State of Rhode Island
Department of Administration / Division of Purchases
One Capitol Hill, Providence, Rhode Island 02908-5855
Tel: (401) 574-8100 Fax: (401) 574-8387

Solicitation Information
December 28, 2015

ADDENDUM # 2

RFP #7550109PH1

TITLE: PHASE 1 CONSTRUCTION SERVICES VIRKS BUILDING, PASTORE COMPLEX

Submission Deadline: Wednesday January 6, 2016 at 11:0 AM (Local Time)

Notice to Vendors:

Attached includes:

- **Questions received with responses, no further questions will be answered**
- **Additional information from architect, as well as second walk through visit schedule**

Tom Bovis
Interdepartmental Project Manager

Interested parties should monitor this website, on a regular basis, for any additional information that may be posted.

DR. JOHANNES VIRKS BUILDING RESTORATION PROJECT: PHASE 1

3 WEST ROAD

PASTORE COMPLEX

CRANSTON, RHODE ISLAND

7550109PH1

Requests for Information:

1. The Civil/Site drawings contain proposed plans, how is the site to be left/restored following the demolition work?
   Response: At the conclusion of Phase I Construction, all paved areas surrounding the building shall be left cleaned with a street sweeper and all demolition materials from Phase I shall be removed and disposed of properly. The site shall be left rough graded with no areas of ponding or potential tripping hazards. The area shall have erosion control measures in place that are season appropriate, i.e. mechanical stabilization if necessary.

2. The Architectural drawings do not contain third and fourth floor plans. Please advise.
   Response: Phase I involves no new work on the Third Floor or the Fourth Floor of the Virks Building, therefore these plans were not included in the Construction Documents.

3. The Door Schedule on drawing A500 and the hardware schedule contained in the specifications do not contain a hardware set for door CC100, please advise.
   Response: Door CC100 has hardware set #5. Refer to Section 080671 of the Project Manual.

4. Detail 5/A510, shows a bluestone window sill on P.T. plywood. Is this work a part of Phase 1?
   Response: The construction of the interior of the walls/ceiling/etc. is shown for reference only. All interior construction will be part of the project's Phase II. This includes the window sills.

5. At the mandatory site visit on 12/16/15, it was stated that the completion date for this project is the end of June, 2016 and the liquidated damages are $1,500.00 per calendar day. The Bid Form states that the completion date is September 8, 2016, and the liquidated damages are $1,000.00 per calendar day. Please advise.
Response: The Project Completion Date has been revised to Tuesday, June 26, 2016. The liquidated damages have been amended to $1,500.00 per day.

6. What is the scope of the demolition electrically? Drawings contradict themselves.
Response: All electrical equipment is to be removed from the building. Service is to be removed to the point where it enters the building.

7. Drawing ED101 requires the relocation of fiber optic and TeleData cables from the Bernadette building to underground conduits? How many and what size?
Response: Bidders are to carry a $20,000 allowance for the new underground conduits to be installed between the Virks Building and the Bernadette Building, carrying the various cables.

8. If we are removing all the power panels and main transformer from the building where will the temporary power come from?
Response: The General Contractor is responsible for temporary power and lighting, heat, and water for the duration of Phase I of the project.

9. It shows on the drawings to remove the main fire alarm panel. Is it there intent to leave this building without fire alarm protection?
Response: Please refer to Typical Demolition Notes #9 on drawing ED100: Electrical: Demolition Basement Floor Plan.

10. Per Specification Section 015000 Item 3.2L: Is a computer, printer, internet, etc needed for the Owner's Representative for the project? If so, does this become the property of the state at the completion of the project or is it turned back over to the general contractor?

Response: The computer, printer, and internet service are not required.

11. Will the drawings be re-issued to correct the formatting error that is present on the current ones uploaded to the state web-site?
Response: Yes.

12. Will the fire alarm and the sprinkler system need to remain active if the building is to remain partially occupied?
Response: The Virks Building will not be occupied during construction.

13. Please provide location of and phasing plan/narrative for the occupants who are to remain in the building. Specification Section 011000 Section 1.7A notes to look to sheet AG06 for location but no sheet exists in the set provided by the state. Is GC to assume that the heating system, water service, restroom facilities are to remain active while occupants are in the building? When will they vacate the premises so that GC can properly demo the facility?
Response: The Virks Building will not be occupied during construction.

14. Request to schedule a walk thru for sub-contractors that could not make the mandatory walk thru on December 16th. This walk thru is important to secure an accurate proposal.
Response: A second walk-through has been scheduled for Wednesday, December 30, 2015 @ 1:00 p.m.

15. The plans call for painted wrought iron railings but the specs call for aluminum. Which is correct?
Response: The exterior railings are painted wrought iron to match the existing railings.

16. Please provide details (ie: sizes of foundation, slab, footings, etc.) for the cooling tower & mechanical building demolition.
Response: The Mechanical Building and the Cooling Tower are located behind the Virks Building and may be observed/measured by potential bidders.

17. Are the temporary stairs & landings at the exterior doors (Note #9/A300 & A301) to remain in place for the next phase or are they to be removed at the completion of the project?
Response: Temporary stairs/landings are to remain in place until replaced by the permanent stairs/landings during Phase II.

18. Is the surface mounted electrical fixture (detail #3/A350) installed in the next phase?
Response: All surface-mounted electrical fixtures are to be installed during Phase II.

19. Is the ADA door paddle & card reader (detail #2/A350) installed in the next phase?
Response: The ADA door paddle and card reader are to be installed during Phase II.

20. Should the new floor framing at the Conference Rooms (214 & 235) be priced under this contract?
Response: The new floor framing for Conference Rooms 214 & 235 are to be priced under Phase II. Provide blocking, etc., only as necessary to install exterior windows, flashing, and other materials specified in Phase I.

21. Should note #30 on AD102 be located in Conference Room 214 and not at the exterior deck?
Response: Yes.

22. Drawing A106 indicates a note (19/A470) along column line 10 but no corresponding note exists. Please advise.
Response: The notes inside the section marks @ column lines 01 and 10 should read: 14/A470.

n|e|m|d architects, inc.

architects | planners | interior designers

1 Virginia Avenue, Suite 202 | Providence, Rhode Island 02905

T: 401.435.3532 | F: 401.435.3712 | www.nemd.com | nemd@nemd.com

NEMD Project #: 14001
Client: Rhode Island Department of Administration
Project: Dr. Johannes Virks Building Renovation: Phase 1
3 West Road
Cranston, RI 02920

Addendum 03
December 22, 2015

This Addendum 03, dated 12-22-15, modifies the Construction Documents dated 11-16-15, all subsequent revisions, addenda, and additional information prepared by New England Medical Design, Inc. and its Consultants. All notations herein shall become a part of the scope of the work for the above referenced project. Any and all changes in cost that may result from this Addendum shall be reflected in the General Contractor's Cost Estimate. Receipt of this Addendum and attachments shall be acknowledged by the General Contractor.

1. **Refer to Construction Documents, Project Manual, Section 012100: Allowances:**
   a. *Add to Part 3 – Execution, Section 3.3 – Schedule of Allowances: Allowance No. 5: Lump-Sum Allowance: Include $20,000 for underground conduits from Virks Building to Bernadette Building.*
2. **Refer to Bid Form:**
   a. *Add to Allowances: No. 5: Underground Conduits (Virks to Bernadette Bldgs.), $20,000.00.*
3. **Meeting Minutes from Pre-Bid Meeting (12-16-15):**
   a. *Add: Meeting Minutes from Pre-Bid Meeting (dated: 12-16-15).*

Attachments:
Project Manual, Section 012100: Allowances.
Revised Bid Form
Meeting Minutes from Pre-Bid Meeting (12-16-15)

End of Addendum

SECTION 012100 – ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:

1. Lump-sum allowances.

1.2 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.3 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.4 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 LUMP-SUM ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include freight and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.7 TESTING AND INSPECTING ALLOWANCES

A. Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.

B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labor to assist the testing agency shall be included in the Contract Sum.

C. Costs of services not required by the Contract Documents are not included in the allowance.

D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

1.8 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 1: Lump-Sum Allowance: Include $50,000 for materials testing of concrete, soils, etc. for asbestos, PCBs, etc. required during the construction process.

1. Coordinate quantity allowance adjustment with unit-price requirements in Section 012200 "Unit Prices."

B. Allowance No. 2: Lump-Sum Allowance: Include $60,000 for any required hazardous waste abatement (asbestos, PCBs, etc.) not indicated in the construction documents.

1. Coordinate quantity allowance adjustment with unit-price requirements in Section 012200 "Unit Prices."

C. Allowance No. 3: Lump-Sum Allowance: Include $20,000 for whole building lightning protection. This would be provided as a design-build type of system.

1. Coordinate quantity allowance adjustment with unit-price requirements in Section 012200 "Unit Prices."

D. Allowance No. 4: Lump-Sum Allowance: Include $8,000 for interior masonry work not indicated in the construction documents.

1. Coordinate quantity allowance adjustment with unit-price requirements in Section 012200 "Unit Prices."

E. Allowance No. 5: Lump-Sum Allowance: Include $20,000 for underground conduits from Virks Building to Bernadette Building.

1. Coordinate quantity allowance adjustment with unit-price requirements in Section 012200 "Unit Prices."

END OF SECTION 012100

Solicitation #: _____
Solicitation Title: Dr. Joahnnes Virks Building Renovation: Phase I
3 West Road, Pastore Campus, Cranston, RI 02920

BID FORM

To: State of Rhode Island Department of Administration
One Capitol Hill, Providence, Rhode Island 02908

Bidder:

_____
Legal name of entity

_____
Address (street/city/state/zip)

_____
Contact name Contact email

_____
Contact telephone Contact fax

1. BASE BID PRICE

The Bidder submits this bid proposal to perform all of the work (including labor and materials) described in the solicitation for this Base Bid Price (*including the costs for all Allowances, Bonds, and Addenda*):

$_____
(base bid price *in figures* printed electronically, typed, or handwritten legibly in ink)

_____
(base bid price *in words* printed electronically, typed, or handwritten legibly in ink)

- **Allowances**

  The Base Bid Price ***includes*** the costs for the following Allowances as defined in Division 01, Section 012100 of the Specifications:

No. 1: Hazardous Waste Construction Testing Allowance	$50,000.00
No. 2: Additional Hazardous Waste Abatement/Removal	$60,000.00
No. 3: Lightning Protection	$20,000.00

No. 4: Interior Masonry	$ 8,000.00
No. 5: Underground Conduits (Virks to Bernadette Bldgs.)	$20,000.00

- **Bonds**

  The Base Bid Price ***includes*** the costs for all Bid and Payment and Performance Bonds required by the solicitation.

- **Addenda**

The Bidder has examined the entire solicitation (including the following Addenda), and the Base Bid Price ***includes*** the costs of any modifications required by the Addenda.

All Addenda must be acknowledged.

Addendum No. 1 dated: _____

Addendum No. 2 dated: _____

Addendum No. 3 dated: _____

Addendum No. 4 dated: _____

2. ALTERNATES (*Additions/Subtractions* to Base Bid Price)

There are no Alternates listed for this Phase of this Project.

Solicitation #: _____
Solicitation Title: Dr. Joahnnes Virks Building Renovation: Phase I
3 West Road, Pastore Campus, Cranston, RI 02920

3. UNIT PRICES

The Bidder submits these predetermined Unit Prices as the basis for any change orders approved in advance by the State. These Unit Prices include ***all*** costs, including labor, materials, services, regulatory compliance, overhead, and profit.

GENERAL CONSTRUCTION UNIT COSTS: DESCRIPTION OF SERVICES	CONTRACTORS UNIT COST
1. Provided State Police Details that the Owner may direct outside of the Contractors Responsibility to Provide Police	
1A. Daily Rate Per Eight (8) Hours	$, .
1B. One Half Day Rate [Four (4) Hours]	$, .
2A. Ten (10) Yard Roll Off Dumpster for use by the Owners Own Workforce or Owners Subcontractors. This includes Drop off, and pick up of units as well as tipping fees for allowable load.	$, .
2B. Twenty (20) Yard Roll Off Dumpster for use by the Owners Own Workforce or Owners Subcontractors. This includes Drop of, and pick up of units as well as tipping fees for allowable load.	$, .
2C. Thirty (30) Yard Roll Off Dumpster for use by the Owners Own Workforce or Owners Subcontractors. This includes Drop off, and pick up of units as well as tipping fees for allowable load.	$, .
3. Additional Portable Toilets that may be required for use by the Owners Own Work Force and/or Subcontractors. This cost shall include delivery and pick up and maintenance of the units and is based on a single unit. As such the cost is for each unit.	$, .
4. Cost Per Man Hour for a Laborer dedicated to assist in housekeeping operations that may be required to maintain site and building cleanliness for work performed by the Owners Work Force and/or Owners Subcontractors. This item does not mean the Owner has to utilize a laborer from the Contractors workforce.	$, .
5. Cost to continue to provide and maintain temporary fencing beyond the initial contract period as defined in the specifications per one thousand lineal feet (1000lf) including cost of reconfiguration and one double gate vehicle gate (sixteen feet wide) per this unit.	

5A. Per Diem	$, .
5B. Per Month	$, .
6. Cost Per Square Foot of Brick Replacement. This is in addition to the replacement of 30% of the brick included in the Base Bid.	$, .
7. Cost Per Lineal Foot of Cast Stone Sill Replacement. This is in addition to the replacement of 30% of the cast stone elements included in the Base Bid.	$, .
8. Cost Per Lineal Foot of Cast Stone Cornice Replacement. This is in addition to the replacement of 30% of the cast stone elements included in the Base Bid.	$, .
9. Cost Per Square Foot Cost of Building Brick Masonry Repointing. This is in addition to the repointing of 30% of the building brick masonry included in the Base Bid.	$, .
10. Cost Per Square Foot for Concrete Slab Patching. This is for interior floor slab concrete that is damaged during demolition.	$, .
11. Cost Per Lineal Foot of Removal of Brick/Terra Cotta/Gypsum Block Wall Remnant Demolition. This is for the removal of the wall remnants that were concealed in the ceiling after the partial demolition of original brick/terra cotta/gypsum block walls at interior porches.	$, .
12. Cost Per Square Foot for Roof Deck Replacement. This is in addition to the areas requiring replacement indicated in the construction documents and is for the replacement of any additional roof deck found to be deficient after demolition of the existing roofing. Deck is to be infilled using the same methods/materials shown in the construction documents.	$, .
DEMOLITION and HAZARDOUS MATERIALS UNIT COSTS: DESCRIPTION OF SERVICES	
13. Title: Provide TCLPS in full compliance with all regulatory requires utilizing the Owners Lab as may be requested by the Owner in addition to those required in the base bid.	
13A. Twenty Four hour Turnaround	$, .

13B. Forty Eight hour Turnaround	$, .
14. Expeditious Legal Removal and Disposal of Underground Tanks including all appurtenant work such as disconnect from pumping, pump out tank, purging, excavation backfill, compaction rigging, transportation, disposal, working with regulatory authorities and design team and etc. as required to remove the structure from the work site.	
14A. Underground Tank less than 1000 Gallons Per Each	$, .
14B. Underground Tank 1001 to 3000 Gallons Per Each	$, .
14C. Underground Tank 3001 to 5000 Gallons Per Each	$, .
15. Title: All Services required for the collection, storage, and legal disposal of fuel, oil, solvents, and other liquid materials classified as hazardous. (unit cost per gallon, one to ten gallons, unit cost provided per one gallon)	$, .
16. Title: All services required for the collection, storage, and legal disposal of fuel, oil, solvents, and other liquid materials classified as hazardous. (unit cost per ten gallon, eleven to fifty gallons, unit cost provided per ten gallons)	$, .
17. Title: All services required for the collection, storage, and legal disposal of fuel, oil, solvents, and other liquid materials classified as hazardous. (unit cost per fifty gallons, fifty-one to "X" gallons unit cost provided per fifty gallons)	$, .
18. Title: All services required to excavate, temporarily store and protect, remove and dispose of in a legal manner contaminated soils as may be encountered, not identified in the base bid. (Unit cost per cubic yard, one to ten cubic yards. Unit cost per cubic yard.)	$, .
19. Title: All services required to excavate, temporarily store and protect, remove and dispose of in a legal manner contaminated soils as may be encountered, not identified in the base bid. (Unit cost per ten cubic yards, eleven to "X" cubic yards. Unit cost per ten cubic yards.)	$, .

20. Title: All services required to remove, and legally dispose of electrical transformers with suspect hazardous materials (units cost per each)	$		,				.		
21. Title: Removal and Disposal of Ceiling and Wall Materials Containing Asbestos **Per SF** greater than a total of 100 SF.	$		,				.		
22. Title: Removal and Disposal of Firestopping and Fire Caulking Materials Containing Asbestos **Per LF** less than a total of 100 LF.	$		,				.		
23. Title: Removal and Disposal of Firestopping and Fire Caulking Materials Containing Asbestos **Per LF** greater than a total of 100 LF.	$		,				.		
24. Title: Removal and Disposal of Window Caulking and Window Glazing Material Containing PCBs **Per LF** less than a total of 100 LF.									
25. Title: Removal and Disposal of Window Caulking and Window Glazing Material Containing PCBs **Per LF** greater than a total of 100 LF.									

4. CONTRACT TIME

The Bidder offers to perform the work in accordance with the timeline specified below:

- Start of construction: Within 7 days of receipt of Purchase Order
- Substantial/Final completion: September 8, 2016.

5. LIQUIDATED DAMAGES

The successful bidder awarded a contract pursuant to this solicitation shall be liable for and pay the Sate, as liquidated damages and not as a penalty, the following amount for each calendar day of delay beyond the date for substantial completion, as determined in the sole discretion of the State:

$1,000.00 per calendar day

Solicitation #: _____
Solicitation Title: Dr. Joahnnes Virks Building Renovation: Phase I
3 West Road, Pastore Campus, Cranston, RI 02920

This bid proposal is irrevocable for 60 days from the bid proposal submission deadline.

If the Bidder is determined to be the successful bidder pursuant to this solicitation, the Bidder will promptly: (i) comply with each of the requirements of the Tentative Letter of Award; and (ii) commence and diligently pursue the work upon issuance and receipt of the purchase order from the State and authorization from the user agency.

The person signing below certifies that he or she has been duly authorized to execute and submit this bid proposal on behalf of the Bidder.

BIDDER

Date: _____

_____
Name of Bidder

_____
Signature in ink

_____
Printed name and title of person signing on behalf of Bidder

#_____
Bidder's Contractor Registration Number

n | e | m | d architects, inc.
1 Virginia Avenue, Suite 202
Providence, RI 02905

PROJECT MEETING MINUTES

Project: Virks Building
Project #: 14001
Client: State of Rhode Island: Department of Administration
Meeting #: 64
Date/Time: December 16, 2015, 1:00 pm
Location: Virks Building, First Floor
Subject(s): Mandatory Pre-Bid Meeting for General Contractors

Attendee	Company
Tomas Bovis	RIDOA
Christopher Condon	RIDOA
Ryan Haggerty	RIDOA
Dane Kwiatkowski	RIDOA
Mark Peters	Peregrine Group, LLC – Owner's Rep.
Timothy Kennedy	n|e|m|d architects, inc.
Lynne Heinzmann	n|e|m|d architects, inc.
Mark Menard	Nadeau Corporation
Paul Tierney	Bentley Builders, LLC
Ed Tower	Iron Construction Group, LLC
Jay Moon	Urbane Construction Corporation
Tom Mello	Maron Construction Company, Inc.
M. Chernasky	SimplexGrinnell
Sal Jervgresso	Tower Construction Corporation
Jack Demers	Encore Fire Protection
Mark DiBenedetto	Interstate Electrical Services Corporation
Tony DePasquale	ADS Construction, Inc.
Jim Plante	Ahlborg Construction Corporation
Bob Dandeneau	E.W. Burman, Inc.
Nick Jensen	J.J. Cardosi, Inc.
Mark Kaplan	D.F. Pray, Inc.
Frank Gionfrido	TRAC Builders, Inc.
Dan Valcourt	Pezzuco Construction, Inc.
Fred Abatecola	Alpha Omega Construction, Inc.
Gerald St. Angelo	RD Preservation Company, Inc.

ITEM NO.	ITEMS DISCUSSED:	ACTION REQUIRED BY:
64.01 64.01.01 64.01.02 64.01.03 64.01.04 64.01.05 64.01.06 64.01.07	Discussion of Bid Submissions (Tom Bovis): • This was mandatory Pre-Bid Meeting for the Dr. Johannes Virks Building Phase I, RFP# 7550109. • Someone from each company had to sign in on one of the two sign-in sheets being circulated. The sign-in sheets will be issued as an addendum on the Division of Purchases website. • Bids are due Wednesday, January 6, 2015 by 11 a.m. at the Department of Administration, 1 Capitol Hill, Providence, RI, Division of Purchases, Second Floor. • All bids will be marked with a date/time stamp, so make sure your bid is on time. • No late bids will be accepted. • Several forms are included in the invitation to bid package: Prevailing Wage Form, Apprentice Certification Form, Subcontractor Apprenticeship Certification Form, etc. Make sure to complete all of these and return them with your bid. • There is a checklist included with the invitation to bid that lists all of the forms, etc., which need to be returned with your bid.	
64.02 64.02.01 64.02.02 64.02.03 64.02.04 64.02.05 64.02.06	Discussion of Construction Questions (Tom Bovis): • We will try to answer questions today, which will be posted in the Meeting Minutes as an addendum on the Division of Purchases website. • Please submit questions in writing in Microsoft Word format to: Thomas.Bovis@ purchasing.ri.gov • Questions are due by Tuesday, December 22, 2015 @ 5 p.m. • Please list the RFP# in the subject line of your e-mail. • Answers will be posted on the website by Tuesday, December 29, 2015 @ 5 p.m. • Please monitor the website in the event there are other addenda for this project.	
64.03	Discussion of construction documents drawings:	

64.03.01 64.03.02	• Some of the bidders stated that they had been having difficulties downloading the construction documents drawings, that some of the text was not printing correctly. • n|e|m|d architects, inc., will send RIDOA a new file of drawings that will be posted on the Division of Purchases website.	 n|e|m|d
64.04 64.04.01 64.04.02 64.04.03 64.04.04 64.04.05 64.04.06 64.04.07 64.04.08 64.04.09 64.04.10 64.04.11	Discussion of work included in Phase I of the project (Chris Condon): • Demolition: interior. • Abatement: asbestos and PCBs – abatement/removal plans in specifications • Demolition: exterior, roof, windows, doors, any sitework that touches building (landings, patio, stairs, etc.). • Exterior whole building staging to be erected by General Contractor for use by all trades. Bottom two levels of staging to be secured against trespassing. • Perimeter construction fence with gates to be installed. • Repoint brick (30%) • Repair/replace cast stone (30%) • Replace roofing – slate/EPDM • Install 3 roof hatches • Roof vents, etc., not in contract – to be installed in Phase II through flat membrane roof section • Demolition of the Connecting Corridor (to the Bernadette Building) and construction of new end wall for Corridor are part of Phase I of this project.	
64.05 64.05.01 64.05.02 64.05.03 64.05.04	Discussion of possible tenants in building at time of construction (Chris Condon): • Sterile Storage and Dental Labs may remain in building during Phase I • RIDOA will determine whether or not tenants will be present • If tenants will be present, an addendum will be issued with revised documents containing provisions for tenants • Project may be delayed to allow time for tenants to be relocated	 RIDOA
64.06	Discussion of Phase I construction schedule and liquidated damages (Chris Condon):	

64.06.01 64.06.02	• RIDOA announced that this phase of the Virks project is to be completed by June 2016. • RIDOA also announced that there is a $1,500 per day penalty for liquidated damages for every day after the deadline that the project remains incomplete.	
64.07 64.07.01	Discussion of construction materials staging area (Chris Condon): • RIDOA stated that all construction materials are to be staged from the Virks rear parking lot.	
64.08 64.08.01	Discussion of trailer/computer/printer for Owner or Owner's Representative (Chris Condon): • No provisions for a trailer/computer/printer/etc. for the Owner or his Representative are needed for this job.	
64.09 64.09.10	Discussion of possible additional walk-through of building for sub-contractors (Chris Condon): • RIDOA said that if anyone would like an additional walk-through of the building, they should request one in writing to Tom Bovis at the e-mail address listed above.	
64.10 64.10.01 64.10.02	Discussion of base bid windows (Lynne Heinzmann): • Base bid windows are by Winco Windows. • n|e|m|d will supply additional information about the base bid windows for the project.	n|e|m|d

These notes are part of the project record. Please make any responses or comments to these notes in writing within five working days.

Prepared by: Lynne M. Heinzmann, n|e|m|d architects, inc.

Date Issued: Monday, December 21, 2015

Attachment: None

Cc: Project Share Point site, n|e|m|d architects, inc. file

n|e|m|d architects, inc.

architects | planners | interior designers

1 Virginia Avenue, Suite 202 | Providence, Rhode Island 02905
T: 401.435.3532 | F: 401.435.3712 | www.nemd.com | nemd@nemd.com

NEMD Project #: 14001
Client: Rhode Island Department of Administration
Project: Dr. Johannes Virks Building Renovation: Phase 1
3 West Road
Cranston, RI 02920

Addendum 02
December 18, 2015

This Addendum 02, dated 12-18-15, modifies the Construction Documents dated 11-16-15, all subsequent revisions, addenda, and additional information prepared by New England Medical Design, Inc. and its Consultants. All notations herein shall become a part of the scope of the work for the above referenced project. Any and all changes in cost that may result from this Addendum shall be reflected in the General Contractor's Cost Estimate. Receipt of this Addendum and attachments shall be acknowledged by the General Contractor.

1. **Refer to Construction Documents, Project Manual, Section 085130: Aluminum Windows:**
   a. *Remove: Section 085130: Aluminum Windows (dated: 11-16-15).*
   b. *Replace with: Section 085130: Aluminum Windows (dated: 12-18-15).*
2. **Refer to Construction Documents, Project Manual, Section 088000: Glazing:**
   a. *Remove: Section 088000: Glazing (dated: 11-16-15).*
   b. *Replace with: Section 088000: Glazing (dated: 12-18-15).*

Attachments: Project Manual, Section 085130: Aluminum Windows; Project Manual, Section 088000: Glazing.

End of Addendum

SECTION 085130 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.00 GENERAL REFERENCES AND PROVISIONS

A. The general conditions, Supplementary General Conditions & Division 1 of these specifications are hereby included as part of this section.
B. Thoroughly examine all other Sections of the specifications for requirements which affect the work of this section, whether or not such work is specifically mentioned in this section.

1.01 RELATED WORK

A. Caulking and Sealants: Section 079200
B. Painting: Section 099123
C. Glass & Glazing: Section 088000

1.02 DESCRIPTION OF WORK INCLUDED

A. Material: New factory glazed, thermally broken, extruded projected & fixed aluminum windows, together with all necessary mullions, panning, trim, expanders, operating hardware, installation hardware, full screens and all other accessories as required for a complete weather tight installation.

1. Provide windows, master frame, receptors, snap trim, subsills, panning, mullions, mullion covers, extenders, caulk stop, and other brake formed, cut sheet and extruded aluminum products in conformance with applicable code and law, and best professional practice. Materials are to be aluminum and compatible metal hardware of sufficient strength to meet project design load as required by local codes.

B. Removal from the site and legal disposal of all materials, debris, packaging, banding, and other materials and equipment.

C. Installation of treated wood blocking, fillers and nailers as required for a plumb, square, secure installation.

D. Installation of fiberglass insulation between new window frames and adjacent construction.

E. Sealing of all joints within window assemblies, (panning, receptors, trim etc.) and entire and interior perimeter(s) of new window units after installation.

F. Furnishing and delivering extra materials as maybe specified.

G. Make field observations and taking all field measurements of existing openings and conditions.

1. Bidders shall survey job-site conditions and shall thoroughly familiarize themselves with the work of this contract and all site conditions prior to submitting a bid. Window contractor shall

not be responsible for modifications to the building structure, or relocation of mechanical and electrical services which conflict with window locations.
2. Bidders shall be responsible for field measurement. The dimensions shown on drawings are to be used as a guide and are not to be used for estimating or final measurements.
3. Coordinating work with that of all other construction trades affecting or affected by the work of this section.

1.03 REFERENCES:

A. American Architectural Manufacturers Association [AAMA].
B. American National Standards Institute [ANSI].
C. Aluminum Association. [AA].
D. American Society for Testing & Materials [ASTM].
E. Federal Specification or Federal Standard [FS].
F. U.S. Department of Commerce [USDC].

1.04 QUALITY STANDARDS:

A. Standards: Except as otherwise indicated, requirements for aluminum windows, terminology and standards of performance, and fabrication workmanship are those specified and recommended in AAMA Designation: AP-AW and applicable general recommendations published by AAMA.

1. These performance requirements are to be met by all products according to the more stringent requirements in cases where there are redundant performance requirements stated in the AAMA specification, and in this specification.

2. Provide complete certified current test reports from an AAMA certified independent testing facility verifying that the structural loading capabilities, infiltration testing, water resistance testing and thermal performance testing that meets or exceeds the following criteria. Test reports shall be no more than four (4) years old. Sample submitted for tests shall be of manufacturer's standard construction and at least 5'0"wide x 8'0". All windows shall indicate conformance with AAMA/WDMA/CSA101/I.S.2/A440-08, 101/I.S.2/NAFSA-02 Architectural AW Performance Class windows.
3. All insulating glass units shall bear an "IGCC Certification Program" Level CBA label.
4. All performance requirements as stated herein above are the minimum acceptable levels of performance and no products shall be deemed acceptable that do not meet these requirements.

B. Consumer Product Safety Commission (CPSC): CPSC 16 CFR-1201, "Safety Standard for Architectural Glazing Materials".

C. Glass Association of North America (GANNA): "Glazing Manual".

D. Sealed Insulating Glass Manufacturer's Association (SIGMA):

1. SIGMA TM-3000 "Vertical Glazing Guidelines".

1.05 PERFORMANCE REQUIREMENTS:

A. All window work shall meet wind loading and deflection requirements of the State of Rhode Island as a minimum. Design, fabricate and install component parts so that completed frame and window installation will withstand the maximum inward and outward pressures allowed by Code measured in pounds per square foot (psf) normal to the plane of the wall. In no case shall uniform live load be less than 30psf, nor less than 36psf at corners.
B. All windows shall be fabricated and installed to provide for expansion and contraction of the window over an ambient temperature range of 150° degrees Fahrenheit, without buckling, sealed joint failure, glass breakage, undue stress on members or anchors and other detrimental, including cosmetic failure.
C. Maximum full load deflection normal to the wall plane for any member shall not exceed l/175 of the clear span of the member, except as otherwise provided by code.
D. Windows shall meet or exceed AAMA/WDMA/CSA 101/I.S.2/A440-08 classification:AP-(AW80).
E. Uniform Load Structural Test: Design and size members to withstand dead loads and live loads caused by pressure (positive/negative) of wind as calculated in accordance with ASTM E330 at 150 percent of the design pressure and Rhode Island Building Code. A minimum exterior and interior uniform load of 120 pounds per square foot (psf) 2880 PA shall be applied to the entire outside surface of the test unit. At the conclusion of the test there shall be no glass breakage, permanent damage of fasteners, hardware parts, support arms or any other damage causing the window to be inoperable. There shall be no permanent deformation of any frame or sash member in excess of 0.2 percent of its span.
F. Air Infiltration Tests: With sash in a closed and locked position, window shall be tested in accordance with ASTM E283 @ 6.24 psf. Allowable air infiltration shall not exceed 0.10 cfm/ft. of operable sash joint.
G. Water Resistance Tests: With the sash in a fully closed and locked position, window unit shall be tested in accordance with ASTM E331/ASTM E 547. There shall be no uncontrolled water leakage into the interior side of the window when subjected to a static air pressure difference of 12.0 psf
H. "U-Value": Provide unit when tested in accordance with NFRC 100-2004, when combined area of window, shall have a thermal transmittance not to exceed U-Value of 0.44 BTU/hr./sf/deg.F.
I. Condensation Resistance Factor (CRF): Provide window tested in accordance with NFRC 500-2004 standards and tests of thermal performance with a CR of 40.
J. Solar Heat Gain Coefficient (SHGC): Provide window with whole window SHGC max. of 0.31 per NFRC 200- 2004.
K. Forced Entry Resistance:Window unit shall conform to AAMA 1302.5, ASTM F588-85 performance Level 10.
L. Life Cycle Testing: When tested in accordance with AAMA 910-93 there shall be no damage to fasteners, hardware parts, support arms, activating mechanisms, or any other damage that would cause the window to be inoperable at the conclusion of testing. Air infiltration and water resistance tests shall not exceed the primary performance requirements specified.

1.06 SUBMITTALS:

A. General Requirements: Provide submittals in compliance with the following.

B. Product Data: Submit (3 sets) manufacturers specifications, standard details for window units, including profiles and dimensions of individual components. Data on hardware, accessories and finishes.

1. Test Reports/Calculations: Provide (3 copies) manufacturers certified test results for each type of window noted showing compliance with requirements herein. Test reports are to include structural calculations prepared by a registered structural engineer.
2. Structural Calculations: Prepared & stamped by a registered Structural Engineer (P.E.) for compliance with Rhode Island State Building Code, latest edition, for anchorage of all units.
3. Shop Drawings: Submit complete shop drawings, to include location floor plans and/or exterior wall elevations denoting all window openings, typical unit elevations at 1/2 inch scale, and FULL scale section details of typical composite members including reinforcement and stiffeners. Show anchors, hardware, operators, receptors, subsills and other component not included in manufacturer's standard data. Include glazing details, instructions and standards for factory glazed units.

C. Samples: Submit three (3) each of samples as follows:

1. Aluminum finish, color samples on 6" section(s) of extrusion for Architect's approval representative of finish as required for window units.
2. Samples of anchors, fasteners, hardware and other component parts as may be directed by Architect

D. Test Reports/ Calculations

1.07 PRODUCT DELIVERY, STORAGE & HANDLING:

A. Materials will be delivered to the site in an undamaged condition. Use care in handling and hoisting windows during transportation and at job site. All window units and components to be stored out of contact with the ground under water tight cover tarpaulins) or in storage trailer so as to prevent bending, warping or damage to windows.
B. All damaged window units shall be removed from the site and replaced with new units at no additional cost to owner. All materials shall be new and of best quality. Materials shall be delivered and stored at site in sufficient quantity to allow continuity of the work.
C. All materials shall be protected at all times from damage of any kind including breakage, scratches, dents, stains and deformation. No damaged materials shall be incorporated in any work. Protection during installation shall be responsibility of the contractor.

1.08 QUALITY ASSURANCE:

A. Installer Qualification: Installer shall be experienced in every way with the complete installation of aluminum windows similar in material, design and size.
B. Single source responsibility: Obtain aluminum windows from one source and by a single manufacturer.
C. Mock-Up Unit(s): The Architect/Owner requires a sample window unit to be installed into a designated opening. Sample to be representative of standard production window unit. All costs associated with Mock-up unit to be included in contractor's base bid. Owner will not be liable for any and all costs associated with the installation of the mock-up in the event that the unit installed is not approved. Award of contract shall not be completed until successful completion of mock-up.

1.09 WARRANTIES:

A. Provide a written, signed warranty from the window manufacturer agreeing to repair and/or replace any defective units or materials, to the satisfaction of and at NO cost to the Owner, which fail due to unsatisfactory materials or workmanship for a period of ten (10) years from date of substantial completion. The warranty shall be for failure of the entire window including but not limited to water leakage, excessive air infiltration, excessive deflections, and faulty operation of sash or deterioration of the finish in excess of normal weathering and defects in hardware, weather-stripping and all other components of the completed product.
B. Upon completion of the work and prior to acceptance of the work, the contractor shall provide to the Owner his own written warranty agreeing to repair and/or replace any window units which fail due to the improper installation within the first two (2) years after the date of substantial completion. In addition the warranty shall also certify that the perimeter sealant(s) are suitable for each specific application and have been applied in accordance with the sealant manufacturer's recommendations for joint size, width, depth, priming, joint movement, weather conditions, bond breakers, etc. This warranty will cover all materials and labor to correct such failures.
C. Provide additional written warranty from the window manufacturer agreeing to:

1. Replace at no cost to Owner, any insulated glass unit which fails within ten (10) years resulting in condensation, fogging, misting or dust which appears on the #2 or #3 surfaces of the insulated glass unit, stress cracks, or coating deterioration, if applied.
2. Replace at no cost to Owner, finish on window frames, parts and accessories which fails within five (5) years due to defects including chipping, cracking, peeling or blistering.

1.10 PRE-BID QUALIFICATIONS:

A. All products, other than those referenced herein, must be pre-qualified (by manufacturer and/or contractor) prior to bid due date for consideration. A Contractor entertaining submission of bid proposal must furnish one (1) complete window unit, complete with manufacturer's literature describing all materials and manufacturing processes, and additional information as shown below Fourteen (14) - calendar days prior to bid date.
   1. Sample must be same type (style) in which the bid is based on.
   2. Copies of independent laboratory tests, which certify that the proposed product meets or exceeds the classifications and performance standards, specified herein. Provide documentation showing continuing compliance by furnishing Notice of Product Certification from an administrator of AAMA Certification Program
   3. Provide documentation showing window manufacturer has been in business producing similar type products for a minimum of ten (10) years.
   4. Provide evidence that window installer has been in business installing similar type products for a minimum of 5 years.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. For the purpose of establishing a standard of quality, the aluminum windows noted and specified herein are based on Diamond Window & Doors Mfg. (Project Out & Fixed) Thermal

Aluminum Windows (Series: 8206-SRW) each having a 3 part muntin system for each sash, in the pattern shown on each window type in the construction documents.

B. Other manufacturer's offering products that maybe included in the work include but are not limited to the following:
   1. Universal Window
   2. Winco Window Company
   3. Diamond Windows and Doors Manufacturing

C. Equal products will be acceptable, provided those products are bid in strict compliance with this specification and requirements of this project, (refer to paragraph Item 1.10, Section 08520). Compliance with AAMA or other referenced standards specified are minimal and will not necessarily assure approval. The Owner reserves the right to disapprove alternative manufacturers for aesthetic as well as functional reasons. Approval maybe withheld for products which depart from sight line requirements, have thinner extrusions, and have shallower frame or sash depths, or which do not meet the finish requirements.

2.02 MATERIALS:

A. Aluminum extrusions: All frame and sash sections shall be extruded aluminum shapes produced from commercial quality type 6063T5/T6 alloy, with a minimum wall thickness of .125". Alloy and temper as recommended by window manufacture for strength, corrosion resistance and application of required finish, but not less than 22,000psi ultimate tensile strength and minimum yield strength of 16,000psi. Sash & Sash frame extrusions shall be tubular design. Minimum frame depth shall be 3¼". All ventilator sections to be tubular, factory structural glazed with adjoining frame surfaces at exterior and interior. Exterior sightlines at perimeter framing members will not exceed 2".

   Miscellaneous Installation Accessories and Trim:
   1. Subsills: An extruded aluminum subsill finished to match window with integral poured and debridged thermal break, if indicated and called for, shall be provided.
   2. Snap Trim: A two- (2) piece, aluminum rectangular section snap trim, If indicated and called for, shall be extruded aluminum with finish to match window. Snap trim shall be supplied in required lengths and attached with clips spaced no more than 18 inches on center. No exposed screws shall be visible upon completion of trim installation. Snap trim wall thickness shall be minimum of .062".
   3. Sill Extenders: Extruded aluminum sill extenders, trim and closures shall be required if indicated on drawing details.
   4. Mullions: Mullions, where indicated, shall be of extruded aluminum with a minimum wall thickness of .062", fastened with stainless steel fasteners, with aluminum snap cover trim where required to cover exposed fasteners.
   5. Muntins(TSDL): True simulated divided as required, exterior putty bead profiled (integral to master frame – NON tape applied), GBG and interior putty bead profiled #4 surface muntins in grid pattern to match existing profiles.

B. Thermal Barrier: Fabricate window units with an integrally concealed low conductance thermal barrier. Material shall be pour-in-place, two part chemically curing structural polyurethane equal to PRC (Product Research and Chemical Corp.) PR-453M. The thermal barrier shall totally separate the interior from the exterior surfaces of all window parts, which are exposed, to the elements. No primary window parts, hardware or other appurtenances shall bridge the thermal

barrier in any way. Snap together, pressed together or non-structural thermal barriers other than what has been specified will not be accepted. Thermal barrier shall be debridged toward the outside of the master frame or to the interior of the sash members to prevent continuing access to sharp debridge edges.

C. Fasteners: Aluminum, non-magnetic stainless steel or other material warranted by the window manufacturer to be non-corrosive and compatible with the aluminum window members trim, hardware, anchors, and other components of the window units. Do not use exposed fasteners except where unavoidable for application of operating hardware. Provide only exposed fasteners that match the Finish of the window members and hardware being used. Exposed fasteners shall be Phillips flat-head screws.

D. Anchors, Clips and Window Accessories: Depending on strength and corrosion inhibiting requirements fabricate accessories of aluminum, non-magnetic stainless steel or hot-dip zinc coated steel or iron complying with ASTM A386.

E. Compression Glazing Gaskets & Weather-stripping: At the manufacturer's option, provide extruded neoprene gaskets complying with ASTM D2000 - 2BC415 to 3BC620.

F. Window Assembly Sealant: Unless otherwise indicated for sealant required within the fabricated window units, use type recommended by the window manufacturer for joint size and movement, to remain permanently elastic, non-shrinking and non-migrating.

G. Perimeter Weather Seals: Sealant for metal to metal contact surfaces of window members and related items and for sealing mechanical joints shall be one part silicone or polyurethane sealant. In all cases, use sealant color, which matches the finish of window when sealant is exposed to view. Use primers, back up material, bond breakers and cleaning agents as recommended by sealant manufacturer.

1. Use of the following acceptable products or equal as approved by the Architect:
    a. Tremco, "Dymonic"
    b. GE (General Electric), "Silpruf"
    c. Dow Corning, "795"

2.03 FABRICATION:

A. General Requirements:

1. Finish, fabricate and shop assemble frame and sash into a complete window unit allowing for minimum clearances and shim spacing around perimeter of assembly, yet enabling installation.
2. Rigidly fit and secure joints and corners, accurately fit and secure corners tight. make corner joints flush, hairline, and weatherproof. Seal all frame joints with epoxy back sealant meeting AAMA 803.3 specification for Narrow Joint Sealants.
3. Develop drainage holes (weeps) with moisture pattern to exterior. Weep holes or slots of adequate size shall be provided as a means of drainage of water and condensation, which may accumulate, a minimum of two (2) weep holes per window is required. Weep holes shall have integral covers to minimize the penetration of weather, wind and insects.
4. Prepare components with internal reinforcement for operating hardware.

5. Prepare components to receive anchor devices. Fabricate anchorage items.
6. Provide internal reinforcement in mullions with galvanized steel members to maintain rigidity.

B. Frames:All windows shall have a minimum master frame depth of 3¼" with wall thickness not less than .125".

1. Windows shall be of butt jointed coped and secured construction, fastened with stainless steel screws, anchored in integral screw bosses, epoxy back sealed at the corners with narrow joint sealant meeting AAMA 803.3 specifications

C. Operating sash hardware for Projected window units.
1. Locks
   a. Die cast or stainless steel cam locks w/pole ring, strikes and/or keepers for manual operation shall secure sash in closed position.
   b. Provide two (2) locks for ventilators at maximum 40" spacing.

2. Limited Opening Device
   a. Provide concealed device to limit initial sash operation to 4". Operation past this point to be by use of a tool or removable key.

D. All sash shall be interior glazed at factory with glazing as specified herein.

E. Insect Screens: Full screens, field mounted on interior with swivel clips; handle-access wickets; ¾"x1 1/8"x.050" extruded aluminum frame with finish to match window in color and performance; corners mitered, gusset reinforced, and crimped, 18 x 16 dark aluminum mesh; PVC spline. . Screens shall be removable from the interior without the necessity to remove the sash and aluminum mesh shall be installed in a manner as to be easily replaced and/or repaired.

F. Weather-stripping: Provide replaceable double weather-stripping around the entire perimeter of each sash, incorporating a silicone treated pile conforming to AAMA 701-92 with Mylar fin bonded to a .270" backing. It shall be held in integral extruded ports and secured to prevent movement or loss while operating sash.

G. Glazing beads: Sashes to be glazed with 1" sealed insulated glass and so constructed to allow for field replacement of glazing. Glazing shall be of type extruded aluminum snap in type glazing beads or putty style and Tremco EPDM poly-weg compression gasket on the interior of the glazing. Exterior of the glass shall be set on Tremco POLY shim II butyl glazing tape. The sealed insulated unit glass shall conform to S.I.G.M.A. standards for Level "A" performance when tested in accordance with ASTM E6P1 and ASTM E6P2.

H. Structural Mullions: Shall be of sufficient strength to resist the specified window structural design load with a maximum deflection of L/175. Strength demonstrated by certified engineering calculations might be used in lieu of tested assembly demonstrations.

2.05 RELATED MATERIALS:

A. Receptor System shall be aluminum, not less than 062" thick, of sizes and profiles shown on drawings. All face joints between adjacent sill, mullion, and receiver segments shall be finished with concealed splice plates to eliminate through joints and to permit for expansion and contraction.

B. Mullions: Provide for horizontal tube mullions at stacking window sections to match profiles as shown on drawings.

C. Interior Trim: Provide window manufacturer's extruded aluminum snap trim sections at perimeter of interior of windows where required or as noted on drawings. Interior trim clips shall be at least 090".

D. Batt Insulation: Insulation shall be unfaced fiberglass all-purpose insulation. Insulation shall be 1.0" thick and cut to size(s) as needed, at all locations within window frames

E. Compressible Filler: Shall be closed cell polyethylene foam rope joint backing material between window members and surrounding construction. Do not use vinyl foam, degradable materials or paper.

F. Fasteners: All screws, nuts, washers, bolts, rivets and other fastening devices incorporated in the work shall be of sufficient strength and quality to per form their designated function. Fasteners shall be made of the following approved materials;

1. Aluminum
   a. Non magnetic stainless steel
   b. Corrosion resistant materials compatible with aluminum
   c. Steel-Cadmium plated (ASTM A 165-80, Type OS)
   d. Steel-Zinc Plated (ASTM B 633-78)
   e. Steel-Nickel & Chrome Plated (ASTM B 456-79, Type SC)

2. All through-frame connections shall be non-thermal bridging plates or clips. There shall be no through- frame fasteners.

2.06 FINISHES:

A. Comply with the NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.

B. Polyvinylidene Fluoride (PVDF) Coating: AA-C12C42R1x (Chemical Finish cleaned with inhibited chemicals, Chemical Finish: chemical conversion coating, acid chromate-fluoride-phosphate pretreatment, Organic Coating, (as specified below). Prepare, pretreat and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.
   1. Organic Coating: with resin containing 50% fluoropolymer; thermosetting; alternative finishes will not be acceptable.
   2. Quality standard: conforming to AAMA 2605.
   3. Pretreatment: five stage; zinc chromate conversion coating.
   4. Application: electrostatic spray and oven bake by approved applicator.
   5. Coating quantity: minimum one primer coat and one color coat.

6. Dry film thickness: minimum 1.2 mils on exposed surfaces, except inside corners and channels.

C. Color & Gloss: As selected by architect from manufacturer's full range (14 colors minimum) of choices for color & gloss.

2.07 GLASS & GLAZING MATERIALS:

A. Insulating Glass: Provide insulating glass units permanently marked either on spacers or at least one component light of units with certification label of the Insulating Glass Certification Council (IGCC); indicate class of glass.

B. Insulated Glass TYPE 1 & 1A: Units designated shall be of type as noted in Section 08800 item 2.02.A.

1. All insulated glass units shall be tested, certified and carry the respective IGCC-CBA level certification number. Glass shall be able to be replaced in field.

PART 3 - EXECUTION

3.01 PREPARATION AND INSPECTION:

A. Carefully remove all applicable items of the existing window systems, including stops, mullions, screens, storm windows and trim as required for the proper installation of the new window system. Avoid damage to the existing work that remains. No window shall be removed unless it can be replaced by the end of the workday. Existing window shall be removed and the new window installed in one continuous operation.

B. Existing window items removed from the construction shall not be reused in the new installation.
1. Existing windows, window shades, brackets, drapery that is to be disposed of, hardware or other miscellaneous items within the immediate adjacent opening surfaces which affect the installation of the new replacement windows shall become the responsibility of the installation contractor who shall remove and legally dispose of same at no additional cost to the Owner.

C. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION:

A. The installation contractor and his representatives shall be totally responsible for the installation of the window units.

B. Use only skilled tradesmen and complete all work in strict accordance with the manufacturer's specifications and recommendations for the installation of window units, hardware, operators and other components as well as the approved project shop drawings and these specifications.

C. Set units plumb, level and true to line without warp or rack of frames or sash. Compress fiberglass insulation between frames of new windows and construction that remains, as applicable. Install units centered in openings. Anchor frames adequately to maintain position permanently when subjected to normal thermal stress, building movement, operating activities and specified wind loads.

D. Insulate all aluminum from direct contact with steel, masonry, concrete or other non-compatible materials with treated wood or plastic shims, or with bituminous paint or zinc chromate primer.

E. Seal all exterior perimeter joints between windows and surrounding construction in accordance with the approved project shop drawings. Joints and other surfaces that are to receive sealant shall be clean free from loose debris or construction stains and must be totally dry. In all, prepare surfaces that are to receive sealant and apply sealant according to the manufacturer's instructions.

F. Treated wood blocking, fillers and nailers as required for secure installation.

G. Carefully install pre glazed operating windows in wall construction in accordance with the approved shop drawings. Take great care not to damage work in place. Apply fillers and perimeter sealant at all such windows.

H. All assembled window units shall be properly backsealed buttered with sealant where required and properly fastened together before erection. The Architect may inspect delivered units to determine whether joints are satisfactorily sealed before installation.

I. Apply sealant in all field assembled metal to metal joints as required to provide a completely weather tight installation. Install sealant in strict accordance with the manufacturer's application instructions, in a continuous manner, with sealant bead uniform in width in each direction. Tool sealant surface to a smooth uniform density, Remove excess sealant immediately.

J. Installation of window assemblies shall provide for thermal expansion and contraction without impairment of function or weather resistance.

3.03 ADJUSTMENTS, PROTECTION AND CLEANING:

A. Adjust operating sash and sash hardware to provide tight fit at contact points and at weather-stripping, for smooth operation and wheatertight closure. Check all operating sash and demonstrate operation free from twist and rattle.

B. Adjust the sash hardware so that the sash is perfectly square in the primary frame member. Lubricate hardware and all moving parts as necessary and in accordance with manufacturer's instructions.

C. Clean aluminum surfaces promptly after installation of window units in accordance with the manufacturer's instructions. Exercise extreme caution to avoid damage to finish. Remove excess glazing materials and sealant compounds, dirt and other substances by using mineral spirits or other solvent acceptable to sealant manufacturer. Touch up blemishes and other defects in the surface.

D. Clean interior and exterior surfaces of glass promptly after installation of window units. Wash down exposed surfaces using a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

E. Protect glass and window materials from contact with contaminating substances resulting from construction operations. After installation and cleaning the window contractor and/or general contractor shall be responsible for maintaining the cleanliness and protection of the window units from damage from other trades.

F. Initiate all protection and other precautions required to ensure that window units will be free from damage or deterioration (other than normal weathering) at time of acceptance. Send to architect, with copy to Owner, written recommendations for the maintenance and protection of the windows following Substantial Completion of Replacement Window Contract.

END OF SECTION

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Glass for windows, doors, interior borrowed lites, glazed curtain walls, and sloped glazing.
2. Glazing sealants and accessories.

1.2 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.3 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of the following products; 12 inches square.

1. Tinted glass.
2. Coated glass.
3. Insulating glass.

C. Glazing Accessory Samples: For sealants, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer manufacturers of insulating-glass units with sputter-coated, low-E coatings glass testing agency and sealant testing agency.

B. Product Certificates: For glass.

C. Product Test Reports: For coated glass insulating glass and glazing sealants, for tests performed by a qualified testing agency.

1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

E. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

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

1. Install glazing in mockups specified in Section 085113 "Aluminum Windows" Section 084413 "Glazed Aluminum Curtain Walls" to match glazing systems required for Project, including glazing methods.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.11 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period.

Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Guardian Industries Corp.; SunGuard.
2. Pilkington North America.
3. PPG Industries, Inc.

B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.

1. Design Wind Pressures: As indicated on Drawings.
2. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.

a. Wind Design Data: As indicated on Drawings.
b. Basic Wind Speed: 110 mph.

c. Importance Factor: 1.0.
d. Exposure Category: C.

3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
4. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IgCC.

C. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

1. Minimum Glass Thickness for Exterior Lites: 6 mm.

D. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

2.5 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

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

a. Pecora Corporation.
b. Sika Corporation.
c. Tremco Incorporated.

2. Applications: Describe types of glazing applications where this sealant is required.

2.6 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.8 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

    a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

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

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches.

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 MONOLITHIC GLASS SCHEDULE

A. Refer to schedules in the Drawings.

1. Minimum Thickness: 6 mm.

3.9 INSULATING GLASS SCHEDULE

A. Refer to schedules in the Drawings.

1. Minimum Thickness: 6 mm.

2. Exterior Lite: ¼" Clear annealed with a Solarban 60 or SN-68 low E on the second surface.

3. Air Space: ½" Air Space with Argon & Black Spacer.

4. Interior Lite: ¼" Clear annealed.

END OF SECTION 088000