

AGENDA

LANDMARKS & DESIGN COMMISSION

August 15, 2023

Hybrid Meeting In-person and via Zoom



<https://us02web.zoom.us/j/84145669740?pwd=TmgxblFIMVViWnJoZ2tzWFI5dG5yUT09>

Meeting ID: 841 4566 9740
Passcode: 079961

AMERICANS WITH DISABILITIES ACT

**CITY OF ELLENSBURG
LANDMARKS & DESIGN COMMISSION AGENDA
Council Chambers
501 North Anderson Street
Ellensburg, WA 98926
And remotely via Zoom
Tuesday, August 15, 2023
5:45 PM - Regular Meeting**

- 1. Call to Order and Roll Call of Members**
- 2. Approval of Agenda (No Public Comment)**
- 3. Approval of Minutes**
 - 3.A Approval of Minutes 7.18.23
- 4. New Business**
 - 4.A First Railroad Addition Survey Review
 - 4.B Brick Mortar Resource
- 5. Unfinished Business**
- 6. Citizen Comment**
- 7. Staff Update/Discussion Items**
- 8. Commission Representative Update**
- 9. Adjournment**



For more information on the Landmarks & Design Commission, contact Senior Planner Stacey Henderson at 509-925-8608.



CITY OF ELLENSBURG

Minutes of Landmarks & Design Commission, Regular Meeting

Date of Meeting

July 18, 2023

Time of Meeting

5:45 PM

Place of Meeting

**Council Chambers
501 North Anderson Street
Ellensburg, WA 98926
And remotely via Zoom**

1. Call to Order and Roll Call of Members

2. Approval of Agenda

Commissioner Stanley motioned to approve the agenda. Motion passed 5-0

3. Approval of Minutes

3.A Review of June 21, 2023 LDC Meeting Minutes.

Commissioner Watson motioned to approve the minutes from June 21, 2023. Motion passed 5-0.

4. New Business

4.A Public Hearing for Consideration of a Certificate of Appropriateness (COA) for the previously installed shed roof structure at 111 W 4th Ave.

Appearance of fairness completed. Staff report read. Henderson recommended approval of COA for the existing structure with no conditions and findings of fact apply as stated in the staff report. Public Comment opened. Applicant Leo D'Acquisto was present and spoke about his project. Public comment closed. Commissioner Watson motioned to approve the existing shed roof structure on the back patio, as constructed, at 111 West 4th Ave, with no conditions. Findings of Fact as outlined from staff report on page 8-9 and findings #1-5 are applicable. Motion Passed 5-0.

4.B Roberts Rules Process Discussion

Roberts Rules summarized. A recommended motion will now be part of the agenda packet. Findings of Fact can be stated the Commissioner agrees with per staff report on page x-x as provided. If a motion gets a 2nd, then the Commission can discuss it; otherwise a new motion would be needed. The new motion would be a motion to amend the original motion and then a vote is needed for the amendment to the motion. The final motion would be for the original motion with the amendment.

5. Unfinished Business

None

6. Citizen Comment

None

7. Staff Update/Discussion Items

New members will finish onboarding and provide certificates to staff.

The first meeting in August will be canceled due to no current COA's.

The next meeting will be August 15th, 2023. The meeting will be utilized for training.

8. Commission Representative Update

Commissioner Watson suggested the City powder coat the garbage cans and planters so they don't rust.

Commissioner Stanley asked for an update on the sign on the awning where the Valley Cafe used to be located.

New grant application was emailed to Commission members to utilize or provide to others.

8.A EDA Representative Update

EDA has several more murals in the planning stages.

9. Adjournment



Meeting Date: August 15, 2023

**City of Ellensburg
Landmarks & Design Commission Agenda Report**

Agenda Subject: First Railroad Addition Survey Review
Submitted by:
Department: Community Development

Suggested Motion/Action:
No Motion- Discussion Item

Background/Summary:
BACKGROUND:

A CLG Grant was awarded to the City of Ellensburg in spring of 2021 for the 2022 calendar year. This grant is federal funds issued through the Washington Department of Archaeology and Historic Preservation to Certified Local Government organizations. The public meeting on January 19, 2022 is the first of two public meetings to be held with regards to this project. Public notices for this meeting included a newspaper notice and letters mailed to the residents of the neighborhood. This is the first opportunity to explain the project to the public before the survey work begins.

THE PROJECT:

The project is to conduct a Reconnaissance Level Survey of the Historic First Railroad Addition Historic District, which will take place from January to September of 2022. The original nominations for these districts were completed in 1987, and it is time to update the information in these documents with additional information and changes to structures. Conducting this survey is the first step towards providing the information necessary to update these nomination forms and possibly expand the district boundaries.

DELIVERABLES:

Staff, and the City Preservation consultant, will be completing historic property inventory (HPI) forms for each structure within these districts, as well as compiling a survey report, and holding a second public presentation in August 2022. Information to be gathered includes historic context of the district, property type, location information, physical description, determination of eligibility, and digital images.

WISAARD MAP RESOURCES:

wisaard.dahp.wa.gov

<https://dahp.wa.gov/project-review/wisaard-washington-information-system-for-architectural-and-archeological-records-data>

Previous Council Action:**Analysis:**

As discussed at previous meetings, commissioners shall review the report and deliverables provided, and determine areas that need revision before moving forward. In addition, planning next steps towards nomination updates shall occur, to keep project moving forward.

Financial Impact:

Budget Adjustment: No

Attachments:

1. Survey Report_9-1_Final

**Ellensburg
First Railroad Addition Historic District
Survey Report**



"Residence Section, Ellensburg, Washington" 1923, (EPL)

Prepared for
City of Ellensburg
Community Development Department
Ellensburg Landmarks and Design Commission
DAHP# 2022-01-00206

Prepared by
Sarah Desimone, MAHP
Desimone Preservation

2022

This survey has been financed in part with Federal funds from the National Park Service, Department of the Interior administrated by the Department of Archaeology and Historic Preservation (DAHP) and the City of Ellensburg. However, the contents and opinions do not necessarily reflect the views or policies of the Department of the Interior, DAHP, nor does the mention of trade names or commercial products constitute endorsement or recommendation by the Department of the Interior or DAHP.

Ellensburg
First Railroad Addition Historic District
Survey Report

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ABSTRACT

This survey yielded 107 new HPI forms input into WISAARD and a survey report. The following survey report provides supporting contextual information and recommended next steps regarding possible district nomination updates. Of the 107 properties surveyed, a total of 79 are recommended contributing to a revised National and/or local register historic district, 21 are recommended non-contributing, and seven have been demolished. Of the properties considered non-contributing in the 1986 National Register nomination, five are now recommended contributing either because they have achieved significance over time, or their associative significance has been reevaluated.

Based on survey results, the original National Register boundaries continue to retain sufficient integrity, and an amended National Register boundary could encompass the area of the current Local Landmark District. Considering the number of properties built between 1935 and 1952, and the two infill homes built as late as 1968, it would be appropriate to expand the period of significance to 1895-1968. The houses retain sufficient historic integrity and architectural style, so the expanded and updated National Register and Local Landmark district nomination would qualify under Criterion C for the National Register, and under Criterion 3 with the local Ellensburg Landmarks register.

INTRODUCTION

Background and Project Goals

The City of Ellensburg received a grant from the Washington State Department of Archaeology and Historic Preservation (DAHP) in late-2021 to fund the survey of an area encompassing the current local and national First Railroad Addition historic districts. The local historic district encompasses a slightly larger area than the National Register historic district and is codified in the Ellensburg City Code by way of a map but does not have a nomination document with survey forms for each individual property. The survey forms and nomination document for the First Railroad Addition National Register Historic District were written in 1986 and while the district has maintained a high degree of overall integrity, the forms need to be updated and the context statement expanded.

The period of significance for the National Register district is 1895-1935. In order for a property to be listed in the National Register, it must be at least fifty years of age unless it is of exceptional importance. At the time of the last survey in 1985, properties built after 1935 could not be included in the nomination. As a result, many of these properties have not been evaluated.

The goal of the survey is to evaluate the district's integrity, update the district's historic context, and inform a possible expansion of the National Register district boundaries to match the existing Ellensburg Local Landmarks Historic District boundaries.

Evaluator Qualifications

Sarah Desimone conducted the field survey and archival research and prepared this report. Mrs. Desimone has a Master's Degree in Historic Preservation from Savannah College of Art and Design and is a qualified architectural historian as defined in the Code of Federal Regulations, 36 CFR Part 61.

Sarah Desimone was selected as the consultant for the project as she already has a contract with the City of Ellensburg to perform on-call historic preservation planning services.

Survey Area

The survey area encompasses Blocks 25-29, 15-19, and the north half of Blocks 5-9 of the First Railroad Addition to Ellensburg (1888). This translates roughly to the area bound by North Main Street to the west and North Wildcat Way to the east, and from the south side of 11th Street to the north side of University Way (see map 23). The total number of properties included in the survey is 107.

Research Design and Survey Methodology

Background research began in January of 2022 and in-person field survey of properties in the First Railroad Addition historic districts was conducted from February 23 - February 26, 2022. At this time, all properties were photographed and evaluated in accordance with the Washington State Guidelines for Cultural Resource Reporting and recorded in WISAARD. Survey site numbers correspond loosely with the numbering used in the 1986 National Register nomination form with the addition of the local register parcels. Properties were evaluated at a reconnaissance level for integrity and significance under Criterion C. Some properties were also evaluated under Criterion A, B and/or Criteria Consideration G. Archival research began in February and continued through June and this report was written from April – July, 2022.

Research sources included:

- Historic property records and current property information from the Kittitas County Assessor's Office and the Central Regional Branch of the Washington State Archives.
- Historic *Sanborn* and plat maps, historic *Polk Directories*, property information, local history documents and historic newspapers from the Kittitas County Historical Museum.
- Previous register nominations and surveys including the First Railroad Addition Historic District National Register Nomination (1986), the Downtown Ellensburg Historic District National Register nomination (2019) and CWU Campus Buildings Determination of Eligibility document (2015).
- WISAARD, the Washington Information System for Archaeological and Architectural Records.

- Publications on historic architectural styles, urban and suburban development in the United States and various period resources including advertisements.

Acknowledgements

The report author wishes to recognize the assistance provided by the City and county and their various repositories and public library collections as well as several property owners who contributed their personal research materials.

City of Ellensburg	Kirsten Sackett, Community Development Director Stacey Henderson, Senior Historic Preservation Planner GIS Specialist City of Ellensburg, Stephen Ramella
Ellensburg Public Library	Regina Tipton-Llamas, Library Reference Supervisor & Local Historian
Ellensburg Landmarks And Design Commission	Dorothy Stanley Maurice Blackson Zane Kanyer Fred Redmon Amy McCoy Darren Reid
Kittitas County Historical Museum	Sadie Thayer, Museum Director
Property Owners	David Cross John Shaw Anthony Clayton Karen and Larry Gookin John and Linda Graf

2. ELLENSBURG CONTEXT

Early Development

The City of Ellensburg is located in the Kittitas Valley in Central Washington at nearly the geographic center of the state. Surrounded by three mountain ranges, the city is located in the Shrubsteppe Region of the state whose landscape is characterized by rolling grassy plains, canyons and streams. The historical center of the city sits to the east of the Yakima River and Interstate-90 and is traversed by Wilson and Mercer Creeks. Prior to white settlement, the area was known to be a gathering place for the Kittitas band of the Yakama Nation and other tribes of the Columbia plateau region.¹ By 1859, after the Yakama Nation was forced to cede their lands

¹ Andrew Jackson Splawn, Ka-mi-akin, the Last Hero of the Yakimas, Caldwell, ID: The Caxton Printers Ltd. 1958.

to the U.S. by way of the Treaty of 1855, cattlemen began driving herds through the Kittitas Valley and the first permanent white settlers began to arrive.²

William Bud Wilson filed the first claim in Ellensburg where he built a log cabin on what would become known as Wilson Creek. In 1870, cattlemen Andrew Jackson Splawn and Ben Burch purchased Wilson's cabin and moved it to a site on what is now East 3rd Ave. between N. Main and N. Water streets.³ Intending to capitalize on the Indian fur trade and cattle drives through the valley, the two opened the first trading post and called it "Robber's Roost."⁴

In 1871, John and Mary Ellen Shoudy came to Ellensburg from Seattle while John was on a scouting mission to build a wagon road from Seattle to the Kittitas Valley. Shoudy purchased all of the Robber's Roost inventory from A. J. Splawn who was by that time the sole owner. According to Splawn, he later gifted Jon and Mary Ellen his squatter's right to the 160 acres of land now comprising the city of Ellensburg. John built a new two-story wood frame building to house the new store and Mary Ellen would later open a millinery shop in what is now the Shoudy-Caldwell block.⁵⁶ In 1875, John Shoudy platted 80 of his 160 acres into the town of Ellensburgh, so named in honor of his wife Mary Ellen (renamed "Ellensburg" in 1894).⁷

The town grew slowly over the next decade but when Kittitas County was established in 1884 and Ellensburg was named the county seat, growth began to pick up. In 1885, the population was approximately 600 and by 1887 it had doubled to 1200, largely in part to the Northern Pacific Railroad which had arrived in Ellensburgh from Yakima in 1886 and completed its track all the way to Puget Sound.⁸ As an enticement for choosing Ellensburgh as a depot location, the Shoudy's and other settler's gave land to the Northern Pacific Railroad and in 1888, the Northern Pacific Railroad platted the First Railroad Addition. Soon after, Ellensburgh was featured in an 1889 edition of *Northwest Illustrated Monthly Magazine*, a magazine distributed largely on the east coast and devoted to "western progress." Investors from the east coast and the Seattle area began purchasing lots on spec and the city saw a huge real estate boom.⁹ By 1891, 29 additional plats had been filed and the population surpassed 2,500.

On July 4, 1889, a fire wiped out as many as 200 houses and ten brick blocks and kicked off a new decade full of hardship. Looking to rebuild and establish new industries in the city, the Ellensburgh Improvement Company was incorporated and began working to establish the city

² Paula Becker, HistoryLink, "Ellensburg- Thumbnail History," 2005. Electronic document <https://www.historylink.org/File/7554>, accessed April 23, 2022.

³ Andrew Jackson Splawn, *Ka-mi-akin, the Last Hero of the Yakimas*, Caldwell, ID: The Caxton Printers Ltd. 1958.

⁴ Ibid.

⁵ Ibid.

⁶ Paula Becker, HistoryLink, "Ellensburg- Thumbnail History," 2005. Electronic document

⁷ Donald W. Meyers, "It Happened Here: Mary Ellen Shoudy becomes 'Mother of Ellensburg'" *Yakima Herald-Republic*. March 3, 2019. Electronic Document https://www.yakimaherald.com/news/local/it-happened-here-mary-ellen-shoudy-becomes-mother-of-ellensburg/article_2e13d7fe-3d42-11e9-8317-27e70fef1103.html, Accessed April 23, 2022.

⁸ Kittitas County Historical Museum, Timeline. Electronic document, <https://kchm.org/timeline/> Accessed April 23, 2022.

⁹ Samuel R. Mohler, "Boom Days in Ellensburg, 1888-1891" *The Pacific Northwest Quarterly*, Vol. 36, No.4, October 1945.

as an iron and brick manufacturing center.¹⁰ The idea did not pan out, however, and by 1891 real estate values had collapsed and banks and businesses failed.¹¹

In the midst of the economic downturn, the Washington State Normal School, which would later become Central Washington University, was established in Ellensburg. The school began holding classes in a local public school but by 1894, Barge Hall had been constructed at the corner of what are today named E. University and N. Wildcat Way, in the southeastern corner of the First Railroad Addition. By 1937, the name of the school changed to Central Washington College of Education and then to Central Washington State College in 1961. In 1977, the name was changed a third time to Central Washington University.¹² Two buildings were built in 1907 and 1908, a heating plant and Edison Hall, respectively, and the Chicago, Milwaukee, St. Paul, and Pacific electric railroad opened in 1908 in what is presently the northern portion of campus.¹³

Early and Mid-20th Century Development

During the early 20th century, the First Railroad Addition neighborhood saw another large period of growth. In 1904, the State Legislature approved funding to expand the CWU campus. Growing northward, the campus doubled its original size by 1904.

Between 1911 and 1920, the High Line Canal, an irrigation project by the Kittitas Reclamation District, was constructed in the Kittitas Valley. This helped to fuel the economy and Ellensburg's population increased. During this era, the state also developed a plan to expand advanced educational opportunities for everyone which meant there was a greater demand for teachers from CWU and the other state Normal Schools.¹⁴ The school once again expanded in 1911 and found itself scrambling to find housing for students. A temporary plan was implemented to allow private citizens to lease out rooms to students and the First Railroad Addition was the natural choice due to its proximity to the school.¹⁵ In 1925, the State Legislature funded the construction of a new library (Smyser Hall) and passed a bill that enabled Normal Schools to expand further by adding dormitories and student activity buildings and by 1928, CWU had all three.

As the campus grew, so did the population of Ellensburg and the population of the First Railroad Addition district. Population growth during this period is apparent in the neighborhood as approximately 30 homes were constructed between 1911 and 1930. Both campus expansion and construction in the district mostly halted during the Great Depression but picked up again after World War II. After 1944, the remaining seven lots were improved, probably due to the implementation of the Servicemen's Readjustment Act of 1944, or GI Bill.¹⁶

¹⁰ Ibid.

¹¹ Ellensburg Dawn, property valuation notices, September 1, 1899. Pg.7

¹² Mohler, 1967

¹³ Walton,

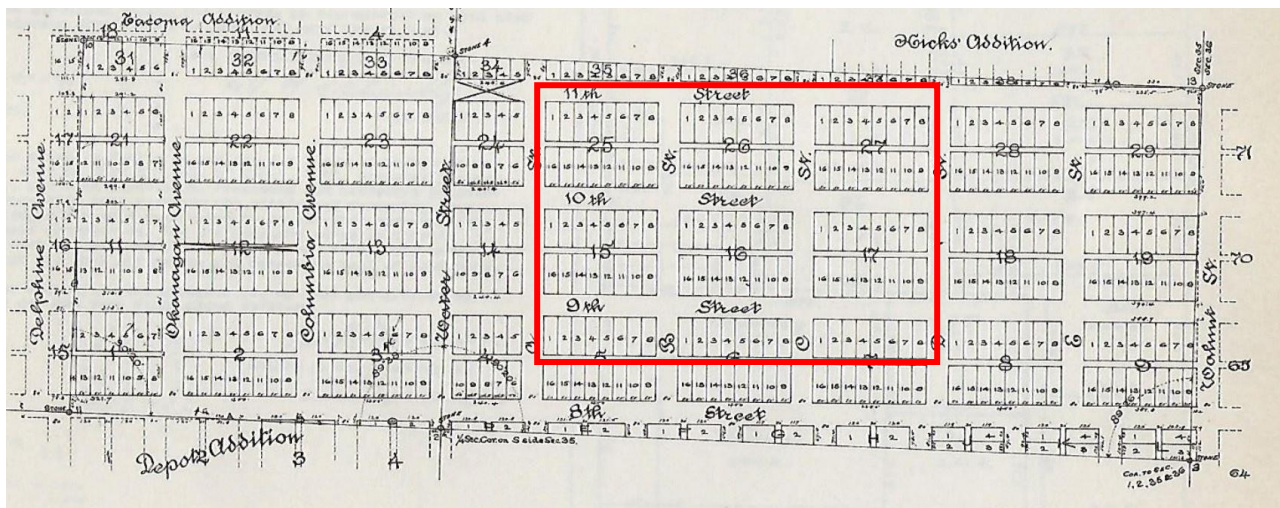
¹⁴ Ibid.

¹⁵ Walton, 23

¹⁶ Sanborn Map Co.

3. FIRST RAILROAD ADDITION NATIONAL AND LOCAL HISTORIC DISTRICTS

Together, the First Railroad Addition national and local register districts make up a nine city block portion of the First Railroad Addition which actually encompasses the area between E. University Way and E. 11th Ave from about N. Delphine St. on the west end over to the eastern edge of CWU campus, including Barge Hall, Shaw-Smyer Hall, McConnell Hall, Mitchell Hall, Hebel Hall, and part of Hertz Hall. The vast majority of the properties in the district are residential with the exception of properties along the E. University Way commercial corridor and the CWU campus. South of E. University Way lies the city's historic downtown and the Ellensburg Downtown local and national register historic districts. When the addition was platted in 1888, the town was in the midst of an economic "boom." Land values were increasing so steadily that property was being bought and sold as whole blocks or parts of blocks for profit and many properties changed hands multiple times during this period without seeing any improvements.¹⁷



First Railroad Addition Plat Map- Kittitas County Historical Museum. Survey Area outlined in red.

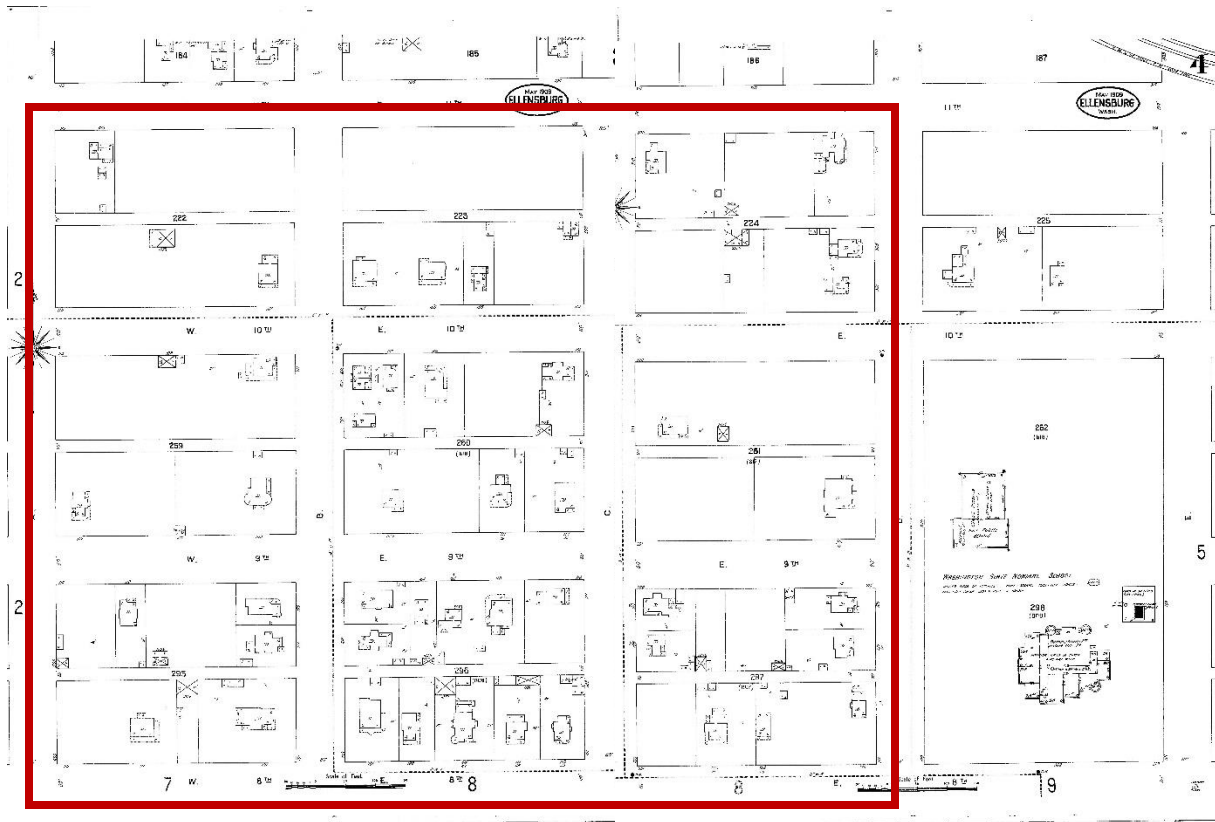
After the fire and the overzealous rebuilding efforts, construction in the district and the city was stagnant. However, upwards of about fifty homes were built between 1890 and 1909. The unique Ramsay Residence at 103 West 9th Ave. was built in 1895 and may be the earliest house in the district. The 1897 Sanborn map depicts only the blocks surrounding the Normal School and shows that four homes had been constructed in the vicinity: two at the southeast corner of East 9th Ave. and North C Street are extant (804 and 805 North B) and two along East 8th Ave. (E. University Way) have been demolished. Several additional homes built at the turn of the twentieth century are simpler Late-Victorian homes with Queen Anne elements such as cross-gabled wings, chamfered corners, corner porches and minimal ornament including 200 East 9th Ave. (formerly 806 North C Street), 115 West 9th Ave., and smaller examples like 804 and 805 North B Street. Others provide good representations of the Free Classic style with heavier massing, wrap around porches and turned posts such as 108 and 111 East 9th Ave. A

¹⁷ Shirley Courtois, First Railroad Addition Historic District National Register Nomination. Electronic document, on file at the City of Ellensburg Community Development Department, accessed March 10, 2022.

number of Bungalows with Craftsman styling like 115 East 9th Ave. and Foursquare homes with a combination of Craftsman and Free Classic elements such as 105 East and 101 West 10th Ave. were also built during this time period. It also includes a Prairie influenced home at 103 East 9th Ave. The 1909 Sanborn also shows a number of lots with very small dwellings or auxiliary buildings that could indicate someone was preparing to build on those sites.

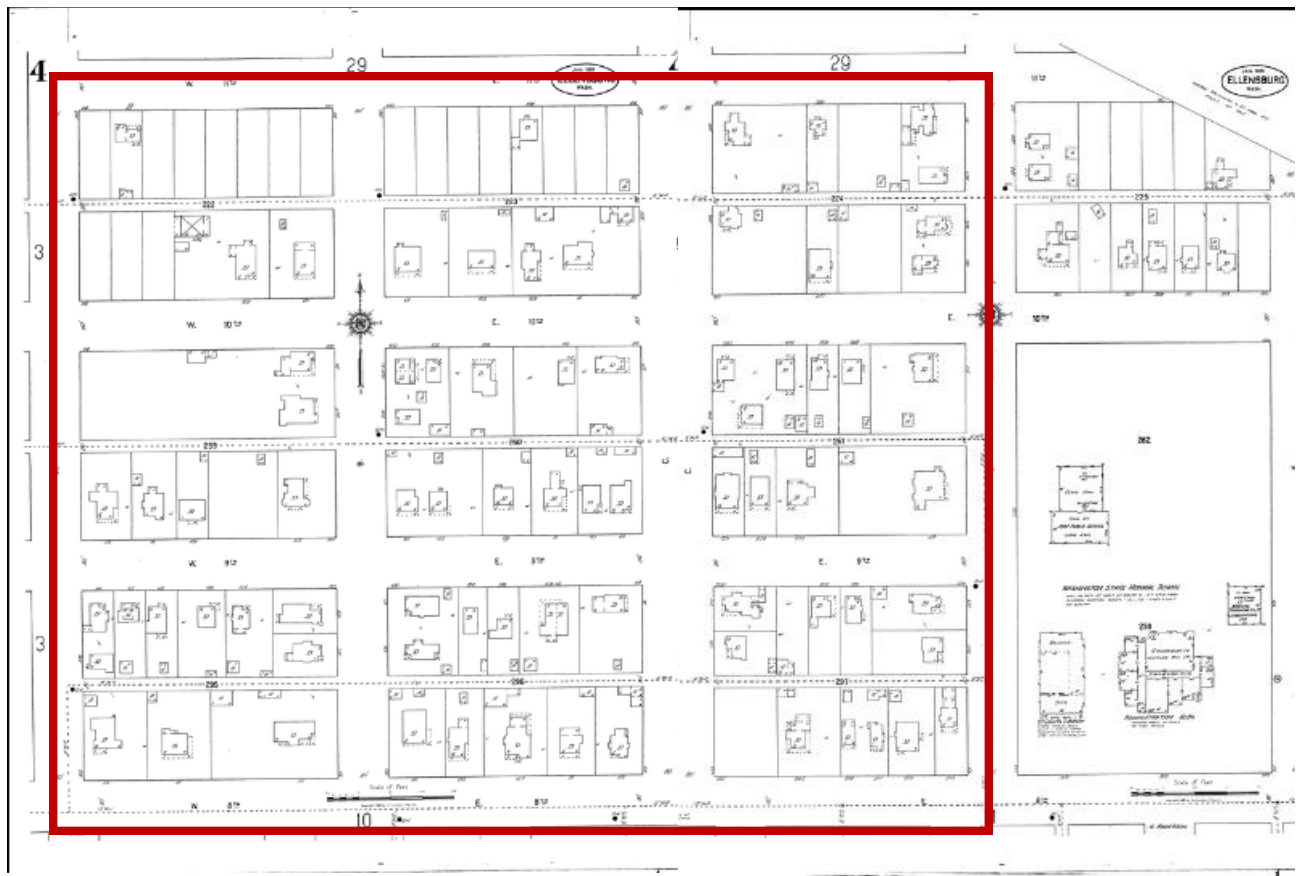


As of 1909, the blocks on the south end of the district, along 8th Ave. (E. University Way) and the south side of 9th Ave. had homes on almost every parcel and homes were sporadically placed throughout the remainder of the district yet somewhat concentrated in the center block.



Sanborn Fire Insurance Map, 1909. Survey area highlighted in red.

During the teens and 1920s, more than 25 homes were constructed in the district. By 1928, the bulk of the blocks between C and University, along the western edge of the Normal School campus, had been developed as well as the north side of 9th and 10th avenues.



Sanborn Fire Insurance Map, 1928. Survey area highlighted in red.

Houses of this period included the Prairie style Mary and Orrin Sinclair House built circa 1920 and numerous Craftsman and other styled bungalows.



Kelleher, John and Selina, House, 201 E. 9th Ave. (c. 1922). Photo by author.

The northwest corner of the district and the south side of 11th Ave. were the last to be developed as the district slowly grew northward. Most of the homes on 11th Ave. were built between 1930 and 1940. In particular, a large concentration of mid-1930s homes is located on the western end of 11th Ave. All five of these were designed in a version of the Tudor Cottage style and encompass the entire block with the exception of the house at the far west end which was built circa 1900. The middle block of 11th Ave. has three homes with very little ornament and one more that was not constructed until 1952. The east end of 11th Ave. has a mixture of two circa 1900 homes, a 1930s Tudor Cottage and two later Minimal Traditional houses. Only two homes along 11th Ave., 112 W. 11th Ave. and 1006 N. C St, were shown on the 1909 Sanborn map and one more, on the 1928.¹⁸

¹⁸ Sanborn Map Co., 1909; 1928; 1948.



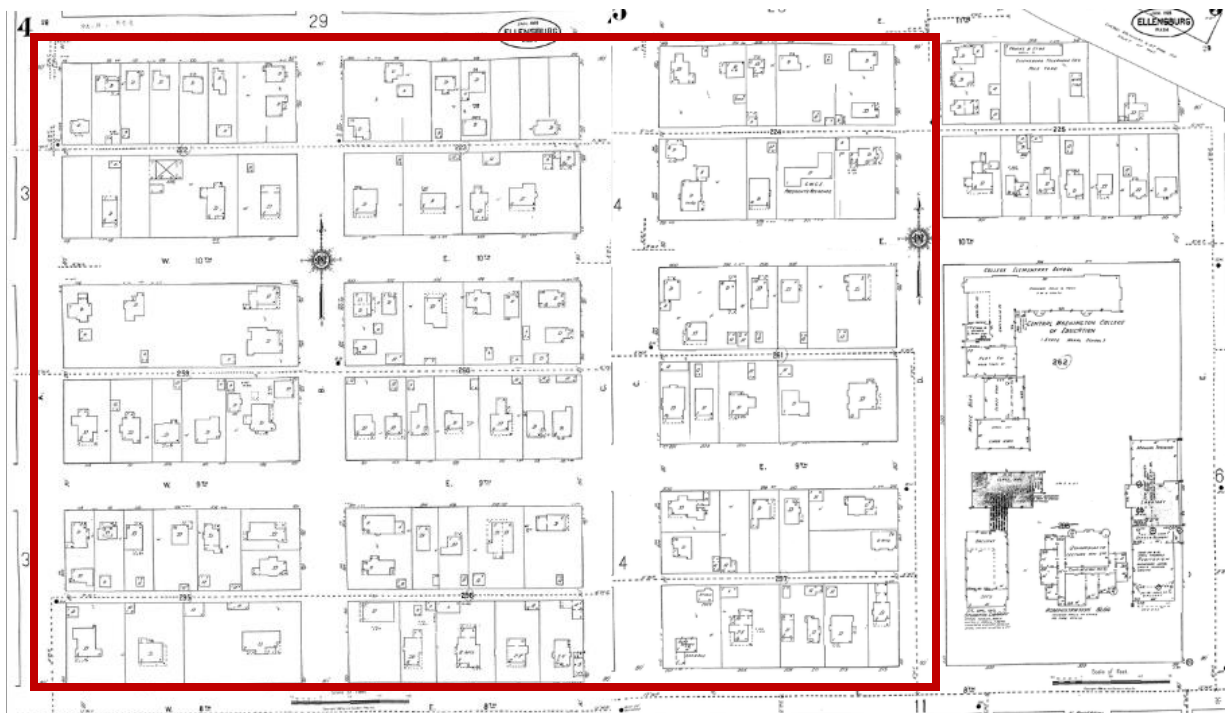
House, 108 W. 11th Ave. (c. 1930). Photo by author.

By the 1930s, house styles started to shift toward period revival styles which is evidenced by the construction of houses such as Georgian Revival Dr. William Taylor Residence at 1000 North C Street which was built circa 1930, the French Norman style residence at 1004 North B Street, circa 1934, and the cluster of Tudor Cottages on the west end of 11th Ave. circa 1930s.



Taylor, Dr. William, House, 1000 N. C St. (1930). Photo by author.

When the 1948 overlay of the 1928 Sanborn was issued, almost every parcel in the district had been developed except for a grouping of parcels in the southwest corner of E. 11th Ave. and North C St. which would be developed in 1952 and a large parcel in the center of the block on the south side of W. 10th Ave. that wouldn't be fully developed until the mid-1980s. In 1949, an older house was razed along E. 9th Ave. and the Modern Amanda Hebler House built in its place. Also at this time, the CWU President's House, originally designed by John W. Maloney, was built at the east end of E. 10th Ave.

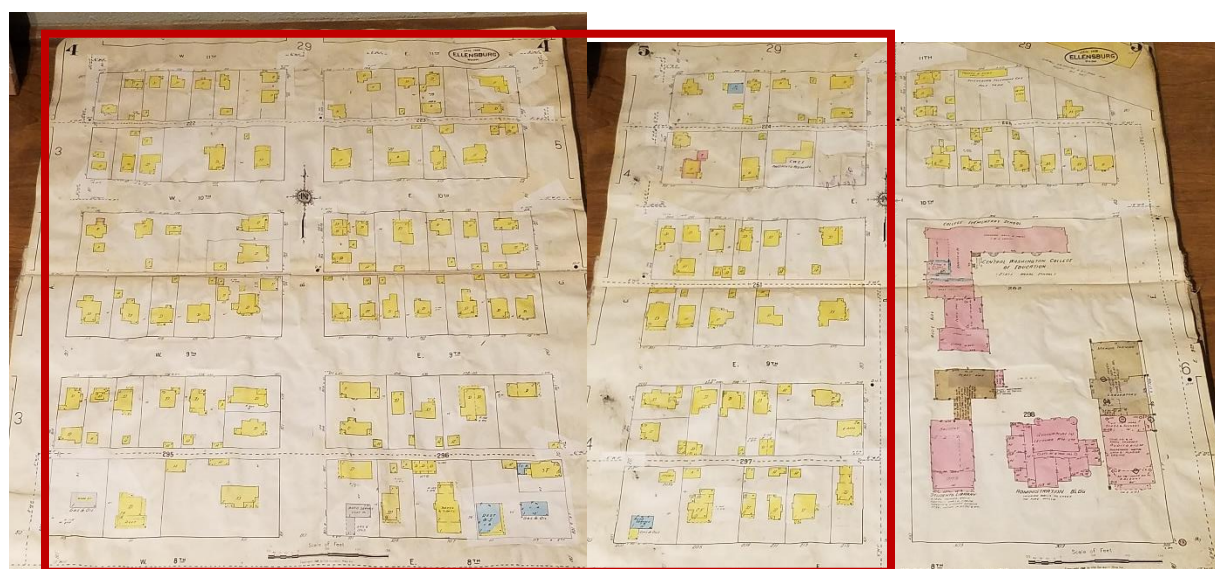


Sanborn Fire Insurance Map, 1928 with 1948 overlay. Survey area highlighted in red.

In 1952, a Modern house designed by John W. Maloney, was built at the southwest corner of N. C St. and E. 11th Ave., completing the infill on that street. Between 1952 and 1972, one home and one apartment building were built in the district, circa 1967-68, each replacing an older structure. In 1967, the CWU President's House was drastically altered and expanded and the houses to its east were razed. Finally, in the early 1980s, a Shed style home was built at 104 W 10th Ave. Since that time, two new homes have been built in place of homes that were destroyed or demolished.



Whitney, Henry J., House, 1009 N. C St. (1952). Photo by author.



Sanborn Fire Insurance Map, 1928 with 1959 overlay. Survey area highlighted in red.

Architectural Styles

Architectural styles in the district are typical of those found on the west coast throughout the last years of the 19th century and into the mid-twentieth century. The Craftsman style is extremely prevalent in the district with twenty-one homes possessing attributes of that style. Also popular are late-Victorian styles and to a lesser extent, period revivals. Bungalows are numerous and while most exhibit Craftsman styling, some have characteristics of other styles. Styles from the mid-20th century are not common as most houses were built prior to 1948.

The following chart tables shows how many examples of each style are contained in the district.

Craftsman	21
Classical Revival	6
Contemporary/Modern/Asian-Inspired	6
Tudor Revival	6
Free Classic	5
Minimal Traditional	5
Colonial Revival	4
Queen Anne	2
Dutch Colonial	2
Prairie	2
PWA Modern/Art Moderne	2
Shingle	2
Workingman's Foursquare	1
Arts and Crafts	1
Second Empire	1
Georgian Revival	1
French Norman	1
Gable Front and Wing	1
No Style	23

Queen Anne – Free Classic (1880-1905)

In the United States, the Queen Anne style evolved out of the English Arts and Crafts movement of the mid-19th century when England showed two half-timbered buildings at the Philadelphia Centennial Exposition in 1876. H.H. Richardson built the William Watts Sherman House which is generally considered to be the first Queen Anne house built in America. The style is characterized by asymmetrical massing, wrap-around porches or verandas, towers and multi-story bays, chamfered corners, flared or battered courses and decorative elements like scroll brackets, spindlework, dentils and turned posts. Wall surfaces often featured decorative shingle courses and ornamental cladding and many were painted with multiple colors. The Free Classic variant of the style, common after 1890, features classical columns rather than turned

porch posts and lacks delicate spindlework. Dentils on the cornice-line, Palladian windows and other classical details are prevalent on Free Classic houses.¹⁹

Shingle (1885-1910)

The Shingle style was so named by the architectural historian Vincent Scully in his 1955 book, *The Shingle Style*.²⁰ It is a transitional style that originated on the east coast between the Queen Anne and Georgian Revival periods and was first used in the construction of summer homes for the wealthy.²¹ Borrowing its massing and asymmetry from the Queen Anne style and other embellishments from Colonial Revival such as classical columns, Palladian windows, balustrades and decorative windows.²² Other common features are rounded corners, verandas towers, turrets, or multi-story bay windows. Buildings are fully clad in shingles but may have stone or brick foundations or accents. Pacific Northwest versions of the style tended to be less elaborate but still feature many of the key elements.²³

Prairie (1905-1930)

Developed by Frank Lloyd Wright, the Prairie style was less common on the west coast as it was intended to be a “natural style,” sympathetic to the regional midwestern prairie landscape.²⁴ The style has a horizontal emphasis with string courses and bands of windows, low-pitched roofs, often flat, and deep overhanging eaves. Typically clad in light-colored stucco, variants in the Pacific Northwest are often clad in wood clapboard or a combination of stucco and wood.²⁵

Craftsman (1905-1930)

Charles and Henry Greene, brothers who practiced architecture together in Pasadena, California are credited as the inspiration for the Craftsman style. Often conflated with the Bungalow type, Craftsman homes have low-pitched roofs with deep overhanging eaves, wide bargeboard, exposed rafter tails and roof brackets. They are most commonly clad in wood clapboard or shingles but often have accent materials such as stone, brick, stucco or false half-timbering. Porches are prominent on Craftsman style homes and are often supported by battered piers or heavy supports and railings. Brick and stone are commonly found on porch foundations and piers. Craftsman windows and doors have multiple light sashes, are wrapped with wood molding, and are often placed in pairs or groups of three or more.²⁶

Bungalow (1880-1930)

The Bungalow house type is often conflated with the Craftsman style but is not an actual architectural style but a building form. Its origins are the subject of debate but they became most prominent during the first decade of the 20th century during a population boom and continued its dominance in small towns throughout the 1920s and even the early 1930s in some

¹⁹ McAlester, pp.345-346.

²⁰ John Milnes Baker, *American House Styles*, Norton: 2002, pp.110-111

²¹ DAHP, “Shingle Style,” *Architectural Style Guide*. Electronic Document <https://dahp.wa.gov/historic-preservation/historic-buildings/architectural-style-guide/shingle-style> accessed April 23, 2022.

²² Ibid

²³ Ibid

²⁴ John Milnes Baker, *American House Styles*, Norton: 2002, pp.112-114

²⁵ Ibid.

²⁶ McAlester, pp. 567-568

cases. Most often constructed in the Craftsman style, bungalows were offered as “kit houses” by national companies such as Sears & Roebuck and Montgomery Wards, and both national and local plan books were developed such as those promoted by Seattle’s Victor W. Voorhees. Geared toward one-story living and simplified construction requirements, Bungalows offered a relatively inexpensive and easy path toward home ownership and west coast living. There are six predominant bungalow subtypes: side gable, hipped, front facing gable, double front-gable, triple front-gable, and cross gable. Each is unique but most feature compact footprints, low-pitched roofs with overhanging eaves and porches.²⁷

American Foursquare (1900-1925)

Similar to the Bungalow, the American Foursquare is a house form that can has been built in many different styles and was popular during the early 20th century. Sold in kits and plan books, the American Foursquare offered a larger home that could be built relatively easily inexpensively. Foursquare houses typically have low-pitched pyramidal roofs and simple square plans with four rooms per floor. Smaller versions of the foursquare have three rooms per floor with an entryway and stairway where the fourth room would be. Full-width porches are common and typically project away from the house. A popular variant in the Pacific Northwest has its porch recessed underneath the second floor, usually just in one corner rather than across the full-width.²⁸

Colonial Revival - Georgian Revival - Dutch Colonial Revival (1880-1955)

The Colonial Revival style takes many forms and was perhaps the most dominant style for housing in this country during the 20th century.²⁹ Coming about in the 1880s, the style draws from the earlier Georgian, Dutch, Federal and other Colonial styles that were prevalent on the east coast throughout the 17th and 18th centuries. Georgian Revival homes follow a fairly strict pattern in that they have symmetrical facades, are most often clad in brick and are emphasized at the entrance, openings and cornices. They typically have dormers across the front roof slope and pedimented porticos. Similarly, the centered gable variant is symmetrical with a side-gable roof but has a slightly projecting wing with a front facing gable centered on the façade. Dutch Colonials are symmetrical with side-gabled gambrel roofs, a nearly full-width shed dormer on the front, a pedimented portico and often a sunroom on one gable end. The asymmetrical variant is massed more like homes of the Queen Anne style and often has a two-story bay window and a small porch rather than a portico.³⁰

French Norman (1918-1940)

Inspired by the vernacular architecture of the French countryside, the style developed after World War I while the country was enthralled with French culture and architecture having fought for France. News coverage of the destruction in France was common and a number of pictorial studies on French architecture were published.³¹ A number of architects who had served in France came home and began to incorporate French architectural designs into their work, particularly with regard to single-family housing. Borrowed from dwellings seen in the

²⁷ DAHP, “Bungalow,” Architectural Style Guide. Electronic Document <https://dahp.wa.gov/historic-preservation/historic-buildings/architectural-style-guide/bungalow> Accessed April 23, 2022.

²⁸ Caroline T. Swope, *Classic Houses of Seattle*. Timber Press: Portland, OR 2005.

²⁹ McAlester, pp.408-432.

³⁰ Ibid.

³¹ McAlester, pp.493-494

Normandy region of France, the signature aspect of the style is a central tower that often holds the interior staircase. Buildings of this style tend to be clad in brick, stucco, stone or shingle and often incorporate several types of cladding or decorative half-timbering. Dormers, multipane casement windows and rustic, planked entry doors are common.³²

Tudor Revival/Tudor Composite (1925-1940)

Based on English cottage styles, the Tudor Revival or Tudor Composite homes were popular from the early twentieth century up to roughly 1940.³³ These homes, found in both urban and suburban neighborhoods, often feature one or more front-facing gables, Tudor arches, and half-timbering on the upper story in larger two-story examples. In the northwest, they are generally clad in wood or brick, often with ribbons of three or more wood-framed, multi-light casement or double-hung windows on the façade. A common variation consists of a projecting asymmetrical gable with a sweeping curve over the entry.³⁴

Contemporary (1930-1970)

Based on Frank Lloyd Wright's plans for the Usonian house, Contemporary style, popular in the Northwest, opened residential houses to a more intense relationship with the surrounding landscape. In residential design, it appeared in the post-war era but rose to popularity in the 1950s and beyond. It is characterized by dramatic roof forms, either very low pitched or flat roofs with deep overhanging eaves, sometime with boxed gutters, or, in some cases, dramatic gables. Other variations include inverted roofs known as butterfly roofs. The style employs expanses of glass, courtyards, viewing gardens, and other details that brought the experience of the outdoors into the contemporary home's living spaces. In the northwest, trapezoidal windows angled up into the eaves, which often included exposed roof beams, are evidence of Japanese influence.³⁵

Minimal Traditional (1935-1950)

The Minimal Traditional home is generally simple in plan and design, often rectangular or L-shaped, a single story tall, cross-gabled, with minimal ornament, minimal eaves, and minimal breaks in wall and roof surfaces. Minimal Traditional homes were constructed with modest plans and materials, were generally plain and straightforward by design, and wood framed with wood siding, and double-hung, wood-framed windows. Designed during the Great Depression to qualify for Federal Housing Administration loans, the Minimal Traditional was easy to construct and economical for young families to buy, particularly after World War II, when houses of this style were popularly used to house workers flowing toward World War II-era manufacturing centers, including those in Washington state.³⁶ Typical examples are common, although the popular design was soon surpassed by less compact housing forms, like the Ranch house, after roughly 1950.³⁷

³² DAHP, "French Norman" Architectural Style Guide. Electronic document <https://dahp.wa.gov/historic-preservation/historic-buildings/architectural-style-guide/french-norman> accessed April 23, 2022.

³³ Gottfreid and Jennings; McAlester

³⁴ McAlester, pp.450.

³⁵ McAlester, pp.628-630.

³⁶ Federal Housing Administration, Principles of Planning Small Houses, Technical Bulletin No. 4, Revised June 1948.

³⁷ McAlester, pp.587-589.

Architects

Homes within the district that are known to be architect designed are limited and the scope of this survey does not include such research. However, at least two houses are known to be designed by local and/or nationally significant architects including Samuel Maclure (1860-1929) who was a prolific Canadian architect best known for his work in Vancouver and Victoria, B.C. and the duo of John W. Maloney (1896-1978) and John H. Whitney (1913-1954). The Dutch Colonial Agnes Gray House at 802 N B St. is noted in a magazine from the period as having been designed by Edwin A. Williams of Seattle but no information was located as to his life or body of work.

Samuel Maclure (1860-1929)

Samuel Maclure was a prominent Canadian architect best known for his work in British Columbia, Canada and, in particular, Victoria, B.C. There, he developed a uniquely Pacific Northwest version of the English Arts and Crafts styles, known for his use of half-timbering, and designed over 350 buildings.³⁸

John W. Maloney (1896-1978)

John Maloney is a renowned architect and best known in Kittitas County for his design of the Larson Building in Yakima. Maloney also designed high profile buildings such as schools and hospitals as well as many buildings for college campuses in Washington including thirteen (13) buildings for Central Washington University. Some of his Ellensburg buildings include the Ellensburg National Bank Building and alterations to Washington National Bank, Ellensburg Telephone Company, Ellensburg High School, Morgan Jr. High, Dr. Robert McConnell House, Henry Schnebly House, Dr. R.M. Hill House, H.J. Whitney House, and Wilbur T. Anderson House.

John H. Whitney

John Whitney was a local architect who worked for John W. Maloney in Yakima and also designed the Kittitas County Courthouse at W. 5th Ave. and N. Main St. in 1955.³⁹ He was the son of Henry J. Whitney, a highly regarded Professor and Administrator at CWU from 1908-1943, and for whom Whitney Hall at CWU and Whitney Park at Ellensburg High School are named. Whitney designed his parent's house at 1009 N. C St. in conjunction with Maloney.

Lafayette "Fay" Robinson Spangler (1885-1970)

Noted as "F.R. Spangler" on the plans, is known to have designed the Classical Revival James Clark House at 101 E. 10th Ave. Spangler lived in Ellensburg from about 1908 to 1912 and designed the Flemish Revival style YMCA building (1911) and submitted a proposal for the Ellensburg Carnegie library but was not awarded the commission.⁴⁰

³⁸ Dictionary of Canadian Biography, Maclure, Samuel,

http://www.biographi.ca/en/bio/maclure_samuel_15E.html, accessed July 25, 2022.

³⁹ PCAD, John H. Whitney, <https://pcad.lib.washington.edu/firm/4603/>, accessed July 25, 2022.

⁴⁰ DAHP, Architect Biographies: Fay R. Spangler. <https://dahp.wa.gov/historic-preservation/research-and-technical-preservation-guidance/architect-biographies/bio-for-fay-r-spangler>, accessed July 25, 2022.

Joseph Coté (1874-1957)

Coté lived and worked primarily in Seattle where he designed a number of large buildings such as the Machinery Hall at the Alaska-Yukon-Pacific Exposition in 1909, the Perry Apartments (1910), the Seattle Fire Department Station #25, the Sunset Club on First Hill (1914-15) and many large Georgian style residences in Seattle. The Georgian Revival house at 1000 N. C St. is his only known building in Ellensburg.⁴¹

4. SURVEY RESULTS

The survey area included the properties included in the National Register district as well as those within the boundaries of the local register district which extends approximately one-half block further to the north, east and west. Eight of the properties in the National Register district have been demolished. Those include a grouping of four homes at the southeast corner of the district, west of Shaw-Smyser Hall on the CWU campus, that were razed circa 2005 for a student parking lot. These were located at 209, 211, 213 and 213 N. Wildcat Way (formerly E. 8th Ave.). Also demolished were individual properties at 807 N C. St., 114 W. 9th Ave., and 104 W 10th Ave.

Of the 107 properties surveyed, a total of 79 are recommended contributing to a revised National and/or local register historic district, 21 are recommended non-contributing and seven have been demolished. Of the properties considered non-contributing in the 1986 National Register nomination, five are now recommended contributing either because they have achieved significance over time or their associative significance has been reevaluated.

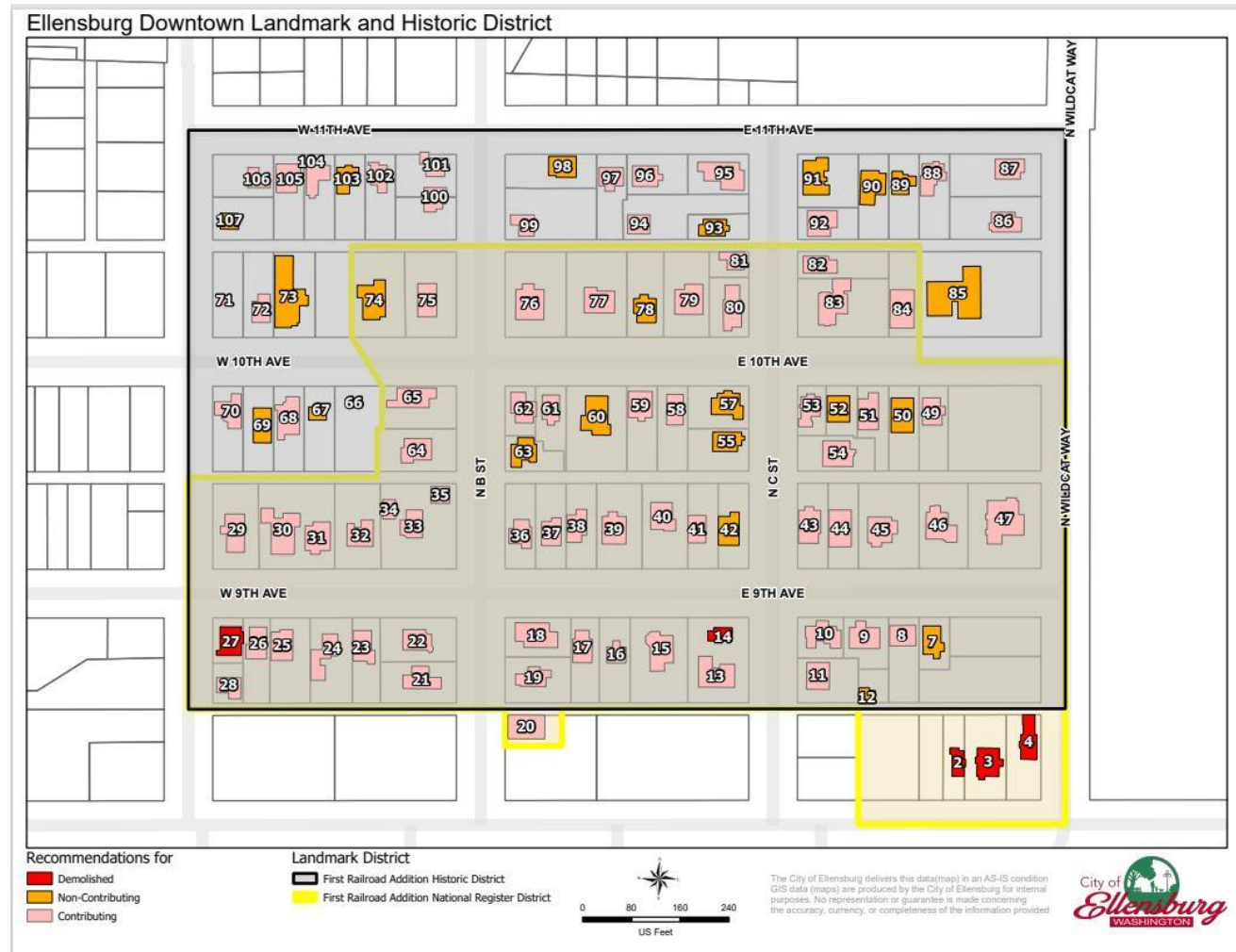
These include the following:

- 9. Amanda Hebler House, 204 E. 9th Ave.(1949) Modern
- 13. Apartment Building, 805 N. C St., (1968) Contemporary/Modern
- 21. William E. Wilson House, 805 N. B St., (c.1910) Queen Anne
- 34. Bentley Kern House, 901 N. B St., (c.1940) no style
- 46. Carl Ostrander House, 211 E. 9th Ave. (c.1948) Minimal Traditional

From the 75 that were considered contributing properties in the 1986 National Register nomination, five are now recommended non-contributing due to loss of integrity. These include numbers 12, 42, 50, 60 and 74.

When looking at the survey area, it is clear that many of the non-contributing properties are grouped into a couple of areas. The southeast corner has four contiguous parcels along E. University Way that have been developed into parking lots which are somewhat isolated from the remainder of the district with the exception of Button Hall (No.5) which lies between a fifth parking lot and E. 9th Ave. Similarly, three adjacent properties at the southeast corner of the intersection of E. 11th Ave. and N C St. are non-contributing. Several of the other non-contributing properties are also located along 11th Ave.

⁴¹ PCAD, Joseph Coté, <https://pcad.lib.washington.edu/person/2665/>, accessed July 25, 2022.



Inventory Map of Changes to Historic District

Data Gathered by Author- Map Created by Stephen Ramella.

The table below lists each property surveyed by its 2022 survey number, DAHP property number and current address. Survey numbers for properties included in the 1986 National Register historic district nomination have not retained the same survey number in all cases. Properties that have been demolished are noted with "DEM," contributing properties with "C", non-contributing properties with "NC", and individually eligible properties with "IND". Date of construction is also listed for each property. Property number six (6) had been demolished before the 1986 survey took place and was therefore already listed as a parking lot.

Survey No.	DAHP No.	Current Address	NR C/NC	Local R C/NC	Date (circa)
1	3983	209 East University Way	DEM	DEM	-
2	633683	211 East University Way	DEM	DEM	-
3	634110	213 East University Way	DEM	DEM	-
4	634109	215 East University Way	DEM	DEM	-

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5	676939	833 N. Wildcat Way	C	C	1928
6	-	corner of East 9 th & D St.	NC	NC	-
7	4008	210 East 9th	NC	C	1910
8	4007	208 East 9th Ave	C	C	1902
9	4005	204 East 9th Ave	C	C	1949
10	3612	806 North C Street	C	C	1895
11	3609	804 North C Street	C	C	1910
12	3610	804 1/2 North C Street	NC	NC	1900
13	3611	805 North C Street	C	C	1968
14	-	807 North C Street	DEM	DEM	-
15	3998	108 East 9th Ave	C	C	1889
16	3997	106 East 9th Ave	C	C	1900
17	3995	104 east 9th Ave	C	C	1900
18	3601	806 North B Street	C	C	1900
19	3599	804 North B Street	C	C	1895
20	3598	802 North B Street	C	C	1905
21	3600	805 North B Street	C	C	1910
22	3602	807 North B Street	C	C	1910
23	4012	104 West 9th Ave	C	C	1916
24	4013	106 West 9th Ave	C	C	1920
25	4016	110 West 9th Ave	C	C	1908
26	4018	112 West 9th Ave	C	C	1910
27	4019	114 West 9th Ave	DEM	DEM	-
28	3597	804 North A Street	C	C	1920
29	4020	115 West 9th Ave	C	C	1900
30	4017	111 West 9th Ave	C	C	1915
31	4015	109 West 9th Ave	C	C	1920
32	4014	107 West 9th Ave	C	C	1934
33	4011	103 West 9th Ave	C	C	1895
34	3603	901 North B Street	C	C	1940
35	3604	903 North B Street	C	C	1935
36	3993	101 East 9th Ave	C	C	1910
37	3994	103 East 9th Ave	C	C	1900
38	3996	105 East 9th Ave	C	C	1928
39	3999	109 East 9th Ave	C	C	1910
40	4000	111 East 9th Ave	C	C	1895
41	4001	113 East 9th Ave	C	C	1920
42	4002	115 East 9th Ave	NC	NC	1905
43	4003	201 East 9th Ave	C	C	1922
44	4004	203 East 9th Ave	C	C	1919
45	4006	209 East 9th Ave	C	C	1910

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46	4009	211 East 9th Ave	C	C	1948
47	4010	215 East 9th Ave	C	C	1904
48	3622	907 North D Street	C	C	1911
49	4033	208 East 10th Ave	C	C	1930
50	4032	206 East 10th Ave	NC	NC	1916
51	4031	204 East 10th Ave	C	C	1910
52	4030	202 East 10th Ave	NC	NC	1939
53	4029	200 East 10th Ave	C	C	1929
54	3615	904 North C Street	C	C	1908
55	3614	903 North C Street	C	C	1907
56	3616	905 North C Street	C	C	1910
57	3617	907 North C Street	NC	NC	1935
58	4027	110 East 10th Ave	C	C	1917
59	4025	108 East 10th Ave	C	C	1936
60	4024	106 East 10th Ave	NC	C	1905
61	4022	102 East 10th Ave	C	C	1905
62	3607	906/908 North B Street	C	C	1905
63	3605	904 North B Street	NC	NC	1905
64	3606	905 North B Street	C	C	1924
65	3608	907 North B Street	C	C	1903
66	726943	104 West 10th Ave	DEM	DEM	-
67	632825	108 West 10th Ave	NC	NC	1948
68	634018	110 West 10th Ave	C	C	1946
69	633139	112 West 10th Ave	NC	NC	1967
70	632899	114 West 10th Ave.	C	C	1936
71	634180	115 West 10th Ave	C	C	1947
72	631537	113 West 10th Ave	C	C	1900
73	632802	111 West 10th Ave	NC	NC	1900
74	4036	105 West 10th Ave	C	C	1920
75	4035	101 West 10th Ave	C	C	1910
76	4021	101 East 10th Ave	C	C	1909
77	4023	105 East 10th Ave	C	C	1909
78	4026	109 East 10th Ave	NC	C	1899
79	4028	111 East 10th Ave.	C	C	1910
80	726944	1001 North C Street	NC	C-IND	1905
81	3620	1003 North C Street	C	C	1900
82	3619	1002 North C Street	C	C	1917
83	3618	1000 North C Street	C	C	1930
84	4034	209 East 10th Ave	C	C	1920
85	677640	211 E 10th St.	NC	C	1947
86	726945	1005 North Wildcat Way	C	C	1930

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87	726946	1009 North Wildcat Way	C	C	1930
88	631977	208 East 11th Ave	C	C	1950
89	726947	206 East 11th Ave	NC	NC	1946
90	726948	204 East 11th Ave	NC	NC	1946
91	726962	1006 North C Street	NC	NC	1905
92	726963	1004 North C Street	C	C	1963
93	726964	1005 North C Street	NC	NC	1930
94	726964	1007 North C Street	C	C	1945
95	726966	1009 North C Street	C	C	1952
96	631836	108 E 11th Ave	C	C	1925
97	634009	106 East 11th Ave	C	C	1930
98	634365	104 East 11th Ave	NC	NC	1945
99	726967	1004 North B Street	C	C	1934
100	632772	1007 North B Street	C	C	1945
101	726968	1009 North B Street	C	C	1930
102	634408	104 West 11th Ave	C	C	1935
103	633882	106 West 11th Ave	NC	NC	1930
104	632374	108 West 11th Ave	C	C	1930
105	632878	110 West 11th Ave	C	C	1931
106	634244	112 West 11th Ave	C	C	1900
107	631713	1004 Main Street	NC	NC	1930

Looking at the survey area from a wider perspective, the character of the district has remained that of a single-family residential neighborhood. Out of 107 total homes within the 2022 survey area; 7 homes have been demolished, 21 homes should be considered non-contributing structures, and 79 homes qualify as contributing structures. The historic integrity of the houses located within the local landmark district boundaries remain well intact overall, with 74% considered contributing structures, 20% considered non-contributing, and 6% were demolished since the 1986 survey.

Commercial development pressure has come largely from the south along E. University Way, one of the city's main thoroughfares which provides access to Central Washington University. Several homes at the corner of N. Main and W. University had been lost prior to the 1986 survey and the north half of block along University Way is entirely commercial with the exception of the Agnes Gray House (No.20) which was moved to the north half of the parcel to make way for a service station in the late-1940s⁴².

Some of the single family homes along the north half of 11th Ave. have been replaced with multifamily buildings, office buildings and institutional buildings as the CWU campus has expanded to the northwest of Wildcat N. Way. About one-third of the properties along the south

⁴² KCHS, Research compiled for 802 N B., 2018

side of 11th Ave. are non-contributing due to alterations but they have remained single family homes. Overall, the residential character of the district has remained intact.

Current Period of Significance

The current period of significance for the 1986 National Register district is 1895-1935. The majority of the properties (17) that were surveyed in 2022 that were not included in the 1986 survey fall within that period. However, ten were built between 1935 and 1952 and two were built in the 1960s. Generally, the properties along 11th Ave. and in the northwest corner of the survey area were built later than the southern parts of the survey area, during the 1930s and 1940s, as the University expanded and more housing was needed.

5. CONCLUSIONS AND RECOMMENDATIONS

Period of Significance Recommendations

The period of significance for the 1986 National Register district was 1895-1935. The majority of the properties surveyed in 2022 that were not included in the 1986 survey fall within that period. However, ten were built between 1935 and 1952 and two were built in the 1960s. These properties were not originally surveyed because the National Register threshold for being considered “historic” is 50 years, and some houses did not meet this qualification at that time. Generally, the properties along 11th Ave. and in the northwest corner of the survey area were built later than the southern parts of the survey area, during the 1930s and 1940s, as both the University and the city expanded. These properties are all single family homes, built in variations of the Tudor Cottage, French Norman and Minimal Traditional styles.

Two infill properties were developed during the 1960s. An apartment building was constructed circa 1962 at 805 N. C St. and a Modern/Contemporary single-family home was built at 1004 N. C St. circa 1968. Also, the CWU President’s House, originally designed by John W. Maloney circa 1947, was heavily altered in 1967 with Contemporary/Asian-Inspired additions.

Considering the number of properties built between 1935 and 1952, the two infill homes built as late as 1968, it would be appropriate to expand the period of significance to 1895-1968.

District Boundary Recommendations

The original National Register district encompassed the area between N. Main St. and N. Wildcat Way and included both sides of 9th Ave., most of the south side of 10th Ave. and about two-thirds of the north side of 10th Ave., creating an irregular shaped district. The local register district boundaries and 2022 survey area is square, and includes the area from the south side of 11th Ave. to the south side of 9th Ave. and between N. Main and N. Wildcat Way.

Given the placement of new contributing properties along 11th Ave. and the east and west ends of 10th Ave., the local district boundaries would be appropriate for a revised National Register historic district.

Based on the data from the survey, the original National Register boundaries continue to retain sufficient integrity, and an amended National Register boundary could encompass the local register historic district as shown below. The revised boundary should include properties from the south side of 11th Ave to the north side of 9th Ave. between N. Main St. and N. Wildcat Way.



8/1/2022

Sections

0 0.03 0.05 0.1
0 0.04 0.08 0.16 mi
City of Ellensburg GIS, City of Yakima, County of Kittitas, Bureau of Land Management, Esri Canada, Esri, HERE, Garmin, GeoTechnology, Inc.

Map of First Railroad Addition from Kittitas County Assessor, 2022. Survey area highlighted in red.

Register Criteria Recommendations

The proposed expanded district boundaries and period of significance, as recommended, would qualify for the National Register of Historic Places under Criterion C, and local Ellensburg Landmarks register under ECC 15.280.080(A) Criterion(3), for embodying the distinctive visual characteristics of an architectural type, period, style, or method of construction. Through this survey the style, characteristics, and historical integrity of the homes was well documented. It is evident that many homes within the National Register district boundaries have retained their historic integrity, as well as many homes outside the National Register boundary that are in the local boundary, and they would contribute the same quality of character and representation of architectural style.

Additional Recommendations

Additional research is needed to determine if these later properties are significant for more than just their architectural qualities under Criterion C. It seems possible, given their similar appearance and date of construction, that several of the properties along 11th Ave. could have been owned or built by the same person. However, this research is beyond the scope of this project and would require additional examination.

Utilizing the new information from this survey, it is recommended that the City of Ellensburg seek additional CLG funding in a future funding cycle to update the First Railroad Addition National Register Historic District nomination.

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5. APPENDIX



Meeting Date: August 15, 2023

City of Ellensburg

Landmarks & Design Commission Agenda Report

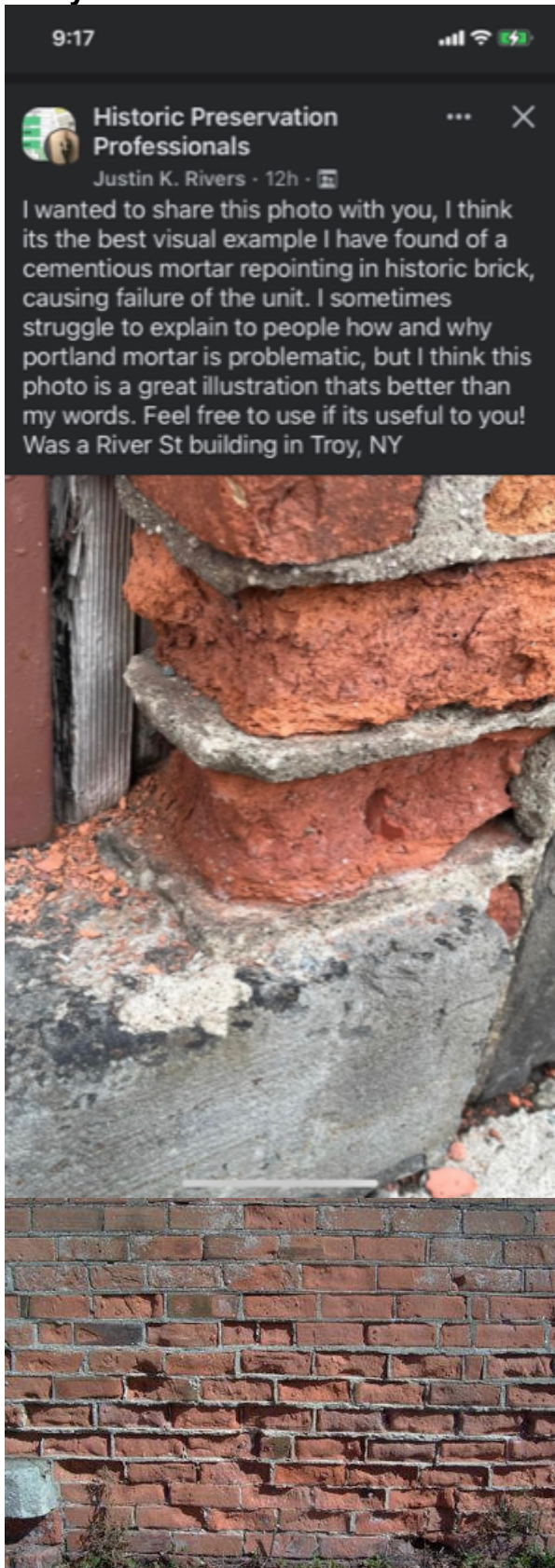
Agenda Subject: Brick Mortar Resource
Submitted by:
Department: Community Development

Suggested Motion/Action:
N/A

Background/Summary:
Brief review of helpful resources when discussing historic brick and mortar.

Previous Council Action:

Analysis:



Financial Impact:

Budget Adjustment: No

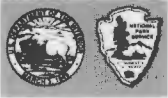
Attachments:

1. preservation-brief-02-repointing

2 PRESERVATION BRIEFS

Repointing Mortar Joints in Historic Masonry Buildings

Robert C. Mack, FAIA
John P. Speweik



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*

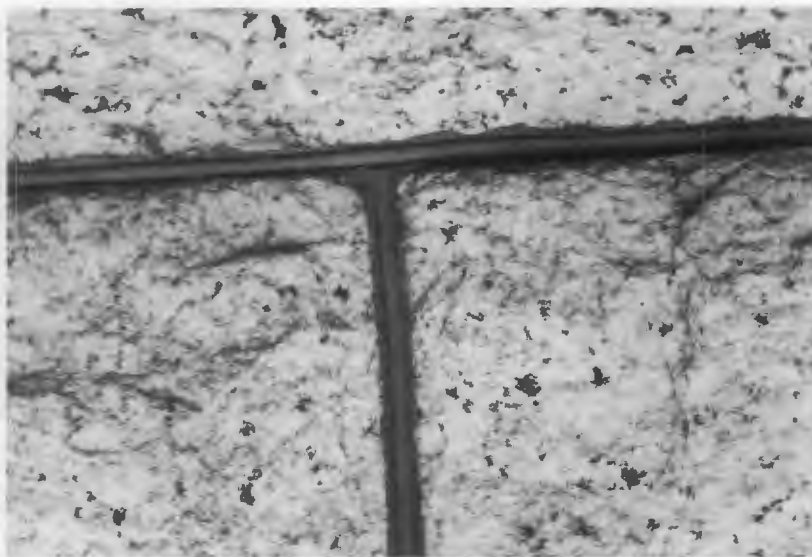


Figure 3. Good-quality repointing closely replicates the original in composition, texture, joint type and profile on this 19th century brick building (left), and on this late-19th century granite on H.H. Richardson's Glessner House in Chicago (right). Photos: Charles E. Fisher; Sharon C. Park, FAIA.

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.

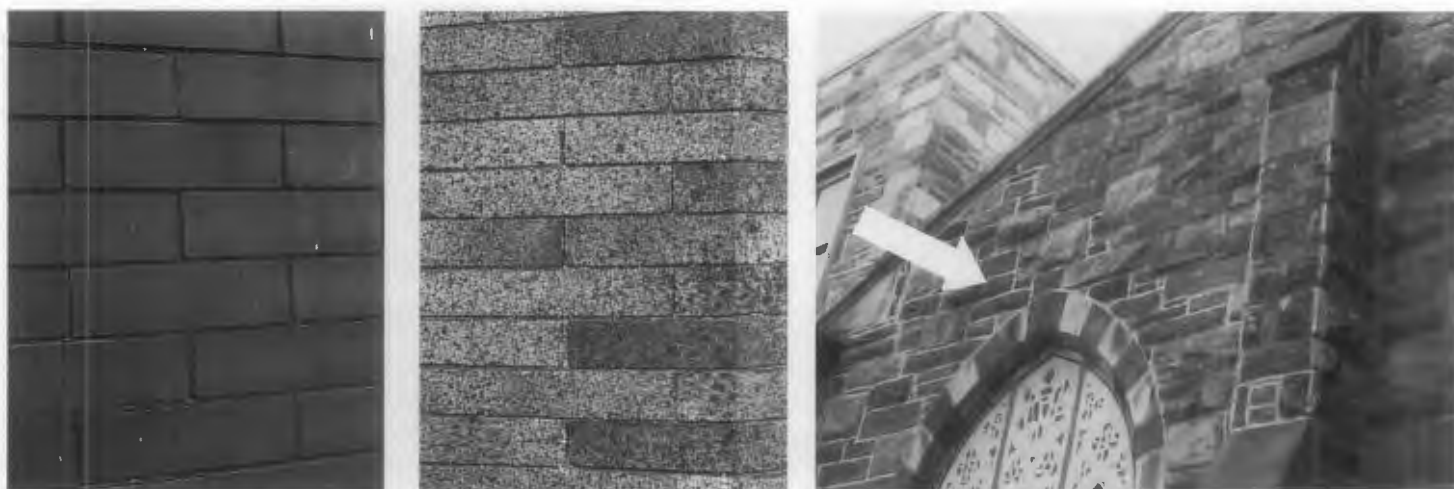


Figure 6. Tinted mortar. (left) Black mortar with a beaded joint was used here on this late-19th century hard pressed red brick and, (center) a dark brown tinted mortar with an almost flush joint was used on this early-20th century Roman brick. (right) When constructed at the turn-of-the-century, this 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

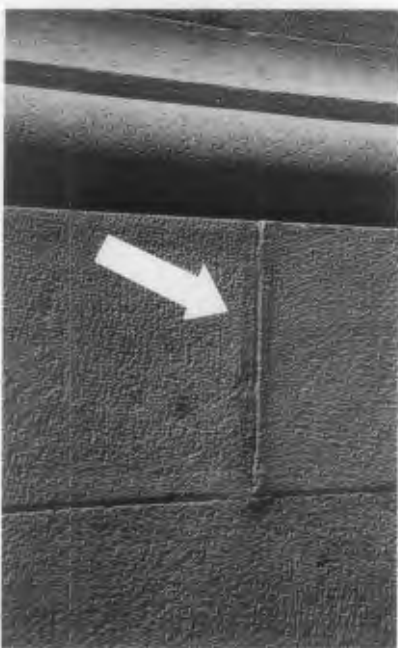


Figure 7. The dark stain on either side of the vertical joint on this sandstone waterable probably resulted from the use of a bonding agent that was not properly cleaned off the masonry after repointing. Photo: Anne Grimmer.

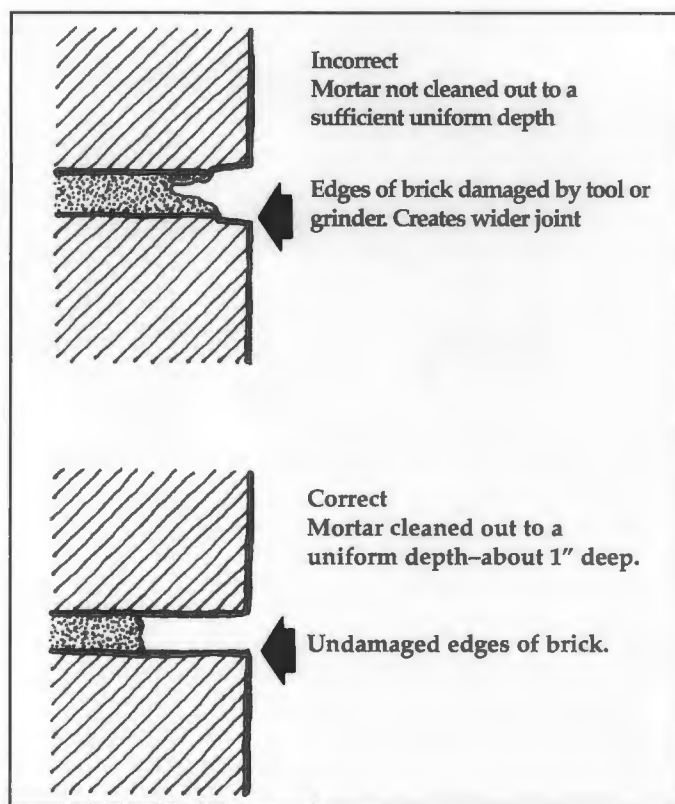


Figure 9. Comparison of incorrect and correct preparation of mortar joints for repointing. Drawing: Robert C. Mack, FAIA, and David W. Look, ALA.

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

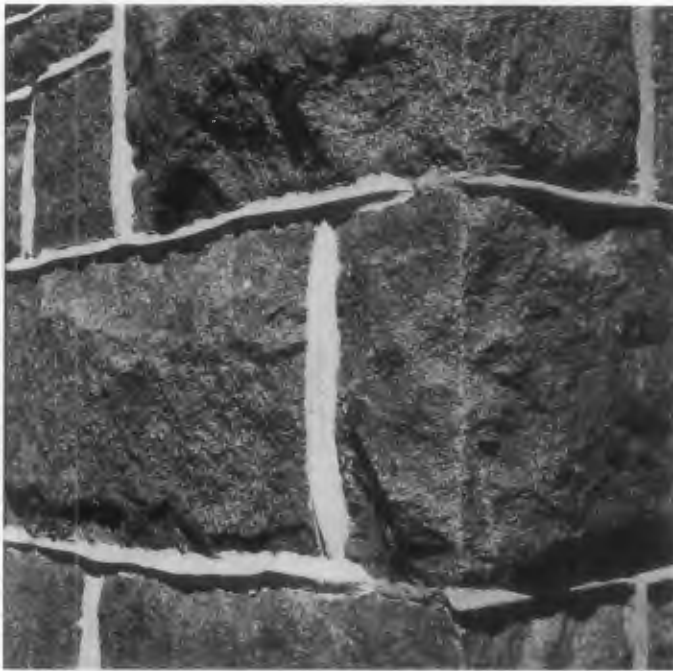


Figure 15. The profile of the repointed joints on the left replicate the historic joints around the corner to the right on the front of this stone building in Leesburg, VA. The contractor's pride in the repointing work is evident by the signature in the vertical joint. Photo: Anne Grimmer.

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

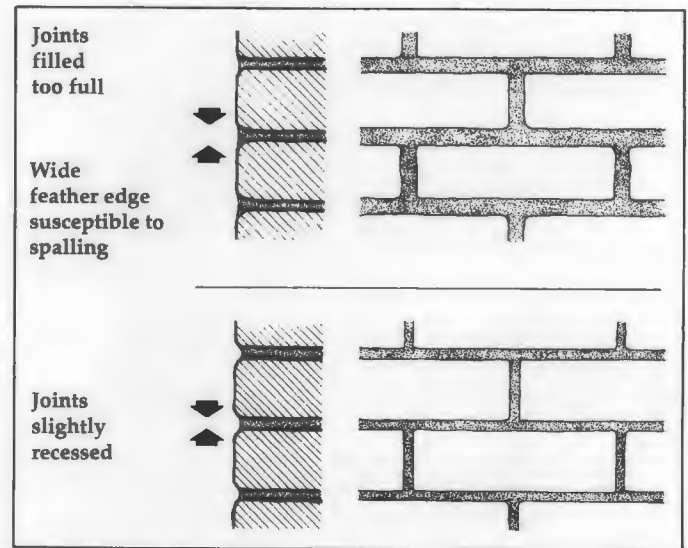


Figure 16. Comparison of visual effect of full mortar joints vs. slightly recessed joints. Filling joints too full hides the actual joint thickness and changes the character of the original brickwork. Drawing: Robert C. Mack, FAIA.

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.

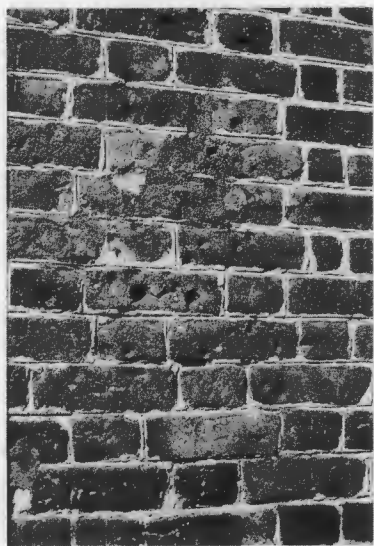
its color. A surprising variety of colors of sand may be found in a single sample of historic mortar, and the different sizes of the grains of sand or other materials, such as incompletely ground lime or cement, play an important role in the texture of the repointing mortar. Therefore, when specifying 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



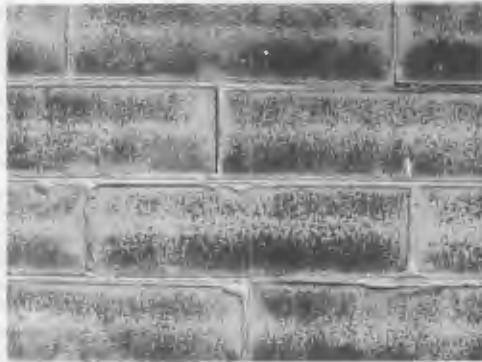
Figure 20. This stone garden wall was tuckpointed to match the tuckpointing on the c. 1920s house on the property. Photo: Anne Grimmer.



a



b



c

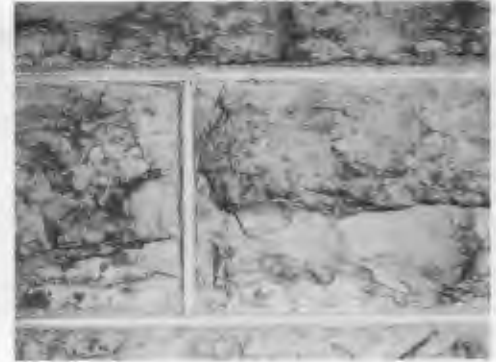


f

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).



e



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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The authors and the editor wish to thank the following for the professional and technical review they provided: Mark Macpherson and Ron Peterson, Masonry Restoration Contractors, Macpherson-Towne Company, Minneapolis, MN; Lorraine Schnabel, Architectural Conservator, John Milner Associates, Inc., Philadelphia, PA; Lauren B. Sickels-Taves, Ph.D., Architectural Conservator, Biohistory International, Huntington Woods, MI; and the following National Park Service professional staff, including: E. Blaine Cliver, Chief, Historic American Buildings Survey/Historic American Engineering Record; Douglas C. Hicks, Deputy Superintendent, Historic Preservation Training Center, Frederick, MD; Chris McGuigan, Supervisory Exhibits Specialist, Historic Preservation Training Center, Frederick, MD; Charles E. Fisher, Sharon C. Park, FAIA, John Sandor, Technical Preservation Services Branch, Heritage Preservation Services, and Kay D. Weeks, Heritage Preservation Services.

The original version of this brief, *Repointing Mortar Joints in Historic Brick Buildings*, was written by Robert C. Mack in 1976, and was revised and updated in 1980 by Robert C. Mack, de Teel Patterson Tiller, and James S. Askins.

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.