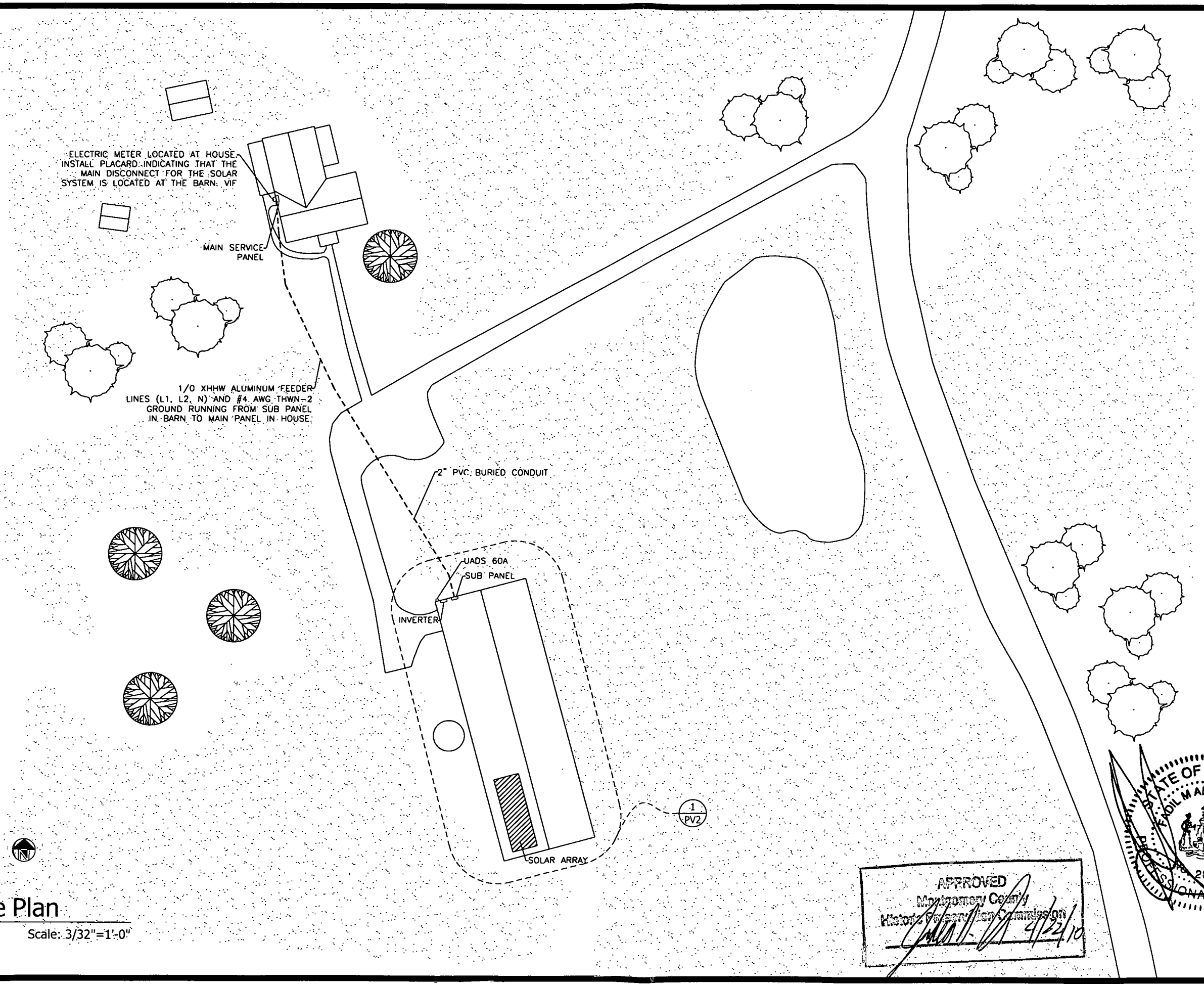
920 Old Buckhodge Road, Boyds
(HPC Case # 18/12-10A)
Master Plan Site # 18/12 White Carlin Farm



1 Site Plan

Scale: 3/32"=1'-0"

APPROVED
Montgomery County
Historic Preservation Commission
2/22/10

STATE OF MARYLAND
FADIL M ABDELFATAH
28174
PROFESSIONAL ENGINEER

STANDARD SOLAR
Clean Energy Smart Business
202 Perry Parkway #7
Gaithersburg, MD 20877
301-944-1200
www.StandardSolar.com

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE DESIGNED IN ACCORDANCE WITH THE APPLICABLE CODES IN MONTGOMERY COUNTY, MARYLAND, INCLUDING IRC, 2006 EDITION, AND WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NUMBER 28174 EXPIRATION DATES: JANUARY 23, 2011.

PROJECT TITLE
Bergmann
PROJECT ADDRESS
920 Old Bucklodge Ln
Boyds, MD 20841

SHEET TITLE
Site Plan

REVISIONS

PROJECT NUMBER
10-0010

DRAWN BY
MAJ

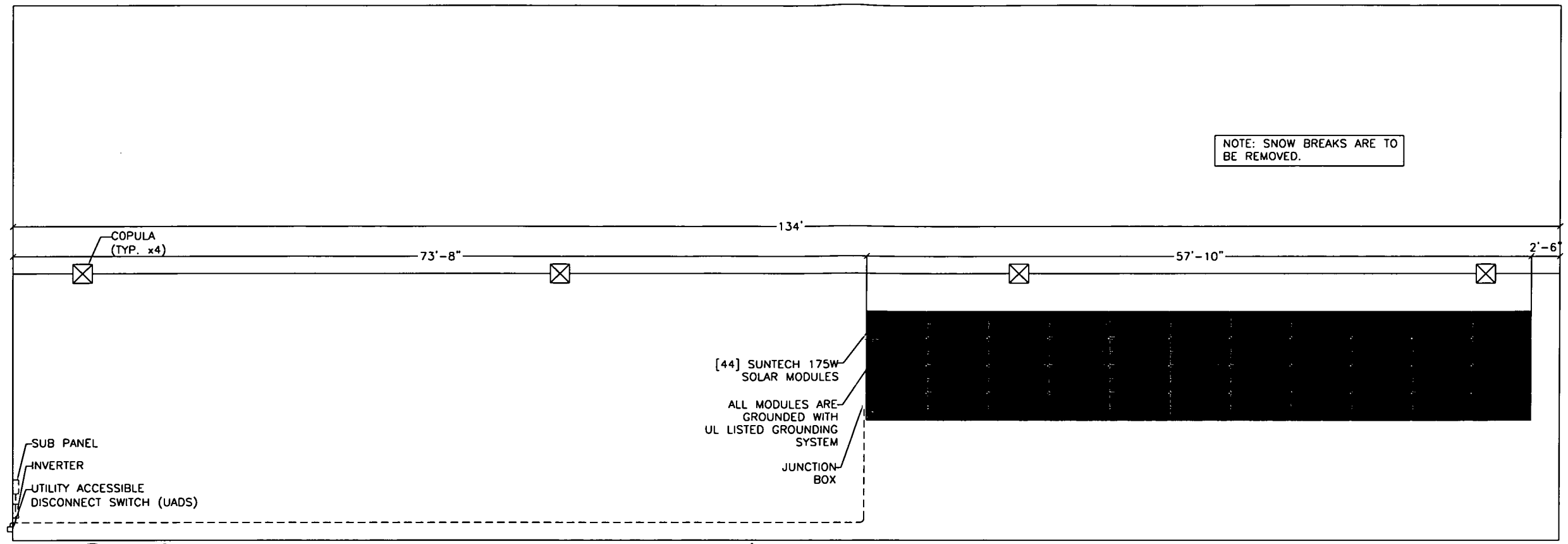
APPROVED BY
MNS

DATE
03.26.10

ORIGINAL SHEET SIZE
11X17

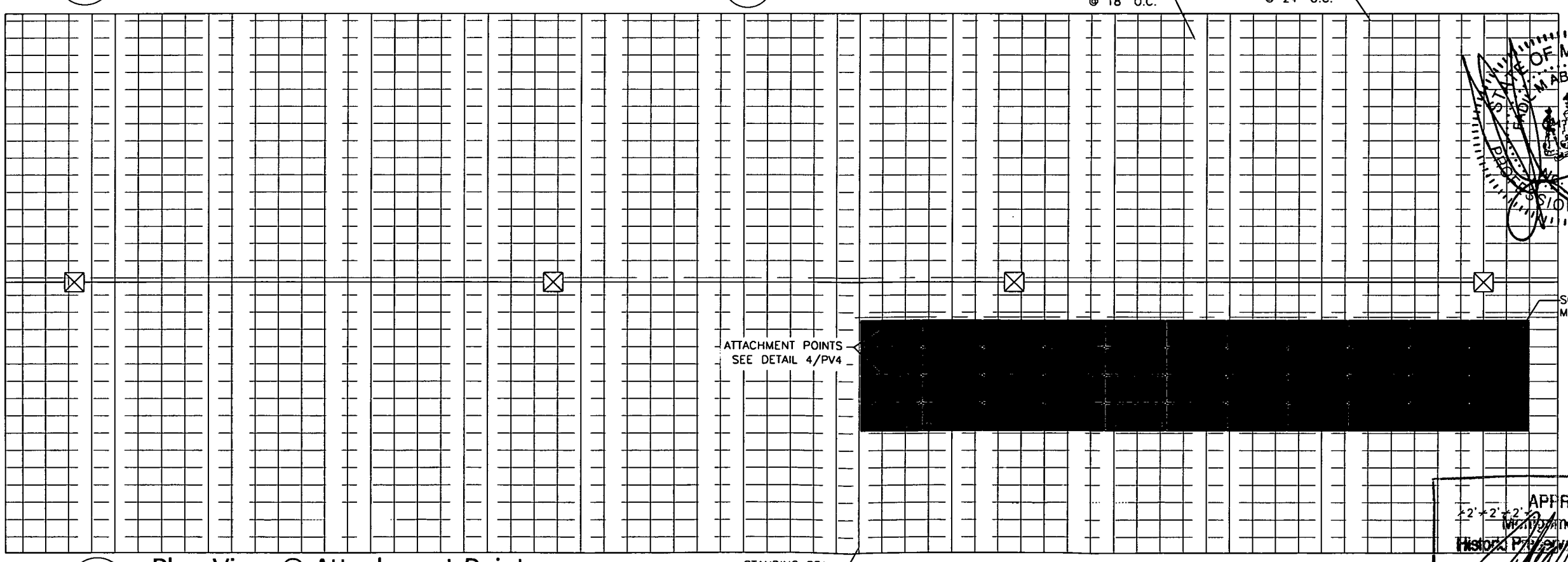
SCALE
AS SHOWN

DRAWING
PV1



1 **Plan View**

Scale: 3/32"=1'-0"



2 **Plan View @ Attachment Points**

Scale: 3/32"=1'-0"

NOTE: SUNTECH TYPE CLAMPS TO BE USED IN CONJUNCTION WITH UNIRAC

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Montgomery County
Historic Preservation Commission
4/22/10

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STATE OF MARYLAND
SOLIMAN ABDELFATAH
28174
PROFESSIONAL ENGINEER

PROJECT TITLE
Bergmann
PROJECT ADDRESS
920 Old Bucklodge Ln
Boyds, MD 20841

SHEET TITLE
Plan View

REVISIONS

PROJECT NUMBER
10-0010

DRAWN BY
MAJ

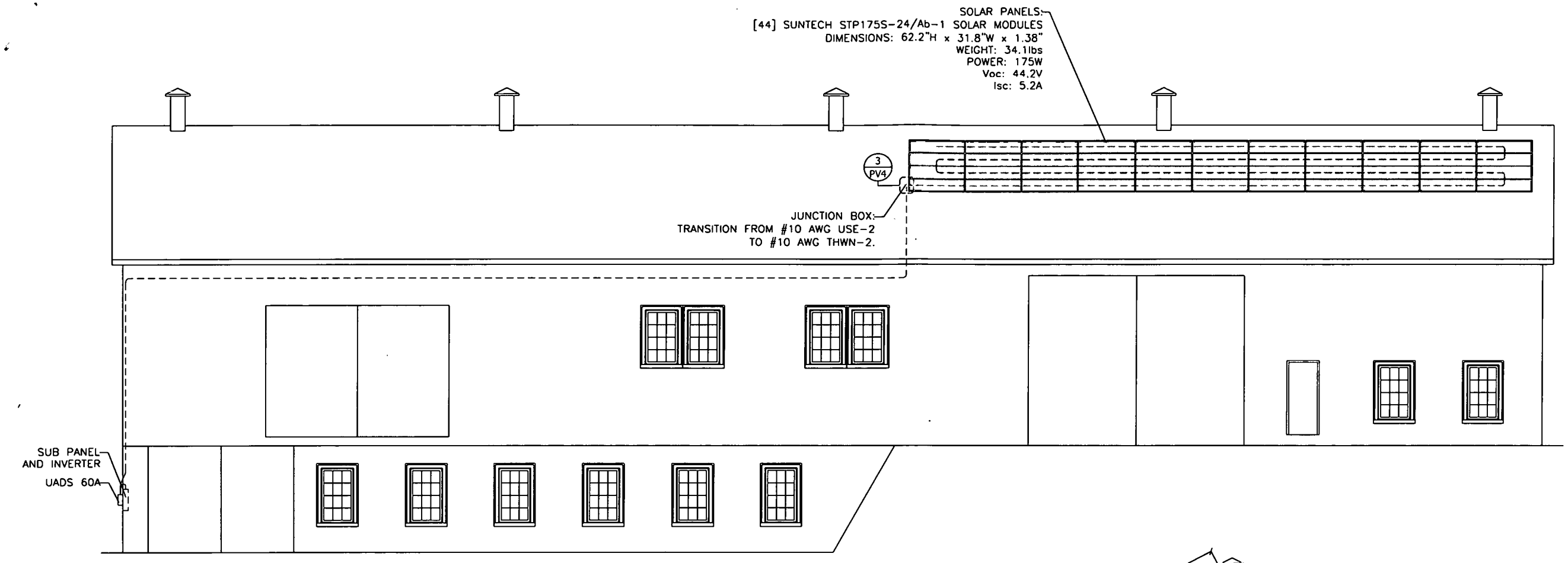
APPROVED BY
MNS

DATE
03.26.10

ORIGINAL SHEET SIZE
11X17

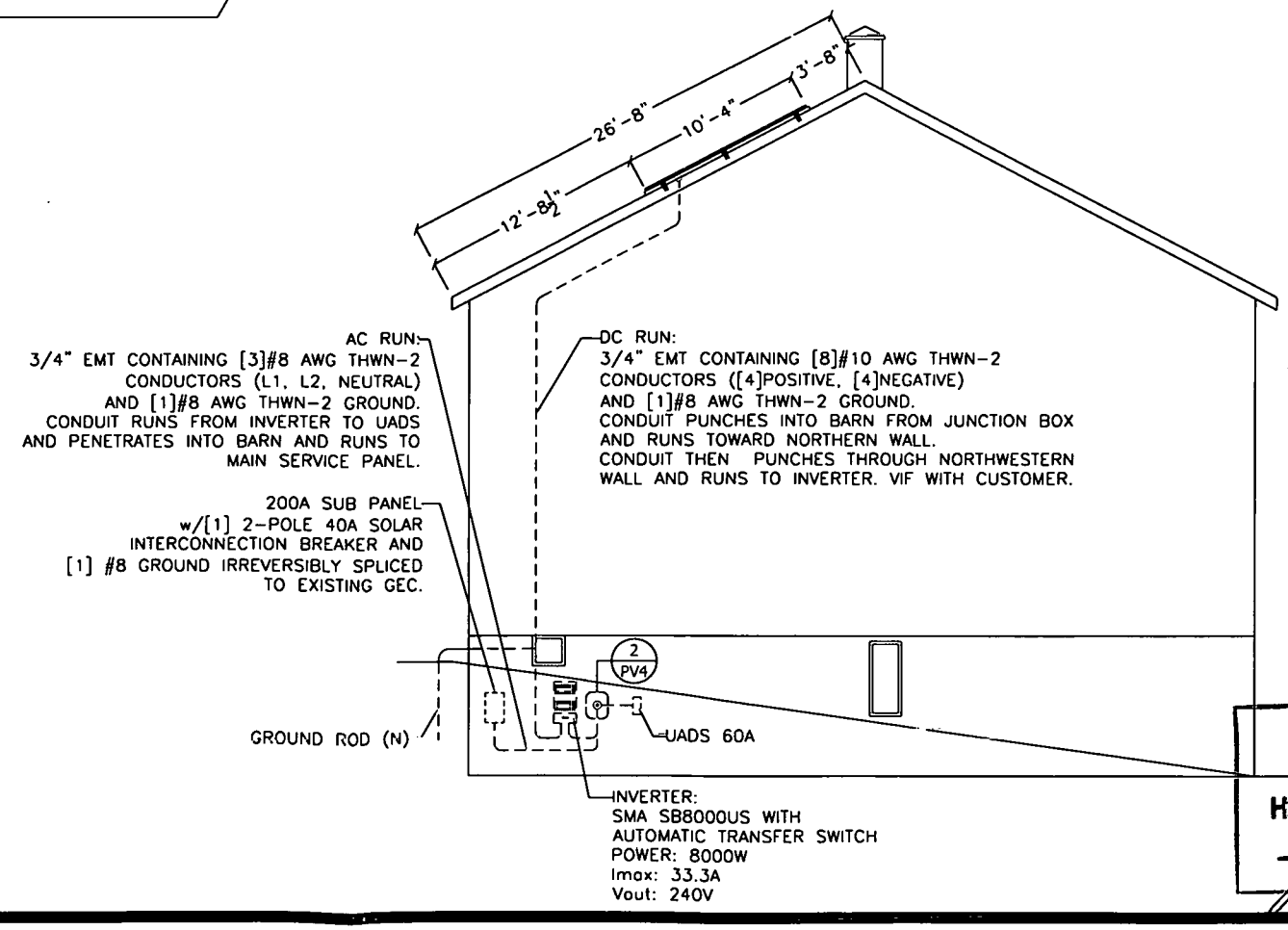
SCALE
AS SHOWN

DRAWING
PV2



1 West Elevation

Scale: 3/32"=1'-0"



2 South Elevation

Scale: 3/32"=1'-0"

STATE OF MARYLAND
FADY M ABDELFATAH
No. 28174
PROFESSIONAL ENGINEER

APPROVED
Montgomery County
Historic Preservation Commission
4/22/10

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Bergmann
PROJECT ADDRESS
920 Old Bucklodge Ln
Boyds, MD 20841

SHEET TITLE
Elevations

REVISIONS

PROJECT NUMBER
10-0010

DRAWN BY
MAJ

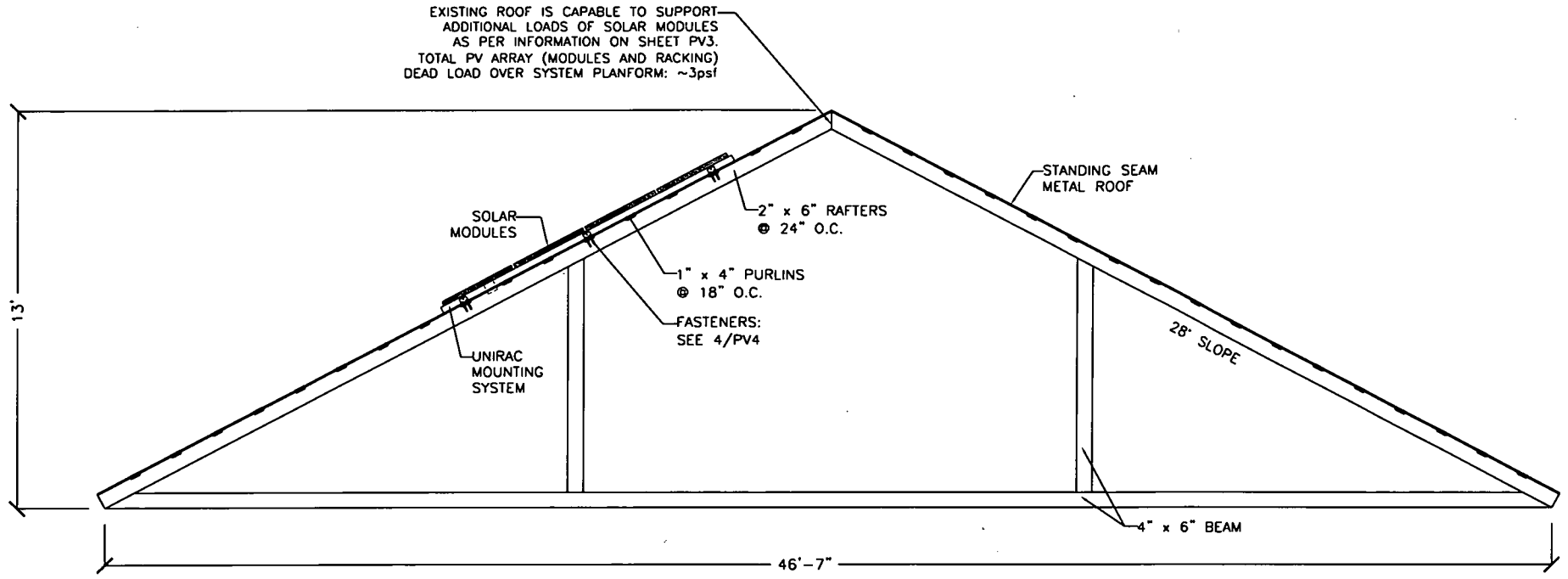
APPROVED BY
MNS

DATE
03.26.10

ORIGINAL SHEET SIZE
11X17

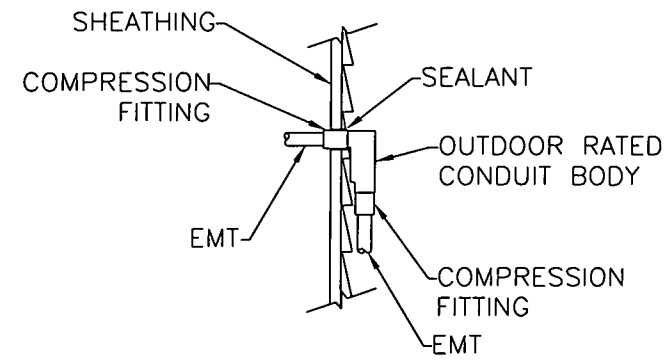
SCALE
AS SHOWN

DRAWING
PV3



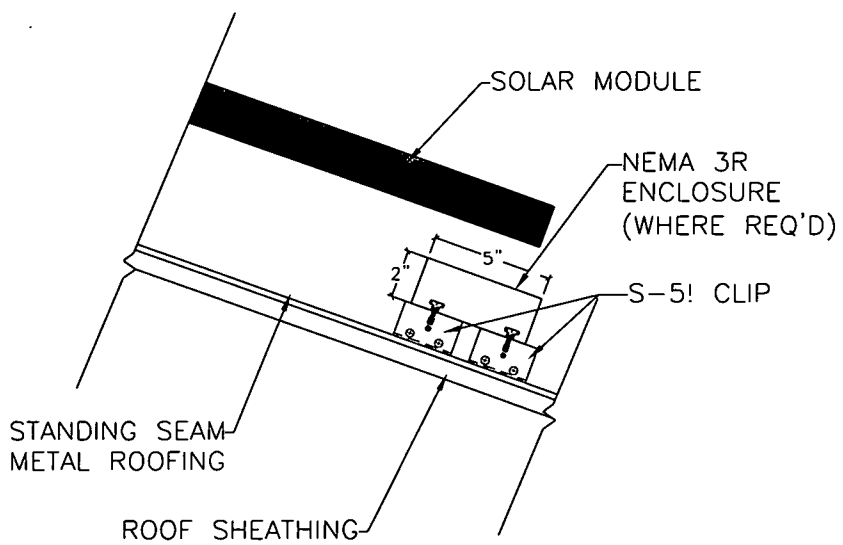
1 Roof A Detail

Scale: 3/16"=1'-0"



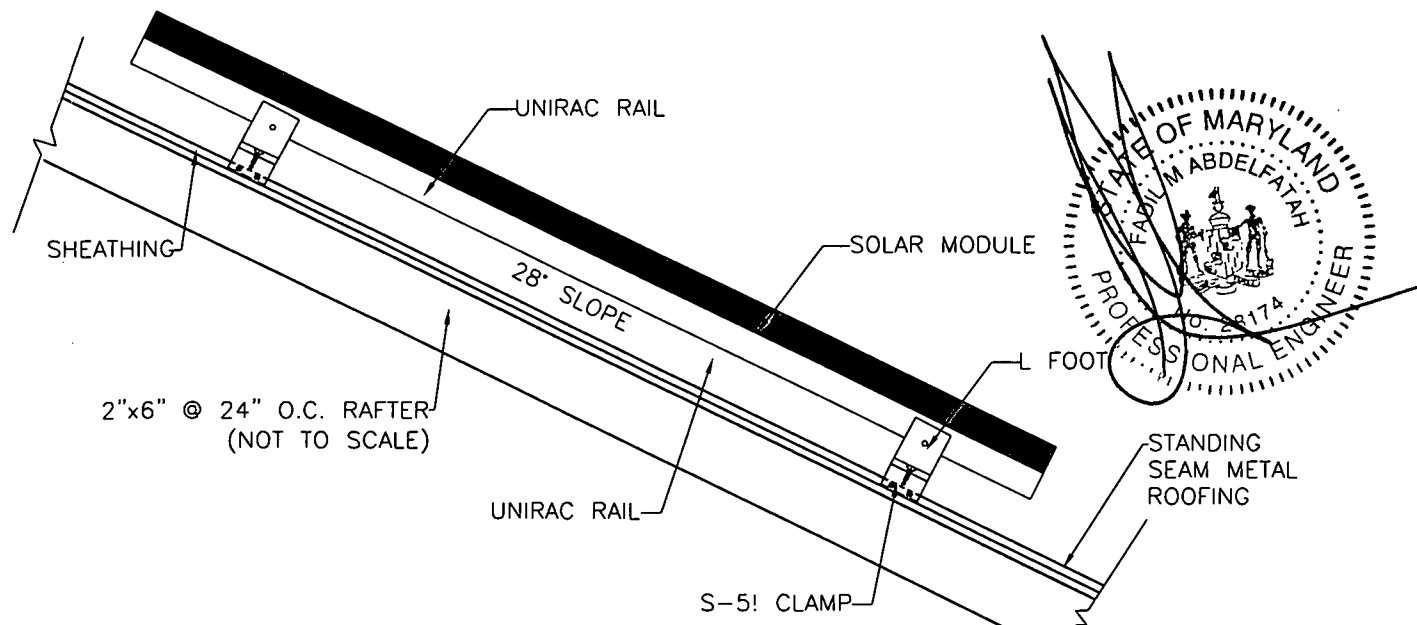
2 Wall Penetration Detail

Scale: 1-1/2"=1'-0"



3 Junction Box Detail

Scale: 1-1/2"=1'-0"



4 Attachment Detail

Scale: 1"=1'-0"

APPROVED
Montgomery County
Historic Preservation Commission
4/22/10

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PROJECT TITLE
Bergmann
PROJECT ADDRESS
920 Old Bucklodge Ln
Boyds, MD 20841

SHEET TITLE
Details

REVISIONS

DISCLAIMER
THIS DRAWING IS THE PROPERTY OF STANDARD SOLAR, INC. THIS INFORMATION IS CONFIDENTIAL AND IS TO BE USED ONLY IN CONNECTION WITH WORK DESCRIBED BY STANDARD SOLAR, INC. NO PART IS TO BE DISCLOSED TO OTHERS WITHOUT WRITTEN PERMISSION FROM STANDARD SOLAR, INC.

PROJECT NUMBER
10-0010

DRAWN BY
MAJ

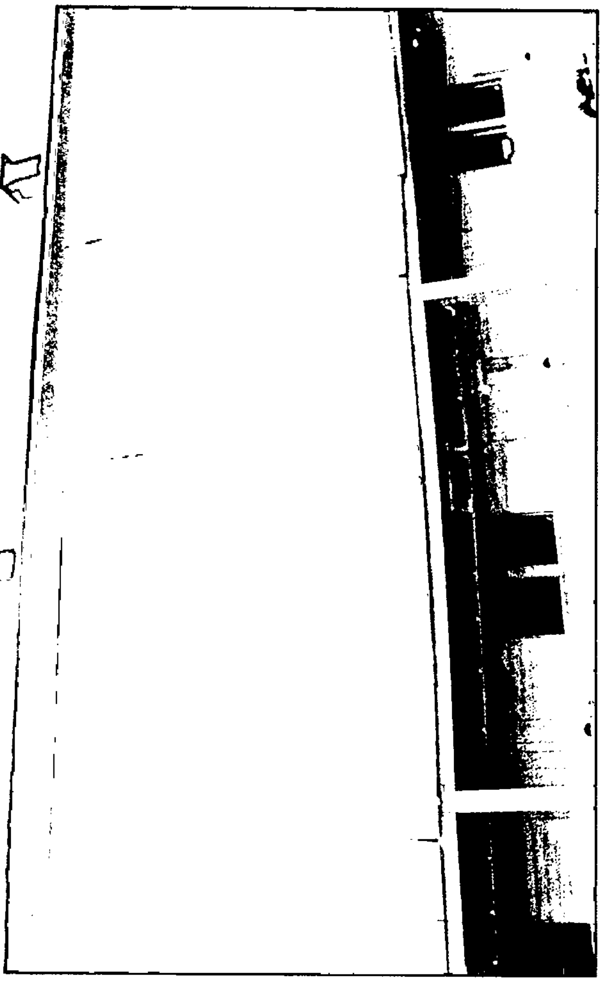
APPROVED BY
MNS

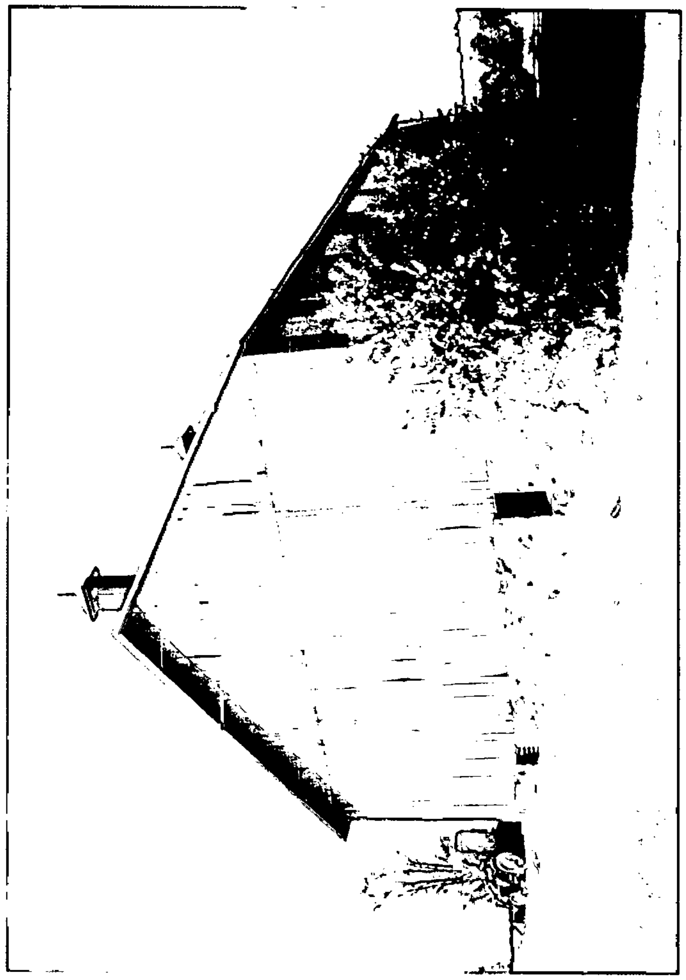
DATE
03.26.10

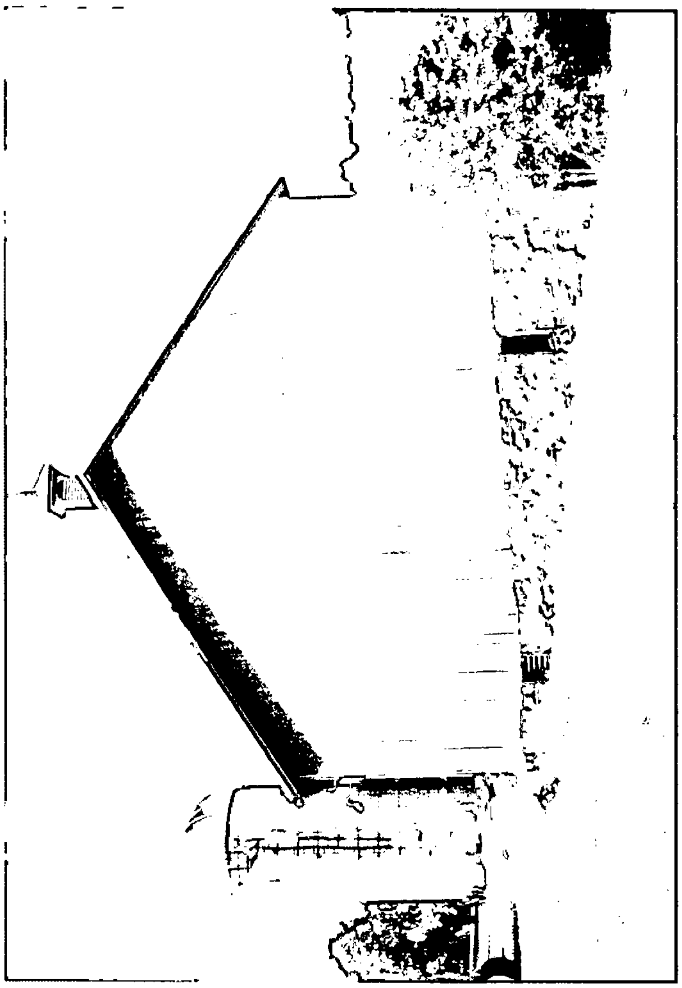
ORIGINAL SHEET SIZE
11X17

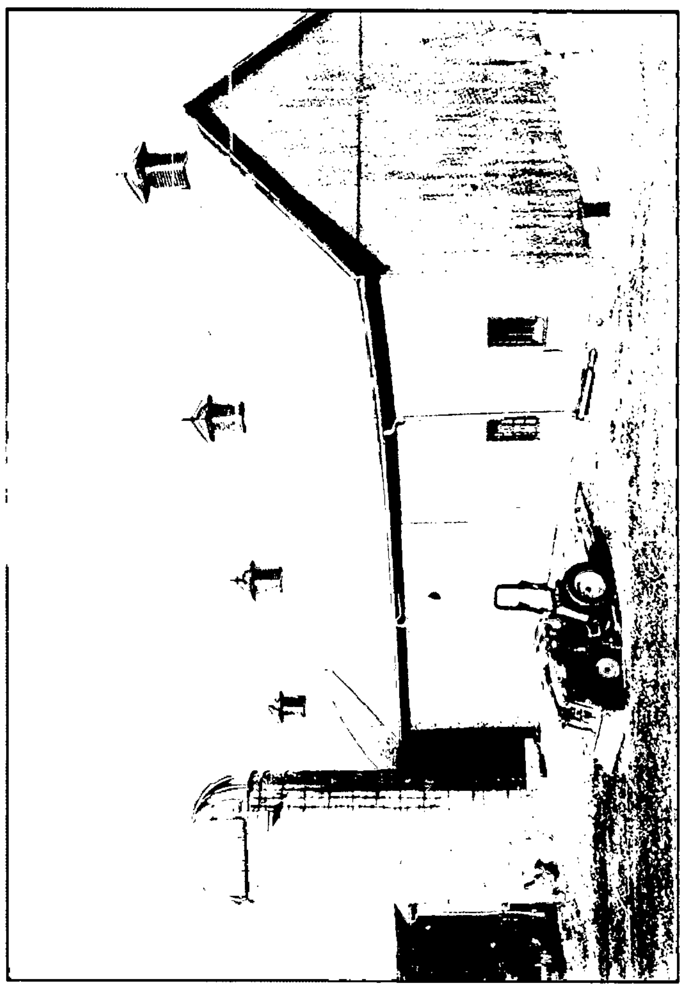
SCALE
AS SHOWN

DRAWING
PV4

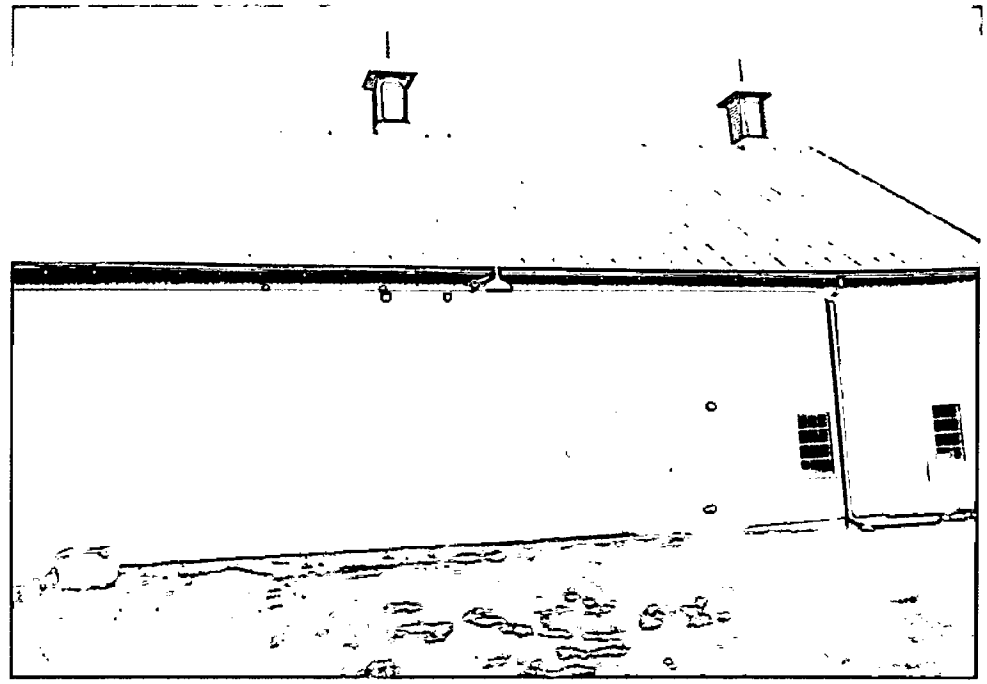


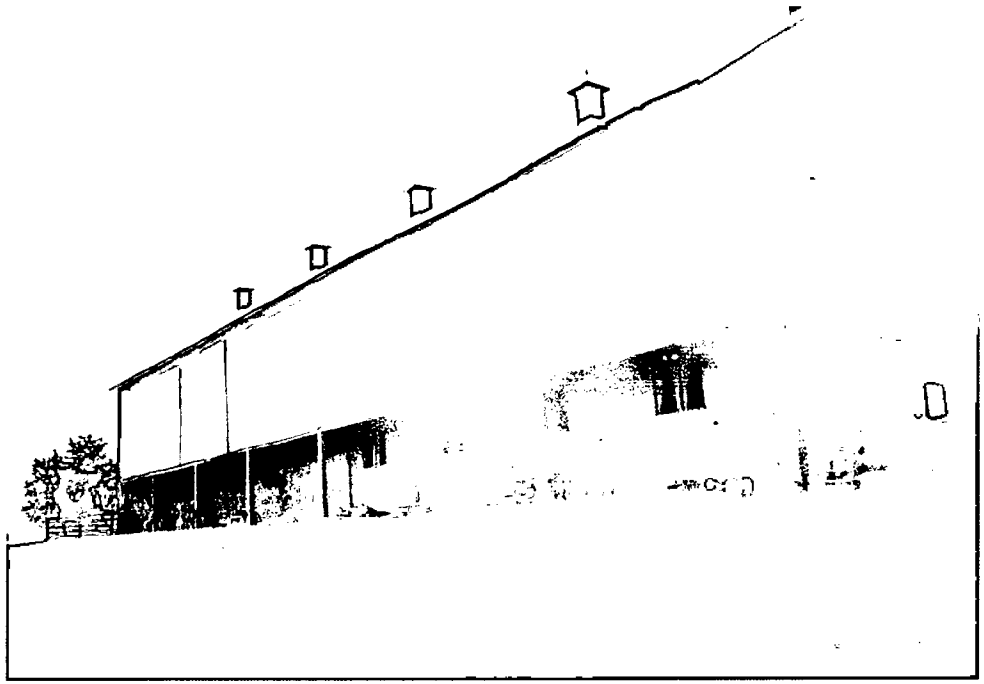


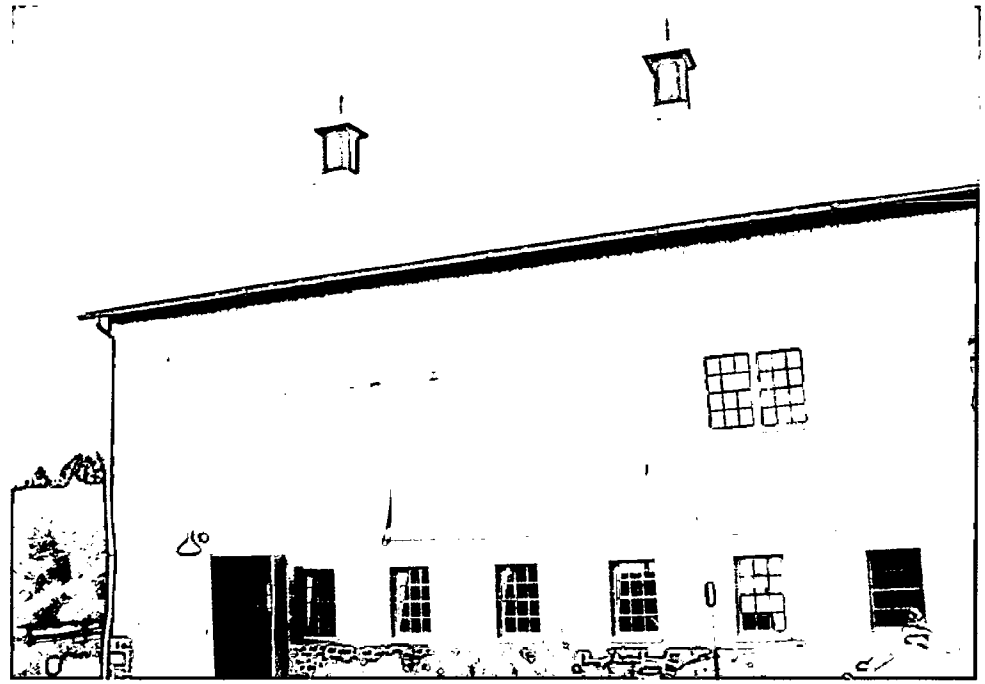


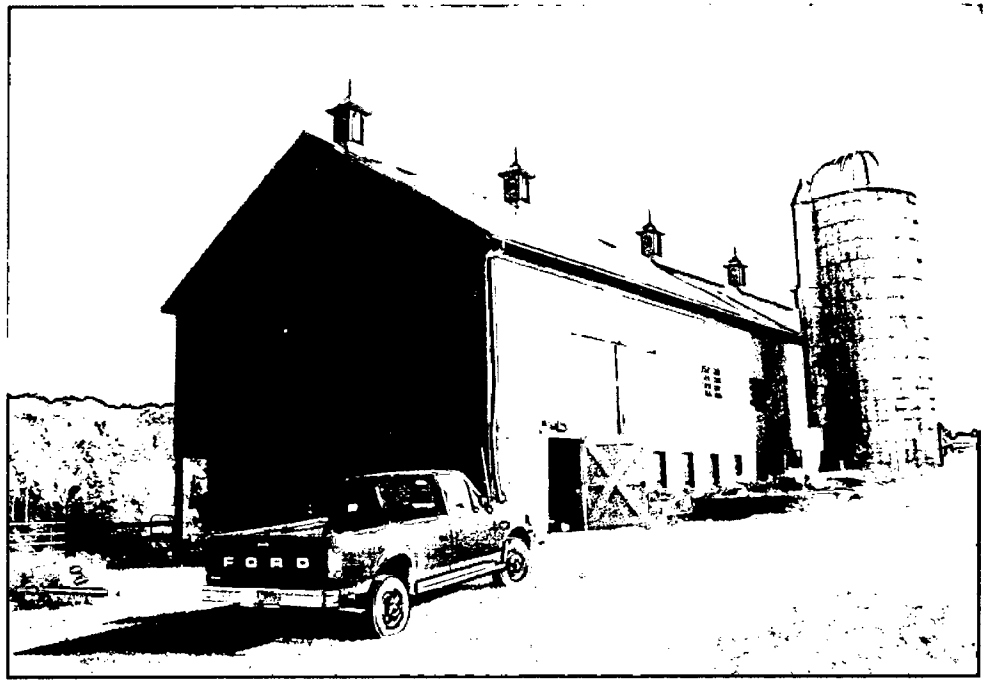


2010 HAWP





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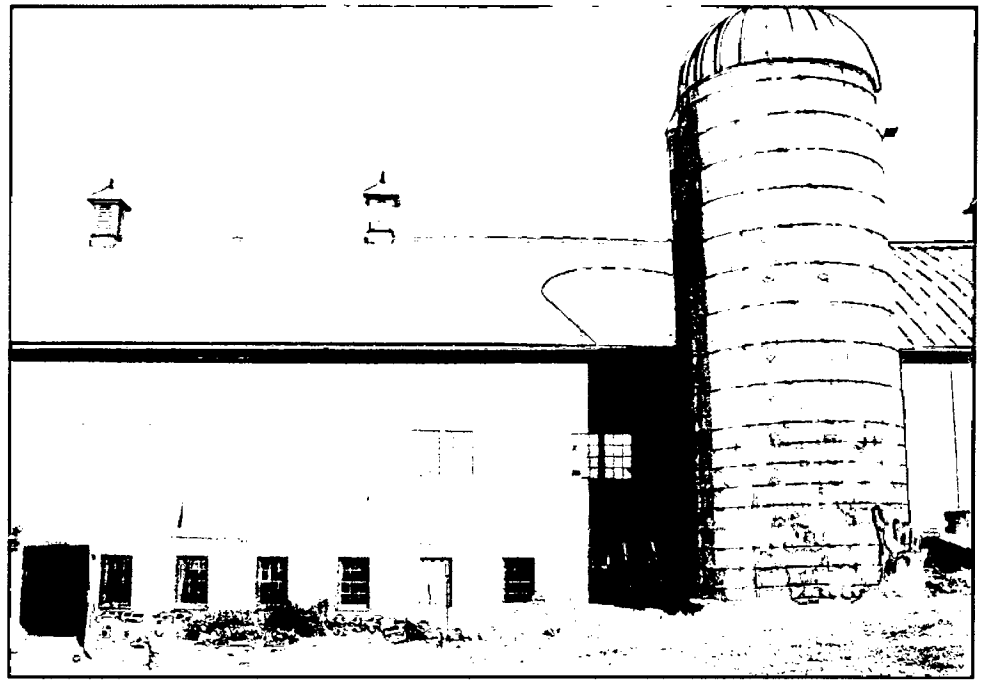

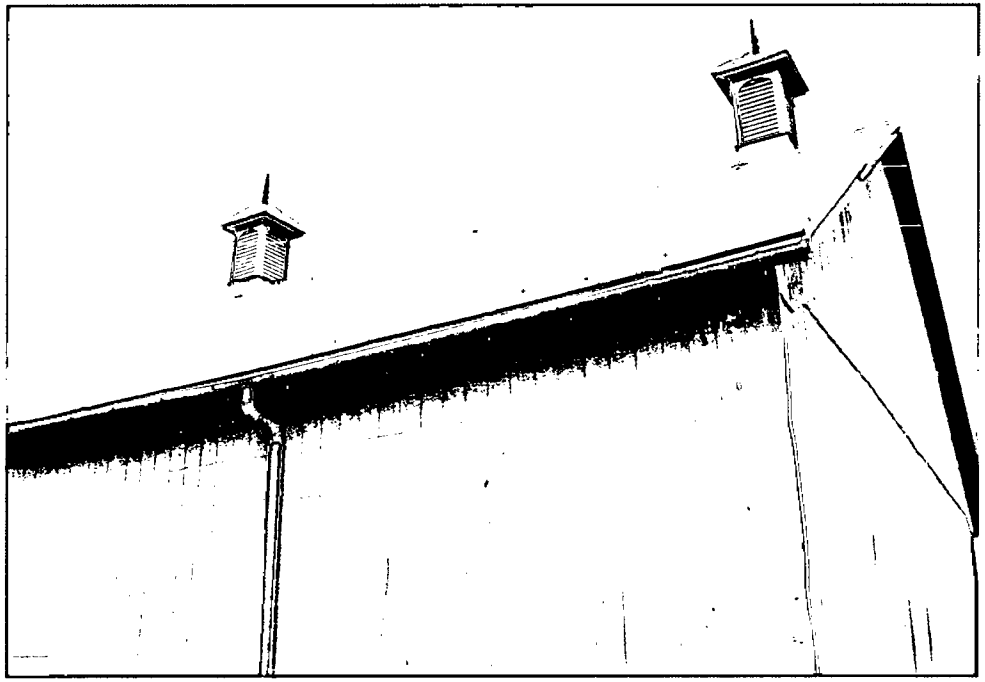

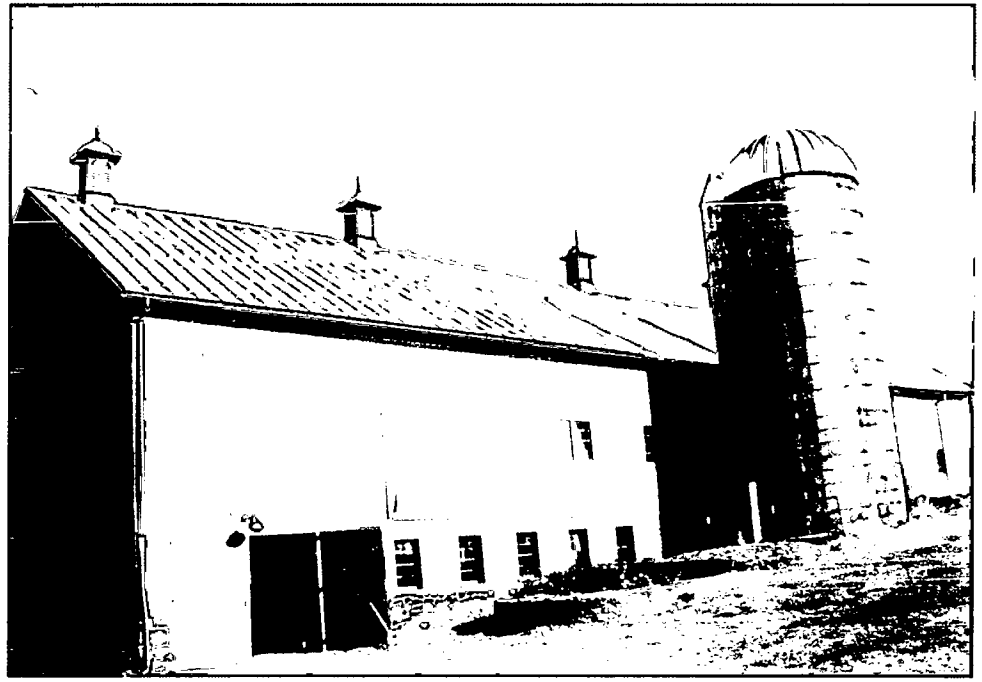

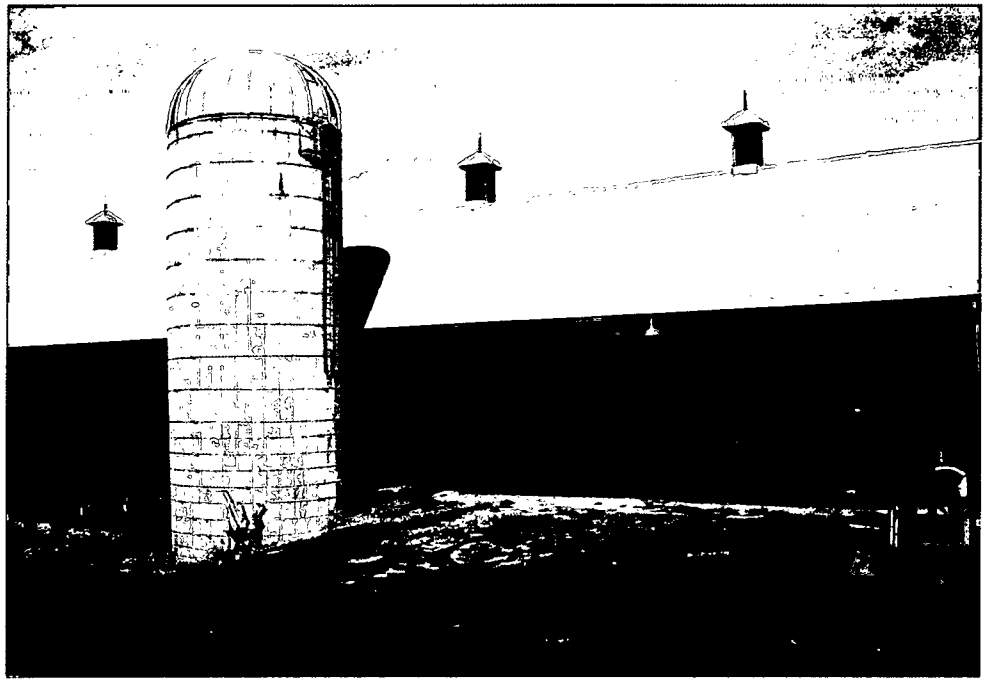

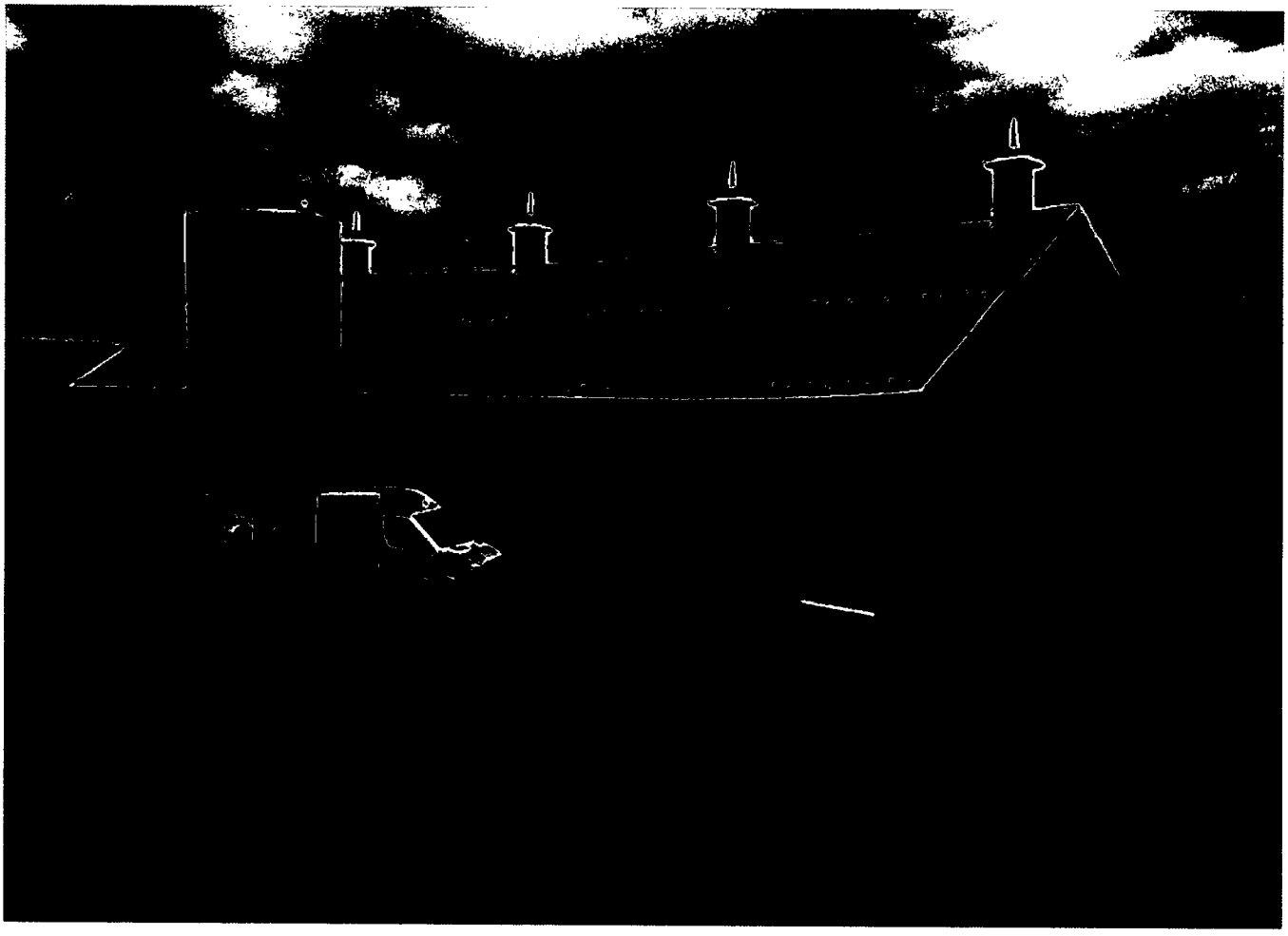

HISTORIC PRESERVATION COMMISSION

Isiah Leggett
County Executive

Thomas Jester
Chairperson

Date: April 22, 2010

MEMORANDUM

TO: Carla Reid, Director
Department of Permitting Services

FROM: Josh Silver, Senior Planner JDS
Historic Preservation Section
Maryland-National Capital Park & Planning Commission

SUBJECT: Historic Area Work Permit #531815, solar panel installation

---

The Montgomery County Historic Preservation Commission (HPC) has reviewed the attached application for a Historic Area Work Permit (HAWP). This application was **approved** at the March 24, 2010 meeting.

The HPC staff has reviewed and stamped the attached construction drawings.

THE BUILDING PERMIT FOR THIS PROJECT SHALL BE ISSUED CONDITIONAL UPON ADHERENCE TO THE ABOVE APPROVED HAWP CONDITIONS AND MAY REQUIRE APPROVAL BY DPS OR ANOTHER LOCAL OFFICE BEFORE WORK CAN BEGIN.

Applicant: Carline Farm LLC (Chuck Bergman, Agent)

Address: 920 Old Bucklodge Lane, Boyds

This HAWP approval is subject to the general condition that the applicant will obtain all other applicable Montgomery County or local government agency permits. After the issuance of these permits, the applicant must contact this Historic Preservation Office if any changes to the approved plan are made. Once the work is complete the applicant will contact the staff person assigned to this application at 301-563-3400 or joshua.silver@mncppc-mc.org to schedule a follow-up site visit.

DPS - #8

HISTORIC PRESERVATION COMMISSION
301/563-3400

APPLICATION FOR HISTORIC AREA WORK PERMIT

531815

Contact Person: CHUCK BERGMANN

Daytime Phone No.: 301-972-0211

Tax Account No.: 11 03302384

Name of Property Owner: CARLIN FARM LLC Daytime Phone No.:

Address: 920 OLD BUCKLODGE LN (Street Number) BOYDS (City) MD (State) 20841 (Zip Code)

Contractor: STANDARD SOLAR Phone No.: 301.944.5137

Contractor Registration No.: AC 1090454

Agent for Owner: TOM SHEA Daytime Phone No.: 301.944.5137

LOCATION OF BUILDING/PREMISE

House Number: 920 Street: OLD BUCKLODGE LN

Town/City: BOYDS Nearest Cross Street: BUCKLODGE LN (119)

Lot: Block: Subdivision: 1

Liber: Folio: Parcel: P420

PART ONE: TYPE OF PERMIT ACTION AND USE

1A. CHECK ALL APPLICABLE:

☐ Construct ☐ Extend ☐ Alter/Renovate ☐ Move ☑ Install ☐ Wreck/Raze ☐ Revision ☐ Repair ☐ Revocable

CHECK ALL APPLICABLE:

☐ A/C ☐ Slab ☐ Room Addition ☐ Porch ☐ Deck ☐ Shed ☐ Solar ☐ Fireplace ☐ Woodburning Stove ☐ Single Family ☐ Fence/Wall (complete Section 4) ☐ Other: ROOFTOP SOLAR SYSTEM

1B. Construction cost estimate: $ 28,500

1C. If this is a revision of a previously approved active permit, see Permit #

PART TWO: COMPLETE FOR NEW CONSTRUCTION AND EXTEND/ADDITIONS

2A. Type of sewage disposal: 01 ☐ WSSC 02 ☑ Septic 03 ☐ Other:

2B. Type of water supply: 01 ☐ WSSC 02 ☑ Well 03 ☐ Other:

PART THREE: COMPLETE ONLY FOR FENCE/RETAINING WALL

3A. Height feet inches

3B. Indicate whether the fence or retaining wall is to be constructed on one of the following locations:

☐ On party line/property line ☐ Entirely on land of owner ☐ On public right of way/easement

I hereby certify that I have the authority to make the foregoing application, that the application is correct, and that the construction will comply with plans approved by all agencies listed and I hereby acknowledge and accept this to be a condition for the issuance of this permit.

CHARLES BERGMANN

Charles D Bergmann
Signature of owner or authorized agent

1/20/10
Date

Approved: ✓

Disapproved: Signature: FOR THOMAS JESTER Chairperson *For Chairperson, Historic Preservation Commission* Date: 4/22/10

Application/Permit No.: Date Filed: Date Issued:

Edit 6/21/99

SEE REVERSE SIDE FOR INSTRUCTIONS

THE FOLLOWING ITEMS MUST BE COMPLETED AND THE REQUIRED DOCUMENTS MUST ACCOMPANY THIS APPLICATION.

1. **WRITTEN DESCRIPTION OF PROJECT**

   a. Description of existing structure(s) and environmental setting, including their historical features and significance:

   AGRICULTURAL BARN - RURAL LOCATION

   b. General description of project and its effect on the historic resource(s), the environmental setting, and, where applicable, the historic district:

   INSTALATION OF 44 PV SOLAR PANELS ON BARN ROOF ATTACHED TO STANDING SEAM METAL ROOF WITH S-5 CLIPS. EACH PANEL MEASURES 31.8 INCHES X 62.2 INCHES.

2. **SITE PLAN**

   Site and environmental setting, drawn to scale. You may use your plat. Your site plan must include:

   a. the scale, north arrow, and date;

   b. dimensions of all existing and proposed structures; and

   c. site features such as walkways, driveways, fences, ponds, streams, trash dumpsters, mechanical equipment, and landscaping.

3. **PLANS AND ELEVATIONS**

   You must submit 2 copies of plans and elevations in a format no larger than 11" x 17". Plans on 8 1/2" x 11" paper are preferred.

   a. ***Schematic construction plans***, with marked dimensions, indicating location, size and general type of walls, window and door openings, and other fixed features of both the existing resource(s) and the proposed work.

   b. Elevations (facades), with marked dimensions, clearly indicating proposed work in relation to existing construction and, when appropriate, context. All materials and fixtures proposed for the exterior must be noted on the elevations drawings. An existing and a proposed elevation drawing of each facade affected by the proposed work is required.

4. **MATERIALS SPECIFICATIONS**

   General description of materials and manufactured items proposed for incorporation in the work of the project. This information may be included on your design drawings.

5. **PHOTOGRAPHS**

   a. Clearly labeled photographic prints of each facade of existing resource, including details of the affected portions. All labels should be placed on the front of photographs.

   b. Clearly label photographic prints of the resource as viewed from the public right-of-way and of the adjoining properties. All labels should be placed on the front of photographs.

6. **TREE SURVEY**

   If you are proposing construction adjacent to or within the dripline of any tree 6" or larger in diameter (at approximately 4 feet above the ground), you must file an accurate tree survey identifying the size, location, and species of each tree of at least that dimension.

7. **ADDRESSES OF ADJACENT AND CONFRONTING PROPERTY OWNERS**

   For **ALL** projects, provide an accurate list of adjacent and confronting property owners (not tenants), including names, addresses, and zip codes. This list should include the owners of all lots or parcels which adjoin the parcel in question, as well as the owner(s) of lot(s) or parcel(s) which lie directly across the street/highway from the parcel in question. You can obtain this information from the Department of Assessments and Taxation, 51 Monroe Street, Rockville, (301/279-1355).

PLEASE PRINT (IN BLUE OR BLACK INK) OR TYPE THIS INFORMATION ON THE FOLLOWING PAGE.
PLEASE STAY WITHIN THE GUIDES OF THE TEMPLATE, AS THIS WILL BE PHOTOCOPIED DIRECTLY ONTO MAILING LABELS.

EXPEDITED

MONTGOMERY COUNTY HISTORIC PRESERVATION COMMISSION

STAFF REPORT

Address: 920 Old Bucklodge Lane, Boyds

Applicant: Carlin Farm LLC
(Chuck Bergman, Agent)

Resource: *Master Plan* Site #18/12, White-Carlin Farm

Review: HAWP

Case Number: 18/12-10A

PROPOSAL: Solar panel installation

Meeting Date: 3/24/10

Report Date: 3/17/10

Public Notice: 3/10/10

Tax Credit: None

Staff: Josh Silver

STAFF RECOMMENDATION

☑ **Approval**

☐ Approval with conditions

PROPERTY DESCRIPTION

SIGNIFICANCE: *Master Plan* Site #18/12, White-Carlin Farm
STYLE: Bank Barn
DATE: c1793

Excerpt from Places in the Past:

A rustic Federal stone house and immense bank barn are key features of the White-Carlin Farm. In 1793, Stephen Newton Chiswell, owner of extensive land, gave 192 acres to his daughter Peggy Presbury White and her husband Nathan Smith White. The Whites raised tobacco, owned slaves, and constructed a mill.

With its collection of farm buildings, the White-Carlin Farm represents the eras of tobacco, wheat and dairy farming. Dominating the landscape is an enormous bank barn that represents a shift to wheat farming in the 1800s, and then dairying in the early 1900s. The barn which was stabilized in 1996, is 140' x 45' on sandstone foundations and was aired with five wooden ventilators, In 1939, the barn housed 87 cows and 12 horses.

PROPOSAL

The applicant is proposing to install 44 photovoltaic solar panels on the rear (southwest corner) barn roof at the subject property. The panels will attach to the existing standing seam metal roof of the barn and measure approximately 31.8" x 62.2". A flush mounted installation method is proposed to mitigate visibility from the public right-of-way.

APPLICABLE GUIDELINES

When reviewing alterations and new construction to a *Master Plan* site several documents are to be utilized as guidelines to assist the Commission in developing their decision. These documents include *Montgomery County Code Chapter 24A* (*Chapter 24A*) and the *Secretary of the Interior's Standards for Rehabilitation (Standards).* The pertinent information in these documents is outlined below.

Montgomery County Code; Chapter 24A-8:

(a) The commission shall instruct the director to deny a permit if it finds, based on the evidence and information presented to or before the commission that the alteration for which the permit is sought would be inappropriate, inconsistent with or detrimental to the preservation, enhancement or ultimate protection of the historic site or historic resource within an historic district, and to the purposes of this chapter.

(b) The commission shall instruct the director to issue a permit, or issue a permit subject to such conditions as are found to be necessary to insure conformity with the purposes and requirements of this chapter, if it finds that:

(1) The proposal will not substantially alter the exterior features of an historic site or historic resource within an historic district; or

(2) The proposal is compatible in character and nature with the historical, archeological, architectural or cultural features of the historic site or the historic district in which an historic resource is located and would not be detrimental thereto or to the achievement of the purposes of this chapter; or

(3) The proposal would enhance or aid in the protection, preservation and public or private utilization of the historic site or historic resource located within an historic district in a manner compatible with the historical, archeological, architectural or cultural value of the historic site or historic district in which an historic resource is located; or

(4) The proposal is necessary in order that unsafe conditions or health hazards be remedied; or

(5) The proposal is necessary in order that the owner of the subject property not be deprived of reasonable use of the property or suffer undue hardship; or

(6) In balancing the interests of the public in preserving the historic site or historic resource located within an historic district, with the interests of the public from the use and benefit of the alternative proposal, the general public welfare is better served by granting the permit.

(c) It is not the intent of this chapter to limit new construction, alteration or repairs to any one period or architectural style.

(d) In the case of an application for work on an historic resource located within an historic district, the commission shall be lenient in its judgment of plans for structures of little historical or design significance or for plans involving new construction, unless such plans would seriously impair the historic or architectural value of surrounding historic resources or would impair the character of the historic district. (Ord. No. 9-4, § 1; Ord. No. 11-59.)

STAFF RECOMMENDATION

Staff recommends that the Commission **approve** the HAWP application as being consistent with Chapter 24A-8(b), (1) and (2):

and with the general condition that the applicant shall present the **3 permit sets of drawings to Historic Preservation Commission (HPC) staff for review and stamping** prior to submission for the Montgomery County Department of Permitting Services (DPS) building permits;

and with the general condition that the applicant shall notify the Historic Preservation Staff if they propose to make **any alterations** to the approved plans. Once the work is completed the applicant will contact the staff person assigned to this application at 301-563-3400 or anne.fothergill@mncppc-mc.org to schedule a follow-up site visit.

DPS - #8

HISTORIC PRESERVATION COMMISSION
301/563-3400

APPLICATION FOR HISTORIC AREA WORK PERMIT

~~531,15~~ 531815

Contact Person: CHUCK BERGMANN

Daytime Phone No.: 301-972-0211

Tax Account No.: 11 03302384

Name of Property Owner: CARLIN FARM LLC Daytime Phone No.:

Address: 920 OLD BUCKLODGE LN (Street Number) BOYDS (City) MD (State) 20841 (Zip Code)

Contractor: STANDARD SOLAR Phone No.: 301-944-5137

Contractor Registration No.: AC1090454

Agent for Owner: TOM SHEA Daytime Phone No.: 301-944-5137

LOCATION OF BUILDING/PREMISE

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Town/City: BOYDS Nearest Cross Street: BUCKLODGE LN (119)

Lot: Block: Subdivision: 1

Liber: Folio: Parcel: P420

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1A. CHECK ALL APPLICABLE:

☐ Construct ☐ Extend ☐ Alter/Renovate

☐ Move ☑ Install ☐ Wreck/Raze

☐ Revision ☐ Repair ☐ Revocable

CHECK ALL APPLICABLE:

☐ A/C ☐ Slab ☐ Room Addition ☐ Porch ☐ Deck ☐ Shed

☐ Solar ☐ Fireplace ☐ Woodburning Stove ☐ Single Family

☐ Fence/Wall (complete Section 4) ☐ Other: ROOFTOP SOLAR SYSTEM

1B. Construction cost estimate: $ 28,500

1C. If this is a revision of a previously approved active permit, see Permit #

PART TWO: COMPLETE FOR NEW CONSTRUCTION AND EXTEND/ADDITIONS

2A. Type of sewage disposal: 01 ☐ WSSC 02 ☑ Septic 03 ☐ Other:

2B. Type of water supply: 01 ☐ WSSC 02 ☑ Well 03 ☐ Other:

PART THREE: COMPLETE ONLY FOR FENCE/RETAINING WALL

3A. Height feet inches

3B. Indicate whether the fence or retaining wall is to be constructed on one of the following locations:

☐ On party line/property line ☐ Entirely on land of owner ☐ On public right of way/easement

I hereby certify that I have the authority to make the foregoing application, that the application is correct, and that the construction will comply with plans approved by all agencies listed and I hereby acknowledge and accept this to be a condition for the issuance of this permit.

CHARLES BERGMANN

Charles D Bergmann
Signature of owner or authorized agent

1/20/10
Date

Approved: For Chairperson, Historic Preservation Commission

Disapproved: Signature: Date:

Application/Permit No.: Date Filed: Date Issued:

Edit 6/21/99

SEE REVERSE SIDE FOR INSTRUCTIONS

(4)

THE FOLLOWING ITEMS MUST BE COMPLETED AND THE REQUIRED DOCUMENTS MUST ACCOMPANY THIS APPLICATION.

1. **WRITTEN DESCRIPTION OF PROJECT**

   a. Description of existing structure(s) and environmental setting, including their historical features and significance:

   AGRICULTURAL BARN - RURAL LOCATION

   b. General description of project and its effect on the historic resource(s), the environmental setting, and, where applicable, the historic district:

   INSTALATION OF 44 PV SOLAR PANELS ON BARN ROOF ATTACHED TO STANDING SEAM METAL ROOF WITH S-5 CLIPS. EACH PANEL MEASURES 31.8 INCHES X 62.2 INCHES.

2. **SITE PLAN**

   Site and environmental setting, drawn to scale. You may use your plat. Your site plan must include:

   a. the scale, north arrow, and date;

   b. dimensions of all existing and proposed structures; and

   c. site features such as walkways, driveways, fences, ponds, streams, trash dumpsters, mechanical equipment, and landscaping.

3. **PLANS AND ELEVATIONS**

   You must submit 2 copies of plans and elevations in a format no larger than 11" x 17". Plans on 8 1/2" x 11" paper are preferred.

   a. *Schematic construction plans*, with marked dimensions, indicating location, size and general type of walls, window and door openings, and other fixed features of both the existing resource(s) and the proposed work.

   b. Elevations (facades), with marked dimensions, clearly indicating proposed work in relation to existing construction and, when appropriate, context. All materials and fixtures proposed for the exterior must be noted on the elevations drawings. An existing and a proposed elevation drawing of each facade affected by the proposed work is required.

4. **MATERIALS SPECIFICATIONS**

   General description of materials and manufactured items proposed for incorporation in the work of the project. This information may be included on your design drawings.

5. **PHOTOGRAPHS**

   a. Clearly labeled photographic prints of each facade of existing resource, including details of the affected portions. All labels should be placed on the front of photographs.

   b. Clearly label photographic prints of the resource as viewed from the public right-of-way and of the adjoining properties. All labels should be placed on the front of photographs.

6. **TREE SURVEY**

   If you are proposing construction adjacent to or within the dripline of any tree 6" or larger in diameter (at approximately 4 feet above the ground), you must file an accurate tree survey identifying the size, location, and species of each tree of at least that dimension.

7. **ADDRESSES OF ADJACENT AND CONFRONTING PROPERTY OWNERS**

   For **ALL** projects, provide an accurate list of adjacent and confronting property owners (not tenants), including names, addresses, and zip codes. This list should include the owners of all lots or parcels which adjoin the parcel in question, as well as the owner(s) of lot(s) or parcel(s) which lie directly across the street/highway from the parcel in question. You can obtain this information from the Department of Assessments and Taxation, 51 Monroe Street, Rockville, (301/279-1355).

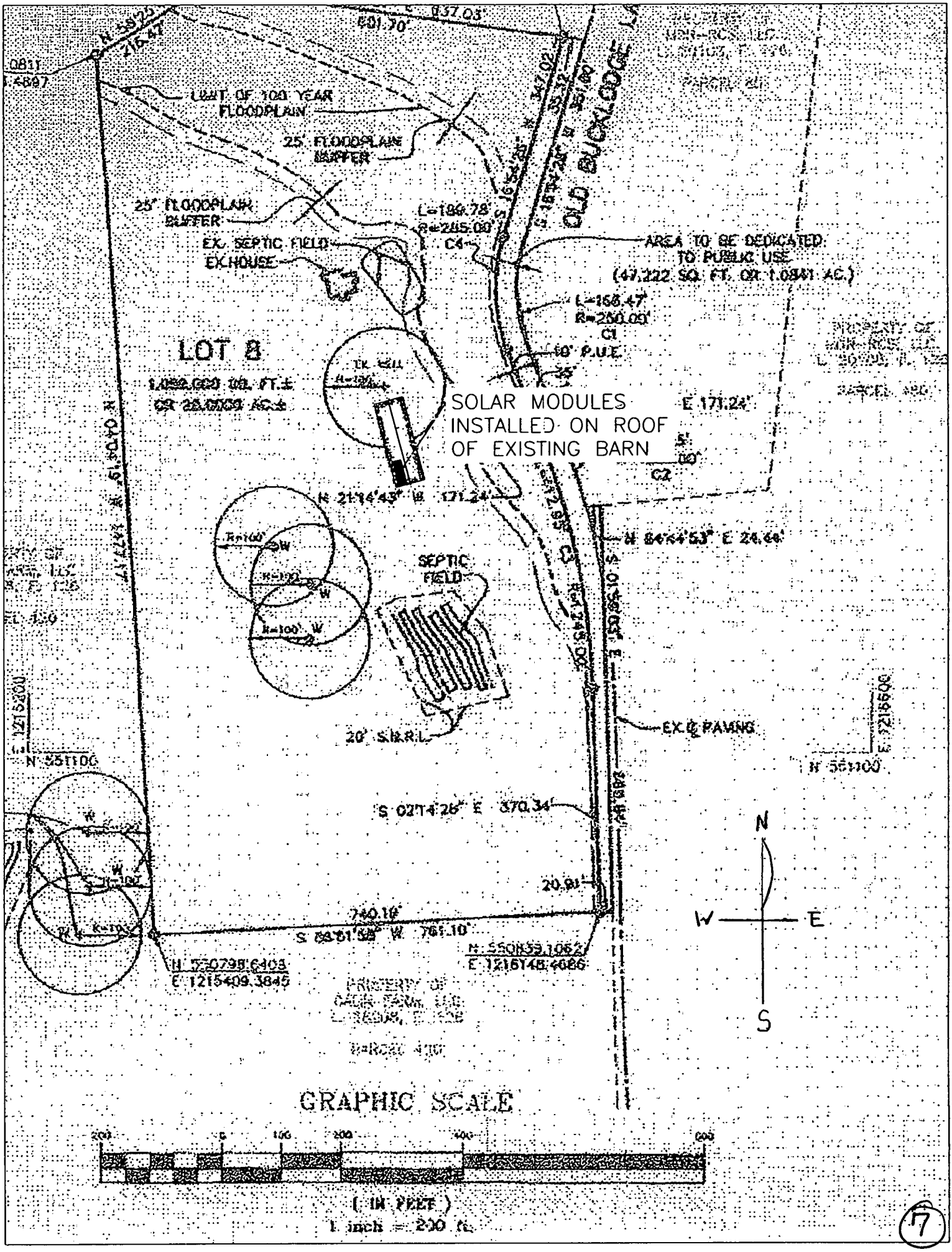
PLEASE PRINT (IN BLUE OR BLACK INK) OR TYPE THIS INFORMATION ON THE FOLLOWING PAGE.
PLEASE STAY WITHIN THE GUIDES OF THE TEMPLATE, AS THIS WILL BE PHOTOCOPIED DIRECTLY ONTO MAILING LABELS.

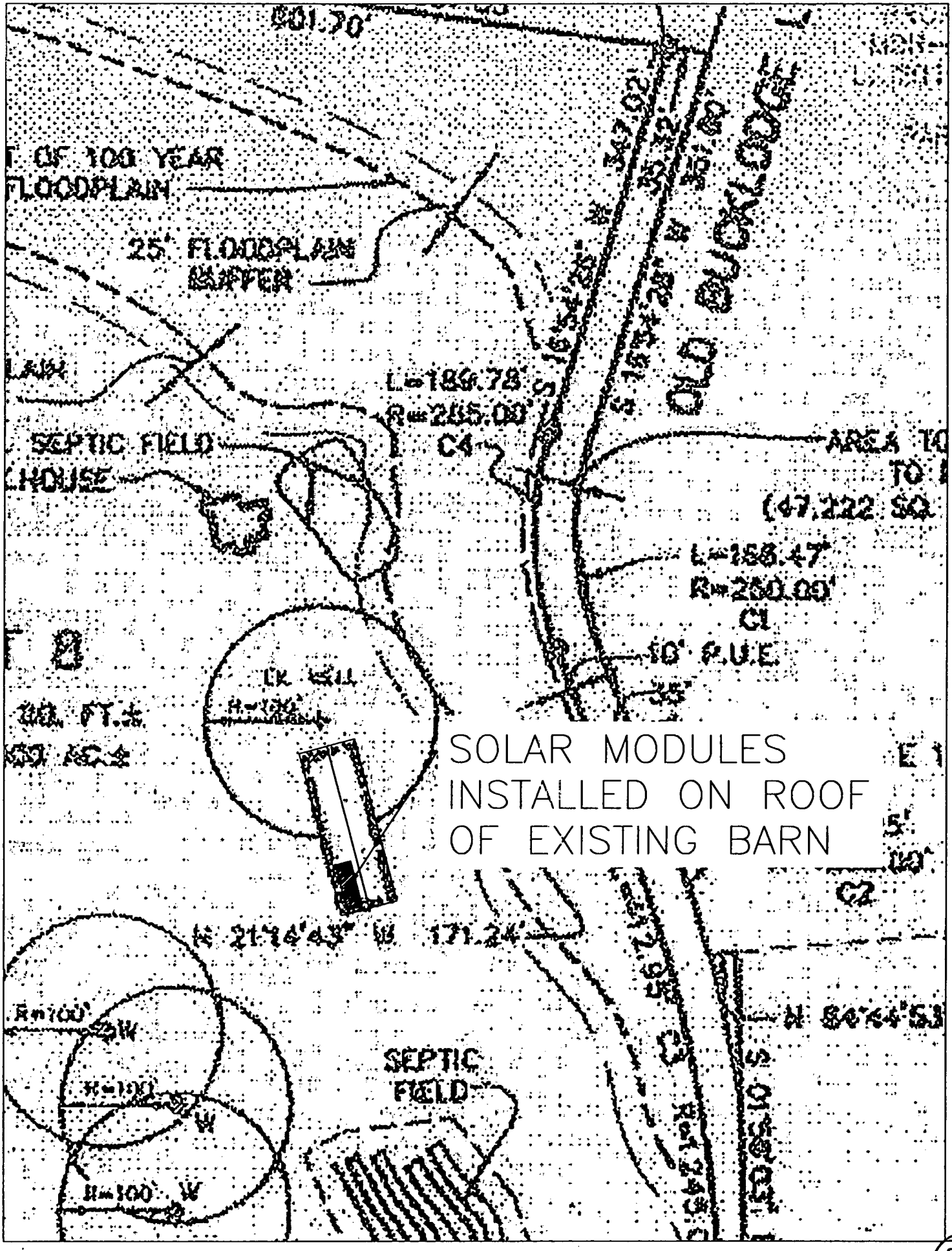
HAWP APPLICATION: MAILING ADDRESSES FOR NOTIFING
[Owner, Owner's Agent, Adjacent and Confronting Property Owners]

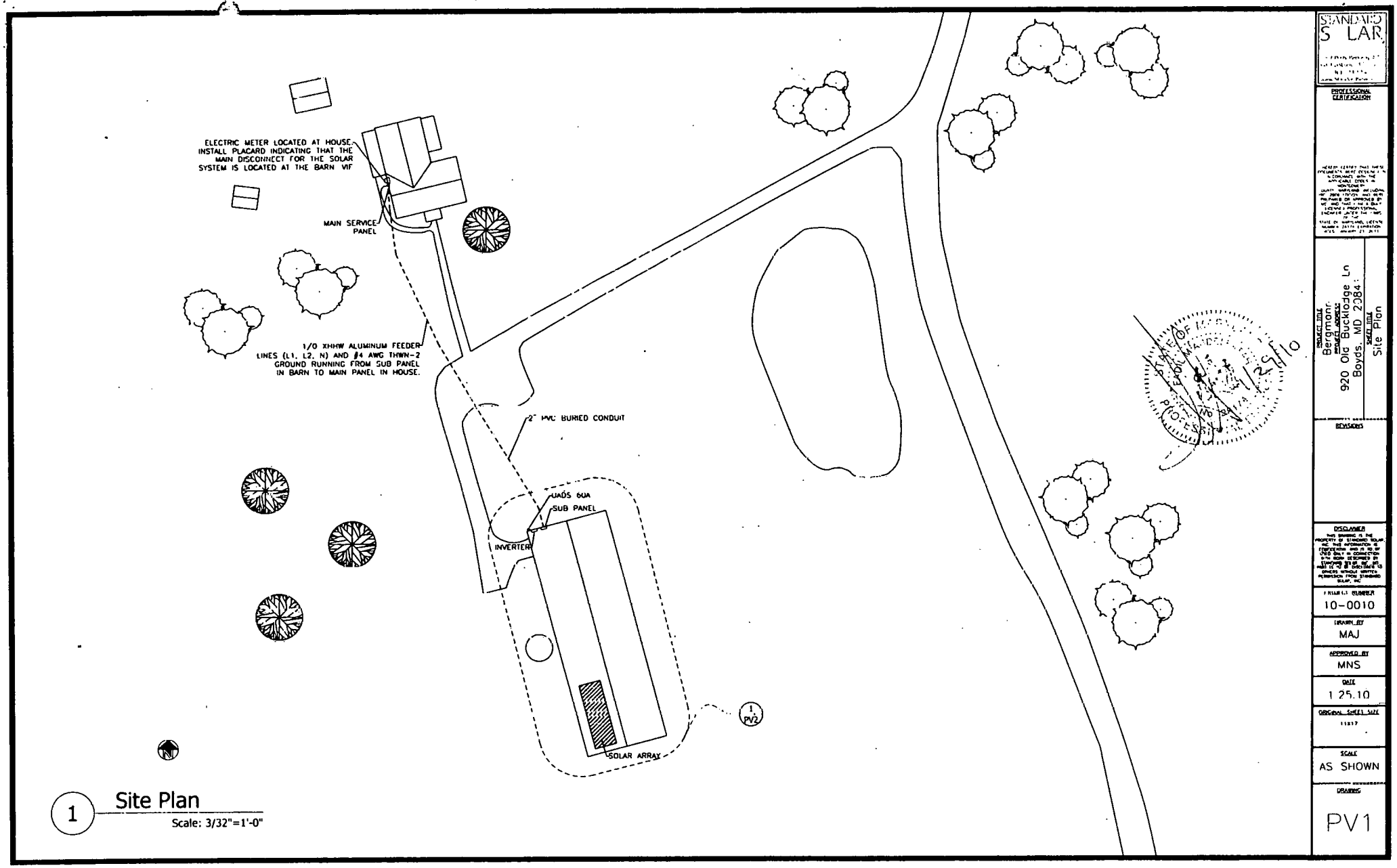
Owner's mailing address	**Owner's Agent's** mailing address
CHUCK BERGMANN 920 OLD BUCKLODGE LA BOYDS, MD 20841	TOM SHEA 202 PERRY PARKWAY #7 GAITHERSBURG, MD 20877

Adjacent and confronting Property Owners mailing addresses

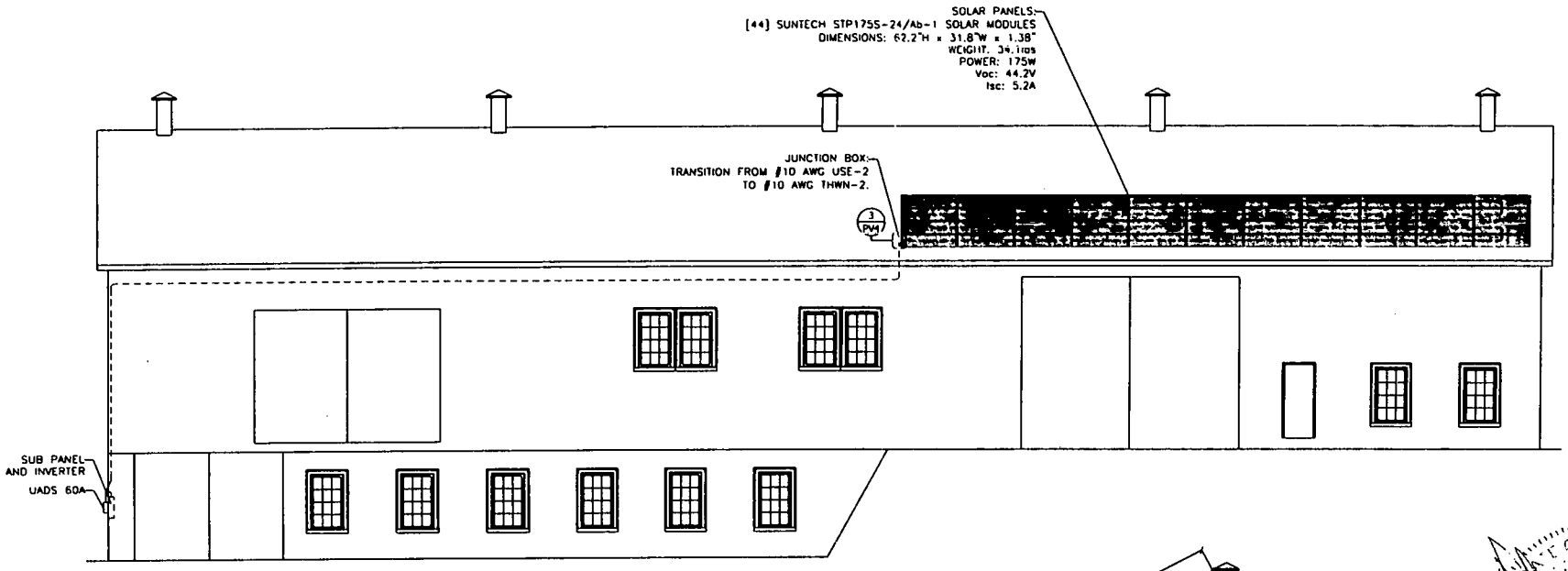
MICHAEL RUBIN 810 BUCKLODGE RD. BOYDS, MD 20841	JOEL & CAROL DAVIS 815 OLD BUCKLODGE LANE BOYDS, MD 20841


LIMIT OF 100 YEAR FLOODPLAIN
25' FLOODPLAIN BUFFER
25' FLOODPLAIN BUFFER
EX. SEPTIC FIELD
EX. HOUSE
L=186.78'
R=285.00'
C4
OLD BUCKLOOE
AREA TO BE DEDICATED TO PUBLIC USE
(47,222 SQ. FT. OR 1.0841 AC.)
L=158.47'
R=250.00'
C1
10' P.U.E.
LOT 8
1,052,600 SQ. FT.±
OR 24.0709 AC.±
EX. WELL
SOLAR MODULES INSTALLED ON ROOF OF EXISTING BARN
E 171.24'
C2
N 21°14'45" W 171.24'
N 84°44'53" E 24.44'
SEPTIC FIELD
EX. PAVING
20' S.B.R.L.
S 02°14'26" E 370.34'
20.81'
740.10'
S 88°51'58" W 761.10'
N: 550738.6403
E: 1215409.3845
N: 550839.1062
E: 1215745.4086
N 551100
E 1215600
N
W
E
S
GRAPHIC SCALE
200
0
100
200
400
600
(IN FEET)
1 inch = 200 ft.


EDGE OF 100 YEAR FLOODPLAIN
25' FLOODPLAIN BUFFER
SEPTIC FIELD
HOUSE
L=186.78'
R=255.00'
C4
AREA TO
(47,222 SQ.
L=156.47'
R=250.00'
C1
10' D.U.E.
SOLAR MODULES
INSTALLED ON ROOF
OF EXISTING BARN
C2
SEPTIC
FIELD

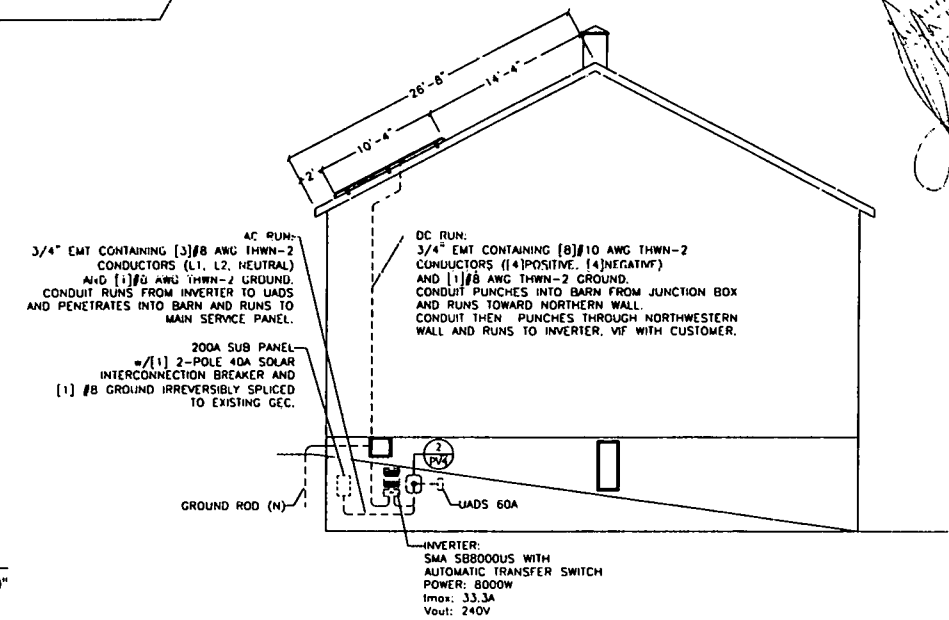

ELECTRIC METER LOCATED AT HOUSE. INSTALL PLACARD INDICATING THAT THE MAIN DISCONNECT FOR THE SOLAR SYSTEM IS LOCATED AT THE BARN WF
MAIN SERVICE PANEL
1/0 XHHW ALUMINUM FEEDER LINES (L1, L2, N) AND #4 AWG THWN-2 GROUND RUNNING FROM SUB PANEL IN BARN TO MAIN PANEL IN HOUSE.
2" PVC BURIED CONDUIT
UADS 60A SUB PANEL
INVERTER
SOLAR ARRAY
1 PV2
N
1 Site Plan
Scale: 3/32"=1'-0"
STANDARD SOLAR
PROFESSIONAL CERTIFICATION
PROJECT TITLE
Bergmann
PROJECT ADDRESS
920 Old Buckridge Ln
Boyds, MD 20841
SHEET TITLE
Site Plan
REVISIONS
DISCLAIMER
10-0010
DRAWN BY
MAJ
APPROVED BY
MNS
DATE
1.25.10
ORIGINAL SHEET SIZE
11x17
SCALE
AS SHOWN
DRAWING
PV1

6



1 West Elevation

Scale: 3/32"=1'-0"



2 South Elevation

Scale: 3/32"=1'-0"

STANDARD SOLAR

PROFESSIONAL CERTIFICATION

PROJECT NAME
Bergmann
STREET ADDRESS
920 Old Buckridge Ln
Boyds, MD 20841
SHEET TITLE
Elevations

REVISIONS

DISCLAIMER

PROJECT NUMBER
10 0010

DRAWN BY
MAJ

APPROVED BY
MNS

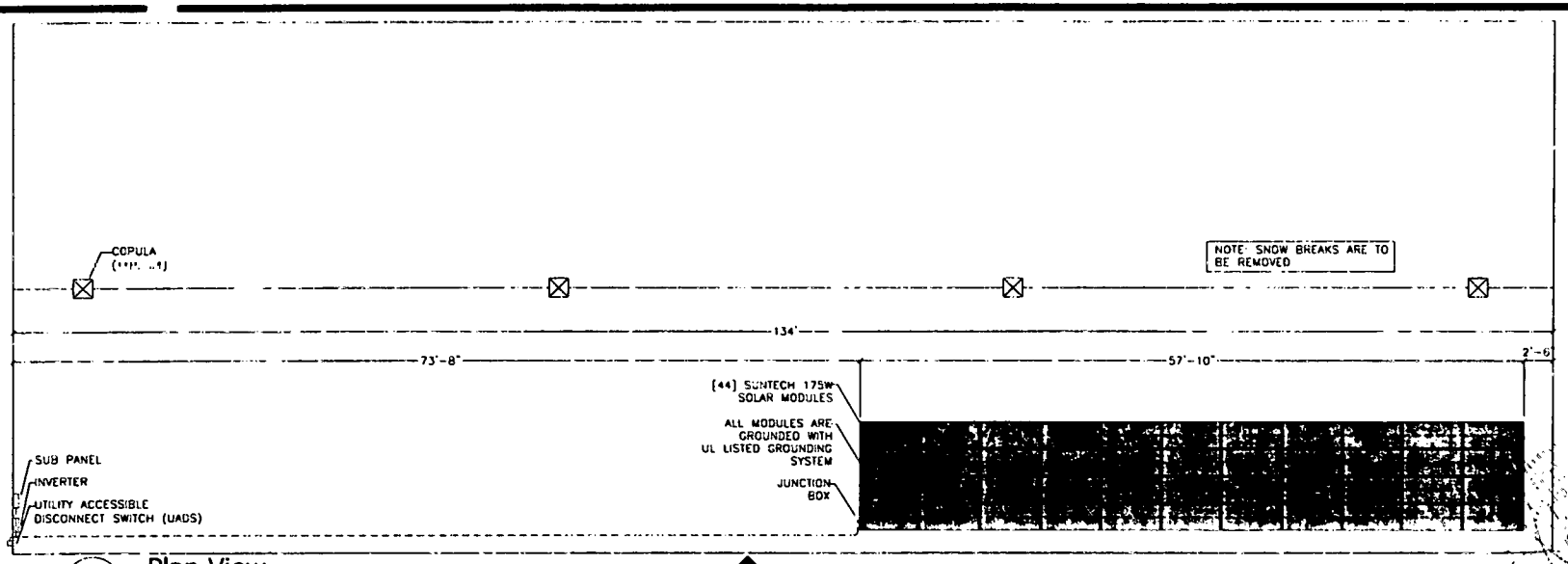
DATE
1.25.10

ORIGINAL SHEET SIZE
11x17

SCALE
AS SHOWN

DRAWING
PV3

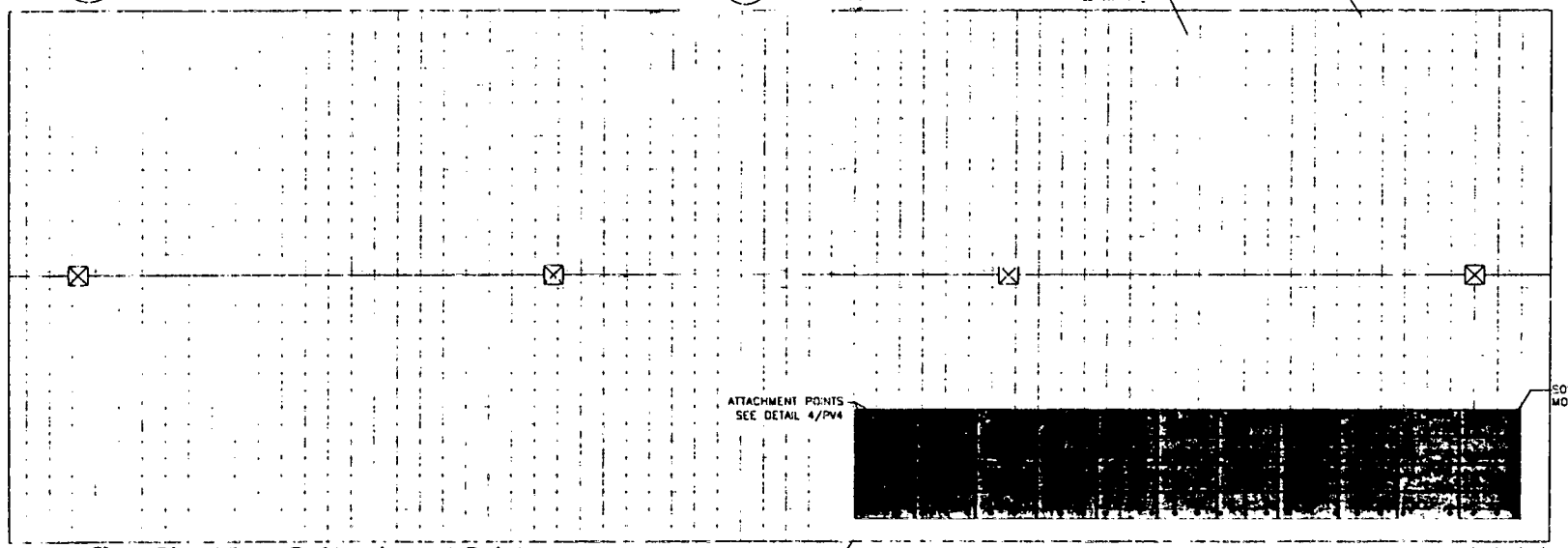
(9)



1 Plan View

Scale: 3/32"=1'-0"

1 PV3



2 Plan View @ Attachment Points

Scale: 3/32"=1'-0"

S LABS

PROJECT INFO
Bergmann
320 Old Buckridge Ct
Boyds, MD 20841
Plan View

DISCLAIMER

PROJECT NUMBER
10 0010

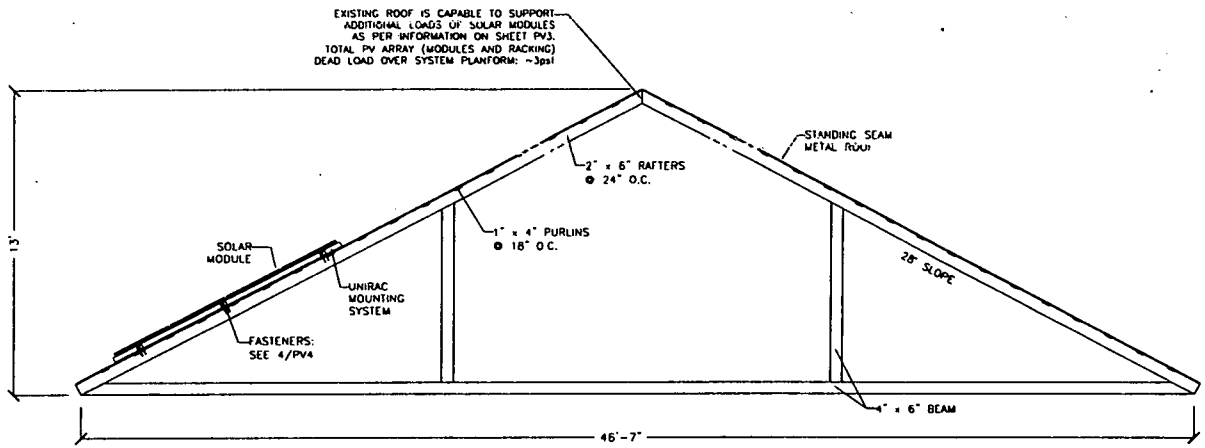
DRAWN BY
MAJ

APPROVED BY
MNS

DATE
1.25.10

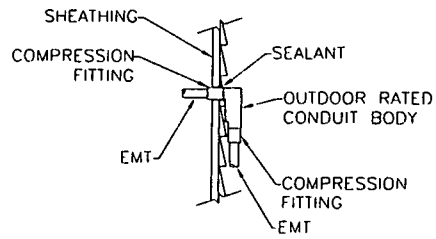
SCALE
AS SHOWN

DRAWING
PV2



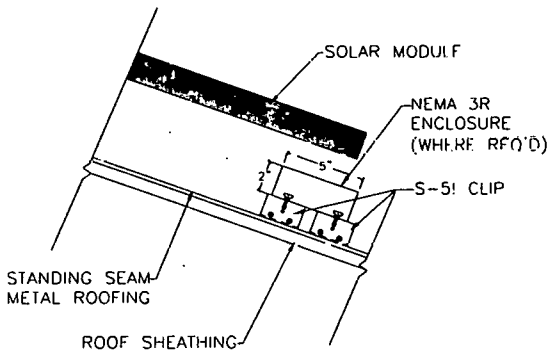
1 Roof A Detail

Scale: 3/16"=1'-0"



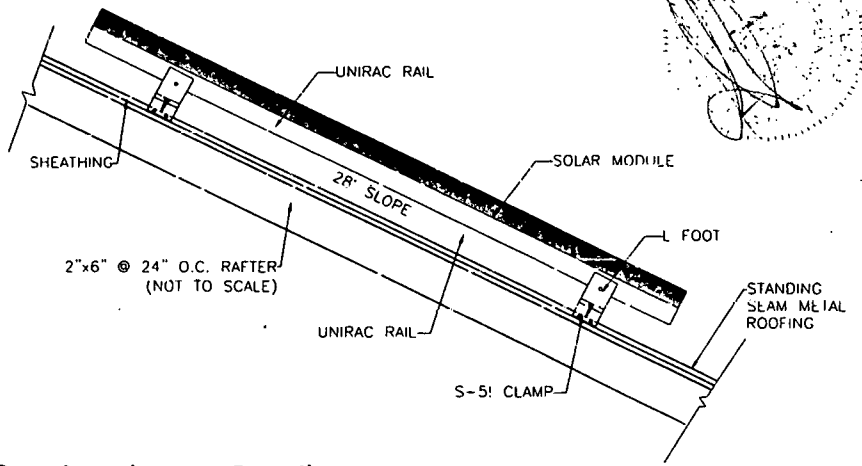
2 Wall Penetration Detail

Scale: 1-1/2"=1'-0"



3 Junction Box Detail

Scale: 1-1/2"=1'-0"



4 Attachment Detail

Scale: 1"=1'-0"

STANDING SEAM SOLAR

PROFESSIONAL CERTIFICATION

PROJECT TITLE
Benjamin Residence
92C Old Buckledge Ln
Goyds, MD 20841

SHEET TITLE
Details

REVISIONS

DISCLAIMER
THIS DRAWING IS THE PROPERTY OF STANDING SOLAR INC. THIS INFORMATION IS CONFIDENTIAL AND IS TO BE USED ONLY IN CONNECTION WITH WORK BY STANDING SOLAR INC. IT IS NOT TO BE DISCLOSED TO OTHERS WITHOUT WRITTEN PERMISSION FROM STANDING SOLAR, INC.

PROJECT NUMBER
10-0010

DRAWN BY
MAJ

APPROVED BY
MNS

DATE
1.25.10

ORIGINAL SHEET SIZE
11X17

SCALE
AS SHOWN

DRAWING
PV4

(12)

SOLARMOUNT™

Code-Compliant Installation Manual 227

U.S. Des. Patent No. D496,248S, D496,249S. Other patents pending.

UniRac Code-Compliant Installation Manual

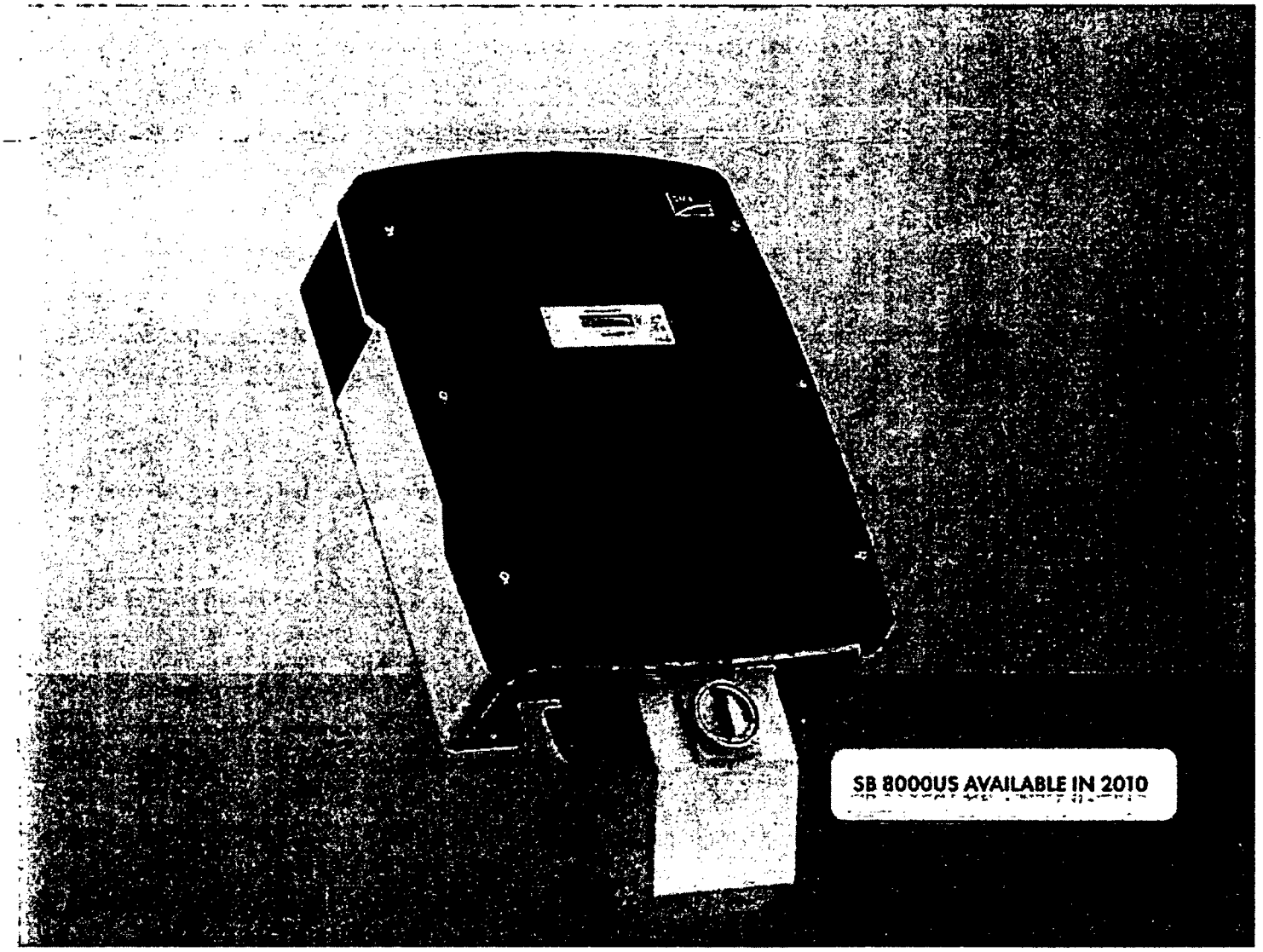
Table of Contents

UNIRAC® THE STANDARD IN PV MOUNTING STRUCTURES™

Pub 080118-2cc
February 2008

UniRac welcomes input concerning the accuracy and user-friendliness of this publication. Please write to publications@unirac.com.

SUNNY BOY 5000US / 6000US / 7000US / 8000US



- Highest CEC efficiency in its class
- Integrated load-break rated lockable DC disconnect switch
- Integrated fused series string combiner
- Sealed electronics enclosure & Opticool™
- Comprehensive SMA communications and data collection options
- Ideal for residential or commercial applications
- Sunny Tower compatible
- 10 year standard warranty
- UL 1741/IEEE-1547 compliant

c UL US

SUNNY BOY 5000US/6000US/7000US / 8000US

The best in their class

Our US series inverters utilize our proven technology and are designed specifically to meet IEEE-1547 requirements. Sunny Boy 6000US, Sunny Boy 7000US and Sunny Boy 8000US are also compatible with the Sunny Tower. Increased efficiency means better performance and shorter payback periods. All four models are field-configurable for positive ground systems making them more versatile than ever. Throughout the world, Sunny Boy is the benchmark for PV inverter performance and reliability.

SUNTECH

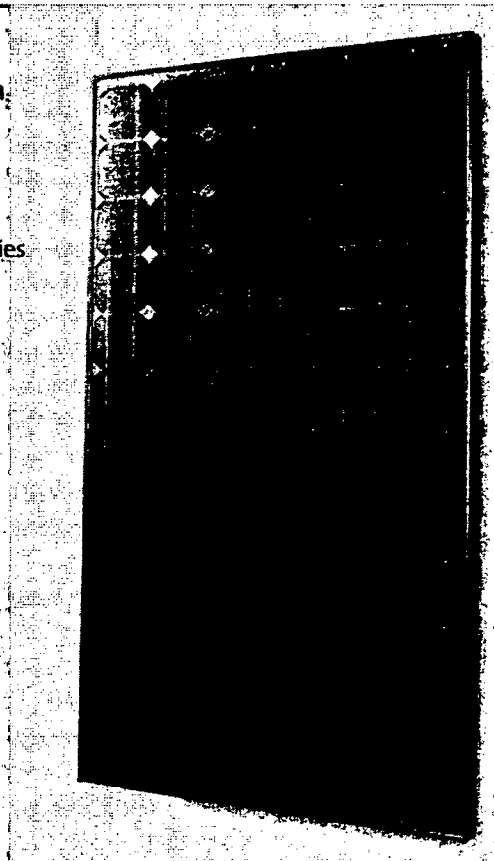
Solar powering a green future™

BLACK LABEL™

STP180S - 24/Ab -1
STP175S - 24/Ab -1
STP170S - 24/Ab -1
STP165S - 24/Ab -1
STP160S - 24/Ab -1

175 Watt
MONO-CRYSTALLINE SOLAR PANEL

Suntech Black Label™ modules are exclusively designed and engineered for homeowners who seek a rooftop solar solution that combines visual aesthetics with excellent efficiency.



Features

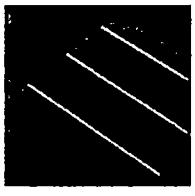
- High conversion efficiency based on innovative photovoltaic technologies
- High reliability with guaranteed +/-3% power output tolerance
- Withstands high wind-pressure and snow load, and extreme temperature variations

Quality and Safety

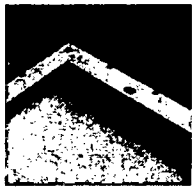
- 25-year power output transferable warranty
- Rigorous quality control meeting the highest international standards
- ISO 9001:2000 (Quality Management System) and ISO 14001:2004 (Environmental Management System) certified factories manufacturing world class products
- UL listings: UL1703, cULus, Class C fire rating, conformity to CE

Recommended Applications

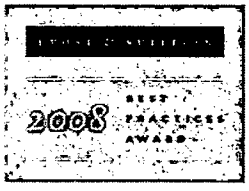
- Residential roof top systems
- On-grid utility systems
- On-grid commercial systems



Suntech's technology yields improvements to BSF structure and anti-reflective coating to increase conversion efficiency



Unique design on drainage holes and rigid construction prevents frame from deforming or breaking due to freezing weather and other forces



Suntech was named Frost and Sullivan's 2008 Solar Energy Development Company of the Year

The panel provides more field power output through an advanced cell texturing and isolation process, which improves low irradiance performance

15

Part I. Procedure to Determine the Design Wind Load

[1.1.] Using the Simplified Method - ASCE 7-05

The procedure to determine Design Wind Load is specified by the American Society of Civil Engineers and referenced in the International Building Code 2006. For purposes of this document, the values, equations and procedures used in this document reference ASCE 7-05, Minimum Design Loads for Buildings and Other Structures. ***Please refer to ASCE 7-05 if you have any questions about the definitions or procedures presented in this manual.*** UniRac uses Method 1, the Simplified Method, for calculating the Design Wind Load for pressures on components and cladding in this document.

The method described in this document is valid for flush, no tilt, SolarMount Series applications on either roofs or walls. Flush is defined as panels parallel to the surface (or with no more than 3" difference between ends of assembly) with no more than 10" space between the roof surface, and the bottom of the PV panels.

This method is not approved for open structure calculations. ***Applications of these procedures is subject to the following ASCE 7-05 limitations:***

1. The building height must be less than 60 feet, h < 60. See note for determining h in the next section. For installations on structures greater than 60 feet, contact your local UniRac Distributor.

2. The building must be enclosed, not an open or partially enclosed structure, for example a carport.

3. The building is regular shaped with no unusual geometrical irregularity in spatial form, for example a geodesic dome.

4. The building is not in an extreme geographic location such as a narrow canyon or steep cliff.

5. The building has a flat or gable roof with a pitch less than 45 degrees or a hip roof with a pitch less than 27 degrees.

6. If your installation does not conform to these requirements please contact your local UniRac distributor, a local professional engineer or UniRac

If your installation is outside the United States or does not meet all of these limitations, consult a local professional engineer or your local building authority. Consult ASCE 7-05 for more clarification on the use of Method I. Lower design wind loads may be obtained by applying Method II from ASCE 7-05. Consult with a licensed engineer if you want to use Method II procedures.

The equation for determining the Design Wind Load for components and cladding is:

$$p_{net}\ (psf) = \lambda K_{zt} I\ p_{net30}$$

p_{net} *(psf) = Design Wind Load*

λ *= adjustment factor for height and exposure category*

K_{zt} *= Topographic Factor at mean roof height, h (ft)*

I *= Importance Factor*

p_{net30} *(psf) = net design wind pressure for Exposure B, at height = 30, I = 1*

You will also need to know the following information:

Basic Wind Speed = V (mph), the largest 3 second gust of wind in the last 50 years.

h (ft) = total roof height for flat roof buildings or mean roof height for pitched roof buildings

Effective Wind Area (sf) = minimum total continuous area of modules being installed

Roof Zone = the area of the roof you are installing the pv system according to Figure 2, page 5.

Roof Zone Setback Length = a (ft)

Roof Pitch (degrees)

Exposure Category

[1.2.] Procedure to Calculate Total Design Wind

The procedure for determining the Design Wind Load can be broken into steps that include looking up several values in different tables.

Step 1: Determine *Basic Wind Speed, V (mph)*

Determine the *Basic Wind Speed, V (mph)* by consulting your local building department or locating your installation on the maps in Figure 1, page 4.

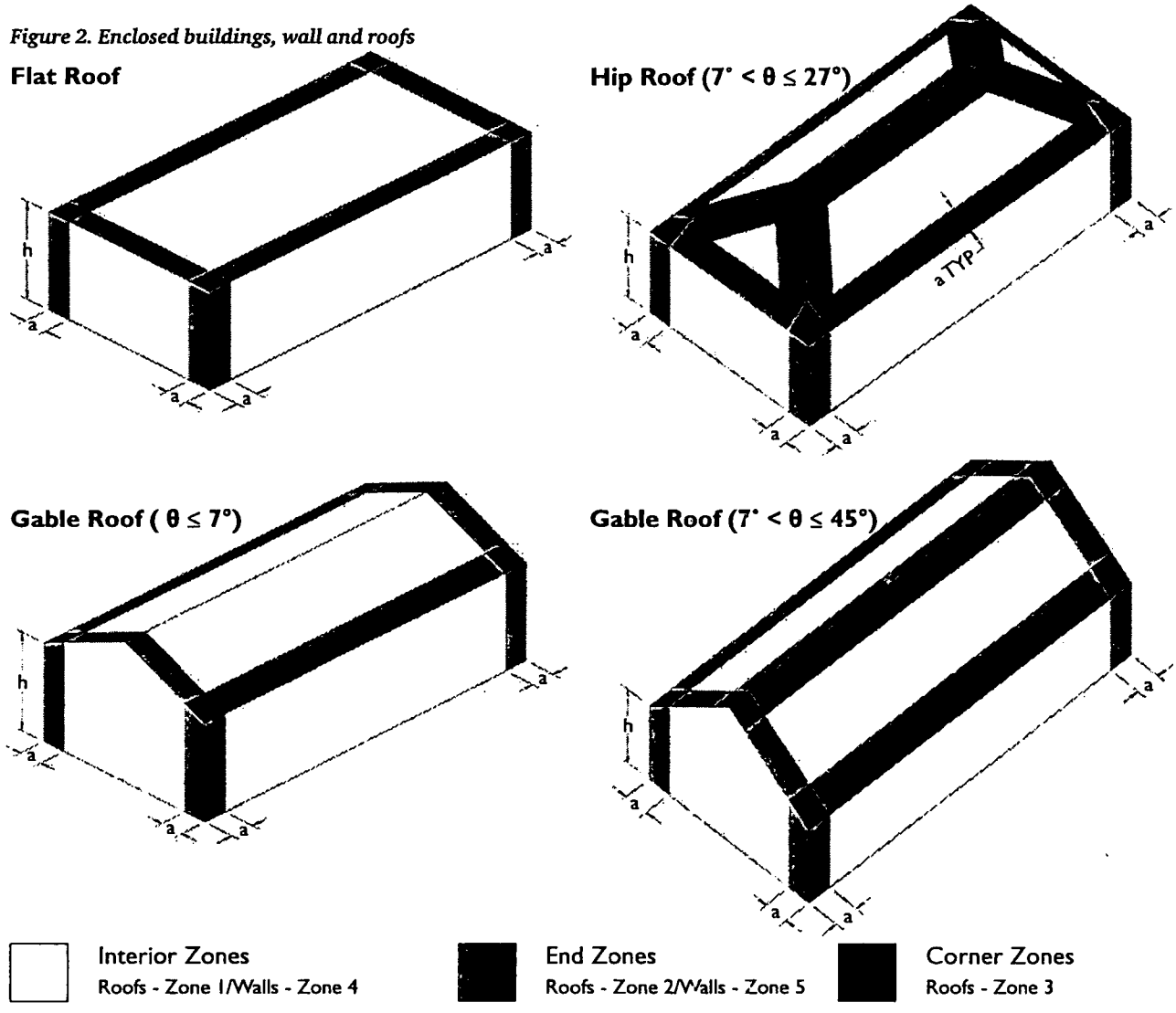
Step 2: Determining *Effective Wind Area*

Determine the smallest area of continuous modules you will be installing. This is the smallest area tributary (contributing load) to a support or to a simple-span of rail. That area is the Effective Wind Area.

Step 3: Determine *Roof Zone (continued)*

Using *Roof Zone Setback Length*, a, determine the roof zone locations according to your roof type, gable, hip or monoslope. Determine in which roof zone your pv system is located, Zone 1, 2, or 3 according to Figure 2.

Figure 2. Enclosed buildings, wall and roofs



Source: ASCE/SEI 7-05, Minimum Design Loads for Buildings and Other Structures, Chapter 6, p. 41.

Step 4: Determine *Net Design Wind Pressure, p_{net30} (psf)*

Using the *Effective Wind Area* (Step 2), *Roof Zone Location* (Step 3), and *Basic Wind Speed* (Step 1), look up the appropriate *Net Design Wind Pressure* in Table 2, page 6. Use the *Effective Wind Area* value in the table which is smaller than the value calculated in Step 2. If the installation is located on a roof overhang, use Table 3, page 7.

Both downforce and uplift pressures must be considered in overall design. Refer to Section II, Step 1 for applying downforce and uplift pressures. Positive values are acting toward the surface. Negative values are acting away from the surface.

Table 3. p_{net30} (psf) Roof Overhang

	Zone	Effective Wind Area (sf)	Basic Wind Speed V (mph)							
			90	100	110	120	130	140	150	170
Roof 0 to 7 degrees	2	10	-21.0	-25.9	-31.4	-37.3	-43.8	-50.8	-58.3	-74.9
	2	20	-20.6	-25.5	-30.8	-36.7	-43.0	-49.9	-57.3	-73.6
	2	50	-20.1	-24.9	-30.1	-35.8	-42.0	-48.7	-55.9	-71.8
	2	100	-19.8	-24.4	-29.5	-35.1	-41.2	-47.8	-54.9	-70.5
	3	10	-34.6	-42.7	-51.6	-61.5	-72.1	-83.7	-96.0	-123.4
	3	20	-27.1	-33.5	-40.5	-48.3	-56.6	-65.7	-75.4	-96.8
	3	50	-17.3	-21.4	-25.9	-30.8	-36.1	-41.9	-48.1	-61.8
	3	100	-10.0	-12.2	-14.8	-17.6	-20.6	-23.9	-27.4	-35.2
Roof 7 to 27degrees	2	10	-27.2	-33.5	-40.5	-48.3	-56.7	-65.7	-75.5	-96.9
	2	20	-27.2	-33.5	-40.5	-48.3	-56.7	-65.7	-75.5	-96.9
	2	50	-27.2	-33.5	-40.6	-48.3	-56.7	-65.7	-75.5	-96.9
	2	100	-27.2	-33.5	-40.6	-48.3	-56.7	-65.7	-75.5	-96.9
	3	10	-45.7	-56.4	-68.3	-81.2	-95.3	-110.6	-126.9	-163.0
	3	20	-41.2	-50.9	-61.6	-73.3	-86.0	-99.8	-114.5	-147.1
	3	50	-35.3	-43.6	-52.8	-62.8	-73.7	-85.5	-98.1	-126.1
	3	100	-30.9	-38.1	-46.1	-54.9	-64.4	-74.7	-85.8	-110.1
Roof 27 to 45 degrees	2	10	-24.7	-30.5	-36.9	-43.9	-51.5	-59.8	-68.6	-88.1
	2	20	-24.0	-29.6	-35.8	-42.6	-50.0	-58.0	-66.5	-85.5
	2	50	-23.0	-28.4	-34.3	-40.8	-47.9	-55.6	-63.8	-82.0
	2	100	-22.2	-27.4	-33.2	-39.5	-46.4	-53.8	-61.7	-79.3
	3	10	-24.7	-30.5	-36.9	-43.9	-51.5	-59.8	-68.6	-88.1
	3	20	-24.0	-29.6	-35.8	-42.6	-50.0	-58.0	-66.5	-85.5
	3	50	-23.0	-28.4	-34.3	-40.8	-47.9	-55.6	-63.8	-82.0
	3	100	-22.2	-27.4	-33.2	-39.5	-46.4	-53.8	-61.7	-79.3

Source: ASCE/SEI 7-05, Minimum Design Loads for Buildings and Other Structures, Chapter 6, p. 44.

Step 5: Determine the Topographic Factor, K_{zt}

For the purposes of this code compliance document, the *Topographic Factor*, K_{zt}, is taken as equal to one (1), meaning, the installation is on level ground (less than 10% slope). If the installation is not on level ground, please consult ASCE 7-05, Section 6.5.7 and the local building authority to determine the *Topographic Factor*.

Step 6: Determine *Exposure Category (B, C, D)*

Determine the *Exposure Category* by using the following definitions for Exposure Categories.

The *ASCE/SEI 7-05** defines wind exposure categories as follows:

EXPOSURE B is urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single family dwellings.

EXPOSURE C has open terrain with scattered obstructions having heights generally less than 30 feet. This category includes flat open country, grasslands, and all water surfaces in hurricane prone regions.

EXPOSURE D has flat, unobstructed areas and water surfaces outside hurrican prone regions. This category includes smooth mud flats, salt flats, and unbroken ice.

Also see ASCE 7-05 pages 287-291 for further explanation and explanatory photographs, and confirm your selection with the local building authority.

Table 6. Occupancy Category Importance Factor

Category	*Category Description*	*Building Type Examples*	*Non-Hurricane Prone Regions and Hurricane Prone Regions with Basic Wind Speed, V = 85-100 mph, and Alaska*	*Hurricane Prone Regions with Basic Wind Speed, V > 100mph*
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including, but limited to:	Agricultural facilities Certain Temporary facilities Minor Storage facilities	0.87	0.77
II	All buildings and other structures except those listed in Occupancy Categories I, III, and IV.		1	1
III	Buildings and other structures that represent a substantial hazard to human life in the event of a failure, including, but not limited to:	Buildings where more than 300 people congregate Schools with a capacity more than 250 Day Cares with a capacity more than 150 Buildings for colleges with a capcity more than 500 Health Care facilities with a capacity more than 50 or more resident patients Jails and Detention Facilities Power Generating Stations Water and Sewage Treatment Facilities Telecommunication Centers Buildings that manufacutre or house hazardous materials	1.15	1.15
IV	Buildings and other structures designated as essential facilities, including, but not limited to:	Hospitals and other health care facilities having surgery or emergency treatment Fire, rescue, ambulance and police stations Designated earthquake, hurricane, or other emergency shelters Designated emergency preparedness, communication, and operation centers Power generating stations and other public utility facilities required in an emergency Ancillary structures required for operation of Occupancy Category IV structures Aviation control towers, air traffic control centers, and emergency aircraft hangars Water storage facilities and pump structures required to maintain water pressure for fire suppression Buildings and other structures having critical national defense functions	1.15	1.15

Source: IBC 2006, Table 1604.5, Occupancy Category of Buildings and other structures, p. 281; ASCE/SEI 7-05, Minimum Design Loads for Buildings and Other Structures, Table 6-1, p. 77

Table 7. ASCE 7 ASD Load Combinations

Description	Variable	Downforce Case 1	Downforce Case 2	Downforce Case 3	Uplift	units
Dead Load	D	1.0 x	1.0 x	1.0 x	0.6 x	psf
Snow Load	S	1.0 x +	1.0 x +	0.75 x +		psf
Design Wind Load	Pnet		1.0 x +	0.75 x +	1.0 x	psf
Total Design Load	P					psf

Note: Table to be filled out or attached for evaluation.

Step 2: Determine the *Distributed Load on the rail, w (plf)*

Determine the *Distributed Load, w (plf)*, by multiplying the module width, B (ft), by the *Total Design Load, P (psf)* and dividing by two. Use the maximum absolute value of the three downforce cases and the Uplift Case. We assume each module is supported by two rails.

$$w = PB/2$$

w = Distributed Load (pounds per linear foot, plf)

B = Module Length Perpendicular to Rails (ft)

P = Total Design Pressure (pounds per square foot, psf)

Step 3: Determine *Rail Span/ L-Foot Spacing*

Using the *distributed load, w*, from Part II, **Step 2**, look up the *allowable spans, L*, for each UniRac rail type, SolarMount (SM) and SolarMount Heavy Duty (HD).

There are two tables, L-Foot SolarMount Series Rail Span Table and Double L-Foot SolarMount Series Rail Span Table. The L-Foot SolarMount Series Rail Span Table uses a single L-foot connection to the roof, wall or stand-off. The point load connection from the rail to the L-foot can be increased by using a double L-foot in the installation. Please refer to the **Part III** for more installation information.

Table 8. L-Foot SolarMount Series Rail Span

SM - SolarMount **HD - SolarMount Heavy Duty**

Span (ft)	w = Distributed Load (plf)																	
	20	25	30	40	50	60	80	100	120	140	160	180	200	220	240	260	280	300
2	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM
2.5	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM
3	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM
3.5	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM
4	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	HD	HD	HD	HD	HD	HD	HD
4.5	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	HD	HD	HD	HD	HD	HD	HD	HD
5	SM	SM	SM	SM	SM	SM	SM	SM	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
5.5	SM	SM	SM	SM	SM	SM	SM	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
6	SM	SM	SM	SM	SM	SM	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
6.5	SM	SM	SM	SM	SM	SM	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
7	SM	SM	SM	SM	SM	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
7.5	SM	SM	SM	SM	SM	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
8	SM	SM	SM	SM	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
8.5	SM	SM	SM	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
9	SM	SM	SM	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
9.5	SM	SM	SM	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
10	SM	SM	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
10.5	SM	SM	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
11	SM	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
11.5	SM	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
12	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
12.5	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
13	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
13.5	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
14	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
14.5	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
15	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
15.5	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
16	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD
17	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD	HD

20

Table 10. Downforce Point Load Calculation

Total Design Load (downforce) (max of case 1, 2 or 3)	P			psf	Step 1
Module length perpendicular to rails	B	x		ft	
Rail Span	L	x		ft	Step 4
			/2		
Downforce Point Load	R			lbs	

Step 6: Determine the Uplift Point Load, R (lbs), at each connection based on rail span

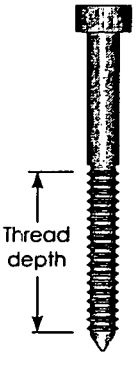
You must also consider the Uplift Point Load, R (lbs), to determine the required lag bolt attachment to the roof (building) structure.

Table 11. Uplift Point Load Calculation

Total Design Load (uplift)	P			psf	Step 1
Module length perpendicular to rails	B	x		ft	
Rail Span	L	x		ft	Step 4
			/2		
Uplift Point Load	R			lbs	

Table 12. Lag pull-out (withdrawal) capacities (lbs) in typical roof lumber (ASD)

		Lag screw specifications	
	Specific gravity	*5/16" shaft,** *per inch thread depth*	
Douglas Fir, Larch	**0.50**	**266**	
Douglas Fir, South	**0.46**	**235**	
Engelmann Spruce, Lodgepole Pine (MSR 1650 f & higher)	**0.46**	**235**	
Hem, Fir, Redwood (close grain)	**0.43**	**212**	
Hem, Fir (North)	**0.46**	**235**	
Southern Pine	**0.55**	**307**	
Spruce, Pine, Fir	**0.42**	**205**	
Spruce, Pine, Fir (E of 2 million psi and higher grades of MSR and MEL)	**0.50**	**266**	



Sources: American Wood Council, NDS 2005, Table 11.2A, 11.3.2A.

Notes: (1) Thread must be embedded in the side grain of a rafter or other structural member integral with the building structure.
(2) Lag bolts must be located in the middle third of the structural member.
(3) These values are not valid for wet service.
(4) This table does not include shear capacities. If necessary, contact a local engineer to specify lag bolt size with regard to shear forces.
(5) Install lag bolts with head and washer flush to surface (no gap). Do not over-torque.
(6) Withdrawal design values for lag screw connections shall be multiplied by applicable adjustment factors if necessary. See Table 10.3.1 in the American Wood Council NDS for Wood Construction.

**Use flat washers with lag screws.*

Use Table 12 to select a lag bolt size and embedment depth to satisfy your Uplift Point Load Force, R (lbs), requirements.

It is the installer's responsibility to verify that the substructure and attachment method is strong enough to support the maximum point loads calculated according to Step 5 and Step 6.

[3.2.] Installing SolarMount with top mounting clamps

This section covers SolarMount rack assembly where the installer has elected to use top mounting clamps to secure modules to the rails. It details the procedure for flush mounting SolarMount systems to a pitched roof.

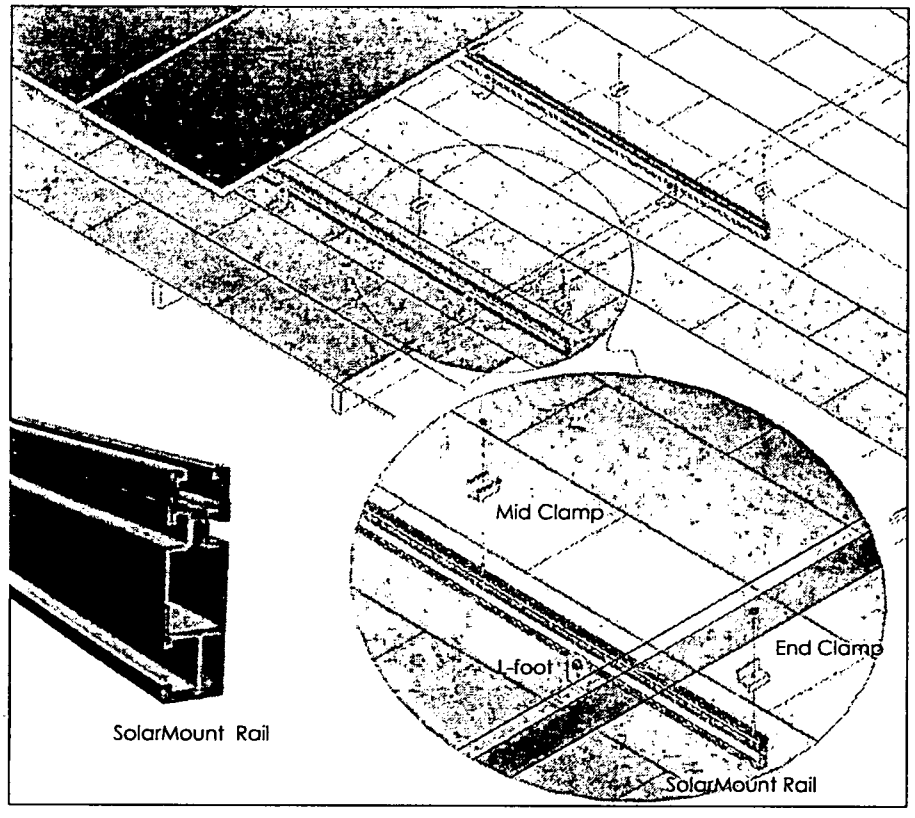


Figure 5. Exploded view of a flushmount installation mounted with L-feet.

Table 14. Clamp kit part quantities

Modules	End clamps	Mid clamps	¼" module clamp bolts	¼"x ⅝" safety bolts	¼" flange nuts
2	4	2	6	2	8
3	4	4	8	2	10
4	4	6	10	2	12
5	4	8	12	2	14
6	4	10	14	2	16
7	4	12	16	2	18
8	4	14	18	2	20

Stainless steel hardware can seize up, a process called galling. To significantly reduce its likelihood, (1) apply lubricant to bolts, preferably an anti-seize lubricant, available at auto parts stores, (2) shade hardware prior to installation, and (3) avoid spinning on nuts at high speed. See Installation Supplement 910, Galling and Its Prevention, at www.unirac.com.

Table 15. Wrenches and torque

	Wrench size	Recommended torque (ft-lbs)
¼" hardware	7/16"	15
⅜" hardware	9/16"	30

Torques are not designated for use with wood connectors

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[3.2.2] Laying out L-feet

L-feet (Fig. 7) are used for attachment through existing roofing material, such as asphalt shingles, sheathing or sheet metal to the building structure.

Use Figure 8 or 9 below to locate and mark the position of the L-feet lag screw holes within the installation area.

If multiple rows are to be installed adjacent to one another, it is not likely that each row will be centered above the rafters. Adjust as needed, following the guidelines in Figure 9 as closely as possible.

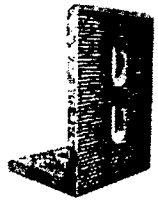

Figure 7

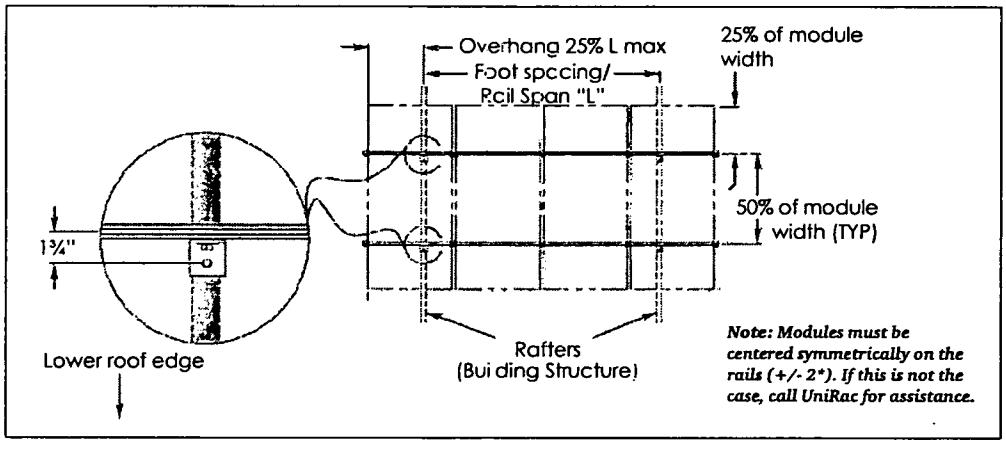

Figure 8. Layout with rails perpendicular to rafters.

Installing L-feet

Drill pilot holes through the roof into the center of the rafter at each L-foot lag screw hole location.

Squirt sealant into the hole, and on the shafts of the lag screws. Seal the underside of the L-feet with a suitable sealant. Consult with the company providing the roofing warranty.

Securely fasten the L-feet to the roof with the lag screws. Ensure that the L-feet face as shown in Figure 8 and 9. For greater ventilation, the preferred method is to place the single-slotted square side of the L-foot against the roof with the double-slotted side perpendicular to the roof. If the installer chooses to mount the L-foot with the long leg against the roof, the bolt slot closest to the bend must be used.

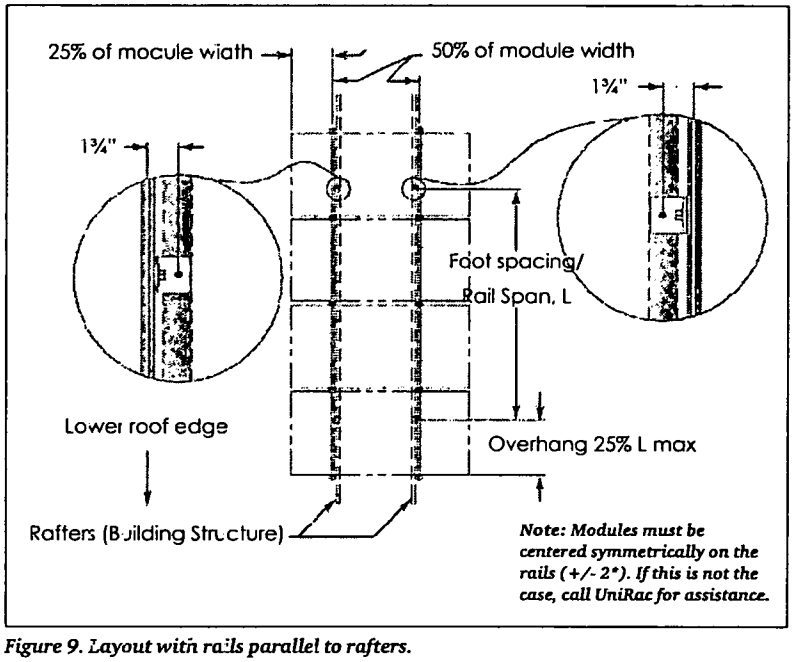

Figure 9. Layout with rails parallel to rafters.

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[3.2.4] Installing SolarMount rails

Keep rail slots free of roofing grit or other debris. Foreign matter will cause bolts to bind as they slide in the slots.

Installing Splices. If your installation uses SolarMount splice bars, attach the rails together (Fig. 13) before mounting the rails to the footings. Use splice bars only with flush installations or those that use low-profile tilt legs.

If using more than one splice per rail, contact UniRac concerning thermal expansion issues.

Mounting Rails on Footings. Rails may be attached to either of two mounting holes in the L-feet (Fig. 14). Mount in the lower hole for a low profile, more aesthetically pleasing installation. Mount in the upper hole for a higher profile, which will maximize airflow under the modules. This will cool them more and may enhance performance in hotter climates.

Slide the ⅜-inch mounting bolts into the footing bolt slots. Loosely attach the rails to the footings with the flange nuts.

Ensure that the rails are oriented to the footings as shown in Figure 8, 9, 11, or 12, whichever is appropriate.

Aligning the Rail Ends. Align one pair of rail ends to the edge of the installation area (Fig. 15 or Fig. 16).

The opposite pair of rail ends will overhang the side of the installation area. Do not trim them off until the installation is complete.

If the rails are perpendicular to the rafters (Fig. 15), either end of the rails can be aligned, but the first module must be installed at the aligned end.

If the rails are parallel to the rafters (Fig. 16), the aligned end of the rails must face the lower edge of the roof. Securely tighten all hardware after alignment is complete (28-32 ft lbs).

Mount modules to the rails as soon as possible. Large temperature changes may bow the rails within a few hours if module placement is delayed.

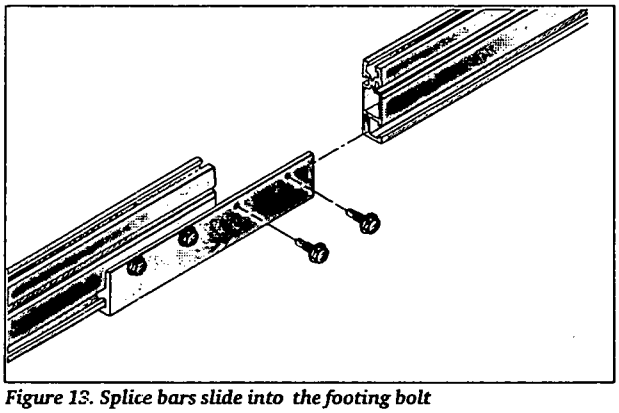


Figure 13. Splice bars slide into the footing bolt slots of SolarMount rail sections.

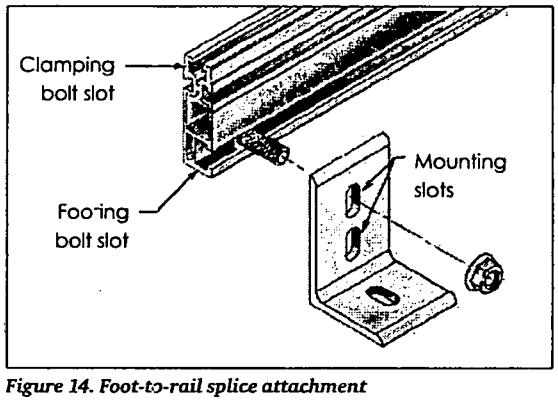


Figure 14. Foot-to-rail splice attachment

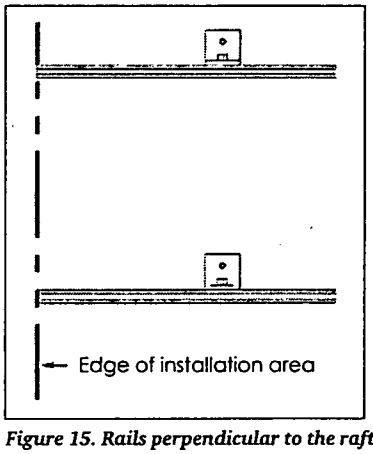


Figure 15. Rails perpendicular to the rafters.

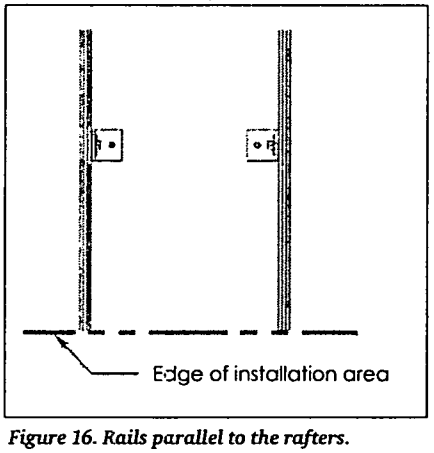


Figure 16. Rails parallel to the rafters.

R4

[3.3] Installing SolarMount with bottom mounting clips

This section covers SolarMount rack assembly where the installer has elected to use bottom mounting clamps to secure modules to the rails. It details the procedure for flush mounting SolarMount systems to a pitched roof.

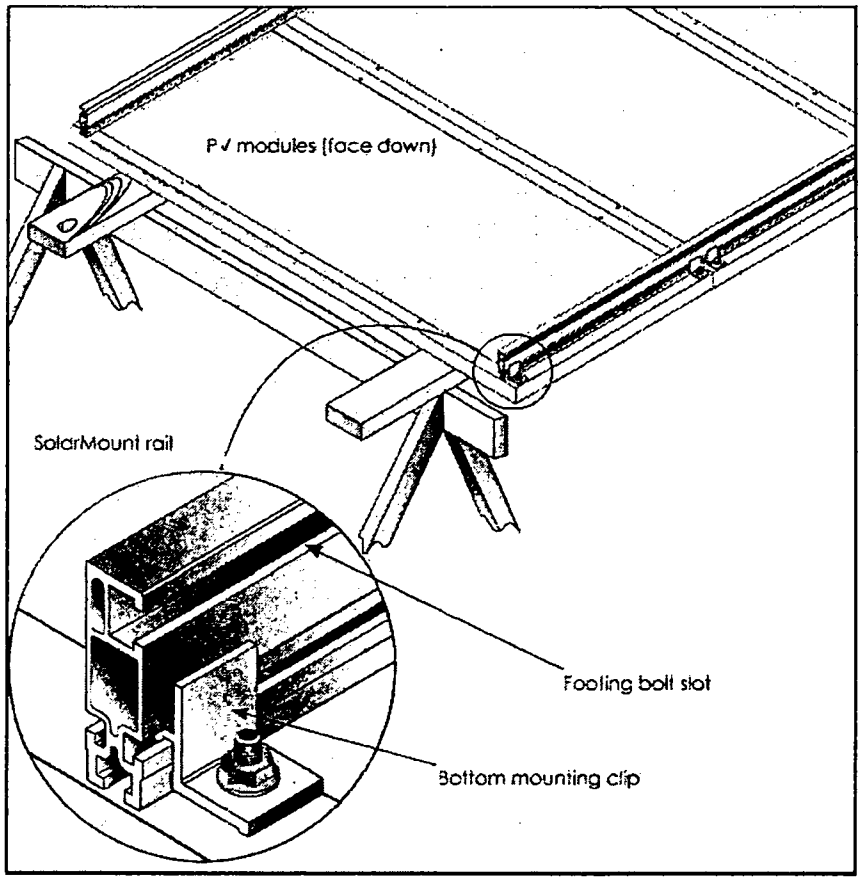


Figure 21. SMR and CB components

Table 16. Wrenches and torque

	Wrench size	*Recommended torque (ft-lbs)*
¼" hardware	7/16"	15
⅜" hardware	9/16"	30

Note: Torque specifications do not apply to lag bolt connections.

Stainless steel hardware can seize up, a process called galling. To significantly reduce its likelihood, (1) apply lubricant to bolts, preferably an anti-seize lubricant, available at auto parts stores, (2) shade hardware prior to installation, and (3) avoid spinning on nuts at high speed. See Installation Supplement 910, Galling and Its Prevention, at www.unirac.com.

[3.3.2] Laying out the installing L-feet

L-feet are used for installation through existing low profile roofing material, such as asphalt shingles or sheet metal. They are also used for most ground mount installations. To ensure that the L-feet will be easily accessible during flush installation:

- Use the PV module mounting holes nearest the ends of the modules.
- Situate the rails so that footing bolt slots face outward.

The single slotted square side of the L-foot must always lie against the roof with the double-slotted side perpendicular to the roof.

Foot spacing (along the same rail) and rail overhang depend on design wind loads.

Install half the L-feet:

- If rails are perpendicular to rafters (Fig. 23), install the feet closest to the lower edge of the roof.
- If rails are parallel to rafters (Fig 24), install the feet for one of the rails, but not both.

For the L-feet being installed now, drill pilot holes through the roofing into the center of the rafter at each lag screw hole location.

Squirt sealant into the hole and onto the shafts of the lag screws. Seal the underside of the L-feet with a sealant. Securely fasten the L-feet to the building structure with the lag screws. Ensure that the L-feet face as shown in Figure 23 or Figure 24.

Hold the rest of the L-feet and fasteners aside until the panels are ready for the installation.

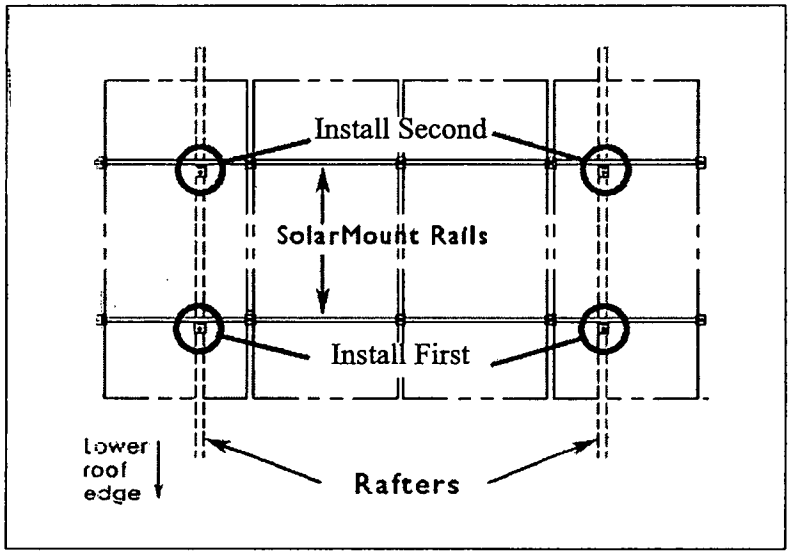


Figure 23. Layout with rails perpendicular to rafters.

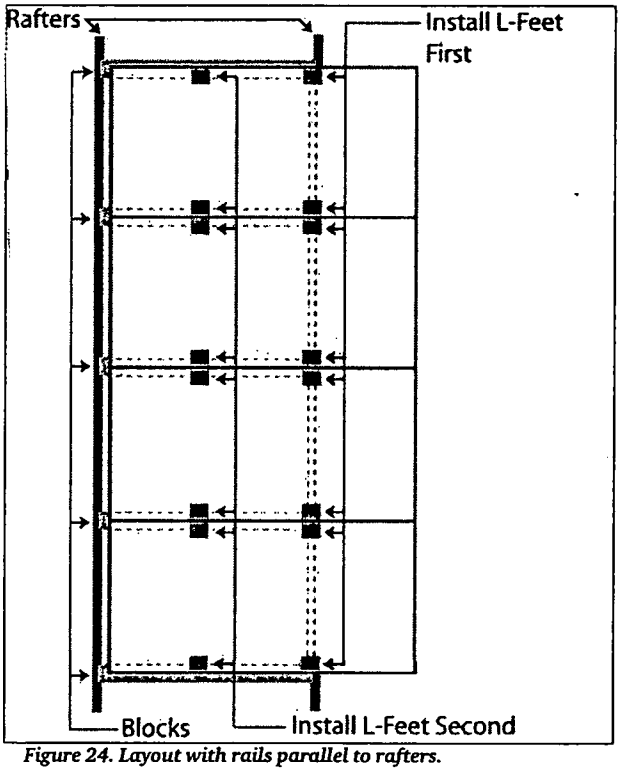


Figure 24. Layout with rails parallel to rafters.

[3.4] Installing SolarMount with grounding clips and lugs

Clips and lugs are sold separately.

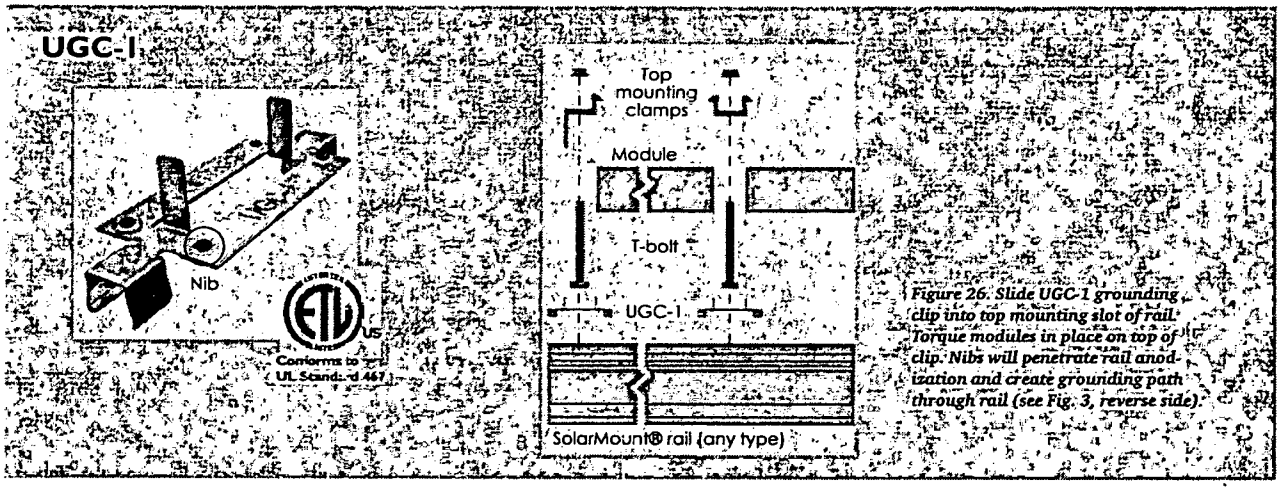


Figure 26. Slide UGC-1 grounding clip into top mounting slot of rail. Torque modules in place on top of clip. Nibs will penetrate rail anodization and create grounding path through rail (see Fig. 3, reverse side).

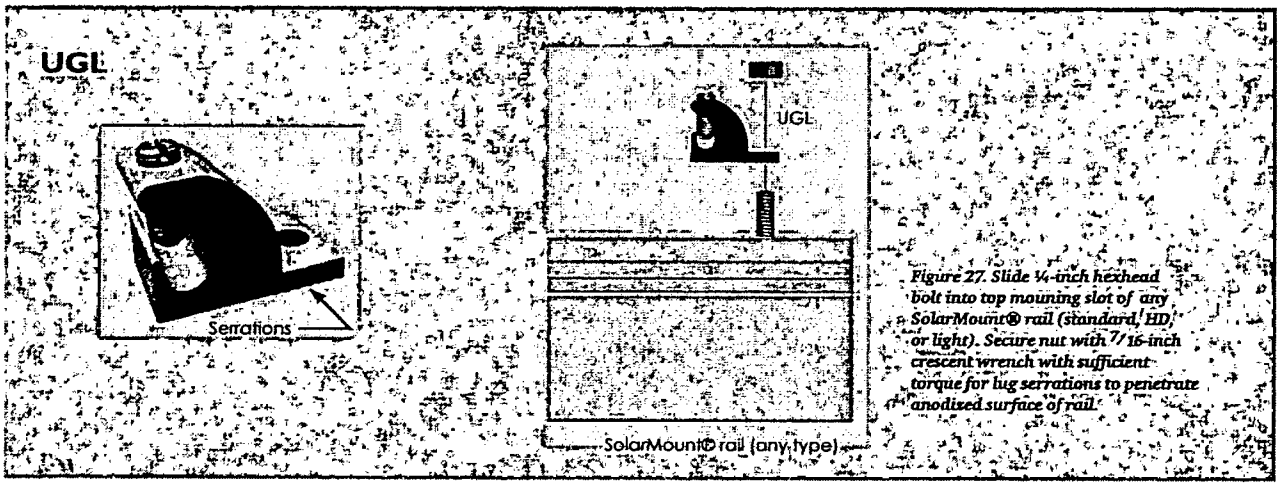
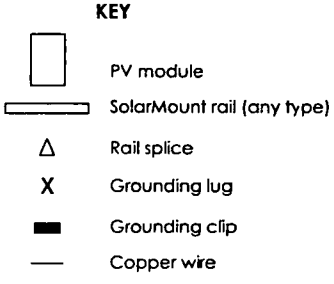
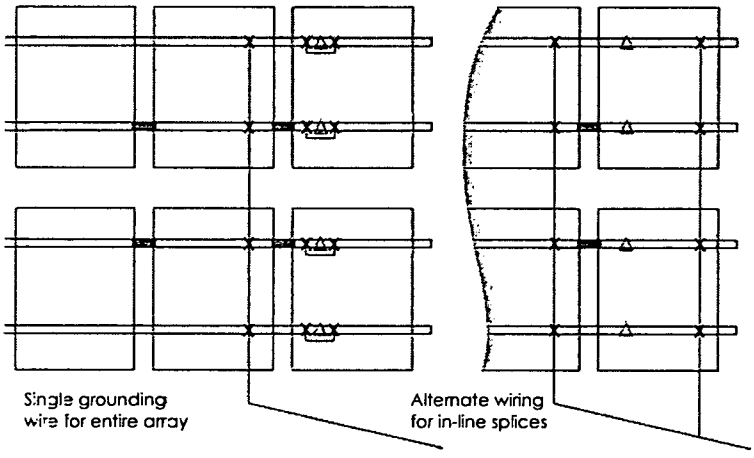


Figure 27. Slide ¼-inch hexhead bolt into top mounting slot of any SolarMount® rail (standard, HD, or light). Secure nut with 7/16-inch crescent wrench with sufficient torque for lug serrations to penetrate anodized surface of rail.

Figure 28. Place grouding clips, lugs, and copper wire (6–10 AWG). Place a loop in the wire around splices to prevent tension. Be sure wiring between rails is not taut.





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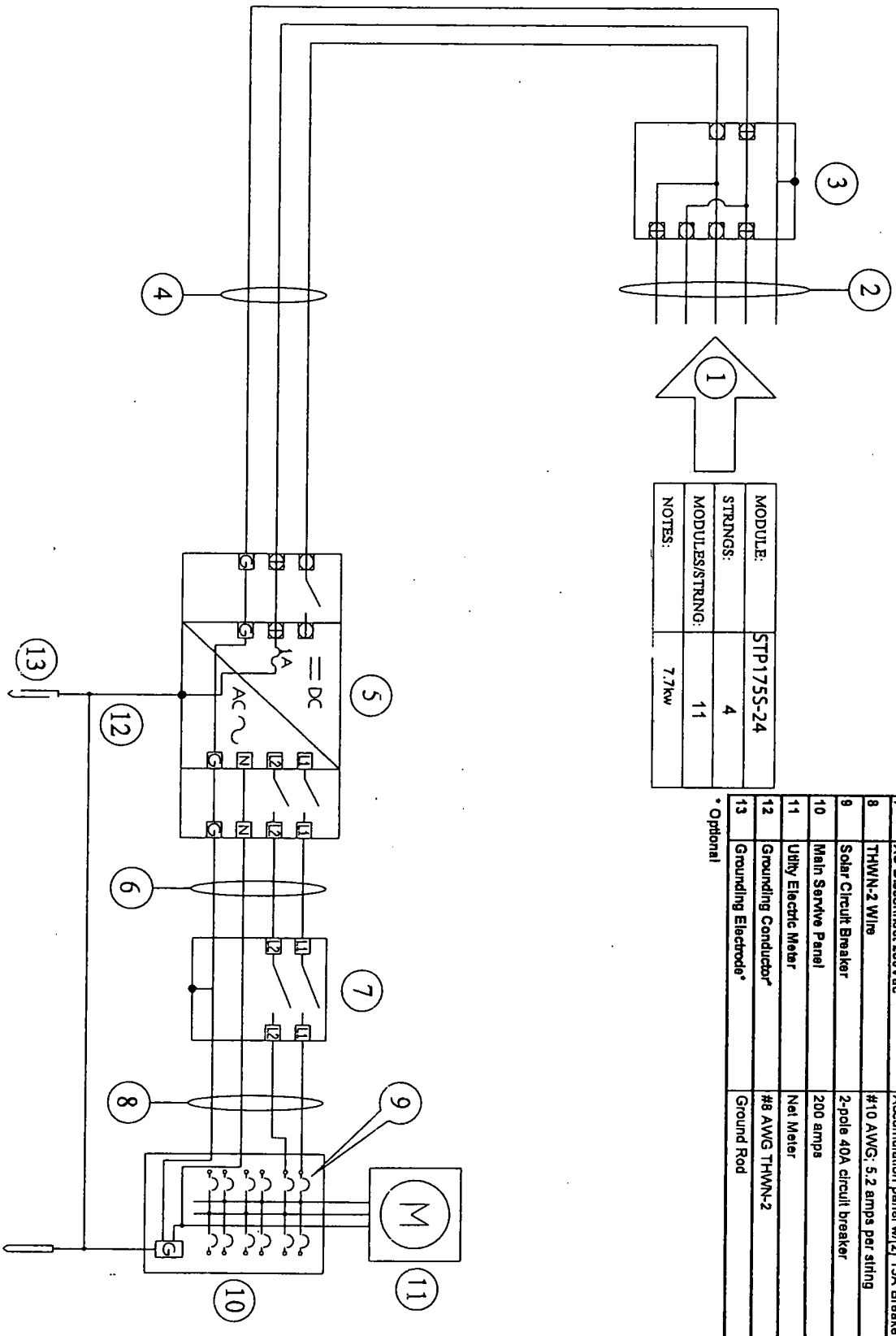
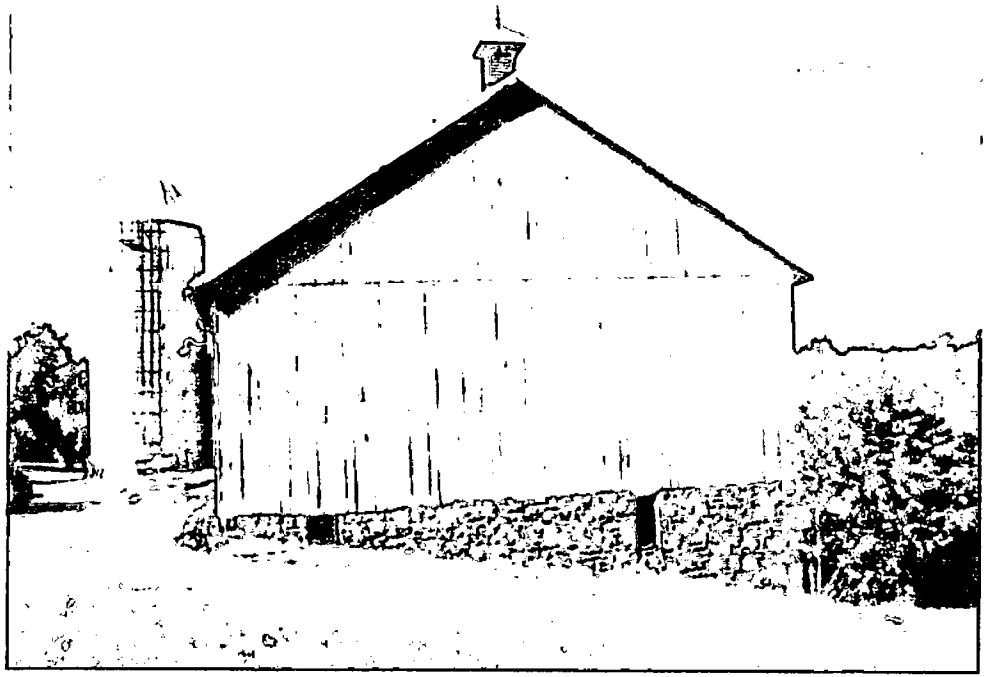


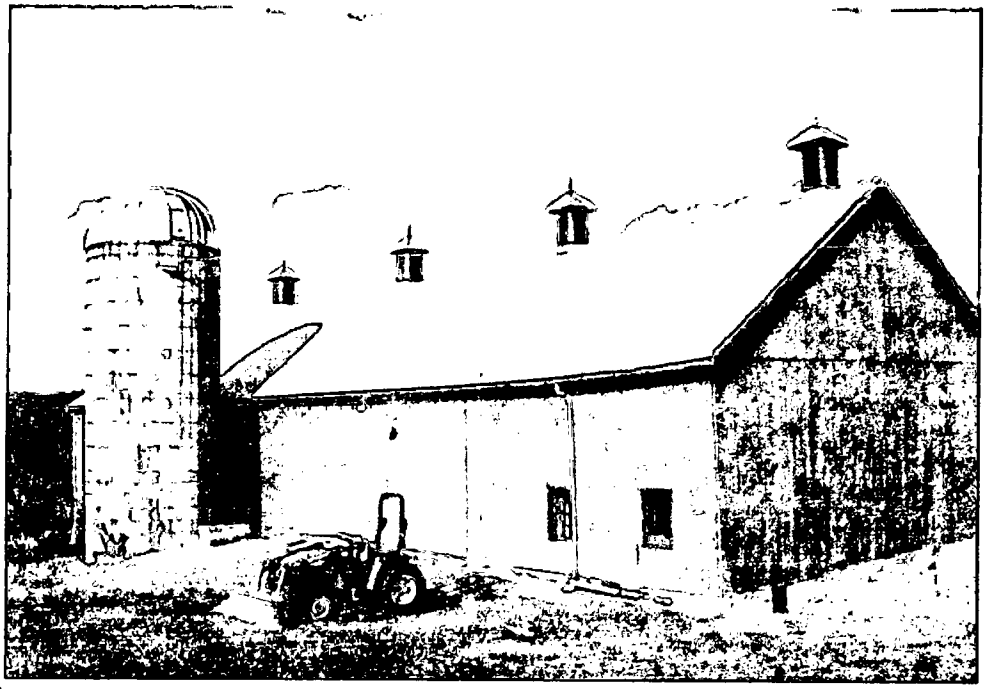
MODULE:	STP175S-24
STRINGS:	4
MODULES/STRING:	11
NOTES:	7.7kw

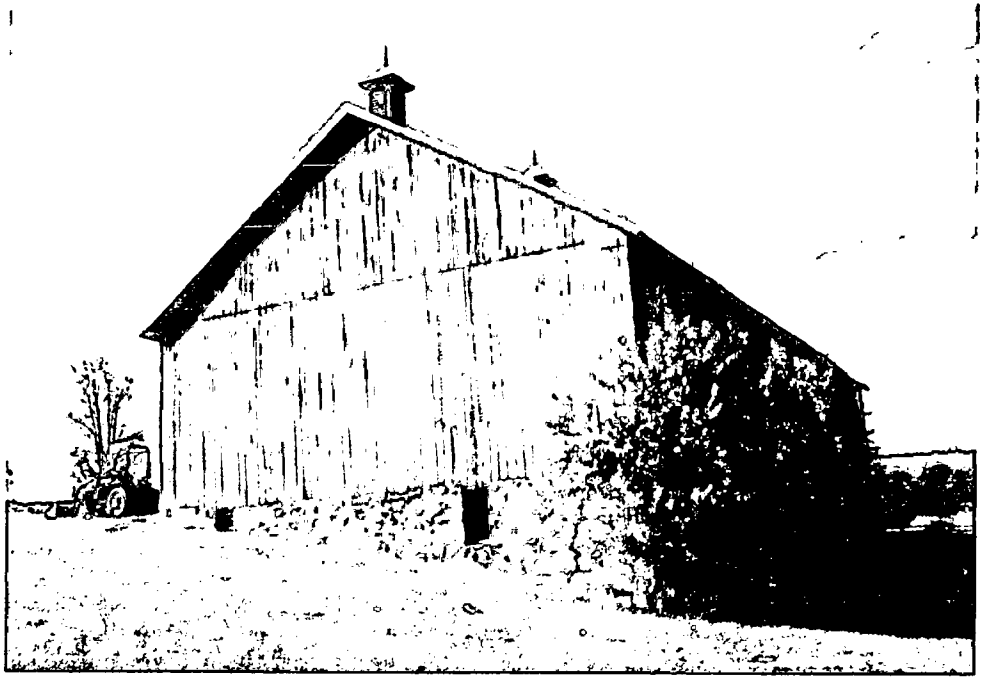
TAG	DESCRIPTION	NOTES
1	Solar Array	44 Modules Voc: 44.2V Isc: 5.2A
2	USE-2 Wire	NA
3	Combiner Box*	Transition Box
4	THWN-2 Wire	#10 AWG; 5.2 amps per string
5	Inverter with integrated AC/DC disconnect*	SB8000US with automatic transfer switch
6	THWN-2 Wire	#10 AWG; 5.2 amps per string
7	AC Disconnect 250Vac	Accumulation panel w/[2] 15A Breakers
8	THWN-2 Wire	#10 AWG; 5.2 amps per string
9	Solar Circuit Breaker	2-pole 40A circuit breaker
10	Main Service Panel	200 amps
11	Utility Electric Meter	Net Meter
12	Grounding Conductor*	#8 AWG THWN-2
13	Grounding Electrode*	Ground Rod

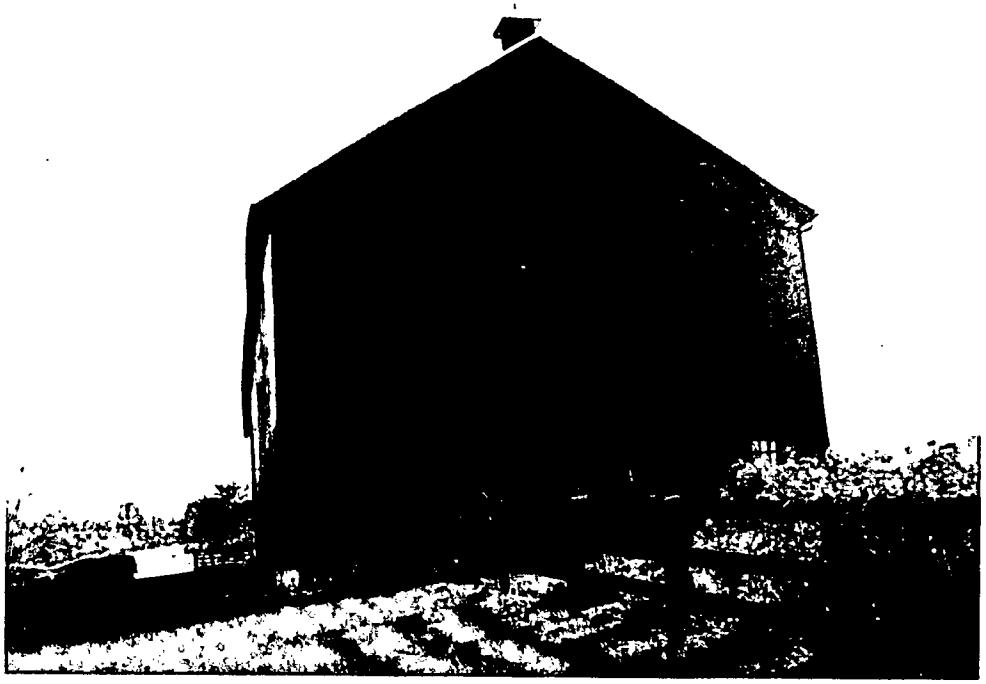
* Optional

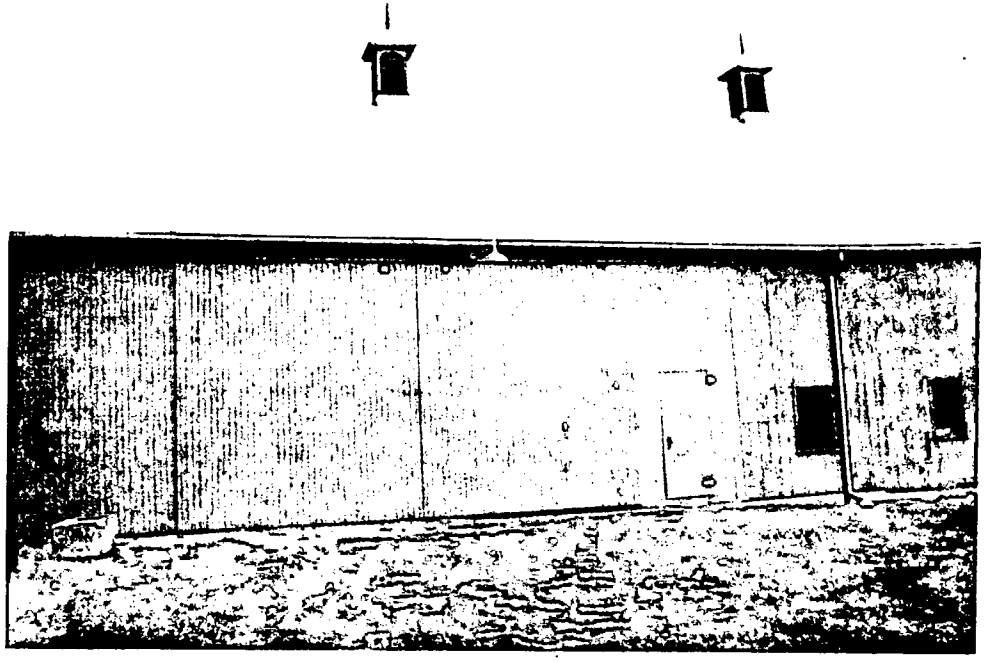
Customer Name: Bergmann	Installation Company: Standard Solar	Revision Date: 01.25.10
Project Address: 920 Old Bucklodge Ln	Address: 202 Perry Parkway #7	SUNTECH
Boyds, MD 20841	Gaithersburg, MD 20877	

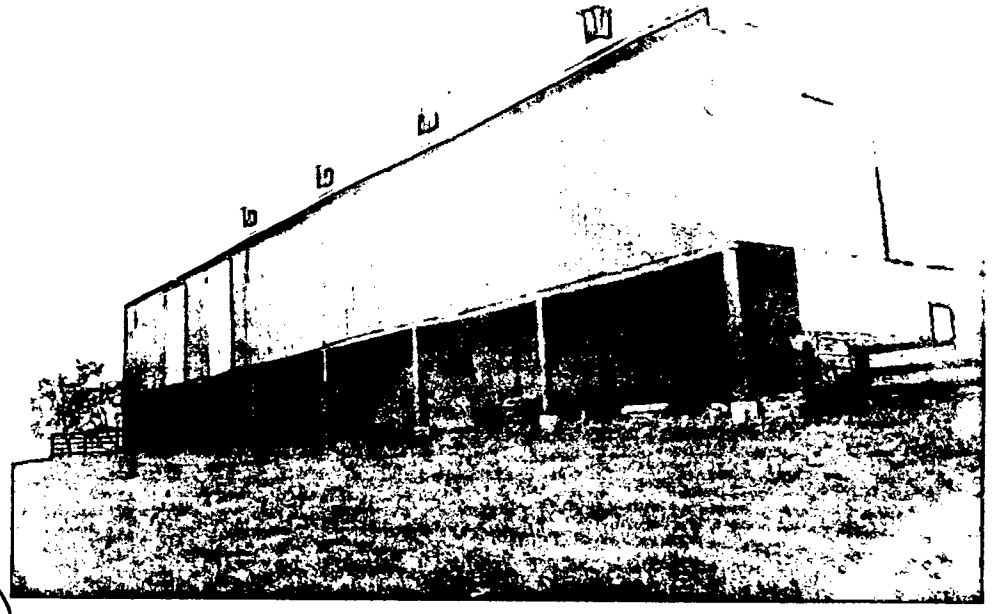


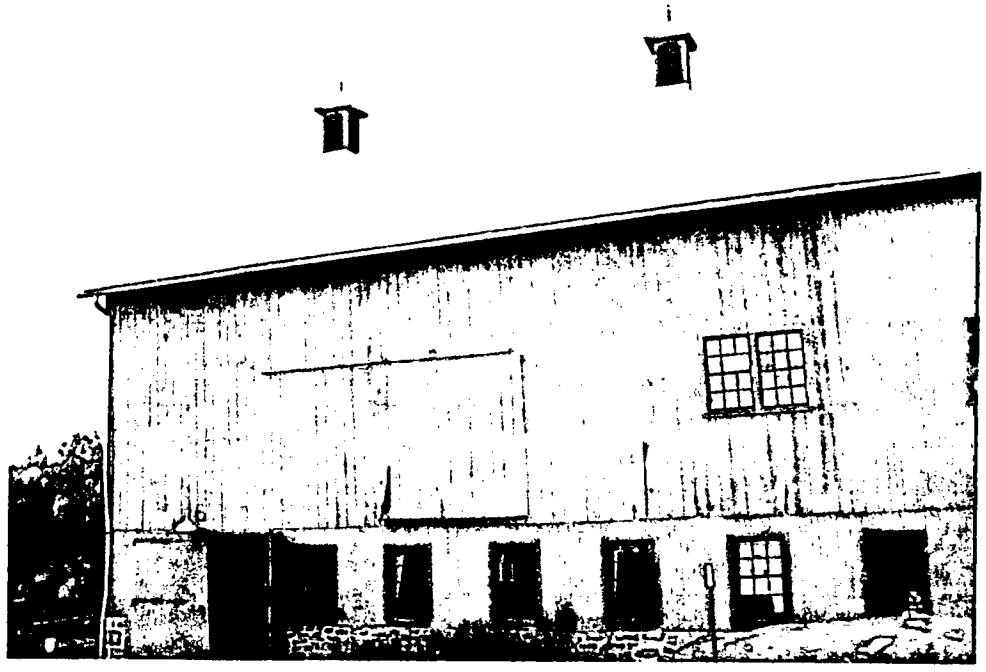


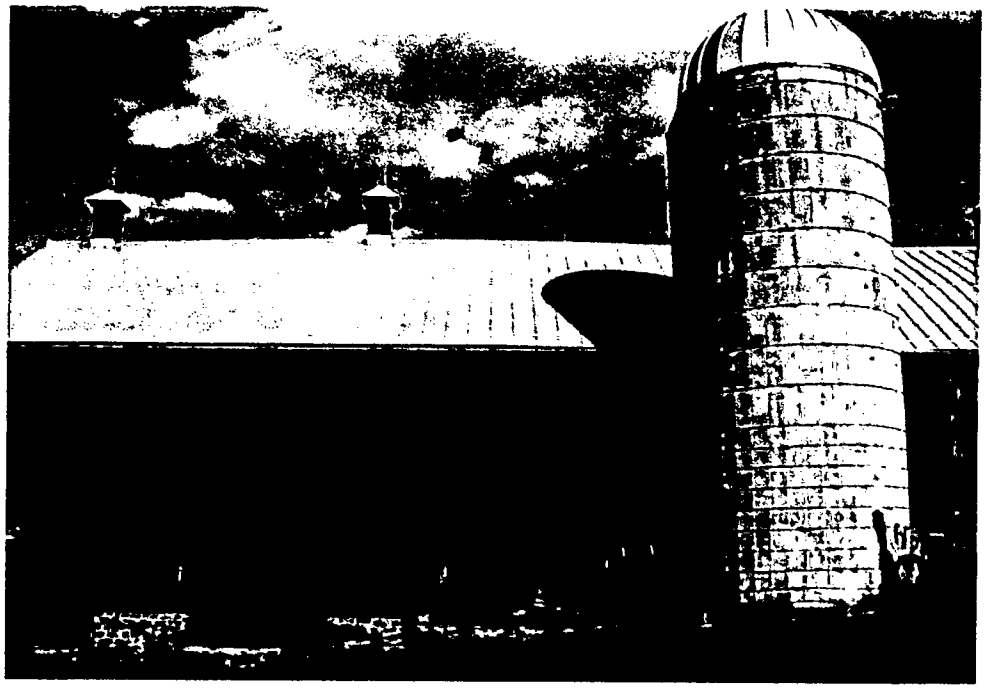


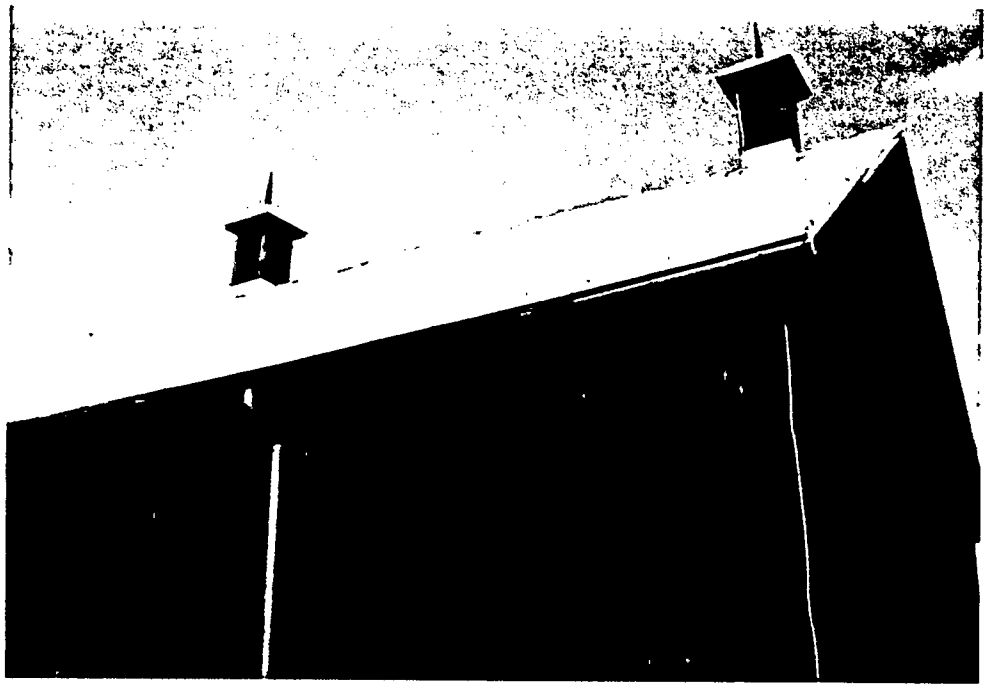


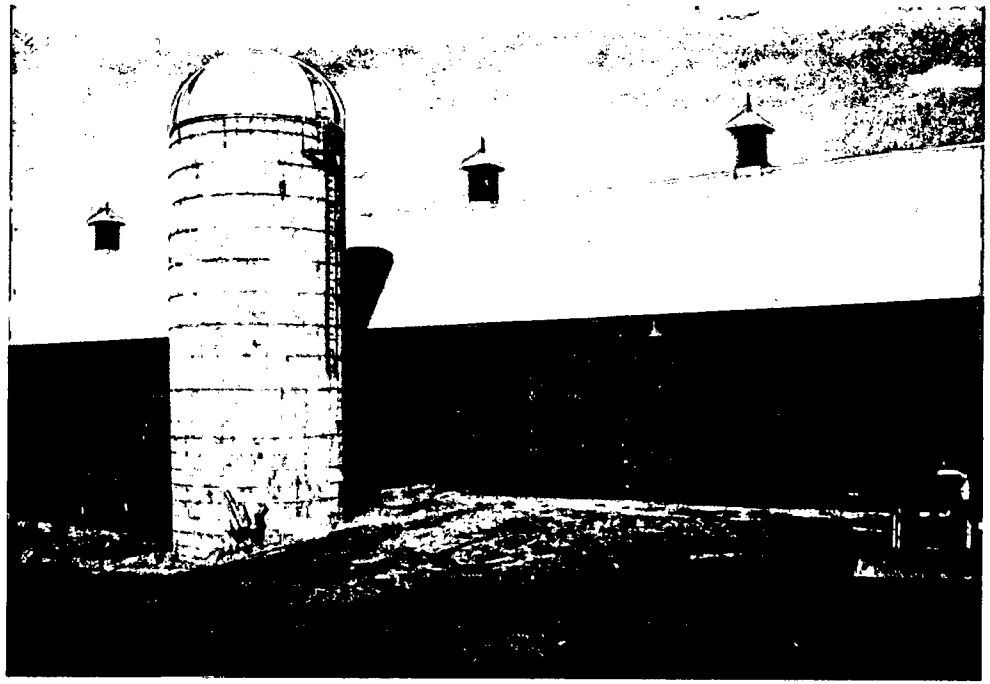


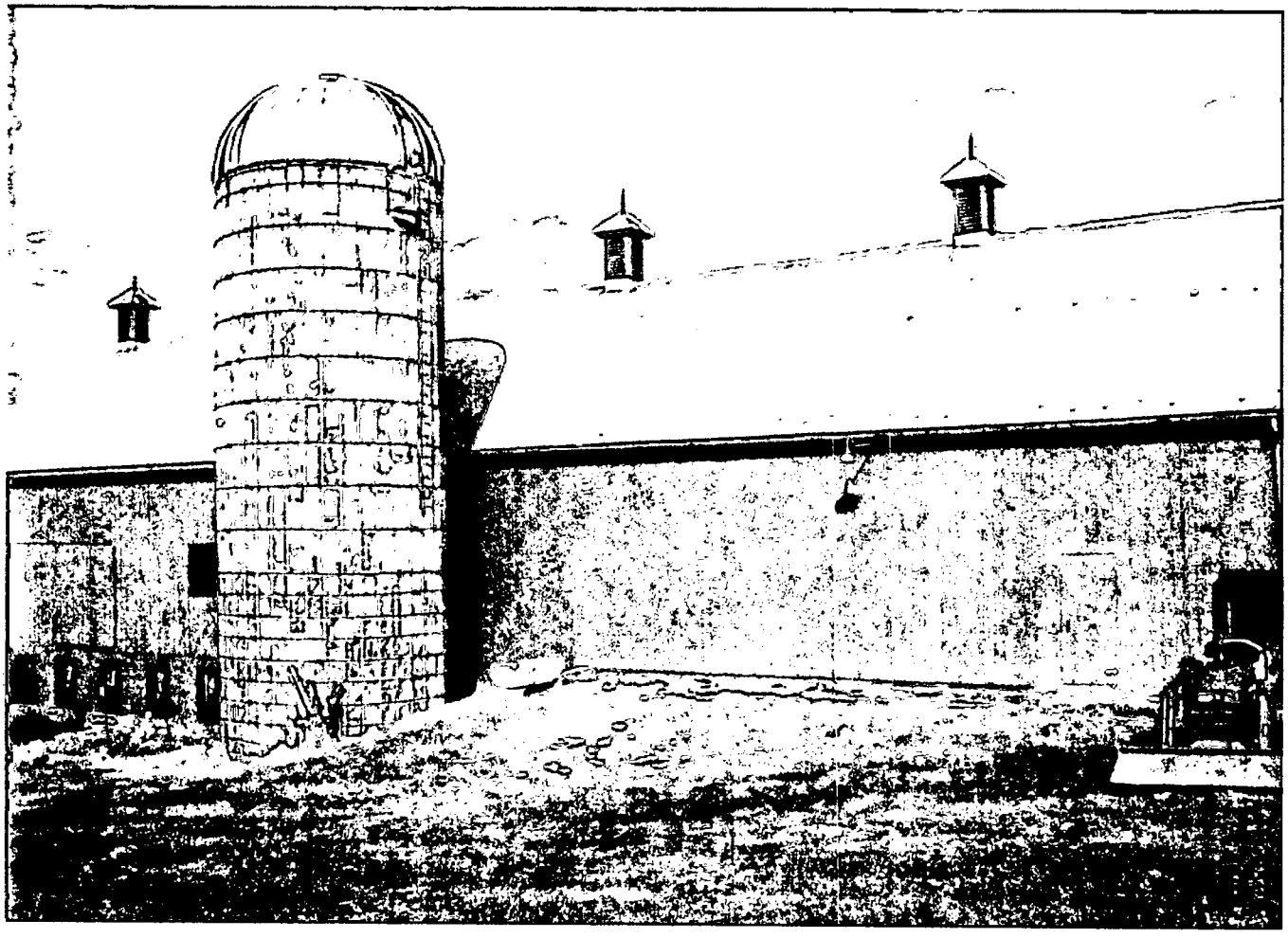


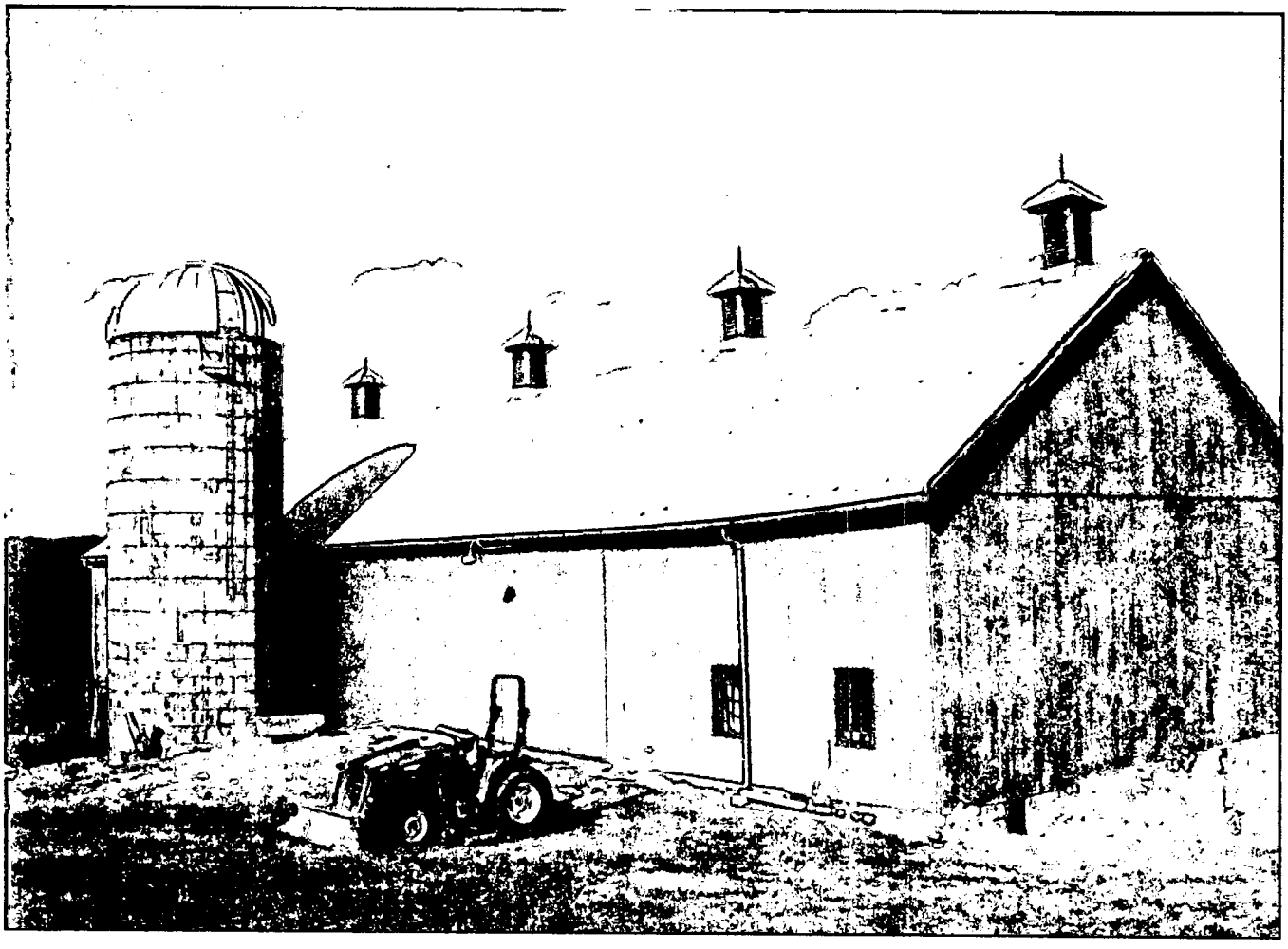


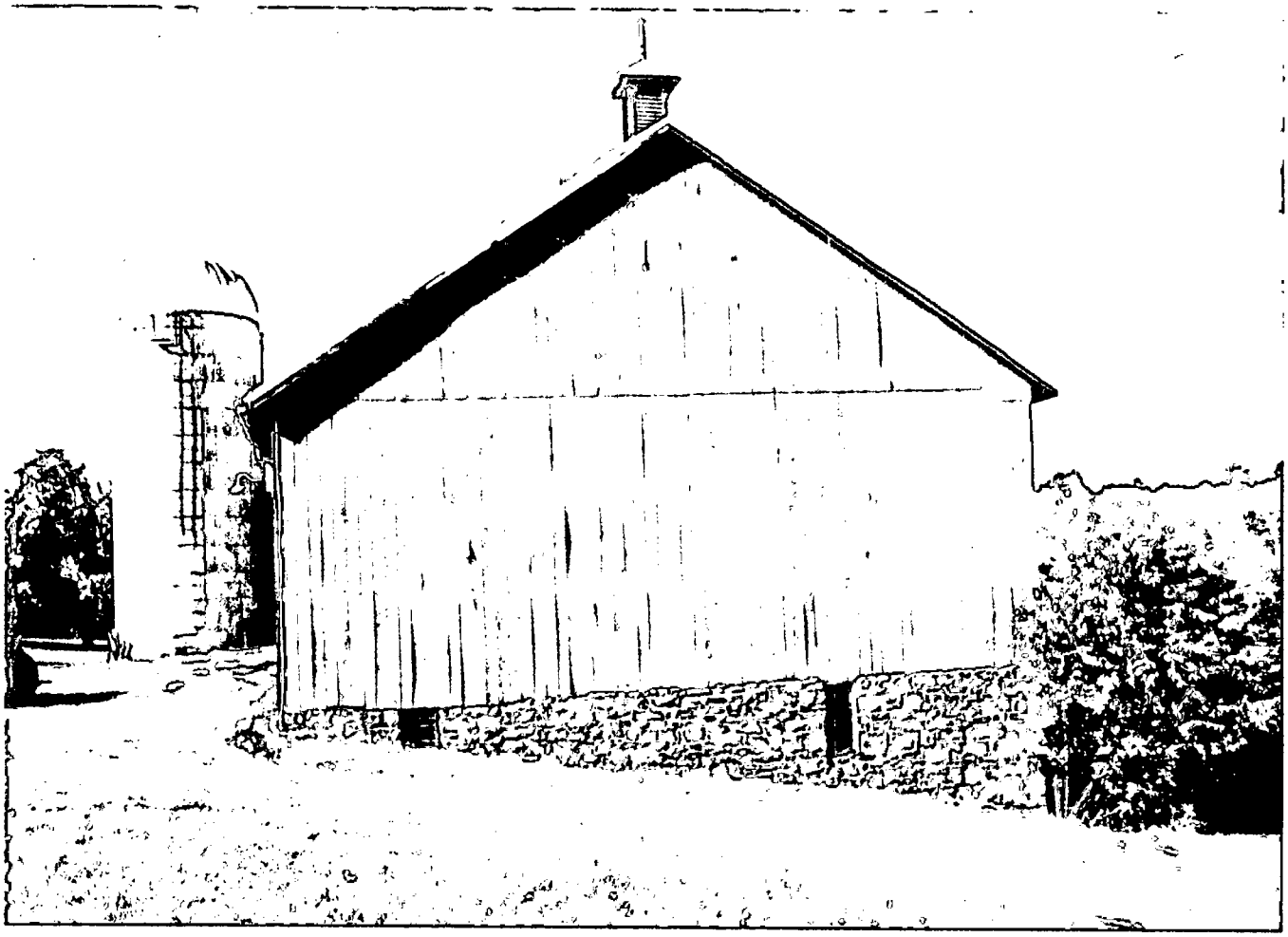


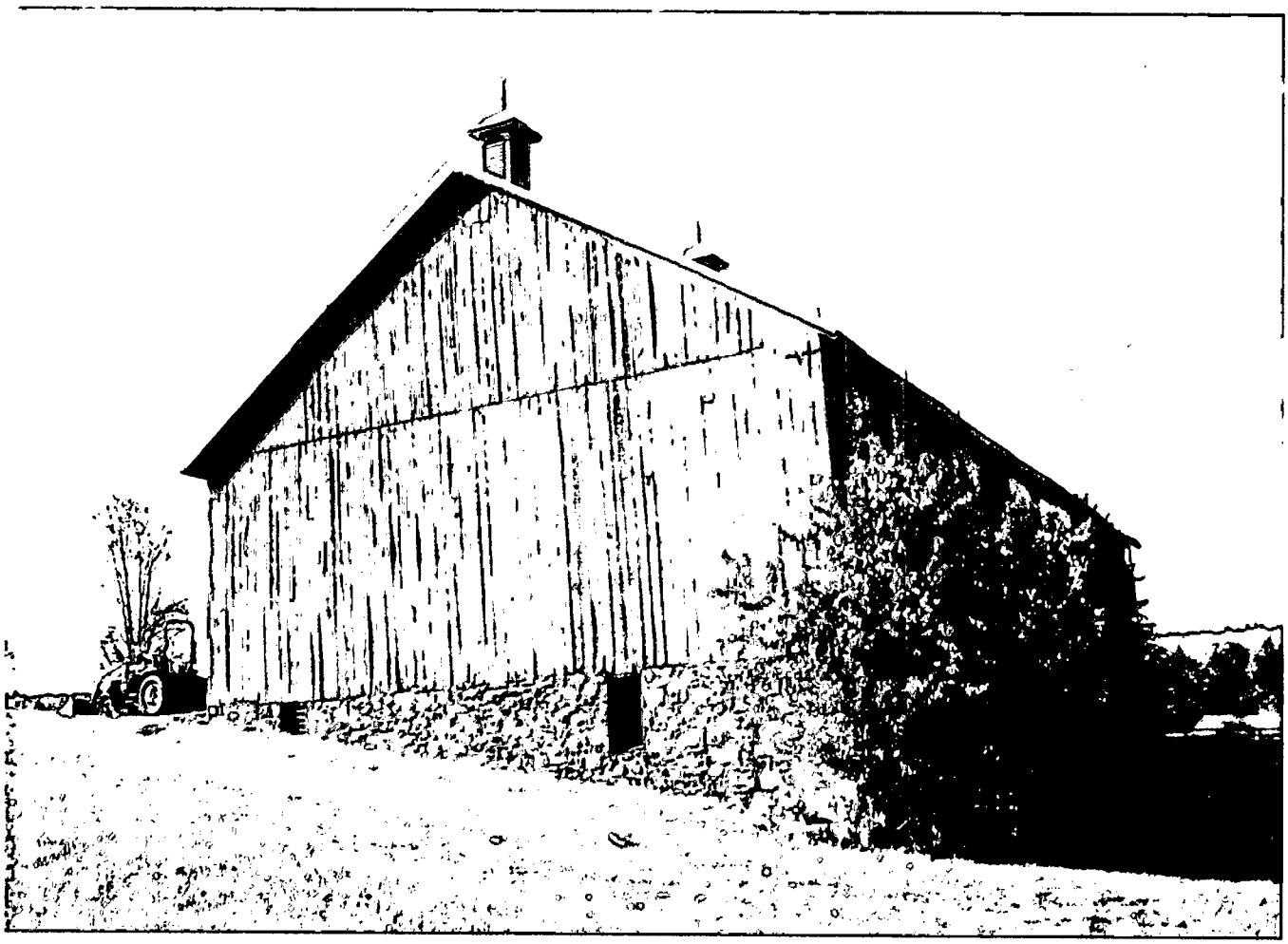


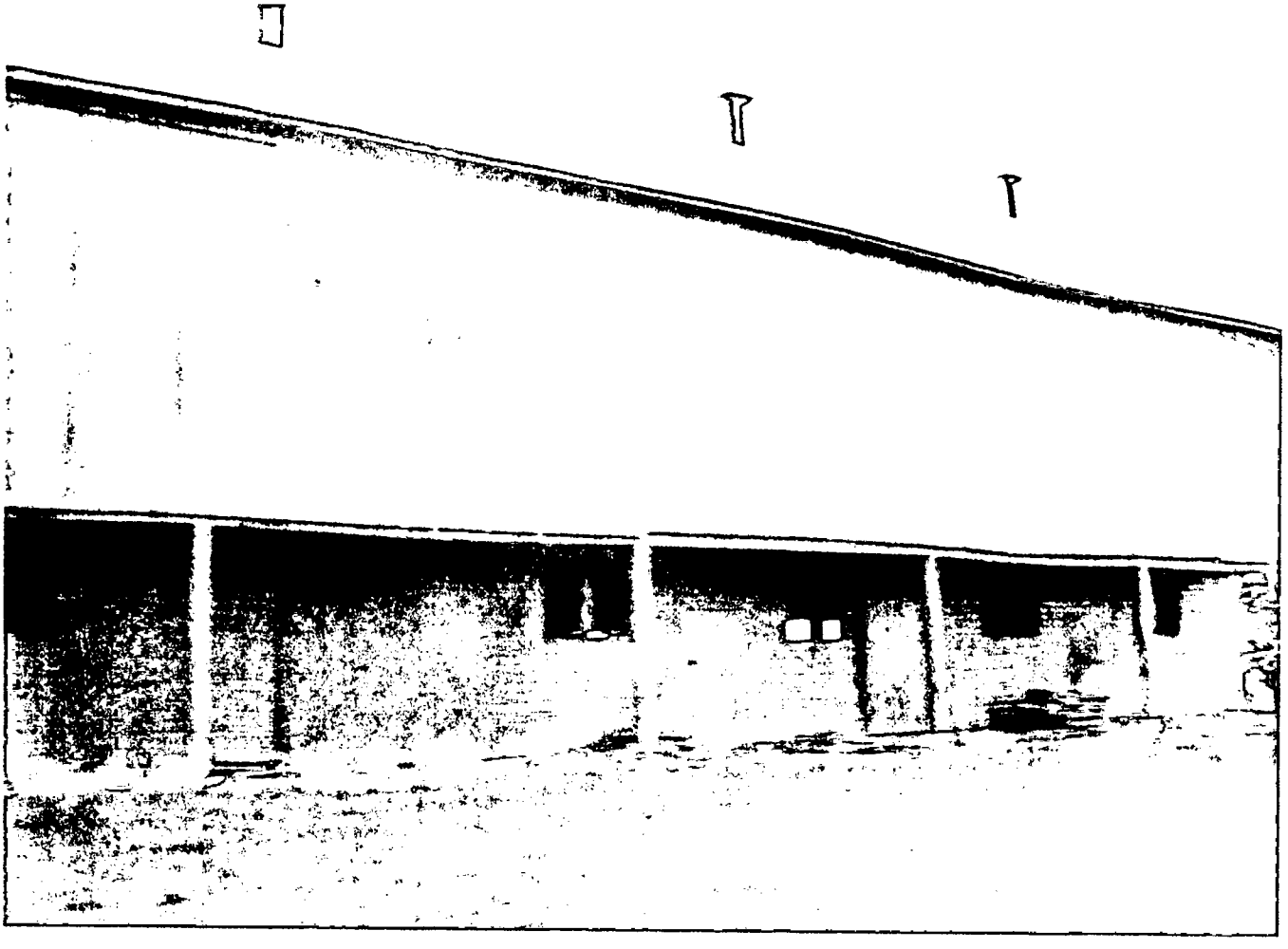


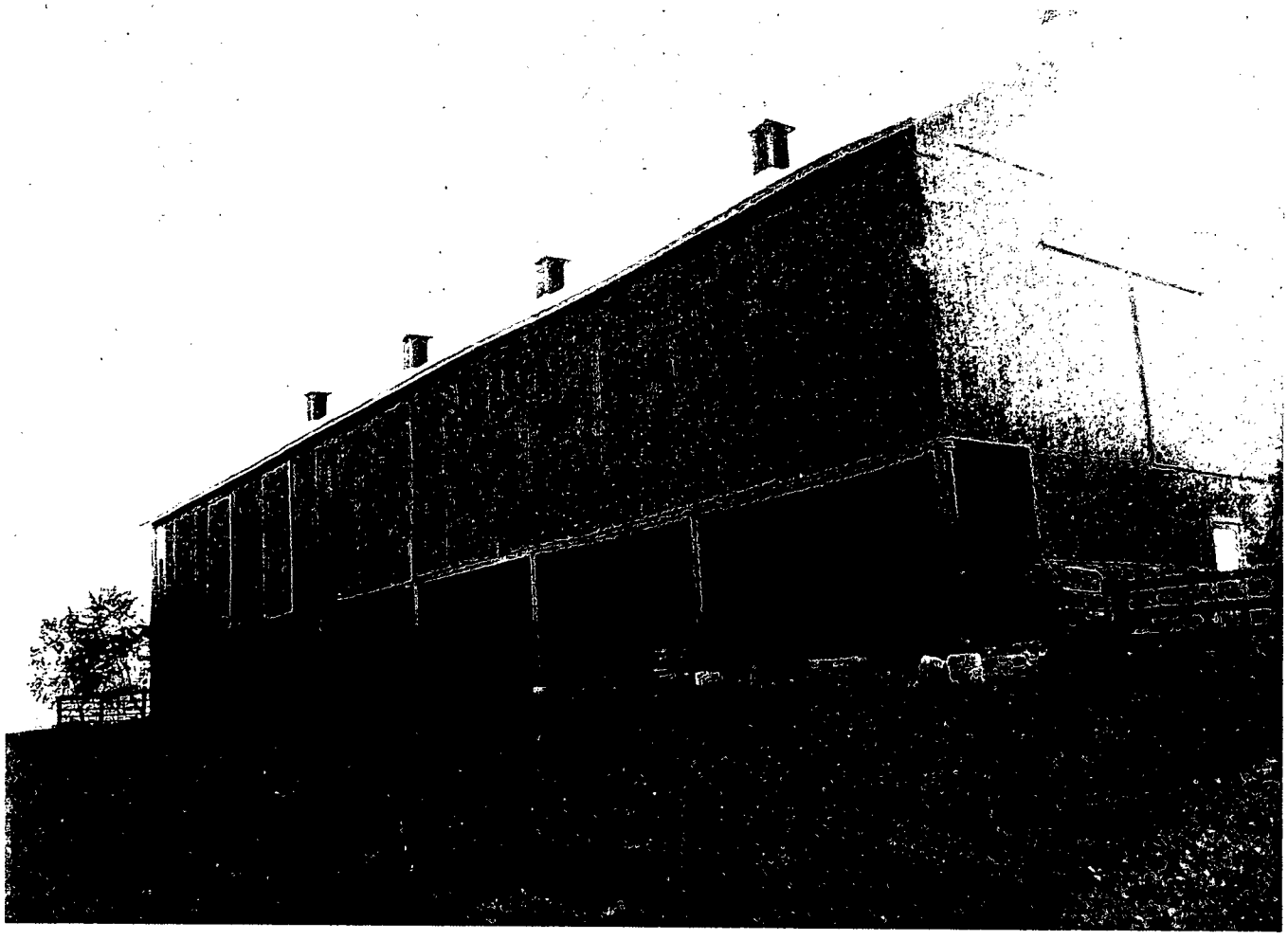


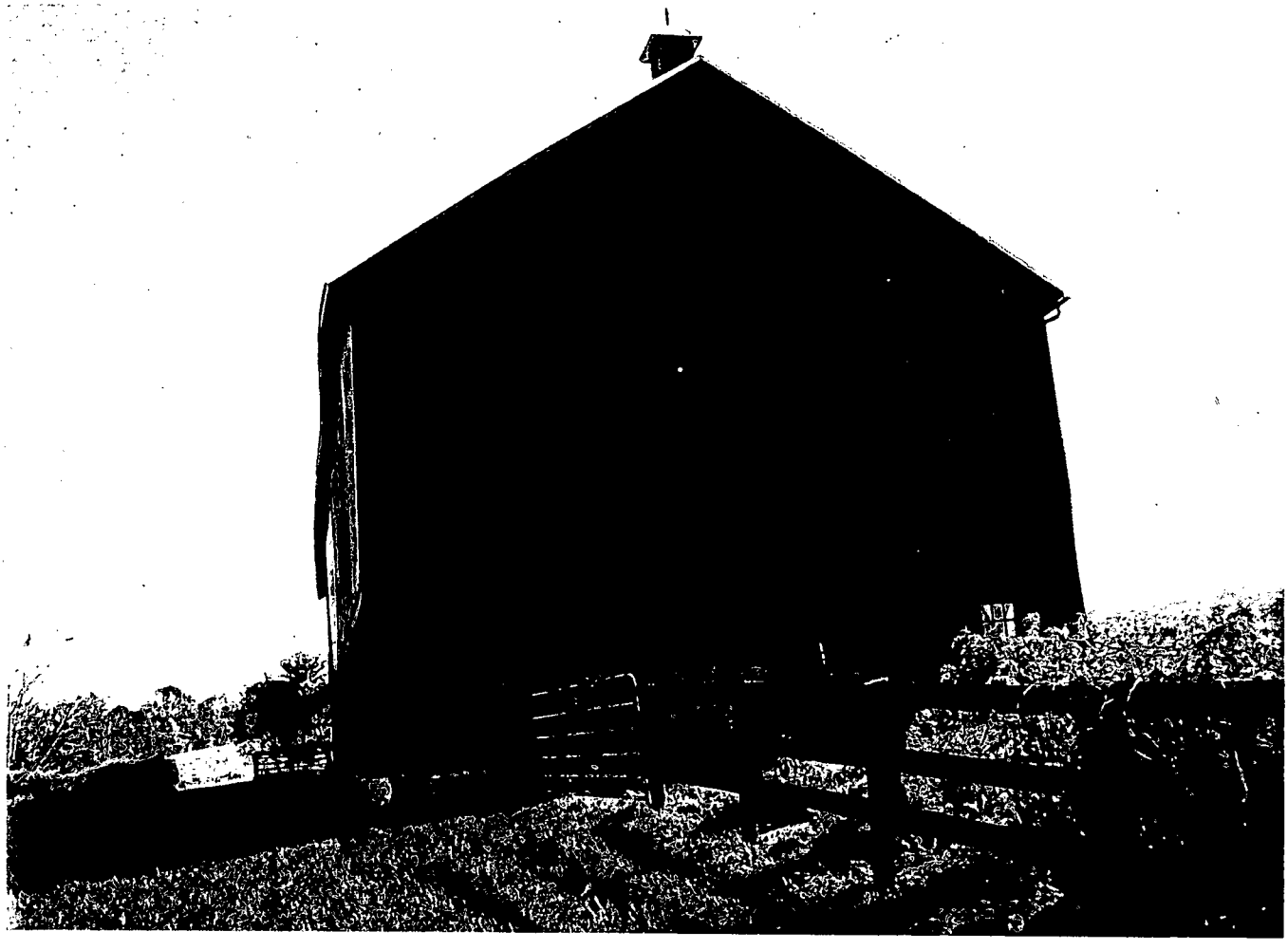


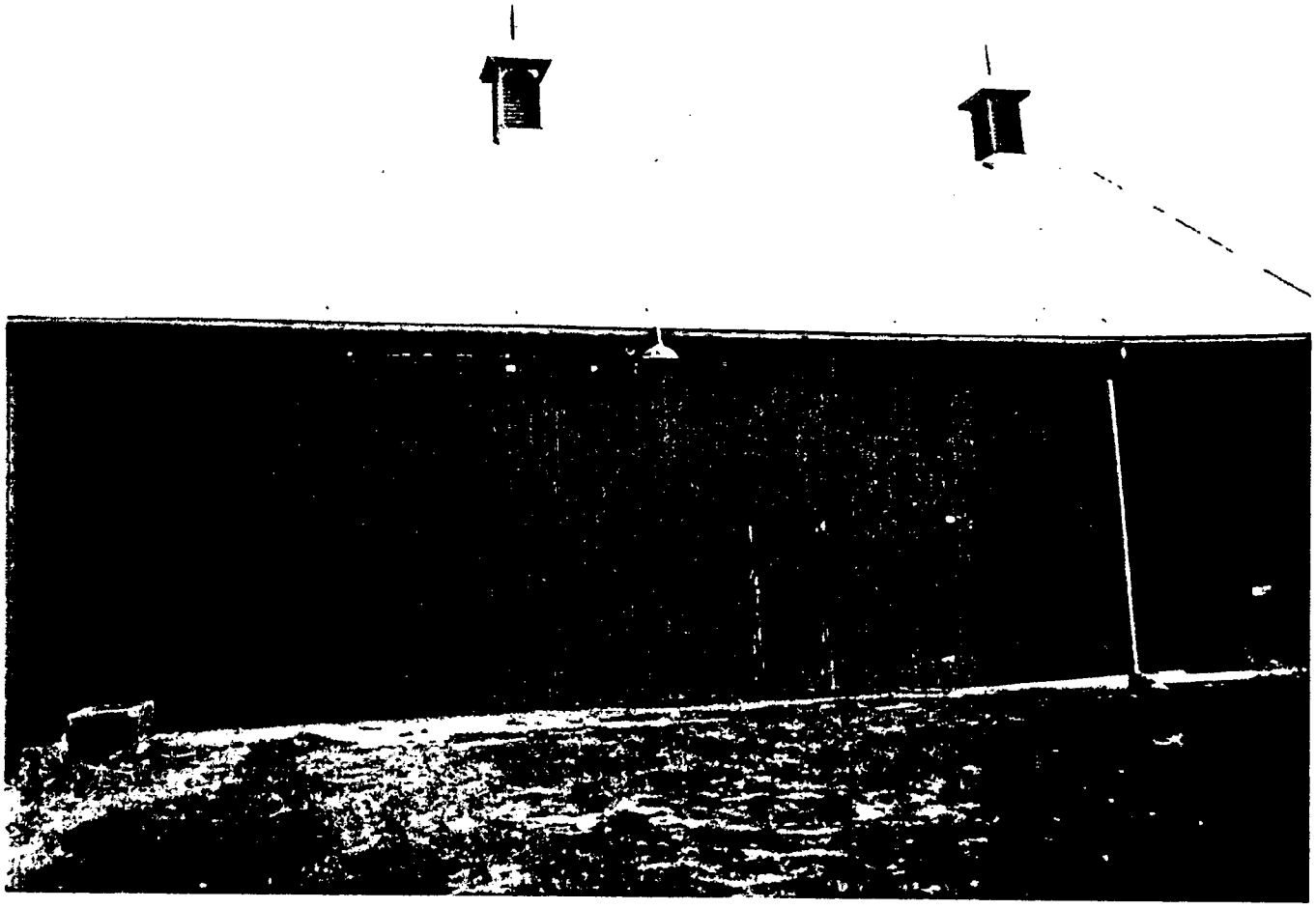


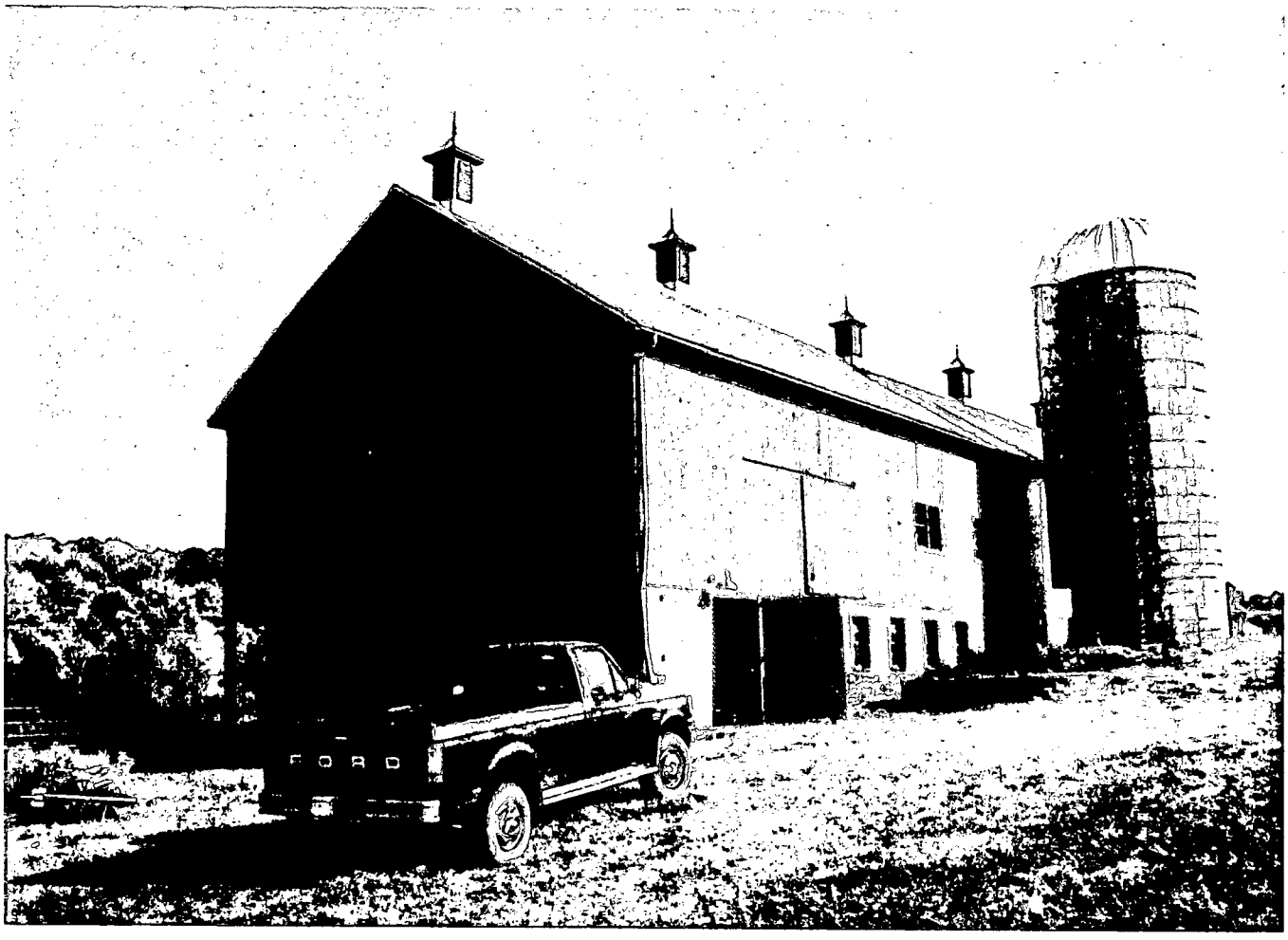








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