularly scheduled basis.
5. Submit completed data retrieval forms for the equipment specified on the preventive maintenance list.
6. Develop and deliver O&M manuals immediately after equipment submittal is approved (typical all equipment)
7. Refine and implement Pre-Functional Performance test procedures and, where applicable, have equipment manufacturer participation.
8. Develop and implement equipment education/training.
9. Prior to the system demonstrations with the commissioning team, perform systems Functional Performance Tests and submit documented results to the Commissioning Firm.
10. Demonstrate systems working with the commissioning team implementing Functional Performance Tests.
11. Demonstrate systems working with the commissioning team implementing deferred/seasonal test Functional Performance Tests.
12. Correct all contractor-related deficiencies identified during Functional Performance Tests and retest the corrected functions with the commissioning team.

G. Equipment Manufacturers



1. Equipment Manufacturers of commissioned equipment are required to participate in the commissioning process. Participation shall include demonstration of furnished equipment operation and packaged control system functions.
  2. Prior to the systems demonstrations with the commissioning team, perform system Functional Performance Tests in conjunction with the Installation Trade Contractor.
  3. Demonstrate systems working with the commissioning team implementing Functional Performance Tests in conjunction with the Installation Subcontractor.
  4. Demonstrate systems working with the commissioning team implementing deferred/seasons test Functional Performance Tests in conjunction with the Installation Subcontractor.
  5. Correct all equipment deficiencies identified during Functional Performance Tests and retest the corrected functions with the commissioning team.
- H. Testing, Adjusting, Balancing (TAB) Contractor Agency
1. Attend all commissioning coordination meetings.
  2. Submit TAB industry standard requirement including but not limited to schematic flow diagrams of each system to be commissioned with points where TAB readings will be taken, TAB strategy, and field notes.
  3. Review and comment on field coordination drawings during the mechanical-electrical field drawing coordination meetings relative to testing, adjusting and balancing.
  4. Participate in Pre-Functional Performance Tests.
  5. Complete testing, adjusting and balancing of systems.
  6. Participate in Functional Performance Tests.
  7. Provide system performance verification data for commissioned systems.

### 3.3 RE-COMMISSIONING MANAGEMENT MANUAL

- A. The Contractor shall be responsible for coordination and development of the Re-Commissioning Manual beginning immediately following the acceptance of equipment and component submittals.
- B. The Re-Commissioning Manual shall include:
1. Design Team, Construction Team, Commissioning Firm and Contracting Officer Representatives.
  2. Brief Description of each system commissioned.
  3. Record documents of ATC Sequence of Operation.
  4. Building Automation logic flow diagram (P&ID)
  5. Building Occupancy Schedules
  6. Trending Checklist with control logic to each trending program.
  7. Equipment start-up, shutdown and restarting instructions.
  8. Equipment manufacturer's re-calibration instructions for sensors, transmitters and actuators and frequency of tasking.
  9. Listing of all systems commissioned adjustable setpoints and reset schedule with description of set point purpose and recommended adjustable range.
  10. Automatic control manufacturer's recommended re-commissioning interval and continuous commissioning recommendations, as well as recommendation to reassess setpoints and schedule based on current system use.
  11. Recommended energy monitoring and benchmarking of energy metering (all utilities) using the building automation for energy reporting.
  12. List of diagnostic tools for those systems commissioned that will be useful for facility management in maintaining efficient operation of the equipment and systems.



### 3.4 PRE-FUNCTIONAL PERFORMANCE TESTS

- A. Test Checklists will be included with the Commissioning Plan

### 3.5 FUNCTIONAL PERFORMANCE TEST NARRATIVES

- A. Functional Performance Test Narratives will be included with the Commissioning Plan and will be in a "draft" format and will be finalized upon final approved sequence of operations and comments from the disciplines involved in demonstrating the systems to the Owner.

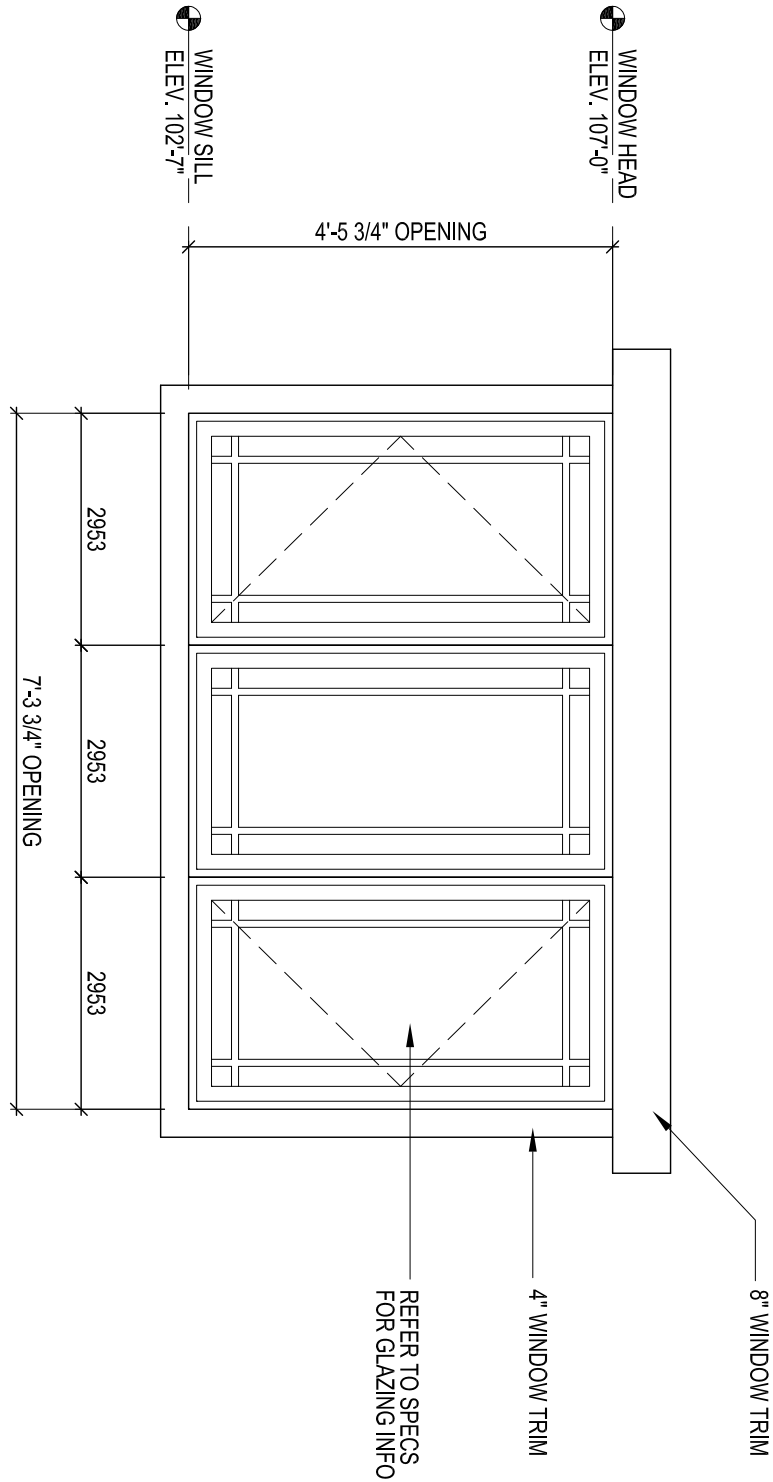
### 3.6 WARRANTY PERIOD

- A. The goals of the commissioning tasks during the Warranty Period include the following:
  - 1. Identify and correct any outstanding deficiencies.
  - 2. Perform seasonal and other deferred functional performance testing.
  - 3. Review facility operation at 10-month mark into the 12-month warranty period.
  - 4. Complete Final Commissioning Report document
- B. Team Member Responsibilities
  - 1. Owner Project Manager
    - a. Maintain records of problems or concerns associated with the systems during normal operation.
    - b. Distribute Post Construction Evaluation information to other commissioning team members for review and comment.
    - c. Coordinate and facilitate the meeting with the commissioning team at the 10-month mark to discuss operational problems and concerns.
    - d. Oversee the revision of the Owner Design and Construction Standards based on the results of the 10-month warranty meeting.
- C. Owner Facility Manager
  - 1. Maintain problems/complaints from occupants and Owner personnel regarding new building systems.
  - 2. Participate in seasonal/deferred functional performance tests.
  - 3. Maintain "as-commissioned" proper operation of the building systems.
  - 4. Participate in 10-month Warranty meeting present the problems, issues, and concerns.
  - 5. Identify warranty versus operational issues and concerns.
- D. Commissioning Firm
  - 1. Maintain Commissioning Corrective Action Log until all issues are resolved.
  - 2. Facilitate seasonal/deferred functional performance tests
  - 3. Complete Final Commissioning Report document.
  - 4. Have in place a contractor a "near warranty end" or "post occupancy review". Within this contract, an excerpt from the Commissioning Plan is to highlight the 5 Additional Commissioning Tasks per LEED prerequisite for Additional Commissioning of which three are as follows:
    - a. Conduct a focused review of the design prior to construction document phase.
    - b. Conduct a focused review of the design when close to completion
    - c. Conduct a selective review of contractor submittals of commissioned equipment.
  - 5. Complete Final Commissioning Report document.
  - 6. Participate in 10-month Warranty meeting present the problems, issues, and concerns.
  - 7. Make suggestions for improvements and for recording these changes in the O&M manuals.



- E. Design Professionals
  - 1. Be available to consult on the results of the seasonal/deferred functional performance test results.
  - 2. Meet with the commissioning team at the 10-month mark to discuss operational problems and concerns.
- F. General Contractor (or Construction Manager)
  - 1. Coordinate scheduling of seasonal/deferred functional performance tests.
  - 2. Participate in 10-month Warranty meeting present the problems, issues, and concerns.
  - 3. Address outstanding warranty issues and tasks identified as being under the original construction contract.
- G. Installation Contractors
  - 1. Be present for and conduct seasonal/deferred functional performance tests.
  - 2. Address outstanding warranty issues and tasks identified as being under the original construction contract.
  - 3. Be available to meet with the commissioning team at the 10-month mark to discuss operational problems, issues, and concerns.
  - 4. Address outstanding warranty issues and tasks identified as being under the original construction contract.
- H. Equipment Manufacturers
  - 1. Be present for and conduct seasonal/deferred functional performance tests.
  - 2. Address outstanding warranty issues and tasks identified as being under the original construction contract.
  - 3. Be available to meet with the commissioning team at the 10-month mark to discuss operational problems, issues and concerns.
  - 4. Address outstanding warranty issues and tasks identified as being under the original construction contract.
- I. Independent Test Agency
  - 1. Conduct seasonal/deferred TAB associated with functional performance tests.

END OF SECTION 23 0800



# A WINDOW ELEVATION

SCALE: 1/2"=1'-0"

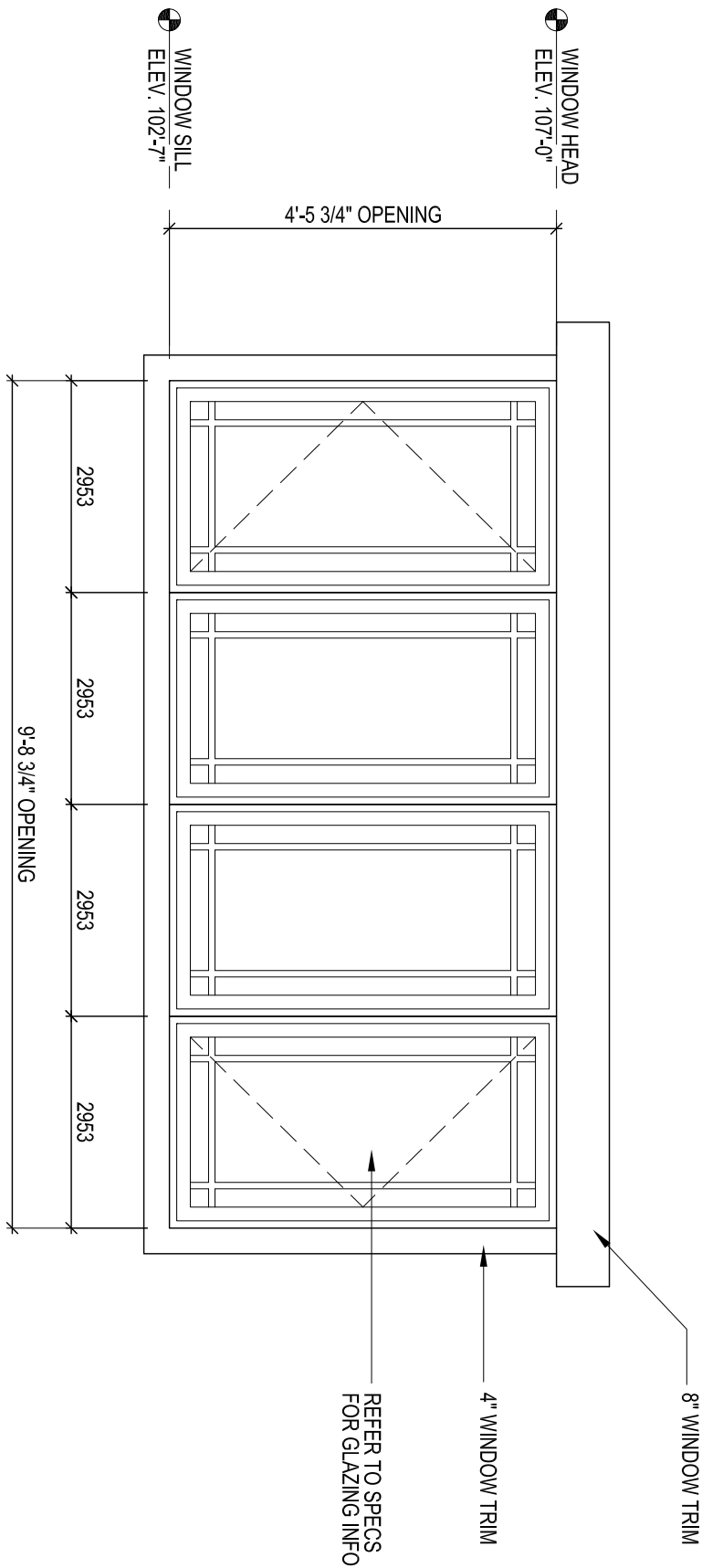
\* INTERIOR OF WINDOWS AND EXTENSION JAMBS TO BE FIELD STAINED TO MATCH ARCHITECTS SAMPLE. INTERIOR WOOD TRIM TO BE STAINED TO MATCH ARCHITECTS SAMPLE.

REFERENCE SHEET A920

SCALE: 1/2" = 1'-0"

ADDENDUM #2





**B**

# WINDOW ELEVATION

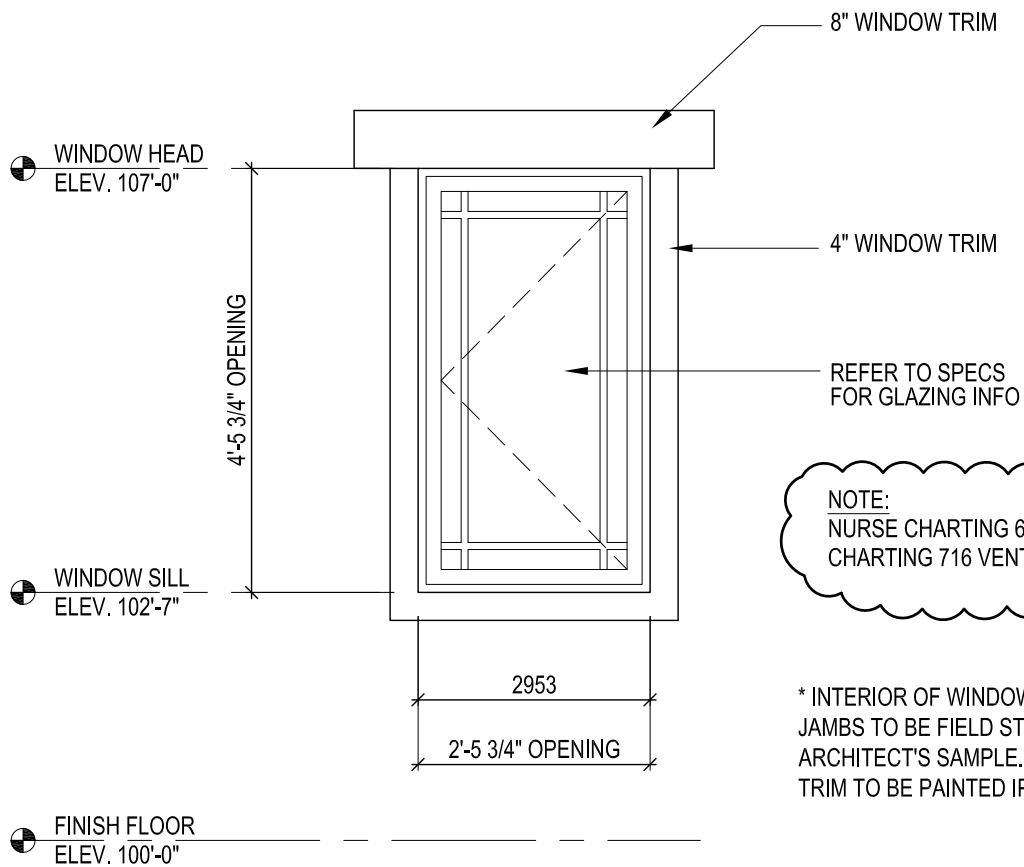
SCALE: 1/2" = 1'-0"

\* INTERIOR OF WINDOWS AND EXTENS JAMBS TO BE FIELD STAINED TO MATC ARCHITECTS SAMPLE. INTERIOR WOOD TRIM TO BE PAINTED IPS-6.

REFERENCE SHEET A920

SCALE: 1/2" = 1'-0"

ADDENDUM #2



## C WINDOW ELEVATION

SCALE: 1/2" = 1'-0"

REFERENCE SHEET A920

SCALE: 1/2" = 1'-0"

ADDENDUM #2

SET: 1.0  
HINGE

T4A3786 5" X 4-1/2"

US10B

MK

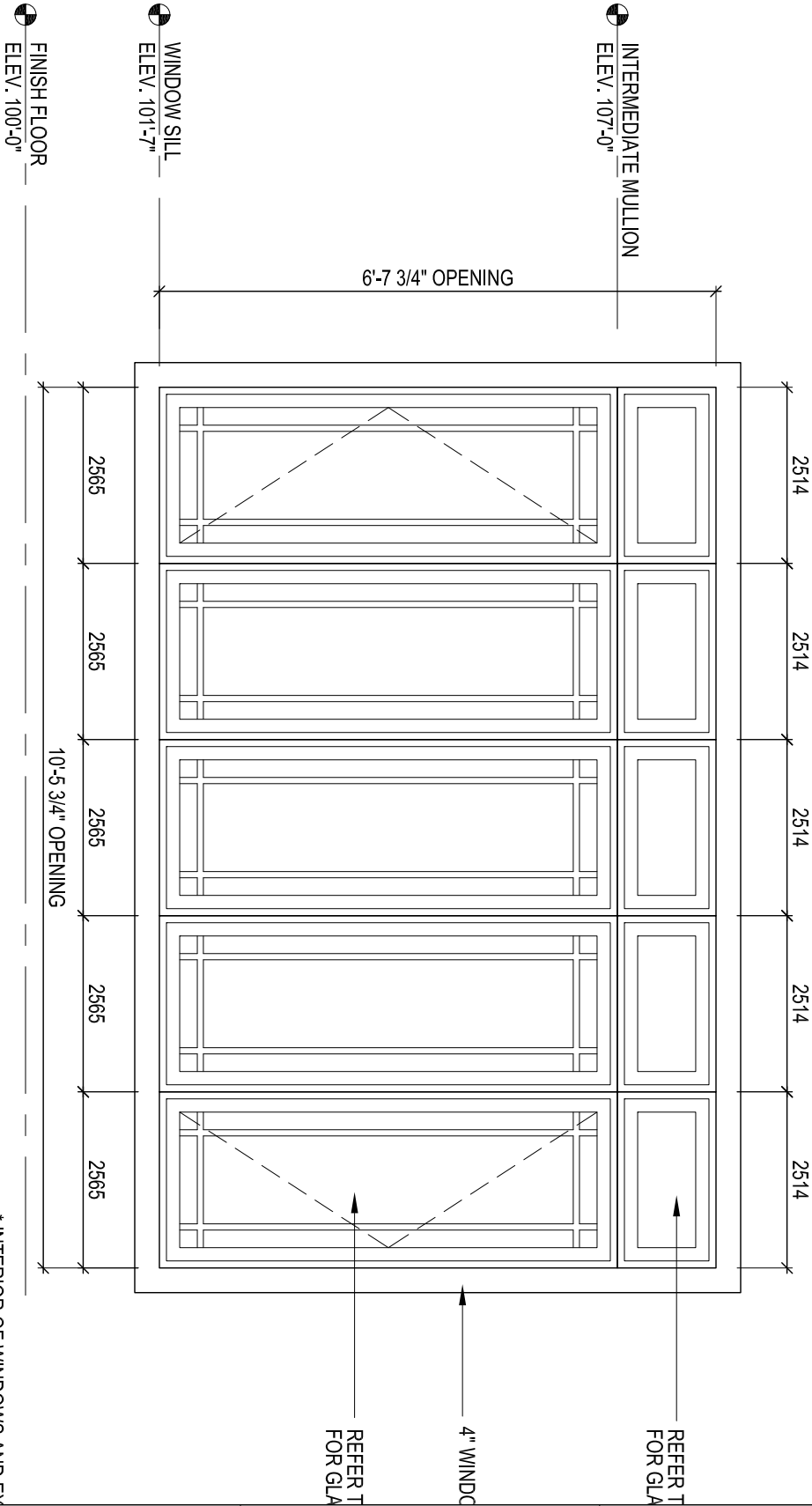
SET: 9.0  
HINGE  
1 PRIVACY W/ INDICATOR  
1 CLOSER  
1 WALL STOP

# HARDWARE SETS

## E WINDOW ELEVATION

SCALE: 1/2"=1'-0"

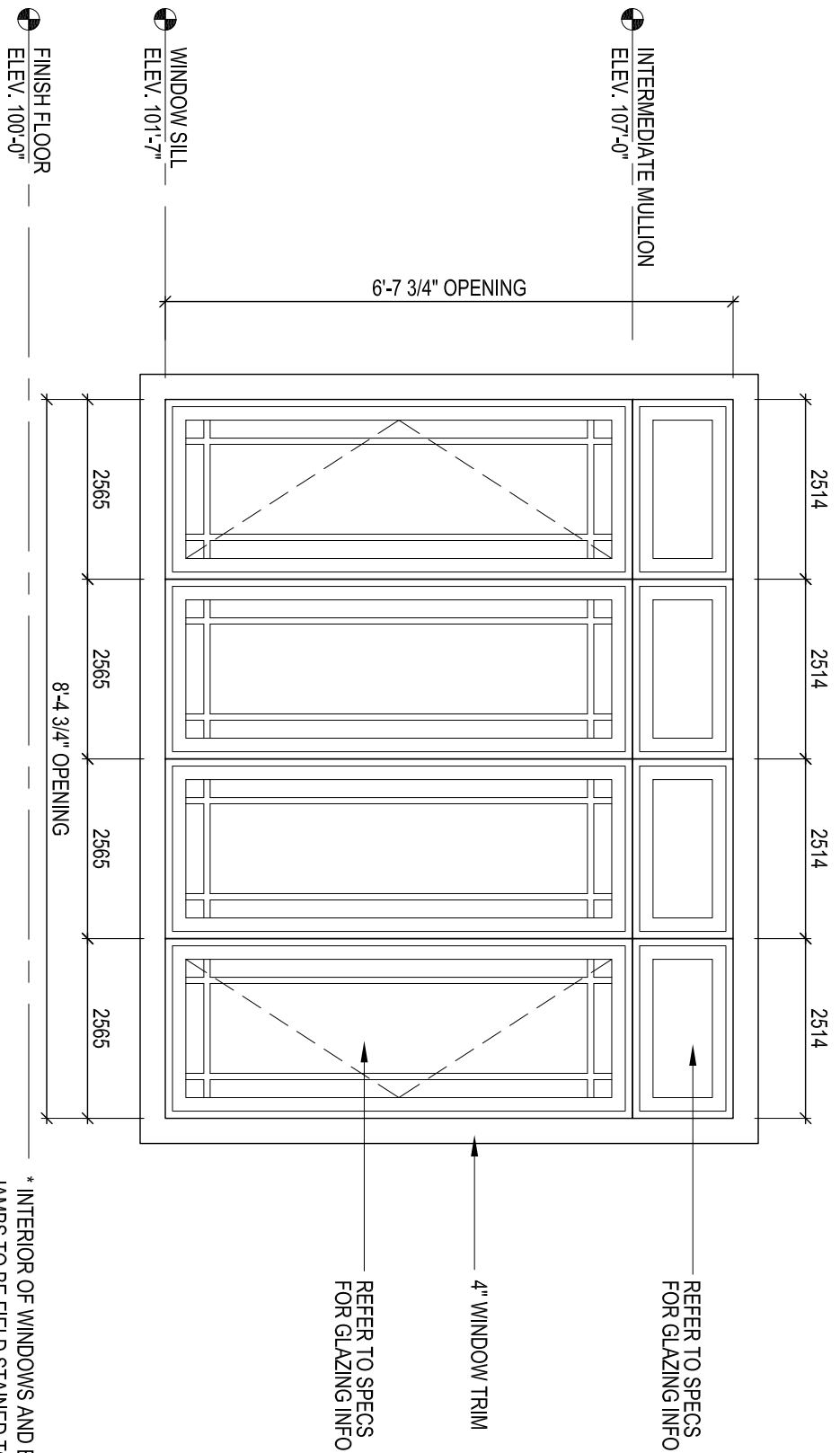
\* INTERIOR OF WINDOWS AND EX JAMBS TO BE FIELD STAINED TO ARCHITECT'S SAMPLE. INTERIOR TRIM TO BE PAINTED IPS-6.



REFERENCE SHEET A920

SCALE: 1/2" = 1'-0"

ADDENDUM #2



# F WINDOW ELEVATION

SCALE: 1/2"=1'-0"

\* INTERIOR OF WINDOWS AND EXTENSION JAMBS TO BE FIELD STAINED TO MATCH ARCHITECT'S SAMPLE. INTERIOR WOOD TRIM TO BE PAINTED IPS-6.

SET: 15.0	
2	HINGE
1	HINGE
1	INTEGRATED CARD READER LOCK
1	SFIC CORE
1	CLOSER
1	WALL STOP
US10B	TA2714 4-1/2" X 4-1/2"
613	TA2714 4-1/2" X 4-1/2" X QC12
690	ML20605 116T RNE1 M802 CTTSD 12AD
US10B	1C-7
RO	DC6200
US10B	DL1960

REFERENCE SHEET A920	SCALE: 1/2" = 1'-0"	ADDENDUM #2
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