Photo 3.4.3-7. Missing quarter-round trim at bottom of main altar where carpet was removed. View Northeast.

Photo 3.4.3-8. Door to sacristy with observable mold. View Southeast.

Photo 3.4.3-9. Loose VAT on chancel floor. View North.

Appendix B
Site Plan and Drawings

ASSUMED NORTH

wrought iron fence

concrete structure

outfall pipe

outfall pipe

light post

Unknown Utility

steps

hinged gate

cemetery area

wrought iron fence

EX. BUILDING

concrete walk

ROCK RUN ROAD (CR 17/2)

concrete stoop

abandoned well

steps

concrete stoop

steps

light post

concrete walk

hinged gate

wrought iron fence

hinged gate

dyo

ohp

LOVEBERRY RIDGE ROAD (CR 20/6)

unpaved road

*NOTE: GRAVE MARKERS/HEADSTONES/MONUMENTS VISIBLE IN 3D LASER SCAN ARE PLOTTED ABOVE, HOWEVER THIS IS NOT A COMPLETE SURVEY OF ALL MARKERS

LEGEND

- ohp — Overhead Power
- Asphalt
- Building
- X — X — Wrought Iron Fence
- Tree Line
- Concrete
- Utility Pole
- Light Pole

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)

1 inch = 20 ft.

Draper Aden Associates

TETRA TECH

Alpha ARCHITECTS ENGINEERS

Appendix B - Site Plan
Historic Structure Report

ST. BERNARD'S CHURCH AND CEMETERY

LEWIS COUNTY, WEST VIRGINIA

RECORD DOCUMENT

DESIGNED BY:	--
DRAWN BY:	SB
CHECKED BY:	BB
SCALE:	1" = 20'
DATE:	10/29/2018
PROJECT NUMBER:	B14188R-13ALM

SHEET 1 OF 1

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ST. BERNARD'S CHURCH AND CEMETERY

LEWIS COUNTY, WEST VIRGINIA

LIST OF DRAWINGS	
DRAWING	**TITLE**
GENERAL SHEETS	
G000	COVER SHEET
ARCHITECTURAL SHEETS	
A101	FIRST FLOOR PLAN
A102	CHOIR LOFT FLOOR PLAN
A103	ARCHED CEILING FRAMING PLAN
A111	FIRST FLOOR REFLECTED CEILING PLANS
A201	WEST ELEVATION
A202	NORTH ELEVATION
A203	EAST ELEVATION
A204	SOUTH ELEVATION
A301	LONGITUDINAL BUILDING SECTION
A302	TRANSVERSE BUILDING SECTION
A401	INTERIOR ELEVATION - TOWARD ALTAR
A402	INTERIOR ELEVATION - TOWARD CHOIR LOFT
A601	WINDOW SCHEDULE
A701	FIXTURES, FURNITURE, AND EQUIPMENT
A702	FIXTURES, FURNITURE, AND EQUIPMENT IMAGES
A703	STATIONS OF THE CROSS PAINTINGS

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LEWIS COUNTY, WEST VIRGINIA

Draper Aden Associates

1030 WILMER AVE, STE. 100
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804-264-2228

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G000

COVER SHEET

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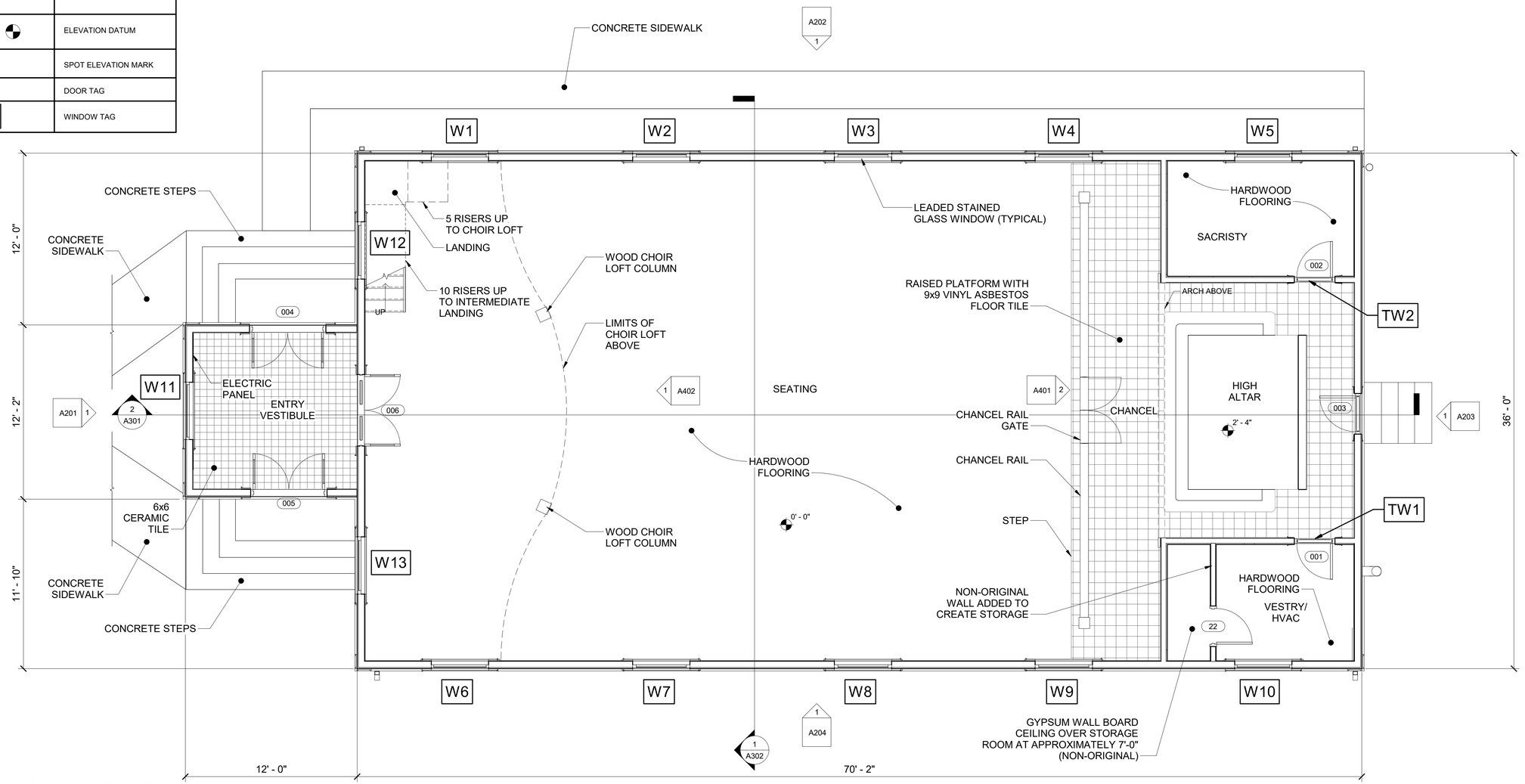
SYMBOL	DESCRIPTION
1 / A101 — View Name / 1/8" = 1'-0"	VIEW TITLE
1 / A101	ELEVATION MARKER
1 / A101	SECTION MARKER
ROOM NAME	ROOM TAG
0	GRID LINE MARKER
Name / Elevation	ELEVATION DATUM
	SPOT ELEVATION MARK
101	DOOR TAG
W1	WINDOW TAG



FIRST FLOOR PLAN

0 2' 4' 8'

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FIRST FLOOR PLAN

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SYMBOL	DESCRIPTION
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1 A101	SECTION MARKER
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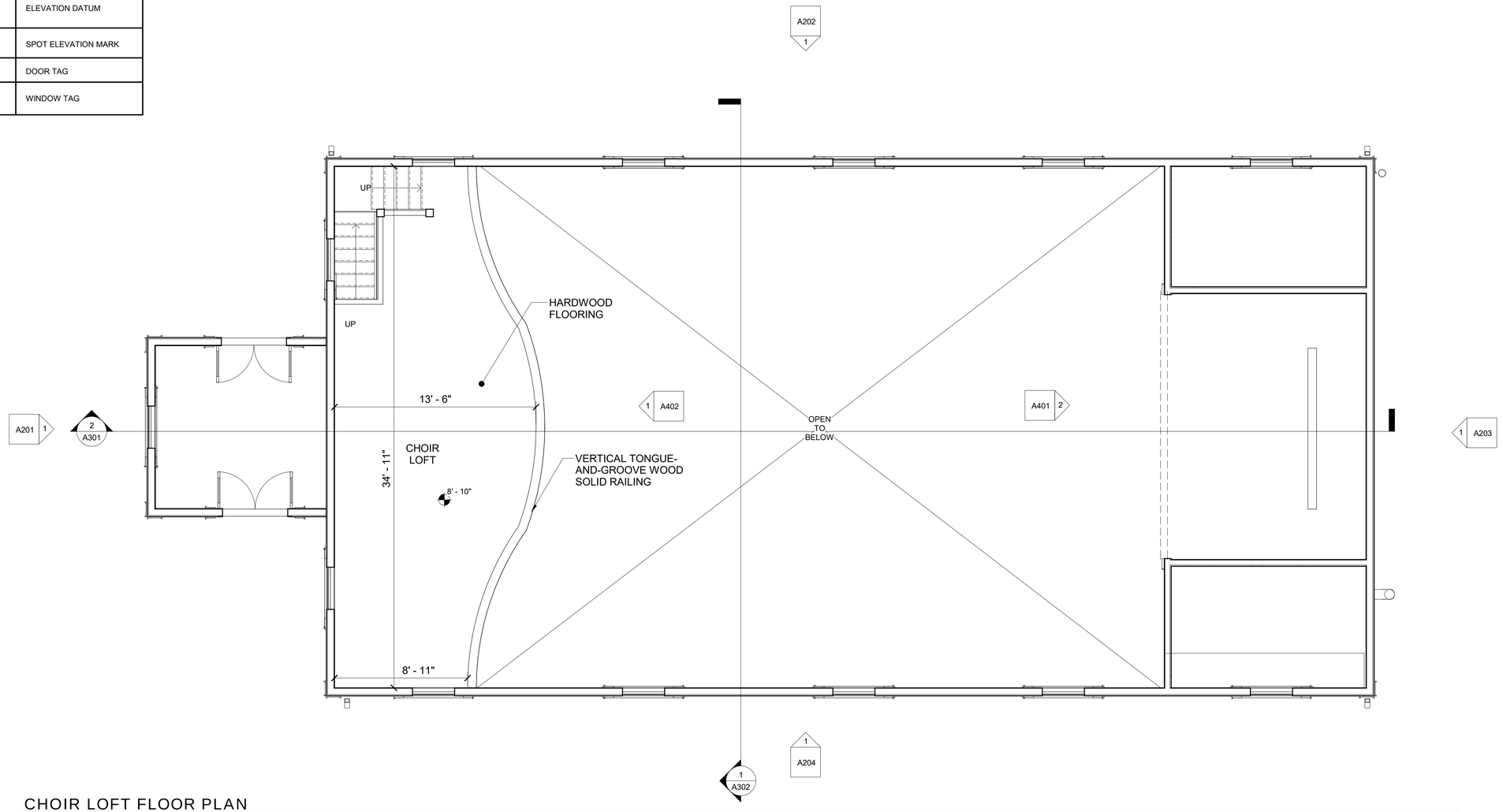
0	GRID LINE MARKER
Name Elevation	ELEVATION DATUM
	SPOT ELEVATION MARK
101	DOOR TAG
W1	WINDOW TAG



CHOIR LOFT FLOOR PLAN

0 2' 4' 8'

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CHOIR LOFT FLOOR PLAN

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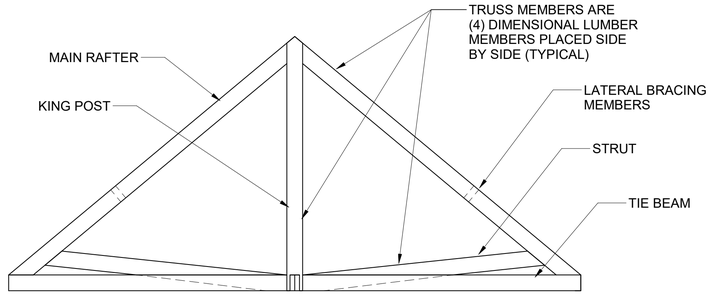
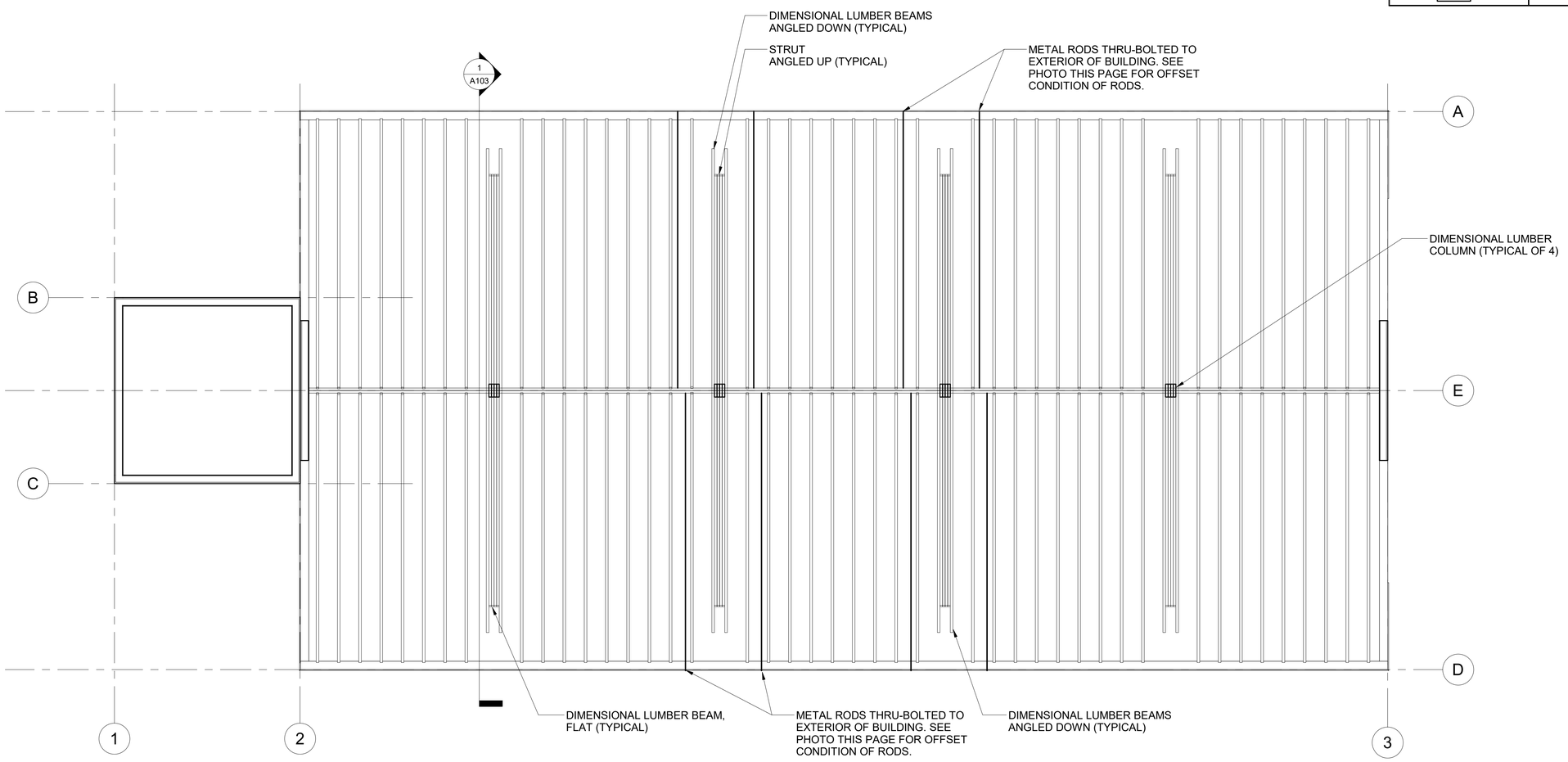
STEEL ROD OFFSET



1 A103 TYPICAL MAIN ROOF TRUSS
1/4" = 1'-0"

0 2' 4' 8'

SYMBOL	DESCRIPTION
1 A101 View Name 1/8" = 1'-0"	VIEW TITLE
1 A101	ELEVATION MARKER
1 A101	SECTION MARKER
ROOM NAME	ROOM TAG
0	GRID LINE MARKER
Name Elevation	ELEVATION DATUM
	SPOT ELEVATION MARK
101	DOOR TAG
W1	WINDOW TAG



ARCHED CEILING FRAMING PLAN

0 2' 4' 8'

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LEWIS COUNTY, WEST VIRGINIA

PROJ. NO.:1803027.00
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PLAN NORTH

ARCHED CEILING FRAMING PLAN

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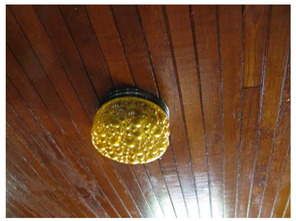
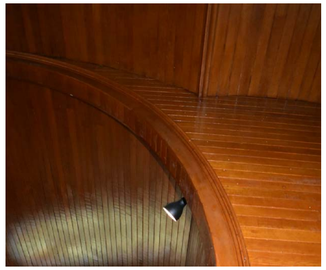
SCHOOLHOUSE LIGHT FIXTURE

PENDANT LIGHTING

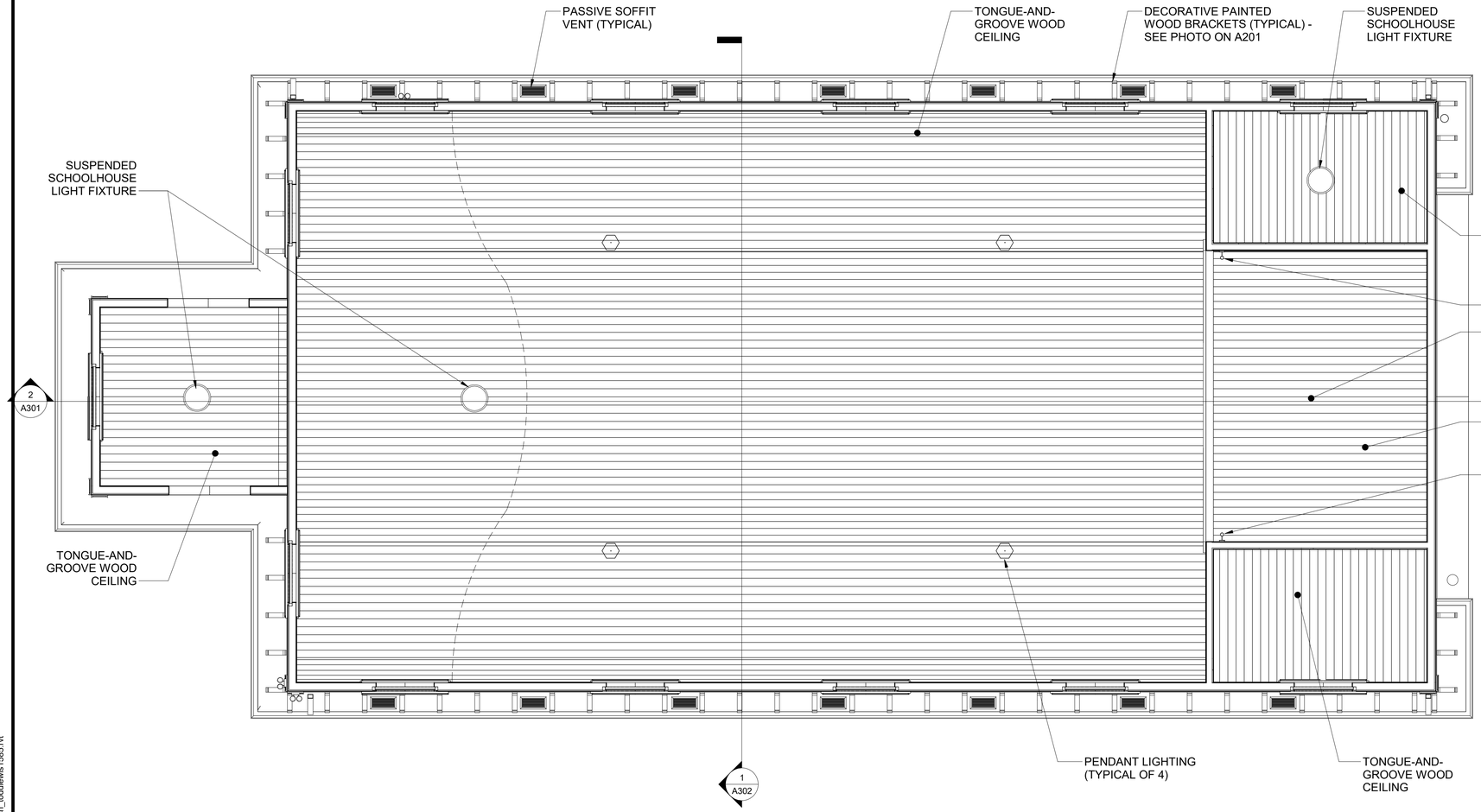
VIGIL CANDLE PENDANT



FLUSH-MOUNT LIGHT FIXTURE

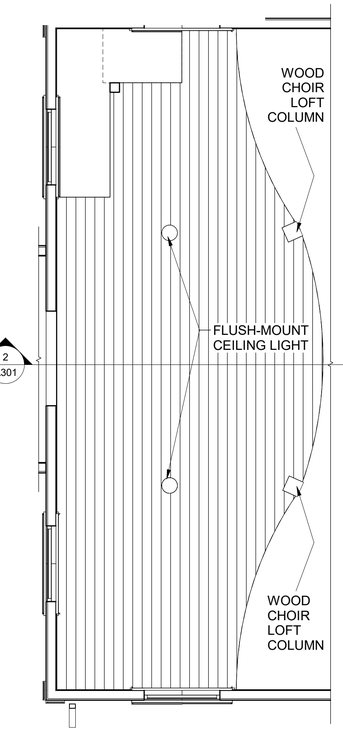


ALTAR SPOTLIGHT



FIRST FLOOR REFLECTED CEILING PLAN

0 2' 4' 8'



UNDERSIDE OF CHOIR LOFT REFLECTED CEILING PLAN

0 2' 4' 8'

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FIRST FLOOR REFLECTED CEILING PLANS

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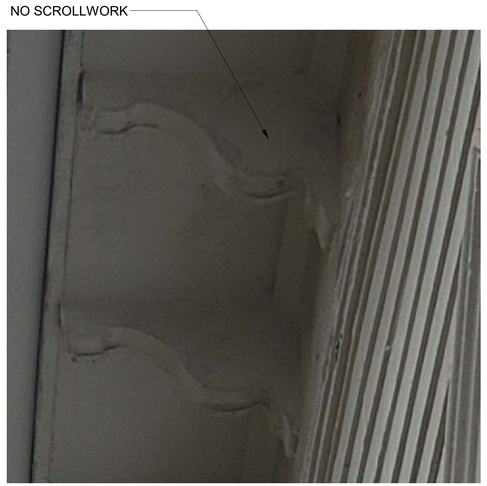
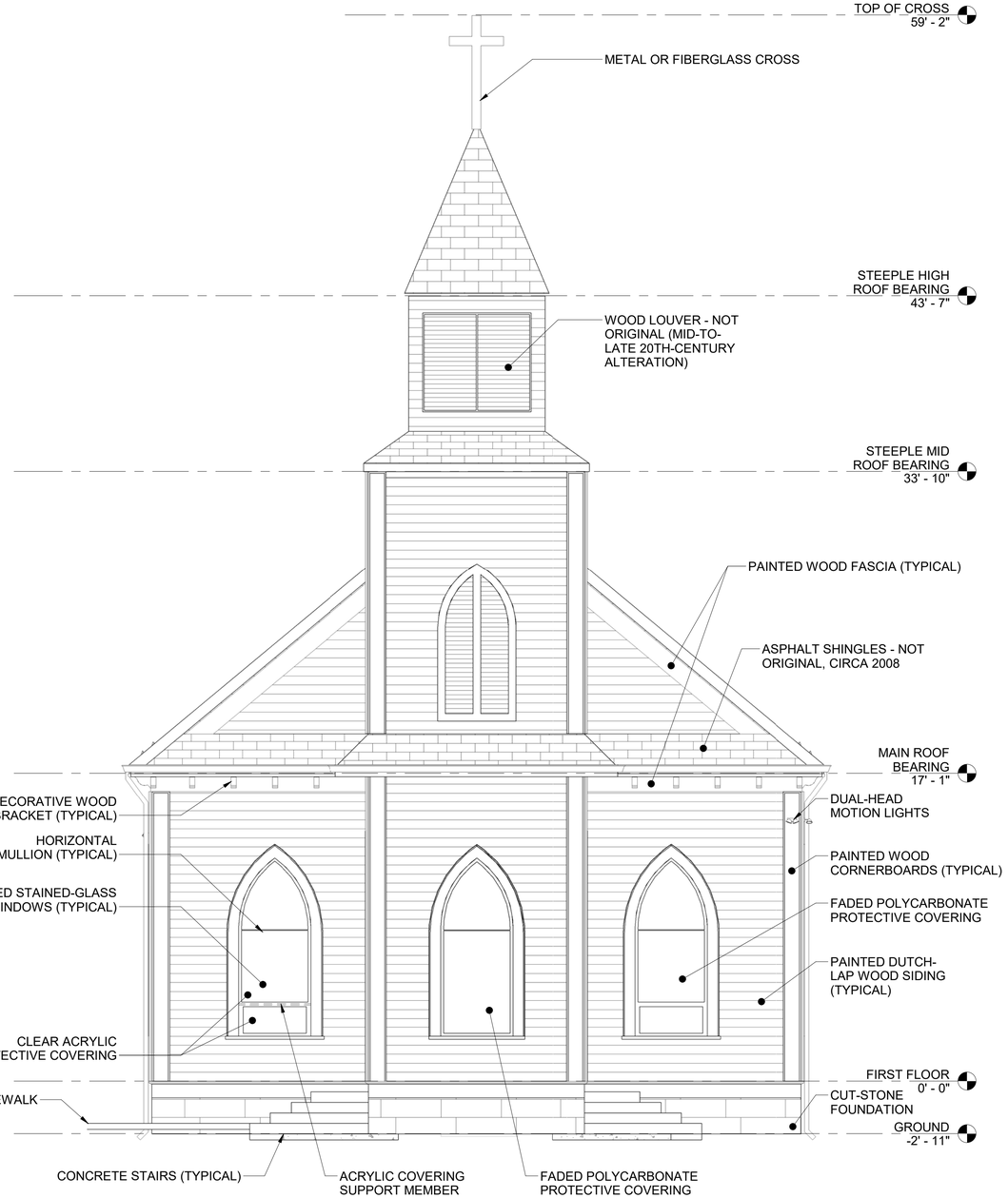
CLOSE-UP ORIGINAL BRACKET



CLOSE-UP REPLACEMENT BRACKET

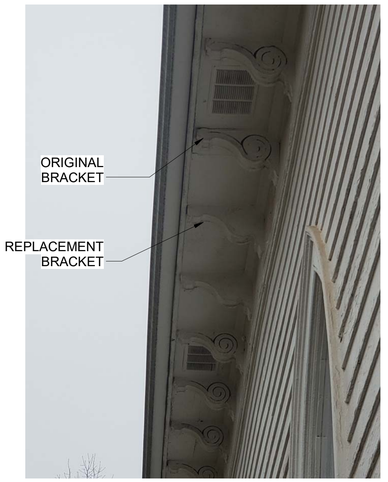


WEST ELEVATION

0 2' 4' 8'

GENERAL ELEVATION NOTES

1. SEE A601 FOR IMAGES OF WINDOWS



DECORATIVE WOOD BRACKET

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LEWIS COUNTY, WEST VIRGINIA

PROJ. NO.:1803027.00
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A201

WEST ELEVATION

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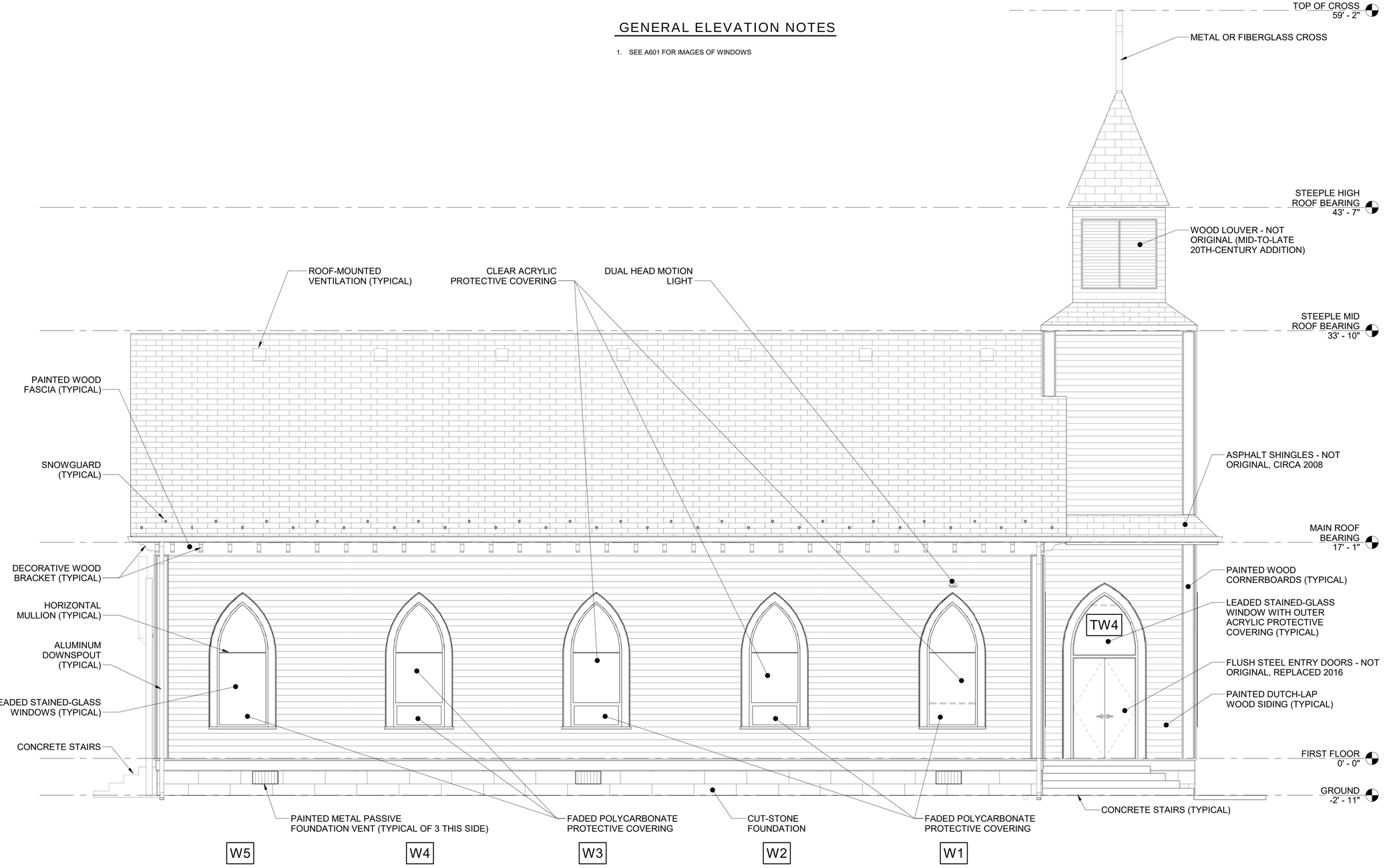
GENERAL ELEVATION NOTES

1. SEE A601 FOR IMAGES OF WINDOWS



NORTH ELEVATION

0 2' 4' 8'

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LEWIS COUNTY, WEST VIRGINIA

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NORTH ELEVATION

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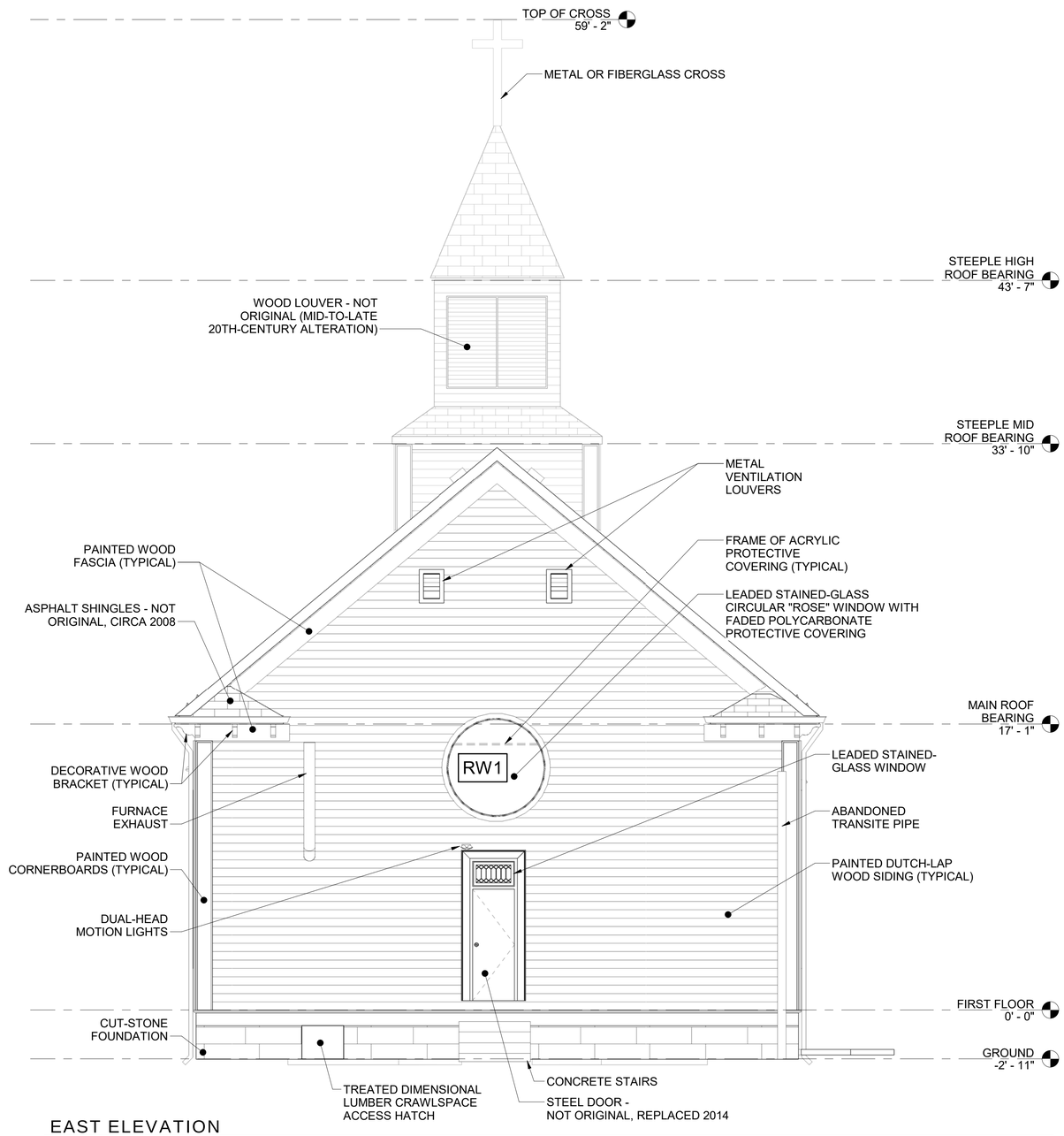

EAST ELEVATION

0 2' 4' 8'

GENERAL ELEVATION NOTES

1. SEE A601 FOR IMAGES OF WINDOWS

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LEWIS COUNTY, WEST VIRGINIA

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EAST ELEVATION

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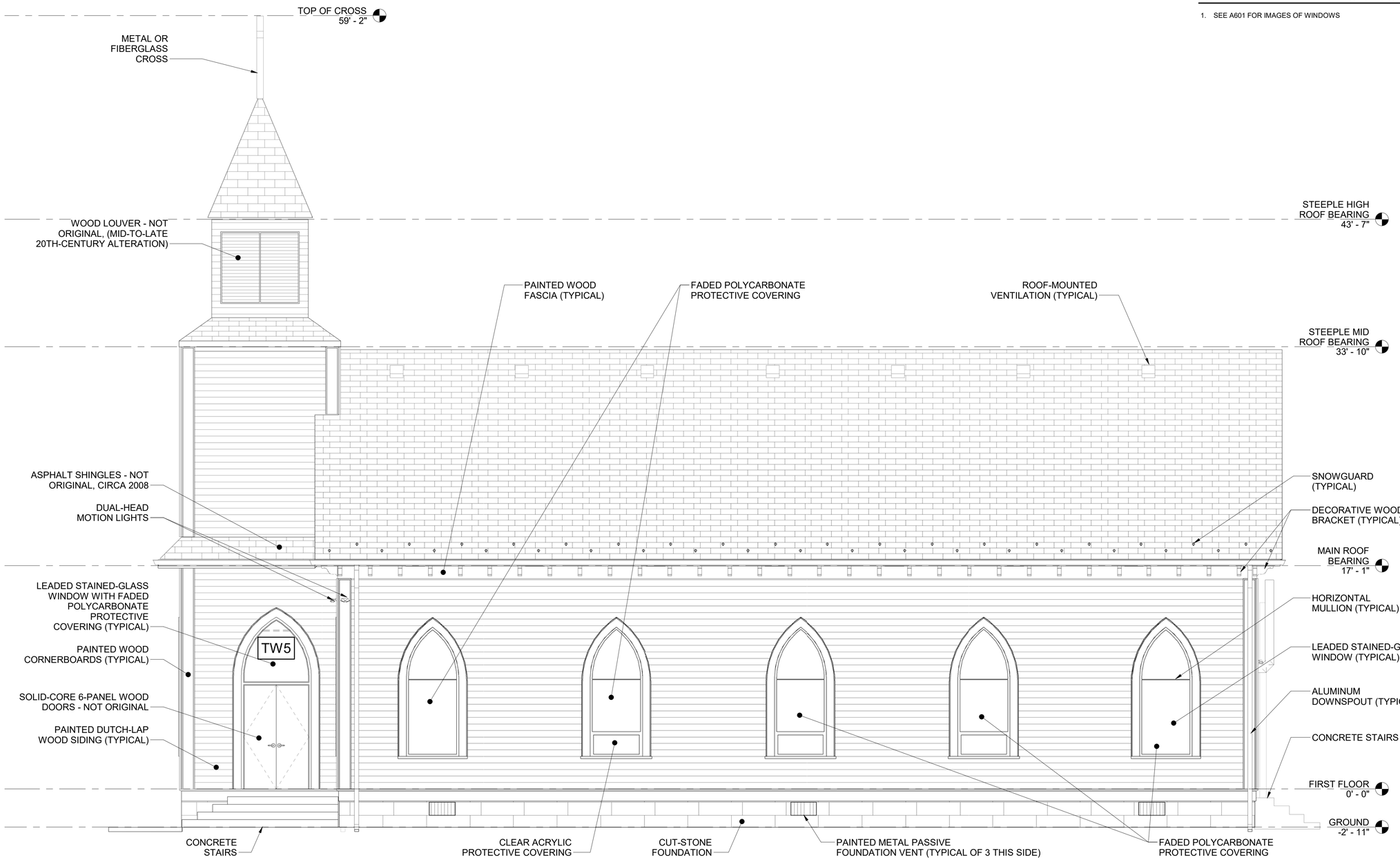
GENERAL ELEVATION NOTES

1. SEE A601 FOR IMAGES OF WINDOWS



SOUTH ELEVATION

0 2' 4' 8'

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SOUTH ELEVATION

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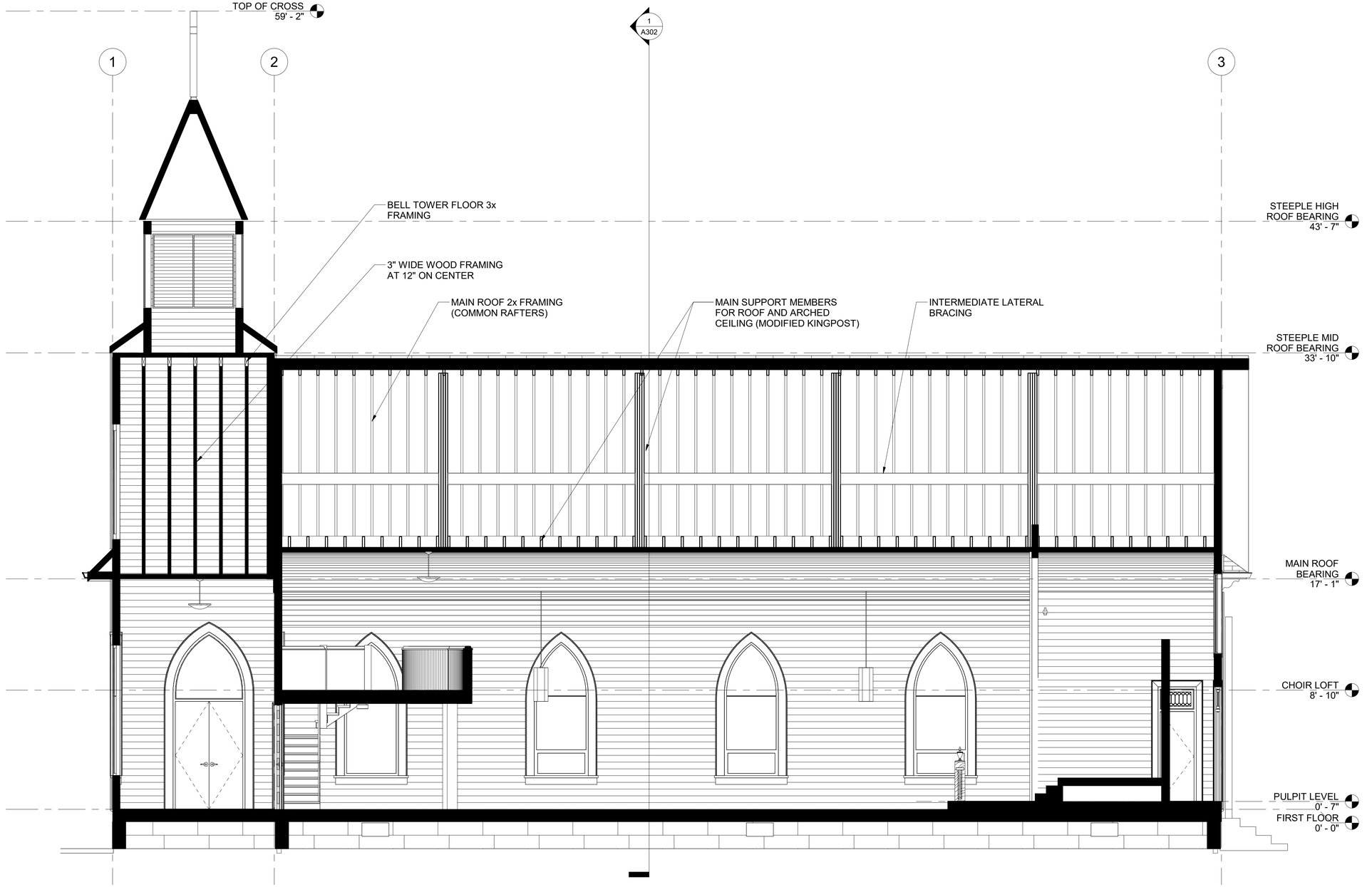

LONGITUDINAL SECTION

0 2' 4' 8'

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LONGITUDINAL BUILDING SECTION

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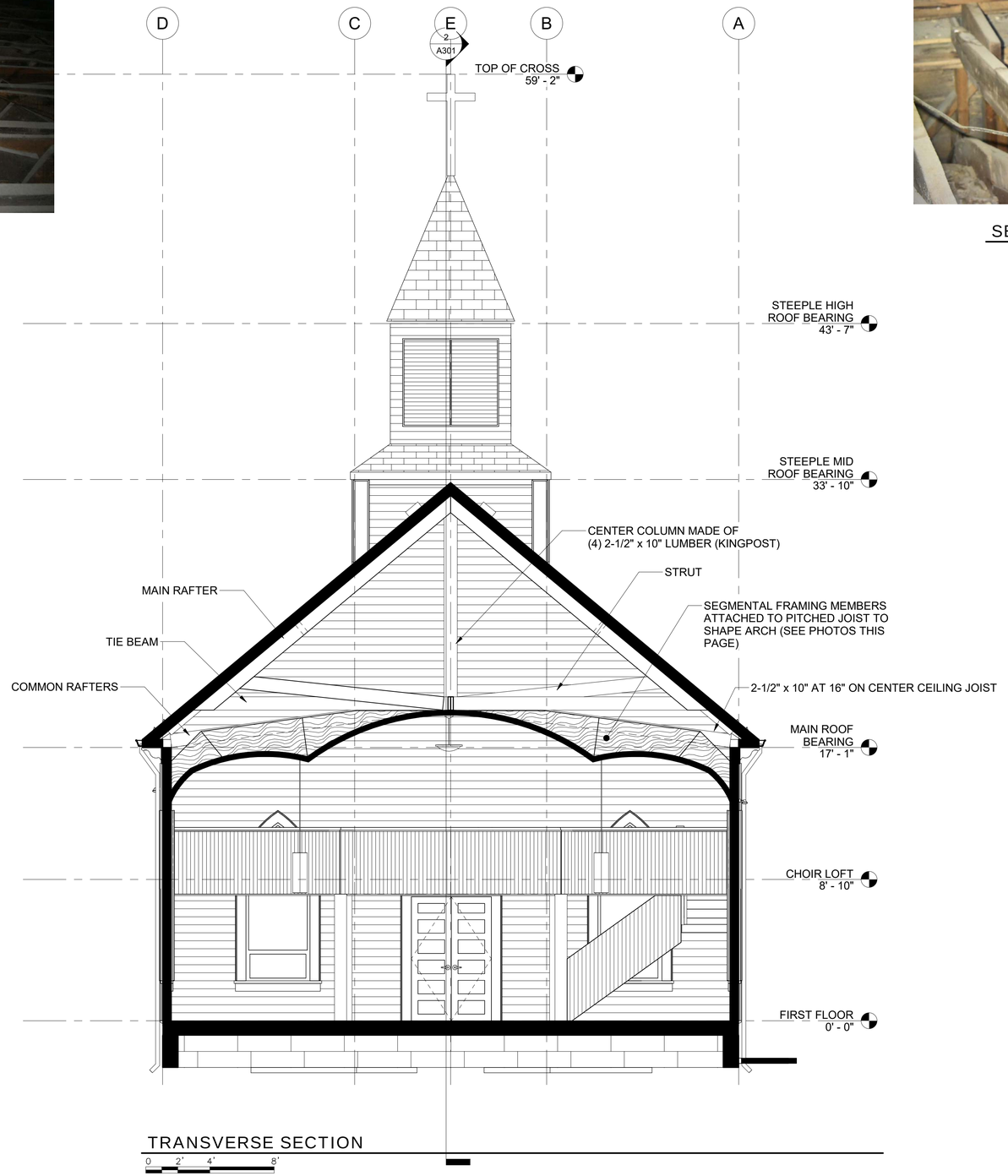
SEGMENTAL FRAMING

SEGMENTAL FRAMING



TRANSVERSE SECTION

0 2' 4' 8'

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TRANSVERSE BUILDING SECTION

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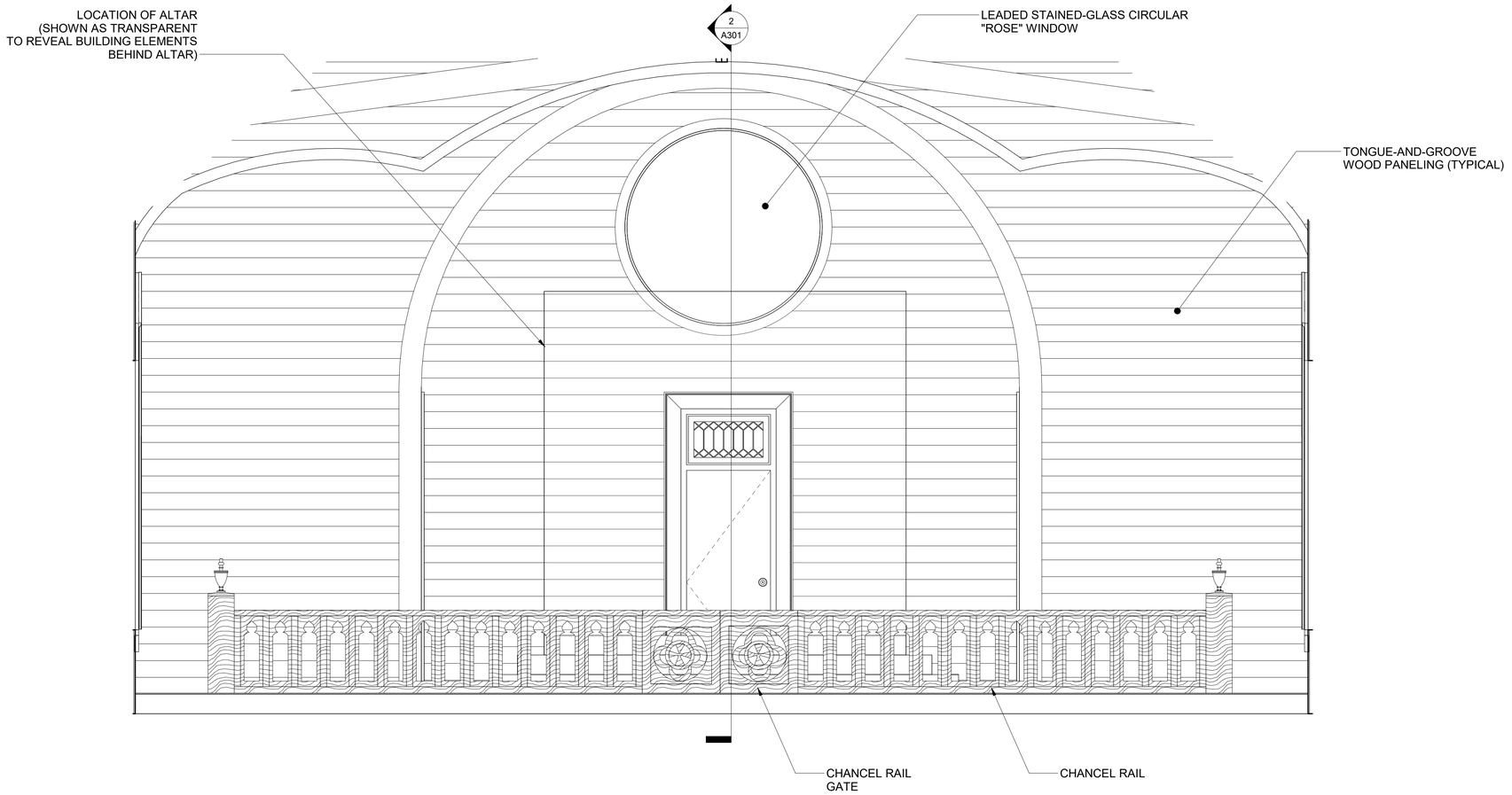
VIEW TOWARD ALTAR



2 A401 INTERIOR EAST ELEVATION

1/2" = 1'-0"

0 1' 2' 4'

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INTERIOR ELEVATION - TOWARD ALTAR

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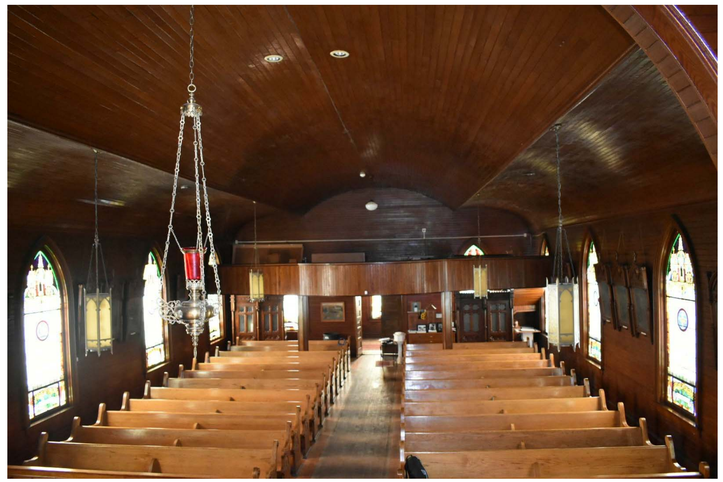
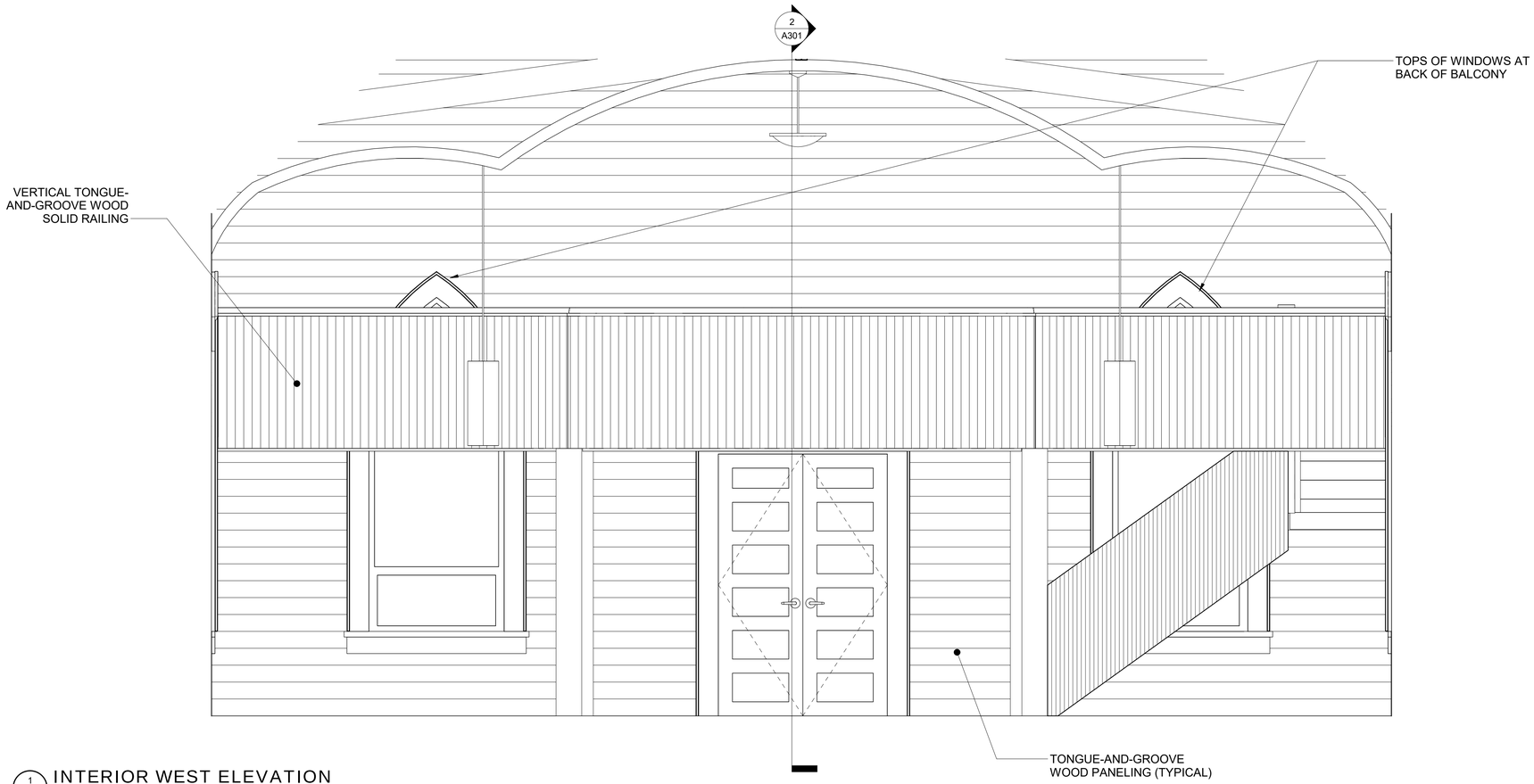


VIEW TOWARD CHOIR LOFT



1 A402 INTERIOR WEST ELEVATION

1/2" = 1'-0"

0 1' 2' 4'

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PROJ. NO.:1803027.00
DATE:03/27/2019
SHEET NO.:

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INTERIOR ELEVATION - TOWARD CHOIR LOFT

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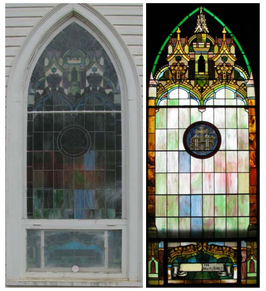
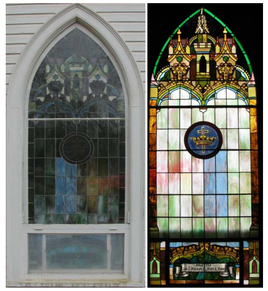
W1



W2 OPERABLE HOPPER



W3 OPERABLE HOPPER

W4 OPERABLE HOPPER

W5

W6

W7 OPERABLE HOPPER

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W9 OPERABLE HOPPER

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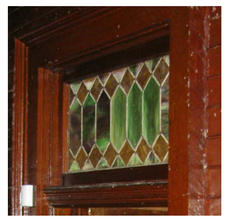
W11

W12

W13

RW1



TW1

TW2

TW4

TW5

STAINED GLASS WINDOW NOTES

1. THERE ARE 13 ARCHED WINDOWS OF WHICH 6 HAVE AN OPERABLE HOPPER IN LOWER THIRD.
2. ARCHED WINDOWS ARE PRE-MANUFACTURED OFF-SITE AND PRESUMABLY DELIVERED IN THREE PIECES OR PANELS.
3. GERMANIC-THEMED BUILDING IS REPRESENTED IN TOP PORTION OF ARCH.
4. LOWER PORTION OF ARCH HAS SCROLL FOR NAME OF DONOR.
5. MIDDLE PORTION OF WINDOWS HAS A CIRCULAR MEDALLION. EACH OF THE 13 WINDOWS HAS A DIFFERENT RELIGIOUS SYMBOL AS THE MEDALLION.

WINDOW SCHEDULE

Alpha ARCHITECTS ENGINEERS
ALPHA ASSOCIATES, INC.
209 PRAIRIE AVENUE
MORGANTOWN, WV 26501
PHONE/FAX: 304-296-8216
TOLL FREE: 800-640-8216
www.thinkALPHAfirst.com

TETRA TECH
320 ADAMS ST, STE. 101
FAIRMONT, WV 26554
304-534-4021

RECORD DOCUMENTS

HISTORIC STRUCTURE REPORT
(APPENDIX B - ARCHITECTURAL DRAWINGS)
FOR
ST. BERNARD'S CHURCH AND CEMETERY
LEWIS COUNTY, WEST VIRGINIA

Draper Aden Associates
1030 WILMER AVE, STE. 100
RICHMOND, VA 23227
804-264-2228

PROJ. NO.:1803027.00
DATE:03/27/2019
SHEET NO.:

A601

WINDOW SCHEDULE

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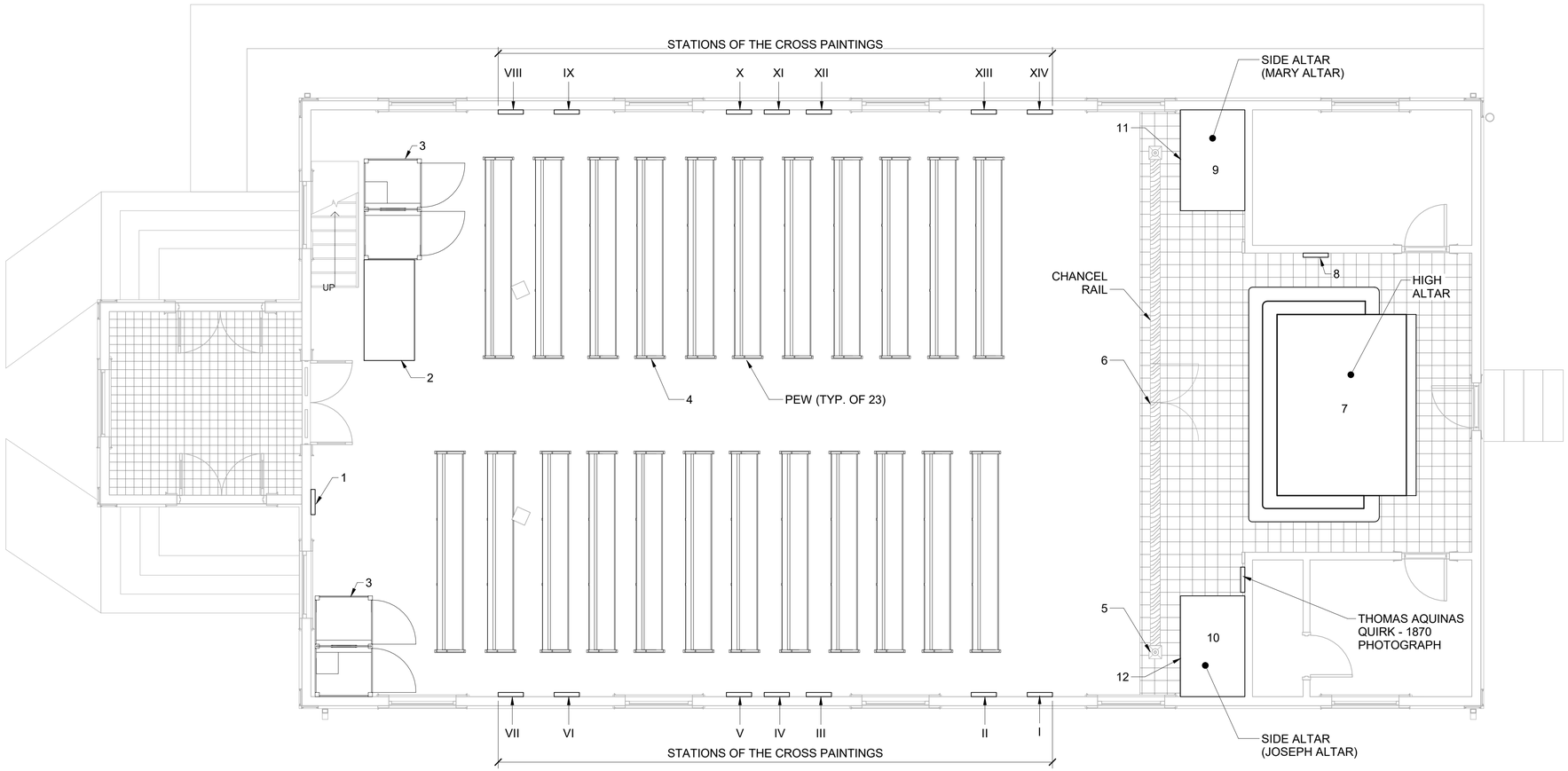
NOTE: NUMBERS & ROMAN NUMERALS REFER TO PHOTOGRAPHS AS SHOWN ON SHEETS A702 & A703



FIXTURES, FURNITURE, AND EQUIPMENT

0 2' 4' 8'

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804-264-2228

PROJ. NO.:1803027.00
DATE:03/27/2019
SHEET NO.:

A701

FIXTURES, FURNITURE, AND EQUIPMENT

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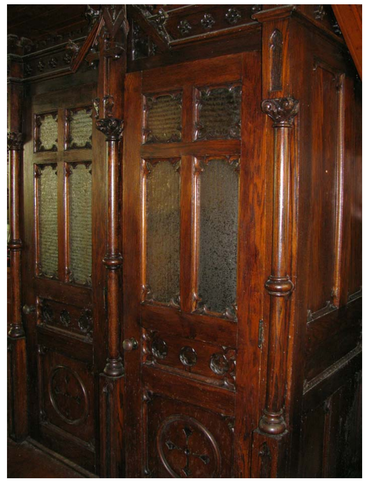
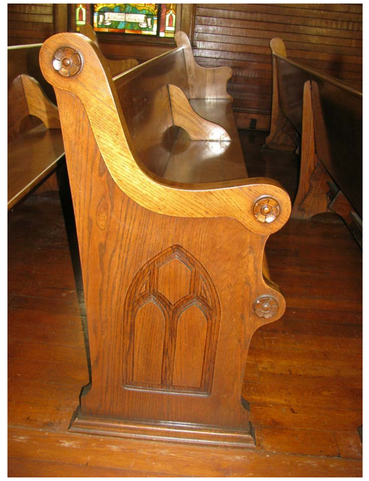
1 - CHURCH FARM PAINTING

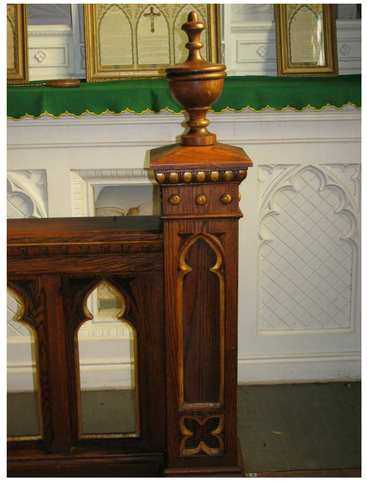
2 - VESTING TABLE/CABINET - RELOCATED FROM VESTRY



3 - CONFESSIONAL



4 - PEW

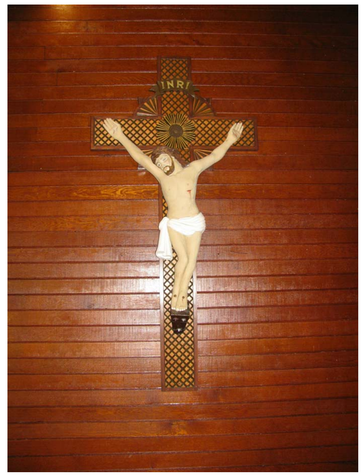


5 - CHANCEL RAIL END POST

6 - CHANCEL RAIL GATE DETAIL

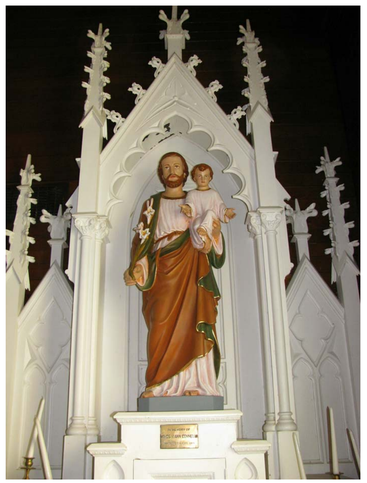
COMPOSITION RELIEF PANEL OF THE LORD'S SUPPER

7 - PRIMARY ALTAR



8 - CRUCIFIX

9 - MARY ALTAR STATUARY



10 - JOSEPH ALTAR STATUARY

11 - COMPOSITION RELIEF PANEL AT BASE OF MARY ALTAR

12 - COMPOSITION RELIEF PANEL AT BASE OF JOSEPH ALTAR

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FOR
ST. BERNARD'S CHURCH AND CEMETERY
LEWIS COUNTY, WEST VIRGINIA

PROJ. NO.:1803027.00
DATE:03/27/2019
SHEET NO.:

A702

FIXTURES, FURNITURE, AND EQUIPMENT IMAGES

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I

II

III

IV

V

VI

VII

VIII

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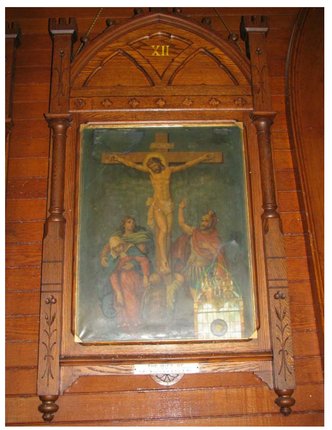
X

XI



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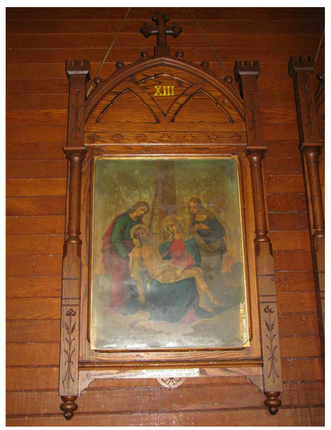

XIII

XIV

STATIONS OF THE CROSS PAINTINGS

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DATE:03/27/2019
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A703

STATIONS OF THE CROSS PAINTINGS

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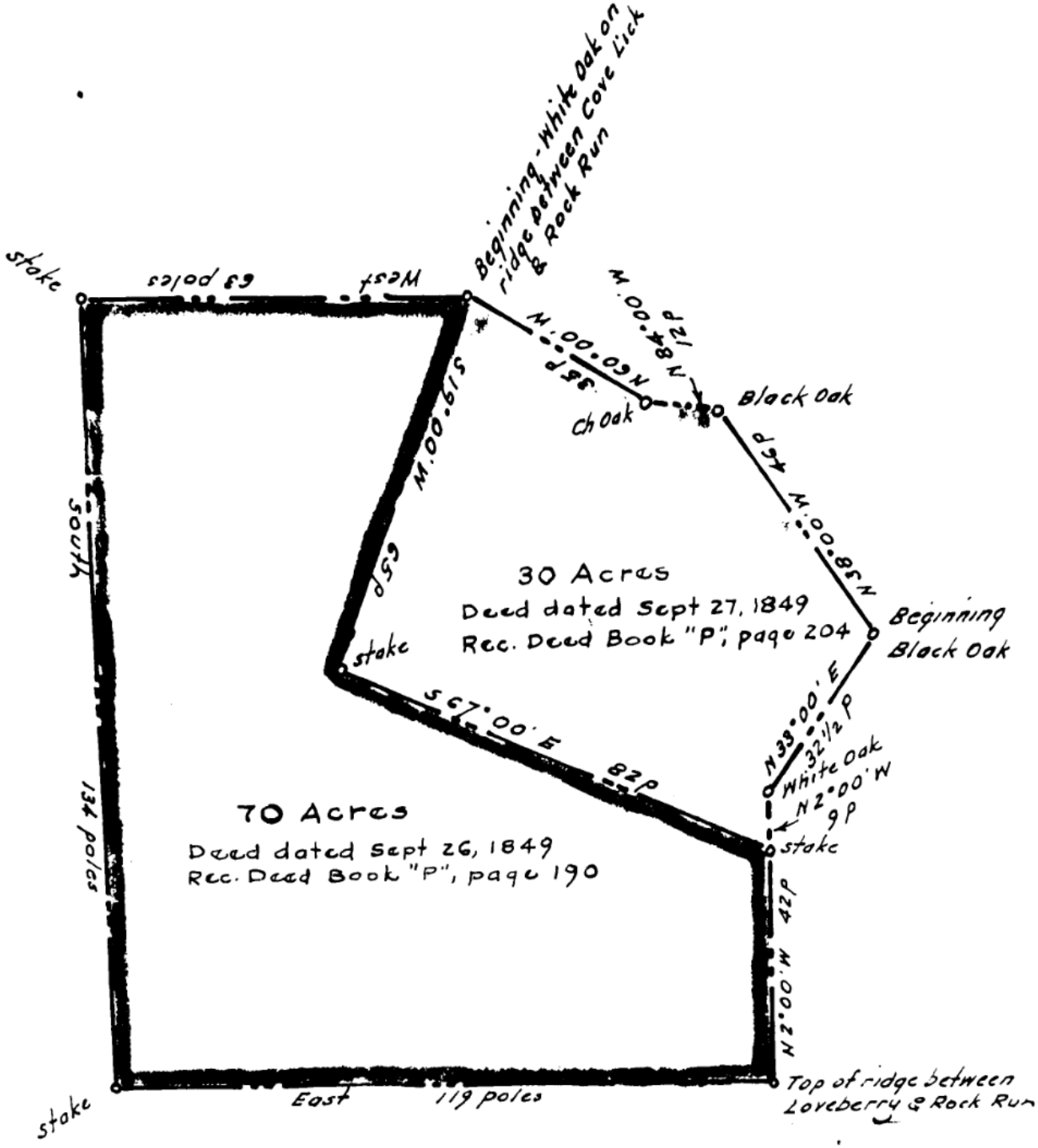
Appendix C
Historic Documents

The following documents are courtesy of the Diocese of Wheeling-Charleston Archives & Records and are located in the Parish History Files for "Loveberry, WV (Lewis County) St. Bernard & Weston Missions (1864-1994)."



Sketch showing real estate conveyed
~ by ~

CAMDEM, BAILEY & CAMDEN

~ to ~

RICHARD V. WHELAN, Bishop.

Situate on the waters of Sand Fork, a tributary of the Little Kanawha River, in Court House District of Lewis County, West Va.

Scale:- 1" = 30 poles July, 1955.

M. S. Holt, Jr.
Reg. Eng'r. - Weston

Rec'd 8/21/2002

HOW SAINT BERNARD'S CHURCH PROPERTY WAS ACQUIRED

AND SOME HISTORY OF THE EARLY SETTLERS OF THE SANDFORK REGION.

Originally the title to the Saint Bernard's Church property on Cove Lick, in Lewis County, was acquired in November 1842, by seven of the first settlers of the community in which the church is located. They included John Hayden, Thomas White, James Mullady, Thomas Mullady, Michael Copley, Patrick Copley and Michael Collins.

An immense boundary of about twenty thousand acres of land in the southwestern section of Lewis County had been acquired by Gideon D. Camden, Minter Bailey and Richard P. Camden. Their claim to the property was for a time disputed by a man named Crowley, but his claim proved to be unfounded.

The owners divided the property into farms of various sizes and undertook to interest in the purchase of such farms, those who would found homes thereon and by whom same would be cleared, cultivated and enclosed. They were able to get in contact with an enterprising group of people of Irish extraction who were newcomers to America and who were desirous of establishing themselves permanently in this section; and as an inducement to them to buy and locate upon their lands, the owners offered to donate a tract of one hundred acres on the head waters of Rock Run and Loveberry of Sandfork, thirty of which were allotted for a church and cemetery, and seventy acres for a homestead for whatever priest might be assigned to the parish. The buyers were accorded the privilege of saying to whom the church property should be deeded or conveyed, on condition that each would buy one hundred acres, or more, at two dollars and fifty cents ($2.50) per acre.

Upon this basis the deal was closed, and be it said in respect to the memory of these seven men, they stipulated that the one hundred acres should be conveyed by deed to their beloved Bishop, the Right Reverend Richard Vincent Whelan, who was then Catholic Bishop of Richmond, and to his successors, for the benefit of St. Bernard's Church. The first settler to occupy his land was Thomas White, the father of the writer, and in due time a church was erected on the land allotted for it, which was for many years the principal Catholic church in this section.

By way of providing further for the welfare of the community which they established, and no doubt as an inducement to buyers, Camden, Bailey and Camden also agreed to donate one hundred acres of land for a grist mill site to anyone who would erect and maintain a mill upon same for five years. After two failures to meet the conditions, a mill was finally installed and operated for many years by John R. Beall.

All of these hardy pioneers who first ventured into the Sandfork region are now deceased. The children of several survive, among whom are: Mrs. Bridget Copley Gilooly and Mrs. Nora Mullady Murphy of Weston, and the writer, who is the only living direct male descendant of the original settlers, who still lives on the ancestral farm founded by his father.

The above information was communicated verbally to the writer by his father, who frequently recounted the many hardships endured by the early settlers in what was then a wilderness and their difficulties in establishing homes therein.

Thomas J. White
Camden, W.Va.

LOVEBERRY - St. Bernard Chapel
. Connected w/ St. Patrick, Weston

P. J. Donahue, Bishop

To DEED.

Thomas J. White.

This DEED made this 6th day of October 1910 between P. J. Donahue. Bishop of Wheeling, of the City of Wheeling West Virginia of the first part, and Thomas J. White, of the county of Lewis and State of West Virginia, of the second part

Witnesseth that for and in consideration of the sum of one hundred and eleven $111.26 dollars and tweenty six cents cash in hand paid to John Healy, Treasurer of Saint Bernards. Church for the use of said Church, The said P. J. Donahue Bishop of Wheeling does grant and convey unto the said Thomas J. White all of the herein after described tract or parcel of land with covenants of general warranty. Reserving all of the Gas, Oil, and Coal that may underly the above mentioned land with the right of ingress and egress to fully enjoy the same. Described and bounded as follows to Wit:

Being a part of a one hundred acres of land conveyed by Camden and Bailey and Camden, to Bishop Whelan, former Bishop of Wheeling. Situate in Court House District, Lewis County West Virginia. on the head of Rock-Run and Cove-Lick, tributaries of Sand-Fork of the Little Kanawha River and is bounded as follows,

Beginning at a Chestnut Oak, standing on top of the ridge between Rock-Run and a branch of Cove-Lick thence S. 70.30' W. 9.16 poles to a Jack Oak, S. 77.45' W. 5.12 poles to a White O. N. 60.35' W. 12.76 poles to a stone and pointers Thomas J. Whites corner, thence with two of his lines N. 3.18' E. 30.60 poles to a Stone, S. 88.35' E. 35 poles to a Stake on the West edge of the public Road thence S. 13.25' W. 7.20 poles to a C. oak at the lower edge of the Road S. 26.45' W. 9.50 poles to a W. O. on the lower edge of said Road, thence S. 20 W. 17.50 poles to the beginning containing 6 acres and 29 square poles.

Witness the following signature and seal.

P. J. Donahue, (Seal)

State of West Virginia,

Lewis County, to Wit:-

I, Leander Troxell, a Notary, of Lewis County West Virginia, do certify that P. J. Donahue, Bishop of Wheeling whoes name is signed to the writing hereto annexed, bearing date on the 6th. day of October 1910, has this day acknowledged the same before me in my said County.

Given under my hand this 6th day of October, 1910.

Leander Troxell,

My Commission Expires
Aug. 25, 1915.

Notary Public.

The State of West Virginia,

Clerk's Office, County Court, Lewis County, ss: October 6th, 1910.

The foregoing Deed, together with the certificate thereto annexed, was this day presented in said office and admitted to record.

Attest: _____ Clerk.

FROM THE PEN OF THOMAS J. WHITE, LATE, OF COVE LICK

The original title to the St. Bernard's Church property in Lewis County was acquired in November 1842 by seven men of the first settlers of the community in which the church is located. John Hayden, Thomas White, James Mullady, Thomas Mullady, Michael Copley, Patrick Copley, and Michael Collins were the men.

Gideon Draper Camden, Hinter Bailey and Richard P. Camden had a grant of approximately 20,000 acres.

These owners got in touch with a group of enterprising newcomers to America, who were desirous of establishing themselves permanently in this section and as an inducement to these mostly Irish, the owners offered them 30 acres for a church site, and a cemetery free if each one bought 100 acres at $2.50 an acre. Later 70 free acres were offered to help support a permanent priest---- a homestead. To try to get a priest these 7 men had to contact Rt Rev. Vincent Whelan of the Diocese of Richmond, Virginia because this Diocese did not exist for 8 more years, when Bishop Whelan became the first Bishop of Wheeling in 1850.

Be it said to the memory of these 7 men, that they stipulated to Bishop Whelan and to his successors, that these 100 acres were for the benefit of St. Bernard's. These were men of their word and Bishop Whelan agreed and the successors to the See are trusted to respect the agreement.

T. J. White

This is a unique parish
There is no other in the Diocese

St. Bernard Church, Sandfork

Memorial Mass Celebrated

Seven large, raw-boned men surrounded five-foot, seven-and-one-half-inch Father John Mueller on the first Sunday he came to St. Bernard Church after Father Quirk had died. The year was 1937, and they were on the front steps at the entrance to the church.

Each of them at least six feet tall, asked Father Mueller what time Mass would be said.

"What time did Father Quirk say it?" Father Mueller asked cautiously.

"Nine o'clock," the men told him.

"We shall have Mass at 9 o'clock, then," the young priest replied.

It was recollections like these which made Sunday, Oct. 7, a special date in the history of St. Bernard Church at Loveberry Ridge, near Copley, in the Weston Deanery. The occasion was a Memorial Mass in honor of Monsignor Thomas Aquinas Quirk who had arrived in Lewis County 100 years before, in 1884. He served that parish and two others in Lewis County as well as three other counties in West Virginia. Father Quirk was pastor at St. Bernard in Sandfork (Loveberry), St. Bridget, Roanoke (Goosepen), and St. Michael, Orlando, for 53 years. He celebrated 67 years as a priest before his death on Sept. 12, 1937. He is buried in St. Bernard Cemetery.

More than 100 persons attended the Mass, with Father Donal O'Donovan, VF, pastor of St. Patrick Church in Weston, presiding. Concelebrants were Father John J. Mueller, Father John J. O'Reilly, and Lewis County natives Father James E. Tierney and Father M. Edward McDonald.

"Today we honor not only Father Quirk, a man who gave his life for the glory of God in a foreign land, but all the pioneer priests in this area," Father O'Donovan said in his opening remarks. The Mass was offered for the intentions of Father Quirk and for the increase of vocations in the Diocese.

Father Quirk was born in County Cork, Ireland, near the Village of Castletownroche on March 7, 1845, the son of Michael and Catherine Rice Quirk. From a well-to-do family, he went to the Primary and Classical school established by the Cistercian Monks at the Monastery of Mount Mellary. At age 18, he emigrated to the United States in April, 1863, and fought with the 69th New York Regiment in the Civil War.

In France after the war, he studied for the priesthood at San Sulpice Seminary in Paris and returned to the United States in 1869 at the request of Bishop Richard V. Whelan of the Diocese of Wheeling. After further study he was ordained to the priesthood on Aug. 31, 1870.

Father Quirk first served at St. James Cathedral, Wheeling, at Parkersburg and in Huntington, where he established St. Joseph parish and built the first church there. In 1884 he was transferred to Lewis County and the newly established parish encompassing St. Bernard, St. Bridget and St. Michael.

"It is difficult for us today to picture a priest on horseback traveling over hundreds of miles of muddy roads and dense forests, in freezing rain and snow, to attend to the sick and dying," Father O'Donovan said in his homily.

"In the winter of 1893, Father Quirk made 83 sick calls. On one occasion, he saddled his horse at midnight to ride 13 miles to administer the sacraments to a dying young mother who had just given birth to her baby. He returned home on Easter Sunday morning in time to offer Mass for his congregation. Picture a priest riding his horse, vestments, sacred vessels, altar stone strapped to his back, riding off across the hills to a church 20 miles away.

"I do not believe we can fully appreciate the heroic life, the greatness of soul and spirit of the early pioneer priests of West Virginia. Constant traveling through a country with few roads and no signposts, guided only from cabin to cabin by the smoke coming from their fires, was the life of a pioneer priest. How often he must have dragged himself, half frozen, from the wet saddle into a parishioner's home. A sick call often meant a day's journey in the saddle. When he reached the home in Nicholas county, hungry and exhausted, it was a question of who had the greater claim to attention, the priest or the dying parishioner.

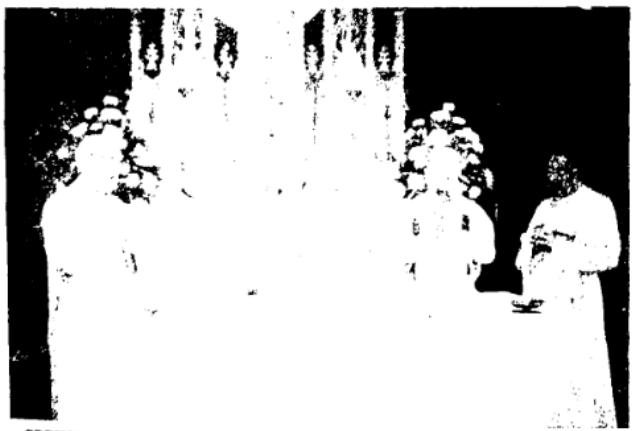
"But he thought nothing of it as long as that old faithful (smoking) pipe kept drawing. But Father Quirk well understood that God never allows Himself to be outdone in generosity. For the widow's mite and the widow's goodwill, He gives away heaven."

Cont'd On Page 11

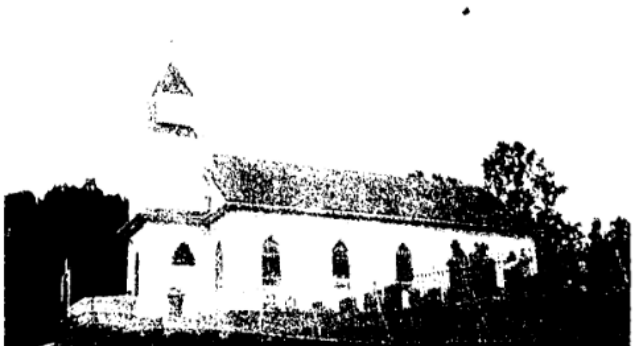
ST. BERNARD CHURCH *was built in 1910 on Loveberry Hill near Weston, W.Va. The Church was the site of an Oct. 7 Memorial Mass for Father Thomas Aquinas Quirk, former pastor.* (MARY M. HENDRICKS Photo)

FATHER JAMES E. TIERNEY, ***a native of Lewis County lead the prayers of the faithful during the Oct. 7 Memorial Mass for Father Thomas A. Quirk held at St. Bernard Church at Sandfork [Loveberry] near Weston, W.Va. In the background is Father M. Edward McDonald, also a native of Lewis County.*** (MARY M. HENDRICKS Photo)

Msgr. Thomas Aquinas Quirk [1845-1937]



PRESIDING *at the Oct. 7 Memorial Mass for Father Thomas Aquinas Quirk was Father Donal O'Donovan, VF, [center] pastor of St. Patrick parish, Weston. Concelebrants were [l-r]: Father James E. Tierney; Father M. Edward McDonald, pastor, St. John parish, St. Mary's; Father John J. Mueller; and Father John J. O'Reilly, pastor, Sacred Heart parish, Wheeling.* (MARY M. HENDRICKS Photo)



A SIDE VIEW *of St. Bernard Catholic Church and Cemetery, Sandfork, W.Va., located atop Loveberry Hill, near Weston in Lewis County. Father Thomas Aquinas Quirk, [1845-1937] who was pastor of St. Bernard for 53 years is buried there.* (MARY M. HENDRICKS Photo)

Memorial Mass Celebra...

Cont'd From Page 6

Father O'Donovan added, "It is little wonder then we gather here today to honor not only this great and extraordinary priest, but all the pioneer priests who served before him in Central West Virginia---Father Austin Grogan, Father Bartholomew Stack, Father Denis Brennan, Father Daniel O'Connor, Father Patrick F. Burke, and all the others."

Father O'Donovan also pointed out that Father Quirk was "not the Saint of the storybook --- halo, uplifted eyes, hands crossed like a Thomas a Kempis. He was rather a robust man, about six feet tall and weighing about 180 pounds, admirably suited to the rigors of the life he led and the rustic surroundings of his parish. While he was a very simple and ordinary man in his tastes and living, he was an extraordinary priest."

"As much as he shunned worldly honors, he had even greater disdain for the world's goods and riches. Once a priest told me that Father Quirk wore the same suit of clothes on the day of his death as he did on the day of his ordination. That was said not in a deragory manner, but rather to emphasize his total disregard for the comforts of this life.

"His rectory was furnished with the bare essentials---table, chair, bed. After all bills pertaining to his estate were paid, there was a balance of $86.55 credited to his estate. Father Quirk was content living in the country and with country folk. We do wish to recognize him as one who gave himself completely to the work he was ordained to do. We cannot depict him laying a healing hand on infected lepers. The only leprosy he healed was the leprosy of sin.

"By the time Thomas Aquinas Quirk reached the end of his earthly sojourn, his most notable accomplishment would be the fact that he lived each day in the service of God's people, doing the things a priest was ordained to do. Father Quirk will hardly ever be credited with any great words or deeds worthy, according to the world's standards, of being transmitted to prosperity. But he will live on in the memories of those whom he served as priest and pastor.

"Father Quirk laughed at fame, prominence, and recognition. He refused promotion to many of the more prominent and larger parishes of the Diocese. When Bishop Swint informed him by letter that he had been honored by Pope Pius XI in consideration of his long years of service to the church he responded in these words: 'I will look at it as throwing honor on an old bag of bones. In a few months I shall be in the 66th year of my priesthood and the 90th year of age, able still to do all the small duties, daily Mass, Sunday appointments, the few sick calls, confessions, funerals. But it is my conclusion that the honors should be bestowed on younger men whose zeal they would stimulate to greater effort. My advanced age nullifies such stimulation.' "

Father Quirk's life at St. Bernard and his other churches wasn't completely peaceful, and some of his parishioners failed to appreciate his holiness and dedication. When he was suspended in 1886 by Bishop John J. Kain, he fought back and was vindicated of any wrongdoing by the Archbishop of Baltimore, later Cardinal James Gibbons. Also when trusteeism caused a dispute within the community. Bishop Donahue placed the parish under interdict (withdrawal of the sacraments) until the whole matter was finally resolved.

Father O'Donovan concluded the homily with a poem by Padraic Pearse:

"Lord I have staked my soul
I have staked the lives
of my kin
On the truth of Thy
dreadful work.
Do not remember
my failures,
But remember this
my faith."

In his comments before the congregation, Father Mueller recalled his years as successor at St. Bernard Church. "The first six years of my priesthood were some of the happiest in my life. The faith and dedication and generosity of the people were unforgettable. I remember that Jim Murray had a little mare that I liked to ride on Sunday afternoons. I heard that he was going to sell it, and I offered to buy it from him if he'd let me keep it on his farm. He told me, 'If you like it so well, I won't sell it.' "

Father Mueller stated that under his pastorship, the church held three annual chicken suppers to raise money to repair the church. "The people donated the chickens and vegetables, cooked and served them, and then they bought the dinners. How could we lose? We made over $1,000 the first year, and that was a lot of money in 1937.

Father McDonald also spoke of his memories of Father Quirk, relating that he had been baptized by the priest. "The first Masses I ever attended were here," he said. "I can remember how Father Quirk said Mass and the distinct manner in which he pronounced his Latin. When Father Quirk preached a sermon, I'm not sure people appreciated it as well as they might have. He used the King's English and all the sermons were true theological dissertations. He was one of the inspirations of my life."

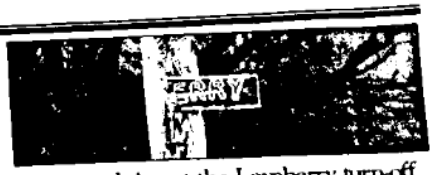
Music for the Memorial Mass was provided by St. Patrick Church Choir, Weston, under the direction of June Foster, with accompaniment by Elizabeth Jones. Marian organ themes before Mass were presented by Nell Feeney. Mary Margaret Hartleroad and Helena McCudden were lectors, with Joseph and James Flesher, altar servers.

Members of the offertory procession and gift bearers included Tom Mullooly, Bill Taylor, Margaret Shea, Mary Ellyson, Mary C. Taylor, Regina Droppleman, Irene Rafferty, Margaret Rafferty, Shirley Flesher, Mr. and Mrs. Thomas Dolan, and Margaret Mullooly. Ushers were Joe Flesher, Joe Wagoner and Jimmy Weber. **(Mary Mazza Hendricks, correspondent)**

FEATURE

stery Of "Loveberry Ridge"

by Joey Herron



Damaged sign at the Loveberry turn-off

Since Valentine's Day occurs in February, I thought it would be appropriate to do a story on "Loveberry Ridge" located in the southern part of Lewis County. I was hoping that the story behind the name would be an appropriate valentine for our readers. Well, to my surprise and dismay, the origin of the name was not to be found. Visions of two lovers walking the ridge and standing on an outcropping of rocks, picking blackberries and whispering sweet nothings to each other danced in my head. This was not to be!


Loveberry Ridge January 1989

Following a few brief conversations, I found that the name had been of interest to many others also. Most of the information that I found dealt with the Catholic Church that sits on the ridge. By the way, a book will be published later this year written by Father O'Donnevan, former priest of St. Patrick's Catholic Church in Weston. Upon conversing with Father O'Donnevan, now living in White Sulphur Springs, he never found the origin of the name either.

By this time my curiosity and the mystery behind the name began to build. I had to see this place for myself!

5 miles south of Weston on Rt. 19, the Copley Road leads its travelers 5.1 miles to the road that turns off and makes its way 2 miles to the top of Loveberry Ridge. My first visit to the ridge was on a day with chilly temperatures and a blue almost cloudless sky. The road up the hill to the church was very steep, winding around, first right, then left to an open area where the St. Bernard Catholic Church stands. The road proceeds on the left side of the church front, with a fork of the road going left, down over the hill, and a right fork going out the ridge; "Loveberry Ridge"! This road ends up on Sassafrass [illegible] to the south-west. Just above the fork in the road stands a wooden cross, probably about 8-10 feet tall, and to the right of it stands the remains of the old rectory and cellar house. When standing next to the ruins, the view out the ridge is tremendous.

At this point, I would like to interject some of my personal feelings about this "place" in Lewis County. I've heard of this place for many years, but had never visited it. This being my first visit, I wanted to take in all I could. I can't exactly explain it, but as I walked around and took pictures, I was overwhelmed with a feeling of uncertainy, not that of concern and worry, but that of being in another world. The woods were filled with "quiet and peacefulness", and the church itself seemed to have an air of "another world" about it.

...The woods were filled with "quiet and peacefulness", and the church itself seemed to have an air of "another world" ...

On my second visit to the ridge, I felt the same things, but even stronger. The graveyard, which lays to the left of the church and runs down the hill to the place where the road tops the hill from below, is surrounded by an iron fence and is filled with "history", as well as those who lived and died in the area. In 1985, St. Bernard


The ruins of the old rectory that sits on the bank above the church.

feast of All Souls Day.
pastor and all who worshipped here."
Roanoke on Memorial D
Msgr. Quirk served as pastor of St. Bernard Parish

Catholic Church was made a National Historic Site, well deserved recognition for this small tract of real estate in Lewis County, West Virginia.

I had remembered from an earlier conversation that the land the church was on was given to it by a real estate company. After some searching through the book "The History of Lewis County", I found that around 1849, the firm of Camden, Bailey, and Camdon, "conveyed to Bishop Francis V. Whelan of the diocese of Wheeling thirty acres on Loveberry Run for building a church and laying out a cemetery." This is the first mention of Loveberry that could be found.

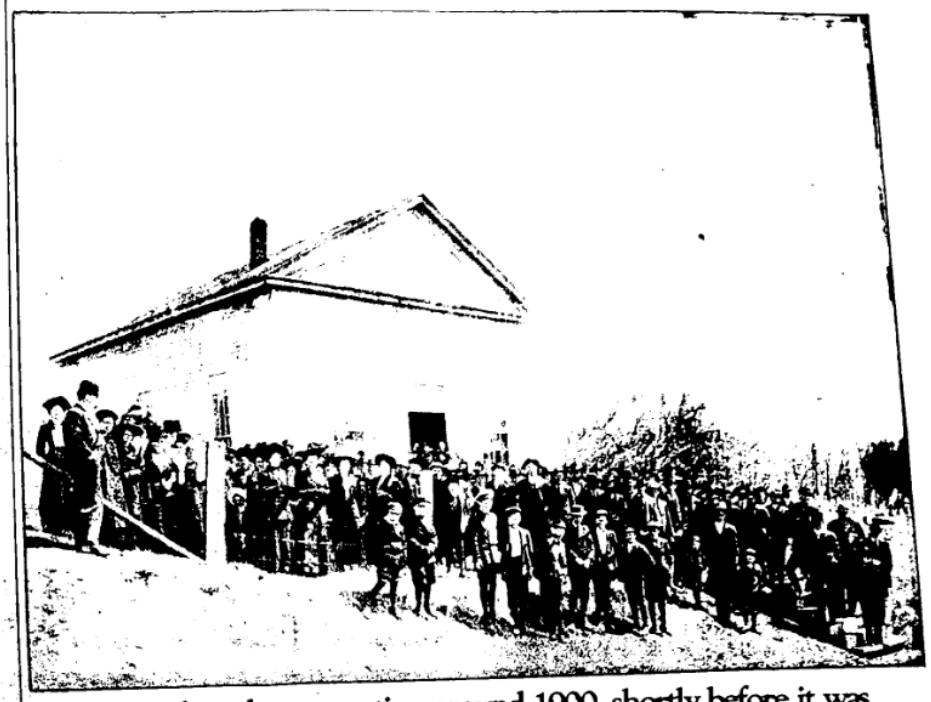
I questioned some of the local residents about the origin of the name, but they were unable to tell me also. One resident, Mrs. Mary Margaret Byrne Donahue, who has lived near Loveberry all her life, did share some interesting stories about a priest of the church who lived there for 50 years. Mrs. Donahue remembered Father Thomas A. Quirk as "a smart kind and good person." She remembered wanting to take her daughter to be baptized by him in 1937, but he couldn't because he was ill from a fall that he had taken which later resulted in his death that September.

Father Quirk on his horse

Father Quirk was well liked by everyone and was "quite a doctor" explained Mrs. Donahue. "He once told me to rub some liquid called Soribe Quadruple on a goiter that I had on my neck. Within a few days it was gone. Another man had been to a number of doctors for a back problem and Father Quirk told him to wash his back with pure cold water a couple times a day; His back was cured!". Many times Father Quirk was seen riding his horse to a couple of missions at Orlando and Goosepen, which he visited regularly. Mrs. Donahue recalls a situation that arose at a home just below the church; "The family had a sick child and they needed milk, but didn't have a cow. Father Quirk gave them a cow so the child could get better." The word "Love" in "Loveberry" was very evident in the life of this priest who gave 50 years of his life on "Loveberry Ridge."

Still, through this conversation and others, the origin of the name "Loveberry Ridge" was not to be found. Although "Loveberry" may not have any romantic meaning and may not seem to have any significance on Valentine's Day, it will have a special meaning to me because it was at this time of year that I became acquainted with the "Mystery of "Loveberry Ridge."

Special Thanks to Mrs.Mary Donahue for the old pictures & her hospitality.



The church and congregation around 1900, shortly before it was replaced by the current St.Bernard Catholic Church on Loveberry Ridge in Lewis County.

St.Bernard Catholic Church today!

Conception; St. John Chapel
Memorial Day, the feast of th
remember in a special way the man who was here as

Appendix D
Technical Preservation Reference Materials

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

Heritage Preservation Services

Preservation Briefs: 9

The Repair of Historic Wooden Windows

John H. Myers

The windows on many historic buildings are an important aspect of the architectural character of those buildings. Their design, craftsmanship, or other qualities may make them worthy of preservation. This is self-evident for ornamental windows, but it can be equally true for warehouses or factories where the windows may be the most dominant visual element of an otherwise plain building (see figure 1). Evaluating the significance of these windows and planning for their repair or replacement can be a complex process involving both objective and subjective considerations. The *Secretary of the Interior's Standards for Rehabilitation*, and the accompanying guidelines, call for respecting the significance of original materials and features, repairing and retaining them wherever possible, and when necessary, replacing them in kind. This **Brief** is based on the issues of significance and repair which are implicit in the standards, but the primary emphasis is on the technical issues of planning for the repair of windows including evaluation of their physical condition, techniques of repair, and design considerations when replacement is necessary.

Figure 1. *Windows are frequently important visual focal points, especially on simple facades such as this mill building. Replacement of the multi-pane windows here with larger panes could dramatically change the appearance of the building. The areas of missing windows convey the impression of such a change. Photo: John T. Lowe*

Much of the technical section presents repair techniques as an instructional guide for the do-it-yourselfer. The information will be useful, however, for the architect, contractor, or developer on large-scale projects. It presents a methodology for approaching the evaluation and repair of existing windows, and considerations for replacement, from which the professional can develop alternatives and specify appropriate materials and procedures.

Architectural or Historical Significance

Evaluating the architectural or historical significance of windows is the first step in planning for window treatments, and a general understanding of the function and history of windows is vital to making a proper evaluation. As a part of this evaluation, one must consider four basic window functions: admitting light to the interior spaces, providing fresh air and ventilation to the interior, providing a visual link to the outside world, and enhancing the appearance of a building. No single factor can be disregarded when planning window treatments; for example, attempting to conserve energy by closing up or reducing the size of window openings may result in the use of *more* energy by increasing electric lighting loads and decreasing passive solar heat gains.

Historically, the first windows in early American houses were casement windows; that is, they were hinged at the side and opened outward. In the beginning of the eighteenth century single- and double-hung windows were introduced. Subsequently many styles of these vertical sliding sash windows have come to be associated with specific building periods or architectural styles, and this is an important consideration in determining the significance of windows, especially on a local or regional basis. Site-specific, regionally oriented architectural comparisons should be made to determine the significance of windows in question. Although such comparisons may focus on specific window types and their details, the ultimate determination of significance should be made within the context of the whole building, wherein the windows are one architectural element (see figure 2).

After all of the factors have been evaluated, *windows should be considered significant to a building if they:* 1) are original, 2) reflect the original design intent for the building, 3) reflect period or regional styles or building practices, 4) reflect changes to the building resulting from major periods or events, or 5) are examples of exceptional craftsmanship or design. Once this evaluation of significance has been completed, it is possible to pro-

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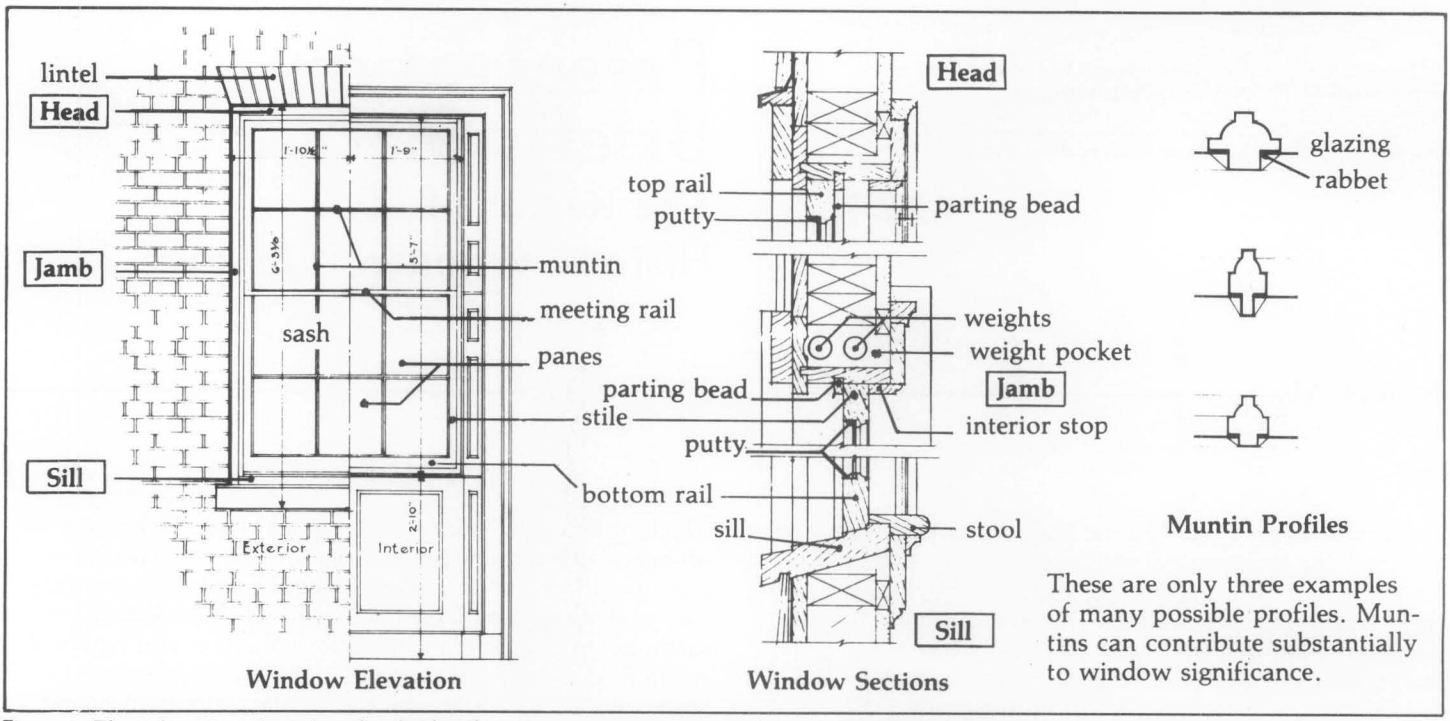

Figure 2. *These drawings of window details identify major components, terminology, and installation details for a wooden double-hung window.*

ceed with planning appropriate treatments, beginning with an investigation of the physical condition of the windows.

Physical Evaluation

The key to successful planning for window treatments is a careful evaluation of existing physical conditions on a unit-by-unit basis. A graphic or photographic system may be devised to record existing conditions and illustrate the scope of any necessary repairs. Another effective tool is a window schedule which lists all of the parts of each window unit. Spaces by each part allow notes on existing conditions and repair instructions. When such a schedule is completed, it indicates the precise tasks to be performed in the repair of each unit and becomes a part of the specifications. In any evaluation, one should note at a minimum, 1) window location, 2) condition of the paint, 3) condition of the frame and sill, 4) condition of the sash (rails, stiles and muntins), 5) glazing problems, 6) hardware, and 7) the overall condition of the window (excellent, fair, poor, and so forth).

Many factors such as poor design, moisture, vandalism, insect attack, and lack of maintenance can contribute to window deterioration, but moisture is the primary contributing factor in wooden window decay. All window units should be inspected to see if water is entering around the edges of the frame and, if so, the joints or seams should be caulked to eliminate this danger. The glazing putty should be checked for cracked, loose, or missing sections which allow water to saturate the wood, especially at the joints. The back putty on the interior side of the pane should also be inspected, because it creates a seal which prevents condensation from running down into the joinery. The sill should be examined to insure that it slopes downward away from the building and allows water to drain off. In addition, it may be advisable to cut a dripline along the underside of the sill. This almost invisible treatment will insure proper water run-off, particularly if the bottom of the sill is flat. Any conditions, including poor original design, which permit water to come in contact with the wood or to puddle on the sill must be corrected as they contribute to deterioration of the window.

One clue to the location of areas of excessive moisture is the condition of the paint; therefore, each window should be examined for areas of paint failure. Since excessive moisture is detrimental to the paint bond, areas of paint blistering, cracking, flaking, and peeling usually identify points of water penetration, moisture saturation, and potential deterioration. Failure of the paint should not, however, be mistakenly interpreted as a sign that the wood is in poor condition and hence, irreparable. Wood is frequently in sound physical condition beneath unsightly paint. After noting areas of paint failure, the next step is to inspect the condition of the wood, particularly at the points identified during the paint examination.

Each window should be examined for operational soundness beginning with the lower portions of the frame and sash. Exterior rainwater and interior condensation can flow downward along the window, entering and collecting at points where the flow is blocked. The sill, joints between the sill and jamb, corners of the bottom rails and muntin joints are typical points where water collects and deterioration begins (see figure 3). The operation of the window (continuous opening and closing over the years and seasonal temperature changes) weakens the joints, causing movement and slight separation. This process makes the joints more vulnerable to water which is readily absorbed into the end-grain of the wood. If severe deterioration exists in these areas, it will usually be apparent on visual inspection, but other less severely deteriorated areas of the wood may be tested by two traditional methods using a small ice pick.

An ice pick or an awl may be used to test wood for soundness. The technique is simply to jab the pick into a wetted wood surface at an angle and pry up a small sec-

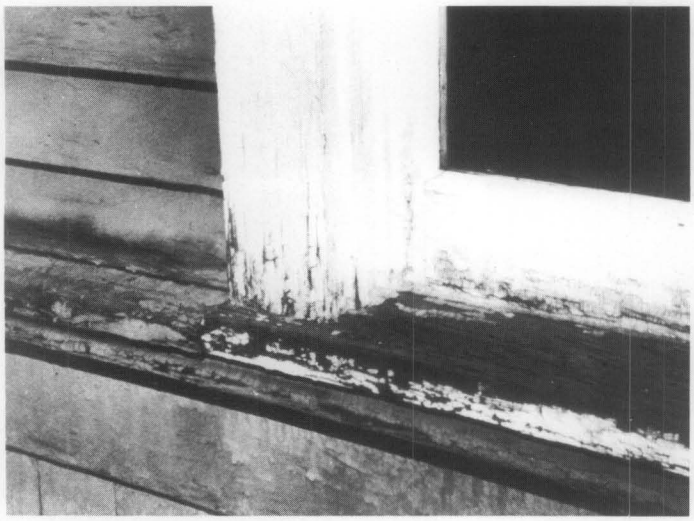

Figure 3. *Deterioration of poorly maintained windows usually begins on horizontal surfaces and at joints where water can collect and saturate the wood. The problem areas are clearly indicated by paint failure due to moisture. Photo: Baird M. Smith, AIA*

tion of the wood. Sound wood will separate in long fibrous splinters, but decayed wood will lift up in short irregular pieces due to the breakdown of fiber strength.

Another method of testing for soundness consists of pushing a sharp object into the wood, perpendicular to the surface. If deterioration has begun from the hidden side of a member and the core is badly decayed, the visible surface may appear to be sound wood. Pressure on the probe can force it through an apparently sound skin to penetrate deeply into decayed wood. This technique is especially useful for checking sills where visual access to the underside is restricted.

Following the inspection and analysis of the results, the scope of the necessary repairs will be evident and a plan for the rehabilitation can be formulated. Generally the actions necessary to return a window to "like new" condition will fall into three broad categories: 1) routine maintenance procedures, 2) structural stabilization, and 3) parts replacement. These categories will be discussed in the following sections and will be referred to respectively as Repair Class I, Repair Class II, and Repair Class III. Each successive repair class represents an increasing level of difficulty, expense, and work time. Note that most of the points mentioned in Repair Class I are routine maintenance items and should be provided in a regular maintenance program for any building. The neglect of these routine items can contribute to many common window problems.

Before undertaking any of the repairs mentioned in the following sections all sources of moisture penetration should be identified and eliminated, and all existing decay fungi destroyed in order to arrest the deterioration process. Many commercially available fungicides and wood preservatives are toxic, so it is extremely important to follow the manufacturer's recommendations for application, and store all chemical materials away from children and animals. After fungicidal and preservative treatment the windows may be stabilized, retained, and restored with every expectation for a long service life.

Repair Class I: Routine Maintenance

Repairs to wooden windows are usually labor intensive and relatively uncomplicated. On small scale projects this allows the do-it-yourselfer to save money by repairing all or part of the windows. On larger projects it presents the opportunity for time and money which might otherwise be spent on the removal and replacement of existing windows, to be spent on repairs, subsequently saving all or part of the material cost of new window units. Regardless of the actual costs, or who performs the work, the evaluation process described earlier will provide the knowledge from which to specify an appropriate work program, establish the work element priorities, and identify the level of skill needed by the labor force.

The routine maintenance required to upgrade a window to "like new" condition normally includes the following steps: 1) some degree of interior and exterior paint removal, 2) removal and repair of sash (including reglazing where necessary), 3) repairs to the frame, 4) weatherstripping and reinstallation of the sash, and 5) repainting. These operations are illustrated for a typical double-hung wooden window (see figures 4a-f), but they may be adapted to other window types and styles as applicable.

Historic windows have usually acquired many layers of paint over time. Removal of excess layers or peeling and flaking paint will facilitate operation of the window and restore the clarity of the original detailing. Some degree of paint removal is also necessary as a first step in the proper surface preparation for subsequent refinishing (if paint color analysis is desired, it should be conducted prior to the onset of the paint removal). There are several safe and effective techniques for removing paint from wood, depending on the amount of paint to be removed. Several techniques such as scraping, chemical stripping, and the use of a hot air gun are discussed in "Preservation Briefs: 10 Paint Removal from Historic Woodwork" (see Additional Reading section at end).

Paint removal should begin on the interior frames, being careful to remove the paint from the interior stop and the parting bead, particularly along the seam where these stops meet the jamb. This can be accomplished by running a utility knife along the length of the seam, breaking the paint bond. It will then be much easier to remove the stop, the parting bead and the sash. The interior stop may be initially loosened from the sash side to avoid visible scarring of the wood and then gradually pried loose using a pair of putty knives, working up and down the stop in small increments (see figure 4b). With the stop removed, the lower or interior sash may be withdrawn. The sash cords should be detached from the sides of the sash and their ends may be pinned with a nail or tied in a knot to prevent them from falling into the weight pocket.

Removal of the upper sash on double-hung units is similar but the parting bead which holds it in place is set into a groove in the center of the stile and is thinner and more delicate than the interior stop. After removing any paint along the seam, the parting bead should be carefully pried out and worked free in the same manner as the interior stop. The upper sash can be removed in the same manner as the lower one and both sash taken to a convenient work area (in order to remove the sash the interior stop and parting bead need only be removed from one side of the window). Window openings can be covered with polyethylene sheets or plywood sheathing while the sash are out for repair.

The sash can be stripped of paint using appropriate techniques, but if any heat treatment is used (see figure 4c), the glass should be removed or protected from the sudden temperature change which can cause breakage. An

Figure 4a. *The following series of photographs of the repair of a historic double-hung window use a unit which is structurally sound but has many layers of paint, some cracked and missing putty, slight separation at the joints, broken sash cords, and one cracked pane. Photo: John H. Myers*

Figure 4b. *After removing paint from the seam between the interior stop and the jamb, the stop can be pried out and gradually worked loose using a pair of putty knives as shown. To avoid visible scarring of the wood, the sash can be raised and the stop pried loose initially from the outer side. Photo: John H. Myers*

Figure 4c. *Sash can be removed and repaired in a convenient work area. Paint is being removed from this sash with a hot air gun while an asbestos sheet protects the glass from sudden temperature change. Photo: John H. Myers*

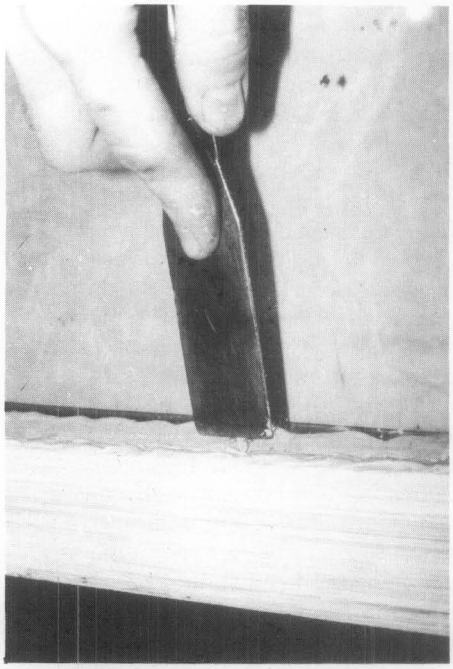

Figure 4d. *Reglazing or replacement of the putty requires that the existing putty be removed manually, the glazing points be extracted, the glass removed, and the back putty scraped out. To reglaze, a bed of putty is laid around the perimeter of the rabbet, the pane is pressed into place, glazing points are inserted to hold the pane (shown), and a final seal of putty is beveled around the edge of the glass. Photo: John H. Myers*

Figure 4e. *A common repair is the replacement of broken sash cords with new cords (shown) or with chains. The weight pocket is often accessible through a removable plate in the jamb, or by removing the interior trim. Photo: John H. Myers*

Figure 4f. *Following the relatively simple repairs, the window is weathertight, like new in appearance, and serviceable for many years to come. Both the historic material and the detailing and craftsmanship of this original window have been preserved. Photo: John H. Myers*

overlay of aluminum foil on gypsum board or asbestos can protect the glass from such rapid temperature change. It is important to protect the glass because it may be historic and often adds character to the window. Deteriorated putty should be removed manually, taking care not to damage the wood along the rabbet. If the glass is to be removed, the glazing points which hold the glass in place can be extracted and the panes numbered and removed for cleaning and reuse in the same openings. With the glass panes out, the remaining putty can be removed and the sash can be sanded, patched, and primed with a preservative primer. Hardened putty in the rabbets may be softened by heating with a soldering iron at the point of removal. Putty remaining on the glass may be softened by soaking the panes in linseed oil, and then removed with less risk of breaking the glass. Before reinstalling the glass, a bead of glazing compound or linseed oil putty should be laid around the rabbet to cushion and seal the glass. Glazing compound should only be used on wood which has been brushed with linseed oil and primed with an oil based primer or paint. The pane is then pressed into place and the glazing points are pushed into the wood around the perimeter of the pane (see figure 4d). The final glazing compound or putty is applied and beveled to complete the seal. The sash can be refinished as desired on the inside and painted on the outside as soon as a "skin" has formed on the putty, usually in 2 or 3 days. Exterior paint should cover the beveled glazing compound or putty and lap over onto the glass slightly to complete a weathertight seal. After the proper curing times have elapsed for paint and putty, the sash will be ready for reinstallation.

While the sash are out of the frame, the condition of the wood in the jamb and sill can be evaluated. Repair and refinishing of the frame may proceed concurrently with repairs to the sash, taking advantage of the curing times for the paints and putty used on the sash. One of the most common work items is the replacement of the sash cords with new rope cords or with chains (see figure 4e). The weight pocket is frequently accessible through a door on the face of the frame near the sill, but if no door exists, the trim on the interior face may be removed for access. Sash weights may be increased for easier window operation by elderly or handicapped persons. Additional repairs to the frame and sash may include consolidation or replacement of deteriorated wood. Techniques for these repairs are discussed in the following sections.

The operations just discussed summarize the efforts necessary to restore a window with minor deterioration to "like new" condition (see figure 4f). The techniques can be applied by an unskilled person with minimal training and experience. To demonstrate the practicality of this approach, and photograph it, a Technical Preservation Services staff member repaired a wooden double-hung, two over two window which had been in service over ninety years. The wood was structurally sound but the window had one broken pane, many layers of paint, broken sash cords and inadequate, worn-out weatherstripping. The staff member found that the frame could be stripped of paint and the sash removed quite easily. Paint, putty and glass removal required about one hour for each sash, and the reglazing of both sash was accomplished in about one hour. Weatherstripping of the sash and frame, replacement of the sash cords and reinstallation of the sash, parting bead, and stop required an hour and a half. These times refer only to individual operations; the entire process took several days due to the drying and curing times for putty, primer, and paint, however, work on other window units could have been in progress during these lag times.

Repair Class II: Stabilization

The preceding description of a window repair job focused on a unit which was operationally sound. Many windows will show some additional degree of physical deterioration, especially in the vulnerable areas mentioned earlier, but even badly damaged windows can be repaired using simple processes. Partially decayed wood can be waterproofed, patched, built-up, or consolidated and then painted to achieve a sound condition, good appearance, and greatly extended life. Three techniques for repairing partially decayed or weathered wood are discussed in this section, and all three can be accomplished using products available at most hardware stores.

One established technique for repairing wood which is split, checked or shows signs of rot, is to: 1) dry the wood, 2) treat decayed areas with a fungicide, 3) waterproof with two or three applications of boiled linseed oil (applications every 24 hours), 4) fill cracks and holes with putty, and 5) after a "skin" forms on the putty, paint the surface. Care should be taken with the use of fungicide which is toxic. Follow the manufacturers' directions and use only on areas which will be painted. When using any technique of building up or patching a flat surface, the finished surface should be sloped slightly to carry water away from the window and not allow it to puddle. Caulking of the joints between the sill and the jamb will help reduce further water penetration.

When sills or other members exhibit surface weathering they may also be built-up using wood putties or homemade mixtures such as sawdust and resorcinol glue, or whiting and varnish. These mixtures can be built up in successive layers, then sanded, primed, and painted. The same caution about proper slope for flat surfaces applies to this technique.

Wood may also be strengthened and stabilized by consolidation, using semi-rigid epoxies which saturate the porous decayed wood and then harden. The surface of the consolidated wood can then be filled with a semi-rigid epoxy patching compound, sanded and painted (see figure 5). Epoxy patching compounds can be used to build up

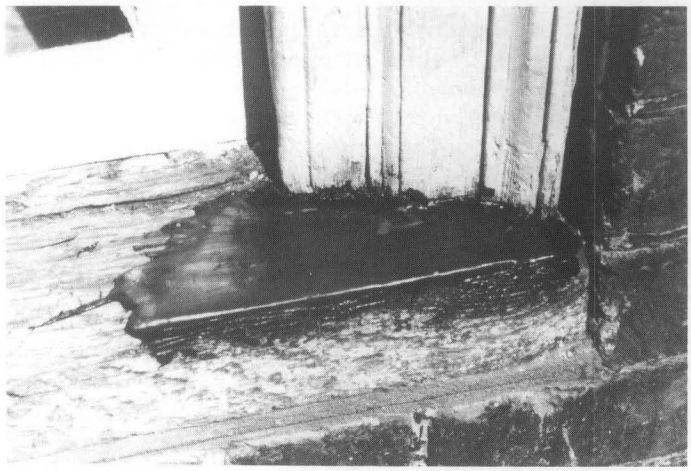

Figure 5. *This illustrates a two-part epoxy patching compound used to fill the surface of a weathered sill and rebuild the missing edge. When the epoxy cures, it can be sanded smooth and painted to achieve a durable and waterproof repair. Photo: John H. Myers*

missing sections or decayed ends of members. Profiles can be duplicated using hand molds, which are created by pressing a ball of patching compound over a sound section of the profile which has been rubbed with butcher's wax. This can be a very efficient technique where there are many typical repairs to be done. Technical Preservation Services has published *Epoxies for Wood Repairs in Historic Buildings* (see Additional Reading section at end), which discusses the theory and techniques of epoxy repairs. The process has been widely used and proven in marine applications; and proprietary products are available at hardware and marine supply stores. Although epoxy materials may be comparatively expensive, they hold the promise of being among the most durable and long lasting materials available for wood repair.

Any of the three techniques discussed can stabilize and restore the appearance of the window unit. There are times, however, when the degree of deterioration is so advanced that stabilization is impractical, and the only way to retain some of the original fabric is to replace damaged parts.

Repair Class III: Splices and Parts Replacement

When parts of the frame or sash are so badly deteriorated that they cannot be stabilized there are methods which permit the retention of some of the existing or original fabric. These methods involve replacing the deteriorated parts with new matching pieces, or splicing new wood into existing members. The techniques require more skill and are more expensive than any of the previously discussed alternatives. It is necessary to remove the sash and/or the affected parts of the frame and have a carpenter or woodworking mill reproduce the damaged or missing parts. Most millwork firms can duplicate parts, such as muntins, bottom rails, or sills, which can then be incorporated into the existing window, but it may be necessary to shop around because there are several factors controlling the practicality of this approach. Some woodworking mills do not like to repair old sash because nails or other foreign objects in the sash can damage expensive knives (which cost far more than their profits on small repair jobs); others do not have cutting knives to duplicate muntin profiles. Some firms prefer to concentrate on larger jobs with more profit potential, and some may not have a craftsman who can duplicate the parts. A little searching should locate a firm which will do the job, and at a reasonable price. If such a firm does not exist locally, there are firms which undertake this kind of repair and ship nationwide. It is possible, however, for the advanced do-it-yourselfer or craftsman with a table saw to duplicate moulding profiles using techniques discussed by Gordie Whittington in "Simplified Methods for Reproducing Wood Mouldings," *Bulletin* of the Association for Preservation Technology, Vol. III, No. 4, 1971, or illustrated more recently in *The Old House*, Time-Life Books, Alexandria, Virginia, 1979.

The repairs discussed in this section involve window frames which may be in very deteriorated condition, possibly requiring removal; therefore, caution is in order. The actual construction of wooden window frames and sash is not complicated. Pegged mortise and tenon units can be disassembled easily, *if* the units are out of the building. The installation or connection of some frames to the surrounding structure, especially masonry walls, can complicate the work immeasurably, and may even require dismantling of the wall. It may be useful, therefore, to take the following approach to frame repair: 1) conduct regular maintenance of sound frames to achieve the longest life possible, 2) make necessary repairs in place wherever possible, using stabilization and splicing techniques, and 3) if removal is necessary, thoroughly investigate the structural detailing and seek appropriate professional consultation.

Another alternative may be considered if parts replacement is required, and that is sash replacement. If extensive replacement of parts is necessary and the job becomes prohibitively expensive it may be more practical to purchase new sash which can be installed into the existing frames. Such sash are available as exact custom reproductions, reasonable facsimiles (custom windows with similar profiles), and contemporary wooden sash which are similar in appearance. There are companies which still manufacture high quality wooden sash which would duplicate most historic sash. A few calls to local building suppliers may provide a source of appropriate replacement sash, but if not, check with local historical associations, the state historic preservation office, or preservation related magazines and supply catalogs for information.

If a rehabilitation project has a large number of windows such as a commercial building or an industrial complex, there may be less of a problem arriving at a solution. Once the evaluation of the windows is completed and the scope of the work is known, there may be a potential economy of scale. Woodworking mills may be interested in the work from a large project; new sash in volume may be considerably less expensive per unit; crews can be assembled and trained on site to perform all of the window repairs; and a few extensive repairs can be absorbed (without undue burden) into the total budget for a large number of sound windows. While it may be expensive for the average historic home owner to pay seventy dollars or more for a mill to grind a custom knife to duplicate four or five bad muntins, that cost becomes negligible on large commercial projects which may have several hundred windows.

Most windows should not require the extensive repairs discussed in this section. The ones which do are usually in buildings which have been abandoned for long periods or have totally lacked maintenance for years. It is necessary to thoroughly investigate the alternatives for windows which do require extensive repairs to arrive at a solution which retains historic significance and is also economically feasible. Even for projects requiring repairs identified in this section, if the percentage of parts replacement per window is low, or the number of windows requiring repair is small, repair can still be a cost effective solution.

Weatherization

A window which is repaired should be made as energy efficient as possible by the use of appropriate weatherstripping to reduce air infiltration. A wide variety of products are available to assist in this task. Felt may be fastened to the top, bottom, and meeting rails, but may have the disadvantage of absorbing and holding moisture, particularly at the bottom rail. Rolled vinyl strips may also be tacked into place in appropriate locations to reduce infiltration. Metal strips or new plastic spring strips may be used on the rails and, if space permits, in

the channels between the sash and jamb. Weatherstripping is a historic treatment, but old weatherstripping (felt) is not likely to perform very satisfactorily. Appropriate contemporary weatherstripping should be considered an integral part of the repair process for windows. The use of sash locks installed on the meeting rail will insure that the sash are kept tightly closed so that the weatherstripping will function more effectively to reduce infiltration. Although such locks will not always be historically accurate, they will usually be viewed as an acceptable contemporary modification in the interest of improved thermal performance.

Many styles of storm windows are available to improve the thermal performance of existing windows. The use of exterior storm windows should be investigated whenever feasible because they are thermally efficient, cost-effective, reversible, and allow the retention of original windows (see "Preservation Briefs: 3"). Storm window frames may be made of wood, aluminum, vinyl, or plastic; however, the use of unfinished aluminum storms should be avoided. The visual impact of storms may be minimized by selecting colors which match existing trim color. Arched top storms are available for windows with special shapes. Although interior storm windows appear to offer an attractive option for achieving double glazing with minimal visual impact, the potential for damaging condensation problems must be addressed. Moisture which becomes trapped between the layers of glazing can condense on the colder, outer prime window, potentially leading to deterioration. The correct approach to using interior storms is to create a seal on the interior storm while allowing some ventilation around the prime window. In actual practice, the creation of such a durable, airtight seal is difficult.

Window Replacement

Although the retention of original or existing windows is always desirable and this **Brief** is intended to encourage that goal, there is a point when the condition of a window may clearly indicate replacement. The decision process for selecting replacement windows should *not* begin with a survey of contemporary window products which are available as replacements, but should begin with a look at the windows which are being replaced. Attempt to understand the contribution of the window(s) to the appearance of the facade including: 1) the pattern of the openings and their size; 2) proportions of the frame and sash; 3) configuration of window panes; 4) muntin profiles; 5) type of wood; 6) paint color; 7) characteristics of the glass; and 8) associated details such as arched tops, hoods, or other decorative elements. Develop an understanding of how the window reflects the period, style, or regional characteristics of the building, or represents technological development.

Armed with an awareness of the significance of the existing window, begin to search for a replacement which retains as much of the character of the historic window as possible. There are many sources of suitable new windows. Continue looking until an acceptable replacement can be found. Check building supply firms, local woodworking mills, carpenters, preservation oriented magazines, or catalogs or suppliers of old building materials, for product information. Local historical associations and state historic preservation offices may be good sources of information on products which have been used successfully in preservation projects.

Consider energy efficiency as one of the factors for replacements, but do not let it dominate the issue. Energy conservation is no excuse for the wholesale destruction of historic windows which can be made thermally efficient by historically and aesthetically acceptable means. In fact, a historic wooden window with a high quality storm window added should thermally outperform a new double-glazed metal window which does not have thermal breaks (insulation between the inner and outer frames intended to break the path of heat flow). This occurs because the wood has far better insulating value than the metal, and in addition many historic windows have high ratios of wood to glass, thus reducing the area of highest heat transfer. One measure of heat transfer is the U-value, the number of Btu's per hour transferred through a square foot of material. When comparing thermal performance, the lower the U-value the better the performance. According to *ASHRAE 1977 Fundamentals*, the U-values for single glazed wooden windows range from 0.88 to 0.99. The addition of a storm window should reduce these figures to a range of 0.44 to 0.49. A non-thermal break, double-glazed metal window has a U-value of about 0.6.

Conclusion

Technical Preservation Services recommends the retention and repair of original windows whenever possible. We believe that the repair and weatherization of existing wooden windows is more practical than most people realize, and that many windows are unfortunately replaced because of a lack of awareness of techniques for evaluation, repair, and weatherization. Wooden windows which are repaired and properly maintained will have greatly extended service lives while contributing to the historic character of the building. Thus, an important element of a building's significance will have been preserved for the future.

Additional Reading

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1981

10 PRESERVATION BRIEFS

Exterior Paint Problems on Historic Woodwork

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

Heritage Preservation Services

A cautionary approach to paint removal is included in the guidelines to "The Secretary of the Interior Standards for Historic Preservation Projects." Removing paints down to bare wood surfaces using harsh methods can permanently damage those surfaces; therefore such methods are not recommended. Also, total removal obliterates evidence of the historical paints and their sequence and architectural context.

This Brief expands on that advice for the architect, building manager, contractor, or homeowner by identifying and describing common types of paint surface conditions and failures, then recommending appropriate treatments for preparing exterior wood surfaces for repainting[1] to assure the best adhesion and greatest durability of the new paint. Although the Brief focuses on responsible methods of "paint removal," several paint surface conditions will be described which do not require any paint removal, and still others which can be successfully handled by limited paint removal. In all cases, the information is intended to address the concerns related to *exterior wood.* It will also be generally assumed that, because houses built before 1950 involve one or more layers of lead-base paint,[2] the majority of conditions warranting paint removal will mean dealing with this toxic substance along with the dangers of the paint removal tools and chemical strippers themselves.

Purposes of Exterior Paint

Paint[3] applied to exterior wood must withstand yearly extremes of both temperature and humidity. While never expected to be more than a temporary physical shield—requiring re-application every 5-8 years—its importance should not be minimized. Because one of the main causes of wood deterioration is moisture penetration, a primary purpose for painting wood is to exclude such moisture, thereby slowing deterioration not only of a building's exterior siding and decorative features but, ultimately, its underlying structural members. Another important purpose for painting wood is, of course, to define and accent architectural features and to improve appearance.

Treating Paint Problems in Historic Buildings

Exterior paint is constantly deteriorating through the processes of weathering, but in a program of regular maintenance—assuming all other building systems are functioning properly—surfaces can be cleaned, lightly scraped, and hand sanded in preparation for a new finish coat. Unfortunately, these are ideal conditions. More often, complex maintenance problems are inherited by owners of historic buildings, including areas of paint that have failed[4] beyond the point of mere cleaning, scraping, and hand sanding (although much so-called "paint failure" is attributable to interior or exterior moisture problems or surface preparation and application mistakes with previous coats).

Although paint problems are by no means unique to historic buildings, treating multiple layers of hardened, brittle paint on complex, ornamental—and possibly fragile—exterior wood surfaces necessarily requires an extremely cautious approach (see figure 1). In the case of recent construction, this level of concern is not needed because the wood is generally less detailed and, in addition, retention of the sequence of paint layers as a partial record of the building's history is not an issue.

When historic buildings are involved, however, a special set of problems arises—varying in complexity depending upon their age, architectural style, historical importance, and physical soundness of the wood—which must be carefully evaluated so that decisions can be made that are sensitive to the longevity of the resource.

Justification for Paint Removal

At the outset of this Brief, it must be emphasized that removing paint from historic buildings—with the exception of cleaning, light scraping, and hand sanding as part of routine maintenance—should be avoided unless absolutely essential. *Once conditions warranting removal have*

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[1] General paint type recommendations will be made, but paint color recommendations are beyond the scope of this Brief.

[2] Douglas R. Shier and William Hall, *Analysis of Housing Data Collected in a Lead-Based Paint Survey in Pittsburgh, Pennsylvania, Part 1,* National Bureau of Standards, Inter-Report 77-1250, May 1977.

[3] Any pigmented liquid, liquefiable, or mastic composition designed for application to a substrate in a thin layer which is converted to an opaque solid film after application. *Paint and Coatings Dictionary,* 1978. Federation of Societies for Coatings and Technology.

[4] For purposes of the Brief, this includes any area of painted exterior woodwork displaying signs of peeling, cracking, or alligatoring to bare wood. See descriptions of these and other paint surface conditions as well as recommended treatments on pp. 5-10.

Fig. 1 *Excessive paint build-up on architectural details such as this ornamental bracket does not in itself justify total paint removal. If paint is cracked and peeling down to bare wood, however, it should be removed using the gentlest means possible. Photo: David W. Look, AIA.*

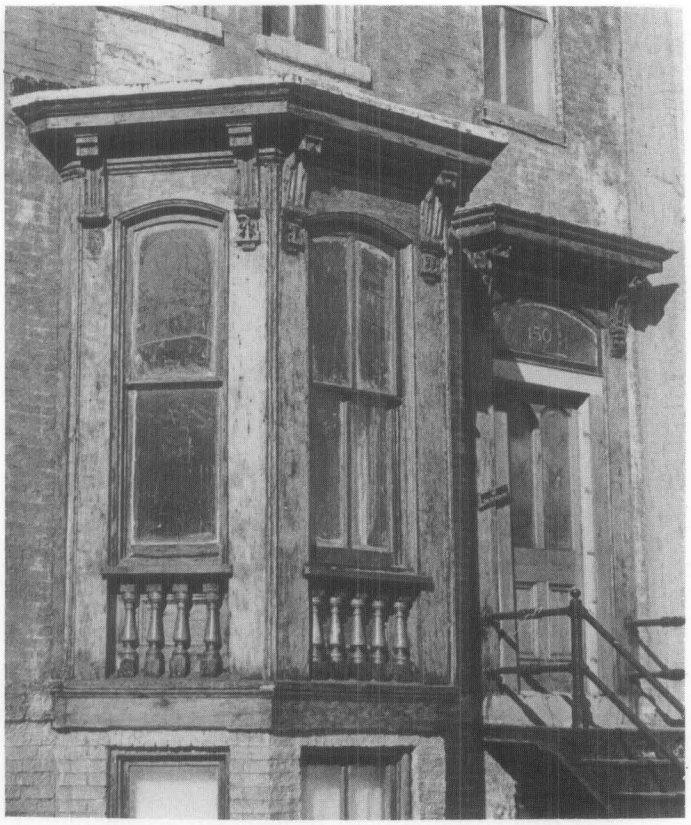

Fig. 2 *A traditionally painted bay window has been stripped to bare wood, then varnished. In addition to being historically inaccurate, the varnish will break down faster as a result of the sun's ultraviolet rays than would primer and finish coats of paint. Photo: David W. Look, AIA.*

been identified, the general approach should be to remove paint to the next sound layer using the gentlest means possible, then to repaint (see figure 2). Practically speaking as well, paint can adhere just as effectively to existing paint as to bare wood, providing the previous coats of paint are also adhering uniformly and tightly to the wood and the surface is properly prepared for repainting—cleaned of dirt and chalk and dulled by sanding. But, if painted exterior wood surfaces display continuous patterns of deep cracks or if they are extensively blistering and peeling so that bare wood is visible, then the old paint should be completely removed before repainting. The only other justification for removing all previous layers of paint is if doors, shutters, or windows have literally been "painted shut," or if new wood is being pieced-in adjacent to old painted wood and a smooth transition is desired (see figure 3).

Paint Removal Precautions

Because paint removal is a difficult and painstaking process, a number of costly, regrettable experiences have occurred—and continue to occur—for both the historic building and the building owner. Historic buildings have been set on fire with blow torches; wood irreversibly scarred by sandblasting or by harsh mechanical devices such as rotary sanders and rotary wire strippers; and layers of historic paint inadvertently and unnecessarily removed. In addition, property owners, using techniques that substitute speed for safety, have been injured by toxic lead vapors or dust from the paint they were trying to remove or by misuse of the paint removers themselves.

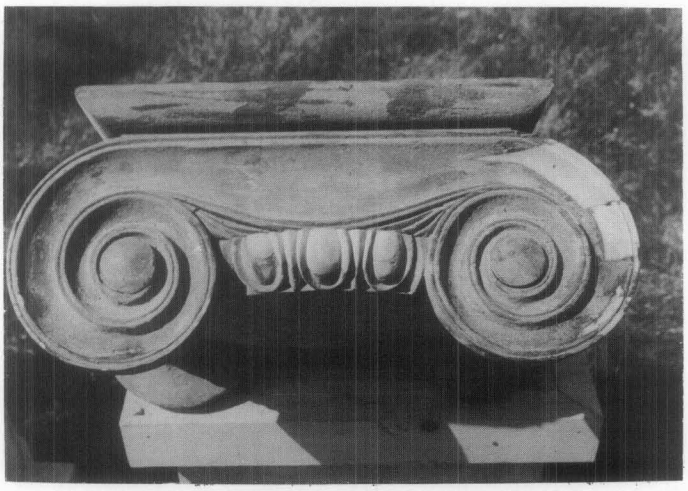

Fig. 3 *If damage to parts of a wooden element is severe, new sections of wood will need to be pieced-in. When such piecing is required, paint on the adjacent woodwork should be removed so that the old and new woods will make a smooth profile when joined. After repainting, the repair should be virtually impossible to detect. Photo: Morgan W. Phillips.*

Owners of historic properties considering paint removal should also be aware of the amount of time and labor involved. While removing damaged layers of paint from a door or porch railing might be readily accomplished within a reasonable period of time by one or two people, removing paint from larger areas of a building can, with-

out professional assistance, easily become unmanageable and produce less than satisfactory results. The amount of work involved in any paint removal project must therefore be analyzed on a case-by-case basis. Hiring qualified professionals will often be a cost-effective decision due to the expense of materials, the special equipment required, and the amount of time involved. Further, paint removal companies experienced in dealing with the inherent health and safety dangers of paint removal should have purchased such protective devices as are needed to mitigate any dangers and should also be aware of State or local environmental and/or health regulations for hazardous waste disposal.

All in all, paint removal is a messy, expensive, and potentially dangerous aspect of rehabilitating or restoring historic buildings and should not be undertaken without careful thought concerning first, its necessity, and second, which of the available recommended methods is the safest and most appropriate for the job at hand.

Repainting Historic Buildings for Cosmetic Reasons

If existing exterior paint on wood siding, eaves, window sills, sash, and shutters, doors, and decorative features shows no evidence of paint deterioration such as chalking, blistering, peeling, or cracking, then there is no *physical reason* to repaint, much less remove paint! Nor is color fading, of itself, sufficient justification to repaint a historic building.

The decision to repaint may not be based altogether on paint failure. Where there is a new owner, or even where ownership has remained constant through the years, taste in colors often changes. Therefore, if repainting is primarily to alter a building's primary and accent colors, a technical factor of paint accumulation should be taken into consideration. When paint builds up to a thickness of approximately 1/16" (approximately 16-30 layers), one or more extra coats of paint may be enough to trigger cracking and peeling in limited or even widespread areas of the building's surface. This results because excessively thick paint is less able to withstand the shrinkage or pull of an additional coat as it dries and is also less able to tolerate thermal stresses. Thick paint invariably fails at the weakest point of adhesion—the oldest layers next to the wood. Cracking and peeling follow. Therefore, if there are no signs of paint failure, it may be somewhat risky to add still another layer of unneeded paint simply for color's sake (extreme changes in color may also require more than one coat to provide proper hiding power and full color). When paint appears to be nearing the critical thickness, a change of accent colors (that is, just to limited portions of the trim) might be an acceptable compromise without chancing cracking and peeling of paint on wooden siding.

If the decision to repaint is nonetheless made, the "new" color or colors should, at a minimum, be appropriate to the style and setting of the building. On the other hand, where the intent is to restore or accurately reproduce the colors originally used or those from a significant period in the building's evolution, they should be based on the results of a paint analysis.[5]

Identification of Exterior Paint Surface Conditions/Recommended Treatments

It is assumed that a preliminary check will already have been made to determine, first, that the painted exterior surfaces are indeed wood—and not stucco, metal, or other wood substitutes—and second, that the wood has not decayed so that repainting would be superfluous. For example, if any area of bare wood such as window sills has been exposed for a long period of time to standing water, wood rot is a strong possibility (see figure 4). Repair or replacement of deteriorated wood should take place before repainting. After these two basic issues have been resolved, the surface condition identification process may commence.

The historic building will undoubtedly exhibit a variety of exterior paint surface conditions. For example, paint on the wooden siding and doors may be adhering firmly; paint on the eaves peeling; and paint on the porch balusters and window sills cracking and alligatoring. The accurate identification of each paint problem is therefore the first step in planning an appropriate overall solution.

Paint surface conditions can be grouped according to their relative severity: CLASS I conditions include minor blemishes or dirt collection and generally require *no* paint removal; CLASS II conditions include failure of the top layer or layers of paint and generally require *limited* paint removal; and CLASS III conditions include substantial or multiple-layer failure and generally require *total* paint removal. It is precisely because conditions will vary at different points on the building that a careful inspection is critical. Each item of painted exterior woodwork (i.e., siding, doors, windows, eaves, shutters, and decorative elements) should be examined early in the planning phase and surface conditions noted.

CLASS I Exterior Surface Conditions Generally Requiring No Paint Removal

- **Dirt, Soot, Pollution, Cobwebs, Insect Cocoons, etc.**

Cause of Condition

Environmental "grime" or organic matter that tends to cling to painted exterior surfaces and, in particular, protected surfaces such as eaves, do not constitute a paint problem unless painted over rather than removed prior to repainting. If not removed, the surface deposits can be a barrier to proper adhesion and cause peeling.

Recommended Treatment

Most surface matter can be loosened by a strong, direct stream of water from the nozzle of a garden hose. Stubborn dirt and soot will need to be scrubbed off using ½ cup of household detergent in a gallon of water with a medium soft bristle brush. The cleaned surface should then be rinsed thoroughly, and permitted to dry before further inspection to determine if repainting is necessary. Quite often, cleaning provides a satisfactory enough result to postpone repainting.

[5] See the Reading List for paint research and documentation information. See also *The Secretary of the Interior's Standards for Historic Preservation Projects with Guidelines for Applying the Standards* for recommended approaches on paints and finishes within various types of project work treatments.

- **Mildew**

Cause of Condition

Mildew is caused by fungi feeding on nutrients contained in the paint film or on dirt adhering to any surface. Because moisture is the single most important factor in its growth, mildew tends to thrive in areas where dampness and lack of sunshine are problems such as window sills, under eaves, around gutters and downspouts, on the north side of buildings, or in shaded areas near shrubbery. It may sometimes be difficult to distinguish mildew from dirt, but there is a simple test to differentiate: if a drop of household bleach is placed on the suspected surface, mildew will immediately turn white whereas dirt will continue to look like dirt.

Recommended Treatment

Because mildew can only exist in shady, warm, moist areas, attention should be given to altering the environment that is conducive to fungal growth. The area in question may be shaded by trees which need to be pruned back to allow sunlight to strike the building; or may lack rain gutters or proper drainage at the base of the building. If the shady or moist conditions can be altered, the mildew is less likely to reappear. A recommend solution for removing mildew consists of one cup non-ammoniated detergent, one quart household bleach, and one gallon water. When the surface is scrubbed with this solution using a medium soft brush, the mildew should disappear; however, for particularly stubborn spots, an additional quart of bleach may be added. After the area is mildew-free, it should then be rinsed with a direct stream of water from the nozzle of a garden hose, and permitted to dry thoroughly. When repainting, specially formulated "mildew-resistant" primer and finish coats should be used.

- **Excessive Chalking**

Cause of Condition

Chalking—or powdering of the paint surface—is caused by the gradual disintegration of the resin in the paint film. (The amount of chalking is determined both by the formulation of the paint and the amount of ultraviolet light to which the paint is exposed.) In moderation, chalking is the ideal way for a paint to "age," because the chalk, when rinsed by rainwater, carries discoloration and dirt away with it and thus provides an ideal surface for repainting. In excess, however, it is not desirable because the chalk can wash down onto a surface of a different color beneath the painted area and cause streaking as well as rapid disintegration of the paint film itself. Also, if a paint contains too much pigment for the amount of binder (as the old white lead carbonate/oil paints often did), excessive chalking can result.

Recommended Treatment

The chalk should be cleaned off with a solution of ½ cup household detergent to one gallon water, using a medium soft bristle brush. After scrubbing to remove the chalk, the surface should be rinsed with a direct stream of water from the nozzle of a garden hose, allowed to dry thoroughly, (but not long enough for the chalking process to recur) and repainted, using a non-chalking paint.

- **Staining**

Cause of Condition

Staining of paint coatings usually results from excess moisture reacting with materials within the wood substrate. There are two common types of staining, neither of which requires paint removal. The most prevalent type of stain is due to the oxidation or rusting of iron nails or metal (iron, steel, or copper) anchorage devices. A second type of stain is caused by a chemical reaction between moisture and natural extractives in certain woods (red cedar or redwood) which results in a surface deposit of colored matter. This is most apt to occur in new replacement wood within the first 10-15 years.

Fig. 4 *Paint films wear unevenly depending on exposure and location. Exterior locations which are susceptible to accelerated deterioration are horizontal surfaces such as window sills. These and similar areas will require repainting more often than less vulnerable surfaces. In the case of this window sill where paint has peeled off and adjacent areas have cracked and alligatored, the paint should be totally removed. Prior to repainting, any weathered wood should be rejuvenated using a solution of 3 cups exterior varnish, 1 oz. paraffin wax, and mineral spirits/paint thinner/or turpentine to make 1 gallon. Liberal brush application should be made. This formula was tested over a 20-year period by the U.S. Department of Agriculture's Forest Products Laboratory and proved to be just as effective as water-repellent preservatives containing pentachlorophenol. After the surface has thoroughly dried (2-3 days of warm weather), the treated surface can be painted. A high quality oil-base primer followed by two top coats of a semi-gloss oil-enamel or latex-enamel paint is recommended. Photo: Baird M. Smith, AIA.*

Recommended Treatment

In both cases, the source of the stain should first be located and the moisture problem corrected.

When stains are caused by rusting of the heads of nails used to attach shingles or siding to an exterior wall or by rusting or oxidizing iron, steel, or copper anchorage devices adjacent to a painted surface, the metal objects themselves should be hand sanded and coated with a rust-inhibitive primer followed by two finish coats. (Exposed nail heads should ideally be countersunk, spot primed, and the holes filled with a high quality wood filler except where exposure of the nail head was part of the original construction system or the wood is too fragile to withstand the countersinking procedure.)

Discoloration due to color extractives in replacement wood can usually be cleaned with a solution of equal parts denatured alcohol and water. After the affected area

has been rinsed and permitted to dry, a "stain-blocking primer" especially developed for preventing this type of stain should be applied (two primer coats are recommended for severe cases of bleeding prior to the finish coat). Each primer coat should be allowed to dry at least 48 hours.

CLASS II Exterior Surface Conditions Generally Requiring Limited Paint Removal

- **Crazing**

Cause of Condition

Crazing—fine, jagged interconnected breaks in the top layer of paint—results when paint that is several layers thick becomes excessively hard and brittle with age and is consequently no longer able to expand and contract with the wood in response to changes in temperature and humidity (see figure 5). As the wood swells, the bond between paint layers is broken and hairline cracks appear. Although somewhat more difficult to detect as opposed to other more obvious paint problems, it is well worth the time to scrutinize all surfaces for crazing. If not corrected, exterior moisture will enter the crazed surface, resulting in further swelling of the wood and, eventually, deep cracking and alligatoring, a Class III condition which requires total paint removal.

Recommended Treatment

Crazing can be treated by hand or mechanically sanding the surface, then repainting. Although the hairline cracks may tend to show through the new paint, the surface will be protected against exterior moisture penetration.

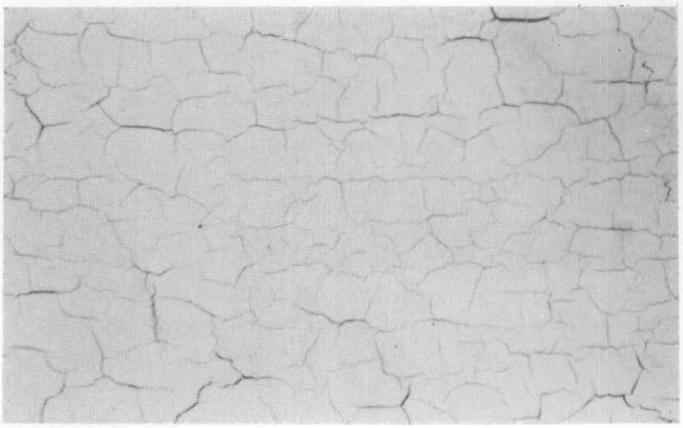

Fig. 5 *Crazing—or surface cracking—is an exterior surface condition which can be successfully treated by sanding and painting. Photo: Courtesy, National Decorating Products Association.*

- **Intercoat Peeling**

Cause of Condition

Intercoat peeling can be the result of improper surface preparation prior to the last repainting. This most often occurs in protected areas such as eaves and covered porches because these surfaces do not receive a regular rinsing from rainfall, and salts from air-borne pollutants thus accumulate on the surface. If not cleaned off, the new paint coat will not adhere properly and that layer will peel.

Another common cause of intercoat peeling is incompatibility between paint types (see figure 6). For example, if oil paint is applied over latex paint, peeling of the top coat can sometimes result since, upon aging, the oil paint becomes harder and less elastic than the latex paint. If latex paint is applied over old, chalking oil paint, peeling can also occur because the latex paint is unable to penetrate the chalky surface and adhere.

Recommended Treatment

First, where salts or impurities have caused the peeling, the affected area should be washed down thoroughly after scraping, then wiped dry. Finally, the surface should be hand or mechanically sanded, then repainted.

Where peeling was the result of using incompatible paints, the peeling top coat should be scraped and hand or mechanically sanded. Application of a high quality oil type exterior primer will provide a surface over which either an oil or a latex topcoat can be successfully used.

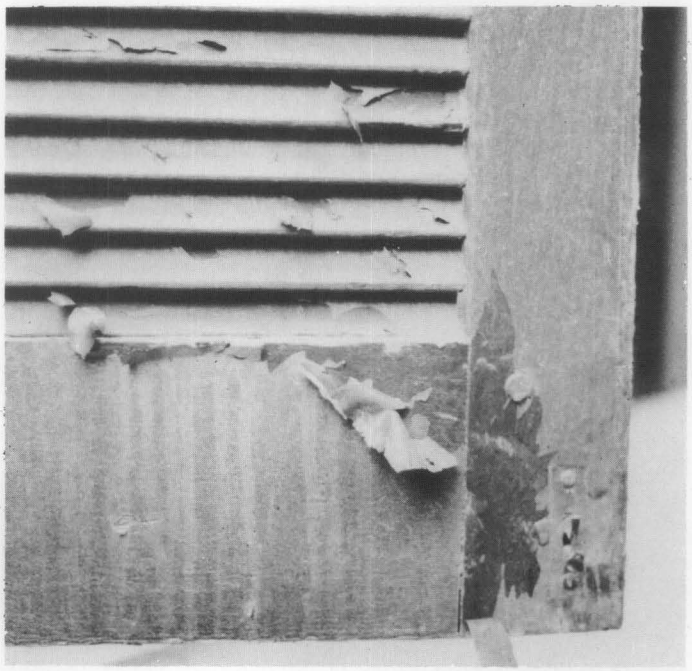

Fig. 6 *This is an example of intercoat peeling. A latex top coat was applied directly over old oil paint and, as a result, the latex paint was unable to adhere. If latex is being used over oil, an oil-base primer should be applied first. Although much of the peeling latex paint can be scraped off, in this case, the best solution may be to chemically dip strip the entire shutter to remove all of the paint down to bare wood, rinse thoroughly, then repaint. Photo: Mary L. Oehrlein, AIA.*

- **Solvent Blistering**

Cause of Condition

Solvent blistering, the result of a less common application error, is not caused by moisture, but by the action of ambient heat on paint solvent or thinners in the paint film. If solvent-rich paint is applied in direct sunlight, the top surface can dry too quickly and, as a result, solvents become trapped beneath the dried paint film. When the solvent vaporizes, it forces its way through the paint film, resulting in surface blisters. This problem occurs more often with dark colored paints because darker colors absorb more heat than lighter ones. To distinguish between solvent blistering and blistering caused by moisture, a blister should be cut open. If another layer of paint is visible, then solvent blistering is likely the problem whereas if bare wood is revealed, moisture is probably to blame. Solvent blisters are generally small.

Recommended Treatment

Solvent-blistered areas can be scraped, hand or mechanically sanded to the next sound layer, then repainted. In order to prevent blistering of painted surfaces, paint should not be applied in direct sunlight.

- **Wrinkling**

Cause of Condition

Another error in application that can easily be avoided is wrinkling (see figure 7). This occurs when the top layer of paint dries before the layer underneath. The top layer of paint actually moves as the paint underneath (a primer, for example) is drying. Specific causes of wrinkling include: (1) applying paint too thick; (2) applying a second coat before the first one dries; (3) inadequate brushing out; and (4) painting in temperatures higher than recommended by the manufacturer.

Recommended Treatment

The wrinkled layer can be removed by scraping followed by hand or mechanical sanding to provide as even a surface as possible, then repainted following manufacturer's application instructions.

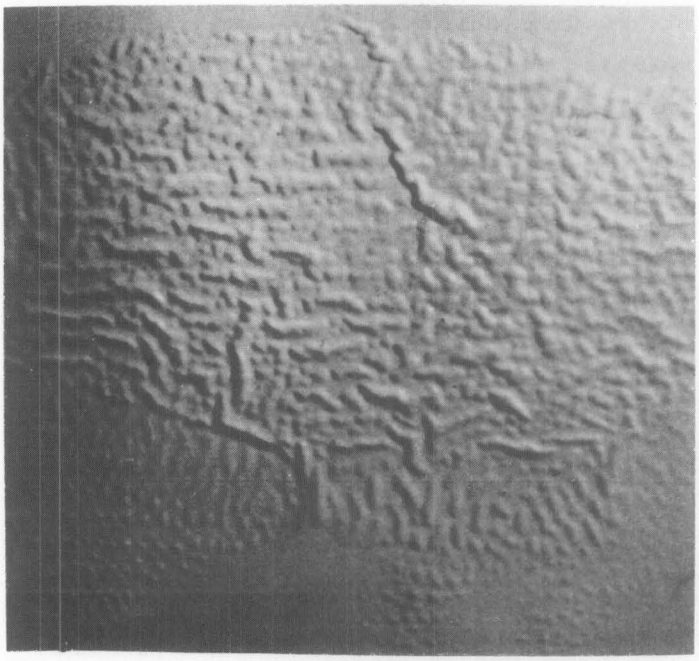

Fig. 7 *Wrinkled layers can generally be removed by scraping and sanding as opposed to total paint removal. Following manufacturers' application instructions is the best way to avoid this surface condition. Photo: Courtesy, National Decorating Products Association.*

CLASS III Exterior Surface Conditions Generally Requiring Total Paint Removal

If surface conditions are such that the majority of paint will have to be removed prior to repainting, it is suggested that a small sample of intact paint be left in an inconspicuous area either by covering the area with a metal plate, or by marking the area and identifying it in some way. (When repainting does take place, the sample should not be painted over). This will enable future investigators to have a record of the building's paint history.

- **Peeling**

Cause of Condition

Peeling to bare wood is most often caused by excess interior or exterior moisture that collects behind the paint film, thus impairing adhesion (see figure 8). Generally beginning as blisters, cracking and peeling occur as moisture causes the wood to swell, breaking the adhesion of the bottom layer.

Recommended Treatment

There is no sense in repainting before dealing with the moisture problems because new paint will simply fail. Therefore, the first step in treating peeling is to locate and remove the source or sources of the moisture, not only because moisture will jeopardize the protective coating of paint but because, if left unattended, it can ultimately cause permanent damage to the wood. Excess interior moisture should be removed from the building through installation of exhaust fans and vents. Exterior moisture should be eliminated by correcting the following conditions prior to repainting: faulty flashing; leaking gutters; defective roof shingles; cracks and holes in siding and trim; deteriorated caulking in joints and seams; and shrubbery growing too close to painted wood. After the moisture problems have been solved, the wood must be permitted to dry out thoroughly. The damaged paint can then be scraped off with a putty knife, hand or mechanically sanded, primed, and repainted.

Fig. 8 *Peeling to bare wood—one of the most common types of paint failure—is usually caused by an interior or exterior moisture problem. Photo: Anne E. Grimmer.*

- **Cracking/Alligatoring**

Cause of Condition

Cracking and alligatoring are advanced stages of crazing (see figure 9). Once the bond between layers has been broken due to intercoat paint failure, exterior moisture is able to penetrate the surface cracks, causing the wood to swell and deeper cracking to take place. This process continues until cracking, which forms parallel to grain, extends to bare wood. Ultimately, the cracking becomes an overall pattern of horizontal and vertical breaks in the paint layers that looks like reptile skin; hence, "alligatoring." In advanced stages of cracking and alligatoring, the surfaces will also flake badly.

Recommended Treatment

If cracking and alligatoring are present only in the top layers they can probably be scraped, hand or mechanically sanded to the next sound layer, then repainted. However, if cracking and/or alligatoring have progressed to

bare wood and the paint has begun to flake, it will need to be totally removed. Methods include scraping or paint removal with the electric heat plate, electric heat gun, or chemical strippers, depending on the particular area involved. Bare wood should be primed within 48 hours, then repainted.

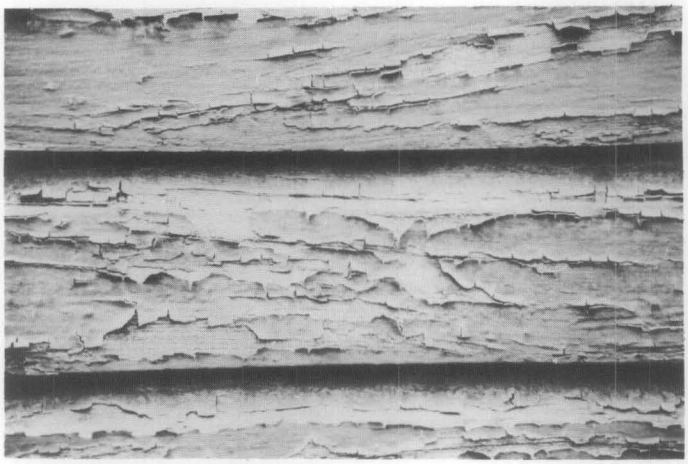

Fig. 9 *Cracking, alligatoring, and flaking are evidence of long-term neglect of painted surfaces. The remaining paint on the clapboard shown here can be removed with an electric heat plate and wide-bladed scraper. In addition, unsound wood should be replaced and moisture problems corrected before primer and top coats of paint are applied. Photo: David W. Look, AIA.*

Selecting the Appropriate/Safest Method to Remove Paint

After having presented the "hierarchy" of exterior paint surface conditions—from a mild condition such as mildewing which simply requires cleaning prior to repainting to serious conditions such as peeling and alligatoring which require total paint removal—one important thought bears repeating: if a paint problem has been identified that warrants either limited or total paint removal, the gentlest method possible for the particular wooden element of the historic building should be selected from the many available methods.

The treatments recommended—based upon field testing as well as onsite monitoring of Department of Interior grant-in-aid and certification of rehabilitation projects—are therefore those which take three over-riding issues into consideration (1) the continued protection and preservation of the historic exterior woodwork; (2) the retention of the sequence of historic paint layers; and (3) the health and safety of those individuals performing the paint removal. By applying these criteria, it will be seen that no paint removal method is without its drawbacks and all recommendations are qualified in varying degrees.

Methods for Removing Paint

After a particular exterior paint surface condition has been identified, the next step in planning for repainting—if paint removal is required—is selecting an appropriate method for such removal.

The method or methods selected should be suitable for the specific paint problem as well as the particular wooden element of the building. Methods for paint removal can be divided into three categories (frequently, however, a combination of the three methods is used). Each method is defined below, then discussed further and specific recommendations made:

Abrasive—"Abrading" the painted surface by manual and/or mechanical means such as scraping and sanding. Generally used for surface preparation and limited paint removal.

Thermal—Softening and raising the paint layers by applying heat followed by scraping and sanding. Generally used for total paint removal.

Chemical—Softening of the paint layers with chemical strippers followed by scraping and sanding. Generally used for total paint removal.

- **Abrasive Methods (Manual)**

If conditions have been identified that require limited paint removal such as crazing, intercoat peeling, solvent blistering, and wrinkling, scraping and hand sanding should be the first methods employed before using mechanical means. Even in the case of more serious conditions such as peeling—where the damaged paint is weak and already sufficiently loosened from the wood surface—scraping and hand sanding may be all that is needed prior to repainting.

Recommended Abrasive Methods (Manual)

Putty Knife/Paint Scraper: Scraping is usually accomplished with either a putty knife or a paint scraper, or both. Putty knives range in width from one to six inches and have a beveled edge. A putty knife is used in a pushing motion going under the paint and working from an area of loose paint toward the edge where the paint is still firmly adhered and, in effect, "beveling" the remaining layers so that as smooth a transition as possible is made between damaged and undamaged areas (see figure 10).

Paint scrapers are commonly available in $1\frac{5}{16}$, $2\frac{1}{2}$, and $3\frac{1}{2}$ inch widths and have replaceable blades. In addition, profiled scrapers can be made specifically for use on moldings. As opposed to the putty knife, the paint scraper is used in a pulling motion and works by raking the damaged areas of paint away.

The obvious goal in using the putty knife or the paint scraper is to selectively remove the affected layer or layers of paint; however, both of these tools, particularly the paint scraper with its hooked edge, must be used with care to properly prepare the surface and to avoid gouging the wood.

Sandpaper/Sanding Block/Sanding sponge: After manually removing the damaged layer or layers by scraping, the uneven surface (due to the almost inevitable removal of varying numbers of paint layers in a given area) will need to be smoothed or "feathered out" prior to repainting. As stated before, hand sanding, as opposed to harsher mechanical sanding, is recommended if the area is relatively limited. A coarse grit, open-coat flint sandpaper—the least expensive kind—is useful for this purpose because, as the sandpaper clogs with paint it must be discarded and this process repeated until all layers adhere uniformly.

Blocks made of wood or hard rubber and covered with sandpaper are useful for handsanding flat surfaces. Sanding sponges—rectangular sponges with an abrasive aggregate on their surfaces—are also available for detail work that requires reaching into grooves because the sponge easily conforms to curves and irregular surfaces. All sanding should be done with the grain.

Summary of Abrasive Methods (Manual)

Recommended: Putty knife, paint scraper, sandpaper, sanding block, sanding sponge.
Applicable areas of building: All areas.
For use on: Class I, Class II, and Class III conditions.
Health/Safety factors: Take precautions against lead dust, eye damage; dispose of lead paint residue properly.

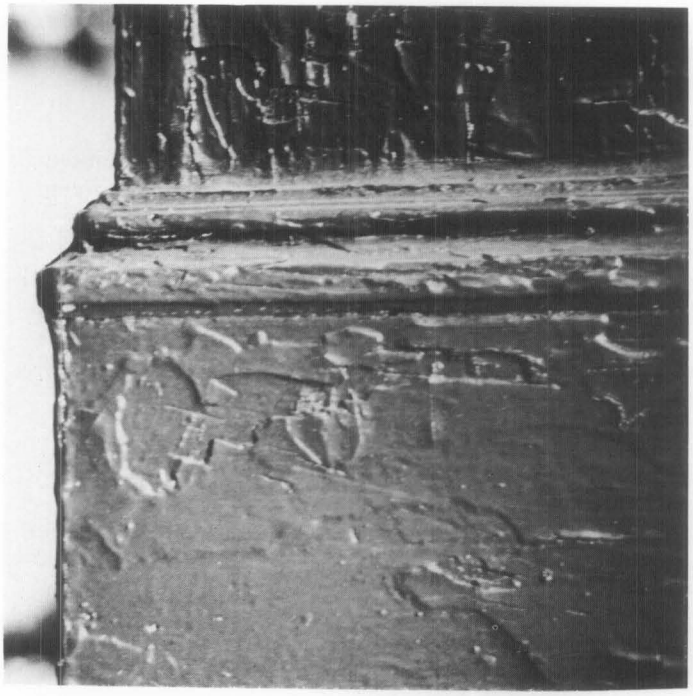

Fig. 10 *An excellent example of inadequate scraping before repainting, the problems here are far more than cosmetic. This improperly prepared surface will permit moisture to get behind the paint film which, in turn, will result in chipping and peeling. Photo: Baird M. Smith, AIA.*

- **Abrasive Methods (Mechanical)**

If hand sanding for purposes of surface preparation has not been productive or if the affected area is too large to consider hand sanding by itself, mechanical abrasive methods, i.e., power-operated tools may need to be employed; however, it should be noted that the majority of tools available for paint removal can cause damage to fragile wood and must be used with great care.

Recommended Abrasive Methods (Mechanical)

Orbital sander: Designed as a finishing or smoothing tool—not for the removal of multiple layers of paint—the oribital sander is thus recommended when limited paint removal is required prior to repainting. Because it sands in a small diameter circular motion (some models can also be switched to a back-and-forth vibrating action), this tool is particularly effective for "feathering" areas where paint has first been scraped (see figure 11). The abrasive surface varies from about 3×7 inches to 4×9 inches and sandpaper is attached either by clamps or sliding clips. A medium grit, open-coat aluminum oxide sandpaper should be used; fine sandpaper clogs up so quickly that it is ineffective for smoothing paint.

Belt sander: A second type of power tool—the belt sander—can also be used for removing limited layers of paint but, in this case, the abrasive surface is a continuous belt of sandpaper that travels at high speeds and consequently offers much less control than the orbital sander. Because of the potential for more damage to the paint or the wood, use of the belt sander (also with a medium grit sandpaper) should be limited to flat surfaces and only skilled operators should be permitted to operate it within a historic preservation project.

Fig. 11 *The orbital sander can be used for limited paint removal, i.e., for smoothing flat surfaces after the majority of deteriorated paint has already been scraped off. Photo: Charles E. Fisher, III.*

Not Recommended

Rotary Drill Attachments: Rotary drill attachments such as the rotary sanding disc and the rotary wire stripper should be avoided. The disc sander—usually a disc of sandpaper about 5 inches in diameter secured to a rubber based attachment which is in turn connected to an electric drill or other motorized housing—can easily leave visible circular depressions in the wood which are difficult to hide, even with repainting. The rotary wire stripper—clusters of metals wires similarly attached to an electric drill-type unit—can actually shred a wooden surface and is thus to be used exclusively for removing corrosion and paint from metals.

Waterblasting: Waterblasting above 600 p.s.i. to remove paint is not recommended because it can force water into the woodwork rather than cleaning loose paint and grime from the surface; at worst, high pressure waterblasting causes the water to penetrate exterior sheathing and damages interior finishes. A detergent solution, a medium soft bristle brush, and a garden hose for purposes of rinsing, is the gentlest method involving water and is recommended when cleaning exterior surfaces prior to repainting.

Sandblasting: Finally—and undoubtedly most vehemently "not recommended"—sandblasting painted exterior woodwork will indeed remove paint, but at the same time can scar wooden elements beyond recognition. As with rotary wire strippers, sandblasting erodes the soft porous fibers (spring wood) faster than the hard, dense fibers (summer wood), leaving a pitted surface with ridges and valleys. Sandblasting will also erode projecting areas of carvings and moldings before it removes paint from concave areas (see figure 12). Hence, this abrasive method is potentially the most damaging of all possibilities, even if a contractor promises that blast pressure can be controlled so that the paint is removed without harming the historic exterior woodwork. (For Additional Information, See Presevation Briefs 6, "Dangers of Abrasive Cleaning to Historic Buildings".)

Fig. 12 *Sandblasting has permanently damaged this ornamental bracket. Even paint will not be able to hide the deep erosion of the wood. Photo: David W. Look, AIA.*

Summary of Abrasive Methods (Mechanical)

Recommended: Orbital sander, belt sander (skilled operator only).
Applicable areas of building: Flat surfaces, i.e., siding, eaves, doors, window sills.
For use on: Class II and Class III conditions.
Health/Safety factors: Take precautions against lead dust and eye damage; dispose of lead paint residue properly.
Not Recommended: Rotary drill attachments, high pressure waterblasting, sandblasting.

- **Thermal Methods**

Where exterior surface conditions have been identified that warrant total paint removal such as peeling, cracking, or alligatoring, two thermal devices—the electric heat plate and the electric heat gun—have proven to be quite successful for use on different wooden elements of the historic building. One thermal method—the blow torch—is not recommended because it can scorch the wood or even burn the building down!

Recommended Thermal Methods

Electric heat plate: The electric heat plate (see figure 13) operates between 500 and 800 degrees Fahrenheit (not hot enough to vaporize lead paint), using about 15 amps of power. The plate is held close to the painted exterior surface until the layers of paint begin to soften and blister, then moved to an adjacent location on the wood while the softened paint is scraped off with a putty knife (it should be noted that the heat plate is most successful when the paint is very thick!). With practice, the operator can successfully move the heat plate evenly across a flat surface such as wooden siding or a window sill or door in a continuous motion, thus lessening the risk of scorching the wood in an attempt to reheat the edge of the paint sufficiently for effective removal. Since the electric heat plate's coil is "red hot," extreme caution should be taken to avoid igniting clothing or burning the skin. If an extension cord is used, it should be a heavy-duty cord (with 3-prong grounded plugs). A heat plate could overload a circuit or, even worse, cause an electrical fire; therefore, it is recommended that this implement be used with a single circuit and that a fire extinguisher always be kept close at hand.

Fig. 13 *The electric heat plate (with paint scraper) is particularly useful for removing paint down to bare wood on flat surfaces such as doors, window frames, and siding. After scraping, some light sanding will probably be necessary to smooth the surface prior to application of primer and top coats. Photo: David W. Look, AIA.*

Electric heat gun: The electric heat gun (electric hot-air gun) looks like a hand-held hairdryer with a heavy-duty metal case (see figure 14). It has an electrical resistance coil that typically heats between 500 and 750 degrees Fahrenheit and, again, uses about 15 amps of power which requires a heavy-duty extension cord. There are some heat guns that operate at higher temperatures but they should not be purchased for removing old paint

because of the danger of lead paint vapors. The temperature is controlled by a vent on the side of the heat gun. When the vent is closed, the heat increases. A fan forces a stream of hot air against the painted woodwork, causing a blister to form. At that point, the softened paint can be peeled back with a putty knife. It can be used to best advantage when a paneled door was originally varnished, then painted a number of times. In this case, the paint will come off quite easily, often leaving an almost pristine varnished surface behind. Like the heat plate, the heat gun works best on a heavy paint build-up. (It is, however, not very successful on only one or two layers of paint or on surfaces that have only been varnished. The varnish simply becomes sticky and the wood scorches.)

Although the heat gun is heavier and more tiring to use than the heat plate, it is particularly effective for removing paint from detail work because the nozzle can be directed at curved and intricate surfaces. Its use is thus more limited than the heat plate, and most successfully used in conjunction *with* the heat plate. For example, it takes about two to three hours to strip a paneled door with a heat gun, but if used in combination with a heat plate for the large, flat area, the time can usually be cut in half. Although a heat gun seldom scorches wood, it can cause fires (like the blow torch) if aimed at the dusty cavity between the exterior sheathing and siding and interior lath and plaster. A fire may smolder for hours before flames break through to the surface. Therefore, this thermal device is best suited for use on solid decorative elements, such as molding, balusters, fretwork, or "gingerbread."

Fig. 14 *The nozzle on the electric heat gun permits hot air to be aimed into cavities on solid decorative elements such as this applied column. After the paint has been sufficiently softened, it can be removed with a profiled scraper. Photo: Charles E. Fisher, III.*

Not Recommended

Blow Torch: Blow torches, such as hand-held propane or butane torches, were widely used in the past for paint removal because other thermal devices were not available. With this technique, the flame is directed toward the paint until it begins to bubble and loosen from the surface. Then the paint is scraped off with a putty knife. Although this is a relatively fast process, at temperatures between 3200 and 3800 degrees Fahrenheit the open flame is not only capable of burning a careless operator and causing severe damage to eyes or skin, it can easily scorch or ignite the wood. The other fire hazard is more insidious. Most frame buildings have an air space between the exterior sheathing and siding and interior lath and plaster. This cavity usually has an accumulation of dust which is also easily ignited by the open flame of a blow torch. Finally, lead-base paints will vaporize at high temperatures, releasing toxic fumes that can be unknowingly inhaled. Therefore, because both the heat plate and the heat gun are generally safer to use—that is, the risks are much more controllable—the blow torch should definitely be avoided!

Summary of Thermal Methods

Recommended: Electric heat plate, electric heat gun.
Applicable areas of building: Electric heat plate—flat surfaces such as siding, eaves, sash, sills, doors. Electric heat gun—solid decorative molding, balusters, fretwork, or "gingerbread."
For use on: Class III conditions.
Health/Safety factors: Take precautions against eye damage and fire. Dispose of lead paint residue properly.
Not Recommended: Blow torch.

- **Chemical Methods**

With the availability of effective thermal methods for total paint removal, the need for chemical methods—in the context of preparing historic exterior woodwork for repainting—becomes quite limited. Solvent-base or caustic strippers may, however, play a supplemental role in a number of situations, including:

- Removing paint residue from intricate decorative features, or in cracks or hard to reach areas if a heat gun has not been completely effective;
- Removing paint on window muntins because heat devices can easily break the glass;
- Removing varnish on exterior doors after all layers of paint have been removed by a heat plate/heat gun if the original varnish finish is being restored;
- Removing paint from detachable wooden elements such as exterior shutters, balusters, columns, and doors by dip-stripping when other methods are too laborious.

Recommended Chemical Methods
(Use With Extreme Caution)

Because all chemical paint removers can involve potential health and safety hazards, no wholehearted recommendations can be made from that standpoint. Commonly known as "paint removers" or "strippers," both solvent-base or caustic products are commercially available that, when poured, brushed, or sprayed on painted exterior woodwork are capable of softening several layers of paint at a time so that the resulting "sludge"—which should be remembered is nothing less than the sequence of historic

paint layers—can be removed with a putty knife. Detachable wood elements such as exterior shutters can also be "dip-stripped."

Solvent-base Strippers: The formulas tend to vary, but generally consist of combinations of organic solvents such as methylene chloride, isopropanol, toluol, xylol, and methanol; thickeners such as methyl cellulose; and various additives such as paraffin wax used to prevent the volatile solvents from evaporating before they have time to soak through multiple layers of paint. Thus, while some solvent-base strippers are quite thin and therefore unsuitable for use on vertical surfaces, others, called "semi-paste" strippers, are formulated for use on vertical surfaces or the underside of horizontal surfaces.

However, whether liquid or semi-paste, there are two important points to stress when using any solvent-base stripper: First, the vapors from the organic chemicals can be highly toxic if inhaled; skin contact is equally dangerous because the solvents can be absorbed; second, many solvent-base strippers are flammable. Even though application out-of-doors may somewhat mitigate health and safety hazards, a respirator with special filters for organic solvents is recommended and, of course, solvent-base strippers should never be used around open flames, lighted cigarettes, or with steel wool around electrical outlets.

Although appearing to be the simplest for exterior use, a particular type of solvent-base stripper needs to be mentioned here because it can actually cause the most problems. Known as "water-rinsable," such products have a high proportion of methylene chloride together with emulsifiers. Although the dissolved paint can be rinsed off with water with a minimum of scraping, this ultimately creates more of a problem in cleaning up and properly disposing of the sludge. In addition, these strippers can leave a gummy residue on the wood that requires removal with solvents. Finally, water-rinsable strippers tend to raise the grain of the wood more than regular strippers.

On balance, then, the regular strippers would seem to work just as well for exterior purposes and are perhaps even better from the standpoint of proper lead sludge disposal because they must be hand scraped as opposed to rinsed off (a coffee-can with a wire stretched across the top is one effective way to collect the sludge; when the putty knife is run across the wire, the sludge simply falls into the can. Then, when the can is filled, the wire is removed, the can capped, and the lead paint sludge disposed of according to local health regulations).

Caustic Strippers: Until the advent of solvent-base strippers, caustic strippers were used exclusively when a chemical method was deemed appropriate for total paint removal prior to repainting or refinishing. Now, it is more difficult to find commercially prepared caustic solutions in hardware and paint stores for home-owner use with the exception of lye (caustic soda) because solvent-base strippers packaged in small quantities tend to dominate the market.

Most commercial dip stripping companies, however, continue to use variations of the caustic bath process because it is still the cheapest method available for removing paint. Generally, dip stripping should be left to professional companies because caustic solutions can dissolve skin and permanently damage eyes as well as present serious disposal problems in large quantities.

If exterior shutters or other detachable elements are being sent out[6] for stripping in a caustic solution, it is wise to see samples of the company's finished work. While some companies do a first-rate job, others can leave a residue of paint in carvings and grooves. Wooden elements may also be soaked too long so that the wood grain is raised and roughened, requiring extensive hand sanding later. In addition, assurances should be given by these companies that caustic paint removers will be neutralized with a mild acid solution or at least thoroughly rinsed with water after dipping (a caustic residue makes the wood feel slippery). If this is not done, the lye residue will cause new paint to fail.

Summary of Chemical Methods

Recommended, with extreme caution: Solvent-base strippers, caustic strippers.
Applicable areas of buildings: decorative features, window muntins, doors, exterior shutters, columns, balusters, and railings.
For use on: Class III Conditions.
Health/Safety factors: Take precautions against inhaling toxic vapors; fire; eye damage; and chemical poisoning from skin contact. Dispose of lead residue properly

General Paint Type Recommendations

Based on the assumption that the exterior wood has been painted with oil paint many times in the past and the existing top coat is therefore also an oil paint,* it is recommended that for CLASS I and CLASS II paint surface conditions, a top coat of high quality oil paint be applied when repainting. The reason for recommending oil rather than latex paints is that a coat of latex paint applied directly over old oil paint is more apt to fail. The considerations are twofold. First, because oil paints continue to harden with age, the old surface is sensitive to the added stress of shrinkage which occurs as a new coat of paint dries. Oil paints shrink less upon drying than latex paints and thus do not have as great a tendency to pull the old paint loose. Second, when exterior oil paints age, the binder releases pigment particles, causing a chalky surface. Although for best results, the chalk (or dirt, etc.) should *always* be cleaned off prior to repainting, a coat of new oil paint is more able to penetrate a chalky residue and adhere than is latex paint. Therefore, unless it is possible to thoroughly clean a heavy chalked surface, oil paints—on balance—give better adhesion.

If however, a latex top coat is going to be applied over several layers of old oil paint, an oil primer should be applied first (the oil primer creates a flat, porous surface to which the latex can adhere). After the primer has thoroughly dried, a latex top coat may be applied. In the long run, changing paint types is more time consuming and expensive. An application of a new oil-type top coat on the old oil paint is, thus, the preferred course of action.

[6] Marking the original location of the shutter by number (either by stamping numbers into the end grain with metal numeral dies or cutting numbers into the end with a pen knife) will minimize difficulties when rehanging them.

* If the top coat is latex paint (when viewed by the naked eye or, preferably, with a magnifying glass, it looks like a series of tiny craters) it may either be repainted with new latex paint or with oil paint. Normal surface preparation should precede any repainting.