



**Painter Preservation**  
HISTORIC PRESERVATION & URBAN DESIGN

City of Santa Rosa

APR 18 2019

Planning & Economic  
Development Department

April 17, 2019

Mr. Richard Deringer  
808 Donahue  
Santa Rosa, CA 99401

**Re Review of changes to the DeTurk Winery Village project**

Dear Rick,

Attached please find a review for compliance with the appropriate regulations governing the historic resources present on the DeTurk Winery property, which consist of the winery building itself and the US Bonded Warehouse to the south (APN 010-091-001 and 010-091-007). The property is addressed in permit records as 8 W 9<sup>th</sup> Street and 806 Donahue. The plans for this project were approved by the Santa Rosa City Council in 2016, after reviews by the Cultural Heritage Board and the Design Review Board.

The attached review addresses revisions to the project as reflected in drawings prepared by the architecture firm of O'Malley Wilson Westphal dated April 5, 2019. The changes reviewed here include a revision to the west parapet on Building C, as requested by the Cultural Heritage Board; the addition of a fourth floor on Building B, which was previously approved for three stories; and an expansion to Building A, which now has an L-shaped footprint and is located between Building B and Building C. An additional change is that Building C, the historic winery building, will retain its commercial uses and the housing units previously included in this building will be moved to other locations.

The cumulative effect of these changes on the historic resources of the DeTurk Winery building, the US Bonded Warehouse building, and the West End Preservation District are addressed through additions to each of the ten Secretary of Interior's Standards for Rehabilitation responses that were part of a November 29, 2016 Addendum to the September 2016 Report of the DeTurk Winery prepared by Susan Clark. The Painter Preservation responses are dated April 17, 2019 and reflect the current project proposal. Cumulative changes do not rise to the level that would cause an inconsistency with these standards as previously reviewed.

Sincerely,

Diana J. Painter, PhD  
Owner/Principal Architectural Historian

**Attachments:**

- Letter to Suzie Murray, City of Santa Rosa, from Jillian Guldenbrein, NWIC, November 2, 2016
- Preservation Brief #1 – Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings
- Preservation Brief #6 – Dangers of Abrasive Cleaning to Historic Buildings

**DeTurk Winery Village**  
**Donahue Street between 8<sup>th</sup> St and 9<sup>th</sup> St**  
**Santa Rosa, CA 95401**

**BACKGROUND**

**Project Location and Historic Status**

The DeTurk Winery Village project at 8 West 9<sup>th</sup> Street and 806 Donahue Street proposes the redevelopment of a 3.6-acre, largely developed site in west Santa Rosa, bounded by West 9<sup>th</sup> Street on the north, the SMART train (Northwestern Pacific) railroad tracks on the east (parallel to Cleveland Street), West 8<sup>th</sup> Street on the south, and Donahue Street on the west. The site is within the West End Preservation District, which is a local historic district; the Railroad Square Preservation District is two blocks to the south (note that Railroad Square is also a National Register Historic District). The property is located within the proposed North Railroad Square Preservation District, which was never adopted by the Santa Rosa City Council. The intensive-level survey that accompanied the proposed development found the complex individually eligible for listing in the National Register of Historic Resources by survey evaluation, as well as being eligible as a contributor to a National Register district.<sup>1</sup> Therefore, the building complex is considered a historic resource for purposes of CEQA.<sup>2</sup>

**Previous Historic Reports**

A historic resource report consisting of an evaluation for CEQA compliance and a mitigation plan was prepared for the project in August 2006, based on an intensive survey of the property undertaken in March 2006, updated in May 2016.<sup>3</sup> This survey found the DeTurk Winery and the US Bonded Warehouse eligible for listing in the California and National Registers as an individual property and as a contributor to a National Register-eligible district (APNs 010-091-001 and 010-091-007).<sup>4</sup> The Clark and Scotten survey found the winery significant under California Register Criteria 1, 2 and 3, and found that it retained sufficient integrity to be a historic resource for purposes of CEQA. Clark noted that the building is a focal point of the West End Preservation District and associated with the industrial and architectural history of Santa Rosa.<sup>5</sup>

The Clark and Scotten report notes previous historic resource surveys that included the building. The 1977 Peterson survey found the building significant and included it in a proposed Westside District. The 1998 Bloomfield survey defined "winery complexes" as historically significant, a category within which the DeTurk Winery easily fits. Bloomfield highlighted the DeTurk Winery in her proposed North Railroad Square District. She recommended that this district be listed as a local historic district (Preservation District) with the City of Santa Rosa until it became eligible for listing in the National Register, which she noted would occur in 1997.<sup>6</sup> This was never done. In 1996 the DeTurk Winery was included in the West

---

<sup>1</sup> Note that the building complex is a contributor to a local district, not a National Register district. Nonetheless, a contributor to a local district that is recognized by the State, as this one is, is considered a historic resource for purposes of CEQA.

<sup>2</sup> Susan M. Clark and Nicholas Radtkey, *DeTurk Winery Village, Donahue Street between 8<sup>th</sup> St and 9<sup>th</sup> St, Santa Rosa, CA 95401. Review of Proposed Project for Consistency with Preservation Ordinances*. Prepared for Mr. Richard Deringer, Railroad Square Village, LLC, Santa Rosa, Ca. Prepared by Susan M. Clark, Architectural Historian, and Nicholas Radtkey, Assistance Historians, Sea Ranch, CA 95497. September 2016.

<sup>3</sup> Susan M. Clark and Heather M. Scotten, *A CEQA Evaluation and Mitigation Plan, Isaac De Turk Winery, 700, 722, 730, 816, 820 Donahue Street (Between West 8<sup>th</sup> and West 9<sup>th</sup> streets) Within the West End Preservation District, APN 010-0910001 & 010-091-007 Santa Rosa, CA 95401*. Prepared for Railroad Square Village, LLC, Tiburon, CA. Prepared by Clark Historic Resource Consultants, Inc., Santa Rosa, CA. August 2006. The Building, Structure and Object record for the buildings rated them with a State of California Status Code of "3B", which is defined as, "Appears eligible for NR both individually and as a contributor to a NR eligible district through survey evaluation." Note that the West End Preservation District is a local historic district.

<sup>4</sup> The Status Code assigned to the property was "3B", defined as, "Appears eligible for National Register (NR) as an individual property and as a contributor to a NR district through survey evaluation."

<sup>5</sup> Clark, 2006, p. 10 of 19.

<sup>6</sup> Anne Bloomfield, "North Railroad District," *Cultural Heritage Survey of the City of Santa Rosa*. Santa Rosa, CA: Cultural Heritage Board, 1989, sheet 5. Note that buildings must be over 50 years of age to be listed in the National Register unless it can be determined that they meet the threshold for "exceptional significance." See Patrick W.

**DeTurk Winery Village  
Donahue Street between 8<sup>th</sup> St and 9<sup>th</sup> St  
Santa Rosa, CA 95401**

End Preservation District by the Santa Rosa City Council as a contributing element.<sup>7</sup> A November 2, 2016 letter from the California Office of Historic Preservation's Northwest Information Center, which was requested by the City of Santa Rosa, noted that three studies in the project area had been conducted in the past. They were: a 2006 cultural resource study by Massey; a 2006 Historic Property Survey Report by Beard; and the 2016 compliance document by Clark and Radtkey, which is the review of the proposed project for consistency with city preservation ordinances dated September 2016.<sup>8</sup>

### **Previous Compliance Statements**

At the time of the September 2016 submittal, a review of the proposed project was undertaken to establish whether the project was consistent with the City's preservation ordinances. This report also included a section stating that the project as proposed was consistent with the Secretary of Interior's Standards for Rehabilitation.<sup>9</sup> An addendum prepared on November 29, 2016 demonstrated compliance with the Secretary of Interior's Standards by responding to each of the ten standards in the affirmative, as well as including a response to, "Questions relating to the City of Santa Rosa's Design Guidelines, Historic Properties and District, Section 4.7." The latter inclusion also discussed the fact that the complex was considered a contributor to the West End Preservation District, even though it contrasted in historic use and form with the majority of the small residences that make up the district. Finally, it included a reference to the fact that the complex would have been more consistent with the proposed North Railroad Square Historic District, of which it is a part, but that that district was never adopted. The author also notes that the properties within this proposed district are nonetheless protected historic resources by virtue of the fact that they are included in the State's inventory of historic properties.<sup>10</sup>

The development project that was reviewed in 2016 was three and four stories in height and contained 185 residential units, in addition to commercial space.<sup>11</sup> This project was reviewed by the Cultural Heritage Board and Design Review Board and approved by the Santa Rosa City Council. It followed on a proposal that received preliminary review at a joint meeting of the Cultural Heritage Board and Design Review Board on March 1, 2006 and for which a Proposed Mitigated Negative Declaration was issued in 2007. Since the time of the 2016 hearings, density bonuses and other provisions have been put in place to encourage the development of housing, especially affordable housing, in Santa Rosa, although the current project proposes 185 residential units, the same number of units reviewed in 2016. At the same time, the SMART train has begun service on the former Northwestern Pacific tracks, making the development of a transit-oriented village a reality.

## **CURRENT REVIEW**

### **Current Compliance Statement**

The changes reviewed here include:

1. A revision to the west parapet on Building C, as requested by the Cultural Heritage Board;<sup>12</sup>
2. The addition of a complete fourth floor on Building B, which was originally approved for three stories;
3. An expansion of Building A and revision of the north and south side facades

---

Andrus, *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation*. Washington DC: US Department of the Interior, National Park Service, Cultural Resources, 1995, p. 41 for more information.

<sup>7</sup> Clark, 2006, 8 of 19.

<sup>8</sup> Jillian Guldenbrein, researcher, California Historical Resources Information System, letter to Susie Murray, City Planner, City of Santa Rosa, "PR/16-012/806 Donahue & 8 W. 9<sup>th</sup> Street / DeTurk Winery Village." November 2, 2016, 1.

<sup>9</sup> Clark, September 2016, 11.

<sup>10</sup> Clark, November 2016, 5 of 6.

<sup>11</sup> The review was based on plans dated May 19, 2016 by Kevin O'Malley of O'Malley, Wilson and Westphal.

<sup>12</sup> This was previously reviewed in a concept review and recommended by the DRB/CHB.

**DeTurk Winery Village  
Donahue Street between 8<sup>th</sup> St and 9<sup>th</sup> St  
Santa Rosa, CA 95401**

4. The change that all housing units in Building C will be relocated to the other buildings within the development. Building C will be used for commercial uses only and associated parking and exiting.

Generally, a project in which the treatment of a historic resource(s) is consistent with the Secretary of the Interior's Standards for Rehabilitation and local historic preservation regulations will not adversely affect historic resource(s) and by extension, will not have a significant adverse effect on the environment.<sup>13</sup> Substantial adverse changes include changes such that the qualities that make the resource significant are impaired or lost.<sup>14</sup> The September 2016 report by Clark and Radtkey note the character-defining elements of the historic resources at the DeTurk Winery site. The follow-up Addendum to the September 2016 Report of the DeTurk Winery, issued November 29, 2016, demonstrates concurrence with the Secretary of Interior's Standards for Rehabilitation. The following statements are intended to demonstrate that the current proposed changes also meet the Standards.

In addition to ensuring that the above changes meet the Standards, the City of Santa Rosa has requested that the cumulative effect of the project changes be reviewed to ensure that it does not have an adverse effect on historic resources. Historic resources here refer to the Winery building, the US Bonded Warehouse building, and the West End neighborhood itself, which is a Preservation District.<sup>15</sup>

**Change #1: Replacement of the Stepped Parapet on Building C**

The Cultural Heritage Board has recommended that the replacement of the stepped parapet on the west face of the southerly winery building (806 Donahue Street) be replaced with a straight parapet. Historic photos reveal that the building originally had a straight parapet in this location. While the project is under no obligation to replace the stepped parapet with a straight parapet, as the former has become historic in itself, the original straight parapet also falls within the Period of Significance for the building. Its replacement does not constitute an adverse effect to the building.

**Change #2: The Addition of a Fourth Story on Building B**

Building B was previously approved for a three-story high insert into the historic building. The surrounding buildings, Buildings A, C and D were all previously approved at four stories. The current proposal is to add a fourth story to Building B (the US Bonded Warehouse). The building faces industrial buildings across West 8<sup>th</sup> Street and the railroad tracks on the east side. As viewed from Donahue Street, Building B will be largely blocked visually by Building A. This change is not substantially different than what was previously proposed and approved in 2016. It also makes the height of Building B consistent with adjacent Buildings A.. This change does not constitute an adverse effect to the building.

**Change #3: An expansion of Building A and alteration of the north and south facades**

Building A has been revised to include an additional wing that extends east-west, so that the building now has an L-shaped footprint and is 73,450 square feet in size. The main portion of the four-story building is located at Donahue and West 8<sup>th</sup> Street and is oriented north-south. The new wing is located between Building B (the US Bonded Warehouse) and Building C (the DeTurk Winery). The new building is pulled away from both of these historic structures, such that the building facades are still visible, including the character-defining port hole windows on the Winery building.

The north and south side facades of Building A, which were previously approved with large expanses of glass within three- and four-story, brick-veneer-clad frames, will be altered. The new proposal, which

---

<sup>13</sup> State of California Governor's Office of Planning and Research, "CEQA Provisions," *CEQA & Historical Resources, CQA Technical Advice Series*. Sacramento, CA: State of California Governor's Office of Planning and Research, n.d., 1.

<sup>14</sup> State of California Governor's Office, n.d., 2.

<sup>15</sup> Note that previous changes to the US Bonded Warehouse building that were approved by the DRB and CHB include the addition of new windows and doors to the building.

**DeTurk Winery Village  
Donahue Street between 8<sup>th</sup> St and 9<sup>th</sup> St  
Santa Rosa, CA 95401**

includes three and four distinct floors with more traditionally scaled openings and materials, will be more in keeping with the detailing on the historic buildings and the residential portions of the project. This will not adversely impact the existing historic structures on the site.

**Change #4: Removal of all housing units previously approved for Building C**

Building C will be reserved for the commercial uses that are present in the building today, plus associated parking. The housing units previously proposed for Building C will be moved to other buildings within the development. This change will not adversely impact the existing historic structures nor the historic district to the west.

**References**

Andrus, Patrick W., *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation*. Washington DC: US Department of the Interior, National Park Service, Cultural Resources, 1995.

Bloomfield, Anne, "North Railroad District," *Cultural Heritage Survey of the City of Santa Rosa*. Santa Rosa, CA: Cultural Heritage Board, 1989.

"Historic Preservation," *City of Santa Rosa*, <https://srcity.org/398/Historic-Preservation>, accessed April 2019.

Clark, Susan M. and Heather M. Scotten, *A CEQA Evaluation and Mitigation Plan, Isaac De Turk Winery, 700, 722, 730, 816, 820 Donahue Street (Between West 8<sup>th</sup> and West 9<sup>th</sup> streets) Within the West End Preservation District, APN 010-0910001 & 010-091-007 Santa Rosa, CA 95401*. Prepared for Railroad Square Village, LLC, Tiburon, CA. Prepared by Clark Historic Resource Consultants, Inc., Santa Rosa, CA. August 2006.

Clark, Susan M. and Nicholas Radtkey, *DeTurk Winery Village, Donahue Street between 8<sup>th</sup> St and 9<sup>th</sup> St, Santa Rosa, CA 95401. Review of Proposed Project for Consistency with Preservation Ordinances*. Prepared for Mr. Richard Deringer, Railroad Square Village, LLC, Santa Rosa, Ca. Prepared by Susan M. Clark, Architectural Historian, and Nicholas Radtkey, Assistance Historians, Sea Ranch, CA 95497. September 2016.

Guldenbrein, Jillian, researcher, California Historical Resources Information System, letter to Susie Murray, City Planner, City of Santa Rosa, "PR/16-012/806 Donahue & 8 W. 9<sup>th</sup> Street / DeTurk Winery Village." November 2, 2016.

Hartman, Clare, City Planner, "DeTurk Winery Village, 8 West Ninth Street, 700 to 820 Donahue Street, Santa Rosa, CA (Sonoma County), Draft Initial Study/Proposed Mitigated Negative Declaration" (memo). Santa Rosa, CA: City of Santa Rosa, community Development Department, January 19, 2007.

State of California Governor's Office of Planning and Research, "CEQA Provisions," *CEQA & Historical Resources, CQA Technical Advice Series*. Sacramento, CA: State of California Governor's Office of Planning and Research, n.d.

**DeTurk Winery Village  
Donahue Street between 8<sup>th</sup> St and 9<sup>th</sup> St  
Santa Rosa, CA 95401**

(HISTORIC Resource CONSULTANT)  
P.O. Box 198, Sea Ranch, CA 95497, Ph (707) 785-2725

**CITY OF SANTA ROSA**  
DEPT OF COMMUNITY DEVELOPMENT

**NOV 29 2016**

November 29, 2016

**AN ADDENDUM TO THE SEPTEMBER 2016 REPORT OF THE DETURK WINERY**

There were questions regarding the September 2016 report on the DeTurk Winery report. They fell into two categories: those concerning the application of the Secretary of the Interior's Standards for Rehabilitation and those concerning the City of Santa Rosa Design Guidelines, Section 4.7 Historic Properties and Districts, I Goals and III Design Guidelines or Historic Properties and Districts, G. New Construction. This addendum is intended to address those questions.

An Analysis of the proposed DeTurk Winery Village project and The Secretary of the Interior's Standards for Rehabilitation

1. A property shall be used for its intended historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.

*The DeTurk Winery was constructed in the late 19<sup>th</sup> century as a facility to produce and ship wine. Isaac DeTurk, who had the Winery constructed, was a prominent local businessman and winemaker. He was also responsible for the construction of the round bam directly across Donahue Street from the Winery building. The Winery has not functioned in a wine production and shipping business for almost a century. In recent decades the building was used to store stage props and costumes for a local theater group, gym, and moving van business. No project other than the currently proposed project has ever been proposed for the property which would insure its overall continued use and maintenance. It is common knowledge that an unused building does not receive the necessary maintenance and attention as does a building in everyday use. Mr. Richard Deringer, its current owner, has an office in the building as he has awaited building permits to allow the rehabilitation of the Winery into a multi-residential project which will include some affordable housing units. Facilitating the construction of affordable housing units has been an ongoing stated goal of recent Santa Rosa City Councils.*

*The Santa Rosa General Plan would not permit the property to be used for winery production or storage. The currently permitted land use includes attached housing with no less than 75 units on the 3.6-acre parcel. The proposed project calls for 185 dwelling units, including 15 affordable units.*

*If preservation of historically significant buildings is important to the City of Santa Rosa and if the construction of affordable housing is also important, this proposed rehabilitation of the DeTurk Winery and Bonded Warehouse is a project that furthers both of those objectives.*



**DeTurk Winery Village**  
**Donahue Street between 8<sup>th</sup> St and 9<sup>th</sup> St**  
**Santa Rosa, CA 95401**

**2019 Response - Painter**

**The present project proposal adds additional housing units and affordable housing units to the project area. As currently proposed, there are no changes to the use of Building C, the Winery building. It remains in commercial use, making this project compliant with this standard.**

2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

*The historic character of a building is embodied in its shape, its materials, its features, its setting and its interiors. The character-defining elements of the DeTurk Winery were identified in DeTurk Winery Village, Review for Proposed Project for Consistency with Preservation Ordinances, Susan Clark, September 2016, pages 3 and 4.*

*The current proposed project preserves the primary facade of the DeTurk Winery on Donahue Street. The alterations are minimal with several of the openings which have been closed off or altered being restored to their original appearance. The south elevation of the winery has had several alterations over the years, including installation of large roll up doors and closing off original windows. ~~The proposed alterations on the south elevation call for removing some of the roll up doors and slightly raising a band of circular windows to provide light for the proposed apartments. The raising of the band of circular windows is necessary for the functioning of the new use. Left in their current location the round windows will only provide light into the apartments at floor level. The blue stucco which has been applied to the south elevation and obscures the original brick wall will also be removed.~~*

*The red brick exterior, series of three horizontal box-like structures, arched doorways, arched windows all make up the visual characteristics of the DeTurk Winery. These are to be retained and, in some cases, restored.*

*In the case of the DeTurk Winery, the most significant elevations are located on the west (front) and south of the building. The segmental arched windows along the west elevation and the common English bond pattern of exterior red bricks are important character-defining features that will be retained and should remain visible from the street.*

*The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings (Weeks and Grimmer, 1995) provide for flexibility when interior and exterior alterations are necessary to assure continued use of a historic building. The following is found on page 65:*

*"Some exterior and interior alterations to a historic building are generally needed to assure its continued use, but it is most important that such alterations do not radically change, obscure, or destroy character-defining spaces, materials, features, or finishes. Alterations may include...cutting new entrances or windows on secondary elevations; inserting an additional floor; installing an entirely new mechanical system; or creating an atrium or light well.*

*Alteration may also include the selective removal of buildings or other features of the environment or building site that are intrusive and therefore detract from the overall historic character" (emphasis mine)*

*The acceptability of raising the string of round windows on a secondary elevation is permitted in the section quoted above. This proposed alteration is justified in terms of its functionality for the proposed*  
April 17, 2019 Painter Preservation 7

**DeTurk Winery Village  
Donahue Street between 8<sup>th</sup> St and 9<sup>th</sup> St  
Santa Rosa, CA 95401**

~~residential space. It is absolutely essential to provide daylight for the future occupants of the proposed new apartments.~~

**2019 Response - Painter**

**No apartments are planned for Building C now. The building will retain its commercial uses. As a result, the previously proposed raising of the round windows on Building C will be avoided.**

3. Each property shall be recognized as a physical record of its time, place and use. Changes that create a false sense of historic development, such as adding conjectural feature or architectural elements from other buildings, shall not be undertaken.

*The proposed design for the rehabilitation of the DeTurk Winery includes NO conjectural features, architectural elements from other buildings or any false sense of historic development.*

**2019 Response - Painter**

**There is no change in the response to this Standard.**

4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

*Over the historic period the Winery served two purposes: wine production and storage, storage of both alcoholic beverages and other types of storage. The only significant changes to the building were the addition of the Large roll up doors on the south elevation and the replacement of some of the round windows with squared windows on the west elevation of the winery. The roll up doors speak more to the intensity of transporting product rather than change in property use. The replacing some of the round windows with squared ones possibly took place as early as 1906. The squared windows which face Donahue Street have been part of the visual character of the winery for over 100 years are to be retained.*

**2019 Response - Painter**

**There is no change in the response to this Standard.**

5. Distinctive features, finishes and construction techniques or example of craftsmanship that characterizes a historic property shall be preserved.

*The Character-defining Elements tables for the Winery and Bonded Warehouse were created so the distinctive features, finishes, and construction techniques could be identified up-front and protected in the rehabilitation design. Several of the elements that characterize the buildings have already been compromised. To the greatest extent possible, the original features will be restored.*

*The red brick exterior, massing and arched openings are perhaps the most distinctive of the building's finishes and construction techniques. The bricks are set in common English bond with one header row to five stretcher rows. The brickwork at the lower level of the south elevation has been covered by a layer of blue stucco. In order to restore the original south elevation appearance, the blue stucco is to be removed to reveal the original brickwork or replace it with same.*



**DeTurk Winery Village  
Donahue Street between 8<sup>th</sup> St and 9<sup>th</sup> St  
Santa Rosa, CA 95401**

*The winery had a 45' parapet when it was originally constructed. The parapet fell during the 1906 earthquake. It is the intent of the project to restore this element to the building.*

**2019 Response - Painter**

***There is no change in the response to this Standard. Note that removal of the stucco should be done in compliance with Standard #7. Preservation Briefs with guidance as to how to do this sensitively is attached to this document.***

6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

*There is ample documentary and pictorial evidence of the historic appearance, building materials and building techniques. Additionally, Sanborn Fire insurance maps show original roof line, locations of doors (now closed in), dimensions of structures on the property, building material and what activities took place in what areas of the buildings.*

*The brick exterior will require the majority of the repair and replace work. To the extent possible, bricks will be repaired. If some bricks are too damaged to repair, they will be replaced by identical bricks. The common English bond pattern will be preserved. Other exterior features, such as windows and doors, will be repaired using materials already in place or replaced with like materials.*

**2019 Response - Painter**

***There is no change in the response to this Standard***

7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

*The owner is aware of the fragility of the bricks and other original building materials. He has already begun research into discovering which methods of cleaning to preserve are suitable for his buildings. There will be no sand blasting or use of caustic or corrosive cleaning agents.*

**2019 Response - Painter**

***There is no change in the response to this Standard. Preservation Briefs with guidance as to how to clean the bricks sensitively is attached to this document.***

8. Significant archaeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

*If any archaeological resources are found, work will stop until a professional archaeologist is consulted. In her Historic Property Survey Report for the City of Santa Rosa bike/pedestrian path along the Northwestern Pacific Railroad, Vicky Beard stated that the Winery did not meet Criterion D dealing with archaeological resources that could yield important analytical data relating to prehistory or history.*

**DeTurk Winery Village  
Donahue Street between 8<sup>th</sup> St and 9<sup>th</sup> St  
Santa Rosa, CA 95401**

**2019 Response - Painter**

***There is no change in the response to this Standard***

9. New Additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, and scale and architectural features to protect the historic integrity of the property and its environment.

*The Secretary of the Interior's Guidelines pertaining to new additions to historic buildings which have been incorporated into this project include:*

*Constructing a new addition so that there is the least possible loss of historic materials and so that the character-defining features are not obscured, damaged, or destroyed. Designing a new addition in a manner that makes clear what is historic and what is new. Designing a rooftop addition when required for the new use, that is set back from the wall plane and as inconspicuous as possible when viewed from the street.*

*All new construction adjacent to the subject historic property has been designed to recognize and conform to size, bulk and massing and is not mimicking the historic character of the original building. The new construction is both compatible with and consistent as to design elements so to meet this provision.*

**2019 Response - Painter**

***There is no change in the response to this Standard.***

10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

*The new addition was designed with the condition that if the improvements were removed in the future these improvements will not impact the status of the existing building. If Building D (apartments), upper stories of the Winery, and Building A were removed, the property would look pretty much what it looks like today.*

*Actually, if the new additions were removed in the future, the Winery would be closer to its original appearance than it is today. Some of the original windows will have been restored, two big roll-up doors will have been removed and the blue stucco lower level of the south elevation will have been removed.*

*The project as proposed is consistent with the Secretary of the Interior's Standards and will not adversely affect or decrease the significance of the historic DeTurk Winery.*

**2019 Response - Painter**

***There is no change in the response to this Standard, with the exception that no apartments are proposed for the Winery building.***

**DeTurk Winery Village  
Donahue Street between 8<sup>th</sup> St and 9<sup>th</sup> St  
Santa Rosa, CA 95401**

**Questions relating to the City of Santa Rosa's Design Guidelines, Historic Properties and Districts, section 4.7 – Clark, November 29, 2016**

1. Goals

- A. To preserve Santa Rosa's historic heritage.
- B. To encourage maintenance and retention of historic structures and districts.
- C. To ensure that alterations to historic buildings are compatible with the character of the structure and the neighborhood.
- D. To discourage the demolition of significant historic structures.
- E. To assist property owners and designers in developing plans for historic properties and to encourage the compatibility of new structures in historic districts, and having those plans approved by the City.

*The proposed project will rehabilitate the historic DeTurk Winery for a new purpose which addresses one of the goals of City Counsel which is not addressed here – to increase the housing stock in Santa Rosa, especially affordable housing. By rehabilitation the historic building will be preserved and will be maintained for the residents occupying the new units.*

*The West End Preservation District is comprised of small residential buildings, very unlike the more industrial appearing Winery. Yet when the district was formed in the 1990s in order to offer some protection to the Winery from demolition or inappropriate alterations, the building was included in the West End Preservation District. The Winery has never reflected the character of the neighborhood of small, wood-frame houses. The building was constructed as an industrial building to house the production and storage of wine.*

*The historic resource survey conducted by Anne Bloomfield in 1989 identified the Winery as a contributor to a proposed North Railroad Square Preservation District. The proposed preservation district was to be made up of commercial and industrial buildings. Bloomfield identified the buildings at 415 Davis, 410, 422, 504, 510, 512, 514, 600, 610, 618, 620, 625, 700, 701, 708, 716, 717, 726 and 732 Wilson as potential contributors to the North Railroad Square Preservation District. The City of Santa Rosa has never pursued formation of the North Railroad Square Preservation District. The district is not listed among the preservation districts listed in II HISTORIC LANDMARKS AND PRESERVATION DISTRICTS.*

*Anne Bloomfield's survey was included in the Santa Rosa Cultural Heritage Survey which was submitted in 1990 to the California Office of Historic Preservation. The properties listed on the survey enjoy protections from demolition and inappropriate alterations as do those in preservation districts which were formally established by local jurisdictions. Contrary to the report dated September 2016, they are Listed on the California Register of Historic Resources. Proposed alteration and rehabilitation plans are reviewed by the local jurisdiction for consistency with the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings.*

*Santa Rosa's Design Guidelines addresses new construction in Historic Districts in Section III, G. New Construction. There are three points in this section.*

- 1. Design new construction so that the architectural character of the neighborhood is maintained.

*The architectural of the district does not apply to Donahue Street. The streetscape was never one of small wood-frame residences as is the rest of the preservation district.*

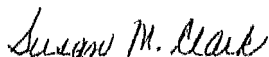
2. Design new construction to be compatible in height and proportion with adjacent structures

*The proposed alteration to the Winery is compatible in height with the historic Winery and the nearby Bonded Warehouse. As mentioned above, the Winery's inclusion in the West End Preservation District composed of small residences rather than the proposed North Railroad Square District made up of larger commercial and industrial buildings is awkward. The proportion and height are compatible with the DeTurk Round Barn across Donahue Street from the Winery. The height of the original building is 34-35 feet; the height of the proposed new construction is 34 feet plus the fourth story roof garden and apartments. The proposed fourth story raises the overall height to 40 feet, which is still 2-3 feet lower than a tentative map for this project which was approved in 2007. Additionally, the fourth floor is less visible from the street since it is set back 12-15 feet from the front wall of the rest of the building. The Winery has always been of greater height and proportion than the small residences that make up the West End Preservation District. The addition of a fourth story will not appreciably change the streetscapes in the area.*

*This project addresses the City goal of providing affordable dwelling units. The proportion and height as proposed are necessary to provide housing for low- and moderate-income households. To reduce height and proportion to that of nearby structures would result in fewer apartment units. The costs per unit to be greater and, therefore, the rent would not be affordable to low- and moderate-income families.*

3. Use materials and designs similar to that found throughout the neighborhood.

This guideline brings us back to the problem of having the Winery located in the West End Preservation District rather than the proposed North Railroad Square Preservation District. There simply are no other large, industrial red brick buildings in the surrounding neighborhood. The nearby buildings are wood-frame and wood exterior and residential design. The Winery is simply of another design and built from materials not found nearby.

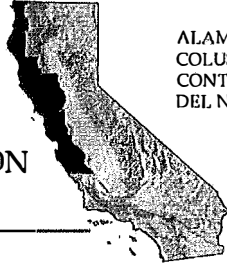


Susan M. Clark, MA  
Architectural historian

### **2019 Response - Painter**

**As previously noted, the current proposal does not include apartment units in Building C. This is the only change from this 2016 response to Santa Rosa's design guidelines for historic properties.**

CALIFORNIA  
HISTORICAL  
RESOURCES  
INFORMATION  
SYSTEM



ALAMEDA HUMBOLDT SAN FRANCISCO  
COLUSA LAKE SAN MATEO  
CONTRA COSTA MARIN SANTA CLARA  
DEL NORTE MENDOCINO SANTA CRUZ  
MONTEREY SOLANO  
NAPA SONOMA  
SAN BENITO YOLO

**Northwest Information Center**  
Sonoma State University  
150 Professional Center Drive, Suite E  
Rohnert Park, California 94928-3609  
Tel: 707.588.8455  
nwic@sonoma.edu  
<http://www.sonoma.edu/nwic>

November 2, 2016

File No.: 16-0650-revised

Susie Murray, City Planner  
City of Santa Rosa  
Community Development Department  
100 Santa Rosa Ave., Rm. 3  
Santa Rosa, CA 95404

re: PRJ16-012 / 806 Donahue & 8 W. 9th Street / DeTurk Winery Village

Dear Ms. Susie Murray,

Records at this office were reviewed to determine if this project could adversely affect cultural resources. **Please note that use of the term cultural resources includes both archaeological sites and historical buildings and/or structures. The review for possible historic-era building/structures, however, was limited to references currently in our office and should not be considered comprehensive.**

**Previous Studies:**

XX There are three studies that include the proposed project area. Study # 32059 (Massey 2006), a project-specific cultural resource study, did not include any field study. Study # 33228 (Beard 2006), a Historic Property Survey Report, whose Architectural Area of Potential Effects (APE) included the proposed project area, although the Archaeological APE did not. Study # 48234 (Clark and Radtkey 2016) conducted a review of proposed project for consistency with preservation ordinances. See recommendations below for resource specific information.

**Archaeological and Native American Resources Recommendations:**

XX Archaeological recommendations from Massey's study (2006:3-4) include:

1. The project area has a moderate to high sensitivity for prehistoric archaeological sites. Prehistoric sites are known to be present in the immediate vicinity of the project area, although there is no evidence that such a resource is present underneath the standing buildings. If the existing buildings are demolished, a qualified archaeologist should be present during ground-disturbing activities to inspect activities to inspect exposed ground surfaces, identify SHRC-eligible resources, and make recommendations for their disposition.
2. The project area has a moderate sensitivity for historic-era archaeological resources. No historic-era archaeological resources have been recorded in the project area. Archaeological deposits associated with the operation of the winery may be present. Historic maps indicate that the De Turk Wine

Cellar, and the U.S. Bonded Warehouse are the first buildings to have stood in their locations (Bowers 1867, GLO 1859, Reynolds and Proctor 1898). Therefore, it seems unlikely that historic-era remains exist that pre-date these uses. If these existing buildings are demolished, a qualified archaeologist should be present during ground-disturbing activities to inspect exposed ground surfaces, identify SHRC-eligible resources, and make recommendations for their disposition.

### 3. Encountering Human Remains

If ground-disturbing activities are to be undertaken in association with the planned project, the possibility of encountering human remains cannot be entirely discounted. Section 7050.5 of the California Health and Safety Code states that it is a misdemeanor to knowingly disturb a human grave. If human graves are encountered, work shall halt in the vicinity and the County Coroner should be notified. At the same time, an archaeologist should be contacted to evaluate the situation. If human remains are of Native American origin, the Coroner must notify the Native American Heritage Commission within 24 hours of this identification.

XX We recommend the lead agency contact the local Native American tribe(s) regarding traditional, cultural, and religious heritage values. For a complete listing of tribes in the vicinity of the project, please contact the Native American Heritage Commission at 916/373-3710.

#### **Built Environment Recommendations:**

XX The proposed project area contains several recorded buildings. The De Turk Winery Complex (P-49-003727), is comprised of three buildings: The Santa Rosa Wine Cellar/ De Turks Winery, The U.S. Bonded Warehouse (also known as the L.W. Burriss Distillery & Cold Storage), and the De Turk S.R. Wine Cellar.

XX The recorded buildings mentioned above are also included in the Office of Historic Preservations Historic Property Directory (April 2012).

The Santa Rosa Wine Cellar/De Turks Winery (Property #s 002212, 002317) with status codes **2S2**, **3S**, and **7N**

- **2S2**, meaning this individual property determined eligible for National Register (NR) by a consensus through Section 106 process. Listed in the California Register (CR).
- **3S**, meaning it appears eligible for NR as an individual property through survey evaluation.
- **7N**, meaning it needs to be reevaluated

The U.S. Bonded Warehouse, also known as the L.W. Burriss Distillery & Cold Storage (Property # 002315, 002211) with status codes of **2S2**, **3S**, and **7N**

- **2S2**, meaning this individual property determined eligible for National Register (NR) by a consensus through Section 106 process. Listed in the California Register (CR).
- **3S**, meaning it appears eligible for NR as an individual property through survey evaluation.
- **7N**, meaning it needs to be reevaluated

De Turk S.R. Wine Cellar (Property # 002316) with a status code of **3B**

- **3B**, meaning it appears eligible for the NR both individually and as a contributor to a NR eligible district through survey evaluation



XX As part of Beard's study these buildings were determined eligible for the NR (2006:3-4). No further recommendations were made as part of that report.

XX In addition, the proposed project is located within the boundaries of two recorded districts: the North Railroad District (P-49-003727), determined eligible to the NR in Beard (2006:3-4), and the locally recognized West End Preservation District (Bloomfield 1989 and City of Santa Rosa). Clark and Radtkey state that the proposed project will not reduce the significance of the West End Preservation District (2016:2), but make no mention of the NR-determined eligible North Railroad District. Therefore, it is recommended that the proposed project impacts be assessed in relation to the potential to impact the integrity of this district.

XX Additional built environment recommendations from Massey's study (2006:3) include:

1. The three buildings within the study area have been evaluated by Bloomfield as eligible for the California Register of Historical Resources under Criterion 1, association with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States.
2. According to CEQA guidelines,  
  
where maintenance, repair, stabilization, rehabilitation, restoration, preservation, conservation or construction of the historical resource will be conducted in a manner consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historical Buildings (1995), Weeks and Grimmer, the project's impact on the historical resource shall generally be considered mitigated below a level of significance and thus is not significant (Title 14. California Code of Regulations, Chapter 3, Section 15126.4 (b)).

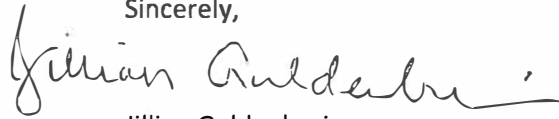
It is recommended that building renovation be carried out in a manner consistent with these standards.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the California Historical Resources Information System (CHRIS) Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

The California Office of Historic Preservation (OHP) contracts with the California Historical Resources Information System's (CHRIS) regional Information Centers (ICs) to maintain information in the CHRIS inventory and make it available to local, state, and federal agencies, cultural resource professionals, Native American tribes, researchers, and the public. Recommendations made by IC coordinators or their staff regarding the interpretation and application of this information are advisory only. Such recommendations do not necessarily represent the evaluation or opinion of the State Historic Preservation Officer in carrying out the OHP's regulatory authority under federal and state law.

For your reference, a list of qualified professionals in California that meet the Secretary of the Interior's Standards can be found at <http://www.chrisinfo.org>. If archaeological resources are encountered during the project, work in the immediate vicinity of the finds should be halted until a qualified archaeologist has evaluated the situation. If you have any questions please give us a call (707) 588-8455.

Sincerely,

A handwritten signature in cursive script that reads "Jillian Guldenbrein". The signature is written in black ink and is positioned to the left of the typed name.

Jillian Guldenbrein  
Researcher



[Home](#) > [How to Preserve](#) > [Preservation Briefs](#) > 1 Cleaning and Water-Repellent Treatments

Some of the web versions of the Preservation Briefs differ somewhat from the printed versions. Many illustrations are new and in color; Captions are simplified and some complex charts are omitted. To order hard copies of the Briefs, see [Printed Publications](#)™.

## PRESERVATION BRIEFS

# 1

## Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings

Robert C. Mack, FAIA, and Anne E. Grimmer

[Preparing for a Cleaning Project](#)

[Understanding the Building Materials](#)

[Cleaning Methods and Materials](#)

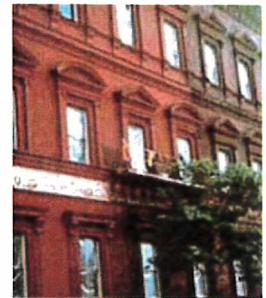
[Planning a Cleaning Project](#)

[Water-Repellent Coatings and Waterproof Coatings](#)

[Summary and References](#)

[Reading List](#)

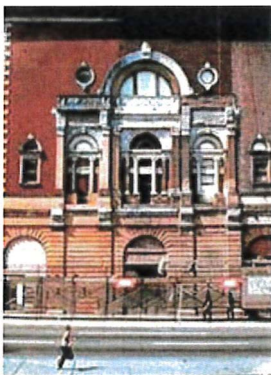
[Download the PDF](#) 



Appropriate cleaning of historic masonry. Photo: NPS files.

### **Inappropriate cleaning and coating treatments are a major cause of damage to historic masonry buildings.**

While either or both treatments may be appropriate in some cases, they can be very destructive to historic masonry if they are not selected carefully. Historic masonry, as considered here, includes stone, brick, architectural terra cotta, cast stone, concrete and concrete block. It is frequently cleaned because cleaning is equated with improvement. Cleaning may sometimes be followed by the application of a water-repellent coating. However, unless these procedures are carried out under the guidance and supervision of an architectural conservator, they may result in irrevocable damage to the historic resource.



Ninety years of accumulated dirt and pollutants are being removed from this historic theater using an appropriate chemical cleaner, applied in

The purpose of this Brief is to provide information on the variety of cleaning methods and materials that are available for use on the *exterior* of historic masonry buildings, and to provide guidance in selecting the most appropriate method or combination of methods. The difference between water-repellent coatings and waterproof coatings is explained, and the purpose of each, the suitability of their application to historic masonry buildings, and the possible consequences of their inappropriate use are discussed.

The Brief is intended to help develop sensitivity to the qualities of historic masonry that makes it so special, and to assist historic building owners and property managers in working cooperatively with architects, architectural conservators, and contractors. Although specifically intended for historic buildings, the information is applicable to all masonry buildings. This publication updates and expands *Preservation Briefs 1: The Cleaning and Waterproof Coating of Masonry Buildings*. The Brief is not meant to be a cleaning manual or a guide for preparing specifications. Rather, it provides general information to raise awareness of the many factors involved in selecting cleaning and water-repellent treatments for historic masonry buildings.

stages. Photo: Richard Wagner,  
AIA.

## Preparing for a Cleaning Project

### Reasons for Cleaning

First, it is important to determine whether it is appropriate to clean the masonry. The objective of cleaning a historic masonry building must be considered carefully before arriving at a decision to clean. There are several major reasons for cleaning a historic masonry building: **improve the appearance of the building** by removing unattractive dirt or soiling materials, or non-historic paint from the masonry; **retard deterioration** by removing soiling materials that may be damaging the masonry; or **provide a clean surface** to accurately match repointing mortars or patching compounds, or to conduct a condition survey of the masonry.

### Identify What is to be Removed

The general nature and source of dirt or soiling material on a building must be identified to remove it in the gentlest means possible--that is, in the most effective, yet least harmful, manner. Soot and smoke, for example, require a different cleaning agent to remove than oil stains or metallic stains. Other common cleaning problems include biological growth such as mold or mildew, and organic matter such as the tendrils left on masonry after removal of ivy.

### Consider the Historic Appearance of the Building

If the proposed cleaning is to remove paint, it is important in each case to learn whether or not unpainted masonry is historically appropriate. And, it is necessary to consider why the building was painted. Was it to cover bad repointing or unmatched repairs? Was the building painted to protect soft brick or to conceal deteriorating stone? Or, was painted masonry simply a fashionable treatment in a particular historic period? Many buildings were painted at the time of construction or shortly thereafter; retention of the paint, therefore, may be more appropriate historically than removing it. And, if the building appears to have been painted for a long time, it is also important to think about whether the paint is part of the character of the historic building and if it has acquired significance over time.

### Consider the Practicalities of Cleaning or Paint Removal

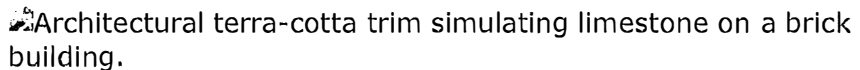
Some gypsum or sulfate crusts may have become integral with the stone and, if cleaning could result in removing some of the stone surface, it may be preferable not to clean. Even where unpainted masonry is appropriate, the retention of the paint may be more practical than removal in terms of long range preservation of the masonry. In some cases, however, removal of the paint may be desirable. For example, the old paint layers may have built up to such an extent that removal is necessary to ensure a sound surface to which the new paint will adhere.

### Study the Masonry

Although not always necessary, in some instances it can be beneficial to have the coating or paint type, color, and layering on the masonry researched before attempting its removal. Analysis of the nature of the soiling or of the paint to be removed from the masonry, as well as guidance on the appropriate cleaning method, may be provided by professional consultants, including architectural conservators, conservation scientists, and preservation architects. The State Historic Preservation Office (SHPO), local historic district commissions, architectural review boards, and preservation-oriented websites may also be able to supply useful information on masonry cleaning techniques.

## Understanding the Building Materials

The construction of the building must be considered when developing a cleaning program because inappropriate cleaning can have a deleterious effect on the masonry as well as on other building materials.

 Architectural terra-cotta trim simulating limestone on a brick building.

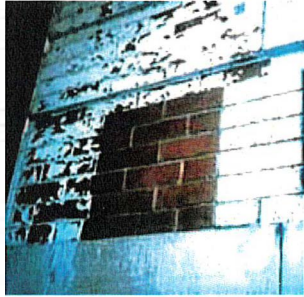
The decorative trim on this brick building is architectural terra-cotta intended to simulate the limestone foundation. Photo: NPS files.

The masonry material or materials must be correctly identified. It is sometimes difficult to distinguish one type of stone from another; for example, certain sandstones can be easily confused with limestones. Or, what appears to be natural stone may not be stone at all, but cast stone or concrete. Historically, cast stone and architectural terra cotta were frequently used in combination with natural stone, especially for trim elements or on upper stories of a building where, from a distance, these substitute materials looked like real stone. Other features on historic buildings that appear to be stone, such as decorative cornices, entablatures and window hoods, may not even be masonry, but metal.

### Identify Prior Treatments

Previous treatments of the building and its surroundings should be researched and building maintenance records should be obtained, if available. Sometimes if streaked or spotty areas do not seem to get cleaner following an initial cleaning, closer inspection and analysis may be warranted. The discoloration may turn out not to be dirt but the remnant of a water-repellent coating applied long ago which has darkened the surface of the masonry over time. Successful removal may

require testing several cleaning agents to find something that will dissolve and remove the coating. Complete removal may not always be possible. Repairs may have been stained to match a dirty building, and cleaning may make these differences apparent. De-icing salts used near the building that have dissolved can migrate into the masonry. Cleaning may draw the salts to the surface, where they will appear as efflorescence (a powdery, white substance), which may require a second treatment to be removed. Allowances for dealing with such unknown factors, any of which can be a potential problem, should be included when investigating cleaning methods and materials. Just as more than one kind of masonry on a historic building may necessitate multiple cleaning approaches, unknown conditions that are encountered may also require additional cleaning treatments.



Any cleaning method should be tested before using it on historic masonry. Photo: NPS files.

### Choose the Appropriate Cleaner

The importance of testing cleaning methods and materials cannot be over emphasized. Applying the wrong cleaning agents to historic masonry can have disastrous results. Acidic cleaners can be extremely damaging to acid-sensitive stones, such as marble and limestone, resulting in etching and dissolution of these stones. Other kinds of masonry can also be damaged by incompatible cleaning agents, or even by cleaning agents that are usually compatible. There are also numerous kinds of sandstone, each with a considerably different geological composition. While an acid-based cleaner may be safely used on some sandstones, others are acid-sensitive and can be severely etched or dissolved by an acid cleaner. Some sandstones contain water-soluble minerals and can be eroded by water cleaning. And, even if the stone type is correctly identified, stones, as well as some bricks, may contain unexpected impurities, such as iron particles, that may react negatively with a particular cleaning agent and result in staining. Thorough understanding of the physical and chemical properties of the masonry will help avoid the inadvertent selection of damaging cleaning agents.

Other building materials also may be affected by the cleaning process. Some chemicals, for example, may have a corrosive effect on paint or glass. The portions of building elements most vulnerable to deterioration may not be visible, such as embedded ends of iron window bars. Other totally unseen items, such as iron cramps or ties which hold the masonry to the structural frame, also may be subject to corrosion from the use of chemicals or even from plain water. The only way to prevent problems in these cases is to study the building construction in detail and evaluate proposed cleaning methods with this information in mind. However, due to the very likely possibility of encountering unknown factors, any cleaning project involving historic masonry should be viewed as unique to that particular building.

## Cleaning Methods and Materials

Masonry cleaning methods generally are divided into three major groups: water, chemical, and abrasive. *Water methods* soften the dirt or soiling material and rinse the deposits from the masonry surface. *Chemical cleaners* react with dirt, soiling material or paint to effect their removal, after which the cleaning effluent is rinsed off the masonry surface with water. *Abrasive methods* include blasting with grit, and the use of grinders and sanding discs, all of which mechanically remove the dirt, soiling material or paint (and, usually, some of the masonry surface). Abrasive cleaning is also often followed with a water rinse. *Laser cleaning*, although not discussed here in detail, is another technique that is used sometimes by conservators to clean small areas of historic masonry. It can be quite effective for cleaning limited areas, but it is expensive and generally not practical for most historic masonry cleaning projects.

Although it may seem contrary to common sense, masonry cleaning projects should be carried out starting at the bottom and proceeding to the top of the building always keeping all surfaces wet below the area being cleaned. The rationale for this approach is based on the principle that dirty water or cleaning effluent dripping from cleaning in progress above will leave streaks on a dirty surface but will not streak a clean surface as long as it is kept wet and rinsed frequently.

### Water Cleaning

Water cleaning methods are generally the *gentlest means possible*, and they can be used safely to remove dirt from all types of historic masonry.\* There are essentially four kinds of water-based methods: soaking; pressure water washing; water washing supplemented with non-ionic detergent; and steam, or hot-pressurized water cleaning. Once water cleaning has been completed, it is often necessary to follow up with a water rinse to wash off the loosened soiling material from the masonry.

*\*Water cleaning methods may not be appropriate to use on some badly deteriorated masonry because water may exacerbate the deterioration, or on gypsum or alabaster, which are very soluble in water.*

### Soaking

Prolonged spraying or misting with water is particularly effective for cleaning limestone and marble. It is also a good method for removing heavy accumulations of soot, sulfate crusts or gypsum crusts that tend to form in protected areas of a



building not regularly washed by rain. Water is distributed to lengths of punctured hose or pipe with non-ferrous fittings hung from moveable scaffolding or a swing stage that continuously mists the surface of the masonry with a very fine spray. A timed on-off spray is another approach to using this cleaning technique. After one area has been cleaned, the apparatus is moved on to another. Soaking is often used in combination with water washing and is also followed by a final water rinse. Soaking is a very slow method—it may take several days or a week—but it is a very gentle method to use on historic masonry.

### Water Washing

Washing with low-pressure or medium-pressure water is probably one of the most commonly used methods for removing dirt or other pollutant soiling from historic masonry buildings. Starting with a very low pressure (100 psi or below), even using a garden hose, and progressing as needed to slightly higher pressure—generally no higher than 300-400 psi—is always the recommended way to begin. Scrubbing with natural bristle or synthetic bristle brushes—never metal which can abrade the surface and leave metal particles that can stain the masonry—can help in cleaning areas of the masonry that are especially dirty.

### Water Washing with Detergents

Non-ionic detergents—which are not the same as soaps—are synthetic organic compounds that are especially effective in removing oily soil. (Examples of some of the numerous proprietary non-ionic detergents include Igepal by GAF, Tergitol by Union Carbide and Triton by Rohm & Haas.) Thus, the addition of a non-ionic detergent, or surfactant, to a low- or medium-pressure water wash can be a useful aid in the cleaning process. (A non-ionic detergent, unlike most household detergents, does not leave a solid, visible residue on the masonry.) Adding a non-ionic detergent and scrubbing with a natural bristle or synthetic bristle brush can facilitate cleaning textured or intricately carved masonry. This should be followed with a final water rinse.



Low-to-medium-pressure steam (hot-pressurized water washing) is a gentle method of softening heavy soiling deposits and cleaning historic marble. Photo: NPS files.

### Steam/Hot-Pressurized Water Cleaning

Steam cleaning is actually low-pressure hot water washing because the steam condenses almost immediately upon leaving the hose. This is a gentle and effective method for cleaning stone and particularly for acid-sensitive stones. Steam can be especially useful in removing built-up soiling deposits and dried-up plant materials, such as ivy disks and tendrils. It can also be an efficient means of cleaning carved stone details and, because it does not generate a lot of liquid water, it can sometimes be appropriate to use for cleaning interior masonry.

### Potential Hazards of Water Cleaning

Despite the fact that water-based methods are generally the most gentle, even they can be damaging to historic masonry. Before beginning a water cleaning project, it is important to make sure that all mortar joints are sound and that the building is watertight. Otherwise water can seep through the walls to the interior, resulting in rusting metal anchors and stained and ruined plaster.

Some water supplies may contain traces of iron and copper which may cause masonry to discolor. Adding a chelating or complexing agent to the water, such as EDTA (ethylene diamine tetra-acetic acid), which inactivates other metallic ions, as well as softens minerals and water hardness, will help prevent staining on light-colored masonry.

Any cleaning method involving water should never be done in cold weather or if there is any likelihood of frost or freezing because water within the masonry can freeze, causing spalling and cracking. Since a masonry wall may take over a week to dry after cleaning, no water cleaning should be permitted for several days prior to the first average frost date, or even earlier if local forecasts predict cold weather.

Most important of all, it is imperative to be aware that using water at too high a pressure, a practice common to "power washing" and "water blasting", is very abrasive and can easily etch marble and other soft stones, as well as some types of brick. In addition, the distance of the nozzle from the masonry surface and the type of nozzle, as well as gallons per minute (gpm), are also important variables in a water cleaning process that can have a significant impact on the outcome of the project. This is why it is imperative that the cleaning be closely monitored to ensure that the cleaning operators do not raise the pressure or bring the nozzle too close to the masonry in an effort to "speed up" the process. The appearance of grains of stone or sand in the cleaning effluent on the ground is an indication that the water pressure may be too high.

### Chemical Cleaning

Chemical cleaners, generally in the form of proprietary products, are another material frequently used to clean historic masonry. They can remove dirt, as well as paint and other coatings, metallic and plant stains, and graffiti. Chemical cleaners used to remove dirt and soiling include **acids**, **alkalies** and **organic compounds**. Acidic cleaners, of course,



should not be used on masonry that is acid sensitive. Paint removers are **alkaline**, based on **organic solvents** or other chemicals.

## Chemical Cleaners to Remove Dirt

Both alkaline and acidic cleaning treatments include the use of water. Both cleaners are also likely to contain surfactants (wetting agents), that facilitate the chemical reaction that removes the dirt. Generally, the masonry is wet first for both types of cleaners, then the chemical cleaner is sprayed on at very low pressure or brushed onto the surface. The cleaner is left to dwell on the masonry for an amount of time recommended by the product manufacturer or, preferably, determined by testing, and rinsed off with a low- or moderate-pressure cold, or sometimes hot, water wash.

More than one application of the cleaner may be necessary, and it is always a good practice to test the product manufacturer's recommendations concerning dilution rates and dwell times. Because each cleaning situation is unique, dilution rates and dwell times can vary considerably. The masonry surface may be scrubbed lightly with natural or synthetic bristle brushes prior to rinsing. After rinsing, pH strips should be applied to the surface to ensure that the masonry has been neutralized completely.

### Acidic Cleaners

Acid-based cleaning products may be used on **non-acid sensitive masonry**, which generally includes: granite, most sandstones, slate, unglazed brick and unglazed architectural terra cotta, cast stone and concrete. Most commercial acidic cleaners are composed primarily of hydrofluoric acid, and often include some phosphoric acid to prevent rust-like stains from developing on the masonry after the cleaning. Acid cleaners are applied to the pre-wet masonry which should be kept wet while the acid is allowed to "work", and then removed with a water wash.

### Alkaline Cleaners

Alkaline cleaners should be used on **acid-sensitive** masonry, including: limestone, polished and unpolished marble, calcareous sandstone, glazed brick and glazed architectural terra cotta, and polished granite. (Alkaline cleaners may also be used sometimes on masonry materials that are not acid sensitive--after testing, of course--but they may not be as effective as they are on acid-sensitive masonry.) Alkaline cleaning products consist primarily of two ingredients: a non-ionic detergent or surfactant; and an alkali, such as potassium hydroxide or ammonium hydroxide. Like acidic cleaners, alkaline products are usually applied to pre-wet masonry, allowed to dwell, and then rinsed off with water. (Longer dwell times may be necessary with alkaline cleaners than with acidic cleaners.) Two additional steps are required to remove alkaline cleaners after the initial rinse. First the masonry is given a slightly acidic wash--often with acetic acid--to neutralize it, and then it is rinsed again with water.

## Chemical Cleaners to Remove Paint and Other Coatings, Stains and Graffiti

Removing paint and some other coatings, stains and graffiti can best be accomplished with alkaline paint removers, organic solvent paint removers, or other cleaning compounds. The removal of layers of paint from a masonry surface usually involves applying the remover either by brush, roller or spraying, followed by a thorough water wash. As with any chemical cleaning, the manufacturer's recommendations regarding application procedures should always be tested before beginning work.

### Alkaline Paint Removers

These are usually of much the same composition as other alkaline cleaners, containing potassium or ammonium hydroxide, or trisodium phosphate. They are used to remove oil, latex and acrylic paints, and are effective for removing multiple layers of paint. Alkaline cleaners may also remove some acrylic water-repellent coatings. As with other alkaline cleaners, both an acidic neutralizing wash and a final water rinse are generally required following the use of alkaline paint removers.

### Organic Solvent Paint Removers

The formulation of organic solvent paint removers varies and may include a combination of solvents, including methylene chloride, methanol, acetone, xylene and toluene.

### Other Paint Removers and Cleaners

Other cleaning compounds that can be used to remove paint and some painted graffiti from historic masonry include paint removers based on N-methyl-2-pyrrolidone (NMP), or on petroleum-based compounds. Removing stains, whether they are industrial (smoke, soot, grease or tar), metallic (iron or copper), or biological (plant and fungal) in origin, depends on carefully matching the type of remover to the type of stain. Successful removal of stains from historic masonry often requires the application of a number of different removers before the right one is found. The removal of layers of paint from a masonry surface is usually accomplished by applying the remover either by brush, roller or spraying, followed by a thorough water wash.

## Potential Hazards of Chemical Cleaning

Since most chemical cleaning methods involve water, they have many of the potential problems of plain water cleaning. Like water methods, they should not be used in cold weather because of the possibility of freezing. Chemical cleaning should never be undertaken in temperatures below 40 degrees F (4 degrees C), and generally not below 50 degrees F. In addition, many chemical cleaners simply do not work in cold temperatures. Both acidic and alkaline cleaners can be dangerous to cleaning operators, and clearly, there are environmental concerns associated with the use of chemical cleaners.

If not carefully chosen, chemical cleaners can react adversely with many types of masonry. Obviously, acidic cleaners should not be used on acid-sensitive materials; however, it is not always clear exactly what the composition is of any stone or other masonry material. For this reason, testing the cleaner on an inconspicuous spot on the building is always necessary. While certain acid-based cleaners may be appropriate if used as directed on a particular type of masonry, if left too long or if not adequately rinsed from the masonry they can have a negative effect. For example, hydrofluoric acid can etch masonry leaving a hazy residue (whitish deposits of silica or calcium fluoride salts) on the surface. While this efflorescence may usually be removed by a second cleaning—although it is likely to be expensive and time-consuming—**hydrofluoric acid** can also leave calcium fluoride salts or a colloidal silica deposit on masonry which may be impossible to remove. Other acids, particularly **hydrochloric (muriatic) acid**, which is very powerful, should not be used on historic masonry, because it can dissolve lime-based mortar, damage brick and some stones, and leave chloride deposits on the masonry.

Alkaline cleaners can stain sandstones that contain a ferrous compound. Before using an alkaline cleaner on sandstone it is always important to test it, since it may be difficult to know whether a particular sandstone may contain a ferrous compound. Some alkaline cleaners, such as **sodium hydroxide (caustic soda or lye)** and **ammonium bifluoride**, can also damage or leave disfiguring brownish-yellow stains and, in most cases, should not be used on historic masonry. Although alkaline cleaners will not etch a masonry surface as acids can, they are caustic and can burn the surface. In addition, alkaline cleaners can deposit potentially damaging salts in the masonry which can be difficult to rinse thoroughly.

### Poulticing to Remove Stains and Graffiti

Graffiti and stains, which have penetrated into the masonry, often are best removed by using a poultice. A poultice consists of an absorbent material or clay powder (such as kaolin or fuller's earth, or even shredded paper or paper towels), mixed with a liquid (a solvent or other remover) to form a paste which is applied to the stain. The poultice is kept moist and left on the stain as long as necessary for it to draw the stain out of the masonry. As it dries, the paste absorbs the staining material so that it is not redeposited on the masonry surface.

Some commercial cleaning products and paint removers are specially formulated as a paste or gel that will cling to a vertical surface and remain moist for a longer period of time in order to prolong the action of the chemical on the stain. Pre-mixed poultices are also available as a paste or in powder form needing only the addition of the appropriate liquid. The masonry must be pre-wet before applying an alkaline cleaning agent, but not when using a solvent. Once the stain has been removed, the masonry must be rinsed thoroughly.

### Abrasive and Mechanical Cleaning

**Generally, abrasive cleaning methods are not appropriate for use on historic masonry buildings.** Abrasive cleaning methods are just that—abrasive. Grit blasters, grinders, and sanding discs all operate by abrading the dirt or paint off the surface of the masonry, rather than reacting with the dirt and the masonry which is how water and chemical methods work. Since the abrasives do not differentiate between the dirt and the masonry, they can also remove the outer surface of the masonry at the same time, and result in permanently damaging the masonry. Brick, architectural terra cotta, soft stone, detailed carvings, and polished surfaces, are especially susceptible to physical and aesthetic damage by abrasive methods. Brick and architectural terra cotta are fired products which have a smooth, glazed surface which can be removed by abrasive blasting or grinding. Abrasively-cleaned masonry is damaged aesthetically as well as physically, and it has a rough surface which tends to hold dirt and the roughness will make future cleaning more difficult. Abrasive cleaning processes can also increase the likelihood of subsurface cracking of the masonry. Abrasion of carved details causes a rounding of sharp corners and other loss of delicate features, while abrasion of polished surfaces removes the polished finish of stone.

Mortar joints, especially those with lime mortar, also can be eroded by abrasive or mechanical cleaning. In some cases, the damage may be visual, such as loss of joint detail or increased joint shadows. As mortar joints constitute a significant portion of the masonry surface (up to 20 per cent in a brick wall), this can result in the loss of a considerable amount of the historic fabric. Erosion of the mortar joints may also permit increased water penetration, which will likely necessitate repointing.



The iron stain on this granite post may be removed by applying a commercial rust-removal product in a poultice. Photo: NPS files



Sandblasting has permanently damaged this brick wall. Photo: NPS files

## Abrasive Blasting

Blasting with abrasive grit or another abrasive material is the most frequently used abrasive method. Sandblasting is most commonly associated with abrasive cleaning. Finely ground silica or glass powder, glass beads, ground garnet, powdered walnut and other ground nut shells, grain hulls, aluminum oxide, plastic particles and even tiny pieces of sponge, are just a few of the other materials that have also been used for abrasive cleaning. Although abrasive blasting is not an appropriate method of cleaning historic masonry, it can be safely used to clean some materials. Finely-powdered walnut shells are commonly used for cleaning monumental bronze sculpture, and skilled conservators clean delicate museum objects and finely detailed, carved stone features with very small, micro-abrasive units using aluminum oxide.

A number of current approaches to abrasive blasting rely on materials that are not usually thought of as abrasive, and not as commonly associated with traditional abrasive grit cleaning. Some patented abrasive cleaning processes—one dry, one wet—use finely-ground glass powder intended to "erase" or remove dirt and surface soiling only, but not paint or stains. Cleaning with baking soda (sodium bicarbonate) is another patented process. Baking soda blasting is being used in some communities as a means of quick graffiti removal. However, it should not be used on historic masonry which it can easily abrade and can permanently "etch" the graffiti into the stone; it can also leave potentially damaging salts in the stone which cannot be removed. Most of these abrasive grits may be used either dry or wet, although dry grit tends to be used more frequently.

Ice particles, or pelletized dry ice (carbon dioxide or CO<sub>2</sub>), are another medium used as an abrasive cleaner. This is also too abrasive to be used on most historic masonry, but it may have practical application for removing mastics or asphaltic coatings from some substrates.

Some of these processes are promoted as being more environmentally safe and not damaging to historic masonry buildings. However, it must be remembered that they are abrasive and that they "clean" by removing a small portion of the masonry surface, even though it may be only a minuscule portion. The fact that they are essentially abrasive treatments must always be taken into consideration when planning a masonry cleaning project. In general, abrasive methods should not be used to clean historic masonry buildings. In some, very limited instances, highly-controlled, gentle abrasive cleaning may be appropriate on selected, hard-to-clean areas of a historic masonry building if carried out under the watchful supervision of a professional conservator. But, abrasive cleaning should never be used on an entire building.

## Grinders and Sanding Disks

Grinding the masonry surface with mechanical grinders and sanding disks is another means of abrasive cleaning that should not be used on historic masonry. Like abrasive blasting, grinders and disks do not really clean masonry but instead grind away and abrasively remove and, thus, damage the masonry surface itself rather than remove just the soiling material.

# Planning a Cleaning Project

Once the masonry and soiling material or paint have been identified, and the condition of the masonry has been evaluated, planning for the cleaning project can begin.

## Testing Cleaning Methods

In order to determine the *gentlest means possible*, several cleaning methods or materials may have to be tested prior to selecting the best one to use on the building. Testing should always begin with the gentlest and least invasive method proceeding gradually, if necessary, to more complicated methods, or a combination of methods. All too often simple methods, such as a low-pressure water wash, are not even considered, yet they frequently are effective, safe, and not expensive. Water of slightly higher pressure or with a non-ionic detergent additive also may be effective. It is worth repeating that these methods should always be tested prior to considering harsher methods; they are safer for the building and the environment, often safer for the applicator, and relatively inexpensive.

The level of cleanliness desired also should be determined prior to selection of a cleaning method. Obviously, the intent of cleaning is to remove most of the dirt, soiling material, stains, paint or other coating. A "brand new" appearance, however, may be inappropriate for an older building, and may require an overly harsh cleaning method to be achieved. When undertaking a cleaning project, it is important to be aware that some stains simply may not be removable. It may be wise, therefore, to agree upon a slightly lower level of cleanliness that will serve as the standard for the cleaning project. The precise amount of residual dirt considered acceptable may depend on the type of masonry, the type of soiling and difficulty of total removal, and local environmental conditions.

Cleaning tests should be carried out in an area of sufficient size to give a true indication of their effectiveness. It is preferable to conduct the test in an inconspicuous location on the building so that it will not be obvious if the test is not successful. A test area may be quite small to begin, sometimes as small as six square inches, and gradually may be increased in size as the most appropriate methods and cleaning agents are determined. Eventually the test area may be expanded to a square yard or more, and it should include several masonry units and mortar joints. It should be remembered that a single building may have several types of masonry and that even similar materials may have different surface finishes. Each material and different finish should be tested separately. Cleaning tests should be evaluated only after the masonry has dried completely. *The results of the tests may indicate that several methods of cleaning should be used on a single building.*

When feasible, test areas should be allowed to weather for an extended period of time prior to final evaluation. A waiting period of a full year would be ideal in order to expose the test patch to a full range of seasons. If this is not possible, the test patch should weather for at least a month or two. For any building which is considered historically important, the delay is insignificant compared to the potential damage and disfigurement which may result from using an incompletely tested method. *The successfully cleaned test patch should be protected as it will serve as a standard against which the entire cleaning project will be measured.*

## Environmental Considerations

The potential effect of any method proposed for cleaning historic masonry should be evaluated carefully. Chemical cleaners and paint removers may damage trees, shrubs, grass, and plants. A plan must be provided for environmentally safe removal and disposal of the cleaning materials and the rinsing effluent before beginning the cleaning project. Authorities from the local regulatory agency--usually under the jurisdiction of the federal or state Environmental Protection Agency (EPA)--should be consulted prior to beginning a cleaning project, especially if it involves anything more than plain water washing. This advance planning will ensure that the cleaning effluent or run-off, which is the combination of the cleaning agent and the substance removed from the masonry, is handled and disposed of in an environmentally sound and legal manner. Some alkaline and acidic cleaners can be neutralized so that they can be safely discharged into storm sewers. However, most solvent-based cleaners cannot be neutralized and are categorized as pollutants, and must be disposed of by a licensed transport, storage and disposal facility. Thus, it is always advisable to consult with the appropriate agencies before starting to clean to ensure that the project progresses smoothly and is not interrupted by a stop-work order because a required permit was not obtained in advance.

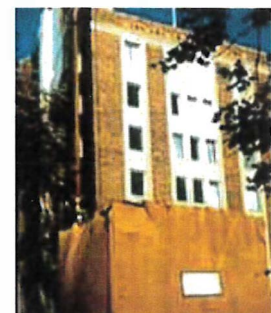
Vinyl guttering or polyethylene-lined troughs placed around the perimeter of the base of the building can serve to catch chemical cleaning waste as it is rinsed off the building. This will reduce the amount of chemicals entering and polluting the soil, and also will keep the cleaning waste contained until it can be removed safely. Some patented cleaning systems have developed special equipment to facilitate the containment and later disposal of cleaning waste.

Concern over the release of volatile organic compounds (VOCs) into the air has resulted in the manufacture of new, more environmentally responsible cleaners and paint removers, while some materials traditionally used in cleaning may no longer be available for these same reasons. Other health and safety concerns have created additional cleaning challenges, such as lead paint removal, which is likely to require special removal and disposal techniques.

Cleaning can also cause damage to non-masonry materials on a building, including glass, metal and wood. Thus, it is usually necessary to cover windows and doors, and other features that may be vulnerable to chemical cleaners. They should be covered with plastic or polyethylene, or a masking agent that is applied as a liquid which dries to form a thin protective film on glass, and is easily peeled off after the cleaning is finished. Wind drift, for example, can also damage other property by carrying cleaning chemicals onto nearby automobiles, resulting in etching of the glass or spotting of the paint finish. Similarly, airborne dust can enter surrounding buildings, and excess water can collect in nearby yards and basements.

## Safety Considerations

Possible health dangers of each method selected for the cleaning project must be considered before selecting a cleaning method to avoid harm to the cleaning applicators, and the necessary precautions must be taken. The precautions listed in Material Safety Data Sheets (MSDS) that are provided with chemical products should always be followed. Protective clothing, respirators, hearing and face shields, and gloves must be provided to workers to be worn at all times. Acidic and alkaline chemical cleaners in both liquid and vapor forms can also cause serious injury to passers-by. It may be necessary to schedule cleaning at night or weekends if the building is located in a busy urban area to reduce the potential danger of chemical overspray to pedestrians. Cleaning during non-business hours will allow HVAC systems to be turned off and vents to be covered to prevent dangerous chemical fumes



The lower floors of this historic brick and architectural terracotta building have been covered during chemical cleaning to protect pedestrians and vehicular traffic from potentially harmful overspray. Photo: NPS files.



from entering the building which will also ensure the safety of the building's occupants. Abrasive and mechanical methods produce dust which can pose a serious health hazard, particularly if the abrasive or the masonry contains silica.

## Water-Repellent Coatings and Waterproof Coatings

To begin with, it is important to understand that waterproof coatings and water-repellent coatings are not the same. Although these terms are frequently interchanged and commonly confused with one another, they are completely different materials. **Water-repellent coatings**—often referred to incorrectly as "sealers", but which do not or should not "seal"—are intended to keep liquid water from penetrating the surface but to allow water vapor to enter and leave, or pass through, the surface of the masonry. Water-repellent coatings are generally transparent, or clear, although once applied some may darken or discolor certain types of masonry while others may give it a glossy or shiny appearance. **Waterproof coatings** seal the surface from liquid water and from water vapor. They are usually opaque, or pigmented, and include bituminous coatings and some elastomeric paints and coatings.

### Water-Repellent Coatings

Water-repellent coatings are formulated to be vapor permeable, or "breathable". They do not seal the surface completely to water vapor so it can enter the masonry wall as well as leave the wall. While the first water-repellent coatings to be developed were primarily acrylic or silicone resins in organic solvents, now most water-repellent coatings are water-based and formulated from modified siloxanes, silanes and other alkoxysilanes, or metallic stearates. While some of these products are shipped from the factory ready to use, other water-borne water repellents must be diluted at the job site. Unlike earlier water-repellent coatings which tended to form a "film" on the masonry surface, modern water-repellent coatings actually penetrate into the masonry substrate slightly and, generally, are almost invisible if properly applied to the masonry. They are also more vapor permeable than the old coatings, yet they still reduce the vapor permeability of the masonry. Once inside the wall, water vapor can condense at cold spots producing liquid water which, unlike water vapor, cannot escape through a water-repellent coating. The liquid water within the wall, whether from condensation, leaking gutters, or other sources, can cause considerable damage.

Water-repellent coatings are not consolidants. Although modern water-repellents may penetrate slightly beneath the masonry surface, instead of just "sitting" on top of it, they do not perform the same function as a consolidant which is to "consolidate" and replace lost binder to strengthen deteriorating masonry. Even after many years of laboratory study and testing, few consolidants have proven very effective. The composition of fired products such as brick and architectural terra cotta, as well as many types of building stone, does not lend itself to consolidation.

Some modern water-repellent coatings which contain a binder intended to replace the natural binders in stone that have been lost through weathering and natural erosion are described in product literature as both a water repellent and a consolidant. The fact that the newer water-repellent coatings penetrate beneath the masonry surface instead of just forming a layer on top of the surface may indeed convey at least some consolidating properties to certain stones. However, a water-repellent coating cannot be considered a consolidant. In some instances, a water-repellent or "preservative" coating, if applied to already damaged or spalling stone, may form a surface crust which, if it fails, may exacerbate the deterioration by pulling off even more of the stone.



This clear coating has failed and is pulling off pieces of the stone as it peels. Photo: NPS files

### Is a Water-Repellent Treatment Necessary?

Water-repellent coatings are frequently applied to historic masonry buildings for the wrong reason. They also are often applied without an understanding of what they are and what they are intended to do. And these coatings can be very difficult, if not impossible, to remove from the masonry if they fall or become discolored. Most importantly, the application of water-repellent coatings to historic masonry is usually unnecessary.

Most historic masonry buildings, unless they are painted, have survived for decades without a water-repellent coating and, thus, probably do not need one now. Water penetration to the interior of a masonry building is seldom due to porous masonry, but results from poor or deferred maintenance. Leaking roofs, clogged or deteriorated gutters and downspouts, missing mortar, or cracks and open joints around door and window openings are almost always the cause of moisture-related problems in a historic masonry building. **If historic masonry buildings are kept watertight and in good repair, water-repellent coatings should not be necessary.**

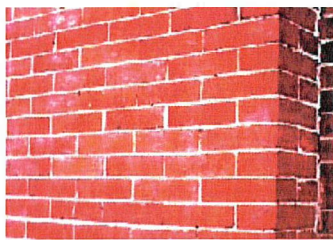
Rising damp (capillary moisture pulled up from the ground), or condensation can also be a source of excess moisture in masonry buildings. A water-repellent coating will not solve this problem either and, in fact, may be likely to exacerbate it. Furthermore, a water-repellent coating should never be applied to a damp wall. Moisture in the wall would reduce the ability of a coating to adhere to the masonry and to penetrate below the surface. But, if it did adhere, it would hold the moisture

inside the masonry because, although a water-repellent coating is permeable to water vapor, liquid water cannot pass through it. In the case of rising damp, a coating may force the moisture to go even higher in the wall because it can slow down evaporation, and thereby retain the moisture in the wall.

Excessive moisture in masonry walls may carry waterborne soluble salts from the masonry units themselves or from the mortar through the walls. If the water is permitted to come to the surface, the salts may appear on the masonry surface as efflorescence (a whitish powder) upon evaporation. However, the salts can be potentially dangerous if they remain in the masonry and crystallize beneath the surface as subflorescence. Subflorescence eventually may cause the surface of the masonry to spall, particularly if a water-repellent coating has been applied which tends to reduce the flow of moisture out from the subsurface of the masonry. Although many of the newer water-repellent products are more breathable than their predecessors, they can be especially damaging if applied to masonry that contains salts, because they limit the flow of moisture through masonry.

### When a Water-Repellent Coating May be Appropriate

There are some instances when a water-repellent coating may be considered appropriate to use on a historic masonry building. Soft, incompletely fired brick from the 18th- and early-19th centuries may have become so porous that paint or some type of coating is needed to protect it from further deterioration or dissolution. When a masonry building has been neglected for a long period of time, necessary repairs may be required in order to make it watertight. If, following a reasonable period of time after the building has been made watertight and has dried out completely, moisture appears actually to be penetrating through the repointed and repaired masonry walls, then the application of a water-repellent coating may be considered in *selected areas only*. This decision should be made in consultation with an architectural conservator. And, if such a treatment is undertaken, it should not be applied to the entire exterior of the building.



Improper cleaning methods may have been responsible for the formation of efflorescence on this brick. Photo: NPS files.

Anti-graffiti or barrier coatings are another type of clear coating—although barrier coatings can also be pigmented—that may be applied to exterior masonry, but they are not formulated primarily as water repellents. The purpose of these coatings is to make it harder for graffiti to stick to a masonry surface and, thus, easier to clean. But, like water-repellent coatings, in most cases the application of anti-graffiti coatings is generally not recommended for historic masonry buildings. These coatings are often quite shiny which can greatly alter the appearance of a historic masonry surface, and they are not always effective. Generally, other ways of discouraging graffiti, such as improved lighting, can be more effective than a coating. However, the application of anti-graffiti coatings may be appropriate in some instances on vulnerable areas of historic masonry buildings which are frequent targets of graffiti that are located in out-of-the-way places where constant surveillance is not possible.

Some water-repellent coatings are recommended by product manufacturers as a means of keeping dirt and pollutants or biological growth from collecting on the surface of masonry buildings and, thus, reducing the need for frequent cleaning. While this at times may be true, in some cases a coating may actually retain dirt more than uncoated masonry. Generally, the application of a water-repellent coating is not recommended on a historic masonry building as a means of preventing biological growth. Some water-repellent coatings may actually encourage biological growth on a masonry wall. Biological growth on masonry buildings has traditionally been kept at bay through regularly-scheduled cleaning as part of a maintenance plan. Simple cleaning of the masonry with low-pressure water using a natural- or synthetic-bristled scrub brush can be very effective if done on a regular basis. Commercial products are also available which can be sprayed on masonry to remove biological growth.

**In most instances, a water-repellent coating is not necessary if a building is watertight.** The application of a water-repellent coating is not a recommended treatment for historic masonry buildings unless there is a specific problem which it may help solve. If the problem occurs on only part of the building, it is best to treat only that area rather than an entire building. Extreme exposures such as parapets, for example, or portions of the building subject to driving rain can be treated more effectively and less expensively than the entire building. Water-repellent coatings are not permanent and must be reapplied periodically although, if they are truly invisible, it can be difficult to know when they are no longer providing the intended protection.

Testing a water-repellent coating by applying it in one small area may not be helpful in determining its suitability for the building because a limited test area does not allow an adequate evaluation of a treatment. Since water may enter and leave through the surrounding untreated areas, there is no way to tell if the coated test area is "breathable." But trying a coating in a small area may help to determine whether the coating is visible on the surface or if it will otherwise change the appearance of the masonry.

### Waterproof Coatings



In theory, waterproof coatings usually do not cause problems as long as they exclude all water from the masonry. If water does enter the wall from the ground or from the inside of a building, the coating can intensify the damage because the water will not be able to escape. During cold weather this water in the wall can freeze causing serious mechanical disruption, such as spalling.

In addition, the water eventually will get out by the path of least resistance. If this path is toward the interior, damage to interior finishes can result; if it is toward the exterior, it can lead to damage to the masonry caused by built-up water pressure.

**In most instances, waterproof coatings should not be applied to historic masonry.** The possible exception to this might be the application of a waterproof coating to below-grade exterior foundation walls as a last resort to stop water infiltration on interior basement walls. **Generally, however, waterproof coatings, which include *elastomeric paints*, should almost never be applied above grade to historic masonry buildings.**

## Summary and References

A well-planned cleaning project is an essential step in preserving, rehabilitating or restoring a historic masonry building. Proper cleaning methods and coating treatments, when determined necessary for the preservation of the masonry, can enhance the aesthetic character as well as the structural stability of a historic building. Removing years of accumulated dirt, pollutant crusts, stains, graffiti or paint, if done with appropriate caution, can extend the life and longevity of the historic resource. Cleaning that is carelessly or insensitively prescribed or carried out by inexperienced workers can have the opposite of the intended effect. It may scar the masonry permanently, and may actually result in hastening deterioration by introducing harmful residual chemicals and salts into the masonry or causing surface loss. Using the wrong cleaning method or using the right method incorrectly, applying the wrong kind of coating or applying a coating that is not needed can result in serious damage, both physically and aesthetically, to a historic masonry building. Cleaning a historic masonry building should always be done using the gentlest means possible that will clean, but not damage the building. It should always be taken into consideration before applying a water-repellent coating or a waterproof coating to a historic masonry building whether it is really necessary and whether it is in the best interest of preserving the building.

### Acknowledgements

**Robert C. Mack, FAIA**, is a principal in the firm of MacDonald & Mack Architects, Ltd., an architectural firm that specializes in historic buildings in Minneapolis, Minnesota. **Anne E. Grimmer** is a Senior Architectural Historian in the Technical Preservation Services Branch, Heritage Preservation Services Program, National Park Service, Washington, D.C.

The original version of *Preservation Brief 1: The Cleaning and Waterproof Coating of Masonry Buildings* was written by Robert C. Mack, AIA. It inaugurated the Preservation Briefs series when it was published in 1975.

The following historic preservation specialists provided technical review of this publication: Frances Gale, Training Director, National Center for Preservation Technology and Training, National Park Service, Natchitoches, LA; Judith M. Jacob, Architectural Conservator, Building Conservation Branch, Northeast Cultural Resources Center, National Park Service, N.Y., NY; Robert M. Powers, Architectural Conservator, Powers and Company, Inc., Philadelphia, PA; Antonio Aguilar, Kaaren Dodge, JoEllen Hensley, Gary Sachau, John Sandor and Audrey T. Tepper, Technical Preservation Services Branch, National Park Service, Washington, DC; and Kay D. Weeks, Heritage Preservation Services Program, National Park Service, Washington, DC.

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. Technical Preservation Services (TPS), National Park Service prepares standards, guidelines, and other educational materials on responsible historic preservation treatments for a broad public.

November 2000

---

## Reading List

*Architectural Ceramics: Their History, Manufacture and Conservation*. A Joint Symposium of English Heritage and the United Kingdom Institute for Conservation, September 22-25, 1994. London: English Heritage, 1996.

Ashurst, Nicola. *Cleaning Historic Buildings. Volume One: Substrates, Soiling & Investigation. Volume Two: Cleaning Materials & Processes*. London: Donhead Publishing Ltd., 1994.

Association for Preservation Technology. *Special Issue: Preservation of Historic Masonry*. Papers from the Symposium on Preservation Treatments for Historic Masonry: Consolidants, Coatings, and Water Repellents, New York, New York, November 11-12, 1994. *APT Bulletin*. Vol. XXVI, No. 4 (1995).

Grimmer, Anne E. *Preservation Brief 6: Dangers of Abrasive Cleaning to Historic Buildings*. Washington, DC: Preservation Assistance Division, National Park Service, U.S. Department of the Interior, 1979.

Grimmer, Anne E. *Keeping it Clean: Removing Exterior Dirt, Paint, Stains and Graffiti from Historic Masonry Buildings*. Washington, DC: Preservation Assistance Division, National Park Service, U.S. Department of the Interior, 1988.

Park, Sharon C., AIA. *Preservation Brief 39: Holding the Line: Controlling Unwanted Moisture in Historic Buildings*. Washington, DC: Heritage Preservation Services, National Park Service, U.S. Department of the Interior, 1996.

Powers, Robert M. *Preservation Tech Note, Masonry No. 3, "Water Soak Cleaning of Limestone"*. Washington, DC: Preservation Assistance Division, National Park Service, U.S. Department of the Interior, 1992.

Sinvinski, Valerie. "Gentle Blasting." *Old-House Journal*. Vol. XXIV, No. 4 (July-August 1996), pp. 46-49.

Weaver, Martin E. *Conserving Buildings: A Guide to Techniques and Materials*. New York: John Wiley & Sons, Inc., 1993.

Weaver, Martin E. *Preservation Brief 38: Removing Graffiti from Historic Masonry*. Washington, DC: Preservation Assistance Division, National Park Service, U.S. Department of the Interior, 1995.

Winkler, E.M. *Stone in Architecture: Properties, Durability*. Third, completely revised and extended edition. Berlin, Germany: Springer-Verlag, 1997.



nps.gov

EXPERIENCE YOUR AMERICA™



[Home](#) > [How to Preserve](#) > [Preservation Briefs](#) > 6 Dangers of Abrasive Cleaning

Some of the web versions of the Preservation Briefs differ somewhat from the printed versions. Many illustrations are new and in color; Captions are simplified and some complex charts are omitted. To order hard copies of the Briefs, see [Printed Publications](#).

## PRESERVATION BRIEFS

# 6

## Dangers of Abrasive Cleaning to Historic Buildings

Anne E. Grimmer

[What is Abrasive Cleaning?](#)

[Why are Abrasive Cleaning Methods Used?](#)

[Problems of Abrasive Cleaning](#)

[How Building Materials React to Abrasive Cleaning](#)

[When is Abrasive Cleaning Permissible?](#)

[Do Not Abrasively Clean these Historic Interiors](#)

[Mitigating the Effects of Abrasive Cleaning](#)

[Summary and References](#)

[Reading List](#)

[Download the PDF](#)



Undamaged historic brick (above). Sandblasted brick (below). Photo: Courtesy, Illinois Historic Preservation Agency.

“Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.” —**The Secretary of the Interior's Standards for Rehabilitation.**

**Abrasive cleaning methods are responsible for causing a great deal of damage to historic building materials.** To prevent indiscriminate use of these potentially harmful techniques, this brief has been prepared to explain abrasive cleaning methods, how they can be physically and aesthetically destructive to historic building materials, and why they generally are not acceptable preservation treatments for historic structures. There are alternative, less harsh means of cleaning and removing paint and stains from historic buildings. However, careful testing should precede general cleaning to assure that the method selected will not have an adverse effect on the building materials. A historic building is irreplaceable, and should be cleaned using only the "gentlest means possible" to best preserve it.

## What is Abrasive Cleaning?

Abrasive cleaning methods include all techniques that physically abrade the building surface to remove soils, discolorations or coatings. Such techniques involve the use of certain *materials* which impact or abrade the surface under pressure, or *abrasive tools and equipment*. Sand, because it is readily available, is probably the most commonly used type of grit material. However, any of the following materials may be substituted for sand, and all can be classified as abrasive substances: ground slag or volcanic ash, crushed (pulverized) walnut or almond shells, rice husks, ground corncobs, ground coconut shells, crushed eggshells, silica flour, synthetic particles, glass beads and micro-balloons. Even *water* under pressure can be an abrasive substance. Tools and equipment that are abrasive to historic building materials include wire

brushes, rotary wheels, power sanding disks and belt sanders.

The use of water in combination with grit may also be classified as an abrasive cleaning method. Depending on the manner in which it is applied, water may soften the impact of the grit, but water that is too highly pressurized can be very abrasive. There are basically two different methods which can be referred to as "wet grit," and it is important to differentiate between the two. One technique involves the addition of a stream of water to a regular sandblasting nozzle. This is done primarily to cut down dust, and has very little, if any, effect on reducing the aggressiveness, or cutting action of the grit particles. With the second technique, a very small amount of grit is added to a pressurized water stream. This method may be controlled by regulating the amount of grit fed into the water stream, as well as the pressure of the water.



Abrasive cleaning can cause permanent damage to historic fabric, such as this brick wall. Photo: NPS files.

## Why Are Abrasive Cleaning Methods Used?

Usually, an abrasive cleaning method is selected as an expeditious means of quickly removing years of dirt accumulation, unsightly stains, or deteriorating building fabric or finishes, such as stucco or paint.

The fact that sandblasting is one of the best known and most readily available building cleaning treatments is probably the major reason for its frequent use.

Many mid-19th century brick buildings were painted immediately or soon after completion to protect poor quality brick or to imitate another material, such as stone. Sometimes brick buildings were painted in an effort to produce what was considered a more harmonious relationship between a building and its natural surroundings. By the 1870s, brick buildings were often left unpainted as mechanization in the brick industry brought a cheaper pressed brick and fashion decreed a sudden preference for dark colors. However, it was still customary to paint brick of poorer quality for the additional protection the paint afforded.

It is a common 20th century misconception that all historic masonry buildings were initially unpainted. If the intent of a modern restoration is to return a building to its original appearance, removal of the paint not only may be historically inaccurate, but also harmful. Many older buildings were painted or stuccoed at some point to correct recurring maintenance problems caused by faulty construction techniques, to hide alterations, or in an attempt to solve moisture problems. If this is the case, removal of paint or stucco may cause these problems to reoccur.



Brick molding next to the window has been severely abraded by sandblasting to remove paint. Photo: NPS files.

Another reason for paint removal, particularly in rehabilitation projects, is to give the building a "new image" in response to contemporary design trends and to attract investors or tenants. Thus, it is necessary to consider the purpose of the intended cleaning. While it is clearly important to remove unsightly stains, heavy encrustations of dirt, peeling paint or other surface coatings, it may not be equally desirable to remove paint from a building which originally was painted. Many historic buildings which show only a slight amount of soil or discoloration are much better left as they are.

A thin layer of soil is more often protective of the building fabric than it is harmful, and seldom detracts from the building's architectural and/or historic character. Too thorough cleaning of a historic building may not only sacrifice some of the building's character, but also, misguided cleaning efforts can cause a great deal of damage to historic building fabric. Unless there are stains, graffiti or dirt and pollution deposits which are destroying the building fabric, it is generally preferable to do as little cleaning as possible, or to repaint where necessary. It is important to remember that a historic building does not have to look as if it were newly constructed to be an attractive or successful restoration or rehabilitation project.

## Problems of Abrasive Cleaning

The crux of the problem is that abrasive cleaning is just that--abrasive. An abrasively cleaned historic structure may be physically as well as aesthetically damaged. Abrasive methods "clean" by eroding dirt or paint, but at the same time they also tend to erode the surface of the building material. In this way, abrasive cleaning is destructive and causes irreversible harm to the historic building fabric. If the fabric is brick, abrasive methods remove the hard, outer protective surface, and therefore make the brick more susceptible to rapid weathering and deterioration.

Grit blasting may also increase the water permeability of a brick wall. The impact of the grit particles tends to erode the bond between the mortar and the brick, leaving cracks or enlarging existing cracks where water can enter. Some types of stone develop a protective patina or "quarry crust" parallel to the worked surface (created by the movement of moisture towards the outer edge), which also may be damaged by abrasive cleaning. The rate at which the material subsequently weathers depends on the quality of the inner surface that is exposed.



- Abrasive cleaning can destroy, or substantially diminish, decorative detailing on buildings such as a molded brickwork or architectural terra-cotta, ornamental carving on wood or stone, and evidence of historic craft techniques, such as tool marks and other surface textures.

In addition, perfectly sound and/or "tooled" mortar joints can be worn away by abrasive techniques. This not only results in the loss of historic craft detailing but also requires repointing, a step involving considerable time, skill and expense, and which might not have been necessary had a gentler method been chosen. Erosion and pitting of the building material by abrasive cleaning creates a greater surface area on which dirt and pollutants collect. In this sense, the building fabric "attracts" more dirt, and will require more frequent cleaning in the future.

In addition to causing physical and aesthetic harm to the historic fabric, there are several adverse environmental effects of dry abrasive cleaning methods. Because of the friction caused by the abrasive medium hitting the building fabric, these techniques usually create a considerable amount of dust, which is unhealthy, particularly to the operators of the abrasive equipment. It further pollutes the environment around the job site, and deposits dust on neighboring buildings, parked vehicles and nearby trees and shrubbery. Some adjacent materials not intended for abrasive treatment such as wood or glass, may also be damaged because the equipment may be difficult to regulate.

Wet grit methods, while eliminating dust, deposit a messy slurry on the ground or other objects surrounding the base of the building. In colder climates where there is the threat of frost, any wet cleaning process applied to historic masonry structures must be done in warm weather, allowing ample time for the wall to dry out thoroughly before cold weather sets in. Water which remains and freezes in cracks and openings of the masonry surface eventually may lead to spalling. High-pressure wet cleaning may force an inordinate amount of water into the walls, affecting interior materials such as plaster or joist ends, as well as metal building components within the walls.

## Variable Factors

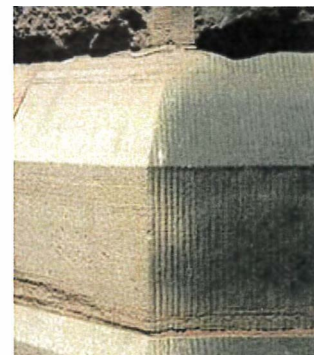
The greatest problem in developing practical guidelines for cleaning any historic building is the large number of variable and unpredictable factors involved. Because these variables make each cleaning project unique, it is difficult to establish specific standards at this time. This is particularly true of abrasive cleaning methods because their inherent potential for causing damage is multiplied by the following factors:

- the type and condition of the material being cleaned
- the size and sharpness of the grit particles or the mechanical equipment
- the pressure with which the abrasive grit or equipment is applied to the building surface
- the skill and care of the operator, and
- the constancy of the pressure on all surfaces during the cleaning process.

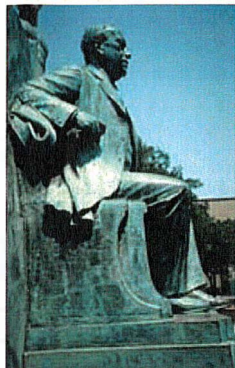
**Pressure:** The damaging effects of most of the variable factors involved in abrasive cleaning are self evident. However, the matter of pressure requires further explanation. In cleaning specifications, pressure is generally abbreviated as "psi" (pounds per square inch), which technically refers to the "tip" pressure, or the amount of pressure at the nozzle of the blasting apparatus. Sometimes "psig," or pressure at the gauge (which may be many feet away, at the other end of the hose), is used in place of "psi." These terms are often incorrectly used interchangeably.

Despite the apparent care taken by most architects and building cleaning contractors to prepare specifications for pressure cleaning which will not cause harm to the delicate fabric of a historic building, it is very difficult to ensure that the same amount of pressure is applied to all parts of the building. For example, if the operator of the pressure equipment stands on the ground while cleaning a two-story structure, the amount of force reaching the first story will be greater than that hitting the second story, even if the operator stands on scaffolding or in a cherry picker, because of the "line drop" in the distance from the pressure source to the nozzle. Although technically it may be possible to prepare cleaning specifications with tight controls that would eliminate all but a small margin of error, it may not be easy to find professional cleaning firms willing to work under such restrictive conditions. The fact is that many professional building cleaning firms do not really understand the extreme delicacy of historic building fabric, and how it differs from modern construction materials. Consequently, they may accept building cleaning projects for which they have no experience.

The amount of pressure used in any kind of cleaning treatment which involves pressure, whether it is dry or wet grit, chemicals or just plain water, is crucial to the outcome of the cleaning project. Unfortunately, no standards have been established for determining the correct pressure for cleaning each of the many historic building materials which would not



On the left, grit blasting has obliterated the vertical tooling marks from granite, a very dense stone. Photo: NPS files.



Bronze statuary may be cleaned gently using crushed walnut shells. Photo: NPS files.

cause harm. The considerable discrepancy between the way the building cleaning industry and architectural conservators define "high" and "low" pressure cleaning plays a significant role in the difficulty of creating standards.

**Non-historic/Industrial:** A representative of the building cleaning industry might consider "high" pressure water cleaning to be anything over 5,000 psi, or even as high as 10,000 to 15,000 psi! Water under this much pressure may be necessary to clean industrial structures or machinery, but would destroy most historic building materials. Industrial chemical cleaning commonly utilizes pressures between 1,000 and 2,500 psi.

**Historic:** By contrast, conscientious dry or wet abrasive cleaning of a historic structure would be conducted within the range of 20 to 100 psi at a range of 3 to 12 inches. Cleaning at this low pressure requires the use of a very fine 00 or 0 mesh grit forced through a nozzle with a 1/4-inch opening. A similar, even more delicate method being adopted by architectural conservators uses a micro-abrasive grit on small, hard-to-clean areas of carved, cut or molded ornament on a building facade. Originally developed by museum conservators for cleaning sculpture, this technique may employ glass beads, micro-balloons, or another type of micro-abrasive gently powered at

approximately 40 psi by a very small, almost pencil-like pressure instrument. Although a slightly larger pressure instrument may be used on historic buildings, this technique still has limited practical applicability on a large scale building cleaning project because of the cost and the relatively few technicians competent to handle the task. In general, architectural conservators have determined that only through very controlled conditions can most historic building material be abrasively cleaned of soil or paint without measurable damage to the surface or profile of the substrate.

Yet some professional cleaning companies which specialize in cleaning historic masonry buildings use chemicals and water at a pressure of approximately 1,500 psi, while other cleaning firms recommend lower pressures ranging from 200 to 800 psi for a similar project. An architectural conservator might decide, after testing, that some historic structures could be cleaned properly using a moderate pressure (200-600 psi), or even a high pressure (600-1800 psi) water rinse. However, cleaning historic buildings under such high pressure should be considered an exception rather than the rule, and would require *very careful* testing and supervision to assure that the historic surface materials could withstand the pressure without gouging, pitting or loosening.

These differences in the amount of pressure used by commercial or industrial building cleaners and architectural conservators point to one of the main problems in using abrasive means to clean historic buildings: misunderstanding of the potentially fragile nature of historic building materials. There is no one cleaning formula or pressure suitable for all situations. Decisions regarding the proper cleaning process for historic structures can be made only after careful analysis of the building fabric, and testing.

## How Building Materials React to Abrasive Cleaning

**Brick and Architectural Terra-cotta:** Abrasive blasting does not affect all building materials to the same degree. Such techniques quite logically cause greater damage to softer and more porous materials, such as brick or architectural terra-cotta. When these materials are cleaned abrasively, the hard, outer layer (closest to the heat of the kiln) is eroded, leaving the soft, inner core exposed and susceptible to accelerated weathering. Glazed architectural terra-cotta and ceramic veneer have a baked on glaze which is also easily damaged by abrasive cleaning. Glazed architectural terra-cotta was designed for easy maintenance, and generally can be cleaned using detergent and water; but chemicals or steam may be needed to remove more persistent stains. Large areas of brick or architectural terra-cotta which have been painted are best left painted, or repainted if necessary.

**Plaster and Stucco:** Plaster and stucco are types of masonry finish materials that are softer than brick or terra-cotta; if treated abrasively these materials will simply disintegrate. Indeed, when plaster or stucco is treated abrasively it is usually with the intention of removing the plaster or stucco from whatever base material or substrate it is covering. Obviously, such abrasive techniques should not be applied to clean sound plaster or stuccoed walls, or decorative plaster wall surfaces.

**Building Stones:** Building stones are cut from the three main categories of natural rock: dense, igneous rock such as granite; sandy, sedimentary rock such as limestone or sandstone; and crystalline, metamorphic rock such as marble. As opposed to kiln-dried masonry materials such as brick and architectural terra-cotta, building stones are generally homogeneous in character at the time of a building's construction. However, as the stone is exposed to weathering and environmental pollutants, the surface may become friable, or may develop a protective skin or patina. These outer surfaces are very susceptible to damage by abrasive or improper chemical cleaning.

Building stones are frequently cut into ashlar blocks or "dressed" with tool marks that give the building surface a specific texture and contribute to its historic character as much as ornately carved decorative stonework. Such detailing is easily



damaged by abrasive cleaning techniques; the pattern of tooling or cutting is erased, and the crisp lines of moldings or carving are worn or pitted.

Occasionally, it may be possible to clean small areas of rough-cut granite, limestone or sandstone having a heavy dirt encrustation by using the "wet grit" method, whereby a small amount of abrasive material is injected into a controlled, pressurized water stream. However, this technique requires very careful supervision in order to prevent damage to the stone. Polished or honed marble or granite should never be treated abrasively, as the abrasion would remove the finish in much the way glass would be etched or "frosted" by such a process. It is generally preferable to underclean, as too strong a cleaning procedure will erode the stone, exposing a new and increased surface area to collect atmospheric moisture and dirt. Removing paint, stains or graffiti from most types of stone may be accomplished by a chemical treatment carefully selected to best handle the removal of the particular type of paint or stain without damaging the stone. (See section on the "Gentlest Means Possible.")



Very high-pressure water has scarred this granite.  
Photo: NPS files.

**Wood:** Most types of wood used for buildings are soft, fibrous and porous, and are particularly susceptible to damage by abrasive cleaning. Because the summer wood between the lines of the grain is softer than the grain itself, it will be worn away by abrasive blasting or power tools, leaving an uneven surface with the grain raised and often frayed or "fuzzy." Once this has occurred, it is almost impossible to achieve a smooth surface again except by extensive hand sanding, which is expensive and will quickly negate any costs saved earlier by sandblasting. Such harsh cleaning treatment also obliterates historic tool marks, fine carving and detailing, which precludes its use on any interior or exterior woodwork which has been hand planed, milled or carved.

**Metals:** Like stone, metals are another group of building materials which vary considerably in hardness and durability. Softer metals which are used architecturally, such as tin, zinc, lead, copper or aluminum, generally should not be cleaned abrasively as the process deforms and destroys the original surface texture and appearance, as well as the acquired patina.



Decorative pressed metal interior or exterior features should not be cleaned abrasively. Photo: NPS files.

Much applied architectural metal work used on historic buildings--tin, zinc, lead and copper--is often quite thin and soft, and therefore susceptible to denting and pitting. Galvanized sheet metal is especially vulnerable, as abrasive treatment would wear away the protective galvanized layer.

In the late 19th and early 20th centuries, these metals were often cut, pressed or otherwise shaped from sheets of metal into a wide variety of practical uses such as roofs, gutters and flashing, and facade ornamentation such as cornices, friezes, dormers, panels, cupolas, oriel windows, etc. The architecture of the 1920s and 1930s made use of metals such as chrome, nickel alloys, aluminum and stainless steel in decorative exterior panels, window frames, and doorways. Harsh abrasive blasting would destroy the original surface finish of most of these metals, and would increase the possibility of corrosion.

However, conservation specialists are now employing a sensitive technique of glass bead peening to clean some of the harder metals, in particular large bronze outdoor sculpture. Very fine (75125 micron) glass beads are used at a low pressure of 60 to 80 psi. Because these glass beads are completely spherical, there are no sharp edges to cut the surface of the metal. After cleaning, these statues undergo a lengthy process of polishing. Coatings are applied which protect the surface from corrosion, but they must be renewed every 3 to 5 years. A similarly delicate cleaning technique employing glass beads has been used in Europe to clean historic masonry structures without causing damage. But at this time the process has not been tested sufficiently in the United States to recommend it as a building conservation measure.

Sometimes a very fine smooth sand is used at a low pressure to clean or remove paint and corrosion from copper flashing and other metal building components. Restoration architects recently found that a mixture of crushed walnut shells and copper slag at a pressure of approximately 200 psi was the only way to remove corrosion successfully from a mid-19th century terne-coated iron roof. Metal cleaned in this manner must be painted immediately to prevent rapid recurrence of corrosion. It is thought that these methods "work harden" the surface by compressing the outer layer, and actually may be good for the surface of the metal. But the extremely complex nature and the time required by such processes make it very expensive and impractical for large-scale use at this time.

Cast and wrought iron architectural elements may be gently sandblasted or abrasively cleaned using a wire brush to remove layers of paint, rust and corrosion. Sandblasting was, in fact, developed originally as an efficient maintenance procedure for engineering and industrial structures and heavy machinery--iron and steel bridges, machine tool frames, engine frames, and railroad rolling stock--in order to clean and prepare them for repainting. Because iron is hard, its surface, which is naturally somewhat uneven, will not be noticeably damaged by controlled abrasion. Such treatment will,

however, result in a small amount of pitting. But this slight abrasion creates a good surface for paint, since the iron must be repainted immediately to prevent corrosion. Any abrasive cleaning of metal building components will also remove the caulking from joints and around other openings. Such areas must be recaulked quickly to prevent moisture from entering and rusting the metal, or causing deterioration of other building fabric inside the structure.

## When is Abrasive Cleaning Permissible?

For the most part, abrasive cleaning is destructive to historic building materials. A limited number of special cases have been explained when it may be appropriate, if supervised by a skilled conservator, to use a delicate abrasive technique on some historic building materials. The type of "wet grit" cleaning which involves a small amount of grit injected into a stream of low pressure water may be used on small areas of stone masonry (i.e., rough cut limestone, sandstone or unpolished granite), where milder cleaning methods have not been totally successful in removing harmful deposits of dirt and pollutants. Such areas may include stone window sills, the tops of cornices or column capitals, or other detailed areas of the facade.

This is still an abrasive technique, and without proper caution in handling, it can be *just as harmful to the building surface as any other abrasive cleaning method*. Thus, the decision to use this type of "wet grit" process should be made only after consultation with an experienced building conservator. *Remember that it is very time consuming and expensive to use any abrasive technique on a historic building in such a manner that it does not cause harm to the often fragile and friable building materials.*

At this time, and only under certain circumstances, abrasive cleaning methods may be used in the rehabilitation of interior spaces of warehouse or industrial buildings for contemporary uses.

Interior spaces of factories or warehouse structures in which the masonry or plaster surfaces do not have significant design, detailing, tooling or finish, and in which wooden architectural features are not finished, molded, beaded or worked by hand, may be cleaned abrasively in order to remove layers of paint and industrial discolorations such as smoke, soot, etc. It is expected after such treatment that brick surfaces will be rough and pitted, and wood will be somewhat frayed or "fuzzy" with raised wood grain. These nonsignificant surfaces will be damaged and have a roughened texture, but because they are interior elements, they will not be subject to further deterioration caused by weathering.

## Historic Interiors That Should Not Be Cleaned Abrasively

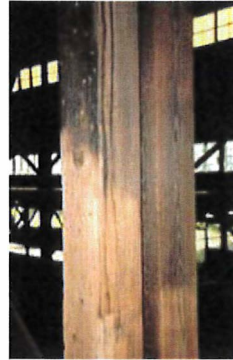
Those instances (generally industrial and some commercial properties), when it may be acceptable to use an abrasive treatment on the interior of historic structures have been described. But for the majority of historic buildings, the Secretary of the Interior's *Guidelines for Rehabilitation* do not recommend "changing the texture of exposed wooden architectural features (including structural members) and masonry surfaces through sandblasting or use of other abrasive techniques to remove paint, discolorations and plaster.

Thus, it is not acceptable to clean abrasively interiors of historic residential and commercial properties which have *finished* interior spaces featuring milled woodwork such as doors, window and door moldings, wainscoting, stair balustrades and mantelpieces. Even the most modest historic house interior, although it may not feature elaborate detailing, contains plaster and woodwork that is architecturally significant to the original design and function of the house. Abrasive cleaning of such an interior would be destructive to the historic integrity of the building.

Abrasive cleaning is also impractical. Rough surfaces of abrasively cleaned wooden elements are hard to keep clean. It is also difficult to seal, paint or maintain these surfaces which can be splintery and a problem to the building's occupants. The force of abrasive blasting may cause grit particles to lodge in cracks of wooden elements, which will be a nuisance as the grit is loosened by vibrations and gradually sifts out. Removal of plaster will reduce the thermal and insulating value of the



Cast iron may be abrasively cleaned, but must be painted immediately to prevent rust. Photo: NPS files.



Industrial interiors that are not finely milled may be abrasively cleaned, in some instances. Photo: NPS files.



Decorative wood exterior or interior features should not be cleaned abrasively. Photo: NPS files.

walls. Interior brick is usually softer than exterior brick, and generally of a poorer quality. Removing surface plaster from such brick by abrasive means often exposes gaping mortar joints and mismatched or repaired brickwork which was never intended to show. The resulting bare brick wall may require repointing, often difficult to match. It also may be necessary to apply a transparent surface coating (or sealer) in order to prevent the mortar and brick from "dusting." However, a sealer may not only change the color of the brick, but may also compound any existing moisture problems by restricting the normal evaporation of water vapor from the masonry surface.

### **"Gentlest Means Possible"**

There are alternative means of removing dirt, stains and paint from historic building surfaces that can be recommended as more efficient and less destructive than abrasive techniques. The "gentlest means possible" of removing dirt from a building surface can be achieved by using a low-pressure water wash, scrubbing areas of more persistent grime with a natural bristle (never metal) brush. Steam cleaning can also be used effectively to clean some historic building fabric. Low-pressure water or steam will soften the dirt and cause the deposits to rise to the surface, where they can be washed away.

A third cleaning technique which may be recommended to remove dirt, as well as stains, graffiti or paint, involves the use of commercially available chemical cleaners or paint removers, which, when applied to masonry, loosen or dissolve the dirt or stains. These cleaning agents may be used in combination with water or steam, followed by a clear water wash to remove the residue of dirt and the chemical cleaners from the masonry. A natural bristle brush may also facilitate this type of chemically assisted cleaning, particularly in areas of heavy dirt deposits or stains, and a wooden scraper can be useful in removing thick encrustations of soot. A limewash or absorbent talc, whitening or clay poultice with a solvent can be used effectively to draw out salts or stains from the surface of the selected areas of a building facade. It is almost impossible to remove paint from masonry surfaces without causing some damage to the masonry, and it is best to leave the surfaces as they are or repaint them if necessary.

Some physicists are experimenting with the use of pulsed laser beams and xenon flash lamps for cleaning historic masonry surfaces. At this time it is a slow, expensive cleaning method, but its initial success indicates that it may have an increasingly important role in the future.

There are many chemical paint removers which, when applied to painted wood, soften and dissolve the paint so that it can be scraped off by hand. Peeling paint can be removed from wood by hand scraping and sanding. Particularly thick layers of paint may be softened with a heat gun or heat plate, providing appropriate precautions are taken, and the paint film scraped off by hand. Too much heat applied to the same spot can burn the wood, and the fumes caused by burning paint are dangerous to inhale, and can be explosive. Furthermore, the hot air from heat guns can start fires in the building cavity. Thus, adequate ventilation is important when using a heat gun or heat plate, as well as when using a chemical stripper. A torch or open flame should never be used.

**Preparations for Cleaning:** It cannot be overemphasized that all of these cleaning methods must be approached with caution. When using any of these procedures which involve water or other liquid cleaning agents on masonry, it is imperative that all openings be tightly covered, and all cracks or joints be well pointed in order to avoid the danger of water penetrating the building's facade, a circumstance which might result in serious moisture related problems such as efflorescence and/or subflorescence. Any time water is used on masonry as a cleaning agent, either in its pure state or in combination with chemical cleaners, it is very important that the work be done in warm weather when there is no danger of frost for several months. Otherwise water which has penetrated the masonry may freeze, eventually causing the surface of the building to crack and spall, which may create another conservation problem more serious to the health of the building than dirt.

Each kind of masonry has a unique composition and reacts differently with various chemical cleaning substances. Water and/or chemicals may interact with minerals in stone and cause new types of stains to leach out to the surface immediately, or more gradually in a delayed reaction. What may be a safe and effective cleaner for certain stain on one type of stone, may leave unattractive discolorations on another stone, or totally dissolve a third type.

**Testing:** Cleaning historic building materials, particularly masonry, is a technically complex subject, and thus, should never be done without expert consultation and testing. No cleaning project should be undertaken without first applying the intended cleaning agent to a representative test patch area in an inconspicuous location on the building surface. The test patch or patches should be allowed to weather for a period of time, preferably through a complete seasonal cycle, in order to determine that the cleaned area will not be adversely affected by wet or freezing weather or any by-products of the cleaning process.

## **Mitigating the Effects of Abrasive Cleaning**

There are certain restoration measures which can be adopted to help preserve a historic building exterior which has been damaged by abrasive methods. Wood that has been sandblasted will exhibit a frayed or "fuzzed" surface, or a harder wood

will have an exaggerated raised grain. The only way to remove this rough surface or to smooth the grain is by laborious sanding. Sandblasted wood, unless it has been extensively sanded, serves as a dustcatcher, will weather faster, and will present a continuing and ever worsening maintenance problem. Such wood, after sanding, should be painted or given a clear surface coating to protect the wood, and allow for somewhat easier maintenance.

There are few successful preservative treatments that may be applied to grit-blasted exterior masonry. Harder, denser stone may have suffered only a loss of crisp edges or tool marks, or other indications of craft technique. If the stone has a compact and uniform composition, it should continue to weather with little additional deterioration. But some types of sandstone, marble and limestone will weather at an accelerated rate once their protective "quarry crust" or patina has been removed.

Softer types of masonry, particularly brick and architectural terra-cotta, are the most likely to require some remedial treatment if they have been abrasively cleaned. Old brick, being essentially a soft, baked clay product, is greatly susceptible to increased deterioration when its hard, outer skin is removed through abrasive techniques. This problem can be minimized by painting the brick. An alternative is to treat it with a clear sealer or surface coating but this will give the masonry a glossy, or shiny look. It is usually preferable to paint the brick rather than to apply a transparent sealer since sealers reduce the transpiration of moisture, allowing salts to crystallize as subflorescence that eventually spalls the brick. If a brick surface has been so extensively damaged by abrasive cleaning and weathering that spalling has already begun, it may be necessary to cover the walls with stucco, if it will adhere.

Of course, the application of paint, a clear surface coating (sealer), or stucco to deteriorating masonry means that the historical appearance will be sacrificed in an attempt to conserve the historic building materials. However, the original color and texture will have been changed already by the abrasive treatment. At this point it is more important to try to preserve the brick, and there is little choice but to protect it from "dusting" or spalling too rapidly. As a last resort, in the case of severely spalling brick, there may be no option but to replace the brick--a difficult, expensive (particularly if custom-made reproduction brick is used), and lengthy process. As described earlier, sandblasted interior brick work, while not subject to change of weather, may require the application of a transparent surface coating or painting as a maintenance procedure to contain loose mortar and brick dust. (See **Preservation Briefs No. 1** for a more thorough discussion of coatings.)

Metals, other than cast or wrought iron, that have been pitted and dented by harsh abrasive blasting usually cannot be smoothed out. Although fillers may be satisfactory for smoothing a painted surface, exposed metal that has been damaged usually will have to be replaced.

## Summary and References

Sandblasting or other abrasive methods of cleaning or paint removal are by their nature destructive to historic building materials and should not be used on historic buildings except in a few well-monitored instances. There are exceptions when certain types of abrasive cleaning may be permissible, but only if conducted by a trained conservator, and if cleaning is necessary for the preservation of the historic structure.

There is no one formula that will be suitable for cleaning all historic building surfaces. Although there are many commercial cleaning products and methods available, it is impossible to state definitively which of these will be the most effective without causing harm to the building fabric. It is often difficult to identify ingredients or their proportions contained in cleaning products; consequently it is hard to predict how a product will react to the building materials to be cleaned. Similar uncertainties affect the outcome of other cleaning methods as they are applied to historic building materials. Further advances in understanding the complex nature of the many variables of the cleaning techniques may someday provide a better and simpler solution to the problems. But until that time, the process of cleaning historic buildings must be approached with caution through trial and error.

It is important to remember that historic building materials are neither indestructible, nor are they renewable. They must be treated in a responsible manner, which may mean little or no cleaning at all if they are to be preserved for future generations to enjoy. If it is in the best interest of the building to clean it, then it should be done "using the gentlest means possible."

## Acknowledgements

This Preservation Brief was written by **Anne E. Grimmer**, Architectural Historian, Technical Preservation Services Division. Valuable suggestions and comments were made by Hugh C. Miller, AIA, Washington, D.C.; Martin E. Weaver, Ottawa, Ontario, Canada; Terry Bryant, Downers Grove, Illinois; Daniel C. Cammer, McLean, Virginia; and the professional staff of Technical Preservation Services Division. Deborah Cooney edited the final manuscript.

The illustrations for this brief, not specifically credited are from the files of the Technical Preservation Services Division.



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. Technical Preservation Services (TPS), National Park Service prepares standards, guidelines, and other educational materials on responsible historic preservation treatments for a broad public.

June 1979

---

## Reading List

Ashurst, John. *Cleaning Stone and Brick*. Technical Pamphlet 4. London: Society for the Protection of Ancient Buildings. 1977.

Asmus, John F. "Light Cleaning: Laser Technology for Surface Preparation in the Arts." *Technology and Conservation*. 3:3 (Fall 1978), pp. 14-18.

"The Bare-Brick Mistake." *The Old House Journal*. I:2 (November 1973). p 2.

Brick Institute of America. Colorless Coatings for Brick Masonry. *Technical Notes on Brick Construction*. Number 7E (September/October 1976).

Gilder, Cornelia Brooke. *Property Owner's Guide to the Maintenance and Repair of Stone Buildings*. Technical Series/ No. 5. Albany, New York: The Preservation League of New York State, 1977.

Prudon, Theodore H.M. "The Case Against Removing Paint from Brick Masonry." *The Old House Journal*, III:2 (February 1975). pp. 6-7.

\_\_\_\_\_. "Removing Stains from Masonry." *The Old House Journal*. V:5 (May 1977), pp. 58-59.

Stambolov, T. and J.R.J. Van Asperen de Boer. *The Deterioration and Conservation of Porous Building Material in Monuments: A Review of the Literature*. Second enlarged edition. Rome: International Centre for Conservation, 1976.

Weiss, Norman R. "Cleaning of Building Exteriors: Problems and Procedures of Dirt Removal." *Technology and Conservation*, 2/76 (Fall 1976), pp. 8-13.

\_\_\_\_\_. *Exterior Cleaning of Historic Masonry Buildings*. Draft. Washington, D.C.: Office of Archeology and Historic Preservation, Heritage Conservation and Recreation Service, U.S. Department of the Interior, 1976.

---