ARCHITECTURAL REVIEW BOARD MEETING

Wednesday, March 18, 2026 at 7:00 PM

Council Chambers – 15000 Washington St., STE 100 Haymarket, VA 20169

http://www.townofhaymarket.org/

AGENDA

I. CALL TO ORDER

II. PLEDGE OF ALLEGIANCE

III. CITIZENS TIME

IV. MINUTE APPROVAL

1. Architectural Review Board-Regular Meeting: August 20, 2025
2. Architectural Review Board-Regular Meeting: December 17, 2025

V. AGENDA ITEMS

1. ZP #2026-003 15013 Gossom Manor Pl., Installation of Roof Mounted Solar Panels
2. ZP #2026-008 6515 Crossroads Village Blvd, Installation of Roof Mounted Solar Panels

VI. OLD BUSINESS

VII. NEW BUSINESS

VIII. PLANNING COMMISSION UPDATES

IX. TOWN COUNCIL UPDATES

X. ADJOURNMENT

ARCHITECTURAL REVIEW BOARD MEETING

Wednesday, August 20, 2025, at 7:00 PM

Council Chambers – 15000 Washington St., STE 100 Haymarket, VA 20169

http://www.townofhaymarket.org/

MINUTES

I. CALL TO ORDER

A Regular Meeting of the Architectural Review Board of the Town of Haymarket, Virginia, was held this evening in the Council Chambers, commencing at 7:00 pm.

Chairman Luersen called the meeting to Order.

PRESENT: Chairman Ken Luersen, Vice Chair Ben Barben, Planning Commission Liaison Dave Capossela, Board Member Chuck Mason, and Board Member Joanna Mason.

II. PLEDGE OF ALLEGIANCE

Chairman Luersen invited everyone to stand for the Pledge of Allegiance.

III. CITIZENS' TIME

There were no citizens at this evening's meeting wishing to address the Board.

IV. MINUTE APPROVAL

Vice Chair Barben moved to approve the meeting minutes for June 25, 2025, and July 16, 2025. Board Member Chuck Mason seconded the motion. With no objections, the Motion carried.

V. AGENDA ITEMS

1. ZP#2025-0703 14841 Washington Street Demolition COA Application

Town Planner Thomas Britt reintroduced the demolition application for the property at 14841 Washington Street, noting it is recognized as historic under local ordinances and guidelines due to its age, stating per our records was built around 1901. Mr. Britt shared that it is not listed on the state or national historic registries. He went over the demolition approval criteria, highlighting that the property is situated at the edge of the town's historic district and is not adjacent to other designated historic structures. Mr. Britt provided updates regarding new reports received after the meeting agenda was published, which included a recent structural report that focused primarily on floor elevation and foundation issues, and a landscape stabilization plan detailing next steps if demolition is approved. Additionally, a member of the Watts family, Jennifer Pearson, is appearing via Zoom and has provided additional documentation from a past appraisal from 2022, which noted the property's deteriorated condition. Mr. Britt summarized the history of the site, which has ties to the Rector and Watts families and was included in the town's historic walking tour, but bringing the question if it is worth preserving or not, partially or completely. Mr. Britt shared the realtor, June Kerns, Jennifer Pearson for the Watts family, and the potential buyer are present to answer questions.

Vice Chair Barben asked about reaching out to the County, Relic, and Town Manager Emily Kyriazi shared that, upon request, they can include materials such as deeds, newspaper clippings, or similar historical documents. Mrs. Kyriazi noted that it provided a more complete chain of ownership for the property, but, to the best of our knowledge, all historical information has already been received. The County would likely have access to the same limited data that we have here.

John Dominick came to the podium and thanked the Board for their work and apologized for missing the ARB Meeting in July. He shared his family's history with the area and their plans to purchase and redevelop the property. His daughter, Kelsey Dominick, spoke about their family legacy and the vision for DiDominico's, which would serve as a community-oriented space to include a fine arts and custom gown studio. Shirley Dominick came up to the podium and emphasized the family's goal of creating a space for education and community connection.

The seller's agent for the Watts, June Kearns, approached and reported multiple failed sales due to mold and structural or foundation issues. She noted challenges with setback lines and compliance for renovations because of the building's age and also mentioned problems with termites.

Vice Chair Barben asked for documentation of the termite damage, and that it wasn't in the structural report or the architectural condition assessment.

The Town Planner, Mr. Britt, responded that there is a land file that mentions termite damage, but he would need to check what it says about the foundation.

The Town Manager shared the document on file that we have is from the prior Town Planner in 2016. It is a lengthy letter and it's an initial assessment from the Town Planner at the time, which states, "some evidence of the termite activity in the older portion of the home might be addressed with the current termite inspection by a reputable inspector. While the floors appeared solid and sturdy to walk on, there is some concern due to the age of the home and observable exterior perimeter wood to ground contact with the siding of the home. The house has settled over the years, especially in the areas where there are load-bearing walls, and this is observable in the unevenness of the floorboards on the first floor. This is especially notable in the oldest portion of the home in the areas of the front two rooms. The building official could provide additional advice to you about code compliance and if that is applicable. My observation does not speak to that. It is not my area of expertise." Mrs. Kyriazi reiterated that it was done by the Town Planner at the time and does not know why he was doing an initial assessment in 2016.

Chairman Luersen said the first step is to determine whether this is a historic asset and whether the structure is stable enough to be rebuilt, or if it will need to be demolished. He noted that with previous properties, owners often start with good intentions but change their plans at the last minute, so at least we have an idea of the direction they want to take. The question is whether we are willing to take the risk with that direction.

The Town Manager directed the Board to page 47 of the packet, which displays the current historic inventory and notes that the comprehensive plan designates the property as locally historic to the Town. She also mentioned that the property is included in the Town's historic walking tour because of its local significance. Mrs. Kyriazi referenced and read the history from the walking tour guidebook (page 17, entry number 14), which provides a summary of all known information about the structure. She explained that this summary was developed in partnership with Prince William County using the documents available at the time and was created just last summer.

A member of the Watts family, Jennifer Pearson, spoke about her family's deep roots in Haymarket, sharing that her grandfather purchased the property in the 1950s and operated "A.M. Watts Plumbing," serving the local area. Her grandmother retired from the Haymarket Post Office, and her grandparents were members of and married at Haymarket Baptist Church. Ms. Pearson emphasized that her family are not outsiders seeking to erase history. She noted their close relationships with the

Gossom, Kern, and Bleight families and explained that the family is burdened with an uninhabitable and structurally unsound home, which they have attempted to sell multiple times. She expressed that the family wants to remain connected to Haymarket and fully supports the seller's request. Ms. Pearson voiced concern that the property may be difficult to sell because it is part of the Town's historic walking tour. She stated her respect for the historic overlay, but she asked that the Town consider the family's situation and allow them the freedom to move forward.

The realtor, June Kearns, reapproached the Board, sharing Mr. Watts does work on the property and recently painted the exterior of the house, but stated Mr. Watts is unable to keep it maintained due to age and health limitations. He is now in his 60s, Mr. Watts said he was born and raised in the home, and he plans to retire soon. He indicated that he will likely need to sell the property, as he will not be able to continue living there or maintaining it, and no other family members are available to take over its care.

Chairman Luersen directed the Board to discuss first if it's a historical asset of the Town, and if it's too much of a burden on the property owner. He also questioned when the clock starts if the COA is denied. The Town Manager mentioned that in the 8 years she's been with the Town, they have been actively trying to sell the property and worked with the family in early 2018 on rezoning.

Chairman Luersen stated it is on the registry and also discussed other properties that have been refurbished. There was discussion on the report and that it looked at the surface, and the report was poor. You also have to weigh the financial burden which will also need to be considered on which direction you want to go.

Board Member Chuck Mason congratulated them on their leadership and on bringing other generations along to support. Mr. Mason shared that he moved to the town 13 years ago and joined the Board to help maintain the feel of community. He expressed concern about preserving the humanity and local character of the community, emphasizing the importance of small, family-run businesses over large commercial developments. Mr. Mason noted that the current structure appears to be in poor condition and may be financially difficult to restore or repurpose and also voiced concern that if the current buyer is not approved, the property could eventually be acquired by something larger and more commercial, given its zoning. Mr. Mason shared his preference for supporting a "mom-and-pop" type business that would honor the spirit of the community and its history while contributing to the local growth.

PC Liaison Capossela shared one concern he has which is that once you tear it down, it's gone forever, and he doesn't want the stories of the families to be gone as well. Mr. Capossela agrees it's on the registry, but nothing historical happened there.

Chairman Luersen acknowledged the difficulty of balancing historic preservation with the owner's burden of maintaining the property. He noted the Board must follow the guidelines in place, even as volunteers, and expressed concern about what might replace the structure if it were demolished, citing past projects that changed direction after they were approved. He added that the proposed replacement building appears too modern and commercial to fit as a transition between nearby residential and commercial areas.

Jennifer Pearson reiterated that her uncle, who maintains the property, is close to retiring and won't be able to keep up with the maintenance. She suggested that perhaps a historical marker could be added to show pictures and tell the story of the home.

Mr. John Dominick approached the podium and stated that the house design presented was only a concept of their vision and they are open to a different style that better fits the area, and they would work closely with the Board to develop something acceptable. Additionally, he suggested working with the museum to document the transition from the 1901 structure to a new building and proposed placing a marker on the property with a photo and description of the original house, as Jennifer

recommended, so visitors can learn its history. His daughter, Kelsey, approached the podium and shared her agreement with everyone, emphasizing their love for Haymarket.

Vice Chairman Barben said, similar to everyone else, his family moved to Haymarket for its small-town charm, which has since changed with increased development and traffic. This was one of the reasons he chose to serve on the ARB, and also that he is a licensed engineer experienced in historic buildings. Mr. Barben noted the house has strong character and historical value similar to other older homes in town that have already been lost. He expressed concern that other nearby historic homes may face similar demolition requests in the future. Mr. Barben felt the structural report appeared light and suggested that some issues, such as uneven floors and settling, may be due to additions built at different times. He emphasized that much of the deterioration seems to be deferred maintenance rather than irreparable damage, and he would like to take a further look at the foundation to see if we could preserve some portion. He acknowledged the family's history in Haymarket and agreed there needs to be a balance between preservation and progress, but wants to support and work with the applicants to find a solution that allows both the business and the town's history.

There was a discussion with Mr. Dominick and the Board about how to take a closer look at the foundation and the process it would take to do that, and who would have to bear the expense and also risk of finding out the possibility of rebuilding a new foundation to get in the shape to use. Board Member Chuck Mason emphasized the Board's obligation to gather enough information to support the decision they need to make. Jennifer Pearson added that maintaining the property has become a financial burden for the family and stressed the need to sell. Mr. Dominick reiterated the burden of costs and that we should have identified properties.

Vice Chair Barben shared that Haymarket already maintains a list of historic inventory properties, which includes details on construction date and architectural features. Mr. Barben reiterated that while the property is not on the National Register, it is recognized on the Town's local list. He emphasized that preservation efforts focus on maintaining the town's architectural fabric, as seen with past discussions about the recently demolished park building. He pointed out features like the early 1900s hand-crimped standing seam metal, reflecting craftsmanship that is rare today, and stressed the importance of recognizing these historic architectural elements.

Board Member Joanna Mason echoed everyone's sentiment and how we should pay homage to what was there. She suggested exploring ways to preserve elements of the house, either through elevation adjustments or incorporating historical features into the new construction. She also recommended tabling the decision so the Board can further review whether the building can be partially preserved or repurposed while still respecting its historic value.

Both daughters of the Dominick family approached the podium and shared that the business focuses on custom wedding gowns, serving a niche, diverse clientele, and welcoming all races, sizes, and genders. She also reiterated that beyond fashion, the plan includes offering art, jewelry, and mommy and me classes, creating a community hub for in-person experiences. The goal is to provide a space that reflects the town's character while engaging multiple generations.

Shirley Dominick returned to the podium, emphasizing their goal to preserve traditional skills like sewing and hands-on experiences, while creating a space in Haymarket that blends custom fashion, art, and classes.

Chairman Luersen noted the volume of information and asked about the decision timeline. Deferring to September was discussed, but Jennifer Pearson raised concerns about the August 28 closing. The Town Manager asked if a special meeting was possible, given scheduling conflicts and the time needed to provide information.

Vice Chair Barben requested the 2022 termite inspection mentioned. The Town Manager clarified with Jennifer Pearson that it was only an email chain. The Town Planner directed the Board to packet pages 35 through 46, which include the email chain and appraisal photos.

Chairman Luersen questioned the mention of termites and the mold, and that there was no supporting evidence of this being provided. The Town Planner shared on packet pages 33-46 is the email correspondence and photos, but there was no verbatim mention of termites. Jennifer Pearson spoke about the condition of the home and past reports. The Town Manager clarified that the email, 8/13, represents all documentation included in the agenda packet. She noted that the only evidence available pertains to the 6802 St. Paul Drive structure, and there is no documentation linking black mold to the main 14841 main structure. Mrs. Kyriazi noted the email chain mentions the loan cannot be secured due to the property's condition and asked whether the "unlivable" reference made was referring to the main structure or the St. Paul Drive structure. Jennifer Pearson confirmed that 14841 was the one being appraised.

Mrs. Kyriazi brought the Board back to the discussion of whether we can make a decision tonight or if we need to schedule a meeting for the following week, on Tuesday or Wednesday, and if that would be a respectable timeline. She also noted the Agenda would have to be posted on Thursday for a Tuesday meeting. Discussion followed about the date and what they would be requesting the applicants to provide should they schedule another meeting.

Vice Chair Barben questioned the termite inspection and appraisal. The Town Manager mentioned from what was provided in the email chain, they came to do the appraisal, and one structure was unlivable due to the black mold and they left the property as it was not financially feasible to continue to be able to secure the loan. Vice Chair also referenced the research done in order to put together the walking tour guidebook. Vice Chair Barben shared we likely have what we have and the only new thing presented for more time would be the email correspondence from the prior Town Planner.

* *The Town Manager suggested a brief recess as it was approaching 9:00 p.m*

Chairman Luerson called the Board back into session. He shared that during the recess, he spoke with individuals one-on-one, and they are willing to move forward. The Town Manager had some draft Motions prepared and asked the Board which motion she should read, whether to approve or deny the application.

Chairman Luersen stated that the Board understands the burden that the present property owner has and the conditions that are too restrictive for the proposed property owner. The Board likes the investment and feels they will want to contribute. The Board will go with the acceptance of the COA.

The Town Manager read the following Motion

I move the Haymarket Architectural Review approve COA ZP#2025-0703 the request to demolish the structure at 14841 Washington Street, the garage structure at 6802 Saint Paul Drive and the accessory shed structure on site, subject to the following findings and discussions for approval;

1. **The application is inconsistent with the stated purpose and intent of the Old and Historic Haymarket District Overlay. The subject building, built prior to 1950, is designated an historic building within the Old and Historic Town of Haymarket. The purpose of the Old and Historic Haymarket District Overlay is to identify, preserve, and enhance buildings and structures with historical, cultural, and architectural significance to the Town. The Zoning Ordinance further defines a "Historic Building" as any structure that is designated as a contributing resources or structure by the Town's comprehensive plan or similar land use policies.**

2. **The application is inconsistent with the Town of Haymarket Comprehensive Plan (Plan). Per Table 16 of the Plan, Historic Building Inventory, 14841 Washington Street, Historical Name "Watts House", circa 1900's, is designated historic and worthy of protection in the Town of Haymarket. The Plan states historic structures are important because they contribute to Haymarket's "sense of place" and provide tactile lessons on the cultural influences of the community.**

3. **Per the Town of Haymarket's research the structure known as, the Former Rector Home, also known commonly as Acie Watt's home, was built in the early twentieth-century, likely with the intention of being used both as a residential and commercial site. Representative of the architecture found in Haymarket at the turn of the century, it is a two-story, frame T-plan structure. It features a hipped roof front porch with decorative wrought iron and a concrete poured pad that at some point replaced the original supports. A stand-out feature of the structure are its windows; note the two-over-two sash windows flanked by one-over-one windows in the bay.**

4. **Per the demolition review standards outlined in the Zoning Ordinance, demolition of the historic resource will impact the historic integrity of the site and overall integrity of the historic district the historic resource is located in.**

5. **Based on the inhabitable condition of the building, the financial burden of the rehabilitation of the structure and the inability to secure a loan for the property with the structure in its current condition**

And

I further move that the Board work with the applicants, Dominickk Family and Watts Family to identify and document the history of the structure, the history of the Watts family in the Town of Haymarket over the past 70 years and other historical information regarding the site in the form of an oral history interview and full photographic documentation.

And

I further recommend the Dominickk Family work with Staff to identify important elements of the structure that may be included in the future designs of structures on site to further celebrate the history of the Watts House as it sits today.

Planning Commission Liaison Capossela so moved the Motion. Vice Chair Barben seconded the motion. Voting Yea: Board Member Chuck Mason, PC Liaison Dave Capossela, Vice Chair Barben, Board Member Joanna Mason, Chairman Luersen. The Motion carried.

2. ARB Guideline Updates

Town Planner Thomas shared that he has provided a draft update of the guidelines, including referenced resources and hyperlinks, specifically to the zoning ordinance. The timeline is to present a final draft at the September meeting, incorporate any edits or corrections for the October 15 meeting, and have the ARB approve the final draft at the November 19 meeting for submission to the Town Council. The November 24 work session is scheduled for authorization of the public hearing for the January Town Council meeting. He directed the Board to begin their review and discussion at page 54, focusing on the reformatting he has been working on.

VI. OLD BUSINESS

The Town Planner shared that the main item prepared was a staff land use update, which included the Lidle and Bleight Drive townhomes. A new for sale sign has been posted at Lidle. For the Bleight

Drive townhomes, the Town has attempted to contact the builders but is still awaiting a response. The COA for the demolition of the three single-family homes that would be replaced by the townhomes is set to expire in December 2025.

VII. NEW BUSINESS

The Town Planner reported that upcoming work includes reviewing the Karter School site plan. Mr. Britt noted that a smaller nearby site will include retail spaces facing Washington Street. The Town Manager discussed plans for a joint ARB and Town Council work session on the Town Hall's exterior, and the possible rescheduling of the October meeting due to Haymarket Day. Chairman Luersen mentioned a potential mural. The Town Manager shared it will reflect the town's history and may include a LOVE sign

VIII. PLANNING COMMISSION UPDATES

PC Liaison shared that they did have a meeting, and they went through the guidelines for the Planning Commission.

IX. TOWN COUNCIL UPDATES

Chairman Luersen shared we did hit on the RFP and land planning communications, and the outdoor event ordinance. The Town Manager said we need to put it out for a public hearing, and we will be posting that since it is an ordinance that's applicable to the entirety of the town and commercial properties. She shared the town's investigation into stormwater and three areas of concern in town. Mrs. Kyriazi also stated on September 2nd we will be doing a proclamation for Supervisor Bob Weir, so please come out and share stories and memories of Bob and everything he meant to our Town and Community. Chairman Luersen also noted the walking tour was a big hit.

X. ADJOURNMENT

With no further business before the Architectural Review Board, Vice Chair Barben moved to adjourn with a second by PC Liaison Dave Capossela. The motion carried.

_____ _____

Alexandra Elswick, Deputy Clerk **Ken Luersen, Chairman**

ARCHITECTURAL REVIEW BOARD MEETING

Wednesday, December 17, 2025, at 7:00 PM

Council Chambers – 15000 Washington St., STE 100 Haymarket, VA 20169

http://www.townofhaymarket.org/

MINUTES

I. CALL TO ORDER

A Regular Meeting of the Architectural Review Board of the Town of Haymarket, Virginia, was held this evening in the Council Chambers, commencing at 7:00 pm.

Chairman Luersen called the meeting to Order.

PRESENT: Chairman Ken Luersen, Vice Chair Ben Barben, Planning Commission Liaison Jeff Kress

ABSENT: Board Member Chuck Mason.

II. PLEDGE OF ALLEGIANCE

Chairman Luersen invited everyone to stand for the Pledge of Allegiance.

III. CITIZENS' TIME

There were no citizens at this evening's meeting wishing to address the Architectural Review Board.

IV. MINUTE APPROVAL

Vice Chair Barben asked that the minutes from the regular meeting on August 20 at 7:00 p.m., specifically the demolition Certificate of Appropriateness (COA), on packet page 6, be pulled for review of the language.

Vice Chair Barben moved to approve the Architectural Review Board site visit minutes from August 20, 2025, as well as the regular meeting minutes from September 17, 2025. PC Liaison Kress seconded the Motion. The motion carried.

V. AGENDA ITEMS

1. Meeting Schedule:

   The Board reviewed the 2026 meeting schedule.

   Vice Chair Barben moved to approve the schedule. PC Liaison Kress seconded the motion. Vote: Luersen- yes; Barben- yes; Kress- yes. Motion passed.

2. ZP #1202-6612 COA for updating branding sign

Town Manager Emily Kyriazi presented the application from Crumbl Cookie to change its signage. She directed the Board to a handout that included images of Crumbl Cookie and other multi-tenant structures that sit on the same development for reference. The existing signage is white lettering on

a black background, including a chef logo. The applicant is proposing the new franchise branding, shown on packet page 24, which features a pink background with black lettering reading “Crumbl.” The Town Manager directed the Board to a paint chip supplied by the applicant for reference.

A representative for Crumbl approached the podium to provide details and answer questions. The representative stated they are proposing to take the existing sign down and replace it with the one proposed as part of a corporate rebrand.

Chairman Luersen stated the proposed coloring is not included in the Town’s approved color palette and thus goes against the Architectural Review Board's Guidelines. Vice Chair Barben asked what was previously established for the site. Town Manager Kyriazi referenced the approval granted approximately three years ago during the build-out, noting Crumbl is located in Building Six.

The Town Manager further explained that the Master Sign Plan requires end-cap units to have backing boards, while interior tenant units have only the individual letter mounting. The Master Sign Plan also allows businesses to use their franchise branding, including colors and logos, though the Board may still consider the Town’s historic color palette in its review. She further clarified the Master Sign Plan specifies a default font to be used if a tenant does not have a designated font.

Chairman Luersen stated he didn’t oppose the font, but he’d like to see the colors reversed to pink lettering on a black background. Board members discussed the proposed sign in relation to other tenant signs in the complex.

The representative asked what the process is further to get what the applicant wants. Chairman Luersen said it’d be a vote of the Board, and he doesn’t think it fits with the surrounding signage in this complex. The Town Manager clarified and said if the Board gives their recommendation and Crumbl doesn’t like their decision, there is an appeal process to the Town Council to have further consideration on getting the pink background approved. The Board members agreed they did not like the option of a pink background as presented.

Vice Chair Barben motioned the Architectural Review Board conditionally approve ZP #1202_6612 COA for signage update installation at 6612 Watts Road. This approval includes the following detail. The front and side elevation signage in channel pink or white lettering and a black background. The sign must be altered to be 25 square feet or less for the front façade. Following the resubmission of the size as well as coloring, the zoning administrator will verify the colors and size prior to sign off. PC Liaison Kress seconded the motion. Vote: Luersen-yes; Barben-yes; Kress-yes. The motion carried.

VI. OLD BUSINESS

Town Manager Kyriazi shared she is still actively working with the Dominicks at the corner of St. Paul and Washington Street. They are working with a civil team and an architectural team on the design for the building they want to put there.

Another old business item, the demolition approved one year ago for the three single-family homes on Bleight Drive, we noticed the property owners were coming up on the expiration of that COA that they received at the time. They stated they were unable to act on it, but understood the process and will seek a new demolition approval for those three structures. The Town Manager further shared there is no update on the Lane Motors property.

VII. NEW BUSINESS

Chairman Leursen brought attention to the Somerset and Heathcote projects. The Town Manager shared that an information night held at Town Hall with Buchanan Partners, who are working on the commercial development right off of Heathcoat, and are in the final phases of their rezoning

application. They are proposing approximately 232 townhomes. She stated they discussed their entry/exit points and traffic concerns, and the Town's concerns will be provided.

As for the other project, a couple of months back, we reviewed a rezoning for the Route 15 area on the other side of the tracks, originally called High Point. A different team has now resubmitted a proposal for approximately 247 units. Four acres are in the town of Haymarket and are designated conservation land. They are not proposing to build on those acres but instead plan to place a stormwater management pond there, along with a trail and walkway. She shared some of our concerns are pedestrian connectivity, the proximity of the railroad track, and traffic impacts to name a few.

Chairman Luersen brought up the corner of Crossroads Village and asked was there a site plan submitted for the hotel. The Town Manager responded that a preliminary site plan has been submitted for a hotel. They are going off of a previously approved special use permit to allow for six stories. They also put in another submission of a retail structure that would sit in front of the Kiddie Academy.

Vice Chair asked if there is any update on the RFP for the Town Pavilion. The Town Manager shared there has been a lot of interest, and proposals are due January 5 at 3:00 p.m. Staff will review proposals and work with the finance liaisons to make a recommendation and bring it to Town Council.

Regarding the Town Hall Site Plan, which you'll see in the Strategic Plan, Town Council has prioritized the exterior site work. We had it approved and signed off in August 2023. The Town Manager shared what this Site Plan will cover.

VIII. PLANNING COMMISSION UPDATES

The Planning Commission shared the second drive-thru lane at Chick-fil-A was a major topic of discussion. They received the conditional approval they were waiting for. The Planning Commission set a public hearing date for the rezoning application located at 14600 Washington Street, also known as the QBE property, which will be held on January 20 at 7:00 p.m. The January meeting would be January 13, but due to a scheduling conflict, we pushed the regular meeting to January 20.

IX. TOWN COUNCIL UPDATES

Chairmen Luersen shared the major topic of discussion has been the Strategic Plan, which is provided in the packet for the Board's review. The Town Manager directed them to the top priorities and how they are numbered.

X. ADJOURNMENT

With no further business before the Architectural Review Board, Vice Chair Barben moved to adjourn with a second by PC Liaison Jeff Kress. The motion carried.

_____ _____

Alexandra Elswick, Deputy Clerk **Ken Luersen, Chairman**

Town of Haymarket
15000 Washington Street, #100
Haymarket, VA 20169
703-753-2600

Lydia Schauss
Town Planner

MEMORANDUM

TO: Architectural Review Board
FROM: Lydia M. Schauss
DATE: March 12, 2026
SUBJECT: ZP #2026-003, Installation of Roof Mounted Solar Panels at 15013 Gossom Manor Pl

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APPLICATION SUMMARY:

Business/Applicant: Barklie Estes – NOVA Solar, Inc.

Street Address: 15013 Gosson Manor Pl, Haymarket Va 20169

Proposed Alteration: Existing Solar Panel Addition

Applicant's Brief Description of the Activity: Installation of a 27-panel, 12.285kW roof mounted solar (PV) system. Mounted flush (parallel) to roofing.

The applicant will be installing 12.2854kW Solar Photovoltaic System; modifications will include eliminating the use of a string inverter on the side of the house adjacent to the utility meter., We will use microinverters located under and hidden by the solar modules. Use "triple-black" (black frames, black back sheets, black cells) solar modules.

Town Planner Assessment		
Zoning Ordinance	**Application Details**	**Staff Response**
Sec. 58-16.8 Matters to be considered by board in acting on appropriateness of erection, reconstruction, alteration, restoration or demolition of building or structure.	Installation of a 27-panel, 12.285kW roof mounted solar (PV) system. Mounted flush (parallel) to roofing.	The proposed alteration is visible from the public right of way. The Board shall consider the new roof mounted solar panels installation.
Sec. 58-16.8 (1) Exterior architectural features, including all signs, which are subject to public view from a public street, way or place.	Installation of a 27-panel, 12.285kW roof mounted solar (PV) system. Mounted flush (parallel) to roofing.	The proposed alteration is visible from the public right of way. The Board shall consider the new roof mounted solar panels installation.
Sec. 58-16.8 (2) General Design Arrangement	Installation of a 27-panel, 12.285kW roof mounted solar (PV) system. Mounted flush (parallel) to roofing.	The roof mounted solar panels will be flush to the roof and utilize microinverters hidden by the panels, the panels will be "triple black."

Sec. 58-16.8 (3) Texture, material and color	Installation of a 27-panel, 12.285kW roof mounted solar (PV) system. Mounted flush (parallel) to roofing.	The panels are shown in the attached rendering; the applicant intends use of TOPCon Cells (1800 x 1134 x 35mm) made with 3.2mmj tempered glass with anti-reflective coating, weighing 50.7lbs. The new panels will be a triple black color. The frames are devised from anodized aluminum alloy.
Sec. 58-16.8 (4) The relation of the factors, subsections (1), (2), and (3) of this section, to similar features of the buildings and structures in the immediate surroundings	Installation of a 27-panel, 12.285kW roof mounted solar (PV) system. Mounted flush (parallel) to roofing.	The installation closely matches the existing roof surface. Therefore, the system blends with the roof plane rather than contrasting and pulling attention from surrounding homes.
Sec. 58-16.8 (5) The extent to which the building or structure would be harmonious with or obviously incongruous with the old and historic aspect of the surroundings	Installation of a 27-panel, 12.285kW roof mounted solar (PV) system. Mounted flush (parallel) to roofing.	The purposed solar installation incorporates renewable energy in manner that minimizes visual impact on the historic character of the property.
Sec. 58-16.8 (6) In the case of a building to be razed, a primary consideration will be the extent to which its continued existence would tend to protect irreplaceable historic places and preserve the general historic atmosphere of the Town	Not applicable	Not applicable
Sec. 58-16.8 (7) The extent to which the building or structure will promote the general welfare of the Town, and all citizens, by the preservation and protection of historic places and areas	Installation of a 27-panel, 12.285kW roof mounted solar (PV) system. Mounted flush (parallel) to roofing.	Not applicable
Sec. 58-16.8 (8) The extent to which the building or structure will promote the general welfare by: (a) Maintaining and increasing real estate values (b) Generating business (c) Creating new positions (d) Attracting tourists, students, writers,	Installation of a 27-panel, 12.285kW roof mounted solar (PV) system. Mounted flush (parallel) to roofing.	These matters are at the discretion of the ARB.

historians, artists and artisans, and new residents (e) Encouraging study of and interest in American history (f) Stimulating interest in and study of architecture and design (g) Educating citizens in American culture and heritage (h) Making the Town a more attractive and desirable place in which to live		
Comprehensive Plan		
Comp Plan 1.5.3 Historic Resource Inventory List	Site – 15013 Gossom Manor Pl	The main structure/site IS NOT listed as a Historic Resource
Comp Plan 1.5.4 Potential Archaeological Site	Site – 15013 Gossom Manor Pl	The site IS NOT one of those listed as a potential archaeological site in the Comprehensive Plan
Architectural Review Board Historic Guidelines		
I. Introduction (E) Community Design and the Comprehensive Plan	Site – 15013 Gosson Manor Pl	Residential Property
II. Streetscape and Site Design		
II. (a) Washington Street Enhancement Project	Not applicable	Not applicable
II. (b) Streetscapes Other Than Washington Street	Not applicable	Not applicable
II. (c) Fences and Walls		
II. (d) Lighting (Free Standing/Posts)	Not Applicable	Not Applicable
II. (e) Telecommunication Dishes, Drums and Towers	Not Applicable	Not Applicable
II. (f) Screening	Not Applicable	Not Applicable
III. New Construction and Additions to Existing Non-Historic and Non-Contributing Structures		
III. (a) General Guidelines	*"To create a more pleasing blend of historic and new elements in the Town, new structures shall be compatible with the prevailing and recognized historic architectural character of the existing adjacent structures"*	These matters are at the discretion of the ARB
III. (b) Colors	Triple Black	At the request of the Sherwood Forest Community Association.

III. (c) Exterior Elements	Installation of a 27-panel, 12.285kW roof mounted solar (PV) system. Mounted flush (parallel) to roofing, triple black in color.	All elements are acceptable within the ARB Guidelines and the Town's Zoning Ordinance.
III. (d) Chimneys	Not Applicable	Not Applicable
III. (e) Roofing	Installation of a 27-panel, 12.285kW roof mounted solar (PV) system. Mounted flush (parallel) to roofing, triple black in color.	All elements are acceptable within the ARB Guidelines and the Town's Zoning Ordinance.
III. (f) Lighting, (attached to structure)	Not Applicable	Not Applicable
III. (g) Windows and Doors	Not Applicable	Not Applicable
III. (h) Decks	Not Applicable	Not Applicable
III. (i) Handicapped Ramps	Not Applicable	Not Applicable
III. (j) Awnings	Not Applicable	Not Applicable
IV. Guidelines for Alterations or Additions to Historic Structures or Contributing Structures		
IV. (a) General Guidelines	Not Applicable	Not Applicable
V. Signage	Not Applicable	Not Applicable, not historic or contributing
VI. Demolition Guidelines	Not Applicable	Not Applicable
VII. Situations Not Covered, Additional Requirements	Not Applicable	Not Applicable

Discussion:
ARB shall discuss the design of the solar panels and the color palette chosen by the Applicant.

STAFF RECOMMENDATION:

Based on the application submitted, the rendering provided, and additional information received from the applicant, the Zoning Administrator recommends the approval of the Certificate of Appropriateness for 15013 Gossom Manor Pl.

The roof-mounted solar panels are a welcome improvement to the structure providing architectural interest. The new panel triple-black color is in keeping with the zoning ordinance color palette and will not hinder the aesthetics of the structure.

Draft Motion: I move the Architectural Review Board approve ZP #2026-003, Installation of Roof Mounted Solar Panels at 15013 Gossom Manor Pl. The approval includes the following details: the panels as shown in the rendering.

Or alternate motion.

ZONING PERMIT APPLICATION

ZONING PERMIT #: 2026-003

NOTE: This application must be filled out completely and all components of submission requirements must be met before the application can be accepted and scheduled for review/hearing.

ZONING ACTIVITY: ❑New Construction ■Alteration/Repair ❑Addition ❑Sign (See Spec sheet)
(Check all that apply) ❑New Tenant/Use ❑Change of Use ❑Relocation

NAME OF BUSINESS/APPLICANT: Nova Solar, Inc.

PROPOSED USE: Existing - Solar Panel Addition Size (Sq. Ft./Length) of Construction: 592.90 ft²

SITE ADDRESS: 15013 Gossom Manor Pl, Haymarket, VA 2016 Parcel ID #: 7298-80-7494

Subdivision Name: Sherwood Forest Lot Size: .2296 Acres

ZONING DISTRICT: ■ R-1 ❑ R-2 ❑ B-1 ❑ B-2 ❑ I-1 ❑

C-1 Special Use Permit Required: ❑ Yes ☒ No Site Plan Required: ❑ Yes ■ No

Off-Street Parking: Spaces Required: _____ Spaces Provided: _____

BRIEF DESCRIPTION OF ACTIVITY: (*i.e. previous use, height/length of fencing, deck specs, etc.*)
Installation of a 27-panel, 12.285kW roof mounted solar (PV) system. Flush (parallel) mounted to roof surface.

Supporting Documentation (*attached*): ■ Narrative ■ Plan/Plat ❑ Specification Sheet

FEE: ■ $50.00 Residential ❑ $100.00 Commercial

CERTIFICATE OF APPROPRIATENESS

ADDITIONAL DESCRIPTION: (*i.e. color, type of material, font style, etc. See Sign Spec Sheet for Signage detail)*

All-Black Solar Panels

Supporting Documentation (*attached*): ■ Specification Sheet ❑ Photograph(s)

PERMIT HOLDER INFORMATION

Barklie Estes - Nova Solar, Inc.
Name

3305 Dye Drive
Address

Falls Church VA 22042
City State Zip

703-679-8607 novasolarinc@gmail.com
Phone# Email

PROPERTY OWNER INFORMATION

Tilak Kharel
Name

15013 Gossom Manor Pl
Address

Haymarket VA 20169
City State Zip

240-481-9503 tilak801@gmail.com
Phone# Email

APPLICANT / PROPERTY OWNER SIGNATURE ********REQUIRED********

I, as owner or authorized agent for the above-referenced parcel, do hereby certify that I have the authority to make the foregoing application and that the information provided herein is correct. Construction of improvements described herein and as shown on the attached plat, plan and/or specifications will comply with the ordinances of the Town of Haymarket and any additional restrictions and/or conditions prescribed by the Architectural Review Board (ARB), Planning Commission, or the Town Council and all other applicable laws.

Bayklie Estes _____ _____

Applicant Signature Property Owner Signature

OFFICE USE ONLY

Date Filed: _____ Fee Amount: _____ Date Paid: _____

DATE TO ZONING ADMINISTRATOR: _____

❑APPROVED ❑DISAPPROVED ❑TABLED UNTIL: _____ ❑DEFERRED UNTIL: _____

_____

SIGNATURE *PRINT*

CONDITIONS:

_____

_____

DATE TO ARCHITECTURAL REVIEW BOARD (ARB): _____

❑APPROVED ❑DISAPPROVED ❑TABLED UNTIL: _____ ❑DEFERRED UNTIL: _____

_____

SIGNATURE *PRINT*

CONDITIONS:

_____

_____

DATE TO TOWN COUNCIL (IF APPLICABLE): _____

❑APPROVED ❑DISAPPROVED ❑TABLED UNTIL: _____ ❑DEFERRED UNTIL: _____

TOWN COUNCIL {where required): _____

SIGNATURE *PRINT*

CONDITIONS:

_____

_____

INSTRUCTIONS FOR COMPLETING APPLICATION

In addition to applying for a Certificate of Appropriateness, the applicant is responsible for obtaining any other required permits and approvals applicable to the project.

1. Provide name, phone number, and email address of business or individual requesting approval for proposed work. If different from property owner, please provide contact information for property owner as well.
2. Indicate site address
3. Indicate mailing address of applicant and owner (if different).
4. Describe in detail work proposed and then attach all required and any additional documentation or material that will describe the project in detail to the reviewing authority. Adequate documentation must be provided. Applicant should provide any necessary item(s), in addition to the items listed on the checklist below.

Check List

Signs/Fences/New Building/Additions/Remodel

The Completed application must be submitted to the Town Clerk's office no later than 4:30pm one week prior to the meeting date.

1) One copy of the Plat-showing location of sign/fence/addition on the façade or grounds
2) Photograph of the existing structure and closest neighboring structures
3) Photograph/drawings, including measurements, of the proposed change
4) Material specifications
5) Color/material samples
6) Description of method of mounting and description of hardware to be used
7) Landlord/HOA approval letter where indicated
8) Copy of business or occupational license if contractor has designed or will install
9) Narrative, if special requests or exceptions to the ARB Guidelines are being requested.
10) Applicant or a representative **must** be present at the ARB meeting, on the scheduled Wednesday of every month at 7:00pm. If a representative is not present at the meeting to answer any questions that may arise, your application may be deferred or denied until the next regularly scheduled meeting. Please check the Town's website for a list of the Town's scheduled meetings. It is the applicant's responsibility to keep apprised of the Town's meeting schedule.
11) If an interpreter is required, the applicant needs to bring one with them.

Please mail application and all applicable information and materials to:
Town of Haymarket
15000 Washington Street, Suite 100
Haymarket, VA 20169

SIGN SPECIFICATION SHEET

SIGN 1:

Type of Sign: ❑Wall ❑Hanging ❑Freestanding ❑Menu ❑Individual Letter ❑Window ❑Other _____

Height above Ground at Signs: Lower Edge: _____ Upper Edge: _____

Height of Sign Structure:_____ Sign Width:_____ Length:_____ Area in Sq Ft:_____

Number of Faces: _____ Sign Material/Color/Font:_____

Location of Sign (Include photo): _____

Lighting Type/Fixture (No internal illumination is allowed): _____

_____

SIGN 2:

Type of Sign: ❑Wall ❑Hanging ❑Freestanding ❑Menu ❑Individual Letter ❑Window ❑Other _____

Height above Ground at Signs: Lower Edge: _____ Upper Edge: _____

Height of Sign Structure:_____ Sign Width:_____ Length:_____ Area in Sq Ft:_____

Number of Faces: _____ Sign Material/Color/Font:_____

Location of Sign (Include photo): _____

Lighting Type/Fixture (No internal illumination is allowed):_____

_____

SIGN 3:

Type of Sign: ❑Wall ❑Hanging ❑Freestanding ❑Menu ❑Individual Letter ❑Window ❑Other _____

Height above Ground at Signs: Lower Edge: _____ Upper Edge: _____

Height of Sign Structure:_____ Sign Width:_____ Length:_____ Area in Sq Ft:_____

Number of Faces: _____ Sign Material/Color/Font:_____

Location of Sign (Include photo): _____

Lighting Type/Fixture (No internal illumination is allowed): _____

_____

SIGN 4:

Type of Sign: ❑Wall ❑Hanging ❑Freestanding ❑Menu ❑Individual Letter ❑Window ❑Other _____

Height above Ground at Signs: Lower Edge: _____ Upper Edge: _____

Height of Sign Structure:_____ Sign Width:_____ Length:_____ Area in Sq Ft:_____

Number of Faces: _____ Sign Material/Color/Font:_____

Location of Sign (Include photo): _____

Lighting Type/Fixture (No internal illumination is allowed): _____

_____

FREQUENTLY ASKED QUESTIONS

1. *What projects require architectural review?*
   Any project involving alterations to the exterior of an existing building, visible from public view (e.g. fences, signs, awnings, mechanical equipment, landscaping, façade changes) and the construction of new buildings, all require an architectural review.

2. *How long does the architectural review process take?*
   The time required to process an application will vary depending on the size of the project. Once the application has been deemed complete, the architectural review process can take between four to eight weeks, to complete, if no changes/revisions are required by any of the reviewing body throughout the process. Vague or incomplete description of the project or failure to provide any pertinent information regarding the project will delay the review process.

3. *What does the ARB look for in a project?*
   Refer to the Town of Haymarket Architectural Review Design Guidelines.

4. *What happens after I submit my application?*
   After an application is submitted, a town clerk will review it for its completeness (not for the accuracy or content of the submission). If the application is incomplete, the missing materials will be required BEFORE the application can be forwarded for review. If complete, the application (and all required supporting documentation) will continue with the review process.

5. *What is the review process?*
   For any submission, there are two reviewing bodies in the Town. The Zoning Administrator, and the Architectural Review Board (If applicable). All reviewing bodies in the Town meet once a month. (A schedule of all the meetings is available on our website at www.townofhaymarket.org/meetings).

6. *Is there a submission deadline?*
   An application must be submitted to the Town Clerk and verified as complete one week prior to the meeting date for proper review.

7. *What happens at the ARB meeting?*
   The ARB reviews any development project(s) to promote and maintain the historic architectural flavor of the Town consistent with the Town's Comprehensive Plan. The ARB reviews any proposal/project which currently or in the future could be visible from any public view.

8. *What should I present at my review?*
   To facilitate a more streamlined review of an application, it is required that an applicant (or representative) be present at the meeting(s) during the review of their proposed project. A brief overview of the project, site, and architecture should be presented. Speak briefly to the design and landscaping features, parking and circulation, delivery routes/access, drainage, lighting, signage, and trash enclosures. Provide sample(s) of colors and materials. For larger development projects, you will need to be able to discuss traffic impacts.

9. *When can I submit my plans for a building permit?*
   If the project is approved by all applicable Boards, the applicant can then receive their building permit (if a permit is required for the project).

Document History

SignNow E-Signature Audit Log

All dates expressed in MM/DD/YYYY (US)

Document name: 10 Zoning Permit Application
Document created: 02/10/2026 21:23:57
Document pages: 5
Document ID: 10e4fa09566149beb16109871f806c70960dc97d
Document Sent: 02/10/2026 21:24:33 UTC
Document Status: Signed
02/10/2026 21:33:31UTC

Sender: novasolarinc@gmail.com
Signers: tilak801@gmail.com
CC:

Client	Event	By	Server Time	Client Time	IP Address
SignNow Web Application	Uploaded the Document	novasolarinc@gmail.com	02/10/2026 21:23:57 pm UTC	02/10/2026 21:23:52 pm UTC	71.191.50.203
SignNow Web Application	Viewed the Document	novasolarinc@gmail.com	02/10/2026 21:24:00 pm UTC	02/10/2026 21:24:01 pm UTC	71.191.50.203
SignNow Web Application	Signed the Document	novasolarinc@gmail.com	02/10/2026 21:24:29 pm UTC	02/10/2026 21:24:29 pm UTC	71.191.50.203
SignNow Web Application	Document Saved	novasolarinc@gmail.com	02/10/2026 21:24:29 pm UTC	02/10/2026 21:24:29 pm UTC	71.191.50.203
SignNow Web Application	Invite Sent to: tilak801@gmail.com	novasolarinc@gmail.com	02/10/2026 21:24:33 pm UTC	02/10/2026 21:24:33 pm UTC	71.191.50.203
SignNow Web Application	Viewed the Document	tilak801@gmail.com	02/10/2026 21:32:45 pm UTC	02/10/2026 21:33:30 pm UTC	71.191.30.207
SignNow Web Application	Viewed the Document	tilak801@gmail.com	02/10/2026 21:32:57 pm UTC	02/10/2026 21:32:57 pm UTC	24.56.144.101
SignNow Web Application	Unfinished Document	tilak801@gmail.com	02/10/2026 21:33:10 pm UTC	02/10/2026 21:33:56 pm UTC	10.50.92.115
SignNow Web Application	Signed the Document	tilak801@gmail.com	02/10/2026 21:33:31 pm UTC	02/10/2026 21:34:16 pm UTC	71.191.30.207
SignNow Web Application	Document Saved	tilak801@gmail.com	02/10/2026 21:33:31 pm UTC	02/10/2026 21:34:16 pm UTC	71.191.30.207
SignNow Web Application	Signer tilak801@gmail.com received a signed document copy	tilak801@gmail.com	02/10/2026 21:33:38 pm UTC	02/10/2026 21:34:16 pm UTC	71.191.30.207
SignNow Web Application	Sender novasolarinc@gmail.com received a signed document copy	novasolarinc@gmail.com	02/10/2026 21:33:38 pm UTC	02/10/2026 21:34:16 pm UTC	71.191.30.207

3305
Falls Church, VA 22042
(703) 679-8607
NovaSolarInc@gmail.com

Aesthetic Design Considerations

To Whom it May Concern:

Nova Solar is proposing to install a 27-panel, 12.285kW Solar Photovoltaic System at the following address:

15013 Gossom Manor Pl, Haymarket, VA 20169

In order to satisfy HOA aesthetic considerations for the proposed project, Nova Solar, Inc. will make the following design considerations:

- Eliminate the use of a string inverter on the side of the house adjacent to the utility meter. We will use microinverters located under and hidden by the solar modules
- Use “triple-black” (black frames, black back sheets, black cells) solar modules

Below is a photograph of a similar system with the effects of the aforementioned design considerations on display.

Parcels (1 record located)

GPIN: 7298-80-7494
Parcel Address:
15013 GOSSOM MANOR PL
HAYMARKET, VA 20169
Subdivision: SHERWOOD FOREST
Lot Number: 26
Driving Directions

Real Estate Assessment Information:
Owner Contact:
KHAREL TILAK
15013 GOSSOM MANOR PL
HAYMARKET, VA 20169
Deeded Acreage: 0.2296
Instrument No.: 201301020000666
Real Estate Account: 246055

List Adjoiners | Less Info.

Elementary School: Haymarket Elementary
Middle School: Reagan Middle
High School: Gainesville High
Jurisdiction: Town of Haymarket
Precinct: 409 - Tyler
Magisterial District: Gainesville
Congressional District: 10th
VA Senate District: 30th
VA House District: 21th
Voting Place:
Tyler Elementary School
14500 John Marshall Highway
Gainesville, VA 20155
RPA on Parcel: NO
Private Septic: NO
FEMA 100YR Floodplain: NO
LOMA Information: Not applicable
Parent Parcel: 7298-80-8782
Child Parcel: No CHILDREN

1 : 600

TILAK KHAREL
NEW GRID-INTERACTIVE PHOTOVOLTAIC SYSTEM
DC SYSTEM SIZE (12.285KW)

SYSTEM DETAILS

DESCRIPTION	NEW GRID-INTERACTIVE PHOTOVOLTAIC SYSTEM WITH NO BATTERY STORAGE
DC RATING OF SYSTEM	SYSTEM SIZE :12.285KW DC STC
AC RATING OF SYSTEM	8.640KW
AC OUTPUT CURRENT	35.91 A
NO. OF MODULES	(27) CANADIAN SOLAR CS6.1-54TM-455H(455W) SOLAR MODULES
NO. OF INVERTERS	(27) ENPHASE IQ8MC-72-M-US MICROINVERTERS
POINT OF CONNECTION	LINE SIDE TAP IN THE MSP
ARRAY STRINGING	(1) STRING OF 10 MODULES (1) STRING OF 9 MODULES (1) STRING OF 8 MODULES

SITE DETAILS

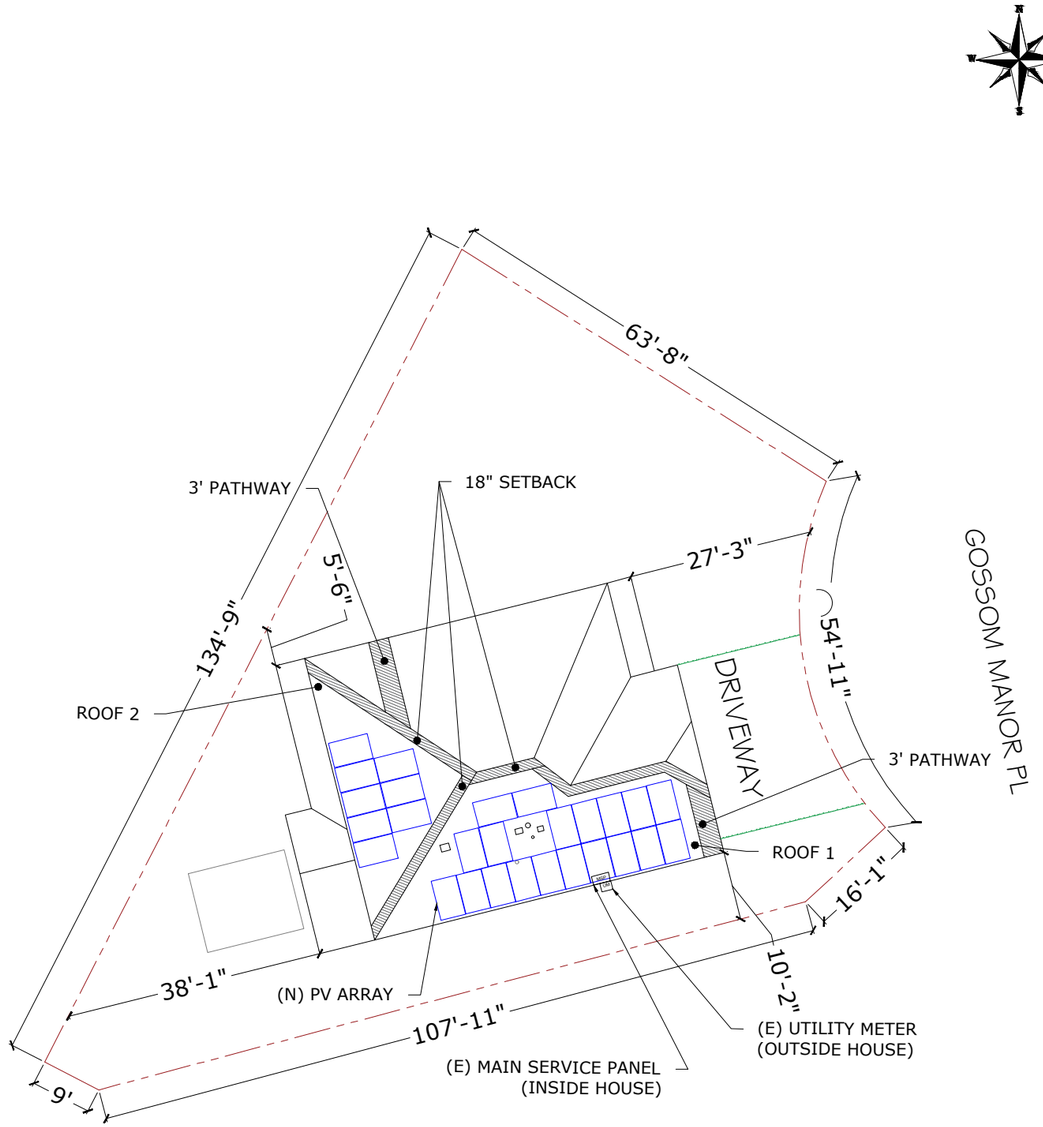
ASHRAE EXTREME LOW	-17°C
ASHRAE 2% HIGH	34°C
GROUND SNOW LOAD	30 PSF
WIND SPEED	90MPH
RISK CATEGORY	II
WIND EXPOSURE CATEGORY	B
AHJ	PRINCE WILLIAM COUNTY

GOVERNING CODES

VIRGINIA RESIDENTIAL CODE 2021
VIRGINIA CONSTRUCTION CODE 2021
VIRGINIA STATEWIDE FIRE PREVENTION CODE 2021(VSFPC 2021)
NATIONAL ELECTRIC CODE, NEC 2020 CODE BOOK, NFPA 70

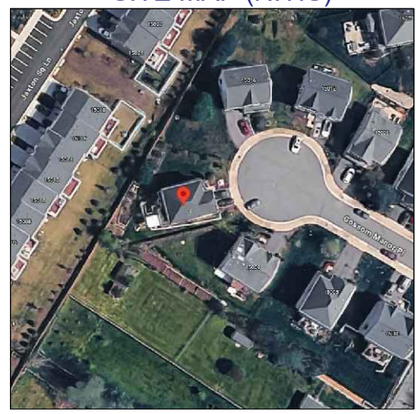
SHEET INDEX

SHEET NO.	SHEET NAME
A - 00	SITE MAP & VICINITY MAP
A - 01	ROOF PLAN & MODULES
S - 01	ARRAY LAYOUT & STRUCTURAL ATTACHMENT DETAIL
E - 01	ELECTRICAL LINE DIAGRAM
E - 02	WIRING CALCULATIONS
E - 03	SYSTEM LABELING
DS - 01	MODULE DATASHEET
DS - 02	INVERTER DATASHEET
DS - 03	JUNCTION BOX DATASHEET
DS - 04	ATTACHMENT DATASHEET
DS - 05	RACKING DATASHEET



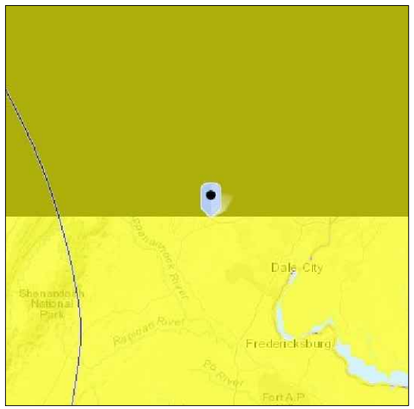
DRAWING SCALE:- 3/32" = 1'-0"

SITE MAP (N.T.S)



VICINITY MAP

WIND FLOW MAP



NOVA SOLAR, INC.
3305 DYE DR, FALLS CHURCH, VA 22042

Signature with Seal

TILAK KHAREL

15013 GOSSOM MANOR PL, HAYMARKET, VA 20169

Green World Renewable Energy
Clean, Safe, Renewable

4408, RICKIE HWY, BALTIMORE, MD 21225, USA.

PERMIT DEVELOPER	
DATE	01/30/2026
DESIGNER	ORP
REVIEWER	

SHEET NAME

SITE MAP & VICINITY MAP

SHEET NUMBER

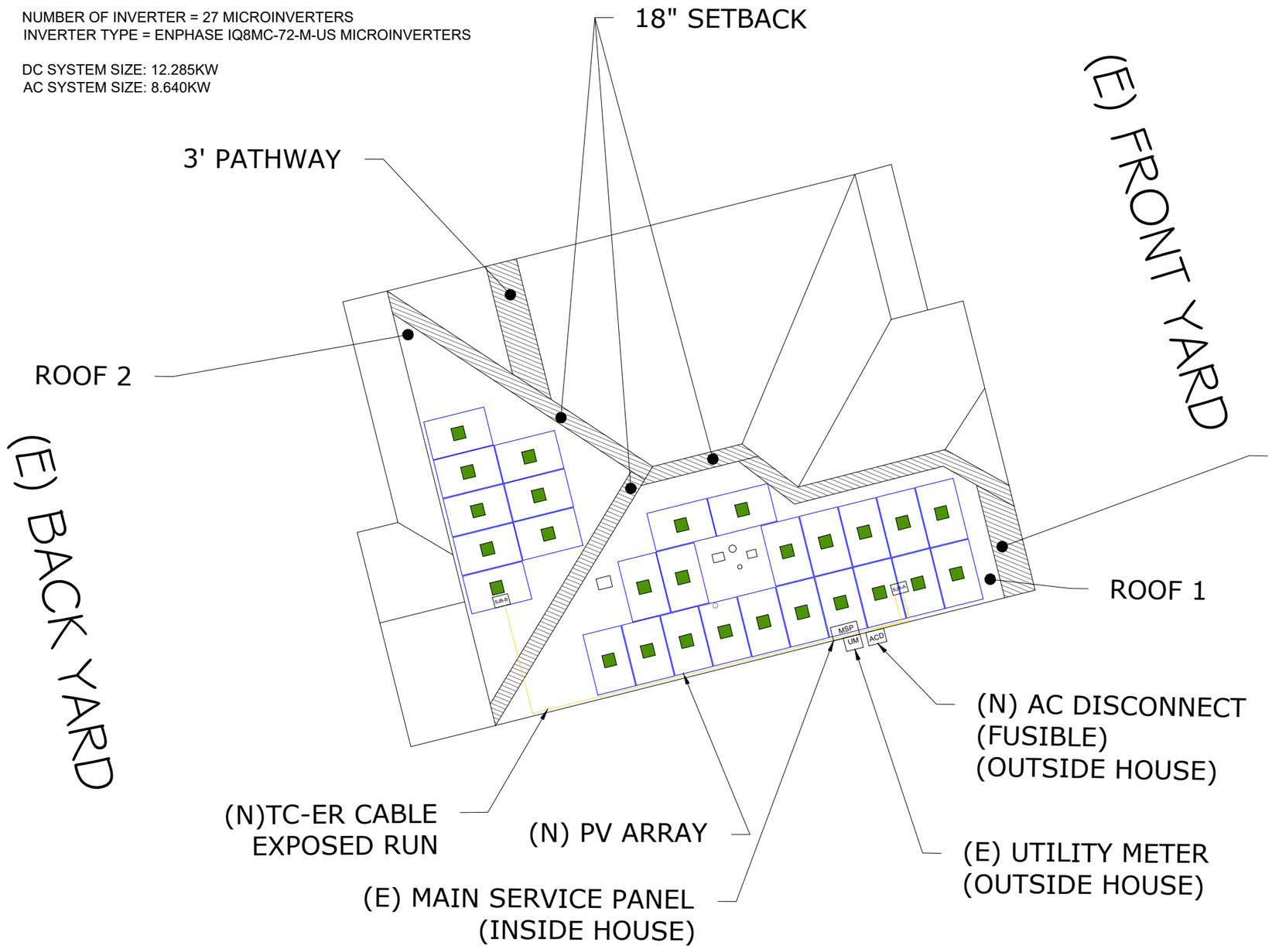
A-00

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 27 MODULES
MODULE TYPE = CANADIAN SOLAR CS6.1-54TM-455H(455W) SOLAR MODULES
WEIGHT =50.7LBS / 23.0KG.
MODULE DIMENSIONS = 70.9" X 44.6" = 21.96 SF

NUMBER OF INVERTER = 27 MICROINVERTERS
INVERTER TYPE = ENPHASE IQ8MC-72-M-US MICROINVERTERS

DC SYSTEM SIZE: 12.285KW
AC SYSTEM SIZE: 8.640KW



DRAWING SCALE:- 3/16" = 1'-0"

ROOF AREA: 2152 SQ. FT
PV AREA: 592.90SQ.FT
ROOF COVERAGE % :27.55%

LEGENDS

- UM - UTILITY METER
- MSP - MAIN SERVICE PANEL
- ACD - AC DISCONNECT
- SJB - JUNCTION BOX
- - FIRE SETBACK
- - MICROINVERTERS
- - VENT, ATTIC FAN (ROOF OBSTRUCTION)
- CABLE

NOVA SOLAR, INC.
3305 DYE DR, FALLS CHURCH, VA 22042

Signature with Seal

TILAK KHAREL

15013 GOSSOM MANOR PL, HAYMARKET, VA 20169

Green World Renewable Energy
Clean, Safe, Renewable
4408, RICKIE HWY, BALTIMORE, MD 21225, USA.

PERMIT DEVELOPER	
DATE	01/30/2026
DESIGNER	ORP
REVIEWER	

SHEET NAME: ROOF PLAN & MODULES

SHEET NUMBER: A-01

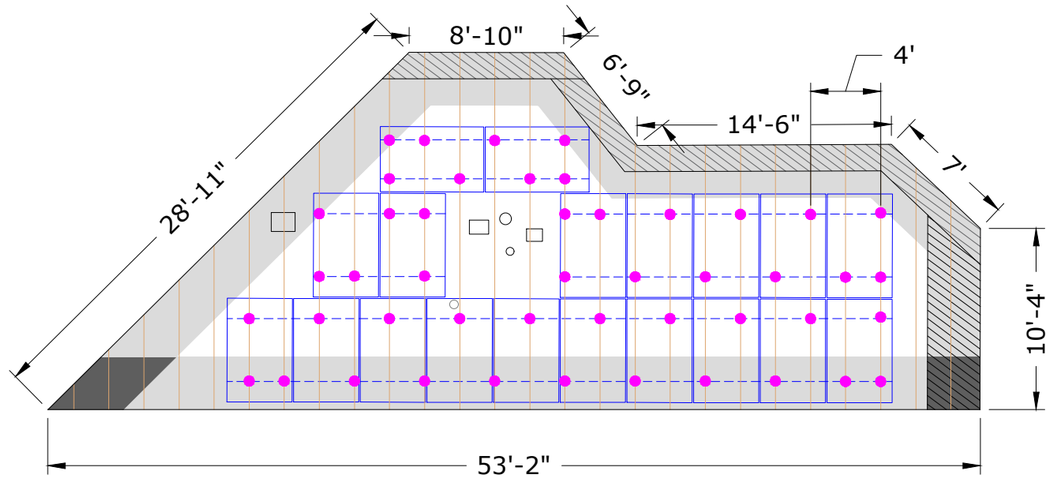
ROOF DESCRIPTION:

(ROOF #1)

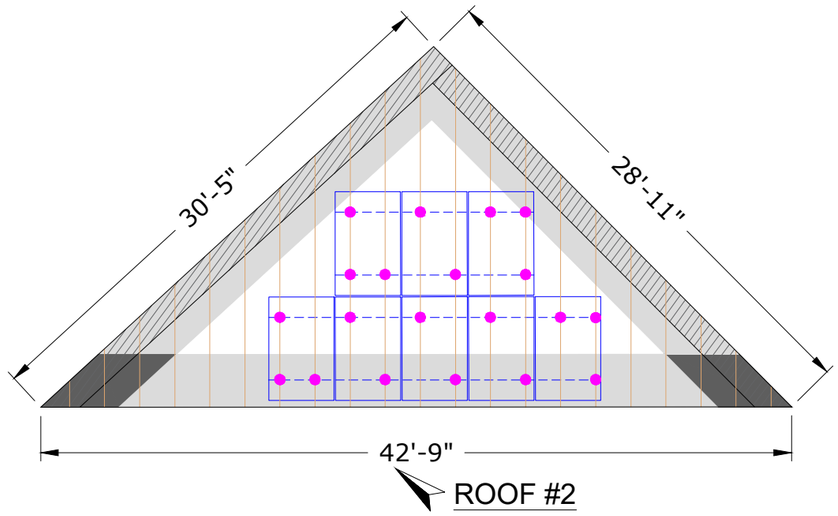
MODULES - 19
ROOF TILT - 41°
ROOF AZIMUTH - 163°
TRUSSES SIZE - 2"X4" @ 24" O.C.

(ROOF #2)

MODULES - 08
ROOF TILT - 41°
ROOF AZIMUTH - 253°
TRUSSES SIZE - 2"X4" @ 24" O.C.



ROOF #1



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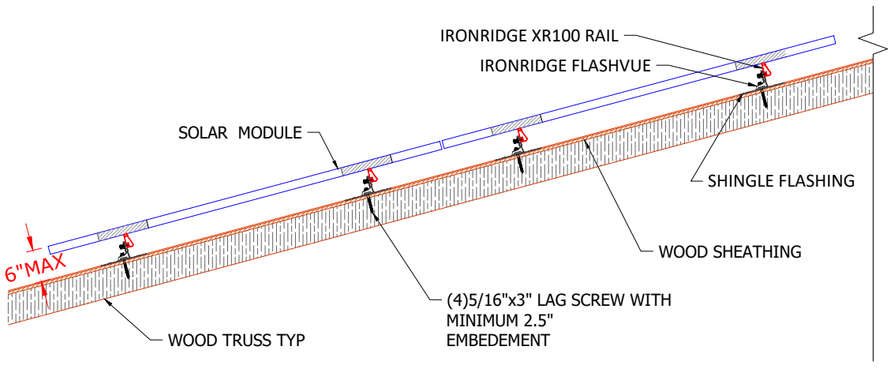
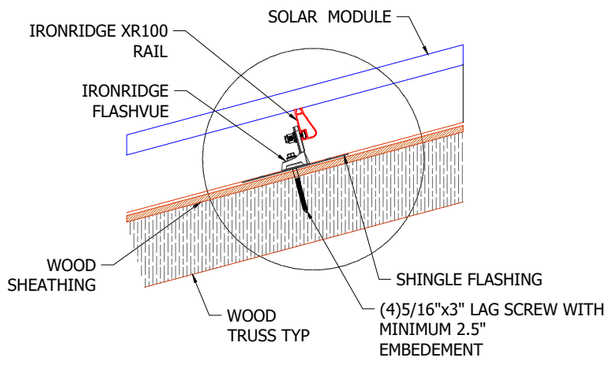




STRUCTURAL DETAILS

NOTE:PANELS WILL BE INSTALL PARALLEL TO THE ROOF SURFACE.

LEGENDS

- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- PV ROOF ATTACHMENT
- RAILS
- RAFTERS / TRUSSES
- METAL SEAM
- WIND ZONE I
- WIND ZONE II
- WIND ZONE III

NOVA SOLAR, INC.
3305 DYE DR, FALLS CHURCH, VA 22042

Signature with Seal

TILAK KHAREL

15013 GOSSOM MANOR PL, HAYMARKET, VA 20169

Green World Renewable Energy
Clean, Safe, Renewable
4408, RICKIE HWY, BALTIMORE, MD 21225, USA.

PERMIT DEVELOPER	
DATE	01/30/2026
DESIGNER	ORP
REVIEWER	

SHEET NAME: ATTACHMENT DETAILS

SHEET NUMBER: S-01

NEW

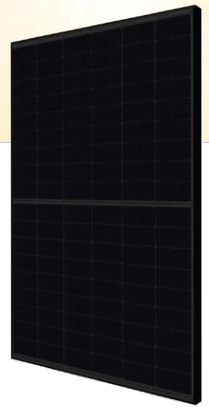
CanadianSolar

TOPHiKu6 (All-Black)

N-type TOPCon Technology

445 W ~ 470 W

CS6.1-54TM-445|450|455|460|465|470H



MORE POWER

- Module power up to 470 W
  Module efficiency up to 23.0 %
- Excellent anti-LeTID & anti-PID performance.
  Low power degradation, high energy yield
- Lower temperature coefficient (Pmax): -0.29%/°C, increases energy yield in hot climate
- Lower LCOE & system cost

MORE RELIABLE

- Minimizes micro-crack impacts
- Heavy snow load up to 8100 Pa, wind load up to 6000 Pa*

25 Years Industry Leading Product Warranty on Materials and Workmanship*

30 Years Linear Power Performance Warranty*

1st year power degradation no more than 1%
Subsequent annual power degradation no more than 0.4%

*Subject to the terms and conditions contained in the applicable Canadian Solar Limited Warranty Statement. Also this 25-year limited product warranty is available only for products installed and operating on rooftops in certain regions.

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001:2015 / Quality management system
ISO 14001:2015 / Standards for environmental management system
ISO 45001: 2018 / International standards for occupational health & safety
IEC62941: 2019 / Photovoltaic module manufacturing quality system

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730
IEC 61701 / IEC 62716 / IEC 60068-2-68
Take-e-way

* The specific certificates applicable to different module types and markets will vary, and therefore not all of the certifications listed herein will simultaneously apply to the products you order or use. Please contact your local Canadian Solar sales representative to confirm the specific certificates available for your Product and applicable in the regions in which the products will be used.

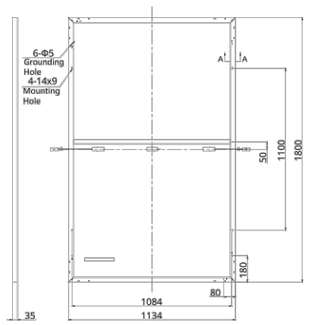
CSI Solar Co., Ltd. is committed to providing high quality solar photovoltaic modules, solar energy and battery storage solutions to customers. The company was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey. Over the past 22 years, it has successfully delivered over 100 GW of premium-quality solar modules across the world.

* For detailed information, please refer to the Installation Manual.

Canadian Solar (USA) Inc.
1350 Treat Blvd. Suite 500, Walnut Creek, CA 94597 | www.csisolar.com/na | service.ca@csisolar.com

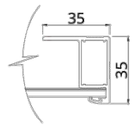
ENGINEERING DRAWING (mm)

Rear View

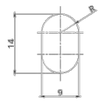


Frame Cross Section

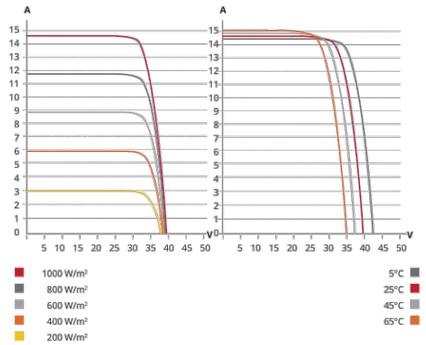
A - A



Mounting Hole



CS6.1-54TM-455H / I-V CURVES



ELECTRICAL DATA | STC*

CS6.1-54TM	445H	450H	455H	460H	465H	470H
Nominal Max. Power (Pmax)	445 W	450 W	455 W	460 W	465 W	470 W
Opt. Operating Voltage (Vmp)	32.8 V	33.0 V	33.2 V	33.4 V	33.6 V	33.8 V
Opt. Operating Current (Imp)	13.59 A	13.66 A	13.72 A	13.78 A	13.85 A	13.91 A
Open Circuit Voltage (Voc)	38.7 V	38.9 V	39.1 V	39.3 V	39.5 V	39.7 V
Short Circuit Current (Isc)	14.48 A	14.55 A	14.61 A	14.69 A	14.77 A	14.86 A
Module Efficiency	21.8%	22.0%	22.3%	22.5%	22.8%	23.0%
Operating Temperature	-40°C ~ +85°C					
Max. System Voltage	1500V (IEC/UL) or 1000V (IEC/UL)					
Module Fire Performance	TYPE 1 (UL 61730 1500V) or TYPE 2 (UL 61730 1000V) or CLASS C (IEC 61730)					
Max. Series Fuse Rating	25 A					
Application Classification	Class A					
Power Tolerance	0 ~ + 10 W					

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m2, spectrum AM 1.5 and cell temperature of 25°C.

MECHANICAL DATA

Specification	Data
Cell Type	TOPCon cells
Cell Arrangement	108 [2 X (9 X 6)]
Dimensions	1800 × 1134 × 35 mm (70.9 × 44.6 × 1.38 in)
Weight	23 kg (50.7 lbs)
Front Cover	3.2 mm tempered glass with anti-reflective coating
Frame	Anodized aluminium alloy
J-Box	IP68, 3 bypass diodes
Cable	4 mm² (IEC), 12 AWG (UL)
Connector	T6, MC4, MC4-EVO2 or MC4- EVO2A
Cable Length (Including Connector)	1550 mm (61.0 in) (+) / 1100 mm (43.3 in) (-)
Per Pallet	31 pieces
Per Container (40' HQ)	744 pieces

ELECTRICAL DATA | NMOT*

CS6.1-54TM	445H	450H	455H	460H	465H	470H
Nominal Max. Power (Pmax)	335 W	339 W	343 W	347 W	351 W	354 W
Opt. Operating Voltage (Vmp)	30.9 V	31.1 V	31.3 V	31.5 V	31.7 V	31.9 V
Opt. Operating Current (Imp)	10.85 A	10.91 A	10.96 A	11.02 A	11.07 A	11.12 A
Open Circuit Voltage (Voc)	36.5 V	36.7 V	36.9 V	37.1 V	37.3 V	37.5 V
Short Circuit Current (Isc)	11.68 A	11.74 A	11.79 A	11.85 A	11.92 A	11.99 A

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m² spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.29 % / °C
Temperature Coefficient (Voc)	-0.25 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	42 ± 3°C

PARTNER SECTION

* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. CSI Solar Co., Ltd. reserves the right to make necessary adjustment to the information described herein at any time without further notice. Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

NOVA SOLAR, INC.
3305 DYE DR, FALLS CHURCH, VA 22042

Signature with Seal

TILAK KHAREL

15013 GOSSOM MANOR PL, HAYMARKET, VA 20169

Green World Renewable Energy
Clean, Safe, Renewable

4408, RICKIE HWY, BALTIMORE, MD 21225, USA.

PERMIT DEVELOPER	
DATE	01/30/2026
DESIGNER	ORP
REVIEWER	

SHEET NAME

MODULE DATASHEET

SHEET NUMBER

DS-01

ENPHASE.

DATA SHEET

IQ8MC Microinverter

Our newest IQ8 Series Microinverters are the industry's first microgrid-forming*, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC), which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55-nm technology with high-speed digital logic and has superfast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.

Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the IQ Battery, IQ Gateway, and the Enphase App monitoring and analysis software.

Enphase 25 year limited warranty

IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.

Connect PV modules quickly and easily to the IQ8 Series Microinverters that have integrated MC4 connectors.

CERTIFIED SAFETY

IQ8 Series Microinverters are UL Listed as PV rapid shutdown equipment and conforms with various regulations when installed according to the manufacturer's instructions.

*Meets UL 1741 only when installed with IQ System Controller 2 and 3.

Easy to install

- Lightweight and compact with plug-and-play connectors
- Power line communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produces power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) and IEEE 1547:2018 (UL 1741-SB)

NOTE:

- IQ8 Microinverters cannot be mixed together with previous generations of Enphase microinverters (IQ7 Series, IQ6 Series, etc.) in the same system.
- IQ Gateway is required to change the default grid profile at the time of installation to meet the local Authority Having Jurisdiction (AHJ) requirements.

IQ8MC Microinverter

INPUT DATA (DC)	UNITS	IQ8MC-72-M-US
Commonly used module pairings [1]	W	260–460
wModule compatibility		To meet compatibility, PV modules must be within the following max. input DC voltage and max. module I_{sc} Module compatibility can be checked at https://enphase.com/installers/microinverters/calculator.
MPPT voltage range	V	25–45
Operating range	V	18–58
Min./Max. start voltage	V	22/58
Max. input DC voltage	V	60
Max. continuous operating DC current	A	14
Max. input DC short-circuit current	A	25
Max. module I_{sc}	A	20
Overvoltage class DC port		II
DC port backfeed current	mA	0
PV array configuration		Ungrounded array; no additional DC side protection required; AC side protection requires max 20 A per branch circuit

OUTPUT DATA (AC)	UNITS	IQ8MC-72-M-US @240 VAC	IQ8MC-72-M-US @208 VAC
Peak output power	VA	330	315
Max. continuous output power	VA	320	310
Nominal grid voltage (L-L)	V	240, split-phase (L-L), 180°	208, single-phase (L-L), 120°
Min./Max. grid voltage [2]	V	211–264	183–229
Max. continuous output current	A	1.33	1.49
Nominal frequency	Hz	60	
Extended frequency range	Hz	47–68	
AC short circuit fault current over three cycles	A_{rms}	2.70	
Max. units per 20 A (L-L) branch circuit [3]		12	10
Total harmonic distortion	%	<5	
Overvoltage class AC port		III	
AC port backfeed current	mA	18	
Power factor setting		1.0	
Grid-tied power factor (adjustable)		0.85 leading ... 0.85 lagging	
Peak efficiency	%	97.4	97.2
CEC weighted efficiency	%	97.0	96.5
Nighttime power consumption	mW	33	25

MECHANICAL DATA	UNITS
Ambient temperature range	-40°C to 65°C (-40°F to 149°F)
Relative humidity range	4% to 100% (condensing)
DC connector type	Stäubli MC4
Dimensions (H × W × D); Weight	212 mm (8.3") × 175 mm (6.9") × 30.2 mm (1.2"); 1.1 kg (2.43 lbs)
Cooling	Natural convection – no fans
Approved for wet locations; Pollution degree	Yes; PD3
Enclosure	Class II double-insulated, corrosion-resistant polymeric enclosure
Environ. category; UV exposure rating	NEMA Type 6; outdoor

COMPLIANCE	
Certifications	CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB), FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV rapid shutdown equipment and conforms with NEC 2014, NEC 2017, NEC 2020, and NEC 2023 section 690.12 and C22.1-2018 Rule 64-218 rapid shutdown of PV systems for AC and DC conductors when installed according to the manufacturer's instructions.

(1) No enforced DC/AC ratio.
(2) Nominal voltage range can be extended beyond nominal if required by the utility.
(3) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8MC-MC4-DSH-00049-3.0-EN-US-2023-10-18

Nova Solar

NOVA SOLAR, INC.
3305 DYE DR, FALLS CHURCH, VA 22042

Signature with Seal

TILAK KHAREL

15013 GOSSOM MANOR PL, HAYMARKET, VA 20169

Green World Renewable Energy
Clean, Safe, Renewable

4408, RICKIE HWY, BALTIMORE, MD 21225, USA.

PERMIT DEVELOPER	
DATE	01/30/2026
DESIGNER	ORP
REVIEWER	

SHEET NAME

INVERTER DATASHEET

SHEET NUMBER

DS-02

Tech Brief

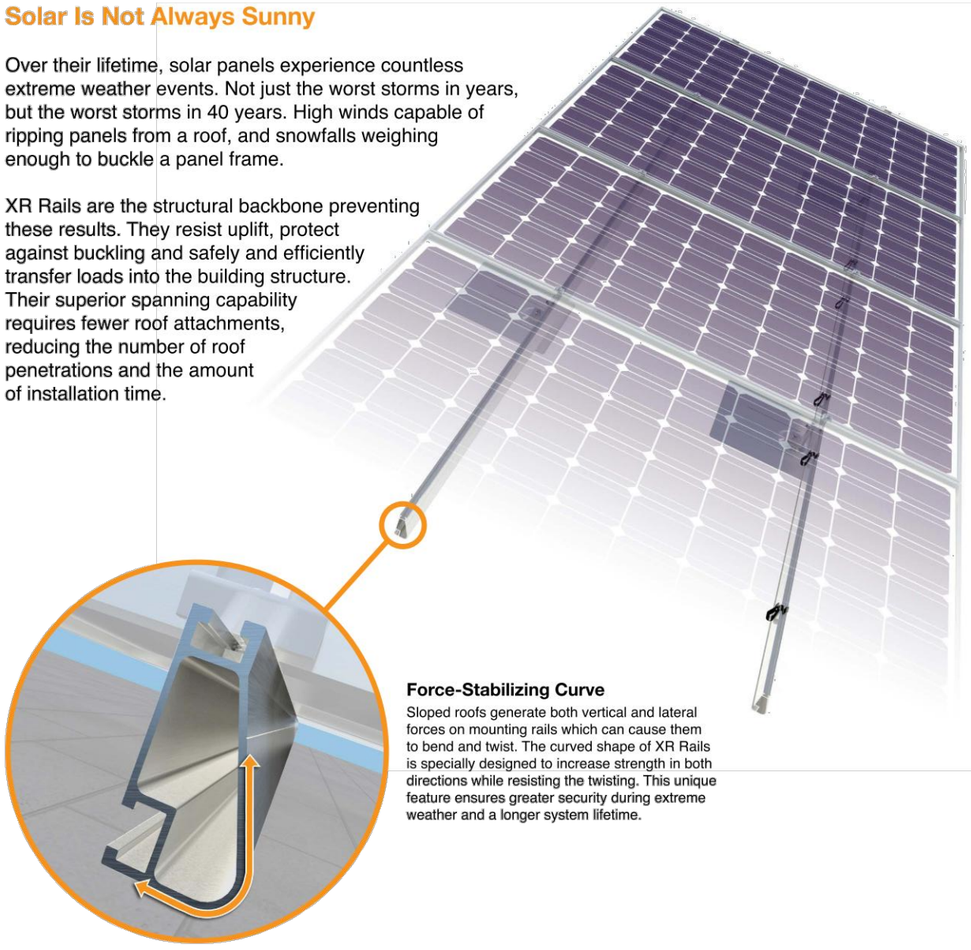
IRONRIDGE

XR Rail Family

Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs

XR Rails are compatible with FlashFoot and other pitched roof attachments.

IronRidge offers a range of tilt leg options for flat roof mounting applications.

Corrosion-Resistant Materials

All XR Rails are made of marine-grade aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.

Tech Brief

XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.

XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves 6 foot spans, while remaining light and economical.

- 6' spanning capability
- Moderate load capability
- Clear anodized finish
- Internal splices available

XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 8 feet.

- 8' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available

XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans 12 feet or more for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

Rail Selection

The following table was prepared in compliance with applicable engineering codes and standards. Values are based on the following criteria: ASCE 7-10, Roof Zone 1, Exposure B, Roof Slope of 7 to 27 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed span tables and certifications.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	100	XR10		XR100		XR1000	
	120						
	140						
	160						
10-20	100						
	120						
	140						
	160						
30	100						
	160						
40	100						
	160						
50-70	160						
80-90	160						

NOVA SOLAR, INC.
3305 DYE DR, FALLS CHURCH, VA 22042

Signature with Seal

TILAK KHAREL

15013 GOSSOM MANOR PL, HAYMARKET, VA 20169

Green World Renewable Energy
Clean, Safe, Renewable
4408, RICKIE HWY, BALTIMORE, MD 21225, USA.

PERMIT DEVELOPER	
DATE	01/30/2026
DESIGNER	ORP
REVIEWER	

SHEET NAME

RACKING DATASHEET

SHEET NUMBER

DS-05

Davinder Singh
Sukhdeep Kaur
14981 Gossom Manor Place
Haymarket, VA 20169

February 27 2026

RE: Solar Panels

Dear Davinder,

We have received your request for the following:

Receive approval to install solar panels on the rear roof.

We are happy to inform you that your request has been approved by the Architectural Committee with the following conditions: . If you have any questions, please contact Sofia Parker at sparker@intempus.net.

Sincerely,

Sofia Parker

Sofia Parker
on behalf of Sherwood Forest Community Association, Inc

Tilak Raj Kharel
15013 Gossom Manor Place
Haymarket, VA 20169

February 27 2026

RE: Solar Panels

Dear Tilak Raj,

We have received your request for the following:

Association: Sherwood Forest Community Association, Inc
Date: 02/01/2026 08:57:23 PM
Owner Name: Tilak Raj Kharel
Account Number: 23962
Unit:
Address: 15013 Gossom Manor Place, Haymarket, VA 20169
Home Phone:
Cell Phone: 2404819503
Email Address: tilak801@hotmail.com
Planned Start Date: 3/1/2026 12:00:00 AM
Planned Completion Date: 3/31/2026 12:00:00 AM
ACC Type: Solar Panels
Detailed Description of the Project: Installation of a27-panel, 12.285Kw roof mounted solar system, Black on black panels Flush mounted (parallel) to roof surface
Work will be performed by Contractor or Homeowner?: Contractor, Nova Solar
Name of Contractor, if applicable: Nova Solar, 703-679-8607, novasolarinc@gmail.com
By clicking submit, I hereby agree and certify to each of the following:
I have read the instructions on this form and familiarized myself with the Architectural Standards in the Governing Documents for my Association.
I agree that I may be required to alter or remove my improvement if it does not follow the plan as submitted and approved by the Architectural Committee.
I agree to not begin my project before receiving formal approval by the Architectural Committee.

We are happy to inform you that your request has been approved by the Architectural Committee with the following conditions: Approved.. If you have any questions, please contact Sofia Parker at sparker@intempus.net.

Sincerely,

Sofia Parker
on behalf of Sherwood Forest Community Association, Inc

Town of Haymarket
15000 Washington Street, #100
Haymarket, VA 20169
703-753-2600

Lydia Schauss
Town Planner

MEMORANDUM

TO: Architectural Review Board
FROM: Lydia M. Schauss
DATE: March 12, 2026
SUBJECT: ZP #2026-008, Installation of Roof Mounted Solar Panels at 6515 Crossroads Village Blvd

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APPLICATION SUMMARY:

Business/Applicant: Fusion Solar Services

Street Address: 6515 Crossroads Village Blvd, Haymarket Va 20169

Proposed Alteration: Solar Panel and Universal Wall Charger Installation

Applicant's Brief Description of the Activity: Installation of a 48-panel, 20.64kW roof mounted solar (PV) system. Install one Universal Wall Charger.

The applicant will be installing 20.64kW Solar Photovoltaic System; modifications will include microinverters located under and hidden by the solar modules. Use "triple-black" (black frames, black back sheets, black cells) solar modules.

Town Planner Assessment		
Zoning Ordinance	**Application Details**	**Staff Response**
Sec. 58-16.8 Matters to be considered by board in acting on appropriateness of erection, reconstruction, alteration, restoration or demolition of building or structure.	Installation of a 48 panel, 20.64kW roof mounted solar (PV) system. (1) Tesla Universal Wall Connector.	The proposed alteration is visible from the public right of way. The Board shall consider the new roof mounted solar panels installation.
Sec. 58-16.8 (1) Exterior architectural features, including all signs, which are subject to public view from a public street, way or place.	Installation of a 48 panel, 20.64kW roof mounted solar (PV) system. (1) Tesla Universal Wall Connector.	The proposed alteration is visible from the public right of way. The Board shall consider the new roof mounted solar panels installation.
Sec. 58-16.8 (2) General Design Arrangement	Installation of a 48 panel, 20.64kW roof mounted solar (PV) system. (1) Tesla Universal Wall Connector.	The roof mounted solar panels will be flush to the roof and utilize microinverters hidden by the panels, the panels will be "triple black."
Sec. 58-16.8 (3) Texture, material and color	Installation of a 48 panel, 20.64kW roof mounted solar	The solar modules consist of triple-black photovoltaic panels with

	(PV) system. (1) Tesla Universal Wall Connector.	tempered glass with anti-reflective coating. The new panels will be a triple black color. The frames are devised from anodized aluminum alloy.
Sec. 58-16.8 (4) The relation of the factors, subsections (1), (2), and (3) of this section, to similar features of the buildings and structures in the immediate surroundings	Installation of a 48 panel, 20.64kW roof mounted solar (PV) system. (1) Tesla Universal Wall Connector.	The installation closely matches the existing roof surface. Therefore, the system blends with the roof plane rather than contrasting and pulling attention from surrounding homes.
Sec. 58-16.8 (5) The extent to which the building or structure would be harmonious with or obviously incongruous with the old and historic aspect of the surroundings	Installation of a 48 panel, 20.64kW roof mounted solar (PV) system. (1) Tesla Universal Wall Connector.	The purposed solar installation incorporates renewable energy in manner that minimizes visual impact on the historic character of the surrounding Town property.
Sec. 58-16.8 (6) In the case of a building to be razed, a primary consideration will be the extent to which its continued existence would tend to protect irreplaceable historic places and preserve the general historic atmosphere of the Town	Not applicable	Not applicable
Sec. 58-16.8 (7) The extent to which the building or structure will promote the general welfare of the Town, and all citizens, by the preservation and protection of historic places and areas	Installation of a 48 panel, 20.64kW roof mounted solar (PV) system. (1) Tesla Universal Wall Connector.	Not applicable
Sec. 58-16.8 (8) The extent to which the building or structure will promote the general welfare by: (a) Maintaining and increasing real estate values (b) Generating business (c) Creating new positions (d) Attracting tourists, students, writers, historians, artists and artisans, and new residents	Installation of a 48 panel, 20.64kW roof mounted solar (PV) system. (1) Tesla Universal Wall Connector.	These matters are at the discretion of the ARB.

(e) Encouraging study of and interest in American history (f) Stimulating interest in and study of architecture and design (g) Educating citizens in American culture and heritage (h) Making the Town a more attractive and desirable place in which to live		
Comprehensive Plan		
Comp Plan 1.5.3 Historic Resource Inventory List	Site – 6515 Crossroads Village Blvd	The main structure/site IS NOT listed as a Historic Resource
Comp Plan 1.5.4 Potential Archaeological Site	Site – 6515 Crossroads Village Blvd	The site IS NOT one of those listed as a potential archaeological site in the Comprehensive Plan
Architectural Review Board Historic Guidelines		
I. Introduction (E) Community Design and the Comprehensive Plan	Site – 6515 Crossroads Village Blvd	Commercial Property
II. Streetscape and Site Design		
II. (a) Washington Street Enhancement Project	Not applicable	Not applicable
II. (b) Streetscapes Other Than Washington Street	Not applicable	Not applicable
II. (c) Fences and Walls		
II. (d) Lighting (Free Standing/Posts)	Not Applicable	Not Applicable
II. (e) Telecommunication Dishes, Drums and Towers	Not Applicable	Not Applicable
II. (f) Screening	Not Applicable	Not Applicable
III. New Construction and Additions to Existing Non-Historic and Non-Contributing Structures		
III. (a) General Guidelines	*"To create a more pleasing blend of historic and new elements in the Town, new structures shall be compatible with the prevailing and recognized historic architectural character of the existing adjacent structures"*	These matters are at the discretion of the ARB
III. (b) Colors	Triple Black	All elements are acceptable within the Town's Zoning Ordinance
III. (c) Exterior Elements	Installation of a 48 panel, 20.64kW roof mounted solar	All elements are acceptable within the ARB Guidelines and the Town's Zoning Ordinance.

	(PV) system. (1) Tesla Universal Wall Connector.	
III. (d) Chimneys	Not Applicable	Not Applicable
III. (e) Roofing	Installation of a 48 panel, 20.64kW roof mounted solar (PV) system.	All elements are acceptable within the ARB Guidelines and the Town's Zoning Ordinance.
III. (f) Lighting, (attached to structure)	Not Applicable	Not Applicable
III. (g) Windows and Doors	Not Applicable	Not Applicable
III. (h) Decks	Not Applicable	Not Applicable
III. (i) Handicapped Ramps	Not Applicable	Not Applicable
III. (j) Awnings	Not Applicable	Not Applicable
IV. Guidelines for Alterations or Additions to Historic Structures or Contributing Structures		
IV. (a) General Guidelines	Not Applicable	Not Applicable
V. Signage	Not Applicable	Not Applicable, not historic or contributing
VI. Demolition Guidelines	Not Applicable	Not Applicable
VII. Situations Not Covered, Additional Requirements	Not Applicable	Not Applicable

Discussion:
ARB shall discuss the design, placement, and color palette of the proposed roof mounted solar panel system.

STAFF RECOMMENDATION:

Based on the application submitted, the rendering provided, and additional information received from the applicant, the Zoning Administrator recommends the approval of the Certificate of Appropriateness for 6515 Crossroads Village Blvd.

The roof-mounted solar panels are a welcome improvement to the structure providing architectural interest. The new panel triple-black color is in keeping with the zoning ordinance color palette and will not hinder the aesthetics of the structure.

Draft Motion: I move the Architectural Review Board approve ZP #2026-008, Installation of Roof Mounted Solar Panels at 6515 Crossroads Village Blvd. The approval includes the following details: the installation of the 48-panel, 20.64kW roof mounted solar system and (1) Tesla Universal Wall Connector as shown in the submitted plans and renderings.

Or alternate motion.

ZONING PERMIT APPLICATION

ZONING PERMIT #: 2026-008

NOTE: This application must be filled out completely and all components of submission requirements must be met before the application can be accepted and scheduled for review/hearing.

ZONING ACTIVITY: ❑New Construction ■Alteration/Repair ❑Addition ❑Sign (See Spec sheet)
(Check all that apply) ❑New Tenant/Use ❑Change of Use ❑Relocation

NAME OF BUSINESS/APPLICANT: Fusion Solar Services

PROPOSED USE: Commerical Size (Sq. Ft./Length) of Construction: 1257

SITE ADDRESS: 6515 Crossroads Village Bld, Haymarket20169 Parcel ID #: 7298-81-0546.

Subdivision Name: Crossroad Village Center Lot Size: _____

ZONING DISTRICT: ❑ R-1 ❑ R-2 ❑ B-1 ■ B-2 ❑ I-1 ❑

C-1 Special Use Permit Required: ❑ Yes ❑ No Site Plan Required: ❑ Yes ■ No

Off-Street Parking: Spaces Required: _____ Spaces Provided: _____

BRIEF DESCRIPTION OF ACTIVITY: (*i.e. previous use, height/length of fencing, deck specs, etc.*)
Install (48) Roof Mounted Solar Panels. System Size 20.64kw Install (1) Universal Wall Charger

Supporting Documentation (*attached*): ■ Narrative ❑ Plan/Plat ■ Specification Sheet

FEE: ❑ $50.00 Residential ❑■$100.00 Commercial

CERTIFICATE OF APPROPRIATENESS

ADDITIONAL DESCRIPTION: (*i.e. color, type of material, font style, etc. See Sign Spec Sheet for Signage detail)*

Supporting Documentation (*attached*): ■ Specification Sheet ■ Photograph(s)

PERMIT HOLDER INFORMATION
Fusion Solar Services
Name
3600 Commerce Drive
Address
Baltimore Maryland 21227
City State Zip
4434253023 permits@fusionss.net
Phone# Email

PROPERTY OWNER INFORMATION
Hassan Saeed
Name
6515 Crossroads Village Boulevard
Address
Haymarket, VA, 20169
City State Zip
440-463-7364 / jonsnowar@icloud.com
Phone# Email

APPLICANT / PROPERTY OWNER SIGNATURE ********REQUIRED********

I, as owner or authorized agent for the above-referenced parcel, do hereby certify that I have the authority to make the foregoing application and that the information provided herein is correct. Construction of improvements described herein and as shown on the attached plat, plan and/or specifications will comply with the ordinances of the Town of Haymarket and any additional restrictions and/or conditions prescribed by the Architectural Review Board (ARB), Planning Commission or the Town Council and all other applicable laws.

Ola Carew
box SIGN 427XYL51-4P2XKXKK
Applicant Signature

Hassan Saeed
box SIGN 4Q3ZX5L9-4P2XKXKK
Property Owner Signature

OFFICE USE ONLY

Date Filed: _____ Fee Amount: _____ Date Paid: _____

DATE TO ZONING ADMINISTRATOR: _____

❑APPROVED ❑DISAPPROVED ❑TABLED UNTIL: _____ ❑DEFERRED UNTIL: _____

_____
SIGNATURE *PRINT*

CONDITIONS:

_____

_____

DATE TO ARCHITECTURAL REVIEW BOARD (ARB): _____

❑APPROVED ❑DISAPPROVED ❑TABLED UNTIL: _____ ❑DEFERRED UNTIL: _____

_____
SIGNATURE *PRINT*

CONDITIONS:

_____

_____

DATE TO TOWN COUNCIL (IF APPLICABLE): _____

❑APPROVED ❑DISAPPROVED ❑TABLED UNTIL: _____ ❑DEFERRED UNTIL: _____

TOWN COUNCIL {where required): _____
SIGNATURE *PRINT*

CONDITIONS:

_____

_____

INSTRUCTIONS FOR COMPLETING APPLICATION

In addition to applying for a Certificate of Appropriateness, the applicant is responsible for obtaining any other required permits and approvals applicable to the project.

1. Provide name, phone number, and email address of business or individual requesting approval for proposed work. If different from property owner, please provide contact information for property owner as well.
2. Indicate site address
3. Indicate mailing address of applicant and owner (if different).
4. Describe in detail work proposed and then attach all required and any additional documentation or material that will describe the project in detail to the reviewing authority. Adequate documentation must be provided. Applicant should provide any necessary item(s), in addition to the items listed on the checklist below.

Check List

Signs/Fences/New Building/Additions/Remodel

The Completed application must be submitted to the Town Clerk's office no later than 4:30pm one week prior to the meeting date.

1) One copy of the Plat-showing location of sign/fence/addition on the façade or grounds
2) Photograph of the existing structure and closest neighboring structures
3) Photograph/drawings, including measurements, of the proposed change
4) Material specifications
5) Color/material samples
6) Description of method of mounting and description of hardware to be used
7) Landlord/HOA approval letter where indicated
8) Copy of business or occupational license if contractor has designed or will install
9) Narrative, if special requests or exceptions to the ARB Guidelines are being requested.
10) Applicant or a representative **must** be present at the ARB meeting, on the scheduled Wednesday of every month at 7:00pm. If a representative is not present at the meeting to answer any questions that may arise, your application may be deferred or denied until the next regularly scheduled meeting. Please check the Town's website for a list of the Town's scheduled meetings. It is the applicant's responsibility to keep apprised of the Town's meeting schedule.
11) If an interpreter is required, the applicant needs to bring one with them.

Please mail application and all applicable information and materials to:
Town of Haymarket
15000 Washington Street, Suite 100
Haymarket, VA 20169

SIGN SPECIFICATION SHEET

SIGN 1:

Type of Sign: ❑Wall ❑Hanging ❑Freestanding ❑Menu ❑Individual Letter ❑Window ❑Other _____

Height above Ground at Signs: Lower Edge: _____ Upper Edge: _____

Height of Sign Structure:_____ Sign Width:_____ Length:_____ Area in Sq Ft:_____

Number of Faces: _____ Sign Material/Color/Font:_____

Location of Sign (Include photo): _____

Lighting Type/Fixture (No internal illumination is allowed): _____

_____

SIGN 2:

Type of Sign: ❑Wall ❑Hanging ❑Freestanding ❑Menu ❑Individual Letter ❑Window ❑Other _____

Height above Ground at Signs: Lower Edge: _____ Upper Edge: _____

Height of Sign Structure:_____ Sign Width:_____ Length:_____ Area in Sq Ft:_____

Number of Faces: _____ Sign Material/Color/Font:_____

Location of Sign (Include photo): _____

Lighting Type/Fixture (No internal illumination is allowed):_____

_____

SIGN 3:

Type of Sign: ❑Wall ❑Hanging ❑Freestanding ❑Menu ❑Individual Letter ❑Window ❑Other _____

Height above Ground at Signs: Lower Edge: _____ Upper Edge: _____

Height of Sign Structure:_____ Sign Width:_____ Length:_____ Area in Sq Ft:_____

Number of Faces: _____ Sign Material/Color/Font:_____

Location of Sign (Include photo): _____

Lighting Type/Fixture (No internal illumination is allowed): _____

_____

SIGN 4:

Type of Sign: ❑Wall ❑Hanging ❑Freestanding ❑Menu ❑Individual Letter ❑Window ❑Other _____

Height above Ground at Signs: Lower Edge: _____ Upper Edge: _____

Height of Sign Structure:_____ Sign Width:_____ Length:_____ Area in Sq Ft:_____

Number of Faces: _____ Sign Material/Color/Font:_____

Location of Sign (Include photo): _____

Lighting Type/Fixture (No internal illumination is allowed): _____

_____

FREQUENTLY ASKED QUESTIONS

1. *What projects require architectural review?*
   Any project involving alterations to the exterior of an existing building, visible from public view (e.g. fences, signs, awnings, mechanical equipment, landscaping, façade changes) and the construction of new buildings, all require an architectural review.

2. *How long does the architectural review process take?*
   The time required to process an application will vary depending on the size of the project. Once the application has been deemed complete, the architectural review process can take between four to eight weeks, to complete, if no changes/revisions are required by any of the reviewing body throughout the process. Vague or incomplete description of the project or failure to provide any pertinent information regarding the project will delay the review process.

3. *What does the ARB look for in a project?*
   Refer to the Town of Haymarket Architectural Review Design Guidelines.

4. *What happens after I submit my application?*
   After an application is submitted, a town clerk will review it for its completeness (not for the accuracy or content of the submission). If the application is incomplete, the missing materials will be required BEFORE the application can be forwarded for review. If complete, the application (and all required supporting documentation) will continue with the review process.

5. *What is the review process?*
   For any submission, there are two reviewing bodies in the Town. The Zoning Administrator, and the Architectural Review Board (If applicable). All reviewing bodies in the Town meet once a month. (A schedule of all the meetings is available on our website at www.townofhaymarket.org/meetings).

6. *Is there a submission deadline?*
   An application must be submitted to the Town Clerk and verified as complete one week prior to the meeting date for proper review.

7. *What happens at the ARB meeting?*
   The ARB reviews any development project(s) to promote and maintain the historic architectural flavor of the Town consistent with the Town's Comprehensive Plan. The ARB reviews any proposal/project which currently or in the future could be visible from any public view.

8. *What should I present at my review?*
   To facilitate a more streamlined review of an application, it is required that an applicant (or representative) be present at the meeting(s) during the review of their proposed project. A brief overview of the project, site, and architecture should be presented. Speak briefly to the design and landscaping features, parking and circulation, delivery routes/access, drainage, lighting, signage, and trash enclosures. Provide sample(s) of colors and materials. For larger development projects, you will need to be able to discuss traffic impacts.

9. *When can I submit my plans for a building permit?*
   If the project is approved by all applicable Boards, the applicant can then receive their building permit (if a permit is required for the project).

GENERAL NOTES

2.1.1 **SITE NOTES:**
2.1.2 A LADDER WILL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
2.1.3 THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.
2.1.4 THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
2.1.5 PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION NEC 110.26.
2.1.6 ROOF COVERINGS SHALL BE DESIGNED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THIS CODE AND THE APPROVED MANUFACTURER'S INSTRUCTIONS SUCH THAT THE ROOF COVERING SERVES TO PROTECT THE BUILDING OR STRUCTURE.

2.2.1 **EQUIPMENT LOCATIONS:**
2.2.2 ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY NEC 110.26.
2.2.3 WIRING SYSTEMS INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC 690.31 (A),(C) AND NEC TABLES 310.15 (B)(2)(A) AND 310.15 (B)(3)(C).
2.2.4 JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER PV MODULES ACCORDING TO NEC 690.34.
2.2.5 ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVICING DISCONNECT.
2.2.6 ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.
2.2.7 ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.

2.3.1 **STRUCTURAL NOTES:**
2.3.2 RACKING SYSTEM & PV ARRAY WILL BE INSTALLED ACCORDING TO CODE-COMPLIANT INSTALLATION MANUAL. TOP CLAMPS REQUIRE A DESIGNATED SPACE BETWEEN MODULES, AND RAILS MUST ALSO EXTEND A MINIMUM DISTANCE BEYOND EITHER EDGE OF THE ARRAY/SUBARRAY, ACCORDING TO RAI MANUFACTURER'S INSTRUCTIONS.
2.3.3 JUNCTION BOX WILL BE INSTALLED PER MANUFACTURERS' SPECIFICATIONS. IF ROOF-PENETRATING TYPE, IT SHALL BE FLASHED & SEALED PER LOCAL REQUIREMENTS.
2.3.4 ROOFTOP PENETRATIONS FOR PV RACEWAY WILL BE COMPLETED AND SEALED W/ APPROVED CHEMICAL SEALANT PER CODE BY A LICENSED CONTRACTOR.
2.3.5 ALL PV RELATED ROOF ATTACHMENTS TO BE SPACED NO GREATER THAN THE SPAN DISTANCE SPECIFIED BY THE RACKING MANUFACTURER.
2.3.6 WHEN POSSIBLE, ALL PV RELATED RACKING ATTACHMENTS WILL BE STAGGERED AMONGST THE ROOF FRAMING MEMBERS.

2.4.1 **WIRING & CONDUIT NOTES:**
2.4.2 ALL CONDUIT AND WIRE WILL BE LISTED AND APPROVED FOR THEIR PURPOSE. CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING.
2.4.3 CONDUCTORS SIZED ACCORDING TO NEC 690.8, NEC 690.7.
2.4.4 VOLTAGE DROP LIMITED TO 1.5%.
2.4.5 DC WIRING LIMITED TO MODULE FOOTPRINT. MICROINVERTER WIRING SYSTEMS SHALL BE LOCATED AND SECURED UNDER THE ARRAY W/ SUITABLE WIRING CLIPS.
2.4.6 AC CONDUCTORS COLORED OR MARKED AS FOLLOWS:
PHASE A OR L1- BLACK
PHASE B OR L2- RED, OR OTHER CONVENTION IF THREE PHASE
PHASE C OR L3- BLUE, YELLOW, ORANGE**, OR OTHER CONVENTION
NEUTRAL- WHITE OR GREY
IN 4-WIRE DELTA CONNECTED SYSTEMS THE PHASE WITH HIGHER VOLTAGE TO BE MARKED ORANGE [NEC 110.15].

4.5.1 **GROUNDING NOTES:**
2.5.2 GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVISES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR SUCH USE.
2.5.3 PV EQUIPMENT SHALL BE GROUNDED ACCORDING TO NEC 690.43 AND MINIMUM NEC TABLE 250.122.
2.5.4 METAL PARTS OF MODULE FRAMES, MODULE RACKING, AND ENCLOSURES CONSIDERED GROUNDED IN ACCORD WITH 250.134 AND 250.136(A).
2.5.5 EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO NEC 690.45 AND MICROINVERTER MANUFACTORERS' INSTRUCTIONS.
2.5.6 EACH MODULE WILL BE GROUNDED USING WEEB GROUNDING CLIPS AS SHOWN IN MANUFACTURER DOCUMENTATION AND APPROVED BY THE AHJ. IF WEEBS ARE NOT USED, MODULE GROUNDING LUGS MUST BE INSTALLED AT THE SPECIFIED GROUNDING LUG HOLES PER THE MANUFACTURERS' INSTALLATION REQUIREMENTS.
2.5.7 THE GROUNDING CONNECTION TO A MODULE SHALL BE ARRANGED SUCH THAT THE REMOVAL OF A MODULE DOES NOT INTERRUPT A GROUNDING CONDUCTOR TO ANOTHER MODULE.
2.5.8 GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLORED GREEN OR MARKED GREEN IF #4 AWG OR LARGER [NEC 250.119]
2.5.9 THE GROUNDING ELECTRODE SYSTEM COMPLIES WITH NEC 690.47 AND NEC 250.50 THROUGH 250.106. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, A GROUNDING ELECTRODE SYSTEM PROVIDED ACCORDING TO NEC 250, NEC 690.47 AND AHJ.
2.5.10 GROUND-FAULT DETECTION SHALL COMPLY WITH NEC 690.5 IN GENERAL AND NEC 690.5 (A)(1) SPECIFICALLY.

2.6.1 **DISCONNECTION AND OVER-CURRENT PROTECTION NOTES:**
2.6.2 DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING ENERGIZED ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS).
2.6.3 DISCONNECTS TO BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH
2.6.4 RAPID SHUTDOWN OF ENERGIZED CONDUCTORS BEYOND 10 FT OF PV ARRAY OR 5 FT INSIDE A BUILDING WITHIN 10 SECONDS. CONTROLLED CONDUCTORS ≤30V AND ≤240VA [NEC 690.12]. LOCATION OF LABEL ACCORDING TO AHJ.
2.6.5 ALL OCPD RATINGS AND TYPES SPECIFIED ACCORDING TO NEC 690.8, 690.9, AND 240.
2.6.6 MICROINVERTER BRANCHES CONNECTED TO A SINGLE BREAKER OR GROUPED FUSES IN ACCORDANCE WITH NEC 110.3(B).
2.6.7 IF REQUIRED BY AHJ, SYSTEM WILL INCLUDE ARC-FAULT CIRCUIT PROTECTION ACCORDING TO NEC 690.11 AND UL1699B.

2.7.1 **INTERCONNECTION NOTES:**
2.7.2 LOAD-SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH [NEC 690.64 (B)]
THE SUM OF THE UTILITY OCPD AND INVERTER CONTINUOUS INPUT MAY NOT EXCEED 120% OF BUSBAR RATING [NEC 705.12(D)(2)(3)].
2.7.3 WHEN SUM OF THE PV SOURCES EQUALS >100% OF BUSBAR RATING, PV DEDICATED BACKFFED BREAKERS MUST BE LOCATED OPPOSITE END OF THE BUS FROM THE UTILITY SOURCE OCPD [NEC 705.12(D)(2)(3)].
2.7.4 AT MULTIPLE PV OUTPUT COMBINER PANEL, TOTAL RATING OF ALL OVERCURRENT DEVICES SHALL NOT EXCEED AMPACITY OF BUSBAR. HOWEVER, THE COMBINED OVERCURRENT DEVICE MAY BE EXCLUDED ACCORDING TO NEC 705.12 (D)(2)(3)(C).
2.7.5 FEEDER TAP INTERCONNECTION (LOAD SIDE) ACCORDING TO NEC 705.12 (D)(2)(1)
2.7.6 SUPPLY SIDE TAP INTERCONNECTION ACCORDING TO NEC 705.12 (A) WITH SERVICE ENTRANCE CONDUCTORS IN ACCORDANCE WITH NEC 230.42
2.7.7 BACKFEEDING BREAKER FOR UTILITY-INTERACTIVE INVERTER OUTPUT IS EXEMPT FROM ADDITIONAL FASTENING [NEC 705.12 (D)(5)].
2.7.8

SYMBOL LEGEND

E	MAIN ENTRANCE DOOR	ATS	AUTOMATIC TRANSFER SWITCH	M	(E) UTILITY METER		PROPERTY LINE
MEP	MAIN ELECTRICAL PANEL	TB	TAP BOX	V	PV REVENUE METER		ROOF RAFTERS
JB	JUNCTION BOX	GEN	GENERATOR	U	UTILITY POLE		MODULE STRINGING
S	AC DISCONNECT	MM	MAIN SWITCHGEAR/ UTILITY METER	A	MODULE STRINGING		EQUIPMENT GROUND
I	DC/AC INVERTER	RSD	RAPID SHUTDOWN	B	MODULE STRINGING		CONDUIT
DCSW	DC DISCONNECT	DNR	(DC) COMBINER BOX	C	MODULE STRINGING		FIRE CLEARANCE
PNL	AC PANELBOARD	TRF	TRANSFORMER	D	MODULE STRINGING		

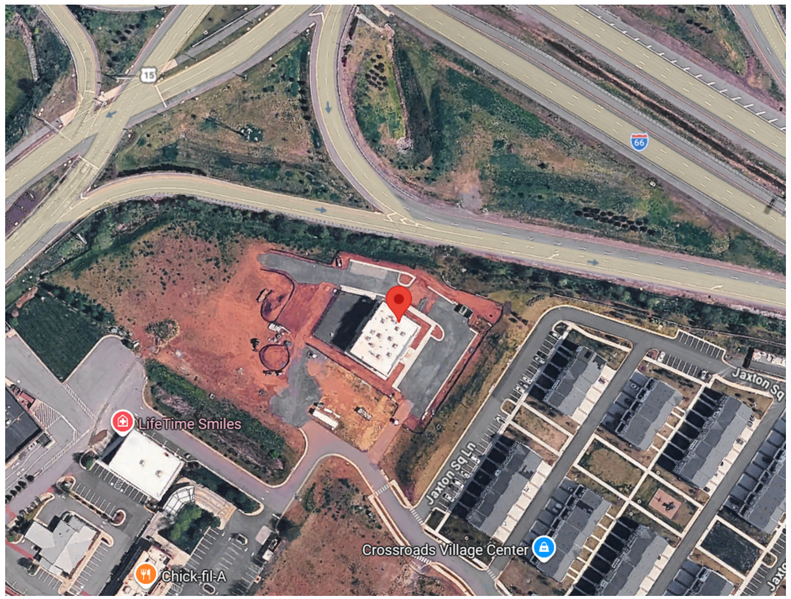
SOLAR (PV) MODULE
RAILS
ATTACHMENTS
26 SHEET KEYNOTE INDICATOR
DETAIL INDICATOR (01 / A-201)
ELEVATION INDICATOR (01 / A-201)
NORTH INDICATOR

DISCLAIMER: PLEASE NOTE THAT THE ABBREVIATIONS, ANNOTATIONS, AND SYMBOLS LISTED ARE INTENDED TO ILLUSTRATE THOSE THAT ARE COMMONLY USED; NOT ALL ARE NECESSARILY UTILIZED WITHIN THIS SET OF DRAWINGS.

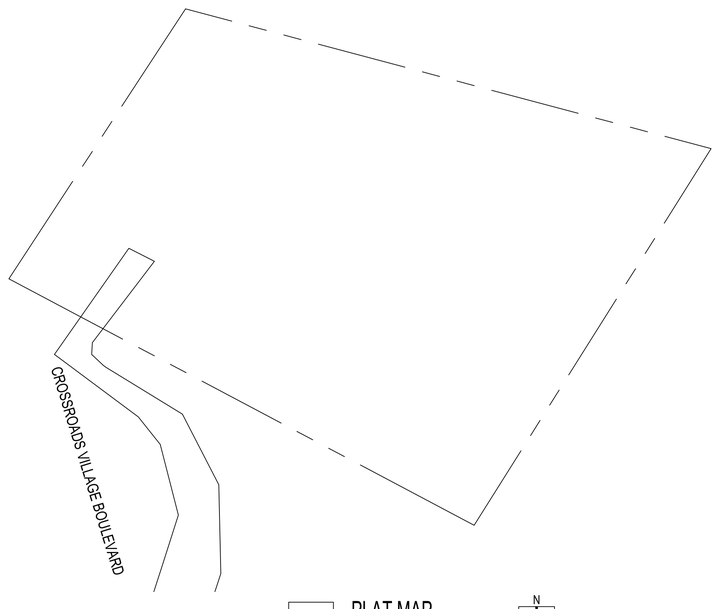
NEW PV SYSTEM: 20.640 kWp

HASSAN SAEED

6515 CROSSROADS VILLAGE BOULEVARD,
HAYMARKET, VA 20169
ASSESSOR'S #: 7298-81-0546



01 AERIAL PHOTO
NOT TO SCALE



02 PLAT MAP
NOT TO SCALE

SHEET LIST TABLE

SHEET NUMBER	SHEET TITLE
T-001	COVER PAGE
A-101	SITE PLAN
A-102	ELECTRICAL ROOF PLAN
A-103	ROOF FRAMING PLAN
E-601	SINGLE LINE DIAGRAM
E-602	PLACARDS
R-001	RESOURCE DOCUMENTS
R-002	RESOURCE DOCUMENTS
R-003	RESOURCE DOCUMENTS
R-004	RESOURCE DOCUMENTS
R-005	RESOURCE DOCUMENTS

PROJECT INFORMATION

OWNER
NAME: HASSAN SAEED

PROJECT MANAGER
NAME:
PHONE:

CONTRACTOR
NAME: LUMINASOLAR
PHONE: 800-971-6118

AUTHORITIES HAVING JURISDICTION
BUILDING: PRINCE WILLIAM COUNTY
ZONING: PRINCE WILLIAM COUNTY
UTILITY: DOMINION VIRGINIA POWER

DESIGN SPECIFICATIONS
OCCUPANCY: II
CONSTRUCTION: V-B
ZONING: C-2 GENERAL COMMERCIAL
GROUND SNOW LOAD: 30 PSF
WIND EXPOSURE: B
WIND SPEED: 112 MPH

APPLICABLE CODES & STANDARDS
BUILDING: IBC 2021
ELECTRICAL: NEC 2020
FIRE: IFC 2021

SCOPE OF WORK
SYSTEM SIZE: STC: 48 x 430W = 20.640kW
PTC: 48 x 409.4W = 19.651kW
(48) REC SOLAR REC430AA PURE 2
(48) IQ8MC-72-M-US
(1) TESLA UNIVERSAL WALL CONNECTOR 40A 8.32 KW

ATTACHMENT TYPE: UNIRAC RM5

MSP UPGRADE: NO

LUMINA SOLAR

CONTRACTOR
LUMINASOLAR
ADRESS: 3600 COMMERCE DR., SUITE 601, HALETHORPE, MD 21227
PHONE: 800-971-6118
LIC. NO.:

REVISION / RELEASE

NO.	DESCRIPTION	DATE

PROJECT
NEW PV SYSTEM: 20.640 kWp
HASSAN SAEED
6515 CROSSROADS VILLAGE BOULEVARD,
HAYMARKET, VA 20169
APN: 7298-81-0546

ENGINEER OF RECORD

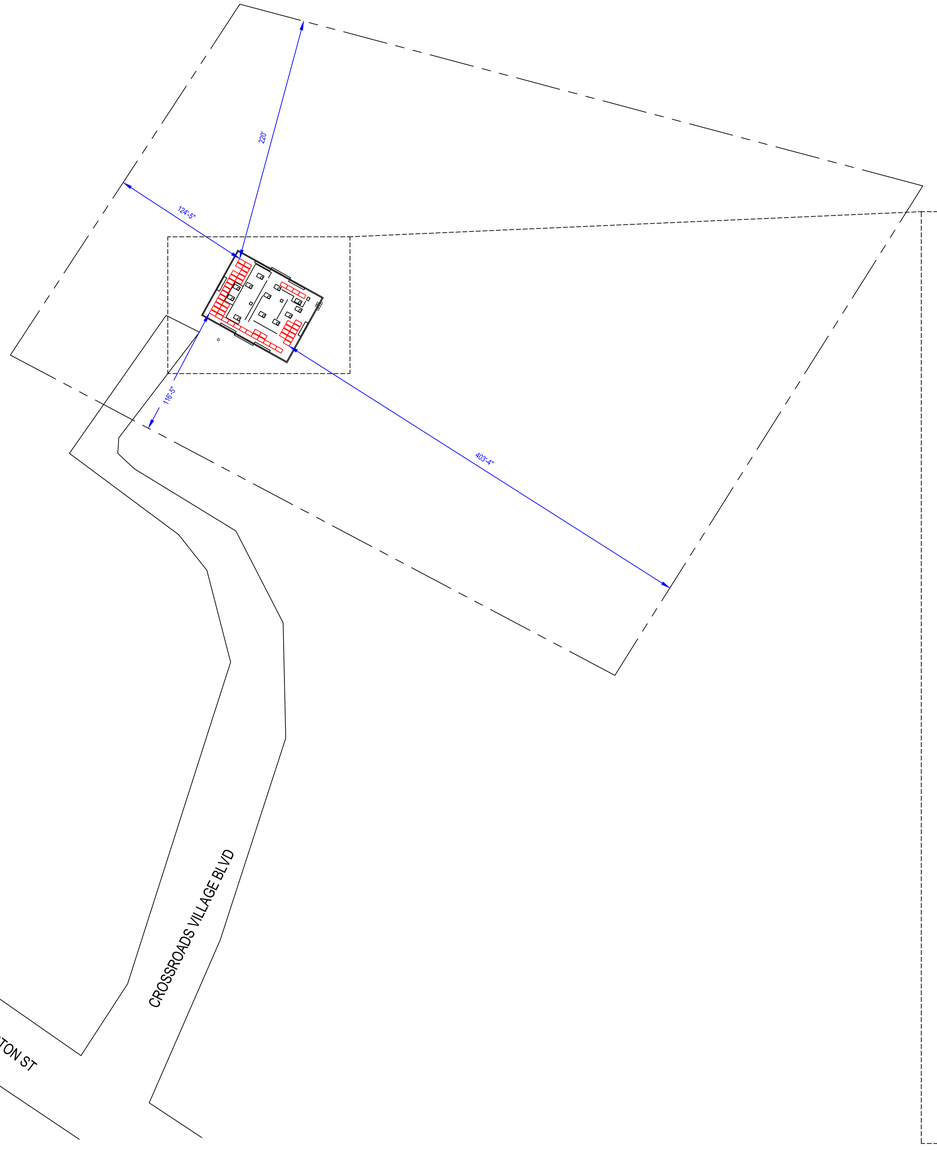
PAPER SIZE: 36" x 24" (ARCH D)

SHEET TITLE:
COVER PAGE
(SHEET 1)

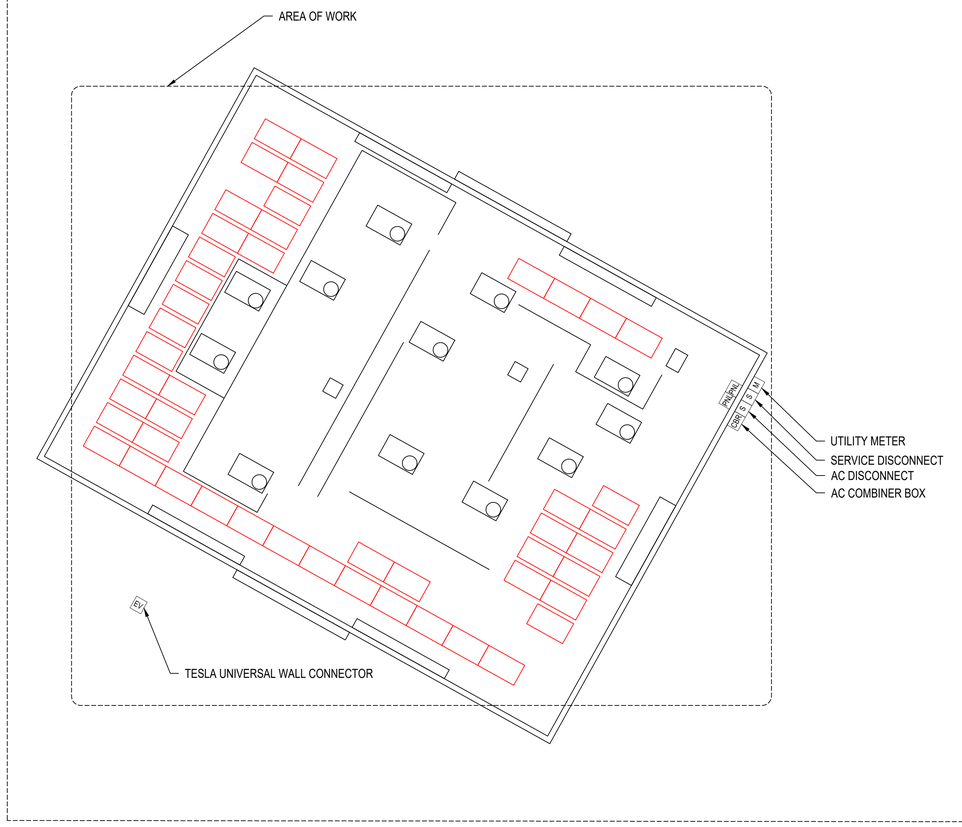
DATE: 03.07.2025
DESIGN BY: H.M.
CHECKED BY: A.L.
SHEET NUMBER:
T-001

GENERAL NOTES

1. FIELD VERIFY ALL MEASUREMENTS
2. SEE SHEET T-001 FOR LEGEND OF SYMBOLS



01 SITE PLAN
1/64" = 1'
0 32' 64'
N



02 SITE PLAN
3/32" = 1'
0 5'-4" 10'-8"
N

LUMINA SOLAR

CONTRACTOR

LUMINASOLAR

ADRESS: 3600 COMMERCE DR., SUITE 601, HALETHORPE, MD 21227

PHONE: 800-971-6118

LIC. NO.:

REVISION / RELEASE

NO.	DESCRIPTION	DATE

PROJECT

NEW PV SYSTEM: 20.640 kWp

HASSAN SAEED

6515 CROSSROADS VILLAGE BOULEVARD,
HAYMARKET, VA 20169
APN: 7298-81-0546

ENGINEER OF RECORD

PAPER SIZE: 36" x 24" (ARCH D)

SHEET TITLE:

SITE PLAN

(SHEET 2)

DATE: 03.07.2025

DESIGN BY: H.M.

CHECKED BY: A.L.

SHEET NUMBER:

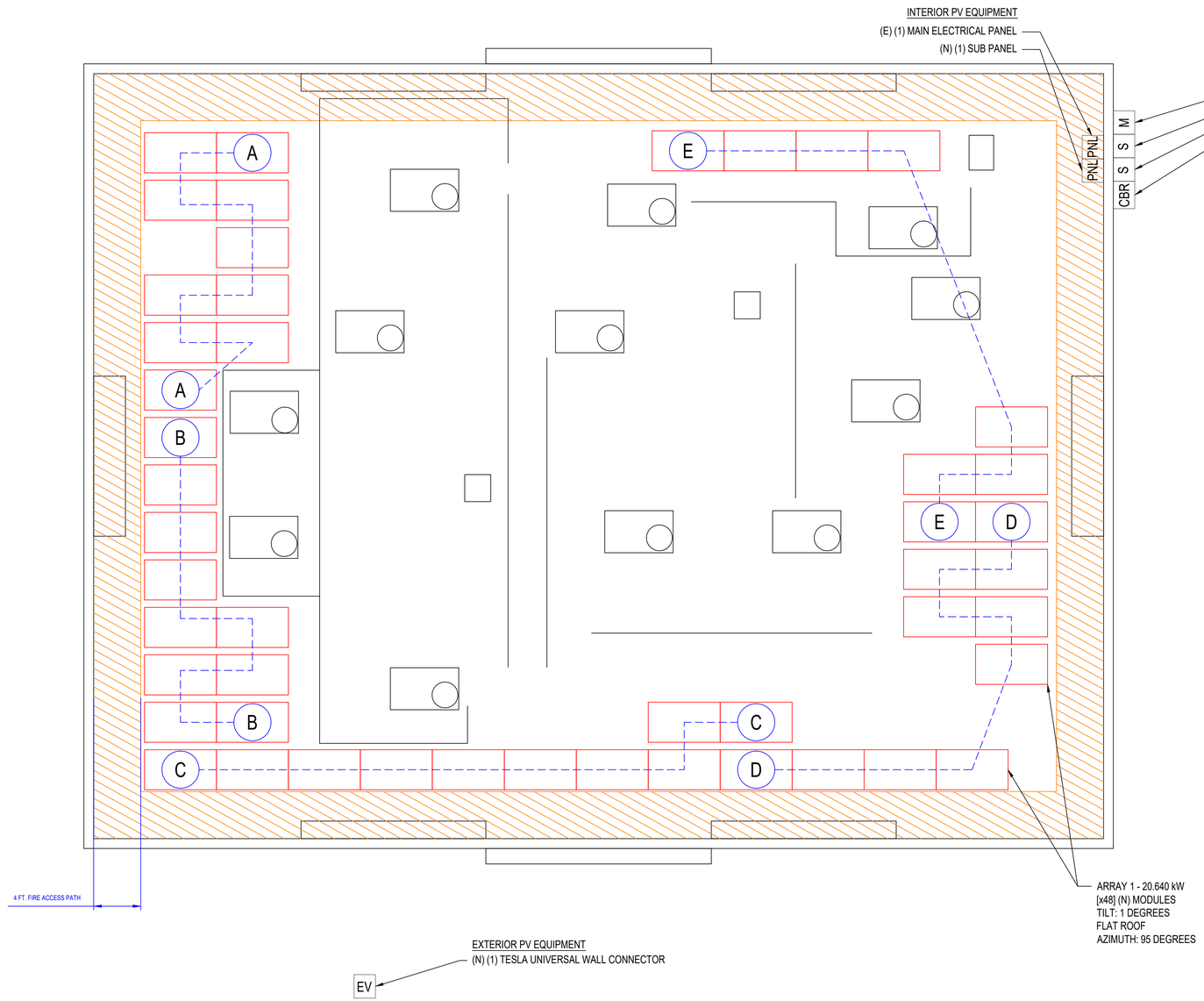
A-101

GENERAL NOTES

1. FIELD VERIFY ALL MEASUREMENTS
2. SEE SHEET T-001 FOR LEGEND OF SYMBOLS

A - E MODULE STRINGING

FIRE CLEARANCE



EXTERIOR PV EQUIPMENT
(N) (1) TESLA UNIVERSAL WALL CONNECTOR

EV

40.9"
73.4"
MODULE:
REC SOLAR
REC430AA PURE 2
430 WATTS

01 ELECTRICAL PLAN
3/16" = 1'
0 7'-8" 5'-4"

N E S W

LUMINA SOLAR

CONTRACTOR

LUMINASOLAR

ADRESS: 3600 COMMERCE DR., SUITE 601, HALETHORPE, MD 21227

PHONE: 800-971-6118

LIC. NO.:

REVISION / RELEASE

NO.	DESCRIPTION	DATE

PROJECT

NEW PV SYSTEM: 20.640 kWp

HASSAN SAEED

6515 CROSSROADS VILLAGE BOULEVARD,
HAYMARKET, VA 20169
APN: 7298-81-0546

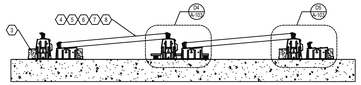
ENGINEER OF RECORD

PAPER SIZE: 36" x 24" (ARCH D)

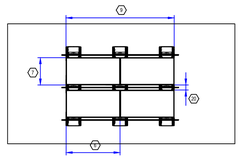
SHEET TITLE:
ELECTRICAL PLAN
(LAUNDRY BUILDING)
(SHEET 3)

DATE: 03.07.2025
DESIGN BY: H.M.
CHECKED BY: A.L.
SHEET NUMBER:

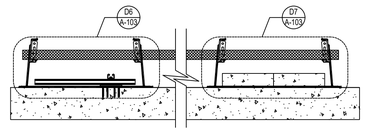
A-102



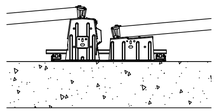
D1 RACKING DETAIL (TRANSVERSE)
NOT TO SCALE



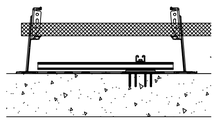
D2 RACKING DETAIL (TOP)
NOT TO SCALE



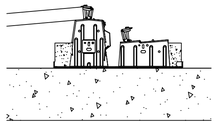
D3 RACKING DETAIL (LONGITUDINAL)
NOT TO SCALE



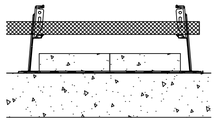
D4 DETAIL (TRANSVERSE)
NOT TO SCALE



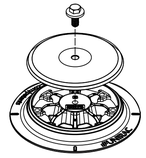
D5 DETAIL (LONGITUDINAL)
NOT TO SCALE



D6 DETAIL (TRANSVERSE)
NOT TO SCALE



D7 DETAIL (LONGITUDINAL)
NOT TO SCALE

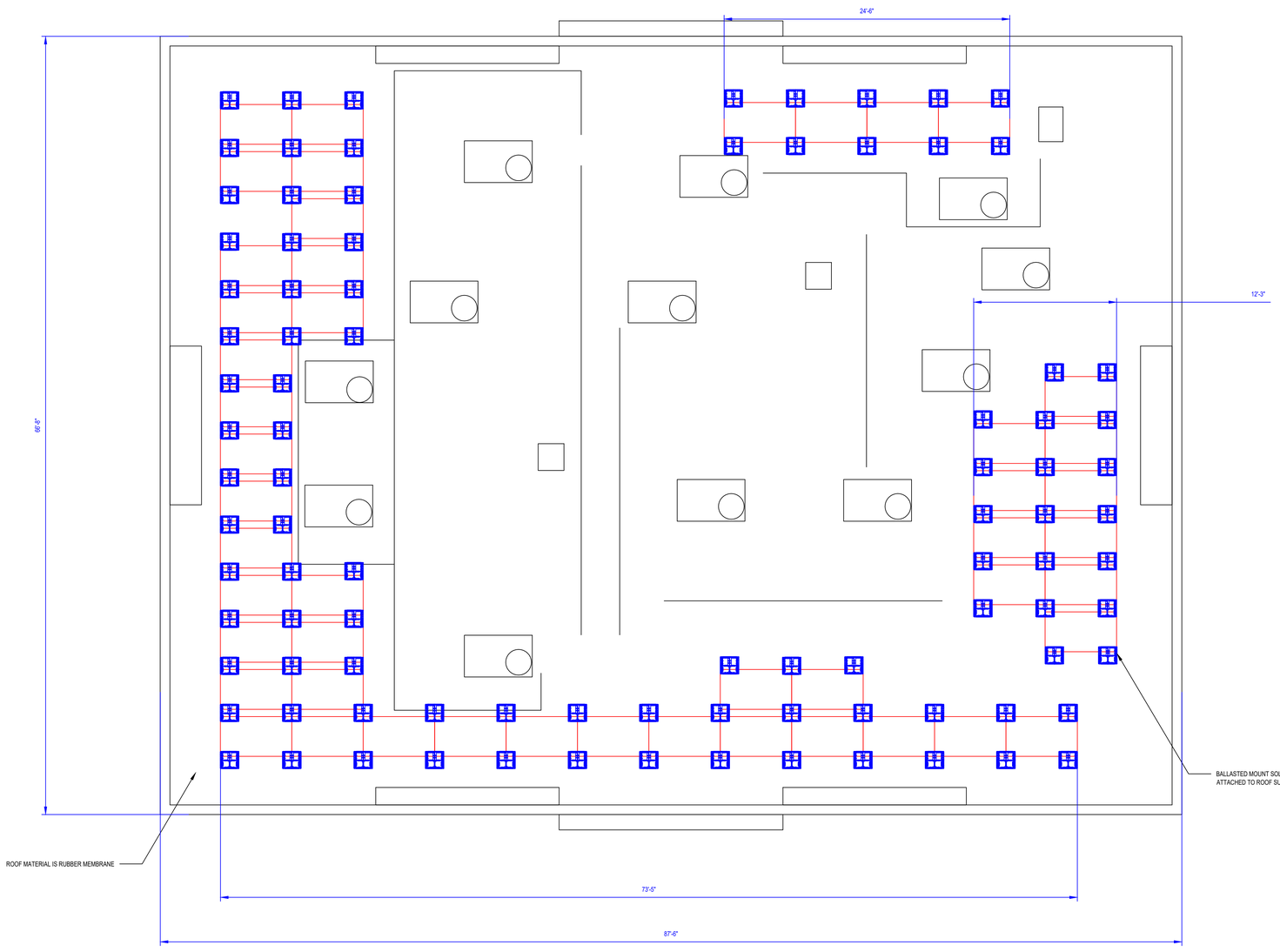


D8 WATERPROOFING/FLASHING DETAIL
NOT TO SCALE

GENERAL NOTES

1. FIELD VERIFY ALL MEASUREMENTS
2. SEE SHEET T-001 FOR LEGEND OF SYMBOLS
3. RACKING SHOWN IS FOR REFERENCE ONLY. COORDINATE WITH RACKING MANUFACTURER FOR RACKING AND FOUNDATION DRAWINGS. AND DETAILS

BAY WITH BALLASTS



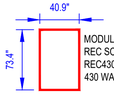
01 ARRAY PLAN
3/16" = 1'
0 2'-8" 5'-4"

SHEET KEYNOTES

1. ROOF MATERIAL: RUBBER MEMBRANE
2. ROOF STRUCTURE: TRUSS
3. ATTACHMENT TYPE: UNIRAC RM5
4. MODULE MANUFACTURER: REC SOLAR
5. MODULE MODEL: REC430AA PURE 2
6. MODULE LENGTH: 73.4"
7. MODULE WIDTH: 40.9"
8. MODULE WEIGHT: 47.6 LBS.
9. SEE SHEET A-103 FOR DIMENSION(S)
10. MIN. FIRE OFFSET: 4 FT. AROUND PERIMETR
11. TRUSS SPACING: 24 IN. O.C.
12. TRUSS SIZE: 2X4 NOMINAL
13. TOTAL AREA: 1257 SQ. FT.
14. TOTAL WEIGHT ON ROOF: 10291 LBS.
15. AVERAGE PSF: 8.19 LBS/FT^2
16. RAIL MANUFACTURER: UNIRAC
17. RAIL MODEL: BALLASTED MOUNT RM5
18. MAX. TRUSS SPAN: N/A.
19. ARRAY MAX HEIGHT: 9".
20. ROW NOMINAL SPACING: 7.5".
21. BAY WEIGHT: 813 LBS
22. MODULE WEIGHT: 2294 LBS
23. BALLAST WEIGHT: 6656 LBS
24. MAX BAY LOAD (DEAD): 145 LBS
25. ANCHOR: UNIRAC FLASHLOC RM
26. STRUT CHANNEL
27. #15 X 4" ANCHOR SCREW: 8 PER ATTACHMENT

11/19/2025

STAMPED AND SIGNED FOR STRUCTURAL ONLY. UNDERLYING STRUCTURE ONLY. ALL ARRAY ANCHORAGE DESIGN (BALLAST) SHALL BE PROVIDED BY THE RACKING MANUFACTURER. MECHANICAL ATTACHMENT TO UNDERLYING STRUCTURE FOR MANUFACTURER PROVIDED LOADS IS INCLUDED IN THE SCOPE OF OUR REVIEW.



MODULE:
REC SOLAR
REC430AA PURE 2
430 WATTS

LUMINA SOLAR

CONTRACTOR

LUMINASOLAR

ADRESS: 3600 COMMERCE DR., SUITE 601, HALETHORPE, MD 21227

PHONE: 800-971-6118

LIC. NO.:

REVISION / RELEASE

NO.	DESCRIPTION	DATE

PROJECT

NEW PV SYSTEM: 20.640 kWp

HASSAN SAEED

6515 CROSSROADS VILLAGE BOULEVARD,
HAYMARKET, VA 20169
APN: 7298-81-0546

ENGINEER OF RECORD

PAPER SIZE: 36" x 24" (ARCH D)

SHEET TITLE:
ARRAY PLAN
(LAUNDRY BUILDING)

(SHEET 4)

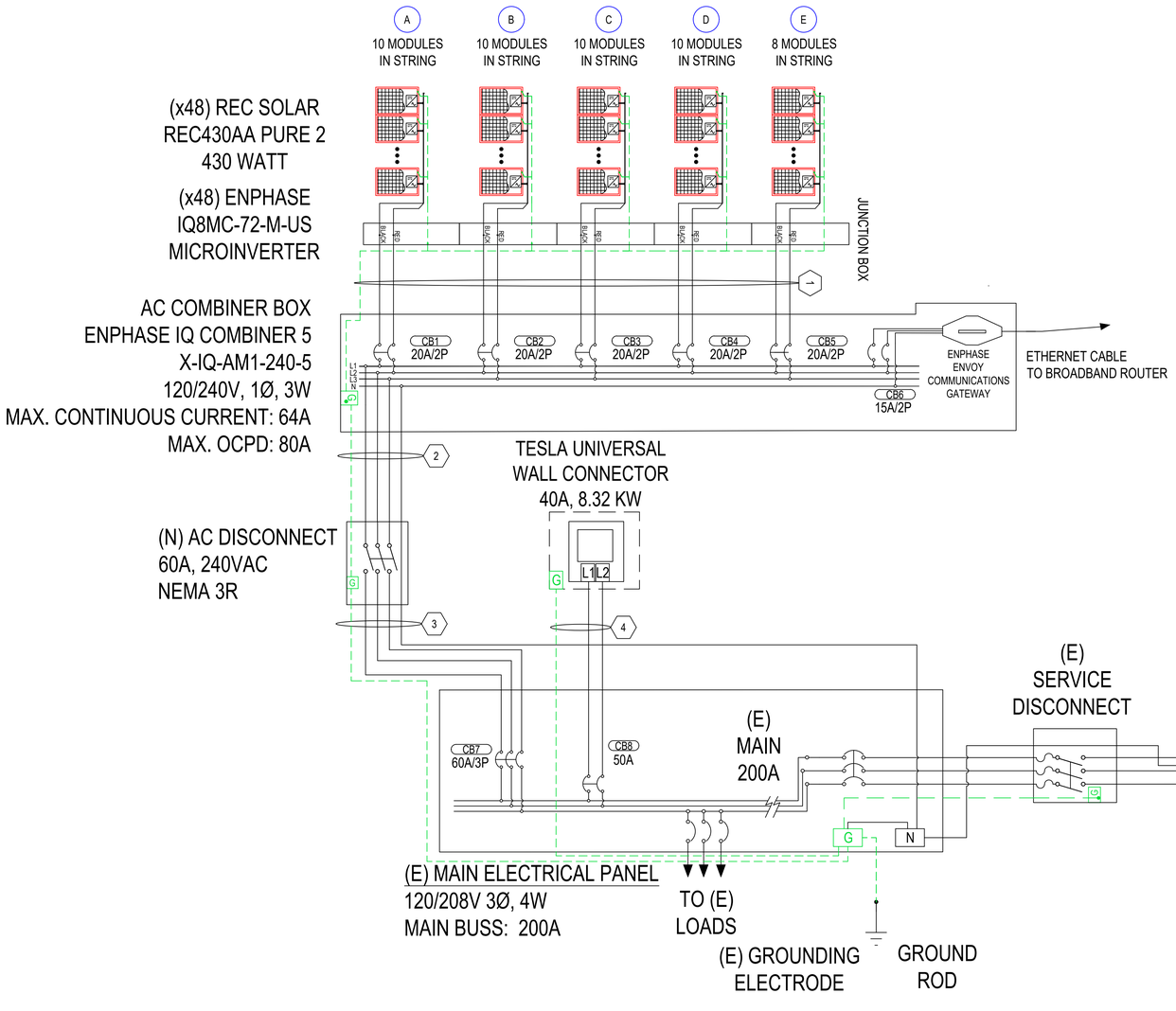
DATE: 03.07.2025
DESIGN BY: H.M.
CHECKED BY: A.L.

SHEET NUMBER:
A-103

CONDUCTOR AND CONDUIT SCHEDULE W/ELECTRICAL CALCULATIONS

ID	TYPICAL	CONDUCTOR	CONDUIT	CURRENT-CARRYING CONDUCTORS IN CONDUIT	OCPD	EGC	TEMP. CORR. FACTOR	CONDUIT FILL FACTOR	CONT. CURRENT	MAX. CURRENT (125%)	BASE AMP.	DERATED AMP.	TERM. TEMP. RATING	AMP. @ TERMINAL
1	2	10 AWG THWN-2, COPPER	1" DIA EMT	8	20A	10 AWG THWN-2, COPPER	0.96 (33.9 °C)	0.7	13.3A	16.63A	40A	26.88A	75°C	35A
2	1	4 AWG THWN-2, COPPER	1.25" DIA EMT	3+N	N/A	8 AWG THWN-2, COPPER	0.96 (33.9 °C)	1	41.97A	52.46A	95A	91.2A	75°C	85A
3	1	4 AWG THWN-2, COPPER	1.25" DIA EMT	3+N	80A	6 AWG THWN-2, COPPER	0.96 (33.9 °C)	1	41.97A	52.46A	95A	91.2A	75°C	85A
4	1	8 AWG THWN-2, COPPER	1" DIA EMT	2	60A	10 AWG THWN-2, COPPER	0.96 (33.9 °C)	1	40A	50A	55A	52.8A	75°C	50A

(A) - (E) MODULE STRINGING



NOTE:
RAPID SHUTDOWN INITIATION DEVICE (RSID) CONFORMING WITH THE RAPID SHUTDOWN CAN ALSO BE INITIATED BY ONE OF THE FOLLOWING METHODS:

- AC BREAKER IS TURNED OFF.
- AC TO THE INVERTER IS DISCONNECTED BY ANOTHER METHOD (INTENTIONALLY OR AS RESULT OF A FAULT)
- INVERTER ON/OFF SWITCH IS TURNED OFF.
- ALL THE ABOVE SHUTS DOWN MICROINVERTERS OR TRANSMITTER WHENEVER SUNSPEC SIGNAL IS INTERRUPTED.

LUMINA SOLAR

CONTRACTOR

LUMINASOLAR
ADRESS: 3600 COMMERCE DR., SUITE 601, HALETHORPE, MD 21227
PHONE: 800-971-6118
LIC. NO.:

REVISION / RELEASE

NO.	DESCRIPTION	DATE

PROJECT

NEW PV SYSTEM: 20.640 kWp

HASSAN SAEED

6515 CROSSROADS VILLAGE BOULEVARD,
HAYMARKET, VA 20169
APN: 7298-81-0546

ENGINEER OF RECORD

PAPER SIZE: 36" x 24" (ARCH D)

SHEET TITLE:
SINGLE LINE DIAGRAM

(SHEET 5)

DATE: 03.07.2025
DESIGN BY: H.M.
CHECKED BY: A.L.
SHEET NUMBER:
E-601

SYSTEM SUMMARY		
	BRANCH #1-4	BRANCH #5
INVERTERS PER BRANCH	10	8
MAX AC CURRENT	14.9A	11.92A
MAX AC OUTPUT POWER	3,200W	2,560W
ARRAY STC POWER	20,640W	
ARRAY PTC POWER	19,651W	
MAX AC CURRENT	41.97A	
MAX AC POWER	15,360W	
DERATED (CEC) AC POWER	15,360W	

MODULES

REF.	QTY.	MAKE AND MODEL	PMAX	PTC	ISC	IMP	VOC	VMP	TEMP. COEFF. OF VOC	FUSE RATING
PM1-48	48	REC SOLAR REC430AA PURE 2	430W	409.4W	10.81A	10.05A	49.3V	42.8V	-0.118V/°C (-0.24%/°C)	25A

INVERTERS

REF.	QTY.	MAKE AND MODEL	AC VOLTAGE	GROUND	OCPD RATING	RATED POWER	MAX OUTPUT CURRENT	MAX INPUT CURRENT	MAX INPUT VOLTAGE	CEC WEIGHTED EFFICIENCY
I1-48	48	ENPHASE IQ8MC-72-M-US	208V	FLOATING	20A	310A	1.49A	25A	60V	97.0%

DISCONNECTS

REF.	QTY.	MAKE AND MODEL	RATED CURRENT	MAX RATED VOLTAGE
SW1	1	SQUARE D HU362RB OR EQUIV.	60A	240VAC

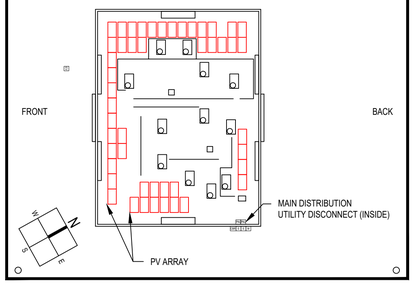
ASHRAE EXTREME LOW	-20.7°C (-5.3°F), SOURCE: MANASSAS RGNL DAVIS (38.72°; -77.5°)
ASHRAE 2% HIGH	33.9°C (93°F), SOURCE: MANASSAS RGNL DAVIS (38.72°; -77.5°)

OCPDS

REF.	QTY.	RATED CURRENT	MAX VOLTAGE
CB1-5	5	20A	240VAC
CB6	1	15A	240VAC
CB7	1	60A	240VAC
CB8	1	50A	240VAC

!CAUTION!

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM ROOF MOUNTED SOLAR ARRAYS WITH SAFETY DISCONNECTS AS SHOWN:



LABELING NOTES
1.1 LABELING REQUIREMENTS BASED ON THE 2017 NATIONAL ELECTRICAL CODE, INTERNATIONAL FIRE CODE 605.11, OSHA STANDARD 1910.145, ANSI Z535
1.2 MATERIAL BASED ON THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
1.3 LABELS TO BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED.
1.4 LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8" AND PERMANENTLY AFFIXED.
1.5 ALERTING WORDS TO BE COLOR CODED. "DANGER" WILL HAVE RED BACKGROUND; "WARNING" WILL HAVE ORANGE BACKGROUND; "CAUTION" WILL HAVE YELLOW BACKGROUND. [ANSI Z535]
1.6 ALL SIGNAGE MUST BE PERMANENTLY ATTACHED AND BE WEATHER RESISTANT/SUNLIGHT RESISTANT AND CANNOT BE HAND-WRITTEN PER NEC 110.21(B)

INTERACTIVE PHOTOVOLTAIC SYSTEM CONNECTED
PHOTOVOLTAIC SYSTEM DISCONNECT LOCATED
SE SIDE OF THE BUILDING

PERMANENT PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS IF NOT IN THE SAME LOCATION (5 3/4" X 1 1/8").
[NEC 690.56(B)]

WHERE THE INVERTERS ARE REMOTELY LOCATED FROM EACH OTHER, A DIRECTORY IN ACCORDANCE WITH 705.10 SHALL BE INSTALLED AT EACH DC PV SYSTEM DISCONNECTING MEANS, AT EACH AC DISCONNECTING MEANS, AND AT THE MAIN SERVICE DISCONNECTING MEANS SHOWING THE LOCATION OF ALL AC AND DC PV SYSTEM DISCONNECTING MEANS IN THE BUILDING.
[NEC 690.4(H)]

⚠ WARNING
ELECTRICAL SHOCK HAZARD
THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENEGIZED

PLACARD 1
AT EACH JUNCTION, COMBINER, DISCONNECT AND DEVICE WHERE ENERGIZED UNGROUNDED CONDUCTORS MAY BE EXPOSED DURING SERVICE (3" X 4").
[NEC 690.35(F)]

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

LABEL 5
AT RAPID SHUTDOWN SWITCH (5 1/4" X 2").
[NEC 690.56(C)].

⚠ WARNING
ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL 2
AT EACH DISCONNECTING MEANS FOR PHOTOVOLTAIC EQUIPMENT (3" X 4").
[NEC 690.17]

⚠ WARNING
THREE POWER SUPPLY SOURCES: UTILITY GRID, BATTERY AND PV SOLAR ELECTRIC SYSTEM

LABEL 7
AT POINT OF INTERCONNECTION (2 3/4" X 1 5/8").
[NEC 705.12(D)(3)]

PHOTOVOLTAIC SYSTEM AC DISCONNECT
RATED AC OUTPUT CURRENT 41.97 A
NOMINAL OPERATING AC VOLTAGE 208 V

LABEL 3
AT POINT OF INTERCONNECTION, MARKED AT DISCONNECTING MEANS (4" X 2").
[NEC 690.54]

PHOTOVOLTAIC SOLAR AC DISCONNECT

LABEL 4
AT EACH AC DISCONNECTING MEANS (1" X 4").
[NEC 690.13(B)]

⚠ CAUTION
SOLAR ELECTRIC SYSTEM CONNECTED

LABEL 8
AT UTILITY METER (5 3/4" X 1 1/8")
[NEC 690.56(B)]

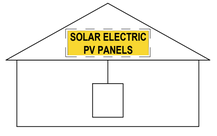
⚠ WARNING
ELECTRICAL SHOCK HAZARD
DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL 9
AT POINT OF INTERCONNECTION OVERCURRENT DEVICE (2" X 4").
[NEC 705.12(D)(2)]

WARNING: PHOTOVOLTAIC POWER SOURCE

LABEL 10
AT EXPOSED RACEWAYS, CABLE TRAYS, AND OTHER WIRING METHODS; SPACED AT MAXIMUM 10 FT SECTION OR WHERE SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS (5 3/4" X 1 1/8").
[CEC 690.31(G)]
LETTERS AT LEAST 3/8 INCH; WHITE ON RED BACKGROUND; REFLECTIVE
[IFC 605.11.1.1]

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN



TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY

LABEL 6
AT RAPID SHUTDOWN SYSTEM
(3 3/4" X 5 1/4"). [NEC 690.56(C)(1)(A)].

LUMINA SOLAR

CONTRACTOR
LUMINASOLAR
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PHONE: 800-971-6118
LIC. NO.:

REVISION / RELEASE

NO.	DESCRIPTION	DATE

PROJECT
NEW PV SYSTEM: 20.640 kWp
HASSAN SAEED
6515 CROSSROADS VILLAGE BOULEVARD, HAYMARKET, VA 20169
APN: 7298-81-0546

ENGINEER OF RECORD

PAPER SIZE: 36" x 24" (ARCH D)

SHEET TITLE:
PLACARDS
(SHEET 6)

DATE: 03.07.2025
DESIGN BY: H.M.
CHECKED BY: A.L.
SHEET NUMBER:
E-602

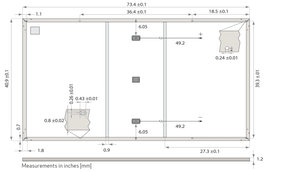
REC ALPHA PURE 2 SERIES

PRODUCT SPECIFICATIONS

REC
SOLAR'S MOST TRUSTED

GENERAL DATA

Cell type:	132 half-cut REC heterojunction cells with lead-free, gapless technology, 6 strings of 22 cells in series
Glass:	0.12 in solar glass with anti-reflective surface treatment in accordance with EN 12150
Backsheet:	Highly resistant polymer (black)
Frame:	Anodized aluminum (black)
Junction box:	3-part, 3bypass diodes, lead-free IP68 rated, in accordance with IEC 62790
Connectors:	Stäubli MC4 PV-KBT4/KST4 (12 AWG) in accordance with IEC 62852; IP68 only when connected
Cable:	12 AWG solar cable, 49.2 + 49.2 in in accordance with EN 50618
Dimensions:	73.4 x 40.9 x 1.2 in (2.08 sq ft)
Weight:	47.6 lbs (21.6 kg)
Origin:	Made in Singapore



ELECTRICAL DATA — Product Code*: REC xxx AA PURE 2

STC	Power Output - P_{MPP} (Wp)	400	410	420	430
	Watt Class Sorting - (W)	0/+10	0/+10	0/+10	0/+10
	Nominal Power Voltage - V_{MPP} (V)	41.1	41.6	42.2	42.8
	Nominal Power Current - I_{MPP} (A)	9.74	9.86	9.96	10.05
	Open Circuit Voltage - V_{OC} (V)	48.5	48.8	49.1	49.3
	Short Circuit Current - I_{SC} (A)	10.60	10.67	10.74	10.81
	Power Density (W/ft²)	19.2	19.6	20.1	20.6
	Panel Efficiency (%)	20.6	21.1	21.7	22.2
NMOT	Power Output - P_{MPP} (Wp)	304	312	320	327
	Nominal Power Voltage - V_{MPP} (V)	38.7	39.2	39.8	40.3
	Nominal Power Current - I_{MPP} (A)	7.86	7.96	8.05	8.12
	Open Circuit Voltage - V_{OC} (V)	45.7	45.8	46.0	46.2
	Short Circuit Current - I_{SC} (A)	8.50	8.62	8.68	8.73

Values at standard test conditions (STC: air mass AM1.5, irradiance 1000 W/m² (1 kW/m²), temperature 77°F (25°C), based on a production spread with a tolerance of P_{MPP}, V_{OC} & I_{SC} ±3% within one watt class. Nominal module operating temperature (NMOT: air mass AM1.5, irradiance 800 W/m², temperature 68°F (20°C), windspeed 3.3 ft/s (1 m/s).) *Where xxx indicates the nominal power class (P_{MPP}) at STC above.

CERTIFICATIONS

IEC 61215-2016, IEC 61730-2016, UL 61730	
IEC 62804	PID
IEC 61701	Salt Mist
IEC 62716	Ammonia Resistance
UL 61730	Fire Type 2
IEC 62782	Dynamic Mechanical Load
IEC 61215-2:2016	Hailstone (35mm)
IEC 62321	Lead-free acc. to RoHS EU 863/2015
ISO 14001, ISO 9001, IEC 45001, IEC 62941	

TEMPERATURE RATINGS*

Nominal Module Operating Temperature:	44°C (±2°C)
Temperature coefficient of P_{max}:	-0.24 %/°C
Temperature coefficient of V_{OC}:	-0.24 %/°C
Temperature coefficient of I_{SC}:	0.04 %/°C

*The temperature coefficients stated are linear values

MAXIMUM RATINGS

Operational temperature:	-40…+85°C
System voltage:	1000 V
Test load (front):	+ 7000 Pa (146 lbs/ft²)*
Test load (rear):	- 4000 Pa (83.5 lbs/ft²)*
Series fuse rating:	25 A
Reverse current:	25 A

*See installation manual for mounting instructions. Design load = Test load / 1.5 (safety factor)

WARRANTY

Installed by an REC Certified Solar Professional	Standard	REC ProTrust	
System Size	All	≤25 kW	25-500 kW
Product Warranty (yrs)	20	25	25
Power Warranty (yrs)	25	25	25
Labor Warranty (yrs)	0	25	10
Power in Year 1	98%	98%	98%
Annual Degradation	0.25%	0.25%	0.25%
Power in Year 25	92%	92%	92%

See warranty documents for details. Conditions apply

DELIVERY INFORMATION

Panels per pallet:	33
Panels per 40 ft GP/high cube container:	792 (24 pallets)
Panels per 53 ft truck:	858 (26 pallets)

LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC:

Available from:

Founded in 1996, REC Group is an international pioneering solar energy company dedicated to empowering consumers with clean, affordable solar power. As Solar's Most Trusted, REC is committed to high quality, innovation, and a low carbon footprint in the solar materials and solar panels it manufactures. Headquartered in Norway with operational headquarters in Singapore, REC also has regional hubs in North America, Europe, and Asia-Pacific.

REC Solar PTE. LTD.
20 Tuas South Ave 14
Singapore 637312
post@recgroup.com
www.recgroup.com

REC

Ref: IYO DS-AAPR Rev 1.8 08.23

Specifications subject to change without notice.

ENPHASE.

DATA SHEET

IQ8MC Microinverter

Our newest IQ8 Series Microinverters are the industry's first microgrid-forming*, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC), which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55-nm technology with high-speed digital logic and has superfast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.

Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the IQ Battery, IQ Gateway, and the Enphase App monitoring and analysis software.

Connect PV modules quickly and easily to the IQ8 Series Microinverters that have integrated MC4 connectors.

Enphase 25 year limited warranty

IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.

IQ8 Series Microinverters are UL Listed as PV rapid shutdown equipment and conforms with various regulations when installed according to the manufacturer's instructions.

*Meets UL 1741 only when installed with IQ System Controller 2 or 3.

Easy to install

- Lightweight and compact with plug-and-play connectors
- Power line communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produces power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) and IEEE 1547:2018 (UL 1741-SB)

NOTE:

- IQ8 Microinverters cannot be mixed together with previous generations of Enphase microinverters (IQ7 Series, IQ6 Series, and so on) in the same system.
- IQ Microinverters ship with default settings that meet North America's IEEE 1547 interconnection standard requirements. Region-specific adjustments may be requested by an Authority Having Jurisdiction (AHJ) or utility representative. An IQ Gateway is required to make these changes during installation.

ENPHASE.

DATA SHEET

X-IQ-AM1-240-5-HDK
X-IQ-AM1-240-5C-HDK
X-IQ-AM1-240-5
X-IQ-AM1-240-5C

IQ Combiner 5/5C

The IQ Combiner 5/5C consolidates interconnection equipment into a single enclosure and streamlines IQ Series Microinverters and IQ Gateway installation by providing a consistent, pre-wired solution for residential applications. IQ Combiner 5/5C uses wired control communication and is compatible with IQ System Controller 3/3G and IQ Battery 5P.

The IQ Combiner 5/5C, IQ Series Microinverters, IQ System Controller 3/3G, and IQ Battery 5P provide a complete grid-agnostic Enphase Energy System.

IQ Series Microinverters
The high-powered smart grid-ready IQ Series Microinverters (IQ6, IQ7, and IQ8 Series) simplify the installation process.

IQ System Controller 3/3G
Provides microgrid interconnection device (MID) functionality by automatically detecting grid failures and seamlessly transitioning the home energy system from grid power to backup power.

IQ Battery 5P
Fully integrated AC battery system. Includes six field-replaceable IQ8D-BAT Microinverters.

IQ Load Controller
Helps prioritize essential appliances during a grid outage to optimize energy consumption and prolong battery life.

Enphase 5 year limited warranty

NOM

CERTIFIED SAFETY IEC 62368-1 E351166

5-year limited warranty

*For country-specific warranty information, see the https://enphase.com/installers/resources/warranty page.

Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect (CELLMODEM-M1-06-SP-05), only with IQ Combiner 5C
- Supports flexible networking: Wi-Fi, Ethernet, or cellular
- Provides production metering (revenue grade) and consumption monitoring

Easy to install

- Mounts to one stud with centered brackets
- Supports bottom, back, and side conduit entries
- Supports up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV branch circuits
- Factory installed hold-down kit
- Bluetooth-based Wi-Fi provisioning for easy Wi-Fi setup

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- 5-year limited warranty
- 2-year labor reimbursement program coverage included for IQ Combiner SKUs*
- UL1741 Listed

IQ Combiner 5/5C

MODEL NUMBER	
IQ Combiner 5 (X-IQ-AM1-240-5/ X-IQ-AM1-240-5-HDK)	IQ Combiner 5 with IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSI C12.20 ±0.5%), consumption monitoring (±2.5%), and IQ Battery monitoring (±2.5%). Includes a silver solar shield to deflect heat. IQ-AM1-240-5-HDK includes a factory installed hold-down kit compatible with all the circuit breakers mentioned in the **Accessories and Replacement Parts** section.
IQ Combiner 5C (X-IQ-AM1-240-5C / X-IQ-AM1-240-5C-HDK)	IQ Combiner 5C with IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSI C12.20 ±0.5%), consumption monitoring (±2.5%), and IQ Battery monitoring (±2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05)[1], includes a silver solar shield to deflect heat. IQ-AM1-240-5C-HDK includes a factory installed hold-down kit compatible with all the circuit breakers mentioned in the **Accessories and Replacement Parts** section.
WHAT'S IN THE BOX	
IQ Gateway printed circuit board	IQ Gateway is the platform for total energy management for comprehensive, remote maintenance, and management of the Enphase Energy System
Busbar	80 A busbar with support for one IQ Gateway breaker and four 20 A breakers for installing IQ Series Microinverters and IQ Battery 5P
IQ Gateway breaker	Circuit breaker, 2-pole, 10 A/15 A
Production CT	Pre-wired revenue-grade solid-core CT, accurate up to ±0.5%
Consumption CT	Two consumption metering clamp CTs, shipped with the box, accurate up to ±2.5%
IQ Battery CT	One battery metering clamp CT, shipped with the box, accurate up to ±2.5%
CTRL board	Control board for wired communication with IQ System Controller 3/3G and the IQ Battery 5P
Enphase Mobile Connect (only with IQ Combiner 5C)	4G-based LTE-M1 cellular modem (CELLMODEM-M1-06-SP-05) with a 5-year T-Mobile data plan
Accessories kit	Spare control headers for the COMMS-KIT-2 board
ACCESSORIES AND REPLACEMENT PARTS (NOT INCLUDED, ORDER SEPARATELY)	
CELLMODEM-M1-06-SP-05	4G-based LTE-M1 cellular modem with a 5-year T-Mobile data plan
CELLMODEM-M1-06-AT-05	4G-based LTE-M1 cellular modem with a 5-year AT&T data plan
Circuit breakers (off-the-shelf)	Supports Eaton BR2XX, Siemens Q2XX, and GE/ABB THQL2tXX Series circuit breakers (XX represents 10, 15, 20, 30, 40, 50, or 60). Also supports Eaton BR2206, BR2306, and BR240B circuit breakers compatible with the hold-down kit.
Circuit breakers (provided by Enphase)	BRK-10A-2-240V, BRK-15A-2-240V, BRK-20A-2P-240V, BRK-15A-2P-240V-B, and BRK-20A-2P-240V-B (more details in the "Accessories" section)
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 5/5C
XA-ENV2-PCBA-5	IQ Gateway replacement printed circuit board (PCB) for IQ Combiner 5/5C
X-IQ-NA-HD-125A	Hold-down kit compatible with Eaton BR-B Series circuit breakers (with screws). Not required for X-IQ-AM1-240-5-HDK / X-IQ-AM1-240-5C-HDK.
XA-COMMS2-PCBA-5	Replacement COMMS-KIT-2 printed circuit board (PCB) for IQ Combiner 5/5C
ELECTRICAL SPECIFICATIONS	
Rating	80 A
System voltage and frequency	120/240 VAC or 120/208 VAC, 60 Hz
Busbar rating	125 A
Fault current rating	10 kAIC
Maximum continuous current rating (input from PV/ storage)	64 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR, Siemens Q, or GE/ABB THQL Series distributed generation (DG) breakers only (not included)
Maximum total branch circuit breaker rating (input)	80 A of distributed generation/95 A with IQ Gateway breaker included
IQ Gateway breaker	10 A or 15 A rating GE/Siemens/Eaton included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway

[1] A plug-and-play industrial-grade cell modem for systems of up to 60 microinverters. Available in the United States, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.

IQ8MC Microinverter

INPUT DATA (DC)	UNITS	IQ8MC-72-M-US
Commonly used module pairings [1]	W	290–460
Module compatibility	—	To meet compatibility, PV modules must be within the following max. input DC voltage and max. module I_{sc}. Module compatibility can be checked at https://enphase.com/installers/microinverters/calculator.
MPPT voltage range	V	25–45
Operating range	V	18–58
Min./Max. start voltage	V	22/58
Max. input DC voltage	V	60
Max. continuous operating DC current	A	14
Max. input DC short-circuit current	A	25
Max. module I_{sc}	A	20
Overvoltage class DC port	—	II
DC port backfeed current	mA	0
PV array configuration	—	Ungrounded array; no additional DC side protection required; AC side protection requires max 20 A per branch circuit

OUTPUT DATA (AC)	UNITS	IQ8MC-72-M-US @240 VAC	IQ8MC-72-M-US @208 VAC
Peak output power	VA	330	315
Max. continuous output power	VA	320	310
Nominal grid voltage (L-L)	V	240, split-phase (L-L), 180°	208, single-phase (L-L), 120°
Min./Max. grid voltage [2]	V	211–264	183–229
Max. continuous output current	A	1.33	1.49
Nominal frequency	Hz	60	
Extended frequency range	Hz	47–68	
AC short circuit fault current over three cycles	Arms	2.70	
Max. units per 20 A (L-L) branch circuit [3]	—	12	10
Total harmonic distortion	%	<5	
Overvoltage class AC port	—	III	
AC port backfeed current	mA	18	
Power factor setting	—	1.0	
Grid-tied power factor (adjustable)	—	0.85 leading … 0.85 lagging	
Peak efficiency	%	97.4	97.2
CEC weighted efficiency	%	97.0	96.5
Nighttime power consumption	mW	33	25

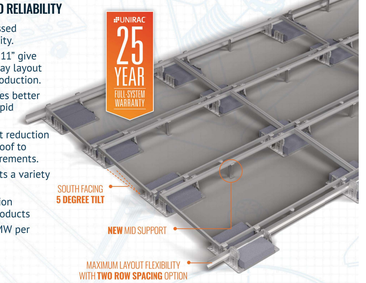
MECHANICAL DATA	UNITS
Ambient temperature range	–40°C to 65°C (–40°F to 149°F)
Relative humidity range	4% to 100% (condensing)
DC connector type	Stäubli MC4
Dimensions (H × W × D); Weight	212 mm (8.3") × 175 mm (6.9") × 30.2 mm (1.2"); 1.1 kg (2.43 lbs)
Cooling	Natural convection – no fans
Approved for wet locations; Pollution degree	Yes; PD3
Enclosure	Class II double-insulated, corrosion-resistant polymeric enclosure
Environ. category; UV exposure rating	NEMA Type 6; outdoor

COMPLIANCE	
Certifications	CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB), FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01. This product is UL Listed as PV rapid shutdown equipment and conforms with NEC 2014, NEC 2017, NEC 2020, and NEC 2023 section 690.12 and C22.1-2018 Rule 64-218 rapid shutdown of PV systems for AC and DC conductors when installed according to the manufacturer's instructions.

(1) No enforced DC/AC ratio.
(2) Nominal voltage range can be extended beyond nominal if required by the utility.
(3) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

ROOFMOUNT® | RM5

UNIRAC
BETTER SOLAR STARTS HERE



MAXIMUM VALUE, FLEXIBILITY AND RELIABILITY

- RM5 system provides unsurpassed adaptability and layout flexibility.
- Row spacing options of 7.5" or 11" give you the ability to maximize array layout and increase project energy production.
- Set, then clamp feature provides better construction sequencing for rapid installation
- Wind deflectors provide ballast reduction overall system weight on the roof to meet a variety of project requirements.
- Optional roof attachment meets a variety of project requirements
- G235 steel - double the corrosion protection of other industry products
- Compact packaging - up to 1 MW per truck

NEW MID-SUPPORT!

- Lower the overall system cost by replacing some mid-support field bays with a smaller mid-support

WHY ROOFMOUNT™ | RM5?

RM5 is a ballasted south-facing five-degree tilt mounting system for flat roofs. Fewer components, single tool installation, snap-in hardware, and integrated bonding ensure high speed installation, while features such as 7.5" or 11" row spacing and optional wind deflector, roof attachments, MLPE mount, and wire management provide a complete solution. UNIRAC's unmatched commercial project support makes construction easy, from permitting through installation, and RM5 is supported by North America's largest distribution network. Plus, enjoy peace of mind with UNIRAC's industry-leading 25-year warranty.

FOR QUESTIONS OR CUSTOMER SERVICE CONTACT:
505.242.6411 | SALES@UNIRAC.COM | WWW.UNIRAC.COM
PUB20240EC10-V1

CONFORMS TO UL3741 CONFORMS TO UL2703 ISO 9001:2015 14001:2015 CERTIFIED

LUMINA SOLAR

CONTRACTOR

LUMINASOLAR

ADRESS: 3600 COMMERCE DR., SUITE 601, HALETHORPE, MD 21227

PHONE: 800-971-6118

LIC. NO.:

REVISION / RELEASE

NO.	DESCRIPTION	DATE

PROJECT

NEW PV SYSTEM: 20.640 kWp

HASSAN SAEED

6515 CROSSROADS VILLAGE BOULEVARD,
HAYMARKET, VA 20169
APN: 7298-81-0546

ENGINEER OF RECORD

PAPER SIZE: 36" x 24" (ARCH D)

SHEET TITLE:

RESOURCE DOCUMENTS

(SHEET 7)

DATE: 03.07.2025

DESIGN BY: H.M.

CHECKED BY: A.L.

SHEET NUMBER:

R-001

Universal Wall Connector

The Tesla Universal Wall Connector is an efficient and convenient charging solution that lets you plug your electric vehicle in overnight and start your day fully charged. It is compatible with Tesla and non-Tesla electric vehicle models. It provides up to 48A of continuous current that offers 77 km or 44 miles of range per hour of charge. It is approved for indoor and outdoor installation. The Universal Wall Connector can support AC charging for vehicles with NACS or J1772 chargeports through the use of a J1772 adapter that docks into the side of the Wall Connector.

Wall Connector

Performance Specifications

Part Numbers	1734412-02-X; 1734412-03-X
Nominal Voltage	200-240 V L-L 1-phase
Current	Maximum 48A (adjustable by installer)
Grounding Scheme	TN/TT
Frequency	50/60 Hz
Means of Disconnect	External branch circuit breaker
Residual Current Detection	Integrated, CCID20
Short Circuit Current Rating	14kA
Connectors	NACS, J1772
Connectivity	Wi-Fi (2.4 GHz, 802.11b/g/n)

Compliance Information

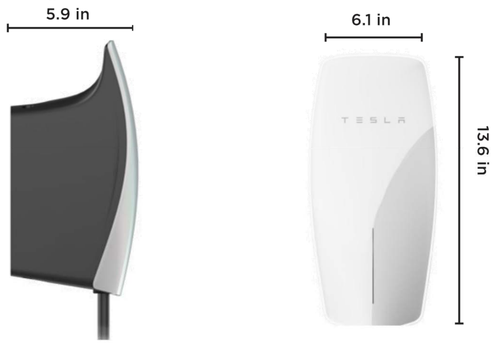
Agency Approvals	cULus - E351001
Standards	UL 2594, UL 2231
Energy Star Certified (Applicable to U.S. only)	ENERGY STAR

Environmental Specifications

Operating Temperature	-22˚F to 122˚F (-30˚C to 50˚C)
Storage Temperature	-40˚F to 185˚F (-40˚C to 85˚C)
Enclosure Rating	Type 3R

Mechanical Specifications

Wall Connector Dimensions	13.6 in x 6.1 in x 5.9 in
Wire Box Bracket Dimensions	9.8 in x 4.7 in x 3.5 in
Weight (Including bracket)	15 lbs (6.8 kg)
Cable Length	1734412-02-X: 24 ft (7.3 m) 1734412-03-X: 13.1 ft. (4 m)



LUMINA SOLAR

CONTRACTOR

LUMINASOLAR

ADRESS: 3600 COMMERCE DR., SUITE 601, HALETHORPE, MD 21227

PHONE: 800-971-6118

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APN: 7298-81-0546

ENGINEER OF RECORD

PAPER SIZE: 36" x 24" (ARCH D)

SHEET TITLE: RESOURCE DOCUMENTS

(SHEET 8)

DATE: 03.07.2025

DESIGN BY: H.M.

CHECKED BY: A.L.

SHEET NUMBER: R-002

AOstructures
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Carnelian Bay, CA 96140
916.541.8586
www.AOstructures.com

February 25, 2026

TO: Lumina Solar

SUBJECT: Roof-top Solar PV Addition - Kiddie Academy (Hassan Saeed)
6515 Crossroads Village Blvd., Haymarket, VA. 20169

SCOPE OF WORK:
AOstructures, Inc. was asked to provide a structural review for the project at the above subject location. The scope of this report is strictly limited to the items listed below and based on the design criteria listed below. See additional limitations in Appendix B.

- Analyze the existing structure(s) to see if it is/they are suitable to support the additional weight of the proposed roof mounted solar PV system.
- The scope of this review is strictly limited to an evaluation of the existing roof structures ability to support the static forces of the proposed roof mounted PV system. All array anchorage for wind and seismic forces shall be provided by the manufacturer (by others). This report is based on manufacturer provided specifications prepared by Unirac and dated November 10, 2025.
- See Supplement A - Evaluate the connection capacity of the proposed racking system to the existing roof structure.

PROVIDED INFORMATION:
As-built plans were not provided for our review. The findings of this report are based upon a jobsite evaluation of the existing condition of the existing framing system collected by Lumina Solar as requested by AOstructures, Inc.. All attached structural calculations are based on the provided information and are only deemed valid if the provided information is true and accurate.

OBSERVED CONDITIONS:
The observed roof framing is described below. If field conditions differ, the contractor shall notify the engineer prior to starting construction.

The roof framing system of (Roof A) consists of a built-up roof atop of plywood sheathing which is supported by pre-fabricated roof trusses spaced at 24" o.c.. The roof trusses are marginally sloped for drainage. See Appendix A for snippits of truss calcs for the governing trusses below the proposed ballast systems.

CONCLUSIONS:
The existing roof framing members of (Roof A) are judged to be adequate to withstand the loading imposed by the installation of the solar panels. No structural retrofits are required.

All hardware shall be installed per manufacturer specifications and within specified design limitations based on the design criteria of this report. AOstructures, Inc. assumes no responsibility for hardware installed outside the design & install specifications of the manfacturer. All waterproofing shall be provided by the contractor.

DESIGN CRITERIA:

- Applicable Codes = 2021 IBC/IRC, ASCE 7-16
- Ballast array (flush mounted) - Anchorage design shall be provided by manufacturer.
- Roof Dead Load = 10 psf (Roof A)
- Roof Live Load = 20 psf (reduced where allowed by ASCE7 - 1607.14.4.1)
- Wind Speed = 115 mph, Exposure C
- Ground Snow Load = 30 psf - Roof Snow Load (at PV) = 25.2 psf

Please contact me with any further questions or concerns regarding this project.

Sincerely,

02/25/2026

Andrew Oesterreicher, P.E.
Project Engineer

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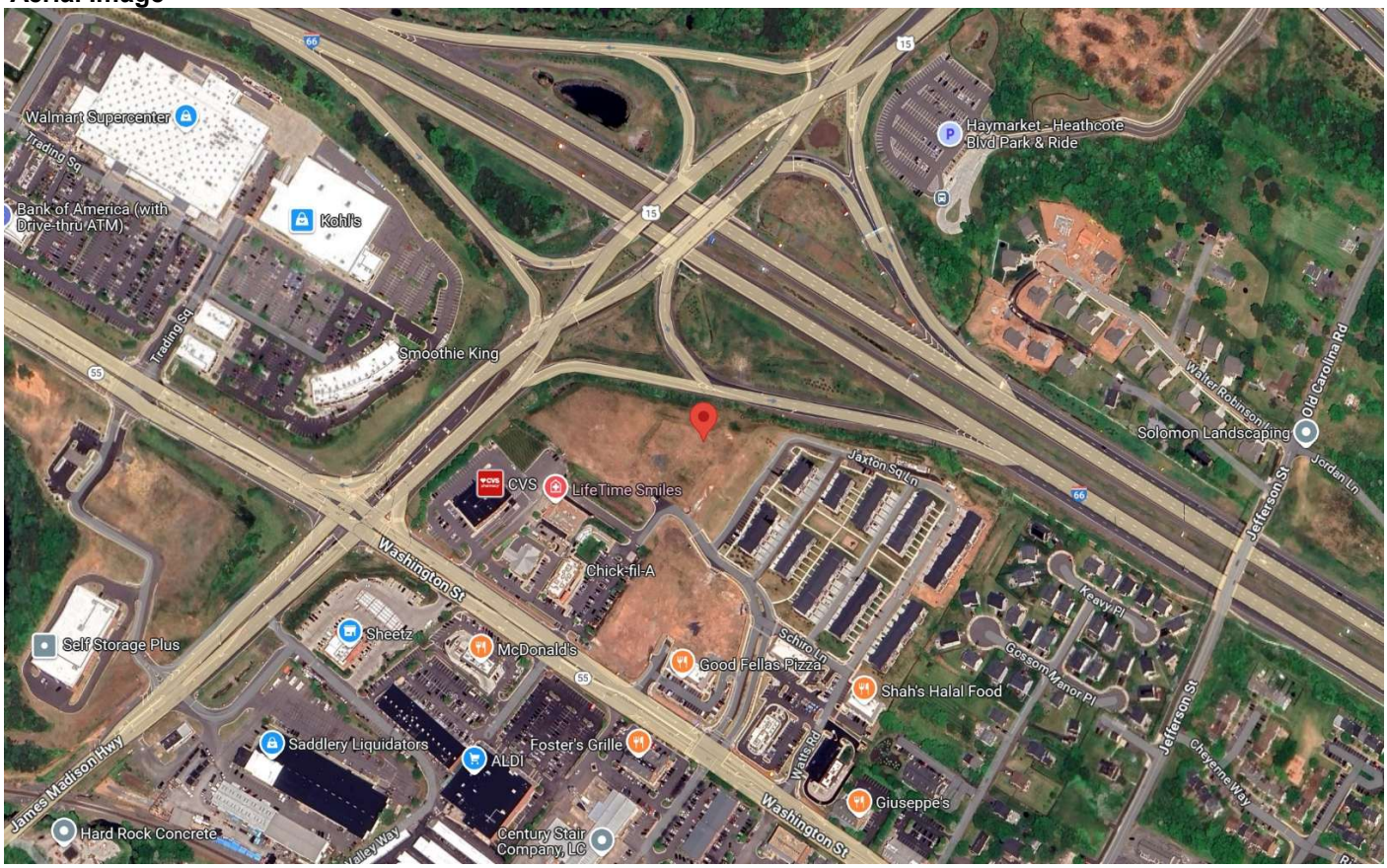
Carnelian Bay, CA 96140
916.541.8586
www.AOstructures.com

Address: 6515 Crossroads Village Blvd., Haymarket, VA. 20169

Wind Design

Exposure: C
Wind Speed: 115 mph
Risk Category: II

Aerial Image



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SNOW LOADS

Roof Snow Load Calculations (ASCE 7-16)			
Unobstructed, Slippery Roof Surface?	no		
Roof Slope	0	degrees	
p_g = Ground Snow Load =	30.0	psf	
$p_f = 0.7\ C_e\ C_t\ I\ p_g$			(ASCE7 - Eq 7-1)
C_e = Exposure Factor =	1.0		(ASCE7 - Table 7-2)
C_t = Thermal Factor =	1.2		(ASCE7 - Table 7-3)
I = Importance Factor =	1.0		(ASCE7 - 7.3.3)
p_f = Flat Roof Snow Load =	25.2	psf	
$p_s = C_s p_f$			(ASCE7 - Eq 7-2)
Cs = Slope Factor =	1.00		(ASCE7 - Fig. 7-2)
p_s = Sloped Roof Snow Load =	**25.2**	**psf**	

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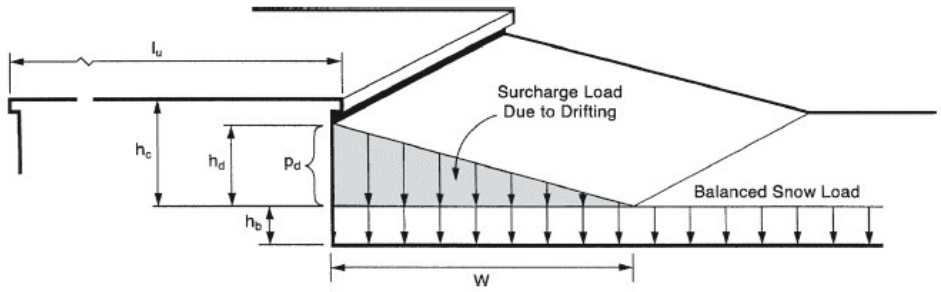
Drifting Snow Loads

Snow Drift Calculations



p_g = Ground Snow Load =	30	psf	
p_s = Sloped Roof Snow Load =	25.2	psf	
ɣ = density of snow =	17.9	pcf	(ASCE 7 - Eq. 7.7-1)
h_b = height of sloped roof snow load =	1.41	feet	
h_c = height of parapet or obstruction =	10	feet	
hc/h_b =	7.10	hc/hb > 0.2, Drift Required	
l_u = upwind building projection =	86	feet	
h_d = height of Drifted Snow =	3.27	feet	(ASCE 7 - Fig 7.6-1)
0.75 h_d for parapet use =	2.45	feet	(ASCE 7 - 7.8)
Drift Intensity =	43.94	psf	(ASCE 7 - Fig 7.6-1)
Drift Width =	13.1	feet	

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ROOF DEAD AND LIVE LOADS

Roof Live Load =	**20**	**psf**

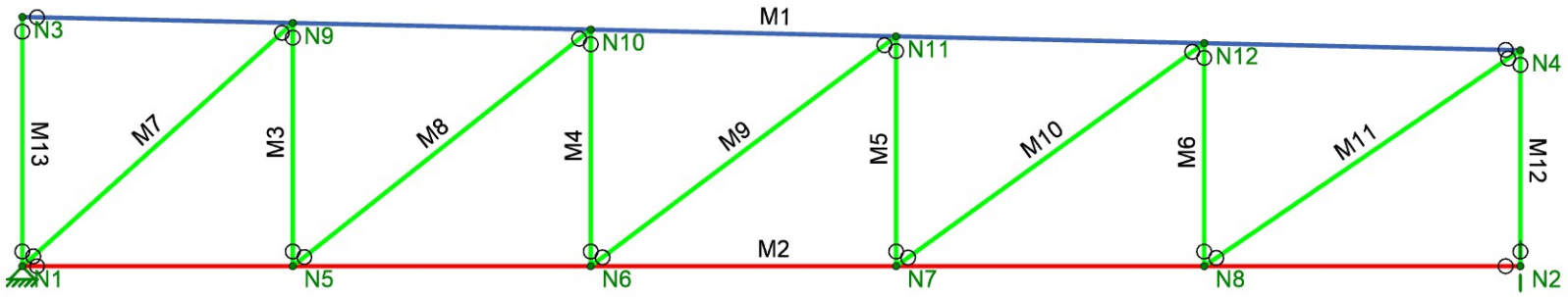
Note: Per Section 1607.14.4.1 of 2021 IBC - roof live load is removed in area's covered by PV array when the PV array is less than 24" above the roof surface.

Roof Dead Load (Roof A)		
Built Up Roof	4.00	psf
Roof Plywood	2.00	
Truss top chord @ 24" o.c.	2.00	
MEP/Miscellaneous	2.00	
Total Roof DL (Roof A)	**10.0**	**psf**
DL Adjusted to 0 Degree Slope	10.0	psf

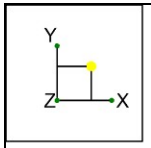
Truss RT-1

2D Lock ON

Top Chords
Webs
Bottom Chord



RISA A NEMETSCHEK COMPANY	AOstructures, Inc.		SK-1
	AO		Nov 07, 2025 at 10:06 AM
			Truss - RT1.r3d



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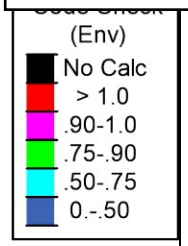

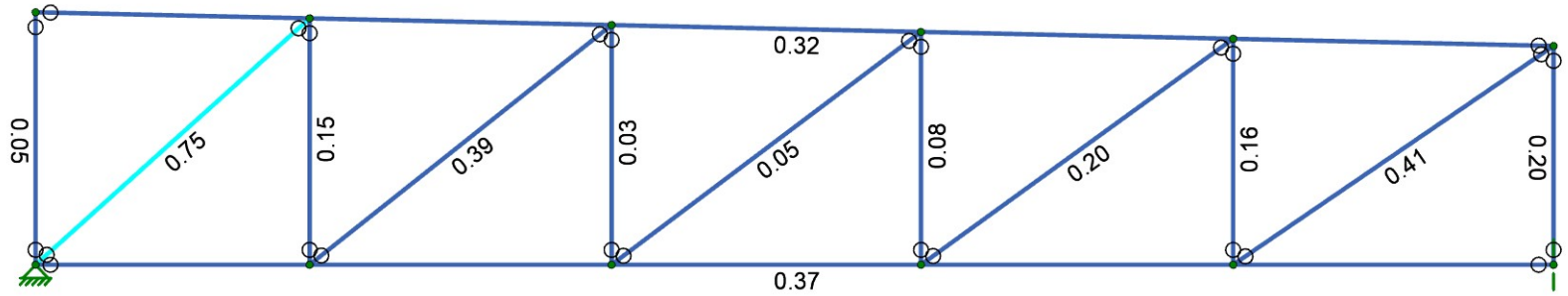

Member Code Checks Displayed (Enveloped)
Envelope Only Solution

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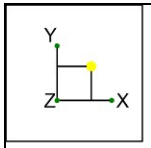
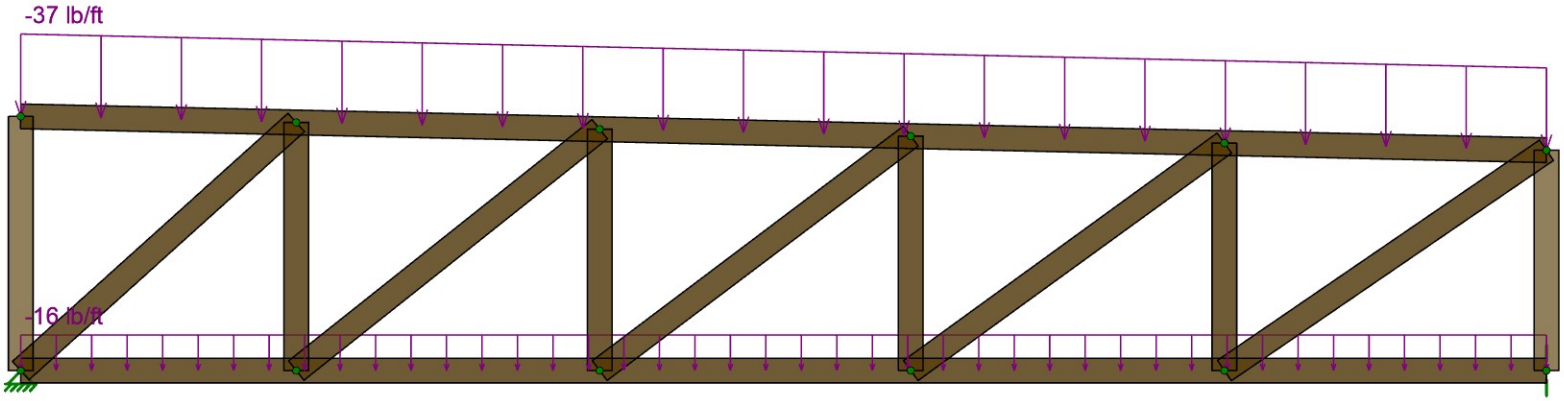
			Truss - RT1.r3d

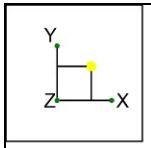


2D Lock ON

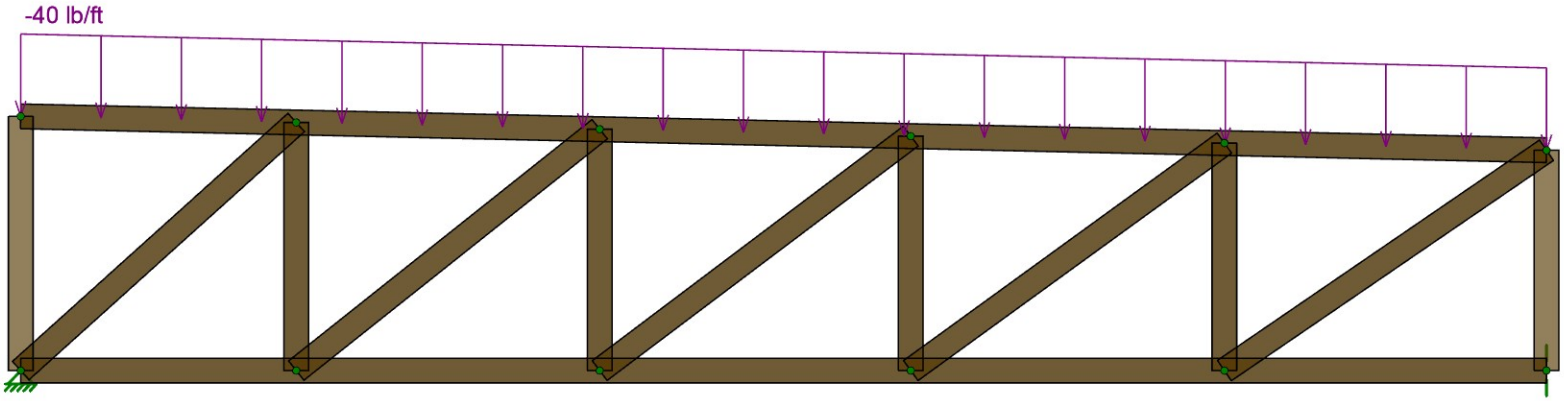


Loads: BLC 1, DL
Envelope Only Solution

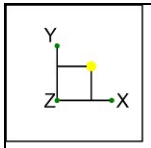
RISA A NEMETSCHEK COMPANY	AOstructures, Inc.		SK-3
	AO		Nov 07, 2025 at 10:07 AM
			Truss - RT1.r3d



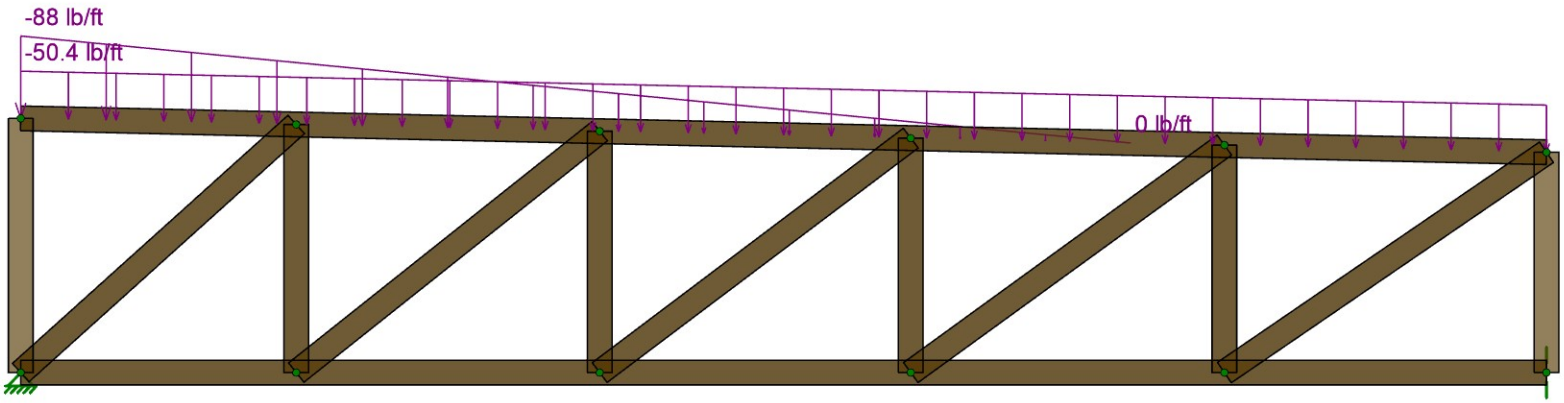
2D Lock ON



Loads: BLC 3, RLL
Envelope Only Solution



2D Lock ON



Loads: BLC 5, SL
Envelope Only Solution

RISA A NEMETSCHEK COMPANY	AOstructures, Inc.		SK-5
	AO		Nov 07, 2025 at 10:07 AM
			Truss - RT1.r3d

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	18	0	0	
3	N3	0	3	0	
4	N4	18	2.6	0	
5	N5	3.25	0	0	
6	N6	6.83	0	0	
7	N7	10.5	0	0	
8	N8	14.2	0	0	
9	N9	3.25	2.927778	0	
10	N10	6.83	2.848222	0	
11	N11	10.5	2.766667	0	
12	N12	14.2	2.684444	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	ALL			Fixed
2	N1	Reaction	Reaction	Reaction
3	N2		Reaction	

Wood Properties

	Label	Type	Database	Species	Grade	Cm	Ci	Emod	Nu	Therm. Coeff. [1e^{5}°F^{-1}]	Density [k/ft^{3}]
1	DF	Solid Sawn	Visually Graded	Douglas Fir-Larch	No.2			1	0.3	0.3	0.035
2	SP #2	Solid Sawn	Visually Graded	Southern Pine	No.2			1	0.3	0.3	0.035
3	HF	Solid Sawn	Visually Graded	Hem-Fir	No.2			1	0.3	0.3	0.035
4	SPF	Solid Sawn	Visually Graded	Spruce-Pine-fir	No.2			1	0.3	0.3	0.035
5	SPSS	Solid Sawn	Visually Graded	Southern Pine	Select Structural			1	0.3	0.3	0.035
6	SP #1	Solid Sawn	Visually Graded	Southern Pine	No.1			1	0.3	0.3	0.035

Wood Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in^{2}]	Iyy [in^{4}]	Izz [in^{4}]	J [in^{4}]
1	Top Chords	2X4	None	None	SP #1	Typical	5.25	0.984	5.359	2.877
2	Webs	2X4	None	None	SP #2	Typical	5.25	0.984	5.359	2.877
3	Bottom Chord	2X4	None	None	SP #1	Typical	5.25	0.984	5.359	2.877

Wood Design Parameters

	Label	Shape	Length [ft]	le2 [ft]	le1 [ft]	le-bend top [ft]	le-bend bot [ft]	K y-y	K z-z	Cr	y sway	z sway
1	M1	Top Chords	18.004	1	1	1	Segment			Yes		
2	M2	Bottom Chord	18	1	1	Segment	1			Yes		
3	M3	Webs	2.928			Lbyy		0.85	0.85			
4	M4	Webs	2.848			Lbyy		0.85	0.85			
5	M5	Webs	2.767			Lbyy		0.85	0.85			
6	M6	Webs	2.684			Lbyy		0.85	0.85			
7	M7	Webs	4.374			Lbyy		0.85	0.85			
8	M8	Webs	4.575			Lbyy		0.85	0.85			
9	M9	Webs	4.596			Lbyy		0.85	0.85			
10	M10	Webs	4.571			Lbyy		0.85	0.85			
11	M11	Webs	4.604			Lbyy		0.85	0.85			
12	M12	Webs	2.6			Lbyy		0.85	0.85			
13	M13	Webs	3			Lbyy		0.85	0.85			

Load Combination Design

	Description	CD	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	DL	0.9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	DL + RLL	1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	DL + SL	1.15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor
1	DL	Yes	Y	DL	1		
2	DL + RLL	Yes	Y	DL	1	RLL	1
3	DL + SL	Yes	Y	DL	1	SL	1

Basic Load Cases

	BLC Description	Category	Y Gravity	Distributed
1	DL	DL	-1	3
3	RLL	RLL		1
5	SL	SL		2

Member Distributed Loads (BLC 1 : DL)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-20	-20	0	%100
2	M2	Y	-16	-16	0	%100
3	M1	Y	-17	-17	0	%100

Member Distributed Loads (BLC 3 : RLL)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-40	-40	0	%100

Member Distributed Loads (BLC 5 : SL)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-50.4	-50.4	0	%100
2	M1	Y	-88	0	0	13.1

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]
1	N1	max	0	1	1416.364	3	0	3	0	3	0	3	LOCKED
2		min	0	3	526.158	1	0	1	0	1	0	1	LOCKED
3	N2	max	0	3	1118.035	3	0	3	0	3	0	3	LOCKED
4		min	0	1	524.417	1	0	1	0	1	0	1	LOCKED
5	N4	max	NC		NC		NC		NC		NC		LOCKED
6		min	NC		NC		NC		NC		NC		LOCKED
7	N3	max	NC		NC		NC		NC		NC		LOCKED
8		min	NC		NC		NC		NC		NC		LOCKED
9	Totals:	max	0	1	2534.399	3	0	3					
10		min	0	3	1050.575	1	0	1					

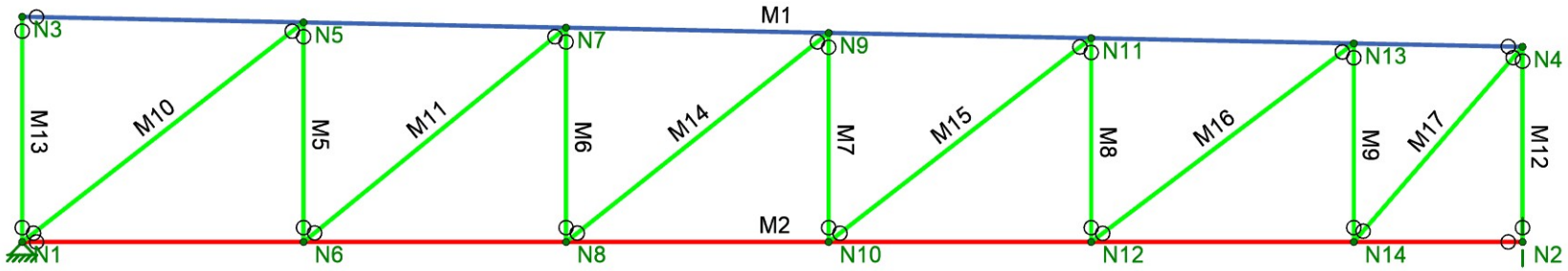
Envelope AWC NDS-18 / SDPWS-21 ASD Member Wood Code Checks

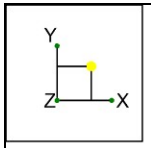
	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Fc' [ksi]	Ft' [ksi]	Fb1' [ksi]	Fb2' [ksi]	Fv' [ksi]	RB	CL	CP	Eqn
1	M1	2X4	0.317	3.188	3	0.438	3.188	y	3	1.786	1.15	1.964	1.984	0.201	7.79	0.99	0.941	3.9-3
2	M2	2X4	0.373	8.625	3	0.067	14.25	y	1	1.786	1.15	1.961	1.984	0.158	8.277	0.988	0.941	3.9-1
3	M3	2X4	0.145	2.928	3	0	2.928	z	3	0.87	0.776	1.257	1.265	0.201	7.393	0.994	0.522	3.9-1
4	M4	2X4	0.033	2.848	1	0	2.848	z	3	0.83	0.608	0.985	0.99	0.201	7.292	0.995	0.636	3.9-1
5	M5	2X4	0.078	0	3	0	2.767	z	3	0.943	0.776	1.258	1.265	0.201	7.186	0.994	0.565	3.6.3
6	M6	2X4	0.164	0	3	0	2.684	z	3	0.981	0.776	1.258	1.265	0.201	7.079	0.994	0.588	3.6.3
7	M7	2X4	0.748	0	3	0.004	4.374	y	1	0.443	0.776	1.252	1.265	0.158	9.036	0.99	0.266	3.6.3
8	M8	2X4	0.394	0	3	0.004	4.575	y	1	0.408	0.776	1.252	1.265	0.158	9.241	0.99	0.245	3.6.3
9	M9	2X4	0.049	0	2	0.004	4.596	y	1	0.407	0.844	1.359	1.375	0.158	9.262	0.988	0.224	3.6.3
10	M10	2X4	0.195	2.333	3	0.004	4.571	y	1	0.409	0.776	1.252	1.265	0.158	9.237	0.99	0.245	3.9-1
11	M11	2X4	0.406	2.35	3	0.004	4.604	y	1	0.403	0.776	1.252	1.265	0.158	9.271	0.989	0.242	3.9-1
12	M12	2X4	0.203	2.6	3	0	2.6	z	3	1.022	0.776	1.258	1.265	0.201	6.967	0.995	0.613	3.6.3
13	M13	2X4	0.051	3	3	0	3	z	3	0.84	0.776	1.257	1.265	0.201	7.483	0.994	0.504	3.6.3

Truss RT-4

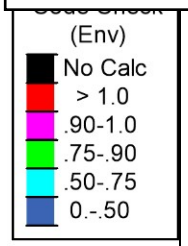
2D Lock ON

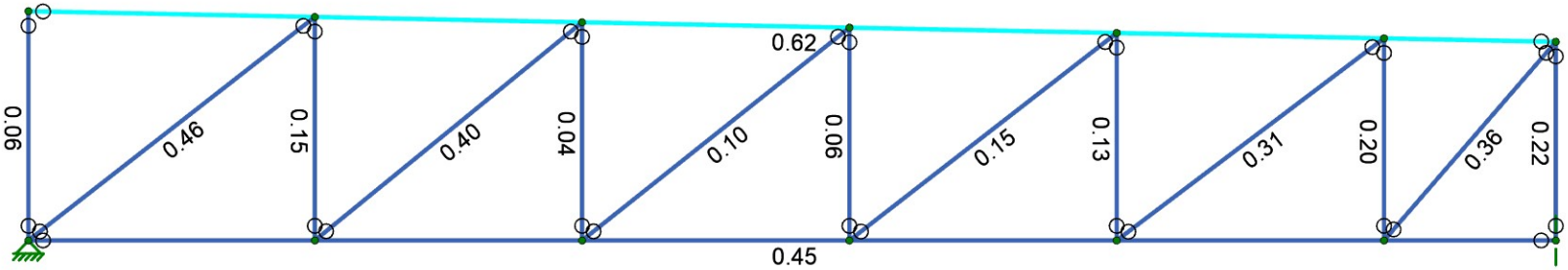
Top Chords
Webs
Bottom Chord





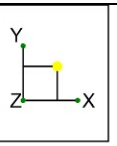
2D Lock ON



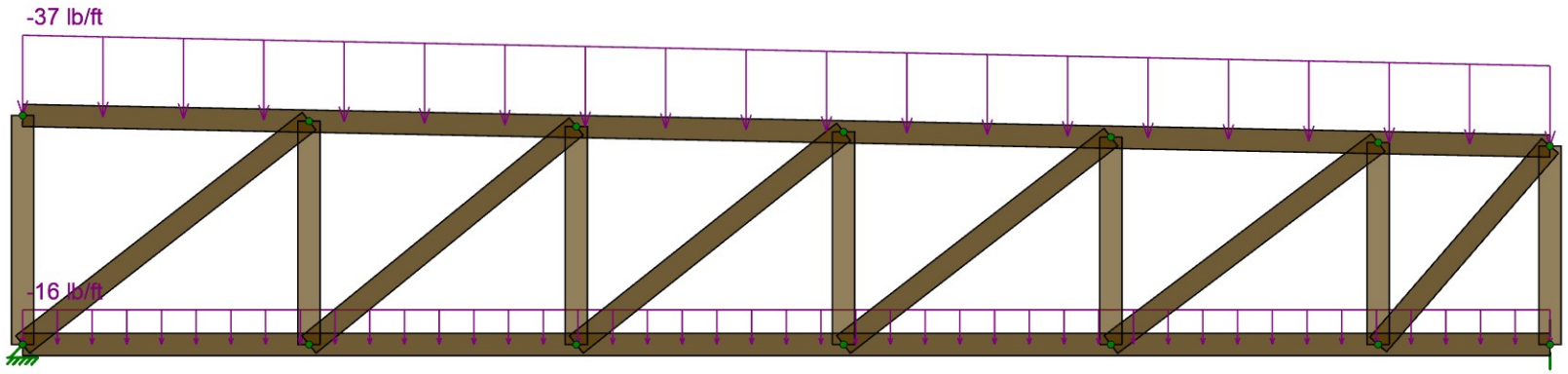


Member Code Checks Displayed (Enveloped)
Envelope Only Solution

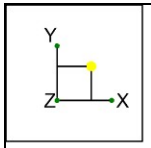
RISA A NEMETSCHEK COMPANY	AOstructures, Inc.		SK-2
	AO		Nov 07, 2025 at 10:09 AM
			Truss - RT4.r3d



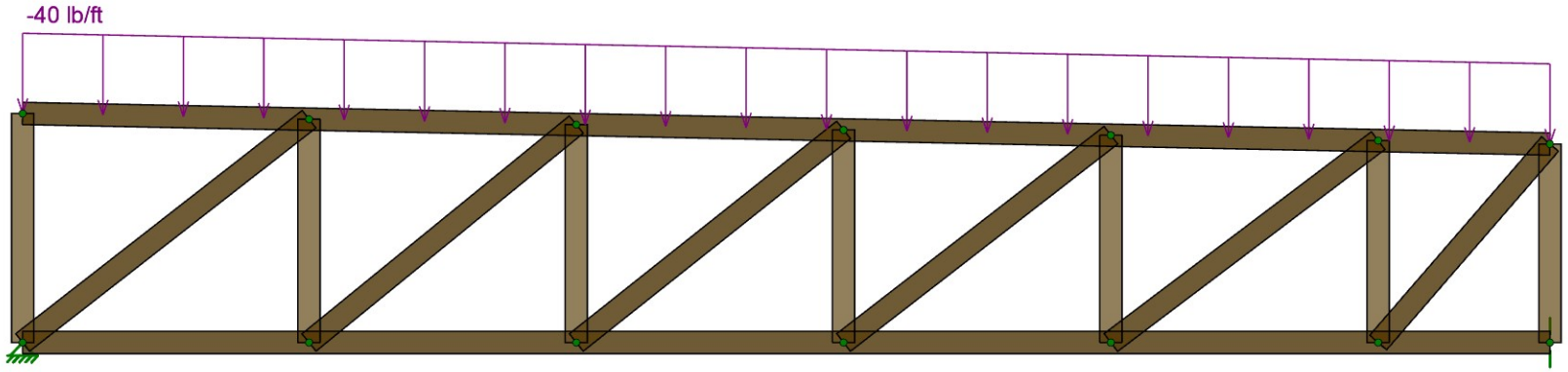
2D Lock ON



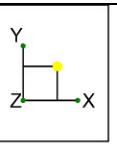
Loads: BLC 1, DL
Envelope Only Solution



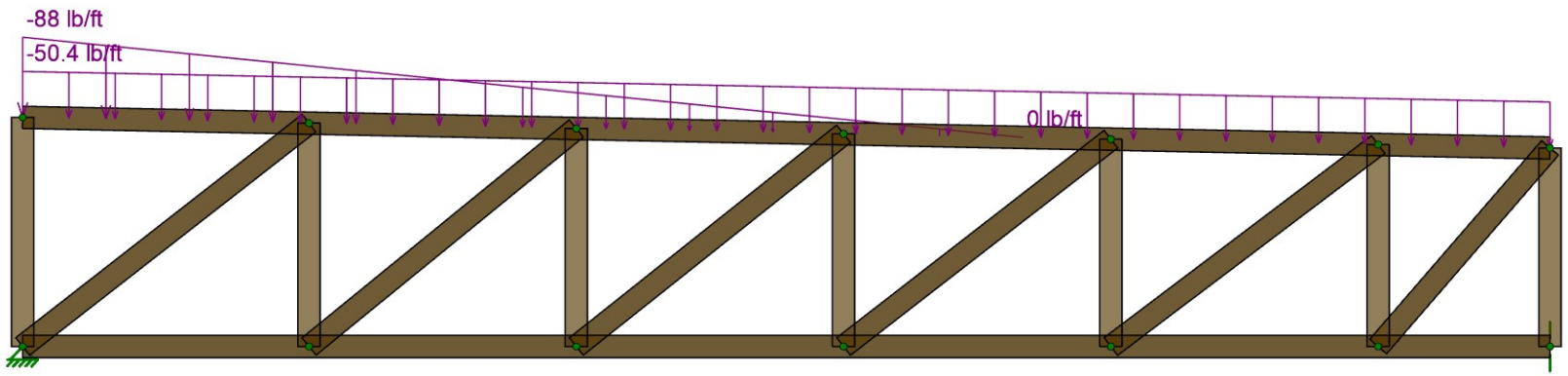
2D Lock ON



Loads: BLC 3, RLL
Envelope Only Solution



2D Lock ON



Loads: BLC 5, SL
Envelope Only Solution

RISA A NEMETSCHEK COMPANY	AOstructures, Inc.		SK-5
	AO		Nov 07, 2025 at 10:09 AM
			Truss - RT4.r3d

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	20	0	0	
3	N3	0	3	0	
4	N4	20	2.6	0	
5	N5	3.75	2.925	0	
6	N6	3.75	0	0	
7	N7	7.25	2.855	0	
8	N8	7.25	0	0	
9	N9	10.75	2.785	0	
10	N10	10.75	0	0	
11	N11	14.25	2.715	0	
12	N12	14.25	0	0	
13	N13	17.75	2.645	0	
14	N14	17.75	0	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	ALL			Fixed
2	N1	Reaction	Reaction	Reaction
3	N2		Reaction	

Wood Properties

	Label	Type	Database	Species	Grade	Cm	Ci	Emod	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]
1	DF	Solid Sawn	Visually Graded	Douglas Fir-Larch	No.2			1	0.3	0.3	0.035
2	SP #2	Solid Sawn	Visually Graded	Southern Pine	No.2			1	0.3	0.3	0.035
3	HF	Solid Sawn	Visually Graded	Hem-Fir	No.2			1	0.3	0.3	0.035
4	SPF	Solid Sawn	Visually Graded	Spruce-Pine-fir	No.2			1	0.3	0.3	0.035
5	SPSS	Solid Sawn	Visually Graded	Southern Pine	Select Structural			1	0.3	0.3	0.035
6	SP #1	Solid Sawn	Visually Graded	Southern Pine	No.1			1	0.3	0.3	0.035

Wood Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Top Chords	2X4	None	None	SP #2	Typical	5.25	0.984	5.359	2.877
2	Webs	2X4	None	None	SP #2	Typical	5.25	0.984	5.359	2.877
3	Bottom Chord	2X4	None	None	SP #1	Typical	5.25	0.984	5.359	2.877

Wood Design Parameters

	Label	Shape	Length [ft]	le2 [ft]	le1 [ft]	le-bend top [ft]	le-bend bot [ft]	K y-y	K z-z	Cr	y sway	z sway
1	M1	Top Chords	20.004	1	1	1	Segment			Yes		
2	M2	Bottom Chord	20	1	1	Segment	1			Yes		
3	M12	Webs	2.6			Lbyy		0.85	0.85			
4	M13	Webs	3			Lbyy		0.85	0.85			
5	M5	Webs	2.925			Lbyy		0.85	0.85			
6	M6	Webs	2.855			Lbyy		0.85	0.85			
7	M7	Webs	2.785			Lbyy		0.85	0.85			
8	M8	Webs	2.715			Lbyy		0.85	0.85			
9	M9	Webs	2.645			Lbyy		0.85	0.85			
10	M10	Webs	4.756	3	3	3		0.85	0.85			
11	M11	Webs	4.517			Lbyy		0.85	0.85			

Wood Design Parameters (Continued)

	Label	Shape	Length [ft]	le2 [ft]	le1 [ft]	le-bend top [ft]	le-bend bot [ft]	K y-y	K z-z	Cr	y sway	z sway
12	M14	Webs	4.473			Lbyy		0.85	0.85			
13	M15	Webs	4.43			Lbyy		0.85	0.85			
14	M16	Webs	4.387			Lbyy		0.85	0.85			
15	M17	Webs	3.438			Lbyy		0.85	0.85			

Load Combination Design

	Description	CD	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	DL	0.9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	DL + RLL	1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	DL + SL	1.15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor
1	DL	Yes	Y	DL	1		
2	DL + RLL	Yes	Y	DL	1	RLL	1
3	DL + SL	Yes	Y	DL	1	SL	1

Basic Load Cases

	BLC Description	Category	Y Gravity	Distributed
1	DL	DL	-1	3
3	RLL	RLL		1
5	SL	SL		2

Member Distributed Loads (BLC 1 : DL)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-20	-20	0	%100
2	M2	Y	-16	-16	0	%100
3	M1	Y	-17	-17	0	%100

Member Distributed Loads (BLC 3 : RLL)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-40	-40	0	%100

Member Distributed Loads (BLC 5 : SL)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-50.4	-50.4	0	%100
2	M1	Y	-88	0	0	13.1

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]
1	N1	max	0	1	1538.642	3	0	3	0	3	0	3	LOCKED
2		min	0	3	584.095	1	0	1	0	1	0	1	LOCKED
3	N2	max	0	3	1215.25	3	0	3	0	3	0	3	LOCKED
4		min	0	1	585.195	1	0	1	0	1	0	1	LOCKED
5	N4	max	NC		NC		NC		NC		NC		LOCKED
6		min	NC		NC		NC		NC		NC		LOCKED

Envelope Node Reactions (Continued)

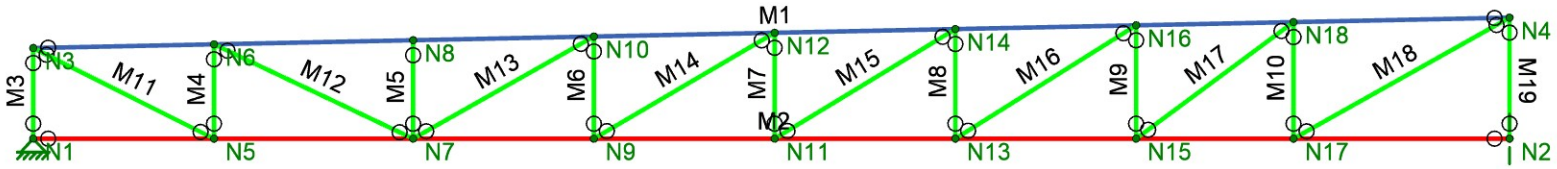
	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]
7	N3	max	NC		NC		NC		NC		NC		LOCKED
8		min	NC		NC		NC		NC		NC		LOCKED
9	Totals:	max	0	1	2753.892	3	0	3					
10		min	0	3	1169.29	1	0	1					

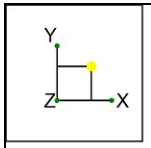
Envelope AWC NDS-18 / SDPWS-21 ASD Member Wood Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Fc' [ksi]	Ft' [ksi]	Fb1' [ksi]	Fb2' [ksi]	Fv' [ksi]	RB	CL	CP	Eqn
1	M1	2X4	0.621	3.751	3	0.506	3.751	y	3	1.569	0.776	1.441	1.455	0.201	8.367	0.99	0.941	3.9-3
2	M2	2X4	0.447	8.958	3	0.068	3.75	y	1	1.786	1.15	1.962	1.984	0.158	8.083	0.989	0.941	3.9-1
3	M12	2X4	0.224	2.6	3	0	2.6	z	3	1.022	0.776	1.258	1.265	0.201	6.967	0.995	0.613	3.6.3
4	M13	2X4	0.06	3	3	0	3	z	3	0.84	0.776	1.257	1.265	0.201	7.483	0.994	0.504	3.6.3
5	M5	2X4	0.154	0	3	0	2.925	z	3	0.872	0.776	1.257	1.265	0.201	7.389	0.994	0.523	3.9-1
6	M6	2X4	0.045	0	1	0	2.855	z	3	0.828	0.608	0.985	0.99	0.201	7.3	0.995	0.634	3.9-1
7	M7	2X4	0.059	2.785	3	0	2.785	z	3	0.934	0.776	1.258	1.265	0.201	7.21	0.994	0.56	3.6.3
8	M8	2X4	0.134	2.715	3	0	2.715	z	3	0.967	0.776	1.258	1.265	0.201	7.119	0.994	0.58	3.6.3
9	M9	2X4	0.2	2.645	3	0	2.645	z	3	1	0.776	1.258	1.265	0.201	7.027	0.994	0.6	3.6.3
10	M10	2X4	0.458	0	3	0.004	4.756	y	1	0.84	0.776	1.251	1.265	0.158	9.422	0.989	0.504	3.6.3
11	M11	2X4	0.403	0	3	0.004	4.517	y	1	0.418	0.776	1.252	1.265	0.158	9.182	0.99	0.251	3.6.3
12	M14	2X4	0.096	0	2	0.004	4.473	y	1	0.428	0.844	1.36	1.375	0.158	9.137	0.989	0.236	3.6.3
13	M15	2X4	0.147	2.261	3	0.004	4.43	y	1	0.433	0.776	1.252	1.265	0.158	9.093	0.99	0.26	3.9-1
14	M16	2X4	0.309	2.239	3	0.004	4.387	y	1	0.441	0.776	1.252	1.265	0.158	9.049	0.99	0.264	3.9-1
15	M17	2X4	0.363	1.827	3	0.003	3.438	y	1	0.677	0.776	1.256	1.265	0.158	8.011	0.992	0.406	3.9-1

Truss RT-7

2D Lock ON





2D Lock ON

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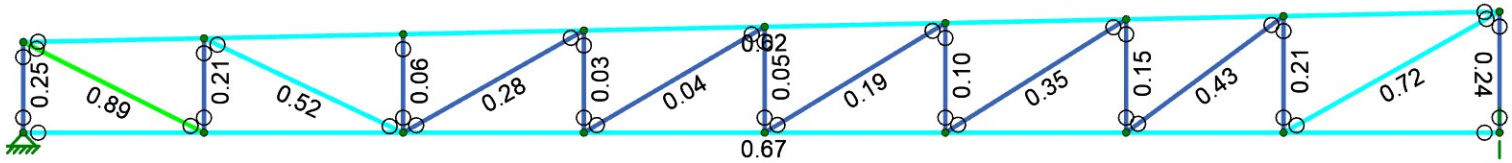
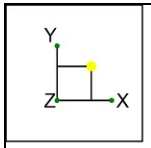


Member Code Checks Displayed (Enveloped)
Envelope Only Solution

RISA A NEMETSCHEK COMPANY	AOstructures, Inc.		SK-2
	AO		Nov 07, 2025 at 10:12 AM
			Truss - RT7.r3d



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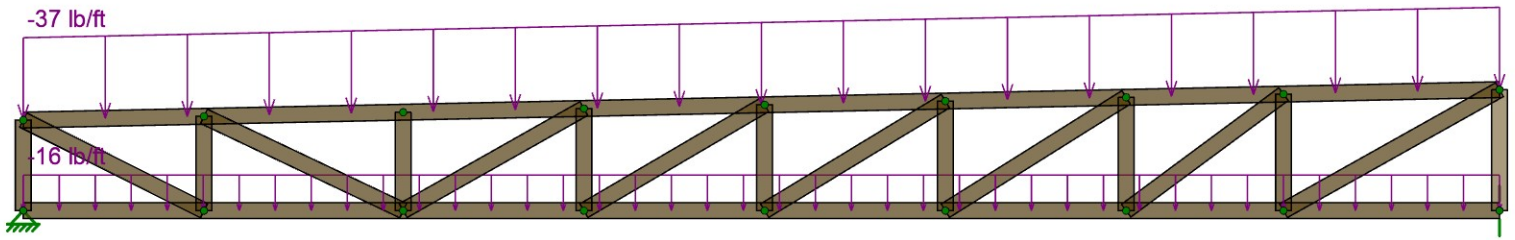
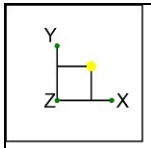
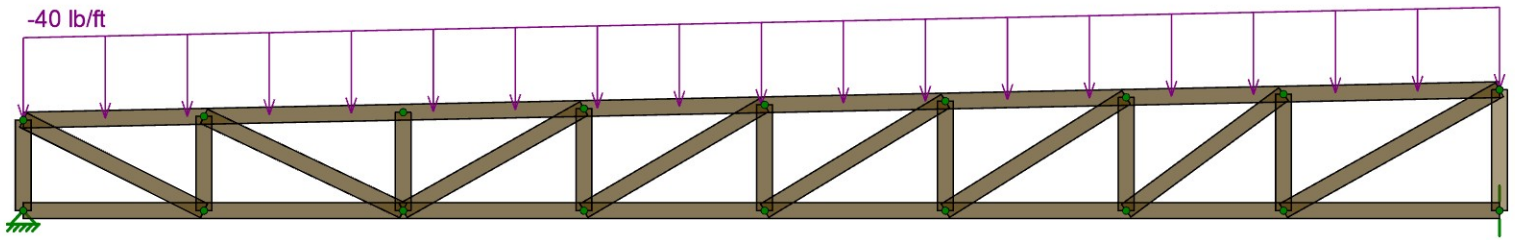


Loads: BLC 1, DL
Envelope Only Solution

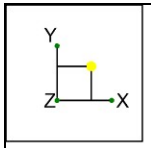
RISA A NEMETSCHEK COMPANY	AOstructures, Inc.		SK-3
	AO		Nov 07, 2025 at 10:13 AM
			Truss - RT7.r3d



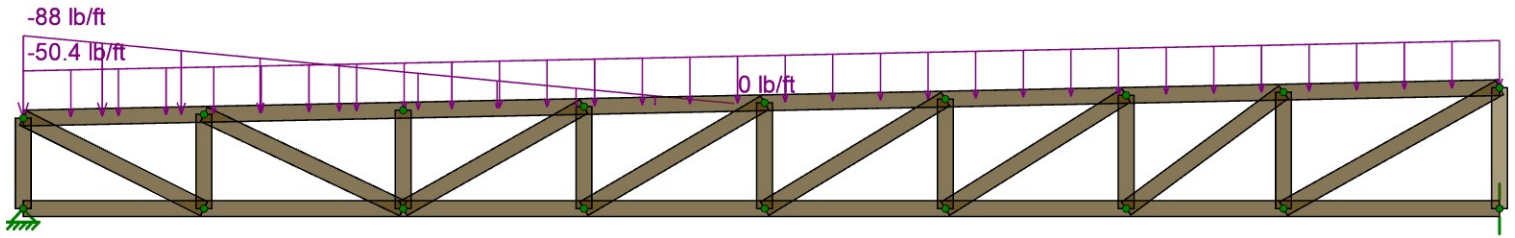
2D Lock ON



Loads: BLC 3, RLL
Envelope Only Solution



2D Lock ON



Loads: BLC 5, SL
Envelope Only Solution

RISA A NEMETSCHEK COMPANY	AOstructures, Inc.		SK-5
	AO		Nov 07, 2025 at 10:13 AM
			Truss - RT7.r3d

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	27.2	0	0	
3	N3	0	1.67	0	
4	N4	27.2	2.23	0	
5	N5	3.33	0	0	
6	N6	3.33	1.738559	0	
7	N7	7	0	0	
8	N8	7	1.814118	0	
9	N9	10.33	0	0	
10	N10	10.33	1.882676	0	
11	N11	13.66	0	0	
12	N12	13.66	1.951235	0	
13	N13	16.99	0	0	
14	N14	16.99	2.019794	0	
15	N15	20.32	0	0	
16	N16	20.32	2.088353	0	
17	N17	23.22	0	0	
18	N18	23.22	2.148059	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	ALL			Fixed
2	N1	Reaction	Reaction	Reaction
3	N2		Reaction	

Wood Properties

	Label	Type	Database	Species	Grade	Cm	Ci	Emod	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]
1	DF	Solid Sawn	Visually Graded	Douglas Fir-Larch	No.2			1	0.3	0.3	0.035
2	SP #2	Solid Sawn	Visually Graded	Southern Pine	No.2			1	0.3	0.3	0.035
3	HF	Solid Sawn	Visually Graded	Hem-Fir	No.2			1	0.3	0.3	0.035
4	SPF	Solid Sawn	Visually Graded	Spruce-Pine-fir	No.2			1	0.3	0.3	0.035
5	SPSS	Solid Sawn	Visually Graded	Southern Pine	Select Structural			1	0.3	0.3	0.035
6	SP #1	Solid Sawn	Visually Graded	Southern Pine	No.1			1	0.3	0.3	0.035

Wood Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Top Chords	2X4	None	None	SP #1	Typical	5.25	0.984	5.359	2.877
2	Webs	2X4	None	None	SP #2	Typical	5.25	0.984	5.359	2.877
3	Bottom Chord	2X4	None	None	SPSS	Typical	5.25	0.984	5.359	2.877

Wood Design Parameters

	Label	Shape	Length [ft]	le2 [ft]	le1 [ft]	le-bend top [ft]	le-bend bot [ft]	K y-y	K z-z	Cr	y sway	z sway
1	M1	Top Chords	27.206	1	1	1	Segment			Yes		
2	M2	Bottom Chord	27.2	1	1	Segment	1			Yes		
3	M3	Webs	1.67			Lbyy		0.85	0.85			
4	M4	Webs	1.739			Lbyy		0.85	0.85			
5	M5	Webs	1.814			Lbyy		0.85	0.85			
6	M6	Webs	1.883			Lbyy		0.85	0.85			
7	M7	Webs	1.951			Lbyy		0.85	0.85			

Wood Design Parameters (Continued)

	Label	Shape	Length [ft]	le2 [ft]	le1 [ft]	le-bend top [ft]	le-bend bot [ft]	K y-y	K z-z	Cr	y sway	z sway
8	M8	Webs	2.02			Lbyy		0.85	0.85			
9	M9	Webs	2.088			Lbyy		0.85	0.85			
10	M10	Webs	2.148			Lbyy		0.85	0.85			
11	M11	Webs	3.725			Lbyy		0.85	0.85			
12	M12	Webs	4.061			Lbyy		0.85	0.85			
13	M13	Webs	3.825			Lbyy		0.85	0.85			
14	M14	Webs	3.86			Lbyy		0.85	0.85			
15	M15	Webs	3.895			Lbyy		0.85	0.85			
16	M16	Webs	3.931			Lbyy		0.85	0.85			
17	M17	Webs	3.609			Lbyy		0.85	0.85			
18	M18	Webs	4.562			Lbyy		0.85	0.85			
19	M19	Webs	2.23			Lbyy		0.85	0.85			

Load Combination Design

	Description	CD	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	DL	0.9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	DL + RLL	1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	DL + SL	1.15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor
1	DL	Yes	Y	DL	1		
2	DL + RLL	Yes	Y	DL	1	RLL	1
3	DL + SL	Yes	Y	DL	1	SL	1

Basic Load Cases

	BLC Description	Category	Y Gravity	Distributed
1	DL	DL	-1	3
3	RLL	RLL		1
5	SL	SL		2

Member Distributed Loads (BLC 1 : DL)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-20	-20	0	%100
2	M2	Y	-16	-16	0	%100
3	M1	Y	-17	-17	0	%100

Member Distributed Loads (BLC 3 : RLL)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-40	-40	0	%100

Member Distributed Loads (BLC 5 : SL)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-50.4	-50.4	0	%100
2	M1	Y	-88	0	0	13.1

Envelope Node Reactions

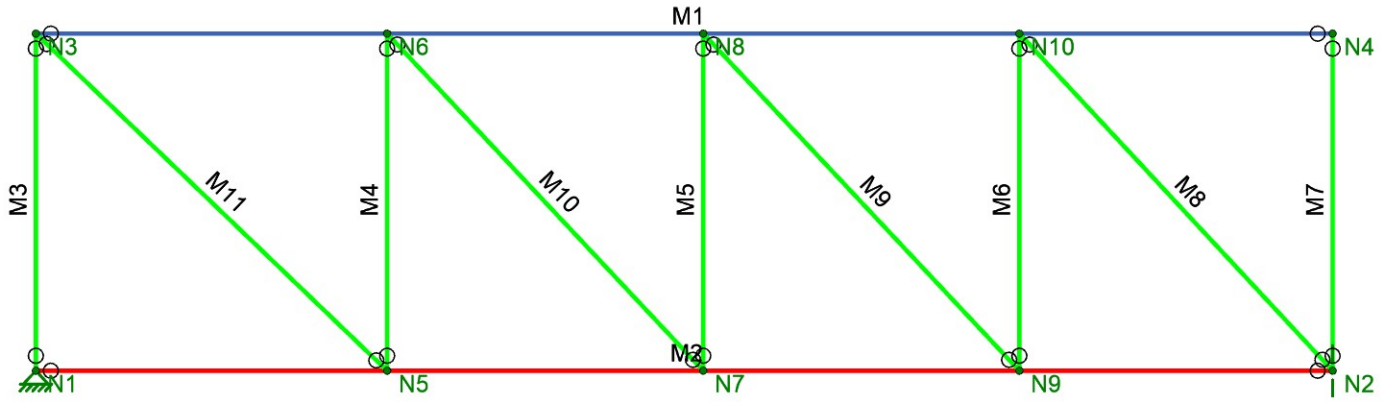
	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]
1	N1	max	0	2	1955.342	3	0	3	0	3	0	3	LOCKED
2		min	0	1	786.026	1	0	1	0	1	0	1	LOCKED
3	N2	max	0	3	1566.009	3	0	3	0	3	0	3	LOCKED
4		min	0	1	787.754	1	0	1	0	1	0	1	LOCKED
5	N4	max	NC		NC		NC		NC		NC		LOCKED
6		min	NC		NC		NC		NC		NC		LOCKED
7	N3	max	NC		NC		NC		NC		NC		LOCKED
8		min	NC		NC		NC		NC		NC		LOCKED
9	Totals:	max	0	2	3521.351	3	0	3					
10		min	0	1	1573.78	1	0	1					

Envelope AWC NDS-18 / SDPWS-21 ASD Member Wood Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Fc' [ksi]	Ft' [ksi]	Fb1' [ksi]	Fb2' [ksi]	Fv' [ksi]	RB	CL	CP	Eqn
1	M1	2X4	0.623	10.486	3	0.406	3.117	y	3	1.786	1.15	1.963	1.984	0.201	7.885	0.99	0.941	3.6.3
2	M2	2X4	0.667	8.5	3	0.065	23.233	y	1	2.053	1.898	3.059	3.108	0.158	7.884	0.984	0.94	3.9-1
3	M3	2X4	0.254	0	3	0	1.67	z	3	1.44	0.776	1.261	1.265	0.201	5.583	0.997	0.863	3.6.3
4	M4	2X4	0.21	0	3	0	1.739	z	3	1.416	0.776	1.26	1.265	0.201	5.697	0.996	0.849	3.6.3
5	M5	2X4	0.063	0	3	0	1.814	z	3	1.387	0.776	1.26	1.265	0.201	5.819	0.996	0.832	3.6.3
6	M6	2X4	0.03	1.883	1	0	1.883	z	3	1.128	0.608	0.987	0.99	0.201	5.928	0.997	0.864	3.9-1
7	M7	2X4	0.05	0	3	0	1.951	z	3	1.332	0.776	1.26	1.265	0.201	6.035	0.996	0.799	3.6.3
8	M8	2X4	0.102	0	3	0	2.02	z	3	1.302	0.776	1.26	1.265	0.201	6.14	0.996	0.781	3.6.3
9	M9	2X4	0.147	0	3	0	2.088	z	3	1.271	0.776	1.26	1.265	0.201	6.244	0.996	0.762	3.6.3
10	M10	2X4	0.209	0	3	0	2.148	z	3	1.243	0.776	1.259	1.265	0.201	6.332	0.996	0.745	3.6.3
11	M11	2X4	0.892	1.824	3	0.004	3.725	y	1	0.59	0.776	1.255	1.265	0.158	8.339	0.992	0.354	3.9-1
12	M12	2X4	0.522	1.988	3	0.004	4.061	y	1	0.507	0.776	1.254	1.265	0.158	8.707	0.991	0.304	3.9-1
13	M13	2X4	0.275	0	2	0.004	3.825	y	1	0.569	0.844	1.362	1.375	0.158	8.45	0.991	0.314	3.6.3
14	M14	2X4	0.043	0	2	0.004	3.86	y	1	0.56	0.844	1.362	1.375	0.158	8.488	0.991	0.309	3.6.3
15	M15	2X4	0.192	1.988	3	0.004	3.895	y	1	0.546	0.776	1.254	1.265	0.158	8.526	0.991	0.328	3.9-1
16	M16	2X4	0.351	2.006	3	0.004	3.931	y	1	0.537	0.776	1.254	1.265	0.158	8.566	0.991	0.322	3.9-1
17	M17	2X4	0.431	1.88	3	0.003	3.609	y	1	0.624	0.776	1.255	1.265	0.158	8.208	0.992	0.374	3.9-1
18	M18	2X4	0.724	2.329	3	0.005	4.562	y	1	0.41	0.776	1.252	1.265	0.158	9.228	0.99	0.246	3.9-1
19	M19	2X4	0.242	2.23	3	0	2.23	z	3	1.204	0.776	1.259	1.265	0.201	6.452	0.995	0.722	3.6.3

Truss RT-21

2D Lock ON



Envelope Only Solution

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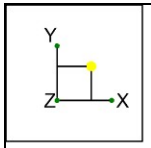
	AO		Nov 07, 2025 at 10:15 AM
			Truss - RT21.r3d



2D Lock ON

(Env)
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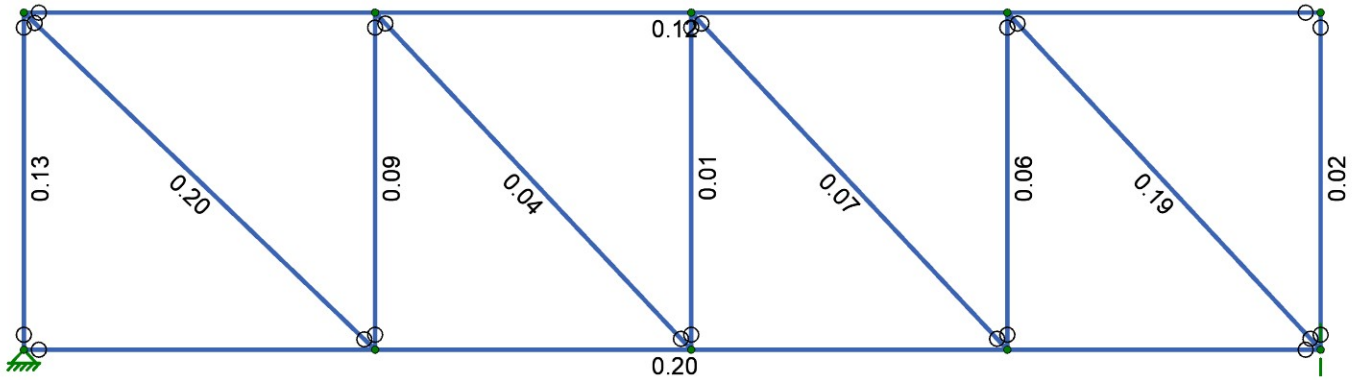
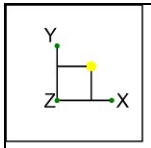
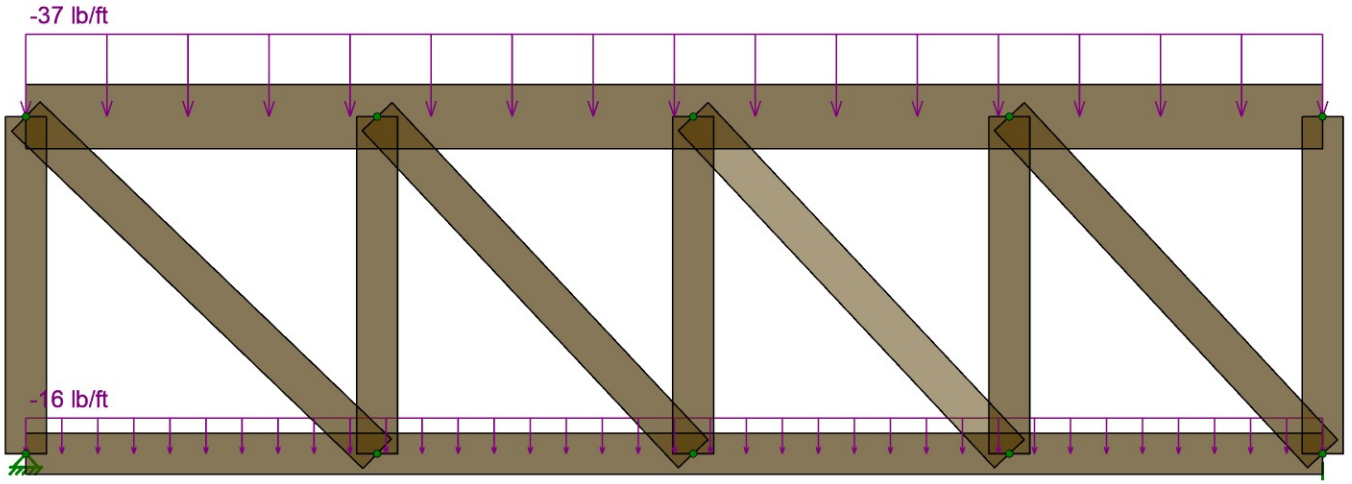


Member Code Checks Displayed (Enveloped)
Envelope Only Solution

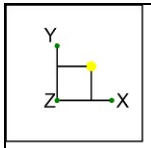
RISA A NEMETSCHEK COMPANY	AOstructures, Inc.		SK-2
	AO		Nov 07, 2025 at 10:15 AM
			Truss - RT21.r3d



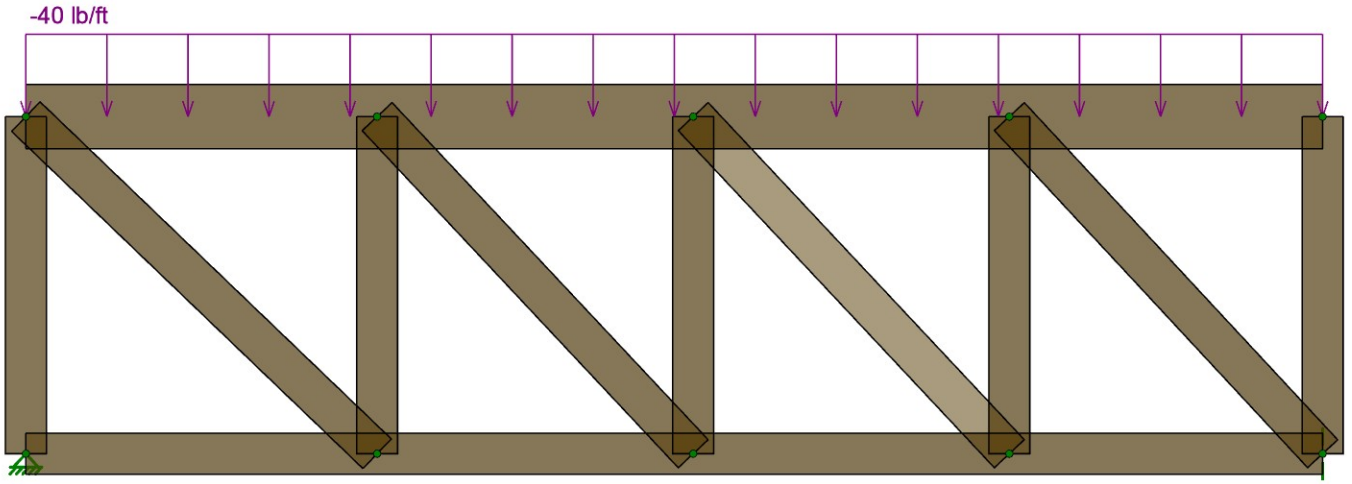
2D Lock ON



Loads: BLC 1, DL
Envelope Only Solution

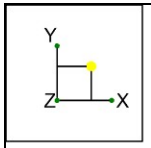


2D Lock ON

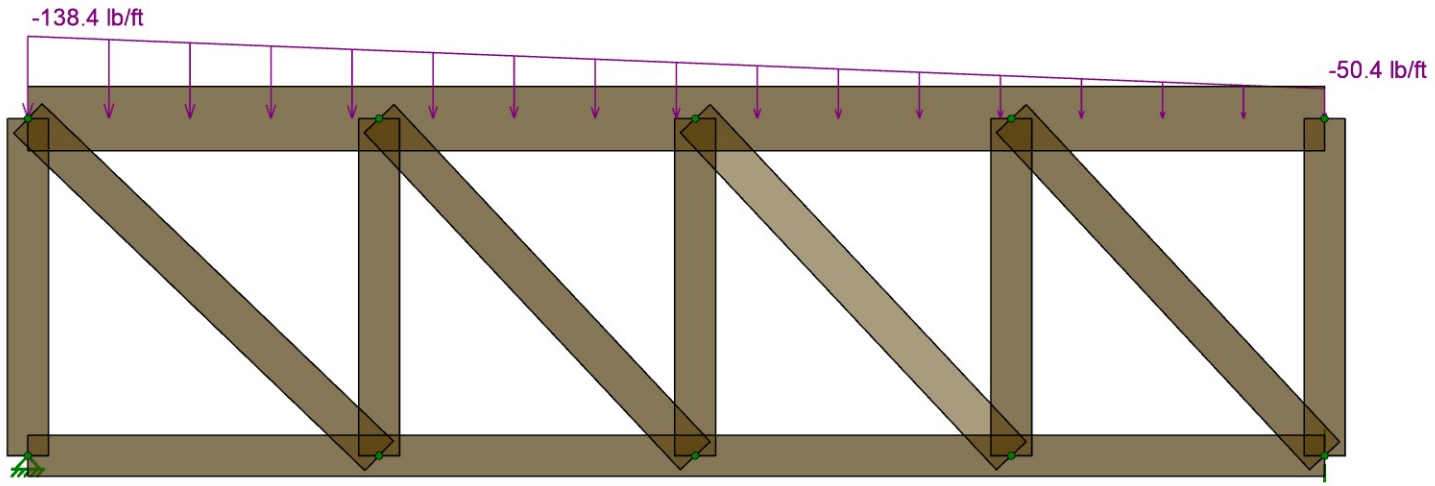


Loads: BLC 3, RLL
Envelope Only Solution

RISA A NEMETSCHEK COMPANY	AOstructures, Inc.		SK-4
	AO		Nov 07, 2025 at 10:16 AM
			Truss - RT21.r3d



2D Lock ON



Loads: BLC 5, SL
Envelope Only Solution

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	9.23	0	0	
3	N3	0	2.4	0	
4	N4	9.23	2.4	0	
5	N5	2.5	0	0	
6	N6	2.5	2.4	0	
7	N7	4.75	0	0	
8	N8	4.75	2.4	0	
9	N9	7	0	0	
10	N10	7	2.4	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	ALL			Fixed
2	N1	Reaction	Reaction	Reaction
3	N2		Reaction	

Wood Properties

	Label	Type	Database	Species	Grade	Cm	Ci	Emod	Nu	Therm. Coeff. [1e^{5}°F^{-1}]	Density [k/ft^{3}]
1	DF	Solid Sawn	Visually Graded	Douglas Fir-Larch	No.2			1	0.3	0.3	0.035
2	SP #2	Solid Sawn	Visually Graded	Southern Pine	No.2			1	0.3	0.3	0.035
3	HF	Solid Sawn	Visually Graded	Hem-Fir	No.2			1	0.3	0.3	0.035
4	SPF	Solid Sawn	Visually Graded	Spruce-Pine-fir	No.2			1	0.3	0.3	0.035
5	SPSS	Solid Sawn	Visually Graded	Southern Pine	Select Structural			1	0.3	0.3	0.035
6	SP #1	Solid Sawn	Visually Graded	Southern Pine	No.1			1	0.3	0.3	0.035

Wood Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in^{2}]	Iyy [in^{4}]	Izz [in^{4}]	J [in^{4}]
1	Top Chords	2X6	None	None	SP #2	Typical	8.25	1.547	20.797	5.125
2	Webs	2X4	None	None	SP #2	Typical	5.25	0.984	5.359	2.877
3	Bottom Chord	2X4	None	None	SP #2	Typical	5.25	0.984	5.359	2.877

Wood Design Parameters

	Label	Shape	Length [ft]	le2 [ft]	le1 [ft]	le-bend top [ft]	le-bend bot [ft]	K y-y	K z-z	Cr	y sway	z sway
1	M1	Top Chords	9.23	1	1	1	Segment			Yes		
2	M2	Bottom Chord	9.23	1	1	Segment	1			Yes		
3	M3	Webs	2.4			Lbyy		0.85	0.85			
4	M4	Webs	2.4			Lbyy		0.85	0.85			
5	M5	Webs	2.4			Lbyy		0.85	0.85			
6	M6	Webs	2.4			Lbyy		0.85	0.85			
7	M7	Webs	2.4			Lbyy		0.85	0.85			
8	M8	Webs	3.276			Lbyy		0.85	0.85			
9	M9	Webs	3.29			Lbyy		0.85	0.85			
10	M10	Webs	3.29			Lbyy		0.85	0.85			
11	M11	Webs	3.466			Lbyy		0.85	0.85			

Load Combination Design

	Description	CD	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	DL	0.9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	DL + RLL	1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	DL + SL	1.15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor
1	DL	Yes	Y	DL	1		
2	DL + RLL	Yes	Y	DL	1	RLL	1
3	DL + SL	Yes	Y	DL	1	SL	1

Basic Load Cases

	BLC Description	Category	Y Gravity	Distributed
1	DL	DL	-1	3
3	RLL	RLL		1
5	SL	SL		2

Member Distributed Loads (BLC 1 : DL)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-20	-20	0	%100
2	M2	Y	-16	-16	0	%100
3	M1	Y	-17	-17	0	%100

Member Distributed Loads (BLC 3 : RLL)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-40	-40	0	%100

Member Distributed Loads (BLC 5 : SL)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-50.4	-50.4	0	%100
2	M1	Y	-88	0	0	13.1

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]
1	N1	max	0	3	779.021	3	0	3	0	3	0	3	LOCKED
2		min	0	1	275.667	1	0	1	0	1	0	1	LOCKED
3	N2	max	0	3	644.08	3	0	3	0	3	0	3	LOCKED
4		min	0	1	276.122	1	0	1	0	1	0	1	LOCKED
5	N4	max	NC		NC		NC		NC		NC		LOCKED
6		min	NC		NC		NC		NC		NC		LOCKED
7	N3	max	NC		NC		NC		NC		NC		LOCKED
8		min	NC		NC		NC		NC		NC		LOCKED
9	N9	max	NC		NC		NC		LOCKED		NC		NC
10		min	NC		NC		NC		LOCKED		NC		NC
11	Totals:	max	0	3	1423.101	3	0	3					
12		min	0	1	551.789	1	0	1					

Envelope AWC NDS-18 / SDPWS-21 ASD Member Wood Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Fc' [ksi]	Ft' [ksi]	Fb1' [ksi]	Fb2' [ksi]	Fv' [ksi]	RB	CL	CP	Eqn
1	M1	2X6	0.124	1.058	3	0.204	2.5	y	3	1.519	0.69	1.318	1.322	0.201	5.416	0.997	0.943	3.9-3
2	M2	2X4	0.197	5.769	3	0.045	2.5	y	1	1.569	0.776	1.447	1.455	0.158	6.481	0.995	0.941	3.9-1
3	M3	2X4	0.129	0	3	0	2.4	z	3	1.12	0.776	1.259	1.265	0.201	6.693	0.995	0.672	3.6.3
4	M4	2X4	0.088	0	3	0	2.4	z	3	1.12	0.776	1.259	1.265	0.201	6.693	0.995	0.672	3.6.3
5	M5	2X4	0.011	0	3	0	2.4	z	3	1.12	0.776	1.259	1.265	0.201	6.693	0.995	0.672	3.6.3
6	M6	2X4	0.062	2.4	3	0	2.4	z	3	1.12	0.776	1.259	1.265	0.201	6.693	0.995	0.672	3.9-1
7	M7	2X4	0.016	0	3	0	2.4	z	3	1.12	0.776	1.259	1.265	0.201	6.693	0.995	0.672	3.6.3
8	M8	2X4	0.189	3.276	3	0.003	3.276	y	1	0.732	0.776	1.256	1.265	0.158	7.82	0.993	0.439	3.6.3
9	M9	2X4	0.074	0	3	0.003	3.29	y	1	0.727	0.776	1.256	1.265	0.158	7.836	0.993	0.436	3.6.3
10	M10	2X4	0.039	1.576	3	0.003	3.29	y	1	0.727	0.776	1.256	1.265	0.158	7.836	0.993	0.436	3.9-1
11	M11	2X4	0.204	1.661	3	0.003	3.466	y	1	0.668	0.776	1.255	1.265	0.158	8.043	0.992	0.4	3.9-1

Steel Beam

Project File: GIrder.ec6

DESCRIPTION: Beam 1

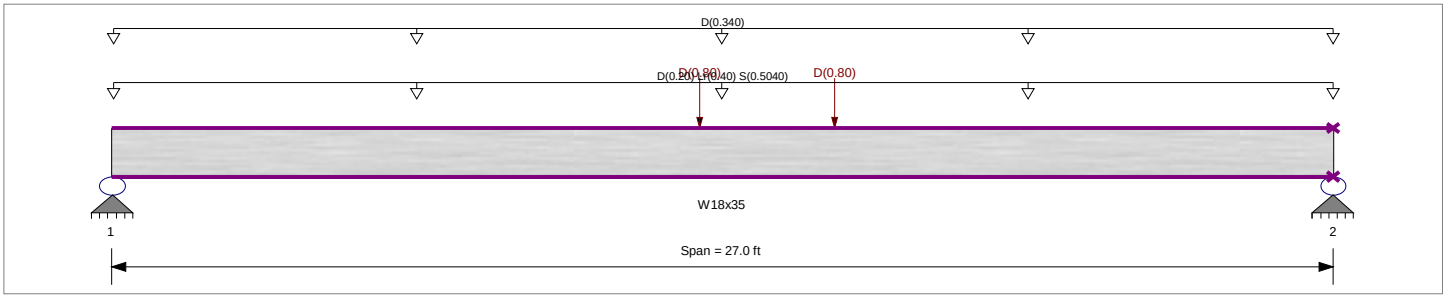
CODE REFERENCES

Calculations per AISC 360-16, IBC 2021
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.010, Lr = 0.020, S = 0.02520 ksf, Tributary Width = 20.0 ft
Uniform Load on ALL spans : D = 0.0170 ksf, Tributary Width = 20.0 ft
Load(s) for Span Number 1
Point Load : D = 0.80 k @ 16.0 ft, (RTU1)
Point Load : D = 0.80 k @ 13.0 ft, (RTU2)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.631** : 1	Maximum Shear Stress Ratio =	**0.141** : 1
Section used for this span	**W18x35**	Section used for this span	**W18x35**
Ma : Applied	104.736 k-ft	Va : Applied	14.953 k
Mn / Omega : Allowable	165.918 k-ft	Vn/Omega : Allowable	106.20 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	27.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.409 in	Ratio =	791	>=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.923 in	Ratio =	351	>=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 27.00 ft	1	0.354	0.077	58.81		58.81	277.08	165.92	1.00	1.00	8.15	159.30	106.20
+D+Lr													
Dsgn. L = 27.00 ft	1	0.574	0.128	95.26		95.26	277.08	165.92	1.00	1.00	13.55	159.30	106.20
+D+S													
Dsgn. L = 27.00 ft	1	0.631	0.141	104.74		104.74	277.08	165.92	1.00	1.00	14.95	159.30	106.20
+D+0.750Lr													
Dsgn. L = 27.00 ft	1	0.519	0.115	86.15		86.15	277.08	165.92	1.00	1.00	12.20	159.30	106.20
+D+0.750S													
Dsgn. L = 27.00 ft	1	0.562	0.125	93.25		93.25	277.08	165.92	1.00	1.00	13.25	159.30	106.20
+0.60D													
Dsgn. L = 27.00 ft	1	0.213	0.046	35.29		35.29	277.08	165.92	1.00	1.00	4.89	159.30	106.20

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.9230	13.577		0.0000	0.000

Steel Beam

Project File: GIrder.ec6

DESCRIPTION: Beam 1

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	14.835	14.953
Max Upward from Load Combinations	14.835	14.953
Max Upward from Load Cases	8.031	8.149
D Only	8.031	8.149
+D+Lr	13.431	13.549
+D+S	14.835	14.953
+D+0.750Lr	12.081	12.199
+D+0.750S	13.134	13.252
+0.60D	4.818	4.890
Lr Only	5.400	5.400
S Only	6.804	6.804

Steel Beam

Project File: GIrder.ec6

DESCRIPTION: Beam 2

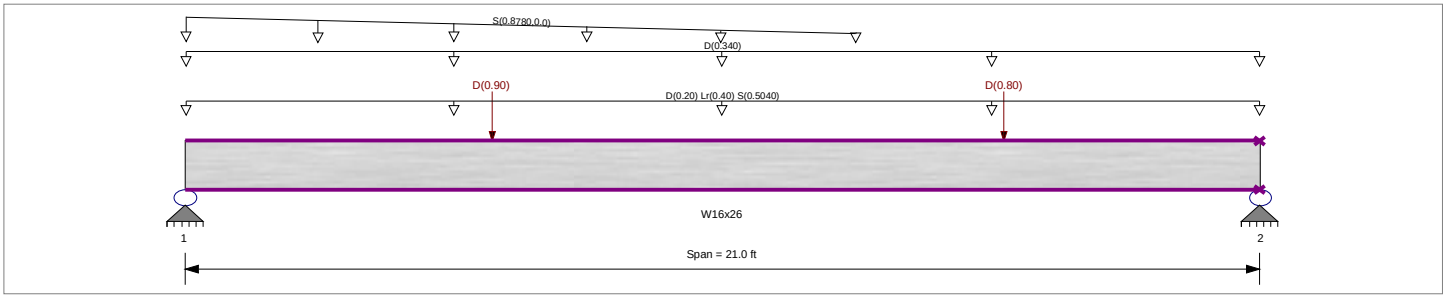
CODE REFERENCES

Calculations per AISC 360-16, IBC 2021
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.010, Lr = 0.020, S = 0.02520 ksf, Tributary Width = 20.0 ft
Uniform Load on ALL spans : D = 0.0170 ksf, Tributary Width = 20.0 ft
Varying Uniform Load : S= 0.8780->0.0 k/ft, Extent = 0.0 -->> 13.10 ft
Load(s) for Span Number 1
Point Load : D = 0.80 k @ 16.0 ft, (RTU1)
Point Load : D = 0.90 k @ 6.0 ft, (RTU2)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.680 : 1	Maximum Shear Stress Ratio =	0.232 : 1
Section used for this span	W16x26	Section used for this span	W16x26
Ma : Applied	75.044 k-ft	Va : Applied	16.350 k
Mn / Omega : Allowable	110.279 k-ft	Vn/Omega : Allowable	70.509 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.370 in	Ratio =	680	>=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.689 in	Ratio =	366	>=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 21.00 ft	1	0.313	0.093	34.47		34.47	184.17	110.28	1.00	1.00	6.54	117.75 70.51
+D+Lr												
Dsgn. L = 21.00 ft	1	0.513	0.152	56.52		56.52	184.17	110.28	1.00	1.00	10.74	117.75 70.51
+D+S												
Dsgn. L = 21.00 ft	1	0.680	0.232	75.04		75.04	184.17	110.28	1.00	1.00	16.35	117.75 70.51
+D+0.750Lr												
Dsgn. L = 21.00 ft	1	0.463	0.137	51.01		51.01	184.17	110.28	1.00	1.00	9.69	117.75 70.51
+D+0.750S												
Dsgn. L = 21.00 ft	1	0.588	0.197	64.87		64.87	184.17	110.28	1.00	1.00	13.89	117.75 70.51
+0.60D												
Dsgn. L = 21.00 ft	1	0.188	0.056	20.68		20.68	184.17	110.28	1.00	1.00	3.92	117.75 70.51

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.6889	10.380		0.0000	0.000

Steel Beam

Project File: GIrder.ec6

DESCRIPTION: Beam 2

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	16.350	13.024
Max Upward from Load Combinations	16.350	13.024
Max Upward from Load Cases	9.847	6.537
D Only	6.503	6.537
+D+Lr	10.703	10.737
+D+S	16.350	13.024
+D+0.750Lr	9.653	9.687
+D+0.750S	13.889	11.403
+0.60D	3.902	3.922
Lr Only	4.200	4.200
S Only	9.847	6.488

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LATERAL CHECK OF EXISTING LFRS

Per 10% lateral exemption of 2021 IBC - Existing Building Code - Section 503.4

Methodology: The proposed PV array will be uniformly distributed about the roof surface. Therefore, it is reasonable to assume that the seismic force applied from the PV array will be uniformly distributed back into the underlying roof diaphragm and existing lateral force resisting system. The increase in lateral load to the building will be held to a maximum increase of 10% as per the limitations of the 10% exemption of the existing building code. Due to the fact that seismic load is directly proportional to the weight of the building, the net increase in seismic mass of the roof diaphragm will be be held to a 10% increase. The existing seismic mass at the roof diaphragm level is equivalent to the weight of the roof and 1/2 of the walls below.

Existing Weight of Effected Building				
Level	**Area**	**Weight (psf)**	**Weight (lb)**	
Roof	5,676 sf	12.0 psf	68,112 lb	(As per asbuilt plans)
Ceiling	5,676 sf	8.0 psf	45,408 lb	(As per asbuilt plans)
Ext. Walls	225 ft	15.0 psf	16,875 lb	(10'-0" Wall Height)
Int. Walls	113 ft	10.0 psf	5,625 lb	
Existing Weight of Effected Building			**136,020 lb**	

Proposed Weight of PV System	
Approximate Total Weight of PV System	**9,594 lb**

10% Comparison	
10% of Existing Building Weight (Allowed)	13,602 lb
Approximate Weight of PV System (Actual)	9,594 lb
Percent Increase	7.1%
13602 lb > 9594 lb, Therefore OK	

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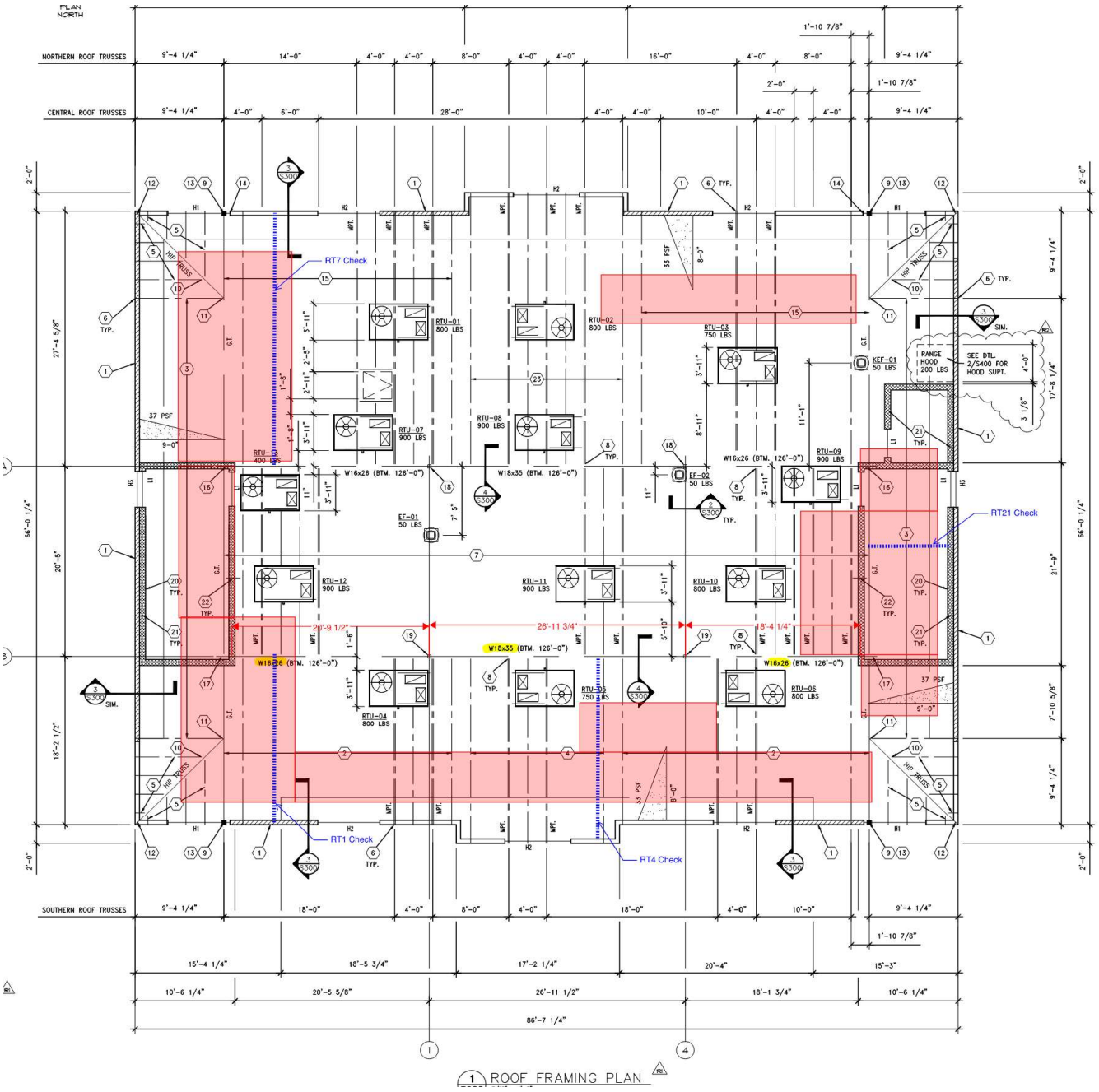
Appendix A: Framing Information & Site Specific Pictures



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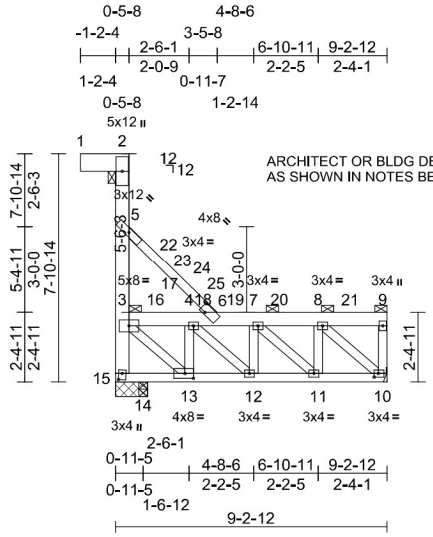
Appendix A: Framing Information & Site Specific Pictures

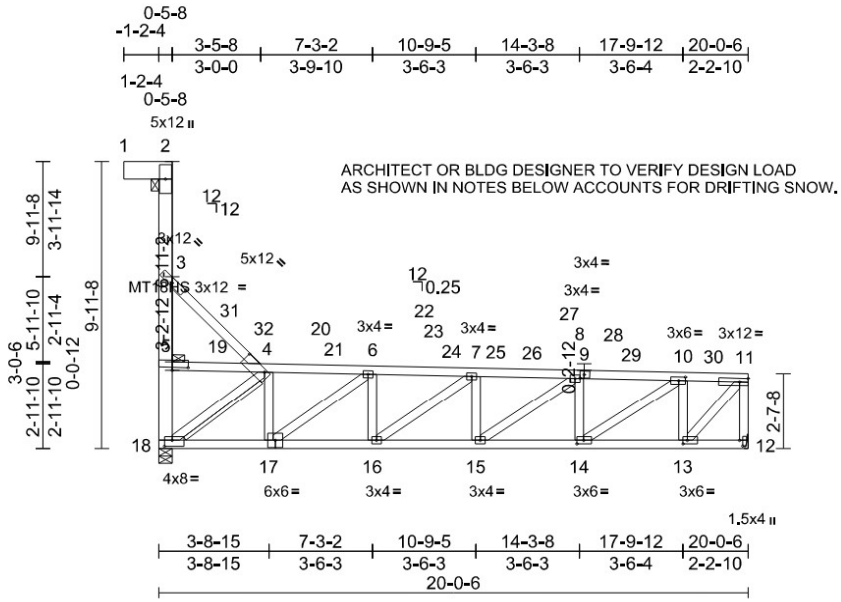
RT-21



LUMBER

TOP CHORD	2x6 SP No.2 *Except* 2-1:2x8 SP No.2, 6-5:2x4 SP No.2
BOT CHORD	2x4 SP No.2
WEBS	2x4 SP No.2 *Except* 2-15:2x6 SP No.2

RT-4



LUMBER

TOP CHORD	2x8 SP No.2 *Except* 9-11:2x4 SP No.2, 4-3,9-5:2x4 SP 2400F 2.0E
BOT CHORD	2x4 SP 2400F 2.0E
WEBS	2x4 SP No.2 *Except* 2-18:2x6 SP No.2
OTHERS	2x4 SPF No.2(flat)

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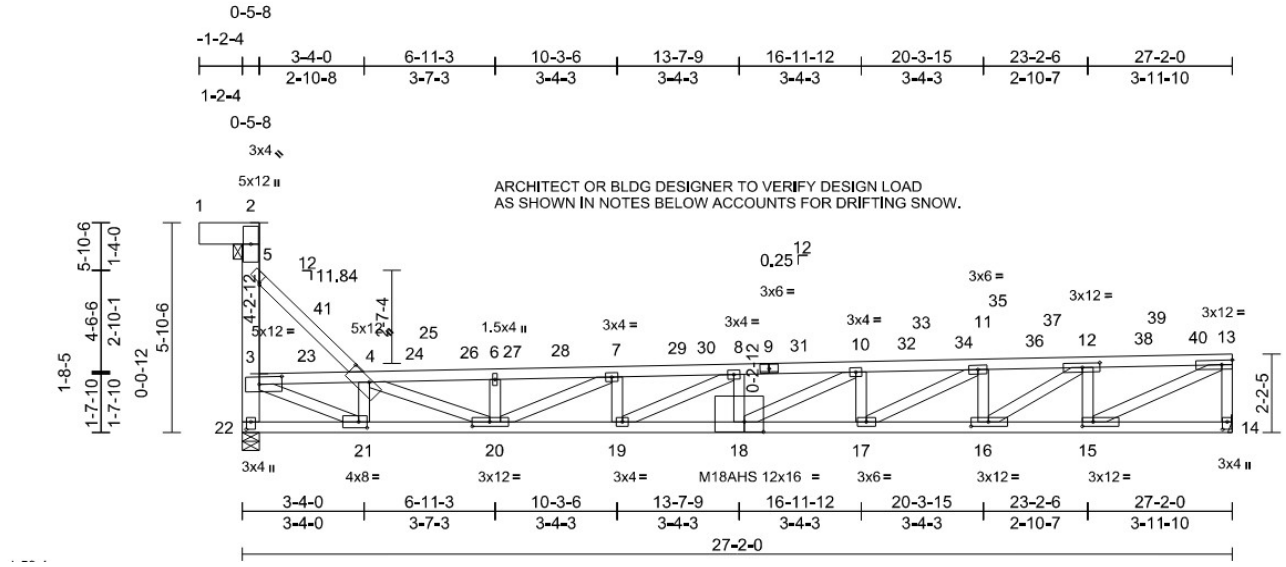
Appendix A: Framing Information & Site Specific Pictures

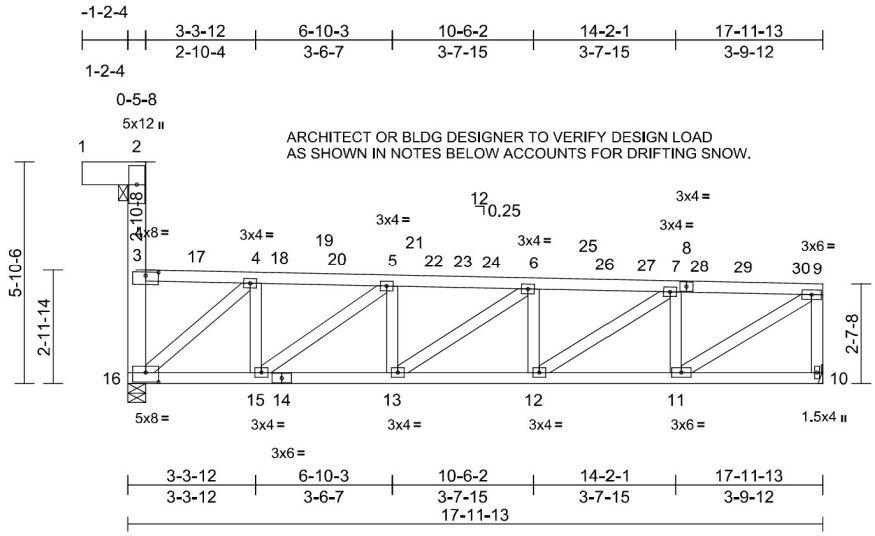
RT-7



LUMBER

TOP CHORD	2x4 SP 2400F 2.0E *Except* 0-0,2-1:2x8 SP No.2, 5-4:2x4 SP No.2
BOT CHORD	2x4 SP 2400F 2.0E
WEBS	2x4 SP No.2 *Except* 21-3:2x4 SP 2400F 2.0E, 2-22:2x6 SP No.2

RT-1



LUMBER

TOP CHORD	2x8 SP No.2 *Except* 3-8:2x4 SP 2400F 2.0E, 8-9:2x4 SP No.2
BOT CHORD	2x4 SP 2400F 2.0E
WEBS	2x4 SP No.2 *Except* 2-16:2x6 SP No.2

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Appendix B: General Notes

GENERAL

- The contractor shall verify all dimensions, property setbacks, AHJ/HOA CC&R's, elevations and site conditions before starting work and shall notify AOstructure, Inc, (AOstructures) of any discrepancies.
- All report conclusions represent AOstructures, Inc.'s best professional judgment based upon industry standards.
- Resolve any conflicts on the drawings with AOstructures, Inc before proceeding with construction.
- The design criteria used for this project & listed on the first page of the report is based on the engineers best judgement and/or provided by the ATC council. AHJ specific requests may differ. Please contact our team if the design criteria needs to be modified.
- A site visit was not physically conducted by AOstructures. The accompanying calculations and certification are provided with the understanding that the building is in a good state of repair and was constructed to standard construction practice. It shall be the contractors responsibility to identify any framing irregularities including but not limited to inconsistent framing conditions, water, fire, pest or mold damage, cracked, split, deflecting, removed or otherwise compromised framing members and notify the EOR of any such findings prior to starting construction.
- AOstructures is not responsible for enforcing safety measures or regulations. The contractor shall design, construct, and maintain all safety devices including shoring and bracing, and shall be solely responsible for conforming to all local, state and federal safety and health standards, laws and regulations. The contractor shall take necessary precautions to maintain and insure the integrity of the structure during construction. If a lawsuit is filed by one of the contractor's or subcontractor's employees, or any one else, the contractor will indemnify, defend and hold the owner and AOstructures harmless of any and all such claims.
- Any and all waterproofing shall be provided by the contractor. AOstructures is not responsible for waterproofing.
- The anchorage design of miscellaneous equipment (including but not limited to conduit, inverters, batteries, transformers, etc.) is not included in the scope of this review. If required or requested, additional services can be provided from our team to include such elements.
- All hardware shall be installed per manufacturer specifications and within specified design limitations. AOstructures, Inc. assumes no responsibility for incorrectly installed hardware or hardware installed outside of the manfacturer specifications.

USER RELIANCE

- AOstructures was engaged by Lumina Solar (Client) to perform this assessment. This report and the information therein, are for the exclusive use of the Client. This report has no other purpose and shall not be relied upon, or used, by any other person or entity without the written consent of AOstructures. Third parties that obtain this report, or the information within shall have no rights of recourse or recovery against AOstructures, it's officers or employees.

ROOF MOUNTED ARRAY'S

- If an analysis of a supporting stucture is included in our scope of work, the structural assessment only applies to the section of the roof that is directly supporting the proposed solar PV system. No existing solar system or other building components are certified by this report unless specifically mentioned as otherwise.
- No structural members can be cut for conduit, etc., unless specifically shown. Obtain prior written approval for installation of any additional conduit, etc. It is the contractors responsibility to field verify the location of any and all embedded or hidden rebar, mechanical, electrical or plumbing components prior to starting
- Provide staggered rails/struts/beams every 100'-0", min. or per manufacturer spec's, whichever is smaller to allow for thermal expansion of the array elements.
- It is assumed that a standard quality of construction care was used to construct the original building and any subsequent retrofits, additions, remodels or tennant improvements. Roof's are assumed to be installed per manufacturer specifications and in good condition. It is the contractors responsibility to field inspect any and all decking or framing members supporting the proposed PV array for sub-standard construction means, signs of dryrot or water damage, corosion mold, fire damage, etc. and notify AOstructures in writing if any compromised material is found on site prior to starting construction.
- It is assumed that there have been no additional loads (HVAC or MEP equipment, additional layers of roofing, etc) added to the building over the course of the structures history. The contractor and/or client shall verify this with the property owner and notify AOstructures, Inc. if additional load has been added to the structure already.
- Flexible utility connections must be used at any building seismic joint.
- Care should be taken during installation to ensure that PV arrays and/or miscellaneous equipment does not preclude drainage of water.
- Unless otherwise noted, construction material shall be evenly distributed if placed on framed floors or roofs. Loads shall not exceed the allowable loading for the supporting members and their connections. A certfication of the underlying building does not acoount for construction loads or construction staging unless specifically stated otherwise.
- All fasteners at the roof shall be stainless steel or otherwise be protected by a waterproofing membrane and installed withing the middle 1/3 of the dimensional width of the framing members.
- All fasteners shall be a minimum of 6" away from any truss panel or hinge joints, truss plates and/or member ends. Field verify location of fasteners prior to starting construction. All fasteners shall be pre-drilled to avoid splitting existing lumber.
- Unless otherwise noted, all lags installed in underlying roof framing members shall be embedded (threaded embed) a minimum of 2.5" into the underlying framing.
- AOstructures is not responsible for downslope effects of snow shedding or sliding off of the PV array nor any damage to downslope decks, roofs, walkways, landscaping, automobiles, pets, people, etc.. If snow guards are requested by the customer, notify AOstructures.

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February 25, 2026

TO: King Energy

SUBJECT: Supplement A - Attachment Calcs - Kiddie Academy (Hassan Saeed)
6515 Crossroads Village Blvd., Haymarket, VA. 20169

SCOPE OF WORK:
AOstructures, Inc. was asked to provide a supplementary review to evaluate the capacity of the roof fasteners for the project at the above subject location. The scope of this report is strictly limited to the items listed below and based on the design criteria listed below.

- Evaluate the fastener connection capacity of the proposed racking system to the existing roof structure based on manufacturer provided demand values listed below in the design criteria. All array anchorage (ballast) for wind and seismic forces shall be provided by the manufacturer (by others) and is not included in our scope of work.

PROVIDED INFORMATION:
Unirac provided racking calculations which specify the standoff capacity shear and uplift values of 194 lb and 355 lb respectively. It is our understanding that these values are the maximum uplift and shear forces applied to the roof attachments.

STRUCTURE DESCRIPTION:
The roof framing system of (Roof A) consists of a built-up roof atop of plywood sheathing which is supported by pre-fabricated roof trusses spaced at 24" o.c.. The roof trusses are marginally sloped for drainage.

DESIGN CRITERIA:

- Applicable Codes = 2021 IBC/IRC, ASCE 7-16
- Governing Shear = 194lb
- Governing Uplift = 355lb

CONCLUSIONS:
The Unirac Flashloc RM attachments may be connected to the underlying plywood roof sheathing using a minimum of (8) #14 wood screws per attachment. All screws shall penetrate the sheathing by a minimum of 3/4".The fasteners shall be stainless steel or otherwise protected by a waterprooing membrane. The attachments shall be fastened to the roof diaphram sheathing and not to built-up roof sheathing. The contractor shall field verify sheathing location and core through roof build up as necessary. If roof build-up exceeds 6", notify EOR prior to starting installation.

Please contact me with any further questions or concerns regarding this project.

Sincerely,

02/25/2026
Andrew Oesterreicher, P.E.
Project Engineer

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Fastener & Standoff Uplift Capacity Check

Input Variables		
Demand Uplift =	355.0 lb	Per Unirac
Fastener Type =	#14 Wood Screw	
Attachment material =	Plywood decking	

Fastener Capacity Check - Uplift		
Uplift Demand =	355.0 lb	
Fastener Type =	#14 Wood Screw	
Number of Fasteners =	8	
Ultimate Capacity of Individual Fastener =	350 lb	(Per APA table below)
Group Ultimate Capacity =	2800 lb	
Factor of Safety =	4.0	
Group Allowed Capacity =	700 lb	
Demand / Capacity Ratio =	51%	
Results: 700 lb capacity > 355 lb demand		**Therefore, OK**

Standoff Capacity Check - Uplift		
Uplift Demand =	355.0 lb	
Ultimate Standoff Uplift Capacity =	6670.0 lb	(See Appendix A)
Factor of Safety =	4.0	
Allowed Standoff Uplift Capacity =	1668 lb	
Demand / Capacity Ratio =	21%	
Results: 1667.5 lb capacity > 355 lb demand		**Therefore, OK**

APA Ultimate Capacity Tables

Wood and Sheet Metal Screws: Metal-to-Plywood Connections[a]

Depth of Threaded Penetration (in.)	Average Ultimate Withdrawal Load (lb)					
	Screw Size					
	#6	#8	#10	#12	#14	#16
3/8	150	180	205	–	–	–
1/2	200	240	275	315	350	–
5/8	250	295	345	390	440	–
3/4	300	355	415	470	525	–
1	–	–	–	625	700	775
1-1/8	–	–	–	705	790	875
2-1/4	–	–	–	–	1580	–

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Fastener & Standoff Shear Capacity Check

Input Variables		
Demand Shear =	194.0 lb	Per Unirac
Fastener Type =	#14 Wood Screw	
Attachment material =	Plywood decking	

Fastener Capacity Check - Shear		
Shear Demand =	194.0 lb	
Fastener Type =	#14 Wood Screw	
Number of Fasteners =	8	
Ultimate Capacity of Individual Fastener =	590 lb	(Per APA table below)
Group Ultimate Capacity =	4720 lb	
Factor of Safety =	4.0	
Group Allowed Capacity =	1180 lb	
Demand / Capacity Ratio =	16%	
Results: 1180 lb capacity > 194 lb demand		**Therefore, OK**

Standoff Capacity Check - Shear		
Shear Demand =	194.0 lb	
Ultimate Standoff Shear Capacity =	5760.0 lb	(See Appendix A)
Factor of Safety =	4.0	
Allowed Standoff Shear Capacity =	1440 lb	
Demand / Capacity Ratio =	13%	
Results: 1440 lb capacity > 194 lb demand		**Therefore, OK**

APA Ultimate Capacity Tables

TABLE 1.
Screws: Metal-to-Plywood Connections[a]

Depth of Threaded Penetration (in.)	Ultimate Lateral Load (lb)[b]					
	Wood Screws			Sheet Metal Screws		
	#8	#10	#12	#8	#10	#12
1/2	415	(500)	590	465	(565)	670
5/8	–	–	–	500	(600)	705
3/4	–	–	–	590	(655)	715

(a) Plywood was C-D grade with exterior glue (all plies Group 1), face grain parallel to load. Side plate was 3/16"-thick steel.

(b) Values in parentheses are estimates based on other tests.

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Plywood Bending Capacity Check

Assumptions

- Plywood is laid perpendicular to rafter span direction
- Plywood is a continuous 8'-0" member
- Plywood is in good repair with no damage from moisture/dryrot/fire/etc.
- Plywood has a minimum span rating of 24/0 and a minimum thickness of 15/32"

Input Variables

Demand Uplift (P) =	355.0 lb	Per Unirac
Purlin/Joist Spacing =	24.0 in	
Plywood Span Rating =	24/0	(Assumed)
Plywood Thickness =	15/32	(Assumed)

Plywood Bending Capacity Check

Uplift Demand =	355.0 lb	
Demand Moment =	(5 * P * L) / 32	Pinned/Fixed Condition
	1331.3 lb-in	
FbS =	275.0 lbf-in/ft	(Per APA Table 9 - See Below)
Cd =	1.6	(Per APA Table 6)
FbS * Cd =	440.0 lbf-in/ft	
Rail Spacing =	37.0 in	(Half of a PV Module)
Tributary area over which load is applied =	Rail Spacing or 4'-0", whichever is less	
	37.0 in	
Plywood Moment Capacity =	1356.7 lbf-in	
Demand / Capacity Ratio =	98%	
Results: 1356.7 lb-in capacity > 1331.3 lb-in demand		**Therefore, OK**

APA Design Capacity Tables

PANEL BENDING STRENGTH, F_bS (lbf-in./ft of panel width)

W24	NA	NA	NA	300	NA	NA	NA	97
24/0	250	275	300	300	54	65	97	97
24/16	320	330	385	385	64	77	115	115
32/16	370	405	445	445	92	110	165	165
40/20	625	690	750	750	150	180	270	270
48/24	NA	930	1,000	1,000	NA	270	405	405
16 oc	415	455	500	500	100	120	180	180
20 oc	480	530	575	575	140	170	250	250
24 oc	NA	705	770	770	NA	260	385	385
32 oc	NA	NA	1,050	1,050	NA	NA	685	685
48 oc	NA	NA	1,900	1,900	NA	NA	1,200	1,200

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Plywood Punching Shear Capacity Check

Input Variables		
Demand Uplift (Punching Shear) =	355.0 lb	Per Unirac
Purlin/Joist Spacing =	24.0 in	
Plywood Span Rating =	24/0	(Assumed)
Plywood Thickness =	15/32	(Assumed)
Standoff Diameter =	7.25 in	

Plywood Shear Capacity Check		
Punching Shear Demand =	355.0 lb	
Fv * tv =	69.0 lbf/in	(Per APA Table 9 - See Below)
Cd =	1.6	(Per APA Table 6)
(Fv * tv) * Cd =	110.4 lbf/in	
Allowed Shear (punching) =	= (Fv * tv) * Cd * Standoff diameter	
	800.4 lb	
Demand / Capacity Ratio =	44%	
Results: 800.4 lb capacity > 355 lb demand		**Therefore, OK**

APA Design Capacity Tables

PANEL SHEAR THROUGH THE THICKNESS, $F_v t_v$ (lbf/in. of shear-resisting panel length)

W24	NA	NA	NA	145	NA	NA	NA	145
24/0	53	69	80	155	53	69	80	155
24/16	57	74	86	165	57	74	86	165
32/16	62	81	93	180	62	81	93	180
40/20	68	88	100	195	68	88	100	195
48/24	NA	98	115	220	NA	98	115	220
16 oc	58	75	87	170	58	75	87	170
20 oc	67	87	100	195	67	87	100	195
24 oc	NA	96	110	215	NA	96	110	215
32 oc	NA	NA	120	230	NA	NA	120	230
48 oc	NA	NA	160	305	NA	NA	160	305

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Appendix A: Manufacturer Specifications

ATTACHMENT TYPE	UNIRAC FLASHLOC RM
ATTACHMENT CAPACITY UPLIFT	355.0 lbs
ATTACHMENT CAPACITY SHEAR	194.0 lbs

UNIRAC
BETTER SOLAR STARTS HERE

U-Builder® PROJECT REPORT

APPLICATION VERSION: 6.7.2
PROJECT VERSION: 0.0.69

PROJECT TITLE	PROJECT ID	LAST UPDATED
ROOFMOUNT RM5	D1325FFE	Nov. 10, 2025
		ORIGINALLY CREATED
		Oct. 28, 2025

NAME	Jon Snow
ADDRESS	6515 Crossroads Village Boulevard
CITY, STATE	Haymarket, VA
MODULE	REC SOLAR REC420AA PURE 2 v1

Designed by david@luminasolar.com

ROOFMOUNT RM5

REC SOLAR

48 - REC420AA PURE 2 v1

1257 ft^2

20.16 KW

NOTE: Designing on a "blank page" in the U-Builder® design tool may not provide accurate wind engineering results because the roof outline is not provided. It is the user's responsibility to verify building dimensions, site criteria, array distance from roof edges. When designing a construction-ready project, it is always recommended to "Design On Map".

NOTE: Installation of the project is intended to happen within the year of project designed in U-Builder®. If it's past one year please rerun the design or contact Unirac Engineering Services.

Use TPO primer before installation of Flashloc RM.

ENGINEERING INPUTS

Plan Review

AVERAGE PSF	7.63 psf
TOTAL NUMBER OF MODULES	48
TOTAL KW	20.16 KW
TOTAL STRUCTURE AREA	~1257 ft^2
TOTAL WEIGHT ON ROOF	9594 lbs
RACKING WEIGHT	1441 lbs
MODULE WEIGHT	2294 lbs
BALLAST WEIGHT	5696 lbs
MAX BAY LOAD (DEAD)	132 lbs
TOTAL ATTACHMENT COUNT	23
ATTACHMENT KIT WEIGHT	162.38 lbs

Loads Used for Design

BUILDING CODE	ASCE 7-16
WIND SPEED	115.00 mph
GROUND SNOW LOAD	30.00 psf
SEISMIC, S_S	0.152
ELEVATION	488 ft
WIND EXPOSURE	C
RISK CATEGORY	II
VELOCITY PRESSURE, Q_Z	27.77 psf

Inspection

PRODUCT	ROOFMOUNT RM5
MODULE MANUFACTURER	REC SOLAR
MODEL	REC420AA PURE 2 v1
MODULE WATTS	420 watts
MODULE LENGTH	73.4"
MODULE WIDTH	40.9"
MODULE THICKNESS	1.2"
MODULE WEIGHT	47.8 lbs
ADD CENTRAL SUPPORT FOR MODULE	No
SETBACK DISTANCE	3.0 ft
HALF BLOCK ALLOWED	No
BALLAST BLOCK (CMU) WEIGHT	32.0 lbs
MAX BLOCKS PER BAY	2
BUILDING HEIGHT	30.0 ft
ROOF TYPE	TPO
LONGEST BUILDING LENGTH	88.0 ft
SHORTEST BUILDING LENGTH	67.0 ft
PARAPET HEIGHT	24.0"
WIND DEFLECTORS	EVERYWHERE
ATTACHMENTS OPTIMIZATION CRITERIA	Psf Limit
ROOF PSF LIMIT	8.00 psf
ATTACHMENT TYPE	UNIRAC FLASHLOC RM
ATTACHMENT CAPACITY UPLIFT	355.0 lbs
ATTACHMENT CAPACITY SHEAR	194.0 lbs
CONTROLLING COMPONENT UPLIFT CAPACITY	RACKING
CONTROLLING COMPONENT SHEAR CAPACITY	RACKING

ENGINEERING OUTPUTS

Roof Area 1 - Array 1

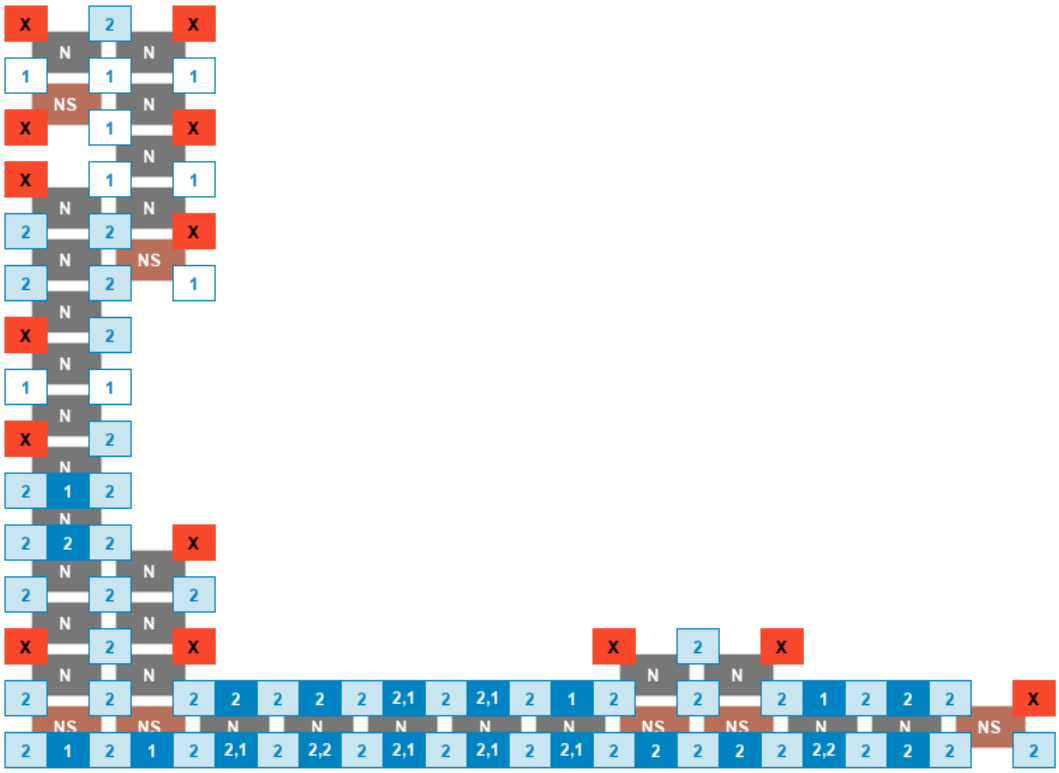
AVERAGE PSF	7.99 psf

TOTAL NUMBER OF MODULES	34
ROOF SLOPE	1 degrees
ROW SPACING	7.5"
TOTAL KW	14.28 KW
TOTAL AREA	890 ft^2
TOTAL WEIGHT ON ROOF	7107 lbs
RACKING WEIGHT	1031 lbs
MODULE WEIGHT	1625 lbs
BALLAST WEIGHT	4352 lbs
MID SUPPORT KIT WEIGHT	0 lbs
TOTAL ATTACHMENT COUNT	14
ATTACHMENT KIT WEIGHT	98.84 lbs
CONTROLLING COMPONENT UPLIFT CAPACITY	RACKING
CONTROLLING COMPONENT SHEAR CAPACITY	RACKING
ATTACHMENT CAPACITY UPLIFT	355.0 lbs
ATTACHMENT CAPACITY SHEAR	194.0 lbs

BOM

PART	QTY
RM5 BAY	92
BALLAST BLOCK	136
RM5 84" WIND DEFLECTOR	55
RM END CLAMP 30-40MM	267
KIT 1/4 20 CLIP ON NUT SS 18-8	393
KIT, WIND DEFLECTOR ATTACHMENT	126
FLASHLOC RM KIT	14
RM5/RMDT H-ATTACHMENT KIT	14
MLPE TIGER CLIP	34

Roof Area 1 - Array 1 - Ballast Map with Attachment And Deflectors



LEGEND

N	Module with north wind deflector (for uplift)
S	Module with south wind deflector (for fire requirements - type 2)
NS	Module with both deflector types
	Module with no deflectors
1	Standard corner bay with CMU block count
4	Supplemental bay with CMU block count
	Mid Support

NOTE

Bays in the space above and below modules are supplemental bays. You can fit a maximum of 2 blocks in each bay.
If the number of blocks in these bays is more than 2, you will need to add an additional supplemental bay.

Roof Area 1 - Array 2

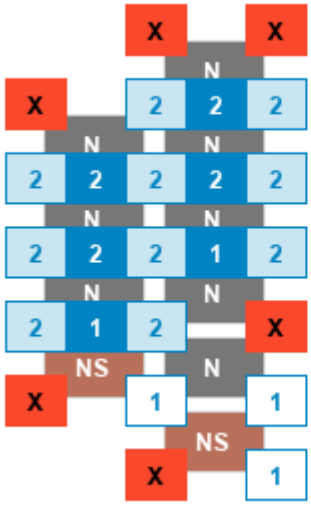
AVERAGE PSF	7.36 psf

TOTAL NUMBER OF MODULES	10
ROOF SLOPE	1 degrees
ROW SPACING	7.5"
TOTAL KW	4.20 KW
TOTAL AREA	254 ft^2
TOTAL WEIGHT ON ROOF	1867 lbs
RACKING WEIGHT	291 lbs
MODULE WEIGHT	478 lbs
BALLAST WEIGHT	1056 lbs
MID SUPPORT KIT WEIGHT	0 lbs
TOTAL ATTACHMENT COUNT	6
ATTACHMENT KIT WEIGHT	42.36 lbs
CONTROLLING COMPONENT UPLIFT CAPACITY	RACKING
CONTROLLING COMPONENT SHEAR CAPACITY	RACKING
ATTACHMENT CAPACITY UPLIFT	355.0 lbs
ATTACHMENT CAPACITY SHEAR	194.0 lbs

BOM

PART	QTY
RM5 BAY	25
BALLAST BLOCK	33
RM5 84" WIND DEFLECTOR	18
RM END CLAMP 30-40MM	86
KIT 1/4 20 CLIP ON NUT SS 18-8	127
KIT, WIND DEFLECTOR ATTACHMENT	41
FLASHLOC RM KIT	6
RM5/RMDT H-ATTACHMENT KIT	6
MLPE TIGER CLIP	10

Roof Area 1 - Array 2 - Ballast Map with Attachment And Deflectors



LEGEND

N	Module with north wind deflector (for uplift)
S	Module with south wind deflector (for fire requirements - type 2)
NS	Module with both deflector types
	Module with no deflectors
1	Standard corner bay with CMU block count
4	Supplemental bay with CMU block count
	Mid Support

NOTE

Bays in the space above and below modules are supplemental bays. You can fit a maximum of 2 blocks in each bay.
If the number of blocks in these bays is more than 2, you will need to add an additional supplemental bay.

Roof Area 1 - Array 3

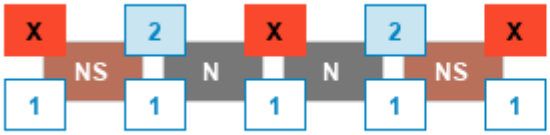
AVERAGE PSF	5.45 psf

TOTAL NUMBER OF MODULES	4
ROOF SLOPE	1 degrees
ROW SPACING	7.5"
TOTAL KW	1.68 KW
TOTAL AREA	114 ft^2
TOTAL WEIGHT ON ROOF	619 lbs
RACKING WEIGHT	119 lbs
MODULE WEIGHT	191 lbs
BALLAST WEIGHT	288 lbs
MID SUPPORT KIT WEIGHT	0 lbs
TOTAL ATTACHMENT COUNT	3
ATTACHMENT KIT WEIGHT	21.18 lbs
CONTROLLING COMPONENT UPLIFT CAPACITY	RACKING
CONTROLLING COMPONENT SHEAR CAPACITY	RACKING
ATTACHMENT CAPACITY UPLIFT	355.0 lbs
ATTACHMENT CAPACITY SHEAR	194.0 lbs

BOM

PART	QTY
RM5 BAY	10
BALLAST BLOCK	9
RM5 84" WIND DEFLECTOR	7
RM END CLAMP 30-40MM	20
KIT 1/4 20 CLIP ON NUT SS 18-8	30
KIT, WIND DEFLECTOR ATTACHMENT	10
FLASHLOC RM KIT	3
RM5/RMDT H-ATTACHMENT KIT	3
MLPE TIGER CLIP	4

Roof Area 1 - Array 3 - Ballast Map with Attachment And Deflectors



LEGEND

N	Module with north wind deflector (for uplift)
S	Module with south wind deflector (for fire requirements - type 2)
NS	Module with both deflector types
	Module with no deflectors
1	Standard corner bay with CMU block count
4	Supplemental bay with CMU block count
	Mid Support

NOTE

Bays in the space above and below modules are supplemental bays. You can fit a maximum of 2 blocks in each bay.
If the number of blocks in these bays is more than 2, you will need to add an additional supplemental bay.

WIND DESIGN DETAIL

Terrain Category	C	Section 26.7 (ASCE 7-16)
Basic Wind Speed	115.00 mph	
Elevation	488.00 ft	
Risk Category	II	Table 1.5-1 (ASCE 7-16)
Mean Roof Height	30.0 ft	
Numerical Coefficient	0.002560	Section C26.10.2 (ASCE 7-16)
Topographic Factor, K_{zt}	1.00	Section 26.8.2 (ASCE 7-16)
Wind Directionality Factor, K_d	0.85	Table 26.6-1 (ASCE 7-16)
Ground Elevation Factor, K_e	0.982	Table 26.9-1 (ASCE 7-16)
Velocity Pressure Exposure Coefficient, K_z	0.98	Table 26.10-1 (ASCE 7-16)
Velocity Pressure at Height, Q_z	27.77 psf	Equation 26.10.1 (ASCE 7-16)

SEISMIC DESIGN PER ASCE 7-16

Site Classification	D_DEFAULT	Section 11.4.3 (ASCE 7-16)
S_s	0.152 g	Section 11.4.2 (ASCE 7-16)
S_1	0.000 g	Section 11.4.2 (ASCE 7-16)
Risk Category	II	
Coefficient of Friction, μ_0	0.41	TT 516003
Site Coefficient, F_a (Minimum 1.2)	1.600	Table 11.4-1 (ASCE 7-16)
Site Coefficient, F_v	2.400	Table 11.4-2 (ASCE 7-16)
S_{MS}	0.243 g	Section 11.4.4 (ASCE 7-16)
S_{DS}	0.162 g	Section 11.4.5 (ASCE 7-16)
Module Weight	47.80 lbs	
Racking and Ballast Weight to One Module	100.96 lbs	
Capacity of Connections to One Module (N/S)	348.00 lbs	UTR 272
Capacity of Connections to One Module (E/W)	284.00 lbs	UTR 272
W1 (Module, Racking, and Ballast Weight to One Module)	148.76 lbs	
0.2 S_{DS} W1	4.82 lbs	Section 13.6.12 (ASCE 7-16)
Maximum Number of Modules per Row (N-S)	72	
Maximum Number of Modules per Column (E-W)	58	
Building Importance Factor, I_e	1.00	Table 1.5-2 (ASCE 7-16)
Importance Factor of Array, I_p	1.00	Section 13.1.3 (ASCE 7-16)
Seismic Design Category	A	Section 11.6 (ASCE 7-16)
Seismic Design Displacement	12.00"	

NOTE

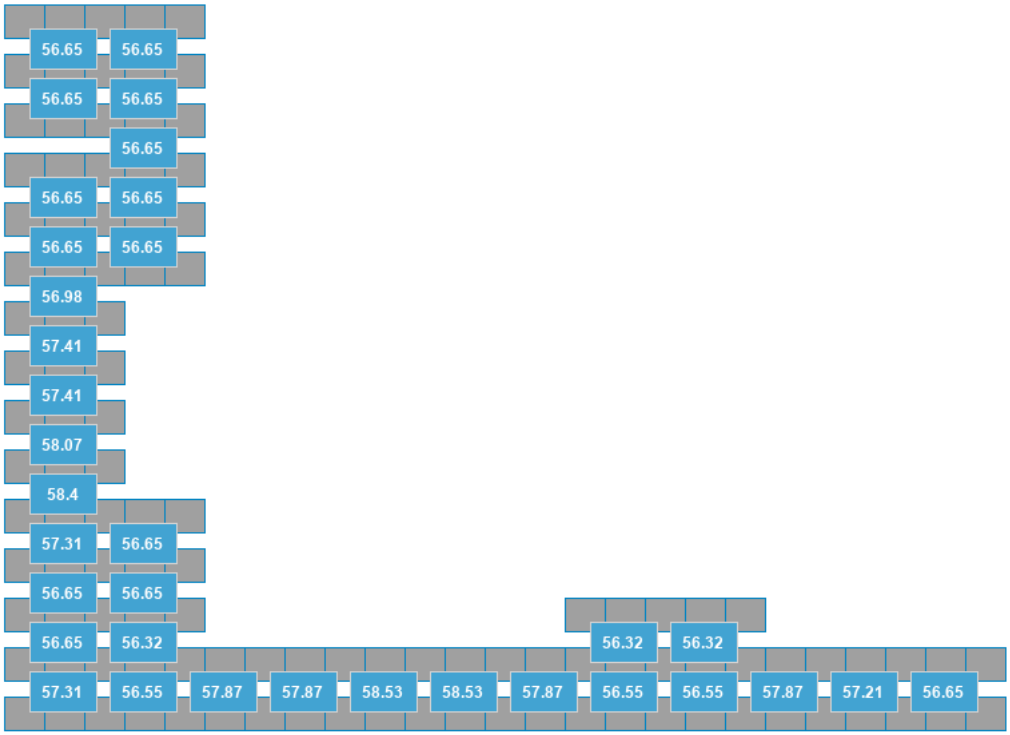
SDC A and B designs are exempt from the ASCE 7-16 seismic requirements under the section 13.1.4: Exemptions - Point 4: Mechanical and electrical components in Seismic Design Category A and B

SNOW DESIGN

Risk Category	II	Table 1.5-1 (ASCE 7-16)
Importance Factor, I_S	1.00	Table 1.5-2 (ASCE 7-16)
Exposure Category	C	Section 26.7 (ASCE 7-16)
Exposure Factor, C_e	1.00	Table 7.3-1 (ASCE 7-16)
Thermal Factor, C_t	1.00	Table 7.3-2 (ASCE 7-16)
Ground Snow, p_g	30.00 psf	
Tilt Angle	5°	
Minimum Snow Load, p_m		
$p_m = I_s\ p_g$, For $p_g \leqslant 20$ psf	30.00 psf	Section 7.3.4 (ASCE 7-16)
$p_m = 20\ I_s$, For $p_g > 20$ psf	20.00 psf	Section 7.3.4 (ASCE 7-16)
Flat Roof Snow Load, $p_f = \text{Max}(0.7\ C_e\ C_t\ I_s\ p_g, p_m)$	21.00 psf	Equation 7.3-1 (ASCE 7-16)
Slope Factor, C_s	1.0	Figure 7-2a (ASCE 7-16)*
Sloped Roof Snow Load, $p_s = C_s\ p_f$	21.00 psf	Equation 7.4-1 (ASCE 7-16)*

*Section C7.8 states "collectors should be designed to sustain a load calculated by using the "unobstructed slippery surfaces" curve in Figure 7.4-1." This indicates that Ct ⩽ 1.0. Per Figure 7-2a for a roof slope of 5° with the unobstructed slippery surfaces graph, Cs = 1.0.

DEAD LOAD PER MODULE(D) - Roof Area 1 - Array 1



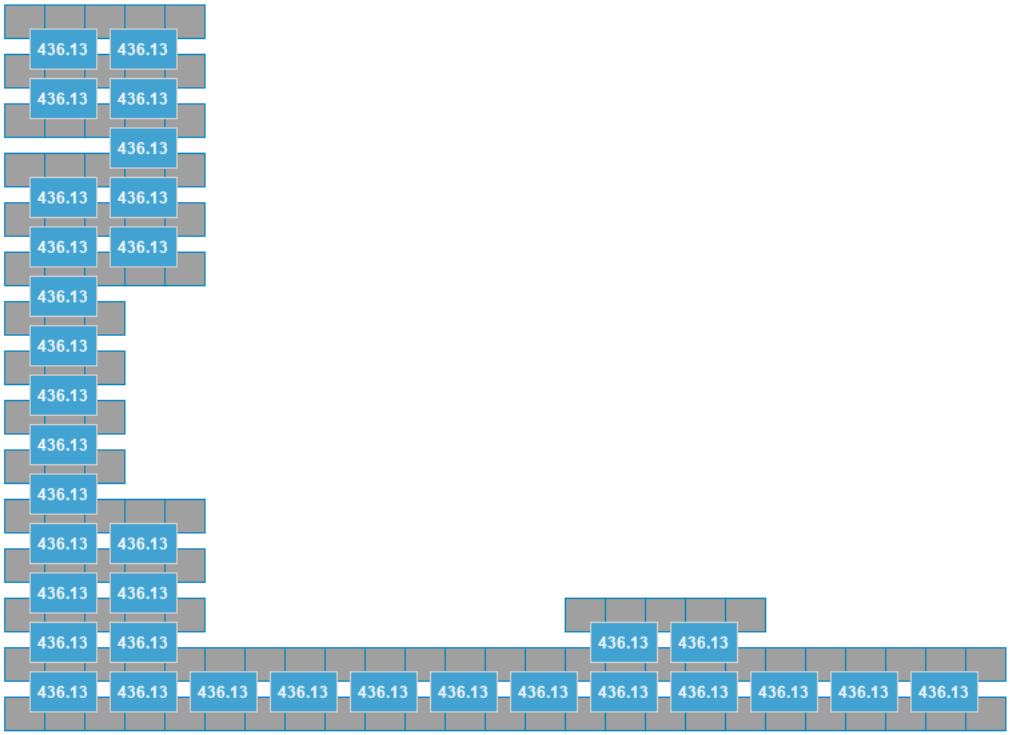
Units: lbs

X Dead Load = Module Wt. + Clamp & Bolt Wt. + Deflector Wt.

LEGEND

Module

SNOW LOAD PER MODULE(S) - Roof Area 1 - Array 1



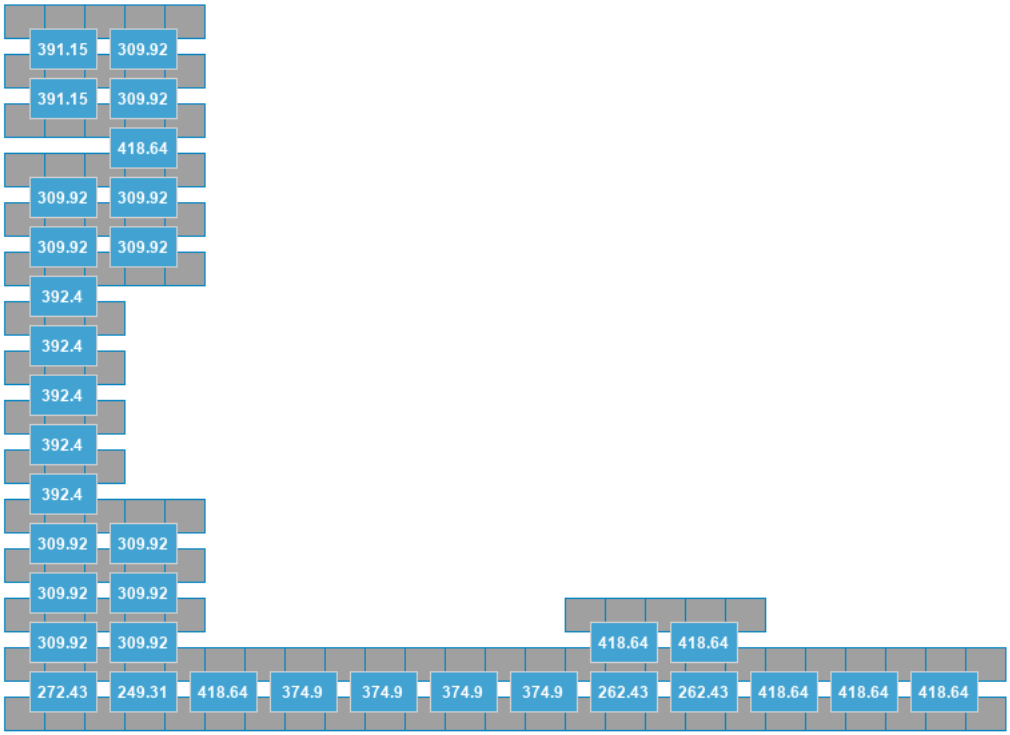
Units: lbs

x Snow Load Per Module = Module Area * Flat Roof Snow Load

LEGEND

Module

WIND LOAD (UPWARD) PER MODULE - Roof Area 1 - Array 1



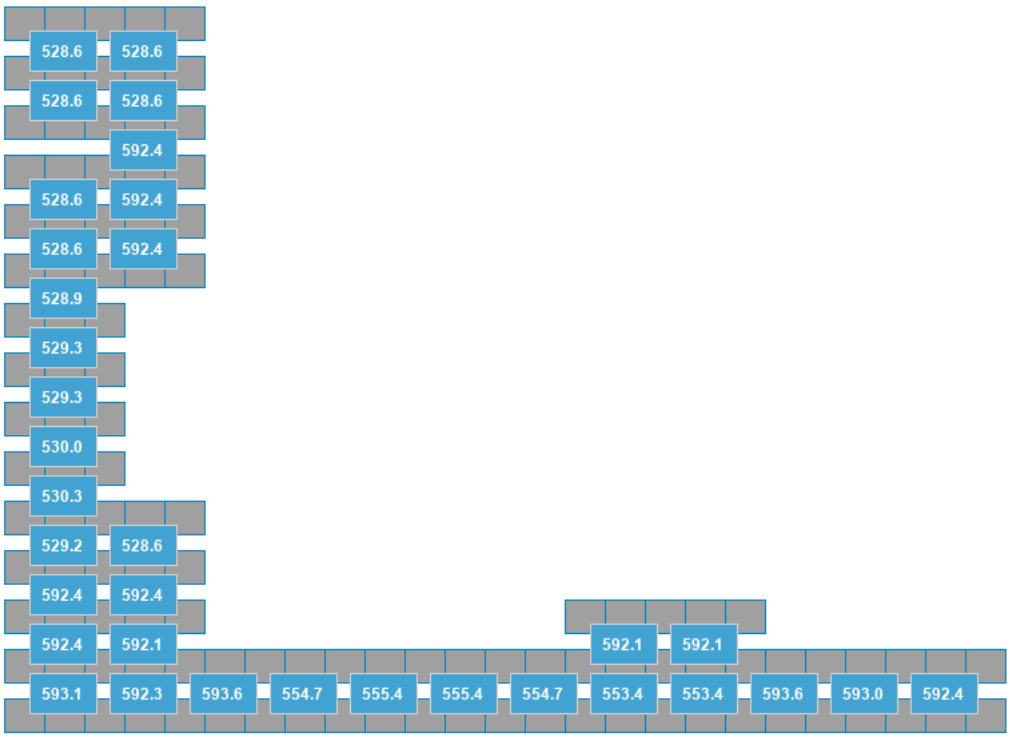
Units: lbs

x Total uplift = Qz * gcp * uplift area

LEGEND

Module

FINAL DOWNLOAD PER MODULE MAP (max(D + 0.75(0.6W) + 0.75S, D + 0.6W, D + S)) - Roof Area 1 - Array 1



Units: lbs

X Downward Force = MAX(DL + SL, DL + 0.6WL, DL + 0.45WL + 0.75SL)

Where:

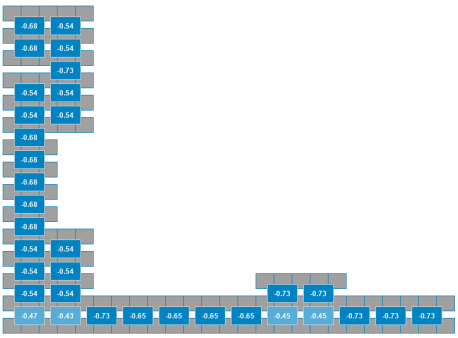
DL = Dead Load
SL = Snow Load
WL = Wind Load(Downward)

LEGEND

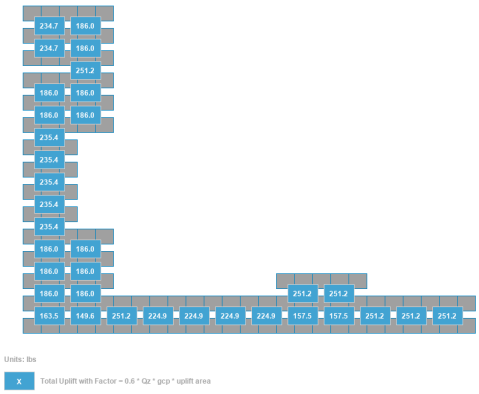
Module

UPLIFT CALCULATIONS

Modified Gcp factor per module (uplift) map - Roof Area 1 - Array 1



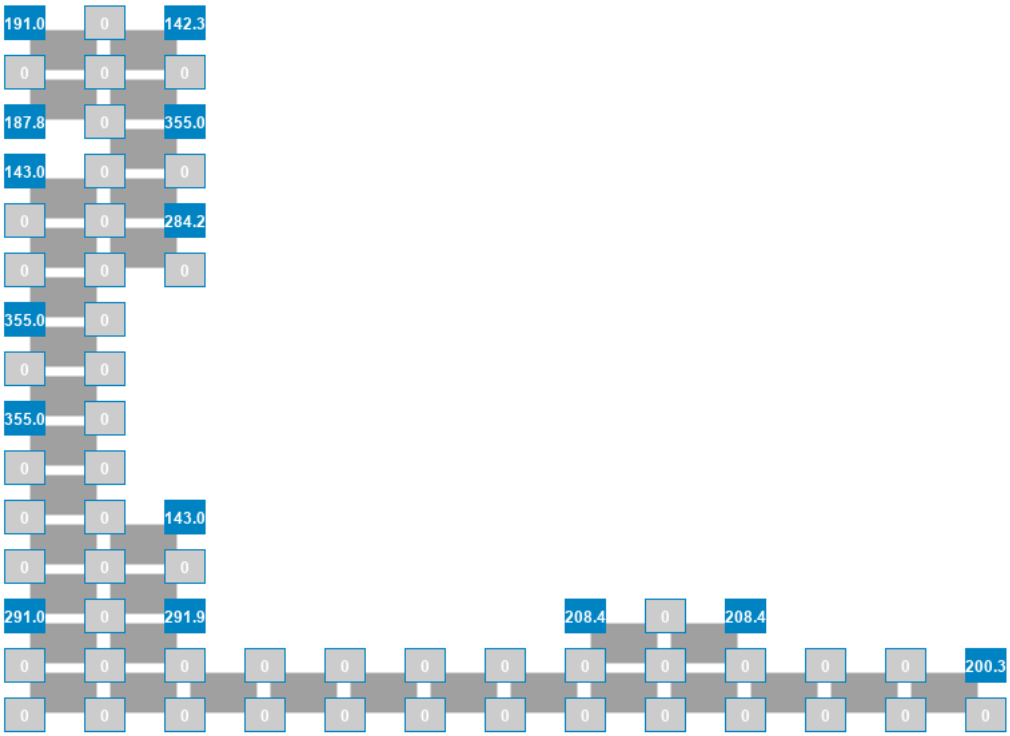
Factored total wind uplift map - Roof Area 1 - Array 1



LEGEND

Module

Uplift load on attachments - Roof Area 1 - Array 1



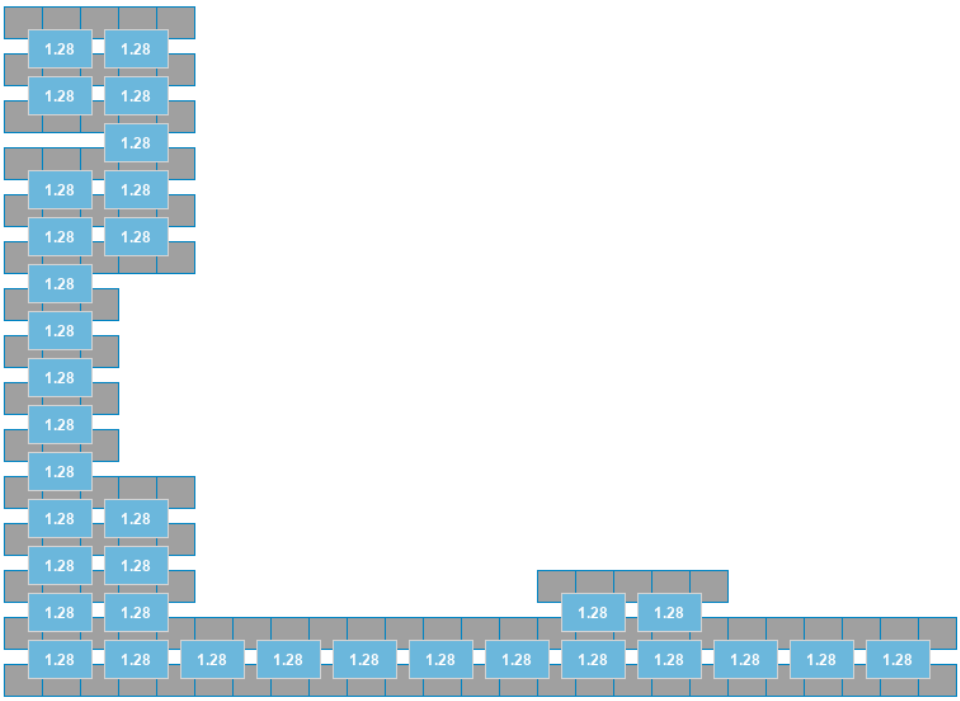
LEGEND

Module

x Utilised attachment capacity on uplift

DRAG CALCULATIONS

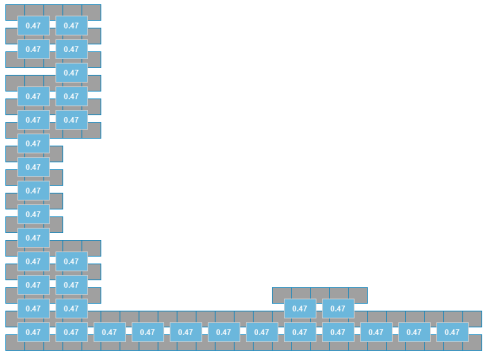
Drag Gcp factor per module - Roof Area 1 - Array 1



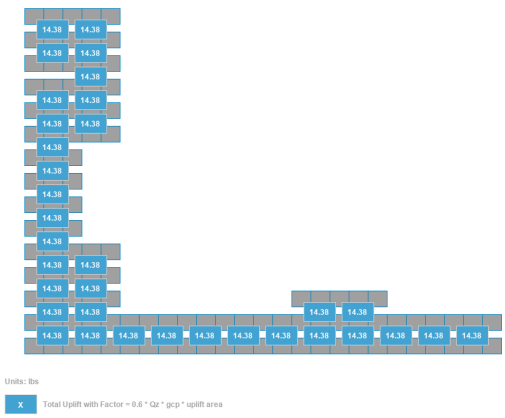
LEGEND

Module

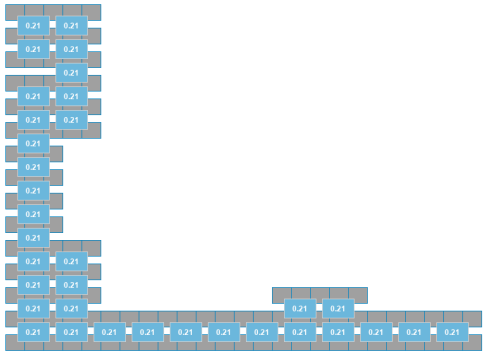
Modified Gcp factor per module (drag effect) - Roof Area 1 - Array 1



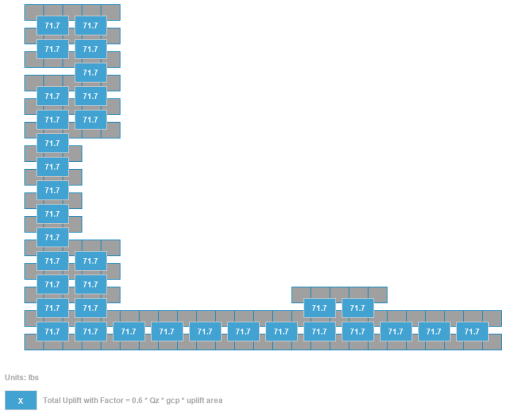
Drag load- Roof Area 1 - Array 1



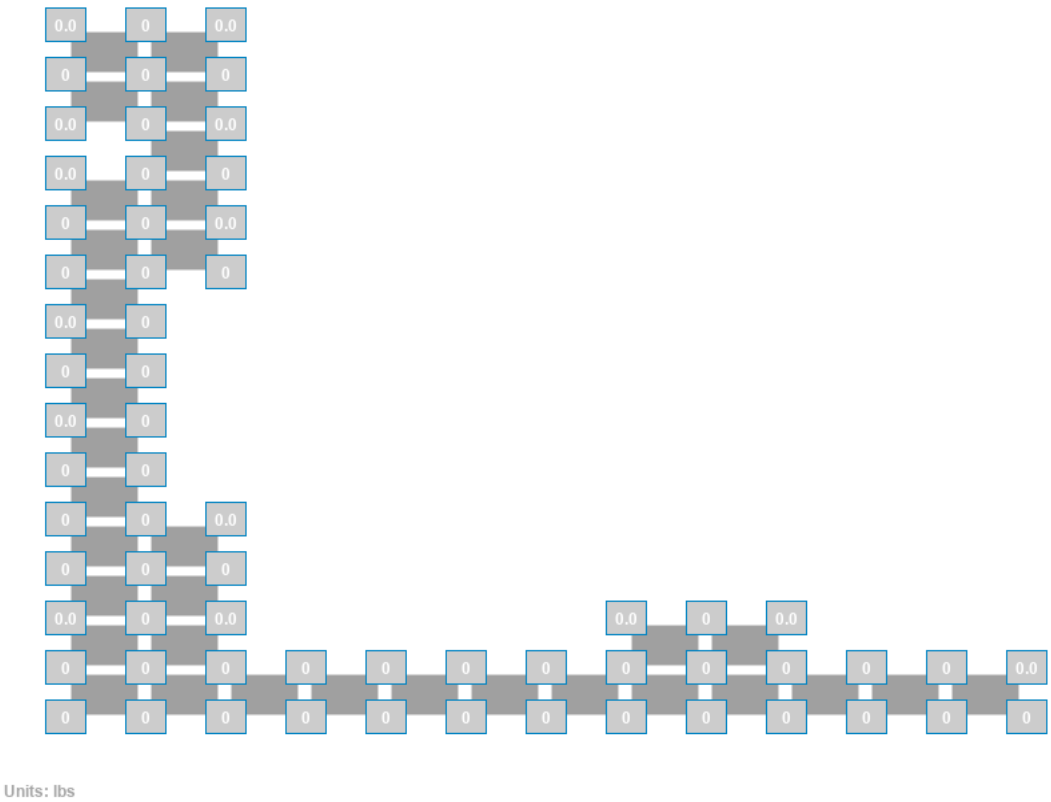
Modified Gcp factor per module (uplift effect) - Roof Area 1 - Array 1



Uplift for drag load- Roof Area 1 - Array 1



Shear load on attachments (Sliding) - Roof Area 1 - Array 1



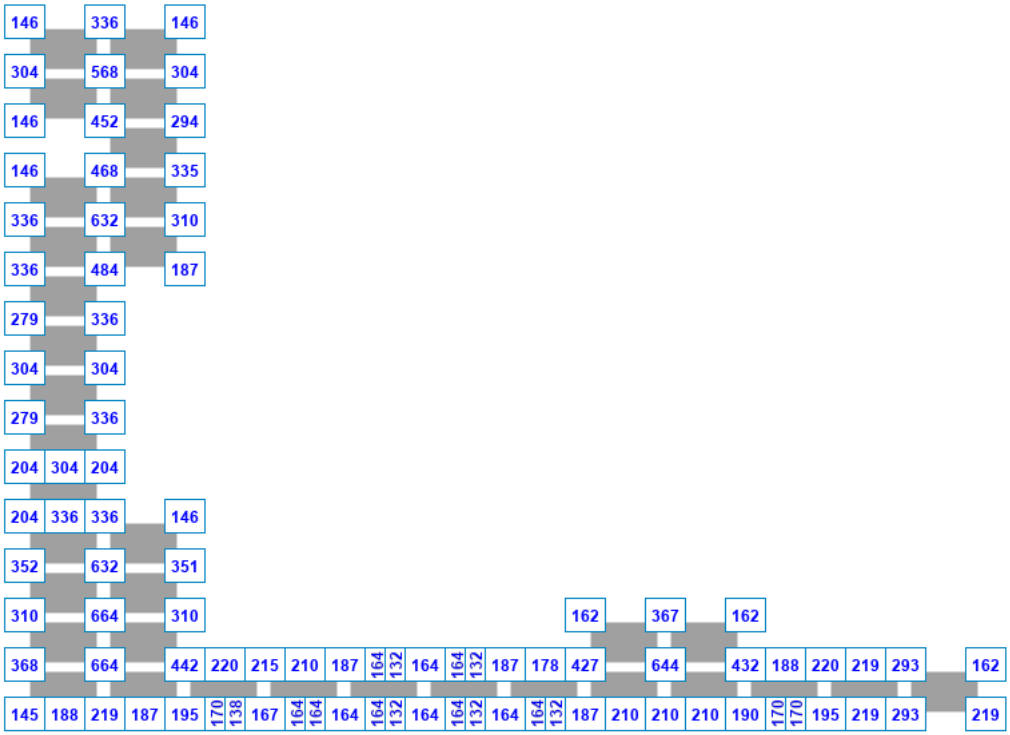
LEGEND

Module

x Utilised attachment capacity on shear

TOTAL DOWNLOAD CALCULATIONS

Total downpoint load per bay - Roof Area 1 - Array 1



Units: lbs

x Down Point Load = Down point load on module contribution+ bay weight with ballast

LEGEND

Module

x Bay - Downpoint load

NOTE

For exact values please check DXF file.

DEAD LOAD PER MODULE(D) - Roof Area 1 - Array 2

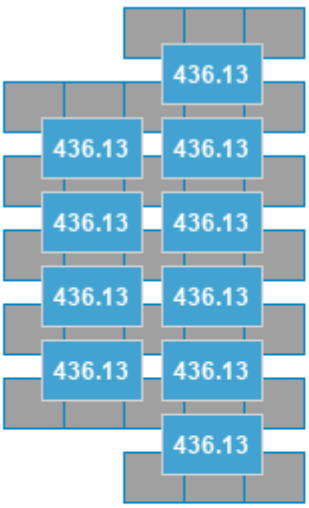
Units: lbs

X Dead Load = Module Wt. + Clamp & Bolt Wt. + Deflector Wt.

LEGEND

Module

SNOW LOAD PER MODULE(S) - Roof Area 1 - Array 2



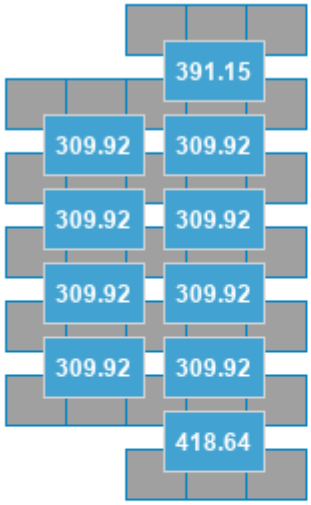
Units: lbs

X Snow Load Per Module = Module Area * Flat Roof Snow Load

LEGEND

Module

WIND LOAD (UPWARD) PER MODULE - Roof Area 1 - Array 2



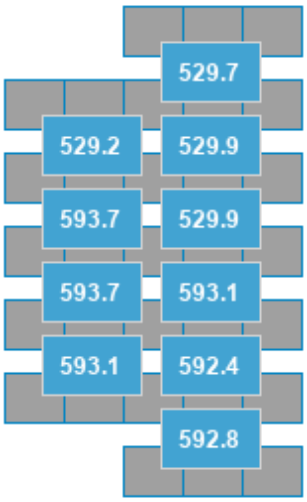
Units: lbs

X Total uplift = Qz * gcp * uplift area

LEGEND

Module

FINAL DOWNLOAD PER MODULE MAP (max(D + 0.75(0.6W) + 0.75S, D + 0.6W, D + S)) - Roof Area 1 - Array 2



Units: lbs

X Downward Force = MAX(DL + SL, DL + 0.6WL, DL + 0.45WL + 0.75SL)

Where:

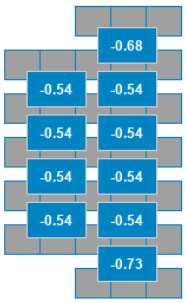
DL = Dead Load
SL = Snow Load
WL = Wind Load(Downward)

LEGEND

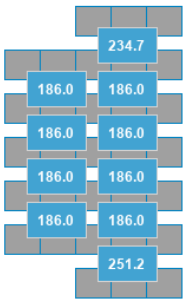
Module

UPLIFT CALCULATIONS

Modified Gcp factor per module (uplift) map - Roof Area 1 - Array 2



Factored total wind uplift map - Roof Area 1 - Array 2



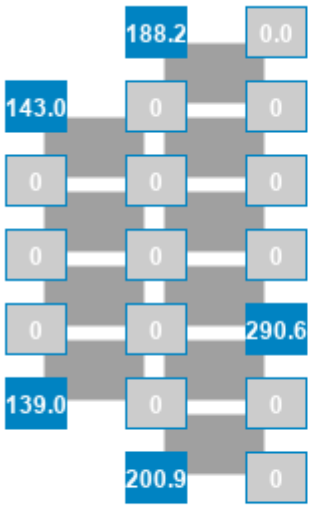
Units: lbs

x Total Uplift with Factor = 0.6 * Qz * gcp * uplift area

LEGEND

Module

Uplift load on attachments - Roof Area 1 - Array 2



Units: lbs

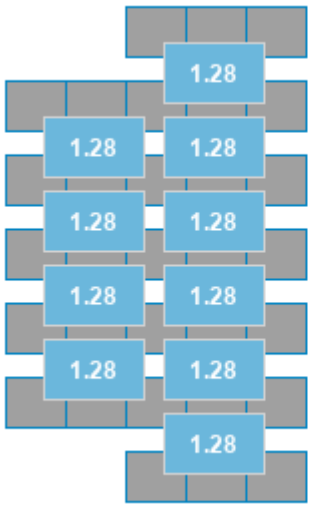
LEGEND

Module

x Utilised attachment capacity on uplift

DRAG CALCULATIONS

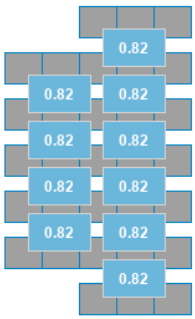
Drag Gcp factor per module - Roof Area 1 - Array 2



LEGEND

Module

Modified Gcp factor per module (drag effect) - Roof Area 1 - Array 2

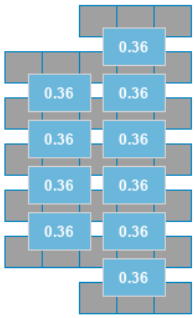


Drag load- Roof Area 1 - Array 2

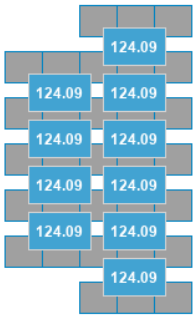
Units: lbs

X Total Uplift with Factor = 0.6 * Qz * gcp * uplift area

Modified Gcp factor per module (uplift effect) - Roof Area 1 - Array 2



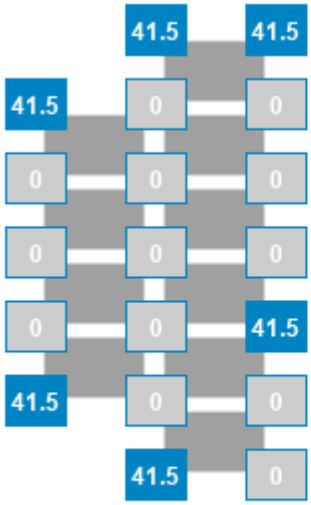
Uplift for drag load- Roof Area 1 - Array 2



Units: lbs

x Total Uplift with Factor = 0.6 * Qz * gcp * uplift area

Shear load on attachments (Sliding) - Roof Area 1 - Array 2



Units: lbs

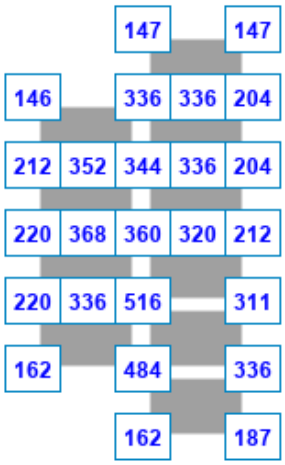
LEGEND

Module

x Utilised attachment capacity on shear

TOTAL DOWNLOAD CALCULATIONS

Total downpoint load per bay - Roof Area 1 - Array 2



Units: lbs

X Down Point Load = Down point load on module contribution+ bay weight with ballast

LEGEND

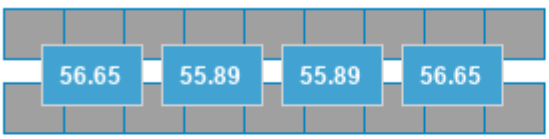
Module

x Bay - Downpoint load

NOTE

For exact values please check DXF file.

DEAD LOAD PER MODULE(D) - Roof Area 1 - Array 3



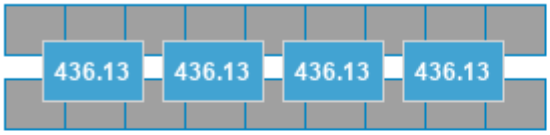
Units: lbs

X Dead Load = Module Wt. + Clamp & Bolt Wt. + Deflector Wt.

LEGEND

Module

SNOW LOAD PER MODULE(S) - Roof Area 1 - Array 3



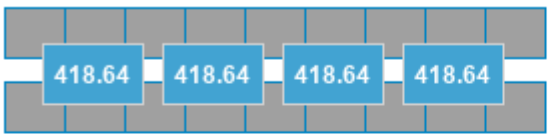
Units: lbs

X Snow Load Per Module = Module Area * Flat Roof Snow Load

LEGEND

Module

WIND LOAD (UPWARD) PER MODULE - Roof Area 1 - Array 3



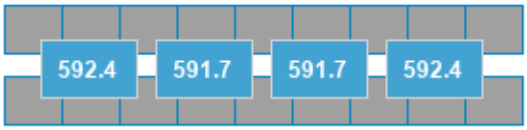
Units: lbs

X Total uplift = Qz * gcp * uplift area

LEGEND

Module

FINAL DOWNLOAD PER MODULE MAP (max(D + 0.75(0.6W) + 0.75S, D + 0.6W, D + S)) - Roof Area 1 - Array 3



Units: lbs

X Downward Force = MAX(DL + SL, DL + 0.6WL, DL + 0.45WL + 0.75SL)

Where:

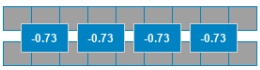
DL = Dead Load
SL = Snow Load
WL = Wind Load(Downward)

LEGEND

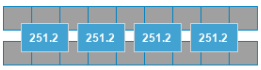
Module

UPLIFT CALCULATIONS

Modified Gcp factor per module (uplift) map - Roof Area 1 - Array 3



Factored total wind uplift map - Roof Area 1 - Array 3



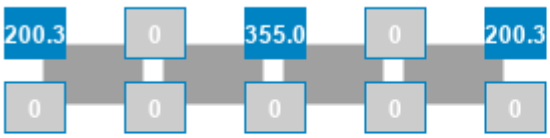
Units: lbs

X Total Uplift with Factor = 0.6 * Qz * gcp * uplift area

LEGEND

Module

Uplift load on attachments - Roof Area 1 - Array 3



Units: lbs

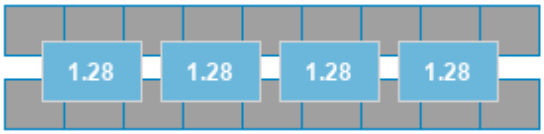
LEGEND

Module

x Utilised attachment capacity on uplift

DRAG CALCULATIONS

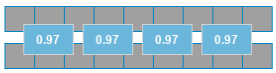
Drag Gcp factor per module - Roof Area 1 - Array 3



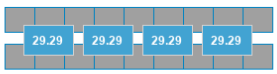
LEGEND

Module

Modified Gcp factor per module (drag effect) - Roof Area 1 - Array 3



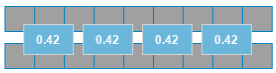
Drag load- Roof Area 1 - Array 3



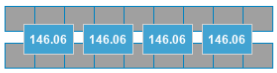
Units: lbs

x Total Uplift with Factor = 0.6 * Qz * gcp * uplift area

Modified Gcp factor per module (uplift effect) - Roof Area 1 - Array 3



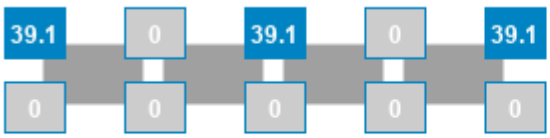
Uplift for drag load- Roof Area 1 - Array 3



Units: lbs

x Total Uplift with Factor = 0.6 * Qz * gcp * uplift area

Shear load on attachments (Sliding) - Roof Area 1 - Array 3



Units: lbs

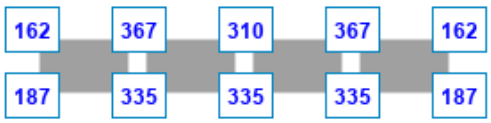
LEGEND

Module

x Utilised attachment capacity on shear

TOTAL DOWNLOAD CALCULATIONS

Total downpoint load per bay - Roof Area 1 - Array 3



Units: lbs

x Down Point Load = Down point load on module contribution+ bay weight with ballast

LEGEND

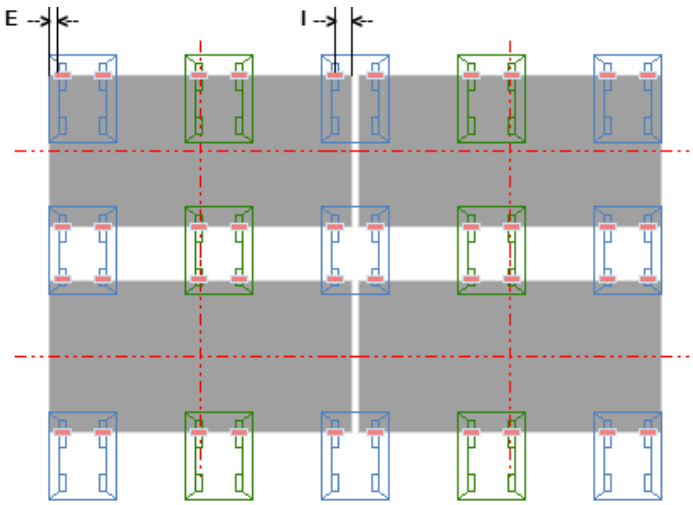
Module

x Bay - Downpoint load

NOTE

For exact values please check DXF file.

CLAMPS LOCATIONS AND MAX MODULE PRESSURES



NOTE :

1. Supplemental bays are placed symmetric to the module.
2. Edge cantilever distance to clamp(E) = 1.63" approx.
3. Edge of module to clamp center(I) = 8.28".
4. Possible cases for RM5 mid support and supplemental bays combinations.
    a. Kits = 4
    b. 1 Kit 1 Bay
    c. 2 Kits 1 Bay
    d. 2 Bays 1 Kit
    e. 1 Bay
    f. 2 Bays

LEGEND


Module


Primary bay


Supplemental bay


Clamp

FACTORED MAX UPWARD PRESSURE ON MODULE :	12.10 psf
FACTORED MAX DOWNWARD PRESSURE ON MODULE:	28.59 psf

NOTE

1. Unirac testing was performed as per AISI S100-2007 standards

1. Terrapin testing report roof mount ballast support coefficient of friction testing RM 2.0 family (July 13, 2016) (Static,Kinetic,Wet and Dry testing performed)

RM5 U-Builder® PRODUCT ASSUMPTIONS

RM5 – Ballasted Flat Roof Systems

Limitations of Responsibility: It is the user's responsibility to ensure that inputs are correct for your specific project.
Unirac is not the solar, electrical, or building engineer of record and is not responsible for the solar, electrical, or building design for this project.

Building Assumptions

1. Risk Category I to IV
2. Minimum allowed setback distance is 1.00 ft
3. Building Height ⩽ 150.00 ft
4. Building Height > 50.00 ft: only where (longest length of building x building height)^0.5 ⩽ 100.00 ft
5. Roof Slope ⩾ 0° (0:12) and ⩽ 3° (5/8:12) for Seismic Design Category C, D, E and F. For low seismic regions Seismic Design Category A and B (provided Array Importance factor = 1.0), Roof Slope ⩾ 0° (0:12) and ⩽ 7° (1 1/2:12).
6. Roofing Material Types: EDPM, PVC, TPO, or Mineral Cap
7. Surrounding Building Grade: Level
8. Building Height > 60.00 ft requires attachments

Ballast Blocks

The installer is responsible for procuring the ballast blocks (Concrete Masonry Units – CMU) and verifying the required minimum weight needed for this design. CMU should comply with ASM standard specification for concrete roof pavers designation (C1491 or C90 with an integral water repellent suitable for the climate it is placed. It is recommended that the blocks are inspected periodically for any signs of degradation. If degradation of the block is observed, the block should immediately be replaced.
The CMU ballast block should have nominal dimensions of 4.00" x 8.00" x 16.00". The actual block dimensions are 0.37" less than the nominal dimensions. Ballast blocks should have a weight as specified for the project in the "Inspection" section of this report.

Design Parameters

1. Risk Category I to IV
2. Wind Design
    a. Basic Wind Speed: 85.00 mph - 120.00 mph (ASCE 7-05)/110.00 mph - 150.00 mph (ASCE 7-10)/90.00 mph - 180.00 mph (ASCE 7-16)
    b. Exposure: B, C or D (ASCE 7-05/ASCE 7-10)
    c. 25 year Design Life/50 year Design Life for ASCE 7-16
    d. Elevation: Insertion of the project at - grade elevation can result in a reduction of wind pressure. If your project is in a special case study region or in an area where wind studies have been performed, please verify with your jurisdiction to ensure that elevation effects have not already been factored into the wind speed. If elevation effects have been included in your wind speed, please select 0.00 ft as the project site elevation.
    e. Wind Tunnel Testing: Wind tunnel testing coefficients have been utilized for design of the system.
3. Snow Design
    a. Ground Snow Load: 0 - 100.00 psf (ASCE 7-10/ASCE 7-16)
    b. Roof Snow Load: Calculation per Section 7.3 (ASCE 7-05/ASCE 7-10/ASCE 7-16)
    c. Unbalanced/Drifting/Sliding: Results are based on the uniform snow loading and do not consider unbalanced, drifting, and sliding conditions
4. Seismic Design
    a. Report *SEAOC PV1-2012/ASCE 7-16 SECTION 13.6.12 – Structural Seismic Requirements and Commentary for Rooftop Solar Photovoltaic Arrays*
    b. Seismic Site Class: A, B, C, or D (ASCE 7-05/ASCE 7-10/ASCE 7-16)

Properties

1. Bay Weight: 7.20 lbs
2. Wind Deflector Weight: 525.44 lbs
3. Module Gaps (E/W) = 0.25"
4. Wind Deflectors: Wind deflectors on the east and west edges of the array should overhang the east and west modules by six inches for Type 1 modules on the north rows only. Wind deflectors on the east and west edges of the array should overhang the east and west modules by six inches for Type II modules.
5. Bays: North row bays overhang the module by ~6.50" and south row bays overhang the module by ~12.25"

Testing

1. Coefficient of Friction
2. Wind Tunnel
3. UL 2703
4. Component Testing (Bay and Clamp)

Setbacks

For the wind tunnel recommendations in U-Builder® to apply, the following setbacks should be observed/followed for U-Builder® wind design:

1. Modules should be placed a minimum of 3.00 ft from the edge of the building in any direction.
2. If the array is located near an obstruction that is 3.50 ft wide and 3.50 ft high or larger, the nearest module of the array must be located a distance from the obstruction that is greater than or equal to the height of the obstruction. Exception: When using ASCE 7-16 Building Code and using the obstruction feature in the module editor to accurately model the size and location of obstruction
3. Installations within the setbacks listed above require site specific engineering.
4. The setbacks above are for wind. High seismic areas, fire access isles, mechanical equipment, etc., may require larger setbacks than listed above for wind.

Site Specific Engineering

Conditions listed below are beyond the current capabilities of U-Builder®. Site specific engineering is required.

1. Building assumptions and design parameters outside of U-Builder® assumptions
2. Wind tunnel testing reduction factors are not permitted by the Authority Having Jurisdiction (AHJ).
3. Seismic designs that fall outside SEAOC PV1-2012/ASCE 7-16 SECTION 13.6.12 recommendations (>3% roof slope, or AHJ's that require shake table testing or non-linear site-specific response history analysis)
4. Signed and sealed site-specific calculations, layouts, and drawings
5. Building that is not enclosed and categorized as open structures, carport or others

Notes:

- Please contact Engineering.Services@unirac.com for more information.