# Architectural Conservation: [Using Science to Reveal Historic Paint and Mortar Compositions]

Betty Prime, Associate AIA, Architectural Conservator
Kalen McNabb, Architectural Conservator

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[MEADORS]

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# [Deteriorated Mortar]

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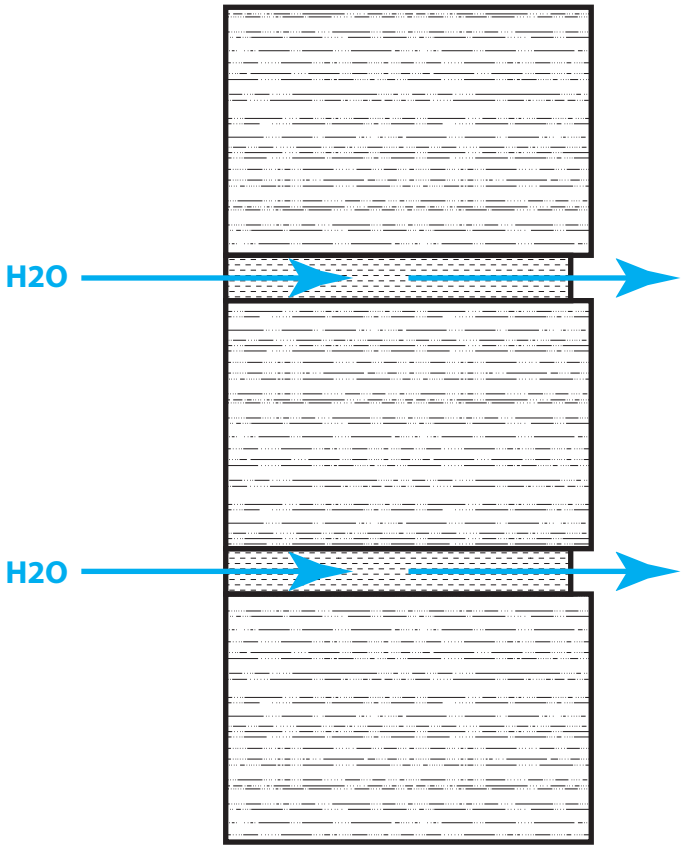
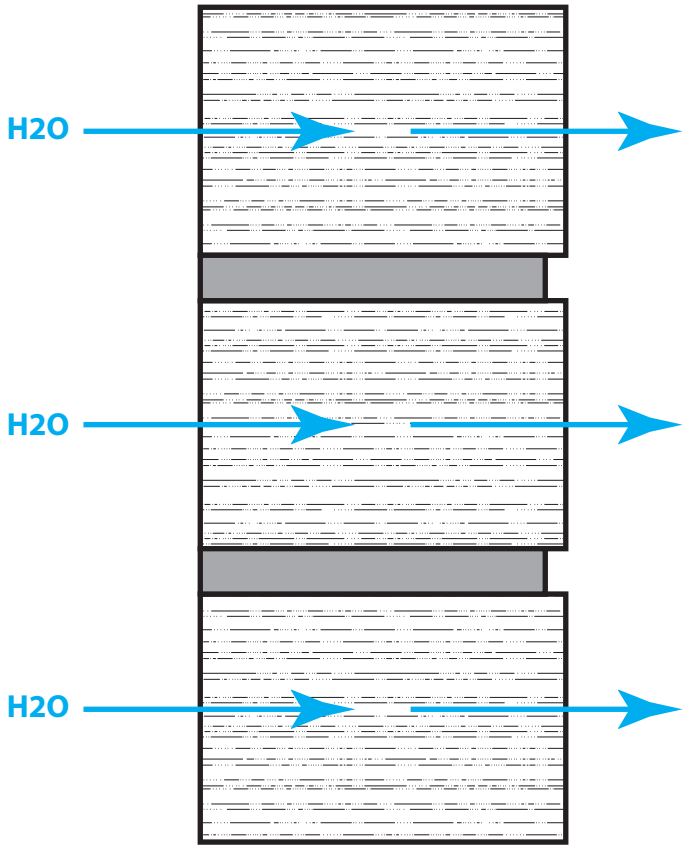
Historic Brick w/ Soft Mortar




Historic Brick w/ Portland Mortar



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# [Deteriorated Masonry]

# [Specifying a Compatible Mortar]

*What information do we need to know:*

- Date of Construction

- Ratio and composition of original parts

- Aggregate size, shape, gradation

- Porosity of the mortar and brick

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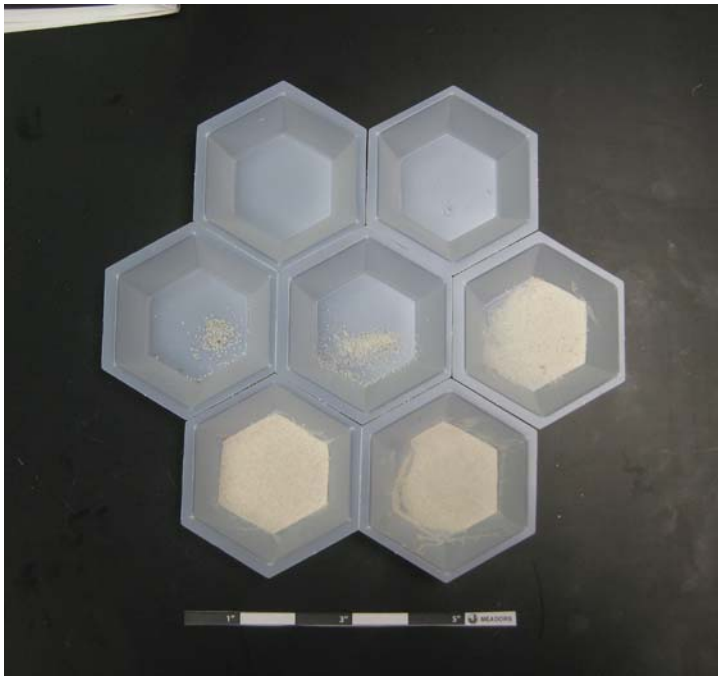
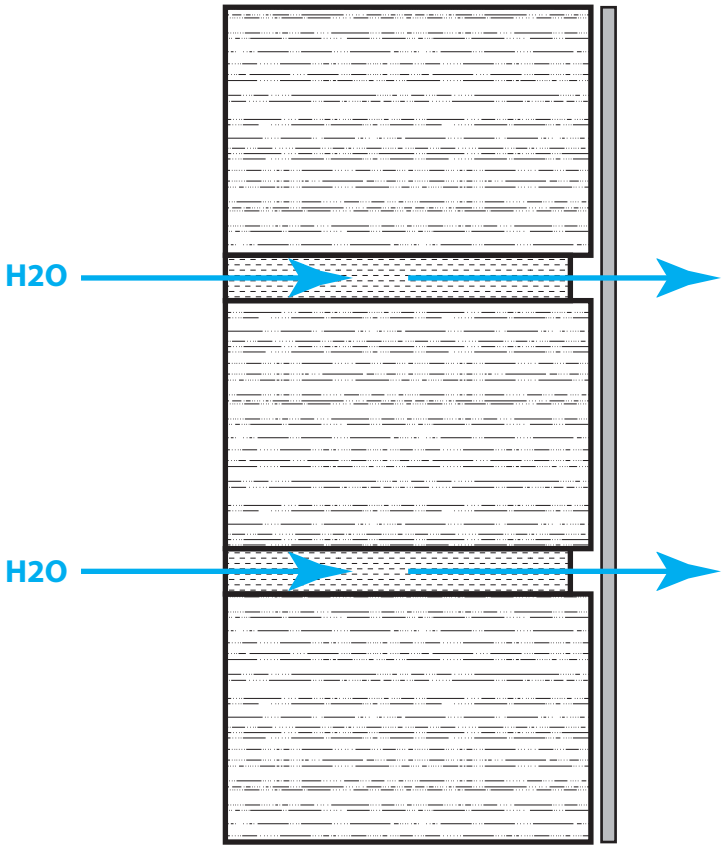
# [Mortar Analysis]

# [Mortar Analysis]

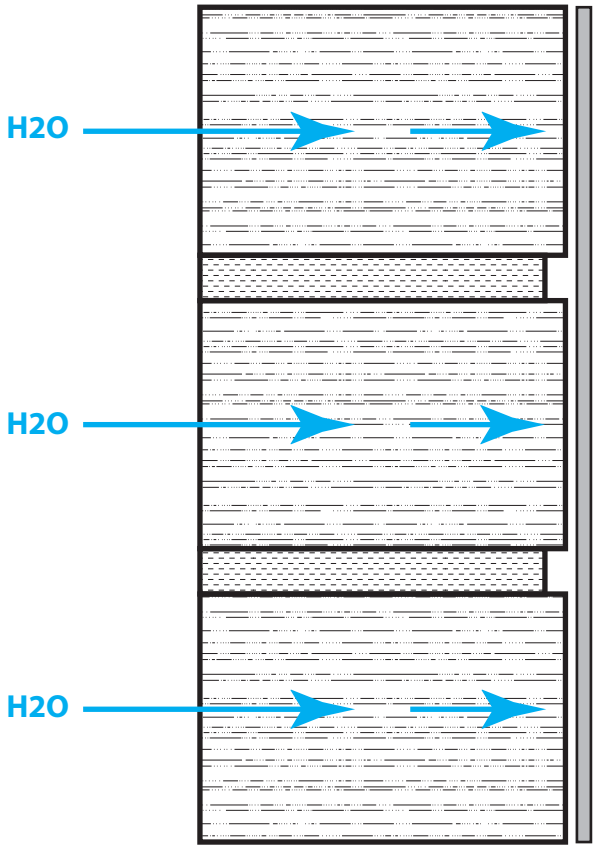


# [Masonry Coatings]

Historic Masonry w/ Permeable Coating




Historic Masonry w/ Impermeable Coating

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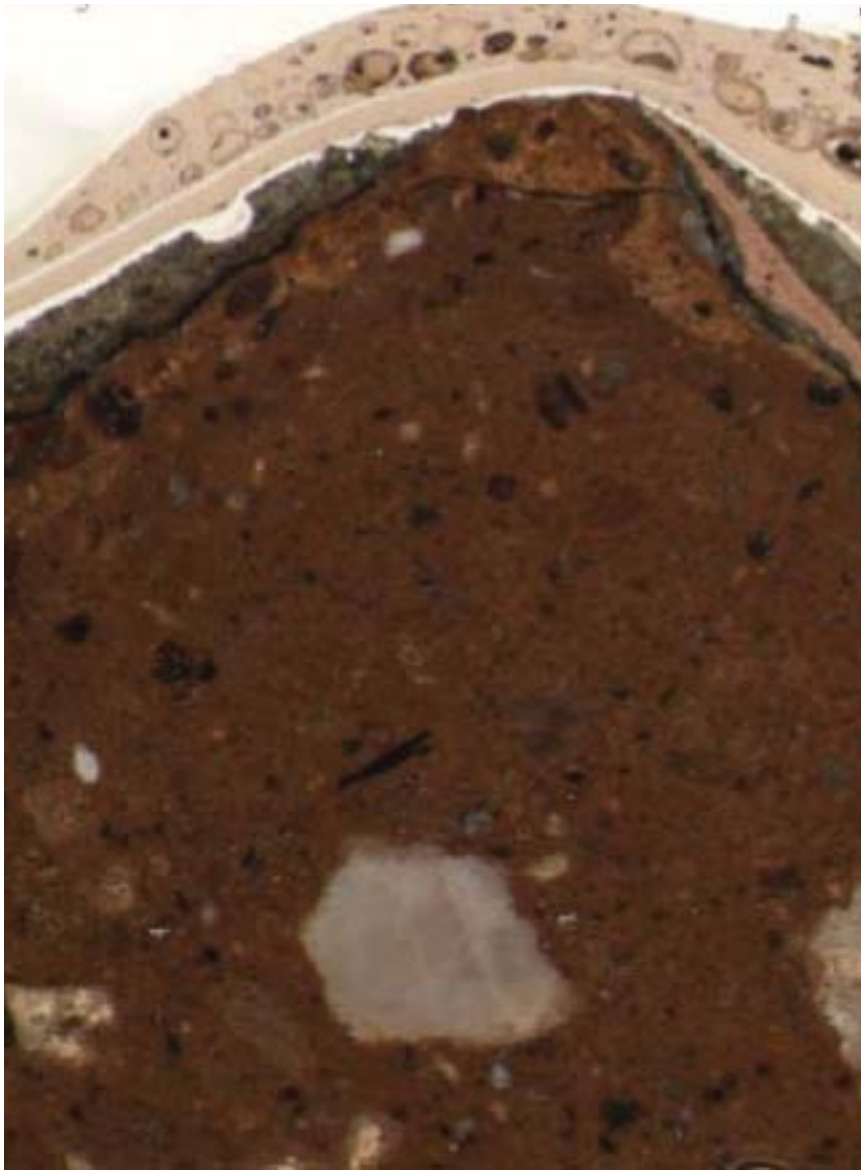
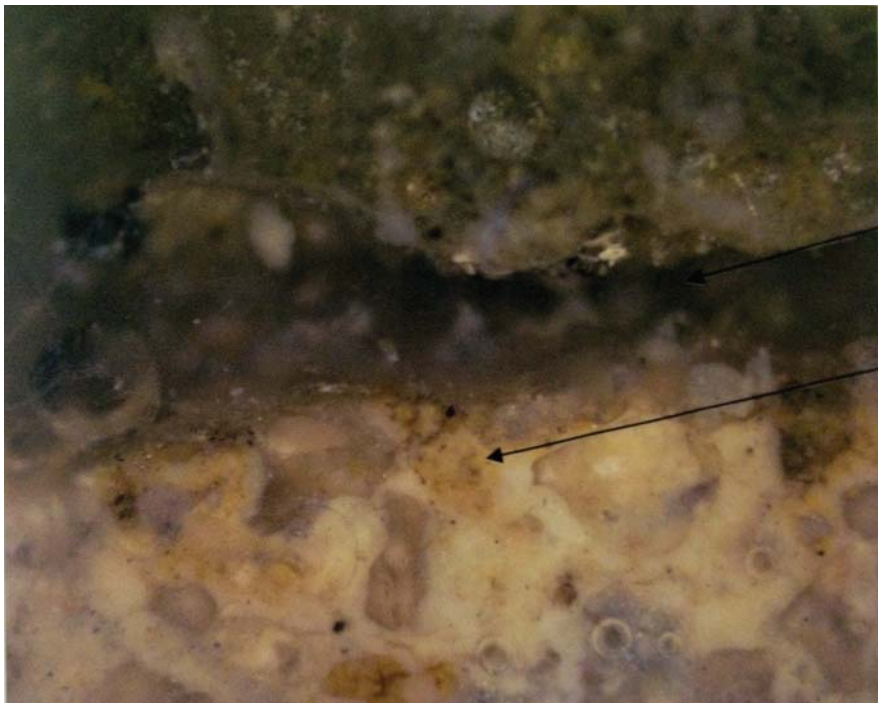
# [Impermeable Coatings]



# [Permeable Coatings]



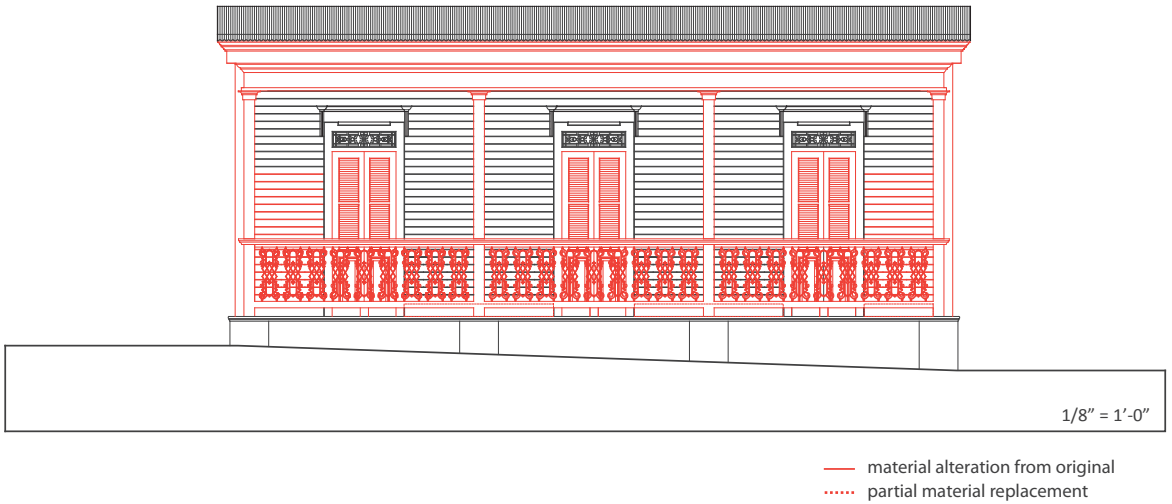
Bedroom, Charleston, SC.

Small dining room, Mount Vernon, Virginia. Courtesy of the Mount Vernon Ladies' Association.

# [Paint Analysis]

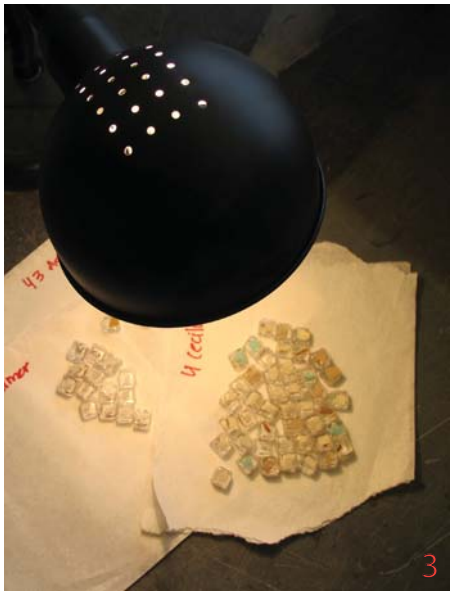
## [ Existing Condition ]

## [ Map of Material Integrity ]



1

2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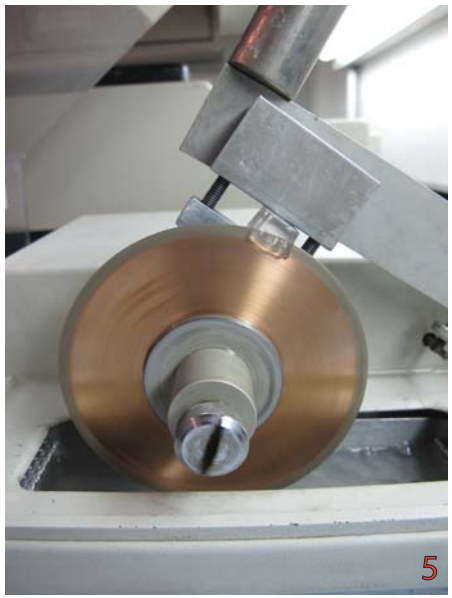
4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6

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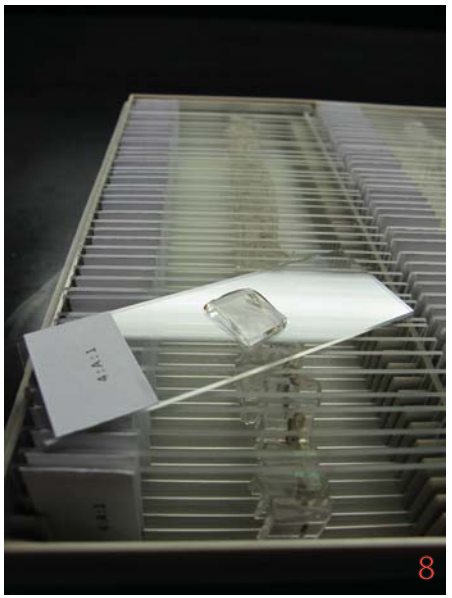
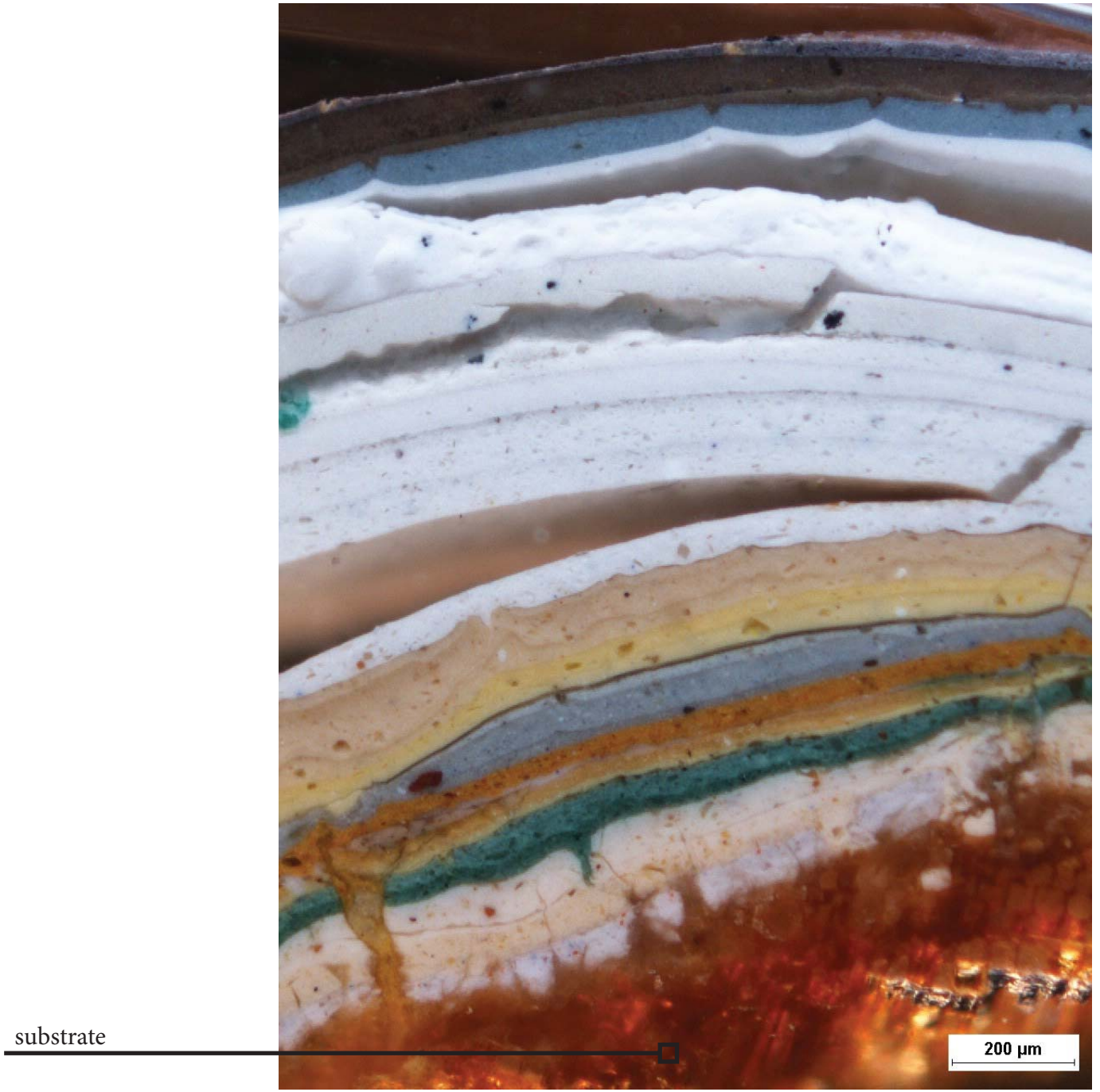

8

# [Typical Paint Cross Section]

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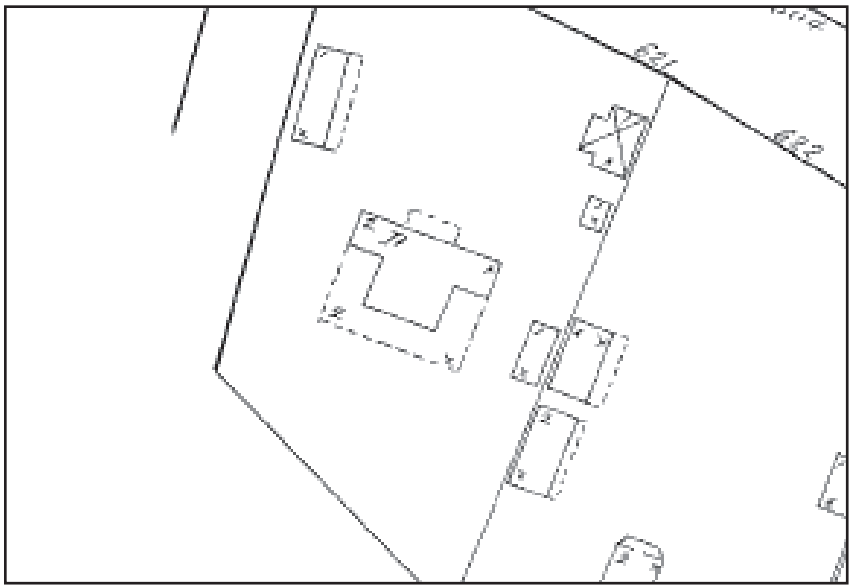
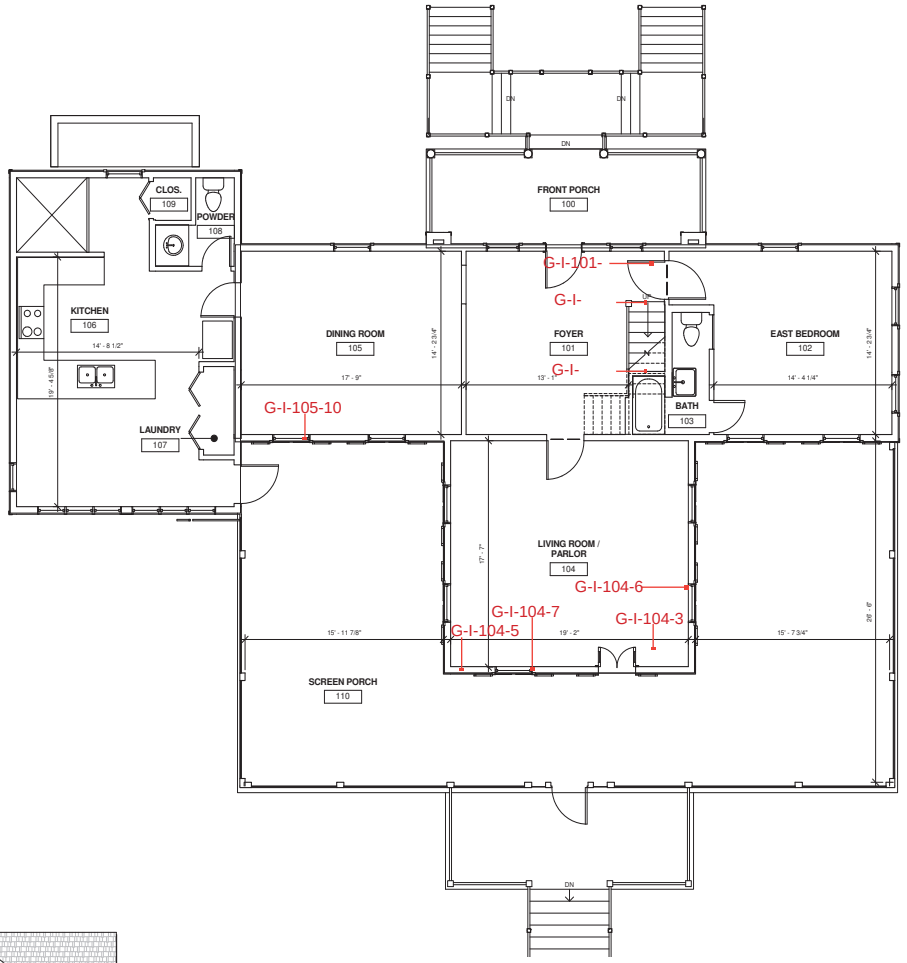
# [Sullivan's Island Residence]



1893 Sanborn Fire Insurance Map




First Floor Plan

South Elevation

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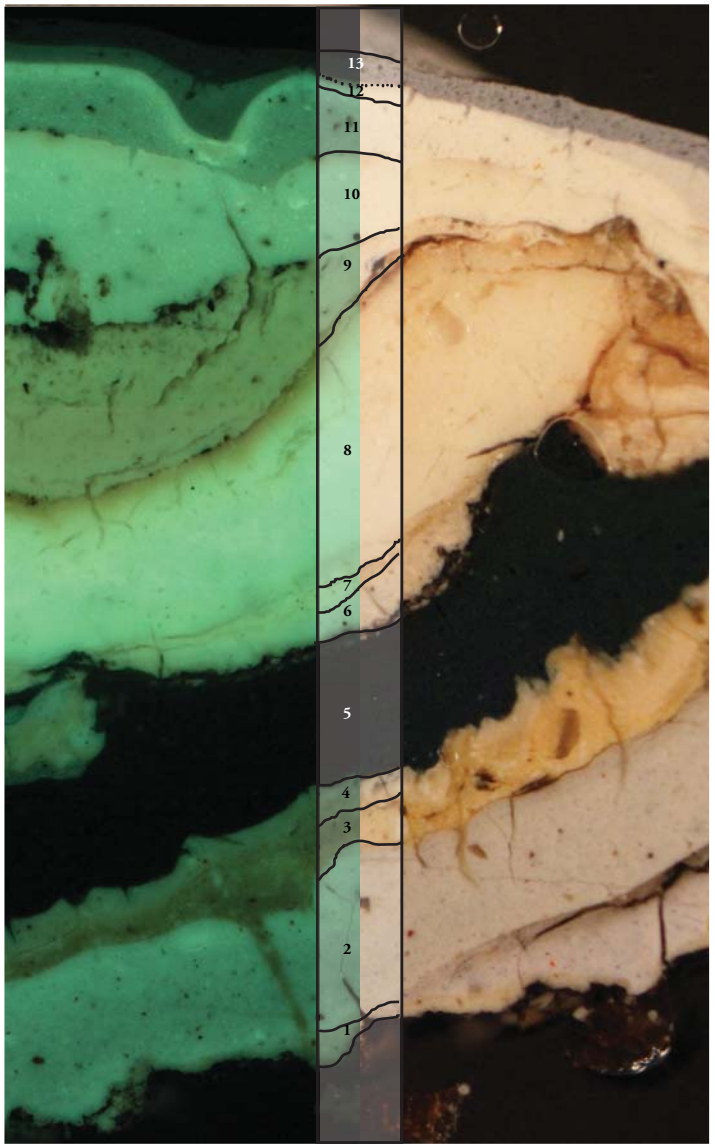
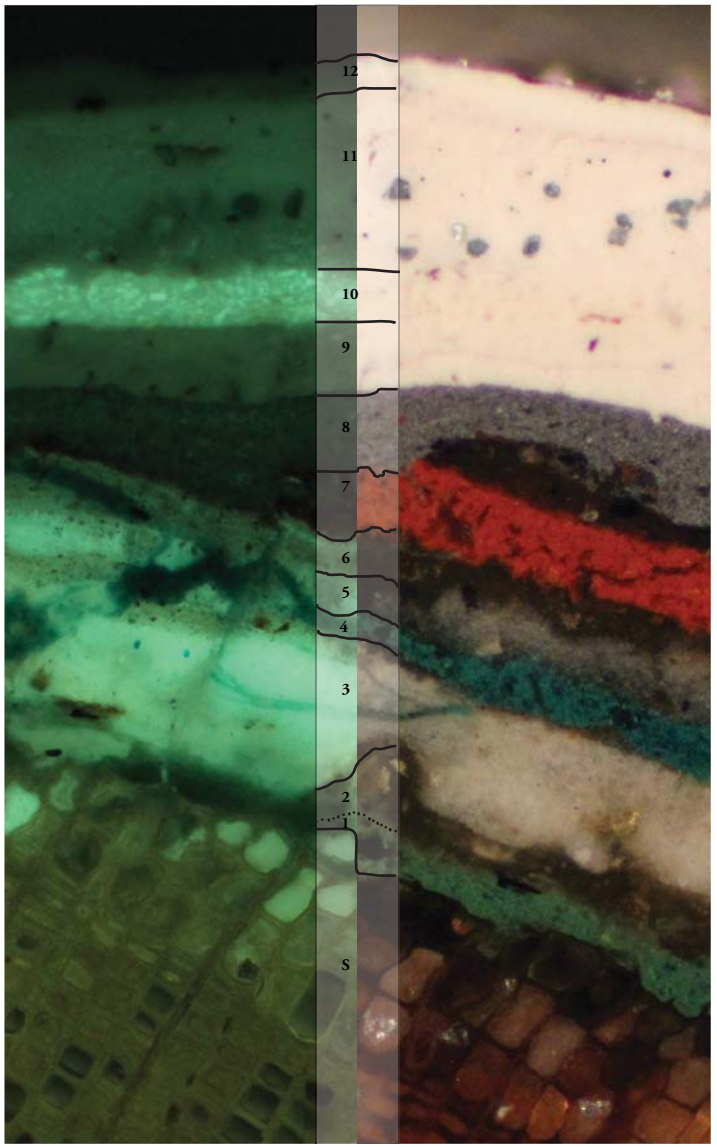
# Siding




# Shutters

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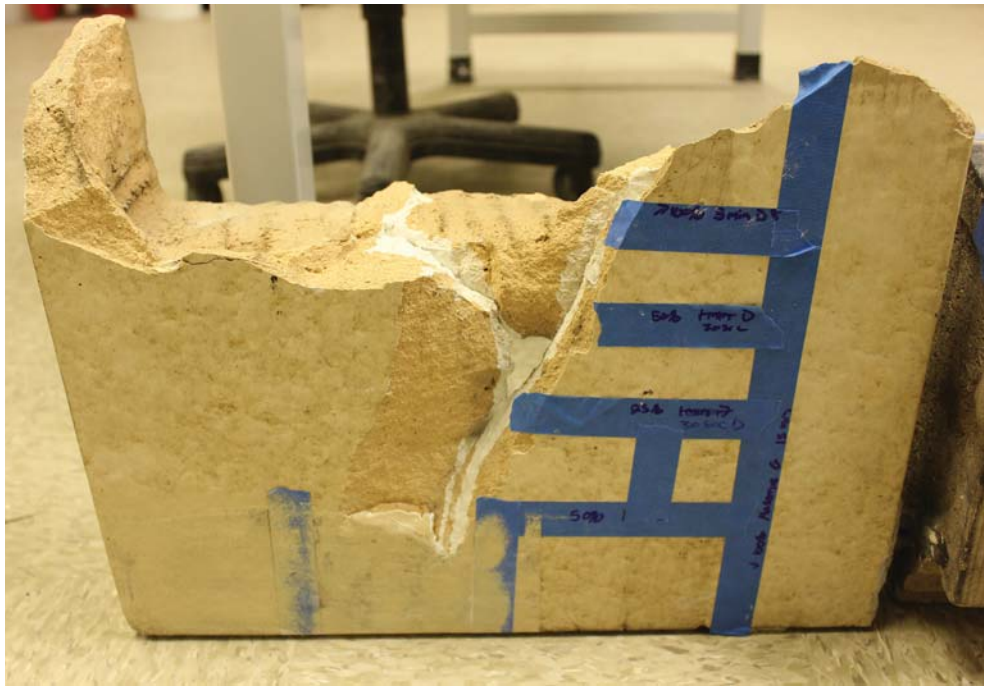
# [ SOUTH ELEVATION ]

South Elevation in original color scheme
(note: jib doors and windows were origionally full height french doors)

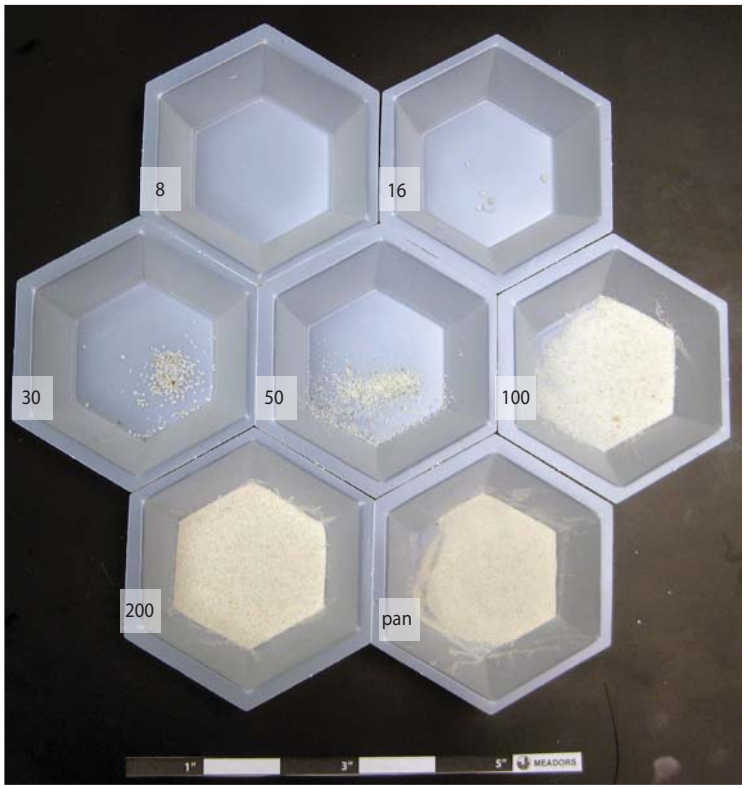
# [Agape Main Street Facades]



1620
Glaze

GOOD LIFE CAFE

# [Aiken-Rhett House]


8
16
30
50
100
200
pan
1"
3"
5"
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# [Sand Library]

| | Sand Type | Distributor | Address | Phone | Mine/Location | Other info |
|---|---|---|---|---|---|---|
| **Sand 1** | Concrete Sand | Murray Sand | 156 Checkerboard Rd. Summerville, SC | 843-873-0416 | Murray, Dorchester County, Edisto River | coarse sand |
| **Sand 2** | Masonry Sand | Murray Sand | 156 Checkerboard Rd. Summerville, SC | 843-873-0416 | Murray, Dorchester County, Edisto River | fine grained river sand |
| **Sand 3** | Masonry Sand | Deerfield/Cemex | 7630 Deerfield Rd. Tillman, SC | 843-784-2261 | Deerfield Sand and Mining Co., Hardeeville, SC | fine grained sand from site |
| **Sand 4** | Masonry Sand | Hughes Lumber | 82 Mary St. Charleston, SC | 843-577-6671 | Setcrete, Inc, Gilbert, SC | "play" sand |
| **Sand 5** | Masonry Sand | Hughes Lumber | 82 Mary St. Charleston, SC | 843-577-6671 | Setcrete, Inc, Gilbert, SC | all purpose |
| **Sand 6** | Masonry Sand | Hughes Lumber | 82 Mary St. Charleston, SC | 843-577-6671 | no info | "yard" sand |
| **Sand 7** | Masonry Sand | Palmetto Sand | 556 Wire Rd. Dorchester, SC | 843-563-5014 | Palmetto Sand Mine, Dorchester, SC | fine grained sand from site |
| **Sand 8** | Concrete Sand | Palmetto Sand | 556 Wire Rd. Dorchester, SC | 843-563-5014 | Palmetto Sand Mine, Dorchester, SC | coarse sand from site |
| **Sand 9** | Masonry Sand | Columbia Silica | 1310 Pine Ridge Rd. West Columbia, SC | 803-755-1036 | Dixiana Mine, West Columbia, SC | fine grained sand from site |
| **Sand 10** | Masonry Sand | B & T | 5960 Edumund Hwy. Lexington, SC | 803-955-0771 | B&T Mine, Lexington, SC | fine grained sand from site |
| **Sand 11** | Masonry Sand | Lugoff Sand | 1428 Fort Jackson Rd. Lugoff, SC | 803-771-6150 | Lugoff Mine, Lugoff, SC | fine grained sand from site |
| **Sand 12** | Masonry Sand | BHC Trucking | 2114 SC 72 Greenwood, SC | 864-227-6328 | local river sand | coarse river sand washed |
| **Sand 13** | Masonry Sand | Carolina Sand | 9208 Pet Larrimore Rd. Gresham, SC | 843-362-2271 | Pee Dee plant | fine grained sand from site |
| **Sand 14** | Masonry Sand | Thomas Sand Co. | 5 Oakvale Dr. Greenville, SC | 864-277-7931 | local source, unkown | fine grained sand |
| **Sand 15** | River Sand | Thomas Sand Co. | 5 Oakvale Dr. Greenville, SC | 864-277-7931 | local river sand | coarse sand with inclusions |
| **Sand 16** | Masonry Sand | Hipp's Stone | 899 N Highway 25 Travelers Rest, SC | 864-834-1111 | source unkown | fine grained sand |

Sand 1

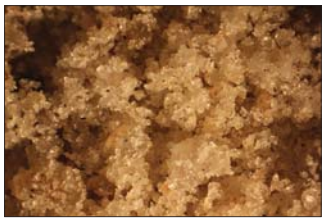
Sand 2

Sand 3

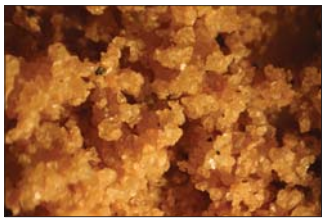
Sand 4

Sand 5

Sand 6


Sand 7

Sand 8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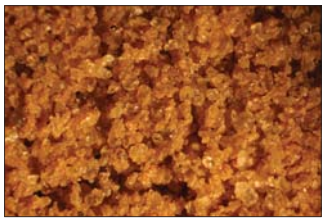
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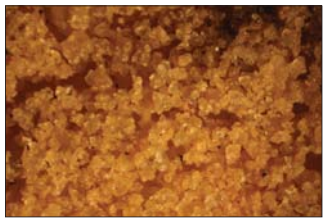
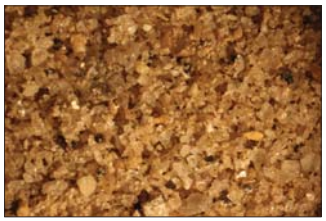
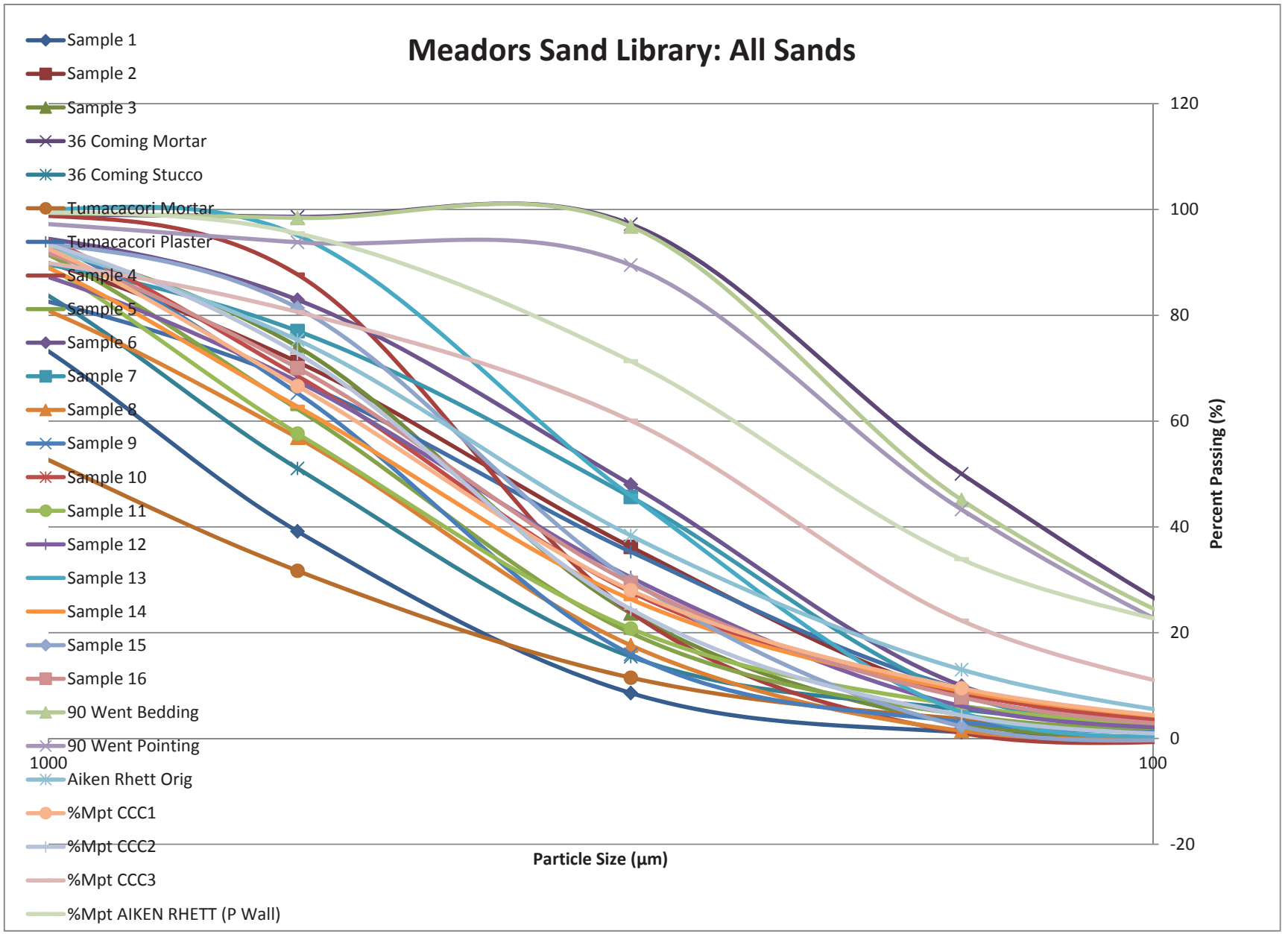

Sand 11


Sand 12

Sand 13

Sand 14

Sand 15

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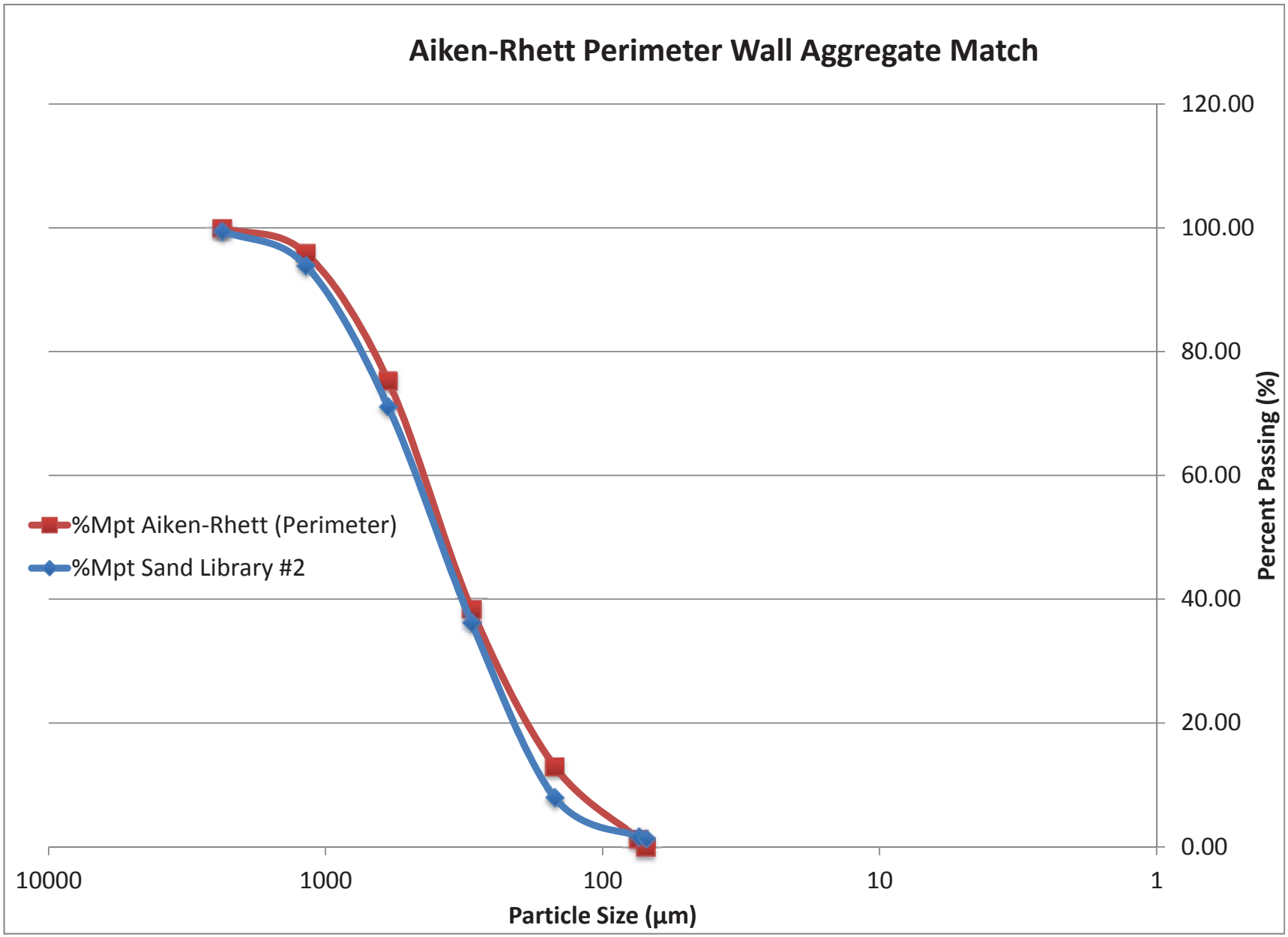


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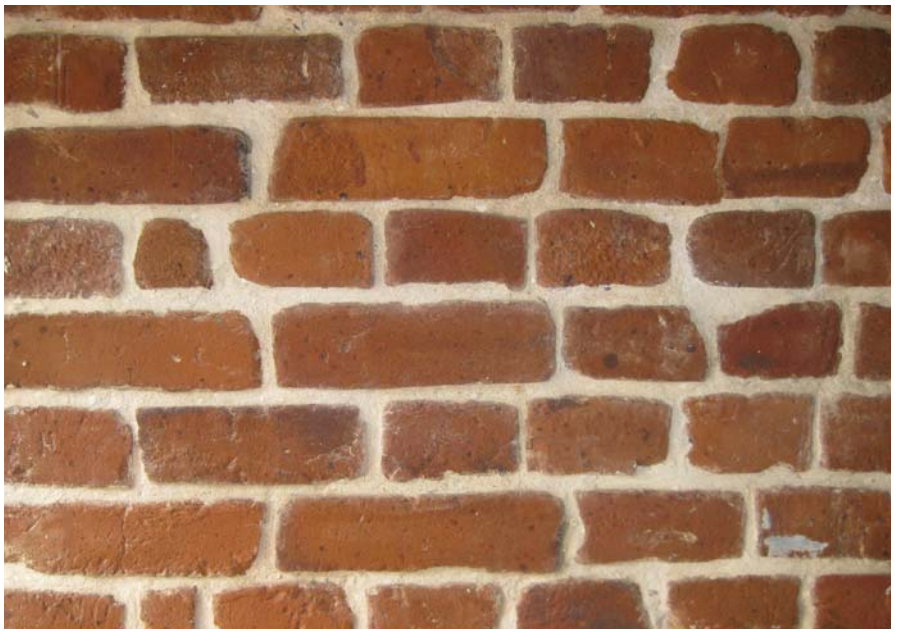
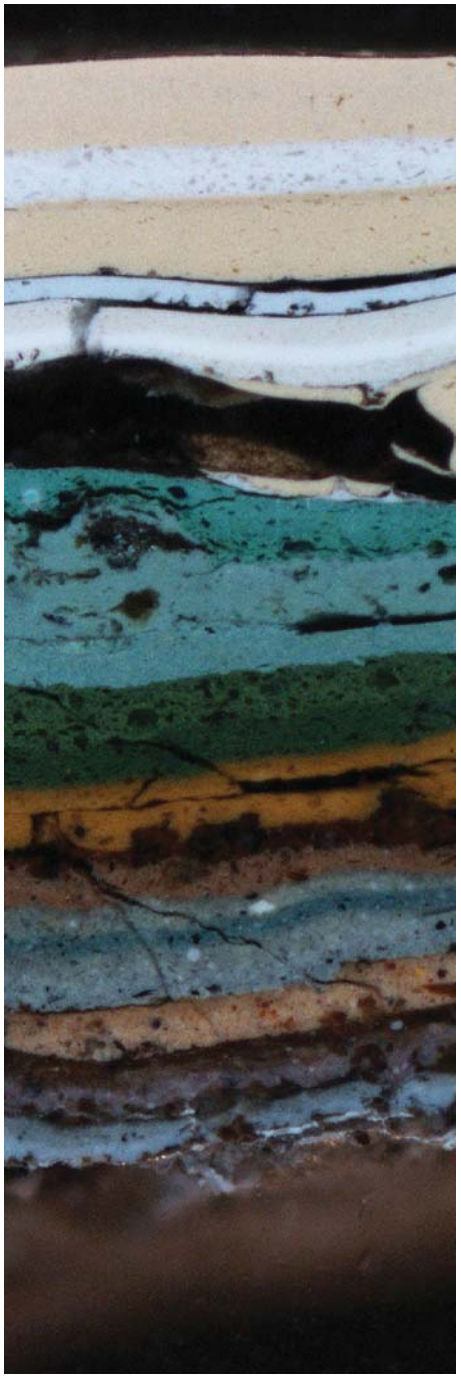
# [Replication Mortar]



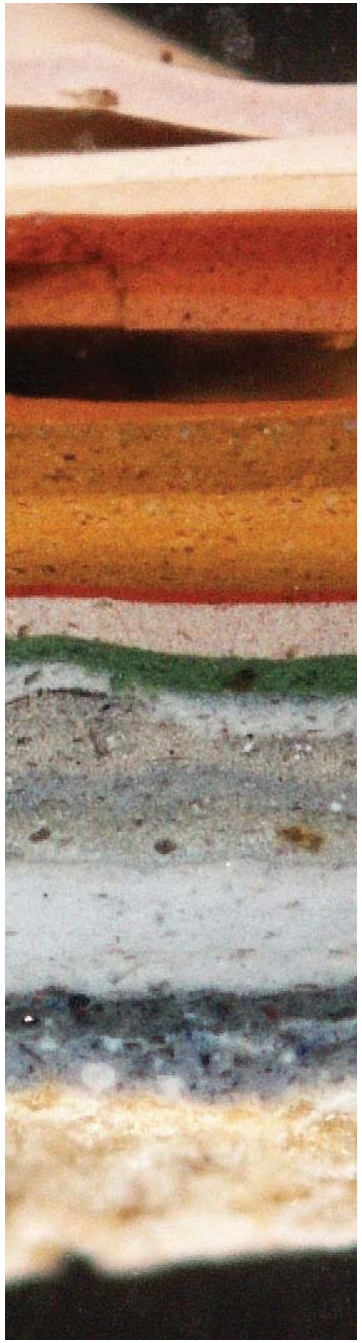
WARMING
KITCHEN

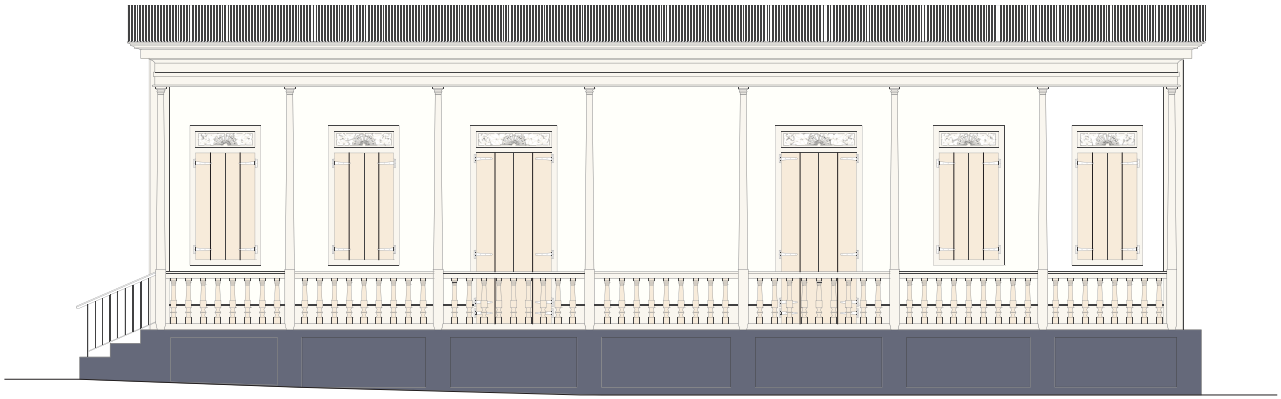
# [Guayama, Puerto Rico]

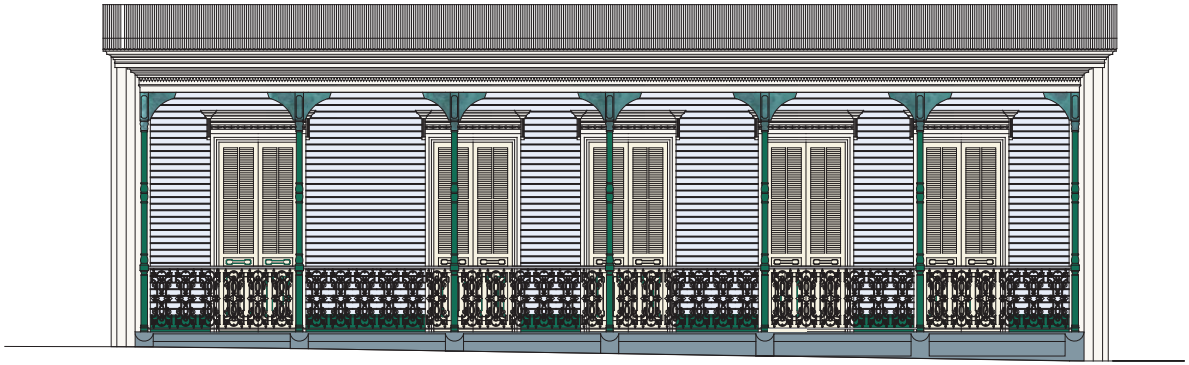
# [Material History]

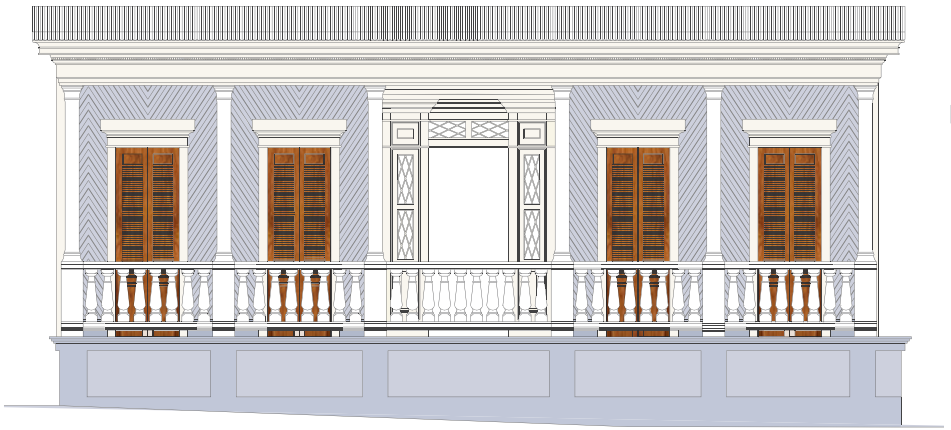


| architectural feature | base |
| --- | --- |
| 4 E. Cecelio Dominguez Street | 7.5B 7/2<br>**5B 7/1** |
| 6 E. Cecelio Dominguez Street | 5 PB 7/1 |
| 3 N. Ashford Street | 10B 5/2 |
| 43 S. Ashford Street | 10B 3.5/1 |









# [Decorative Trends by Location and Time Period]

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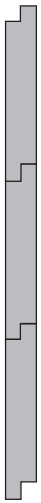
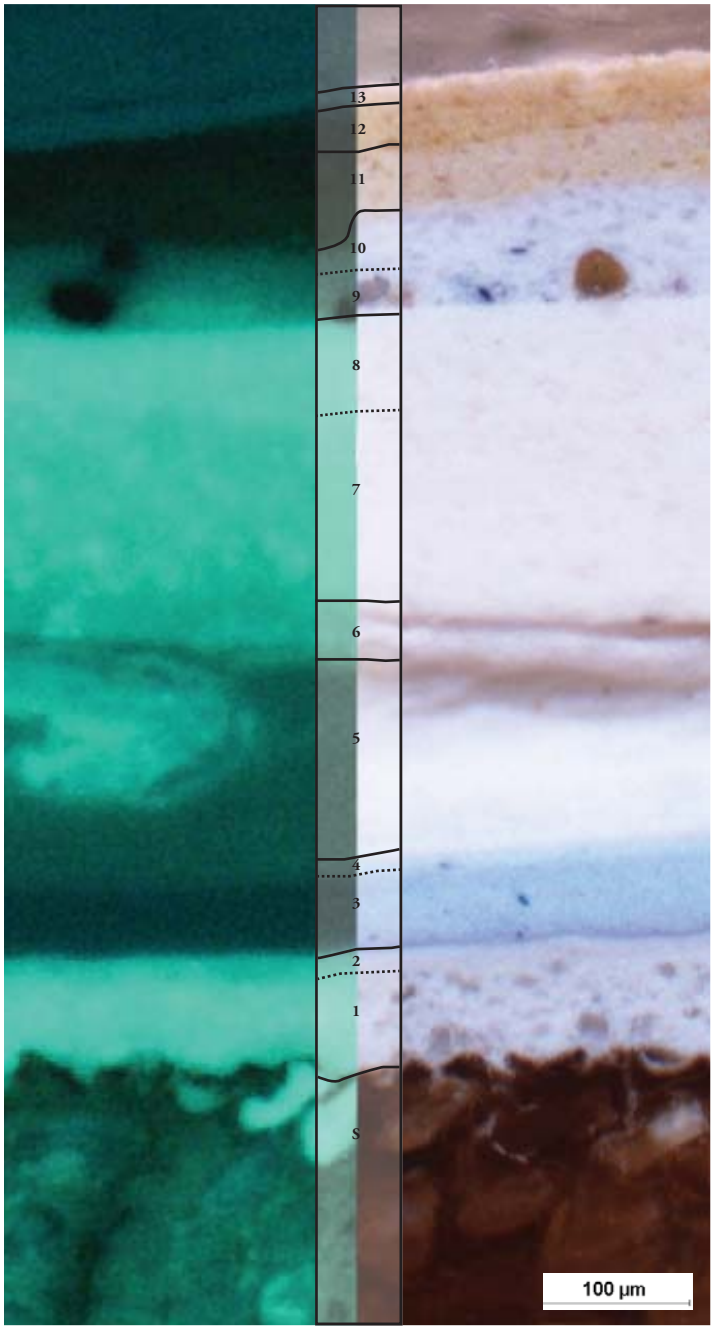
# [Specialty Finishes]





# [Specialty Finishes]

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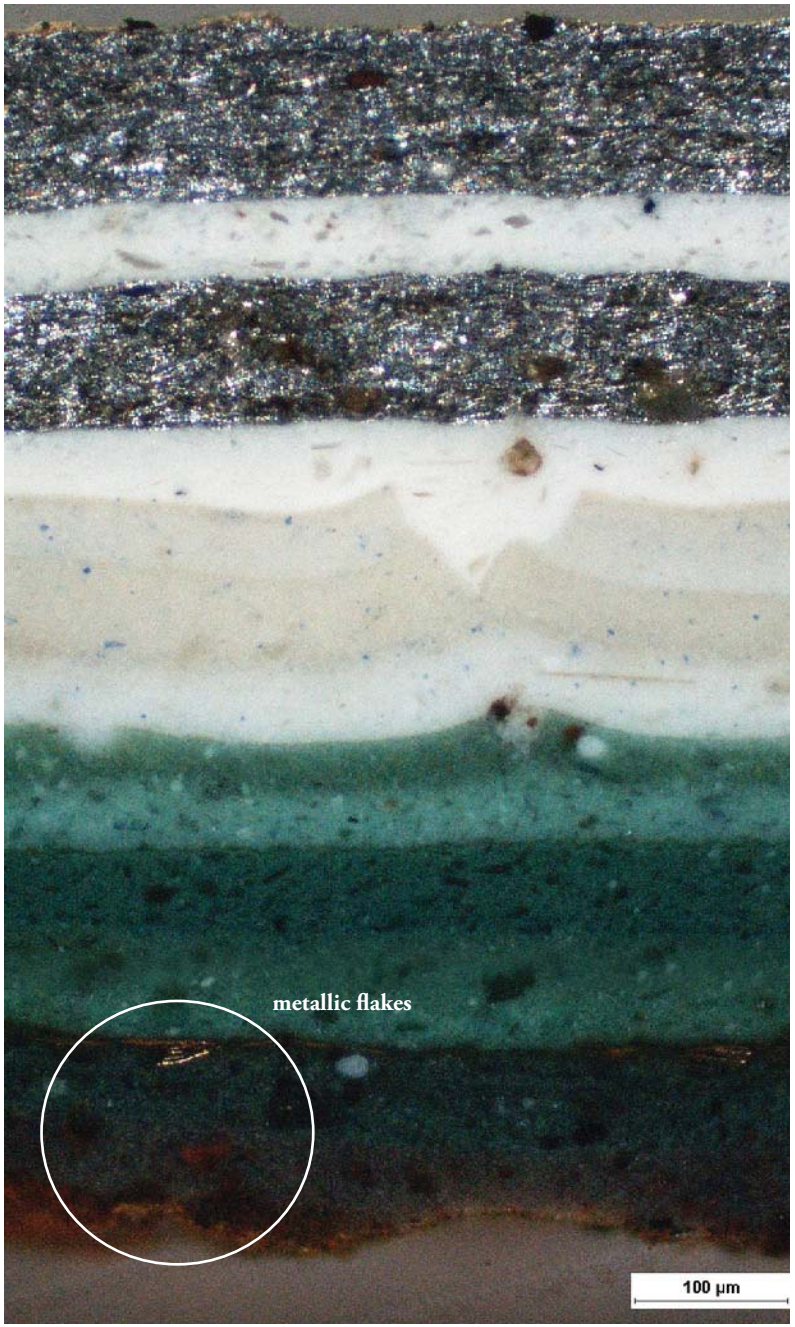
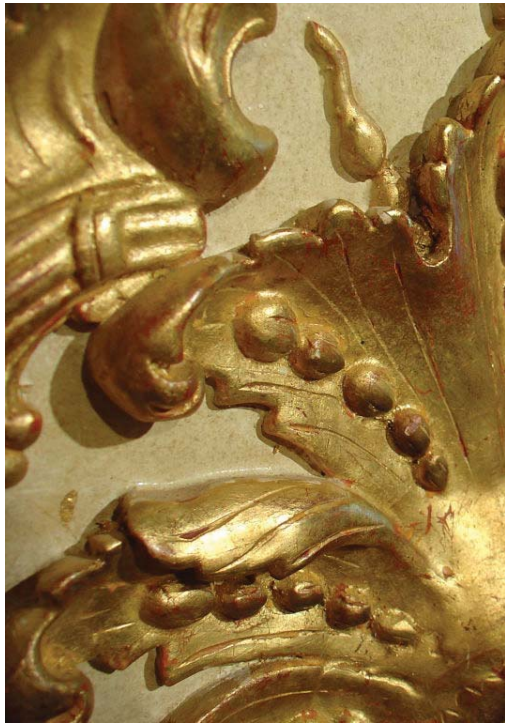
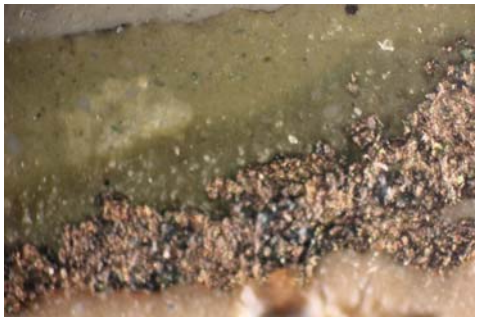
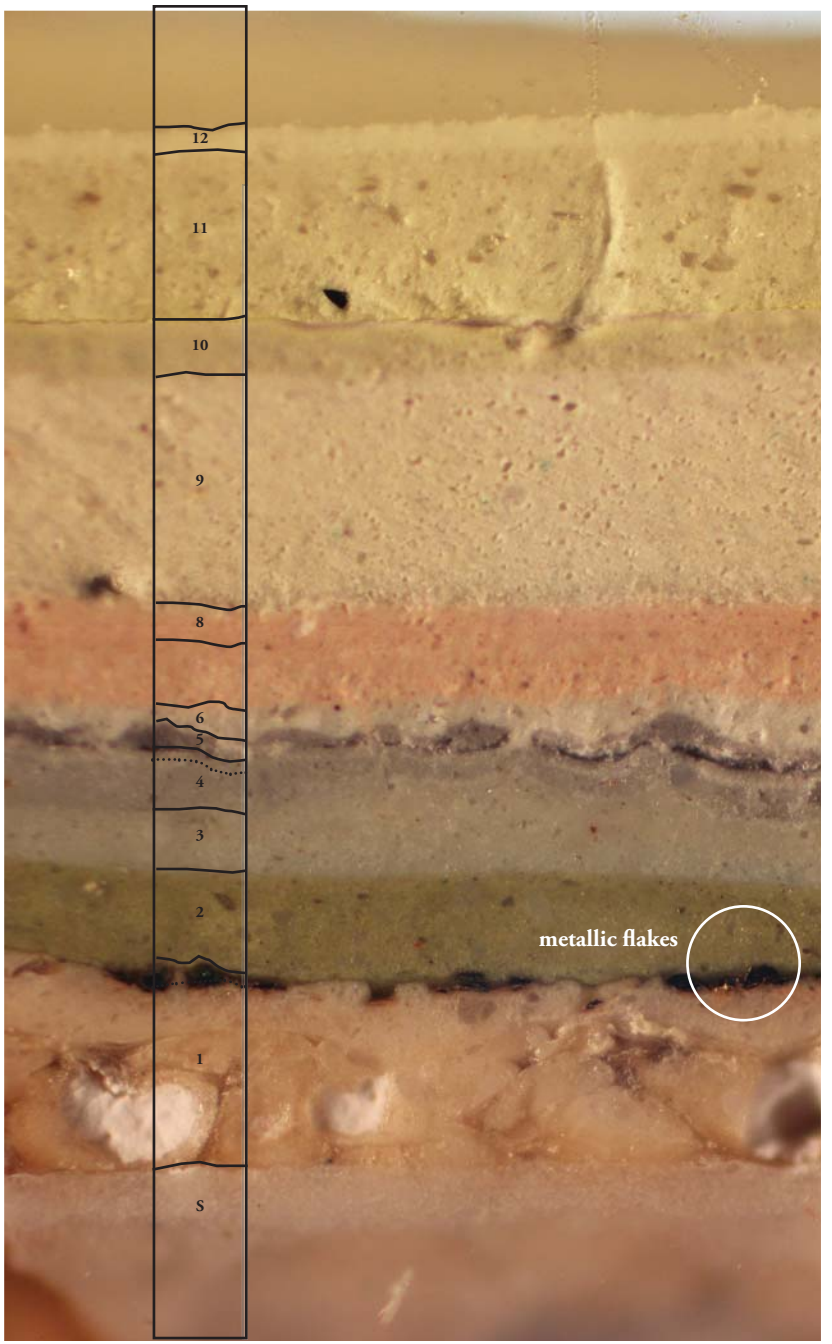


# [Specialty Finishes]

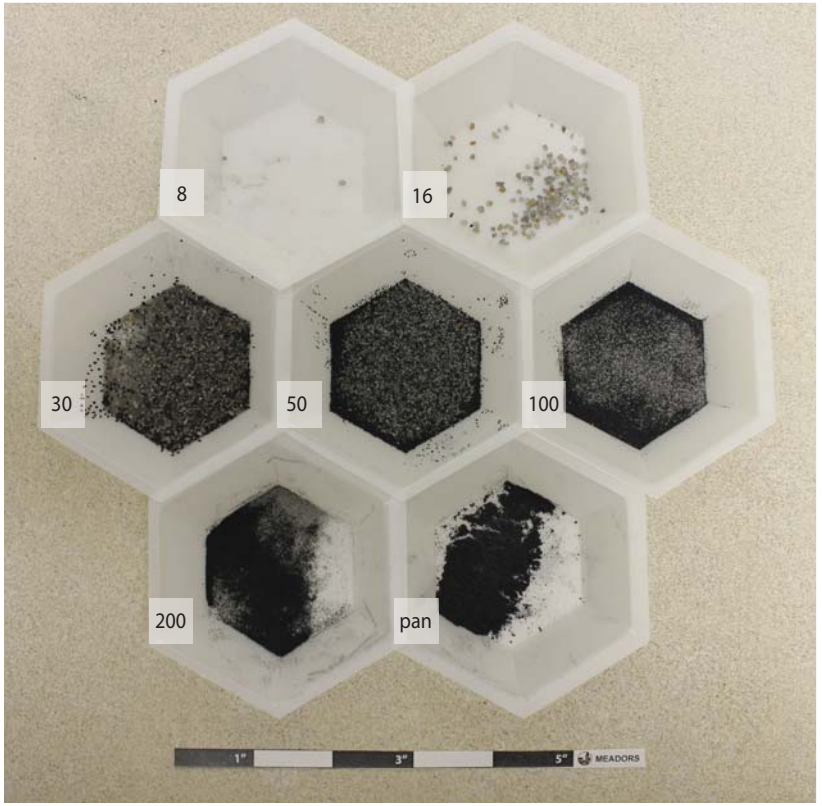






# [Mortars with Additives]

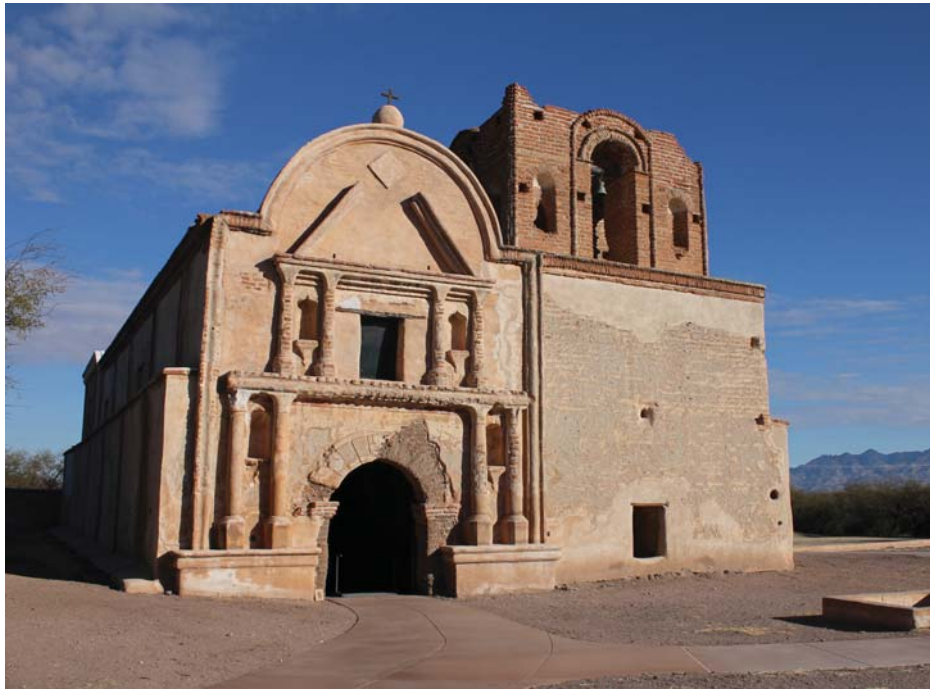
historic fly ash



modern fly ash

# [Natural Cement]

# [Tumacacori National Historical Park]



MM
MM
50
40
30
20
10
0
0
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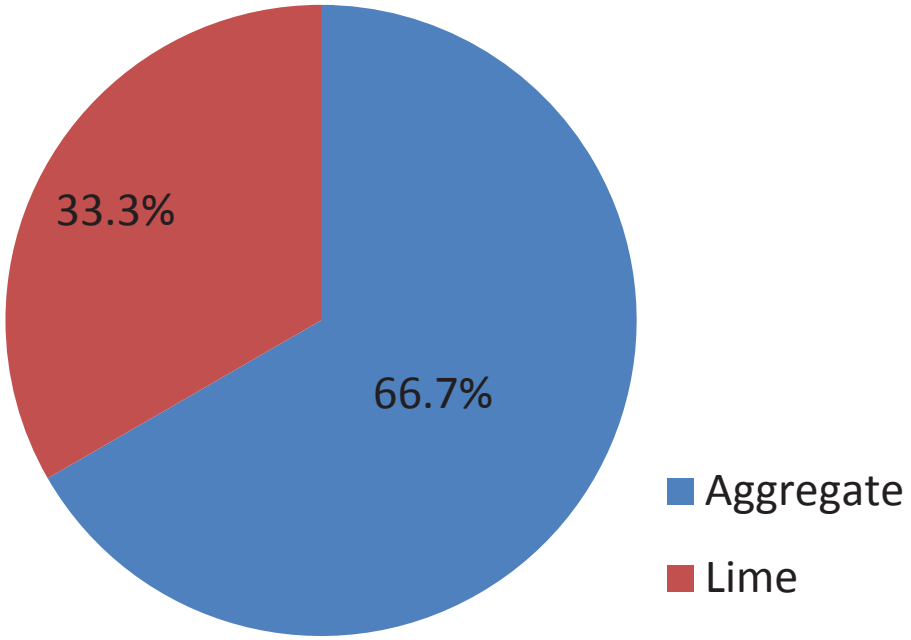
20
30
40
50
HUMBOLDT MFG. CO.
NORRIDGE, IL. U.S.A.
B2

# Tumacacori Mortar Components

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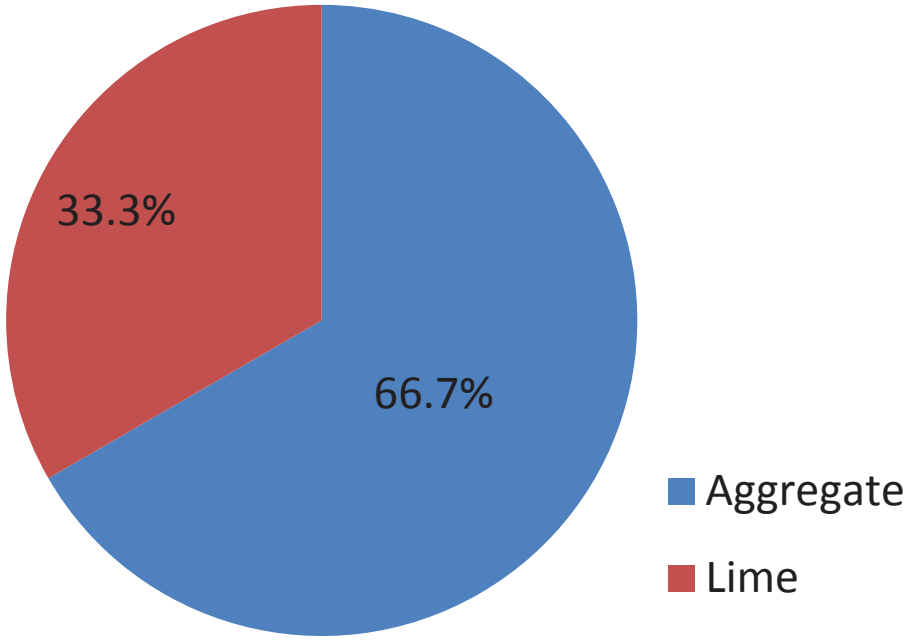
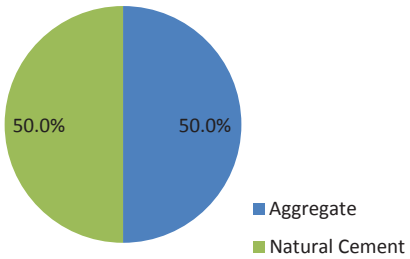
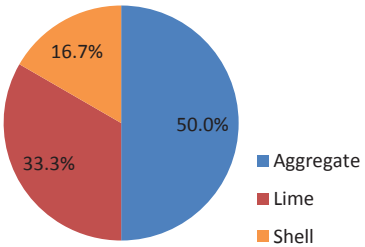
# Tumacacori Mortar Components



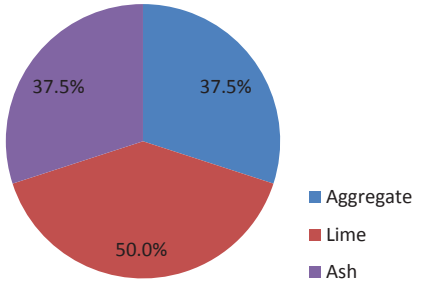

## 90 Wentworth Pointing Mortar Components




## Aiken-Rhett Bedding Mortar Components




## 133 Calhoun Mortar Components

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# Questions?

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