

NATURAL LIGHT ENERGY SYSTEMS

SOLAR ATTIC FAN - POWERED BY PHOTO VOLTAIC PANEL

INSTALLATION ANCHORAGE DETAILS

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

GENERAL NOTES:

1. THE PRODUCT ANCHORAGE SHOWN HEREIN IS DESIGNED TO COMPLY WITH THE CURRENT EDITION OF THE FLORIDA BUILDING AND RESIDENTIAL CODES INCLUDING THE HIGH VELOCITY HURRICANE ZONE (HVHZ) AT THE DESIGN PRESSURES STATED HEREIN.
2. THE PRODUCT DETAILS CONTAINED HEREIN ARE BASED UPON SIGNED AND SEALED AS FOLLOWS:
 - 2.1. ATI TEST REPORT NO. ATI TEST REPORT A8071.01-301-18, DATED 03/21/11, ASTM E330-02 TESTED.
 - 2.1.1. SAFETY FACTOR OF 2 APPLIED TO STRUCTURAL TEST RESULTS YIELDS DESIGN PRESSURE OF +86.5/-175 PSF.
 - 2.2. ATI TEST REPORT NO. ATI TEST REPORT A8071.02-301-18, DATED 08/24/11, TAS 202-94 TESTED.
 - 2.2.1. SAFETY FACTOR OF 2 APPLIED TO STRUCTURAL TEST RESULTS YIELDS DESIGN PRESSURE OF +86.5/-175 PSF.
- 2.3. PRI CONSTRUCTION MATERIALS TECHNOLOGY TEST REPORT NLES-001-02-02, DATED 12/30/09, TAS-100(A)-95 TESTED USING SHINGLED ROOF COVERING.
 - 2.3.1. THE PRODUCT HAS TESTED FOR WIND-DRIVEN RAIN RESISTANCE PER TAS-100(A)-95, SECTION 10.3 AND FOUND TO BE IN CONFORMANCE WITH CHAPTER 15 OF THE FBC. SUBSEQUENT STRUCTURAL TESTING FOR INCREASED WINDSPEED RESISTANCE FOR VENTS PER SECTION 10.4 OF TAS-100(A)-95 WAS PERFORMED TO TAS-202-94 (ABOVE). AN INSTALLATION HEIGHT NOT TO EXCEED 75 FEET IS APPLICABLE.
- 2.4. PRI CONSTRUCTION MATERIALS TECHNOLOGY TEST REPORT NLES-002-02-01, DATED 8/03/17, TAS-100(A)-95 TESTED USING HIGH PROFILE "S" SHAPED CONCRETE ROOF TILES.
 - 2.4.1. THE PRODUCT HAS TESTED FOR WIND-DRIVEN RAIN RESISTANCE PER TAS-100(A)-95, SECTION 10.3 AND FOUND TO BE IN CONFORMANCE WITH CHAPTER 15 OF THE FBC. AN INSTALLATION HEIGHT NOT TO EXCEED 75 FEET IS APPLICABLE.
3. FOR ROOF MOUNTING: ADEQUACY OF THE EXISTING STRUCTURAL ROOF SHEATHING AND SUPPORTING 2X FRAMING AS A MAIN WIND FORCE RESISTING SYSTEM CAPABLE OF WITHSTANDING AND TRANSFERRING APPLIED PRODUCT LOADS TO THE FOUNDATION IS THE RESPONSIBILITY OF THE ENGINEER OR ARCHITECT OF RECORD FOR THE PROJECT OF INSTALLATION.
4. FOR WALL MOUNTING AT GABLES: ADEQUACY OF THE EXISTING STRUCTURAL WALL SHEATHING AND SUPPORTING 2X FRAMING AS A MAIN WIND FORCE RESISTING SYSTEM CAPABLE OF WITHSTANDING AND TRANSFERRING APPLIED PRODUCT LOADS TO THE FOUNDATION IS THE RESPONSIBILITY OF THE ENGINEER OR ARCHITECT OF RECORD FOR THE PROJECT OF INSTALLATION.
5. THE INSTALLATION DETAILS DESCRIBED HEREIN ARE GENERIC AND MAY NOT REFLECT ACTUAL CONDITIONS FOR A SPECIFIC SITE. IF SITE CONDITIONS CAUSE INSTALLATION TO DEVIATE FROM THE REQUIREMENTS DETAILED HEREIN, A LICENSED ENGINEER OR ARCHITECT SHALL PREPARE SITE SPECIFIC DOCUMENTS FOR USE WITH THIS DOCUMENT.
6. HOOD & FLASHING MATERIAL: 1100-O ALUMINUM.
7. PRIOR TO A HURRICANE OR ANTICIPATED HIGH WIND EVENT, THE SOLAR PANEL SHALL BE PLACED IN THE RETRACTED POSITION WHERE APPLICABLE.
8. SOLAR ATTIC FAN MODELS:
 - 8.1. SOLAR ATTIC FAN WITH POSITIONABLE PHOTO VOLTAIC PANEL (SHEET 2) WITH A 40 WATT FAN MOTOR WAS TESTED. THIS SOLAR ATTIC FAN IS ALSO AVAILABLE IN 12, 24, 36 AND 60 WATT SIZES. ALL STRUCTURAL BRACKETS AND ANCHORING ARE IDENTICAL FOR ALL SOLAR PANEL SIZES. FAN SIZE REMAINS CONSISTENT, ONLY WATTAGE VARIES.
 - 8.2. SOLAR ATTIC FAN WITH FIXED LOW-PROFILE PHOTO VOLTAIC PANEL (SHEET 3) WITH A 24 WATT FAN MOTOR WAS TESTED.
9. SOLAR ATTIC FAN MAY BE INSTALLED AS FOLLOWS:
 - 9.1. ON ROOFS WITH SLOPES FROM 9 DEGREES (2" RISE OVER 12" RUN) TO 45 DEGREES (RISE EQUALS RUN).
 - 9.2. ON WALLS AT GABLE ENDS.
10. THIS PRODUCT EVALUATION DOCUMENT ADDRESSES THE STRUCTURAL ATTACHMENT OF THE ROOF VENT TO THE ROOF SHEATHING ONLY. PREPARATION OF THE ROOF SHEATHING AND ROOF COVERING(S) TO RECEIVE THE ROOF VENT SHALL BE PER THE MANUFACTURER'S INSTRUCTIONS AND IN ACCORDANCE WITH CHAPTER 15 OF THE FLORIDA BUILDING CODE AND CHAPTER 9 OF THE FLORIDA RESIDENTIAL CODE.
11. THIS APPROVAL IS FOR THE STRUCTURAL AND WIND-DRIVEN RAIN PERFORMANCE ONLY. IMPACT RESISTANCE WAS NOT TESTED. INTERIOR MECHANISM AND/OR ELECTRICAL CIRCUITRY ARE OUTSIDE THE SCOPE OF THIS PRODUCT APPROVAL DOCUMENT.

INSTALLATION NOTES:

1. ONE (1) INSTALLATION ANCHOR IS REQUIRED AT EACH ANCHOR LOCATION SHOWN.
2. THE NUMBER OF INSTALLATION ANCHORS DEPICTED (QUANTITY OF 10 ANCHORS) ARE THE MINIMUM NUMBER OF ANCHORS TO BE USED FOR PRODUCT INSTALLATION AS FOLLOWS:
 - 2.1. 2 BY WOOD FRAMING OPTION
 - 2.1.1. A MINIMUM OF TEN (10) ANCHORS SHALL BE USED.
 - 2.2. OSB AND PLYWOOD ROOF SHEATHING OPTION, THE GREATER OF
 - 2.2.1. A MINIMUM OF TEN (10) ANCHORS SHALL BE USED, OR
 - 2.2.2. AS REQUIRED BY THE INSTALLATION ANCHOR SCHEDULE ON SHEET 6.
3. ANCHOR TYPE AND SIZE;
 - 3.1. FOR INSTALLATION INTO WOOD FRAMING, USE #10 WOOD SCREWS OR #10 SELF-TAPPING/SELF-DRILLING SCREWS OF SUFFICIENT LENGTH TO ACHIEVE 1 1/2 INCH MINIMUM EMBEDMENT INTO 2X WOOD STRUCTURAL SUBSTRATE. MINIMUM EDGE DISTANCE IS 3/8 INCHES AND MINIMUM END DISTANCE IS 3/4 INCHES.
 - 3.2. FOR INSTALLATION INTO WALL OR ROOF SHEATHING, USE #10 SELF-TAPPING/SELF-DRILLING SCREWS OF SUFFICIENT LENGTH TO ACHIEVE FULL THREAD EMBEDMENT INTO STRUCTURAL SUBSTRATE. SELF-TAPPING/SELF-DRILLING SCREWS (a.k.a., SHEET METAL SCREWS) ARE THREADED THE FULL LENGTH AND REQUIRED TO ENSURE FULL THREAD ENGAGEMENT INTO SHEATHING.
 - 3.3. ANCHOR SPECIFICATIONS
 - 3.3.1. WOOD SCREWS WILL BE NO. 10 PAN HEAD WOOD SCREW, MEETING ANSI B18.6.1, CARBON OR STAINLESS STEEL, CORROSION RESISTANT BY COATING OR MATERIAL.
 - 3.3.2. TAPPING SCREWS SHALL BE NO. 10 TYPE AB PAN HEAD TAPPING SCREW, MEETING ASME/ANSI B18.6.4, CARBON OR STAINLESS STEEL, CORROSION RESISTANT BY COATING OR MATERIAL.
4. MINIMUM EMBEDMENT AND EDGE DISTANCE EXCLUDE ROOFING FINISHES, INCLUDING BUT NOT LIMITED TO ROOF SHEATHING, ROOF TILE, SHINGLES, UNDERLAYMENTS, ETC.
5. INSTALLATION ANCHOR CAPACITIES FOR PRODUCTS HEREIN ARE BASED ON SUBSTRATE MATERIALS WITH THE FOLLOWING PROPERTIES:
 - 5.1. 2 BY WOOD FRAMING (FOR 2X WOOD FRAMING INSTALLATION OPTION)
 - 5.1.1. MINIMUM SPECIFIC GRAVITY OF 0.42 OUTSIDE HVHZ.
 - 5.1.2. MINIMUM SPECIFIC GRAVITY OF 0.55 INSIDE HVHZ.
 - 5.2. PLYWOOD - SPECIES GROUP 1, 2, 3, 4 OR 5 (APA VOLUNTARY PRODUCT STANDARD PS 1).
 - 5.2.1. PLYWOOD SPECIES GROUP OR OTHER CLASSIFICATIONS AS REQUIRED BY THE FLORIDA BUILDING CODE WILL BE MET.
 - 5.3. OSB - SHEATHING GRADE (APA VOLUNTARY PRODUCT STANDARD PS 2).
 - 5.3.1. OSB CLASSIFICATIONS AS REQUIRED BY THE FLORIDA BUILDING CODE WILL BE MET.
6. ADDITIONAL INSTALLATION LIMITATIONS
 - 6.1. PRODUCT SHALL NOT BE INSTALLED AT AN ELEVATION EXCEEDING 75 FEET.
 - 6.2. PRODUCT SHALL NOT BE INSTALLED ON WALL OR ROOF SHEATHING LESS THAN 3/8" IN THICKNESS OR AS LIMITED BY THE FLORIDA BUILDING CODE.
 - 6.3. PRODUCT CAN BE INSTALLED ON ROOFS UTILIZING SHINGLES, TILES OR MEMBRANES.

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4	2X WOOD FRAMING INSTALLATION OPTION
5	SHEATHING INSTALLATION OPTION - ANCHORAGE DETAILS
6	SHEATHING INSTALLATION OPTION - ANCHORAGE SCHEDULE & NOTES

DESIGN PRESSURE RATING (PSF)

LOADING DIRECTION	DP LIMITATION (PSF)
POSITIVE (DOWNWARD)	86.5 PSF
NEGATIVE (UPWARD)	175 PSF

NATURAL LIGHT ENERGY SYSTEMS
10821 N. 23rd AVE.
PHOENIX, AZ 85029

SOLAR ATTIC FAN
POWERED BY PHOTO VOLTAIC PANELS
GENERAL NOTES

DRAWN: RJA	DWG NO. NLES-100	REV B
SCALE NTS	DATE 8/31/2023	SHEET 1 OF 6

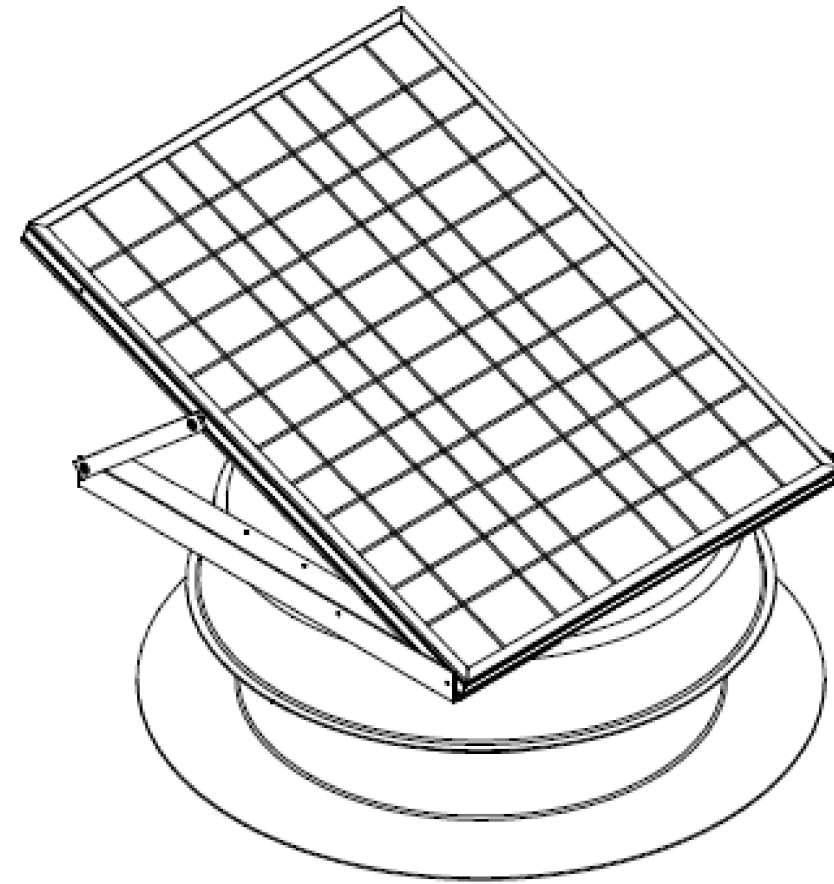
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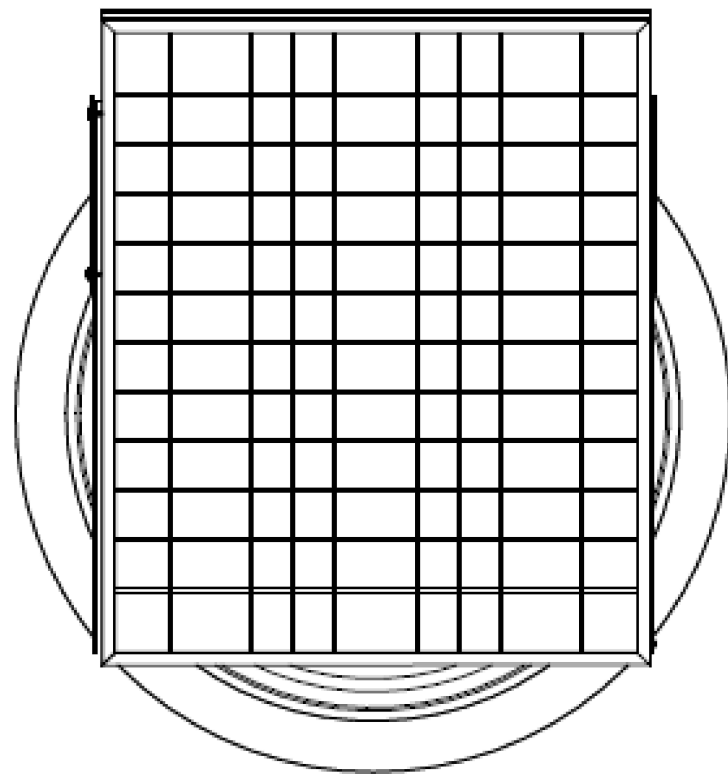
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

ISOMETRIC VIEW

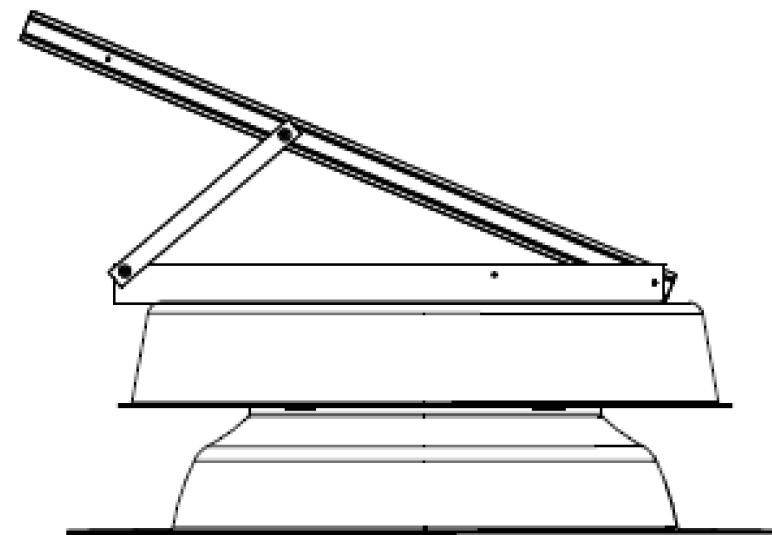
POSITIONABLE PHOTO VOLTAIC PANEL



PERSPECTIVE VIEW
NOT TO SCALE



TOP VIEW
NOT TO SCALE



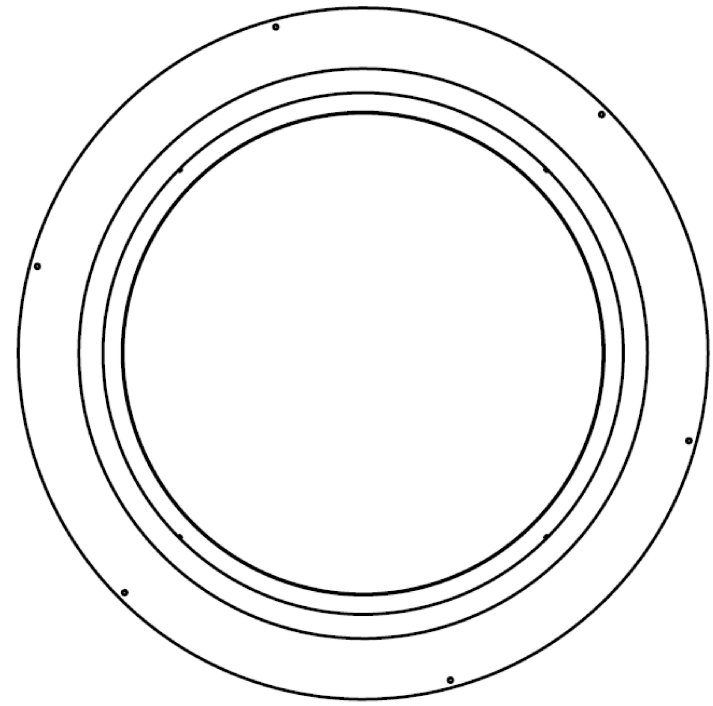
LEFT VIEW
NOT TO SCALE

NATURAL LIGHT ENERGY SYSTEMS 10821 N. 23rd AVE. PHOENIX, AZ 85029			
SOLAR ATTIC FAN POWERED BY PHOTO VOLTAIC PANELS ISOMETRIC VIEW			
DRAWN: RJA	DWG NO. NLES-100	REV B	
SCALE NTS	DATE 8/31/2023	SHEET 2 OF 6	

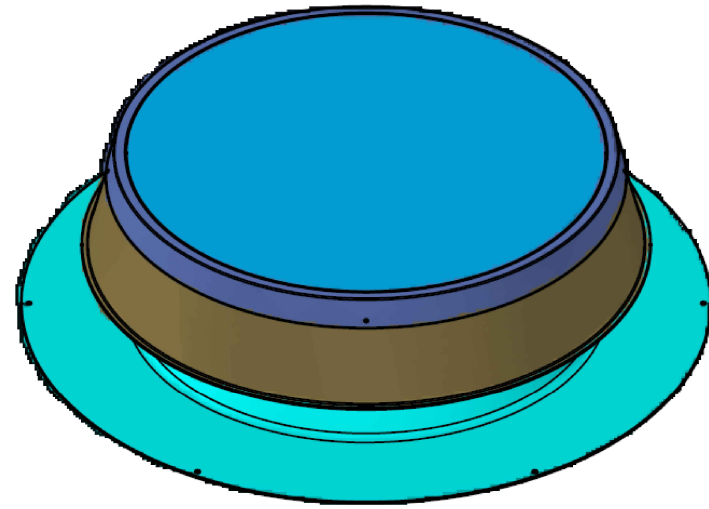
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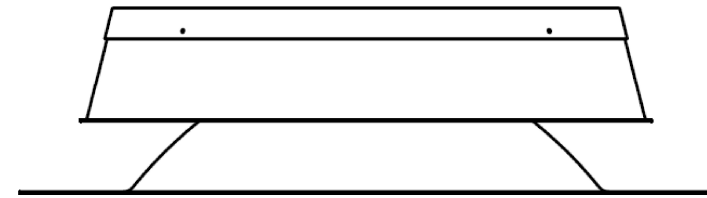


TOP VIEW

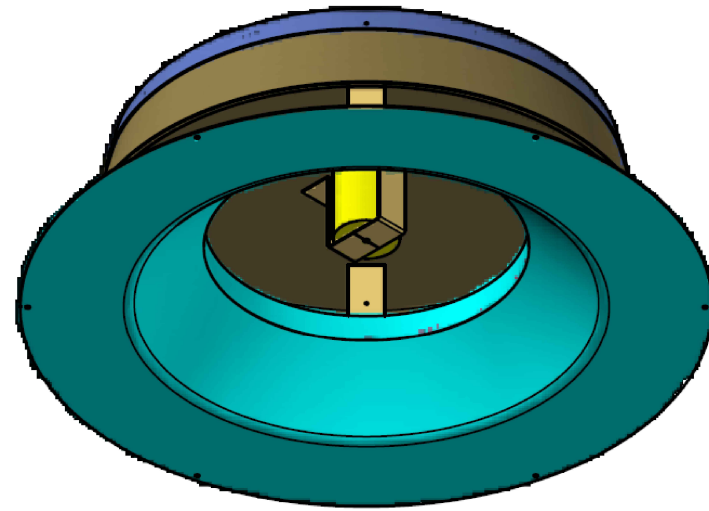


ISOMETRIC TOP VIEW

ISOMETRIC VIEW
FIXED LOW-PROFILE PHOTO VOLTAIC PANEL



FRONT VIEW



ISOMETRIC BOTTOM VIEW

NATURAL LIGHT ENERGY SYSTEMS 10821 N. 23rd AVE. PHOENIX, AZ 85029			
SOLAR ATTIC FAN POWERED BY PHOTO VOLTAIC PANELS ISOMETRIC VIEW			
DRAWN: RJA	DWG NO. NLES-100	REV B	
SCALE NTS	DATE 8/31/2023	SHEET 3 OF 6	

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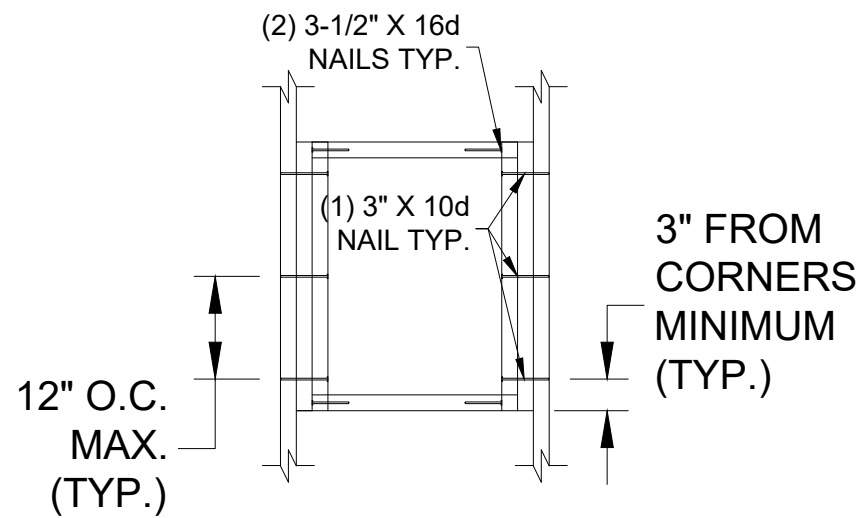
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2X WOOD FRAMING INSTALLATION OPTION

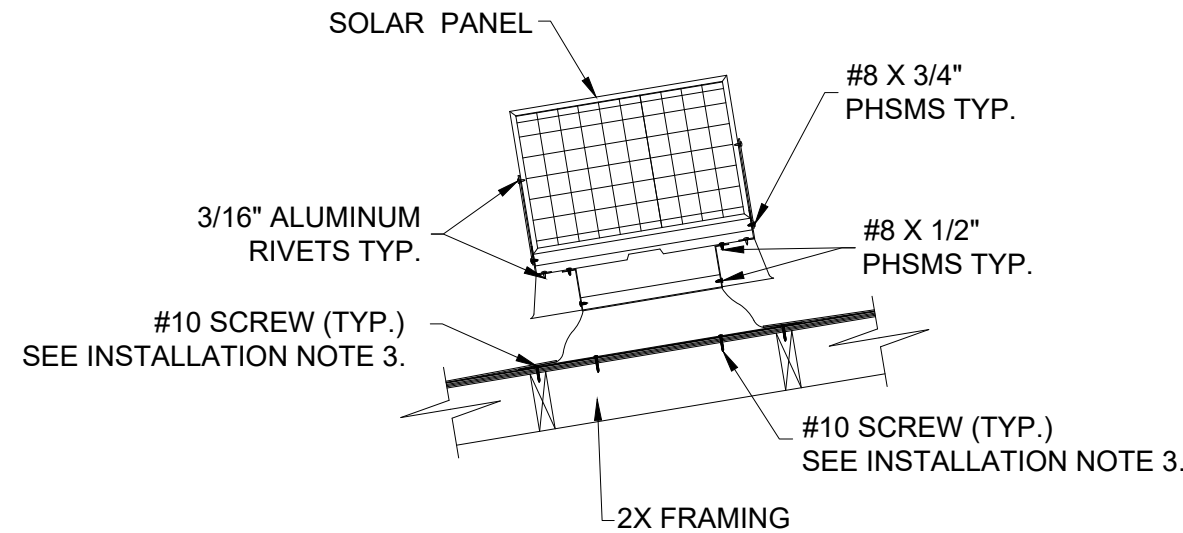
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

WOOD FRAMING OPTION SHOWN IS FOR EXAMPLE. OTHER ROOF JOIST/RAFTER OR WALL STUD SPACING IS ALLOWED. OTHER 2X FRAMING OPTIONS ARE ALLOWED. LIMITATIONS OF THIS OPTION ARE:

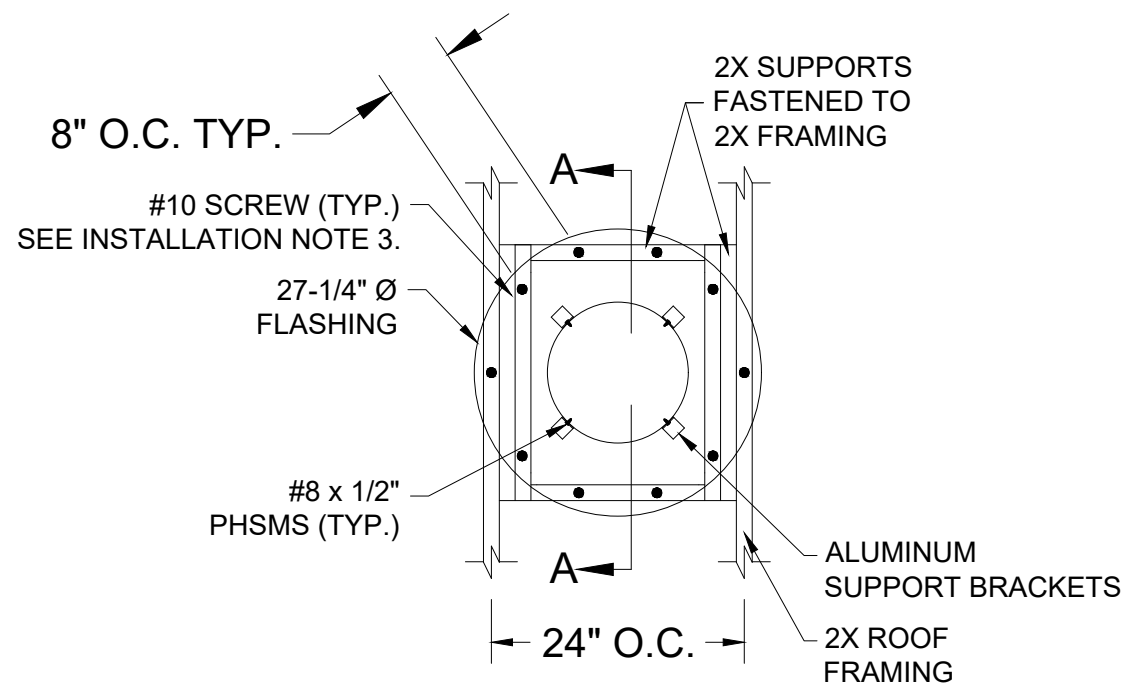
1. ALL TEN (10) INSTALLATION ANCHORS MUST ENGAGE WITH THE 2X WOOD FRAMING. SEE INSTALLATION ANCHOR SCHEDULE ON SHEET 6.
2. 2X FRAMING INSTALLED BY INSTALLATION CONTRACTOR IS BEYOND SCOPE OF THIS PRODUCT APPROVAL DOCUMENT AND MAY REQUIRE APPROVED BY THE AUTHORITY HAVING JURISDICTION
3. THE 2X FRAMING OPTION SHOWN HERE IS APPROVED WITH THIS PRODUCT APPROVAL DOCUMENT AND APPLICABLE TO ROOF JOIST/RAFTER OR WALL STUD SPANS UP TO 24".
 - 3.1. ROOF JOIST/RAFTER OR WALL STUD SPANS LESS THAN 24" CAN INCLUDE FRAMING IN MULTIPLE ADJACENT BAYS.
 - 3.2. ADDITIONAL 2X FRAMING USING STEEL CONNECTORS (SIMPSON STRONGTIE, ETC.) ARE ALSO APPROVED.
4. FOR 2X FRAMED INSTALLATION, ALL TEN (10) INSTALLATION ANCHORS MUST ENGAGE THE 2X WOOD FRAMING.



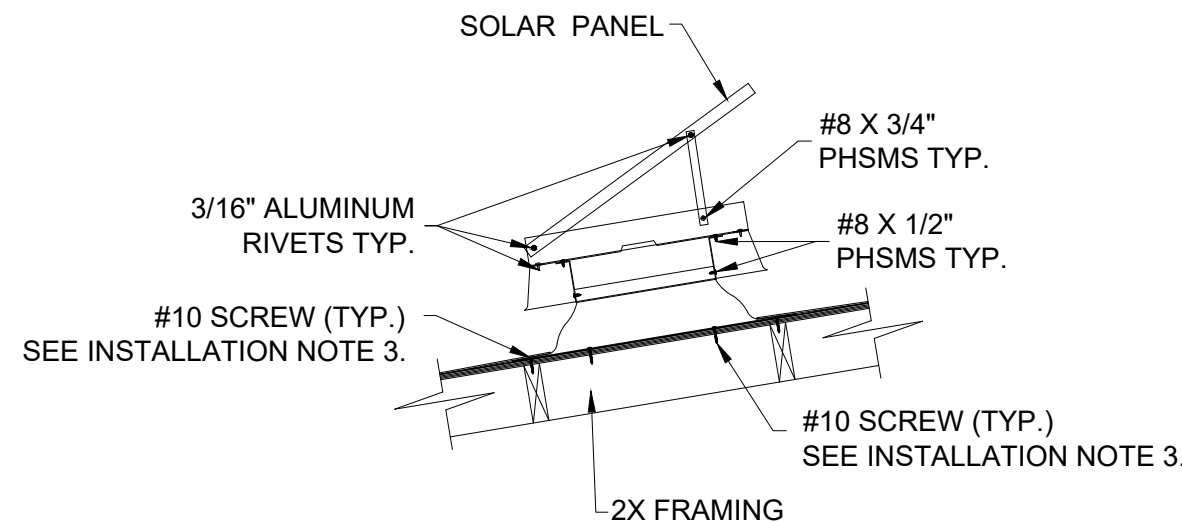
ANCHOR LOCATION DETAIL
2X WOOD SUPPORT FRAMING - EXAMPLE



ELEVATION



ROOF MOUNTED SOLAR ATTIC FAN
ANCHOR LOCATION DETAIL
2X WOOD SUPPORT FRAMING - EXAMPLE



SECTION A-A

2X WOOD FRAMING INSTALLATION OPTION SHOWN FOR ROOF INSTALLATION USING POSITIONABLE SOLAR PANEL ATTIC FAN. INSTALLATION ALSO APPLICABLE TO FIXED LOW-PROFILE SOLAR PANEL ATTIC FAN. 2X WOOD FRAMING OPTION CAN ALSO BE USED FOR GABLE END WALL INSTALLATION WITH EITHER ATTIC FAN.

NATURAL LIGHT ENERGY SYSTEMS 10821 N. 23rd AVE. PHOENIX, AZ 85029		
SOLAR ATTIC FAN POWERED BY PHOTO VOLTAIC PANELS 2X WOOD FRAMING INSTALLATION OPTION		
DRAWN: RJA	DWG NO. NLES-100	REV B
SCALE NTS	DATE 8/31/2023	SHEET 4 OF 6

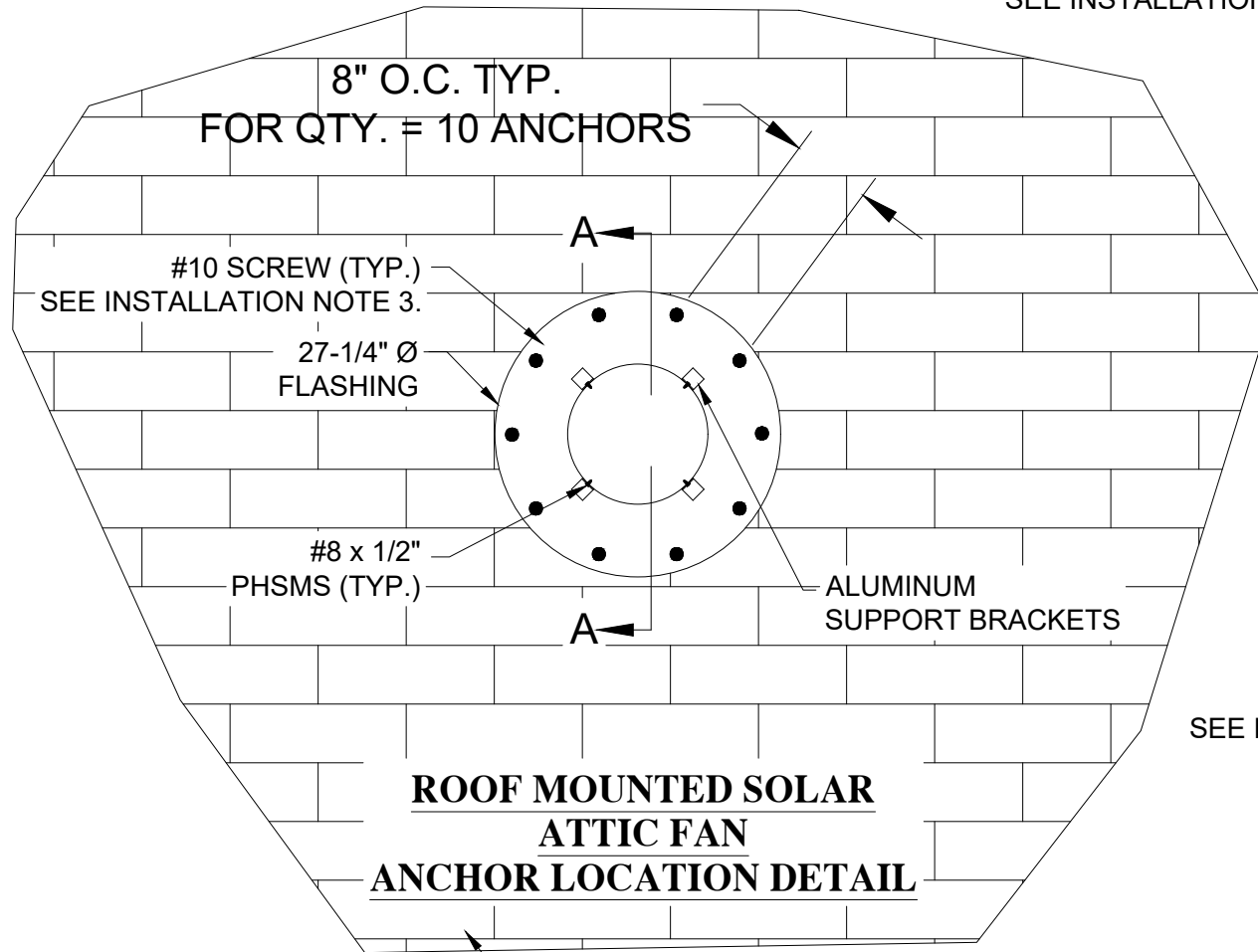
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PLYWOOD OR OSB WALL/ROOFSHEATHING INSTALLATION OPTION

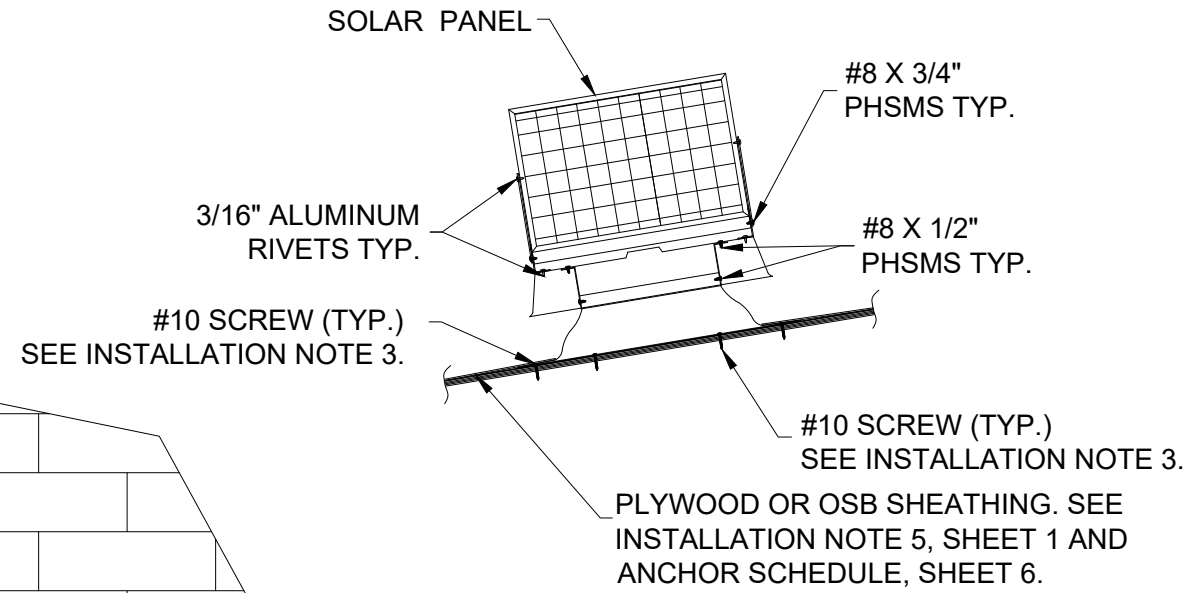
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- ROOF SHEATHING COVERINGS ALLOWED.
1. ROOFING SHINGLES (SHOWN) ALLOWED. MEMBRANE ROOFING MATERIALS ALLOWED BASED ON SHINGLE TESTING RESULTS.
 2. TILE (FLAT OR CORRUGATED) ROOFING MATERIALS ALLOWED.
 3. TYPICAL WALL COVERING MATERIALS (STUCCO, SIDING, ETC.) ALLOWED.

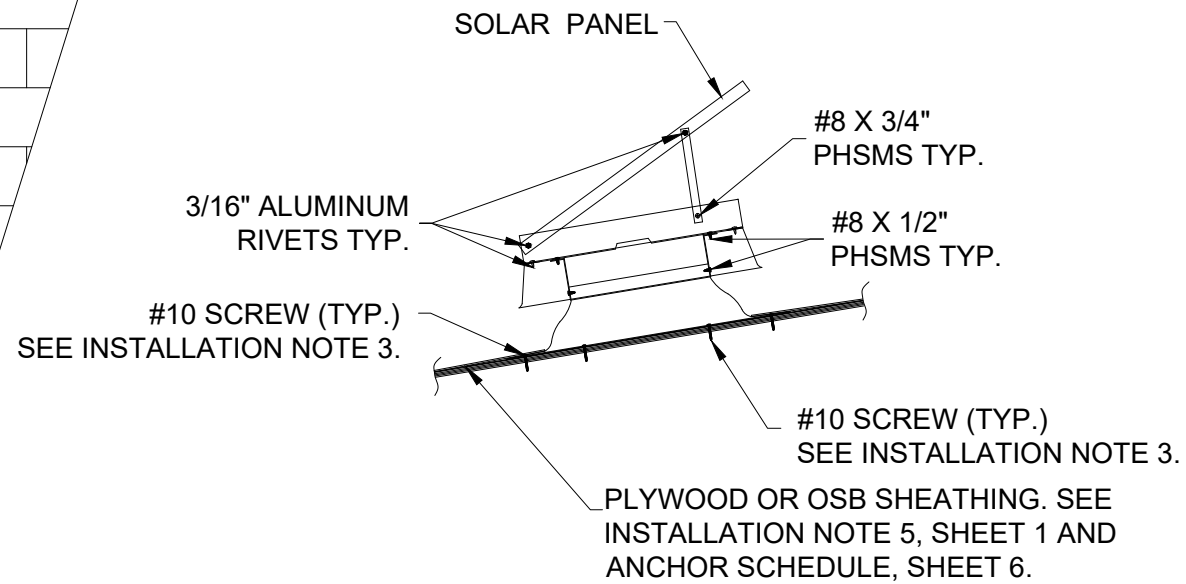


- NOTES:
1. SEE SHEET 6 FOR INSTALLATION ANCHOR SCHEDULE AND REQUIRED ANCHOR QUANTITIES.
 2. SEE INSTALLATION NOTE 5 ON SHEET 1 FOR MATERIAL REQUIREMENTS AND SHEATHING THICKNESS.
 - 2.1. FOR THICKNESSES OTHER THAN THAT SHOWN ON SHEET 5, USE THE NEXT THINNER THICKNESS.

SHEATHING INSTALLATION OPTION SHOWN FOR ROOF INSTALLATION USING POSITIONABLE SOLAR PANEL ATTIC FAN. INSTALLATION ALSO APPLICABLE TO FIXED LOW-PROFILE SOLAR PANEL ATTIC FAN. SHEATHING OPTION CAN ALSO BE USED FOR GABLE END WALL INSTALLATION WITH EITHER ATTIC FAN.



ELEVATION



SECTION A-A

NATURAL LIGHT ENERGY SYSTEMS 10821 N. 23rd AVE. PHOENIX, AZ 85029		
SOLAR ATTIC FAN POWERED BY PHOTO VOLTAIC PANELS PLYWOOD/OSB ROOF SHEATHING INSTALL. OPTION		
DRAWN: RJA	DWG NO. NLES-100	REV B
SCALE NTS	DATE 8/31/2023	SHEET 5 OF 6

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PLYWOOD OR OSB WALL/ ROOF SHEATHING INSTALLATION OPTIONS

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

SUBSTRATE		QUANTITY OF INSTALLATION ANCHORS AT VARIOUS DESIGN PRESSURES (psf)										
Type	Thickness	42 psf	48 psf	49 psf	50 psf	58 psf	63 psf	68 psf	70 psf	78 psf	82 psf	92 psf
2X FRAMING		10	10	10	10	10	10	10	10	10	10	10
OSB	3/8"	10	10	10	10	12	13	14	14	16	16	18
	7/16"	10	10	10	10	10	10	10	10	11	12	13
	15/32"	10	10	10	10	10	10	10	10	10	11	12
	1/2"	10	10	10	10	10	10	10	10	10	10	11
	5/8"	10	10	10	10	10	10	10	10	10	10	10
Plywood 1	3/8"	10	10	10	10	10	10	10	10	10	10	10
	7/16"	10	10	10	10	10	10	10	10	10	10	10
	15/32"	10	10	10	10	10	10	10	10	10	10	10
	1/2"	10	10	10	10	10	10	10	10	10	10	10
	5/8"	10	10	10	10	10	10	10	10	10	10	10
Plywood 2	3/8"	10	10	10	10	10	11	12	12	13	14	15
	7/16"	10	10	10	10	10	10	10	10	11	12	13
	15/32"	10	10	10	10	10	10	10	10	11	11	13
	1/2"	10	10	10	10	10	10	10	10	10	11	12
	5/8"	10	10	10	10	10	10	10	10	10	10	10
Plywood 3, 4, 5	3/8"	10	11	11	11	13	14	15	15	17	18	20
	7/16"	10	10	10	10	11	12	12	13	14	15	17
	15/32"	10	10	10	10	10	11	12	12	14	14	16
	1/2"	10	10	10	10	10	10	11	11	13	13	15
	5/8"	10	10	10	10	10	10	10	10	10	11	12

WALL/ROOF SHEATHING OPTION INSTALLATION ANCHOR SCHEDULE AND INSTALLATION NOTES:

- SEE SHEET 1, INSTALLATION NOTES FOR ANCHOR SIZE, TYPE AND EMBEDMENT REQUIREMENTS.
- TABLE AT LEFT SHOWS QUANTITY OF ANCHORS REQUIRED FOR THE FOLLOWING:
 - VARIOUS DESIGN PRESSURES (DP) IN POUNDS PER SQUARE FOOT (PSF),
 - PLYWOOD (SPECIES GROUPS 1 THROUGH 5 - SEE INSTALLATION NOTE 5.2 ON SHEET 1).
 - OSB (SHEATHING GRADE - SEE INSTALLATION NOTE 5.3 ON SHEET 1)
- USE THIS TABLE AS FOLLOWS:
 - DETERMINE THICKNESS AND TYPE OF WALL OR ROOF SHEATHING.
 - DETERMINE REQUIRED NEGATIVE (UPLIFT) DESIGN PRESSURE FOR PROJECT'S PHYSICAL LOCATION.
 - ENTER TABLE TO DETERMINE QUANTITY OF ANCHORS (SELF-TAPPING SCREWS REQUIRED FOR SHEATHING ONLY WHERE ANCHORS WILL NOT ENGAGE IN 2X FRAMING).
- QUANTITY OF ANCHORS SHALL NEVER BE LESS THAN TEN (10).
- SPACING SHOWN ON SHEETS 4 & 5 BASED ON THE FOLLOWING.
 - QUANTITY OF ANCHORS TEN (10).
 - ANCHORS LOCATED IN CIRCULAR MANNER IN A PERIMETER CIRCLE OF 25-1/2" DIAMETER.
 - TEN (10 ANCHORS) SPACED EVENLY ON 25-1/2" DIAMETER ARE SPACED 8" ON CENTER (O.C.).
 - SPACING MAY BE LESS BUT CANNOT EXCEED 8" O.C.
 - SPACING WILL BE LESS WHEN ANCHOR QUANTITY EXCEEDS TEN (10) ANCHORS.

SUBSTRATE		QUANTITY OF INSTALLATION ANCHORS AT VARIOUS DESIGN PRESSURES (psf)										
Type	Thickness	96 psf	108 psf	115 psf	120 psf	130 psf	140 psf	150 psf	160 psf	170 psf	175 psf	
2X FRAMING		10	10	10	10	10	10	11	12	13	13	
OSB	3/8"	19	21	23	24	26	27	29	31	33	34	
	7/16"	14	16	17	17	19	20	21	23	24	25	
	15/32"	12	14	15	15	16	18	19	20	21	22	
	1/2"	11	13	13	14	15	16	17	18	20	20	
	5/8"	10	10	10	10	11	11	12	13	14	14	
Plywood 1	3/8"	10	11	12	12	13	14	15	16	17	18	
	7/16"	10	10	10	11	11	12	13	14	15	15	
	15/32"	10	10	10	10	11	11	12	13	14	14	
	1/2"	10	10	10	10	10	11	12	12	13	13	
	5/8"	10	10	10	10	10	10	11	12	13	13	
Plywood 2	3/8"	16	18	19	20	22	23	25	26	28	29	
	7/16"	14	16	17	17	19	20	21	23	24	25	
	15/32"	13	15	16	16	17	19	20	21	23	23	
	1/2"	12	14	15	15	16	18	19	20	21	22	
	5/8"	10	11	12	12	13	14	15	16	17	18	
Plywood 3, 4, 5	3/8"	21	24	25	26	28	30	32	35	37	38	
	7/16"	17	20	21	22	23	25	27	29	30	31	
	15/32"	17	19	20	21	22	24	26	27	29	30	
	1/2"	15	17	18	19	21	22	24	25	27	28	
	5/8"	13	14	15	16	17	18	19	21	22	23	

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10821 N. 23rd AVE.
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SOLAR ATTIC FAN
POWERED BY PHOTO VOLTAIC PANELS
SHEATHING INSTALL OPTIONS - SCHEDULE & NOTES

DRAWN: RJA	DWG NO. NLES-100	REV B
SCALE NTS	DATE 8/31/2023	SHEET 6 OF 6

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