



AGENDA
**HISTORIC PRESERVATION/
DESIGN REVIEW COMMISSION**

Members

- Chairperson Tim Siebert
- Vice Chair Peter Munck
- Alderperson Marc Christianson
- Barry Calnan
- Erik McFarland
- Carol Molepske (Alternate 1)
- Hana Cutler (Alternate 2)

Date and Time: September 25, 2023
5:00 PM

Location: Community Room
933 Michigan Avenue, Stevens
Point, WI

OR

Zoom Teleconferencing

Meeting ID: 812 5097 5069

Passcode: 219855

By

Computer: <https://us02web.zoom.us/j/81250975069?pwd=TU9FWGlhY2N6aW5XN293QjVuamd6dz09>

By Phone: +1-312-626-6799 (US
Chicago)

Opening Section:

1. Roll Call

Discussion and Possible Action on the Following:

2. Report of the August 1, 2023 meeting of the Historic Preservation / Design Review Commission.
3. A request from BJ Welling, representing Welling Properties LLC, for a design review to perform roof and exterior wall improvements to the building located at 1028 Main Street (Parcel ID 281240832202922), consistent with Ch. 22.05(2).
4. A request from Jeff Rice, representing Rain Dog LLC, for a demolition review to raze the detached garage on the property located at 2017 Main Street (Parcel ID 281240832103502), consistent with Ch. 22.05(2).
5. Discussion on the Historic Preservation / Design Review Commission's Design Guidelines:

PLEASE TAKE NOTICE that any person who has special needs while attending these meetings or needs agenda materials for these meetings should contact the City Clerk as soon as possible to ensure that a reasonable accommodation can be made. The City Clerk can be reached by telephone at (715) 346-1569 or by mail at 1515 Strongs Avenue, Stevens Point, WI 54481.

Maps further defining the above area(s) may be obtained from the City of Stevens Point Department of Community Development, 1515 Strongs Avenue, Stevens Point, WI 54481, or by calling (715) 346-1567, during normal business hours.

PLEASE TAKE FURTHER NOTICE that a quorum of the Common Council may be in attendance at this meeting.

- Section 3.2.2: Masonry Exterior Walls

Closing Section:

6. Adjourn

PLEASE TAKE NOTICE that any person who has special needs while attending these meetings or needs agenda materials for these meetings should contact the City Clerk as soon as possible to ensure that a reasonable accommodation can be made. The City Clerk can be reached by telephone at (715) 346-1569 or by mail at 1515 Strong's Avenue, Stevens Point, WI 54481.

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PLEASE TAKE FURTHER NOTICE that a quorum of the Common Council may be in attendance at this meeting.

REPORT OF THE HISTORIC PRESERVATION / DESIGN REVIEW COMMISSION

August 1, 2023 – 5:00 PM
933 Michigan Ave, Stevens Point, WI 54481

PRESENT: Alderperson Christianson, Commissioner Calnan, and Commissioner Molepske.

ALSO PRESENT: Associate Planner/Zoning Administrator Kuhn, Dale Warner, John Marceau, and unidentified audience members via Virtual Zoom Meeting.

INDEX:

Opening Section:

1. Roll Call

Discussion and Possible Action on the Following:

2. Report of the June 26, 2023 meeting of the Historic Preservation / Design Review Commission.
3. A request from Dale Warner for a design review to perform restorative improvements to an accessory building located at 2101 Clark Street (Parcel ID 281240833200604), consistent with Ch. 22.05(2).

Closing Section:

4. Adjourn
-

Opening Section:

1. Roll Call

Present: Christianson, Calnan, Molepske

Excused: Siebert Munck, McFarland, Cutler

Associate Planner/Zoning Administrator Kuhn opened the floor for Temporary Chairperson nominations.

Motion by Commissioner Calnan to nominate Commissioner Molepske as Temporary Chairperson.

No further nominations. Motion carried 3-0.

Discussion and Possible Action on the Following:

2. Report of the June 26, 2023 meeting of the Historic Preservation / Design Review Commission.

Motion by Alderperson Christianson to approve the report of the June 26, 2023 meeting of the Historic Preservation / Design Review Commission; seconded by Commissioner Calnan.

Motion carried 3-0.

3. A request from Dale Warner for a design review request to perform restorative improvements to an accessory building located at 2101 Clark Street (Parcel ID 281240833200604), consistent with Ch. 22.05(2).

Associate Planner/Zoning Administrator Kuhn provided a summary of the design review request to perform restoration improvements to the carriage house, a detached accessory building. Repairs would include residing, pouring new concrete footings, and a roof replacement. After review, staff held no further concerns and recommended approval with conditions outlined in the staff report.

Applicant Dale Warner provided testimony relating to their request, including more in-depth repair and material details. The existing issues simply stemmed from the age of the buildings. He also inquired on the replacement of the garage doors, to which staff directed Mr. Warner to touch base with staff post the meeting as it may be something that could be approved internally, but details would need to be reviewed prior to that determination.

John Marceau, contractor provided additional technical repair specifications.

Commissioners had the following comments:

- Inquiry as to whether all garage doors would match at the end of the project, to which Mr. Warner indicated that it would be ideal and he would consider it, but it would largely depend on financials.
- Comment on the important historic nature of the building and noted gratitude for the push to restore the carriage house.
- Commended the applicant and homeowner for their efforts on restoring not only the carriage house but their ongoing historic improvements to the property.
- Commended the applicant and homeowner on bridging the gap on maintaining the historic nature of the building while also not compromising on current building standards.

Motion by Alderperson Christianson to amend the motion to allow the applicant to change the third garage door if they chose, subject to staff approval; seconded by Commissioner Calnan.

Motion carried 3-0.

Motion by Alderperson Christianson to approve the request from Dale Warner for a design review request to perform restorative improvements to an accessory building located at 2101 Clark Street (Parcel ID 281240833200604), consistent with Ch. 22.05(2) with the following condition:

- 1. Allow the applicant to change the third garage door if they chose, subject to staff approval.**

seconded by Temporary Chairperson Molepske.

Motion carried 3-0.

Closing Section:

4. Adjourn

Meeting adjourned at 5:16 PM.

A recording of this meeting can be viewed/heard at: <https://stevenspoint.com/365/AgendasMinutesVideos>

Administrative Staff Report

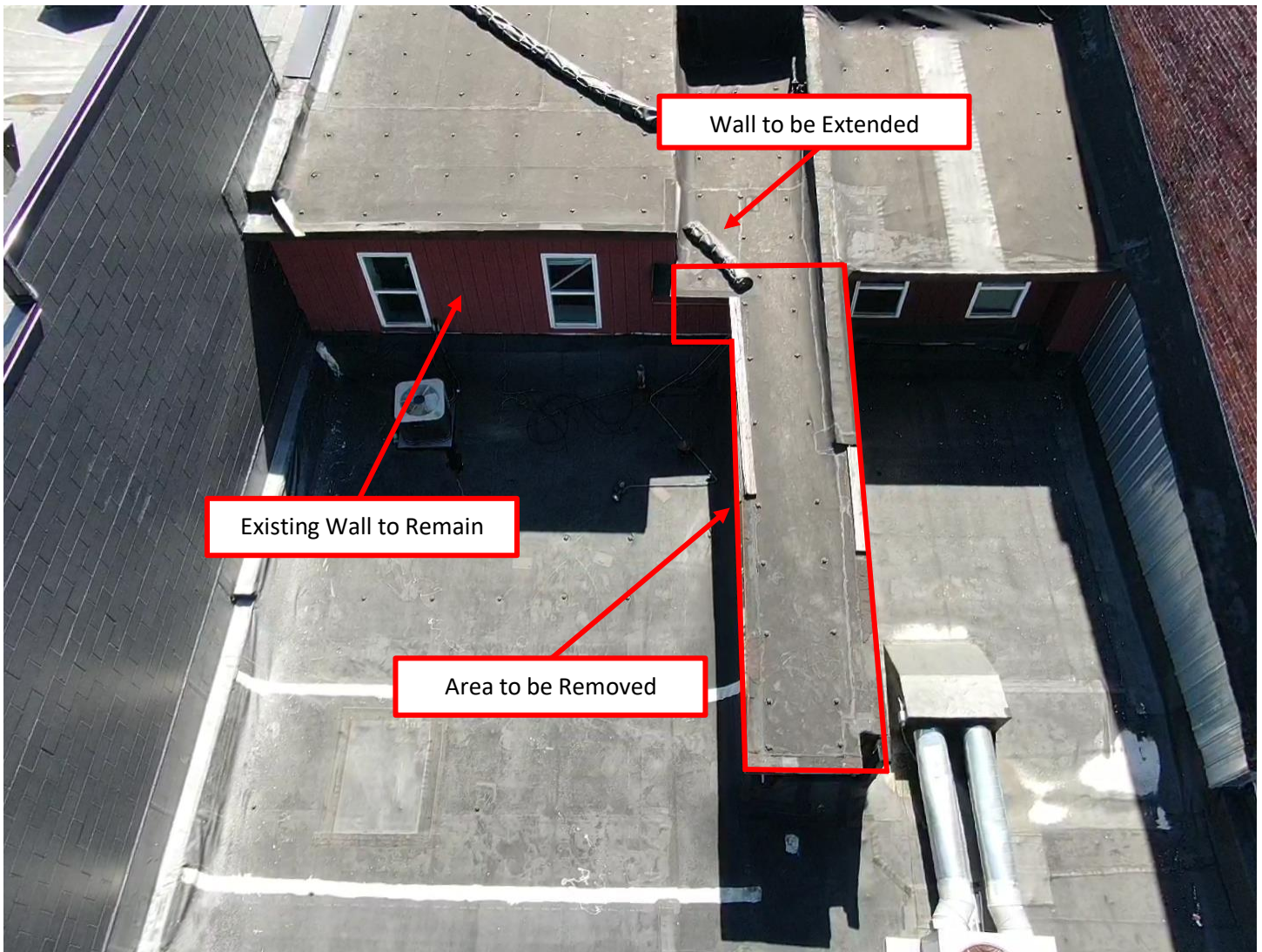


**Design Review
1028 Main Street
September 25, 2023**

**Department of Community Development
1515 Strong's Avenue, Stevens Point, WI
54481
Ph: (715) 346-1568 - Fax: (715) 346-1498**

Applicant(s): • BJ Welling, representing Welling Properties LLC Staff: • Adam Kuhn, Associate Planner akuhn@stevenspoint.com Parcel Number(s): • 281240832202922 Zone(s): • "B-3" Central Business District Council District: • District 1 – Ald. Christianson Lot Information: • Actual Frontage: 40 feet • Effective Depth: 134 feet • Square Footage: 5,388 • Acreage: 0.124 Structure Information: • Year of construction: 1879 (144 years old) Current Use: • Ground-floor retail & two residential units on the second floor Applicable Regulations: • Chapter 22 • Downtown Design Guidelines	Request A request from BJ Welling, representing Welling Properties LLC, for a design review to perform roof and exterior wall improvements to the building located at 1028 Main Street (Parcel ID 281240832202922), consistent with Ch. 22.05(2). City Official Design Review / Historic District 1. Downtown Design Review District Staff Recommendation Approve the request for a design review to perform roof and exterior wall improvements to the building located at 1028 Main Street (Parcel ID 281240832202922), subject to the following conditions: 1. A building permit shall be issued prior to the start of construction. 2. The applicant shall submit the specific red paint color that is proposed to confirm consistency with the Commission's approved color palette, subject to the review and approval of the Designated Agent. 3. Staff shall have the ability to approve minor amendments to the approved project plan.
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Overview: The applicant is requesting a design review to perform improvements to the roof on the subject property. Said request entails removing an abandoned hallway on the upper level of the building, whose sole purpose is to lead to mechanical equipment located on the building's roof. With removing this abandoned hallway, the applicant is requesting to extend the existing parapet wall from the west half of the building to the east half of the building. The proposed parapet wall extension will match in terms of height, window size and design, and exterior building material (i.e., wood siding). Please see the image below to provide further context as to the scope of this request.



The proposed improvements are considered a 'major work' per the Historic Preservation / Design Review Commission's Design Guidelines and shall require approval from the Commission.

Sec. 7.4.1: Major Works

- b. Exterior alterations to principal elevations of buildings
- m. Changes to historic roof features

CHAPTER 22: HISTORIC PRESERVATION

Division 5.02 Regulation of Construction, Reconstruction, Alteration, and Demolition

No owner or person in charge of a historic structure or historic site, or property located within a historic district shall reconstruct, alter, or demolish all or any part of the exterior of such property or construct any improvement upon such designated property or properties or cause or permit any such work to be performed upon such property or demolish such property unless approval has been granted by the commission.

Upon the filing of any request for a design review certificate with the commission, the commission shall review the request in accordance with the design guidelines. If the commission determines that the application for a design review certificate and the proposed changes are consistent with the design guidelines, it shall issue the design review certificate. Upon the issuance of such certificate, any other required permits shall be obtained.

This request has been reviewed subject to the Commission's review standards for considering a design review request. An analysis is found below.

Guidelines of Review (numbers below pertain to the pertinent guideline standards)

*****Other standards within the design guidelines not specifically mentioned below have been reviewed and are met or not applicable pertaining to the proposed building improvement activities.**

SEC. 3.5: ROOFS

1. Retain and preserve historic roofs and roofing materials including its overall design, shape, pitch, and line.

Analysis: The request is to extend the south-facing wall on the upper-level of the building to create a uniform wall in terms of height and exterior wall material. For this to occur, portions of the roof identified above is request to be removed.

Findings: Staff believes that removing this portion of the roof would better meet the requirements of this guideline. Metal siding is used for the area requested to be removed, while other exterior walls on the upper level of this building utilizes wood. Additionally, removing this building section would better achieve the Commission's massing and scaling guidelines (more information on this below) by creating a uniform roofline and shape of the second floor of the building when viewed from the adjacent parking lot.

2. Character-defining elements of historic roofs should be retained and preserved including dormer windows, chimneys, turrets, cupolas, and parapet walls. Eave overhangs, moldings and trim, and soffit boards should also be retained and preserved.

Analysis: Please see the first roof guideline above.

Findings: The building section proposed to be removed does not contain any character-defining elements that would warrant it remaining. This building section accommodates a dead-end hallway with no dedicated access to the roof. This standard is met.

5. Changing the historic character of the building by adding roof elements that are not historically accurate such as dormer windows, vents, or skylights is not recommended.

Analysis: No additional windows are proposed to be installed along the south-facing wall as part of removing the aforementioned building section. The same paint color will be used for the extension of the south-facing wall.

Findings: No additional character-defining improvements are proposed as part of this project. This standard is met.

SEC. 5.1.2: COMMERCIAL MASSING, SCALE AND ORIENTATION GUIDELINES

1. Buildings within Stevens Point's Downtown Historic / Design Review District are of similar heights. Therefore, the height of a new building should be compatible with other buildings in the district when measured from grade.

Analysis: As shown in the picture above, the south-facing wall on the second story of the building does not

provide a uniform height.

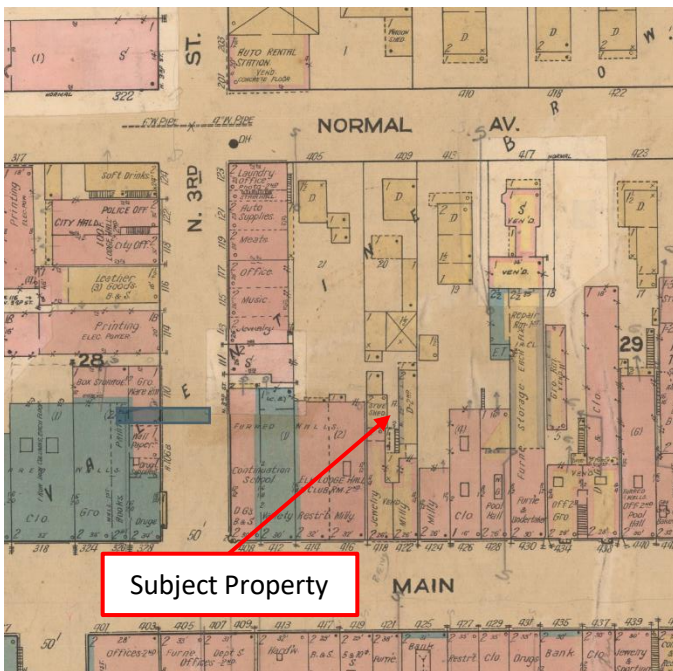
Findings: As part of the proposed demolition work, providing a uniform height for this south-facing wall is proposed. While this project is not new construction, staff believes that this project meets this guideline in correcting a building improvement that, at the time of construction, did not meet this requirement.

4. The overall building massing and placement on the lot should be similar to that of other buildings in the historic district. Commercial buildings within the interior of the block should be built to the front property line resulting in a continuous building line.

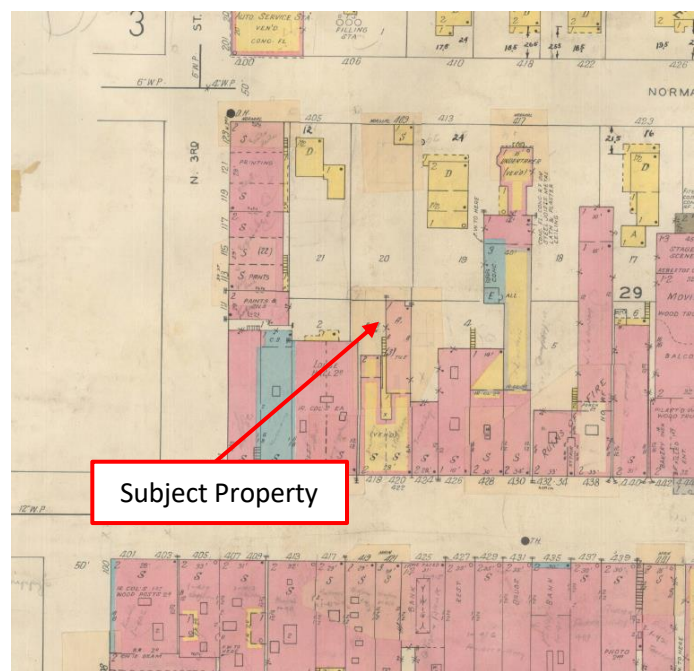
Analysis: See review standard #1 above.

Findings: As the subject property is located within the interior of a city block, staff believes that this project better meets this guideline by maintaining a continuous building line along the rear elevation of the site.

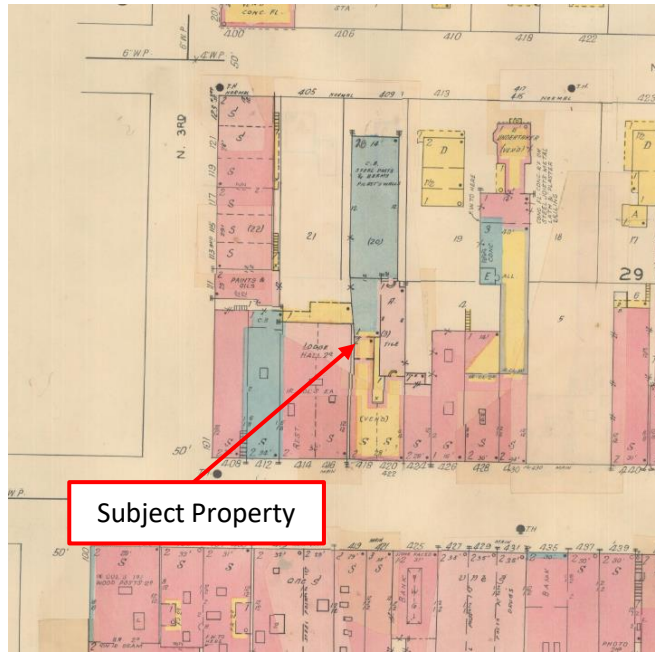
Historic Photographs



1922 Sanborn Map



1939 Sanborn Map



1950 Sanborn Map



HISTORIC PRESERVATION/ DESIGN REVIEW COMMISSION

City of Stevens Point
Community Development Department

1515 Strongs Avenue, Stevens Point, WI 54481
P: (715) 346-1567 F: (715) 346-1498
communitydevelopment@stevenspoint.com
<http://stevenspoint.com>

APPLICATION FOR DESIGN REVIEW

ADMINISTRATIVE SUMMARY (Staff Use Only)

Application #		Date Submitted	8/14/23	Assigned Case Manager	
Associated Permits or Applications (if any)				Pre-Application Conference Date	
Decision		Date Reviewed		Staff Signature	
Notes:					

APPLICANT/CONTACT INFORMATION

APPLICANT INFORMATION		CONTACT INFORMATION (Same as Applicant? ☐)	
Applicant Name	Welling Properties, LLC	Contact Name	Robert Welling
Address	1028-1036 Main St.	Address	247 Edgewood Rd
City, State, Zip	St A WI 54481	City, State, Zip	Custer WI 54423
Telephone		Telephone	715 340 4069
Fax		Fax	
Email		Email	bjwellingwi@gmail.com

OWNERSHIP INFORMATION

PROPERTY OWNER OF RECORD 1 INFORMATION (Same as Applicant? ☐)		PROPERTY OWNER OF RECORD 2 INFORMATION (If Needed)	
Owner's Name	Robert Welling Properties LLC	Owner's Name	
Address	247 Edgewood Rd	Address	
City, State, Zip	Custer WI 54423	City, State, Zip	
Telephone	715 340 4069	Telephone	
Fax		Fax	
Email	bjwellingwi@gmail.com	Email	

PROJECT SUMMARY

Subject Property Location [Please Include Address and Assessor's Identification Number(s)]		
Parcel 1	Parcel 2	Parcel 3
1028-1036 Main St. Stevens Point		
Legal Description of Subject Property		
Area of Subject Property (Acres/Sq Ft)		Area of Building or Structure (Sq Ft)

Current Zoning District(s)		Current Historic District(s) - Local, State, National	
Designated Future Land Use Category	Current Use of Property	Proposed Use of Property	
Briefly describe the proposed building, structure construction, reconstruction or exterior alteration. Please also provide rationale for the design review request, along with the time schedule (if any) for the project. (Use additional pages if necessary)			
Roof replacement			
Will the proposed work detrimentally change, destroy or adversely affect any exterior architectural features of the improvement upon which said work is to be done? Explain your answer.			
No.			
Does the proposed work match and harmonize with the external appearance of adjacent neighboring improvements. Explain your answer.			
Yes			
Does the proposed work conform to the objectives of the historic preservation plan for said district (if any)? Explain your answer.			
Yes			
Does the proposed work conform with the architectural design guidelines with emphasis on contextual issues including compatibility of size, volume proportions, rhythm, materials, detailing, colors, and expressiveness? (Historic Design Guidelines can be found at www.stevenspoint.com) Explain your answer.			
Yes.			

EXHIBITS

Letter to District Alderperson (www.stevenspoint.com/Directory)	☐	Additional Exhibits If Any (List):
Photographs of Building or Structure	☐	
Renderings or Elevations	☐	
Site Plan (for additions, and new construction)	☐	

CERTIFICATION AND SIGNATURE

By my signature below, I certify that the information contained in this application is true and correct to the best of my knowledge at the time of the application. I acknowledge that I understand and have complied with all of the submittal requirements and procedures and that this application is a complete application submittal. I further understand that an incomplete application submittal may cause my application to be deferred to the next posted deadline date.

Signature of Applicant	Date	Signature of Property Owner(s)	Date
Robert Welch	8/14/23	Robert Welch	8/14/23

From: [BJ Welling](#)
To: [District 1](#)
Cc: [Adam Kuhn](#)
Subject: Fwd: RE: [External] 1028-36 Roof replacement/remodeling
Date: Tuesday, September 5, 2023 11:53:09 AM
Attachments: [image001.png](#)
[image001.png](#)

Hello Marc,

This email is to let you know that I am applying for a permit to reroof my building at 1028-1036 Main Street. Adam Kuhn has informed me that this correspondence is required for them to proceed with the permit application process.

Please contact me with any questions you may have.

Thank you,

BJ Welling

----- Forwarded message -----

From: Adam Kuhn <akuhn@stevenspoint.com>
Date: Tue, Aug 29, 2023 at 3:32 PM
Subject: RE: RE: 1028-36 Roof replacement/remodeling
To: Maria Mohr <mmohr@stevenspoint.com>, bjwell.wi@gmail.com <bjwell.wi@gmail.com>, Jackson Case <jackson.gccorp@gmail.com>
Cc: Loren De Lonay <ldelonay@stevenspoint.com>, Ximena Christianson <XChristianson@stevenspoint.com>

As Maria mentioned below, this project will need approval by the City's Historic Preservation / Design Review Commission prior to us issuing the building permit. For Commission approvals, I will need an updated plan proposal (more information on this below) and correspondence with the district alderperson (Marc Christianson, district1@stevenspoint.com), either in written or email form.

For the updated plan proposal, I would strongly recommend against using a steel panel siding for the north-facing wall. As this wall was historically comprised out of wood, the Commission's Design Guidelines recommends against a material change to aluminum, steel, vinyl or veneer. I would recommend using a treated wood material (specifications that meets Ximena's fire combustible requirements) with a similar dark red color. While you have the right to present a steel panel material to the Commission, it is my belief that the Commission would not vote in favor of that proposal.

Once I receive updated plans, I will work on scheduling a Commission meeting. If you have any questions, please feel free to contact me.

STRUCTURAL CONNECTIONS			
Model	TO TOP	TO FACE	TO JOIST
HU1.81/5		(12) 0.162 X 3-1/2"	(4) 0.148 X 1-1/2"
HU612		(16) 1/4" X 2 1/4" TITEN TURBO	(6) 0.162 X 3-1/2"
THA1.81/22	(4) 0.148X1-1/2	(2) 0.148X1-1/2	(2) 0.148X1-1/2

ROOF REMODEL

1028 MAIN STREET
STEVENS POINT, WI

Architectural Service LLC
Complete Architectural Service
3028 Stanley St. Stevens Point, WI 54481
(608) 844-4319

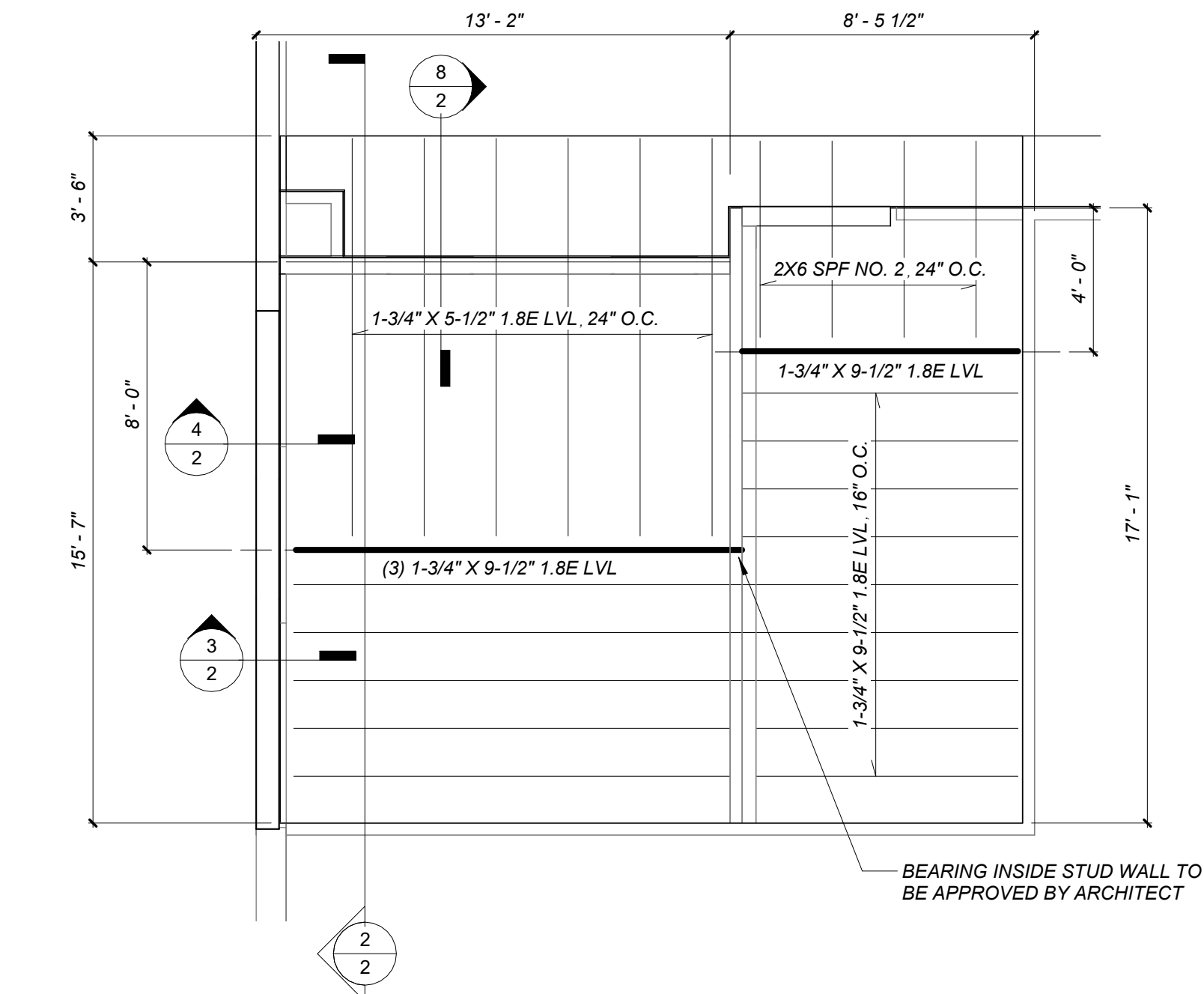
Project: 2315C
Date: 08/29/2023

UPPER ROOF PLAN

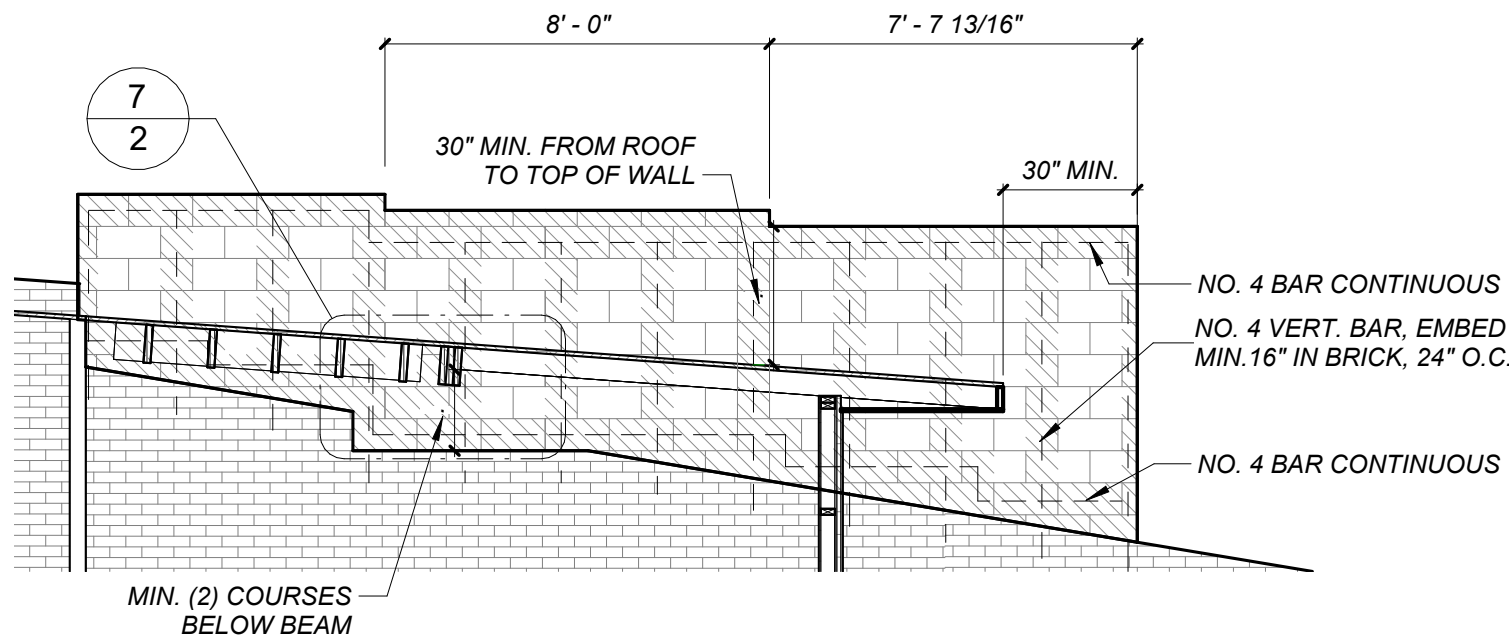
Scale: As indicated

Page: 2

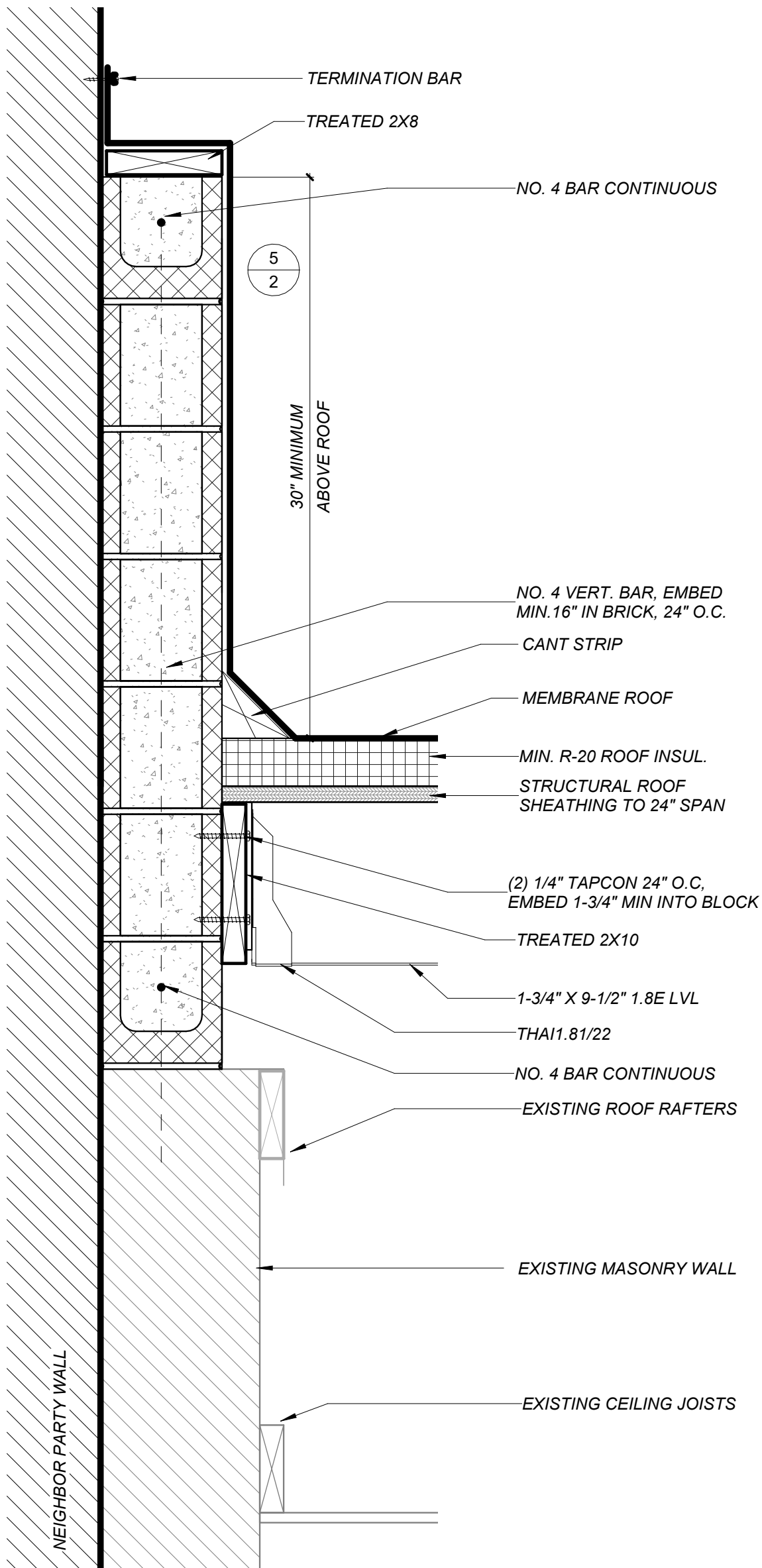
Page formatted for ANSI-D
(34" x 22")



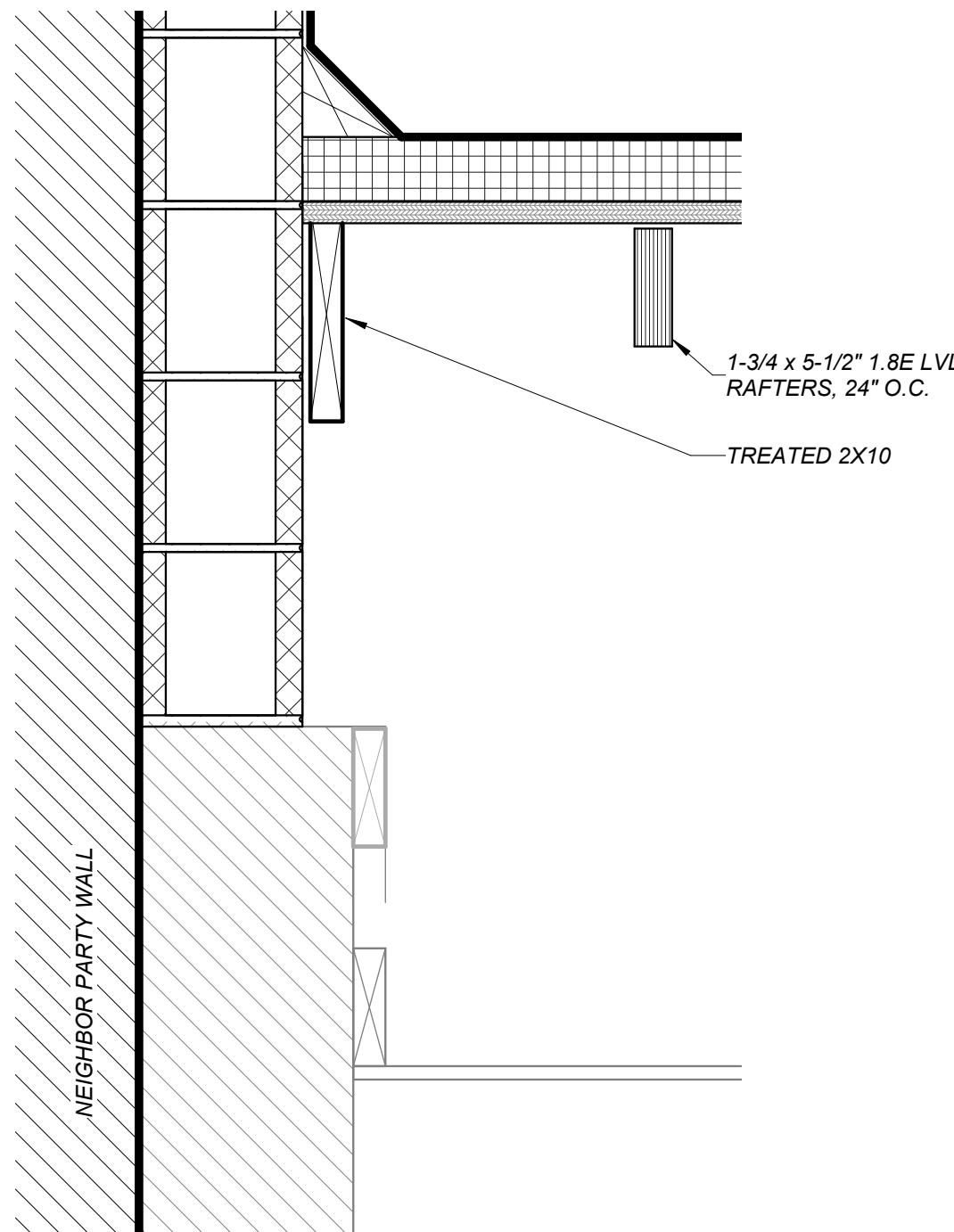
1 UPPER ROOF FRAMING
1/4" = 1'-0"



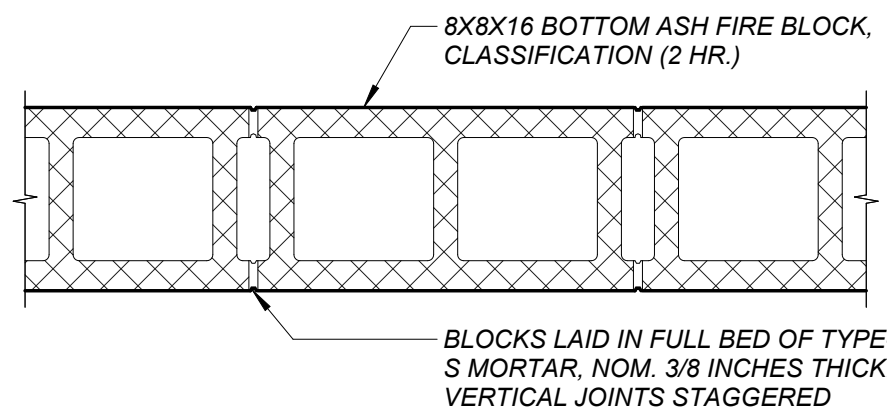
2 WALL ELEVATION
1/4" = 1'-0"



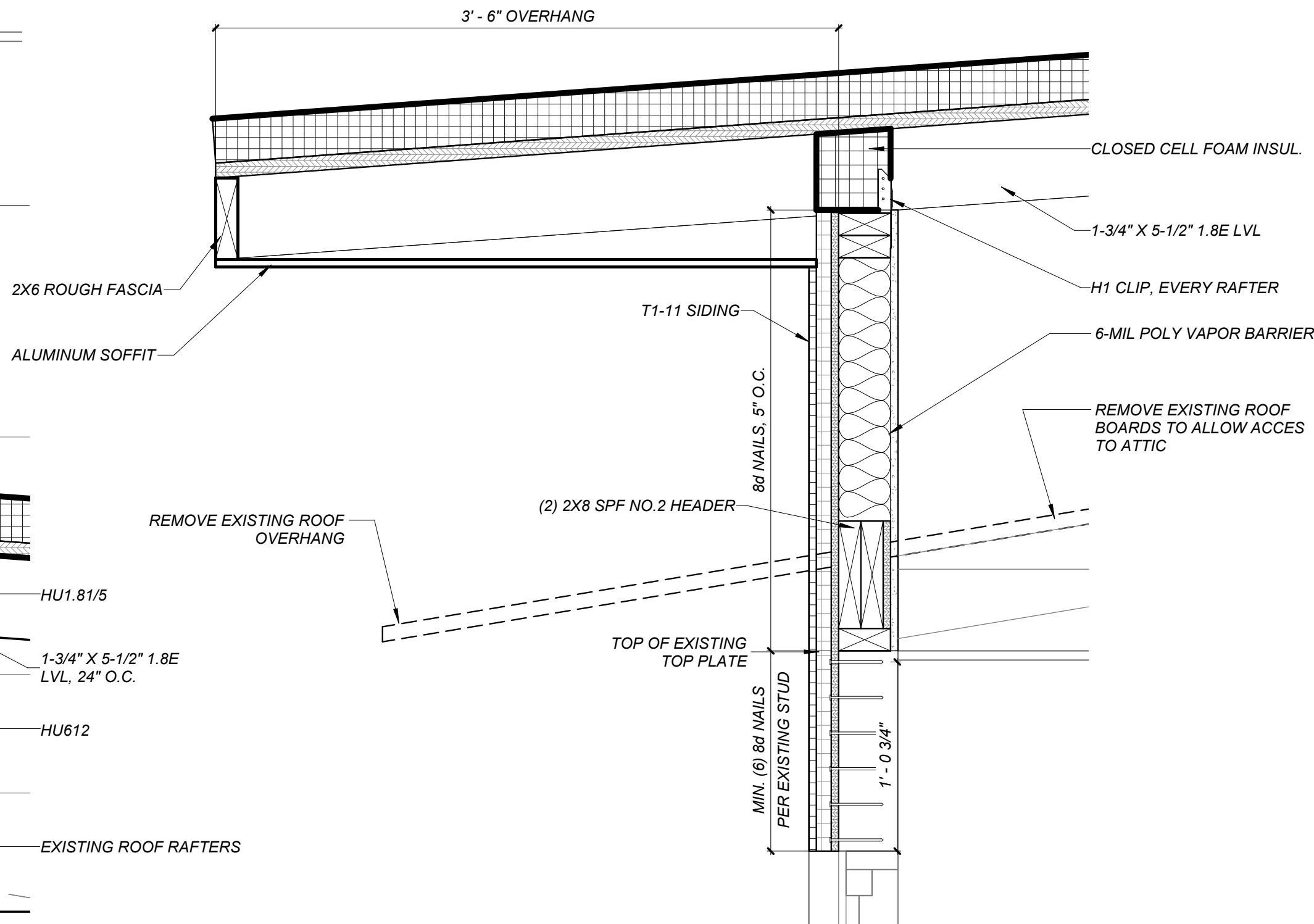
3 NEW ROOF AT PARTY WALL 1
1 1/2" = 1'-0"



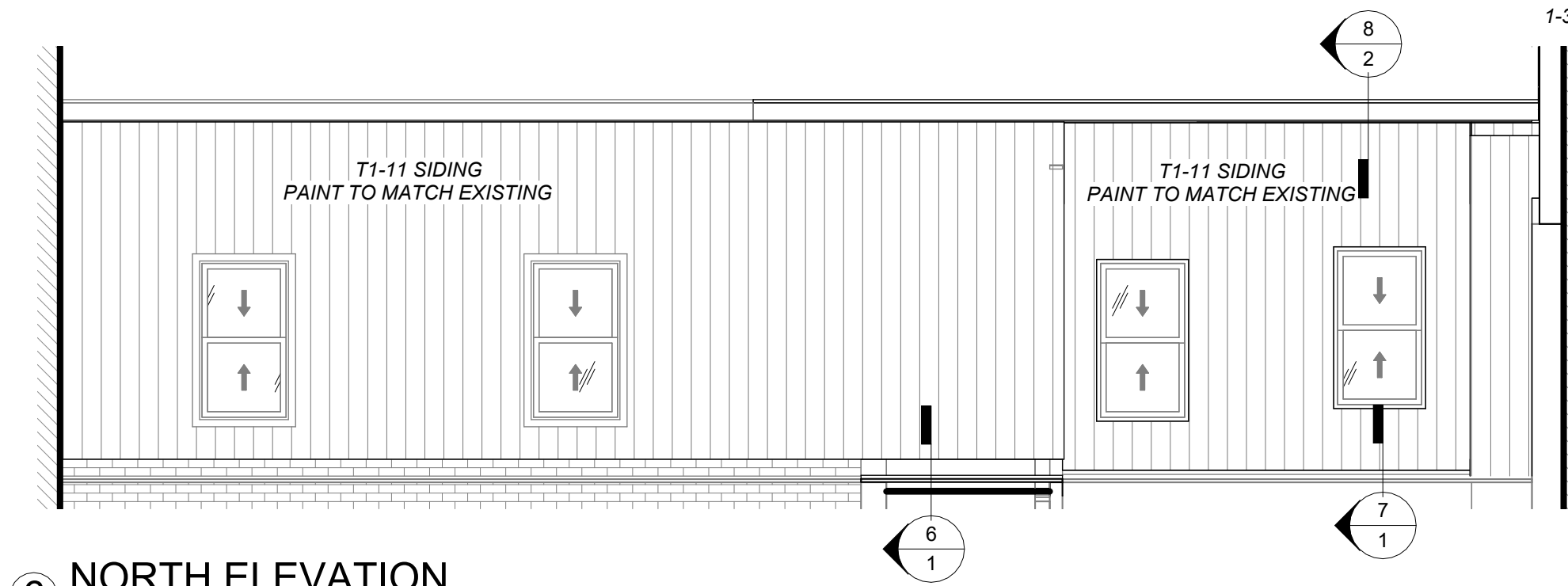
4 NEW ROOF AT PARTY WALL 2
1 1/2" = 1'-0"



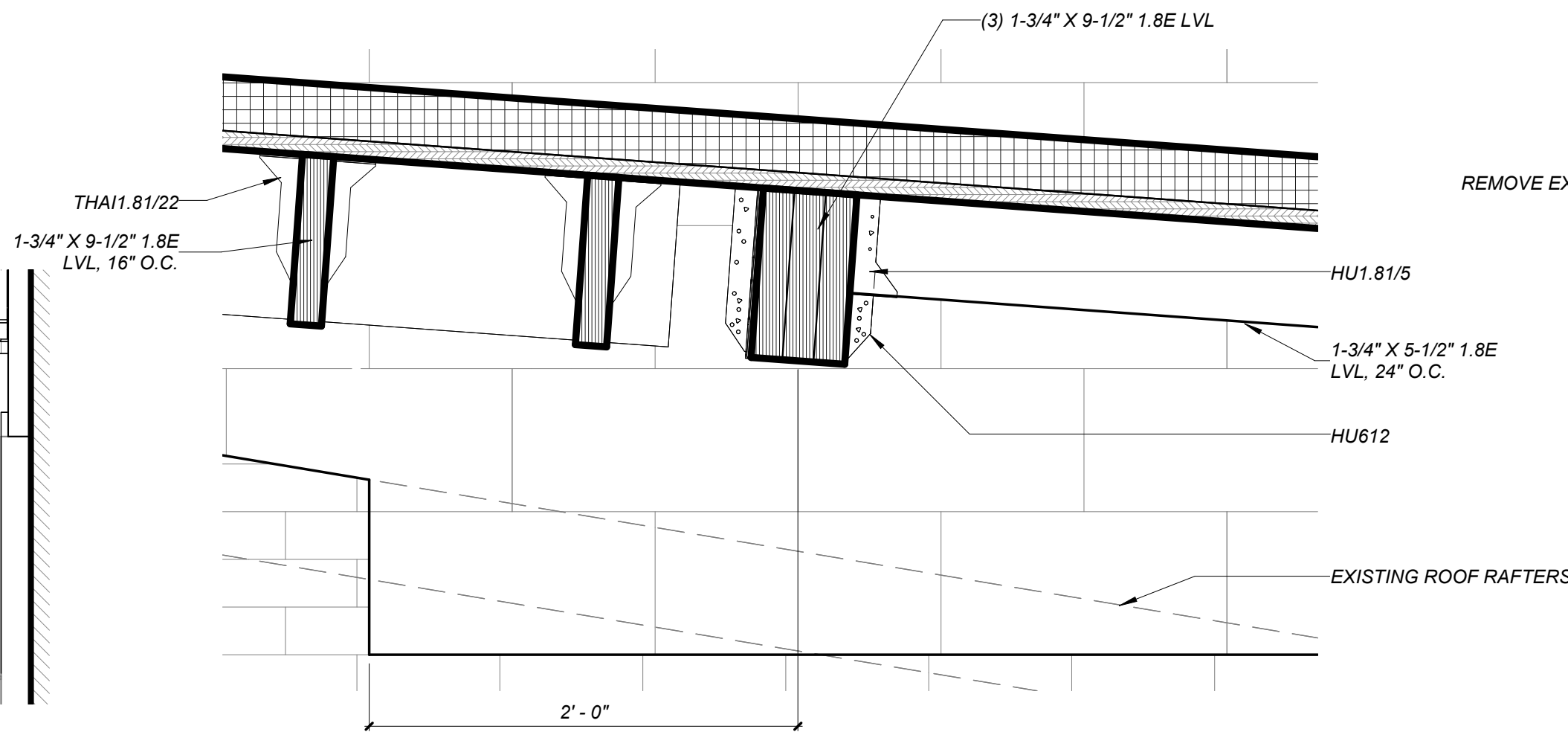
5 U937 - 2 HR. BLOCK WALL
1 1/2" = 1'-0"



8 NEW ROOF OVERHANG
1 1/2" = 1'-0"



6 NORTH ELEVATION
1/4" = 1'-0"



7 NEW ROOF AT PARTY WALL 3
1 1/2" = 1'-0"

From: [Jackson Case](#)
To: [Ximena Christianson](#); [BJ Welling](#)
Subject: [External] BJ Wellings Building down town
Date: Thursday, August 24, 2023 10:12:26 AM

1028, 1032B and 1036 Main street are in a building that has been transformed over many years. The "hallway" that will be removed on the second floor is not an active egress path, and the elimination of the space will not impact the ingress or egress of the building.
Sincerely,

Jackson I. Case
Architect Builder Contractor
Guzman Case Corporation
Stevens Point, WI 54481
715-344-6777

www.GuzmanCase.com

This email has been scanned for spam and viruses by Proofpoint Essentials. Click [here](#) to report this email as spam.











Administrative Staff Report

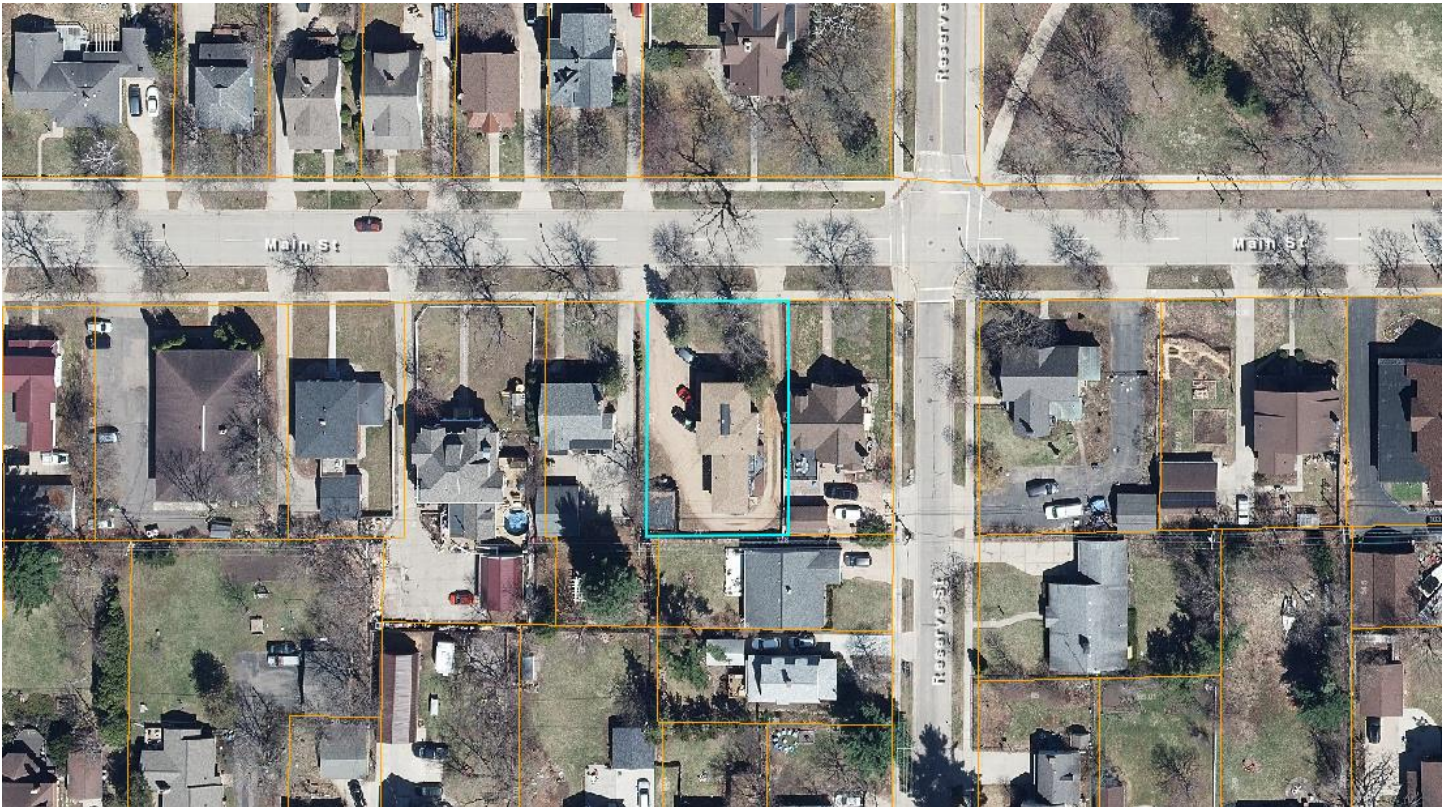


Demolition Review 2017 Main Street September 25, 2023

Department of Community Development
1515 Strong's Avenue, Stevens Point, WI
54481
Ph: (715) 346-1568 - Fax: (715) 346-1498

Applicant(s): - Jeff Rice, representing Rain Dog LLC Staff: - Adam Kuhn, Associate Planner akuhn@stevenspoint.com Parcel Number(s): 281240832103502 Zone(s): "R-3" Single- and Two-Family Residential Council District: - District 3 – Ald. Keymer Lot Information: - Actual Frontage: 77 feet - Effective Depth: 125 feet - Square Footage: 9,625 - Acreage: 0.221 Structure Information: - House: - Year built: 1876 (147 years old) - Detached Garage: - Year built: Unknown (between 1912-1939) Current Use: - Rooming House Applicable Regulations: - Chapter 22 - Downtown Design Guidelines	Request A request from Jeff Rice, representing Rain Dog LLC, for a demolition review to raze the detached garage on the property located at 2017 Main Street (Parcel ID 281240832103502), consistent with Ch. 22.05(2). City Official Design Review / Historic District - Locally Designated Landmark - Clark Street – Main Street Historic District (National Register of Historic Places) Staff Recommendation Deny the request for a demolition review to raze the detached garage on the property located at 2017 Main Street (Parcel ID 281240832103502) due to the following reasons: - The detached garage, while itself not a historic structure, contributes to the distinctive architectural and historic character of the Edward McGlachlin House and should be preserved for the benefit of the people of Stevens Point. - Retaining the detached garage on the subject property would promote the general welfare of Stevens Point residents by encouraging the study of local history, such as the local significance of Edward McGlachlin Sr. and Edward McGlachlin Jr. - While restoration improvements are needed for the detached garage, it is structurally feasible to preserve or restore the structure.
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Vicinity Map



Scope of Work

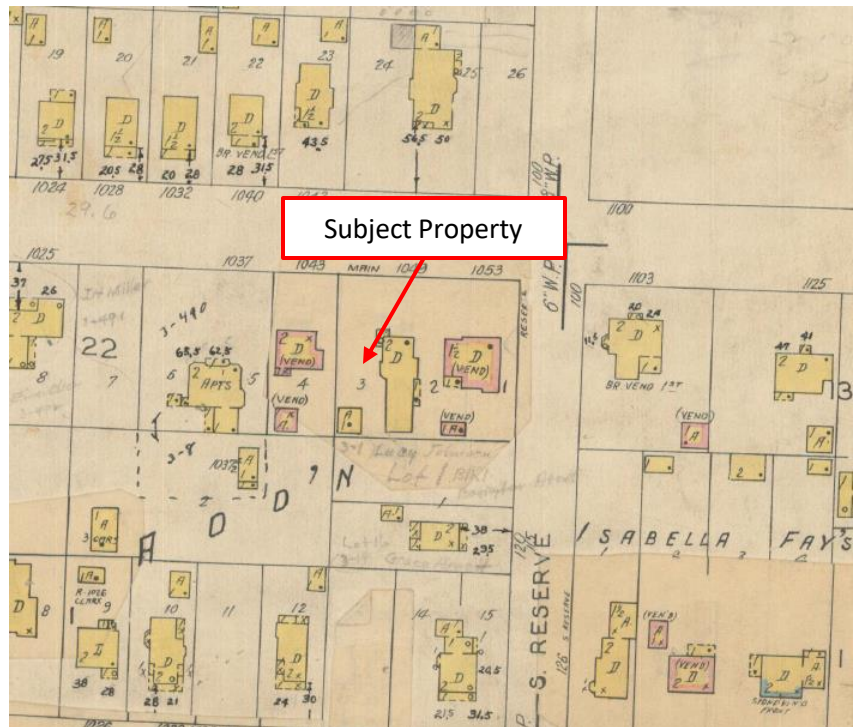
Overview: The applicant is requesting a demolition review to raze the detached garage located on the subject property. Approximately 396 square feet in size, the detached garage has an undetermined year of construction. In looking through archival records, this 396 square foot garage is located in the City's 1939 sanborn maps but not the 1912 sanborn maps. With that said, it is safe to determine that this garage was constructed between 1912-1939, resulting in an estimated age of 84-111 years old.

The detached garage services the Edward McGlachlin House, a residence that was constructed in 1876 (147 years old). Both structures comprise of an Italianate Style architecture, with its most prominent feature being a clapboard wall material. According to the [City's 2011 Historic Intensive Survey Report](#), the subject property is one of four properties in Stevens Point that has a clapboard-clad Italianate Style architecture (the others being 1245 Clark Street, 1925 Center Street and 1640 Main Street).

The subject property is not located within a local historic district – however, the property is classified as a locally-designated landmark. After the Common Council created the Historic Preservation / Design Review Commission in 1983, work commenced through several actions to fulfill the purpose statement of the Commission – to “safeguard the City's historic and cultural heritage, as embodied and reflected in such historic structures, sites and districts.” One such action was to create a local landmark nomination program. The purpose of the local landmark nomination program is to designate any site that has a particular historic, architectural, archeological or cultural significance to the city. For the Common Council to designate a site as a local landmark, said site must fulfill one of the following review standards:

- Exemplify or reflect the broad cultural, political, economic or social history of the nation, state or community; or

- Is identified with historic personages or with important events in national, state or local history; or
- Embodies the distinguishing characteristics of an architectural type or specimen inherently valuable for a study of a period, style, method of construction, or of indigenous materials or craftsmanship; or
- Is representative of the notable work of a master builder, designer or architect who influenced his age; or
- Have yielded, or may be likely to yield, information important to prehistory or history.



1939 Sanborn Map

The first owner of the subject property was Edward McGlachlin. Edward McGlachlin relocated to Stevens Point in 1873 and bought the *Stevens Point Journal*. According to Wendell Nelson's *Houses That Grew*, the *Stevens Point Journal* was struggling to stay afloat at the time of McGlachlin's purchase of the newspaper. After McGlachlin's purchase of the *Stevens Point Journal*, it ultimately prevailed over other local newspapers (*Wisconsin Pinery* and the *Portage County Gazette*) to become a major newspaper in the city and region.¹

In addition to Edward McGlachlin, the subject property is also home to another famous local figure. Edward McGlachlin Jr. was born and raised on the subject property. Edward McGlachlin Jr. ultimately became Portage County's highest-ranking officer of the Army (Major General). Because of these two local figures, the City, in 1920, designated its first park in their honor. [McGlachlin Park](#) is located on the south side of Main Street between Minnesota Avenue and Soo Marie Avenue.



Detached Garage on the Subject Property

With the aforementioned historical information, the City's Historic Preservation / Design Review Commission, on March 1, 1988, recommended that the subject property be designated as a local landmark. The Common Council confirmed the designation of the subject property on April 18, 1988.

The subject property, while a designated local landmark, is not located within a local historic district (the Clark Street – Main Street Historic District is listed on the National Register of Historic Places). According to the City's Historic

¹ Nelson, Wendell. *Houses That Grew*, Stevens Point, 1983, pg. 140.

Preservation Ordinance, local landmark properties shall receive approval from the Historic Preservation / Design Review Commission for the demolition of any structures located within.

CHAPTER 22: HISTORIC PRESERVATION

Division 5.02 Regulation of Construction, Reconstruction, Alteration, and Demolition

No owner or person in charge of a historic structure or historic site, or property located within a historic district shall reconstruct, alter, or demolish all or any part of the exterior of such property or construct any improvement upon such designated property or properties or cause or permit any such work to be performed upon such property or demolish such property unless approval has been granted by the commission.

Upon the filing of any request for a design review certificate with the commission, the commission shall review the request in accordance with the design guidelines. If the commission determines that the application for a design review certificate and the proposed changes are consistent with the design guidelines, it shall issue the design review certificate. Upon the issuance of such certificate, any other required permits shall be obtained.

This request has been reviewed subject to the Commission's review standards for considering a demolition review request. An analysis is found below.

Guidelines of Review (numbers below pertain to the pertinent guideline standards)

*****Other standards within the design guidelines not specifically mentioned below have been reviewed and are met or not applicable pertaining to the proposed building improvement activities.**

SEC. 6.1.2: DEMOLITION GUIDELINES

- 1. Whether the building or structure is of such architectural or historic significance that its demolition would be detrimental to the public interest and contrary to the general welfare of the people of the city or state.**

Analysis: Per the City's 2011 Historic Intensive Survey Report, the subject property is one of four properties in the city that features a clapboard-clad Italianate Style architecture. Per the Report, all four properties would be eligible for individual listing in the National Register of Historic Places.

Findings: Italianate buildings gained prominence in the 1850s and ultimately fizzled out in the 1880s. Prominent architectural features of Italianate-style buildings include belvederes, eaves that extend out farther than most other buildings (and generally supported by large, decorative brackets), tall and narrow windows, and cast-iron decorations (e.g., door and window crowns).

It is not surprising that there are so few Italianate-style structures found within Stevens Point. With the city's first trading post being established in the late 1830s, along with Stevens Point's eventual inception in 1858, residential development began to occur primarily from the 1880s and afterwards – when Italianate architecture became replaced by Queen Anne and Neo-Classical Revival as the preferred architectural styles.

While the proposed demolition is for the detached garage and not the house, it is my belief that demolishing this detached garage would result in a reduced supply of Italianate architecture among buildings in Stevens Point. As this detached garage is contributing to the Edward McGlachlin House, staff believes that demolishing the detached garage would reduce the historic integrity of the subject property and, therefore, would go against this review standard.

- 2. Whether the building or structure, although not itself a historic structure, contributes to the distinctive architectural or historic character of the historic district as a whole, and therefore, should be preserved for**

the benefit of the people of the city or the state.

Analysis: The principal building located on the subject property was constructed in 1876, while the year of construction for the detached garage is undetermined (estimated to be between 1912 and 1939).

Findings: While the detached garage was built after the Edward McGlachlin House, it is of a contemporary design that is consistent with the Italianate design of the primary house on the property. Per the Commission's Design Guidelines, the detached garage would be classified as 'contemporary compatible' as it is of "contemporary design that, while not presenting a historic appearance, is in keeping with the character of the historic district in its size, scale, materials, proportion, and overall design."

Staff believes that the design of the detached garage contributes to the local landmark site that is 2017 Main Street. According to the 2011 Historic Intensive Survey Report, the period of significance of the Clark Street – Main Street Historic District is from 1860-1963. Even though the detached garage was constructed after the principal building, it was constructed during the period of significance of this nationally recognized historic district.

Lastly, it is important to recognize the uniqueness of Italianate architecture that exists on the subject property relative to the surrounding area. The Clark Street – Main Street Historic District, while not a local historic district, is a melting pot of different architectural styles (i.e., Queen Anne, Greek Revival, Ranch, Neo-Classical, etc.). It is my belief that demolishing this detached garage not only negatively impacts the architectural significance of the Edward McGlachlin House, but it also reduces the historic significance of the Clark Street – Main Street Historic District. Given the short supply of Italianate architecture relative to the aforementioned styles within and around Main Street and Clark Street, staff believes that demolishing this detached garage would have a greater impact when compared to other detached garages complimenting more modern architectural styles. Please note that the Clark Street – Main Street Historic District is nationally recognized and not locally recognized. If this Commission would vote to approve the demolition request, applicable approvals from the State Historic Preservation Office will be needed prior to demolition.

3. Whether demolition of the subject property would be contrary to the objectives of the historic preservation plan for the applicable district as duly adopted.

Analysis: The subject property is not governed by a historic preservation plan. The demolition of this detached garage would be subject to the City's Historic Preservation Ordinance and the Commission's Design Guidelines.

Findings: This standard is met.

4. Whether the building or structure is of such old, unusual or uncommon design, texture, and/or material, that it could be reproduced only with great difficulty and/or expense.

Analysis: The exact age of the detached garage is unknown, however is estimated to have been constructed between 1912 and 1939. With this timeline, the garage would have been built after the peak prevalence of Italianate home construction.

Findings: As the detached garage was built after the Edward McGlachlin House, it does not exhibit as much Italianate architectural features. Given the 'contemporary compatible' classification of the detached garage, staff believes that it can be remodeled in a manner that does not incur a significant cost or difficulty to complete the work.

5. Whether retention of the building or structure would promote the general welfare of the people of the city or the state, by encouraging study of American history, architecture and design, or by developing an understanding of American culture and heritage.

Analysis: The purpose of the City’s Historic Preservation Ordinance is, in part, to “effect and accomplish the protection, enhancement, and perpetuation of such improvements, sites and districts which represent or reflect elements of the city’s cultural, social, economic, political and architectural history.”

Findings: Please see details in the ‘background’ section pertaining to why the subject property met the criteria to be considered a local landmark site. The Edward McGlachlin House is significant in terms of its architectural design and the historical figures of Stevens Point who resided here. While the detached garage in question was built after the house, along with it exhibiting lesser architectural features of the Italianate era, it is important to recognize that the detached garage is contributing to the Edward McGlachlin House. Two things can both be true – 1.) the removal of the Edward McGlachlin House would lose all historical significance of the site, and 2.) that the removal of the detached garage would diminish, although not eliminate, the historic significance of the site. As the purpose of this Commission is to protect the City’s cultural history through building and site preservation, staff believes that allowing this garage to be demolished would go against this standard.

6. Whether the building or structure is in such a deteriorated condition that it is not structurally or economically feasible to preserve or restore it. Any hardship or difficulty claimed by the owner may not come as a result of any failure to maintain the property in good repair by the current property owner or previous property owners.

Analysis: According to the demolition review application, it is stated that there “is structural damage from insects and roofing materials are falling off.” Additionally, it is stated that there is a hole in one wall. Please see the attached interior pictures of the garage that were provided by the applicant.

Findings: Upon review, it is apparent that there is a hole in the side of the building and that water damage exists among interior walls. According to Section 3.2.1 of the Commission’s Design Guidelines (Wood Guidelines), it is required of property owners and contractors to repair deteriorated wood by patching and splicing with a material of similar size, shape, and texture. In lieu of demolishing the detached garage, it is my belief that appropriate splicing of water damaged wood should occur and be replaced with new wood of a similar size and texture. Likewise, correcting the hole in the wall can be done by replacing the full building wall instead of demolishing the garage. Although there are surely repairs needed for this detached garage, restoration work can be done in a manner that would not pose an economic hardship.

7. Whether demolition of the building or structure would promote conformance with other criteria as designated in the City of Stevens Point Historic Design guidelines.

Analysis: The following are the design guidelines for outbuildings and accessory structures:

- The same criteria related to the use of materials for new construction shall apply to outbuildings and accessory structures.
- Retain and preserve original outbuildings which have gained historic significance on their own.
- Architectural elements of historic outbuildings such as roofs, siding, material, windows and doors, foundations, and character-defining detailing should be retained and preserved.
- If the replacement of an element on a historic outbuilding is necessary, replace only the deteriorated portion to match the original in material, size, proportion, texture, and detailing.
- Designs for new outbuildings and accessory structures should complement the architectural style and period of the primary structures as well as examples of similar structures within the district.
- New outbuildings should be located in rear yards if possible.

- New outbuildings should be proportionally the same in size and height to the primary structure as is seen in the relationship between other primary and secondary structures in the district.
- Prefabricated wooden accessory structures that are not architecturally similar to the primary structure are allowed only if screened from view from any existing right-of-way. Prefabricated metal storage buildings are not recommended.

Findings: The detached garage in question does meet several of the aforementioned design guidelines. The garage is located in the rear yard of the subject property, is designed in a way that compliments that Italianate building style of the primary residence on the site, and is massed and scaled appropriately. Bullet point number four above states that only deteriorated sections of an accessory structure should be replaced instead of demolishing the entire structure. Staff believes that performing restoration improvements to the detached garage would retain the above standards for accessory structures.

Closing Remarks

As highlighted above, it is my determination that the above demolition review standards are not met. Therefore, my recommendation to the Commission would be to deny the demolition request of the detached garage on the subject property.

If the Commission is not comfortable with denying the demolition request, please note that Section 6.1.2 of the Commission's Design Guidelines provides direction to the Commission should it choose to delay a vote on the demolition. Said provision is included below in its entirety.

Sec. 6.1.2: Demolition Guidelines

9. *If the HP/DRC determines that the structure is historically significant, it should delay the demolition for an appropriate time in order for staff and the Commission to work with the property owner to seek viable alternatives to demolition. Alternatives to demolition include, among other things:*
 - a. *If a building is in disrepair, work with the property owner to develop a rehabilitation plan and identify funding assistance such as rehabilitation tax credits that would allow the building to be rehabilitated.*
 - b. *If a building does not fit the owner's required needs, determining if the structure could be adaptively reused.*
 - c. *Working with the property owner to locate a buyer who will use the property without demolishing the structure.*
 - d. *As a last resort, finding a suitable location within the district for the historic building to be moved and working with the property owner to develop a plan for relocation.*

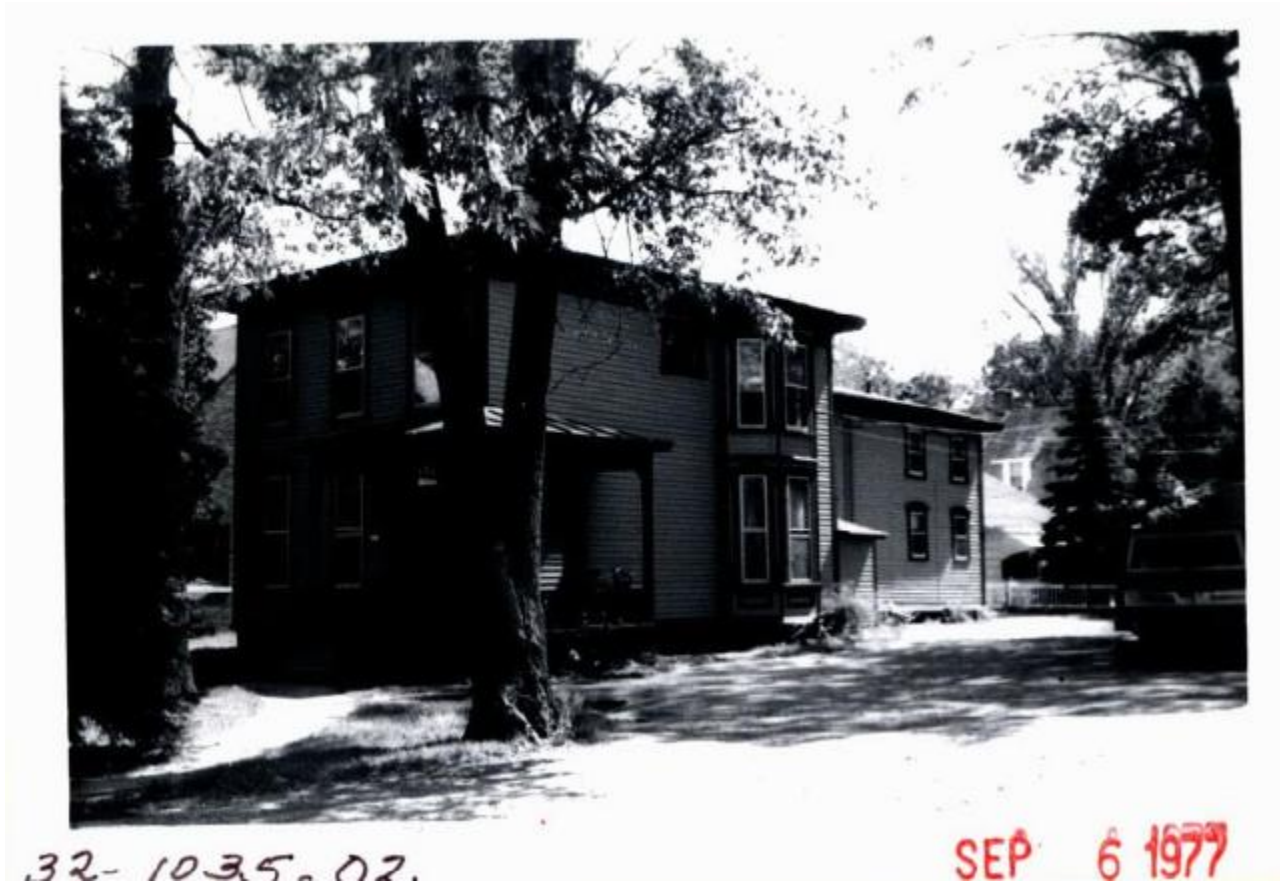
If the Commission is comfortable with granting the demolition request, I would recommend that the following conditions be applied:

1. Prior to a razing permit being issued, the applicant shall obtain applicable approvals to raze the detached garage from the Wisconsin Historic Preservation Office. *(Note: As the subject property is located within the Clark Street – Main Street Historic District, listed on the National Register of Historic Places, approval from the Wisconsin Historic Preservation Office is necessary for the demolition of any structures within the*

District).

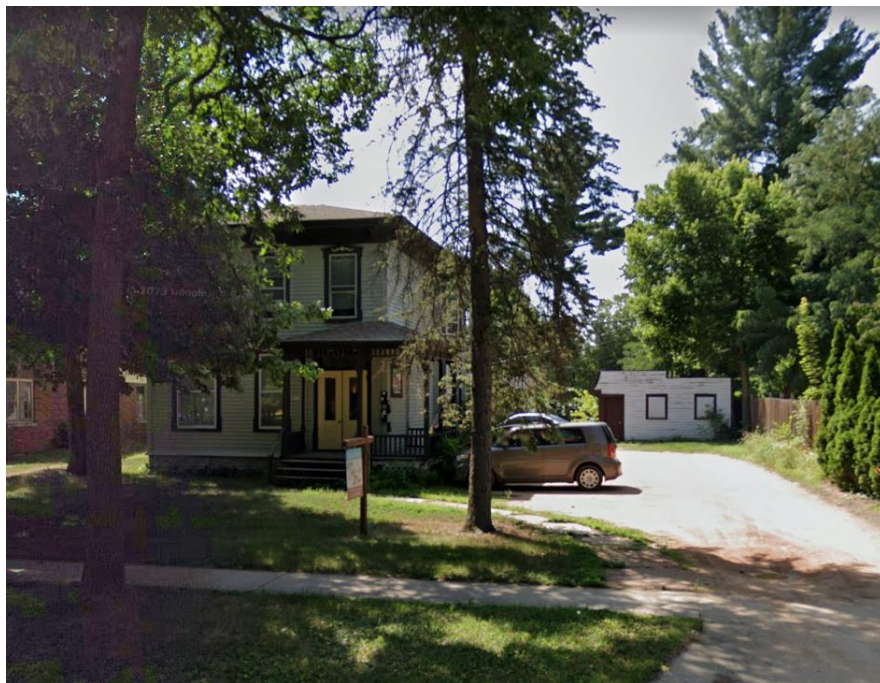
2. The applicant shall submit a landscaping plan illustrating proposed landscaping and other site development to be completed within six months after demolition.
3. A razing permit shall be obtained.

Historic Photographs





Site Photographs





HISTORIC PRESERVATION/ DESIGN REVIEW COMMISSION

City of Stevens Point
Community Development Department

1515 Strongs Avenue, Stevens Point, WI 54481
P: (715) 346-1567 F: (715) 346-1498
communitydevelopment@stevenspoint.com
<http://stevenspoint.com>

APPLICATION FOR DEMOLITION

ADMINISTRATIVE SUMMARY (Staff Use Only)

Application #		Date Submitted		Assigned Case Manager	
Associated Applications (if any)				Pre-Application Conference Date	
Decision		Date Reviewed		Staff Signature	
Notes: This is an application for the demolition of an existing detached garage that is in poor condition. The residential structure on site is not to be altered.					

APPLICANT/CONTACT INFORMATION

APPLICANT INFORMATION		CONTACT INFORMATION (Same as Applicant? ☒)	
Applicant Name	Jeff Rice	Contact Name	
Address	117 Edgewood Rd. N	Address	
City, State, Zip	Custer, WI 54423	City, State, Zip	
Telephone	651-728-3118	Telephone	
Fax	NA	Fax	
Email	jrice410@gmail.com	Email	

OWNERSHIP INFORMATION

PROPERTY OWNER OF RECORD 1 INFORMATION (Same as Applicant? ☐)		PROPERTY OWNER OF RECORD 2 INFORMATION (If Needed)	
Owner's Name	Rain Dog LLC	Owner's Name	
Address	117 Edgewood Rd. N	Address	
City, State, Zip	Custer, WI 54423	City, State, Zip	
Telephone	651-728-3118	Telephone	
Fax		Fax	
Email	jrice410@gmail.com	Email	

PROJECT SUMMARY

Subject Property Location [Please Include Address and Assessor's Identification Number(s)]		
Parcel 1	Parcel 2	Parcel 3
2017 Main St. Stevens Point		
Legal Description of Subject Property		
W27' LOT 2 & ALL LOT 3 BLK 22 SMITH BRIGGS & PHILLIPS ADD S32 T24 R8 877674		
Area of Subject Property (Acres/Sq Ft)		Area of Building or Structure (Sq Ft)
0.22		400

Current Zoning District(s)		Current Historic District(s) - Local, State, National	
R3			
Designated Future Land Use Category	Current Use of Property	Proposed Use of Property	
	4-plex rental	4-plex rental	
Briefly describe the property and building(s) Please also provide reasoning for the demolition request, along with the time schedule (if any) for demolition. (Use additional pages if necessary)			
Demolition of detached garage. Demo to occur approximately 1st week of October			
Please describe the building or structures architectural or historical significance (if any).			
None - it's a falling-down detached garage.			
Does the building or structure contribute to the architectural or historic character of the historic district as a whole?			
No.			
Does the building or structure display old, unusual or uncommon design, texture, and/or materials?			
No. It's falling down.			
Does the building or structure promote or encourage the study of American history, architecture and design or assist in developing an understanding of American culture and heritage?			
No.			
Describe the building or structures current condition and provide rationale and cause (if any) for its current state. Photographs are encouraged.			
Yes. There's structural damage from insects, and roofing materials are falling off. There's a hole in one wall			
What is the anticipated land use or proposed development (if any) for the property?			
No change, except garage will no longer exist on the property. No anticipated change to the existing residences.			

Please describe any non-conformities that exist on the property or structure (if any), regarding building and zoning regulations, as well as architectural design guidelines.

None known.

EXHIBITS

Letter to District Alderperson (www.stevenspoint.com/directory)	☐	Additional Exhibits If Any (List):
Photographs of Building or Structure	☐	
Site Plan (for any future improvements)	☐	
Historic Photos, Renderings or Maps	☐	

CERTIFICATION AND SIGNATURE

By my signature below, I certify that the information contained in this application is true and correct to the best of my knowledge at the time of the application. I acknowledge that I understand and have complied with all of the submittal requirements and procedures and that this application is a complete application submittal. I further understand that an incomplete application submittal may cause my application to be deferred to the next posted deadline date.

Signature of Applicant	Date	Signature of Property Owner(s)	Date

LOCAL LANDMARK DESIGNATION

REQUEST FORM

APPLICANT: Virginia Clark

PROPERTY ADDRESS: 2017 Main Street

PROPERTY OWNER: James Clark

DATE OF CONSTRUCTION: 1876?

SIGNIFICANCE

ARCHITECTURAL: Italianate (see attached)

CULTURAL/SOCIAL: First Owner: Edward McGlachlin - bought Stevens Point Journal -
made it prosper

DATE BEFORE HP/DRC: March 1, 1988

DATE OFFICIALLY NOMINATED:



ADDRESS: 2017 Main Street
 STYLE: Italianate
 BUILT: 1876?
 FIRST OWNER: Edward McGlachlin (1840-1931)
 LATER OWNERS: L. W. Schnittger (1899-1959) John M. Noel

Like the house at 1665 Main Street, this is a rectangular variation on the usual square Italianate house (see page 124). It is also a simple example, with only a few, small, plain brackets under the eaves; a two-story bay on the west side; some appliquéwork on the exterior window-moldings; and a small, Stick Style—with plain, geometric sticks instead of ornate, turned spindles—front porch. (This may not be the original front porch; there may have been a wider one across the whole front at one time.) After having been white for a long time—though whether it was white originally is unclear—the house was made more distinctive a few years ago by a two-tone paint scheme of a medium green with dark-brown trim.

Edward McGlachlin came to Stevens Point in 1873, and bought out the foundering *Stevens Point Journal*. He made it prosper, and eventually it outlasted the *Wisconsin Pinery* and the *Portage County Gazette* to become (as the *Stevens Point Daily Journal*, which it was named in 1895) the major, if not the only, newspaper in the city.

In this house, also, was born and raised Portage County's highest-ranking army officer. Major General Edward McGlachlin, Jr., graduated from West Point in 1889, served in the Philippines in 1898, and commanded the artillery for the First Army in World War I. The General McGlachlin School on County Highway J in the Town of Sharon was named for him.

Louis Schnittger owned and managed several business properties in the county at different times, including the Wilshire Shop on Main Street, and the Sky Club in Plover.



ADDRESS: 2024 Main
 STYLE: High Victorian
 BUILT: 1878 RE
 FIRST OWNER: Mat
 LATER OWNERS: L.
 H.
 L.
 E.
 R.
 S.
 H.

The style of this house is Gothic Revival. It is much larger and more ornate than the Italianate house, and it contained, when built, a two-story transom, and a bracketed bay window.

The Gothic trim includes gables; high-pitched cresting on the ridge gables; and rectangular siding over them covered in various red house with a tower, sidelights astride that door.

This house was apparently built by Matthew Wadleigh to assist his assistant postmaster as an immigrant and secret agent. A florist, Kuehl and Kranig a tinner at the



CITY OF
STEVENS POINT
WISCONSIN 54481

1515 Strongs Avenue
715-346-1571

March 2, 1988

Mrs. Virginia Clark
2501 Clark Street
Stevens Point, WI 54481

RE: Request for Local Landmark Nomination - 2017 Main Street

Dear Mrs. Clark,

This letter will acknowledge the action taken by the Historic Preservation-Design Review Commission on March 1, 1988 regarding your request to nominate 2017 Main Street as a Local Landmark. The Commission recommended the request be approved and forwarded to the Common Council for final consideration. This request will be forwarded to the Common Council at their April 18, 1988 meeting.

If you have any questions in this regard, please feel free to call me at 346-1577.

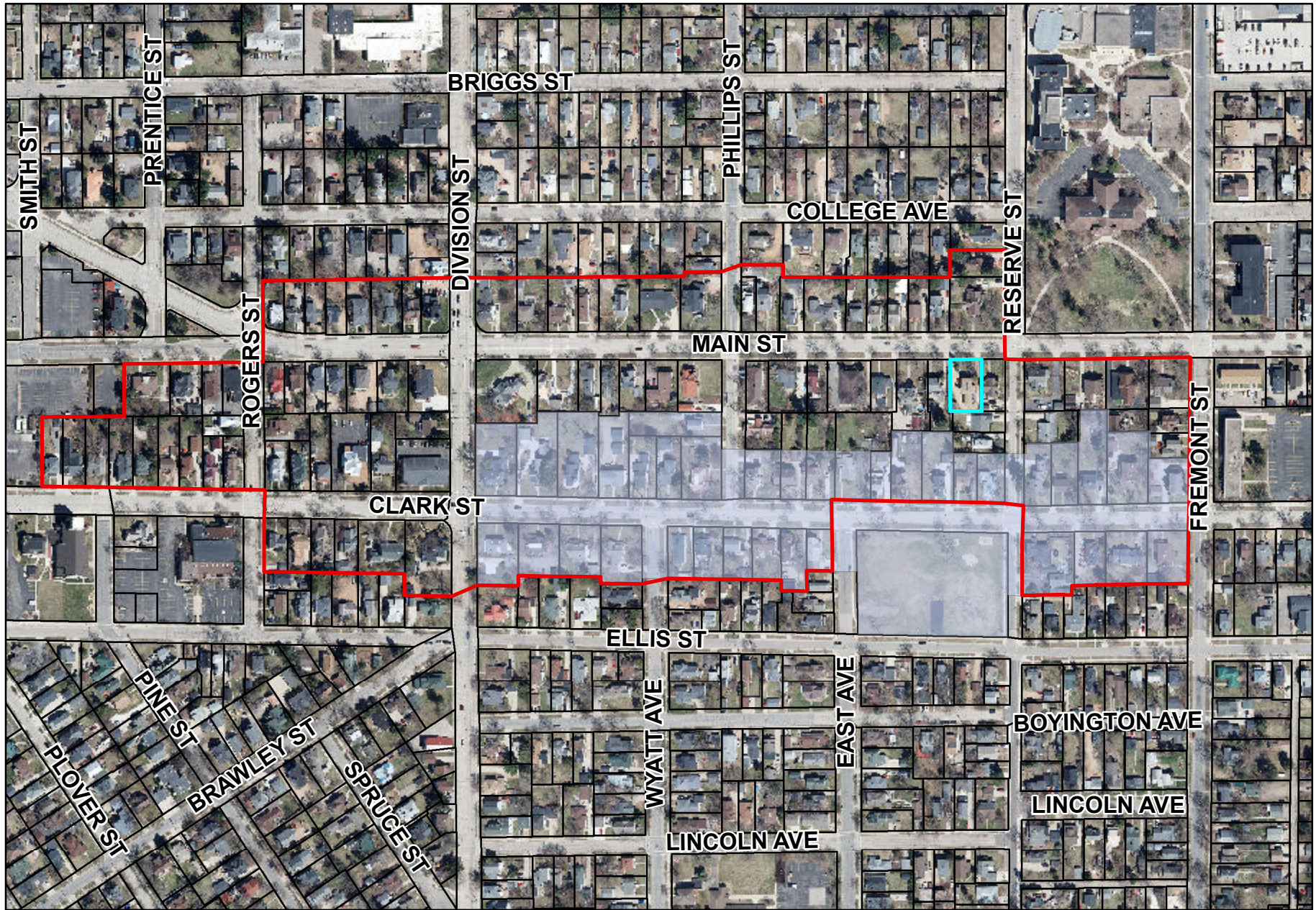
Sincerely,

Julie Farnham
City Planner

City of Stevens Point
Local Landmark Register

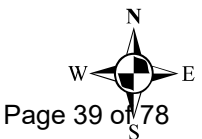
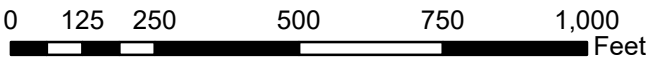
PROPERTY NAME	ADDRESS	DATE OF HPDRC NOMINATION	DATE OF COUNCIL APPROVAL
✓ Frame Memorial Church	1300 Main St.	10/14/86	11/17/86
✓ Kuhl-Gurath House	1416 Main St.	10/14/86	11/17/86
✓ Church of the Intercession	1417 Church St.	10/14/86	11/17/86
✓ Andrae House	1249 Clark St.	10/14/86	11/17/86
✓ Sentry Insurance Bldg.	1421 Strongs Ave.	10/14/86	11/17/86
✓ Whiting Hotel	1408 Strongs Ave.	10/14/86	11/17/86
✓ WI Bell Bldg.	1045 Clark St.	10/14/86	11/17/86
✓ Commercial District	N.R. District (Same)	10/14/86	11/17/86
✓ J. L. Jensen House	1100 Brawley St.	03/01/88	04/18/88
✓ J.W. Moxon House	1700 College Ave.	03/01/88	04/18/88
✓ Carl Hassell House	2317 Jefferson St.	03/01/88	04/18/88
✓ Dr. Alfred Earl House	1924 Main St.	03/01/88	04/18/88
✓ Edward McGlachlin House	2017 Main St.	03/01/88	04/18/88
✓ A.J. Agnew House	1901-03 Pine St.	03/01/88	04/18/88
✓ W.J. Clifford House	1554 Strongs Ave.	04/05/88	04/18/88

Historic District Boundaries



Legend

- Clark Street - Main Street Historic District
- Parcels
- Clark Street Historic District



ARTICLE 6.0 DEMOLITION AND RELOCATION



Sec. 6.1 Demolition

Demolishing a historic structure within a district has the potential to irreversibly change the character of the district and can compromise the quality and sense of place of the entire district. Historic structures represent a tangible link to a community's past. They are physical expressions of architectural style, building technology, and personal taste. Demolition of a historic structure is strongly discouraged, and any time a demolition is proposed, alternatives should be carefully explored. Design Review guidelines and procedures are further described in Chapter 22 of the City of Stevens Point revised municipal code.

6.1.1 Review for Demolition

The HP/DRC will review demolition requests, taking into consideration the property's significance, and guidelines below. A delay period of 365 days exists, allowing for alternatives to be explored prior to the demolition. If the Commission determines that the building in question has no historic significance or value, the demolition request can be approved without delay.

6.1.2 Demolition Guidelines

1. Whether the building or structure is of such architectural or historic significance that its demolition would be detrimental to the public interest and contrary to the general welfare of the people of the city or state.
2. Whether the building or structure, although not itself a historic structure, contributes to the distinctive architectural or historic character of the historic district as a whole, and therefore, should be preserved for the benefit of the people of the city or the state.
3. Whether demolition of the subject property would be contrary to the objectives of the historic preservation plan for the applicable district as duly adopted.
4. Whether the building or structure is of such old, unusual or uncommon design, texture, and/or material, that it could be reproduced only with great difficulty and/or expense.
5. Whether retention of the building or structure would promote the general welfare of the people of the city or the state, by encouraging study of American history, architecture and design, or by developing an understanding of American culture and heritage.
6. Whether the building or structure is in such a deteriorated condition that it is not structurally or economically feasible to preserve or restore it. Any hardship or difficulty claimed by the owner may not come as a result of any failure to maintain the property in good repair by the current property owner or previous property owners.
7. Whether demolition of the building or structure would promote conformance with other criteria as designated in the City of Stevens Point Historic Design guidelines.
8. Prior to undertaking demolition work, the property owner should approach the HP/DRC to determine the historic significance of the structure and its relationship to the district.

9. If the HP/DRC determines that the structure is historically significant, it should delay the demolition for an appropriate time in order for staff and the Commission to work with the property owner to seek viable alternatives to demolition. Alternatives to demolition include, among other things:
 - a. If a building is in disrepair, working with the property owner to develop a rehabilitation plan and identify funding assistance such as rehabilitation tax credits that would allow the building to be rehabilitated.
 - b. If a building does not fit the owner's required needs, determining if the structure could be adaptively reused.
 - c. Working with the -property owner to locate a buyer who will use the property without demolishing the structure.
 - d. As a last resort, finding a suitable location within the district for the historic building to be moved and working with the property owner to develop a plan for relocation.
10. If all alternatives for preservation have been exhausted, the HP/DRC should work with the owner to make a permanent record of the historic resource including photography, an architectural description of the building, chain of title, floor and site plans, or collection of other historic documentation that is available. Since Stevens Point is a Certified Local Government, it must fill out an annual survey to the State's Historical Preservation Office that includes a list of all demolitions and provide historic data on the demolished properties.
11. When a demolition is proposed, the applicant should submit a landscaping plan illustrating proposed landscaping and other site development to be completed within six (6) months after demolition.

Sec. 6.2 Relocation

Removing a contributing structure from its historic setting can compromise the integrity of the building and the district as a whole. Often, however, relocation is the only method to preserve a structure that is faced with demolition. Relocation should be considered only when all other preservation alternatives have been eliminated. Occasionally, a structure may be moved into historic districts.

In planning the move of a structure, consideration should be given for how the relocated building will impact surrounding structures and fit into its new setting. Often, architectural features are compromised when moving a structure. Only an experienced house mover should be used so that damage to the historic building itself, significant vegetation, or buildings along the route is minimized. Prior to moving a structure, the property owner is advised to contact the State Historic Preservation Office to determine what measures need to be taken to ensure that the contributing status of the building is not jeopardized.

Relocation can be looked at in much the same way as new construction in that the building being introduced into a new environment should complement the character of its surroundings in architectural style, size, scale, orientation, and landscaping.

Much like new construction, the applicant should submit a plan for relocation including a site plan and drawings of the building in its new environment.

Relocation Guidelines

1. Relocation of a building within a historic district should only be considered as an alternative to demolition when all other preservation options have been exhausted.
2. Prior to the act of relocation, the HP/DRC should work with the owner to document through photography, drawings, and other means the existing location and environment of the historic structure. Measured drawings should be made particularly if there is to be

















A stucco-like material (EIFS) installed over brick.



Siding removed revealing original woodwork.

Wall Guidelines

1. Historic character-defining wall features should be retained and protected including clapboards, corner boards, cornices, quoins, corbelling and other architectural detailing.
2. Original walls should be properly maintained and repaired when necessary. If an original wall feature must be replaced due to excessive deterioration or damage, the new feature should match the original in size, profile, material, and texture.
3. Wooden wall materials should be properly painted and maintained.
4. Paint should not be applied to original unpainted wall surfaces.
5. It is not recommended to cover or replace original wall surfaces with vinyl, aluminum, veneer or other synthetic siding, including chemical applications that may change the texture of the original siding.
6. Whenever synthetic siding already exists, it can be replaced with wood or an approved material. Original siding is recommended to be restored if synthetic siding is removed.
7. In cases where vinyl siding is used it is recommended to have a thickness between 0.044 - 0.055 inches, coated with a UV reflective additive and wind resistant.

Sec. 3.2 Materials

3.2.1 Wood

Wood is by far the most common architectural material found within the residential portions of the historic districts. Wood is used for clapboard

siding, shingles, windows, doors, and most architectural details such as cornices, corner boards, and brackets. It is also a common secondary material on commercial and institutional buildings particularly in windows, doors, storefront paneling, and cornices.

Ongoing maintenance of wooden material is imperative to ensure longevity of the historic structure. Improperly maintained wooden structures may exhibit warped boards, rotting wood, missing architectural details, pest infestation and blistering, chipped, and peeling paint. Most of this deterioration is due to the damaging effects of water and therefore, the prevention of moisture infiltration to the material is of primary importance.

Wood Guidelines

1. Preserve and protect character-defining wooden architectural features.
2. Routinely inspect wooden features for signs of water retention and damage, mildew, decay, and insect infestations.
3. Joints between wooden elements should be sealed with caulk and/or other sealant to prevent moisture from penetrating the wood.
4. Keep roofs, gutters and downspouts clean and maintained.
5. Proper preparation should be done prior to painting wood surfaces including:
 - a. Remove damaged paint down to the next sound paint layer using gentle techniques such as hand scraping and sanding. Sandblasting and high-pressure water treatments can damage historic wooden materials and should be avoided.
 - b. Heat guns and plates can be used if additional paint removal is necessary.
 - c. Clean the surface thoroughly with soap and water to remove all dirt and grime.
 - d. Prime any bare wood surfaces prior to painting.
 - e. Apply a sound paint film using high quality paint.
6. Repair deteriorated wood by patching and splicing with a material of similar size, shape, and texture. Materials such as aluminum, vinyl, and veneer are not recommended on historic wooden structures.

3.2.2 Masonry

Various types of masonry construction are found in the districts including brick, stone, stucco, and concrete. Buildings in the downtown commercial area are primarily of brick construction while there are also several examples of brick residential structures. Just like with wood, masonry construction contributes to a building's historic character in its texture, color, size and scale, and detailing. This architectural detailing includes subtle elements like variations in bond patterns to more prominent detailing like corbelling, brick cornices, quoins, etc.

Masonry should be properly maintained in order to prevent deterioration. Typical masonry maintenance issues include deteriorated mortar joints, broken or chipped bricks, and loose bricks. Much of this deterioration is due to the effects of weather as well as improper maintenance and cleaning.



Deteriorated masonry

Masonry Guidelines

1. Preserve and protect character-defining masonry architectural features including corbelling, cornices, sills, quoins, foundations, and walls.
2. Routinely inspect masonry features for cracks, loose bricks, and signs of weather damage paying particular attention to mortar joints.
3. Apply caulk to the joints between bricks and window frames in order to prevent water penetration.
4. Deteriorated masonry units should be repaired rather than replaced using materials that match the original in size, texture, color, and overall appearance. Synthetic materials are not recommended on historic structures for the wholesale covering of a structure.
5. Paint should not be applied to masonry surfaces that were historically not painted.
6. Removal of paint from a masonry structure is encouraged when the underlying masonry units are character defining and are in good condition, and only if safe and proper paint removal procedures are used resulting in no damage to the masonry.

7. When cleaning is necessary, proper techniques should be used.
 - a. Use the gentlest means possible including low-pressure washing with detergent and natural soft bristle brushes. Test the cleaning method on a small area first because older brick can be damaged by even low-pressure washing
 - b. Use caution when utilizing chemical cleaners. Test a small area first to determine that no damaging effects will occur. Run-off from chemical cleaning should be controlled and authorized by the City of Stevens Point prior to the cleaning process.
 - c. Sandblasting, iceblasting, corncob blasting or another method or high-pressure water blasting should not be used to clean historic masonry and may be subject penalty under WI state statute.
8. When repair to mortar joints is needed due to cracks, missing and crumbling mortar, and loose bricks, use proper techniques for re-pointing.
 - a. Remove deteriorated mortar by hand raking rather than using electric saws and hammers that can damage the brick.
 - b. Original texture, color, width, strength and profile of the historic mortar joints should be matched. Type N mortar should be used as defined by the American Society for Testing and Materials (ASTM).
 - c. Repointing with mortar that is stronger than the original, such as Portland cement, can cause brick to crack, break or spall. In re-pointing mortar joints, mortar of appropriate PSI should be used.



Re-pointed and painted masonry

3.2.3 Metal

Architectural metals are frequently found in the historic districts on both residential and non-residential construction. Cast iron columns, metal roofs, and wrought iron details are typical metal treatments in

SUBCHAPTER 41G: HISTORIC DISTRICT STANDARDS

41.22 SPECTRUM OF REVIEW.

- (1) Property owners should conduct Maintenance activities in compliance with the historic district Standards for Maintenance. When a project only involves Maintenance work, it does not require a Certificate of Appropriateness.
- (2) The Preservation Planner or designee can administratively approve Repair and Alterations proposals in conformance with the Landmarks Commission Policy Manual, or may refer the application to the Landmarks Commission for their review.
- (3) Applications for Additions and New Construction must go before the Landmarks Commission for their review.

41.23 STANDARDS FOR MAINTENANCE.

- (1) General
 - (a) All structures in historic districts are required to be maintained pursuant to Sec. 41.14. The highest priority of this ordinance is on the proper proactive and continued maintenance to preserve the integrity of the structure utilizing the least degree of intervention. This section provides standards for building maintenance. Work beyond the level described below, as determined by the Preservation Planner, shall be considered a repair and be governed by the Standards for Repair section (Sec 41.24).
- (2) Building Site
 - (a) General
 1. Buildings and site features shall be protected and maintained by providing proper drainage to ensure that water does not erode foundation walls, drain toward the building, or damage or erode the landscape.
- (3) Exterior Walls
 - (a) Masonry
 1. The Preservation Planner shall approve proposed masonry cleaning methods.
 2. Abrasive methods (including sandblasting, other media blasting, or high-pressure water or acids on limestone or marble) which can damage the surface of the masonry and mortar joints are prohibited.
 3. Masonry building walls and features shall be maintained with tight mortar joints and operational rain water conduction systems.
 4. Sealants and water-repellent coatings applied to the face of the masonry are prohibited.
 5. Previously painted masonry may be repainted, but the painting of previously unpainted masonry is prohibited.
 - (b) Wood
 1. Paint or stain shall be retained and applied to protect wood features.
 - (c) Metals
 1. Non-corrosive chemical methods shall be used to clean soft metals (such as lead, tinplate,terneplate, copper, and zinc) whose finishes can be easily damaged by abrasive methods.
 - (d) Vegetation
 1. Growing new vegetation directly on building walls and roofs is prohibited.
 2. Exterior walls with pre-existing vegetation shall be maintained to ensure exterior surfaces remain undamaged.
- (4) Roofs
 - (a) General
 1. The materials comprising the roof covering, flashing, gutters and downspouts and related trim shall be protected and maintained in functional and operational condition.
- (5) Windows and Doors
 - (a) Windows and Doors
 1. The wood or metal comprising the window or door jamb, sash, and trim shall be protected and maintained through appropriate treatments.

- (6) Entrances, Porches, Balconies and Decks
- (a) Entrances and Porches
1. Entrances and porches and their functional and decorative features that are important in defining the overall historic character of the building, that are historic to the structure, or that date to the period of significance of the district shall be retained and preserved.
 2. The materials that comprise entrances and porches shall be protected and maintained through appropriate surface treatments.

41.24 STANDARDS FOR REPAIRS.

- (1) General
- (a) This section provides standards for building repair when the scope of a project exceeds normal on-going maintenance and a limited amount of repair of any exterior element is necessary. Work beyond the level described below, as determined by the Preservation Planner, shall be considered an alteration and be governed by the Standards for Alterations section (Sec 41.25).
1. Materials and features shall be repaired by patching, splicing, consolidating, or otherwise reinforcing using recognized conservation and preservation methods for the material or feature needing repair.
 2. Compatible substitute materials shall be similar in design, scale, architectural appearance, and other visual qualities.
- (2) Building Site
- (a) General
1. Historic site features, not including landscaping, which have been damaged, are deteriorated, or have missing components shall be repaired to reestablish the whole feature and to ensure retention of the integrity of the historic materials. When damage or deterioration requires repair that cannot be met by these conditions, work will be considered an alteration (Sec. 41.25)
- (3) Walls
- (a) Masonry
1. Remove failed mortar so as to not damage the masonry unit, and new mortar will match the historic in strength, composition, color, texture, and profile of the historic mortar.
 2. Stucco and concrete shall be repaired by removing the damaged material and patching with new material that duplicates the old in strength, composition, color, and texture.
 3. Application of sealers and abrasive cleaning of masonry is prohibited.
 4. For replacement of masonry units, see Standards for Alterations.
- (b) Wood
1. Materials and features shall be repaired by patching, splicing, consolidating, or otherwise reinforcing using recognized conservation and preservation methods for the material or feature needing repair.
- (4) Roofs
- (a) General
1. Roof repairs shall ensure that the existing roof covering is sound and waterproof.
- (5) Windows and Doors
- (a) Windows & Doors
1. Deteriorated or broken components or features shall be repaired.
 2. Replacement in kind or with a compatible substitute materials shall be used when materials or features are missing or are physically beyond repair and/or are not economically feasible to repair.
- (6) Entrances, Porches, Balconies and Decks
- (a) Entrances and Porches
1. Deteriorated or broken components or features shall be repaired.
 2. Replacement in-kind or with a compatible substitute materials shall be used when materials or features are extensively deteriorated or missing.

41.25 STANDARDS FOR ALTERATIONS.

(1) General

- (a) Alterations are defined as any change to any portion of the exterior of a building or site that replaces existing materials or changes its appearance. This section provides standards for building alterations.
- (b) Materials and Features
 - 1. Alterations shall be in keeping with the original design and character of the building.
 - 2. The removal of historic features on elevations visible from the developed public right-of-way is prohibited.
 - 3. The introduction of conjectural architectural features without historic precedent on the building is prohibited.
- (c) Replacement
 - 1. Existing features shall be replaced in-kind if they are too deteriorated to repair.
- (d) Accessibility
 - 1. Whenever possible, access to historic buildings should be through a primary building entrance.
 - 2. Barrier-free access requirements shall be complied with in such a manner that the historic building's character-defining exterior features and features of the site and setting are preserved or impacted as little as possible.
- (e) Lead Paint
 - 1. Window replacement due to lead may not be eligible for state preservation tax credits. In order to replace a feature due to lead paint, the proposal must meet the following conditions:
 - a. A test result that demonstrates that a feature has tested positive for lead.
 - b. Documentation of the existing original feature, including profiles, dimensions, configuration, etc. This documentation should include drawings, photographs, and any other relevant documentation.
 - c. Documentation of the proposed replacement feature, which includes a cut sheet or shop drawing of the proposed replacement feature, and a detailed description of the profile, dimensions, configuration, material, finish, etc.

(2) Building Site

(a) General

- 1. Fences and retaining walls in the front yard shall be in character with the style of fences or retaining walls historically found in the district or in keeping with the materials and character of historic resources in the district.

(3) Exterior Walls

(a) Masonry

- 1. Masonry not previously covered shall not be covered with stucco, exterior insulation and finish systems (EIFS), paint, or other covering.
- 2. Removing a chimney visible from the developed public right-of-way or altering its appearance is prohibited.
- 3. Replacement brick units shall be of a similar dimension, color, and permeability as the historic bricks
- 4. Composite patching, epoxy repair, mechanical repair, or a Dutchman repair of large masonry units shall follow established conservation methods, with the alteration to match the historic appearance as closely as possible.

(b) Wood

- 1. Replacement siding shall imitate the original siding within one inch of historic exposure/reveal.
- 2. Where more than one layer of siding exists on the structure, all layers except the first must be removed prior to re-siding.
- 3. All trim must project beyond the face of the siding to the same extent it did with the historic siding.
- 4. Wrapping of trim and ornament is prohibited.

- (c) Lighting and Electrical Systems
 - 1. Decorative light fixtures shall replicate the original in style and placement.
 - 2. Security light fixtures or security cameras shall be installed so that they are as unobtrusive as possible and do not damage or obscure character-defining historic features.
 - 3. Exterior mounted conduit on elevations visible from the developed public right-of-way is prohibited.
 - 4. Roof appurtenances such as antennas, satellite dishes, or communications equipment should be installed so that they are minimally visible from the developed public right-of-way and do not damage or obscure historic features.
- (d) Rooftop Features
 - 1. Rooftop decks or terraces and green roofs or other roof landscaping, railings, or furnishings shall be installed so that they are inconspicuous and minimally visible on the site and from the street.

41.26 STANDARDS FOR ADDITIONS.

- (1) General
 - (a) General
 - 1. New additions on the front of the principal structure are prohibited, except for restoring or reconstructing missing historic features that can be documented.
 - 2. A new addition shall be designed to be subordinate and compatible with the character of the structure.
 - 3. The addition shall be visually separated from the principal building.
 - 4. The alignment, rhythm, and size of the window and door openings of the new addition shall be similar to those of the historic building.
 - 5. Rooftop additions, decks, terraces, and mechanical and service equipment shall be located to be set back from elevations visible from the developed public right-of-way in order to minimize its visibility and impact on the historic character of the building.
 - (b) Materials and Features
 - 1. A new addition shall be constructed on a secondary or non-character defining elevation so that historic materials and features are not obscured, damaged or destroyed.
 - 2. New additions that destroy significant historic materials or character-defining features are prohibited.
 - (c) Accessibility
 - 1. Whenever possible, access to historic buildings should be through a primary building entrance.
 - 2. Barrier-free access requirements shall be complied with in such a manner that the historic building's character-defining exterior features and features of the site and setting are preserved or impacted as little as possible.
 - (d) Exceptions
 - 1. Additions to structures in Marquette Bungalows Historic District shall be no taller than the existing historic resource.
- (2) Building Site
 - (a) General
 - 1. Exterior additions to historic buildings shall be designed to be compatible with the historic character of historic resources within two hundred (200) feet and to maintain the pattern of the district.
 - 2. New site features (such as parking areas, access ramps, trash or mechanical equipment enclosures) shall be designed so that they are as unobtrusive as possible, retain the historic relationship between the building and the landscape, and are visually compatible with historic resources within two hundred (200) feet.
- (3) Exterior Walls
 - (a) General
 - 1. Materials used for exterior walls of the addition shall be similar in design, scale, architectural appearance, and other visual qualities of the historic building, but differentiated enough so that it is not confused as historic or original to the building.

(6) Entrances, Porches, Balconies and Decks

(a) Porch Elements

1. The style of porch posts, balusters and rails shall be compatible with the overall design of the historic porch but, in most cases, not duplicate the historic features.
2. Spaces beneath porches and stairs shall be enclosed with a framed lattice of crisscross design, narrow vertical boards, masonry, or other openwork design.
3. All wood on exterior porches shall be painted or opaquely stained.
4. Second exit stairways and second exit platforms and stairs shall be as unobtrusive as possible.

(b) Balconies and Decks

1. Rear yard decks shall be constructed so that they are not visible from the developed public right-of-way to which the building is oriented.
2. Spaces beneath decks and stairs visible from the developed public right-of-way shall be screened.
3. All parts of the deck or balcony, except the flooring and steps, shall be painted or opaquely stained.
4. Projecting, partially projecting, and inset balconies are prohibited on elevations visible from the developed public right-of-way.

(7) Building Systems

(a) Mechanical Systems

1. A split system mechanical unit may be installed in a manner that will have minimal impact on the historic character and result in minimal loss of historic building material and shall be placed on an elevation not visible from the developed public right-of-way.
2. Installing mechanical equipment on the roof that is highly visible from the developed public right-of-way is prohibited.
3. Grilles, vents, equipment, and meters shall be placed in a location on an elevation not visible from the developed public right-of-way or on the roof. Grilles, vents, equipment, and meters on elevations visible from the developed public right-of-way are prohibited, unless technically infeasible. Grilles, vents, equipment, and meters shall be finished or painted to match adjacent materials.

(b) Solar

1. Roof-mounted solar arrays on sloped roofs shall be flat, parallel to the slope of the roof, and arranged in a pattern or grid parallel to the roof's ridge and eaves.
2. Roof-mounted solar arrays on flat roofs shall be installed so as to be minimally visible from the developed public right-of-way.

(c) Lighting and Electrical Systems

1. Decorative light fixtures shall be compatible in style and location with the overall design of the building.
2. Security light fixtures or security cameras shall be installed so that they are as unobtrusive as possible.
3. Exterior mounted conduit on elevations visible from the developed public right-of-way is prohibited.
4. Roof appurtenances such as antennas, satellite dishes, or communications equipment should be installed so that they are minimally visible from the developed public right-of-way and do not damage or obscure historic features.

(d) Rooftop Features

1. Rooftop decks or terraces and green roofs or other roof landscaping, railings, or furnishings shall be installed so that they are inconspicuous and minimally visible on the site and from the street.

41.27 STANDARDS FOR NEW STRUCTURES.

(1) General

(a) Primary Structures

The design for a new structure in a historic district shall be visually compatible with other historic resources within two hundred (200) feet in the following ways:

1. Building Placement. When determining visual compatibility for building placement, the Landmarks Commission shall consider factors such as lot coverage, setbacks, building orientation, and historic relationships between the building and site.
 2. Street Setback. When determining visual compatibility for street setbacks, the Landmarks Commission shall consider factors such as the average setback of historic resources on the same block face within two hundred (200) feet, and the setback of adjacent structures.
 3. Visual Size. When determining visual compatibility for visual size, the Landmarks Commission shall consider factors such as massing, building height in feet and stories, the gross area of the front elevation (i.e., all walls facing the street), street presence, and the dominant proportion of width to height in the façade.
 4. Building Form. When determining visual compatibility for building form, the Landmarks Commission shall consider factors such as building type and use, roof shape, symmetry or asymmetry, and its dominant vertical or horizontal expression.
 5. Architectural Expression. When determining visual compatibility for architectural expression, the Landmarks Commission shall consider factors such as the building's modulation, articulation, building planes, proportion of building elements, and rhythm of solids to voids created by openings in the façade.
- (b) Accessory Structures
1. Comply with requirements for new primary structures with other historic accessory structures serving as comparables.
 2. Minimally visible from the developed public right-of-way, or be minimally visible from the front of the property for corner lots.
 3. Clearly be secondary to the primary structure.
- (c) Exceptions
1. New principal structures in Marquette Bungalows Historic District shall be no taller than the existing historic resources in the district.
- (2) Building Site
- (a) General
1. New parking areas, access ramps, trash or mechanical equipment enclosures shall be designed so that they are as unobtrusive as possible, retain the historic relationship between the buildings and the building and the landscape, and are visually compatible with other historic resources in the district.
 2. Fences and retaining walls in the front yard shall be in character with the style of fences or retaining walls historically found in the district, or in keeping with the materials and character of historic resources in the district.
- (3) Exterior Walls
- (a) General
1. Materials used for new structures shall be similar in design, scale and architectural appearance to materials that date to the period of significance on historic resources within two hundred (200) feet, but differentiated enough so that it is not confused as a historic building.
- (4) Roofs
- (a) Form
1. Roof form and pitch shall be similar to the form and pitch of the roofs on historic resources within two hundred (200) feet.
- (b) Materials
1. Roof materials shall replicate materials found on historic resources within two hundred (200) feet.
 2. Any roofing material shall be permitted on flat or slightly pitched roofs not visible from the developed public right-of-way.
- (c) Skylights
1. Skylights visible from the developed public right-of-way shall be flat, parallel to the slope of the roof, and have the frame painted to match the roof material, and be located least twelve (12) feet back from the front edge of the roof.

Sec. 115-320. - Design standards for the Historic Overlay District known as the Downtown Commercial Historic District.

(e) *Design Review Standards for Renovation and Rehabilitation.* These standards specify appropriate maintenance, renovation, and repair of elements on properties within the District and must be reviewed and approved by the Heritage Preservation Planner or the HPC.

(1) *Masonry walls and foundations.* It is the intent of this section to have clay brick walls or stone masonry walls exposed whenever possible. Cinder block masonry walls or poured concrete walls may be covered with materials that blend in with the predominantly clay brick walls within the District upon approval by the Heritage Preservation Commission.

a. *Repair.*

1. When there is evidence of deterioration, masonry walls and other masonry features shall be repaired by repointing of mortar joints.
2. Brick, stone and mortar shall be replaced with the materials used in original construction or materials that closely resemble the original.
3. Repointing of mortar shall match the original brick and mortar joint profile, including width and depth. Mortar shall duplicate the original in color, texture and strength. If possible, mortar mixtures shall duplicate the original composition in lime, sand, and cement proportion.
4. Repair stucco by duplicating the original material in strength, composition, color and texture. If possible, it is recommended that stucco be removed during renovation if it covers a masonry wall.
5. Artificial stone, brick veneer, vinyl or aluminum products, timbers, plywood, stucco, or other similar materials shall not be applied over masonry surfaces unless it was to repair an existing material. An exception to permit materials that will be applied over masonry surfaces may be requested from the HPC for the purpose of creating a "mural". The HPC will review such materials and how they will be attached, connected, or adhered to the building in order to evaluate any impacts. Installation shall be reversible, that is, it should leave little to no trace on the building after it is removed. A "mural" is defined as any piece of artwork painted or applied directly on a wall, ceiling or other large permanent surface.
6. "Color" in this section, refers to matching the existing or overall color, to the extent practicable.

b. *Cleaning.*

1. Clean masonry walls only if necessary to halt deterioration or remove heavy soiling.
2. When cleaning is necessary, the gentlest cleaning method shall be used, as appropriate, such as low pressure water, mild detergents and soft brushes.
3. Surface cleaning tests must be conducted to determine the most appropriate cleaning method. Adequate time must be allowed for the Preservation Planner to observe the results of the test to determine the gentlest cleaning method.
4. Sandblasting or abrasive cleaning is prohibited.

c. *Painting.*

1. Masonry shall not be painted (or stuccoed) if it has not been painted previously. An exception may be requested from the HPC for the purpose of creating a "mural". HPC will review such proposals in order to evaluate any impacts. Any such proposals shall include a plan for removal of the paint that can be accomplished without damage to the

masonry. A "mural" is defined as any piece of artwork painted or applied directly on a wall, ceiling or other large permanent surface.

2. Paint shall not be removed from historically painted masonry unless the removal is historically appropriate and the removal can be accomplished without damage to the masonry.
3. Remove damaged or deteriorated paint only to the next layer, using the gentlest method (such as handscraping) prior to repainting.
4. If repainting is required, select colors that are appropriate to the building and district.

(f) **Design Review Standards for New Construction.** These guidelines apply to new buildings and additions to existing buildings.

(1) *Building placement.*

- a. Most buildings within the district are built to the edge of the sidewalk, maintaining a continuous wall at the building line. New buildings and additions to existing buildings shall maintain the street wall, except where setbacks are used to emphasize entries or create outdoor seating areas.
- b. Buildings shall meet the established building facade line on the block where they are located for at least 75 percent of the length of their front façade.
- c. The remaining 25 percent of the façade may be set back up to ten feet to emphasize entries or create outdoor seating and gathering areas.
- d. At intersections, buildings shall "hold the corner" - that is, their facades should be located at or near the sidewalk line on both streets.
- e. Side setbacks shall only be used to create walkways or semi-public spaces such as restaurant patios.
- f. Driveways may only be placed in side yards where no alternative (such as alley access) exists.

(2) *Façade proportions.*

- a. Buildings shall have a well defined base, middle and top.
- b. The base, or ground floor, shall appear visually distinct from the upper stories, through the use of a change in building materials, window shape or size, an intermediate cornice line, an awning, arcade or portico, or similar techniques.
- c. The base or ground floor of the building shall include elements that relate to the human scale, including texture, projections, doors and windows, awnings, canopies or ornamentation.
- d. Roofs shall be flat or gently sloped, consistent with traditional storefront commercial design.
- e. Building tops shall be articulated with detailed cornices or parapets.
- f. The composition of the façade shall be similar to that of surrounding facades. This includes:
 1. Proportions of openings.
 2. Relation of width to height. Larger buildings shall be broken into a number of smaller bays, to maintain a rhythm similar to the surrounding buildings.
 3. Floor to ceiling ratios.
- g. *Side walls.*

1. Party wall construction is typical within the District. Therefore, relatively few buildings have visible side walls. Where side walls are visible, window openings shall be consistent in their proportions with those on the front facade.

(3) *Building height.*

- a. New buildings shall continue the traditional patterns of two or more stories in height.
- b. Maximum height should be based on the pattern established by surrounding buildings on the block face.

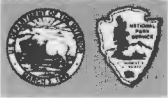
(4) *Building materials.*

- a. Building materials shall be consistent with the predominant materials in use in the District.
- b. Painting of brick buildings is discouraged and shall not be used on new construction. Brick additions may be painted if the existing building is already painted. The paint color of the addition shall match the paint color of the existing building.
- c. The following materials are appropriate on front or primary façades (those facing the street):
 1. Clay brick
 2. Natural stone
 3. Cast stone
 4. Concrete and stucco may be appropriate for some buildings, if approved by the HPC.
- d. Decorative elements on building facades shall be of materials appropriate to the building style and similar to materials used on existing historic buildings, including metal, wood, stone, polished stone, tile, or glass block.
- e. Additional materials may be appropriate on side or rear facades that are less visible from the street, where permitted by the HPC. Materials that may be considered include:
 1. Precast concrete units and concrete block, provided that surfaces are molded, serrated or treated with a textured material in order to give the wall surface a three-dimensional character.
 2. "Jumbo brick" units shall only be used on the lower third of the building wall.
 3. Split-faced brick or block is not acceptable for downtown buildings.
 4. "Novabrick" may be acceptable in some uses.

2 PRESERVATION BRIEFS

Repointing Mortar Joints in Historic Masonry Buildings

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U.S. Department of the Interior
National Park Service
Cultural Resources
Heritage Preservation Services



Figure 1. After removing deteriorated mortar, an experienced mason repoints a portion of this early-20th century limestone building. Photo: Robert C. Mack, FAIA.

Masonry — brick, stone, terra-cotta, and concrete block — is found on nearly every historic building. Structures with all-masonry exteriors come to mind immediately, but most other buildings at least have masonry foundations or chimneys. Although generally considered “permanent,” masonry is subject to deterioration, especially at the mortar joints. Repointing, also known simply as “pointing” or—somewhat inaccurately—“tuck pointing”*, is the process of removing deteriorated mortar from the joints of a masonry wall and replacing it with new mortar (Fig. 1). Properly done, repointing restores the visual and physical integrity of the masonry. Improperly done, repointing not only detracts from the appearance of the building, but may also cause physical damage to the masonry units themselves.

The purpose of this Brief is to provide general guidance on appropriate materials and methods for repointing historic masonry buildings and it is intended to benefit building owners, architects, and contractors. The Brief should serve as a guide to prepare specifications for repointing historic masonry buildings. It should also help develop sensitivity to the particular needs of historic masonry, and to assist historic building owners in working cooperatively with architects, architectural conservators and historic preservation consultants, and contractors. Although specifically intended for historic buildings, the guidance is appropriate for other masonry buildings as well. This publication updates *Preservation Briefs 2: Repointing Mortar Joints in Historic Brick Buildings* to include all types of historic unit masonry. The scope of the earlier Brief has also been expanded to acknowledge that the many buildings constructed in the first half of the 20th century are now historic and eligible for listing in the National Register of Historic Places, and that they may have been originally constructed with portland cement mortar.

*Tuckpointing technically describes a primarily decorative application of a raised mortar joint or lime putty joint on top of flush mortar joints.

Historical Background

Mortar consisting primarily of lime and sand has been used as an integral part of masonry structures for thousands of years. Up until about the mid-19th century, lime or quicklime (sometimes called lump lime) was delivered to construction sites, where it had to be slaked, or combined with water. Mixing with water caused it to boil and resulted in a wet lime putty that was left to mature in a pit or wooden box for several weeks, up to a year. Traditional mortar was made from lime putty, or slaked lime, combined with local sand, generally in a ratio of 1 part lime putty to 3 parts sand by volume. Often other ingredients, such as crushed marine shells (another source of lime), brick dust, clay, natural cements, pigments, and even animal hair were also added to mortar, but the basic formulation for lime putty and sand mortar remained unchanged for centuries until the advent of portland cement or its forerunner, Roman cement, a natural, hydraulic cement.

Portland cement was patented in Great Britain in 1824. It was named after the stone from Portland in Dorset which it resembled when hard. This is a fast-curing, hydraulic cement which hardens under water. Portland cement was first manufactured in the United States in 1872, although it was imported before this date. But it was not in common use throughout the country until the early 20th century. Up until the turn of the century portland cement was considered primarily an additive, or "minor ingredient" to help accelerate mortar set time. By the 1930s, however, most masons used a mix of equal parts portland cement and lime putty. Thus, the mortar found in masonry structures built between 1873 and 1930 can range from pure lime and sand mixes to a wide variety of lime, portland cement, and sand combinations.

In the 1930s more new mortar products intended to hasten and simplify masons' work were introduced in the U.S. These included **masonry cement**, a premixed, bagged mortar which is a combination of portland cement and ground limestone, and **hydrated lime**, machine-slaked lime that eliminated the necessity of slaking quicklime into putty at the site.

Identifying the Problem Before Repointing

The decision to repoint is most often related to some obvious sign of deterioration, such as disintegrating mortar, cracks in mortar joints, loose bricks or stones, damp walls, or damaged plasterwork. It is, however, erroneous to assume that repointing alone will solve deficiencies that result from other problems (Fig. 2). The root cause of the deterioration—leaking roofs or gutters, differential settlement of the building, capillary action causing rising damp, or extreme weather exposure—should always be dealt with prior to beginning work. Without appropriate repairs to eliminate the source of the problem, mortar deterioration will continue and any repointing will have been a waste of time and money.

Use of Consultants. Because there are so many possible causes for deterioration in historic buildings, it may be desirable to retain a consultant, such as a historic architect or architectural conservator, to analyze the building. In addition to determining the most appropriate solutions to the problems, a consultant can



Figure 2. Much of the mortar on this building has been leached away by water from a leaking downspout. The downspout must be replaced and any other drainage problems repaired before repointing. Photo: Robert C. Mack, FAIA.

prepare specifications which reflect the particular requirements of each job and can provide oversight of the work in progress. Referrals to preservation consultants frequently can be obtained from State Historic Preservation Offices, the American Institute for Conservation of Historic and Artistic Works (AIC), the Association for Preservation Technology (APT), and local chapters of the American Institute of Architects (AIA).

Finding an Appropriate Mortar Match

Preliminary research is necessary to ensure that the proposed repointing work is both physically and visually appropriate to the building. Analysis of unweathered portions of the historic mortar to which the new mortar will be matched can suggest appropriate mixes for the repointing mortar so that it will not damage the building because it is excessively strong or vapor impermeable. Examination and analysis of the masonry units—brick, stone or terra cotta—and the techniques used in the original construction will assist in maintaining the building's historic appearance (Figs. 3-4). A simple, non-technical, evaluation of the masonry units and mortar can provide information concerning the relative strength and permeability of each—critical factors in selecting the repointing mortar—while a visual analysis of the historic mortar can provide the information necessary for developing the new mortar mix and application techniques.

Although not crucial to a successful repointing project, for projects involving properties of special historic significance, a mortar analysis by a qualified laboratory can be useful by providing information on the original ingredients. However, there are limitations with such an analysis, and replacement mortar specifications should not be based solely on laboratory analysis. Analysis requires interpretation, and there are important factors which affect the condition and performance of the mortar that cannot be established through laboratory analysis. These may include: the original water content, rate of curing, weather conditions during original construction, the method of mixing and placing the mortar, and the cleanliness and condition of the sand. *The most useful information that can come out of laboratory analysis is the identification of sand by*

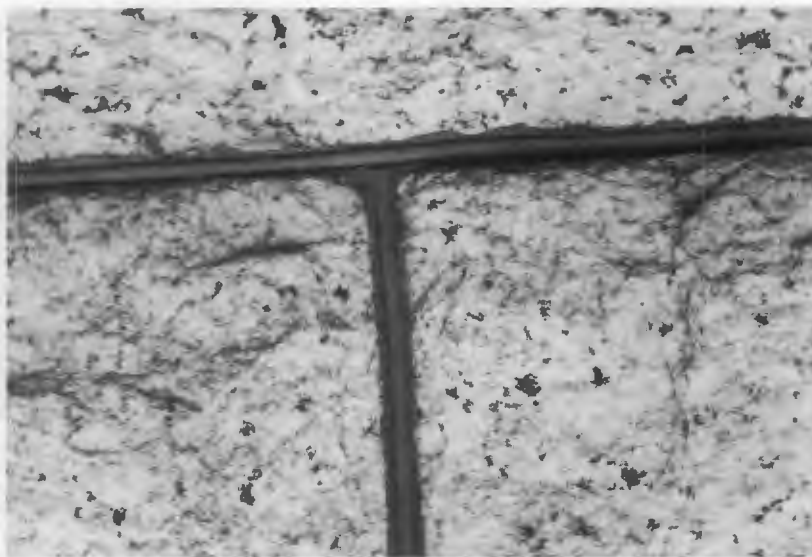


Figure 3. Good-quality repointing closely replicates the original in composition, texture, joint type and profile on this 19th century brick building (left), and on this late-19th century granite on H.H. Richardson's Glessner House in Chicago (right). Photos: Charles E. Fisher; Sharon C. Park, FAIA.

gradation and color. This allows the color and the texture of the mortar to be matched with some accuracy because sand is the largest ingredient by volume.

In creating a repointing mortar that is compatible with the masonry units, the objective is to achieve one that matches the historic mortar as closely as possible, so that the new material can coexist with the old in a sympathetic, supportive and, if necessary, sacrificial capacity. The exact physical and chemical properties of the historic mortar are not of major significance as long as the new mortar conforms to the following criteria:

- The new mortar must match the historic mortar in color, texture and tooling. (If a laboratory analysis is undertaken, it may be possible to match the binder components and their proportions with the historic mortar, if those materials are available.)
- The sand must match the sand in the historic mortar. (The color and texture of the new mortar will usually fall into place if the sand is matched successfully.)

- The new mortar must have **greater vapor permeability** and be **softer** (measured in compressive strength) than the masonry units.

- The new mortar must be **as vapor permeable** and **as soft or softer** (measured in compressive strength) than the historic mortar. (Softness or hardness is not necessarily an indication of permeability; old, hard lime mortars can still retain high permeability.)

Properties of Mortar

Mortars for repointing should be softer or more permeable than the masonry units and no harder or more impermeable than the historic mortar to prevent damage to the masonry units. It is a common error to assume that hardness or high strength is a measure of appropriateness, particularly for lime-based historic mortars. Stresses within a wall caused by expansion, contraction, moisture migration, or settlement must be accommodated in some manner; in a masonry wall these



Figure 4. (left) The poor quality of this repointing—it appears to have been “tooled” with the mason’s finger—does not match the delicacy of the original beaded joint on this 19th-century brick wall. (right) It is obvious that the repointing on this “test patch” is not an appropriate replacement mortar joint for this early-19th century stone foundation. Photos: Lee H. Nelson, FAIA.

stresses should be relieved by the mortar rather than by the masonry units. A mortar that is stronger in compressive strength than the masonry units, will not "give," thus causing the stresses to be relieved through the masonry units—resulting in permanent damage to the masonry, such as cracking and spalling, that cannot be repaired easily (Fig. 5). While stresses can also break the bond between the mortar and the masonry units, permitting water to penetrate the resulting hairline cracks, this is easier to correct in the joint through repointing than if the break occurs in the masonry units.

Permeability, or rate of vapor transmission, is also critical. High lime mortars are more permeable than denser cement mortars. Historically, mortar acted as a bedding material—not unlike an expansion joint—rather than a "glue" for the masonry units, and moisture was able to migrate through the mortar joints rather than the masonry units. When moisture evaporates from the masonry it deposits any soluble salts either on the surface as *efflorescence* or below the surface as *subflorescence*. While salts deposited on the surface of masonry units are usually relatively harmless, salt crystallization within a masonry unit creates pressure that can cause parts of the outer surface to spall off or delaminate. If the mortar does not permit moisture or moisture vapor to migrate out of the wall and evaporate, the result will be damage to the masonry units.

Components of Mortar

Sand. Sand is the largest component of mortar and the material that gives mortar its distinctive color, texture and cohesiveness. Sand must be free of impurities, such as salts or clay. The three key characteristics of sand are: particle shape, gradation and void ratios.



Figure 5. The use of hard, portland-cement mortar that is less permeable than the soft bricks has resulted in severe damage to this brick wall. Moisture trapped in the wall was unable to evaporate through the mortar which is intended to be sacrificial, and thus protect the bricks. As a result the moisture remained in the walls until water pressure eventually popped the surface off the bricks. Photo: National Park Service Files.

When viewed under a magnifying glass or low-power microscope, particles of sand generally have either rounded edges, such as found in beach and river sand, or sharp, angular edges, found in crushed or manufactured sand. For repointing mortar, rounded or natural sand is preferred for two reasons. It is usually similar to the sand in the historic mortar and provides a better visual match. It also has better working qualities or plasticity and can thus be forced into the joint more easily, forming a good contact with the remaining historic mortar and the surface of the adjacent masonry units. Although manufactured sand is frequently more readily available, it is usually possible to locate a supply of rounded sand.

The gradation of the sand (particle size distribution) plays a very important role in the durability and cohesive properties of a mortar. Mortar must have a certain percentage of large to small particle sizes in order to deliver the optimum performance. Acceptable guidelines on particle size distribution may be found in ASTM C 144 (American Society for Testing and Materials). However, in actuality, since neither historic nor modern sands are always in compliance with ASTM C 144, matching the same particle appearance and gradation usually requires sieving the sand.

A scoop of sand contains many small voids between the individual grains. A mortar that performs well fills all these small voids with binder (cement/lime combination or mix) in a balanced manner. Well-graded sand generally has a 30 per cent void ratio by volume. Thus, 30 per cent binder by volume generally should be used, unless the historic mortar had a different binder: aggregate ratio. This represents the 1:3 binder to sand ratios often seen in mortar specifications.

For repointing, sand generally should conform to ASTM C 144 to assure proper gradation and freedom from impurities; some variation may be necessary to match the original size and gradation. Sand color and texture also should match the original as closely as possible to provide the proper color match without other additives.

Lime. Mortar formulations prior to the late-19th century used lime as the primary binding material. Lime is derived from heating limestone at high temperatures which burns off the carbon dioxide, and turns the limestone into quicklime. There are three types of limestone—calcium, magnesium, and dolomitic—differentiated by the different levels of magnesium carbonate they contain which impart specific qualities to mortar. Historically, calcium lime was used for mortar rather than the dolomitic lime (calcium magnesium carbonate) most often used today. But it is also important to keep in mind the fact that the historic limes, and other components of mortar, varied a great deal because they were natural, as opposed to modern lime which is manufactured and, therefore, standardized. Because some of the kinds of lime, as well as other components of mortar, that were used historically are no longer readily available, even when a conscious effort is made to replicate a "historic" mix, this may not be achievable due to the differences between modern and historic materials.

Lime, itself, when mixed with water into a paste is very plastic and creamy. It will remain workable and soft indefinitely, if stored in a sealed container. Lime (calcium hydroxide) hardens by carbonation absorbing carbon dioxide primarily from the air, converting itself to calcium carbonate. Once a lime and sand mortar is mixed and placed in a wall, it begins the process of carbonation. If lime mortar is left to dry too rapidly, carbonation of the mortar will be reduced, resulting in poor adhesion and poor durability. In addition, lime mortar is slightly water soluble and thus is able to re-seal any hairline cracks that may develop during the life of the mortar. Lime mortar is soft, porous, and changes little in volume during temperature fluctuations, thus making it a good choice for historic buildings. *Because of these qualities, high calcium lime mortar may be considered for many repointing projects, not just those involving historic buildings.*

For repointing, lime should conform to ASTM C 207, Type S, or Type SA, Hydrated Lime for Masonry Purposes. This machine-slaked lime is designed to assure high plasticity and water retention. The use of quicklime which must be slaked and soaked by hand may have advantages over hydrated lime in some restoration projects if time and money allow.

Lime putty. Lime putty is slaked lime that has a putty or paste-like consistency. It should conform to ASTM C 5. Mortar can be mixed using lime putty according to ASTM C 270 property or proportion specification.

Portland cement. More recent, 20th-century mortar has used portland cement as a primary binding material. A straight portland cement and sand mortar is extremely hard, resists the movement of water, shrinks upon setting, and undergoes relatively large thermal movements. When mixed with water, portland cement forms a harsh, stiff paste that is quite unworkable, becoming hard very quickly. (Unlike lime, portland cement will harden regardless of weather conditions and does not require wetting and drying cycles.) Some portland cement assists the workability and plasticity of the mortar without adversely affecting the finished project; it also provides early strength to the mortar and speeds setting. Thus, it may be appropriate to add some portland cement to an essentially lime-based mortar even when repointing relatively soft 18th or 19th century brick under some circumstances when a slightly harder mortar is required. The more portland cement that is added to a mortar formulation the harder it becomes—and the faster the initial set.

For repointing, portland cement should conform to ASTM C 150. White, non-staining portland cement may provide a better color match for some historic mortars than the more commonly available grey portland cement. But, it should not be assumed, however, that white portland cement is always appropriate for all historic buildings, since the original mortar may have been mixed with grey cement. The cement should not have more than 0.60 per cent alkali to help avoid efflorescence.

Masonry cement. Masonry cement is a preblended mortar mix commonly found at hardware and home repair stores. It is designed to produce mortars with a compressive strength of 750 psi or higher when mixed

MORTAR ANALYSIS

Methods for analyzing mortars can be divided into two broad categories: **wet chemical** and **instrumental**. Many laboratories that analyze historic mortars use a simple **wet-chemical** method called *acid digestion*, whereby a sample of the mortar is crushed and then mixed with a dilute acid. The acid dissolves all the carbonate-containing minerals not only in the binder, but also in the aggregate (such as oyster shells, coral sands, or other carbonate-based materials), as well as any other acid-soluble materials. The sand and fine-grained acid-insoluble material is left behind. There are several variations on the simple acid digestion test. One involves collecting the carbon dioxide gas given off as the carbonate is digested by the acid; based on the gas volume the carbonate content of the mortar can be accurately determined (Jedrzejewska, 1960). Simple acid digestion methods are rapid, inexpensive, and easy to perform, but the information they provide about the original composition of a mortar is limited to the color and texture of the sand. The gas collection method provides more information about the binder than a simple acid digestion test.

Instrumental analysis methods that have been used to evaluate mortars include polarized light or thin-section microscopy, scanning electron microscopy, atomic absorption spectroscopy, X-ray diffraction, and differential thermal analysis. All instrumental methods require not only expensive, specialized equipment, but also highly-trained experienced analysts. However, instrumental methods can provide much more information about a mortar. Thin-section microscopy is probably the most commonly used instrumental method. Examination of thin slices of a mortar in transmitted light is often used to supplement acid digestion methods, particularly to look for carbonate-based aggregate. For example, the new ASTM test method, ASTM C 1324-96 "Test Method for Examination and Analysis of Hardened Mortars" which was designed specifically for the analysis of modern lime-cement and masonry cement mortars, combines a complex series of wet chemical analyses with thin-section microscopy.

The drawback of most mortar analysis methods is that mortar samples of known composition have not been analyzed in order to evaluate the method. Historic mortars were not prepared to narrowly defined specifications from materials of uniform quality; they contain a wide array of locally derived materials combined at the discretion of the mason. While a particular method might be able to accurately determine the original proportions of a lime-cement-sand mortar prepared from modern materials, the usefulness of that method for evaluating historic mortars is questionable unless it has been tested against mortars prepared from materials more commonly used in the past.

Lorraine Schnabel.

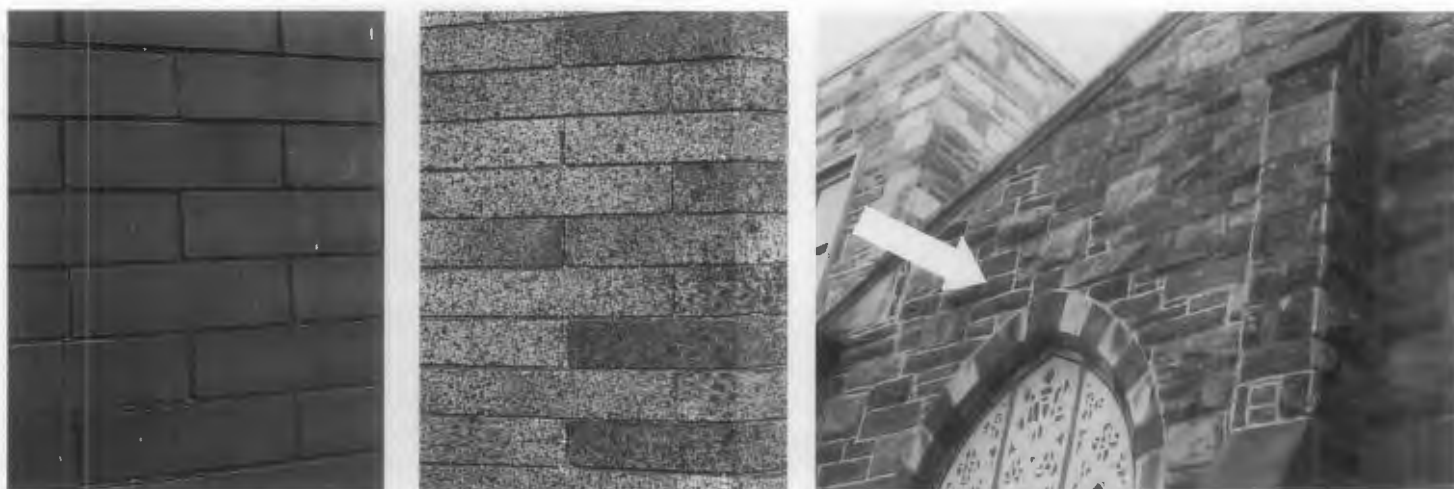


Figure 6. Tinted mortar. (left) Black mortar with a beaded joint was used here on this late-19th century hard pressed red brick and, (center) a dark brown tinted mortar with an almost flush joint was used on this early-20th century Roman brick. (right) When constructed at the turn-of-the-century, this building was pointed with a dark gray mortar to blend with the color of the stone, but the light-colored mortar used in spot repointing has destroyed this harmony and adversely impacts the building's historic character. Photos: Anne Grimmer.

with sand and water at the job site. It may contain hydrated lime, but it always contains a large amount of portland cement, as well as ground limestone and other workability agents, including air-entraining agents. Because masonry cements are not required to contain hydrated lime, and generally do not contain lime, they produce high strength mortars that can damage historic masonry. *For this reason, they generally are not recommended for use on historic masonry buildings.*

Lime mortar (pre-blended). Hydrated lime mortars, and pre-blended lime putty mortars with or without a matched sand are commercially available. Custom mortars are also available with color. In most instances, pre-blended lime mortars containing sand may not provide an exact match; however, if the project calls for total repointing, a pre-blended lime mortar may be worth considering as long as the mortar is compatible in strength with the masonry. If the project involves only selected, "spot" repointing, then it may be better to carry out a mortar analysis which can provide a custom pre-blended lime mortar with a matching sand. In either case, if a preblended lime mortar is to be used, it should contain Type S or SA hydrated lime conforming to ASTM C 207.

Water. Water should be potable—clean and free from acids, alkalis, or other dissolved organic materials.

Other Components

Historic components. In addition to the color of the sand, the texture of the mortar is of critical importance in duplicating historic mortar. Most mortars dating from the mid-19th century on—with some exceptions—have a fairly homogeneous texture and color. Some earlier mortars are not as uniformly textured and may contain lumps of partially burned lime or "dirty lime", shell (which often provided a source of lime, particularly in coastal areas), natural cements, pieces of clay, lampblack or other pigments, or even animal hair. The visual characteristics of these mortars can be duplicated through the use of similar materials in the repointing mortar.

Replicating such unique or individual mortars will require writing new specifications for each project. If possible, suggested sources for special materials should

be included. For example, crushed oyster shells can be obtained in a variety of sizes from poultry supply dealers.

Pigments. Some historic mortars, particularly in the late 19th century, were tinted to match or contrast with the brick or stone (Fig. 6). Red pigments, sometimes in the form of brick dust, as well as brown, and black pigments were commonly used. Modern pigments are available which can be added to the mortar at the job site, but they should not exceed 10 per cent by weight of the portland cement in the mix, and carbon black should be limited to 2 per cent. Only synthetic mineral oxides, which are alkali-proof and sun-fast, should be used to prevent bleaching and fading.

Modern components. Admixtures are used to create specific characteristics in mortar, and whether they should be used will depend upon the individual project. *Air-entraining agents*, for example, help the mortar to resist freeze-thaw damage in northern climates. *Accelerators* are used to reduce mortar freezing prior to setting while *retarders* help to extend the mortar life in hot climates. Selection of admixtures should be made by the architect or architectural conservator as part of the specifications, not something routinely added by the masons.

Generally, modern chemical additives are unnecessary and may, in fact, have detrimental effects in historic masonry projects. The use of antifreeze compounds is not recommended. They are not very effective with high lime mortars and may introduce salts, which may cause efflorescence later. A better practice is to warm the sand and water, and to protect the completed work from freezing. No definitive study has determined whether air-entraining additives should be used to resist frost action and enhance plasticity, but in areas of extreme exposure requiring high-strength mortars with lower permeability, air-entrainment of 10-16 percent may be desirable (see formula for "severe weather exposure" in **Mortar Type and Mix**). Bonding agents are not a substitute for proper joint preparation, and they should generally be avoided. If the joint is properly prepared, there will be a good bond between the new mortar and the adjacent surfaces. In addition, a bonding agent is difficult to remove if smeared on a masonry surface (Fig. 7).

Mortar Type and Mix

Mortars for repointing projects, especially those involving historic buildings, typically are custom mixed in order to ensure the proper physical and visual qualities. These materials can be combined in varying proportions to create a mortar with the desired performance and durability. The actual specification of a particular mortar type should take into consideration all of the factors affecting the life of the building including: current site conditions, present condition of the masonry, function of the new mortar, degree of weather exposure, and skill of the mason. Thus, no two repointing projects are exactly the same. Modern materials specified for use in repointing mortar should conform to specifications of the American Society for Testing and Materials (ASTM) or comparable federal specifications, and the resulting mortar should conform to ASTM C 270, Mortar for Unit Masonry.

Specifying the proportions for the repointing mortar for a specific job is not as difficult as it might seem. Five mortar types, each with a corresponding recommended mix, have been established by ASTM to distinguish high strength mortar from soft flexible mortars. The ASTM designated them in decreasing order of approximate general strength as Type M (2,500 psi), Type S (1,800 psi), Type N (750 psi), Type O (350 psi) and Type K (75 psi). (The letters identifying the types are from the words MASON WORK using every other letter.) Type K has the highest lime content of the mixes that contain portland cement, although it is seldom used today, except for some historic preservation projects. The designation "L" in the accompanying chart identifies a straight lime and sand mix. Specifying the appropriate ASTM mortar by proportion of ingredients, will ensure the desired physical properties. Unless specified otherwise, measurements or proportions for mortar mixes are always given in the following order: cement-lime-sand. Thus, a Type K mix, for example, would be referred to as 1-3-10, or 1 part cement to 3 parts lime to 10 parts sand. Other requirements to create the desired visual qualities should be included in the specifications.



Figure 8. Due to inadequate joint preparation, the repointing mortar has not adhered properly and is falling out of the joint. Photo: Robert C. Mack, FAIA.

The strength of a mortar can vary. If mixed with higher amounts of portland cement, a harder mortar is obtained. The more lime that is added, the softer and more plastic the mortar becomes, increasing its workability. A mortar strong in compressive strength might be desirable for a hard stone (such as granite) pier holding up a bridge deck, whereas a softer, more permeable lime mortar would be preferable for a historic wall of soft brick. Masonry deterioration caused by salt deposition results when the mortar is less permeable than the masonry unit. A strong mortar is still more permeable than hard dense stone. However, in a wall constructed of soft bricks where the masonry unit itself has a relatively high permeability or vapor transmission rate, a soft, high lime mortar is necessary to retain sufficient permeability.

Budgeting and Scheduling

Repointing is both expensive and time consuming due to the extent of handwork and special materials required. It is preferable to repoint only those areas that require work rather than an entire wall, as is often specified. But, if 25 to 50 per cent or more of a wall needs to be repointed, repointing the entire wall may be more cost effective than spot repointing. Total repointing may also be more sensible when access is difficult, requiring the erection of expensive scaffolding (unless the majority of the mortar is sound and unlikely to require replacement in the foreseeable future). Each project requires judgement based on a variety of factors. Recognizing this at the outset will help to prevent many jobs from becoming prohibitively expensive.

In scheduling, seasonal aspects need to be considered first. Generally speaking, wall temperatures between 40 and 95 degrees F (8 and 38 degrees C) will prevent freezing or excessive evaporation of the water in the mortar. Ideally, repointing should be done in shade, away from strong sunlight in order to slow the drying process, especially during hot weather. If necessary, shade can be provided for large-scale projects with appropriate modifications to scaffolding.

The relationship of repointing to other work proposed on the building must also be recognized. For example, if paint removal or cleaning is anticipated, and if the mortar joints are basically sound and need only selective repointing, it is generally better to postpone repointing

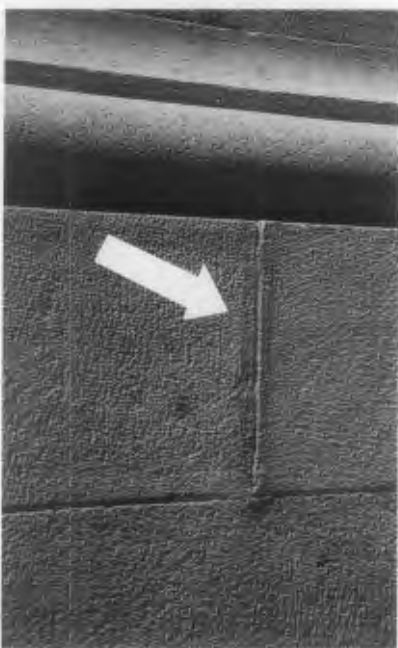


Figure 7. The dark stain on either side of the vertical joint on this sandstone waterable probably resulted from the use of a bonding agent that was not properly cleaned off the masonry after repointing. Photo: Anne Grimmer.

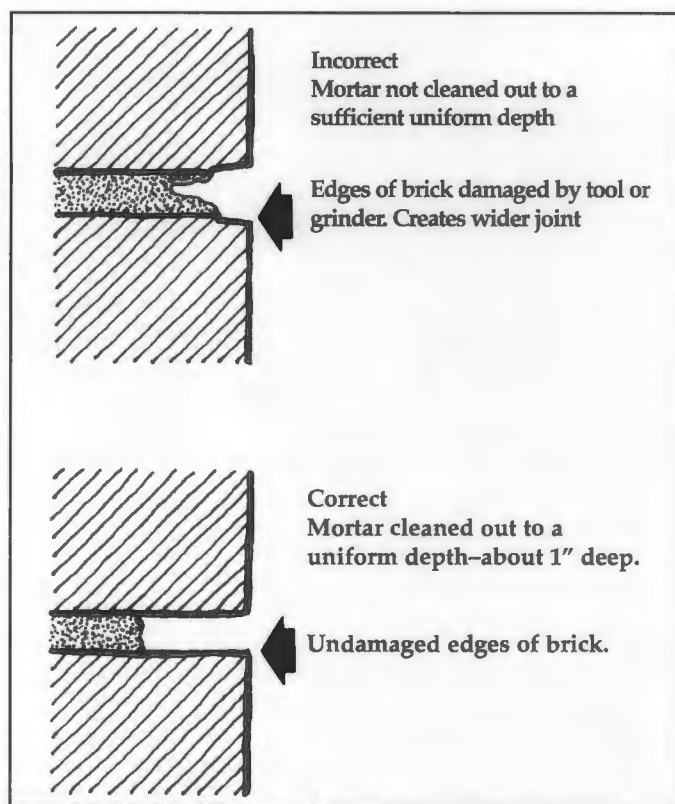


Figure 9. Comparison of incorrect and correct preparation of mortar joints for repointing. Drawing: Robert C. Mack, FAIA, and David W. Look, ALA.

until after completion of these activities. However, if the mortar has eroded badly, allowing moisture to penetrate deeply into the wall, repointing should be accomplished before cleaning. Related work, such as structural or roof repairs, should be scheduled so that they do not interfere with repointing and so that all work can take maximum advantage of erected scaffolding.

Building managers also must recognize the difficulties that a repointing project can create. The process is time consuming, and scaffolding may need to remain in place for an extended period of time. The joint preparation process can be quite noisy and can generate large quantities of dust which must be controlled, especially at air intakes to protect human health, and also where it might damage operating machinery. Entrances may be blocked from time to time making access difficult for both building tenants and visitors. Clearly, building managers will need to coordinate the repointing work with other events at the site.

Contractor Selection

The ideal way to select a contractor is to ask knowledgeable owners of recently repointed historic buildings for recommendations. Qualified contractors then can provide lists of other repointing projects for inspection. More commonly, however, the contractor for a repointing project is selected through a competitive bidding process over which the client or consultant has only limited control. In this situation it is important to ensure that the specifications stipulate that masons must have a minimum of five years' experience with repointing historic masonry buildings to be eligible to bid on the project. Contracts are awarded to the lowest *responsible*

bidder, and bidders who have performed poorly on other projects usually can be eliminated from consideration on this basis, even if they have the lowest prices.

The contract documents should call for unit prices as well as a base bid. Unit pricing forces the contractor to determine in advance what the cost addition or reduction will be for work which varies from the scope of the base bid. If, for example, the contractor has fifty linear feet less of stone repointing than indicated on the contract documents but thirty linear feet more of brick repointing, it will be easy to determine the final price for the work. Note that each type of work—brick repointing, stone repointing, or similar items—will have its own unit price. The unit price also should reflect quantities; one linear foot of pointing in five different spots will be more expensive than five contiguous linear feet.

Execution of the Work

Test Panels. These panels are prepared by the contractor using the same techniques that will be used on the remainder of the project. Several panel locations—preferably not on the front or other highly visible location of the building—may be necessary to include all types of masonry, joint styles, mortar colors, and other problems likely to be encountered on the job. If cleaning tests, for



Figure 10. Using a hammer and masonry chisel is the least damaging and, thus, generally the preferred method of removing old mortar in preparation for repointing historic masonry. Photo: John P. Speweik.



Figure 11. The damage to the edges and corners of these historic bricks was caused by using a mechanical grinder to rake out the joints. Note the overcutting of the head joint and the damage to the arises (corners) of the bricks. Photo: Lee H. Nelson, FAIA.



Figure 12.. A power grinder, operated correctly by a skilled mason may be used in preparation for repointing to cut wide, horizontal mortar joints, typical of many early-20th century brick structures without causing damage to the brick. Note the use of protective safety equipment. Photo: Robert C. Mack, FAIA.

example, are also to be undertaken, they should be carried out in the same location. Usually a 3 foot by 3 foot area is sufficient for brickwork, while a somewhat larger area may be required for stonework. These panels establish an acceptable standard of work and serve as a benchmark for evaluating and accepting subsequent work on the building.

Joint Preparation. Old mortar should be removed to a minimum depth of 2 to 2- 1/2 times the width of the joint to ensure an adequate bond and to prevent mortar "popouts" (Fig. 8). For most brick joints, this will require removal of the mortar to a depth of approximately 1 1/2 to 1 inch; for stone masonry with wide joints, mortar may need to be removed to a depth of several inches. Any loose or disintegrated mortar beyond this minimum depth also should be removed (Fig. 9).

Although some damage may be inevitable, careful joint preparation can help limit damage to masonry units. The traditional manner of removing old mortar is through the use of hand chisels and mash hammers (Fig. 10). Though labor-intensive, in most instances this method poses the least threat for damage to historic masonry units and produces the best final product.

The most common method of removing mortar, however, is through the use of power saws or grinders. The use of power tools by unskilled masons can be disastrous for historic masonry, particularly soft brick. Using power saws on walls with thin joints, such as most brick walls, almost always will result in damage to the masonry units by breaking the edges and by overcutting on the head, or vertical joints (Fig. 11).

However, small pneumatically-powered chisels generally can be used safely and effectively to remove mortar on historic buildings as long as the masons maintain appropriate control over the equipment.

Under certain circumstances, thin diamond-bladed grinders may be used to cut out *horizontal* joints only on hard portland cement mortar common to most early-20th century masonry buildings (Fig. 12). Usually, automatic tools most successfully remove old mortar without damaging the masonry units when they are used in combination with hand tools in preparation for repointing. Where horizontal joints are uniform and fairly wide, it may be possible to use a power masonry saw to assist the removal of mortar, such as by cutting along the middle of the joint; final mortar removal from the sides of the joints still should be done with a hand chisel and hammer. Caulking cutters with diamond blades can sometimes be used successfully to cut out joints without damaging the masonry. Caulking cutters are slow; they do not rotate, but vibrate at very high speeds, thus minimizing the possibility of damage to masonry units (Fig. 13). Although mechanical tools may be used safely in limited circumstances to cut out horizontal joints in preparation for repointing, they should never be used on vertical joints because of the danger of slipping and cutting into the brick above or below the vertical joint. Using power tools to remove mortar without damaging the surrounding masonry units also necessitates highly skilled masons experienced in working on historic masonry buildings. Contractors



Figure 13. (left) In preparation for repointing, the mortar joints on these granite steps are first cut out mechanically (note the vacuum attached to the cutting tool in foreground to cut down on dust). (right) Final removal of the old mortar is done by hand to avoid damage to the edges of the joints. Mechanical preparation of horizontal joints by an experienced mason may sometimes be acceptable, especially where the joints are quite wide and the masonry is a very hard stone. Photos: Anne Grimmer.

should demonstrate proficiency with power tools before their use is approved.

Using any of these power tools may also be more acceptable on hard stone, such as quartzite or granite, than on terra cotta with its glass-like glaze, or on soft brick or stone. The test panel should determine the acceptability of power tools. If power tools are to be permitted, the contractor should establish a quality control program to account for worker fatigue and similar variables.

Mortar should be removed cleanly from the masonry units, leaving square corners at the back of the cut. Before filling, the joints should be rinsed with a jet of water to remove all loose particles and dust. At the time of filling, the joints should be damp, but with no standing water present. For masonry walls—limestone, sandstone and common brick—that are extremely absorbent, it is recommended that a continual mist of water be applied for a few hours before repointing begins.

Mortar Preparation. Mortar components should be measured and mixed carefully to assure the uniformity of visual and physical characteristics. Dry ingredients are measured by volume and thoroughly mixed before the addition of any water. Sand must be added in a damp, loose condition to avoid over sanding. Repointing mortar is typically pre-hydrated by adding water so it will just hold together, thus allowing it to stand for a period of time before the final water is added. Half the water should be added, followed by mixing for approximately 5 minutes. The remaining water should then be added in small portions until a mortar of the desired consistency is reached. The total volume of water necessary may vary from batch to batch, depending on weather conditions. It is important

to keep the water to a minimum for two reasons: first, a drier mortar is cleaner to work with, and it can be compacted tightly into the joints; second, with no excess water to evaporate, the mortar cures without shrinkage cracks. Mortar should be used within approximately 30 minutes of final mixing, and “retempering,” or adding more water, should not be permitted.

Using Lime Putty to Make Mortar. Mortar made with lime putty and sand, sometimes referred to as roughage or course stuff, should be measured by volume, and may require slightly different proportions from those used with hydrated lime (Fig. 14). No additional water is usually needed to achieve a workable consistency because enough water is already contained in the putty. Sand is proportioned first, followed by the lime putty, then mixed for five minutes or until all the sand is thoroughly coated with the lime putty. But mixing, in the familiar sense of turning over with a hoe, sometimes may not be sufficient if the best possible performance is to be obtained from a lime putty mortar. Although the old practice of chopping, beating and ramming the mortar has largely been forgotten, recent field work has confirmed that lime putty and sand rammed and beaten with a wooden mallet or ax handle, interspersed by chopping with a hoe, can significantly improve workability and performance. The intensity of this action increases the overall lime/sand contact and removes any surplus water by compacting the other ingredients. It may also be advantageous for larger projects to use a mortar pan mill for mixing. Mortar pan mills which have a long tradition in Europe produce a superior lime putty mortar not attainable with today’s modern paddle and drum type mixers.

For larger repointing projects the lime putty and sand can be mixed together ahead of time and stored indefinitely, on or off site, which eliminates the need for piles of sand on the job site. This mixture, which resembles damp brown sugar, must be protected from the air in sealed containers with a wet piece of burlap over the top or sealed in a large plastic bag to prevent evaporation and premature carbonation. The lime putty and sand mixture can be recombined into a workable plastic state months later with no additional water.

If portland cement is specified in a lime putty and sand mortar—Type O (1:2:9) or Type K (1:3:11)—the portland cement should first be mixed into a slurry paste before adding it to the lime putty and sand. Not only will this ensure that the portland cement is evenly distributed throughout the mixture, but if dry portland cement is added to wet ingredients it tends to “ball up,” jeopardizing dispersion. (Usually water must be added to the lime putty and sand anyway once the portland cement is introduced.) Any color pigments should be added at this stage and mixed for a full five minutes. The mortar should be used within 30 minutes to 1 ½ hours and it should not be retempered. Once portland cement has been added the mortar can no longer be stored.

Filling the Joint. Where existing mortar has been removed to a depth of greater than 1 inch, these deeper areas should be filled first, compacting the new mortar in several layers. The back of the entire joint should be filled successively by applying approximately ¼ inch of mortar, packing it well into the back corners. This



Figure 14. Mixing mortar using lime putty: (a) proportioning sand; (b) proportioning lime putty; (c) placing lime putty on top of sand; (d) mixing sand over lime putty; (e) hand mixing mortar; and, (f) sample of mortar after mixing. Photos: John P. Speweik.

application may extend along the wall for several feet. As soon as the mortar has reached thumb-print hardness, another $\frac{1}{4}$ inch layer of mortar—approximately the same thickness—may be applied. Several layers will be needed to fill the joint flush with the outer surface of the masonry. It is important to allow each layer time to harden before the next layer is applied; most of the mortar shrinkage occurs during the hardening process and layering thus minimizes overall shrinkage.

When the final layer of mortar is thumb-print hard, the joint should be tooled to match the historic joint (Fig. 15). Proper timing of the tooling is important for uniform color and appearance. If tooled when too soft, the color will be lighter than expected, and hairline cracks may occur; if tooled when too hard, there may be dark streaks called “tool burning,” and good closure of the mortar against the masonry units will not be achieved.

If the old bricks or stones have worn, rounded edges, it is best to recess the final mortar slightly from the face of the masonry. This treatment will help avoid a joint which is visually wider than the actual joint; it also will avoid creation of a large, thin featheredge which is easily damaged, thus admitting water (Fig. 16). After tooling, excess mortar can be removed from the edge of the joint by brushing with a natural bristle or nylon brush. Metal bristle brushes should never be used on historic masonry.

Curing Conditions. The preliminary hardening of high-lime content mortars—those mortars that contain more lime by volume than portland cement, i.e., Type O (1:2:9), Type K (1:3:11), and straight lime/sand, Type “L” (0:1:3)—takes place fairly rapidly as water in the mix is lost to the porous surface of the masonry and through evaporation. A high lime mortar (especially Type “L”) left to dry out too rapidly can result in chalking, poor adhesion, and poor durability. Periodic wetting of the repointed area after the mortar joints are thumb-print hard and have been finish tooled may significantly accelerate the carbonation process. When feasible, misting using a hand sprayer with a fine nozzle can be simple to do for a day or two after repointing. Local conditions will dictate the frequency of wetting, but initially it may be as often as every hour and gradually reduced to every three or four hours. Walls should be covered with burlap for the first three days after repointing. (Plastic may be used, but it should be tented out and not placed directly against the wall.) This helps keep the walls damp and protects them from direct sunlight. Once carbonation of the lime has begun, it will continue for many years and the lime will gain strength as it reverts back to calcium carbonate within the wall.

Aging the Mortar. Even with the best efforts at matching the existing mortar color, texture, and materials, there will usually be a visible difference between the old and

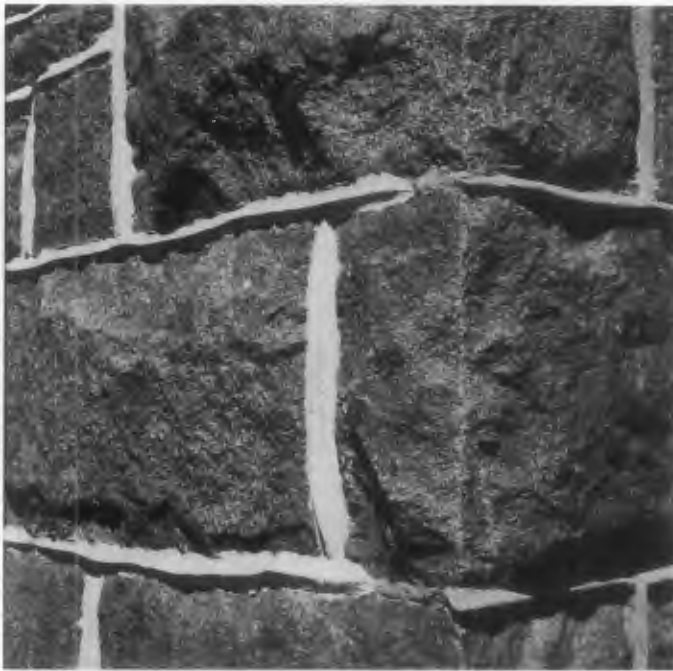


Figure 15. The profile of the repointed joints on the left replicate the historic joints around the corner to the right on the front of this stone building in Leesburg, VA. The contractor's pride in the repointing work is evident by the signature in the vertical joint. Photo: Anne Grimmer.

new work, partly because the new mortar has been matched to the unweathered portions of the historic mortar. Another reason for a slight mismatch may be that the sand is more exposed in old mortar due to the slight erosion of the lime or cement. Although spot repointing is generally preferable and some color difference should be acceptable, if the difference between old and new mortar is too extreme, it may be advisable in some instances to repoint an entire area of a wall, or an entire feature such as a bay, to minimize the difference between the old and the new mortar. If the mortars have been properly matched, usually the best way to deal with surface color differences is to let the mortars age naturally. Other treatments to overcome these differences, including cleaning the non-repointed areas or staining the new mortar, should be carefully tested prior to implementation.

Staining the new mortar to achieve a better color match is generally not recommended, but it may be appropriate in some instances. Although staining may provide an initial match, the old and new mortars may weather at different rates, leading to visual differences after a few seasons. In addition, the mixtures used to stain the mortar may be harmful to the masonry; for example, they may introduce salts into the masonry which can lead to efflorescence.

Cleaning the Repointed Masonry. If repointing work is carefully executed, there will be little need for cleaning other than to remove the small amount of mortar from the edge of the joint following tooling. This can be done with a stiff natural bristle or nylon brush after the mortar has dried, but before it is initially set (1-2 hours). Mortar that has hardened can usually be removed with a wooden paddle or, if necessary, a chisel.

Further cleaning is best accomplished with plain water and natural bristle or nylon brushes. If chemicals must

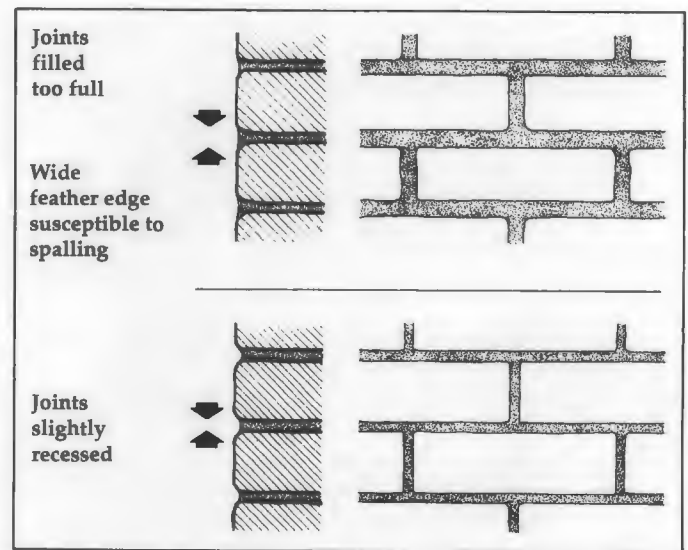


Figure 16. Comparison of visual effect of full mortar joints vs. slightly recessed joints. Filling joints too full hides the actual joint thickness and changes the character of the original brickwork. Drawing: Robert C. Mack, FAIA.

be used, they should be selected with extreme caution. Improper cleaning can lead to deterioration of the masonry units, deterioration of the mortar, mortar smear, and efflorescence. New mortar joints are especially susceptible to damage because they do not become fully cured for several months. Chemical cleaners, particularly acids, should never be used on dry masonry. The masonry should always be completely soaked once with water before chemicals are applied. After cleaning, the walls should be flushed again with plain water to remove all traces of the chemicals.

Several precautions should be taken if a freshly repointed masonry wall is to be cleaned. First, the mortar should be fully hardened before cleaning. Thirty days is usually sufficient, depending on weather and exposure; as mentioned previously, the mortar will continue to cure even after it has hardened. Test panels should be prepared to evaluate the effects of different cleaning



Figure 17. This photograph shows the significant visual change to the character of this historic brick building that has resulted from improper repointing procedures and a noticeably increased thickness of the mortar joints. Photo: Lee H. Nelson, FAIA.

Mortar Types				Suggested Mortar Types for Different Exposures			
(Measured by volume)				Exposure			
Designation	Cement	Hydrated Lime or Lime Putty	Sand	Masonry Material	Sheltered	Moderate	Severe
M	1	1/4	3 - 3 3/4	Very Durable: granite, hard-cored brick, etc. Moderately Durable: limestone, durable stone, molded brick Minimally Durable: soft hand-made brick	O	N	S
S	1	1/2	4 - 4 1/2				
N	1	1	5 - 6				
O	1	2	8 - 9	K	O	N	
K	1	3	10 - 12				
"L"	0	1	2 1/4 - 3	"L"	K	O	

methods. Generally, on newly repointed masonry walls, only very low pressure (100 psi) water washing supplemented by stiff natural bristle or nylon brushes should be used, except on glazed or polished surfaces, where only soft cloths should be used.**

New construction "bloom" or efflorescence occasionally appears within the first few months of repointing and usually disappears through the normal process of weathering. If the efflorescence is not removed by natural processes, the safest way to remove it is by dry brushing with stiff natural or nylon bristle brushes followed by wet brushing. Hydrochloric (muriatic) acid, is generally ineffective, and it should not be used to remove efflorescence. It may liberate additional salts, which, in turn, can lead to more efflorescence.

Surface Grouting is sometimes suggested as an alternative to repointing brick buildings, in particular. This process involves the application of a thin coat of cement-based grout to the mortar joints and the mortar/brick interface. To be effective the grout must extend slightly onto the face of the masonry units, thus widening the joint visually. The change in the joint appearance can alter the historic character of the structure to an unacceptable degree. In addition, although masking of the bricks is intended to keep the grout off the remainder of the face of the bricks, some level of residue, called "veiling," will inevitably remain. Surface grouting cannot substitute for the more extensive work of repointing, and it is not a recommended treatment for historic masonry.

Summary

For the Owner/Administrator. The owner or administrator of a historic building should remember that repointing is likely to be a lengthy and expensive process. First, there must be adequate time for evaluation of the building and investigation into the cause of problems. Then, there will be time needed for preparation of the contract documents. The work itself is precise, time-consuming and noisy, and scaffolding may cover the face of the building for some time. Therefore, the owner must carefully plan the work to avoid problems. Schedules for both repointing and other activities will thus require careful coordination to avoid unanticipated conflicts. The owner must avoid the tendency to rush the work or cut corners if the historic building is to retain its visual integrity and the job is to be durable.

For the Architect/Consultant. Because the primary role of the consultant is to ensure the life of the building, a knowledge of historic construction techniques and the special problems found in older buildings is essential. The consultant must assist the owner in planning for logistical problems relating to research and construction. It is the consultant's responsibility to determine the cause of the mortar deterioration and ensure that it is corrected before the masonry is repointed. The consultant must also be prepared to spend more time in project inspections than is customary in modern construction.

For the Masons. Successful repointing depends on the masons themselves. Experienced masons understand the special requirements for work on historic buildings and the added time and expense they require. The entire masonry crew must be willing and able to perform the work in conformance with the specifications, even when the specifications may not be in conformance with standard practice. At the same time, the masons should not hesitate to question the specifications if it appears that the work specified would damage the building.

**Additional information on masonry cleaning is presented in *Preservation Briefs 1: The Cleaning and Waterproof Coating of Masonry Buildings*, Robert C. Mack, AIA, Washington, D.C.: Technical Preservation Services, National Park Service, U.S. Department of the Interior, 1975; and *Keeping it Clean: Removing Exterior Dirt, Paint, Stains & Graffiti from Historic Masonry Buildings*, Anne E. Grimmer, Washington, D.C.: Technical Preservation Services, National Park Service, U.S. Department of the Interior, 1988.

Visually Examining the Mortar and the Masonry Units

A simple in-situ comparison will help determine the hardness and condition of the mortar and the masonry units. Begin by scraping the mortar with a screwdriver, and gradually tapping harder with a cold chisel and mason's hammer. Masonry units can be tested in the same way beginning, even more gently, by scraping with a fingernail. This relative analysis which is derived from the 10-point hardness scale used to describe minerals, provides a good starting point for selection of an appropriate mortar. It is described more fully in "The Russack System for Brick & Mortar Description" referenced in **Selected Reading** at the end of this Brief.

Mortar samples should be chosen carefully, and picked from a variety of locations on the building to find unweathered mortar, if possible. Portions of the building may have been repointed in the past while other areas may be subject to conditions causing unusual deterioration. There may be several colors of mortar dating from different construction periods or sand used from different sources during the initial construction. Any of these situations can give false readings to the visual or physical characteristics required for the new mortar. Variations should be noted which may require developing more than one mix.

- 1) Remove with a chisel and hammer three or four unweathered samples of the mortar to be matched from several locations on the building. (Set the largest sample aside—this will be used later for comparison with the repointing mortar). Removing a full representation of samples will allow selection of a "mean" or average mortar sample.
- 2) Mash the remaining samples with a wooden mallet, or hammer if necessary, until they are separated into their constituent parts. There should be a good handful of the material.
- 3) Examine the powdered portion—the lime and/or cement matrix of the mortar. Most particularly, note the color. There is a tendency to think of historic mortars as having white binders, but grey portland cement was available by the last quarter of the 19th century, and traditional limes were also sometimes grey. Thus, in some instances, the natural color of the historic binder may be grey, rather than white. The mortar may also have been tinted to create a colored mortar, and this color should be identified at this point.
- 4) Carefully blow away the powdery material (the lime and/or cement matrix which bound the mortar together).
- 5) With a low power (10 power) magnifying glass, examine the remaining sand and other materials such as lumps of lime or shell.
- 6) Note and record the wide range of color as well as the varying sizes of the individual grains of sand, impurities, or other materials.

Other Factors to Consider

Color. Regardless of the color of the binder or colored additives, the sand is the primary material that gives mortar



Figure 19. Mortar joints of 18th century brick buildings were often as much as 1/2 inch wide, cut flush and struck with a grapevine joint, but for window and door surrounds where a finer quality rubbed brick was used, mortar joints were very thin. Photo: National Park Service Files.

its color. A surprising variety of colors of sand may be found in a single sample of historic mortar, and the different sizes of the grains of sand or other materials, such as incompletely ground lime or cement, play an important role in the texture of the repointing mortar. Therefore, when specifying sand for repointing mortar, it may be necessary to obtain sand from several sources and to combine or screen them in order to approximate the range of sand colors and grain sizes in the historic mortar sample.

Pointing Style. Close examination of the historic masonry wall and the techniques used in the original construction will assist in maintaining the visual qualities of the building (Fig. 18). Pointing styles and the methods of producing them should be examined. It is important to look at both the horizontal and the vertical joints to determine the order in which they were tooled and whether they were the same style. Some late-19th and early-20th century buildings, for example, have horizontal joints that were raked back while the vertical joints were finished flush and stained to match the bricks, thus creating the illusion of horizontal bands. Pointing styles may also differ from one facade to another; front walls often received greater attention to mortar detailing than side and rear walls (Fig. 19).

Tuckpointing is not true repointing but the



Figure 20. This stone garden wall was tuckpointed to match the tuckpointing on the c. 1920s house on the property. Photo: Anne Grimmer.



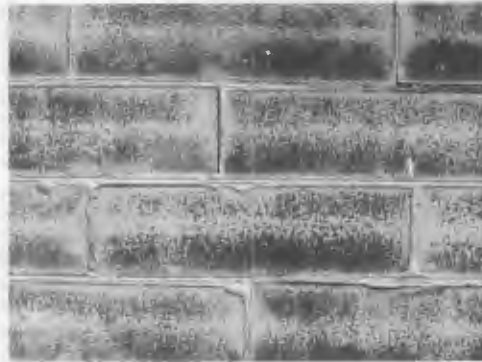
a



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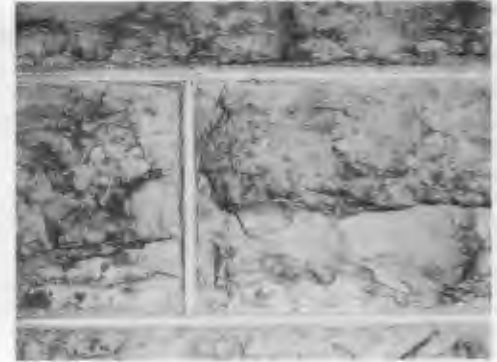


c



f

Figure 18. A cross-section of mortar joint types. (a) Grapevine joints on a mid-18th century brick building; (b) flush joints on a mid-to-late 19th century brick building; (c) beaded joints on a late-19th century brick building; (d) early-20th century beaded joints on rough-cut limestone where the vertical joints were struck prior to the horizontal joints; (e) raked joints on 1920s wire brick; (f) horizontal joints on a 1934 building designed by Frank Lloyd Wright where the vertical joints were raked back from the face of the bricks, and the horizontal joints were filled with a red-tinted mortar to emphasize the horizontality of the narrow bricks, and struck flush with the face of the bricks; (g) the joints on this 20th century glazed terracotta tile building are raked slightly, emphasizing the glazed block face. Photos: National Park Service Files (a,b,e); Robert C. Mack, FAIA (c,d,f,g).



d



g

application of a raised joint or lime putty joint on top of flush mortar joints (Fig. 20). **Penciling** is a purely decorative, painted surface treatment over a mortar joint, often in a contrasting color.

Masonry Units. The masonry units should also be examined so that any replacement units will match the historic masonry. Within a wall there may be a wide range of colors, textures, and sizes, particularly with hand-made brick or rough-cut, locally-quarried stone. Replacement units should blend in with the full range of masonry units rather than a single brick or stone.

Matching Color and Texture of the Repointing Mortar

New mortar should match the unweathered interior portions of the historic mortar. The simplest way to check the match is to make a small sample of the proposed mix and allow it to cure at a temperature of approximately 70 degrees F for about a week, or it can be baked in an oven to speed up the curing; this sample is then broken open and the surface is compared

with the surface of the largest "saved" sample of historic mortar.

If a proper color match cannot be achieved through the use of natural sand or colored aggregates like crushed marble or brick dust, it may be necessary to use a modern mortar pigment.

During the early stages of the project, it should be determined how closely the new mortar should match the historic mortar. Will "quite close" be sufficient, or is "exactly" expected? The specifications should state this clearly so that the contractor has a reasonable idea how much time and expense will be required to develop an acceptable match.

The same judgment will be necessary in matching replacement terra cotta, stone or brick. If there is a known source for replacements, this should be included in the specifications. If a source cannot be determined prior to the bidding process, the specifications should include an estimated price for the replacement materials with the final price based on the actual cost to the contractor.

Conclusion

A good repointing job is meant to last, at least 30 years, and preferably 50-100 years. Shortcuts and poor craftsmanship result not only in diminishing the historic character of a building, but also in a job that looks bad, and will require future repointing sooner than if the work had been done correctly (Fig. 17). The mortar joint in a historic masonry building has often been called a wall's "first line of defense." Good repointing practices guarantee the long life of the mortar joint, the wall, and the historic structure. Although careful maintenance will help preserve the freshly repointed mortar joints, it is important to remember that mortar joints are intended to be sacrificial and will probably require repointing some time in the future. Nevertheless, if the historic mortar joints proved durable for many years, then careful repointing should have an equally long life, ultimately contributing to the preservation of the entire building.

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Useful Addresses

Brick Institute of America
11490 Commerce Park Drive
Reston, VA 22091

National Lime Association
200 N. Glebe Road, Suite 800
Arlington, VA 22203

Portland Cement Association
5420 Old Orchard Road
Skokie, IL 60077

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This publication has been prepared pursuant to the National Historic Preservation Act of 1966, as amended, which directs the Secretary of the Interior to develop and make available information concerning historic properties. Comments about this publication should be directed to de Teel Patterson Tiller, Chief, Heritage Preservation Services Program, National Park Service, 1849 C Street, N.W. Suite NC200, Washington, D.C. 20240. This publication is not copyrighted and can be reproduced without penalty. Normal procedures for credit to the authors and the National Park Service are appreciated.

Front Cover: Repointing a historic brick building using a lime-based mortar. Traditional lime mortars have a consistency that enables the mortar to cling to a repointing tool while in a vertical position. Photo: John P. Speweik.

HOME IMPROVEMENT > EXTERIOR REMODEL

How to Choose the Right Mortar Mix Type: N, O, S, or M

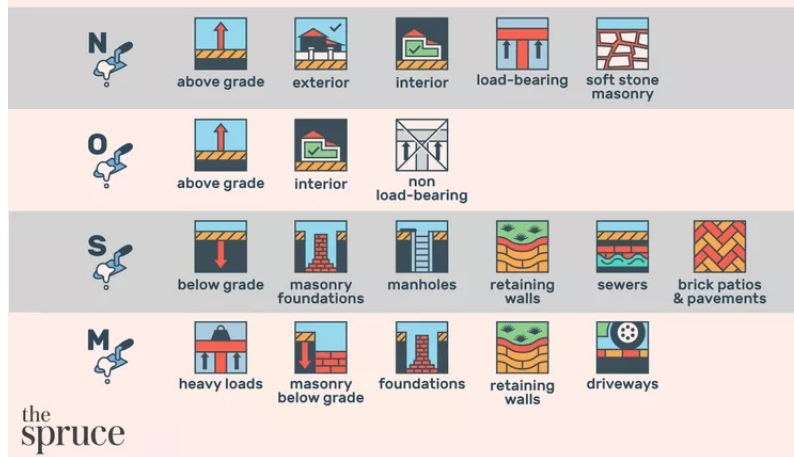
Understanding the Differences for Your Next Project

By [JUAN RODRIGUEZ](#) | Updated on 08/16/22

 Reviewed by [JOHNATHAN BREWER](#)

 Fact checked by [SARAH SCOTT](#)

How to Choose the Right Mortar Mix Type



 The Spruce

[Mortar is the element](#) that bonds bricks or other masonry units together and provides structural capacity to the wall or other structure. There are four main types of mortar mix: N, O, S, and M. Each type is mixed with a different ratio of cement, lime, and sand to produce specific performance characteristics such as flexibility, bonding properties, and compressive strength. The best type of mortar and its use depends on the application and the various design specifications for the masonry construction project.

Tip

[Mortar material](#) is made with Portland cement, hydrated lime, and sand combined in specific proportions to meet required specifications.

[SKIP TO CONTENT](#)

of Portland
cements
for shower

pans.

Type N Mortar Mix

Type N mortar is usually recommended on exterior and above-grade walls (including stone veneer) that are exposed to severe weather and high heat. Type N mortar mix has a medium compressive strength and it is composed of 1 part Portland cement, 1 part lime, and 6 parts sand. It is considered to be a general-purpose mix, useful for above grade, exterior, and interior load-bearing installations. It is also the preferred mortar mix for soft stone masonry (such as limestone). Type N is the mortar most often used by homeowners and is the best choice for general application. It typically achieves 28-day strength in the range of 750 pounds per square inch (psi).

Tip

It's good practice to apply a roll-on waterproofing membrane to seal masonry work once completed.^[1]

Type O Mortar Mix

Type O mortar mix has relatively low compressive strength, at only about 350 psi. It is used primarily for interior, above-grade, non-load-bearing walls. Type O can be used as an alternative to Type N for some interior applications, but its exterior use is limited due to its low structural capacity. It is not recommended in areas subjected to high winds. However, type O mortar mix is ideal for [repointing and similar repair work](#) on existing structures, due to its consistency and ease of application.

Type S Mortar Mix

Offering a high compressive strength of over 1,800 psi and high-tensile bond strength, type S mortar is suitable for many projects at or below grade. It performs extremely well to withstand soil pressure and wind and seismic loads. Type S is the common choice for many below-grade applications, such as masonry foundations, manholes, retaining walls, and sewers, as well as at-grade projects like [brick patios](#) and walkways. Although type S mortar must have a minimum compressive strength of 1,800 psi, it is often mixed for strengths between 2,300 and 3,000 psi.

Tip

If you are working with [glass block](#), you will need a special white glass block mortar. Though technically it is considered a type S

[SKIP TO CONTENT](#)

Type M Mortar Mix

Type M mortar mix has the highest amount of Portland cement and is recommended for heavy loads and below-grade applications, [including foundations](#), retaining walls, and driveways. While type M mortar provides at least 2,500 psi of compressive strength, it offers relatively poor adhesion and sealing properties, making it unsuitable for many exposed applications. Type M is preferred for use with natural stone because it offers similar strength to that of stone.

Tip

If you're working on a project such as a [fire pit, fireplace, or chimney](#), you will need to use a special high heat mortar, also known as refractory mortar, which is formulated to handle high temperatures.

Type K Mortar Mix

Type K mortar is rarely used for new construction but may be specified for restoration or other specialty applications. It offers a very low compressive strength of only about 75 psi. Because of its softness, type K is primarily used for restoring the masonry on historic or ancient buildings that require a special mix that is not significantly stronger than the existing masonry.

Article Sources 

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