117 Union St. – Phase 2 – Rehabilitation of the "Moby Dick" Building

Application for Certificate of Appropriateness

New Bedfod Historical Commission

PRODUCT CUTS

- Window Type A
- Window Type B
- Window Type C-1
- Window Type C-2, D, E & F
- Door Type G
- Door Type H
- Terra Cotta Replacement & Repair
- Poly-Ash Trim

WINDOW TYPE A

MARVIN

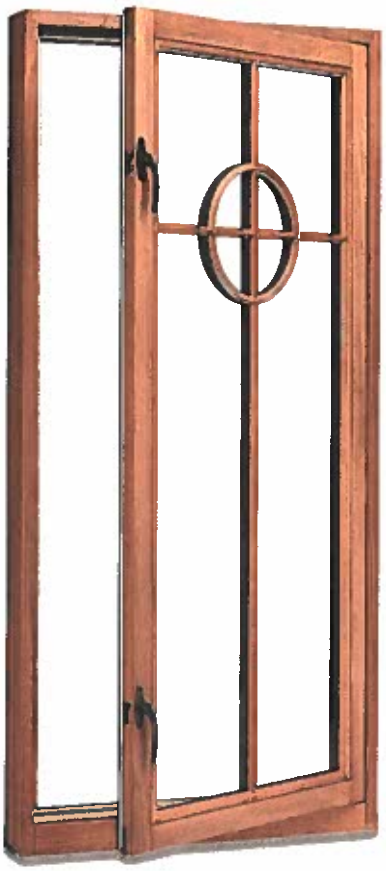
ULTIMATE CASEMENT INSWING

Previously known as Marvin Inswing Casement

The Ultimate Casement Inswing window complements classic architectural styles. Inswing casement windows can open into a room, making them a good choice when an outswing window could block or take up valuable space on patios, decks or

outdoor walkways. Available by special order in single or French double-sash styles.

WINDOW TYPE A



INTERIOR EXTERIOR

Features of the Ultimate Casement Inswing Window

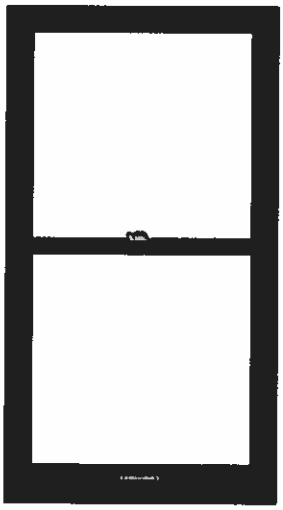
- Available in heights up to 6 feet or widths up to 4 feet
- Choose from single-sash or French double-sash styles
- French Inswing Casement eliminates vertical center post for wide-open views
- Available in large sizes to maximize views and architectural impact
- Optional concealed pocket hinges provide clean look and smooth operation

PROFESSIONAL

WINDOW TYPE B

Return to Window Lines Overview (/windows)

Architect Series® Reserve™
Double- and Single-Hung Window



Downloads

2D Cross Section (Aluminum-Clad Wood)

2D Elevation (Aluminum-Clad Wood)

3D & BIM (Aluminum-Clad Wood)

3D & BIM (Aluminum-Clad Wood)

Specifications (Aluminum-Clad Wood)

- Available in three wood types: Pine, Mahogany, and Douglas Fir.
- Authentic butt joinery with through-stile construction.
- Putty Glaze sash profile available with matching grilles.
- Patent-pending Integrated Rolscreen® retractable screen is optional.
- Optional exterior sash lugs that allow for tilting.
- Operable sizes up to 5' x 10' (LX, additional sizes in Monumental (http://professional.pella.com/windows/product-details/monumental-architect-reserve))

A local Pella team member is ready to help you with your project.

Get A Quote (http://info.pella.com/ProPellaContactUsQuote)

Custom Window Solutions (/windows/product-details/custom-reserve) Installation Guides (http://www.installpella.com) Warranty Info (/warranties)

Find potential LEED credits for this project (/support/leed)

Features & Options

Sizes and Shapes

Performance Values

Wood Types

Interior Finishes

Exterior Finishes

Glazing

Impact Resistant

Grilles

Hardware

Screens

Sizes and Shapes - Architect Series Reserve Hung Window

Sizes

- Double-hung, single-hung and simulated-hung options.
- Three series available (LX, Monumental (http://professional.pella.com/windows/product-details/monumental-architect-reserve), Impact-resistant).
- Built-to-order in 1/8" increments.

View sizes for aluminum-clad wood and wood (http://media.pella.com/professional/adm/Clad-Wood/ASR-DH_SZTAB.pdf)
View design data for monumental hung windows (http://media.pella.com/professional/adm/Clad-Wood/ASR-MDH_DD.pdf)

Combinations

Add transoms or adjacent windows for flexible combinations.

View window combinations (http://media.pella.com/professional/adm/Clad-Wood/AS-DH_COMBO.pdf)

Design Data

View design data for aluminum-clad exterior wood windows (http://media.pella.com/professional/adm/Clad-Wood/ASR-DH_DD.pdf)

Order Pella Replacement Parts Online » (http://parts.pella.com/OA_HTML/ibeCZzpH sitex=10040)

- Window Parts
- Patio Door Parts
- Supplies

PROFESSIONAL

WINDOW TYPE C-1

Return to Patio Doors Overview (/doors)

Architect Series® Reserve™ Bifold Patio Door

Downloads

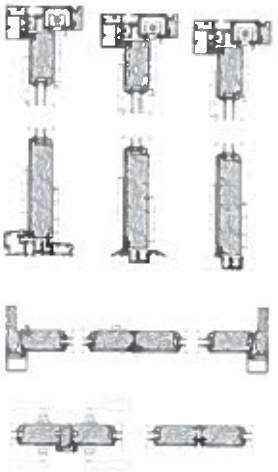
2D Cross Section (Aluminum-Clad Wood)

3D & BIM (Aluminum-Clad Wood)

Design and Performance (Aluminum-Clad Wood)

Specifications (Aluminum-Clad Wood)

- Part of the Pella® Scenescape™ collection.
- Offers the high-end historical detailing of Architect Series® Reserve™ products.
- When open, the panels can be folded and stacked neatly indoors (in-swing) or outdoors (out-swing) to create a larger opening. Bifold doors close flat for a seamless look.
- Door panels can travel to one side or open in the middle.
- Concealed dual-point locks provide easy door operation.
- Tracks can be straight or meet at a 90-degree corner for added design flexibility.
- Bifold panel sizes range from 14.25" x "52" to 42" x 117.375".
- Available in three wood types: Pine, Mahogany and Douglas Fir. Available with Low-E insulating triple-pane glass with Krypton or Argon.



A local Pella team member is ready to help you with your project.

Get A Quote (http://info.pella.com/ProPellaContactUsQuote)

Find potential LEED credits for this project (/support/leed)

Features & Options

Sizes and Shapes

Performance Values

Wood Types

Interior Finishes

Exterior Finishes

Glazing

Grilles

Hardware

Sizes - Architect Series Reserve Bifold Patio Door

Flexible combinations to meet your design needs.

Product Sections

View in-swing product sections (http://media.pella.com/professional/adm/Specialty/ASR-BFOSIS.pdf)
View out-swing product sections (http://media.pella.com/professional/adm/Specialty/ASR-BFOSIS.pdf)

Design Data

View design data for in-swing doors (http://media.pella.com/professional/adm/Specialty/ASR-BFOSIS_DD.pdf)
View design data for out-swing doors (http://media.pella.com/professional/adm/Specialty/ASR-BFOSIS_DD.pdf)

Panel Configuration Examples

Order Pella Replacement Parts Online » (http://parts.pella.com/OA_HTML/ibeCZzpH sitex=10040)

- Window Parts
- Patio Door Parts
- Supplies

PROFESSIONAL

WINDOW TYPE C-2, D, E & F

Return to Window Lines Overview (/windows)

Architect Series® Reserve™ Fixed Sash and Frame Window

Downloads

- 2D Cross Section (Aluminum-Clad Wood)
- 2D Cross Section (Aluminum-Clad Wood)
- 3D & BIM (Aluminum-Clad Wood)
- Design and Performance (Aluminum-Clad Wood)
- Specifications (Aluminum-Clad Wood)

- Available in three wood types: Pine, Mahogany, and Douglas Fir.
- Standard and custom sizes up to 2' 11" x 6' 1".
- Authentic butt joinery with through-stile construction.
- Putty Glaze sash profile available with matching grilles.
- Exceptional energy efficiency.

A local Pella team member is ready to help you with your project.

Get A Quote (http://info.pella.com/ProPellaContactUsQuote)

Custom Window Solutions (/windows/product-details/custom-reserve) Installation Guides (http://www.installpella.com) Warranty Info (/warranties)

Features & Options

Sizes and Shapes – Architect Series Reserve Fixed Sash and Frame Window

Size Tables

Built-to-order in 1/8" increments.

View size tables for rectangular windows (http://media.pella.com/professional/adm/Clad-Wood/ASR-CM_SZTAB.pdf)

Combinations

Add transoms or adjacent windows for flexible combinations.

View window combinations (http://media.pella.com/professional/adm/Clad-Wood/ASR-CM_COMBO.pdf)

Design Data

Design data available for egress, vent opening, clear opening, visible glass and frame area.

View design data for aluminum-clad wood and wood windows (http://media.pella.com/professional/adm/Clad-Wood/ASR-CM_DD.pdf)

Shapes

Architect Series Reserve fixed sash and frame windows are available in a variety of rectangular, curved and angled shapes.

Find potential LEED credits for this project (/support/leed)

Order Pella Replacement Parts Online » (http://parts.pella.com/OA_HTML/ibeCZzpHc sitex=10040)

- Window Parts
- Patio Door Parts
- Supplies

PROFESSIONAL

DOOR TYPE G

Return to Patio Doors Overview (/doors)

Architect Series® Reserve™
Out-Swing Hinged Commercial Door

Downloads

2D Cross Section (Aluminum-Clad Wood)

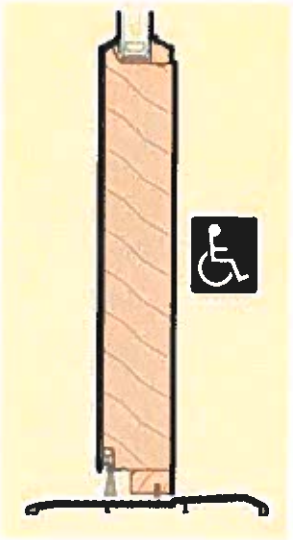
2D Elevation (Aluminum-Clad Wood)

Specifications (Aluminum-Clad Wood)

- Wood and aluminum-clad wood options.
- Standard sizes up to 6' 1-1/2" x 7' 11-1/2".
- 32" clear opening widths and low-profile, ADA compliant sills are standard.
- Putty Glaze sash profile available with matching grilles.
- Exclusive hardware styles in 12 finishes.
- Exceptional energy efficiency.

A local Pella team member is ready to help you with your project.

Get A Quote (http://info.pella.com/ProPellaContactUsQuote)





Custom Door Solutions (/doors/product-details/custom-reserve) Installation Guides (http://www.installpella.com) Warranty Info (/warranties)

Features & Options

Sizes and Shapes
Wood Types
Interior Finishes
Exterior Finishes
Glazing
Grilles
Hardware
Screens

Sizes and Shapes - Architect Series Reserve Out-Swing Hinged Commercial Door

Sizes

Built-to-order in 1/8" increments.

View size tables (http://media.pella.com/professional/adm/Clad-Wood/ASR-COS_SZTAB.pdf)

Combinations

Add transoms or sidelights for flexible combinations.

View door combinations (http://media.pella.com/professional/adm/Clad-Wood/ASR-OS_COMBO.pdf)

Design Data

Design data available for single- and double-panel doors, as well as sidelights and transoms, including clear opening, vent area, visible glass and frame area.

View design data for aluminum clad-wood (http://media.pella.com/professional/adm/Clad-Wood/ASR-COS_DD.pdf)

View design data for wood (http://media.pella.com/professional/adm/Clad-Wood/ASR-COS_DD.pdf)

Shapes

Contact Us

Click here to contact us about your project or information needs.

CONTACT PELLA (http://info.pella.com/ProPellaContactUs)

Find potential LEED credits for this project (/support/leed)

Order Pella Replacement Parts Online » (http://parts.pella.com/OA_HTML/ibeCZzpHc sitex=10040)

- Window Parts
- Patio Door Parts
- Supplies

PROFESSIONAL

DOOR TYPE G

Pella Commercial Entrance Doors

Pella offers your customers more choices. There's a Pella door that's just right.

()

Get A Quote (http://info.pella.com/ProPellaContactUsQuote)

A local Pella team member is ready to help you with your project.

Aluminum-Clad Wood

Fiberglass

Steel

Aluminum-Clad Wood

Architect Series® **Reserve™**

Each intricate detail of Pella's Architect Series Reserve front entrance doors captures the historical authenticity of traditional craftsmanship. Recreate history with these stunning wood products – customizable to your design.

View Details

Out-Swing Hinged (/doors/product-details/aluminum-commercial-reserve)

Architect Series® **Traditional**

Striking from both an interior and exterior perspective, they feature commercial hinges, 1/2" low-profile sills and 32" clear opening widths to meet accessibility requirements.

View Details

Out-Swing Hinged (/doors/product-details/aluminum-commercial-architect)

Fiberglass

Architect Series® **Traditional**

The most realistic wood grain with a sturdy, substantial door panel that feels like a wood door when it swings.

PROFESSIONAL

DOOR TYPE H

Return to Entry Doors Overview (/doors/residential)

Architect Series® Premium Fiberglass Entry Door

Downloads

- 2D Cross Section (Fiberglass)
- Design and Performance (Fiberglass)
- Design and Performance (Wood)
- Specifications (Fiberglass)

- Our very best fiberglass entry doors – inside and out.
- The industry's most realistic look of Mahogany, Oak, Rustic or Hemlock wood grains; available prefinished in your choice of stain or paint colors.
- Sturdy, substantial door panel that feels like a wood door when it swings open or closed.
- VividGrain™ stain process provides the authentic appearance of wood.
- Low-maintenance AdvantagePlus™ protection system.[1]
- PerformaSeal™ design that provides industry-leading protection from drafts and leaks.[2]

[1]Not available on doors with a Mahogany Frame.
[2]Standard feature.

A local Pella team member is ready to help you with your project.

Get A Quote (http://info.pella.com/ProPellaContactUsQuote)

Installation Guides (http://www.installpella.com) Warranty Info (/warranties)

Find potential LEED credits for this project (/support/leed)

Order Pella Replacement Parts Online » (http://parts.pella.com/OA_HTML/ibeCZzpH sitex=10040)

- Window Parts
- Patio Door Parts
- Supplies

Features & Options

Panel Styles and Sizes - Architect Series Premium Fiberglass Entry Door

Sizes

Standard sizes up to 3' 6" wide by 8' 0" feet high.

View sizes (http://media.pella.com/professional/adm/EntryDoor/EAS_SZTAB.pdf)

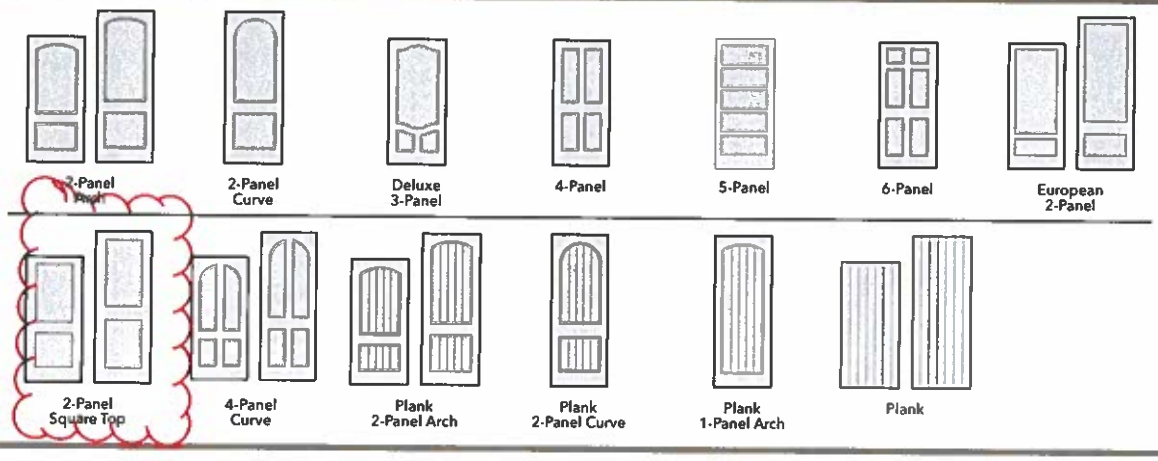
Design Data

View design data (http://media.pella.com/professional/adm/EntryDoor/EAS_DD.pdf)

DOOR TYPE H

		Solid Panels																						
		2-Panel Arch		2-Panel Curve	Deluxe 3-Panel	4-Panel	5-Panel	6-Panel		European 2-Panel		2-Panel Square Top		4-Panel Curve			Plank 2-Panel Arch		Plank 2-Panel Curve		Plank 1-Panel Arch	Plank			
Call Sizes	Height	6'8"	8'0"	8'0"	6'8"	6'8"	6'8"	6'8"	6'8"	6'8"	8'0"	6'8"	8'0"	6'8"	8'0"	8'0"	6'8"	8'0"	8'0"	8'0"	8'0"	6'8"	6'8"	8'0"	8'0"
	Single Panel Width	3'0"	3'0"	3'0"	3'0"	3'6"	3'0"	2' 8"	3'0"	3'0"	3'0"	3'0"	3'0"	3'0"	3'0"	3'6"	3'0"	3'0"	3'0"	3'6"	3'0"	3'0"	3'6"	3'0"	3'6"
	Double Panel Width	6'0"	6'0"	6'0"	6'0"	7'0"	6'0"	5'4"	6'0"	6'0"	6'0"	6'0"	6'0"	6'0"	6'0"	7'0"	6'0"	6'0"	6'0"	7'0"	6'0"	6'0"	7'0"	6'0"	7'0"
Material	Premium Smooth						•		•			•	•				•	•						
	Premium Mahogany-Grain				•				•		•														
	Premium Oak-Grain					•		•	•	•															
	Premium Hemlock-Grain																								
	Premium Rustic-Grain	•	•	•										•	•	•	•	•	•	•	•	•	•	•	•
20-Minute Fire Door Not available in double-panel widths	Premium Smooth																								
	Premium Mahogany-Grain				•				•		•														
	Premium Oak-Grain							•	•	•															
	Premium Hemlock-Grain																								
	Premium Rustic-Grain													•	•		•	•	•		•				

Panel Options



TERRA COTTA REPLACEMENT & REPAIR

Boston Valley Terra Cotta

Main Office

6860 South Abbott Road
Orchard Park, New York 14127
tel 716.649.7490
toll free 1.888.214.3655
www.BostonValley.com

General Inquiries

info@bostonvalley.com

Estimating

estimating@bostonvalley.com

Sales Support

sales@bostonvalley.com

Sales representatives are available across many regions of the US, Canada and Asia. Please contact our main office for more details.

TABLE OF CONTENTS

Through constant pursuit of technological innovations and creative problem solving, architectural terra cotta has been brought into the modern age.

COMPANY & PRODUCT OVERVIEW

Boston Valley Terra Cotta will support its clients from planning through installation with expert personnel in all areas of the process. Our passion for ceramic innovation drives us to constantly explore new and old technologies to push the envelope in quality, design and service

OUR COMPANY

BOSTON VALLEY TERRA COTTA WAS ESTABLISHED by the Krouse family in 1981 following the purchase of Boston Valley Pottery, a company which had been in existence since 1889. Originally a brick manufacturing facility and later a clay pot manufacturer, Boston Valley Pottery was converted to an architectural terra cotta facility by the Krouses. Utilizing both superior ceramic engineering knowledge and sculpting talent, Boston Valley Terra Cotta has become one of the leading manufacturers of architectural terra cotta globally.

Boston Valley commenced operations with the restoration of the Guaranty Building, a Louis Sullivan landmark in Buffalo, New York. Since that time, the company has been awarded contracts for some of the most notable buildings around the country. We are awarded contracts based not only on the cost of our product but also because of our ability to meet and exceed expectations in regard to service and the quality of our terra cotta products. To date, over 2000 contracts have been carried out to completion. Our facility has grown into a state of the art operation with 180,000 square feet of work space and over 150 employees operating two shifts per day. Our management team has over 30 years of experience in design, engineering, drafting, model and mold making, clay body and glaze development, and customer service.

Our Team

Boston Valley Terra Cotta has extremely qualified people in every department. Production is closely monitored and directed by our management team; each employee takes pride in his or her work. Our employees have strong roots in the community and have made Boston Valley Terra Cotta their career. By the fact that we are a corporation with closely held stock, primarily in the hands of the Krouse family, we have a vested interest in seeing that our product is of the very highest quality. Our family values also extend to our commitment to a safe and healthy work environment for our employees.

Boston Valley Terra Cotta strives to be the most internationally recognized and diversified manufacturer in architectural ceramics. Whether providing historic restoration units or product for the most innovative designs in new construction, Boston Valley Terra Cotta will maintain the highest standards in quality for both our products and services.

PRODUCT INTRODUCTION

Terra Cotta Products

Family owned and operated, Boston Valley Terra Cotta understands the legacy of terra cotta design, manufacturing and construction. It is because of the design and construction industry's appreciation of this legacy, as well as the industry's knowledge of the properties of terra cotta which make it a superb building material that so much time and effort is spent on restoring terra cotta façades.

Terra Cotta Properties

Formed of clays and other raw materials mined from the earth which are then fired to high temperatures forming permanent bonds, terra cotta has the following properties:

- Non-Combustible
- Resistant to UV fade
- Does not off-gas
- Inherent color range
- High compressive strength
- Plasticity to be formed into various shapes and profiles
- Ability to withstand severe climates and with proper installation and maintenance can be expected to serve a building for hundreds of years

At our manufacturing facility in Orchard Park, New York, clays from the largest mining operations in North America are blended according to specific recipes that have been engineered to meet industry standards in tolerance and performance criteria. BVTC works with industry professionals as we refine our product and our manufacturing methods to ensure that we are delivering the highest quality terra cotta to our clients. For a list of industry standards and testing, visit our website at *www.bostonvalley.com* or turn to the Performance Section of this booklet.

A skilled sculptor puts the finishing touches on a Corinthian capital for P.S. 114 in New York City

Lead Times of Terra Cotta

Architectural terra cotta is a natural material fired to 2100 degrees fahrenheit over a number of days. The batching, souring, forming, drying, firing, glazing, sizing, fitting and quality inspection processes take time. Technological advances and ceramic engineering continually raise the level of quality and performance; however, they cannot change all of the time requirements of this ancient material.

Lead times vary from project to project. Projects requiring only a few replacement units may receive product 6 to 8 weeks from all approvals where as a large, full-facade restoration may take 18 to 24 months before the project is complete.

An enormous finial for the Life Sciences Secondary School in Manhattan is sculpted to replicate the original from the early 20th Century

PROJECT INSTALLATIONS: RESTORATION

TERRA COTTA RESTORATION

Boston Valley Terra Cotta's products specified for historic restoration have contributed to the successful preservation of some of the most architecturally significant buildings in the United States, Canada, and abroad. Terra cotta units crafted at BVTC to replace pieces that had been in service, often for 100 years, can be seen on buildings in cities from New York to New Orleans, Chicago, San Antonio, and San Francisco.

LEFT: Boston Valley created restoration pieces for Cass Gilbert's 90 West St. façade that were damaged during the September 11th attacks.

Below is a short list of several of the architecturally significant buildings for which BVTC has provided terra cotta restoration products.

US Post Office & Courthouse
Brooklyn, NY
ARCHITECT: James A. Wetmore

90 West Street
New York, NY
ARCHITECT: Cass Gilbert

City College of New York
New York, NY
ARCHITECT: George Post

65 Bleeker Street
New York, NY
ARCHITECT: Adler & Sullivan

Fisher Building
Chicago, IL
ARCHITECT: D.H.Burnham & Company

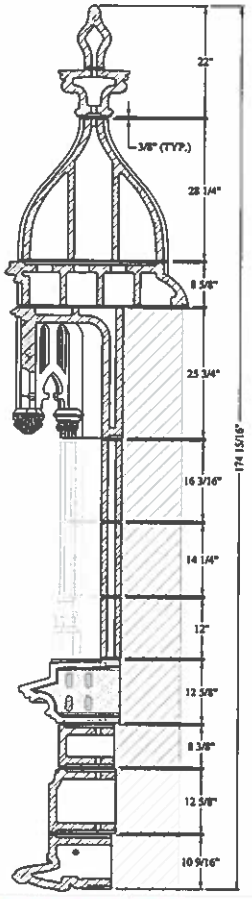
Reliance Building
Chicago, IL
ARCHITECT: D.H.Burnham & Company

Rookery
Chicago, IL
ARCHITECT: Burnham & Root

James Farley Post Office
New York, NY
ARCHITECT: McKim, Mead, & White

Los Angeles City Hall
Los Angeles, CA
ARCHITECT: Parkinson, Austin, Martin

Russ Building
San Francisco, CA
ARCHITECT: George W. Kelham



1 SECTION AT TABERNACLE

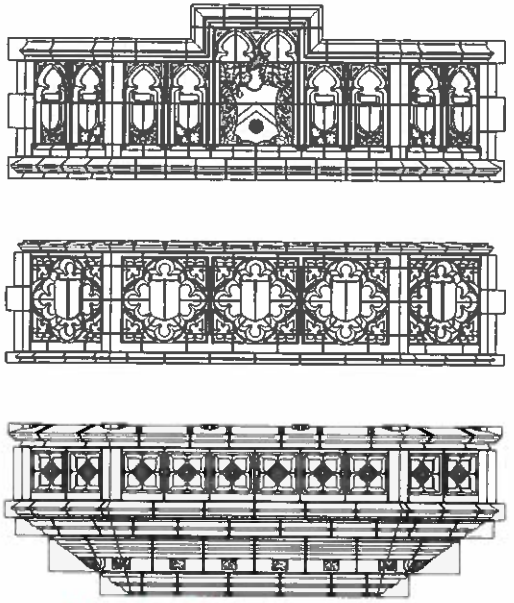
PROJECT INSTALLATIONS

Flushing High School

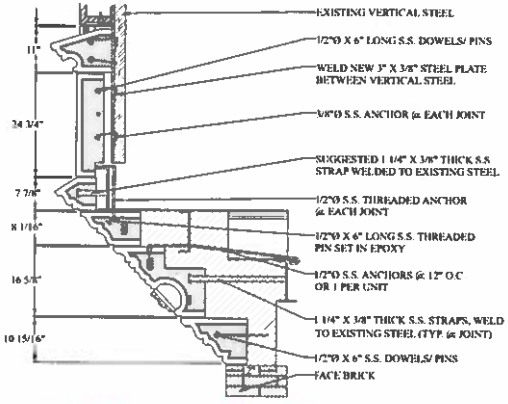
Flushing, NY

RESTORATION ARCHITECT School Construction Authority

INSTALLATION CONTRACTOR Adam's European



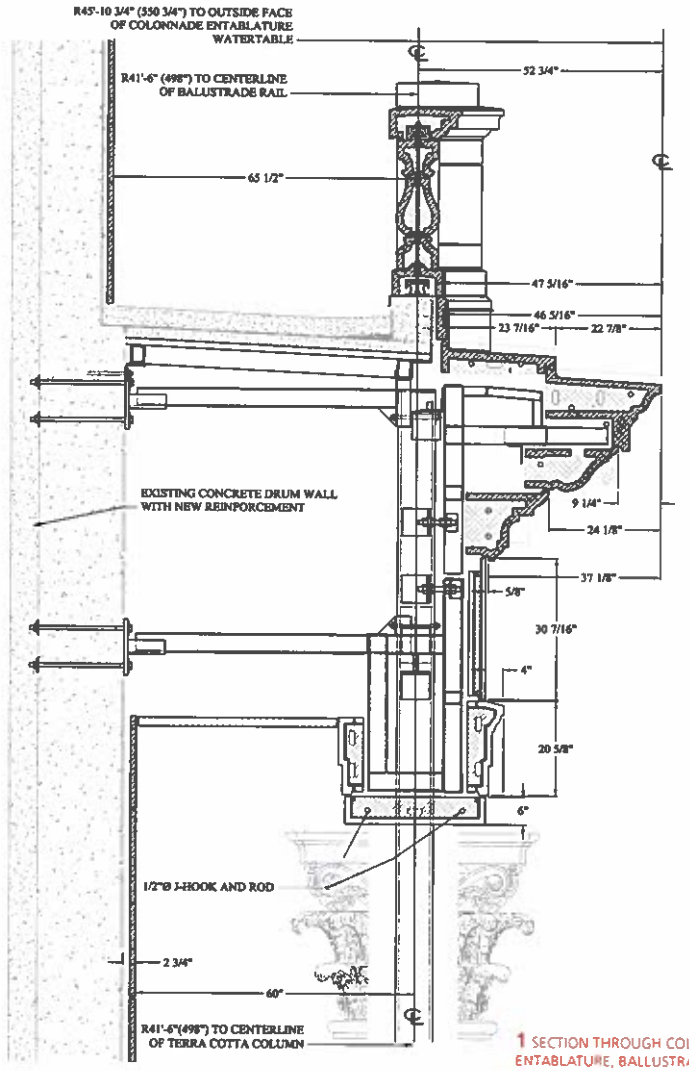
2 PARTIAL ELEVATION



3 SECTION AT LOWER BAY WINDOW

Utah State Capitol

Salt Lake City, UT
RESTORATION ARCHITECT MJSA Architects
ARCHITECT OF THE CAPITOL David Hart
INSTALLATION CONTRACTOR KEPCO+



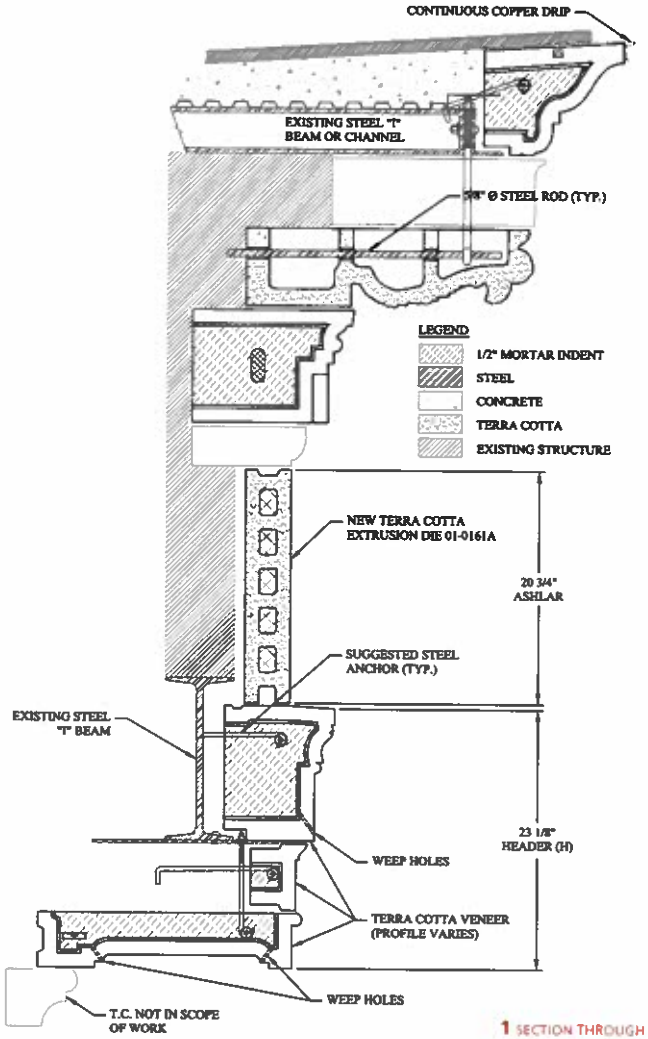
1 SECTION THROUGH COLUMN CAPITAL ENTABLATURE, BALLUSTRADE

Frederic H. Pease Auditorium, Eastern Michigan Universtiy

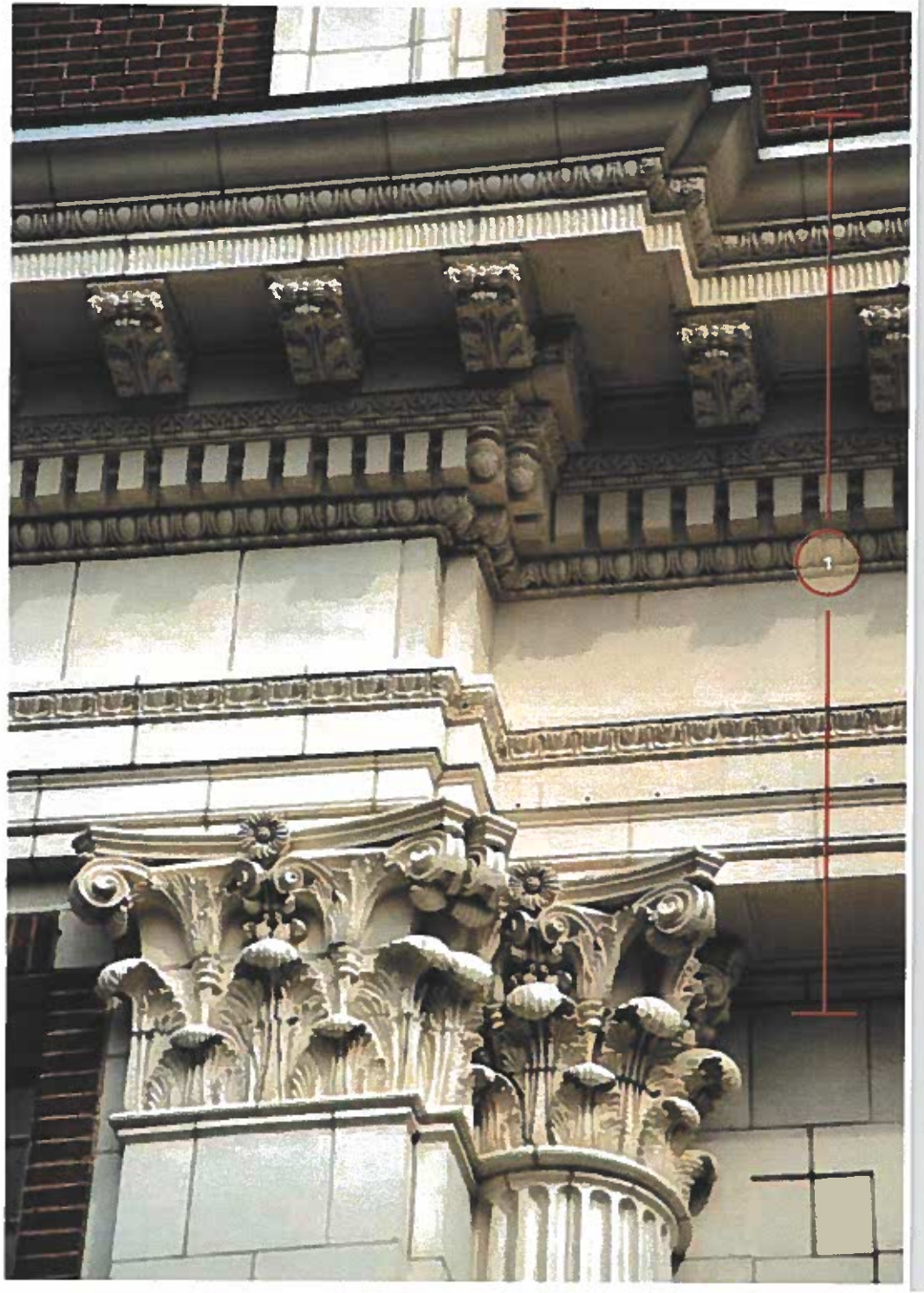
Ypsilanti, MI

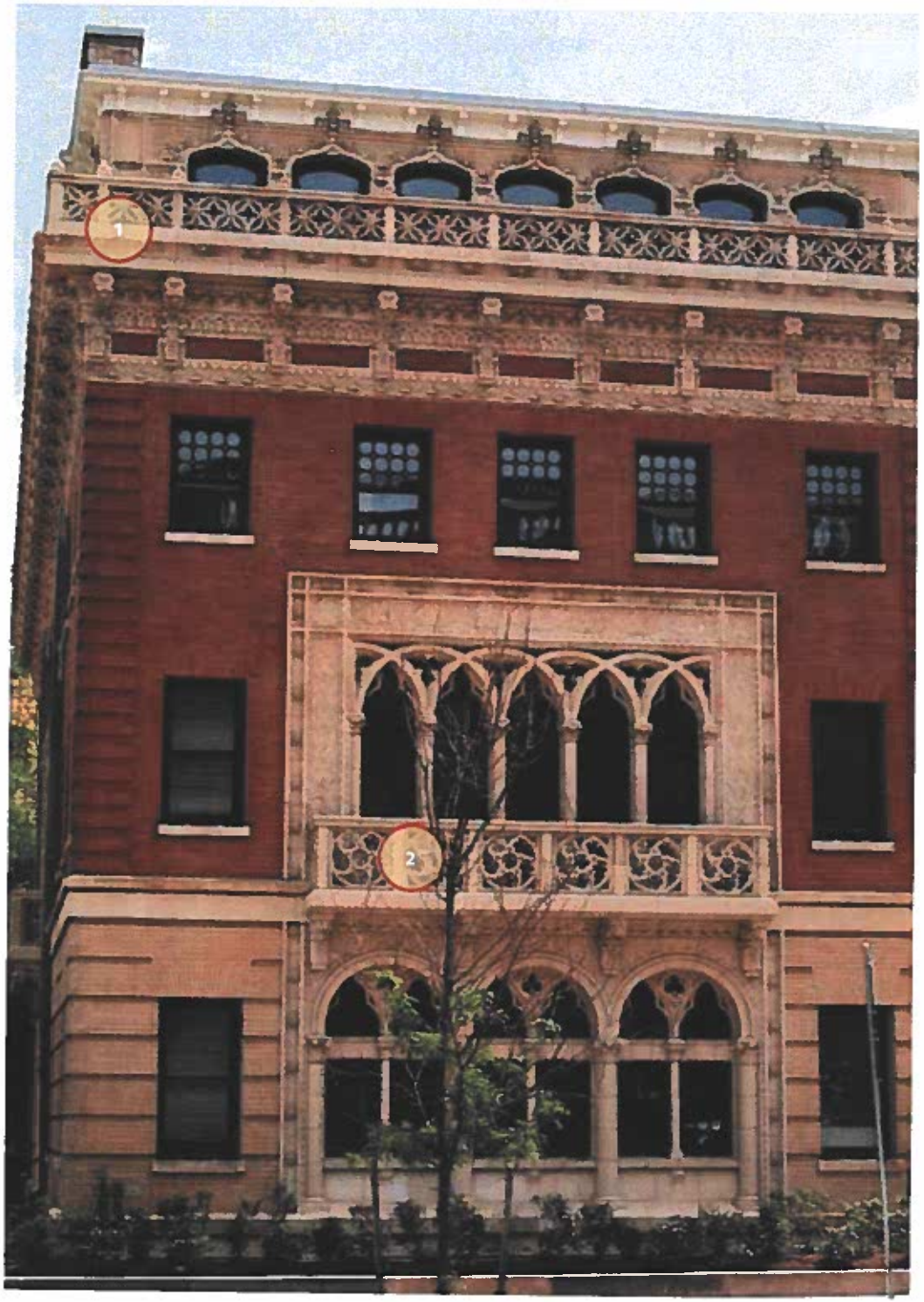
RESTORATION ARCHITECT Quinn Evans Architects

INSTALLATION CONTRACTOR Grunwell-Cashero Co.



1 SECTION THROUGH ENTABLATURE





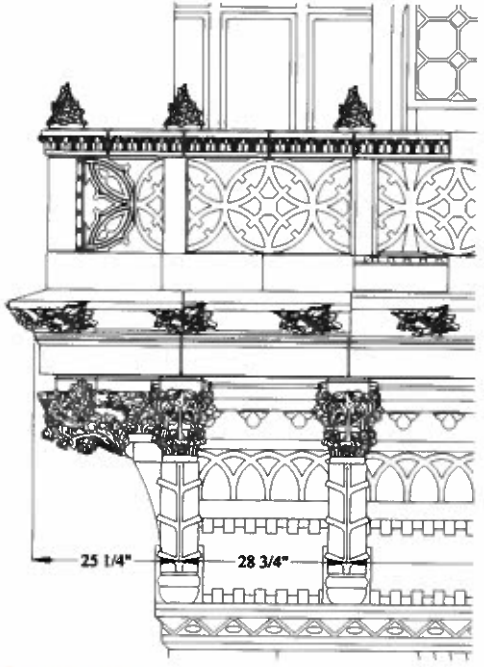
PROJECT INSTALLATIONS

Stoeckel Hall, Yale University

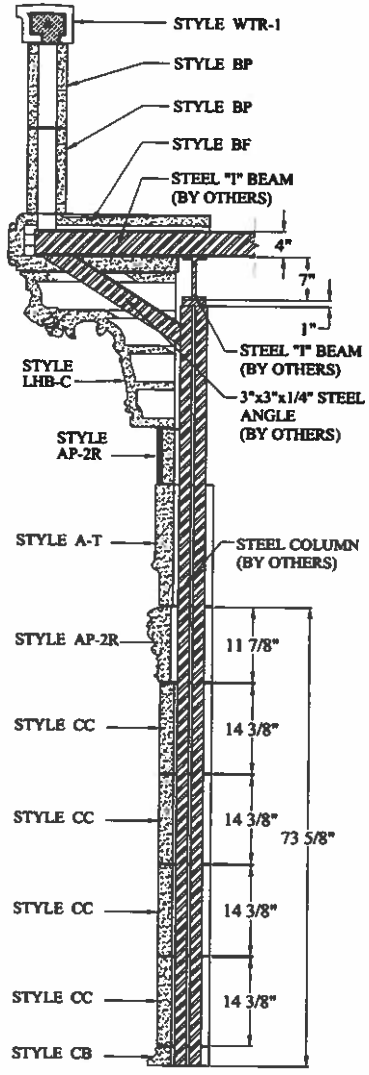
New Haven, CT

RESTORATION ARCHITECT Charney Architects LLC

INSTALLATION CONTRACTOR G.L. Capasso, Inc.



1 ELEVATION DETAIL



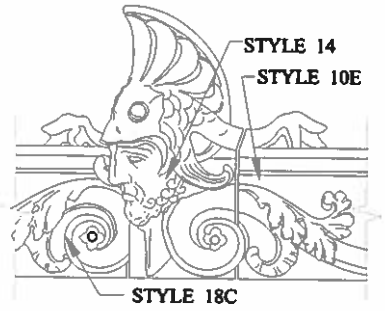
2 SECTION THROUGH BALCONY

Detroit Public Library

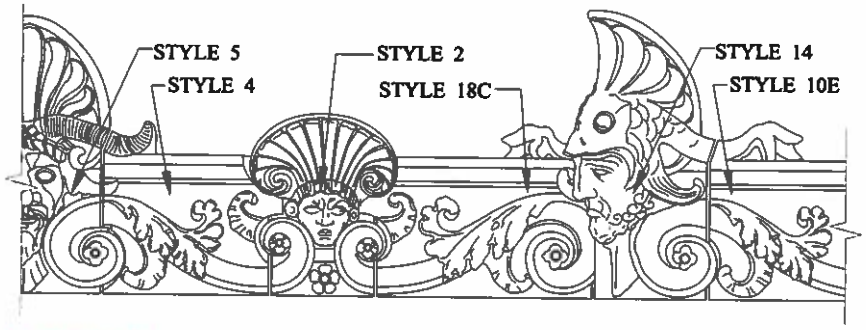
Detroit, MI

RESTORATION ARCHITECT Hamilton Anderson Associates

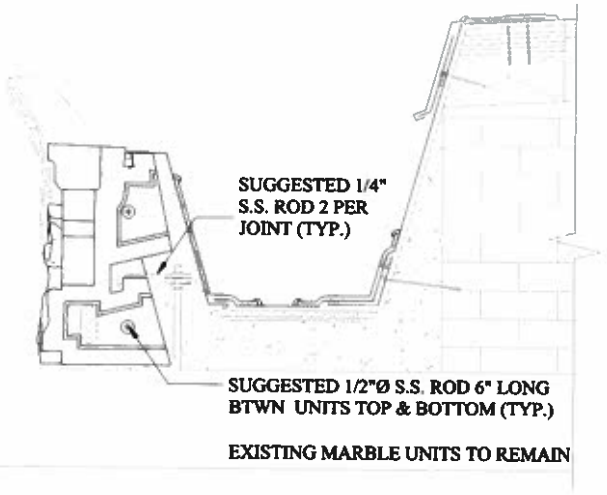
INSTALLATION CONTRACTOR Grunwell-Cashero Co.



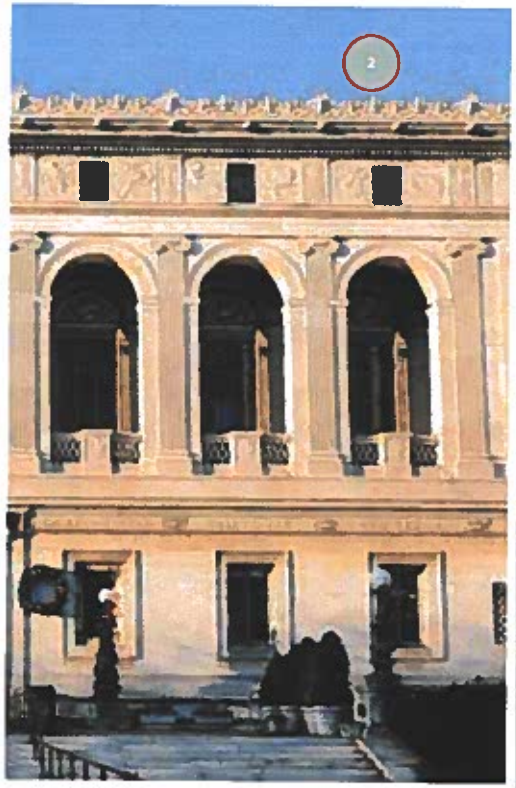
1 ELEVATION DETAIL



2 ELEVATION DETAIL



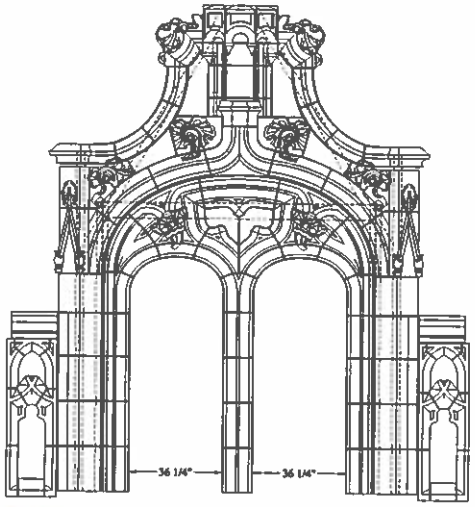
3 SECTION THROUGH PARAPET



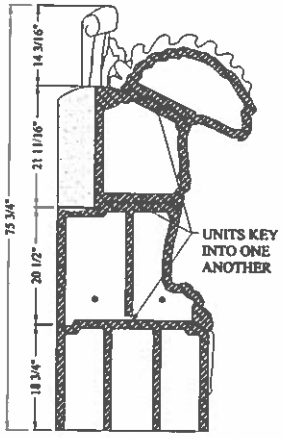
90 West Street

New York, NY

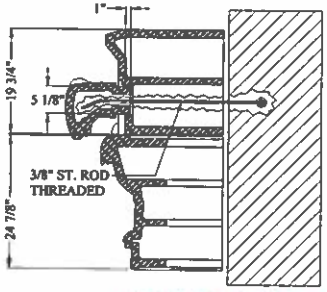
RESTORATION ENGINEER Façade Maintenance Design
RESTORATION ARCHITECT H. Thomas O'Hara Architect
INSTALLATION CONTRACTOR Seaboard Weatherproofing Co.



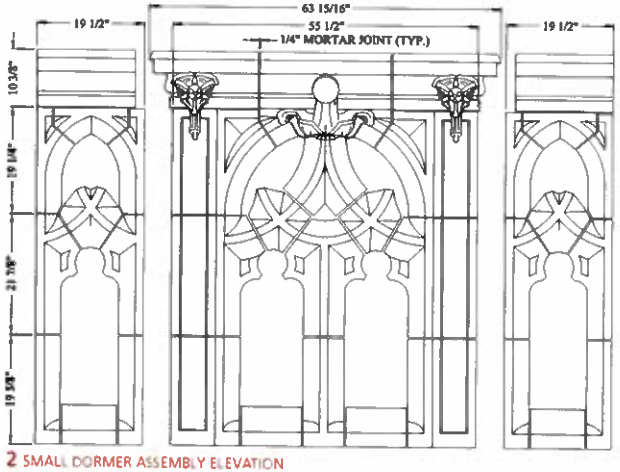
1 LARGE DORMER ASSEMBLY ELEVATION



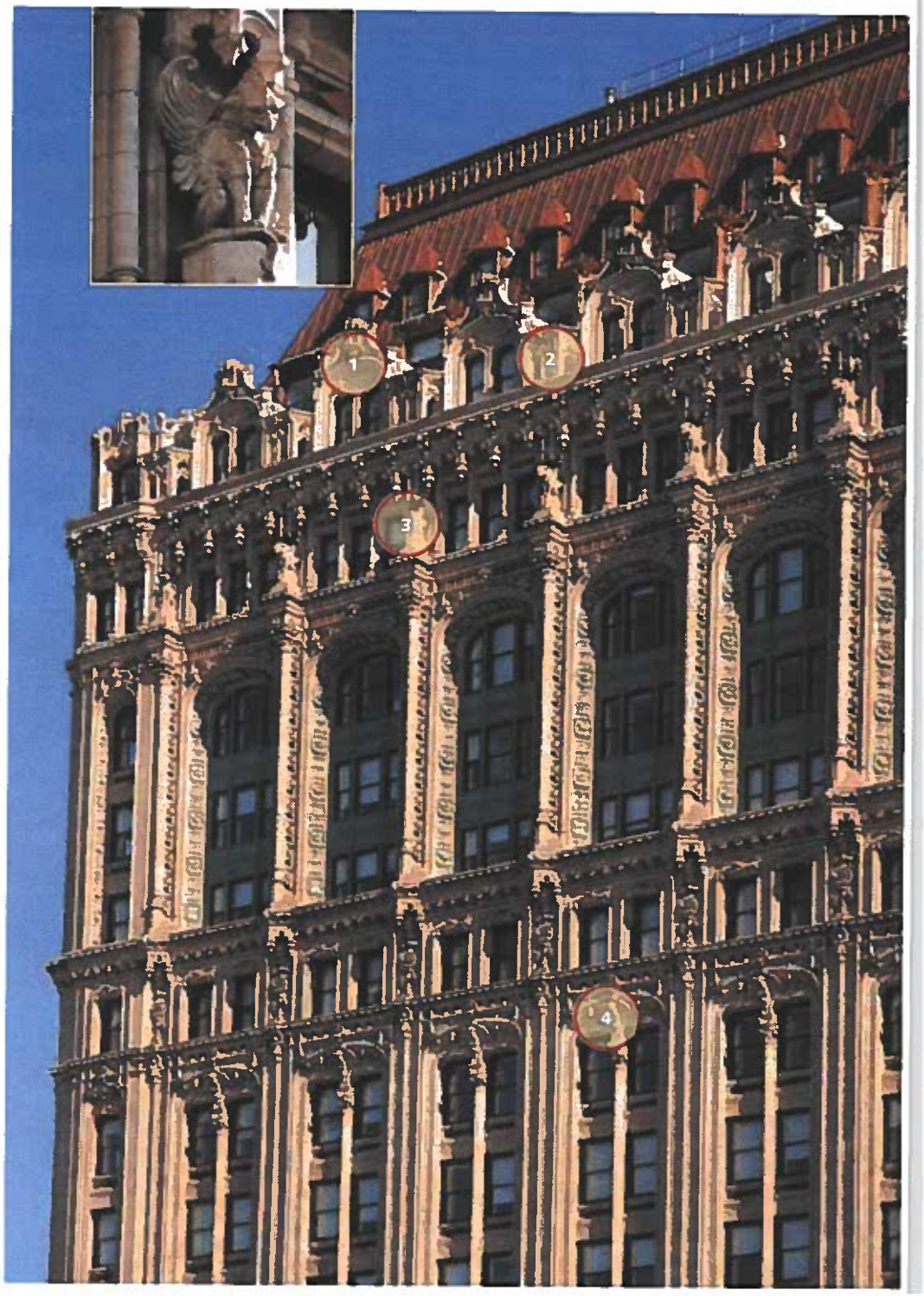
3 GARGOYLE SECTION



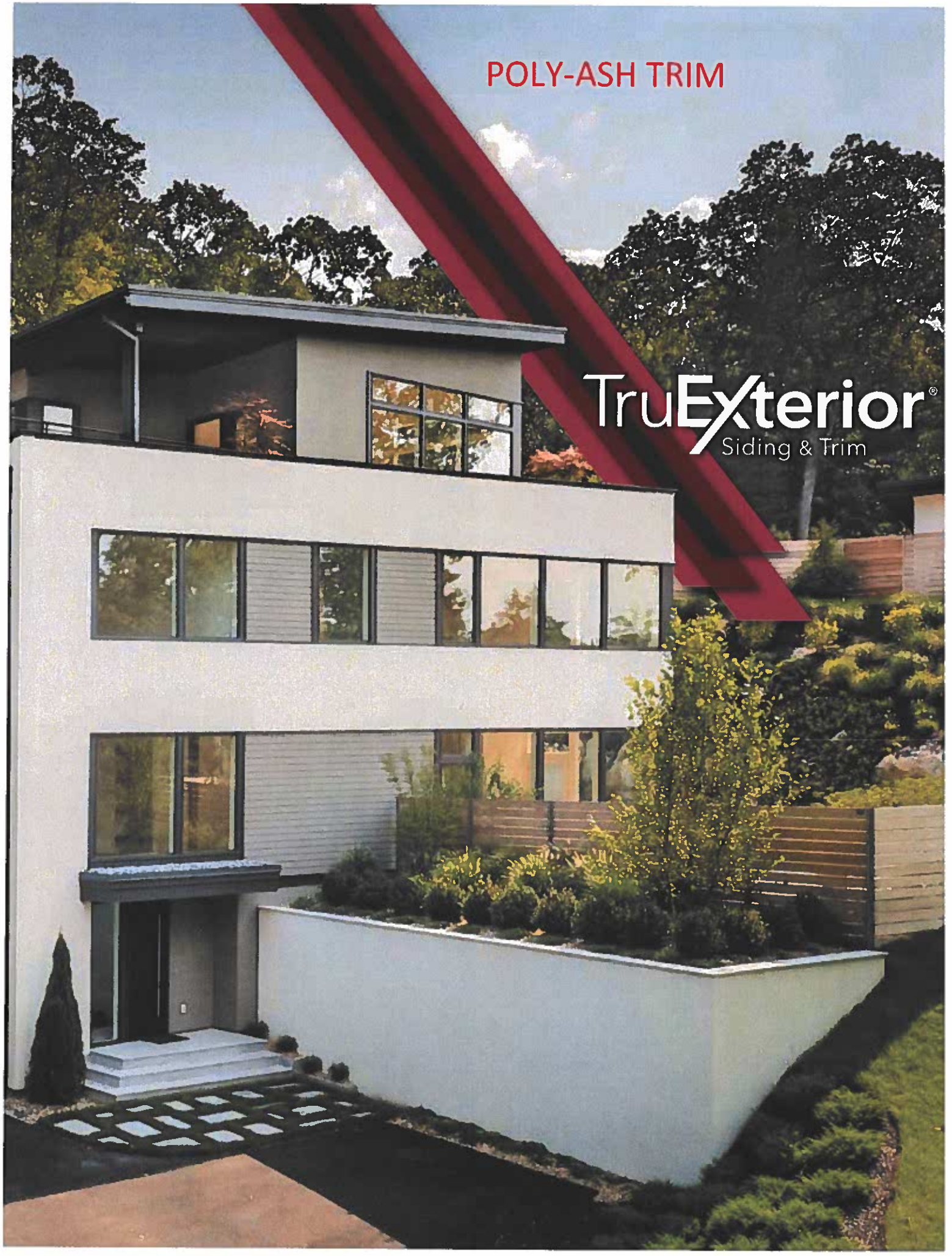
4 COLUMN CAPITAL SECTION

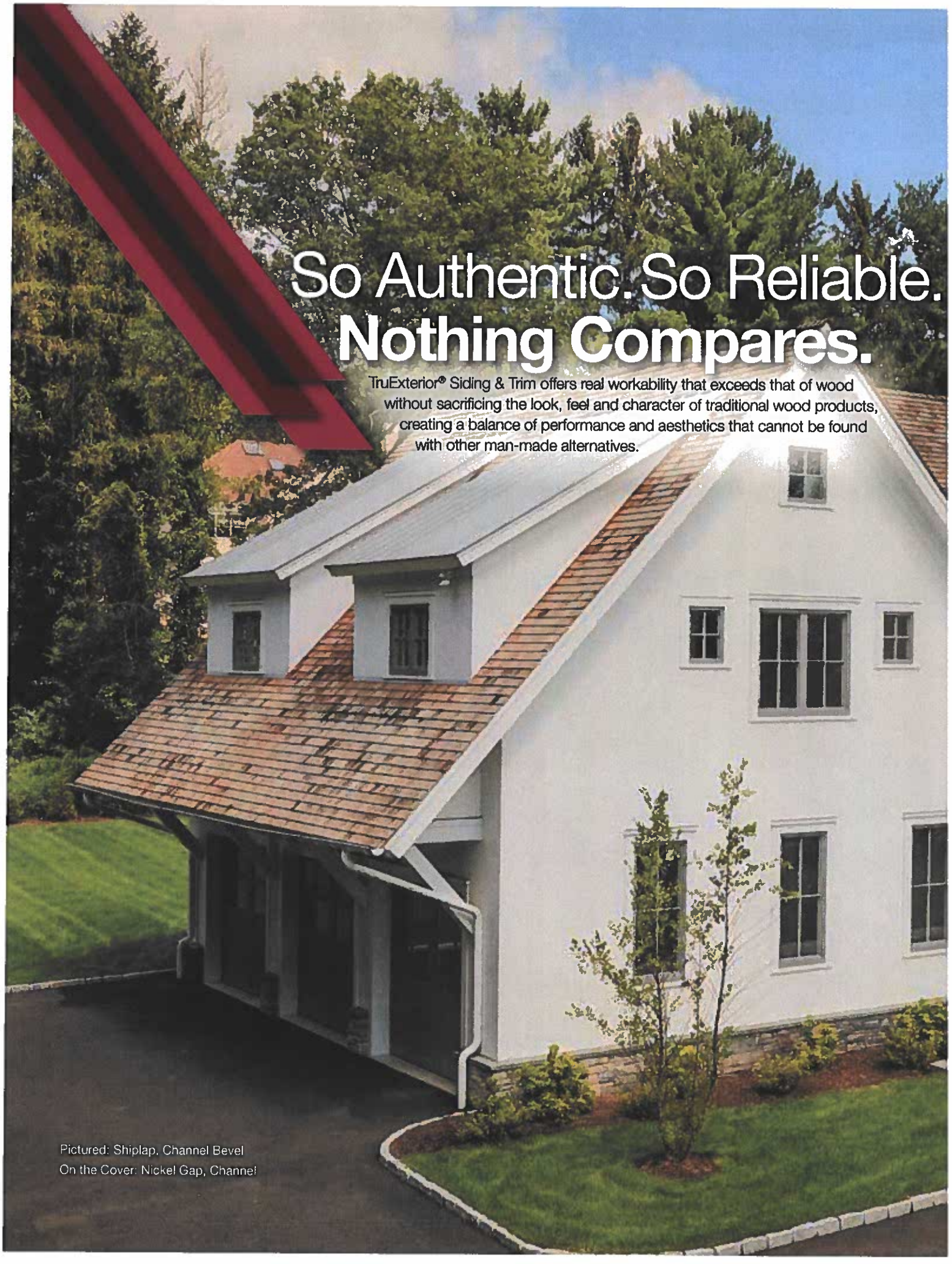


2 SMALL DORMER ASSEMBLY ELEVATION



POLY-ASH TRIM




So Authentic. So Reliable.
Nothing Compares.
TruExterior® Siding & Trim offers real workability that exceeds that of wood without sacrificing the look, feel and character of traditional wood products, creating a balance of performance and aesthetics that cannot be found with other man-made alternatives.
Pictured: Shiplap, Channel Bevel
On the Cover: Nickel Gap, Channel

Cut. Fasten. Paint. **Done.**

It really is that simple. That's because TruExterior® Siding & Trim offers phenomenal performance, remarkable workability and a lasting look while eliminating the need for gluing, gapping and other cumbersome and costly installation techniques.

APPLICATION

- Designed for use in non-structural applications
- Suitable for ground contact
- Can be used in moisture-prone areas

EXPANSION & CONTRACTION

- Traditional exterior-grade caulks, auto-body or wood fillers are all acceptable for filling nail holes

TOOLS

- Installed using proven woodworking tools and methods
- Carbide-tipped blades and bits are recommended for a longer tool life

FASTENING

- Accepts a wide variety of high-quality exterior-grade fasteners that are suitable for the local environment
- Can be fastened close to the edge
- No need for pre-drilling
- No mushrooming

PAINTING

- TruExterior® products come pre-primed and do require paint
- No need to prime end cuts
- Can be painted with any high-grade exterior paint when following the paint manufacturer's instructions
- Can be painted any color without special precautions as it is not prone to movement caused by heat gain from dark colors*
- Paint lasts longer than on wood because TruExterior® products cycle virtually no moisture*

*Please see TruExterior® Siding & Trim Limited Warranties and Product Data Sheets for proprietary test results, located at TruExterior.com. Always follow local building codes and construction best practices. See the complete Installation Guidelines for TruExterior® Siding & Trim at TruExterior.com.

Pioneering an entirely new category of building materials made with the revolutionary poly-ash material.

TruExterior® Siding & Trim is the only product available today that ***addresses issues commonly seen with other exterior materials on the market.***

MOISTURE

TruExterior® products contain no wood fiber, preventing issues that commonly plague wood, wood composites and other fiber cement.

- No need to prime ends or field cuts
- Resists rot and termite attacks*
- No swelling*
- No cracking or splitting
- No cupping or checking*
- Suitable for ground contact

MOVEMENT

TruExterior® products offer a high level of dimensional stability, eliminating many of the movement-related issues seen in other siding and trim products.

- Installation is the same regardless of the season
- No need for special paints
- No limitations on paint colors

OUR PRODUCT OFFERING

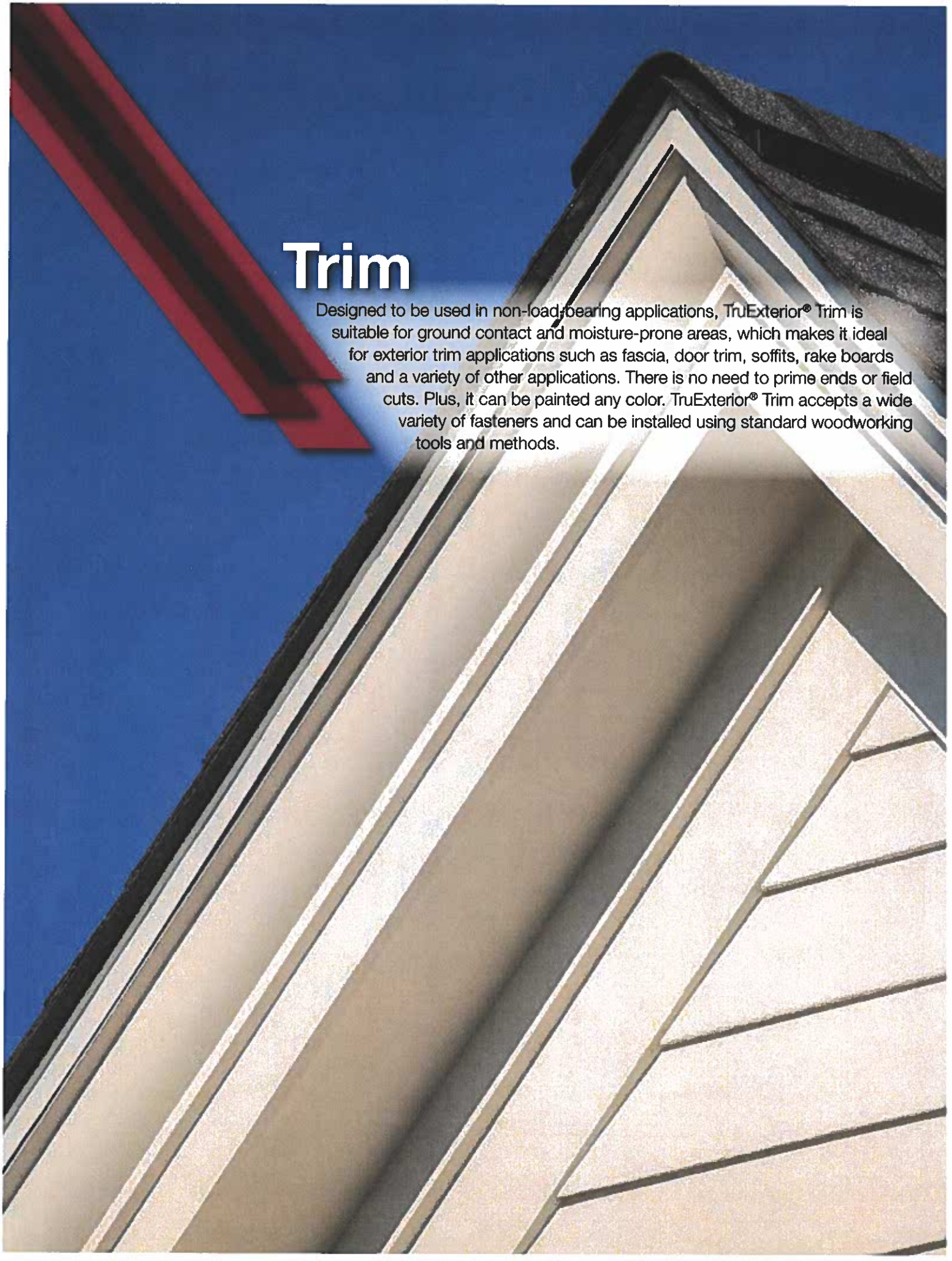
With a complete offering of 4/4, 5/4 and 2x trim, accessories, beadboard and siding, TruExterior® Siding & Trim has everything you need to create a polished and professional installation.

- Siding
- Beadboard
- Trim
- Accessories

Pictured: Cove/Dutch Lap

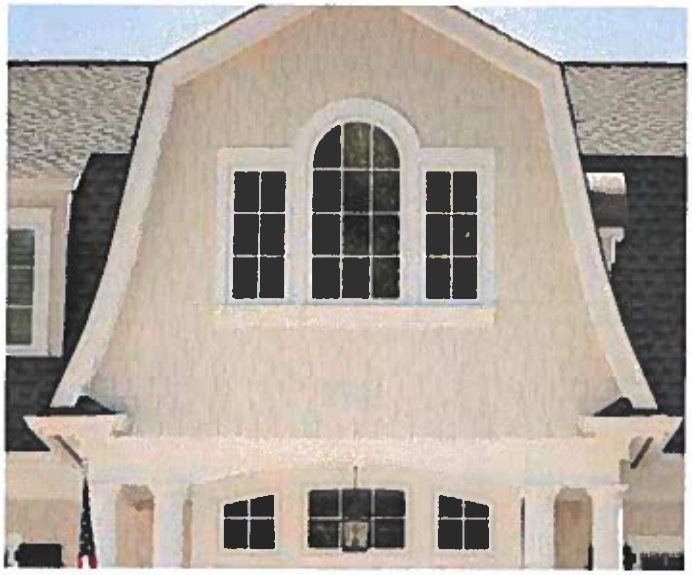
*Please see TruExterior® Siding & Trim Limited Warranties and Product Data Sheets for proprietary test results, located at TruExterior.com. Always follow local building codes and construction best practices. See the complete Installation Guidelines for TruExterior® Siding & Trim at TruExterior.com.

Pictured: Cove/Dutch Lap



Trim

Designed to be used in non-load-bearing applications, TruExterior® Trim is suitable for ground contact and moisture-prone areas, which makes it ideal for exterior trim applications such as fascia, door trim, soffits, rake boards and a variety of other applications. There is no need to prime ends or field cuts. Plus, it can be painted any color. TruExterior® Trim accepts a wide variety of fasteners and can be installed using standard woodworking tools and methods.



1X Trim Sizes		5/4 Trim Sizes		2X Trim Sizes	
Nominal	Actual	Nominal	Actual	Nominal	Actual
—	—	—	—	2 x 2	1-1/2" x 1-1/2"
1 x 3	3/4" x 2-1/2"	5/4 x 3	1" x 2-1/2"	—	—
1 x 4	3/4" x 3-1/2"	5/4 x 4	1" x 3-1/2"	2 x 4	1-1/2" x 3-1/2"
1 x 5	3/4" x 4-1/2"	5/4 x 5	1" x 4-1/2"	—	—
1 x 6	3/4" x 5-1/2"	5/4 x 6	1" x 5-1/2"	2 x 6	1-1/2 x 5-1/2"
1 x 8	3/4" x 7-1/4"	5/4 x 8	1" x 7-1/4"	2 x 8	1-1/2" x 7-1/4"
1 x 10	3/4" x 9-1/4"	5/4 x 10	1" x 9-1/4"	2 x 10	1-1/2" x 9-1/4"
1 x 12	3/4" x 11-1/4"	5/4 x 12	1" x 11-1/4"	2 x 12	1-1/2" x 11-1/4"

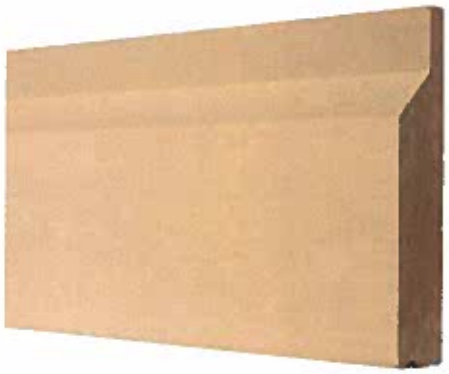
TruExterior® Trim is reversible with woodgrain on one side and a smooth finish on the reverse. Available in 16' and 12' lengths.

Available Finishes: (reversible)

*Please see TruExterior® Siding & Trim Limited Warranties and Product Data Sheets for proprietary test results, located at TruExterior.com.

Accessories

TruExterior® Siding & Trim Accessories make it easy to create polished, professional-looking siding and trim installations. Decorative yet functional, the poly-ash accessories are designed to go where other materials can't, making them the perfect complement to cedar, fiber cement and other traditional siding products, as they are suitable for ground, roofline and masonry contact.



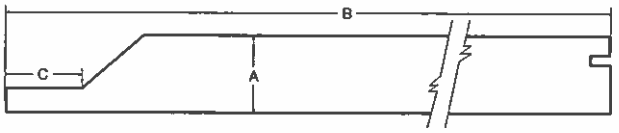
SKIRT BOARD

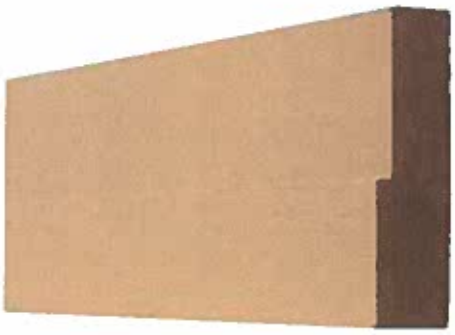
Provides a decorative yet functional way to create the required clearance between siding and grade.

Available Finishes: (not reversible)

smooth woodgrain

Nominal Size	Actual Thickness (A)	Actual Width (B)	Tongue (C)
1 x 6	0.75"	5.50"	1.0"
1 x 8	0.75"	7.25"	1.0"
5/4 x 6	1.0"	5.50"	1.0"
5/4 x 8	1.0"	7.25"	1.0"





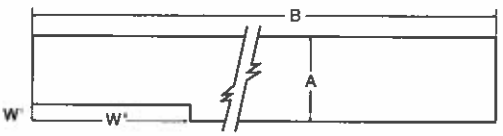
WINDOW POCKET RABBETED TRIM

The rabbeted groove helps trim to sit flush over the window's nailing flange, eliminating the need for cuts or shims.

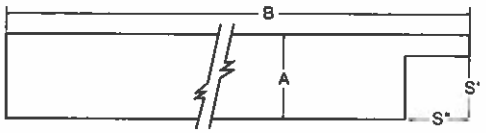
Available Finishes: (not reversible)

smooth woodgrain

Nominal Size	Actual Thickness (A)	Actual Width (B)	Window Pocket (W' x W")
5/4 x 4	1.0"	3.50"	0.187" x 1.88"
5/4 x 6	1.0"	5.50"	0.187" x 1.88"
5/4 x 8	1.0"	7.25"	0.187" x 1.88"



Nominal Size	Actual Thickness (A)	Actual Width (B)	Siding Pocket (S' x S")
5/4 x 3	1.0"	2.50"	0.75" x 0.75"
5/4 x 4	1.0"	3.50"	0.75" x 0.75"
5/4 x 5	1.0"	4.50"	0.75" x 0.75"
5/4 x 6	1.0"	5.50"	0.75" x 0.75"
5/4 x 8	1.0"	7.25"	0.75" x 0.75"



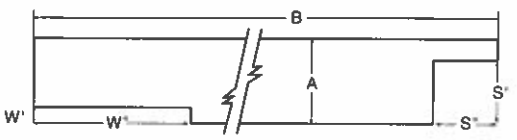
SIDING POCKET RABBETED TRIM

Perfect for end wall terminations, this trim with a 3/4" siding pocket accepts all TruExterior® Siding profiles.

Available Finishes: (not reversible)

smooth woodgrain

Nominal Size	Actual Thickness (A)	Actual Width (B)	Window Pocket (W' x W")	Siding Pocket (S' x S")
5/4 x 4	1.0"	3.50"	0.187" x 1.88"	0.75" x 0.75"
5/4 x 6	1.0"	5.50"	0.187" x 1.88"	0.75" x 0.75"
5/4 x 8	1.0"	7.25"	0.187" x 1.88"	0.75" x 0.75"

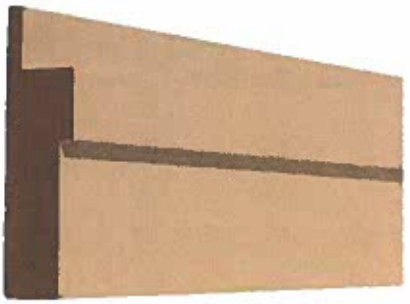


WINDOW AND SIDING POCKET RABBETED TRIM

The ultimate accessory to build a neat, professional-looking window surround.

Available Finishes: (not reversible)

smooth woodgrain



TruExterior® Siding & Trim Reference Guide

SUSTAINABILITY

The sustainable properties of TruExterior® Siding & Trim are a result of a combination of proprietary polymer chemistry and highly refined, recovered coal combustion products (fly ash), which are endorsed by the U.S. Green Building Council (USGBC) for use in construction materials.

- Contains a minimum of 70% recycled content—verified by SCS Global Services

CODE LISTINGS

TruExterior® Siding & Trim have undergone rigorous internal and third-party testing to provide building officials, architects, contractors, specifiers, designers and others with reliable, high-performing products.

- PEI Evaluation Service Report ESR-14090—Trim and Beadboard
- PEI Evaluation Service Report ESR-13069—Siding
- ICC-ES Evaluation Report ESR-3597 verifies that TruExterior® Siding meets code requirements
- California's Wildland-Urban Interface (WUI) listed
- Florida Product Approval FL17285
- Texas Department of Insurance (TDI) ED-92

PROJECT ESTIMATOR

V-Rustic	
Nominal Size	Boards per square
1 x 6	15
1 x 8	11
1 x 10	9

Cove/Dutch Lap	
Nominal Size	Boards per square
1 x 6	15
1 x 8	12
1 x 10	9

Channel	
Nominal Size	Boards per square
1 x 6	15
1 x 8	12
1 x 10	9

Channel Bevel	
Nominal Size	Boards per square
1 x 6	15
1 x 8	11
1 x 10	9

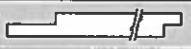
Shiplap	
Nominal Size	Boards per square
1 x 6	15
1 x 8	12
1 x 10	9

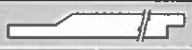
Nickel Gap	
Nominal Size	Boards per square
1 x 4	24
1 x 6	15
1 x 8	11
1 x 10	10

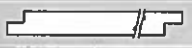
Craftsman Collection™ Siding

V-Rustic	
	
Nominal	**Actual**
1 x 6	11/16" x 5-1/2"
1 x 8	11/16" x 7-1/2"
1 x 10	11/16" x 9-1/2"

Cove/Dutch Lap	
	
Nominal	**Actual**
1 x 6	11/16" x 5-1/2"
1 x 8	11/16" x 7-1/4"
1 x 10	11/16" x 9-1/4"

Channel	
	
Nominal	**Actual**
1 x 6	11/16" x 5-1/2"
1 x 8	11/16" x 7-1/4"
1 x 10	11/16" x 9-1/4"

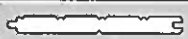
Channel Bevel	
	
Nominal	**Actual**
1 x 6	11/16" x 5-1/2"
1 x 8	11/16" x 7-1/2"
1 x 10	11/16" x 9-1/2"

Shiplap	
	
Nominal	**Actual**
1 x 6	11/16" x 5-1/2"
1 x 8	11/16" x 7-1/4"
1 x 10	11/16" x 9-1/4"

Nickel Gap	
	
Nominal	**Actual**
1 x 4	11/16" x 3-1/2"
1 x 6	11/16" x 5-1/2"
1 x 8	11/16" x 7-1/4"
1 x 10	11/16 x 9-1/4"

Beadboard

Single	
	
Nominal Size	**Actual**
5/8 x 4	5/8" x 3-1/2"
5/8 x 6	5/8" x 5-1/4"

Double	
	
Nominal	**Actual**
5/8 x 8	5/8" x 6-11/16"
5/8 x 12	5/8" x 10-1/4"

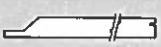
Trim

1X Trim Sizes	
Nominal	**Actual**
–	–
1 x 3	3/4" x 2-1/2"
1 x 4	3/4" x 3-1/2"
1 x 5	3/4" x 4-1/2"
1 x 6	3/4" x 5-1/2"
1 x 8	3/4" x 7-1/4"
1 x 10	3/4" x 9-1/4"
1 x 12	3/4" x 11-1/4"

5/4 Trim Sizes	
Nominal	**Actual**
–	–
5/4 x 3	1" x 2-1/2"
5/4 x 4	1" x 3-1/2"
5/4 x 5	1" x 4-1/2"
5/4 x 6	1" x 5-1/2"
5/4 x 8	1" x 7-1/4"
5/4 x 10	1" x 9-1/4"
5/4 x 12	1" x 11-1/4"

2X Trim Sizes	
Nominal	**Actual**
2 x 2	1-1/2" x 1-1/2"
–	–
2 x 4	1-1/2" x 3-1/2"
–	–
2 x 6	1-1/2" x 5-1/2"
2 x 8	1-1/2" x 7-1/4"
2 x 10	1-1/2" x 9-1/4"
2 x 12	1-1/2" x 11-1/4"

Accessories

Skirt Board	
	
Nominal	**Actual**
1 x 6	3/4" x 5-1/2"
1 x 8	3/4" x 7-1/4"
5/4 x 4	1" x 3-1/2"
5/4 x 6	1" x 5-1/2"
5/4 x 8	1" x 7-1/4"

Window Pocket Rabbeted Trim	
	
Nominal	**Actual**
5/4 x 4	1" x 3-1/2"
5/4 x 6	1" x 5-1/2"
5/4 x 8	1" x 7-1/4"

Siding Pocket Rabbeted Trim	
	
Nominal	**Actual**
5/4 x 3	1" x 2-1/2"
5/4 x 4	1" x 3-1/2"
5/4 x 5	1" x 4-1/2"
5/4 x 6	1" x 5-1/2"
5/4 x 8	1" x 7-1/4"

Window and Siding Pocket Rabbeted Trim	
	
Nominal	**Actual**
5/4 x 4	1" x 3-1/2"
5/4 x 6	1" x 5-1/2"
5/4 x 8	1" x 7-1/4"

Note: All TruExterior® Siding, Trim and Beadboard products are available in standard 16' land 12' lengths. TruExterior® Accessories are available in 16' length.

117 Union St. – Phase 2 – Rehabilitation of the "Moby Dick" Building

Application for Certificate of Appropriateness

New Bedfod Historical Commission

STRUCTURAL REPORT

ASAP Engineering & Design Co., Inc.
155 East Grove Street • Post Office Box 649
Middleborough, MA 02346

ROBERT M. DESROSIERS, P.E.
Consulting Engineer
508-946-3561
Fax 508-946-1653

May 23, 2019

Project No. 2019-144

Mr. Christopher T. Wise
103 Summit Ave
Providence, RI 02906

Re: Site Inspection of the Existing Building Located at 127-129 Union Street New Bedford, Ma

Mr. Wise:

You asked me to conduct a follow-up walk through visual inspection to review the structure and the potential impact to the referenced building during the proposed dismantling of the adjacent structure. On Thursday, May 9, 2019 I visited the site to conduct a walk through visual inspection to re-evaluate the structure and make an assessment as to what the impact on the referenced building might be if the adjacent building is removed.

The referenced building is constructed on an early 1900s board formed poured in place concrete foundation system. The exterior walls of the building consist of red clay bricks around the perimeter and at the front façade and 2x wood framed interior walls.

At the time of the inspection, at the sample locations observed, the foundation walls in the basement did not show significant deterioration, major settlement cracks or major damage the foundation system. In my view, at the sample locations observed the condition of the foundation walls and slab appeared to be in fair to relatively good condition and were effectively supporting the existing structure and is transmitting the loads from the building to the surrounding and bearing soils below.

Noted on the initial ASAP Engineering inspection report (Project # 2018-297)
The initial walk through visual inspection was conducted on October 29, 2018.

The first floor framing consists of heavy timber beams that are supported on a series of steel tube columns and during a previous renovation several of the original columns had been removed and replaced with steel beam the spans across the building. The steel beams support the timber beams where the columns had been removed, and the steel is supported by the remaining existing columns. The first floor framing consists of what appeared to be 3" timber, tongue and groove decking with a ¾" wood flooring applied to the top of the decking. At the sample locations observed the underside of the steel beams, the columns and the heavy timber beams all appeared to be in good condition and are currently supporting the existing structure.

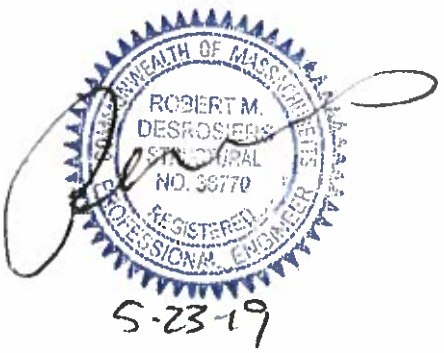
The adjacent building proposed for demolition, is a one story wood and brick structure that is constructed on a slab on grade. The roof structure consists of conventional dimensional lumber that is supported on wood framed walls. At the time of the inspection, it appeared that the buildings were independent structures that shared the brick exterior wall of the referenced building.

In my view, the referenced building is independently supported on a poured in place concrete foundation, not relying on the support system from the adjacent structure. If all precautions and proper shoring and demolition of the adjacent building is conducted, there should be minimal and no structural impact of any kind to the referenced structure of any kind.

If you have any questions regarding this report, or if you require additional information, please do not hesitate to call.

Regards,

Michael R. Shaheen



APPENDIX E

PRODUCT INFORMATION FOR PHASE 2

117 Union St. – Phase 2 – Rehabilitation of the "Moby Dick" Building

Application for Certificate of Appropriateness

New Bedfod Historical Commission

DRAFT SPECIFICATIONS

- Terra Cotta
- Maintenance of Masonry
- Wood Windows

BOSTON VALLEY TERRA COTTA SPECIFICATIONS
OCTOBER 2001

Boston Valley Terra Cotta, 6860 South Abbott Road, Orchard Park, New York 14127
TEL: 716-649-7490; FAX: 716-649-7688; WEB SITE: www.BostonValley.com

Standard Specification for Restoration for the Manufacture, Furnishing and Setting of Architectural Terra Cotta and Veneer

SECTION 04914

TERRA COTTA RESTORATION

***** Founded in 1889, Boston Valley Terra Cotta specializes in manufacturing architectural terra cotta for restoration and new construction. Terra cotta is a molded or extruded clay shape that is fired. Terra cotta can be unglazed or glazed in a wide variety of colors. Terra cotta exterior veneer and decoration was widely used a century ago. Hence there are numerous buildings, many of historical significance, that require new terra cotta pieces to replace damaged or deteriorated items or to use for additions and alterations. Terra cotta panels used for exterior facing of buildings are referred to as ceramic veneer. This veneer is often plain and flat but the plasticity of the material also allows sculptured surfaces. The decorative terra cotta used for copings, column capitals, bandings, gargoyles, and other ornamentation is referred to as architectural terra cotta.

This guide specification, SECTION 04914 - TERRA COTTA RESTORATION, can be used to specify the fabrication and installation of terra cotta to match existing veneer and ornamentation. Usually restoration requires an extensive site survey, removal of illustrative pieces to use as models for preparing new molds or extrusion dyes, and experimentation to match the color and texture of glazes. Boston Valley Terra Cotta has extensive experience in this type of work and is an acknowledged expert terra cotta manufacturer.

This specification guide focuses on terra cotta for restoration. However, the application of terra cotta on new, contemporary buildings is an ever increasing use of an old product that has stood the test of time. This section can be modified to specify architectural terra cotta for completely new buildings.

Throughout this guide specification, references are made to other specification sections that might be contained in the project manual. These references are presented as examples and coordination reminders. For each project, these references will need to be revised to reflect actual sections being used.

Within the specification text, Imperial dimensions are presented first in brackets followed by System International Metric (SI) equivalents also in brackets. Depending on project requirements, either the Imperial or the SI metric equivalents will need to be deleted.

This product specification will need to be edited by the specifier for a specific project to reflect the options and applications being used. The guide section has been written so that most editing can be accomplished by deleting unnecessary requirements and options. Depending on project requirements, some additional information may need to be added by the specifier. Options are indicated by [ ]. Notes to assist the specifier in selecting options and editing the specification guide are printed in bold and indicated with ***. For final editing, all brackets and notes will need to be deleted from the guide. *****

PART 1 - GENERAL

1.1 SUMMARY

***** The scope of terra cotta restoration work will vary depending on the project. Site investigation may be required to determine extent of required restoration, to photograph and measure existing terra cotta, and to remove samples for use in producing molds for fabricating new items. In other projects, site investigation may have been conducted previously and restoration requirements determined. Edit the following paragraph to reflect exact project scope. *****

A. Section includes:

1. Site investigation to determine restoration requirements.
2. Cleaning existing terra cotta.
3. Repairing damaged terra cotta.
4. Repointing existing terra cotta joints.
5. Design and fabrication of architectural terra cotta [to match terra cotta of existing building].
6. Removal of damaged and deteriorated terra cotta on existing building.
7. Installation of terra cotta on [existing building to replace damaged and deteriorated terra cotta.] [building addition to existing building.]

***** List other specification sections dealing with work directly related to this section such as the following. *****

B. Related sections:

***** For restoration work, the quantity of terra cotta pieces to be removed and

replaced may not be determined until an extensive site investigation is conducted or work has actually begun. Hence, it is often practical to base terra cotta restoration on unit prices. ***

1. Section 01200 - Price and Payment Procedures: Unit price procedures for removal and replacement of terra cotta pieces.
2. Section 01735 - Selective Demolition: General requirements for removal and salvage of existing building components.
3. Section 04800 - Unit Masonry Assemblies - [Brick] [Concrete masonry unit] walls to receive terra cotta.
4. Section 03300 - Cast-In-Place Concrete: Concrete structural frame [and walls] to receive terra cotta.
5. [Section 05120 - Structural Steel] [Section 05500 - Metal Fabrications]: Beams, channels, angles, plates, structural members, and fabrications for supporting terra cotta.
6. Section 07600 - Flashing and Sheet Metal: Sheet metal flashings and coverings used in conjunction with terra cotta installation.
7. Section 07900 - Joint Sealers: Sealants used in conjunction with terra cotta expansion joints and sheet metal flashings.

***** List by number and full title reference standards referred to in remainder of the specification section. Delete non-applicable references. *****

1.2 REFERENCES

A. American Institute of Architects (AIA) File No. 9 - Public Works Specifications for Ceramic Veneer, October 1961.
B. ASTM A36 - Structural Steel.
C. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
D. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
E. ASTM C67 - Sampling and Testing Brick and Structural Clay Tile.
F. ASTM C126 - Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units.
G. ASTM C144 - Aggregate for Masonry Mortar.
H. ASTM C150 - Portland Cement.
I. ASTM C207 - Hydrated Lime for Masonry Purposes.
J. ASTM C270 - Mortar for Unit Masonry.
K. ASTM C404 - Aggregates for Masonry Grout.
L. ASTM C476 - Grout for Masonry.
M. ASTM C484 - Thermal Shock Resistance of Glazed Ceramic Tile.
N. ASTM C920 - Elastomeric Joint Sealants.
O. US Department of the Interior - Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings.

1.3 PERFORMANCE REQUIREMENTS

A. Terra cotta to consist of modular, manufactured, fired clay pieces attached to structural substrate to form a weathertight veneer and ornamentation.
B. Method of attachment shall be designed to adequately resist wind pressure, uplift, and other loads for project location.
C. Method of installation and expansion joints shall accommodate stresses caused by deflection, settlement, wind pressure, and temperature changes without failure of joints, undue stress on fasteners, or other detrimental effects.

1.4 SUBMITTALS

A. Provide in accordance with Section 01330 - Submittal Procedures:

1. Product data: Include material descriptions.
2. Mortar design mixes and compressive strength analysis of existing mortar.
3. Shop drawings: Show details of construction, profiles of pieces, ornamentation, dimensions, joints, flashings, sheet metal, reglets, anchors, connections, and installation details. Details shall be drawn at 1:8 minimum scale. Illustrate complicated parts in perspective view.
4. Setting drawings: Show layout of terra cotta pieces, numbering of pieces, and joint sizes.
5. Samples:

    a. 6 by 6 by 3/4 inch tiles illustrating range of colors and textures for clay body and ceramic finish.
    b. Mortar samples illustrating color.
    c. Sealant samples illustrating color.

******* Include the following paragraph if terra cotta pieces are complex or elaborately sculptured and a full size sample is required for approval. *******

6. Full size prototype with ceramic finish: Provide for each major terra cotta piece.
7. Manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

A. Manufacturer: Company with 20 years minimum successful experience manufacturing architectural terra cotta.
B. Installer: Company with 5 years minimum successful experience installing architectural terra cotta. ***** Depending on the scope of the project, it may be advisable for a manufacturer's representative to observe, advise, and assist in terra cotta installation. *****
C. Manufacturer's field representative shall be available on site to observe installation, interpret setting drawings, advise, and assist in sorting, handling cutting, and fitting terra cotta pieces.
D. Single source responsibility: Terra cotta pieces and required anchors shall be furnished by single manufacturer.
E. Sole installation responsibility: The following components shall be installed by a single installer:

1. Terra cotta pieces and anchors specified in this Section.
2. Sheet metal and flashings adjoining terra cotta specified in Section 07600 - Flashing and Sheet Metal.
3. Sealants used for terra cotta expansion joints [specified in Section 07900 - Joints Sealers].

1.6 DELIVERY, STORAGE, AND HANDLING

A. Prior to shipping, pack and crate terra cotta pieces to prevent damage during transit and storage.
B. Schedule deliveries in sequence of installation.
C. Inspect terra cotta immediately upon delivery at site. Notify manufacturer of damage and non-conformity.
D. Keep pieces in original packing material until ready to install. Protect from weather to prevent

staining.

E. Store and maintain crates in upright position. Do not stack crates.

1.7 EXISTING CONDITIONS

******* Describe existing structure and type of terra cotta to be replaced. List special conditions affecting restoration. *******

A. Existing structure is a [_____] story building constructed in [(year)]. Original construction drawings for building including terra cotta details [are available at Architect's office for review by Contractor.] [will be provided by Owner for use by Contractor.]
******* Building requiring terra cotta restoration may be listed on the National Register of Historic Places or other state or municipal registers of historic and cultural properties. Hence, renovations and repairs may be need to comply with preservation regulations. If so, edit the following paragraph to reflect applicable requirements. *******

B. B. Existing structure is a historic building and listed on [the National Register of Historic Places] [_____]. As such, noticeable modifications to exterior of building are not permitted and demolition and restoration shall be conducted to comply with the intent of the Secretary of the Interior's Standards for Rehabilitation. Existing historic items of construction not indicated to be removed or restored, shall be protected during construction operations.
******* Location and quantity of terra cotta pieces to be replaced can be indicated on drawings or in this section. To avoid potential conflicts, do not state information in both locations. *******

A. Terra cotta pieces to be replaced include the following. [Refer to Drawings for locations and quantities.]

******* If not shown on Drawings, indicate location, quantities, sizes, and pertinent information. *******

1. Veneer panels: [_____].
2. Copings: [_____].
3. Column capitals: [_____].
4. Gargoyles: [_____].
5. [_____].

******* Depending on project, illustrative samples of terra cotta may be removed by others under separate contract to owner and provided to manufacturer or sample removal may be included as part of this section. *******

B. Illustrative samples of terra cotta pieces to be duplicated [will be removed, packed, and shipped to manufacturer's plant by Owner.] [shall be removed to manufacturer's plant by Contractor.] At completion, samples shall be [returned to Owner.] [be retained by manufacturer.]

1.7 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to the following limits prior to, during, and 48 hours after completion of terra cotta work:

1. Minimum: [40 degrees F.] [4 degrees C.]
2. Maximum: [90 degrees F.] [32 degrees C.]

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Boston Valley Terra Cotta, 6860 South Abbott Road, Orchard Park, New York 14127; 716-649-7490; www.BostonValley.com. Local contact: Arcspec, 225 Peterson Rd., Libertyville, IL 60048, phone: 847-362-1590, fax: 847-362-1557

2.2 MATERIALS

A. Terra cotta: Fired clay, modular pieces with [glazed] [unglazed] finish as manufactured by Boston Valley Terra Cotta.
B. Minimum averaged characteristics based on testing 10 samples in accordance with referenced standards:

1. Compressive strength, ASTM C67 and ASTM C126: 6,000 PSI.
2. Shear strength: 1,500 PSI.
3. Absorption, ASTM C67:

    a. 11.5 percent after 5 hours boil.
    b. 7.5 percent after 24 hours soak.

******* Saturation coefficient is ratio of absorption during 24 hours cold water submersion to absorption during 5 hours boiling water submersion. *******

4. Saturation coefficient, ASTM C67: 0.69.
5. Coefficient of thermal expansion: 0.0000025 inch/inch/degree F.
6. Craze resistance, AIA File No. 9: No crazing, spalling, or cracking after one cycle of autoclaving.
7. Glaze absorption, ASTM C67: 0.15 percent.
8. Freeze-thaw resistance, ASTM C67: 300 cycles without degradation.
9. Thermal shock resistance of glazed terra cotta, ASTM C484: Passes one test cycle.
10. Glaze adhesion, AIA File No. 9: 1,200 PSI.

2.3 DESIGN

A. Design terra cotta pieces to satisfy performance requirements specified in Paragraph 1.3.
B. Pieces shall be structurally sound with adequate provision for anchorage and setting:
******* Ceramic veneer panels are typically extruded, flat panels with ribs or scoring on backside. *******

1. Ceramic veneer panels: Thin, solid slabs with scored or ribbed backs. Minimum thickness:

    a. Adhesion set veneer: [1 inch.] [25 mm.]
    b. Mechanically anchored veneer: [1-1/4 inches] [32 mm.]

******* Ornamental shapes are typically produced by pressing plastic clay into molds resulting in a hollow form with an exposed front wall strengthened by perpendicular partitions and top and bottom beds. *******

2. Ornamental and special shapes:

    a. Exposed wall faces: [1 inch] [25 mm] minimum.
    b. Partitions: Thickness and spacing to provide required structural support.
    c. Beds: [4 inches] [102 mm] deep minimum.

C. Provide required anchor and hand holes.
D. Provide projecting pieces with drips.
E. Terra cotta veneer shall be continuously supported at each floor level on shelf supports rigidly connected to structural building frame. Shelf supports shall be located in mortar joints.
F. Flashing and sheet metal:

1. Provide for flashings, gutters, parapet coverings, sills, and other sheet metal indicated on Drawings or required to provide weathertight installation.
2. Flashings and sheet metal shall be embedded in terra cotta joints or [3/4 inch] [19 mm] reglets formed in terra cotta pieces.

2.4 FABRICATION

A. Fabricate terra cotta pieces in accordance with approved shop and setting drawings.
B. Duplicate existing terra cotta pieces based on [illustrative samples from existing building] [photographs] [measured drawings] [original building drawings].
C. Produce molds for forming terra cotta pieces. Allow for clay shrinkage resulting from drying and firing.
D. Form clay pieces by hand pressing, ram pressing, or extruding as determined by manufacturer as best method for shapes, sizes, and complexity of terra cotta. Hand finish pieces as required to produce high quality component.
E. Dry pieces 3 to 14 days using regulated temperature and humidity.

2.5 FINISH

******* Terra cotta pieces can be left unglazed or finished with a mixture of metallic oxides, chemicals, clays, and water sprayed on piece which is then fired to fuse the ceramic finish to the terra cotta body. *******

A. Finish: Terra cotta pieces shall be [unglazed.] [finished with colored glazes.]
******* Include the following paragraph if unglazed terra cotta is used. *******
B. Color and texture [to match approved samples.] [to match finish of existing terra cotta.]
******* Include the following paragraphs if glazed terra cotta is used. Glazes may be high-fired type which are sprayed on pieces prior to firing. Low-fired glazes are applied to pieces that have already been fired. These pieces are then fired again at a lower temperature to fuse the ceramic finish to the terra cotta piece. Consult Boston Valley Terra Cotta to determine if a high-fired or a low-fired glaze is required for the desired color and finish. Edit the following paragraphs to reflect type of finish required. *******
C. Glaze: [High-fired type spray applied to unfired piece and then fired to vitrify clay and fuse finish to terra cotta piece.] [Low-fired type spray applied to fired terra cotta piece. Fire piece again at lower temperature to fuse ceramic finish to terra cotta.]

******* Matte, satin, and gloss finishes are available for glazes. *******

1. Finish: [Matte] [Satin] [Gloss].
2. Color:

******* Either a single color or multiple colors can be applied to a terra cotta piece. A mottled appearance can be achieved by blending two or more colors during application. *******

a. [Single solid color.] [Mottled color obtained by blending two or more colored glazes during application.] [Polychrome application of two or more colored glazes in designated areas of single terra cotta piece.]
b. Color to match [approved samples.] [finish of existing terra cotta.]

2.6 FIRING

******* Include the following paragraph if terra cotta is glazed. Edit to reflect use of low-fired or high-fired glaze. *******

A. Fire pieces [prior to application of low-fired glaze.] [after application of high-fired glaze.]
B. Pieces shall be kiln fired at [2100 degrees F] [649 degrees C] in accordance with manufacturer's standard method to obtain characteristics specified in paragraph 2.2.

2.7 SOURCE QUALITY CONTROL

A. After fabrication and prior to packing for shipment, carefully inspect terra cotta pieces for chips, cracks, and other defects. Verify dimensions comply with shop drawing dimensions and finishes match approved samples.
B. Verify pieces meet fabrication tolerances:

1. Warpage for extruded terra cotta veneer: [0.005 inch per inch length] [0.127 mm per 25 mm length] maximum variation from true plane.
2. Tolerance for handmade terra cotta pieces: [1/8 inch] [3 mm] maximum variation from shop drawing dimensions.

C. Shop assembly:

1. Layout terra cotta pieces in accordance with setting drawings. Verify that joints when installed will be straight, true, and uniform width. Verify that decorative elements continuous from one piece to next are aligned.
2. Notify Architect 10 days prior to shop assembly. [Architect will visit factory and inspect layout.]

D. Correct deficiencies.

2.8 MORTAR AND GROUT

A. Materials:

1. Portland cement ASTM C150, Type I, low alkali.
2. Lime: ASTM C207, Type S, hydrated.
3. Aggregates: Free of organic contaminants. Chloride ions not to exceed 50 parts per million.

    a. Fine: ASTM C144 sand [with color and texture to match aggregate used for original mortar].
    b. Coarse: ASTM C404, [1/2 inch] [13 mm] maximum diameter.

4. Water: Potable, clean, and free of deleterious amounts of acids, alkalis, and organic materials.

B. Mortar:

1. Mixes: Mortar for rebuilding existing terra cotta and repointing existing joints shall be mixed so that compressive strength does not exceed that of existing mortar and terra cotta. Adjust the following requirements such that existing compressive strengths are not exceeded. Mortars shall not contain calcium chloride or air-entraining agents.

    a. Setting mortar: ASTM C270, Type M.

        1) Cement: 1 part.
        2) Lime: 1 part.
        3) Sand: 6 parts.

    b. Pointing mortar: ASTM C270, Type N.

        1) Cement: 1 part.
        2) Lime: 1/4 part.
        3) Sand: 3-1/2 parts.

******* Mortar color can be achieved by using colored sand or mineral oxide pigments. However, mineral oxides must not exceed 10 percent by weight. *******

2. Color: [Mineral oxide pigment not to exceed 10 percent by weight.] [Obtain color by using colored sand.] Color [to match cleaned mortar on existing building.] [as selected by Architect.]

C. Grout: ASTM C476, 2,500 PSI strength and 1/2 inch diameter maximum aggregate. Design mix to accommodate field conditions.
D. Thoroughly mix mortar and grout ingredients in quantities needed for immediate use in accordance with ASTM C270 and ASTM C476.
E. Do not use anti-freeze compounds. Do not use admixtures without approval of Architect.
F. Use mortar and grout within two hours after mixing.

2.9 ACCESSORIES

A. Sealant: [Polyurethane type complying with ASTM C920.] [As specified in Section 07900 - Joint Sealers.] [Type as recommended by terra cotta manufacturer.]

1. Maximum movement: [25] [_____] percent expansion and contraction.
2. Joint size limitation:

    a. Width: [1/4 to 1 inch] [6 to 25 mm] [_____]
    b. Depth: [1/4 to 1/2 inch] [6 to 13 mm] [_____].

3. Color: [Shall match mortar color.] [As elected by Architect.]

B. Joint backer rod: Round closed cell polyurethane rod oversized 30 percent larger than joint width.
C. Terra cotta patching compound: Mortar type patching compound as recommended by terra cotta manufacturer.
D. Paint for repaired terra cotta surfaces:

    1. Primer: Waterborne, epoxy resin type, masonry and concrete primer and sealer.
    2. Finish: Exterior, acrylic, waterborne, [semi-gloss] [gloss] enamel, color to match existing terra cotta glaze.

E. Angles, channels, and other secondary support members that are not part of the structural frame: Rolled steel sections, ASTM A36.
F. Anchors, hangers, bolts, clips, straps, rods, pins, clamps, and other metal items for securing terra cotta: Stainless steel, ASTM A167, Type 304 or galvanized steel, ASTM A123 of the following minimum sizes.

    1. Terra cotta courses supported directly on wall: [1/4 by 1/4 inch] [6 by 6 mm] or [1/8 by 5/8 inch] [3 by 16 mm] anchors or No. 6 gage galvanized wire.
    2. Projecting terra cotta courses: [5/8 inch] [16 mm] diameter bars.
    3. Hangers: [5/8 inch] [16 mm] diameter.
    4. Clips and straps: [3/8 by 2 inches.] [10 by 50 mm.]
    5. Pins: [1/2 inch] [13 mm] diameter.
    6. Continuous rods to receive terra cotta anchor clips: [5/8 inch] [16 mm] diameter bars secured to structure with [1/2 inch] [13 mm] diameter anchors at [24 inches] [610 mm] maximum.

G. Weep holes: Preformed plastic tubes.

PART 3 - EXECUTION

******* Edit the following article to reflect scope and extent of site survey required for specific project. *******

3.1 SITE SURVEY

A. Conduct site survey of existing building prior to submittal of shop drawings and fabrication of terra cotta pieces.
B. Identify and code pieces to be replaced.
C. Collect measurements, take photographs, make field sketches, and record other data as required for design and fabrication of replacement pieces.
D. Sample and determine compressive strength of existing mortar. Identify joints to be repointed.
E. Identify existing terra cotta surfaces to be cleaned.
F. Illustrative samples:

    1. Carefully remove existing terra cotta pieces required as samples to use in

preparation of molds for fabrication of replacement pieces.
2. Pack, crate, and delivery samples to manufacturer's plant.
3. Provide temporary protection to prevent moisture penetration into structure where terra cotta pieces are removed.

3.2 COORDINATION

A. Coordinate requirements for steel support members, embedded anchors, flashings, and sheet metal with other work to ensure timely and accurate placement.

3.3 PRE-RESTORATION CONFERENCE

A. Convene a pre-restoration conference prior to commencing work of this Section.
B. Require attendance of entities directly concerned with work related to terra cotta restoration.
C. Notify Architect 5 days in advance of meeting.
D. Review:

1. Items of restoration to be performed, procedures, and work sequence.
2. Requirements for [steel] [concrete] support members and embedded anchors.
3. Coordination with installation of flashings and sheet metal.
4. Protection of installed items and finishes.
5. Availability of materials.
6. Preparation of substrate.

E. Record minutes, and distribute copies within 5 days to Architect, Owner, and other participants.

******* If scope of project includes cleaning of existing terra cotta surfaces, include the following article. If terra cotta is severely stained or vandalized with graffiti, contact Boston Valley Terra Cotta for recommended procedures and cleaning agents. *******

3.4 CLEANING EXISTING TERRA COTTA

A. Clean [all existing terra cotta surfaces.] [existing terra cotta surfaces identified by inspection specified in Paragraph 3.1.]
B. Protect areas below cleaning operation.
C. Clean with detergent and clean water. Use fiber brushes and cloths.
D. Do not use metallic tools for cleaning and scraping.
E. Thoroughly rinse and wash off cleaning solution and dirt.
******* If scope of project includes repointing of existing mortar joints, include the following article. *******

3.5 REPOINTING

A. Repoint [all existing mortar joints.] [existing mortar joints identified by inspection specified in Paragraph 3.1.]
B. Cut out loose and disintegrated mortar in joints to minimum [1/2 inch] [6 mm] depth or until sound mortar is reached.
C. Use tools and methods that do not damage terra cotta.
D. Remove dust and loose material by brushing, water spray, or air jet.
E. Moisten joint. Tightly pack new mortar in [1/4 inch] [6 mm] layers. Form smooth, compact [concave] [flush] joint to match existing.

F. Moist cure for 72 hours.

******* Chipped terra cotta pieces can sometimes be repaired in the field by patching and painting. Contact Boston Valley Terra Cotta for information on techniques for field repair. Include the following article if minor repairs are required. *******

3.6 REPAIRING

A. Repair chipped and broken terra cotta pieces [identified by inspection specified in Paragraph 3.1.] [indicated on Drawings.]
B. Remove loose material and clean surfaces to be repaired.
C. Apply patching compound in accordance with manufacturer's instructions. Sculpt material to match existing profiles and ornamental designs. Provide smooth transition between new and existing surfaces.
D. After compound has set and cured, apply primer and two finish paint coats. Blend and distress paint to match appearance and color of existing terra cotta.

******* Pieces of terra cotta that are badly chipped, cracked, or the ornamentation is broken are difficult to repair. Replacement is often the best method of restoration. If scope of project includes removal and replacement of existing terra cotta pieces, include the following article. *******

3.7 REMOVAL FOR REBUILDING

A. Cut out deteriorated terra cotta pieces to be replaced in manner to prevent damage to remaining terra cotta and adjoining materials.
B. Cut away loose or unsound adjoining mortar and grout to provide clean surfaces and solid bearing for setting new pieces.

******* Include and edit the following article to specify installation of new terra cotta pieces to replace damaged and deteriorated pieces that have been removed. This article can also be used to install new terra cotta used for additions and alterations to existing buildings. *******

3.8 INSTALLATION OF NEW TERRA COTTA

A. Install new terra cotta pieces in accordance with manufacturers recommended instructions and approved shop and setting drawings.
B. Preparation:

    1. Securely attach anchors, hangers, bolts, clips, rods, and pins as required for securing terra cotta pieces. Use type of fastener and spacing recommended by terra cotta manufacturer. Ensure items are properly sized and accurately located.
    2. Soak walls to receive new terra cotta by spraying with clean water at beginning of day and again within one hour of setting pieces.
    3. Soak terra cotta pieces 60 minutes prior to installation.

C. Field cutting: Where cutting is required to accommodate non-standard conditions, use power saw with abrasive or diamond blade and rigid cutting templates. Do not reduce strength of terra cotta by cutting webs and partitions.

D. Set terra cotta plumb, true, and aligned. Maintain courses to uniform dimension.
E. Projecting terra cotta shall be aligned and uniform such that shadow cast is true line.

******* Terra cotta may be applied to substrate with metal anchors or by adhering to substrate with mortar. Use the following paragraphs for anchor installation method. *******

F. Anchor installation method: Attach new terra cotta pieces to substrate with metal anchors as detailed on approved shop and setting drawings. Set pieces in solid mortar bed. Fill all spaces between terra cotta and substrate with grout or mortar.

1. Spaces greater than [3/4 inch] [19 mm]: Fill with grout.
2. Spaces [3/4 inch] [19 mm] or less: Fill with mortar.

******* Use the following paragraphs for adhesion method of installing terra cotta. *******

G. Adhesion installation method:

1. Immediately before application of mortar, brush coat of portland cement and water on back of terra cotta piece and on portion of wall to receive terra cotta.
2. Spread mortar on back of terra cotta piece and portion of wall to receive piece such that total mortar thickness averages [3/4 inch] [19 mm].
3. Tap piece in place completely filling voids and extruding slight excess at joints and edges.

H. Open back terra cotta shapes shall be filled solidly with grout prior to installation. Allow grout to set enough to permit handling.
I. Ensure that all rebates in bed and cross joints on sides and back are filled solid with mortar. Leave no voids.
J. Adjustments: Do not shift or tap terra cotta pieces after mortar has achieved initial set. If adjustments are required or pieces are disturbed after setting, remove, clean, and relay with fresh mortar.
K. Flashing and sheet metal: As work progresses, install built-in flashings and sheet metal in accordance with Section 07600 - Flashing and Sheet Metal. Embed in mortar joints or reglets as indicated on approved shop and setting drawings.
L. Grouting: Fill terra cotta formed cavities containing reinforcement and other locations indicated on approved shop and setting drawings with grout. Place and consolidate grout without displacing reinforcement. Ensure that steel reinforcement, supports, anchors, and ties are encased with grout or mortar and permanently protected from corrosion.
M. Weep holes: Provide weep holes through mortar joints as indicated on approved shop and setting drawings. Keep weep holes free of mortar and grout.

3.9 JOINTS

A. Mortar joints:

1. Size: [1/4 inch] [6 mm] wide unless otherwise indicated on approved shop and setting drawings.
2. Form [concave] [flush] vertical and horizontal joints of uniform thickness. Point joints as work progresses. When repointing is required, rake joint [1/2 inch] [13 mm], drive pointing mortar into joint, and strike with jointing tool.
3. Joints in overhanging pieces, balustrades, parapets, and free standing terra cotta

features: Rake out [1/2 inch] [13 mm] and point with joint backing and sealant.

******* Requirements and location of expansion joints with vary with project conditions. Expansion joints should extend through terra cotta veneer and mortar setting bed to substrate. Coordinate the following paragraphs with joint details on drawings. *******

B. Expansion joints: Provide expansion joints in linear terra cotta runs, at shelf supports, and other locations indicated on approved shop and setting drawings to accommodate deflection, thermal changes, and settlement.

******* Expansion joints for terra cotta should be formed every 25 to 30 linear feet (8 to 9 m). *******

1. Maximum distance between expansion joints: [[25] [30] feet.] [[8] [9] m.]
2. Rake out expansion joints to full depth of setting bed at time terra cotta is installed.
3. Install joint backing with blunt instrument. Do not twist rod. Backing shall be [1/4 inch] [6 mm] from terra cotta surface.
4. Apply sealant with minimum exposure to air using pressure gun with nozzle cut to fit joint width. Install sealant free of air pockets, foreign embedded material, ridges, and sags.
5. Tool joints concave unless otherwise noted. Do not lap or feather onto adjacent surfaces.

3.10 FIELD QUALITY CONTROL

******* Include the following paragraph if manufacturer's field representative is required by Paragraph 1.5.C. *******

A. Manufacturer's field representative shall inspect terra cotta restoration and installation, identify defects, and submit report to Architect in accordance with Section 01400 - Quality Requirements. Correct deficiencies identified by manufacturer's field representative.
B. After restoration is complete, inspect joints. Replace defective mortar. Match adjacent work.

3.11 PROTECTION AND CLEANUP

A. During erection: Cover uncompleted terra cotta and backing with waterproof sheeting at end of each day and hold securely in place.
B. Protect face of adjacent walls and surfaces from water, mortar, and grout used for terra cotta installation.
C. Remove excess mortar and mortar smears as work progresses.
D. Clean soiled surfaces with detergent and clean water. Use fiber brushes and cloths. Do not use metallic tools.
E. Protect terra cotta from subsequent construction operations. If damage occurs, remove and replace damaged components as required to provide terra cotta in original, undamaged condition.

END OF SECTION

SECTION 04 01 00 - MAINTENANCE OF MASONRY

PART 1 GENERAL

1.1 SUMMARY

A. Section includes spot cleaning (water and/or chemical); replacement/repair of brick units; repointing mortar joints; parapet rebuilding; and repair of damaged masonry. For repointing, resetting, relaying of historic masonry as shown on the Drawings and as specified in the construction documents and Preservation Briefs 1, 2 revised, and 6, U.S. Department of the Interior, National Park Service, Technical Preservation Services.

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 530 - Building Code Requirements for Masonry Structures.
   2. ACI 530.1 - Specifications for Masonry Structures.

B. Preservation Briefs:
   1. No. 1 - The Cleaning and Waterproof Coating of Historic Buildings, Robert C. Mack, U.S. Department of the Interior, National Park Service, Preservation Assistance Division, Technical Preservation Services.
   2. No. 2 – Repointing Mortar Joints in Historic Brick Buildings, Robert C. Mack, John P. Speweik, U.S. Department of the Interior, National Park Service, Preservation Assistance Division, Technical Preservation Services.
   3. No. 6 – Dangers of Abrasive Cleaning to Historic Buildings, Anne E. Grimmer, U.S. Department of the Interior, National Park Service, Preservation Assistance Division, Technical Preservation Services.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate special supports for the work. Detail shoring, bracing, scaffolding, and temporary or permanent support. Contractor to supply all scaffolding drawings for permit.

C. Submit the following items in time to prevent delay of work and to allow adequate time for review of submittals, if needed. Do not order materials or start the execution of the work before receiving the written approval:
   1. Written certificates from mortar manufacturer should be submitted stating that all installers of the repointing mortars have successfully completed the training workshop for the installation of the mortar, or have met alternative workmanship qualifications acceptable to the manufacture, or provide written

certification from the manufacture that site training services have been contracted. In lieu of training, documented experience executing successful lime mortar installations may be acceptable. Two day Lime Mortar Workshops are offered by U.S. Heritage Group, Inc., at 3516 North Kostner Ave., Chicago, IL 60641 Phone: 773-286-2100; Fax 773-286-1852. Course schedule is available at www.usheritage.com, advance registration is required.

2. Samples of all specified materials and Material Safety Data Sheets (MSDS) as appropriate.
3. Certificates, except where the material is labeled with such certification by the producers of the materials, that all materials supplied comply with all the requirements of these specifications and the appropriate standards.
4. Color–match repointing mortar samples to existing mortar or specified alternative.
5. Written verification that all specified items will be used. Provide purchase orders, shipping tickets, receipts, etc. to prove that the specified materials were ordered and received.
6. Restoration Program: Submit written program for each phase of restoration process including protection of surrounding material on building and site during operations. Describe in detail material, methods and equipment to be used for each phase of restoration work. (Contractors proposal/bid can serve this purpose.)

D. Product Data: Submit data on cleaning compounds, cleaning solutions, and manufacturer's printed literature for each product.

E. Samples: Submit four unit samples of masonry units to illustrate color, texture, and extremes of color range to match existing where replacements are necessary.

F. Manufacturer's Installation Instructions: Submit installation procedures for products selected for use, manufacturer's installation instructions, perimeter conditions requiring special attention, and test data indicating compliance with requirements, and installation instructions.

1.4 SUBSTITUTIONS

A. If alternative methods and materials to those indicated are proposed for any phase of restoration work, provide written description, and program of testing to demonstrate effectiveness for use on this project. Provide documentation showing compliance with the requirements for substitutions and the following information: Coordination information, including a list of changes needed to other work that will be necessary to accommodate the substitution.

B. A comparison of the substitution with the specified products and methods, including performance, weight, size, durability, and visual effect.

C. Certification that the substitution conforms to the contract documents and is appropriate for the applications indicated. Material substitution requests must be accompanied by independent laboratory test reports from a lab designated by the architect to establish equivalent performance levels and specification compliance. The submitting party shall pay for testing.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 530 and ACI 530.1 requirements.

B. All repointing must be performed by a craftsperson that is familiar with historic lime mortar formulations, curing conditions and performance characteristics. Contractor shall provide proof of such knowledge to the Architect by submitting a certificate from a U.S. Heritage Group Lime Mortar Workshop, similar workshop course, or sufficient proven project experience. Work must be performed by a firm having not less than 5 years successful experience in comparable masonry restoration projects and employing personnel skilled in the restoration process and operations indicated.

C. Only skilled journeymen masons who are familiar and experienced with the materials and methods specified and are familiar with the design requirements shall be used for masonry restoration. One skilled journeyman mason, trained and Certified by the specified manufacturer, shall be present at all times during masonry restoration and shall personally direct the work.

D. Source of Materials: Obtain materials for brick repair and mortar repointing from a single manufacturer source to ensure match quality, color, texture, and detailing.

E. Test Panels: Before full-scale application, test products to be used on panel mock-ups on the actual building to be approved by the Architect.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum five years documented experience.

1.7 MOCKUP

A. Section 01 40 00 - Quality Requirements: Mockup requirements.

B. Field Construction Mock-ups: Prior to start of general masonry restoration, prepare the following sample panels and sample areas on building where directed by Architect. Obtain Architect's acceptance of visual qualities before proceeding with the work.

C. Mortar Repointing: Prepare 2 separate sample areas of approximately 3-feet high by 3-feet wide for each type of repointing required, one for demonstrating methods and quality of workmanship expected in removal of mortar from joints and the other for demonstrating quality of materials and workmanship expected in pointing mortar joints. Prepare, install and finish each sample according to specifications. Sample must be applied to the actual masonry. Samples should cure a minimum of 14 days prior to Architect approval.

CI. Cleaning: Areas slated for cleaning are small. Prepare 3 separate spot cleaning sample areas for each type required to determine the extent of cleaning, cleaning methods, dwell time, and cleaning products. One test sample MUST consist of a hot water wash at low psi using a flat 25-50 degree wide spray stainless steel tip. Record and note all dwell times, surface and air temperatures at the time of testing each possible solution. Architect to be present during mockup execution. Note cleaning detergent or chemical mix, psi, nozzle orifice distance from wall face, dwell times, and any other specific cleaning procedures.

CII. Repeat, using different cleaning methods up to three locations, until acceptable without causing surface damage.

CIII. Locate where directed by Architect.

CIV. Acceptable panel illustrating results of restoration and cleaning will become standard for work of this section. Retain acceptable panels in undisturbed condition, suitably marked, during restoration as a standard for judging completed work.

1.8 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Deliver masonry, brick, and all other materials neatly stacked and tied on pallets. Store clear of ground with adequate waterproof covering.

C. Store all mortar ingredients in manufacturer's packaging, or when delivered loose, with adequate weatherproof covering.

D. Deliver materials to site in manufacturer's original unopened containers and packaging, bearing labels as to type and names of products and manufacturers.

E. Deliver and store restoration material in manufacturer's original, unopened containers with the grade, batch and production data shown on the container or packaging.

F. Protect restoration materials during storage and construction from wetting by rain, snow or ground water, and from staining or intermixture with earth or other types of materials.

G. Protect mortar and other materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

H. Comply with the manufacturers written specifications and recommendations for mixing, application, and curing of repointing mortars and patching materials.

I. Deliver products in time to avoid construction delays.

J. Deliver and store products in manufacturer's original packaging with identification labels intact.

K. Store products protected from weather and at temperature and humidity conditions recommended by manufacturer.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Cold Weather Requirements: In accordance with ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F (4 degrees C) will remain so for at least 48 hours after completion of work.

C. Do not use frozen materials or materials mixed or coated with ice or frost. Do not lower the freezing point of mortar by the use of admixtures or anti-freeze agents, and do not use chlorides in the mortar.

D. Hot Weather Requirements: In accordance with ACI 530.1 when ambient temperature is greater than 100 degrees F (38 degrees C) or surface and ambient air temperature is greater than 90 degrees F (32 degrees C) with wind velocity greater than 8 mph (13 km/h). Phase repointing during hot weather by completing process on

the shady side of the building or schedule installation of materials during cooler evening hours to prevent premature evaporation of moisture the mortar.

E. Do not apply products under conditions outside manufacturer's requirements, which include:
   1. Surfaces that are frozen; allow complete thawing prior to installation.
   2. When surface or air temperature is not expected to remain above 40 degrees F for at least 8 hours after application.
   3. Wind conditions that may blow materials onto surfaces not intended to be treated.
   4. Less than 24 hours after a rain.
   5. When rain is expected less than 6 hours after installation.

1.11 SEQUENCING

A. Section 01 10 00 - Summary: Work sequence.

B. Perform repointing after cleaning masonry surfaces.

1.12 OTHER PROJECT CONDITIONS

A. Protect persons, motor vehicles, building site and surrounding buildings from injury resulting from masonry restoration work. This includes surface areas on adjacent wall surfaces or roofs not included in this scope of work.

B. Prevent repointing mortar from staining the face of masonry or other surfaces to be left exposed. Immediately remove all repointing mortar that comes in contact with such surfaces.

C. Cover partially completed work when work is not in progress.

D. Protect sills, ledges and projections from droppings.

E. Damage occurring to the building as a result of work of this section of Contractor's failure to protect against such damage shall be the Contractor's responsibility. The contractor shall restore damaged areas to the complete satisfaction of the Architect at no expense to the Owner.

1.13 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer's standard warranty for not less than one year, commencing on Date of Substantial Completion.

1.14 SCHEDULING

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Perform cleaning, washing, stripping, repointing, etc. to exterior masonry and stone between hours of 7 AM to 9 PM.

PART 2 PRODUCTS

2.1 REPOINTING MORTAR MATERIALS

A. Repointing mortar shall be prepared and placed in accordance with the Department of the Interior National Park Service Cultural Resources Preservation Briefs 2, "Repointing Mortar Joints in Historic Masonry Buildings", Revised edition October 1998, and in compliance with the guidelines set forth by the Secretary of the Interior's Standards for Rehabilitation.

B. The repointing mortar shall match the original in color, grain size, and texture. The compressive strength of the repointing mortar shall be equal or less than the compressive strength of the original mortar and surrounding brick or stone. The replacement mortar shall contain approximately the same ingredient proportions of the original mortar.

C. All replacement mortar ingredients and mortar formulations will be established from test data gathered from the original materials sampled from site. **Test sampling analysis to be completed by USHG, see lab report provided by Architect.**

D. Mortar Testing Contact: U.S. Heritage Group, Inc., 3516 North Kostner Ave. Chicago, IL 60641 Phone: 773-286-2100 Fax: 773-286-1852. Email: info@usheritage.com; www.usheritage.com.

E. The testing laboratory shall supply a ready mixed mortar sample sufficient in size for a mock up sample at the site.

F. Mixing of individual mortar ingredients at the construction site will not be permitted.

G. Repointing mortars shall be pre blended in single containers in a factory-controlled environment. All ingredients will be converted from volume measurements to weight measurements to ensure quality production of the mortar.

H. All containers shall be marked including manufacturing date and batch number. Manufacture is required to maintain production-sampling procedures for each batch for quality control purposes. Manufacturer to provide samples of proposed materials for mock up panels at the site. All pre blended products are to meet applicable ASTM standards and project specification requirements.

I. Mortar Materials Contact: U.S. Heritage Group, Inc., 3516 North Kostner Ave., Chicago, IL 60641 Phone: 773-286-2100 Fax: 773-286-1852. Email: info@usheritage.com; www.usheritage.com. Mortar supplied from other suppliers is acceptable provided that these sources meet the standards outlined in this document, match the historic mortar formulation and aesthetics, and meet or exceed the quality standards of USHG mortars.

2.2 MASONRY RESTORATION AND CLEANING

A. Masonry Cleaners shall be in accordance with the Department of the Interior National Park Service Cultural Resources Preservation Brief 1, "The Cleaning and Waterproof Coating of Masonry Buildings", and Preservation Brief 6 "Dangers of Abrasive Cleaning to Historic Buildings", and in compliance with the guidelines set forth by the Secretary of the Interior's Standards for Rehabilitation.

B. **Cleaning baseline procedure:** Hot water wash at low psi. If hot water wash proves to be insufficient, see item "J" for acceptable manufacturers of alternate cleaning products. Pressure to be measured at the gun or as closely to it as possible. 200-300 psi may be satisfactory; 400-800 psi (field test psi ranges) are more typical. A bristle brush may be used to supplement the water wash as long as it does not remove or damage the limestone surface. Nozzle size and configuration: Stainless steel flat tip with 25-50 degree wide spray. Distance from nozzle orifice and the surface being cleaned shall be evaluated and tested during the mock-up phase.

C. **Algae growth:** Treat areas of algae/moss growth with an anti-fungal agent prior to masonry cleaning.

D. **Sample cleaning area:** An initial test-cleaning sample with hot water at low psi is requested to evaluate this methods effectiveness and establish a baseline for cleaning techniques. Work with architect to determine locations of cleaning test panels (1'x1').

E. All cleaning techniques should use the gentlest means possible to avoid etching, staining, bleaching, or masonry damage.

F. The goal of the masonry cleaning is not to remove 100% of surface soiling but to generally enhance the stone by removing sufficient particulate caused by pollution. Architect will establish parameters on-site for acceptable levels of cleaning.

G. **Heavily soiled areas** (likely carbon and sulfates): The undersides of limestone sills, ornament, belt courses, etc., may require alternate cleaning methods or additional applications of cleaner to achieve successful results.
   1. Diedrich Chemicals Restoration Technology, Model 808 Black Incrustation Remover (for spot treatment of carbon encrusted black streaks).
   2. Substitutions: Approved equal or better.

H. **Dwell times:** For all cleaning methods, testing and implementation, dwell times shall be closely watched and adhered to in an effort to avoid damaging the masonry (etching the surface).

I. Properly protect all adjacent wall surfaces, roofs, clock faces, windows, doors, glass, adjacent plant material, etc., from overspray.

J. Manufacturers:
1. Mortar Materials Contact: U.S. Heritage Group, Inc., 3516 North Kostner Ave., Chicago, IL 60641 Phone: 773-286-2100 Fax: 773-286-1852. Email: info@usheritage.com; www.usheritage.com
2. Cleaning Materials:
   a. PROSOCO, Inc., 3741 Greenway Circle, Lawrence, KS 66046. ASD. Tel: (800) 255-4255 or (785) 865-4200. Fax: (785) 830-9797. Email: marketing@prosoco.com; www.prosoco.com
   b. Diedrich Technologies, Inc., 7373 South 6th Street, Oak Creek, WI 53154. Tel: (800) 323-3565 or (414) 764-0058. Fax: (414) 764-6993. Email: diedtech@execpc.com; www.diedrichtechnologies.com
3. Substitutions: See Section 01600 - Product Requirements.
4. See Section 04 – Stone Repair Mortar for products including steel anchors.

2.3 COMPONENTS

A. Cleaning Agent: Premixed solvent cleaner type.

B. Blasting Sand: NOT permitted.

C. Mortar Materials: Conform to requirements of Section 04 05 03.

D. Stone: Indiana limestone (carved and ornamental).

E. Brick: Solid red face brick (field).

F. Brick: Solid common brick (parapet back-up), proposed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify surfaces to be cleaned and restored are ready for work of this section.

C. Examine conditions, with installer present, for compliance with requirements for installation tolerances and other specific conditions, and other conditions affecting performance of unit masonry.

D. Do not proceed until unsatisfactory conditions have been corrected.

E. Verify that substrates are acceptable for product installation; do not begin until substrates meet manufacturer's requirements.

F. Do not begin until test panels have been approved by Architect and Owner.

G. Replacement of masonry units to be confirmed by Project Architect prior to execution.

3.2 PREPARATION

A. Protect elements surrounding work of this section from damage or disfiguration.

B. Immediately remove stains, efflorescence, or other excess resulting from work of this section.

C. Protect roof membrane and flashings from damage. Lay 1/2 inch (13 mm) plywood on roof surfaces over full extent of work area and traffic route.

D. Provide waterproof dams to divert flowing water to exterior drains and catch basins.

E. Carefully remove and store fixtures, fittings, finishing hardware, accessories.

F. Close off, seal, mask, and/or board up areas, materials, and surfaces not receiving work of this section to protect from damage.

G. Construct dust proof and weatherproof partitions to close off occupied areas, if any.

3.3 INSTALLATION

A. Rebuilding:

1. Cut out damaged and deteriorated masonry with care in manner to prevent damage to adjacent remaining materials.
2. Shore or support structure in advance of cutting out units to maintain stability of remaining materials. Cut away loose or unsound adjoining masonry and mortar to provide firm and solid bearing for new work. Cut out full units from joint to joint and in a manner to permit the replacement of full size units.
3. Build in reclaimed masonry units following procedures for new work specified in Section 04 05 03.
4. Mortar Mix: As specified in Section 04 05 03.

5. Ensure anchors, ties, reinforcing, stone cramps and dowels, and flashings are correctly located and built in.
6. Install built in masonry work to match and align with existing, with joints and coursing true and level, faces plumb and in line. Build in openings, accessories and fittings.
7. Re-use masonry to the fullest extent possible. Integrate new replacement masonry in concealed areas or shielded from public view.
8. All new brick units to be solid, no voids, consisting of salvaged historic matching material.
9. Build new masonry to the full thickness as shown on drawings. Key brick or stone into existing structure wherever possible providing mortar as required.

B. Repointing:

1. Leave one intact and serviceable example of original mortar on the building; location and size to be determined with Architect.
2. All joints (unless otherwise noted) shall be raked back to sound, solid, back up material. All raking out should leave a clean, square face at the back of the joint to provide for maximum contact of pointing mortar with the masonry back up mortar. Shallow or feather edging shall not be permitted.
3. Existing mortar joints shall be raked out a minimum depth of 2.5 times the height of the existing mortar joints, however, so as not to compromise the structural stability of the wall, the joint should not be raked out more than half the width of the masonry unit.
   EXAMPLES:
   a. 1/16" Mortar joint needs to be cut out to a depth of 3/16" minimum
   b. 1/8" Mortar joint needs to be cut out to a depth of 5/16" minimum
   c. 1/4" Mortar joint needs to be cut out to a depth of 5/8" minimum
   d. 1/2" Mortar joint needs to be cut out to a depth of 1-1/4" minimum
   e. 3/4" Mortar joint needs to be cut out to a depth of 1-7/8" minimum
   f. 1" Mortar joint needs to be cut out to a depth of 2-1/2" minimum

4. Utilize hand tools and power tools only after test cuts determine no damage to masonry units results. Vertical joints (head joints) SHALL NOT be raked out using rotary power saws. All vertical head joints must be removed by hand in stonework unless a demonstration can be made that rotary use can be implemented without over cutting the joint, i.e. "over running." *Vertical joints exceeding 6" in height may be approved for cutting with rotary power saws pending a successful demonstration to the Project Architect.*
5. Do not damage masonry units.
6. Existing horizontal mortar joints (bed joints) that are filled with a hard Portland mortar may be raked out using a diamond blade that is narrower than the joint width. The middle one-third of the mortar joint may be cut using a rotary power saw. The remaining mortar shall be removed from the masonry joints by hand using masonry chisels or pneumatic carving tools powered by air.

7. Existing historic mortar shall be removed using only small-headed chisels that are no wider than half the width of the existing masonry joints. Pneumatic air carving chisels are permitted.
8. Contractor shall not widen the existing masonry joints. The surrounding masonry edges shall not be spalled or chipped in the process of mortar removal. Damage to surrounding stone resulting from rotary blade over running shall not be permitted. Contractor shall replace all brick or stone damaged during mortar removal with replacement units that match the original exactly.
9. Brush, vacuum, blow out, or flush joints with water to remove dirt and loose debris, working from top to bottom of wall.
10. Exposed surface of masonry adjacent to joint shall be wet prior to repointing. Maintain a water sprayer on site at all times during the repointing process.
11. Walls should be pre-soaked with water 10 minutes prior to pointing.
12. Rinse masonry joint with water to remove dust and mortar particles. Time the rinsing application so that at the time of pointing excess water has evaporated or run off. Joint surfaces should be damp but free from standing water.
13. Mortar shall be mixed according to manufacturer recommendations. The mortar material shall resemble the consistency of brown sugar during installation. This drier consistency enables the material to be tightly packed into the joint and allows for cleaner work and prevents shrinkage cracks as the mortar cures.
14. Joints should be pointed in layers or "lifts" where the joints are deeper than one and one-quarter inch (1-1/4 inch or 9mm). Apply in layers not greater than 1/2 the depth but not more than 1-1/4 inch or until a uniform depth is formed. Compact each layer thoroughly and allow it to become thumbprint hard before applying the next layer.
15. LIFT EXAMPLES:
    a. 3/16" joint depth (1/16" joint existing) point in one lift
    b. 5/16" joint depth (1/8" joint existing) point in one lift
    c. 5/8" joint depth (1/4" joint existing) point in one lift
    d. 5/16" joint depth (3/8" joint existing) point in one lift
    e. 1-1/4" joint depth (1/2" joint existing) point in one lift
    f. 1-7/8" joint depth (3/4" joint existing) point in two lifts approx.-1" (each)
    g. 2-1/2" joint depth (1" joint existing) point in three lifts approx.+3/4" (ea.)
    h. over 2-3/4 joint depth- point in lifts of no more than 1-1/4" (each)
16. When mortar is thumbprint hard the joints shall be finished to match the original historic joint profile.
    a. Indiana Limestone: raked joint
    b. Face brick: raked joint
    c. Confirm with Architect once scaffold is erect and direct inspection of protected areas is possible.

17. Keep mortar from drying out to quickly. Protection from direct sun, high winds for the first 72 hours after installation. Thoroughly soak the wall after the mortar has set and the finish joint profile is complete. Water soaking the wall is to be carried out nine (9) separate times allowing the wall to dry out between applications. Protect freshly pointed areas with plastic sheeting for the first 24 hours after installation.
18. Nine (9) wet-and-dry cycles are required and can usually be completed immediately after installation by water soaking the repointing work three times per day for three days. Nine (9) wet-and-dry cycles may take two days or one week depending on the conditions of the wall and the environment.
19. Acceptable curing methods include covering the repointed wall with plastic sheeting, periodic hand misting, and periodic mist spraying using a system of pipes, mist heads, and timers.
20. Adjust curing methods to ensure that the pointing mortar is damp without eroding the surface of the mortar.

C. Cleaning Existing Masonry:

1. Clean only the areas specified in the exterior elevation drawings.
2. Clean all exposed surfaces of masonry using materials specified, so that resulting surfaces have a uniform appearance.
3. When cleaning stains and tough dirt, test masonry for composition and select appropriate cleaner in accordance with manufacturer's instructions and recommendations; use cleaner and cleaning methods selected to minimize damage to surfaces and deterioration of appearance.
4. Mockup testing will determine the most appropriate cleaning solution, treatment, dwell time, psi, and nozzle orifice distance from wall surface.
5. Install and clean up as per manufacturer's recommendations and standards.
6. Capture, store, and dispose of all cleaning products, overspray, wash, and after wash as per EPA and local government standards.

D. Install Work in accordance with State and local Municipality standards.

3.4 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.

B. As work proceeds and on completion, remove excess mortar, smears, droppings.

C. Clean surrounding surfaces.

3.5 REPAIR OF MASONRY

A. Removing metal anchors and filling holes.

B. Repair, patch and fill cracks, voids, defects, and damaged areas to satisfaction of the Architect; allow repair materials to cure completely.

C. Seal joints with sealant and allow to cure completely.

END OF SECTION

SECTION 085200 - WOOD WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes aluminum-clad wood windows.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at [**Project site**] <**Insert location**>.

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, discuss, and coordinate the interrelationship of wood windows with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.
3. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
4. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for wood windows.

B. Sustainable Design Submittals:

1. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
2. Chain-of-Custody Qualification Data: For manufacturer and vendor.

C. Shop Drawings: For wood windows.

1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

D. Samples: For each exposed product and for each specified, [2 by 4 inches (50 by 100 mm)] <**Insert dimensions**> in size.

E. Samples for Initial Selection: For units with factory-applied color finishes.

1. Include Samples of hardware and accessories involving color selection.

F. Samples for Verification: For wood windows and components required, prepared on Samples of size indicated below:

1. Exposed Finishes: [2 by 4 inches (50 by 100 mm)] <**Insert dimensions**>.
2. Exposed Hardware: Full-size units.

G. Product Schedule: For wood windows. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each type of wood window, for tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For manufacturer's warranties.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

C. Installer Qualifications: An installer acceptable to wood window manufacturer or supplier for installation of units required for this Project.

D. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockup of typical wall area as shown on Drawings.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace wood windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet performance requirements.
b. Structural failures including excessive deflection, water leakage, and air infiltration.
c. Faulty operation of movable sash and hardware.
d. Deterioration of materials and finishes beyond normal weathering.
e. Failure of insulating glass.

2. Warranty Period:

a. Window: 10 years from date of Substantial Completion.
b. Glazing Units, Nonlaminated: 20 years from date of Substantial Completion.
c. Glazing Units, Laminated: 10 years from date of Substantial Completion.
d. Aluminum-Cladding Finish: **[10] [20]** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain wood windows from single source from single manufacturer.

2.2 WINDOW PERFORMANCE REQUIREMENTS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Window Certification: WDMA certified with label attached to each window.

B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:

1. Minimum Performance Class: **[R] [LC] [CW] [As indicated on Drawings] <Insert class>**.
2. Minimum Performance Grade: **[15] [20] [25] [30] [35] [40] [45] [50] [As indicated on Drawings] <Insert grade>**.

C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of **[0.30 Btu/sq. ft. x h x deg F (1.71 W/sq. m x K)] [0.32 Btu/sq. ft. x h x deg F (1.83 W/sq. m x K)] [0.35 Btu/sq. ft. x h x deg F (2.0 W/sq. m x K)] [0.60 Btu/sq. ft. x h x deg F (3.43 W/sq. m x K)] <Insert value>**.

D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of **[0.40] [0.30] [0.27] <Insert value>**.

E. Sound Transmission Class (STC): Rated for not less than **[26] [30] <Insert rating>** STC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E413.

F. Outside-Inside Transmission Class (OITC): Rated for not less than **[22] [26] [30] <Insert rating>** OITC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E1332.

G. Windborne-Debris Impact Resistance: Passes ASTM E1886 missile-impact and cyclic-pressure tests in accordance with ASTM E1996 for Wind Zone **[1] [2] [3] [4]** for **[basic] [enhanced]** protection.

1. Large-Missile Test: For glazing located within **[30 feet (9.1 m)] <Insert dimension>** of grade.
2. Small-Missile Test: For glazing located between 30 feet (9.1 m) and **[60 feet (18.3 m)] <Insert dimension>** above grade.

2.3 WOOD WINDOWS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Pella® Corporation **[Architect Series®] [Lifestyle Series]** or comparable product by one of the following:

1. Aluminum-Clad Wood Windows:

   a. EAGLE Window & Door, Inc.; an Andersen Window & Door company.
   b. Marvin Windows and Doors.
   c. **<Insert manufacturer's name>**.

2. Wood Windows:

   a. Kolbe & Kolbe Millwork Co., Inc.
   b. Marvin Windows and Doors.
   c. **<Insert manufacturer's name>**.

B. Operating Types: Provide the following operating types in locations indicated on Drawings:

1. Casement: Project out.
2. Awning: Project out.
3. Single hung.
4. Double hung.
5. Fixed.
6. **<Insert operating type>**.

C. Certified Wood: Wood products shall be certified as "FSC Pure"**[or "FSC Mixed Credit"]** in accordance with FSC STD-01-001 and FSC STD-40-004.

D. Frames and Sashes: Fine-grained wood lumber complying with AAMA/WDMA/CSA 101/I.S.2/A440; kiln dried to a moisture content of not more than 12 percent at time of fabrication; free of visible finger joints on linear members, blue stain, knots,

pitch pockets, and surface checks larger than 1/32 inch (0.8 mm) deep by 2 inches (51 mm) wide; water-repellent preservative treated.

1. Exterior Finish: **[Aluminum-clad] [Manufacturer's standard factory-prime coat] [Unfinished]** wood.

    a. Aluminum Finish: **[Manufacturer's standard baked-on enamel finish] [Manufacturer's standard fluoropolymer two-coat system with fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight and complying with AAMA 2605] [Manufacturer's standard anodized finish complying with AAMA 611] <Insert finish>.**
    b. Exposed Unfinished Wood Surfaces: **[Mahogany] <Insert species>.**
    c. Color: **[White] [Tan] [Brown] [Classic White] [Vanilla Cream] [Poplar White] [Almond] [Sand Dune] [Honeysuckle] [Fossil] [Putty] [Portobello] [Deep Olive] [Auburn Brown] [French Roast] [Summer Sage] [Hemlock] [Hartford Green] [Morning Sky Grey] [Eldridge Grey] [Iron Ore] [Black] [Naval] [Stormy Blue] [Real Red] [Brick Red] [Cranberry] [Custom color as selected by Architect] <Insert color>.**
    d. Anodized Color: **[Clear ANO-215] [Light Bronze ANO-301] [Dark Bronze ANO-303] [Black ANO-305].**

2. Interior Finish: **[Unfinished] [Manufacturer's standard factory-prime coat] [Manufacturer's standard color-coated finish] [Manufacturer's standard stain-and varnish-finish].**

    a. Exposed Unfinished Wood Surfaces: **[Manufacturer's standard species] [Pine] [Mahogany] [Douglas fir] <Insert species>.**
    b. Painted Color: **[White] [Bright White] [Linen White] <Insert color>.**
    c. Stain Color: **[Natural] [Golden Oak] [Early American] [Provincial] [Red Mahogany] [Dark Mahogany] [Black] <Insert color>.**

E. Glass: Clear annealed glass, ASTM C1036, Type 1, Class 1, q3.

1. Kind: Fully tempered, ASTM C1048, **[where indicated on Drawings] <Insert requirements>.**

F. Windborne-Debris-Impact-Resistant Laminated Glass: ASTM C1172 with two plies of float glass.

1. Float Glass: **[Annealed] [Heat strengthened] [Fully tempered] [As required by performance requirements indicated].**
2. Inner Ply: Clear.
3. Interlayer: **[0.090 inch (2.29 mm)] [As required by performance requirements indicated] <Insert requirements>.**
4. Outer Ply: **[Clear] [Gray] [Bronze] [Green] <Insert tint>.**
5. Low-E Coating: **[Pyrolytic on second surface] [Sputtered on second surface] [Sputtered on third surface] [Sputtered on second or third surface] <Insert coating>.**

G. Insulating-Glass Units: ASTM E2190.

1. Glass: ASTM C1036, Type 1, Class 1, q3.

a. Tint or Pattern: **[Clear] [Obscure] [Gray] [Bronze] [Green] <Insert tint>**.
b. Kind: Fully tempered, ASTM C1048, **[where indicated on Drawings] <Insert requirements>**.

2. Lites: Two.
3. Filling: Fill space between glass lites with **[air] [argon]**.
4. Low-E Coating: **[Sputtered on second or third surface] <Insert coating>**.

H. Windborne-Debris-Impact-Resistant Insulating-Glass Units: ASTM E2190 with two lites and complying with impact-resistance requirements in "Window Performance Requirements" Article.

1. Exterior Lite: ASTM C1036, Type 1, Class 1, q3.

a. Tint: **[Clear] [Gray] [Bronze] [Green] <Insert tint>**.
b. Kind: **[Heat strengthened] [Fully tempered]**.

2. Interior Lite: ASTM C1172 clear laminated glass with two plies of float glass.

a. Float Glass: **[Annealed] [Heat strengthened] [Fully tempered] [As required by performance requirements indicated]**.
b. Interlayer Thickness: **[0.090 inch (2.29 mm)] [As required by performance requirements indicated] <Insert requirements>**.

3. Filling: Fill space between glass lites with **[air] [argon]**.
4. Low-E Coating: **[Pyrolytic on second surface] [Sputtered on second surface] [Sputtered on third surface] [Sputtered on second or third surface] <Insert coating>**.

I. Glazing System: **[Manufacturer's standard factory-glazing system that produces weathertight seal] <Insert glazing requirements>**.

1. Triple Glazing:

a. Exterior Lite: Insulating-glass unit **<Insert type>**.

1) Tint or Pattern: **[Clear] [Obscure] [Gray] [Bronze] [Green] <Insert tint>**.
2) Kind: Fully tempered, ASTM C1048, **[where indicated on Drawings] <Insert requirements>**.

b. Interior Lite: **[Glass] <Insert type>**.

1) Tint or Pattern: **[Clear] [Obscure] [Gray] [Bronze] [Green] <Insert tint>**.
2) Kind: Fully tempered, ASTM C1048, **[where indicated on Drawings] <Insert requirements>**.

c. Lites: Three.
d. Filling: Fill space between glass lites with **[air] [argon]**.
e. Low-E Coating: **[Sputtered on second or third surface] <Insert coating>**.

2. Integral Louver Blinds: Glass manufacturer's standard, horizontal louver blinds with aluminum slats and polyester fiber cords, located in space between glass lites, and operated by hardware located on inside face of sash.

a. Operation: Tilt, raising, and lowering.
b. Color: **[As indicated by manufacturer's designations] [As selected by Architect from manufacturer's full range] <Insert color>**.

3. Integral Pleated Shades: Glass manufacturer's standard, horizontal pleated shades with cellular fabric shade and polyester fiber cords, located in space between glass lites, and operated by hardware located on inside face of sash.

a. Operation: Raise and lower top-down.
b. Color: **[As selected by Architect from manufacturer's full range] <Insert color>**.

J. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

1. Exposed Hardware Color and Finish: **[Bright Brass] [Brown] [Champagne] [Distressed Bronze] [Distressed Nickel] [Matte Black] [Oil-Rubbed Bronze] [Polished Chrome] [Satin Nickel] [White] <Insert color and finish>**.

K. Projected Window Hardware:

1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested in accordance with ASTM E405, Method A. Provide operators that function without requiring removal of interior screens.

a. Type and Style: **[Match Architect's sample] [As selected by Architect from manufacturer's full range of types and styles] <Insert type and style>**.

2. Hinges: **[Manufacturer's standard type for sash weight and size indicated] [Stainless steel hinges with stainless steel-reinforced, sliding nylon shoes] <Insert description>**.
3. Single-Handle Locking System: Operates positive-acting arms that pull sash into locked position. Provide one lock on sashes up to 29 inches (735 mm) tall and two locks on taller sashes.
4. Limit Devices: **[Concealed friction adjustor, adjustable stay bar] [Concealed support arms with adjustable, limited, hold-open] <Insert type>** limit devices designed to restrict sash opening.

a. Limit clear opening to **[4 inches (100 mm)] <Insert dimension>** for ventilation; with custodial key release.

5. Operator Stud Cover: Matching operator handle finish. Provide in locations where operator handle is removed for controlled access.
6. Pole Operators: Tubular-shaped anodized aluminum; with rubber-capped lower end and standard push-pull hook at top to match hardware design; of sufficient length to operate window without reaching more than 60 inches (1500 mm) above floor; one pole operator and pole hanger per room that has operable windows more than 72 inches (1800 mm) above floor.

L. Hung Window Hardware:

1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.[**Provide custodial locks.**]
3. Tilt Hardware: Releasing tilt latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.

M. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

N. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.4 ACCESSORIES

A. Dividers (False Muntins): Provide divider grilles in designs indicated for each sash lite.

1. Quantity and Type: [**One per sash, removable from exposed surface of interior lite**] [**Two per sash, permanently located at exterior and interior lites**] [**One permanently located between insulating-glass lites**] [**Three per sash, two permanently located at exterior and interior lites and one permanently located between insulating-glass lites**] <**Insert requirements**>.
2. Material: [**Manufacturer's standard**] <**Insert material**>.
3. Pattern: [**As indicated on Drawings**] <**Insert pattern**>.
4. Profile: [**As selected by Architect from manufacturer's full range**] <**Insert profile**>.
5. Color: [**As selected by Architect from manufacturer's full range**] <**Insert color**>.

2.5 INSECT SCREENS

A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.

1. Type and Location: [**Full, inside for project-out**] [**Full, outside for double-hung**] [**Half, outside for single-hung**] sashes.

B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.

1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
2. Finish for Interior Screens: Baked-on organic coating in [**color selected by Architect from manufacturer's full range**] <**Insert color**>.
3. Finish for Exterior Screens: [**Baked-on organic coating in color selected by Architect from manufacturer's full range**] [**Matching color and finish of cladding**] <**Insert finish**>.

C. Glass-Fiber Mesh Fabric: [18-by-16 (1.1-by-1.3-mm) **or** 18-by-18 (1.0-by-1.0-mm)] [20-by-20 (0.85-by-0.85-mm) **or** 20-by-30 (0.85-by-0.42-mm)] **<Insert type>** mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D3656/D3656M and SMA 1201.

1. Mesh Color: **[Manufacturer's standard] <Insert color>**.

2.6 FABRICATION

A. Fabricate wood windows in sizes indicated. Include a complete system for installing and anchoring windows.

B. Glaze wood windows in the factory.

C. Weather strip each operable sash to provide weathertight installation.

D. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.

E. **[Bow]** **[Bay]** Window Assemblies: Provide **[operating]** **[and]** **[fixed]** units in configuration indicated. Provide window frames, sashes, hardware, and other trim and components necessary for a complete, secure, and weathertight installation, including the following:

1. Angled mullion posts with interior and exterior trim.
2. Angled interior and exterior extension and trim.
3. Clear **[maple]** **[oak]** head and seat boards.
4. Top and bottom plywood platforms.
5. Exterior head and sill casings and trim.
6. Support brackets.

F. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

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

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.

B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

C. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action (dissimilar materials, treated lumber, etc.) at the points of contact with other materials.

D. For fin method of attachment, integrate window system installation with exterior water-resistant barrier using flashing/sealant tape. Apply and integrate flashing/sealant tape with water-resistant barrier using watershed principles in accordance with window manufacturer's written instructions.

E. Place interior seal around window perimeter to maintain continuity of building thermal and air barrier using insulating-foam sealant.

F. Seal window to exterior wall cladding with sealant and related backing materials at perimeter of assembly.

G. Leave windows closed and locked.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: **[Owner will engage]** **[Engage]** a qualified testing agency to perform tests and inspections.

1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

B. Testing Services: Testing and inspecting of installed windows shall take place as follows:

1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed in accordance with AAMA 502.
2. Air-Infiltration Testing:

    a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.
    b. Allowable Air-Leakage Rate: **[1.5]** **<Insert number>** times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.

3. Water-Resistance Testing:

a. Test Pressure: **[Two-thirds]** **<Insert number>** times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.
b. Allowable Water Infiltration: No water penetration.

4. Testing Extent: **[Three]** **[Three mockup]** **<Insert number or description>** windows of each type as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested after perimeter sealants have cured.
5. Test Reports: Prepared in accordance with AAMA 502.

C. Windows will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

B. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.

1. Keep protective films and coverings in place until final cleaning.

C. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately in accordance with manufacturer's written instructions.

END OF SECTION 085200