May 21, 2026

Melanie Bachman, Esq.
Executive Director and Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **PETITION NO. 1687- Plainfield Solar One, LLC** petition for a declaratory ruling, pursuant to Connecticut General Statutes §4-176 and §16-50k, for the proposed construction, maintenance and operation of a 4.0-megawatt AC solar photovoltaic generating facility located at Parcel No. 002-053A-0058, Exley Road, Plainfield, Connecticut, and associated electrical connection.

Compliance with Conditions of Approval Nos. 1, 2, 3, 6, 9, 10, 12 & 13

Dear Attorney Bachman:

In accordance with the Siting Council's February 6, 2026, approval of the above-referenced Petition for Declaratory Ruling, we are providing several materials related to conditions No. 1, 2, 3, 6, 9, 10, 12 and 13 of the approval that may be downloaded via this link (Conditions of Approval) and an explanation of how each condition is being addressed herewith.

Condition No. 1 – In accordance with condition #1, all changes must be approved by Council Staff. As such, attached are revised site plans that reflect some adjustments to the Facility design. The design adjustments are as follows:

A temporary gravel construction staging and laydown area has been added immediately west of the main construction entrance. This will be placed in the area that was previously occupied by the existing tree farm that was already planning to relocate. After completion of construction, the gravel will be removed and the surface restored to a grassed, stabilized condition.

The DC design of the system has been adjusted slightly within the same fence limits. The previously approved design set forth the installation of 2,940 First Solar Model FS-6465-P 465-Watt modules and 8,058 First Solar Model FS-6465A-P-B-I 465-Watt modules for a total system size of 5,114.07 kW DC. The proposed new design amends that to an installation of 4,008 First Solar Model FS-6465A-P-B, 465-Watt modules, 2,028 First Solar Model FS-6460A-P-B, 460-Watt modules, and 3,672 Phono Solar Model PS590M8GFH/THN, 590-watt modules for a new total system size of 4,963.08 kW DC. A data sheet and TCLP report for the newly proposed Phono modules are included herewith. The AC system size and inverter design of the system remains the same.

Condition No. 2 – A copy of the DEEP Stormwater Permit approval letter is being provided herewith.

Condition No. 3 - A copy of the final structural design for the racking system stamped by a Professional Engineer duly licensed in the State of Connecticut is being provided herewith.

Condition No. 6 – The final landscaping/screening plan for the facility is depicted on sheets 2.11 and 2.12 of the revised plans that are being provided herewith, as previously indicated in our response to Condition No. 1.

Condition No. 9 – An agricultural activity plan for the proposed sheep grazing, approved by the Department of Agriculture, was previously provided in Appendix M of the Petition materials. The addition of the requested, executed Hold Harmless Agreement for this activity is being included herewith as a supplement to those materials.

Condition No. 10 – A copy of a Spill Prevention and Materials Storage Plan is being provided herewith.

Condition No. 12 – The Petitioner consulted with Eversource and this resulted in the Eversource service poles being relocated further south, such that all Eversource on-site service poles are now located on the customer property and not within the public right of way. This in turn resulted in a shift southward (further into the site) of the customer-side distribution poles. These changes are reflected on sheet 2.11 of the revised plans that are being provided herewith and are previously indicated in our response to Conditions No. 1 & 6.

Condition No. 13 – This letter shall serve as notice that we intend to commence construction on or around June 8, 2026.

The remaining conditions of approval that must be addressed before facility operations commence or post-construction will be addressed at later dates as appropriate, under separate cover.

If you have any questions concerning this letter or any of the materials provided, please contact me.

Sincerely,

James Cerkanowicz

James Cerkanowicz, PE.
Plainfield Solar One, LLC

Electronic Cc:
Bryan Fitzgerald, Plainfield Solar One, LLC
Bradley Parsons, PE. PMP., Plainfield Solar One, LLC
Lee D. Hoffman, Esq., Pullman & Comley, LLC
Kathryn E. Boucher, Esq., Pullman & Comley, LLC
Liana Feinn, Esq., Pullman & Comley, LLC

Connecticut
Department of Energy & Environmental Protection
WATER PERMITTING & ENFORCEMENT

April 29, 2026

Plainfield Solar One, LLC
124 Lasalle Rd
West Hartford, CT 06107-2368

RE: Permit Issuance
NPDES Construction Stormwater General Permit
Application No. 202600379 & Permit No. CTR100008

Dear Permittee:

Pursuant to Section 22a-430 of Chapter 446k, Connecticut General Statutes ("Conn. Gen. Stat."), and Regulations of Connecticut State Agencies ("Regs. Conn. State Agency") adopted thereunder, as amended, and Section 402(b) of the Clean Water Act, as amended, 33 USC 1251, et. Seq., the Department of Energy and Environmental Protection ("DEEP") has issued the attached authorization to discharge under the National Pollutant Discharge Elimination System ("NPDES") *General Permit for the Discharge of Stormwater from Construction Activities*, issued on January 1, 2026 for the above-referenced facility.

Review the entire General Permit, its conditions, and the supporting regulations. This permit expires on December 31, 2030. Please be advised that on and after the effective date of this Notice of Coverage, the Permittee must comply with all terms, conditions, and limitations of the permit, the requirements of the regulations that govern the authorized activity, and any other applicable state, federal, or local laws or regulations. **All activities must conform to that which is specifically authorized**.

This authorization is not transferable to a new entity. To change the name of the existing permit holder, submit the Notice of Change form. **In case of an emergency, please contact DEEP Dispatch at 860-424-3333**.

Report instances of noncompliance on DEEP's website here: Stormwater Management

Retain a copy of this letter and Notice of Coverage in your Stormwater Pollution Control Plan (SPCP) for your records. Should you have any questions about this notice or any other questions concerning the general permit, please visit the Construction Stormwater website at Construction Stormwater Program or contact the program staff at deep.stormwaterconstruction@ct.gov.

Best Regards,

Audra Godfrey, Director
Water Permitting and Enforcement Division
Bureau of Materials Management and Compliance Assurance

Connecticut
Department of Energy & Environmental Protection
WATER PERMITTING & ENFORCEMENT

NOTICE OF COVERAGE

Authorization to Discharge Stormwater under the Construction Stormwater General Permit

Pursuant to Section 22a-430b of the Connecticut General Statutes, as amended, and in accordance with the provisions of the National Pollutant Discharge Elimination System ("NPDES") *General Permit for the Discharge of Stormwater from Construction Activities*, issued on January 1, 2026 (hereinafter referred to as the "Construction Stormwater General Permit" or "General Permit"), the Commissioner of Energy and Environmental Protection (hereinafter, the "Commissioner") hereby grants authorization to the following permittee at the following site:

Permittee Information:	**Site Information:**
Plainfield Solar One, LLC	Plainfield Solar One
124 Lasalle Rd	0 Exley Road
West Hartford, CT 06107-2368	Plainfield, CT 06374

This authorization is issued based upon the receipt of application no. 202600379 submitted by the permittee in accordance with the Construction Stormwater General Permit. This Notice of Coverage ("NOC") constitutes written confirmation that the Commissioner has received a complete application from the Permittee and that the Permittee is hereby authorized to discharge stormwater associated with construction activity from the site location listed above, in accordance with the terms and conditions of the General Permit. The following permit has been assigned to this site:

Permit Number: CTR100008
Effective Date of Authorization: April 29, 2026
Permit Expiration Date: December 31, 2030

It is expressly understood that this authorization does not constitute a determination by the Connecticut Department of Energy and Environmental Protection regarding the validity, accuracy, or completeness of any information provided in the application or associated documentation. The electronic certification by the Permittee represents that, to the best of their knowledge and belief, the site is eligible for coverage under the General Permit and that all submitted information is true, accurate, and complete. Authorization to discharge shall be considered void if any information submitted in the registration is found to be false, misleading, or if the site is not eligible for coverage. The Permittee shall at all times ensure compliance with all provisions, limitations, and conditions of the General Permit, including applicable effluent limits, benchmark monitoring requirements, and all sector-specific performance standards. Any modification, addition, or removal of outfalls must be approved in accordance with the general permit. This NOC does not relieve the Permittee of compliance with other federal, state, or local laws.

Authorization is issued on April 29, 2026

Issued by: Audra Godfrey, Director
Water Permitting & Enforcement Division
Bureau of Materials Management and Compliance Assurance

Obligations of Construction Stormwater Permit Holders

Any entity authorized by the Commissioner of Energy and Environmental Protection under the NPDES *General Permit for the Discharge of Stormwater from Construction Activities* ("Construction Stormwater General Permit" or "general permit") assumes specific responsibilities to ensure ongoing compliance with terms and conditions of the permit. This document provides an overview of key permit obligations but does not serve as a comprehensive list of all requirements. Permit holders are responsible for reviewing and complying with all applicable provisions of the general permit.

I. General Conditions

The permittee must at all times continue to meet the eligibility and authorization set forth in Section 2 of the general permit for the duration of coverage. Authorized activities must be conducted in accordance with all applicable general and sector-specific conditions, including but not limited to the following:

- Comply with discharge-specific requirements, if applicable.
- Implement all stormwater control measures required by the general permit, such as:
  - Good housekeeping practices
  - Perimeter controls
  - Inlet Protection
  - Containment of liquids and wastewater
  - Anti-tracking control measures
  - Dewatering control measures
  - Dust control
  - Spill prevention and response procedures
  - Erosion and sediment controls
  - Preventive maintenance
  - Stormwater management structures and practices
  - Infiltration and groundwater quality protection
  - Employee training
  - Posting a Notice of Construction Activity
- Develop and maintain a Stormwater Pollution Control Plan (SPCP) in accordance with the general permit.
- Conduct all required inspections.
- Implement and document corrective actions when deficiencies or permit violations occur.
- Maintain records and documentation as required by the general permit.
- Report any permit violations as required by the general permit.

II. Inspection and Reporting Requirements

The Permittee shall comply with all applicable inspection and reporting provisions set forth in the general permit, including, but not limited to the following categories of inspections:

- Plan Implementation Inspection
- Routine inspections
- Post Construction Inspection
- Final Stabilization Inspection
- Termination Inspection

III. Recordkeeping Requirements

The Permittee shall maintain a current copy of the Stormwater Pollution Control Plan on site from the date construction is initiated until the date construction at the site is complete. All records, communications, inspection reports, logs, data, reports, and other relevant documentation shall be retained in the Stormwater Pollution Control Plan (SPCP) for a minimum of five (5) years from the date that the Notice of Termination is submitted to the Commissioner, unless otherwise specified by the Commissioner. Records shall be made available to the Department upon request.

IV. Compliance Obligations

The permittee shall at all times ensure compliance with all applicable conditions and requirements of the Construction Stormwater General Permit. The permittee is responsible for the development, maintenance, and implementation of a current SPCP and the performance of regular activities, including, but not limited to:

- Conducting inspections of stormwater controls, sediment and erosion controls, and best management practices
- Implementing corrective actions where deficiencies, exceedances, or noncompliance are identified.

Failure to maintain compliance with any of the above requirements may result in enforcement actions, including penalties, modification, or revocation of coverage under the general permit.

HOLD HARMLESS AGREEMENT

Plainfield Solar One, LLC ("Plainfield S1") hereby agrees that it will indemnify and hold harmless the Connecticut Siting Council (the "Siting Council") and its respective employees, officers, agents, and representatives (collectively, the "Indemnified Parties") from and against any and all losses, claims, actions, costs and expenses, judgments, subrogations, or other damages (collectively, "Claims") brought against or incurred by the Siting Council or the Indemnified Parties due to injury to a person or damage to property at the solar photovoltaic facility site located at Exley Road in Plainfield, Connecticut (the "Premises") to the extent such injury or damage arises out of the agricultural co-use plan and the corresponding presence of third parties within the fenced solar facility site in the performance of the agricultural co-use plan, unless such Claims are the result of the negligence, recklessness or willful misconduct of the Siting Council or the Indemnified Parties.

This Hold Harmless Agreement shall remain in full force and effect for so long as Plainfield S1 is developing and operating the solar facility on the Premises and performing the agricultural co-use plan, and shall terminate upon the earlier of the decommissioning of the solar facility or the termination of the agricultural co-use plan.

IN WITNESS WHEREOF, this Hold Harmless Agreement has been executed as of the 20th day of May, 2026.

Plainfield Solar One, LLC

By: _____
Name: Brian Smith
Title: Authorized Person

Spill Prevention and Materials Storage Plan

Plainfield Solar One, LLC
4 MW AC Ground Mounted Solar Project
Exley Road, Plainfield, Connecticut

Date:

May 2026

Prepared By:

VCP ECP, LLC

124 LaSalle Road, 2nd Floor

West Hartford, CT 06107

Table of Contents

1. Introduction

2. General Requirements

3. Specific Spill Response and Material Handling Procedures

4. Site and Emergency Contact Information

5. Incident Report Template

1. Introduction

This Spill Prevention and Materials Storage Plan was developed for the construction of a 4 MW ground mounted solar array located at Exley Road, in Plainfield, Connecticut.

2. General Requirements

The project's location is proximate to sensitive environmental features and as such the Contractor is required to take precautions related to the storage of petroleum materials and equipment refueling. The Contractor is responsible for containing and properly cleaning up any inadvertent fuel or petroleum (i.e., oil, hydraulic fluid, biodegradable transformer insulating fluid, etc.) spill.

The Contractor shall not keep any above ground fuel or oil storage onsite greater than 1,320 gallons in cumulative volume.

The Contractor is responsible for keeping and maintaining a spill containment kit on Site for the duration of the construction of the project. The spill containment kit shall consist of a sufficient supply of absorbent pads and absorbent material, as well as contain this Spill Prevention and Materials Storage Plan. In addition, a waste drum will be kept on site to contain any used absorbent pads/material for proper and timely disposal off site in accordance with applicable local, state, and federal laws.

The Contractor shall make all workers and subcontractors on Site aware of this Spill Prevention and Materials Storage Plan and shall include it as part of their job briefings.

3. Specific Spill Response and Material Handling Procedures

The Contractor should adhere to the following spill response and material handling procedures.

<u>Refueling and Material Storage</u>

- All light duty construction support vehicles shall be fueled off site at a service station.
- Refueling of machinery on site shall take place in a supervised manner to avoid any overfills.
- Refueling of machinery shall take place on an impervious pad with secondary containment designed to contain petroleum fuels.
- Any refueling tanks and/or drums or other hazardous materials that must be kept on site shall be stored on an impervious surface utilizing secondary containment and be kept at least 100 feet from any wetlands or water courses located on site.
- All the on-site refueling and materials storage shall be within the gravel laydown area

<u>Initial Spill Response Procedure</u>

- Immediately stop operation and shut off all equipment
- Remove any sources of ignition

- Locate the source of the spill and contain and/or stop the spill from continuing
- Once the spill is stopped or contained, follow any flow paths of the spill and prevent or contain any further release into sensitive environmental areas.
- Ensure that all contractors and subcontractors on site are notified of the spill.

Spill Clean Up

- Obtain the Spill Response Kit from the designated location on Site
- Place the absorbent materials directly on the spill
- Continue to place the absorbent materials around the spill to prevent any further release
- Ensure that the spill is eliminated or isolated at the source
- Determine the type and approximate amount of material that was spilled
- Contact the appropriate Site contacts and local, state, and/or federal agencies as required.
- Contact a disposal company to properly dispose of any contaminated materials
- Fill a report on the incident.

Reporting

- Complete an incident report for each spill
- Submit a completed incident report to local, state and federal agencies, as required.
- The Connecticut Department of Energy & Environmental Protection (DEEP), Emergency Response Unit should be contacted at: (860) 424-3338, in the event of an emergency spill

4. Site and Emergency Contact Information

Project Owner: Plainfield Solar One, LLC Phone: (860) 288-7215	**Local Fire Department:** Costantino Galasso, Fire Marshall Phone (non-emergency): (860)230-3013 Phone (emergency): 911
Project Site Contact: Plainfield Solar One, LLC Name: Dan Sheridan – Project Superintendent Phone: 860.336.7244	**Local Police Department:** Mario A. Arriaga, Chief of Police Phone (non-emergency): (860)564-0804 Phone (emergency): 911
Construction Oversight Contact: Plainfield Solar One, LLC Name: Steven DeNino, Chief Operating Officer Phone: (860) 288-7215	**State Agency: Connecticut Department of Energy & Environmental Protection (DEEP), Emergency Response Unit** Phone: (860) 424-3338 Alternate Phone: (860) 424-3333
Spill Clean Up Contractor: **Clean Harbors Environmental** 51 Broderick Road, Bristol, CT 06010 Phone: (860) 583-8917	

5. Incident Report Template

Plainfield Solar One - Spill Report Form

Date of Spill:_____ Date of Spill Discovery:_____

Time of Spill:_____ Time of Spill Discovery:_____

Name and Title of Discoverer:_____

Type of material spilled and manufacturer's name:_____

Legal Description of spill location to the quarter section:_____

Directions from nearest community:_____

Estimated volume of spill:_____

Weather conditions:_____

Topography and surface conditions of spill site:_____

Spill medium (pavement, sandy soil, water, etc.):_____

Proximity of spill to surface waters: _____

Did the spill reach a waterbody? _____Yes _____No

If so, was a sheen present? _____Yes _____No

Describe the causes and circumstances resulting in the spill:_____

_____

_____

Describe the extent of observed contamination, both horizontal and vertical: _____

_____

_____

Describe immediate spill control and/or cleanup methods used and implementation schedule: _

_____

Status of cleanup actions:_____

Name and Company for the following:

Construction Superintendent:_____

_____

Spill Coordinator:_____

_____

Verogy Representative:_____

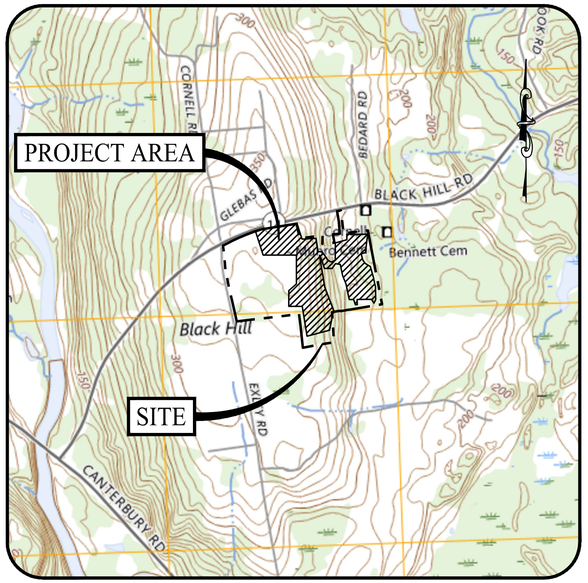
Person Who Reported the Spill:_____

_____

Environmental Inspector:_____

Form completed by:_____Date:_____

Spill Coordinator must complete this for any spill, regardless of size, and submit the form to the Verogy Representative within 24 hours of the occurrence.



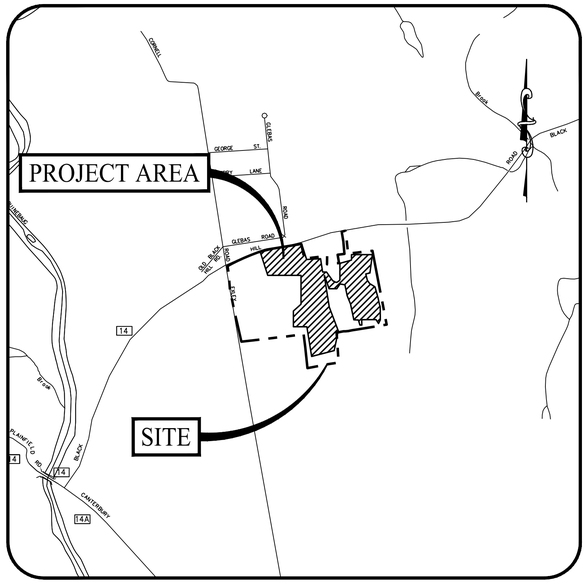
USGS MAP

SCALE: 1" = 1,000'

PROPOSED 4.0 MW SOLAR PHOTOVOLTAIC ARRAY

0 EXLEY ROAD
(PARCEL ID: 002-053A-0058)
PLAINFIELD, CONNECTICUT

CIVIL CONSTRUCTION DRAWINGS



LOCATION MAP

SCALE: 1" = 1,000'

PREPARED FOR:

VEROGY

124 LASALLE ROAD, 2ND FLOOR
WEST HARTFORD, CONNECTICUT

OWNER

MICHAEL & COLLEEN TULES
225 BLACK HILL ROAD
PLAINFIELD, CONNECTICUT 06374

APPLICANT

VEROGY
124 LASALLE ROAD, 2ND FLOOR
WEST HARTFORD, CONNECTICUT 06107

PROPERTY INFORMATION

ADDRESS: 0 EXLEY ROAD, PLAINFIELD, CONNECTICUT
PARCEL ID: 002-053A-0058
AREA: ±58.6 AC

ENGINEER OF RECORD

KEVIN SOLLI, P.E., CPESC, LEED AP BD+C
LICENSE NO. 25759
SOLLI ENGINEERING, LLC
501 MAIN STREET
MONROE, CONNECTICUT 06468
(203) 880-5455

SURVEYOR OF RECORD

CHARLES G. GIDMAN, L.S. LICENSE NO. 70108
NORTHEAST SURVEY CONSULTANTS
3 FERRY STREET
EASTHAMPTON, MASSACHUSETTS 01027
(413) 203-5144

SOILS SCIENTIST

ERIC DAVISON
DAVISON ENVIRONMENTAL, LCC
10 MAPLE STREET
CHESTER, CONNECTICUT 06412
(860) 803-0938

DRAWING LIST

SHEET #	SHEET NAME	PLAN DATE	LATEST REVISION
0.00	COVER SHEET	02/10/26	05/04/26
0.10	PERMIT APPROVALS, NOTES, LEGEND & ABBREVIATIONS	02/10/26	N/A
1 OF 1	EXISTING CONDITIONS PLAN	08/12/25	N/A
2.10	OVERALL SITE LAYOUT PLAN	02/10/26	05/04/26
2.11	SITE LAYOUT PLAN (SHEET 1 OF 2)	02/10/26	05/04/26
2.12	SITE LAYOUT PLAN (SHEET 2 OF 2)	02/10/26	05/04/26
2.21	GRADING & DRAINAGE PLAN (SHEET 1 OF 2)	02/10/26	05/04/26
2.22	GRADING & DRAINAGE PLAN (SHEET 2 OF 2)	02/10/26	05/04/26
2.31.1	SOIL EROSION & SEDIMENT CONTROL PLAN PHASE I (SHEET 1 OF 2)	02/10/26	05/04/26
2.31.2	SOIL EROSION & SEDIMENT CONTROL PLAN PHASE I (SHEET 2 OF 2)	02/10/26	05/04/26
2.32.1	SOIL EROSION & SEDIMENT CONTROL PLAN PHASE II (SHEET 1 OF 2)	02/10/26	05/04/26
2.32.2	SOIL EROSION & SEDIMENT CONTROL PLAN PHASE II (SHEET 2 OF 2)	02/10/26	05/04/26
2.41	SOIL EROSION & SEDIMENT CONTROL NOTES & DETAILS	02/10/26	N/A
3.01	CONSTRUCTION DETAILS	02/10/26	N/A

PREPARED BY:

SOLLI ENGINEERING

MONROE, CT | WEST HARTFORD, CT | QUINCY, MA

Rev. #:	Date	Description
2	05/04/26	Layout Revisions
1	04/08/26	Layout Revisions

Project:
PROPOSED SOLAR PHOTOVOLTAIC ARRAY
0 EXLEY ROAD
(PARCEL ID: 002-053A-0058)
PLAINFIELD, CONNECTICUT

Sheet Title: COVER SHEET

Sheet #: 0.00

SITE PLAN NOTES

1. EXISTING BOUNDARY, TOPOGRAPHY AND SITE CONDITIONS INFORMATION TAKEN FROM A PLAN ENTITLED "PLAN OF LAND IN PLAINFIELD, CT, EXLEY ROAD"; SCALE 1"=100; DATED: 08/12/2025; BY NORTHEAST SURVEY CONSULTANTS.
2. ALL CONSTRUCTION SHALL COMPLY WITH TOWN OF PLAINFIELD STANDARDS, CONNECTICUT DEPARTMENT OF TRANSPORTATION STANDARDS, CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION STANDARDS, AND SPECIFICATIONS IN THE ABOVE REFERENCED INCREASING HIERARCHY. IF SPECIFICATIONS ARE IN CONFLICT, THE MORE STRINGENT SPECIFICATION SHALL APPLY. ALL CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE OSHA, FEDERAL, STATE, AND LOCAL REGULATIONS.
3. THE OWNER IS RESPONSIBLE FOR OBTAINING ALL NECESSARY ZONING PERMITS REQUIRED BY GOVERNMENT AGENCIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL OBTAIN ALL COUNTY AND TOWN CONSTRUCTION PERMITS. THE CONTRACTOR SHALL POST ALL BONDS, PAY ALL FEES, PROVIDE PROOF OF INSURANCE, AND PROVIDE TRAFFIC CONTROL NECESSARY FOR THIS WORK.
4. THE CONTRACTOR SHALL PERFORM ALL SITE WORK PROPOSED HEREON IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL PERMITS / APPROVALS AND CONDITIONS OF APPROVALS ISSUED FOR THIS PROJECT. THE OWNER IS TO PROVIDE THE CONTRACTOR WITH ALL APPROVALS / DOCUMENTATION PRIOR TO CONSTRUCTION.
5. PRIOR TO CONSTRUCTION THE CONTRACTOR IS TO SCHEDULE AND COORDINATE A PRE-CONSTRUCTION MEETING WITH THE OWNER (OR OWNER'S REPRESENTATIVE), CIVIL ENGINEER OF RECORD, AND CT DEEP AND/OR LOCAL CONSERVATION DISTRICT REPRESENTATIVE.
6. THE OWNER SHALL BE RESPONSIBLE TO HAVE THE SITE MAINTAINED FREE OF ALL TRASH, LITTER, DEBRIS, AND OVERGROWN VEGETATION.
7. THE CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS IN THE FIELD AND CONTACT THE ENGINEER OF RECORD IF THERE ARE ANY QUESTIONS OR CONFLICTS REGARDING THE CONSTRUCTION DOCUMENTS AND/OR FIELD CONDITIONS SO THAT APPROPRIATE REVISIONS CAN BE MADE PRIOR TO BIDDING. ANY CONFLICT BETWEEN THE DRAWINGS SHALL BE CONFIRMED WITH THE OWNER'S CONSTRUCTION MANAGER PRIOR TO BIDDING.
8. SHOULD ANY UNCHARTED OR INCORRECTLY CHARTED, EXISTING PIPING OR OTHER UTILITY BE UNCOVERED DURING EXCAVATION, CONSULT THE ENGINEER OF RECORD IMMEDIATELY FOR DIRECTIONS BEFORE PROCEEDING FURTHER WITH WORK IN THIS AREA.
9. DO NOT INTERRUPT EXISTING UTILITIES SERVICING FACILITIES OCCUPIED AND USED BY THE OWNER OR OTHERS DURING OCCUPIED HOURS EXCEPT WHEN SUCH INTERRUPTIONS HAVE BEEN AUTHORIZED IN WRITING BY THE OWNER AND THE LOCAL MUNICIPALITIES. INTERRUPTIONS SHALL ONLY OCCUR AFTER ACCEPTABLE TEMPORARY SERVICE HAS BEEN PROVIDED.
10. THE CONTRACTOR SHALL RESTORE ANY DRAINAGE STRUCTURE, PIPE, UTILITY, PAVEMENT, CURBS, SIDEWALKS, LANDSCAPED AREAS, OR SIGNAGE DISTURBED DURING CONSTRUCTION TO THEIR ORIGINAL CONDITION OR BETTER, AS APPROVED BY THE ENGINEER OF RECORD.
11. THE ENGINEER OF RECORD IS NOT RESPONSIBLE FOR SITE SAFETY MEASURES TO BE EMPLOYED DURING CONSTRUCTION. THE ENGINEER OF RECORD HAS NO CONTRACTUAL DUTY TO CONTROL THE SAFEST METHODS OR MEANS OF THE WORK, JOB SITE RESPONSIBILITIES, SUPERVISION OR TO SUPERVISE SAFETY, AND DOES NOT VOLUNTARILY ASSUME ANY SUCH DUTY OR RESPONSIBILITY.
12. THE CONTRACTOR SHALL COMPLY WITH CFR 29 PART 1926 FOR EXCAVATION TRENCHING AND TRENCH PROTECTION REQUIREMENTS.
13. ALTERNATIVE METHODS AND PRODUCTS OTHER THAN THOSE SPECIFIED MAY BE USED IF REVIEWED AND APPROVED BY THE ENGINEER OF RECORD, AND APPROPRIATE REGULATORY AGENCY PRIOR TO INSTALLATION DURING THE BIDDING PROCESS.
14. INFORMATION ON EXISTING UTILITIES AND STORM DRAINAGE SYSTEMS HAS BEEN COMPILED FROM AVAILABLE INFORMATION INCLUDING UTILITY PROVIDER AND MUNICIPAL RECORD MAPS AND/OR FIELD SURVEY AND IS NOT GUARANTEED CORRECT OR COMPLETE. UTILITIES AND STORM DRAINAGE SYSTEMS ARE SHOWN TO ALERT THE CONTRACTOR TO THEIR PRESENCE AND THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL LOCATIONS AND ELEVATIONS OF ALL UTILITIES AND STORM DRAINAGE SYSTEMS INCLUDING SERVICES. PRIOR TO DEMOLITION OR CONSTRUCTION, THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" 72 HOURS BEFORE COMMENCEMENT OF WORK AT "(800) 922-4455" AND VERIFY ALL UTILITY AND STORM DRAINAGE SYSTEM LOCATIONS.

GRADING & DRAINAGE NOTES

1. REFER TO THE PROPERTY SURVEY FOR THE ENTIRE PROPERTY BOUNDARY AND EXISTING CONDITIONS INFORMATION. THE PLAN HEREON DEPICTS A PORTION OF THE PROPERTY IN WHICH THE SITE WORK IS BEING PROPOSED.
2. THIS DRAWING IS INTENDED TO DESCRIBE GRADING AND DRAINAGE ONLY. REFER TO SITE PLAN FOR GENERAL INFORMATION, AND DETAIL SHEETS FOR DETAILS.
3. THE CONTRACTOR SHALL PRESERVE EXISTING VEGETATION WHERE POSSIBLE AND/OR AS NOTED ON DRAWINGS. REFER TO EROSION CONTROL PLAN FOR LIMIT OF DISTURBANCE AND EROSION CONTROL NOTES.
4. TOPSOIL SHALL BE STRIPPED AND STOCKPILED ON SITE FOR USE IN FINAL LANDSCAPING.
5. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY CONSTRUCTION PERMITS REQUIRED BY GOVERNMENT AND LOCAL AGENCIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY CONSTRUCTION PERMITS FROM THE TOWN OF PLAINFIELD REQUIRED TO PERFORM ALL WORK, INCLUDING FOR STREET CUTS AND CONNECTIONS TO EXISTING UTILITIES. THE CONTRACTOR SHALL POST ALL BONDS, PAY ALL FEES, PROVIDE PROOF OF INSURANCE, AND PROVIDE TRAFFIC CONTROL NECESSARY FOR THIS WORK.
6. ALL DISTURBANCE INCURRED TO TOWN OR STATE PROPERTY DUE TO CONSTRUCTION SHALL BE RESTORED TO ITS PREVIOUS CONDITION OR BETTER, TO THE SATISFACTION OF THE TOWN OF PLAINFIELD AUTHORITY.
7. IF IMPACTED OR CONTAMINATED SOIL IS ENCOUNTERED BY THE CONTRACTOR, THE CONTRACTOR SHALL SUSPEND EXCAVATION WORK OF IMPACTED SOIL AND NOTIFY THE OWNER AND/OR OWNER'S ENVIRONMENTAL CONSULTANT PRIOR TO PROCEEDING WITH FURTHER WORK IN THE IMPACTED SOIL LOCATION UNTIL FURTHER INSTRUCTED BY THE OWNER AND/OR OWNER'S ENVIRONMENTAL CONSULTANT.
8. SEEDING MIXTURES SHALL BE ERNMX-146, OR APPROVED EQUAL.

SITE UTILITY NOTES

1. UTILITIES AND STORM DRAINAGE SYSTEMS ARE SHOWN TO ALERT THE CONTRACTOR TO THEIR PRESENCE AND THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL LOCATIONS AND ELEVATIONS OF ALL UTILITIES AND STORM DRAINAGE SYSTEMS, INCLUDING SERVICES.
2. PRIOR TO DEMOLITION OR CONSTRUCTION, THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" 72 HOURS BEFORE THE COMMENCEMENT OF WORK AT "(800) 922-4455" AND VERIFY ALL UTILITY AND STORM DRAINAGE SYSTEM LOCATIONS. INFORMATION ON EXISTING UTILITIES AND STORM DRAINAGE SYSTEMS HAS BEEN COMPILED FROM AVAILABLE INFORMATION INCLUDING UTILITY PROVIDER AND MUNICIPAL RECORD MAPS AND/OR FIELD SURVEY AND IS NOT GUARANTEED CORRECT OR COMPLETE.
3. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, UTILITY LOCATIONS, AND INVERTS PRIOR TO CONSTRUCTION. ANY CONDITIONS FOUND TO DIFFER FROM THOSE SHOWN IN THE DRAWINGS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE CIVIL ENGINEER OF RECORD.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING UTILITY COMPANIES 72 HOURS PRIOR TO BEGINNING EXCAVATION AND INSTALLATION OF ANY UTILITIES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS WITH EVERSOURCE ENERGY.
6. ALL PAVEMENT REPAIRS REQUIRED AS A RESULT OF ANY UTILITY WORK SHALL COMPLY WITH THE TOWN OF PLAINFIELD AND CTDOT STANDARDS AND SPECIFICATIONS.
7. ALL TRENCHING, PIPE LAYING, AND BACKFILLING SHALL BE IN ACCORDANCE WITH FEDERAL OSHA REGULATIONS.
8. ALL UTILITY WORK SHALL COMPLY WITH ALL APPLICABLE CODES, REGULATIONS, AND / OR LOCAL STANDARDS IMPOSED BY LOCAL UTILITY AUTHORITIES.
9. CONTRACTOR SHALL MAINTAIN A MINIMUM OF 2 FEET OF COVER FOR ALL UNDERGROUND ELECTRIC UTILITY LINES UNLESS OTHERWISE INSTRUCTED BY EVERSOURCE ENERGY.
10. ALL MATERIAL SHALL BE APPROVED BY THE LOCAL UTILITY COMPANIES UNLESS OTHERWISE DIRECTED BY THE CIVIL ENGINEER OF RECORD.
11. SHOULD LATENT SOIL CONDITIONS NECESSITATE, CONTRACTOR SHALL INSTALL SPECIAL SUPPORTS FOR PIPING AND/OR APPURTENANCES INCLUDING THE REMOVAL OF UNSUITABLE MATERIAL AND BACKFILLING WITH GRAVEL OR OTHER APPROVED MATERIAL. CONTRACTOR SHALL PERFORM ANY SUCH WORK AS DIRECTED BY THE CIVIL ENGINEER AND/OR SOILS ENGINEER AT NO COST TO THE OWNER.

SEDIMENT & EROSION CONTROL NOTES

1. THE CONTRACTOR SHALL CONSTRUCT ALL SEDIMENT AND EROSION CONTROLS IN ACCORDANCE WITH THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL, LATEST EDITION, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, AND AS DIRECTED BY THE TOWN OF PLAINFIELD, PERMITTEE, AND/OR SWPCP MONITOR. ALL PERIMETER SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF CLEARING AND GRUBBING AND DEMOLITION OPERATIONS.
2. THESE DRAWINGS ARE ONLY INTENDED TO DESCRIBE THE SEDIMENT AND EROSION CONTROL MEASURES FOR THIS SITE. SEE CONSTRUCTION SEQUENCE FOR ADDITIONAL INFORMATION. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHOWN ON THE EROSION & SEDIMENT CONTROL PLAN ARE SHOWN AS REQUIRED BY THE ENGINEER OF RECORD. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ALL EROSION CONTROL MEASURES ARE CONFIGURED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION OF SOILS AND PREVENT THE TRANSPORT OF SEDIMENTS AND OTHER POLLUTANTS TO STORM DRAINAGE SYSTEMS AND/OR WATERCOURSES. ACTUAL SITE CONDITIONS OR SEASONAL AND CLIMATIC CONDITIONS MAY WARRANT ADDITIONAL CONTROLS OR CONFIGURATIONS, AS REQUIRED, AND AS DIRECTED BY THE PERMITTEE AND/OR SWPCP MONITOR. REFER TO SITE PLAN FOR GENERAL INFORMATION AND OTHER CONTRACT PLANS FOR APPROPRIATE INFORMATION.
3. A BOND OR LETTER OF CREDIT MAY BE REQUIRED TO BE POSTED WITH THE GOVERNING AUTHORITY FOR THE EROSION CONTROL INSTALLATION AND MAINTENANCE.
4. THE CONTRACTOR SHALL APPLY THE MINIMUM EROSION & SEDIMENT CONTROL MEASURES SHOWN ON THE PLAN IN CONJUNCTION WITH CONSTRUCTION SEQUENCING, SUCH THAT ALL ACTIVE WORK ZONES ARE PROTECTED. ADDITIONAL AND/OR ALTERNATIVE SEDIMENT AND EROSION CONTROL MEASURES MAY BE INSTALLED DURING THE CONSTRUCTION PERIOD IF FOUND NECESSARY BY THE CONTRACTOR, OWNER, ENGINEER OF RECORD, MUNICIPAL OFFICIALS, OR ANY GOVERNING AGENCY. THE CONTRACTOR SHALL CONTACT THE OWNER AND APPROPRIATE GOVERNING AGENCIES FOR APPROVAL IF ALTERNATIVE CONTROLS OTHER THAN THOSE SHOWN ON THE PLANS ARE PROPOSED BY THE CONTRACTOR.
5. THE CONTRACTOR SHALL TAKE EXTREME CARE DURING CONSTRUCTION SO AS NOT TO DISTURB UNPROTECTED WETLAND AREAS OR INSTALLED SEDIMENTATION AND EROSION CONTROL MEASURES. THE CONTRACTOR SHALL INSPECT ALL SEDIMENT AND EROSION CONTROLS WEEKLY AND WITHIN 24 HOURS OF A STORM WITH A RAINFALL AMOUNT OF 0.25 INCHES OR GREATER TO VERIFY THAT THE CONTROLS ARE OPERATING PROPERLY AND MAKE REPAIRS AS NECESSARY IN A TIMELY MANNER.
6. THE CONTRACTOR SHALL KEEP A SUPPLY OF EROSION CONTROL MATERIAL (SILT FENCE, COMPOSITE FILTER SOCK, EROSION CONTROL BLANKET, ETC.) ON-SITE FOR PERIODIC MAINTENANCE AND EMERGENCY REPAIRS.
7. ALL FILL MATERIAL PLACED ADJACENT TO ANY WETLAND AREA SHALL BE GOOD QUALITY, WITH LESS THAN 5% FINES PASSING THROUGH A #200 SIEVE (BANK RUN), SHALL BE PLACED IN MAXIMUM ONE FOOT LIFTS, AND SHALL BE COMPACTED TO 95% MAX. DRY DENSITY MODIFIED PROCTOR OR AS SPECIFIED IN THE CONTRACT SPECIFICATIONS.
8. PROTECT EXISTING TREES THAT ARE TO BE SAVED BY FENCING, ORANGE SAFETY FENCE, CONSTRUCTION TAPE, OR EQUIVALENT FENCING/TAPE. ANY LIMB TRIMMING SHOULD BE DONE AFTER CONSULTATION WITH AN ARBORIST AND BEFORE CONSTRUCTION BEGINS IN THAT AREA. FENCING SHALL BE MAINTAINED AND REPAIRED DURING CONSTRUCTION.
9. CONSTRUCTION ENTRANCES (ANTI-TRACKING PADS) SHALL BE INSTALLED PRIOR TO ANY SITE EXCAVATION OR CONSTRUCTION ACTIVITY AND SHALL BE MAINTAINED THROUGHOUT THE DURATION OF ALL CONSTRUCTION IF REQUIRED. THE LOCATION OF THE TRACKING PADS MAY CHANGE AS VARIOUS PHASES OF CONSTRUCTION ARE COMPLETED. CONTRACTOR SHALL ENSURE THAT ALL VEHICLES EXITING THE SITE ARE PASSING OVER THE ANTI-TRACKING PADS PRIOR TO EXITING.
10. ALL CONSTRUCTION SHALL BE CONTAINED WITHIN THE LIMIT OF DISTURBANCE, WHICH SHALL BE MARKED WITH SILT FENCE, SAFETY FENCE, HAY BALES, RIBBONS, OR OTHER MEANS PRIOR TO CLEARING. CONSTRUCTION ACTIVITY SHALL REMAIN ON THE UPHILL SIDE OF THE SEDIMENT BARRIER UNLESS WORK IS SPECIFICALLY CALLED FOR ON THE DOWNHILL SIDE OF THE BARRIER.
11. NO CUT OR FILL SLOPES SHALL EXCEED 2:1 EXCEPT WHERE STABILIZED BY ROCK FACED EMBANKMENTS OR EROSION CONTROL BLANKETS. ALL SLOPES SHALL BE SEEDED AND BANKS WILL BE STABILIZED IMMEDIATELY UPON COMPLETION OF FINAL GRADING UNTIL TURF IS ESTABLISHED.
12. DIRECT ANY DEWATERING PUMP DISCHARGE TO A SEDIMENT CONTROL DEVICE CONFORMING TO THE GUIDELINES WITHIN THE APPROVED LIMIT OF DISTURBANCE IF REQUIRED. DISCHARGE TO STORM DRAINS OR SURFACE WATERS FROM SEDIMENT CONTROLS SHALL BE CLEAR AND APPROVED BY THE PERMITTEE OR MUNICIPALITY.
13. THE CONTRACTOR SHALL MAINTAIN A CLEAN CONSTRUCTION SITE AND SHALL NOT ALLOW THE ACCUMULATION OF RUBBISH OR CONSTRUCTION DEBRIS ON THE SITE. PROPER SANITARY DEVICES SHALL BE MAINTAINED ON-SITE AT ALL TIMES AND SECURED APPROPRIATELY. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID THE SPILLAGE OF FUEL OR OTHER POLLUTANTS ON THE CONSTRUCTION SITE AND SHALL ADHERE TO ALL APPLICABLE POLICIES AND REGULATIONS RELATED TO SPILL PREVENTION AND RESPONSE/CONTAINMENT.
14. MINIMIZE LAND DISTURBANCES. SEED AND MULCH DISTURBED AREAS WITH TEMPORARY MIX AS SOON AS PRACTICABLE (2 WEEK MAXIMUM UNSTABILIZED PERIOD) USING PERENNIAL RYEGRASS AT 40 LBS PER ACRE. MULCH ALL CUT AND FILL SLOPES AND SWALES WITH LOOSE HAY AT A RATE OF 2 TONS PER ACRE. IF NECESSARY, REPLACE LOOSE HAY ON SLOPES WITH EROSION CONTROL BLANKETS OR JUTE CLOTH. MODERATELY GRADED AREAS, ISLANDS, AND TEMPORARY CONSTRUCTION STAGING AREAS MAY BE HYDROSEEDED WITH TACKIFIER.
15. SWEEP AFFECTED PORTIONS OF OFF SITE ROADS ONE OR MORE TIMES A DAY (OR LESS FREQUENTLY IF TRACKING IS NOT A PROBLEM) DURING CONSTRUCTION. FOR DUST CONTROL, PERIODICALLY MOISTEN EXPOSED SOIL SURFACES WITH WATER ON UNPAVED TRAVELWAYS TO KEEP THE TRAVELWAYS DAMP. CALCIUM CHLORIDE MAY ALSO BE APPLIED TO ACCESS ROADS. DUMP TRUCK LOADS EXITING THE SITE SHALL BE COVERED.
16. VEGETATIVE ESTABLISHMENT SHALL OCCUR ON ALL DISTURBED SOIL, UNLESS THE AREA IS UNDER ACTIVE CONSTRUCTION, IT IS COVERED IN STONE OR SCHEDULED FOR PAVING WITHIN 30 DAYS. TEMPORARY SEEDING OR NON-LIVING SOIL PROTECTION OF ALL EXPOSED SOILS AND SLOPES SHALL BE INITIATED WITHIN THE FIRST 7 DAYS OF SUSPENDING WORK IN AREAS TO BE LEFT LONGER THAN 14 DAYS ACCORDING TO DEEP GENERAL PERMIT SECTION 5(2)(A)(i).
17. MAINTAIN ALL PERMANENT AND TEMPORARY SEDIMENT CONTROL DEVICES IN EFFECTIVE CONDITION THROUGHOUT THE CONSTRUCTION PERIOD. UPON COMPLETION OF WORK SWEEP CONCRETE PADS, CLEAN THE STORMWATER MANAGEMENT SYSTEMS AND REMOVE ALL TEMPORARY SEDIMENT CONTROLS ONCE THE SITE IS FULLY STABILIZED AND APPROVAL HAS BEEN RECEIVED FROM PERMITTEE OR THE MUNICIPALITY.
18. ACCORDING TO DEEP GENERAL PERMIT SECTION 5.2.1.2(b), WHEREVER PRACTICABLE, SITE CONSTRUCTION ACTIVITIES SHALL BE PHASED TO AVOID THE DISTURBANCE OF OVER FIVE ACRES AT ONE TIME.
19. ALL DISTURBED AREAS ARE TO BE RESEEDED WITH ERNMX-146.
20. REFER TO SHEET 2.41 FOR SEDIMENT & EROSION CONTROL NARRATIVE & DETAILS.

LEGEND

- PROPERTY LINE
- 50' SOLAR SETBACK
- LIMIT OF WETLANDS
- 50' WETLAND SETBACK LINE
- 100 WETLAND SETBACK LINE
- 7' TALL CHAIN LINK FENCE
- FIRST SOLAR MODULES
- UTILITY POLE
- OVERHEAD ELECTRIC LINE
- ELECTRIC CONDUIT
- LIMIT OF DISTURBANCE
- GRAVEL ACCESS DRIVE
- GRAVEL EQUIPMENT PAD
- 300 MAJOR CONTOURS
- 302 MINOR CONTOURS
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- 334.70 PROPOSED SPOT ELEVATION
- SILT FENCE PROTECTION
- MATERIAL STOCKPILE AREA
- CONSTRUCTION ENTRANCE
- STRUCTURE TO BE REMOVED
- PHASE 1 CLEARING AND GRUBBING
- CONCRETE WASHPIT
- PHASE 2 CLEARING AND GRUBBING

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL & CERTIFIED MAIL
RETURN RECEIPT REQUESTED

February 6, 2026

Lee D. Hoffman, Esq.
Kathryn E. Boucher, Esq.
Liana Feinn, Esq.
Pullman & Comley, LLC
90 State House Square
Hartford, CT 06103-3702
lhoffman@pullcom.com
keboucher@pullcom.com
lfeinn@pullcom.com

RE: **PETITION NO. 1687** – Plainfield Solar One, LLC petition for a declaratory ruling, pursuant to Connecticut General Statutes §4-176 and §16-50k, for the construction, maintenance and operation of a 4.0-megawatt AC solar photovoltaic electric generating facility and associated equipment located at Parcel No. 002-053A-0058, Exley Road, Plainfield, Connecticut, and associated electrical interconnection. **Final Decision.**

Dear Attorneys Hoffman, Boucher, and Feinn:

At a regular meeting held on February 5, 2026, the Connecticut Siting Council (Council) determined that pursuant to Connecticut General Statutes (CGS) § 16-50k,the above-referenced facility would not have a substantial adverse environmental effect, and issued a Declaratory Ruling, with the following conditions:

1. Approval of any changes be delegated to Council staff;
2. Submit a copy of the DEEP Stormwater Permit prior to the commencement of construction;
3. Submit the final structural design for the racking system stamped by a Professional Engineer duly licensed in the State of Connecticut prior to commencement of installation;
4. High voltage signage shall be installed at all fence gate locations, and a contact sign for the facility owner/operator shall be installed at the main access gate;
5. Use of 100 percent natural fiber erosion control to reduce the potential for wildlife entanglement;
6. Submit a copy of the final landscaping/screening plan for the facility;
7. Submit a Final Post-Construction Operations and Maintenance Plan that includes but is not limited to an inspection/maintenance schedule of facility components, periodic perimeter fence inspection for damage, trapped wildlife, and litter, and an annual vegetation maintenance plan to be implemented for the life of the facility;

8. Submit a copy of the final Emergency Response Plan, which shall include, but not be limited to, contact information for local police, fire and emergency medical technicians, and notification procedures for on-site emergencies such as fire, accidents, or electrical issues, to the Council and local emergency responders prior to commencement of operation and provide emergency response training that includes an itemized list of necessary fire suppression equipment and adequate water supplies for any fire issues at the facility site;
9. Submit the Agricultural Activity Plan for the site, if an agricultural activity is implemented, with a document that shall indemnify and hold harmless the Council, its agents, representatives and employees from any and all losses, claims, actions, costs and expenses, judgments, subrogations, or other damages resulting from any injury to a person or to property arising out of the presence of third-parties within the fenced solar facility site;
10. Submit a Spill Prevention, Control and Countermeasures Plan for the Project prior to commencement of construction;
11. Submit a post-construction operational noise study that documents compliance with state standards, and if necessary, the identification of any noise mitigation measures that are employed to adhere to the standards;
12. Consult with Eversource Energy to determine the feasibility of installing the customer-side distribution poles farther into the facility site;
13. The Council shall be notified in writing at least two weeks prior to the commencement of site construction activities;
14. Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed within three years from the date of the mailing of the Council's decision, this decision shall be void, and the facility owner/operator shall dismantle the facility and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The time between the filing and resolution of any appeals of the Council's decision shall not be counted in calculating this deadline. Authority to monitor and modify this schedule, as necessary, is delegated to the Executive Director. The facility owner/operator shall provide written notice to the Executive Director of any schedule changes as soon as is practicable;
15. Any request for extension of the time period to fully construct the facility shall be filed with the Council not later than 60 days prior to the expiration date of this decision and shall be served on all parties and intervenors, if applicable, and the Town of Plainfield;
16. Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed **along with a representative photograph of the facility**;
17. The facility owner/operator shall remit timely payments associated with annual assessments and invoices submitted by the Council for expenses attributable to the facility under Conn. Gen. Stat. §16-50v;
18. The facility owner/operator shall file an annual report on a forecast of loads and resources pursuant to Conn. Gen. Stat. §16-50r;
19. This Declaratory Ruling may be transferred or partially transferred, provided both the facility owner/operator/transferor and the transferee are current with payments to the Council for their respective annual assessments and invoices under CGS §16-50v. The Council and the Town of

Plainfield shall be notified of such sale and/or transfer and of any change in contact information for the individual or representative responsible for management and operations of the facility within 30 days of the sale and/or transfer. Both the facility owner/operator/transferor and the transferee shall provide the Council with a written agreement as to the entity responsible for any quarterly assessment charges under CGS §16-50v(b)(2) that may be associated with this facility, including contact information for the individual acting on behalf of the transferee; and

20. This Declaratory Ruling may be surrendered by the facility owner/operator upon written notification to the Council.

This decision is under the exclusive jurisdiction of the Council and is not applicable to any other modification or construction. All work is to be implemented as specified in the petition dated August 15, 2025 and additional correspondence dated January 5, 2026.

Enclosed for your information is a copy of the staff report on this facility.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/RDM/dll

Enclosure: Staff Report dated February 5, 2026

c: The Honorable Kevin Cunningham, First Selectperson, Town of Plainfield (kcunninghamselectman@plainfieldct.org)
Costantino Galasso, Fire Marshal, Town of Plainfield (cgalasso@plainfieldct.org)
Service List, dated August 15, 2026
CGS §16-50j(i) State Agency Comment List

Rev. #: Date Description

SOLLI ENGINEERING
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T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	ADH
Checked By:	EEL
Approved By:	KMS
Project #:	24120501
Plan Date:	02/10/26
Scale:	NTS

STATE OF CONNECTICUT · KEVIN M. SOLLI · 25759 · LICENSED PROFESSIONAL ENGINEER
Kevin Solli, P.E.
CT 25759

Project:
PROPOSED SOLAR PHOTOVOLTAIC ARRAY
0 EXLEY ROAD
(PARCEL ID: 002-053A-0058)
PLAINFIELD, CONNECTICUT

Sheet Title: PERMIT APPROVALS, NOTES, LEGEND, & ABBREVIATIONS

Sheet #: 0.10

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THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300B-1 THROUGH 20-300B-20 AND THE "STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS INC. ON SEPTEMBER 26, 1997.

TYPE OF SURVEY: IMPROVEMENT LOCATION SURVEY

BOUNDARY SURVEY CATEGORY: DEPENDENT RESURVEY

CLASS OF ACCURACY: HORIZONTAL CLASS A-2
VERTICAL CLASS V-2
TOPOGRAPHIC CLASS T-2

PURPOSE OF SURVEY: PROPOSED SOLAR FACILITY

THIS DOCUMENT AND COPIES THEREOF ARE VALID ONLY IF THEY BEAR THE LIVE SIGNATURE AND EMBOSSED SEAL OF THE DESIGNATED PROFESSIONAL. UNAUTHORIZED ALTERATIONS RENDER ANY DECLARATION NULL AND VOID.

TO THE BEST OF MY KNOWLEDGE AND BELIEF, THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

CHARLES G. GIDMAN, P.L.S. #70103

STATE OF CONNECTICUT CHARLES G. GIDMAN 70103 LICENSED LAND SURVEYOR

NOTES:

1. FIELD SURVEY BY RTK GPS & RTK DRONE IN DECEMBER 2024.
2. THE HORIZONTAL DATUM IS NAD83. THE VERTICAL DATUM IS NAVD88. BOTH WERE DERIVED FROM RTK GPS OBSERVATIONS TAKEN ON SITE.
3. THE LOCATIONS OF UTILITIES SHOWN HEREON ARE THE RESULT OF SURFACE EVIDENCE ONLY. THIS PLAN DOES NOT NECESSARILY DEPICT THE EXACT LOCATION OF THESE UTILITIES AND MAY NOT SHOW ALL OF THE UTILITIES WHICH EXIST WITHIN THE PREMISES SURVEYED. CONTACT DIG-SAFE AT 1-888-344-7233 BEFORE EXCAVATION.
4. THE LOCUS PARCEL AND ALL ABUTTING PARCELS ARE LOCATED IN THE RA-60 ZONING DISTRICT.
5. ACCORDING TO FEDERAL EMERGENCY MANAGEMENT AGENCY MAPS, THE ENTIRE LOCUS PARCEL IS LOCATED IN AN AREA DESIGNATED AS "ZONE X" (AREAS OF MINIMAL FLOODING). COMMUNITY PANEL NO. 09015C 0354 F, EFFECTIVE ON 9/7/2023.
6. WETLANDS SHOWN HEREON WERE DELINEATED BY DAVISON ENVIRONMENTAL, LLC IN DECEMBER 2024 (1 & 2 SERIES; FLAGS LOCATED BY THIS SURVEY) AND JANUARY 2025 (X SERIES; FLAGS LOCATED BY DAVISON ENVIRONMENTAL, LLC).
7. ALL CONTOURS SHOWN HEREON WERE GENERATED IN QGIS FROM DIGITAL ELEVATION MODELS OF THE 2016 CRCOG LIDAR DATA COLLECTED BY USGS AND DISTRIBUTED BY NOAA.

NORTHEAST SURVEY CONSULTANTS
3 FERRY STREET
STUDIO 1 EAST
EASTHAMPTON, MA 01027
(413) 203-5144

EXISTING CONDITIONS

ENGINEER:	–
DESIGN:	–
HORZ. SCALE:	1" = 100'
VERT. SCALE:	–
DATE:	8-12-2025
SURVEYOR:	
DRAFTING:	
FIELD WORK:	MAK MTR CRC
PROJECT NUMBER:	24-331
DRAWING NAME:	24-331.DWG

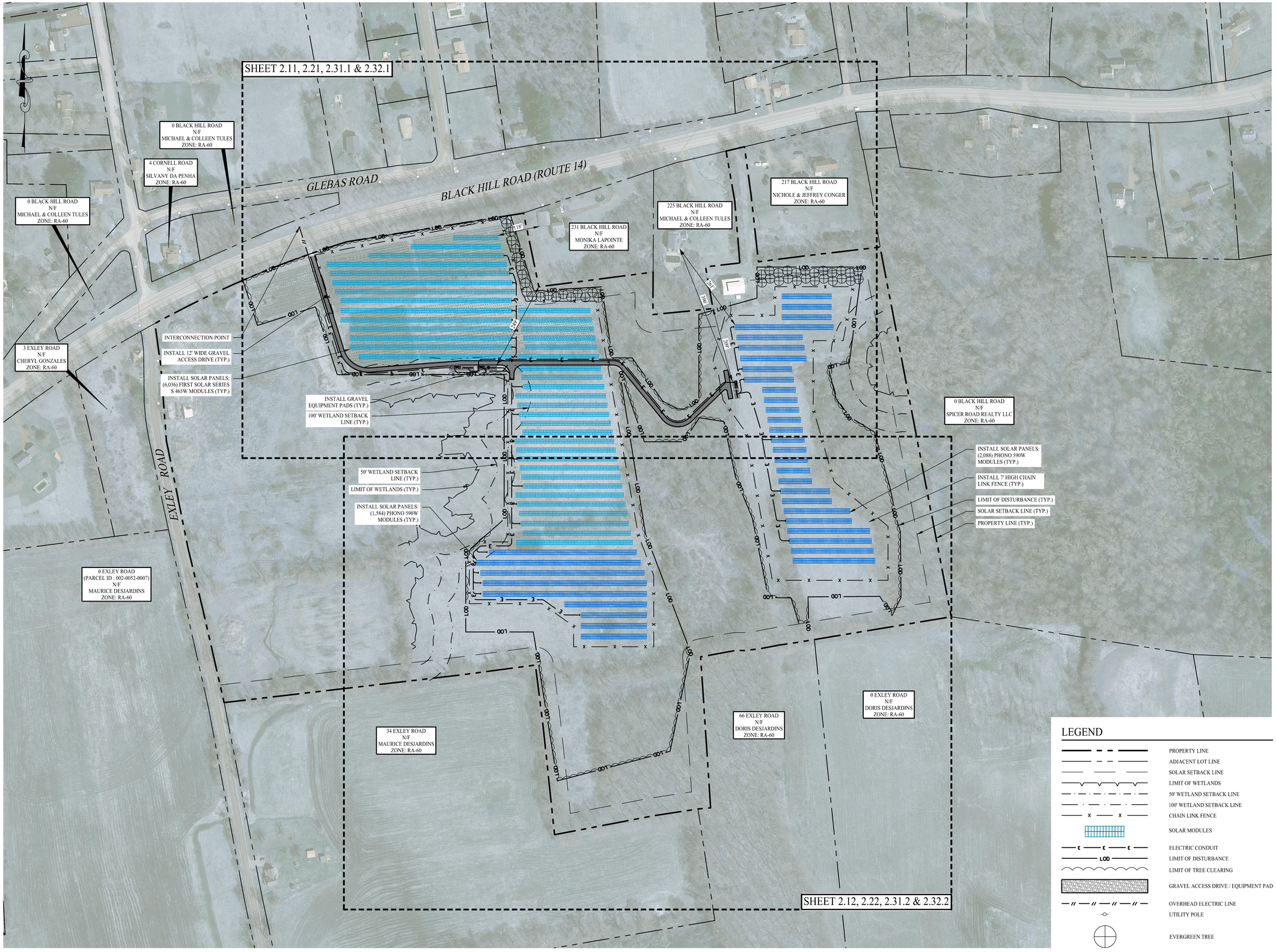
PLAN OF LAND IN PLAINFIELD, CT

EXLEY ROAD

PREPARED FOR

VEROGY

SHEET NO. 1 OF 1



SOLAR ARRAY SYSTEM INFORMATION

	TOTAL OUTPUT
SIZE DC	4.97 MW
SIZE AC	4.00 MW
MODULE TYPE	(6,036) FIRST SOLAR SERIES 6 465W (3,672) PHONO 590W
MODULE QUANTITY	9,708
UTILITY	EVERSOURCE
SITE AREA	58.63± ACRES
PROJECT AREA	26.47± ACRES

LEGEND

- PROPERTY LINE
- ADJACENT LOT LINE
- SOLAR SETBACK LINE
- LIMIT OF WETLANDS
- 50' WETLAND SETBACK LINE
- 100' WETLAND SETBACK LINE
- CHAIN LINK FENCE
- SOLAR MODULES
- ELECTRIC CONDUIT
- LIMIT OF DISTURBANCE
- LIMIT OF TREE CLEARING
- GRAVEL ACCESS DRIVE / EQUIPMENT PAD
- OVERHEAD ELECTRIC LINE
- UTILITY POLE
- EVERGREEN TREE

Rev. #:	Date	Description
2	05/04/26	Layout Revisions
1	04/08/26	Layout Revisions

Graphic Scale: 120 0 120 240

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Drawn By:	ADH
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Approved By:	KMS
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STATE OF CONNECTICUT · KEVIN M. SOLLI · 25759 · LICENSED PROFESSIONAL ENGINEER

Kevin Solli, P.E.
CT 25759

Project:

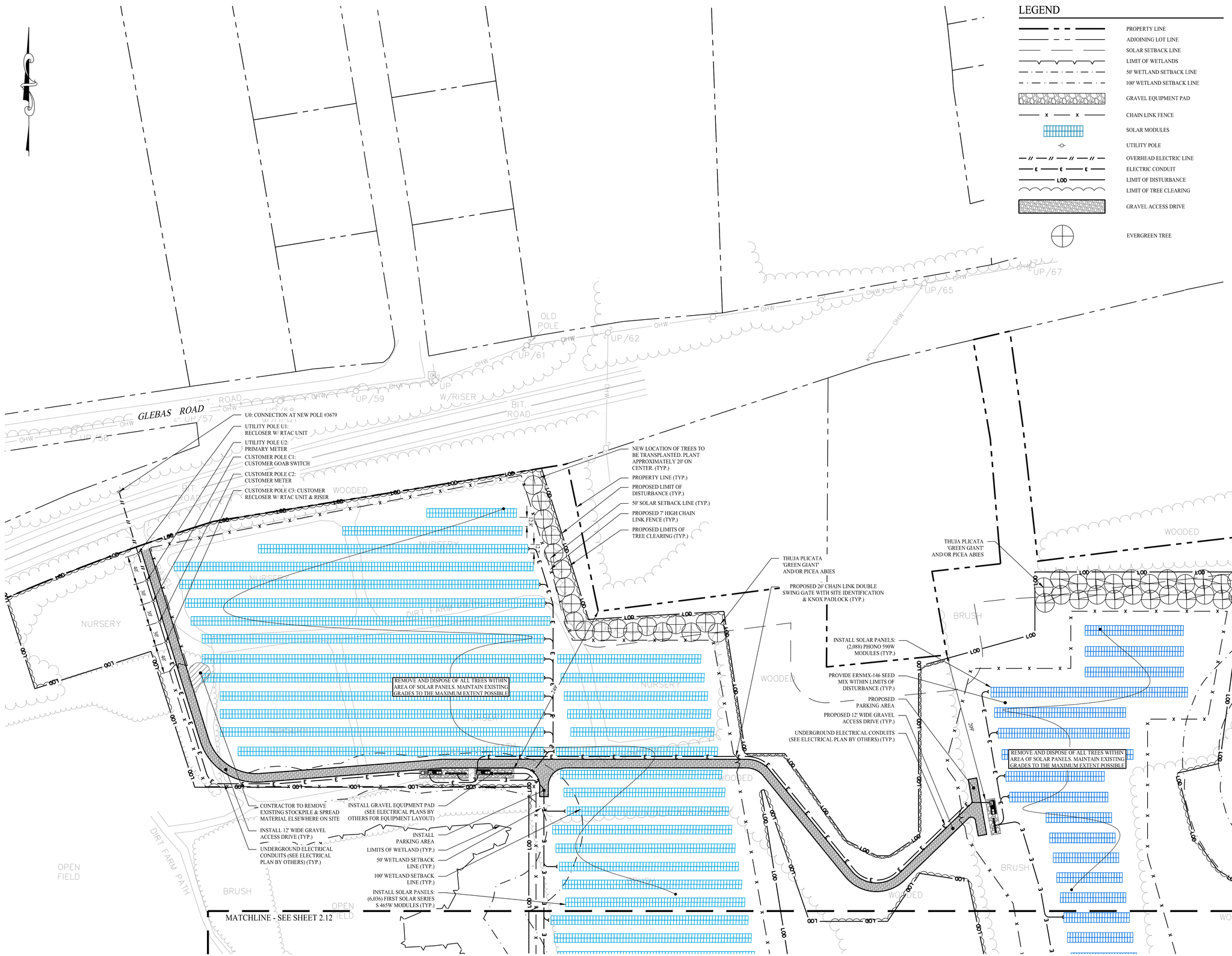
PROPOSED SOLAR PHOTOVOLTAIC ARRAY

0 EXLEY ROAD
(PARCEL ID: 002-053A-0058)
PLAINFIELD, CONNECTICUT

Sheet Title: OVERALL SITE LAYOUT PLAN

Sheet #: 2.10

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LEGEND

- PROPERTY LINE
- ADJOINING LOT LINE
- SOLAR SETBACK LINE
- LIMIT OF WETLANDS
- 50' WETLAND SETBACK LINE
- 100' WETLAND SETBACK LINE
- GRAVEL EQUIPMENT PAD
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- SOLAR MODULES
- UTILITY POLE
- OVERHEAD ELECTRIC LINE
- ELECTRIC CONDUIT
- LIMIT OF DISTURBANCE
- LIMIT OF TREE CLEARING
- GRAVEL ACCESS DRIVE
- EVERGREEN TREE

SITE PLAN NOTES

1. EXISTING BOUNDARY, TOPOGRAPHY AND SITE CONDITIONS INFORMATION TAKEN FROM A PLAN ENTITLED "PLAN OF LAND IN PLAINFIELD, CT, EXLEY ROAD", SCALE 1"=100', DATED: 08/12/2025; BY NORTHEAST SURVEY CONSULTANTS.
2. ALL CONSTRUCTION SHALL COMPLY WITH TOWN OF PLAINFIELD STANDARDS, CONNECTICUT DEPARTMENT OF TRANSPORTATION STANDARDS, CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION STANDARDS, AND SPECIFICATIONS IN THE ABOVE REFERENCED INCREASING HIERARCHY. IF SPECIFICATIONS ARE IN CONFLICT, THE MORE STRINGENT SPECIFICATION SHALL APPLY. ALL CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE OSHA, FEDERAL, STATE, AND LOCAL REGULATIONS.
3. THE OWNER IS RESPONSIBLE FOR OBTAINING ALL NECESSARY ZONING PERMITS REQUIRED BY GOVERNMENT AGENCIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL OBTAIN ALL COUNTY AND TOWN CONSTRUCTION PERMITS. THE CONTRACTOR SHALL POST ALL BONDS, PAY ALL FEES, PROVIDE PROOF OF INSURANCE, AND PROVIDE TRAFFIC CONTROL NECESSARY FOR THIS WORK.
4. THE CONTRACTOR SHALL PERFORM ALL SITE WORK PROPOSED HEREON IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL PERMITS / APPROVALS AND CONDITIONS OF APPROVALS ISSUED FOR THIS PROJECT. THE OWNER IS TO PROVIDE THE CONTRACTOR WITH ALL APPROVALS / DOCUMENTATION PRIOR TO CONSTRUCTION.
5. PRIOR TO CONSTRUCTION THE CONTRACTOR IS TO SCHEDULE AND COORDINATE A PRE-CONSTRUCTION MEETING WITH THE OWNER (OR OWNER'S REPRESENTATIVE), CIVIL ENGINEER OF RECORD, AND CT DEEP AND/OR LOCAL CONSERVATION DISTRICT REPRESENTATIVE.
6. THE OWNER SHALL BE RESPONSIBLE TO HAVE THE SITE MAINTAINED FREE OF ALL TRASH, LITTER, DEBRIS, AND OVERGROWN VEGETATION.
7. THE CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS IN THE FIELD AND CONTACT THE ENGINEER OF RECORD IF THERE ARE ANY QUESTIONS OR CONFLICTS REGARDING THE CONSTRUCTION DOCUMENTS AND/OR FIELD CONDITIONS SO THAT APPROPRIATE REVISIONS CAN BE MADE PRIOR TO BIDDING. ANY CONFLICT BETWEEN THE DRAWINGS SHALL BE CONFIRMED WITH THE OWNER'S CONSTRUCTION MANAGER PRIOR TO BIDDING.
8. SHOULD ANY UNCHARTED OR INCORRECTLY CHARTED, EXISTING PIPING OR OTHER UTILITY BE UNCOVERED DURING EXCAVATION, CONSULT THE ENGINEER OF RECORD IMMEDIATELY FOR DIRECTIONS BEFORE PROCEEDING FURTHER WITH WORK IN THIS AREA.
9. DO NOT INTERRUPT EXISTING UTILITIES SERVICING FACILITIES OCCUPIED AND USED BY THE OWNER OR OTHERS DURING OCCUPIED HOURS EXCEPT WHEN SUCH INTERRUPTIONS HAVE BEEN AUTHORIZED IN WRITING BY THE OWNER AND THE LOCAL MUNICIPALITIES. INTERRUPTIONS SHALL ONLY OCCUR AFTER ACCEPTABLE TEMPORARY SERVICE HAS BEEN PROVIDED.
10. THE CONTRACTOR SHALL RESTORE ANY DRAINAGE STRUCTURE, PIPE, UTILITY, PAVEMENT, CURBS, SIDEWALKS, LANDSCAPED AREAS, OR SIGNAGE DISTURBED DURING CONSTRUCTION TO THEIR ORIGINAL CONDITION OR BETTER, AS APPROVED BY THE ENGINEER OF RECORD.
11. THE ENGINEER OF RECORD IS NOT RESPONSIBLE FOR SITE SAFETY MEASURES TO BE EMPLOYED DURING CONSTRUCTION. THE ENGINEER OF RECORD HAS NO CONTRACTUAL DUTY TO CONTROL THE SAFEST METHODS OR MEANS OF THE WORK, JOB SITE RESPONSIBILITIES, SUPERVISION OR TO SUPERVISE SAFETY, AND DOES NOT VOLUNTARILY ASSUME ANY SUCH DUTY OR RESPONSIBILITY.
12. THE CONTRACTOR SHALL COMPLY WITH CFR 29 PART 1926 FOR EXCAVATION TRENCHING AND TRENCH PROTECTION REQUIREMENTS.
13. ALTERNATIVE METHODS AND PRODUCTS OTHER THAN THOSE SPECIFIED MAY BE USED IF REVIEWED AND APPROVED BY THE ENGINEER OF RECORD, AND APPROPRIATE REGULATORY AGENCY PRIOR TO INSTALLATION DURING THE BIDDING PROCESS.
14. INFORMATION ON EXISTING UTILITIES AND STORM DRAINAGE SYSTEMS HAS BEEN COMPILED FROM AVAILABLE INFORMATION INCLUDING UTILITY PROVIDER AND MUNICIPAL RECORD MAPS AND/OR FIELD SURVEY AND IS NOT GUARANTEED CORRECT OR COMPLETE. UTILITIES AND STORM DRAINAGE SYSTEMS ARE SHOWN TO ALERT THE CONTRACTOR TO THEIR PRESENCE AND THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL LOCATIONS AND ELEVATIONS OF ALL UTILITIES AND STORM DRAINAGE SYSTEMS INCLUDING SERVICES. PRIOR TO DEMOLITION OR CONSTRUCTION, THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" 72 HOURS BEFORE COMMENCEMENT OF WORK AT "(800) 922-4455" AND VERIFY ALL UTILITY AND STORM DRAINAGE SYSTEM LOCATIONS.

Rev. #:	Date	Description
2	05/04/26	Layout Revisions
1	04/08/26	Layout Revisions

Graphic Scale: 60 0 60 120

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Checked By:	EEL
Approved By:	KMS
Project #:	24120501
Plan Date:	02/10/26
Scale:	1" = 60'

STATE OF CONNECTICUT · KEVIN M. SOLLI · 25759 · LICENSED PROFESSIONAL ENGINEER

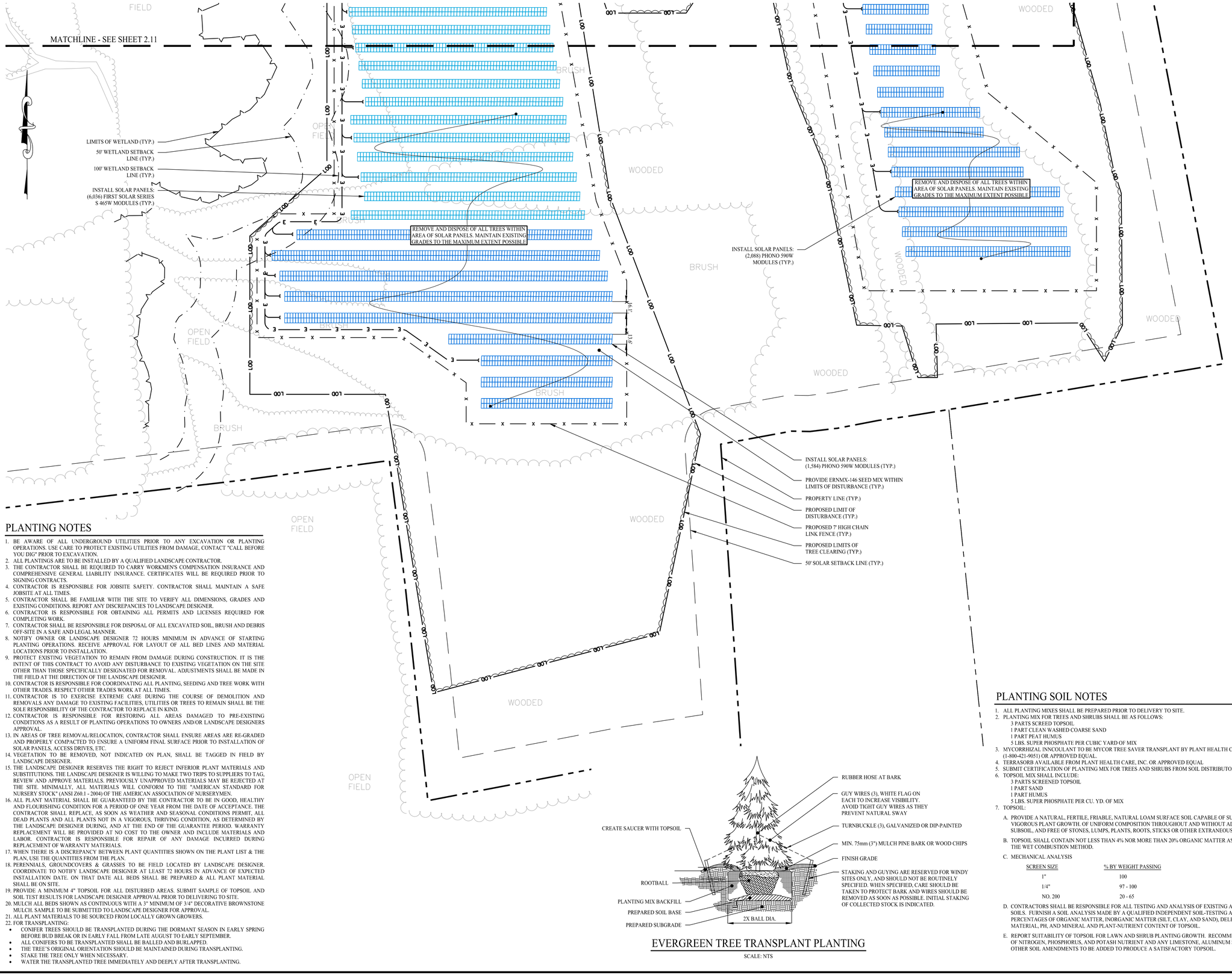
Kevin Solli, P.E.
CT 25759

Project:
PROPOSED SOLAR PHOTOVOLTAIC ARRAY
0 EXLEY ROAD
(PARCEL ID: 002-053A-0058)
PLAINFIELD, CONNECTICUT

Sheet Title: SITE LAYOUT PLAN (SHEET 1 OF 2)

Sheet #: 2.11

May 05, 2026 - 10:42am Anthony
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LEGEND

- PROPERTY LINE
- ADJOINING LOT LINE
- SOLAR SETBACK LINE
- LIMIT OF WETLANDS
- 50' WETLAND SETBACK LINE
- 100' WETLAND SETBACK LINE
- GRAVEL EQUIPMENT PAD
- CHAIN LINK FENCE
- SOLAR MODULES
- UTILITY POLE
- OVERHEAD ELECTRIC LINE
- ELECTRIC CONDUIT
- LIMIT OF DISTURBANCE
- LIMIT OF TREE CLEARING
- GRAVEL ACCESS DRIVE
- EVERGREEN TREE

PLANTING NOTES

1. BE AWARE OF ALL UNDERGROUND UTILITIES PRIOR TO ANY EXCAVATION OR PLANTING OPERATIONS. USE CARE TO PROTECT EXISTING UTILITIES FROM DAMAGE, CONTACT "CALL BEFORE YOU DIG" PRIOR TO EXCAVATION.
2. ALL PLANTINGS ARE TO BE INSTALLED BY A QUALIFIED LANDSCAPE CONTRACTOR.
3. THE CONTRACTOR SHALL BE REQUIRED TO CARRY WORKMENS COMPENSATION INSURANCE AND COMPREHENSIVE GENERAL LIABILITY INSURANCE. CERTIFICATES WILL BE REQUIRED PRIOR TO SIGNING CONTRACTS.
4. CONTRACTOR IS RESPONSIBLE FOR JOBSITE SAFETY. CONTRACTOR SHALL MAINTAIN A SAFE JOBSITE AT ALL TIMES.
5. CONTRACTOR SHALL BE FAMILIAR WITH THE SITE TO VERIFY ALL DIMENSIONS, GRADES AND EXISTING CONDITIONS. REPORT ANY DISCREPANCIES TO LANDSCAPE DESIGNER.
6. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS AND LICENSES REQUIRED FOR COMPLETING WORK.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR DISPOSAL OF ALL EXCAVATED SOIL, BRUSH AND DEBRIS OFF-SITE IN A SAFE AND LEGAL MANNER.
8. NOTIFY OWNER OR LANDSCAPE DESIGNER 72 HOURS MINIMUM IN ADVANCE OF STARTING PLANTING OPERATIONS. RECEIVE APPROVAL FOR LAYOUT OF ALL BED LINES AND MATERIAL LOCATIONS PRIOR TO INSTALLATION.
9. PROTECT EXISTING VEGETATION TO REMAIN FROM DAMAGE DURING CONSTRUCTION. IT IS THE INTENT OF THIS CONTRACT TO AVOID ANY DISTURBANCE TO EXISTING VEGETATION ON THE SITE OTHER THAN THOSE SPECIFICALLY DESIGNATED FOR REMOVAL. ADJUSTMENTS SHALL BE MADE IN THE FIELD AT THE DIRECTION OF THE LANDSCAPE DESIGNER.
10. CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL PLANTING, SEEDING AND TREE WORK WITH OTHER TRADES. RESPECT OTHER TRADES WORK AT ALL TIMES.
11. CONTRACTOR IS TO EXERCISE EXTREME CARE DURING THE COURSE OF DEMOLITION AND REMOVALS ANY DAMAGE TO EXISTING FACILITIES, UTILITIES OR TREES TO REMAIN SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO REPLACE IN KIND.
12. CONTRACTOR IS RESPONSIBLE FOR RESTORING ALL AREAS DAMAGED TO PRE-EXISTING CONDITIONS AS A RESULT OF PLANTING OPERATIONS TO OWNERS AND/OR LANDSCAPE DESIGNERS APPROVAL.
13. IN AREAS OF TREE REMOVAL/RELOCATION, CONTRACTOR SHALL ENSURE AREAS ARE RE-GRADED AND PROPERLY COMPACTED TO ENSURE A UNIFORM FINAL SURFACE PRIOR TO INSTALLATION OF SOLAR PANELS, ACCESS DRIVES, ETC.
14. VEGETATION TO BE REMOVED, NOT INDICATED ON PLAN, SHALL BE TAGGED IN FIELD BY LANDSCAPE DESIGNER.
15. THE LANDSCAPE DESIGNER RESERVES THE RIGHT TO REJECT INFERIOR PLANT MATERIALS AND SUBSTITUTIONS. THE LANDSCAPE DESIGNER IS WILLING TO MAKE TWO TRIPS TO SUPPLIERS TO TAG, REVIEW AND APPROVE MATERIALS. PREVIOUSLY UNAPPROVED MATERIALS MAY BE REJECTED AT THE SITE. MINIMALLY, ALL MATERIALS WILL CONFORM TO THE "AMERICAN STANDARD FOR NURSERY STOCK" (ANSI Z60.1 - 2004) OF THE AMERICAN ASSOCIATION OF NURSERYMEN.
16. ALL PLANT MATERIAL SHALL BE GUARANTEED BY THE CONTRACTOR TO BE IN GOOD, HEALTHY AND FLOURISHING CONDITION FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE. THE CONTRACTOR SHALL REPLACE, AS SOON AS WEATHER AND SEASONAL CONDITIONS PERMIT, ALL DEAD PLANTS AND ALL PLANTS NOT IN A VIGOROUS, THRIVING CONDITION, AS DETERMINED BY THE LANDSCAPE DESIGNER DURING, AND AT THE END OF THE GUARANTEE PERIOD. WARRANTY REPLACEMENT WILL BE PROVIDED AT NO COST TO THE OWNER AND INCLUDE MATERIALS AND LABOR. CONTRACTOR IS RESPONSIBLE FOR REPAIR OF ANY DAMAGE INCURRED DURING REPLACEMENT OF WARRANTY MATERIALS.
17. WHEN THERE IS A DISCREPANCY BETWEEN PLANT QUANTITIES SHOWN ON THE PLANT LIST & THE PLAN, USE THE QUANTITIES FROM THE PLAN.
18. PERENNIALS, GROUNDCOVERS & GRASSES TO BE FIELD LOCATED BY LANDSCAPE DESIGNER. COORDINATE TO NOTIFY LANDSCAPE DESIGNER AT LEAST 72 HOURS IN ADVANCE OF EXPECTED INSTALLATION DATE. ON THAT DATE ALL BEDS SHALL BE PREPARED & ALL PLANT MATERIAL SHALL BE ON SITE.
19. PROVIDE A MINIMUM 4" TOPSOIL FOR ALL DISTURBED AREAS. SUBMIT SAMPLE OF TOPSOIL AND SOIL TEST RESULTS FOR LANDSCAPE DESIGNER APPROVAL PRIOR TO DELIVERING TO SITE.
20. MULCH ALL BEDS SHOWN AS CONTINUOUS WITH A 3" MINIMUM OF 3/4" DECORATIVE BROWNSTONE MULCH. SAMPLE TO BE SUBMITTED TO LANDSCAPE DESIGNER FOR APPROVAL.
21. ALL PLANT MATERIALS TO BE SOURCED FROM LOCALLY GROWN GROWERS.
22. FOR TRANSPLANTING:
    - CONIFER TREES SHOULD BE TRANSPLANTED DURING THE DORMANT SEASON IN EARLY SPRING BEFORE BUD BREAK OR IN EARLY FALL FROM LATE AUGUST TO EARLY SEPTEMBER.
    - ALL CONIFERS TO BE TRANSPLANTED SHALL BE BALLED AND BURLAPPED.
    - THE TREE'S ORIGINAL ORIENTATION SHOULD BE MAINTAINED DURING TRANSPLANTING.
    - STAKE THE TREE ONLY WHEN NECESSARY.
    - WATER THE TRANSPLANTED TREE IMMEDIATELY AND DEEPLY AFTER TRANSPLANTING.

EVERGREEN TREE TRANSPLANT PLANTING

SCALE: NTS

PLANTING SOIL NOTES

1. ALL PLANTING MIXES SHALL BE PREPARED PRIOR TO DELIVERY TO SITE.
2. PLANTING MIX FOR TREES AND SHRUBS SHALL BE AS FOLLOWS:
   3 PARTS SCREED TOPSOIL
   1 PART CLEAN WASHED COARSE SAND
   1 PART PEAT HUMUS
   5 LBS. SUPER PHOSPHATE PER CUBIC YARD OF MIX
3. MYCORRHIZAL INNCOULANT TO BE MYCOR TREE SAVER TRANSPLANT BY PLANT HEALTH CARE, INC. (1-800-421-9051) OR APPROVED EQUAL.
4. TERRASORB AVAILABLE FROM PLANT HEALTH CARE, INC. OR APPROVED EQUAL
5. SUBMIT CERTIFICATION OF PLANTING MIX FOR TREES AND SHRUBS FROM SOIL DISTRIBUTOR.
6. TOPSOIL MIX SHALL INCLUDE:
   3 PARTS SCREENED TOPSOIL
   1 PART SAND
   1 PART HUMUS
   5 LBS. SUPER PHOSPHATE PER CU. YD. OF MIX
7. TOPSOIL:
   A. PROVIDE A NATURAL, FERTILE, FRIABLE, NATURAL LOAM SURFACE SOIL CAPABLE OF SUSTAINING VIGOROUS PLANT GROWTH, OF UNIFORM COMPOSITION THROUGHOUT AND WITHOUT ADMIXTURES OF SUBSOIL, AND FREE OF STONES, LUMPS, PLANTS, ROOTS, STICKS OR OTHER EXTRANEOUS MATTER.
   B. TOPSOIL SHALL CONTAIN NOT LESS THAN 4% NOR MORE THAN 20% ORGANIC MATTER AS DETERMINED BY THE WET COMBUSTION METHOD.
   C. MECHANICAL ANALYSIS

SCREEN SIZE	% BY WEIGHT PASSING
1"	100
1/4"	97 - 100
NO. 200	20 - 65

   D. CONTRACTORS SHALL BE RESPONSIBLE FOR ALL TESTING AND ANALYSIS OF EXISTING AND IMPORTED SOILS. FURNISH A SOIL ANALYSIS MADE BY A QUALIFIED INDEPENDENT SOIL-TESTING AGENCY STATING PERCENTAGES OF ORGANIC MATTER, INORGANIC MATTER (SILT, CLAY, AND SAND), DELETERIOUS MATERIAL, PH, AND MINERAL AND PLANT-NUTRIENT CONTENT OF TOPSOIL.
   E. REPORT SUITABILITY OF TOPSOIL FOR LAWN AND SHRUB PLANTING GROWTH. RECOMMEND QUANTITIES OF NITROGEN, PHOSPHORUS, AND POTASH NUTRIENT AND ANY LIMESTONE, ALUMINUM SULFATE, OR OTHER SOIL AMENDMENTS TO BE ADDED TO PRODUCE A SATISFACTORY TOPSOIL.

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2	05/04/26	Layout Revisions
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Approved By:	KMS
Project #:	24120501
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Scale:	1" = 60'

STATE OF CONNECTICUT KEVIN M. SOLLI 28760 LICENSED PROFESSIONAL ENGINEER

Kevin Solli, P.E.
CT 25759

Project:
PROPOSED SOLAR PHOTOVOLTAIC ARRAY
0 EXLEY ROAD
(PARCEL ID: 002-053A-0058)
PLAINFIELD, CONNECTICUT

Sheet Title: SITE LAYOUT PLAN (SHEET 2 OF 2)

Sheet #: 2.12

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GRADING & DRAINAGE NOTES

1. REFER TO THE EXISTING CONDITIONS MAP FOR THE ENTIRE PROPERTY BOUNDARY AND EXISTING CONDITIONS INFORMATION. THE PLAN HEREON DEPICTS A PORTION OF THE PROPERTY IN WHICH THE SITE WORK IS BEING PROPOSED.
2. THIS DRAWING IS INTENDED TO DESCRIBE GRADING AND DRAINAGE ONLY. REFER TO SITE PLAN FOR GENERAL INFORMATION, AND DETAIL SHEETS FOR DETAILS.
3. THE CONTRACTOR SHALL PRESERVE EXISTING VEGETATION WHERE POSSIBLE AND/OR AS NOTED ON DRAWINGS. REFER TO EROSION CONTROL PLAN FOR LIMIT OF DISTURBANCE AND EROSION CONTROL NOTES.
4. TOPSOIL SHALL BE STRIPPED AND STOCKPILED ON SITE FOR USE IN FINAL LANDSCAPING.
5. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY CONSTRUCTION PERMITS REQUIRED BY GOVERNMENT AND LOCAL AGENCIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY CONSTRUCTION PERMITS FROM THE TOWN OF PLAINFIELD REQUIRED TO PERFORM ALL WORK, INCLUDING FOR STREET CUTS AND CONNECTIONS TO EXISTING UTILITIES. THE CONTRACTOR SHALL POST ALL BONDS, PAY ALL FEES, PROVIDE PROOF OF INSURANCE AND PROVIDE TRAFFIC CONTROL NECESSARY FOR THIS WORK.
6. ALL DISTURBANCE INCURRED TO TOWN OR STATE PROPERTY DUE TO CONSTRUCTION SHALL BE RESTORED TO ITS PREVIOUS CONDITION OR BETTER, TO THE SATISFACTION OF THE TOWN OF PLAINFIELD AUTHORITY.
7. IF IMPACTED OR CONTAMINATED SOIL IS ENCOUNTERED BY THE CONTRACTOR, THE CONTRACTOR SHALL SUSPEND EXCAVATION WORK OF IMPACTED SOIL AND NOTIFY THE OWNER AND/OR OWNER'S ENVIRONMENTAL CONSULTANT PRIOR TO PROCEEDING WITH FURTHER WORK IN THE IMPACTED SOIL LOCATION UNTIL FURTHER INSTRUCTED BY THE OWNER AND/OR OWNER'S ENVIRONMENTAL CONSULTANT.
8. ALL DISTURBED AREAS ARE TO BE RESEEDED WITH ERNMX-146 WITHIN THE ARRAY AREA.

LEGEND

- PROPERTY LINE
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- 300 — MAJOR CONTOURS
- 302 — MINOR CONTOURS
- 334.70 — PROPOSED SPOT ELEVATION
- 338.33 — EXISTING SPOT ELEVATION

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Project #:	24120501
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Scale:	1" = 60'

STATE OF CONNECTICUT — KEVIN M. SOLLI — LICENSED PROFESSIONAL ENGINEER — 25759

Kevin Solli, P.E.
CT 25759

Project:
PROPOSED SOLAR PHOTOVOLTAIC ARRAY
0 EXLEY ROAD
(PARCEL ID: 002-053A-0058)
PLAINFIELD, CONNECTICUT

Sheet Title: GRADING & DRAINAGE PLAN (SHEET 1 OF 2)

Sheet #: 2.21

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LEGEND

- PROPERTY LINE
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Sheet Title: GRADING & DRAINAGE PLAN (SHEET 2 OF 2)

Sheet #: 2.22

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LEGEND

- PROPERTY LINE
- SILT FENCE PROTECTION
- MATERIAL STOCKPILE AREA
- CONSTRUCTION ENTRANCE
- PHASE I CLEARING AND GRUBBING
- EROSION CONTROL MATTING

CONSTRUCTION OPERATION & MAINTENANCE PLAN

E&S MEASURE	INSPECTION SCHEDULE	MAINTENANCE REQUIRED
CONSTRUCTION ENTRANCE	DAILY	PLACE ADDITIONAL STONE, EXTEND THE LENGTH OR REMOVE AND REPLACE THE STONE. CLEAN PAVED SURFACES OF TRACKED SEDIMENT.
COMPOST FILTER SOCK	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.25"	REPAIR/REPLACE WHEN FAILURE OR DETERIORATION IS OBSERVED.
SILT FENCE	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.25"	REPAIR/REPLACE WHEN FAILURE OR DETERIORATION IS OBSERVED. REMOVE SILT WHEN IT REACHES 1/2 THE HEIGHT OF THE FENCE.
TOPSOIL/BORROW STOCKPILES	DAILY	REPAIR/REPLACE SEDIMENT BARRIERS AS NECESSARY.
TEMPORARY SOIL PROTECTION	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.25"	REPAIR ERODED OR BARE AREAS IMMEDIATELY. RESEED AND MULCH.

CONSTRUCTION SEQUENCE (PHASE I)

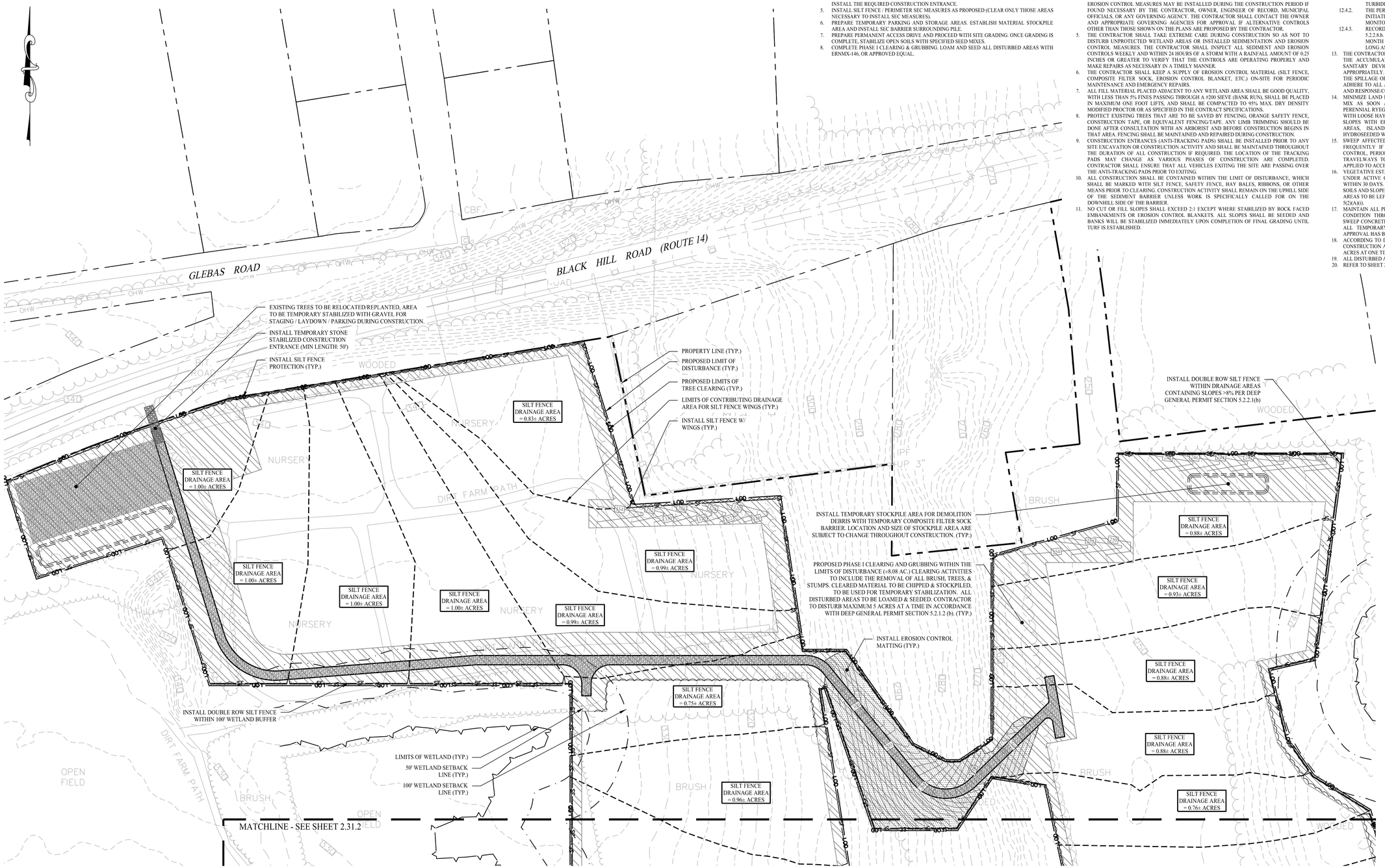
THE FOLLOWING SUGGESTED SEQUENCE OF CONSTRUCTION ACTIVITIES IS PROJECTED BASED UPON ENGINEERING JUDGEMENT AND BEST MANAGEMENT PRACTICES. THE CONTRACTOR MAY ELECT TO ALTER THE SEQUENCING TO BEST MEET THE CONSTRUCTION SCHEDULE, THE EXISTING SITE ACTIVITIES AND WEATHER CONDITIONS. SHOULD THE CONTRACTOR ALTER THE CONSTRUCTION SEQUENCE OR ANY EROSION AND SEDIMENTATION CONTROL MEASURES THEY SHALL MODIFY THE STORMWATER POLLUTION CONTROL PLAN ("SWPCP") AS REQUIRED BY THE GENERAL PERMIT. MAJOR CHANGES IN SEQUENCING AND/OR METHODS MAY REQUIRE REGULATORY APPROVAL PRIOR TO IMPLEMENTATION.

PHASE I:

1. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING. PHYSICALLY FLAG THE LIMITS OF DISTURBANCE IN THE FIELD AS NECESSARY TO FACILITATE THE PRE-CONSTRUCTION MEETING.
2. CONDUCT A PRE-CONSTRUCTION MEETING TO DISCUSS THE PROPOSED WORK AND EROSION AND SEDIMENTATION CONTROL MEASURES. THE MEETING SHOULD BE ATTENDED BY THE OWNER, THE OWNER'S REPRESENTATIVE(S), THE GENERAL CONTRACTOR, DESIGNATED SUB-CONTRACTORS, AND THE PERSON, OR PERSONS, RESPONSIBLE FOR THE IMPLEMENTATION, OPERATION, MONITORING, AND MAINTENANCE OF THE EROSION AND SEDIMENTATION MEASURES. THE CONSTRUCTION PROCEDURES FOR THE ENTIRE PROJECT SHALL BE REVIEWED AT THIS MEETING.
3. NOTIFY CALL BEFORE YOU DIG AT 811, AS REQUIRED, PRIOR TO THE START OF CONSTRUCTION.
4. REMOVE EXISTING IMPEDIMENTS AS NECESSARY AND PROVIDE MINIMAL DISTURBANCE TO INSTALL THE REQUIRED CONSTRUCTION ENTRANCE.
5. INSTALL SILT FENCE / PERIMETER SEC MEASURES AS PROPOSED (CLEAR ONLY THOSE AREAS NECESSARY TO INSTALL SEC MEASURES).
6. PREPARE TEMPORARY PARKING AND STORAGE AREAS. ESTABLISH MATERIAL STOCKPILE AREA AND INSTALL SEC BARRIER SURROUNDING PILE.
7. PREPARE PERMANENT ACCESS DRIVE AND PROCEED WITH SITE GRADING. ONCE GRADING IS COMPLETE, STABILIZE OPEN SOILS WITH SPECIFIED SEED MIXES.
8. COMPLETE PHASE I CLEARING & GRUBBING. LOAM AND SEED ALL DISTURBED AREAS WITH ERNMX-146, OR APPROVED EQUAL.

SEDIMENT & EROSION CONTROL NOTES

1. THE CONTRACTOR SHALL CONSTRUCT ALL SEDIMENT AND EROSION CONTROLS IN ACCORDANCE WITH THE 2024 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL, LATEST EDITION, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, AND AS DIRECTED BY THE TOWN OF PLAINFIELD, PERMITTEE, AND/OR SWPCP MONITOR. ALL PERIMETER SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF CLEARING AND GRUBBING AND DEMOLITION OPERATIONS.
2. THESE DRAWINGS ARE ONLY INTENDED TO DESCRIBE THE SEDIMENT AND EROSION CONTROL MEASURES FOR THIS SITE. SEE CONSTRUCTION SEQUENCE FOR ADDITIONAL INFORMATION. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHOWN ON THE EROSION & SEDIMENT CONTROL PLAN ARE SHOWN AS REQUIRED BY THE ENGINEER OF RECORD. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ALL EROSION CONTROL MEASURES ARE CONFIGURED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION OF SOILS AND PREVENT THE TRANSPORT OF SEDIMENTS AND OTHER POLLUTANTS TO STORM DRAINAGE SYSTEMS AND/OR WATERCOURSES. ACTUAL SITE CONDITIONS OR SEASONAL AND CLIMATIC CONDITIONS MAY WARRANT ADDITIONAL CONTROLS OR CONFIGURATIONS, AS REQUIRED, AND AS DIRECTED BY THE PERMITTEE AND/OR SWPCP MONITOR. REFER TO SITE PLAN FOR GENERAL INFORMATION AND OTHER CONTRACT PLANS FOR APPROPRIATE INFORMATION.
3. A BOND OR LETTER OF CREDIT MAY BE REQUIRED TO BE POSTED WITH THE GOVERNING AUTHORITY FOR THE EROSION CONTROL INSTALLATION AND MAINTENANCE.
4. THE CONTRACTOR SHALL APPLY THE MINIMUM EROSION & SEDIMENT CONTROL MEASURES SHOWN ON THE PLAN IN CONJUNCTION WITH CONSTRUCTION SEQUENCING, SUCH THAT ALL ACTIVE WORK ZONES ARE PROTECTED. ADDITIONAL AND/OR ALTERNATIVE SEDIMENT AND EROSION CONTROL MEASURES MAY BE INSTALLED DURING THE CONSTRUCTION PERIOD IF FOUND NECESSARY BY THE CONTRACTOR, OWNER, ENGINEER OF RECORD, MUNICIPAL OFFICIALS, OR ANY GOVERNING AGENCY. THE CONTRACTOR SHALL CONTACT THE OWNER AND APPROPRIATE GOVERNING AGENCIES FOR APPROVAL IF ALTERNATIVE CONTROLS OTHER THAN THOSE SHOWN ON THE PLANS ARE PROPOSED BY THE CONTRACTOR.
5. THE CONTRACTOR SHALL TAKE EXTREME CARE DURING CONSTRUCTION SO AS NOT TO DISTURB UNPROTECTED WETLAND AREAS OR INSTALLED SEDIMENTATION AND EROSION CONTROL MEASURES. THE CONTRACTOR SHALL INSPECT ALL SEDIMENT AND EROSION CONTROLS WEEKLY AND WITHIN 24 HOURS OF A STORM WITH A RAINFALL AMOUNT OF 0.25 INCHES OR GREATER TO VERIFY THAT THE CONTROLS ARE OPERATING PROPERLY AND MAKE REPAIRS AS NECESSARY IN A TIMELY MANNER.
6. THE CONTRACTOR SHALL KEEP A SUPPLY OF EROSION CONTROL MATERIAL (SILT FENCE, COMPOSITE FILTER SOCK, EROSION CONTROL BLANKET, ETC.) ON-SITE FOR PERIODIC MAINTENANCE AND EMERGENCY REPAIRS.
7. ALL FILL MATERIAL PLACED ADJACENT TO ANY WETLAND AREA SHALL BE GOOD QUALITY, WITH LESS THAN 5% FINES PASSING THROUGH A #200 SIEVE (BANK RUN), SHALL BE PLACED IN MAXIMUM ONE FOOT LIFTS, AND SHALL BE COMPACTED TO 95% MAX. DRY DENSITY MODIFIED PROCTOR OR AS SPECIFIED IN THE CONTRACT SPECIFICATIONS.
8. PROTECT EXISTING TREES THAT ARE TO BE SAVED BY FENCING, ORANGE SAFETY FENCE, CONSTRUCTION TAPE, OR EQUIVALENT FENCING/TAPE. ANY LIMB TRIMMING SHOULD BE DONE AFTER CONSULTATION WITH AN ARBORIST AND BEFORE CONSTRUCTION BEGINS IN THAT AREA. FENCING SHALL BE MAINTAINED AND REPAIRED DURING CONSTRUCTION.
9. CONSTRUCTION ENTRANCES (ANTI-TRACKING PADS) SHALL BE INSTALLED PRIOR TO ANY SITE EXCAVATION OR CONSTRUCTION ACTIVITY AND SHALL BE MAINTAINED THROUGHOUT THE DURATION OF ALL CONSTRUCTION IF REQUIRED. THE LOCATION OF THE TRACKING PADS MAY CHANGE AS VARIOUS PHASES OF CONSTRUCTION ARE COMPLETED. CONTRACTOR SHALL ENSURE THAT ALL VEHICLES EXITING THE SITE ARE PASSING OVER THE ANTI-TRACKING PADS PRIOR TO EXITING.
10. ALL CONSTRUCTION SHALL BE CONTAINED WITHIN THE LIMIT OF DISTURBANCE, WHICH SHALL BE MARKED WITH SILT FENCE, SAFETY FENCE, HAY BALES, RIBBONS, OR OTHER MEANS PRIOR TO CLEARING. CONSTRUCTION ACTIVITY SHALL REMAIN ON THE UPHILL SIDE OF THE SEDIMENT BARRIER UNLESS WORK IS SPECIFICALLY CALLED FOR ON THE DOWNHILL SIDE OF THE BARRIER.
11. NO CUT OR FILL SLOPES SHALL EXCEED 2:1 EXCEPT WHERE STABILIZED BY ROCK FACED EMBANKMENTS OR EROSION CONTROL BLANKETS. ALL SLOPES SHALL BE SEEDED AND BANKS WILL BE STABILIZED IMMEDIATELY UPON COMPLETION OF FINAL GRADING UNTIL TURF IS ESTABLISHED.
12. DEWATERING SHALL BE CONDUCTED IN ACCORDANCE WITH THE CT STORMWATER GENERAL PERMIT (CT SGP) SECTION 5.2.2.8 AND THE CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL (THE GUIDELINES).
    - 12.1. INLET/OUTLET PROTECTION ASSOCIATED WITH PUMP INTAKE / DISCHARGE SHALL BE UTILIZED DURING DEWATERING ACTIVITIES IN THE FORM OF INLET TRAPS, FILTRATION DEVICES, MANIFOLDS, SILT BAGS, RIPRAP OUTFALLS, OR OTHER STANDARD PROTECTION DEVICES. DIRECT DEWATERING DISCHARGES TO UPLAND BMPs DESIGNED TO REMOVE SUSPENDED SOLIDS.
    - 12.2. DEWATERING WATERS SHALL NOT CAUSE SCOURING OR EROSION, SHALL NOT CONTAIN SUSPENDED SOLIDS IN AMOUNTS REASONABLY EXPECTED TO CAUSE POLLUTION OF SURFACE WATERS, AND SHALL NOT CONTAIN A VISIBLE OIL SHEEN, EXCESSIVE TURBIDITY, FLOATING SOLIDS, DEBRIS, TRASH, OR FOAMING IN THE RECEIVING WATER.
    - 12.3. IF TURBIDITY OR DISCOLORATION OR OTHER POLLUTANTS ARE OBSERVED IN THE DISCHARGE FROM DEWATERING CONTROL MEASURES, ADDITIONAL OR ALTERNATE CONTROL MEASURES OR OTHER CORRECTIVE ACTIONS MUST BE IMPLEMENTED IN ACCORDANCE WITH SECTION 5.2.4.2.c.i. OF THE CT SGP AND THE GUIDELINES.
    - 12.4. FOR EACH DEWATERING DISCHARGE POINT, THE PERMITTEE SHALL CARRY OUT INITIAL AND WEEKLY TURBIDITY MONITORING FOR THE DURATION OF DEWATERING OPERATIONS.
        - 12.4.1. THE SAMPLING POINT SHALL BE LOCATED IMMEDIATELY DOWNSTREAM OF THE FINAL TREATMENT, PRIOR TO THE ENTRY INTO ANY RECEIVING SURFACE WATER, WETLAND, OR OFF-SITE DRAINAGE FEATURE. THE PERMITTEE SHALL MEASURE TURBIDITY IN ACCORDANCE WITH 40 CFR 136.
        - 12.4.2. THE PERMITTEE SHALL TAKE THE FIRST MEASUREMENT WITHIN 30 MINUTES OF INITIATING THE DEWATERING AT EACH DISCHARGE POINT. WEEKLY TURBIDITY MONITORING SHALL FOLLOW AT EACH ACTIVE DEWATERING DISCHARGE POINT.
        - 12.4.3. RECORDS OF TURBIDITY MONITORING CONDUCTED PURSUANT TO SECTIONS 5.2.2.8.b. SHALL BE SUBMITTED TO THE COMMISSIONER ON THE FIRST DAY OF EACH MONTH FOLLOWING THE INITIATION OF THE DEWATERING DISCHARGE FOR AS LONG AS THE DISCHARGE EXISTS.
13. THE CONTRACTOR SHALL MAINTAIN A CLEAN CONSTRUCTION SITE AND SHALL NOT ALLOW THE ACCUMULATION OF RUBBISH OR CONSTRUCTION DEBRIS ON THE SITE. PROPER SANITARY DEVICES SHALL BE MAINTAINED ON-SITE AT ALL TIMES AND SECURED APPROPRIATELY. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID THE SPILLAGE OF FUEL OR OTHER POLLUTANTS ON THE CONSTRUCTION SITE AND SHALL ADHERE TO ALL APPLICABLE POLICIES AND REGULATIONS RELATED TO SPILL PREVENTION AND RESPONSE/CONTAINMENT.
14. MINIMIZE LAND DISTURBANCES. SEED AND MULCH DISTURBED AREAS WITH TEMPORARY MIX AS SOON AS PRACTICABLE (2 WEEK MAXIMUM. UNSTABILIZED PERIOD) USING PERENNIAL RYEGRASS AT 40 LBS PER ACRE. MULCH ALL CUT AND FILL SLOPES AND SWALES WITH LOOSE HAY AT A RATE OF 2 TONS PER ACRE. IF NECESSARY, REPLACE LOOSE HAY ON SLOPES WITH EROSION CONTROL BLANKETS OR JUTE CLOTH. MODERATELY GRADED AREAS, ISLANDS, AND TEMPORARY CONSTRUCTION STAGING AREAS MAY BE HYDROSEEDED WITH TACKIFIER.
15. SWEEP AFFECTED PORTIONS OF OFF SITE ROADS ONE OR MORE TIMES A DAY (OR LESS FREQUENTLY IF TRACKING IS NOT A PROBLEM) DURING CONSTRUCTION. FOR DUST CONTROL, PERIODICALLY MOISTEN EXPOSED SOIL SURFACES WITH WATER ON UNPAVED TRAVELWAYS TO KEEP THE TRAVELWAYS DAMP. CALCIUM CHLORIDE MAY ALSO BE APPLIED TO ACCESS ROADS. DUMP TRUCK LOADS EXITING THE SITE SHALL BE COVERED.
16. VEGETATIVE ESTABLISHMENT SHALL OCCUR ON ALL DISTURBED SOIL, UNLESS THE AREA IS UNDER ACTIVE CONSTRUCTION, IT IS COVERED IN STONE OR SCHEDULED FOR PAVING WITHIN 30 DAYS. TEMPORARY SEEDING OR NON-LIVING SOIL PROTECTION OF ALL EXPOSED SOILS AND SLOPES SHALL BE INITIATED WITHIN THE FIRST 7 DAYS OF SUSPENDING WORK IN AREAS TO BE LEFT LONGER THAN 14 DAYS ACCORDING TO DEEP GENERAL PERMIT SECTION 5(2)(A)(i).
17. MAINTAIN ALL PERMANENT AND TEMPORARY SEDIMENT CONTROL DEVICES IN EFFECTIVE CONDITION THROUGHOUT THE CONSTRUCTION PERIOD. UPON COMPLETION OF WORK SWEEP CONCRETE PADS. CLEAN THE STORMWATER MANAGEMENT SYSTEMS AND REMOVE ALL TEMPORARY SEDIMENT CONTROLS ONCE THE SITE IS FULLY STABILIZED AND APPROVAL HAS BEEN RECEIVED FROM PERMITTEE OR THE MUNICIPALITY.
18. ACCORDING TO DEEP GENERAL PERMIT SECTION 5.2.1.2(b), WHEREVER PRACTICABLE, SITE CONSTRUCTION ACTIVITIES SHALL BE PHASED TO AVOID THE DISTURBANCE OF OVER FIVE ACRES AT ONE TIME.
19. ALL DISTURBED AREAS ARE TO BE RESEEDED WITH ERNMX-146.
20. REFER TO SHEET 2.41 FOR SEDIMENT & EROSION CONTROL NARRATIVE & DETAILS.



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2	05/04/26	Layout Revisions
1	04/08/26	Layout Revisions

Graphic Scale: 60 0 60 120

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Checked By:	EEL
Approved By:	KMS
Project #:	24120501
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Scale:	1" = 60'

STATE OF CONNECTICUT — KEVIN M. SOLLI — 25759 — LICENSED PROFESSIONAL ENGINEER

Kevin Solli, P.E.
CT 25759

Project:
PROPOSED SOLAR PHOTOVOLTAIC ARRAY
0 EXLEY ROAD
(PARCEL ID: 002-053A-0058)
PLAINFIELD, CONNECTICUT

Sheet Title: SOIL EROSION & SEDIMENT CONTROL PHASE I (SHEET 1 OF 2)

Sheet #: 2.31.1

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MATCHLINE - SEE SHEET 2.31.1

LIMITS OF WETLAND (TYP.)

50' WETLAND SETBACK LINE (TYP.)

100' WETLAND SETBACK LINE (TYP.)

SILT FENCE DRAINAGE AREA = 0.99± ACRES

SILT FENCE DRAINAGE AREA = 0.99± ACRES

SILT FENCE DRAINAGE AREA = 0.75± ACRES

SILT FENCE DRAINAGE AREA = 0.74± ACRES

SILT FENCE DRAINAGE AREA = 0.93± ACRES

SILT FENCE DRAINAGE AREA = 0.98± ACRES

SILT FENCE DRAINAGE AREA = 1.00± ACRES

SILT FENCE DRAINAGE AREA = 1.00± ACRES

SILT FENCE DRAINAGE AREA = 0.72± ACRES

SILT FENCE DRAINAGE AREA = 0.78± ACRES

SILT FENCE DRAINAGE AREA = 0.94± ACRES

SILT FENCE DRAINAGE AREA = 0.94± ACRES

SILT FENCE DRAINAGE AREA = 0.99± ACRES

SILT FENCE DRAINAGE AREA = 0.51± ACRES

SILT FENCE DRAINAGE AREA = 0.56± ACRES

LIMITS OF CONTRIBUTING DRAINAGE AREA FOR SILT FENCE WINGS (TYP.)

PROPERTY LINE (TYP.)

PROPOSED LIMIT OF DISTURBANCE (TYP.)

PROPOSED LIMITS OF TREE CLEARING (TYP.)

INSTALL TEMPORARY STOCKPILE AREA FOR DEMOLITION DEBRIS WITH TEMPORARY COMPOSITE FILTER SOCK BARRIER. LOCATION AND SIZE OF STOCKPILE AREA ARE SUBJECT TO CHANGE THROUGHOUT CONSTRUCTION. (TYP.)

INSTALL DOUBLE ROW SILT FENCE WITHIN AREAS OF SLOPES >8% PER DEEP GENERAL PERMIT SECTION 5.2.2.1 (b)

PROPOSED PHASE I CLEARING AND GRUBBING WITHIN THE LIMITS OF DISTURBANCE (±8.08 AC.) CLEARING ACTIVITIES TO INCLUDE THE REMOVAL OF ALL BRUSH, TREES, & STUMPS. CLEARED MATERIAL TO BE CHIPPED & STOCKPILED, TO BE USED FOR TEMPORARY STABILIZATION. ALL DISTURBED AREAS TO BE LOAMED & SEEDED. CONTRACTOR TO DISTURB MAXIMUM 5 ACRES AT A TIME IN ACCORDANCE WITH DEEP GENERAL PERMIT SECTION 5.2.1.2 (b). (TYP.)

INSTALL SILT FENCE W/ WINGS (TYP.)

LEGEND

- PROPERTY LINE
- SILT FENCE PROTECTION
- MATERIAL STOCKPILE AREA
- CONSTRUCTION ENTRANCE
- PHASE I CLEARING AND GRUBBING
- EROSION CONTROL MATTING

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Project:

PROPOSED SOLAR PHOTOVOLTAIC ARRAY

0 EXLEY ROAD
(PARCEL ID: 002-053A-0058)
PLAINFIELD, CONNECTICUT

Sheet Title: SOIL EROSION & SEDIMENT CONTROL PHASE I (SHEET 2 OF 2)

Sheet #: 2.31.2

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CONSTRUCTION OPERATION & MAINTENANCE PLAN

E&S MEASURE	INSPECTION SCHEDULE	MAINTENANCE REQUIRED
CONSTRUCTION ENTRANCE	DAILY	PLACE ADDITIONAL STONE, EXTEND THE LENGTH OR REMOVE AND REPLACE THE STONE. CLEAN PAVED SURFACES OF TRACKED SEDIMENT.
COMPOST FILTER SOCK	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.25"	REPAIR/REPLACE WHEN FAILURE OR DETERIORATION IS OBSERVED.
SILT FENCE	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.25"	REPAIR/REPLACE WHEN FAILURE OR DETERIORATION IS OBSERVED. REMOVE SILT WHEN IT REACHES 1/2 THE HEIGHT OF THE FENCE.
TOPSOIL/BORROW STOCKPILES	DAILY	REPAIR/REPLACE SEDIMENT BARRIERS AS NECESSARY.
TEMPORARY SOIL PROTECTION	WEEKLY & WITHIN 24 HOURS OF RAINFALL > 0.25"	REPAIR ERODED OR BARE AREAS IMMEDIATELY. RESEED AND MULCH.

CONSTRUCTION SEQUENCE (PHASE II)

PHASE II:

1. TEMPORARILY SEED, THROUGHOUT CONSTRUCTION, DENUDED AREAS THAT WILL BE INACTIVE FOR 14 DAYS OR MORE.
2. COMPLETE PHASE II CLEARING AND GRUBBING FOR SOLAR PANELS PER DESIGN PLANS. STABILIZE OPEN SOILS WITH EROSION CONTROL BLANKETS OR STUMP GRINDINGS OR EROSION CONTROL MIX MULCH OR HYDROSEED WITH TACKIFER AS NECESSARY.
7. REMOVE / RELOCATE EXISTING EVERGREEN TREES. FOLLOWING TREE REMOVAL, REGRADE & COMPACT SOIL.
8. INSTALL RACKING POSTS FOR SOLAR PANELS.
9. INSTALL SOLAR PANELS AND COMPLETE ELECTRIC INSTALLATION.
10. COMPLETE REMAINING SITE WORK, INCLUDING CHAIN LINK FENCE, EQUIPMENTS PADS, AND INTERCONNECTION ROUTE. STABILIZE ALL DISTURBED AREAS THROUGHOUT CONSTRUCTION.
11. PERMANENTLY STABILIZE AREAS TO BE VEGETATED AS THEY ARE BROUGHT TO FINAL GRADE.
12. PER CT DEEP GENERAL PERMIT 5.2.2.1 (b); FOR SLOPES GREATER THAN OR EQUAL TO 8%, EROSION CONTROL BLANKETS OR STUMP GRINDINGS OR EROSION CONTROL MIX MULCH OR HYDROSEED WITH TACKIFER SHALL BE APPLIED WITHIN 72 HOURS OF FINAL GRADING, OR WHEN A RAINFALL OF 0.5 INCHES OR GREATER IS PREDICTED WITHIN 24 HOURS OF FINAL GRADING, WHICHEVER TIME PERIOD IS LESS.
13. INSTALL GRAVEL ACCESS DRIVE.
14. REMOVE CONSTRUCTION ENTRANCE.
15. INSTALL EVERGREEN TREES.
16. PREPARE SITE FOR FINAL GRADING.
17. FINE GRADE, RAKE, SEED, AND MULCH ALL REMAINING DISTURBED AREAS.
18. CONTRACTOR / CONSTRUCTION MANAGER TO COORDINATE WITH ENGINEER OF RECORD AND SOIL CONSERVATION DISTRICT AGENT TO OBTAIN STABILIZED SITE STATUS.
19. CONTINUE DAILY INSPECTION REPORTS UNTIL THE FINAL DAILY INSPECTION REPORT IS SIGNED BY THE CONSTRUCTION MANAGER AND SUBMITTED.

LEGEND

- PROPERTY LINE
- SILT FENCE PROTECTION
- MATERIAL STOCKPILE AREA
- CONSTRUCTION ENTRANCE
- CONCRETE WASHPIT
- PHASE 2 CLEARING AND GRUBBING
- EROSION CONTROL MATTING



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Kevin Solli, P.E.
CT 25759

Project:

PROPOSED SOLAR PHOTOVOLTAIC ARRAY

0 EXLEY ROAD
(PARCEL ID: 002-053A-0058)
PLAINFIELD, CONNECTICUT

Sheet Title: SOIL EROSION & SEDIMENT CONTROL PHASE II (SHEET 1 OF 2)

Sheet #: 2.32.1

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LEGEND

- PROPERTY LINE
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PLAINFIELD, CONNECTICUT

Sheet Title: SOIL EROSION & SEDIMENT CONTROL PHASE II (SHEET 2 OF 2)

Sheet #: 2.32.2

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SEDIMENT & EROSION CONTROL NARRATIVE

1. THE PROJECT INVOLVES THE CONSTRUCTION OF A GROUND MOUNTED SOLAR PANEL FACILITY WITH ASSOCIATED EQUIPMENT, INCLUDING GRADING OF APPROXIMATELY 0.96± ACRES OF EXISTING LOT.

   THE PROPOSED PROJECT INVOLVES THE FOLLOWING CONSTRUCTION:

   A. CLEARING, GRUBBING, AND GRADING OF EXISTING LOT.
   B. CONSTRUCTION OF 9,708 GROUND MOUNTED SOLAR PANELS AND ASSOCIATED EQUIPMENT.
   C. THE STABILIZATION OF DISTURBED AREAS WITH PERMANENT VEGETATIVE TREATMENTS.

2. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHOWN ON THE PLANS ARE DESIGNED IN ACCORDANCE WITH THE CONNECTICUT GUIDELINES FOR SOIL EROSION & SEDIMENT CONTROL, EFFECTIVE MARCH 30, 2024.

3. FOR THIS PROJECT, THERE ARE APPROXIMATELY 26.47± ACRES OF THE SITE BEING DISTURBED WITH A 12,200 SQUARE-FOOT INCREASE IN THE IMPERVIOUS AREA OF THE SITE. IMPERVIOUS AREAS ARE LIMITED TO THE CONCRETE PADS FOR ELECTRICAL EQUIPMENT & GRAVEL ACCESS DRIVE.

4. THE PROJECT AREA, AS MAPPED IN THE SOIL SURVEY OF STATE OF CONNECTICUT (NRCS, VERSION 1, SEPTEMBER 30, 2023), CONTAINS TYPE 36A (HYDROLOGIC SOIL GROUP A), 23A (HYDROLOGIC SOIL GROUP A/D), 62D (HYDROLOGIC SOIL GROUP B), 84C (HYDROLOGIC SOIL GROUP C), 45A (HYDROLOGIC SOIL GROUP C/D), AND 45B (HYDROLOGIC SOIL GROUP C/D). A GEOTECHNICAL ENGINEERING REPORT IS PROVIDED UNDER SEPARATE COVER.

5. IT IS ANTICIPATED THAT CONSTRUCTION WILL BE COMPLETED IN APPROXIMATELY 8-10 MONTHS.

6. REFER TO THE CONSTRUCTION SEQUENCING AND EROSION AND SEDIMENTATION NOTES FOR INFORMATION REGARDING SEQUENCING OF MAJOR OPERATIONS IN THE ON-SITE CONSTRUCTION PHASES.

7. STORMWATER MANAGEMENT DESIGN CRITERIA UTILIZES THE APPLICABLE SECTIONS OF THE 2024 CONNECTICUT STORMWATER QUALITY MANUAL, TO THE EXTENT POSSIBLE AND PRACTICABLE FOR THIS PROJECT ON THIS SITE. EROSION AND SEDIMENTATION MEASURES ARE BASED UPON ENGINEERING PRACTICE, JUDGEMENT AND THE APPLICABLE SECTIONS OF THE CONNECTICUT EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS, LATEST EDITION.

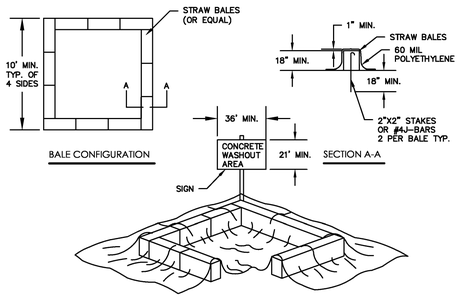
8. DETAILS FOR THE TYPICAL STORMWATER MANAGEMENT AND EROSION AND SEDIMENTATION MEASURES ARE SHOWN ON THE PLAN SHEETS OR PROVIDED AS SEPARATE SUPPORT DOCUMENTATION FOR REVIEW IN THIS PLAN.

9. CONSERVATION PRACTICES TO BE USED DURING CONSTRUCTION:

   A. STAGED CONSTRUCTION;
   B. MINIMIZE THE DISTURBED AREAS TO THE EXTENT PRACTICABLE DURING CONSTRUCTION;
   C. STABILIZE DISTURBED AREAS WITH TEMPORARY OR PERMANENT MEASURES AS SOON AS POSSIBLE, BUT NO LATER THAN 7-DAYS FOLLOWING DISTURBANCE;
   D. MINIMIZE IMPERVIOUS AREAS;
   E. UTILIZE APPROPRIATE CONSTRUCTION EROSION AND SEDIMENTATION MEASURES.

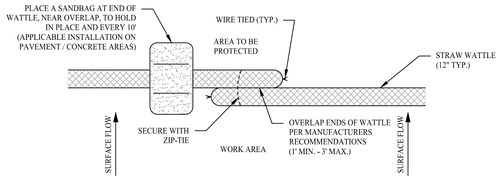
9. THE FOLLOWING SEPARATE DOCUMENTS ARE TO BE CONSIDERED A PART OF THE EROSION SEDIMENTATION PLAN:

   A. STORMWATER MANAGEMENT REPORT.
   B. SWPCP, TO BE ISSUED AT A LATER DATE.



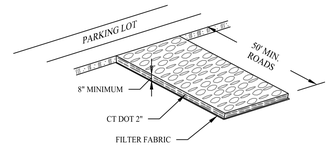
CONCRETE WASH PIT DETAIL

SCALE: NTS



COMPOST FILTER SOCK

SCALE: NTS



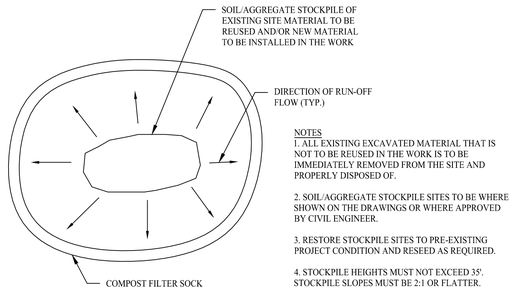
GRADATION TABLE

SQUARE MESH SIEVES	CONN. DOT 2" CRUSHED GRAVEL % FINER	ASTM C-33 NO. 2 % FINER	ASTM C-33 NO. 3 % FINER
2 1/2 INCHES	100	90-100	100
2 INCHES	95-100	35-70	90-100
1 1/2 INCHES	35-70	0-15	35-70
1 1/4 INCHES	0-25	---	---
1 INCHES	0-10	---	0-15
3/4 INCHES	---	0-5	---
1/2 INCHES	---	---	0-5
3/8 INCHES	---	---	---

SOURCE:
U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, STORRS, CONNECTICUT

CONSTRUCTION ENTRANCE

SCALE: NTS



NOTES
1. ALL EXISTING EXCAVATED MATERIAL THAT IS NOT TO BE REUSED IN THE WORK IS TO BE IMMEDIATELY REMOVED FROM THE SITE AND PROPERLY DISPOSED OF.

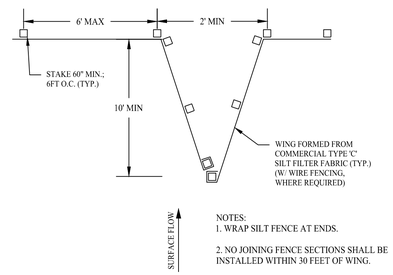
2. SOIL/AGGREGATE STOCKPILE SITES TO BE WHERE SHOWN ON THE DRAWINGS OR WHERE APPROVED BY CIVIL ENGINEER.

3. RESTORE STOCKPILE SITES TO PRE-EXISTING PROJECT CONDITION AND RESEED AS REQUIRED.

4. STOCKPILE HEIGHTS MUST NOT EXCEED 35'. STOCKPILE SLOPES MUST BE 2:1 OR FLATTER.

MATERIALS STOCKPILE DETAIL

SCALE: NTS

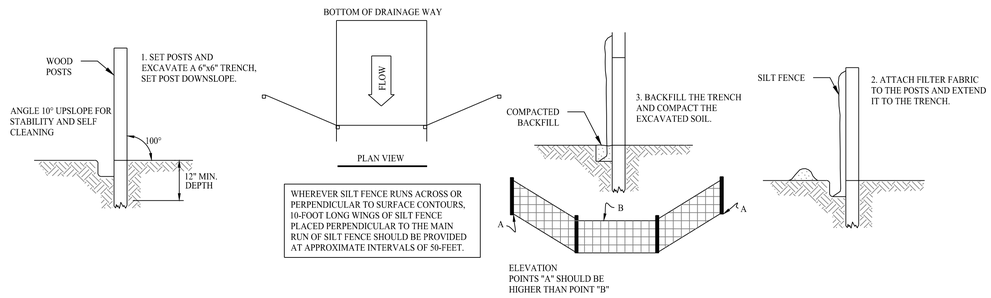


NOTES:
1. WRAP SILT FENCE AT ENDS.

2. NO JOINING FENCE SECTIONS SHALL BE INSTALLED WITHIN 30 FEET OF WING.

SILT FENCE WING DETAIL

SCALE: NTS



SILT FENCE PROTECTION DETAIL

SCALE: NTS

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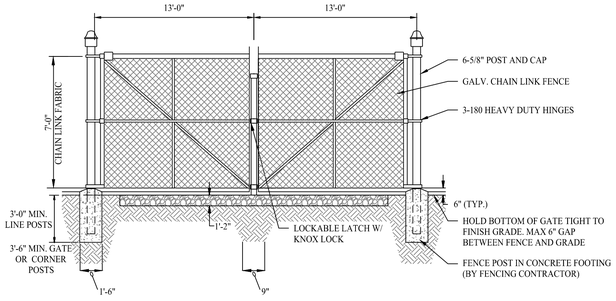
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Sheet Title:
SOIL EROSION & SEDIMENT CONTROL DETAILS

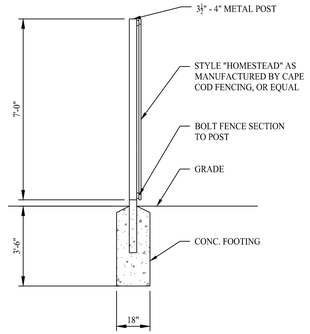
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2.41

May 04, 2026 - 11:12am ahorn
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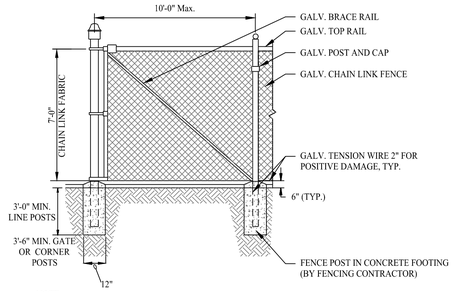
DOUBLE SWING GATE DETAIL

SCALE: NTS



FENCE POST INSTALLATION

SCALE: NTS



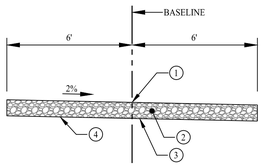
NOTE:
SEE THE SITEWORK SPECIFICATIONS FOR THE SIZE, TYPE, AND GAUGE OF MATERIALS THAT WILL BE USED FOR CONSTRUCTION OF A CHAIN LINK FENCE.

7' HIGH CHAIN LINK FENCE DETAIL

SCALE: NTS

1. POINT OF APPLICATION OF GRADE OR MATCH EXISTING GROUND
2. 12" LAYER CRUSHER RUN GRAVEL
3. NONWOVEN GEOTEXTILE (MIRAFI 140N OR EQUAL)
4. LIMIT OF EXCAVATION OR LIMIT OF COMPACTION

NOTES:
1. THE CONTRACTOR SHALL CONTACT CT CALL BEFORE YOU DIG (CBYD) A MINIMUM OF 72 HOURS PRIOR TO BEGINNING CONSTRUCTION.
2. TRANSITIONS BETWEEN TYPICAL ACCESS ROAD SECTIONS SHALL OCCUR OVER 50 FEET. (TYPICAL)



TYPICAL GRAVEL ROADWAY SECTION

SCALE: NTS

Ernst Conservation Seeds
8884 Mercer Pike
Meadville, PA 16335
(800) 873-3321 Fax (814) 336-5191
www.ernstseed.com

Date: February 20, 2025

Fuzz & Buzz Mix - Standard - ERNMX-146

	Botanical Name	Common Name	Price/Lb
26.70 %	*Lolium perenne, 'Tetra Sweet', Tetraploid*	Perennial Ryegrass, 'Tetra Sweet', Tetraploid	3.36
21.00 %	*Dactylis glomerata, Potomac*	Orchardgrass, Potomac	3.90
18.80 %	*Poa pratensis, 'Ginger'*	Kentucky Bluegrass, 'Ginger' (pasture type)	4.20
12.40 %	*Bromus biebersteinii, 'Fleet'*	Meadow Brome, 'Fleet'	5.52
5.70 %	*Trifolium hybridum*	Alsike Clover	4.80
5.00 %	*Festuca elatior x Lolium perenne, Duo*	Festulolium, 'Duo'	3.60
4.80 %	*Trifolium pratense, Medium, Variety Not Stated*	Red Clover, Medium, Variety Not Stated	4.80
2.00 %	*Lotus corniculatus, 'Norcen'*	Bird's Foot Trefoil, 'Norcen'	10.80
1.00 %	*Linum perenne*	Perennial Blue Flax	48.00
0.90 %	*Coreopsis lanceolata*	Lanceleaf Coreopsis	28.80
0.80 %	*Cichorium intybus*	Blue Chicory	19.20
0.50 %	*Chrysanthemum leucanthemum*	Oxeye Daisy	40.80
0.30 %	*Solidago nemoralis, PA Ecotype*	Gray Goldenrod, PA Ecotype	288.00
0.10 %	*Pycnanthemum tenuifolium*	Narrowleaf Mountainmint	240.00
100.00 %		**Mix Price/Lb Bulk:**	**$6.29**

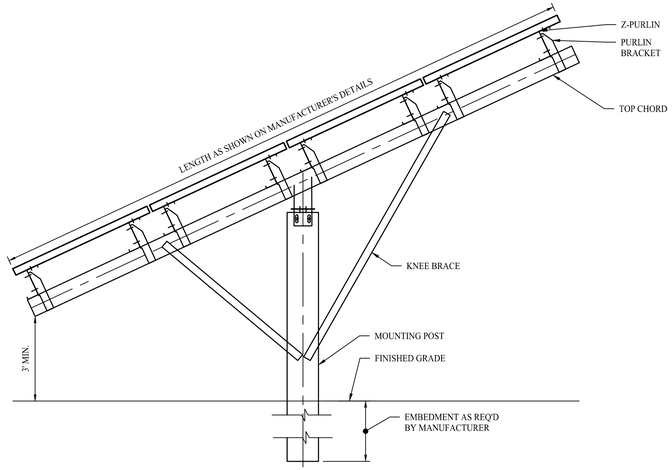
Seeding Rate: Expect to apply about 40 lbs per acre with a cover crop of annual ryegrass 12 lbs/acre

Forage & Pasture Sites; Forage & Pasture Sites - Herbaceous Perennial; Solar Sites

The Fuzz & Buzz Mix-Standard was developed to address the unique nutritional needs of sheep, while providing a low-growing, easily maintained and sustainable vegetation solution for solar installations. The plant species were chosen with guidance from the American Solar Grazing Association (ASGA). The wildflowers in this mix support pollinators. Mix formulations are subject to change without notice depending on the availability of existing and new products. While the formula may change, the guiding philosophy and function of the mix will not.

ERNMX-146 SEED MIX DETAIL

SCALE: NTS — DETAIL PROVIDED BY ERNST SEEDS



NOTES:
SEE MANUFACTURER'S DETAIL SHEETS FOR ADDITIONAL INFORMATION REGARDING RACKING SYSTEM REQUIREMENTS AND INSTALLATION PROCEDURES. RACKING SYSTEM TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

TYPICAL POST MOUNTED RACKING SYSTEM

SCALE: NTS

Rev. #: Date Description

SOLLI ENGINEERING
MONROE, CT | W. HARTFORD, CT | QUINCY, MA
SOLLIENGINEERING.COM
T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	ADH
Checked By:	EEL
Approved By:	KMS
Project #:	24120501
Plan Date:	02/10/26
Scale:	NTS

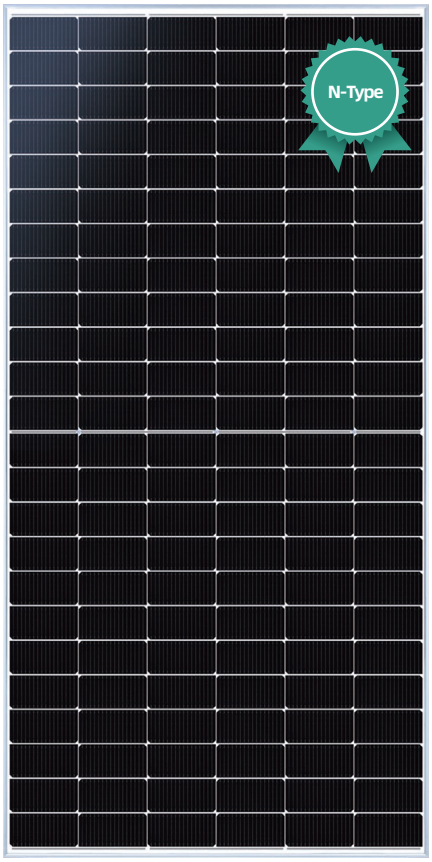
STATE OF CONNECTICUT · KEVIN M. SOLLI · 25759 · LICENSED PROFESSIONAL ENGINEER

Kevin Solli, P.E.
CT 25759

Project:
PROPOSED SOLAR PHOTOVOLTAIC ARRAY
0 EXLEY ROAD
(PARCEL ID: 002-053A-0058)
PLAINFIELD, CONNECTICUT

Sheet Title:	Sheet #:
CONSTRUCTION DETAILS	3.01

May 05, 2026 - 10:44am Anthony
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575-595W

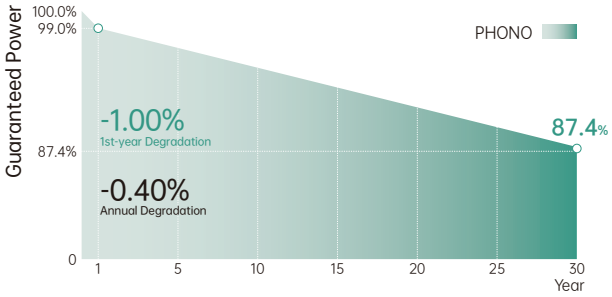
Draco Module Series

N-Type HIGH EFFICIENCY MONO 144-16BB-W-WG

Bloomberg NEW ENERGY FINANCE Tier 1 TOP PERFORMER 2024 kiwa PVEL PV MODULE RELIABILITY SCORECARD

Extraordinary Product Performance

- Up to 30% additional power yield benefited from bifacial technology and up over 80% cell bifaciality
- Competitive high-temperature performance with ameliorated temperature coefficient
- Better weak illumination response, higher power generation with N-Type technology



15-year Product Warranty

30-year Linear Performance Warranty

Higher Quality Reliability

- N-type with lower LID and LeTID
- Industry-leading cell processing technology and dual glass contributes to excellent anti-PID characteristic
- First-year degradation is less than 1.0%, with linear degradation of 0.4% per year for 30 years

Wider Application Conditions

- BIPV, vertical installation, snowfield, high-humid area, windy and dusty area
- Safer and easier handling during transportation and installation

MANAGEMENT SYSTEM CERTIFICATES

IEC 61215, IEC 61730, UL 61730

ISO 9001
2015 / Quality management system

ISO 14001
2015 / Standards for environmental management system

ISO 45001
2018 / International standards for occupational health & safety

UL-EN-VERSION 2025.01.17 © PHONO SOLAR CO., LTD. ALL RIGHTS RESERVED

us.phonosolar.com / usa@phonosolar.com

Electrical Typical Values

Model	1000V	PS575M8GF-24/TNH		PS580M8GF-24/TNH		PS585M8GF-24/TNH		PS590M8GF-24/TNH		PS595M8GF-24/TNH	
	1500V	PS575M8GFH-24/TNH		PS580M8GFH-24/TNH		PS585M8GFH-24/TNH		PS590M8GFH-24/TNH		PS595M8GFH-24/TNH	
Testing Condition		STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Rated Power (Pmpp)		575	440	580	444	585	448	590	452	595	456
Rated Current (Impp)		13.36	10.76	13.42	10.81	13.48	10.86	13.54	10.91	13.60	10.95
Rated Voltage (Vmpp)		43.04	40.92	43.22	41.09	43.40	41.26	43.58	41.43	43.75	41.59
Short Circuit Current (Isc)		14.04	11.31	14.11	11.36	14.18	11.42	14.25	11.48	14.32	11.53
Open Circuit Voltage (Voc)		51.97	49.76	52.20	49.98	52.44	50.21	52.68	50.44	52.92	50.67
Module Efficiency (%)		22.26		22.45		22.65		22.84		23.03	

STC(Standard Testing Conditions): Irradiance 1000W/m², AM 1.5, Cell Temperature 25°C

NOCT (Nominal Operation Cell Temperature): Irradiance 800W/m², Ambient Temperature 20°C , Spectra at AM1.5, Wind at 1m/s

BNPI

Maximum Power (Pmax)	633	639	644	650	655
Optimum Operating Current (Impp)	14.71	14.97	14.84	14.92	14.98
Optimum Operating Voltage (Vmpp)	43.04	43.22	43.40	43.58	43.75
Short Circuit Current (Isc)	15.49	15.58	15.62	15.70	15.75
Open Circuit Voltage (Voc)	51.97	52.20	52.44	52.68	52.92

BNPI:Front Side Irradiation 1000W/m², Back Side Reflection Irradiation 135W/m² , AM 1.5, Ambient Temperature 25°C

Mechanical Characteristics

Cell Type	N Type Monocrystalline
Dimension (L × W × H)	Length: 2278mm (89.69 inch) Width: 1134mm (44.65 inch) Height: 30mm (1.18 inch)
Weight	32.0kg (70.55 lbs)
Glass	2.0mm/2.0mm Heat Strengthened Glass
Frame	Anodized Aluminium Alloy
Cable (Including Connector)	12AWG(UL)4mm² (IEC), (+): 450mm,(-): 250mm or Customized Length
Junction Box	IP 68 Rated

Temperature Ratings

Voltage Temperature Coefficient	-0.25%/°C
Current Temperature Coefficient	+0.04%/°C
Power Temperature Coefficient	-0.29%/°C
Power Tolerance	0~+3%
NOCT	42±2°C
Bifaciality	80±5%

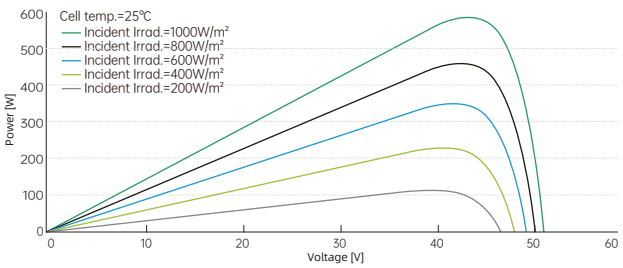
Absolute Maximum Rating

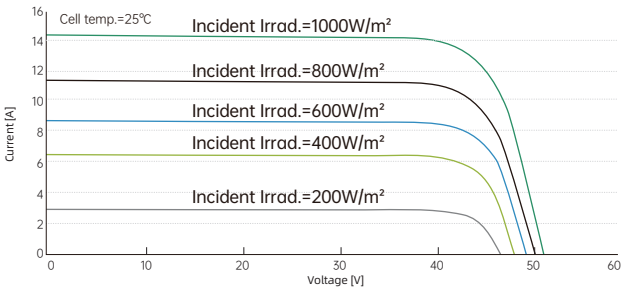
Operating Temperature	From -40 to + 85°C
Hail Diameter @ 80km/h	Up to 25mm
Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Maximum Series Fuse Rating	30A
PV Module Classification	II
Fire Rating (UL 61730)	Type29
Maximum System Voltage	DC 1000V/1500V

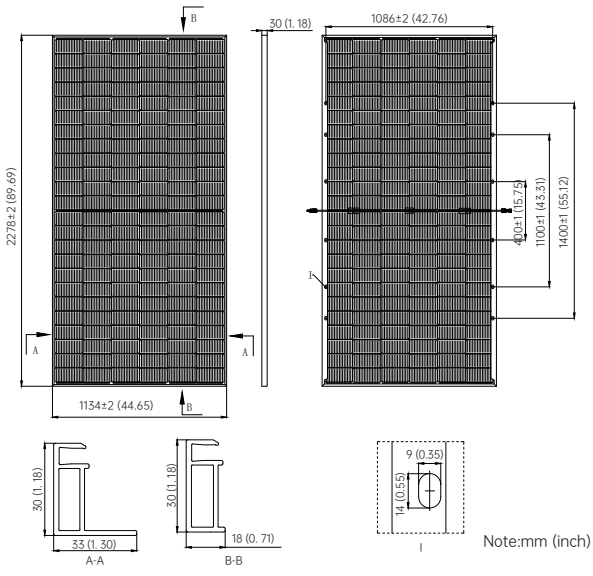
Packing Configuration

Container	20' GP	40' HQ
Pieces/Container	180	720
Pcs/Pallet	36	36
Pallets/Container	5	20

Electrical Characteristics







PHONO SOLAR TECHNOLOGY CO., LTD. reserves the right to make necessary adjustments to the information described herein at any time without further notice. The specifications and certificates contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. Please be sure to use the most recent version of data.

eurofins | Environment Testing TestAmerica



ANALYTICAL REPORT

Eurofins TestAmerica, Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

Laboratory Job ID: 240-122464-1
Client Project/Site: Solar Module TCLP

For:
SUMEC Energy Holdings Co. Ltd.
No.1 Xinghuo Road
Nanjing Hi-tesh Zone
Nanjing, China 210061

Attn: Mr. Chester Chen

Authorized for release by:
12/3/2019 7:25:49 PM

Michael DelMonico, Project Manager I
(330)497-9396
michael.delmonico@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: SUMEC Energy Holdings Co. Ltd.
Job ID: 240-122464-1
Project/Site: Solar Module TCLP

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 240-122464-1

Laboratory: Eurofins TestAmerica, Canton

Narrative

CASE NARRATIVE

Client: SUMEC Energy Holdings Co. Ltd.

Project: Solar Module TCLP

Report Number: 240-122464-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, Canton attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

RECEIPT

The sample was received on 11/18/2019 11:10 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 13.8º C.

TCLP METALS (ICP)

Sample SOLAR PANEL (240-122464-1) was analyzed for TCLP metals (ICP) in accordance with EPA SW-846 Methods 1311/6010B. The sample was leached on 11/25/2019, prepared on 11/26/2019 and analyzed on 11/27/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP MERCURY

Sample SOLAR PANEL (240-122464-1) was analyzed for TCLP mercury in accordance with EPA SW-846 Methods 1311/7470A. The sample was leached on 11/25/2019, prepared on 11/26/2019 and analyzed on 11/27/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method Summary

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL CAN
7470A	Mercury (CVAA)	SW846	TAL CAN
1311	TCLP Extraction	SW846	TAL CAN
3010A	Preparation, Total Metals	SW846	TAL CAN
7470A	Preparation, Mercury	SW846	TAL CAN
Part Size Red	Particle Size Reduction Preparation	None	TAL CAN

Protocol References:

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Sample Summary

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-122464-1	SOLAR PANEL	Solid	11/14/19 00:00	11/18/19 11:10	

Detection Summary

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Client Sample ID: SOLAR PANEL

Lab Sample ID: 240-122464-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	4.3		0.050		mg/L	1		6010B	TCLP

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Client Sample ID: SOLAR PANEL
Date Collected: 11/14/19 00:00
Date Received: 11/18/19 11:10

Lab Sample ID: 240-122464-1
Matrix: Solid

Method: 6010B - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050		mg/L		11/26/19 14:00	11/27/19 10:08	1
Barium	ND		0.50		mg/L		11/26/19 14:00	11/27/19 10:08	1
Cadmium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 10:08	1
Chromium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 10:08	1
Lead	**4.3**		0.050		mg/L		11/26/19 14:00	11/27/19 10:08	1
Selenium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 10:08	1
Silver	ND		0.050		mg/L		11/26/19 14:00	11/27/19 10:08	1

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0020		mg/L		11/26/19 14:00	11/27/19 18:19	1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 240-412722/2-A
Matrix: Solid
Analysis Batch: 412928

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 412722

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:59	1
Barium	ND		0.50		mg/L		11/26/19 14:00	11/27/19 09:59	1
Cadmium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:59	1
Chromium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:59	1
Lead	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:59	1
Selenium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:59	1
Silver	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:59	1

Lab Sample ID: LCS 240-412722/3-A
Matrix: Solid
Analysis Batch: 412928

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 412722

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	2.00	2.15		mg/L		108	50 - 150
Barium	2.00	2.00		mg/L		100	50 - 150
Cadmium	1.00	1.05		mg/L		105	50 - 150
Chromium	1.00	1.01		mg/L		101	50 - 150
Lead	1.00	0.900		mg/L		90	50 - 150
Selenium	2.00	2.13		mg/L		106	50 - 150
Silver	0.100	0.107		mg/L		107	50 - 150

Lab Sample ID: LB 240-412574/1-B
Matrix: Solid
Analysis Batch: 412928

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 412722

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:54	1
Barium	ND		0.50		mg/L		11/26/19 14:00	11/27/19 09:54	1
Cadmium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:54	1
Chromium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:54	1
Lead	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:54	1
Selenium	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:54	1
Silver	ND		0.050		mg/L		11/26/19 14:00	11/27/19 09:54	1

Lab Sample ID: 240-122464-1 MS
Matrix: Solid
Analysis Batch: 412928

Client Sample ID: SOLAR PANEL
Prep Type: TCLP
Prep Batch: 412722

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	ND		5.00	5.46		mg/L		109	75 - 125
Barium	ND		50.0	51.9		mg/L		103	75 - 125
Cadmium	ND		1.00	1.12		mg/L		112	75 - 125
Chromium	ND		5.00	5.38		mg/L		108	75 - 125
Lead	4.3		5.00	9.84		mg/L		110	75 - 125
Selenium	ND		1.00	1.14		mg/L		114	75 - 125
Silver	ND		1.00	1.07		mg/L		107	75 - 125

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: 240-122464-1 MSD — **Client Sample ID: SOLAR PANEL**
Matrix: Solid — **Prep Type: TCLP**
Analysis Batch: 412928 — **Prep Batch: 412722**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	ND		5.00	5.59		mg/L		112	75 - 125	2	20
Barium	ND		50.0	54.0		mg/L		108	75 - 125	4	20
Cadmium	ND		1.00	1.14		mg/L		114	75 - 125	2	20
Chromium	ND		5.00	5.43		mg/L		109	75 - 125	1	20
Lead	4.3		5.00	9.95		mg/L		112	75 - 125	1	20
Selenium	ND		1.00	1.16		mg/L		116	75 - 125	2	20
Silver	ND		1.00	1.09		mg/L		109	75 - 125	2	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 240-412725/2-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 413058 — **Prep Batch: 412725**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0020		mg/L		11/26/19 14:00	11/27/19 18:15	1

Lab Sample ID: LCS 240-412725/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 413058 — **Prep Batch: 412725**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00500	0.00549		mg/L		110	80 - 120

Lab Sample ID: LB 240-412574/1-D — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: TCLP**
Analysis Batch: 413058 — **Prep Batch: 412725**

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0020		mg/L		11/26/19 14:00	11/27/19 18:13	1

Lab Sample ID: 240-122464-1 MS — **Client Sample ID: SOLAR PANEL**
Matrix: Solid — **Prep Type: TCLP**
Analysis Batch: 413058 — **Prep Batch: 412725**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		0.00500	0.00564		mg/L		113	80 - 120

Lab Sample ID: 240-122464-1 MSD — **Client Sample ID: SOLAR PANEL**
Matrix: Solid — **Prep Type: TCLP**
Analysis Batch: 413058 — **Prep Batch: 412725**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.00500	0.00563		mg/L		113	80 - 120	0	20

Metals

Processed Batch: 412195

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-122464-1	SOLAR PANEL	TCLP	Solid	Part Size Red	
240-122464-1 MS	SOLAR PANEL	TCLP	Solid	Part Size Red	
240-122464-1 MSD	SOLAR PANEL	TCLP	Solid	Part Size Red	

Leach Batch: 412574

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-122464-1	SOLAR PANEL	TCLP	Solid	1311	412195
LB 240-412574/1-B	Method Blank	TCLP	Solid	1311	
LB 240-412574/1-D	Method Blank	TCLP	Solid	1311	
240-122464-1 MS	SOLAR PANEL	TCLP	Solid	1311	412195
240-122464-1 MSD	SOLAR PANEL	TCLP	Solid	1311	412195

Prep Batch: 412722

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-122464-1	SOLAR PANEL	TCLP	Solid	3010A	412574
LB 240-412574/1-B	Method Blank	TCLP	Solid	3010A	412574
MB 240-412722/2-A	Method Blank	Total/NA	Solid	3010A	
LCS 240-412722/3-A	Lab Control Sample	Total/NA	Solid	3010A	
240-122464-1 MS	SOLAR PANEL	TCLP	Solid	3010A	412574
240-122464-1 MSD	SOLAR PANEL	TCLP	Solid	3010A	412574

Prep Batch: 412725

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-122464-1	SOLAR PANEL	TCLP	Solid	7470A	412574
LB 240-412574/1-D	Method Blank	TCLP	Solid	7470A	412574
MB 240-412725/2-A	Method Blank	Total/NA	Solid	7470A	
LCS 240-412725/3-A	Lab Control Sample	Total/NA	Solid	7470A	
240-122464-1 MS	SOLAR PANEL	TCLP	Solid	7470A	412574
240-122464-1 MSD	SOLAR PANEL	TCLP	Solid	7470A	412574

Analysis Batch: 412928

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-122464-1	SOLAR PANEL	TCLP	Solid	6010B	412722
LB 240-412574/1-B	Method Blank	TCLP	Solid	6010B	412722
MB 240-412722/2-A	Method Blank	Total/NA	Solid	6010B	412722
LCS 240-412722/3-A	Lab Control Sample	Total/NA	Solid	6010B	412722
240-122464-1 MS	SOLAR PANEL	TCLP	Solid	6010B	412722
240-122464-1 MSD	SOLAR PANEL	TCLP	Solid	6010B	412722

Analysis Batch: 413058

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-122464-1	SOLAR PANEL	TCLP	Solid	7470A	412725
LB 240-412574/1-D	Method Blank	TCLP	Solid	7470A	412725
MB 240-412725/2-A	Method Blank	Total/NA	Solid	7470A	412725
LCS 240-412725/3-A	Lab Control Sample	Total/NA	Solid	7470A	412725
240-122464-1 MS	SOLAR PANEL	TCLP	Solid	7470A	412725
240-122464-1 MSD	SOLAR PANEL	TCLP	Solid	7470A	412725

Lab Chronicle

Client: SUMEC Energy Holdings Co. Ltd.
Project/Site: Solar Module TCLP

Job ID: 240-122464-1

Client Sample ID: SOLAR PANEL

Date Collected: 11/14/19 00:00
Date Received: 11/18/19 11:10

Lab Sample ID: 240-122464-1

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Processed	Part Size Red			412195	11/22/19 08:42	POP	TAL CAN
TCLP	Leach	1311			412574	11/25/19 16:55	DRJ	TAL CAN
TCLP	Prep	3010A			412722	11/26/19 14:00	MRL	TAL CAN
TCLP	Analysis	6010B		1	412928	11/27/19 10:08	WKD	TAL CAN
TCLP	Processed	Part Size Red			412195	11/22/19 08:42	POP	TAL CAN
TCLP	Leach	1311			412574	11/25/19 16:55	DRJ	TAL CAN
TCLP	Prep	7470A			412725	11/26/19 14:00	MRL	TAL CAN
TCLP	Analysis	7470A		1	413058	11/27/19 18:19	SLD	TAL CAN

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Accreditation/Certification Summary

Client: SUMEC Energy Holdings Co. Ltd. Job ID: 240-122464-1
Project/Site: Solar Module TCLP

Laboratory: Eurofins TestAmerica, Canton

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
California	State Program	2927	02-23-20

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
7470A	7470A	Solid	Mercury

13.1/13.8

SUMEC

SUMEC ENERGY HOLDINGS CO.,LTD.
江苏苏美达能源控股有限公司

致TO Eurofins TestAmerica

4101 Shuffel Street NW, North Canton, OH 44720, USA

发票编号 INV.NO. SUMEC-EUROFINS-20191114

日期 DATE 2019/11/14

发　　票
COMMERCIAL INVOICE

L/C NO.

唛头及编号 Mark && Numbers	品名 Descriptions	数量 Quantities	单价 Unit Price	总价 Amount
N/M			USD	USD
	raw material sample of solar module	2 SET	5.00	10
		2 SET		10.00

TOTAL:PACKED IN: 1 CARTON

G/W: 1 KGS

N/W: 0.9 KGS

SUMEC ENERGY HOLDINGS CO.,LTD.
NO.1 XINGHUO ROAD, NATIONAL LEVEL NANJING
HI-TECH ZONE, NANJING, 210061 P.R. CHINA

江苏苏美达能源控股有限公司
SUMEC ENERGY HOLDINGS CO.,LTD

Accepted by Lab
11/18/19
KAC ETA 1110

240-122464 Chain of Custody

Eurofins TestAmerica Canton Sample Receipt Form/Narrative **Login # : 122464**
Canton Facility

Client Sunec Energy Holdings Inc Site Name _____ Cooler unpacked by: Ryan Cribler

Cooler Received on 11-18-19 Opened on 11-18-19 1110

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other DHL

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # _____ Foam Box Client Cooler Box Other _____

Packing material used: Bubble Wrap Foam Plastic Bag None Other _____

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
   IR GUN# IR-10 (CF +0.7 °C) Observed Cooler Temp. 13.1 °C Corrected Cooler Temp. 13.8 °C
   IR GUN #IR-11 (CF +0.9°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1	Yes	No
-Were the seals on the outside of the cooler(s) signed & dated?	Yes	No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes	No
-Were tamper/custody seals intact and uncompromised?	Yes	No NA
3. Shippers' packing slip attached to the cooler(s)?	Yes	No
4. Did custody papers accompany the sample(s)?	Yes	No
5. Were the custody papers relinquished & signed in the appropriate place?	Yes	No
6. Was/were the person(s) who collected the samples clearly identified on the COC?	Yes	No
7. Did all bottles arrive in good condition (Unbroken)?	Yes	No
8. Could all bottle labels be reconciled with the COC?	Yes	No
9. Were correct bottle(s) used for the test(s) indicated?	Yes	No
10. Sufficient quantity received to perform indicated analyses?	Yes	No
11. Are these work share samples?	Yes	No
If yes, Questions 12-16 have been checked at the originating laboratory.		
12. Were all preserved sample(s) at the correct pH upon receipt?	Yes	No NA pH Strip Lot# HC995364
13. Were VOAs on the COC?	Yes	No
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this.	Yes	No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____	Yes	No
16. Was a LL Hg or Me Hg trip blank present? _____	Yes	No

Tests that are not checked for pH by Receiving:
VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by:

Will log ID as "Solar Panel" sample date as 11/14/19 (date at top of COC/letter), no sample time. Will log TCLP metals w/ PSR per PM.

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

SOLAR PV GROUND MOUNT STRUCTURAL CALCULATIONS

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An ARRAY Company
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Ridgeville Corners, OH 43555

Office: 419.267.5280
Fax: 419.267.5214

LOCATION

Connecticut

PRINT PACKAGE NUMBER:

260234.1

REVISION: B

ON:

5/4/2026

DESIGN CRITERIA:

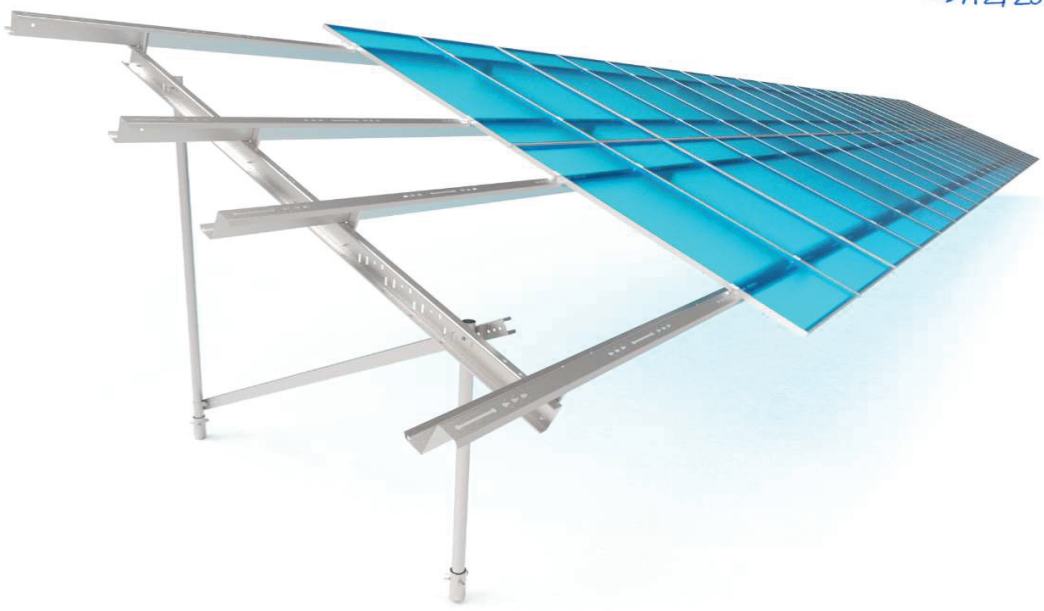
TITAN
25° TILT
30 PSF SNOW
113 MPH WIND, RISK CAT I, EX. C.

ASCE7-16
Allowable Stress Design (ASD)

the jdj group
architects & engineers

360 W. Dussel Drive
Maumee, OH 43537
Office: 419.725.7161
Fax: 419.725.7160

STATE OF CONNECTICUT
ANNE M. GRASSER
0036452
LICENSED
PROFESSIONAL ENGINEER
05/12/2026



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LOAD CALCULATIONS

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General Calculations

General Dimensions

Quantity of PV Modules, Vertically (Cartridge)	PV_Q =	**1**
PV Module Tilt	PVT =	**25°**
PV Module Length	PVL =	**79.69 in**
PV Module Width	PVW =	**49.02 in**
PV Module Area	PVA = PVL × PVW =	**27.13 ft^2**
PV Module Weight	PV_{LB} =	**75 lbs**
Force Resisting Members Quantity	M_Q =	**2**
Vertical Section Flat Length (chord)	$PV_{FL} = PV_L \times PV_Q$ =	**6.64 ft**
Vertical Section Profile Length (at tilt)	$PV_{PL} = PV_{FL} \times \cos(PV_T)$ =	**6.02 ft**
Horizontal Width (at tilt)	$PV_{PW} = PV_W$ =	**4.09 ft**
Profile Height (at tilt)	$PV_{PH} = PV_{FL} \times \sin(PV_T)$ =	**2.81 ft**
Area Projected Vertically	$PV_{AV} = PV_{PL} \times PV_{PW}$ =	**24.59 ft^2**
Area Projected Horizontally	$PV_{AH} = PV_{PH} \times PV_{PW}$ =	**11.46 ft^2**

Dead Loading

Force Resisting Member Weight	M_W =	**2.75 lbs/ft**
Cartridge Weight per Member	$PV_{LBT} = PV_{LB} / PV_Q / M_Q$ =	**37.5 lbs**
Misc. Hardware Weight per Vertical Section	W_{MH} =	**5.00 lbs**
Dead Load per Vertical Section	$DL_T = -(PV_{LB} \times PV_Q + M_W \times PV_W \times M_Q \times PV_Q + W_{MH})$ =	**-102.47 lbs**
TD: Distributed Dead Load on Member	$DL_o = DL_T / PV_Q / M_Q / PV_W$ =	**12.54 lbs/ft**

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SNOW

Snow loading (ASCE7-16)

Tedds calculation version 1.0.09

Building details

Roof type	Monoslope	
Width of roof	b=	**6.02 ft**
Slope of roof 1	α=	**25 deg**

Ground snow load

Ground snow load	Pg=	**30 lb/ft^2**
Density of snow	ɣ=	**17.9 lb/ft^3**
Terrain type	C (see Section 26.7)	
Exposure condition (Table 7.3-1)	Fully Exposed	
Exposure factor (Table 7.3-1)	Ce=	**0.9**
Thermal condition (Table 7.3-2)	Unheated and open air structures	
Thermal factor (Table 7.3-2)	Ct=	**1.2**
Importance category(Table 1.5-1)	I	
Risk factor (Table 7-4)	Is=	0.8
Flat roof snow load (Sect 7.3)	pf = 0.7*Ce*Ct Is*pg =	**18.14 lb/ft^2**
Minimum (flat roof) snow load	p_m=	**30 lb/ft^2**

Cold roof slope factor (Ct > 1.0)

Roof surface type	Slippery	
Ventilation	Ventilated	
Thermal resistance (R-value)	R=	**30**
Roof slope factor Fig 4-1c (dashed line)	Cs=	**0.82**

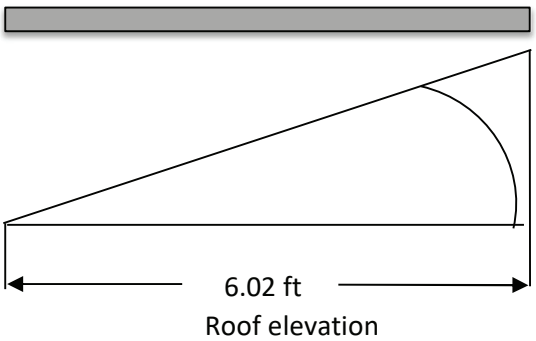
Monoslope

Sloped roof snow load (Cl.7.4)	ps = Cs x pf =	**24.55 lb/ft^2**

Distributed Snow Loading

Snow Load per Vertical Section	$SL_T = -(p_s \times PV_{AV})$ =	**603.59 lbs**
TD: Distributed Snow Load on Member	$SL = SL_T/PV_Q/M_Q/PV_W$ =	**73.88 lbs/ft/mem.**

Balanced Load



Roof elevation

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SEISMIC

Seismic Forces (ASCE7-16)

Tedds calculation version 3.1.01

Site parameters

Site class	E	
Mapped acceleration parameters (Section 11.4.2)		
at short period	S_S =	**0.187**
at 1 sec period	S_1 =	**0.054**
Site coefficientshort period (Table 11.4-1)	F_a =	**2.5**
at 1 sec period (Table 11.4-2)	F_v =	**3.5**

Spectral response acceleration parameters

at short period (Eq. 11.4-1)	S_{MS} =	**0.4488**
at 1 sec period (Eq. 11.4-2)	S_{M1} =	**0.2268**

Design spectral acceleration parameters (Sect 11.4.4)

at short period (Eq. 11.4-3)	S_{DS} =	**0.299**
at 1 sec period (Eq. 11.4-4)	S_{D1} =	**0.151**

Seismic design category

Occupancy category (Table 1-1)	I	
Seismic design category	B	

Approximate fundamental period

Height above base to highest level of building	h_n =	**9.26 ft.**

From Table 12.8-2:		
Structure type	All other systems	
Building period parameter Ct	C_t =	**0.02**
Building period parameter x	x =	**0.75**
Approximate fundamental period (Eq 12.8-7)	T_a =	**0.106 sec**
Building fundamental period (Sect 12.8.2)	T =	**0.106**
Long-period transition period	T_L =	**6**

Seismic response coefficient

Seismic force-resisting system (Table 12.2-1)	G. CANTILEVERED COLUMN SYSTEMS DETAILED TO CONFORM TO THE REQUIRE 2. Steel ordinary cantilever column systems	
Response modification factor (Table 12.2-1)	R =	**1.25**
Seismic importance factor (Table 1.5-2)	I_e =	**1.00**
Seismic response coefficient (Sect 12.8.1.1)		

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Maximum ((Eq 12.8-3))	Cs_max =	**1.139**	
Maximum Sa value	Sa,max =	**0.29**	
Period T at which Sa is max	$T_{sa,max}$ =	**0.05**	**sec**
Minimum:			
Eq 9.5.5.2.1-3	C_{s_min} =	**0.0131648**	
Calculated (Eq 12.8-3)	C_{s_calc} =	**0.23936**	
Seismic response coefficient	C_s =	**0.23936**	

Seismic base shear (Sect 12.8.1)

Effective seismic weight of the structure	W =	**8.81**	**kips**
Seismic base shear (Eq 12.8-1)	$V = C_s \times W$ =	**2.1**	**kips**

Distributed Seismic Loading

Analyzed Rack Length	AR_L =	**2144 in**
Analyzed Rack Weight	$AR_{LB} = AR_L / (PW_{PW} \times 0.75) \times 2 \times DL_T$ =	**8812 lbs**
Analyzed Rack Anchor Qty	AR_A =	22
Load per node (top of post)	$EL = V/AR_A$ =	**95.88 lbs/post**

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WIND

Wind Loading (ASCE7-16)

General wind load requirements

Basic wind speed	V =	**113 mph**
Risk category	I	
Velocity pressure exponent coeff(Table26.6-1)	K_d =	**0.85**
Exposure category (cl.26.7.3)	C	

Topography

Topography factor not significant	K_{zt} =	**1.00**
Ground Elevation Factor	K_e =	**1.00**

Velocity pressure

Velocity pressure coefficient (T.29.3-1)	K_z =	**1.00**
Velocity pressure	qh=0.00256×Kz×Kzt×Kd×Kd×V2×1psf/mph2 =	**27.79 psf**

Pressures and forces

Net pressure	p = qh × GCN
Net force	$F_w = p \times A_{ref}$
Area (per zone)	$A_{ref} = PV_A$

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CPP Wind Loading Table

Titan

	Load Case	Load Case Desc.	Panel Load Loc.	CPP Pressure Coeff. G_{CN}	Net Pressure, p (psf)	Net Force, F_w (lbs)	Rails	Net Force per Rail (lbs/ft)
Green Zone	1	CPP E-W Rail-Up	1	-1.48	-41.12	-278.87	4	137
			2	-0.70	-19.40	-131.60		64
			3	-0.47	-13.11	-88.90		44
			4	-0.29	-8.05	-54.62		27
	2	CPP Half Chord-Up	1	-1.36	-37.77	-256.14		125
			2	-1.01	-28.01	-189.94		93
			3	-0.55	-15.19	-103.01		50
			4	-0.32	-8.90	-60.36		30
	3	CPP Post Pair-Up	1	-1.28	-35.64	-241.69		118
			2	-0.99	-27.51	-186.57		91
			3	-0.73	-20.15	-136.64		67
			4	-0.43	-11.82	-80.17		39
	4	CPP Post Pair-Down	1	0.29	8.10	54.92		-27
			2	0.41	11.48	77.84		-38
			3	0.52	14.51	98.41		-48
			4	0.60	16.63	112.80		-55
	5	CPP Half Chord-Down	1	0.23	6.29	42.64		-21
			2	0.36	9.88	66.98		-33
			3	0.52	14.32	97.12		-48
			4	0.65	18.18	123.27		-60
	6	CPP E-W Rail-Down	1	0.21	5.88	39.85		-20
			2	0.35	9.66	65.53		-32
			3	0.44	12.31	83.46		-41
			4	0.61	17.01	115.34		-56

	Load Case	Load Case Desc.	Panel Load Loc.	CPP Pressure Coeff. G_{CN}	Net Pressure, p (psf)	Net Force, F_w (lbs)	Rails	Net Force per Rail (lbs/ft)
ne	1	CPP E-W Rail-Up	1	-1.85	-51.37	-348.39		171
			2	-0.87	-24.14	-163.73		80
			3	-0.63	-17.57	-119.17		58
			4	-0.38	-10.55	-71.58		35
	2	CPP Half Chord-Up	1	-1.73	-48.06	-325.93		160
			2	-1.33	-36.96	-250.66		123
			3	-0.70	-19.43	-131.78		65
			4	-0.39	-10.75	-72.89		36
			1	-1.52	-42.21	-286.27		140

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Yellow Zc	3	CPP Post Pair-Up	2	-1.26	-34.94	-236.94	4	116
			3	-1.03	-28.66	-194.34		95
			4	-0.63	-17.51	-118.75		58
	4	CPP Post Pair-Down	1	0.41	11.41	77.42		-38
			2	0.69	19.18	130.09		-64
			3	0.93	25.72	174.41		-85
			4	1.05	29.22	198.15		-97
	5	CPP Half Chord-Down	1	0.33	9.11	61.79		-30
			2	0.58	16.00	108.49		-53
			3	0.95	26.29	178.32		-87
			4	1.10	30.47	206.63		-101
	6	CPP E-W Rail-Down	1	0.32	8.87	60.18		-29
			2	0.53	14.85	100.74		-49
			3	0.76	20.98	142.30		-70
			4	1.10	30.70	208.22		-102

	Load Case	Load Case Desc.	Panel Load Loc.	CPP Pressure Coeff. G_{CN}	Net Pressure, p (psf)	Net Force, F_w (lbs)	Rails	Net Force per Rail (lbs/ft)
Orange Zone	1	CPP E-W Rail-Up	1	-2.22	-61.67	-418.26	4	205
			2	-0.86	-23.81	-161.51		79
			3	-0.53	-14.78	-100.26		49
			4	-0.33	-9.19	-62.33		31
	2	CPP Half Chord-Up	1	-2.41	-67.07	-454.89		223
			2	-1.27	-35.42	-240.22		118
			3	-0.86	-23.84	-161.67		79
			4	-0.61	-16.83	-114.16		56
	3	CPP Post Pair-Up	1	-2.33	-64.78	-439.32		215
			2	-1.29	-35.83	-242.99		119
			3	-0.95	-26.47	-179.54		88
			4	-0.69	-19.30	-130.88		64
	4	CPP Post Pair-Down	1	0.66	18.21	123.47		-60
			2	1.00	27.70	187.89		-92
			3	1.51	42.03	285.05		-140
			4	1.68	46.76	317.13		-155
	5	CPP Half Chord-Down	1	0.59	16.48	111.77		-55
			2	0.92	25.50	172.94		-85
			3	1.54	42.72	289.70		-142
			4	1.71	47.54	322.44		-158
	6	CPP E-W Rail-Down	1	0.40	11.08	75.12		-37
			2	0.58	16.02	108.66		-53
			3	0.90	25.10	170.22		-83
			4	1.33	37.05	251.28		-123

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Load data - with ASD Combos (for reactions)

GLOSSARY

Load conditions

Condition	Description	Comb.	Category
DL	Dead Load	No	DL
SL	Snow Load	No	SNOW
WL1	Wind - APA_CPP - EW Rail / Up - 0° (S-N)	No	WIND
WL2	Wind - APA_CPP - Half Chord/ Up - 0° (S-N)	No	WIND
WL3	Wind - APA_CPP - Post Pair / Up - 0° (S-N)	No	WIND
WL4	Wind - APA_CPP - Post Pair / Down - 180° (N-S)	No	WIND
WL5	Wind - APA_CPP - Half Chord / Down - 180° (N-S)	No	WIND
WL6	Wind - APA_CPP - EW Rail / Down - 180° (N-S)	No	WIND
EL1	Seismic Left	No	EQ
EL2	Seismic Right	No	EQ
EL3	Seismic North	No	EQ
EL4	Seismic South	No	EQ
D1	DL	Yes	
D2	DL+SL	Yes	
D3	DL+0.75SL	Yes	
D4	DL+0.6WL1	Yes	
D5	DL+0.6WL2	Yes	
D6	DL+0.7EL1	Yes	
D7	DL+0.7EL2	Yes	
D8	DL+0.7EL3	Yes	
D9	DL+0.7EL4	Yes	
D10	DL+0.75SL+0.45WL1	Yes	
D11	DL+0.75SL+0.45WL2	Yes	
D12	DL+0.75SL+0.525EL1	Yes	
D13	DL+0.75SL+0.525EL2	Yes	
D14	DL+0.75SL+0.525EL3	Yes	
D15	DL+0.75SL+0.525EL4	Yes	
D16	0.6DL+0.6WL1	Yes	
D17	0.6DL+0.6WL2	Yes	
D18	0.6DL+0.7EL1	Yes	
D19	0.6DL+0.7EL2	Yes	
D20	0.6DL+0.7EL3	Yes	
D21	0.6DL+0.7EL4	Yes	
D22	DL+0.6WL3	Yes	
D23	DL+0.6WL4	Yes	
D24	DL+0.6WL5	Yes	
D25	DL+0.6WL6	Yes	
D26	DL+0.525SL+0.45WL3	Yes	

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D27	DL+0.525SL+0.45WL4	Yes
D28	DL+0.525SL+0.45WL5	Yes
D29	DL+0.525SL+0.45WL6	Yes
D30	0.6DL+0.6WL3	Yes
D31	0.6DL+0.6WL4	Yes
D32	0.6DL+0.6WL5	Yes
D33	0.6DL+0.6WL6	Yes

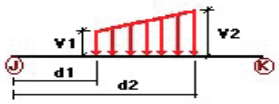
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Load on nodes

Condition	Node	FX	FY	FZ	MX	MY	MZ
		[Lb]	[Lb]	[Lb]	[Lb*ft]	[Lb*ft]	[Lb*ft]
EL1	153	95.88	0.00	0.00	0.00	0.00	0.00
EL2	153	-95.88	0.00	0.00	0.00	0.00	0.00
EL3	153	0.00	0.00	95.88	0.00	0.00	0.00
EL4	153	0.00	0.00	-95.88	0.00	0.00	0.00

Distributed Forces on Members



Condition	Member	Dir1	Val1	Val2	Dist1	%	Dist2	%
			[Lb/ft]	[Lb/ft]	[in]		[in]	
DL	376	Y	-12.54	-12.54	0.00	Yes	100.00	Yes
SL	376	Y	-73.88	-73.88	0.00	Yes	100.00	Yes
WL1	See Pages 9-10							
WL2	See Pages 9-10							
WL3	See Pages 9-10							
WL4	See Pages 9-10							
WL5	See Pages 9-10							
WL6	See Pages 9-10							

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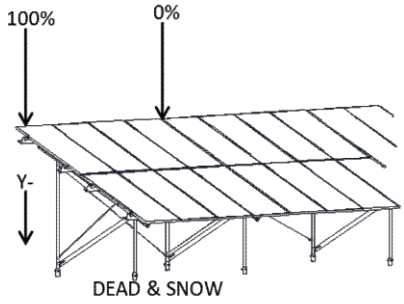


Figure 1: Load Direction Y

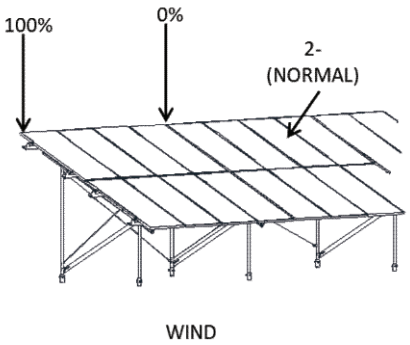


Figure 2: Load Direction 2

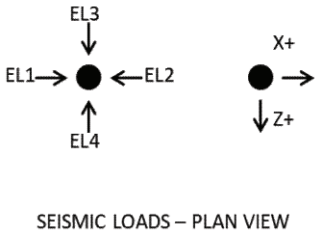


Figure 3: Load Direction X & Z

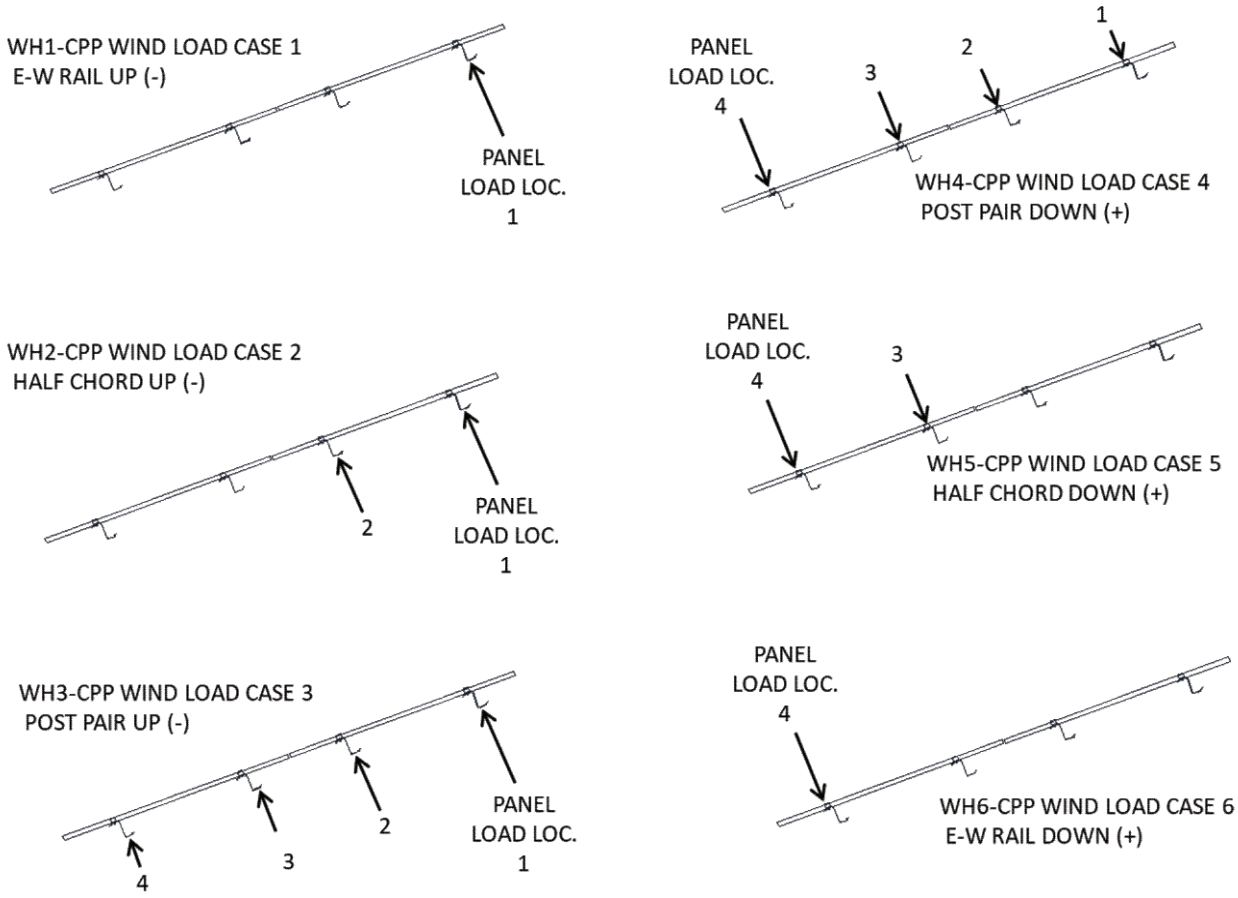


Figure 4: Load CPP Wind Loads

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WIND TUNNEL DATA

CERMAK PETERKA PETERSEN

CPP Project 17649 -
Wind Tunnel Tests and Wind Load Analysis for APA Solar FIXED-TILT GROUND MOUNT

Executive Summary

CPP, Inc. has evaluated wind loads on a generic array of fixed-tilt ground-mounted photovoltaic (PV) solar panels produced by APA Solar. The wind tunnel data used in the analysis is from the CPP proprietary ground mount wind loads database. This database consists of simultaneous surface pressure measurements at a large number of locations on the solar panels. The database contains data for a large number of configurations with varying combinations of tilt, ground clearance, and row spacing. The geometric parameters of the APA Solar system studied are summarized below:

	Range of applicability
Chord length:	140 in to 200 in, with results presented for two chord lengths and interpolation appropriate between the presented chord lengths
Tilt:	5°, 15°, 22.5°, 30° and 45°, allowable with interpolation appropriate between presented results.
Height (low edge of modules):	≤0.5L, with results presented for three low-edge heights (0.2L, 0.35L & 0.5L) and interpolation appropriate between the presented heights.
Row spacing (clear gap):	≤4LSin(tilt), with results presented for 1.5, 2.75 and 4LSin(tilt) and interpolation appropriate between the presented row spacings
Post spacing (along row):	≥0.5L, with results presented for 4 post spacings of 0.5L, 1L, 1.5L and 2.75L and interpolations appropriate between the presented post spacings

The wind loads determined by CPP are based upon measurements obtained in an atmospheric boundary layer wind tunnel study conducted in accordance with the test procedures described in ASCE 7. The primary goal of this study was to determine peak forces on an array of panels for the purpose of calculating design wind loads. The results are presented as load cases, defined in this document. These loads vary with position within the array and, as expected, the worst case- loads were found at the array perimeter. Interior portions of the array were generally found to have substantially lower wind loads than perimeter locations due to sheltering

Wind Tunnel Load Cases

The load cases are listed below. In some cases the load effect is the peak load on a fraction of the chord (e.g. the high rail or half the chord).

$GC_{N\text{-}Post\ \ pair}$ – Peak net pressure on a post-pair tributary area; uplift and downforces; for designs of posts, N-S strut/beam and braces. The tributary area considered includes the full chord and spans halfway to the next post pair; the nominal tributary area for a pair of posts in a dual-post system.

GCN-Post half-chord – Peak net pressure on a single post tributary area; uplift on upper post and downforce on lower post cases; for design of posts, N-S strut, and braces. The tributary area considered includes half of the chord and spans halfway to the next post pair; the nominal tributary area for a single post in a dual-post system.

GCN Rail– Peak net pressure on E-W rails spanning between posts, supporting modules; uplift and downforce cases. The tributary area considered includes one quarter of the chord and spans from one post pair to the next post pair; the nominal tributary area for a rail .

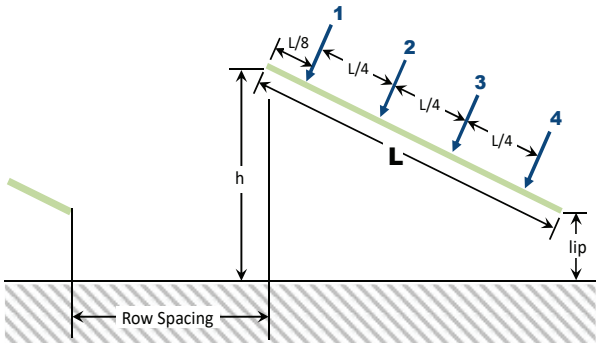


Figure 5: Wind Tunnel Load Distribution Schematic

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Wind Tunnel Zone Map

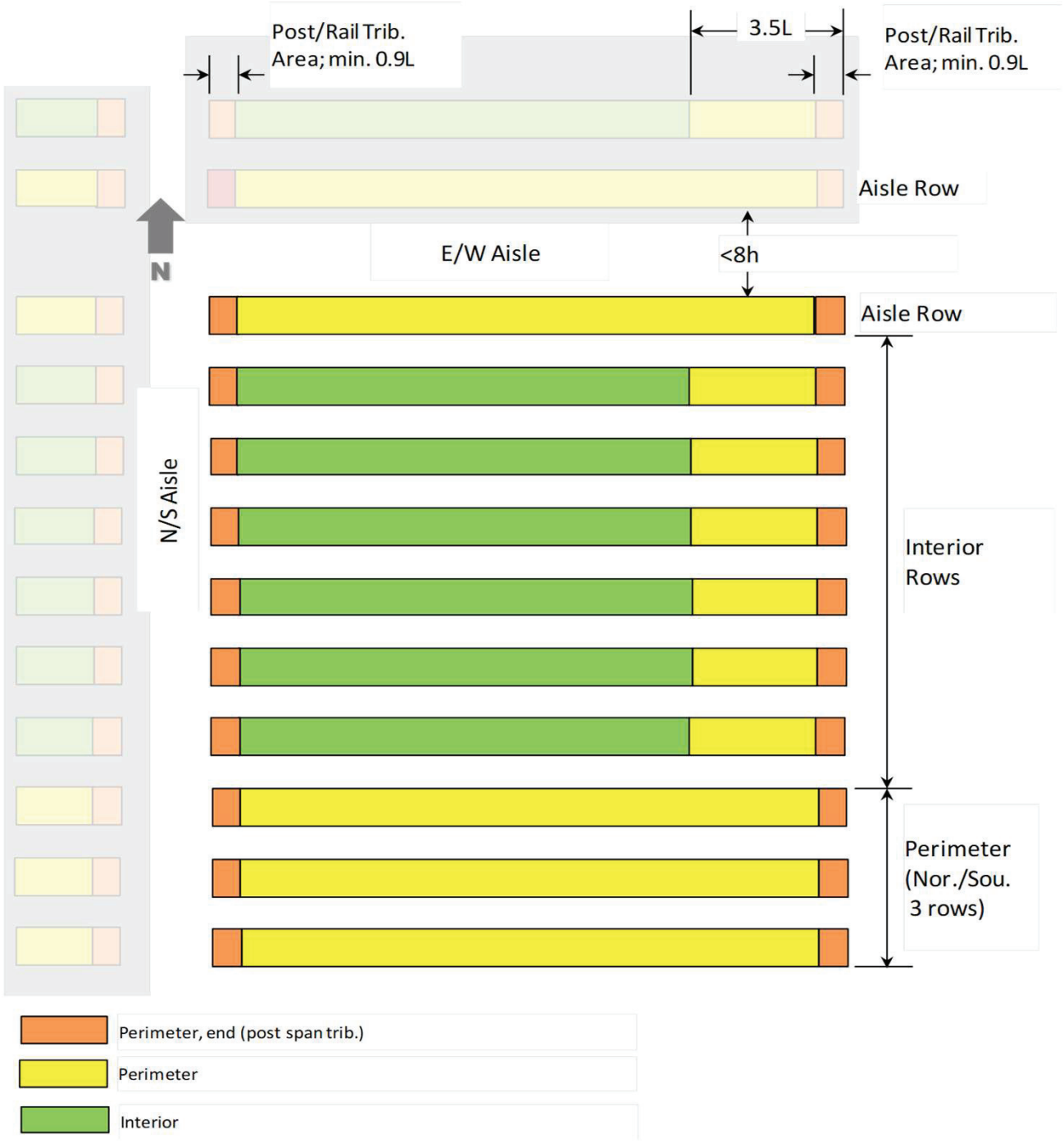


Figure 6: Wind Tunnel Zone Map

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SETUP & ANALYSIS

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Parts list

Note.- Only the graphically selected elements are listed below

Profile	Length [in]	N° of pieces
CABLE BRACE - 1/8	215.93	8
STD. BIG ZEE - 6 X 3 X 0...	169	32
STD. BIG ZEE - 6 X 3 X 0...	185	8
STD. BIG ZEE - 6 X 3 X 0.055	67	8
STD. BIG ZEE SPLICE - 6 ...	16	72
STD. TITAN DUO POST - 2...	39.93	11
STD. TITAN DUO POST - 2...	80.89	11
STD. TITAN KNEE BRACE ...	94.17	11
STD. TITAN NS CHORD -...	111.95	11
Total N° of pieces		172

List of materials

Profile	Material	Uweight [Lb/ft]	Length [in]	Weight [Lb]
CABLE BRACE - 1/8	APA - A36 - CABLES	1.61E-01	1727.419	23.165
STD. BIG ZEE - 6 X 3 X 0.055	A653 SS 80-1	2.51E+00	7424	1555.186
STD. BIG ZEE SPLICE - 6 X 3 X 0.11	A653 SS 80-1	4.97E+00	1152	477.435
STD. TITAN DUO POST - 2.375 X 0.095	APA - A570 GR50	2.18E+00	1329.02	241.727
STD. TITAN KNEE BRACE - 3 X 2 X 0...	A653 SS 80-1	1.99E+00	1035.819	172.158
STD. TITAN NS CHORD - 6 X 2 X 0.108	A653 SS 80-1	3.72E+00	1231.475	381.915
Total weight [Lb]				2851.586

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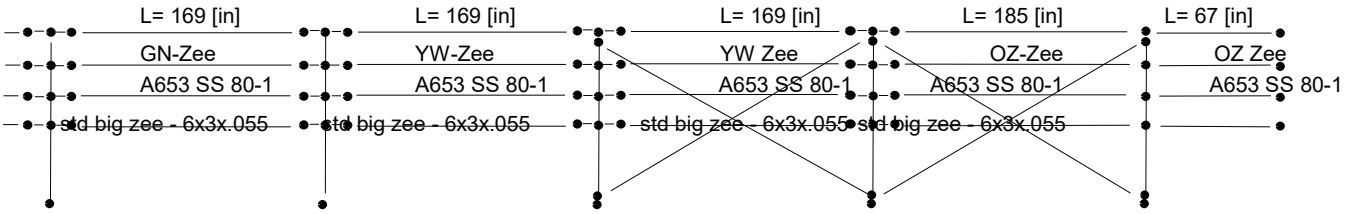


Figure 7: - Member Length, Name, Material, And Section - ORANGE,YELLOW, & GREEN ZONE

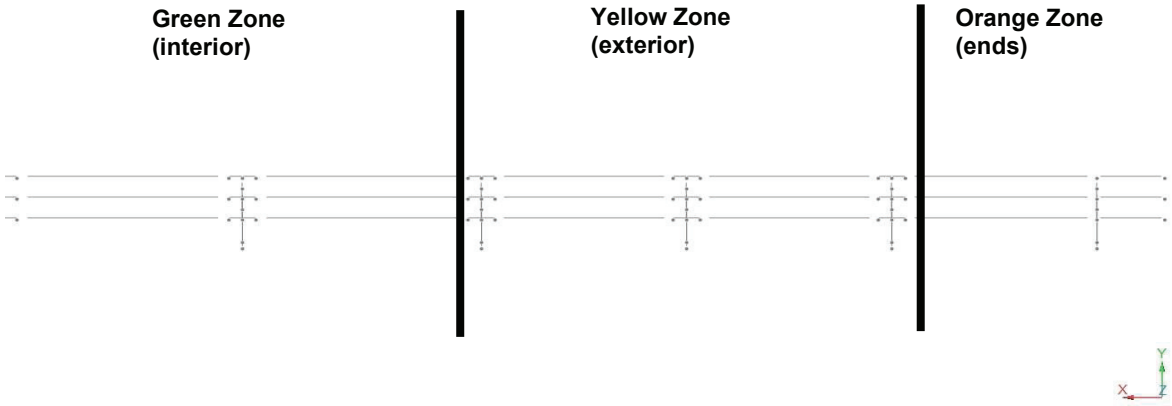


Figure 8: - Racking Zones

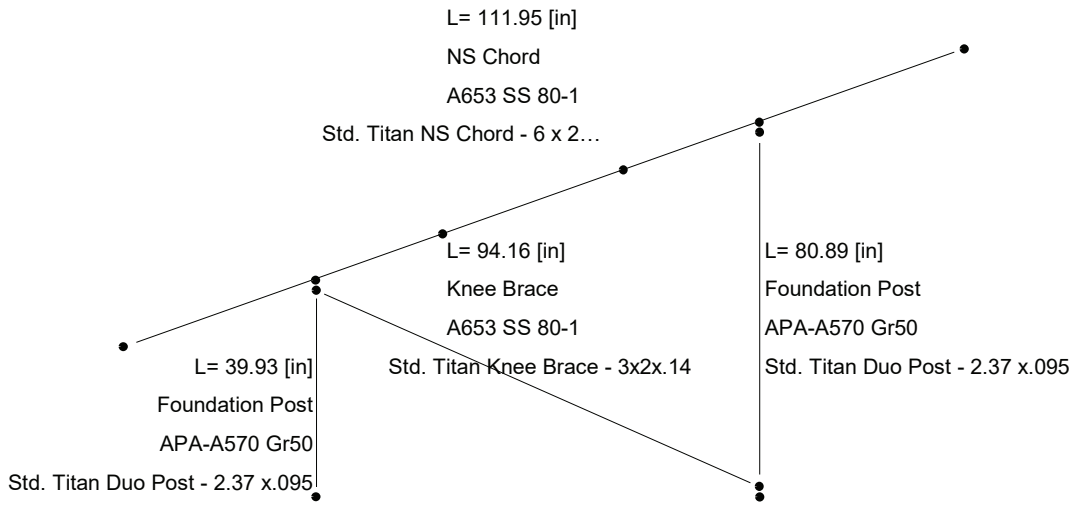


Figure 9: - Member Length, Name, Material, and Section

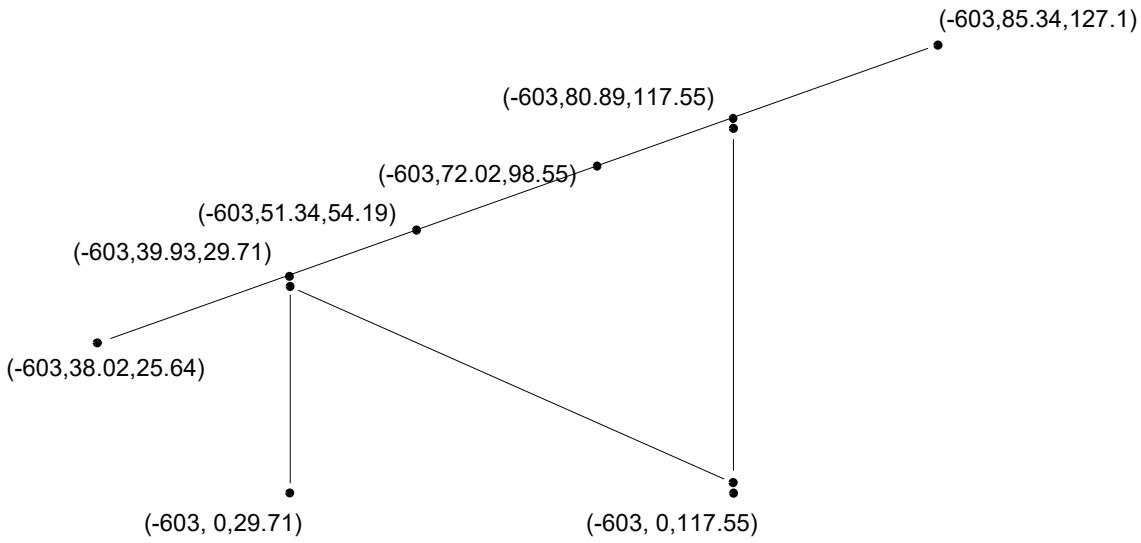


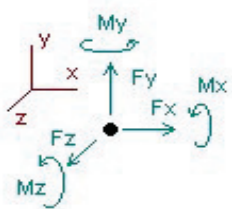
Figure 10: - Node X,Y,Z Coordinate

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Analysis - Reaction Envelope - ASD

Reactions



Direction of positive forces and moments

Max Uplift: -4420 lbs (D17)
Max Down Load: 4318 lbs (D27)
Max Lateral: 2236 lbs (D30)

	Forces						Moments	
Node	Fx [Lb]	lc	Fy [Lb]	lc	Fz [Lb]	lc	My [Lb*ft]	lc
145-max	367.834	D19	3600.68	D27	1905.496	D22	0	D1
145-min	-0.014	D18	-3618.45	D17	-1296.33	D31	0	D1
151-max	0.021	D13	3519.45	D27	1843.36	D22	0	D1
151-min	-373.3	D6	-3715.59	D17	-1707.1	D31	0	D1
173-max	0.02	D13	3594.61	D27	1908.153	D22	0	D1
173-min	-372.899	D6	-3627.22	D17	-1295.17	D31	0	D1
174-max	367.379	D19	3514.19	D27	1844.408	D22	0	D1
174-min	-0.013	D18	-3721.02	D17	-1706.27	D31	0	D1
185-max	374.537	D7	4307.94	D27	2236.014	D30	0	D1
185-min	-371.65	D6	-4420.36	D17	-1849.01	D23	0	D1
195-max	370.508	D19	4318	D27	2233.641	D30	0	D1
195-min	-361.746	D18	-4408.42	D17	-1850.38	D23	0	D1
205-max	0.023	D12	3471.55	D27	1729.774	D30	0	D1
205-min	-0.016	D19	-3287.64	D17	-1093.11	D23	0	D1
212-max	0.022	D12	3469.94	D27	1731.932	D30	0	D1
212-min	-0.017	D19	-3291.18	D17	-1091.88	D23	0	D1
213-max	0.022	D12	3137.12	D27	1455.018	D22	0	D1
213-min	-0.017	D19	-2719.9	D17	-752.525	D31	0	D1
214-max	0.022	D12	3203.74	D27	1507.942	D30	0	D1
214-min	-0.017	D19	-2836.88	D17	-815.202	D23	0	D1

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215-max	0.022 D12	3136.51 D27	1455.832 D22	0 D1
215-min	-0.017 D19	-2721.32 D17	-752.13 D31	0 D1
294-max	0.044 D17	2832.09 D28	133.151 D31	0 D1
294-min	-0.022 D2	149.55 D20	-195.721 D22	0 D1
296-max	0.04 D17	2603.06 D28	175.346 D31	0 D1
296-min	-0.041 D13	103.358 D20	-189.342 D22	0 D1
298-max	0.035 D17	2832.51 D28	133.033 D31	0 D1
298-min	-0.042 D12	149.555 D20	-195.997 D22	0 D1
300-max	0.038 D17	2604.29 D28	175.259 D31	0 D1
300-min	-0.015 D27	103.445 D20	-189.447 D22	0 D1
302-max	0.04 D17	3198.3 D28	189.92 D23	0 D1
302-min	-0.04 D13	159.908 D20	-229.672 D30	0 D1
304-max	0.046 D17	3197.1 D28	190.061 D23	0 D1
304-min	-0.041 D13	159.844 D20	-229.428 D30	0 D1
306-max	0.033 D19	2803.57 D2	112.278 D23	0 D1
306-min	-0.046 D12	151.773 D20	-177.674 D30	0 D1
308-max	0.034 D19	2803.69 D2	112.153 D23	0 D1
308-min	-0.045 D12	151.782 D20	-177.895 D30	0 D1
310-max	0.034 D19	2796.86 D2	77.296 D31	0 D1
310-min	-0.045 D12	151.189 D20	-149.452 D22	0 D1
312-max	0.034 D19	2799.23 D2	83.733 D23	0 D1
312-min	-0.045 D12	151.394 D20	-154.888 D30	0 D1
314-max	0.034 D19	2796.93 D2	77.255 D31	0 D1
314-min	-0.045 D12	151.194 D20	-149.536 D22	0 D1

Mx = 0 for all nodes at ground

Mz = 0 for all nodes at ground

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CODE CHECK

(ASCE7-16, ASD)

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Steel Code Check - SUMMARY

Description	Section	Member & Ctrl Eq.	Ratio & Status	Reference
NS Chord	*Std. Titan NS Chord - 6 x 2...*	335 - D28 at 4.02%	0.78 - OK	Sec. G5
Knee Brace	*Std. Titan Knee Brace - 3 ...*	339 - D23 at 0.00%	0.67 - OK	Sec. E2
Cable Brace	*CABLE BRACE - 1/8*	502 - D7 at 50.00%	0.41 - OK	0
Foundation P	*Std. Titan Duo Post - 2.37...*	334 - D27 at 2.47%	0.66 - OK	0
Zee Purlin	*STD BIG ZEE - 6 X 3 X .055*	350 - D28 at 100.00%	0.9 - OK	Eq. H1.2-1

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CONNECTIONS CHECK

(ASCE7-16, ASD)

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Parts Details (in. & lbs.)

Part Details	Depth (Dia.), in.	Width, in.	Material/ Wall Thickness, in.	Ultimate Strength, psi	Edge Distance, in.	Bolt Couple Distance, in.	
NS Chord	6	2	0.108	82000	1.5		
Knee Brace	3	2	0.078	82000	1.25		
Zee Purlin	6	3	0.055	82000	2	4.75	
Post	2.375		0.095	65300	2		
Roll Bar	2.25		0.078	50000	1		

Governing Loads

Knee Brace - Max(Tension, Compression)	2458
Foundation Post Axial	3760
NS Chord - Axial	1754
Zee Purlin - Axial	347
Zee Purlin - Shear	1194
Zee Purlin - Moment	3381
Uplift Module Pressure, Pa	1472

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Knee Brace-Foundation Post

Safety Factor, Ω	2.5

Governing Load, P_u	2457.79	lbs.	2.457794 kips
	Knee Brace - Max(Tension, Compression)		
Bolt Diameter, d	0.5	in.	
Tensile Strength of Bolt, P_t	150000	psi	150 ksi
Shear Strength of Bolt, P_s	6344.05	lbs.	6.34 kips

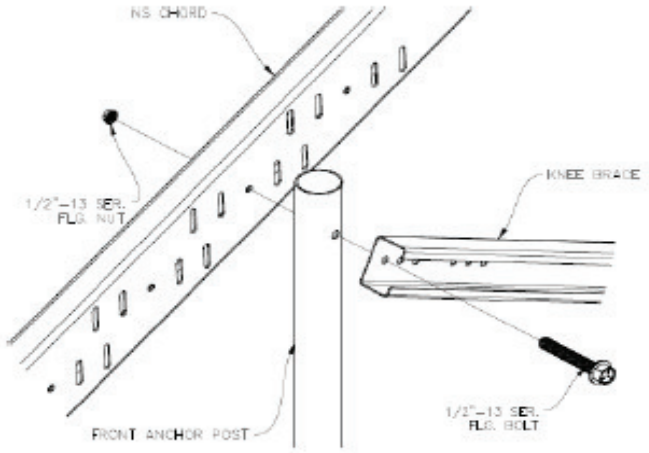
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C =	3	
m_f =	1	
t_{KB} =	0.078	in.
F_{uKNEE} =	82000	psi

P_n/Ω =	3837.6 lbs	3.838	kips

Minimum Edge Distance Required =		**0.75 in.**	**AISC Table J3.4**
Provided Edge Distance =		**1.25 in.**	**PASS**

Pn =	**3.838 >**	**P_u =**	**2.45779419**	**PASS**
Ps =	**6.344 >**	**P_u =**	**2.45779419**	**PASS**



***Knee Brace-Brace clamp connection physically tested for no deformation at maximum 3400 lbs.**
****Post-Pile Set screw connection physically tested for no movement at maximum 11,000 lbs.**

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Foundation Post-NS Chord

Safety Factor, Ω	2.5

Governing Load, P_u	3760.18	lbs.	3.760181 kips
	Foundation Post Axial		
Bolt Diameter, d	0.5	in.	
Tensile Strength of Bolt, P_t	150000	psi	150 ksi
Shear Strength of Bolt, P_s	6344.05	lbs.	6.344 kips

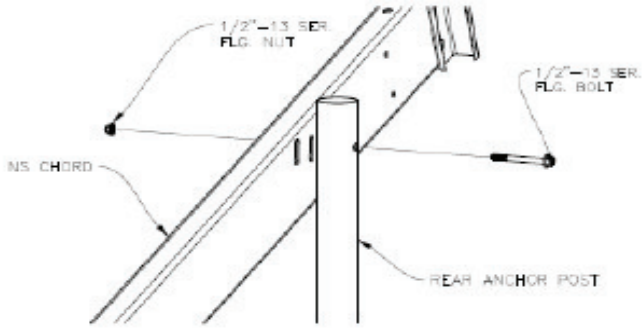
Bearing Capacity	P_n =	$C*m_f*d*t*F_u$	**AISI J3.3.1-1**

C =	3	
m_f =	1	
$t_{nschord}$ =	0.108 in.	
$F_{uNS\ CHORD}$ =	82000 psi	***Two shear walls on post**

P_n/Ω =	5313.6 lbs.	5.3136 kips

Minimum Edge Distance =	**0.75**	**in.**	**AISC Table J3.4**
Provided Edge Distance =	**2**	**in.**	**PASS**

Pn =	**5.314 >**	**P_u =**	**3.76018073**	**PASS**
Ps =	**6.344 >**	**P_u =**	**3.76018073**	**PASS**



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Zee-Zee Splice

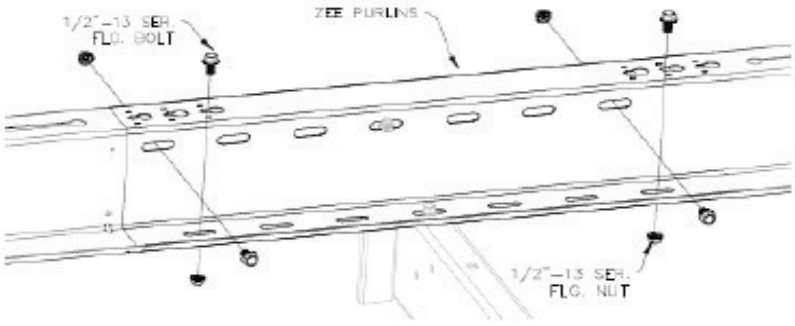
Safety Factor, Ω	2.5		
Maximum Moment in Zee	3381.04	ft*lbs	
Distance Between Bolts	4.75	in.	
Overlap Splice force Reduction Factor	0.66		
Number of Bolt couples, X_B	3		
Governing Load, $P_u = M/d/X_b$	1879.15	lbs	1.879 kips
	Zee Purlin - Moment		
Bolt Diameter, d	0.5	in.	
Tensile Strength of Bolt, P_t	150000	psi	150 ksi
Shear Strength of Bolt, P_s	6344.05	lbs	6.344 kips

Bearing Capacity	$P_n =$	$C*m_f*d*t*F_u$	**AISI J3.3.1-1**

C =	3	
m_f =	1	
t_Z =	0.055	in.
F_{uZEE} =	82000	psi

P_n/Ω =	2706 lbs.	2.706 kips	
Minimum Edge Distance =	**0.75 in.**		**AISC Table J3.4**
Provided Edge Distance =	**2 in.**		**PASS**

Pn =	**2.706 >**	**P_u =**	**1.879**	**PASS**
Ps =	**6.344 >**	**P_u =**	**1.879**	**PASS**



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Roll Bar-NS Chord

Safety Factor, Ω	2.5

Governing Load, P_u	2387.26	lbs.	2.38726 kips
	Zee Purlin - Shear		
Bolt Diameter, d	0.375	in.	
Tensile Strength of Bolt, P_t	75000	psi	75 ksi
Shear Strength of Bolt, P_s	1744.5	lbs.	1.745 kips
Number of bolts, n	2		

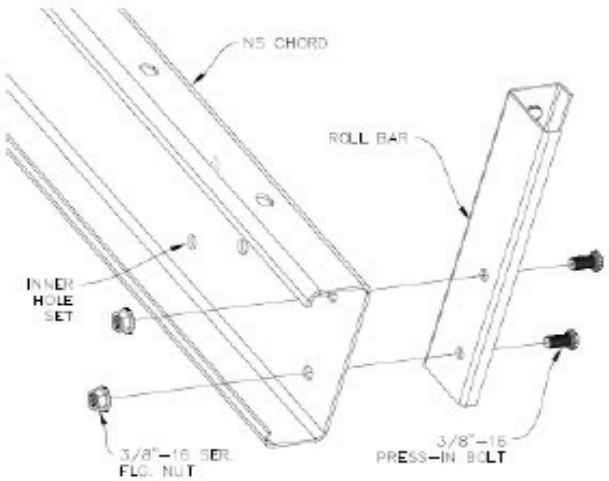
Bearing Capacity	P_n =	$C*m_f*d*t*F_u*2$	**Two Bolts**	**AISI J3.3.1-1**

C =	3	
m_f =	1	
t_{RB} =	0.078	in.
$F_{uROLL\ BAR}$ =	50000	psi

P_n/Ω =	3510 lbs.	3.510 kips	

Minimum Edge Distance =	**0.5625**	**in.**	
Provided Edge Distance =	**1**	**in.**	**PASS**

Pn =	**3.510 >**	**P_u =**	**2.38726**	**PASS**
Ps =	**3.489 >**	**P_u =**	**2.38726**	**PASS**

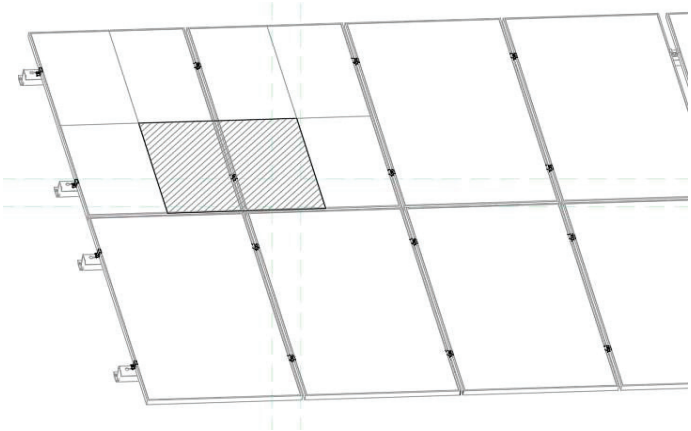


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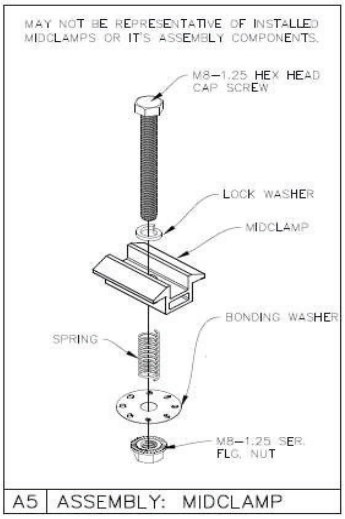
Module Clamp

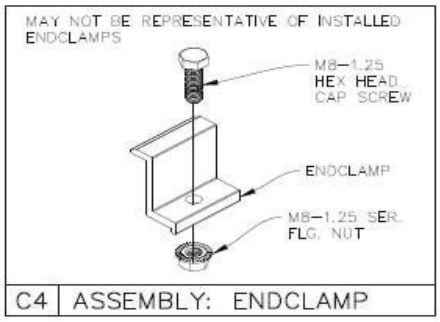
Safety Factor, Ω	2	
Governing Load, P_u	1472 Pa	834 lbs. per panel
Bolt Diameter, d	0.3125 in.	
Torque	15.6 ft. - lbs.	
Coefficient of Friction	0.2	
Bolt Tension, T_u	2995 lbs.	



*Half panel load per Clamp

P_n/Ω =	1497.6 lbs.			
Pn =	**1498 >**	**P_u =**	**417**	**PASS**





Steel Code Check
Concise Report

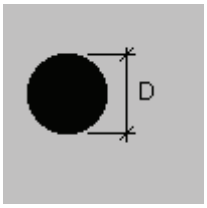
AISC 360-2016 ASD (Hot-rolled)

Member : 502 (Cable Brace) - OK

Section information

Section name: CABLE BRACE - 1/8 **(US)**

Dimensions



D = 0.245 [in] Diameter

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	0.047	
Moment of Inertia (local axes) (I)	[in4]	1.77E-04	1.77E-04
Moment of Inertia (principal axes) (I')	[in4]	1.77E-04	1.77E-04
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	0.061	0.061
Radius of gyration (principal axes) (r')	[in]	0.061	0.061
Saint-Venant torsion constant. (J)	[in4]	3.68E-04	
Section warping constant. (Cw)	[in6]	0.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.001	0.001
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.001	0.001
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.001	0.001
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.001	0.001
Plastic section modulus (local axis) (Z)	[in3]	0.002	0.002
Plastic section modulus (principal axis) (Z')	[in3]	0.002	0.002
Polar radius of gyration. (ro)	[in]	0.087	
Area for shear (Aw)	[in2]	0.047	0.047
Torsional constant. (C)	[in3]	0.004	

Material : APA - A36 - Cables

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	36000.00
Tensile strength (Fu):	[Lb/in2]	58000.00
Elasticity Modulus (E):	[Lb/in2]	2.9E07
Shear modulus for steel (G):	[Lb/in2]	1.150794E07

Design Criteria

Description	Unit	Value

Length for tension slenderness ratio (L)	[in]	215.93

Distance between member lateral bracing points

Length (Lb) [in]	
Top	Bottom
215.93	215.93

Laterally unbraced length

Length [in]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
215.93	215.93	215.93	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.41			
Capacity	:	1017.88 [Lb]	Reference	:	Cl.D2
Demand	:	412.53 [Lb]	Ctrl Eq.	:	D7 at 50.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	1017.88	Cl.D2

Axial Compression Design ✔

Compression in the major axis 33

Ratio	:	0.01			
Capacity	:	0.57 [Lb]	Reference	:	Cl.E3
Demand	:	0.01 [Lb]	Ctrl Eq.	:	D18 at 0.00%

Intermediate results	Unit	Value	Reference
Factored flexural buckling strength(P_{n33}/Ω):	[Lb]	0.57	Cl.E3

Compression in the minor axis 22

Ratio	:	0.01			
Capacity	:	0.57 [Lb]	Reference	:	Cl.E3
Demand	:	0.01 [Lb]	Ctrl Eq.	:	D18 at 0.00%

Intermediate results	Unit	Value	Reference
Factored flexural buckling strength(P_{n22}/Ω):	[Lb]	0.57	Cl.E3

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.00			
Capacity	:	4.07 [Lb*ft]	Reference	:	Cl.F11.1
Demand	:	0.02 [Lb*ft]	Ctrl Eq.	:	D18 at 50.00%

Intermediate results	Unit	Value	Reference
Factored yielding strength(M_n/Ω):	[Lb*ft]	4.07	Cl.F11.1

Bending about minor axis, M22

Ratio	:	0.01			
Capacity	:	4.07 [Lb*ft]	Reference	:	Cl.F11.1
Demand	:	0.04 [Lb*ft]	Ctrl Eq.	:	D13 at 50.00%

Intermediate results	Unit	Value	Reference
Factored yielding strength about a geometric axis(M_n/Ω):	[Lb*ft]	4.07	Cl.F11.1

Shear Design ✔

Shear in major axis 33

Ratio	:	0.00			
Capacity	:	610.73 [Lb]	Reference	:	Cl.G1
Demand	:	0.00 [Lb]	Ctrl Eq.	:	D13 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	610.73	Cl.G1

Shear in minor axis 22

Ratio	:	0.00			
Capacity	:	610.73 [Lb]	Reference	:	Cl.G1
Demand	:	0.00 [Lb]	Ctrl Eq.	:	D18 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	610.73	Cl.G1

Combined Actions Design ✔

Combined flexure and axial

Ratio	:	0.41			
Ctrl Eq.	:	D7 at 50.00%	Reference	:	Eq.H1-1a

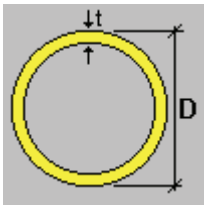
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.41	Eq.H1-1a

Member : 334 (Foundation Post) - OK

Section information

Section name: Std. Titan Duo Post - 2.375 x 0.095 **(US)**

Dimensions



D	=	2.375	[in]	Diameter
T	=	0.088	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	0.640	
Moment of Inertia (local axes) (I)	[in4]	0.417	0.417
Moment of Inertia (principal axes) (I')	[in4]	0.417	0.417
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	0.807	0.807
Radius of gyration (principal axes) (r')	[in]	0.807	0.807
Saint-Venant torsion constant. (J)	[in4]	0.814	
Section warping constant. (Cw)	[in6]	5.07E-05	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.345	0.345
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.345	0.345
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.345	0.345
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.345	0.345
Plastic section modulus (local axis) (Z)	[in3]	0.465	0.465
Plastic section modulus (principal axis) (Z')	[in3]	0.465	0.465
Polar radius of gyration. (ro)	[in]	1.141	
Area for shear (Aw)	[in2]	0.412	0.412
Torsional constant. (C)	[in3]	0.722	

Material : APA - A570 Gr50

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	50000.00
Tensile strength (Fu):	[Lb/in2]	65300.00
Elasticity Modulus (E):	[Lb/in2]	2.9E07
Shear modulus for steel (G):	[Lb/in2]	1.150794E07

Design Criteria

Description	Unit	Value

Length for tension slenderness ratio (L)	[in]	80.89

Distance between member lateral bracing points

Length (Lb) [in]	
Top	Bottom
80.89	80.89

Laterally unbraced length

Length [in]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
80.89	80.89	80.89	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Non sway
Minor axis frame type	Non sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	: 0.23		
Capacity	: 19174.73 [Lb]	Reference	: Cl.D2
Demand	: 4420.36 [Lb]	Ctrl Eq.	: D17 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	19174.73	Cl.D2

Axial Compression Design ✔

Compression in the major axis 33

Ratio	: 0.47		
Capacity	: 9193.05 [Lb]	Reference	: Cl.E3
Demand	: 4307.94 [Lb]	Ctrl Eq.	: D27 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(P_{n33}/Ω):	[Lb]	9193.05	Cl.E3

Compression in the minor axis 22

Ratio	: 0.47		
Capacity	: 9193.05 [Lb]	Reference	: Cl.E3
Demand	: 4307.94 [Lb]	Ctrl Eq.	: D27 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(P_{n22}/Ω):	[Lb]	9193.05	Cl.E3

Flexural Design ✔

Bending about major axis, M33

Ratio	: 0.05		
Capacity	: 1159.85 [Lb*ft]	Reference	: Cl.F8.1
Demand	: -62.42 [Lb*ft]	Ctrl Eq.	: D7 at 2.47%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(M_n/Ω):	[Lb*ft]	1159.85	Cl.F8.1

Bending about minor axis, M22

Ratio	: 0.32		
Capacity	: 1159.85 [Lb*ft]	Reference	: Cl.F8.1
Demand	: 372.65 [Lb*ft]	Ctrl Eq.	: D30 at 2.47%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(M_n/Ω):	[Lb*ft]	1159.85	Cl.F8.1

Shear Design ✔

Shear in major axis 33

Ratio	: 0.39		
Capacity	: 5752.42 [Lb]	Reference	: Cl.G1
Demand	: 2236.01 [Lb]	Ctrl Eq.	: D30 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	5752.42	Cl.G1

Shear in minor axis 22

Ratio	: 0.07		
Capacity	: 5752.42 [Lb]	Reference	: Cl.G1
Demand	: 374.54 [Lb]	Ctrl Eq.	: D7 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	5752.42	Cl.G1

Torsion Design ✔

Torsion

Ratio	:	0.00			
Capacity	:	1080.70 [Lb*ft]	Reference	:	Cl.H3.1
Demand	:	-0.13 [Lb*ft]	Ctrl Eq.	:	D13 at 2.47%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(T_n/Ω):	[Lb*ft]	1080.70	Cl.H3.1

Combined Actions Design

Combined flexure and axial

Ratio	:	0.66			
Ctrl Eq.	:	D27 at 2.47%	Reference	:	Eq.H1-1a

Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.66	Eq.H1-1a

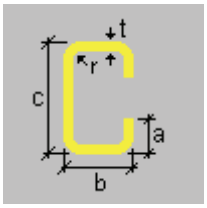
AISI 2016 ASD (Cold-formed)

Member : 335 (NS Chord) - OK

Section information

Section name: Std. Titan NS Chord - 6 x 2 x 0.108 **(US)**

Dimensions



a	=	0.600	[in]	Lip
b	=	2.000	[in]	Flange width
c	=	6.000	[in]	Depth
r	=	0.219	[in]	Inside bend radius
t	=	0.108	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	1.108	
Moment of Inertia (local axes) (I)	[in4]	5.733	0.525
Moment of Inertia (principal axes) (I')	[in4]	5.733	0.525
Bending constant for moments (principal axis) (J')	[in]	0.000	3.324
Radius of gyration (local axes) (r)	[in]	2.275	0.688
Radius of gyration (principal axes) (r')	[in]	2.275	0.688
Saint-Venant torsion constant. (J)	[in4]	0.005	
Section warping constant. (Cw)	[in6]	4.248	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	-1.466	0.000

Top elastic section modulus of the section (local axis) (Ssup)	[in3]	1.911	0.364
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	1.911	0.942
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	1.911	0.364
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	1.911	0.942
Plastic section modulus (local axis) (Z)	[in3]	2.290	0.561
Plastic section modulus (principal axis) (Z')	[in3]	2.290	0.561
Polar radius of gyration. (ro)	[in]	2.793	
Area for shear (Aw)	[in2]	0.409	0.754
Torsional constant. (C)	[in3]	0.042	

Material : A653 SS 80-1

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	80000.00
Tensile strength (Fu):	[Lb/in2]	82000.00
Elasticity Modulus (E):	[Lb/in2]	2.95E07
Shear modulus for steel (G):	[Lb/in2]	1.134615E07

Design Criteria

Description	Unit	Major axis	Minor axis
Additional hypotheses			
Full lateral restraints		No	
Continuous flexural torsional restraint		No	
Local axis design		Yes	
Region between inflection points adjacent to support		No	
Span type		Simple	
Fastened to support		Unfastened	
Local shear		No	
Braced for sidesway in major axis		No	
Braced for sidesway in minor axis		No	
Loading condition		EOF	
Flange support condition		Fastened	
Bearing length	[in]	5.18	

Member lateral unbraced lengths

Length (Lb) [in]		Restraint arrangement		Rotation restraint	
Top	Bottom	Top	Bottom	Top	Bottom
4.50	4.50	FF	FF	None	None
27.00	96.92	FF	FF	None	None
48.95	10.53	FF	FF	None	None
20.97		FF		None	
10.53		FF		None	

Compression member unbraced lengths

Length (L) [in]			Effective length factor (ke)		
Major axis	Minor axis		Major axis	Minor axis	
4.50	4.50	4.50	0.00	0.00	1.0
96.92	27.00	27.00	0.00	0.00	1.0
10.53	48.95	48.95	0.00	0.00	1.0
	20.97	20.97		0.00	1.0
	10.53	10.53		0.00	1.0

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	: 0.02		
Capacity	: 45411.63 [Lb]	Reference	: Sec. D3
Demand	: 1120.23 [Lb]	Ctrl Eq.	: D27 at 71.86%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	53058.71	Sec. D2
Factored axial tensile fracture capacity(P_n/Ω):	[Lb]	45411.63	Sec. D3

Shear Design ✔

Shear in major axis 33

Ratio	: 0.02		
Capacity	: 8722.08 [Lb]	Reference	: Sec. G2
Demand	: 161.70 [Lb]	Ctrl Eq.	: D6 at 90.59%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	8722.08	Sec. G2

Shear in minor axis 22

Ratio	: 0.14		
Capacity	: 15527.64 [Lb]	Reference	: Sec. G2
Demand	: -2136.72 [Lb]	Ctrl Eq.	: D28 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	15527.64	Sec. G2

Axial Compression Design ✔

Axial compression

Ratio	: 0.07		
Capacity	: 24283.59 [Lb]	Reference	: Sec. E3
Demand	: 1669.21 [Lb]	Ctrl Eq.	: D17 at 28.14%

Intermediate results	Unit	Value	Reference
Factored axial compression capacity(P_n/Ω):	[Lb]	27364.39	Sec. E2
Factored axial compression distortional buckling capacity(P_n/Ω):	[Lb]	33136.75	Sec. E4
Factored local buckling strength(P_n/Ω):	[Lb]	24283.59	Sec. E3

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.44			
Capacity	:	7065.74 [Lb*ft]	Reference	:	Sec. F4
Demand	:	3118.86 [Lb*ft]	Ctrl Eq.	:	D28 at 28.14%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(M_n/Ω):	[Lb*ft]	7629.31	Sec. F2
Factored lateral-torsional buckling strength(M_n/Ω):	[Lb*ft]	7578.81	Sec. F2
Factored moment distortional buckling capacity(M_n/Ω):	[Lb*ft]	7065.74	Sec. F4
Factored local buckling strength(M_n/Ω):	[Lb*ft]	7515.58	Sec. F3

Bending about the minor axis 22

Ratio	:	0.10			
Capacity	:	1452.06 [Lb*ft]	Reference	:	Sec. F2
Demand	:	149.22 [Lb*ft]	Ctrl Eq.	:	D7 at 28.14%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(M_n/Ω):	[Lb*ft]	1452.06	Sec. F2
Factored local buckling strength(M_n/Ω):	[Lb*ft]	1452.06	Sec. F3

Web Crippling Design ✔

Web crippling

Ratio	:	0.78			
Capacity	:	5024.13 [Lb]	Reference	:	Sec. G5
Demand	:	3942.30 [Lb]	Ctrl Eq.	:	D28 at 4.02%

Intermediate results	Unit	Value	Reference
Factored web crippling capacity(P_n/Ω):	[Lb]	5024.13	Sec. G5

Combined Actions Design ✔

Combined bending and web crippling interaction

Ratio	:	0.26			
Ctrl Eq.	:	D28 at 28.14%	Reference	:	Sec. H3

Intermediate results	Unit	Value	Reference

Combined bending and shear interaction

Ratio	:	0.43			
Ctrl Eq.	:	D28 at 28.14%	Reference	:	Sec. H2

Intermediate results	Unit	Value	Reference
Combined bending and shear interaction (x-x):	--	0.43	Sec. H2

Combined bending and shear interaction(y-y):	--	0.02

Combined bending and tension interaction

Ratio : 0.46
Ctrl Eq. : D28 at 28.14% Reference : Eq. H1.1-2

Intermediate results	Unit	Value	Reference
Combined tensile axial and bending (flexure with tension yielding):	--	0.42	Eq. H1.1-1
Combined tensile axial and bending (flexure with buckling):	--	0.46	Eq. H1.1-2

Combined bending and compression interaction

Ratio : 0.46
Ctrl Eq. : D28 at 28.14% Reference : Eq. H1.2-1

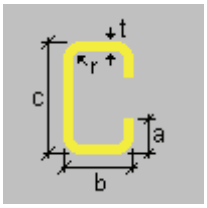
Intermediate results	Unit	Value	Reference
Combined bending and compression interaction:	--	0.46	Eq. H1.2-1

Member : 339 (Knee Brace) - OK

Section information

Section name: Std. Titan Knee Brace - 3 x 2 x 0.078 **(US)**

Dimensions



a	=	0.630	[in]	Lip
b	=	2.000	[in]	Flange width
c	=	3.000	[in]	Depth
r	=	0.141	[in]	Inside bend radius
t	=	0.078	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	0.594	
Moment of Inertia (local axes) (I)	[in4]	0.871	0.333
Moment of Inertia (principal axes) (I')	[in4]	0.871	0.333
Bending constant for moments (principal axis) (J')	[in]	0.000	2.304
Radius of gyration (local axes) (r)	[in]	1.211	0.749
Radius of gyration (principal axes) (r')	[in]	1.211	0.749
Saint-Venant torsion constant. (J)	[in4]	0.001	
Section warping constant. (Cw)	[in6]	0.845	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	-1.909	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.581	0.273
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.581	0.427

Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.581	0.273
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.581	0.427
Plastic section modulus (local axis) (Z)	[in3]	0.672	0.396
Plastic section modulus (principal axis) (Z')	[in3]	0.672	0.396
Polar radius of gyration. (ro)	[in]	2.381	
Area for shear (Aw)	[in2]	0.300	0.320
Torsional constant. (C)	[in3]	0.016	

Material : A653 SS 80-1

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	80000.00
Tensile strength (Fu):	[Lb/in2]	82000.00
Elasticity Modulus (E):	[Lb/in2]	2.95E07
Shear modulus for steel (G):	[Lb/in2]	1.134615E07

Design Criteria

Description	Unit	Major axis	Minor axis
Additional hypotheses			
Full lateral restraints		No	
Continuous flexural torsional restraint		No	
Local axis design		Yes	
Region between inflection points adjacent to support		No	
Span type		Simple	
Fastened to support		Unfastened	
Local shear		No	
Braced for sidesway in major axis		No	
Braced for sidesway in minor axis		No	
Loading condition		EOF	
Flange support condition		Fastened	

Member lateral unbraced lengths

Length (Lb) [in]		Restraint arrangement		Rotation restraint	
Top	Bottom	Top	Bottom	Top	Bottom
94.17	94.17	FF	FF	None	None

Compression member unbraced lengths

Length (L) [in]			Effective length factor (ke)		
Major axis	Minor axis		Major axis	Minor axis	
94.17	94.17	94.17	0.00	0.00	1.0

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.10			
Capacity	:	24337.19 [Lb]	Reference	:	Sec. D3
Demand	:	2455.19 [Lb]	Ctrl Eq.	:	D30 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	28435.45	Sec. D2
Factored axial tensile fracture capacity(P_n/Ω):	[Lb]	24337.19	Sec. D3

Shear Design ✔

Shear in major axis 33

Ratio	:	0.00		
Capacity	:	7310.16 [Lb]	Reference	: Sec. G2
Demand	:	0.00 [Lb]	Ctrl Eq.	: D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	7310.16	Sec. G2

Shear in minor axis 22

Ratio	:	0.00		
Capacity	:	5995.08 [Lb]	Reference	: Sec. G2
Demand	:	0.00 [Lb]	Ctrl Eq.	: D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	5995.08	Sec. G2

Axial Compression Design ✔

Axial compression

Ratio	:	0.67		
Capacity	:	3058.10 [Lb]	Reference	: Sec. E2
Demand	:	2033.91 [Lb]	Ctrl Eq.	: D23 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial compression capacity(P_n/Ω):	[Lb]	3058.10	Sec. E2
Factored axial compression distortional buckling capacity(P_n/Ω):	[Lb]	21111.11	Sec. E4
Factored local buckling strength(P_n/Ω):	[Lb]	3058.10	Sec. E3

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.00		
Capacity	:	1069.76 [Lb*ft]	Reference	: Sec. F2
Demand	:	0.00 [Lb*ft]	Ctrl Eq.	: D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(M_n/Ω):	[Lb*ft]	2317.74	Sec. F2
Factored lateral-torsional buckling strength(M_n/Ω):	[Lb*ft]	1069.76	Sec. F2
Factored moment distortional buckling capacity(M_n/Ω):	[Lb*ft]	2101.38	Sec. F4

Factored local buckling strength(M_n/Ω):	[Lb*ft]	1069.76	Sec. F3

Bending about the minor axis 22

Ratio	: 0.00		
Capacity	: 1090.14 [Lb*ft]	Reference	: Sec. F2
Demand	: 0.00 [Lb*ft]	Ctrl Eq.	: D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(M_n/Ω):	[Lb*ft]	1090.14	Sec. F2
Factored local buckling strength(M_n/Ω):	[Lb*ft]	1090.14	Sec. F3

Web Crippling Design ✔

Web crippling

Ratio	: 0.00		
Capacity	: 799.58 [Lb]	Reference	: Sec. G5
Demand	: 0.00 [Lb]	Ctrl Eq.	: D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored web crippling capacity(P_n/Ω):	[Lb]	799.58	Sec. G5

Combined Actions Design ✔

Combined bending and web crippling interaction

Ratio	: 0.00		
Ctrl Eq.	: D1 at 0.00%	Reference	: Sec. H3

Intermediate results	Unit	Value	Reference

Combined bending and shear interaction

Ratio	: 0.00		
Ctrl Eq.	: D1 at 0.00%	Reference	: Sec. H2

Intermediate results	Unit	Value	Reference
Combined bending and shear interaction (x-x):	--	0.00	Sec. H2
Combined bending and shear interaction(y-y):	--	0.00	Sec. H2

Combined bending and tension interaction

Ratio	: 0.10		
Ctrl Eq.	: D30 at 0.00%	Reference	: Eq. H1.1-1

Intermediate results	Unit	Value	Reference

Combined tensile axial and bending (flexure with tension yielding):	--	0.10	Eq. H1.1-1
Combined tensile axial and bending (flexure with buckling):	--	-0.10	

Combined bending and compression interaction

Ratio	:	0.67			
Ctrl Eq.	:	D23 at 0.00%	Reference	:	Eq. H1.2-1

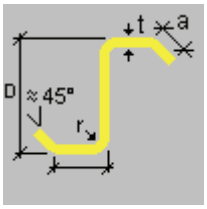
Intermediate results	Unit	Value	Reference
Combined bending and compression interaction:	--	0.67	Eq. H1.2-1

Member : 350 (OG - Zee - 3) - OK

Section information

Section name: Std. Big Zee - 6 x 3 x 0.055 **(US)**

Dimensions



a	=	1.000	[in]	Lip
b	=	3.000	[in]	Flange width
D	=	6.000	[in]	Depth
r	=	0.187	[in]	Inside bend radius
t	=	0.055	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	0.748	
Moment of Inertia (local axes) (I)	[in4]	4.452	2.135
Moment of Inertia (principal axes) (I')	[in4]	4.452	2.135
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	2.439	1.689
Radius of gyration (principal axes) (r')	[in]	2.439	1.689
Saint-Venant torsion constant. (J)	[in4]	7.70E-04	
Section warping constant. (Cw)	[in6]	12.653	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	1.484	0.577
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	1.484	0.577
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	1.484	0.577
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	1.484	0.577
Plastic section modulus (local axis) (Z)	[in3]	1.696	0.837
Plastic section modulus (principal axis) (Z')	[in3]	1.696	0.837
Polar radius of gyration. (ro)	[in]	2.967	
Area for shear (Aw)	[in2]	0.557	0.475
Torsional constant. (C)	[in3]	0.014	

Material : A653 SS 80-1

Properties	Unit	Value

Yield stress (Fy):	[Lb/in2]	80000.00
Tensile strength (Fu):	[Lb/in2]	82000.00
Elasticity Modulus (E):	[Lb/in2]	2.95E07
Shear modulus for steel (G):	[Lb/in2]	1.134615E07

Design Criteria

Description	Unit	Major axis	Minor axis
Additional hypotheses			
Full lateral restraints		No	
Continuous flexural torsional restraint		No	
Local axis design		Yes	
Region between inflection points adjacent to support		No	
Span type		Simple	
Fastened to support		Unfastened	
Local shear		No	
Braced for sidesway in major axis		Yes	
Braced for sidesway in minor axis		Yes	
Loading condition		EOF	
Flange support condition		Fastened	
Bearing length	[in]	3.00	

Member lateral unbraced lengths

Length (Lb) [in]		Restraint arrangement		Rotation restraint	
Top	Bottom	Top	Bottom	Top	Bottom
185.00	185.00	FF	FF	None	None

Compression member unbraced lengths

Length (L) [in]			Effective length factor (ke)		
Major axis	Minor axis		Major axis	Minor axis	
49.02	185.00	49.02	0.00	0.00	1.0

Design Checks

Axial Tension Design ✔

Axial tension

Ratio : 0.00
Capacity : 30673.98 [Lb]
Demand : 8.98 [Lb]
Reference : Sec. D3
Ctrl Eq. : D18 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	35839.32	Sec. D2
Factored axial tensile fracture capacity(P_n/Ω):	[Lb]	30673.98	Sec. D3

Shear Design ✔

Shear in major axis 33

Ratio	: 0.04		
Capacity	: 8054.03 [Lb]	Reference	: Sec. G2
Demand	: 293.69 [Lb]	Ctrl Eq.	: D2 at 100.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	8054.03	Sec. G2

Shear in minor axis 22

Ratio	: 0.37		
Capacity	: 2684.57 [Lb]	Reference	: Sec. G2
Demand	: -986.72 [Lb]	Ctrl Eq.	: D28 at 100.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	2684.57	Sec. G2

Axial Compression Design

Axial compression

Ratio	: 0.01		
Capacity	: 7216.71 [Lb]	Reference	: Sec. E3
Demand	: 52.03 [Lb]	Ctrl Eq.	: D2 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial compression capacity(P_n/Ω):	[Lb]	8850.89	Sec. E2
Factored axial compression distortional buckling capacity(P_n/Ω):	[Lb]	15049.54	Sec. E4
Factored local buckling strength(P_n/Ω):	[Lb]	7216.71	Sec. E3

Flexural Design

Bending about major axis, M33

Ratio	: 0.59		
Capacity	: 3452.84 [Lb*ft]	Reference	: Sec. F4
Demand	: -2020.08 [Lb*ft]	Ctrl Eq.	: D28 at 100.00%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(M_n/Ω):	[Lb*ft]	5923.85	Sec. F2
Factored lateral-torsional buckling strength(M_n/Ω):	[Lb*ft]	4729.25	Sec. F2
Factored moment distortional buckling capacity(M_n/Ω):	[Lb*ft]	3452.84	Sec. F4
Factored local buckling strength(M_n/Ω):	[Lb*ft]	3803.90	Sec. F3

Bending about the minor axis 22

Ratio	: 0.40		
Capacity	: 1918.79 [Lb*ft]	Reference	: Sec. F3
Demand	: -768.46 [Lb*ft]	Ctrl Eq.	: D2 at 100.00%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(M_n/Ω):	[Lb*ft]	2304.60	Sec. F2
Factored local buckling strength(M_n/Ω):	[Lb*ft]	1918.79	Sec. F3

Web Crippling Design

Web crippling

Ratio	:	0.08			
Capacity	:	1176.43 [Lb]	Reference	:	Sec. G5
Demand	:	91.94 [Lb]	Ctrl Eq.	:	D28 at 26.50%

Intermediate results	Unit	Value	Reference
Factored web crippling capacity(P_n/Ω):	[Lb]	1176.43	Sec. G5

Combined Actions Design

Combined bending and web crippling interaction

Ratio	:	0.21			
Ctrl Eq.	:	D28 at 100.00%	Reference	:	Sec. H3

Intermediate results	Unit	Value	Reference

Combined bending and shear interaction

Ratio	:	0.59			
Ctrl Eq.	:	D28 at 100.00%	Reference	:	Sec. H2

Intermediate results	Unit	Value	Reference
Combined bending and shear interaction (x-x):	--	0.59	Sec. H2
Combined bending and shear interaction(y-y):	--	0.31	

Combined bending and tension interaction

Ratio	:	0.90			
Ctrl Eq.	:	D28 at 100.00%	Reference	:	Eq. H1.1-2

Intermediate results	Unit	Value	Reference
Combined tensile axial and bending (flexure with tension yielding):	--	0.60	Eq. H1.1-1
Combined tensile axial and bending (flexure with buckling):	--	0.90	Eq. H1.1-2

Combined bending and compression interaction

Ratio	:	0.90			
Ctrl Eq.	:	D28 at 100.00%	Reference	:	Eq. H1.2-1

Intermediate results	Unit	Value	Reference
Combined bending and compression interaction:	--	0.90	Eq. H1.2-1

SOLAR PV GROUND MOUNT
STRUCTURAL CALCULATIONS

APA SOLAR RACKING
An ARRAY Company
20-345 County Road X, PO Box 326
Ridgeville Corners, OH 43555

Office: 419.267.5280
Fax: 419.267.5214

LOCATION

Connecticut

PRINT PACKAGE NUMBER:

260234

REVISION: B

ON:

5/1/2026

DESIGN CRITERIA:

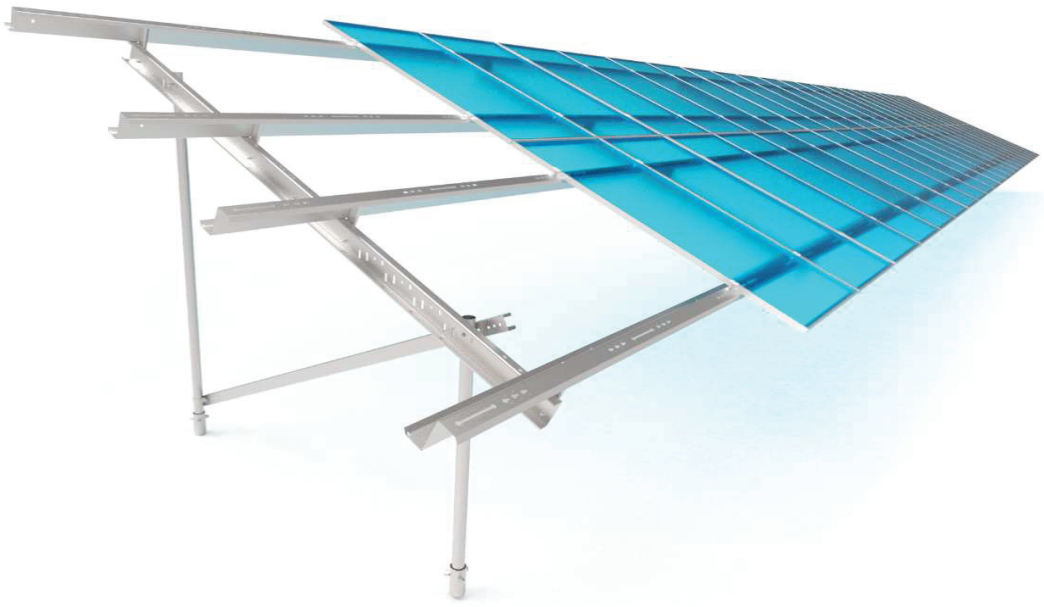
TITAN
25° TILT
30 PSF SNOW
113 MPH WIND, RISK CAT I, EX. C.

ASCE7-16
Allowable Stress Design (ASD)

the jdi group
architects & engineers

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STATE OF CONNECTICUT
ANNE M. GRASSER
0036452
LICENSED
PROFESSIONAL ENGINEER
05/12/2026



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LOAD CALCULATIONS

APA SOLAR RACKING
An ARRAY Company

20-345 County Road X, PO Box 326
Ridgeville Corners, OH 43555

Office: 419.267.5280
Fax:419.267.5214

General Calculations

General Dimensions

Quantity of PV Modules, Vertically (Cartridge)	PV_Q =	**1**	
PV Module Tilt	PVT =	**25°**	
PV Module Length	PVL =	**89.69**	**in**
PV Module Width	PVW =	**44.65**	**in**
PV Module Area	PVA = PVL × PVW =	**27.81**	**ft^2**
PV Module Weight	PV_{LB} =	**71**	**lbs**
Force Resisting Members Quantity	M_Q =	**2**	
Vertical Section Flat Length (chord)	$PV_{FL} = PV_L \times PV_Q$ =	**7.47**	**ft**
Vertical Section Profile Length (at tilt)	$PV_{PL} = PV_{FL} \times \cos(PV_T)$ =	**6.77**	**ft**
Horizontal Width (at tilt)	$PV_{PW} = PV_W$ =	**3.72**	**ft**
Profile Height (at tilt)	$PV_{PH} = PV_{FL} \times \sin(PV_T)$ =	**3.16**	**ft**
Area Projected Vertically	$PV_{AV} = PV_{PL} \times PV_{PW}$ =	**25.20**	**ft^2**
Area Projected Horizontally	$PV_{AH} = PV_{PH} \times PV_{PW}$ =	**11.75**	**ft^2**

Dead Loading

Force Resisting Member Weight	M_W =	**2.75**	**lbs/ft**
Cartridge Weight per Member	$PV_{LBT} = PV_{LB} / PV_Q / M_Q$ =	**35.5**	**lbs**
Misc. Hardware Weight per Vertical Section	W_{MH} =	**5.00**	**lbs**
Dead Load per Vertical Section	$DL_T = -(PV_{LB} \times PV_Q + M_W \times PV_W \times M_Q \times PV_Q + W_{MH})$ =	**-96.46**	**lbs**
TD: Distributed Dead Load on Member	$DL_o = DL_T / PV_Q / M_Q / PV_W$ =	**12.96**	**lbs/ft**

20-345 County Road X, PO Box 326
Ridgeville Corners, OH 43555

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SNOW

Snow loading (ASCE7-16)

Tedds calculation version 1.0.09

Building details

Roof type	Monoslope	
Width of roof	b=	**6.77 ft**
Slope of roof 1	α=	**25 deg**

Ground snow load

Ground snow load	Pg=	**30 lb/ft^2**
Density of snow	ɣ=	**17.9 lb/ft^3**
Terrain type	C (see Section 26.7)	
Exposure condition (Table 7.3-1)	Fully Exposed	
Exposure factor (Table 7.3-1)	Ce=	**0.9**
Thermal condition (Table 7.3-2)	Unheated and open air structures	
Thermal factor (Table 7.3-2)	Ct=	**1.2**
Importance category(Table 1.5-1)	I	
Risk factor (Table 7-4)	Is=	0.8
Flat roof snow load (Sect 7.3)	pf = 0.7*Ce*Ct Is*pg =	**18.14 lb/ft^2**
Minimum (flat roof) snow load	p_m=	**30 lb/ft^2**

Cold roof slope factor (Ct > 1.0)

Roof surface type	Slippery	
Ventilation	Ventilated	
Thermal resistance (R-value)	R=	**30**
Roof slope factor Fig 4-1c (dashed line)	Cs=	**0.82**

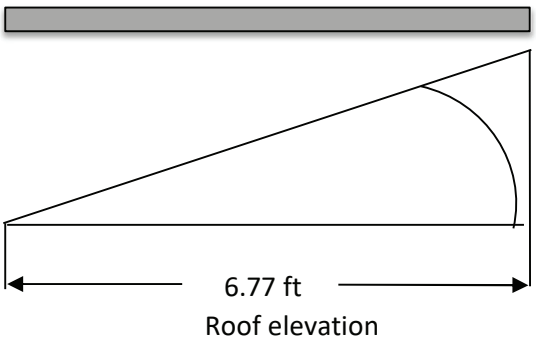
Monoslope

Sloped roof snow load (Cl.7.4)	ps = Cs x pf =	**24.55 lb/ft^2**

Distributed Snow Loading

Snow Load per Vertical Section	$SL_T = -(p_s \times PV_{AV})$ =	**618.77 lbs**
TD: Distributed Snow Load on Member	$SL = SL_T/PV_Q/M_Q/PV_W$ =	**83.15 lbs/ft/mem.**

Balanced Load



Roof elevation

20-345 County Road X, PO Box 326
Ridgeville Corners, OH 43555

Office: 419.267.5280
Fax:419.267.5214

SEISMIC

Seismic Forces (ASCE7-16)

Tedds calculation version 3.1.01

Site parameters

Site class	E	
Mapped acceleration parameters (Section 11.4.2)		
at short period	S_S =	**0.187**
at 1 sec period	S_1 =	**0.054**
Site coefficientshort period (Table 11.4-1)	F_a =	**2.5**
at 1 sec period (Table 11.4-2)	F_v =	**3.5**

Spectral response acceleration parameters

at short period (Eq. 11.4-1)	S_{MS} =	**0.4488**
at 1 sec period (Eq. 11.4-2)	S_{M1} =	**0.2268**

Design spectral acceleration parameters (Sect 11.4.4)

at short period (Eq. 11.4-3)	S_{DS} =	**0.299**
at 1 sec period (Eq. 11.4-4)	S_{D1} =	**0.151**

Seismic design category

Occupancy category (Table 1-1)	I	
Seismic design category	B	

Approximate fundamental period

Height above base to highest level of building	h_n =	**9.96 ft.**

From Table 12.8-2:		
Structure type	All other systems	
Building period parameter Ct	C_t =	**0.02**
Building period parameter x	x =	**0.75**
Approximate fundamental period (Eq 12.8-7)	T_a =	**0.112 sec**
Building fundamental period (Sect 12.8.2)	T =	**0.112**
Long-period transition period	T_L =	**6**

Seismic response coefficient

Seismic force-resisting system (Table 12.2-1)	G. CANTILEVERED COLUMN SYSTEMS DETAILED TO CONFORM TO THE REQUIRE 2. Steel ordinary cantilever column systems	
Response modification factor (Table 12.2-1)	R =	**1.25**
Seismic importance factor (Table 1.5-2)	I_e =	**1.00**
Seismic response coefficient (Sect 12.8.1.1)		

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Maximum ((Eq 12.8-3))	Cs_max =	**1.078**	
Maximum Sa value	Sa,max =	**0.29**	
Period T at which Sa is max	$T_{sa,max}$ =	**0.05**	**sec**
Minimum:			
Eq 9.5.5.2.1-3	C_{s_min} =	**0.0131648**	
Calculated (Eq 12.8-3)	C_{s_calc} =	**0.23936**	
Seismic response coefficient	C_s =	**0.23936**	

Seismic base shear (Sect 12.8.1)

Effective seismic weight of the structure	W =	**8.30**	**kips**
Seismic base shear (Eq 12.8-1)	$V = C_s \times W$ =	**2.0**	**kips**

Distributed Seismic Loading

Analyzed Rack Length	AR_L =	**1962**	**in**
Analyzed Rack Weight	$AR_{LB} = AR_L / (PW_{PW} \times 0.75) \times 2 \times DL_T$ =		**8296 lbs**
Analyzed Rack Anchor Qty	AR_A =	22	
Load per node (top of post)	$EL = V/AR_A$ =	**90.26 lbs/post**	

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WIND

Wind Loading (ASCE7-16)

General wind load requirements

Basic wind speed	V =	**113 mph**
Risk category	I	
Velocity pressure exponent coeff(Table26.6-1)	K_d =	**0.85**
Exposure category (cl.26.7.3)	C	

Topography

Topography factor not significant	K_{zt} =	**1.00**
Ground Elevation Factor	K_e =	**1.00**

Velocity pressure

Velocity pressure coefficient (T.29.3-1)	K_z =	**1.00**
Velocity pressure	qh=0.00256×Kz×Kzt×Kd×Kd×V2×1psf/mph2 =	**27.79 psf**

Pressures and forces

Net pressure	p = qh × GCN
Net force	$F_w = p \times A_{ref}$
Area (per zone)	$A_{ref} = PV_A$

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CPP Wind Loading Table

Titan

	Load Case	Load Case Desc.	Panel Load Loc.	CPP Pressure Coeff. G_{CN}	Net Pressure, p (psf)	Net Force, F_w (lbs)	Rails	Net Force per Rail (lbs/ft)
Green Zone	1	CPP E-W Rail-Up	1	-1.56	-43.42	-301.85	4	162
			2	-0.72	-20.03	-139.27		75
			3	-0.49	-13.65	-94.91		51
			4	-0.30	-8.22	-57.14		31
	2	CPP Half Chord-Up	1	-1.39	-38.69	-268.98		145
			2	-1.04	-28.81	-200.31		108
			3	-0.54	-15.06	-104.72		56
			4	-0.33	-9.08	-63.13		34
	3	CPP Post Pair-Up	1	-1.30	-36.13	-251.16		135
			2	-1.03	-28.61	-198.91		107
			3	-0.74	-20.47	-142.30		76
			4	-0.45	-12.49	-86.86		47
	4	CPP Post Pair-Down	1	0.29	7.93	55.11		-30
			2	0.43	11.83	82.22		-44
			3	0.54	15.04	104.55		-56
			4	0.61	16.83	117.03		-63
	5	CPP Half Chord-Down	1	0.24	6.68	46.45		-25
			2	0.38	10.54	73.31		-39
			3	0.53	14.81	102.97		-55
			4	0.65	17.96	124.88		-67
	6	CPP E-W Rail-Down	1	0.21	5.96	41.40		-22
			2	0.34	9.57	66.52		-36
			3	0.43	11.92	82.91		-45
			4	0.70	19.49	135.50		-73

	Load Case	Load Case Desc.	Panel Load Loc.	CPP Pressure Coeff. G_{CN}	Net Pressure, p (psf)	Net Force, F_w (lbs)	Rails	Net Force per Rail (lbs/ft)
	1	CPP E-W Rail-Up	1	-1.88	-52.31	-363.68		195
			2	-0.90	-25.08	-174.39		94
			3	-0.62	-17.19	-119.49		64
			4	-0.40	-11.12	-77.32		42
	2	CPP Half Chord-Up	1	-1.75	-48.65	-338.26		182
			2	-1.32	-36.71	-255.25		137
			3	-0.73	-20.29	-141.06		76
			4	-0.42	-11.64	-80.93		44
one			1	-1.50	-41.54	-288.84		155

APA SOLAR RACKING
An ARRAY Company

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Yellow Zc	3	CPP Post Pair-Up	2	-1.30	-36.14	-251.28	4	135
			3	-1.05	-29.21	-203.11		109
			4	-0.66	-18.35	-127.59		69
	4	CPP Post Pair-Down	1	0.40	11.08	77.04		-41
			2	0.69	19.04	132.38		-71
			3	0.93	25.87	179.89		-97
			4	1.05	29.15	202.68		-109
	5	CPP Half Chord-Down	1	0.34	9.58	66.60		-36
			2	0.60	16.68	116.00		-62
			3	0.95	26.26	182.59		-98
			4	1.08	30.14	209.58		-113
	6	CPP E-W Rail-Down	1	0.34	9.49	65.99		-35
			2	0.58	16.08	111.76		-60
			3	0.80	22.24	154.61		-83
			4	1.12	31.00	215.52		-116

	Load Case	Load Case Desc.	Panel Load Loc.	CPP Pressure Coeff. G_{CN}	Net Pressure, p (psf)	Net Force, F_w (lbs)	Rails	Net Force per Rail (lbs/ft)
Orange Zone	1	CPP E-W Rail-Up	1	-2.45	-67.98	-472.62	4	254
			2	-0.84	-23.42	-162.80		88
			3	-0.52	-14.40	-100.10		54
			4	-0.35	-9.74	-67.72		36
	2	CPP Half Chord-Up	1	-2.59	-71.86	-499.58		269
			2	-1.32	-36.58	-254.29		137
			3	-0.95	-26.49	-184.18		99
			4	-0.69	-19.08	-132.64		71
	3	CPP Post Pair-Up	1	-2.47	-68.71	-477.73		257
			2	-1.34	-37.21	-258.71		139
			3	-1.08	-29.87	-207.67		112
			4	-0.78	-21.77	-151.33		81
	4	CPP Post Pair-Down	1	0.71	19.83	137.87		-74
			2	1.08	29.98	208.40		-112
			3	1.67	46.33	322.10		-173
			4	1.91	52.96	368.19		-198
	5	CPP Half Chord-Down	1	0.65	18.07	125.62		-68
			2	1.00	27.72	192.72		-104
			3	1.72	47.86	332.71		-179
			4	1.92	53.35	370.89		-199
	6	CPP E-W Rail-Down	1	0.43	11.82	82.19		-44
			2	0.55	15.27	106.17		-57
			3	0.99	27.62	192.05		-103
			4	1.46	40.65	282.63		-152

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Load data - with ASD Combos (for reactions)

GLOSSARY

Load conditions

Condition	Description	Comb.	Category
DL	Dead Load	No	DL
SL	Snow Load	No	SNOW
WL1	Wind - APA_CPP - EW Rail / Up - 0° (S-N)	No	WIND
WL2	Wind - APA_CPP - Half Chord/ Up - 0° (S-N)	No	WIND
WL3	Wind - APA_CPP - Post Pair / Up - 0° (S-N)	No	WIND
WL4	Wind - APA_CPP - Post Pair / Down - 180° (N-S)	No	WIND
WL5	Wind - APA_CPP - Half Chord / Down - 180° (N-S)	No	WIND
WL6	Wind - APA_CPP - EW Rail / Down - 180° (N-S)	No	WIND
EL1	Seismic Left	No	EQ
EL2	Seismic Right	No	EQ
EL3	Seismic North	No	EQ
EL4	Seismic South	No	EQ
D1	DL	Yes	
D2	DL+SL	Yes	
D3	DL+0.75SL	Yes	
D4	DL+0.6WL1	Yes	
D5	DL+0.6WL2	Yes	
D6	DL+0.7EL1	Yes	
D7	DL+0.7EL2	Yes	
D8	DL+0.7EL3	Yes	
D9	DL+0.7EL4	Yes	
D10	DL+0.75SL+0.45WL1	Yes	
D11	DL+0.75SL+0.45WL2	Yes	
D12	DL+0.75SL+0.525EL1	Yes	
D13	DL+0.75SL+0.525EL2	Yes	
D14	DL+0.75SL+0.525EL3	Yes	
D15	DL+0.75SL+0.525EL4	Yes	
D16	0.6DL+0.6WL1	Yes	
D17	0.6DL+0.6WL2	Yes	
D18	0.6DL+0.7EL1	Yes	
D19	0.6DL+0.7EL2	Yes	
D20	0.6DL+0.7EL3	Yes	
D21	0.6DL+0.7EL4	Yes	
D22	DL+0.6WL3	Yes	
D23	DL+0.6WL4	Yes	
D24	DL+0.6WL5	Yes	
D25	DL+0.6WL6	Yes	
D26	DL+0.525SL+0.45WL3	Yes	

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D27	DL+0.525SL+0.45WL4	Yes
D28	DL+0.525SL+0.45WL5	Yes
D29	DL+0.525SL+0.45WL6	Yes
D30	0.6DL+0.6WL3	Yes
D31	0.6DL+0.6WL4	Yes
D32	0.6DL+0.6WL5	Yes
D33	0.6DL+0.6WL6	Yes

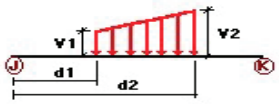
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Load on nodes

Condition	Node	FX	FY	FZ	MX	MY	MZ
		[Lb]	[Lb]	[Lb]	[Lb*ft]	[Lb*ft]	[Lb*ft]
EL1	153	90.26	0.00	0.00	0.00	0.00	0.00
EL2	153	-90.26	0.00	0.00	0.00	0.00	0.00
EL3	153	0.00	0.00	90.26	0.00	0.00	0.00
EL4	153	0.00	0.00	-90.26	0.00	0.00	0.00

Distributed Forces on Members



Condition	Member	Dir1	Val1	Val2	Dist1	%	Dist2	%
			[Lb/ft]	[Lb/ft]	[in]		[in]	
DL	376	Y	-12.96	-12.96	0.00	Yes	100.00	Yes
SL	376	Y	-83.15	-83.15	0.00	Yes	100.00	Yes
WL1	See Pages 9-10							
WL2	See Pages 9-10							
WL3	See Pages 9-10							
WL4	See Pages 9-10							
WL5	See Pages 9-10							
WL6	See Pages 9-10							

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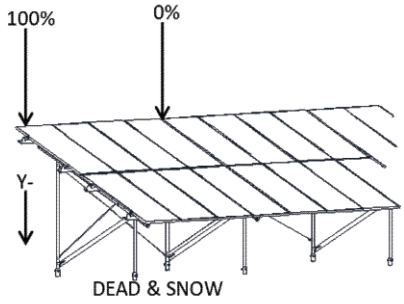


Figure 1: Load Direction Y

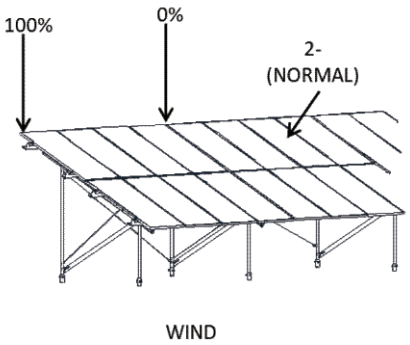


Figure 2: Load Direction 2

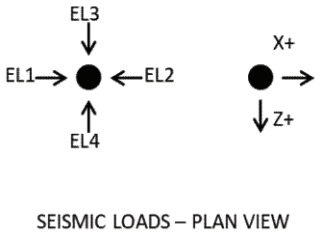


Figure 3: Load Direction X & Z

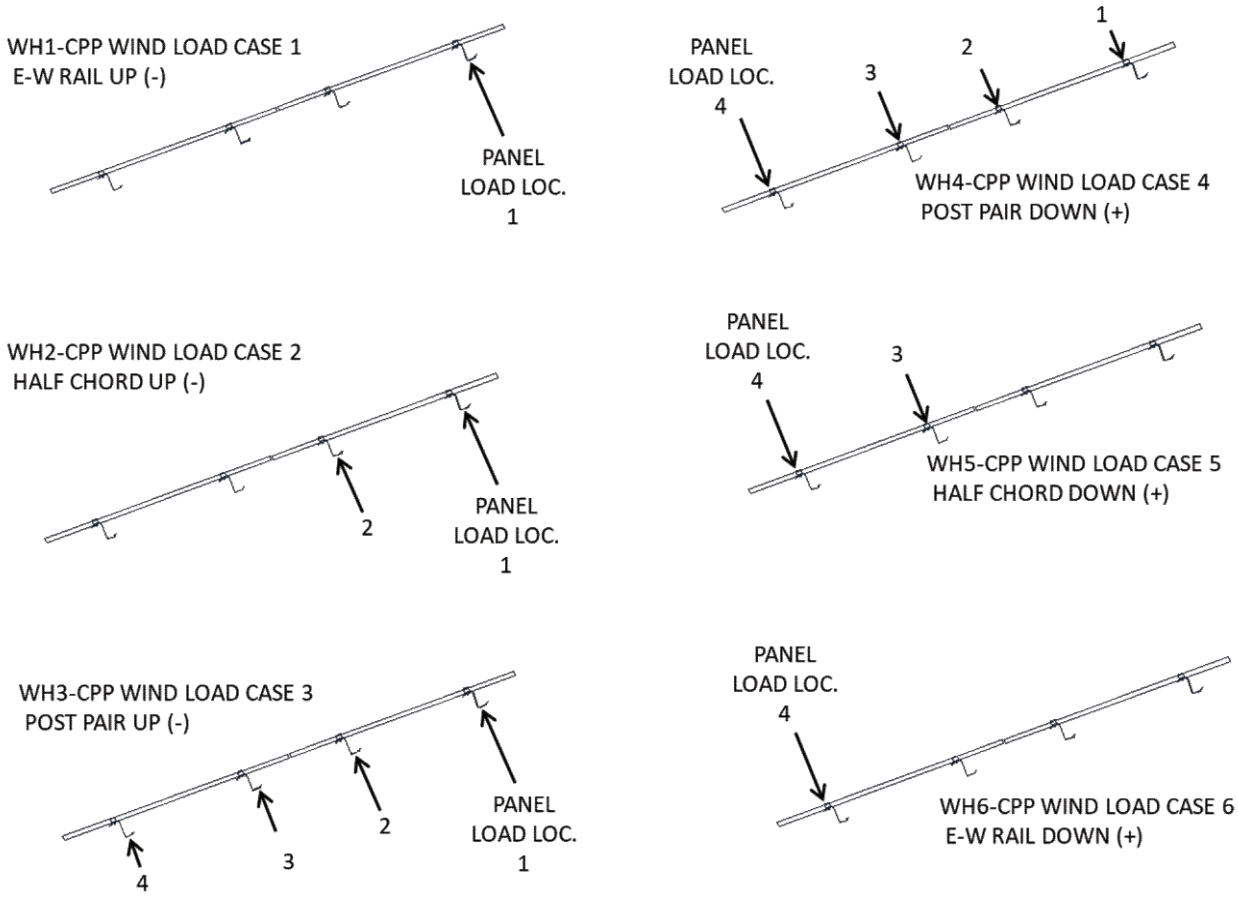


Figure 4: Load CPP Wind Loads

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WIND TUNNEL DATA

CERMAK PETERKA PETERSEN

CPP Project 17649 -
Wind Tunnel Tests and Wind Load Analysis for APA Solar FIXED-TILT GROUND MOUNT

Executive Summary

CPP, Inc. has evaluated wind loads on a generic array of fixed-tilt ground-mounted photovoltaic (PV) solar panels produced by APA Solar. The wind tunnel data used in the analysis is from the CPP proprietary ground mount wind loads database. This database consists of simultaneous surface pressure measurements at a large number of locations on the solar panels. The database contains data for a large number of configurations with varying combinations of tilt, ground clearance, and row spacing. The geometric parameters of the APA Solar system studied are summarized below:

	Range of applicability
Chord length:	140 in to 200 in, with results presented for two chord lengths and interpolation appropriate between the presented chord lengths
Tilt:	5°, 15°, 22.5°, 30° and 45°, allowable with interpolation appropriate between presented results.
Height (low edge of modules):	≤0.5L, with results presented for three low-edge heights (0.2L, 0.35L & 0.5L) and interpolation appropriate between the presented heights.
Row spacing (clear gap):	≤4LSin(tilt), with results presented for 1.5, 2.75 and 4LSin(tilt) and interpolation appropriate between the presented row spacings
Post spacing (along row):	≥0.5L, with results presented for 4 post spacings of 0.5L, 1L, 1.5L and 2.75L and interpolations appropriate between the presented post spacings

The wind loads determined by CPP are based upon measurements obtained in an atmospheric boundary layer wind tunnel study conducted in accordance with the test procedures described in ASCE 7. The primary goal of this study was to determine peak forces on an array of panels for the purpose of calculating design wind loads. The results are presented as load cases, defined in this document. These loads vary with position within the array and, as expected, the worst case- loads were found at the array perimeter. Interior portions of the array were generally found to have substantially lower wind loads than perimeter locations due to sheltering

Wind Tunnel Load Cases

The load cases are listed below. In some cases the load effect is the peak load on a fraction of the chord (e.g. the high rail or half the chord).

$GC_{N\text{-}Post\ \ pair}$ – Peak net pressure on a post-pair tributary area; uplift and downforces; for designs of posts, N-S strut/beam and braces. The tributary area considered includes the full chord and spans halfway to the next post pair; the nominal tributary area for a pair of posts in a dual-post system.

GCN-Post half-chord – Peak net pressure on a single post tributary area; uplift on upper post and downforce on lower post cases; for design of posts, N-S strut, and braces. The tributary area considered includes half of the chord and spans halfway to the next post pair; the nominal tributary area for a single post in a dual-post system.

GCN Rail– Peak net pressure on E-W rails spanning between posts, supporting modules; uplift and downforce cases. The tributary area considered includes one quarter of the chord and spans from one post pair to the next post pair; the nominal tributary area for a rail .

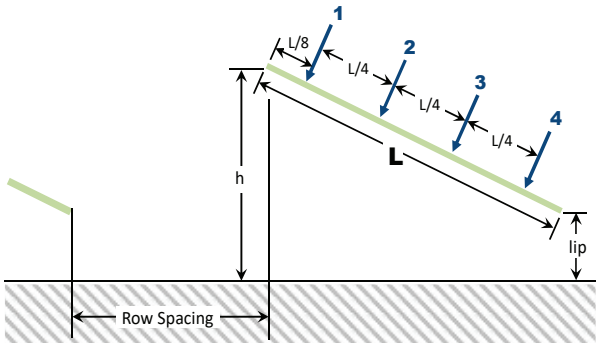


Figure 5: Wind Tunnel Load Distribution Schematic

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Wind Tunnel Zone Map

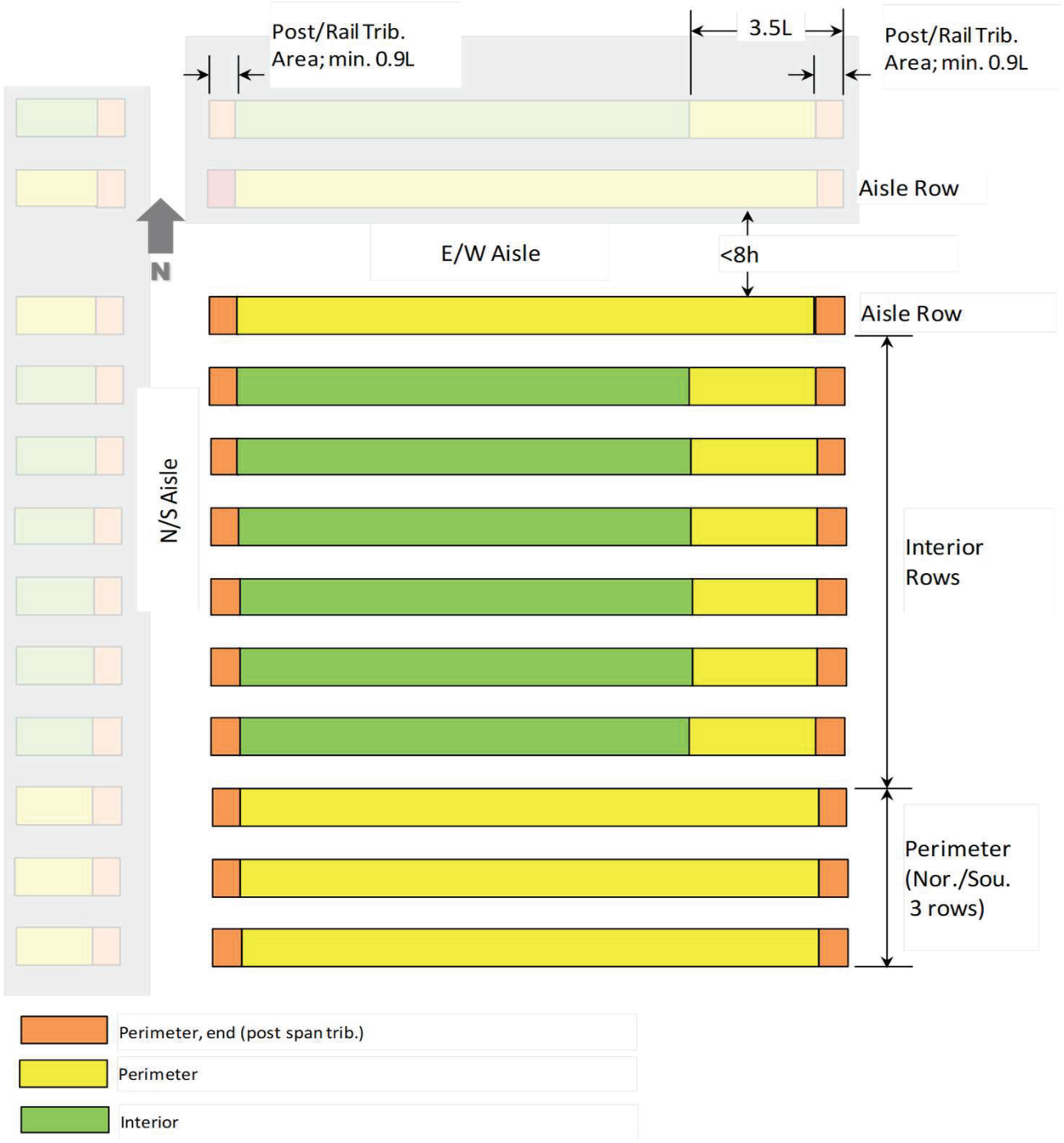


Figure 6: Wind Tunnel Zone Map

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SETUP & ANALYSIS

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Parts list

Note.- Only the graphically selected elements are listed below

Profile	Length [in]	N° of pieces
CABLE BRACE - 1/8	202.77	8
STD. BIG ZEE - 6 X 3 X 0...	152	32
STD. BIG ZEE - 6 X 3 X 0...	168	8
STD. BIG ZEE - 6 X 3 X 0.055	61	8
STD. BIG ZEE SPLICE - 6 ...	16	72
STD. TITAN DUO POST - 2...	42.39	11
STD. TITAN DUO POST - 2...	87.2	11
STD. TITAN KNEE BRAC...	102.75	11
STD. TITAN NS CHORD -...	136.25	11
Total N° of pieces		172

List of materials

Profile	Material	Uweight [Lb/ft]	Length [in]	Weight [Lb]
CABLE BRACE - 1/8	APA - A36 - CABLES	1.61E-01	1622.148	21.753
STD. BIG ZEE - 6 X 3 X 0.055	A653 SS 80-1	2.51E+00	6696	1402.684
STD. BIG ZEE SPLICE - 6 X 3 X 0.11	A653 SS 80-1	4.97E+00	1152	477.435
STD. TITAN DUO POST - 2.375 X 0.095	APA - A570 GR50	2.18E+00	1425.49	259.274
STD. TITAN KNEE BRACE - 3 X 2 X 0...	A653 SS 80-1	1.99E+00	1130.248	187.853
STD. TITAN NS CHORD - 6 X 2 X 0.108	A653 SS 80-1	3.72E+00	1498.698	464.788
Total weight [Lb]				2813.787

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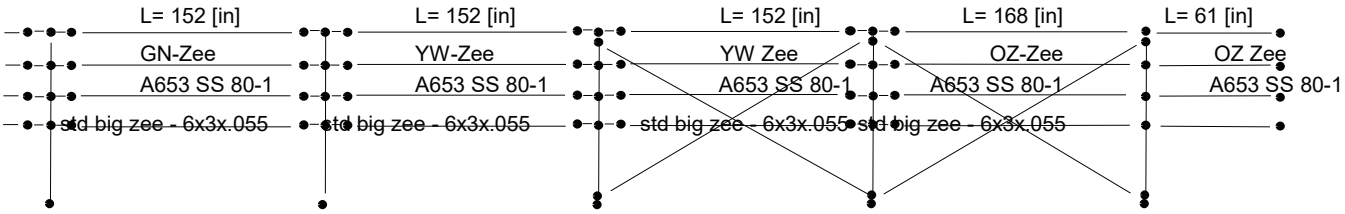


Figure 7: - Member Length, Name, Material, And Section - ORANGE,YELLOW, & GREEN ZONE

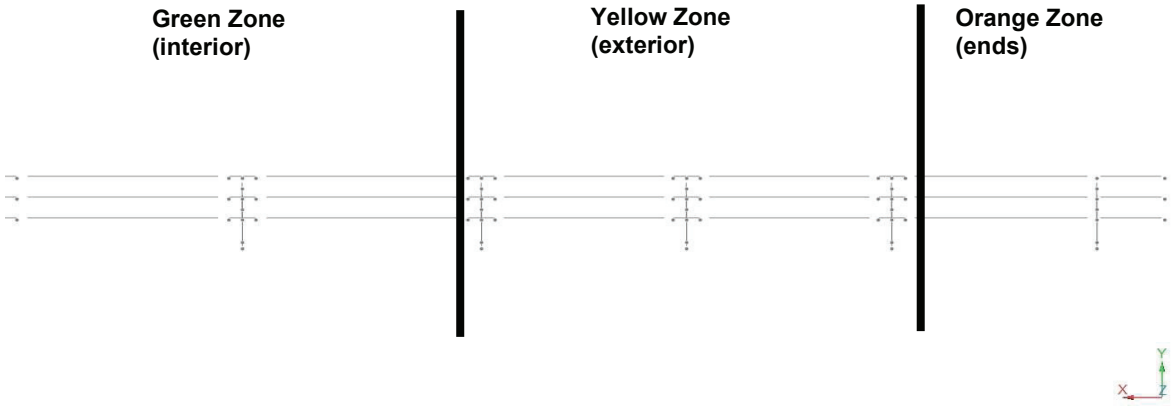


Figure 8: - Racking Zones

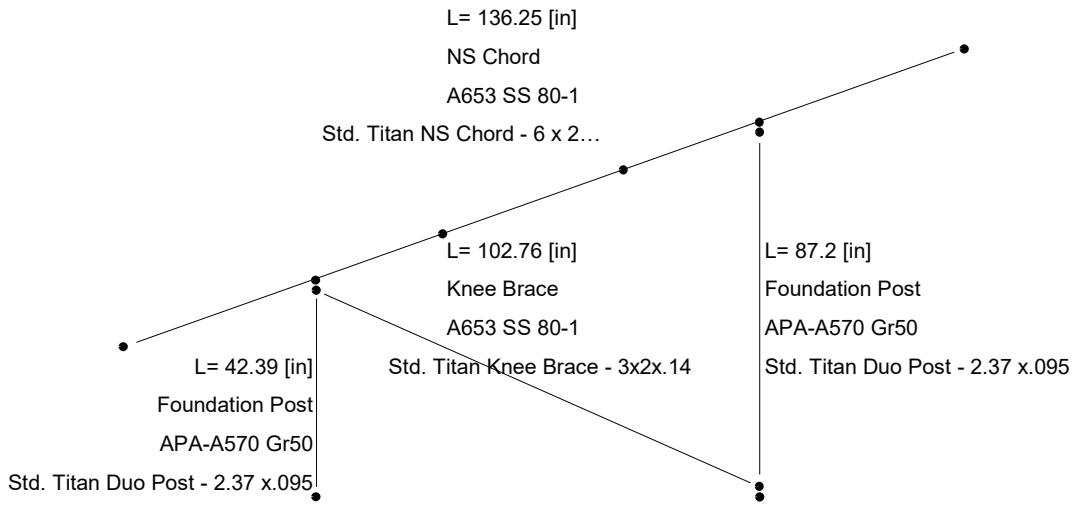


Figure 9: - Member Length, Name, Material, and Section

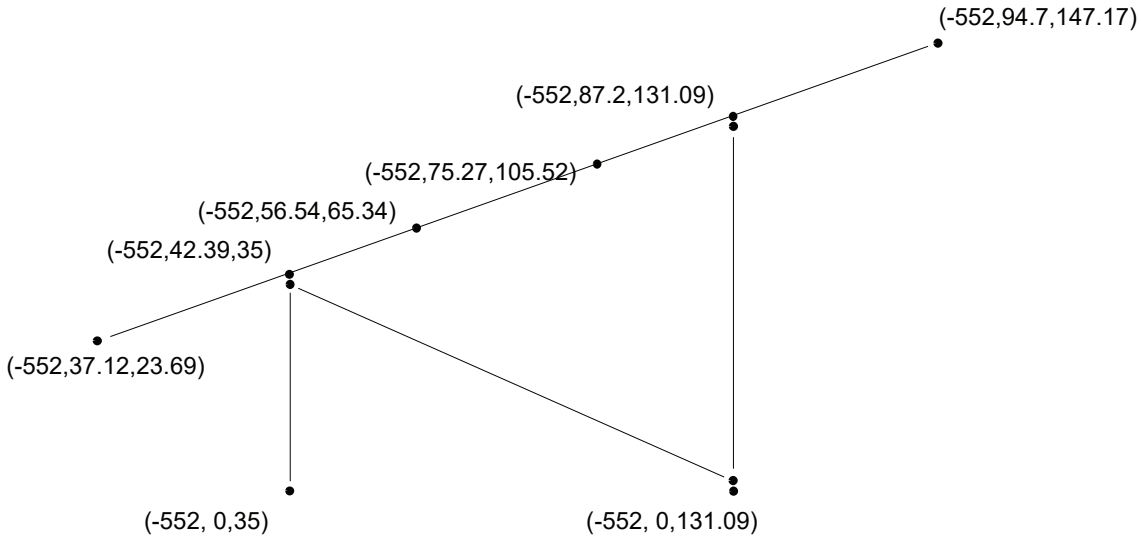


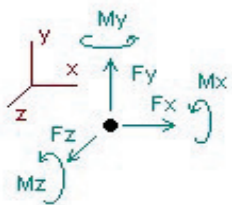
Figure 10: - Node X,Y,Z Coordinate

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Analysis - Reaction Envelope - ASD

Reactions



Direction of positive forces and moments

Max Uplift:	**-4818 lbs (D17)**
Max Down Load:	**4410 lbs (D27)**
Max Lateral:	**2404 lbs (D30)**

	Forces					Moments	
Node	Fx [Lb]	lc	Fy [Lb]	lc	Fz [Lb]	lc	My [Lb*ft]	lc
145-max	348.021	D19	3567.16	D27	1972.905	D22	0	D1
145-min	-0.021	D18	-3758.3	D17	-1307.73	D31	0	D1
151-max	0.024	D13	3661.16	D27	2029.623	D22	0	D1
151-min	-350.63	D6	-4152.49	D17	-1935.25	D31	0	D1
173-max	0.023	D7	3559.35	D27	1980.233	D22	0	D1
173-min	-353.043	D6	-3781.47	D17	-1303.7	D31	0	D1
174-max	344.921	D19	3658.16	D27	2031.261	D22	0	D1
174-min	-0.021	D18	-4164.28	D17	-1934.85	D31	0	D1
185-max	351.481	D7	4402.83	D27	2404.306	D30	0	D1
185-min	-350.474	D6	-4817.69	D17	-2014.55	D23	0	D1
195-max	349.2	D19	4410.08	D27	2399.271	D30	0	D1
195-min	-339.02	D18	-4789.92	D17	-2017.18	D23	0	D1
205-max	0.019	D6	3472	D27	1806.491	D30	0	D1
205-min	-0.021	D16	-3479.8	D17	-1123.42	D23	0	D1
212-max	0.018	D6	3467.11	D27	1812.39	D30	0	D1
212-min	-0.021	D16	-3490.68	D17	-1120.81	D23	0	D1
213-max	0.019	D6	3164.15	D27	1537.738	D22	0	D1
213-min	-0.017	D16	-2932.71	D17	-792.549	D31	0	D1
214-max	0.018	D6	3218.5	D27	1583.634	D30	0	D1
214-min	-0.018	D16	-3035.98	D17	-846.256	D23	0	D1

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215-max	0.018 D6	3162.17 D27	1539.789 D22	0 D1
215-min	-0.017 D19	-2936.99 D17	-791.316 D31	0 D1
294-max	0.06 D17	2944.36 D29	126.295 D31	0 D1
294-min	-0.012 D2	145.915 D20	-190.534 D22	0 D1
296-max	0.055 D16	2847.28 D28	186.902 D31	0 D1
296-min	-0.049 D13	101.06 D20	-196.018 D22	0 D1
298-max	0.047 D16	2943.86 D29	125.909 D31	0 D1
298-min	-0.047 D7	145.876 D20	-191.247 D22	0 D1
300-max	0.058 D16	2848.11 D28	186.86 D31	0 D1
300-min	-0.005 D2	101.128 D20	-196.17 D22	0 D1
302-max	0.057 D16	3438.14 D28	194.559 D23	0 D1
302-min	-0.048 D7	156.525 D20	-232.2 D30	0 D1
304-max	0.062 D16	3436.83 D28	194.813 D23	0 D1
304-min	-0.048 D7	156.513 D20	-231.714 D30	0 D1
306-max	0.044 D16	2884.41 D2	108.496 D23	0 D1
306-min	-0.039 D6	148.162 D20	-174.465 D30	0 D1
308-max	0.044 D16	2884.5 D2	108.244 D23	0 D1
308-min	-0.037 D6	148.166 D20	-175.035 D30	0 D1
310-max	0.035 D16	2877.42 D2	76.542 D31	0 D1
310-min	-0.038 D6	147.595 D20	-148.51 D22	0 D1
312-max	0.037 D16	2879.78 D2	81.729 D23	0 D1
312-min	-0.038 D6	147.786 D20	-152.943 D30	0 D1
314-max	0.036 D19	2877.5 D2	76.423 D31	0 D1
314-min	-0.038 D6	147.601 D20	-148.708 D22	0 D1

Mx = 0 for all nodes at ground

Mz = 0 for all nodes at ground

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CODE CHECK

(ASCE7-16, ASD)

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Steel Code Check - SUMMARY

Description	Section	Member & Ctrl Eq.	Ratio & Status	Reference	
NS Chord	*Std. Titan NS Chord - 6 x 2...*	335 - D28 at 9.16%	0.85 - OK	Sec. G5	
Knee Brace	*Std. Titan Knee Brace - 3 ...*	339 - D23 at 0.00%	0.82 - OK	Sec. E2	
Cable Brace	*CABLE BRACE - 1/8*	502 - D7 at 50.00%	0.4 - OK		0
Foundation P	*Std. Titan Duo Post - 2.37...*	334 - D27 at 2.29%	0.74 - OK		0
Zee Purlin	*STD BIG ZEE - 6 X 3 X .055*	350 - D28 at 100.00%	0.85 - OK	Sec. G5	

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CONNECTIONS CHECK

(ASCE7-16, ASD)

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Parts Details (in. & lbs.)

Part Details	Depth (Dia.), in.	Width, in.	Material/ Wall Thickness, in.	Ultimate Strength, psi	Edge Distance, in.	Bolt Couple Distance, in.	
NS Chord	6	2	0.108	82000	1.5		
Knee Brace	3	2	0.078	82000	1.25		
Zee Purlin	6	3	0.055	82000	2	4.75	
Post	2.375		0.095	65300	2		
Roll Bar	2.25		0.078	50000	1		

Governing Loads

Knee Brace - Max(Tension, Compression)	2631
Foundation Post Axial	4029
NS Chord - Axial	1888
Zee Purlin - Axial	300
Zee Purlin - Shear	1294
Zee Purlin - Moment	3278
Uplift Module Pressure, Pa	1558

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Knee Brace-Foundation Post

Safety Factor, Ω	2.5

Governing Load, P_u	2631.29	lbs.	2.631291 kips
	Knee Brace - Max(Tension, Compression)		
Bolt Diameter, d	0.5	in.	
Tensile Strength of Bolt, P_t	150000	psi	150 ksi
Shear Strength of Bolt, P_s	6344.05	lbs.	6.34 kips

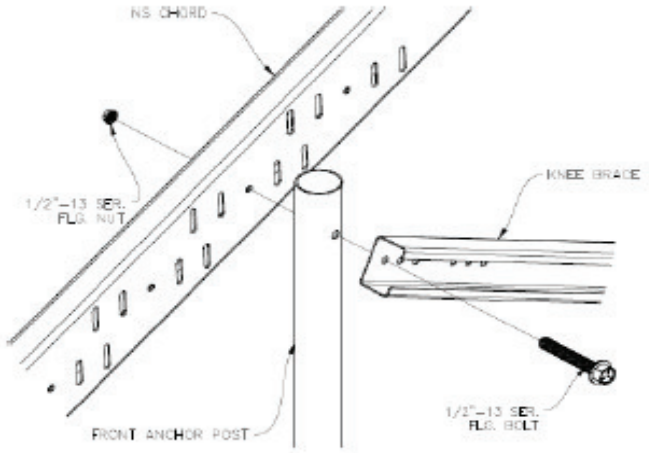
Bearing Capacity	P_n =	$C*m_f*d*t*F_u$	**AISI J3.3.1-1**

C =	3	
m_f =	1	
t_{KB} =	0.078	in.
F_{uKNEE} =	82000	psi

P_n/Ω =	3837.6 lbs	3.838 kips	

Minimum Edge Distance Required =	**0.75 in.**	**AISC Table J3.4**	
Provided Edge Distance =	**1.25 in.**	**PASS**	

Pn =	**3.838 >**	**P_u =**	**2.63129109**	**PASS**
Ps =	**6.344 >**	**P_u =**	**2.63129109**	**PASS**



***Knee Brace-Brace clamp connection physically tested for no deformation at maximum 3400 lbs.**
****Post-Pile Set screw connection physically tested for no movement at maximum 11,000 lbs.**

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Foundation Post-NS Chord

Safety Factor, Ω	2.5	

Governing Load, P_u	4029.06	lbs.	4.02906 kips
	Foundation Post Axial		
Bolt Diameter, d	0.5	in.	
Tensile Strength of Bolt, P_t	150000	psi	150 ksi
Shear Strength of Bolt, P_s	6344.05	lbs.	6.344 kips

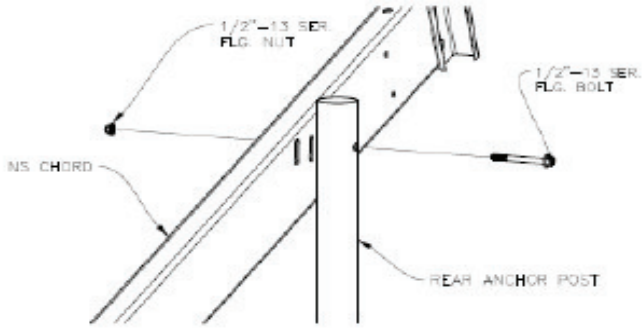
Bearing Capacity	P_n =	$C*m_f*d*t*F_u$	**AISI J3.3.1-1**

C =	3	
m_f =	1	
$t_{nschord}$ =	0.108 in.	
$F_{uNS\ CHORD}$ =	82000 psi	***Two shear walls on post**

P_n/Ω =	5313.6 lbs.	5.3136 kips

Minimum Edge Distance =	**0.75**	**in.**	**AISC Table J3.4**
Provided Edge Distance =	**2**	**in.**	**PASS**

Pn =	**5.314 >**	**P_u =**	**4.02905974**	**PASS**
Ps =	**6.344 >**	**P_u =**	**4.02905974**	**PASS**



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Zee-Zee Splice

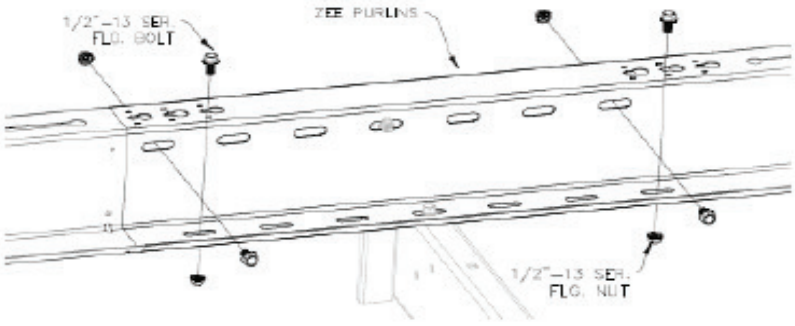
Safety Factor, Ω	2.5		
Maximum Moment in Zee	3277.56	ft*lbs	
Distance Between Bolts	4.75	in.	
Overlap Splice force Reduction Factor	0.66		
Number of Bolt couples, X_B	3		
Governing Load, $P_u = M/d/X_b$	1821.63	lbs	1.822 kips
	Zee Purlin - Moment		
Bolt Diameter, d	0.5	in.	
Tensile Strength of Bolt, P_t	150000	psi	150 ksi
Shear Strength of Bolt, P_s	6344.05	lbs	6.344 kips

Bearing Capacity	$P_n =$	$C*m_f*d*t*F_u$	**AISI J3.3.1-1**

C =	3	
m_f =	1	
t_Z =	0.055	in.
F_{uZEE} =	82000	psi

P_n/Ω =	2706 lbs.	2.706 kips	
Minimum Edge Distance =	**0.75 in.**		**AISC Table J3.4**
Provided Edge Distance =	**2 in.**		**PASS**

Pn =	**2.706 >**	**P_u =**	**1.822**	**PASS**
Ps =	**6.344 >**	**P_u =**	**1.822**	**PASS**



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Roll Bar-NS Chord

Safety Factor, Ω	2.5		
Governing Load, P_u	2587.34 lbs.	2.58734 kips	
	Zee Purlin - Shear		
Bolt Diameter, d	0.375 in.		
Tensile Strength of Bolt, P_t	75000 psi	75 ksi	
Shear Strength of Bolt, P_s	1744.5 lbs.	1.745 kips	
Number of bolts, n	2		

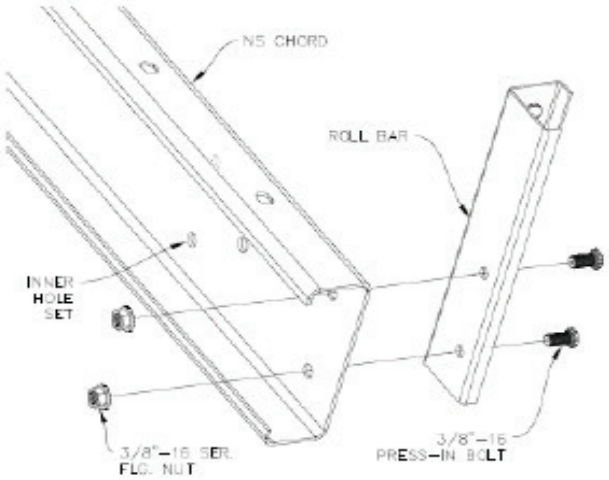
Bearing Capacity	P_n =	$C*m_f*d*t*F_u*2$	**Two Bolts**	**AISI J3.3.1-1**

C =	3	
m_f =	1	
t_{RB} =	0.078	in.
$F_{uROLL\ BAR}$ =	50000	psi

P_n/Ω =	3510 lbs.	3.510 kips	

Minimum Edge Distance =	**0.5625**	**in.**	
Provided Edge Distance =	**1**	**in.**	**PASS**

Pn =	**3.510 >**	**P_u =**	**2.58734**	**PASS**
Ps =	**3.489 >**	**P_u =**	**2.58734**	**PASS**

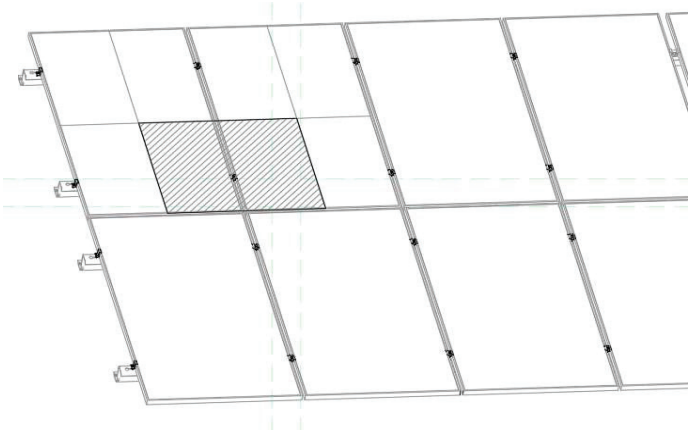


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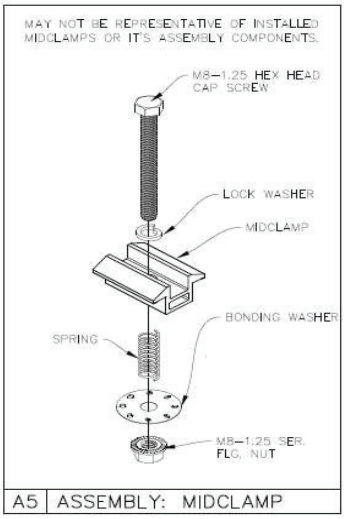
Module Clamp

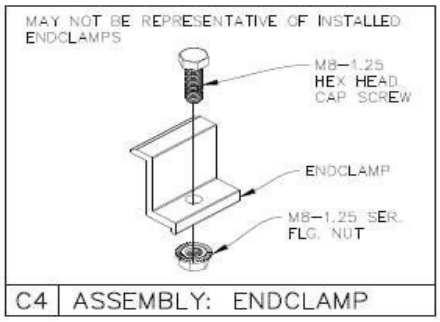
Safety Factor, Ω	2	
Governing Load, P_u	1558 Pa	905 lbs. per panel
Bolt Diameter, d	0.3125 in.	
Torque	15.6 ft. - lbs.	
Coefficient of Friction	0.2	
Bolt Tension, T_u	2995 lbs.	



*Half panel load per Clamp

P_n/Ω =	1497.6 lbs.			
Pn =	**1498 >**	**P_u =**	**452**	**PASS**





Steel Code Check

Concise Report

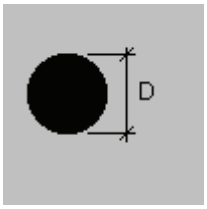
AISC 360-2016 ASD (Hot-rolled)

Member : 502 (Cable Brace) - OK

Section information

Section name: CABLE BRACE - 1/8 **(US)**

Dimensions



D = 0.245 [in] Diameter

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	0.047	
Moment of Inertia (local axes) (I)	[in4]	1.77E-04	1.77E-04
Moment of Inertia (principal axes) (I')	[in4]	1.77E-04	1.77E-04
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	0.061	0.061
Radius of gyration (principal axes) (r')	[in]	0.061	0.061
Saint-Venant torsion constant. (J)	[in4]	3.68E-04	
Section warping constant. (Cw)	[in6]	0.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.001	0.001
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.001	0.001
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.001	0.001
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.001	0.001
Plastic section modulus (local axis) (Z)	[in3]	0.002	0.002
Plastic section modulus (principal axis) (Z')	[in3]	0.002	0.002
Polar radius of gyration. (ro)	[in]	0.087	
Area for shear (Aw)	[in2]	0.047	0.047
Torsional constant. (C)	[in3]	0.004	

Material : APA - A36 - Cables

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	36000.00
Tensile strength (Fu):	[Lb/in2]	58000.00
Elasticity Modulus (E):	[Lb/in2]	2.9E07
Shear modulus for steel (G):	[Lb/in2]	1.150794E07

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[in]	202.77

Distance between member lateral bracing points

Length (Lb) [in]	
Top	Bottom
202.77	202.77

Laterally unbraced length

Length [in]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
202.77	202.77	202.77	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.39			
Capacity	:	1017.88 [Lb]	Reference	:	Cl.D2
Demand	:	396.40 [Lb]	Ctrl Eq.	:	D7 at 50.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	1017.88	Cl.D2

Axial Compression Design ✔

Compression in the major axis 33

Ratio	:	0.01			
Capacity	:	0.65 [Lb]	Reference	:	Cl.E3
Demand	:	0.01 [Lb]	Ctrl Eq.	:	D18 at 0.00%

Intermediate results	Unit	Value	Reference
Factored flexural buckling strength(P_{n33}/Ω):	[Lb]	0.65	Cl.E3

Compression in the minor axis 22

Ratio	:	0.01			
Capacity	:	0.65 [Lb]	Reference	:	Cl.E3
Demand	:	0.01 [Lb]	Ctrl Eq.	:	D18 at 0.00%

Intermediate results	Unit	Value	Reference

Factored flexural buckling strength(P_{n22}/Ω):	[Lb]	0.65	Cl.E3

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.01			
Capacity	:	4.07 [Lb*ft]	Reference	:	Cl.F11.1
Demand	:	0.03 [Lb*ft]	Ctrl Eq.	:	D18 at 50.00%

Intermediate results	Unit	Value	Reference
Factored yielding strength(M_n/Ω):	[Lb*ft]	4.07	Cl.F11.1

Bending about minor axis, M22

Ratio	:	0.02			
Capacity	:	4.07 [Lb*ft]	Reference	:	Cl.F11.1
Demand	:	0.09 [Lb*ft]	Ctrl Eq.	:	D13 at 50.00%

Intermediate results	Unit	Value	Reference
Factored yielding strength about a geometric axis(M_n/Ω):	[Lb*ft]	4.07	Cl.F11.1

Shear Design ✔

Shear in major axis 33

Ratio	:	0.00			
Capacity	:	610.73 [Lb]	Reference	:	Cl.G1
Demand	:	0.01 [Lb]	Ctrl Eq.	:	D13 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	610.73	Cl.G1

Shear in minor axis 22

Ratio	:	0.00			
Capacity	:	610.73 [Lb]	Reference	:	Cl.G1
Demand	:	0.00 [Lb]	Ctrl Eq.	:	D18 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	610.73	Cl.G1

Combined Actions Design ✔

Combined flexure and axial

Ratio	:	0.40			
Ctrl Eq.	:	D7 at 50.00%	Reference	:	Eq.H1-1a

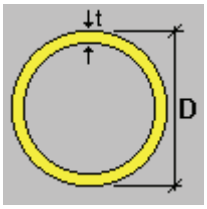
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.40	Eq.H1-1a

Member : 334 (Foundation Post) - OK

Section information

Section name: Std. Titan Duo Post - 2.375 x 0.095 **(US)**

Dimensions



D	=	2.375	[in]	Diameter
T	=	0.088	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	0.640	
Moment of Inertia (local axes) (I)	[in4]	0.417	0.417
Moment of Inertia (principal axes) (I')	[in4]	0.417	0.417
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	0.807	0.807
Radius of gyration (principal axes) (r')	[in]	0.807	0.807
Saint-Venant torsion constant. (J)	[in4]	0.814	
Section warping constant. (Cw)	[in6]	5.07E-05	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.345	0.345
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.345	0.345
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.345	0.345
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.345	0.345
Plastic section modulus (local axis) (Z)	[in3]	0.465	0.465
Plastic section modulus (principal axis) (Z')	[in3]	0.465	0.465
Polar radius of gyration. (ro)	[in]	1.141	
Area for shear (Aw)	[in2]	0.412	0.412
Torsional constant. (C)	[in3]	0.722	

Material : APA - A570 Gr50

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	50000.00
Tensile strength (Fu):	[Lb/in2]	65300.00
Elasticity Modulus (E):	[Lb/in2]	2.9E07
Shear modulus for steel (G):	[Lb/in2]	1.150794E07

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[in]	87.20

Distance between member lateral bracing points

Length (Lb) [in]	
Top	Bottom
87.20	87.20

Laterally unbraced length

Length [in]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
87.20	87.20	87.20	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Non sway
Minor axis frame type	Non sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio : 0.25
Capacity : 19174.73 [Lb]
Demand : 4817.69 [Lb]
Reference : Cl.D2
Ctrl Eq. : D17 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	19174.73	Cl.D2

Axial Compression Design ✔

Compression in the major axis 33

Ratio : 0.54
Capacity : 8160.30 [Lb]
Demand : 4402.82 [Lb]
Reference : Cl.E3
Ctrl Eq. : D27 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(P_{n33}/Ω):	[Lb]	8160.30	Cl.E3

Compression in the minor axis 22

Ratio : 0.54
Capacity : 8160.30 [Lb]
Demand : 4402.82 [Lb]
Reference : Cl.E3
Ctrl Eq. : D27 at 0.00%

Intermediate results	Unit	Value	Reference

Section classification			
Factored flexural buckling strength(P_{n22}/Ω):	[Lb]	8160.30	Cl.E3

Flexural Design ✔

Bending about major axis, M33

Ratio	: 0.05		
Capacity	: 1159.85 [Lb*ft]	Reference	: Cl.F8.1
Demand	: -58.58 [Lb*ft]	Ctrl Eq.	: D7 at 2.29%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(M_n/Ω):	[Lb*ft]	1159.85	Cl.F8.1

Bending about minor axis, M22

Ratio	: 0.35		
Capacity	: 1159.85 [Lb*ft]	Reference	: Cl.F8.1
Demand	: 400.69 [Lb*ft]	Ctrl Eq.	: D30 at 2.29%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(M_n/Ω):	[Lb*ft]	1159.85	Cl.F8.1

Shear Design ✔

Shear in major axis 33

Ratio	: 0.42		
Capacity	: 5752.42 [Lb]	Reference	: Cl.G1
Demand	: 2404.31 [Lb]	Ctrl Eq.	: D30 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	5752.42	Cl.G1

Shear in minor axis 22

Ratio	: 0.06		
Capacity	: 5752.42 [Lb]	Reference	: Cl.G1
Demand	: 351.48 [Lb]	Ctrl Eq.	: D7 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	5752.42	Cl.G1

Torsion Design ✔

Torsion

Ratio	:	0.00			
Capacity	:	1080.70 [Lb*ft]	Reference	:	Cl.H3.1
Demand	:	0.22 [Lb*ft]	Ctrl Eq.	:	D17 at 2.29%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(T_n/Ω):	[Lb*ft]	1080.70	Cl.H3.1

Combined Actions Design

Combined flexure and axial

Ratio	:	0.74			
Ctrl Eq.	:	D27 at 2.29%	Reference	:	Eq.H1-1a

Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.74	Eq.H1-1a

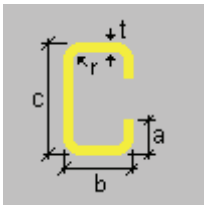
AISI 2016 ASD (Cold-formed)

Member : 335 (NS Chord) - OK

Section information

Section name: Std. Titan NS Chord - 6 x 2 x 0.108 **(US)**

Dimensions



a	=	0.600	[in]	Lip
b	=	2.000	[in]	Flange width
c	=	6.000	[in]	Depth
r	=	0.219	[in]	Inside bend radius
t	=	0.108	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	1.108	
Moment of Inertia (local axes) (I)	[in4]	5.733	0.525
Moment of Inertia (principal axes) (I')	[in4]	5.733	0.525
Bending constant for moments (principal axis) (J')	[in]	0.000	3.324
Radius of gyration (local axes) (r)	[in]	2.275	0.688
Radius of gyration (principal axes) (r')	[in]	2.275	0.688
Saint-Venant torsion constant. (J)	[in4]	0.005	
Section warping constant. (Cw)	[in6]	4.248	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	-1.466	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	1.911	0.364
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	1.911	0.942
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	1.911	0.364

Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	1.911	0.942
Plastic section modulus (local axis) (Z)	[in3]	2.290	0.561
Plastic section modulus (principal axis) (Z')	[in3]	2.290	0.561
Polar radius of gyration. (ro)	[in]	2.793	
Area for shear (Aw)	[in2]	0.409	0.754
Torsional constant. (C)	[in3]	0.042	

Material : A653 SS 80-1

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	80000.00
Tensile strength (Fu):	[Lb/in2]	82000.00
Elasticity Modulus (E):	[Lb/in2]	2.95E07
Shear modulus for steel (G):	[Lb/in2]	1.134615E07

Design Criteria

Description	Unit	Major axis	Minor axis
Additional hypotheses			
Full lateral restraints		No	
Continuous flexural torsional restraint		No	
Local axis design		Yes	
Region between inflection points adjacent to support		No	
Span type		Simple	
Fastened to support		Unfastened	
Local shear		No	
Braced for sidesway in major axis		No	
Braced for sidesway in minor axis		No	
Loading condition		EOF	
Flange support condition		Fastened	
Bearing length	[in]	5.18	

Member lateral unbraced lengths

Length (Lb) [in]		Restraint arrangement		Rotation restraint	
Top	Bottom	Top	Bottom	Top	Bottom
12.48	12.48	FF	FF	None	None
33.48	106.03	FF	FF	None	None
44.33	17.74	FF	FF	None	None
28.22		FF		None	
17.74		FF		None	

Compression member unbraced lengths

Length (L) [in]			Effective length factor (ke)		
Major axis	Minor axis		Major axis	Minor axis	
12.48	12.48	12.48	0.00	0.00	1.0
106.03	33.48	33.48	0.00	0.00	1.0
17.74	44.33	44.33	0.00	0.00	1.0
	28.22	28.22		0.00	1.0
	17.74	17.74		0.00	1.0

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	: 0.02		
Capacity	: 45411.63 [Lb]	Reference	: Sec. D3
Demand	: 1134.85 [Lb]	Ctrl Eq.	: D27 at 66.27%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	53058.71	Sec. D2
Factored axial tensile fracture capacity(P_n/Ω):	[Lb]	45411.63	Sec. D3

Shear Design ✔

Shear in major axis 33

Ratio	: 0.02		
Capacity	: 8722.08 [Lb]	Reference	: Sec. G2
Demand	: 149.78 [Lb]	Ctrl Eq.	: D7 at 66.27%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	8722.08	Sec. G2

Shear in minor axis 22

Ratio	: 0.15		
Capacity	: 15527.64 [Lb]	Reference	: Sec. G2
Demand	: -2265.34 [Lb]	Ctrl Eq.	: D28 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	15527.64	Sec. G2

Axial Compression Design ✔

Axial compression

Ratio	: 0.07		
Capacity	: 25482.42 [Lb]	Reference	: Sec. E3
Demand	: 1808.62 [Lb]	Ctrl Eq.	: D17 at 36.98%

Intermediate results	Unit	Value	Reference
Factored axial compression capacity(P_n/Ω):	[Lb]	28988.63	Sec. E2
Factored axial compression distortional buckling capacity(P_n/Ω):	[Lb]	33136.75	Sec. E4
Factored local buckling strength(P_n/Ω):	[Lb]	25482.42	Sec. E3

Flexural Design ✔

Bending about major axis, M33

Ratio	: 0.50		
Capacity	: 7115.26 [Lb*ft]	Reference	: Sec. F4
Demand	: 3563.16 [Lb*ft]	Ctrl Eq.	: D17 at 86.98%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(M_n/Ω):	[Lb*ft]	7629.31	Sec. F2
Factored moment distortional buckling capacity(M_n/Ω):	[Lb*ft]	7115.26	Sec. F4
Factored local buckling strength(M_n/Ω):	[Lb*ft]	7557.94	Sec. F3

Bending about the minor axis 22

Ratio	: 0.13		
Capacity	: 1452.06 [Lb*ft]	Reference	: Sec. F2
Demand	: 184.81 [Lb*ft]	Ctrl Eq.	: D7 at 66.27%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(M_n/Ω):	[Lb*ft]	1452.06	Sec. F2
Factored local buckling strength(M_n/Ω):	[Lb*ft]	1452.06	Sec. F3

Web Crippling Design ✔

Web crippling

Ratio	: 0.85		
Capacity	: 5024.13 [Lb]	Reference	: Sec. G5
Demand	: 4248.93 [Lb]	Ctrl Eq.	: D28 at 9.16%

Intermediate results	Unit	Value	Reference
Factored web crippling capacity(P_n/Ω):	[Lb]	5024.13	Sec. G5

Combined Actions Design ✔

Combined bending and web crippling interaction

Ratio	: 0.35		
Ctrl Eq.	: D17 at 86.98%	Reference	: Sec. H3

Intermediate results	Unit	Value	Reference

Combined bending and shear interaction

Ratio	: 0.48		
Ctrl Eq.	: D17 at 86.98%	Reference	: Sec. H2

Intermediate results	Unit	Value	Reference
Combined bending and shear interaction (x-x):	--	0.48	Sec. H2
Combined bending and shear interaction(y-y):	--	0.04	

Combined bending and tension interaction

Ratio	:	0.54			
Ctrl Eq.	:	D17 at 86.98%	Reference	:	Eq. H1.1-2

Intermediate results	Unit	Value	Reference
Combined tensile axial and bending (flexure with tension yielding):	--	0.48	Eq. H1.1-1
Combined tensile axial and bending (flexure with buckling):	--	0.54	Eq. H1.1-2

Combined bending and compression interaction

Ratio	:	0.59			
Ctrl Eq.	:	D17 at 86.98%	Reference	:	Eq. H1.2-1

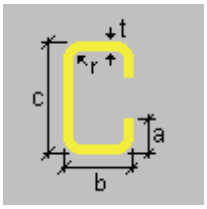
Intermediate results	Unit	Value	Reference
Combined bending and compression interaction:	--	0.59	Eq. H1.2-1

Member : 339 (Knee Brace) - OK

Section information

Section name: Std. Titan Knee Brace - 3 x 2 x 0.078 **(US)**

Dimensions



a	=	0.630	[in]	Lip
b	=	2.000	[in]	Flange width
c	=	3.000	[in]	Depth
r	=	0.141	[in]	Inside bend radius
t	=	0.078	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	0.594	
Moment of Inertia (local axes) (I)	[in4]	0.871	0.333
Moment of Inertia (principal axes) (I')	[in4]	0.871	0.333
Bending constant for moments (principal axis) (J')	[in]	0.000	2.304
Radius of gyration (local axes) (r)	[in]	1.211	0.749
Radius of gyration (principal axes) (r')	[in]	1.211	0.749
Saint-Venant torsion constant. (J)	[in4]	0.001	
Section warping constant. (Cw)	[in6]	0.845	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	-1.909	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.581	0.273
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.581	0.427
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.581	0.273
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.581	0.427
Plastic section modulus (local axis) (Z)	[in3]	0.672	0.396
Plastic section modulus (principal axis) (Z')	[in3]	0.672	0.396
Polar radius of gyration. (ro)	[in]	2.381	
Area for shear (Aw)	[in2]	0.300	0.320

Torsional constant. (C)	[in3]	0.016

Material : A653 SS 80-1

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	80000.00
Tensile strength (Fu):	[Lb/in2]	82000.00
Elasticity Modulus (E):	[Lb/in2]	2.95E07
Shear modulus for steel (G):	[Lb/in2]	1.134615E07

Design Criteria

Description	Unit	Major axis	Minor axis
Additional hypotheses			
Full lateral restraints		No	
Continuous flexural torsional restraint		No	
Local axis design		Yes	
Region between inflection points adjacent to support		No	
Span type		Simple	
Fastened to support		Unfastened	
Local shear		No	
Braced for sidesway in major axis		No	
Braced for sidesway in minor axis		No	
Loading condition		EOF	
Flange support condition		Fastened	

Member lateral unbraced lengths

Length (Lb) [in]		Restraint arrangement		Rotation restraint	
Top	Bottom	Top	Bottom	Top	Bottom
102.75	102.75	FF	FF	None	None

Compression member unbraced lengths

Length (L) [in]			Effective length factor (ke)		
Major axis	Minor axis		Major axis	Minor axis	
102.75	102.75	102.75	0.00	0.00	1.0

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	: 0.11		
Capacity	: 24337.19 [Lb]	Reference	: Sec. D3
Demand	: 2625.78 [Lb]	Ctrl Eq.	: D30 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	28435.45	Sec. D2
Factored axial tensile fracture capacity(P_n/Ω):	[Lb]	24337.19	Sec. D3

Shear Design

Shear in major axis 33

Ratio	:	0.00		
Capacity	:	7310.16 [Lb]	Reference	: Sec. G2
Demand	:	0.00 [Lb]	Ctrl Eq.	: D7 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	7310.16	Sec. G2

Shear in minor axis 22

Ratio	:	0.00		
Capacity	:	5995.08 [Lb]	Reference	: Sec. G2
Demand	:	0.00 [Lb]	Ctrl Eq.	: D11 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	5995.08	Sec. G2

Axial Compression Design

Axial compression

Ratio	:	0.82		
Capacity	:	2705.86 [Lb]	Reference	: Sec. E2
Demand	:	2207.62 [Lb]	Ctrl Eq.	: D23 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial compression capacity(P_n/Ω):	[Lb]	2705.86	Sec. E2
Factored axial compression distortional buckling capacity(P_n/Ω):	[Lb]	21111.11	Sec. E4
Factored local buckling strength(P_n/Ω):	[Lb]	2705.86	Sec. E3

Flexural Design

Bending about major axis, M33

Ratio	:	0.00		
Capacity	:	927.09 [Lb*ft]	Reference	: Sec. F2
Demand	:	0.00 [Lb*ft]	Ctrl Eq.	: D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(M_n/Ω):	[Lb*ft]	2317.74	Sec. F2
Factored lateral-torsional buckling strength(M_n/Ω):	[Lb*ft]	927.09	Sec. F2
Factored moment distortional buckling capacity(M_n/Ω):	[Lb*ft]	2101.38	Sec. F4
Factored local buckling strength(M_n/Ω):	[Lb*ft]	927.09	Sec. F3

Bending about the minor axis 22

Ratio	:	0.00			
Capacity	:	1090.14 [Lb*ft]	Reference	:	Sec. F2
Demand	:	0.00 [Lb*ft]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(M_n/Ω):	[Lb*ft]	1090.14	Sec. F2
Factored local buckling strength(M_n/Ω):	[Lb*ft]	1090.14	Sec. F3

Web Crippling Design ✔

Web crippling

Ratio	:	0.00			
Capacity	:	799.58 [Lb]	Reference	:	Sec. G5
Demand	:	0.00 [Lb]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored web crippling capacity(P_n/Ω):	[Lb]	799.58	Sec. G5

Combined Actions Design ✔

Combined bending and web crippling interaction

Ratio	:	0.00			
Ctrl Eq.	:	D1 at 0.00%	Reference	:	Sec. H3

Intermediate results	Unit	Value	Reference

Combined bending and shear interaction

Ratio	:	0.00			
Ctrl Eq.	:	D7 at 0.00%	Reference	:	Sec. H2

Intermediate results	Unit	Value	Reference
Combined bending and shear interaction (x-x):	--	0.00	
Combined bending and shear interaction(y-y):	--	0.00	Sec. H2

Combined bending and tension interaction

Ratio	:	0.11			
Ctrl Eq.	:	D30 at 0.00%	Reference	:	Eq. H1.1-1

Intermediate results	Unit	Value	Reference
Combined tensile axial and bending (flexure with tension yielding):	--	0.11	Eq. H1.1-1
Combined tensile axial and bending (flexure with buckling):	--	-0.11	

Combined bending and compression interaction

Ratio	:	0.82			
Ctrl Eq.	:	D23 at 0.00%	Reference	:	Eq. H1.2-1

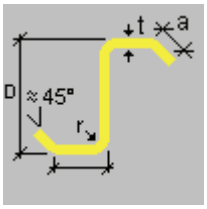
Intermediate results	Unit	Value	Reference
Combined bending and compression interaction:	--	0.82	Eq. H1.2-1

Member : 350 (OG - Zee - 3) - OK

Section information

Section name: Std. Big Zee - 6 x 3 x 0.055 **(US)**

Dimensions



a	=	1.000	[in]	Lip
b	=	3.000	[in]	Flange width
D	=	6.000	[in]	Depth
r	=	0.187	[in]	Inside bend radius
t	=	0.055	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	0.748	
Moment of Inertia (local axes) (I)	[in4]	4.452	2.135
Moment of Inertia (principal axes) (I')	[in4]	4.452	2.135
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	2.439	1.689
Radius of gyration (principal axes) (r')	[in]	2.439	1.689
Saint-Venant torsion constant. (J)	[in4]	7.70E-04	
Section warping constant. (Cw)	[in6]	12.653	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	1.484	0.577
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	1.484	0.577
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	1.484	0.577
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	1.484	0.577
Plastic section modulus (local axis) (Z)	[in3]	1.696	0.837
Plastic section modulus (principal axis) (Z')	[in3]	1.696	0.837
Polar radius of gyration. (ro)	[in]	2.967	
Area for shear (Aw)	[in2]	0.557	0.475
Torsional constant. (C)	[in3]	0.014	

Material : A653 SS 80-1

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	80000.00
Tensile strength (Fu):	[Lb/in2]	82000.00
Elasticity Modulus (E):	[Lb/in2]	2.95E07
Shear modulus for steel (G):	[Lb/in2]	1.134615E07

Design Criteria

Description	Unit	Major axis	Minor axis
Additional hypotheses			
Full lateral restraints		No	
Continuous flexural torsional restraint		No	
Local axis design		Yes	
Region between inflection points adjacent to support		No	
Span type		Simple	
Fastened to support		Unfastened	
Local shear		No	
Braced for sidesway in major axis		Yes	
Braced for sidesway in minor axis		Yes	
Loading condition		EOF	
Flange support condition		Fastened	
Bearing length	[in]	3.00	

Member lateral unbraced lengths

Length (Lb) [in]		Restraint arrangement		Rotation restraint	
Top	Bottom	Top	Bottom	Top	Bottom
168.00	168.00	FF	FF	None	None

Compression member unbraced lengths

Length (L) [in]			Effective length factor (ke)		
Major axis	Minor axis		Major axis	Minor axis	
44.65	168.00	44.65	0.00	0.00	1.0

Design Checks

Axial Tension Design ✔

Axial tension

Ratio : 0.00
Capacity : 30673.98 [Lb]
Demand : 15.61 [Lb]
Reference : Sec. D3
Ctrl Eq. : D19 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	35839.32	Sec. D2
Factored axial tensile fracture capacity(P_n/Ω):	[Lb]	30673.98	Sec. D3

Shear Design ✔

Shear in major axis 33

Ratio : 0.04
Capacity : 8054.03 [Lb]
Demand : 297.16 [Lb]
Reference : Sec. G2
Ctrl Eq. : D2 at 100.00%

Intermediate results	Unit	Value	Reference

Factored shear capacity(V_n/Ω):	[Lb]	8054.03	Sec. G2

Shear in minor axis 22

Ratio	: 0.40		
Capacity	: 2684.57 [Lb]	Reference	: Sec. G2
Demand	: -1072.17 [Lb]	Ctrl Eq.	: D28 at 100.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	2684.57	Sec. G2

Axial Compression Design

Axial compression

Ratio	: 0.00		
Capacity	: 8254.48 [Lb]	Reference	: Sec. E3
Demand	: 10.81 [Lb]	Ctrl Eq.	: D28 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial compression capacity(P_n/Ω):	[Lb]	10732.77	Sec. E2
Factored axial compression distortional buckling capacity(P_n/Ω):	[Lb]	15049.54	Sec. E4
Factored local buckling strength(P_n/Ω):	[Lb]	8254.48	Sec. E3

Flexural Design

Bending about major axis, M33

Ratio	: 0.56		
Capacity	: 3468.05 [Lb*ft]	Reference	: Sec. F4
Demand	: -1959.38 [Lb*ft]	Ctrl Eq.	: D28 at 100.00%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(M_n/Ω):	[Lb*ft]	5923.85	Sec. F2
Factored lateral-torsional buckling strength(M_n/Ω):	[Lb*ft]	4966.99	Sec. F2
Factored moment distortional buckling capacity(M_n/Ω):	[Lb*ft]	3468.05	Sec. F4
Factored local buckling strength(M_n/Ω):	[Lb*ft]	3942.74	Sec. F3

Bending about the minor axis 22

Ratio	: 0.37		
Capacity	: 1918.79 [Lb*ft]	Reference	: Sec. F3
Demand	: -701.70 [Lb*ft]	Ctrl Eq.	: D2 at 100.00%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(M_n/Ω):	[Lb*ft]	2304.60	Sec. F2
Factored local buckling strength(M_n/Ω):	[Lb*ft]	1918.79	Sec. F3

Web Crippling Design ✔

Web crippling

Ratio	:	0.08			
Capacity	:	1176.43 [Lb]	Reference	:	Sec. G5
Demand	:	97.35 [Lb]	Ctrl Eq.	:	D28 at 26.58%

Intermediate results	Unit	Value	Reference
Factored web crippling capacity(P_n/Ω):	[Lb]	1176.43	Sec. G5

Combined Actions Design ✔

Combined bending and web crippling interaction

Ratio	:	0.20			
Ctrl Eq.	:	D28 at 100.00%	Reference	:	Sec. H3

Intermediate results	Unit	Value	Reference

Combined bending and shear interaction

Ratio	:	0.60			
Ctrl Eq.	:	D28 at 100.00%	Reference	:	Sec. H2

Intermediate results	Unit	Value	Reference
Combined bending and shear interaction (x-x):	--	0.60	Sec. H2
Combined bending and shear interaction(y-y):	--	0.28	

Combined bending and tension interaction

Ratio	:	0.85			
Ctrl Eq.	:	D28 at 100.00%	Reference	:	Eq. H1.1-2

Intermediate results	Unit	Value	Reference
Combined tensile axial and bending (flexure with tension yielding):	--	0.57	Eq. H1.1-1
Combined tensile axial and bending (flexure with buckling):	--	0.85	Eq. H1.1-2

Combined bending and compression interaction

Ratio	:	0.85			
Ctrl Eq.	:	D28 at 100.00%	Reference	:	Eq. H1.2-1

Intermediate results	Unit	Value	Reference
Combined bending and compression interaction:	--	0.85	Eq. H1.2-1

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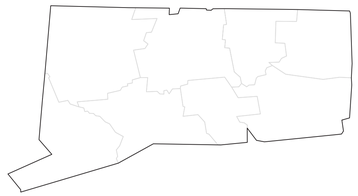
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ANNE M. GRASSER
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PROFESSIONAL ENGINEER
06/12/2026

SOLAR PHOTOVOLTAIC GROUND MOUNT

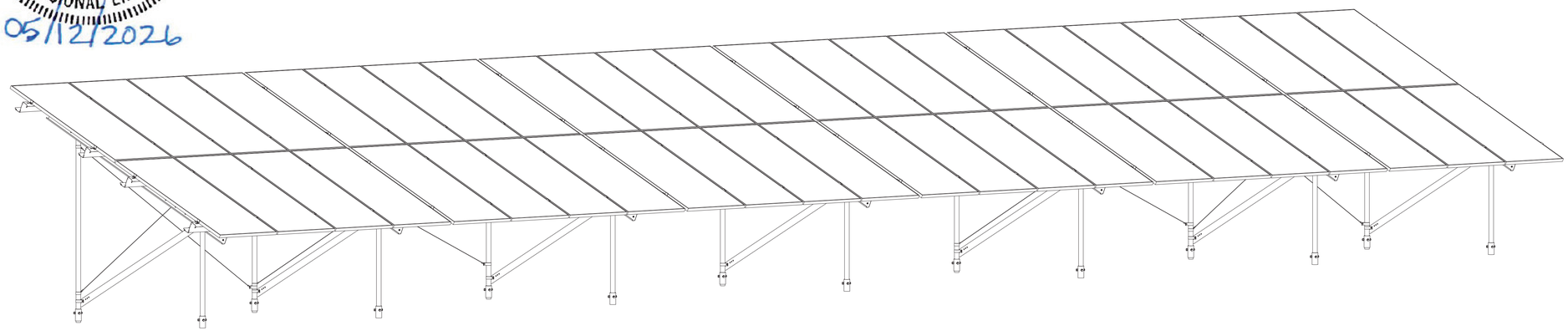


IMAGE FOR REFERENCE ONLY

SHEET INDEX		
STRUCTURAL		
S-000	B	STRUCTURAL COVER
S-100	B	RACKING OVERVIEW
S-300	A	STRUCTURAL COMPONENTS
S-400	A	CONNECTIONS
S-500	B	STRUCTURAL PURLINS
S-600	B	CLAMPS & BRACES

GOVERNING STRUCTURAL CODE/S

2021 INTERNATIONAL BUILDING CODE

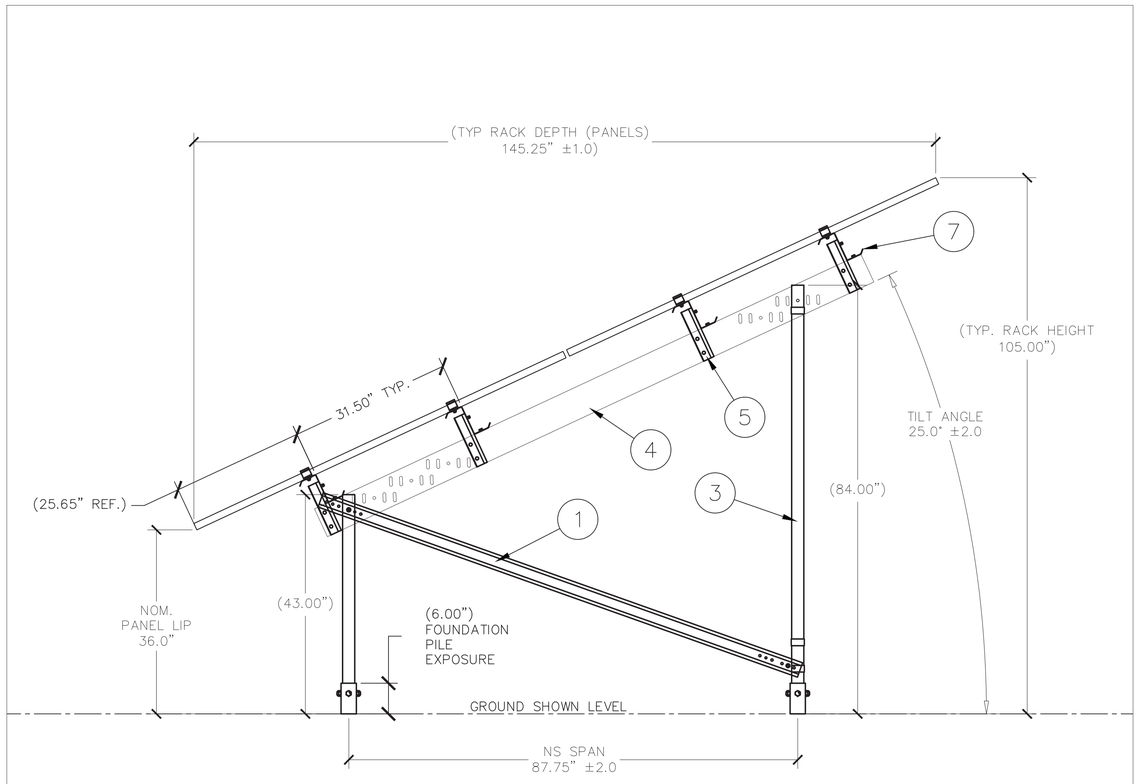
PACKAGE COVERAGE – LOADING AND SETUP RANGES & CONSTANTS

TILT ANGLES:	25°
MAX GROUND SNOW LOAD (PSF):	30
MIN FLAT ROOF SNOW LOAD (PSF):	30
MAX WIND LOADS (MPH):	113
WIND EXPOSURE CATEGORY:	C
MAX SEISMIC Ss:	0.187 g
MAX SEISMIC S1:	0.054 g

PV MODULE: FIRST SOLAR SERIES 6+ OR SIMILAR

MAX. PANEL WIDTH:	49.02"
MAX. PANEL LENGTH:	79.69"
MAX. PANEL HEIGHT:	2.00"
MAX. PANEL WEIGHT:	75 LBS
RISK CATEGORY:	I
MAX FRONT LIP CLEARANCE:	42"

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NOTES: PV MODULE & MODULE RELATED DIMENSIONS THIS DETAIL ARE MAX ALLOWABLE, UNLESS SPECIFIED ELSEWHERE IN THIS PACKET.
DIMENSIONS TO GROUND ARE NOMINAL FROM LEVEL GROUND.

C1 | PROFILE VIEW: RACK OVERVIEW

PARTS LIST (BALLOONS THIS SHEET)

ITEM	DESCRIPTION	SHAPE	DETAIL / SHEET
1	KNEE BRACE	CEE	B2 / S.300
3	FOUNDATION POST	POST	A6 / S.300
4	NS CHORD	CEE	D1 / S.300
5	ROLL BAR	MIXED	A4 / S.300
6	TRANSVERSE BRACE	HAT	D5 / S.600
7	ZEE PURLIN	ZEE	E1 / S.300
8	CABLE BRACE	CABLE	D4/ S.600

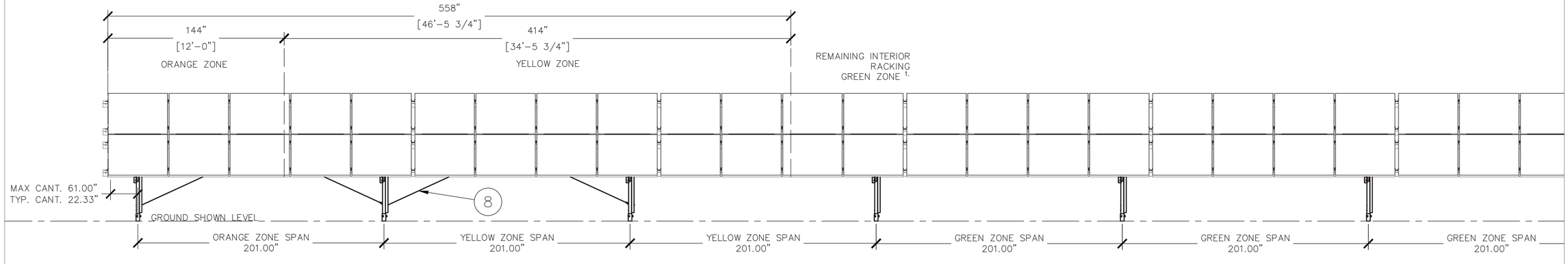
SEE VIEW A1 ON S600 FOR VIEW OF TRANSVERSE BRACE

NOTES:

1. STANDARD FRONT LIP HEIGHT AND TILT ANGLES MEASURED FROM LEVEL GROUND
2. FOUNDATION TESTING, WHERE REQUIRED, SHALL BE DONE ACCORDING TO THE "QUICK TEST METHOD" PER ASTM D1143 & D3689.
3. PRINT DIMENSIONS: DIMENSIONS SHOWN REFLECT POST HEIGHTS ON LEVEL GROUND. ON UNEVEN TERRAIN, REAR FOUNDATION POST HEIGHT WILL BE DICTATED BY FRONT LIP HEIGHT, PANEL TILT, AND NORTH/SOUTH POST SPACING.
4. ADDITIONAL TOLERANCES: POST PLUMBNESS SHOULD BE WITHIN ±2°
5. SPECIAL INSPECTIONS (WHERE REQUIRED):

SPECIAL INSPECTIONS ARE NOT REQUIRED BY APA SOLAR OR THE STRUCTURAL ENGINEER OF RECORD, THE JDI GROUP, WHERE REQUIRED BY OWNER, CUSTOMER, AND/OR AUTHORITY HAVING JURISDICTION, MINIMUM INSPECTION SHALL FOLLOW IBC OR LOCAL AHJ SPECIAL INSPECTIONS GUIDELINES.

*IMAGE REFERENCE ONLY.SHOWS STRUCTURAL MAXIMUMS. NOT INDICATIVE OF REQUIRED QUANTITIES.PLEASE REFER TO SITE SPECIFIC BUILD PLANS FOR SITE SPECIFIC REQUIRED SPANS/QUANTITIES.



NOTES: MAX CANTILEVER MEASURED FROM EDGE OF PANEL TO POST CENTER.
MAX SPAN MEASURED FROM PILE CENTER TO PILE CENTER.
POST QUANTITY AS REQUIRED TO SATISFY CANTILEVERS, SPANS, ROW LENGTH, & PANEL QUANTITY
1. WHERE ALLOWABLE PER THE CALCULATIONS PACKAGE. EXTERIOR/CORNER AREAS SHALL REMAIN ZONED YELLOW. SEE EXPLAINATION IN CALC PACKAGE.
SITE SPECIFIC BUILD PLANS SHALL DESIGNATE EXTERIOR/CORNER SPANS.

A1 | ELEVATION VIEW FROM FRONT (NORTH-FACING)

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PROFESSIONAL ENGINEER
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A	INITIAL RELEASE	4/23/2026
B	UPDATED DESIGN	5/4/206

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SHEET NAME: RACKING OVERVIEW

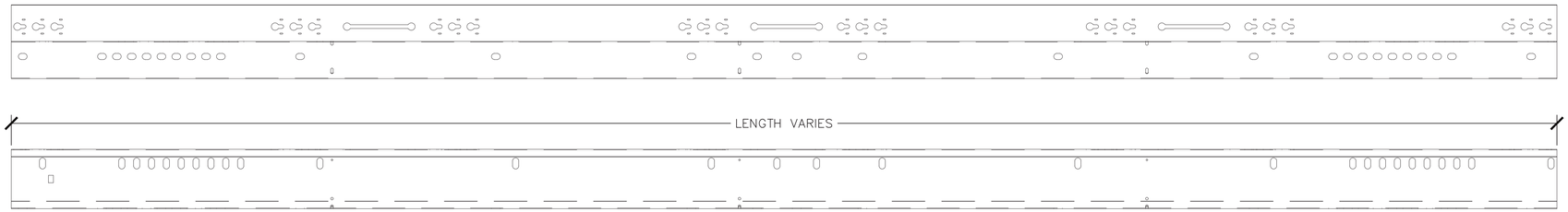
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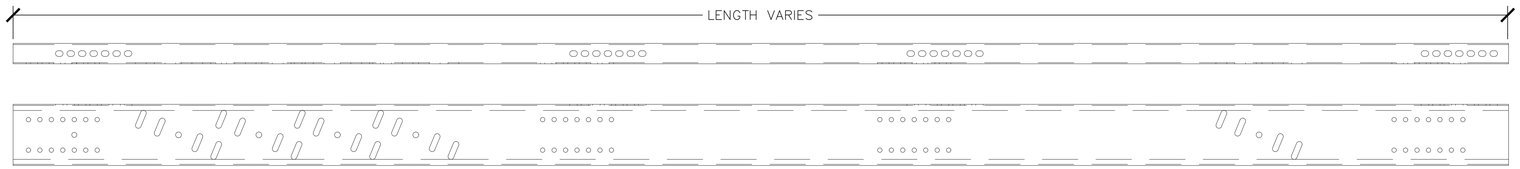
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K:\projects\apa solar tx\apa - projects 2026 - docs\260234 plainfield, ct (plainfield solar xxx, wendy's engineering)\1) design and structural analysis\apa solar - 260234 - plainfield, ct - rev4 - unstamped.dwg

IMAGE FOR REFERENCE ONLY



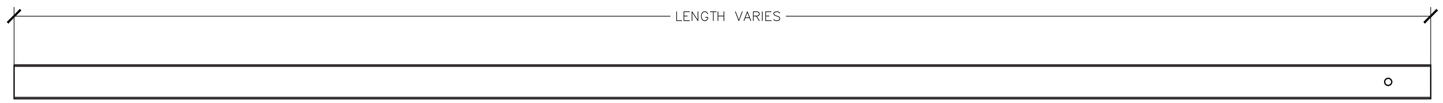
E1 | SIDE/TOP: ZEE PURLIN

IMAGE FOR REFERENCE ONLY



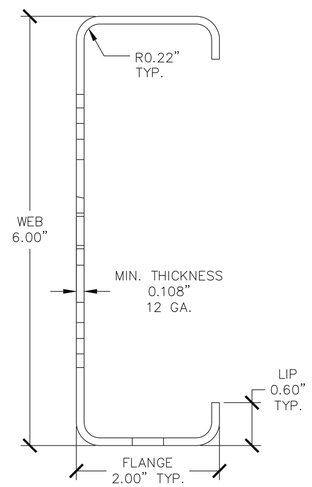
D1 | SIDE/TOP: NS CHORD

IMAGE FOR REFERENCE ONLY



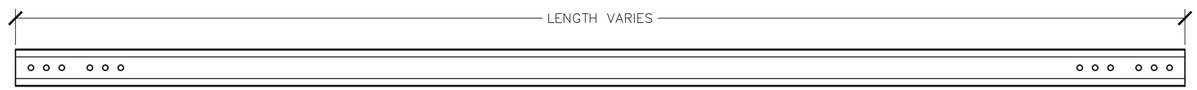
C1 | SIDE: FOUNDATION POST

MATERIAL: A653 HSLAS
STRENGTH: MIN. YIELD (Fy): 80 KSI.



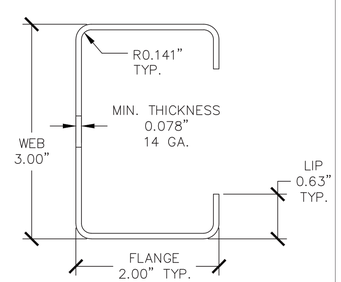
A1 | PROFILE: NS CHORD

IMAGE FOR REFERENCE ONLY



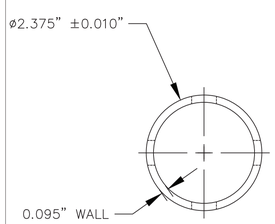
B2 | SIDE: KNEE BRACE

MATERIAL: A653 SS GR 80 CL1
STRENGTH: MIN. YIELD (Fy): 80 KSI.



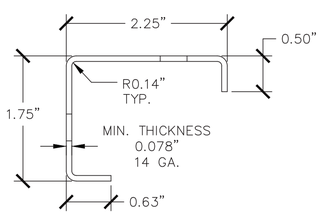
A2 | PROFILE: KNEE BRACE

MATERIAL: A570 CF STR. STL.
STRENGTH: MIN. YIELD (Fy): 50 KSI.

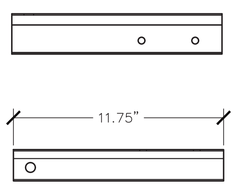


A3 | PROFILE: FOUNDATION POST

MATERIAL: A572 CF STR. STL.
STRENGTH: MIN. YIELD (Fy): 30 KSI.

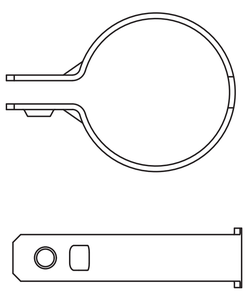


A4 | PROFILE: ROLL BAR



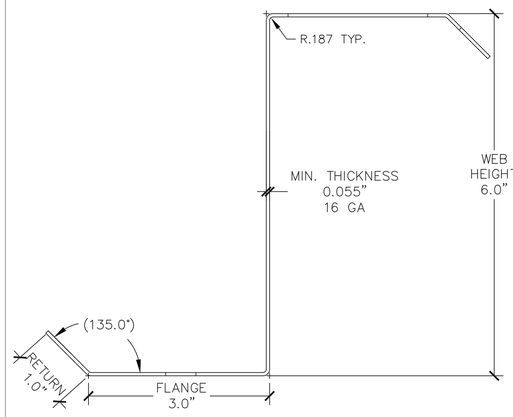
A5 | SIDE/TOP: ROLL BAR

IMAGE FOR REFERENCE ONLY



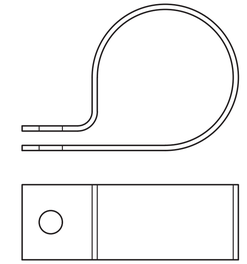
A6 | SIDE: CABLE BRACE CLAMP

MATERIAL: A653 STR. STL.
STRENGTH: MIN. YIELD (Fy): 80 KSI.



D5 | PART: ZEE PURLIN

IMAGE FOR REFERENCE ONLY



B6 | SIDE: KNEE BRACE CLAMP

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0039452
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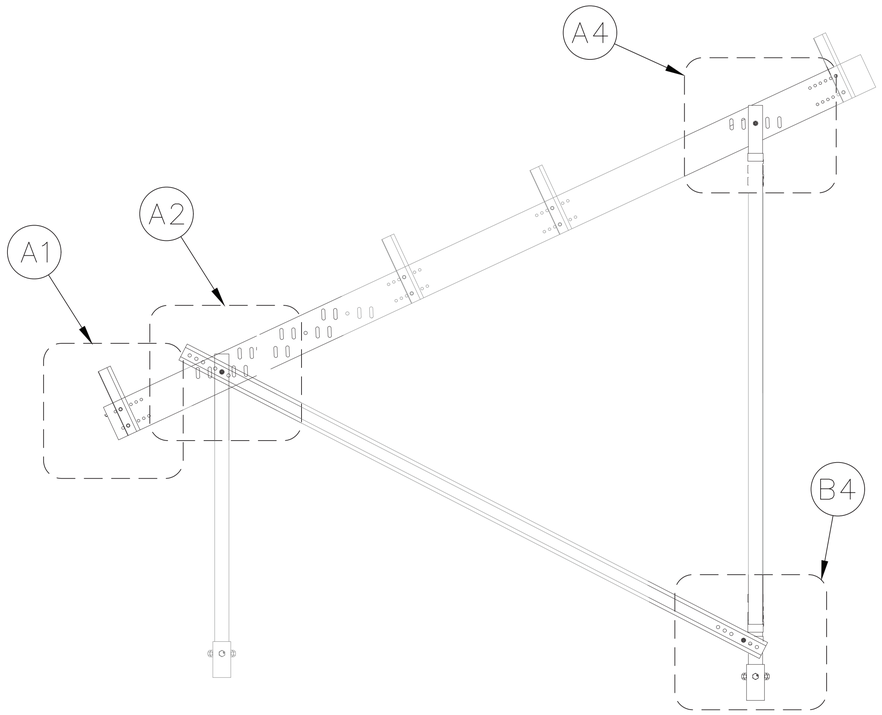
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B1 | FOUNDATION SET CONNECTIONS OVERVIEW

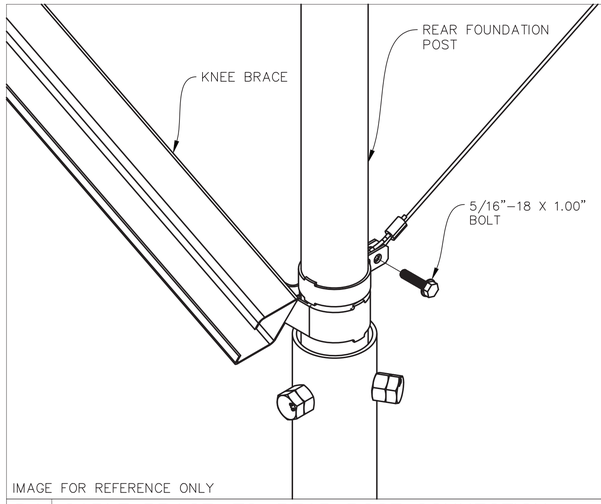
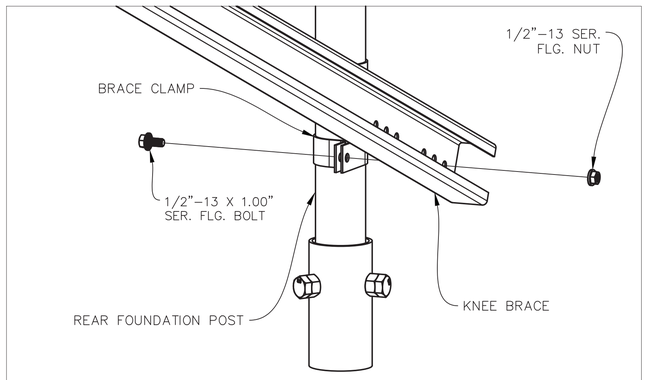


IMAGE FOR REFERENCE ONLY

D4 | CABLE BRACE–TO–REAR POST CONNECTION



*MIN. CONNECTION TORQUE: 40 FT–LBS

B4 | KNEE BRACE–TO–REAR POST

NOTES:

1. HARDWARE TORQUE VALUES:
   - 1A. ROLL BAR–TO–NS CHORD CONNECTION (VIEW A1)

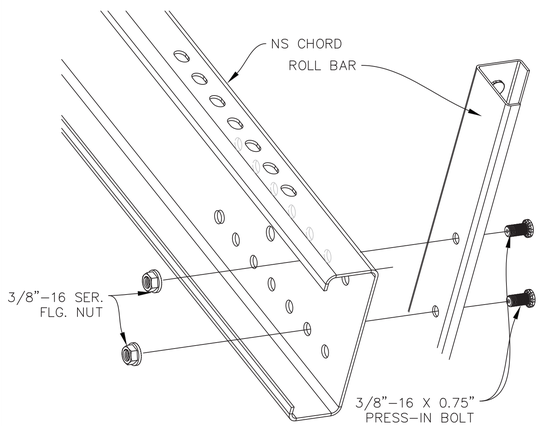
     3/8"–16 STAINLESS STEEL
     MIN.: 17.5 FT–LBS
     NOM.: 19.6 FT–LBS
     MAX.: 50.0 FT–LBS
   - 1B. KNEE BRACE–TO–REAR POST CONNECTION (VIEW B4)

     1/2"–13 CARBON STEEL GRADE 5 OR BETTER
     MIN.: 40 FT–LBS
   - 1C. KNEE BRACE–TO–FRONT POST CONNECTION (VIEW A2)

     REAR POST–TO–NS CHORD CONNECTION (VIEW A4)

     1/2"–13 CARBON STEEL GRADE 5 OR BETTER
     MIN.: 25 FT–LBS
2. DEPICTED HARDWARE AND PART PLACEMENT NOT INDICATIVE OF PREFERRED OR REQUIRED POSITIONS.
3. HOLE/SLOT PATTERNS IN PARTS ALLOW FOR DEVIATION FROM NOMINAL DIMENSIONS, MULTIPLE PART POSITIONS, AND MULTIPLE TILT ANGLES.
4. SEE INSTALLATION MANUAL FOR SETUP INSTRUCTIONS.
5. SERRATED FLANGED BOLTS MAY BE REPLACED WITH EQUIVALENT PRESS–IN BOLTS. SEE NOTE 10 FOR MORE OPTIONS.
6. PRESS–IN BOLTS, WHERE PRESENT, TO BE INSTALLED TO MANUFACTURERS RECOMMENDED VALUES.
7. OTHER SPECIFIC CONNECTIONS ELSEWHERE IN PRINT SET.
8. ROLL BAR MUST CONNECT TO THE CORRECT HOLES IN CEE CHANNEL (INNER, OR OUTER TYPICALLY), AS DETERMINED BY PV MODULE MANUFACTURERS ALLOWABLE CLAMPING ZONE.
9. USE CORRECT NOMINAL HOLES IN CEE TO CONNECT TO FOUNDATION POST, AS INDICATED. ADJACENT HOLES AND SLOTS FOR FIELD ADJUSTMENTS.
10. SERRATED HARDWARE MAY BE REPLACED WITH EQUIVALENT HARDWARE WITH WASHERS IF NECESSARY.
11. IN ALL DETAILS, THE PRESENCE OF TWO SETS OF HARDWARE INDICATES THE REQUIREMENT OF TWO SETS OF HARDWARE.
12. STAINLESS STEEL HARDWARE MAY BE REPLACED WITH GALVANIZED STEEL HARDWARE OR CORROSION AND STRENGTH COMPARABLE HARDWARE MATERIALS AND FINISHES.
13. UNLESS NOTED OTHERWISE, ALL HARDWARE MAY BE INSTALLED IN EITHER DIRECTION (NUT/BOLT MAY BE ON EITHER SIDE OF CONNECTION).
14. WHEN NECESSARY, ADDITIONAL HOLES MAY BE DRILLED TO COMPLETE CONNECTION. ENGINEERING SHALL BE CONTRACTED PRIOR TO FIELD MODIFICATIONS OF PARTS.

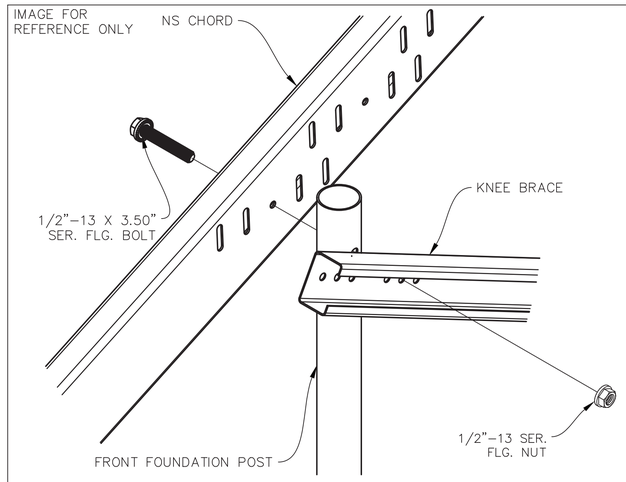
IMAGE FOR REFERENCE ONLY
ATTACHED TO OUTER HOLE SET FOR REFERENCE ONLY. SEE NOTES.



*MIN. CONNECTION TORQUE: 17.5 FT–LBS

A1 | CONNECTION: ROLL BAR–TO–NS CHORD

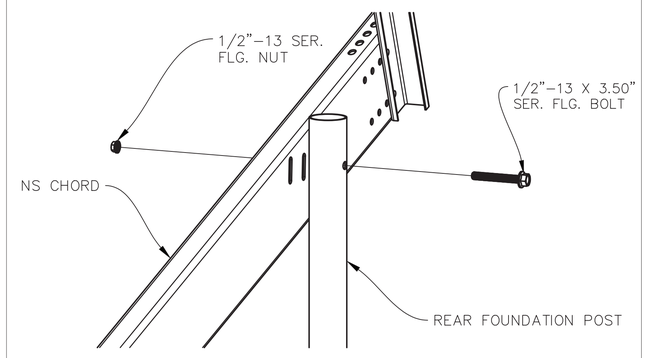
IMAGE FOR REFERENCE ONLY



*MIN. CONNECTION TORQUE: 25 FT–LBS

A2 | CONNECTION: KNEE BRACE–TO–FRONT POST

IMAGE FOR REFERENCE ONLY



*MIN. CONNECTION TORQUE: 25 FT–LBS

A4 | CONNECTION: REAR POST–TO–NS CHORD

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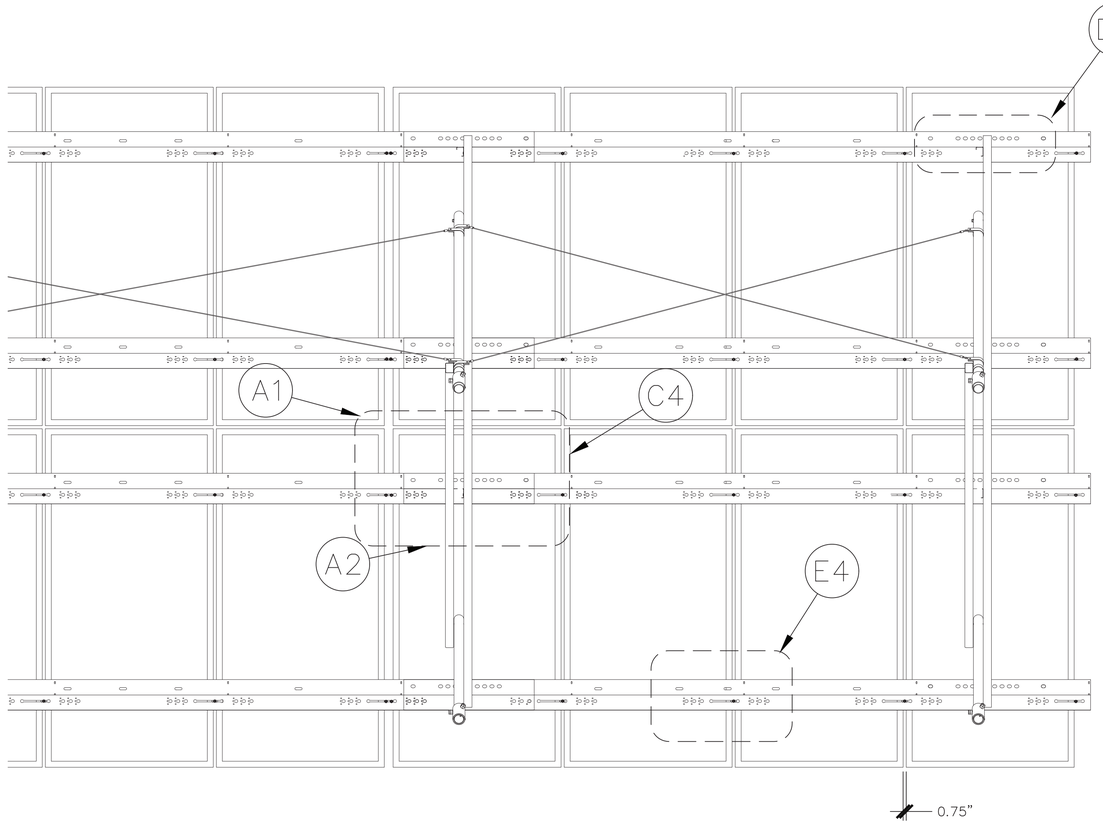
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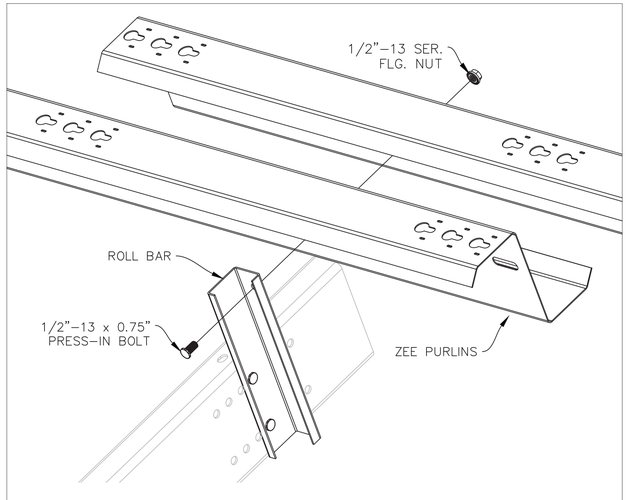
DRAWING NUMBER: S.400 | REV.: A

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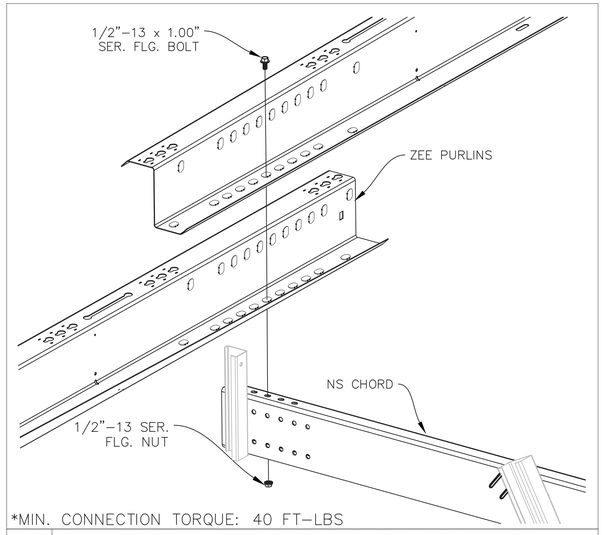


B1 | OVERVIEW: ZEE PURLIN CONNECTIONS (RACK UNDERSIDE)



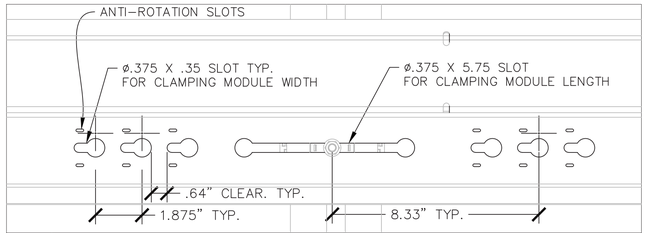
*MIN. CONNECTION TORQUE: 40 FT–LBS

A1 | CONNECTION: ZEE PURLINS–TO–ROLL BAR

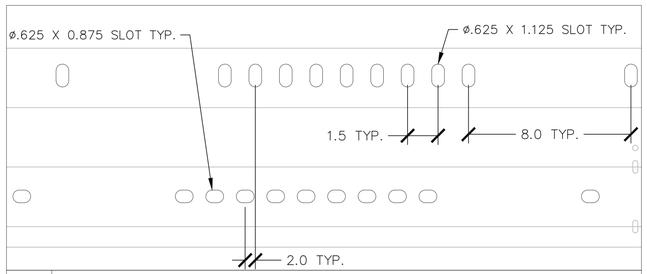


*MIN. CONNECTION TORQUE: 40 FT–LBS

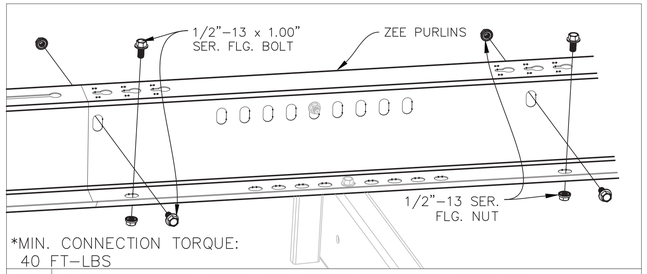
A2 | CONNECTION: ZEE PURLINS–TO–NS CHORD



E4 | DETAIL: ZEE PURLIN PANEL SLOTS



D4 | DETAIL: ZEE PURLIN SPLICE SLOTS



*MIN. CONNECTION TORQUE: 40 FT–LBS

C4 | CONNECTION: ZEE–TO–ZEE PURLINS SPLICE

NOTES:

1. HARDWARE TORQUE VALUES FOR STRUCTURAL PURLIN VIEWS): A1, A2, & C4

   1/2"–13 CARBON STEEL GRADE 5 OR BETTER
   MIN.: 40 FT–LBS

2. DEPICTED HARDWARE AND PART PLACEMENT NOT INDICATIVE OF PREFERRED OR REQUIRED POSITIONS.
3. HOLE/SLOT PATTERNS IN PARTS ALLOW FOR DEVIATION FROM NOMINAL DIMENSIONS, MULTIPLE PART POSITIONS, AND MULTIPLE TILT ANGLES.
4. SEE INSTALLATION MANUAL FOR SETUP INSTRUCTIONS.
5. SERRATED FLANGED BOLTS MAY BE REPLACED WITH EQUIVALENT PRESS–IN BOLTS.
6. PRESS–IN BOLTS, WHERE PRESENT, TO BE INSTALLED TO MANUFACTURERS RECOMMENDED VALUES.
7. OTHER SPECIFIC CONNECTIONS ELSEWHERE IN PRINT SET.
8. SERRATED HARDWARE MAY BE REPLACED WITH EQUIVALENT HARDWARE WITH WASHERS IF NECESSARY.
9. IN ALL DETAILS, THE PRESENCE OF TWO SETS OF HARDWARE INDICATES THE REQUIREMENT OF TWO SETS OF HARDWARE.
10. STAINLESS STEEL HARDWARE MAY BE REPLACED WITH GALVANIZED STEEL HARDWARE OR CORROSION AND STRENGTH COMPARABLE HARDWARE MATERIALS AND FINISHES.
11. UNLESS NOTED OTHERWISE, ALL HARDWARE MAY BE INSTALLED IN EITHER DIRECTION (NUT/BOLT MAY BE ON EITHER SIDE OF CONNECTION).
12. WHEN NECESSARY, ADDITIONAL HOLES MAY BE DRILLED TO COMPLETE CONNECTION. ENGINEERING SHALL BE CONTRACTED PRIOR TO FIELD MODIFICATIONS OF PARTS.
13. CONNECTION IN DETAIL A1 & A2 SHOWN IN NOMINAL POSITION. ACTUAL CONNECTION MAY BE ±3".
14. WHEN CONNECTIONS IN DETAIL A1 & A2 ARE AT THEIR MAX/MIN POSITIONS (±2") INTERFERING SPLICE HARDWARE MAY BE RELOCATED TO NEXT NEAREST SLOTS.
15. WHERE PRESENT, TRANSVERSE BRACE MAY UTILIZE LOWER SPLICE BOLTS. SEE CONNECTIONS SHEET FOR MORE INFORMATION.
16. ZEE–TO–ZEE SPLICE SHALL ALWAYS OVERLAP MINIMUM 32", AS INDICATED, EXCEPT AT ENDS OF ROW, WHERE NO SPLICE IS REQUIRED.
17. SPLICE MAY OVERLAP IN EITHER DIRECTION.
18. ZEE PURLIN MATERIAL AND FINISH ARE MANUFACTURED TO SPECIFICATIONS THAT MEET OR EXCEED OUR STANDARD PRODUCT WARRANTY.
19. ZEE PURLINS GALVANIZED TO CONFORM TO A MINIMUM THICKNESS DESIGNATION EQUAL TO G90 OR INLINE GALVANIZED TO COMPARABLE THICKNESS AS PER ASTM A1057.
20. TYPICAL ZEE PURLIN RETURN LIP ANGLE SHOWN. ACTUAL ANGLE MAY VARY.
21. SLOT DIMENSIONS FOR REFERENCE ONLY. FINAL SHAPE, FREQUENCY, AND DIMENSIONS MAY VARY.
22. LENGTH OF PURLIN VARIES BY PROJECT AND LOCATION WITHIN ARRAY.

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05/12/2026

DOCUMENT NAME:
STRUCTURAL PRINT PACKAGE
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SITE CITY, STATE, ZIP:
PLAINFIELD, CT 06374

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REV.	DESCRIPTION	DATE
A	INITIAL RELEASE	4/23/2026
B	UPDATED DESIGN	5/4/2026

APPROVED

DRAWN	REVIEWED	APPROVED	SIZE
PL	PL	JDI	D

SHEET NAME
STRUCTURAL PURLINS

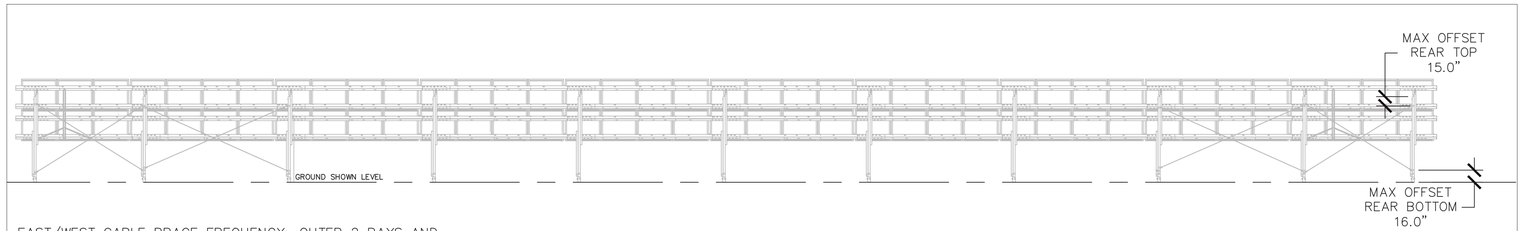
PROJECT NUMBER
260234.1

DRAWING NUMBER
S.500

REV.
B

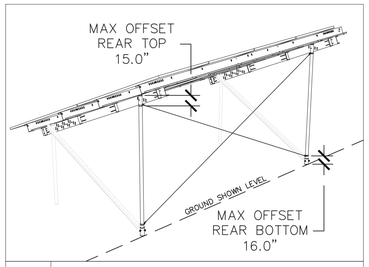
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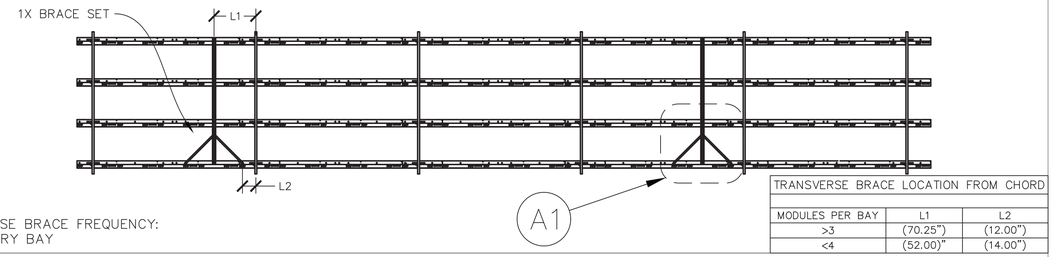


EAST/WEST CABLE BRACE FREQUENCY: OUTER 2 BAYS AND EVERY 7TH BAY.

E1 | REAR VIEW: CABLE BRACE FREQUENCY



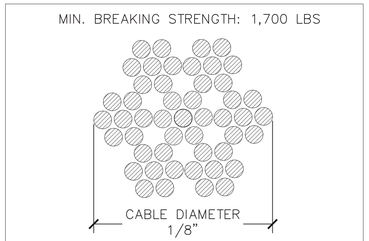
E5 | REAR ISO VIEW: CABLE PLACEMENT



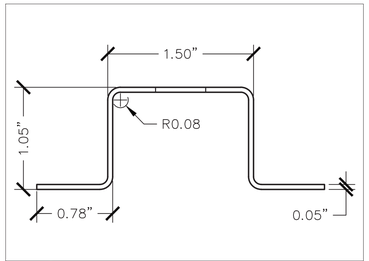
TRANSVERSE BRACE FREQUENCY:
100%, EVERY BAY

TRANSVERSE BRACE LOCATION FROM CHORD		
MODULES PER BAY	L1	L2
>3	(70.25")	(12.00")
<4	(52.00")	(14.00")

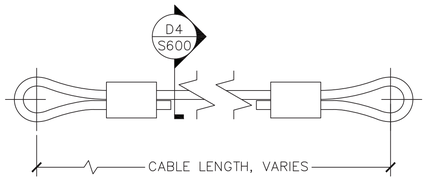
D1 | BOTTOM VIEW: TRANSVERSE BRACE LOCATIONS



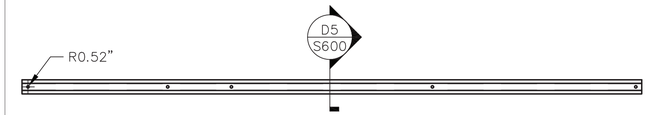
D4 | SEC.: CABLE BRACE



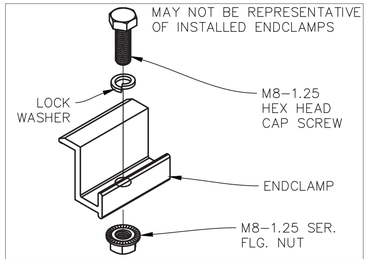
D5 | SECTION: TVS BRACE



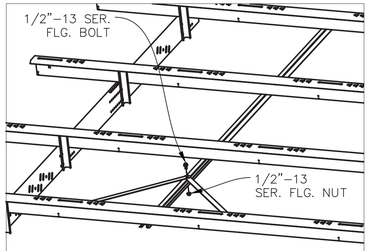
C1 | PART: CABLE BRACE



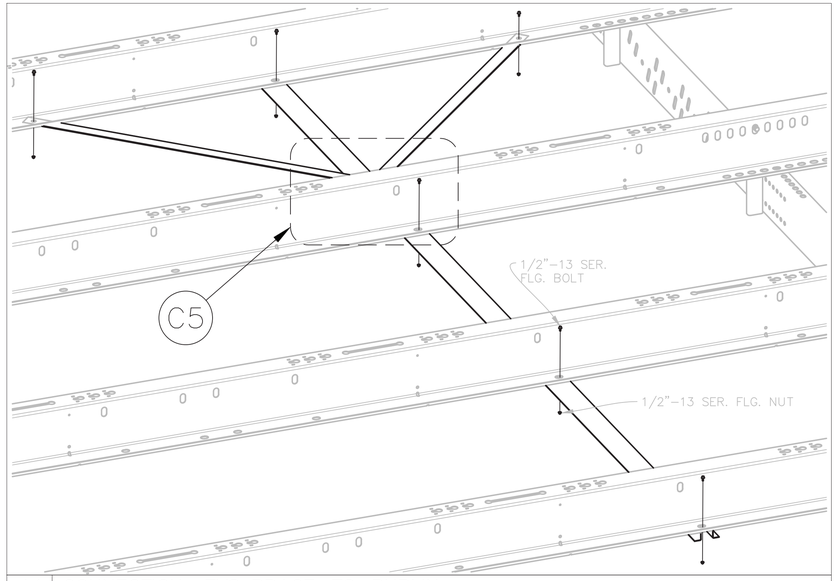
C2 | PART: TRANSVERSE BRACE (TVS BRACE)



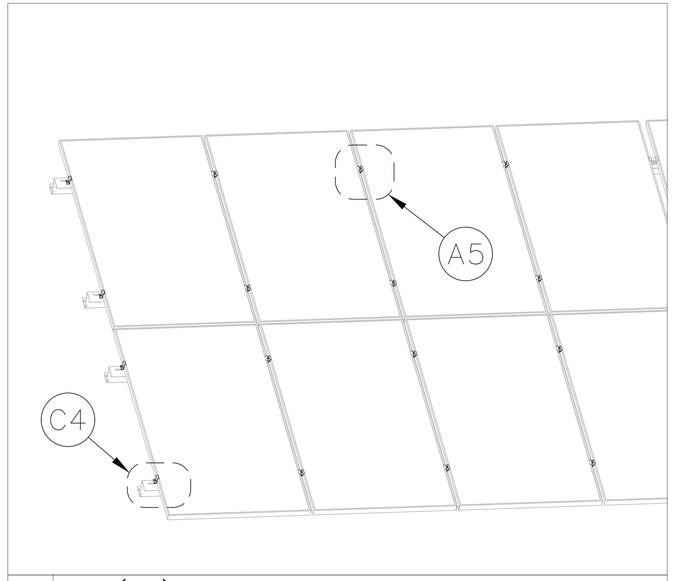
C4 | ASSEMBLY: ENDCLAMP



C5 | TVS BRACE ASSEMBLY

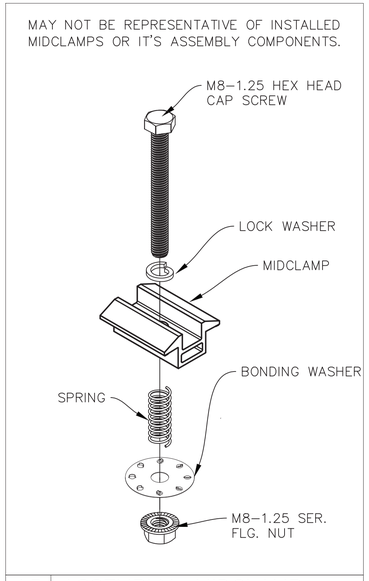


A1 | CONNECTION: TVS BRACE-TO-PURLIN



A3 | TOP (ISO) VIEW: PV CLAMP LOCATIONS

MAY NOT BE REPRESENTATIVE OF INSTALLED MIDCLAMPS OR IT'S ASSEMBLY COMPONENTS.



A5 | ASSEMBLY: MIDCLAMP

NOTES:

1. HARDWARE TORQUE VALUES:
   - 1A. TRANSVERSE BRACE CONNECTIONS (VIEWS A1 & C5)
     1/2"-13 CARBON STEEL GRADE 8 OR 5
     MIN.: 40 FT-LBS
   - 1B. FOR MID & END CLAMP CONNECTIONS (VIEWS A5 & C4)
     M8-1.25 STAINLESS STEEL
     MIN.: 14.0 FT-LBS
     NOM.: 15.6 FT-LBS
     MAX.: 25 FT-LBS
2. DEPICTED HARDWARE AND PART PLACEMENT NOT INDICATIVE OF PREFERRED OR REQUIRED POSITIONS.
3. HOLE/SLOT PATTERNS IN PARTS ALLOW FOR DEVIATION FROM NOMINAL DIMENSIONS, MULTIPLE PART POSITIONS, AND MULTIPLE TILT ANGLES.
4. SEE INSTALLATION MANUAL FOR SETUP INSTRUCTIONS.
5. SERRATED FLANGED BOLTS MAY BE REPLACED WITH EQUIVALENT PRESS-IN BOLTS. SEE NOTE 8 FOR MORE INFORMATION.
6. PRESS-IN BOLTS, WHERE PRESENT, TO BE INSTALLED TO MANUFACTURERS RECOMMENDED VALUES.
7. OTHER SPECIFIC CONNECTIONS ELSEWHERE IN PRINT SET.
8. SERRATED HARDWARE MAY BE REPLACED WITH EQUIVALENT HARDWARE WITH WASHERS IF NECESSARY.
9. STAINLESS STEEL HARDWARE MAY BE REPLACED WITH GALVANIZED STEEL HARDWARE OR CORROSION AND STRENGTH COMPARABLE HARDWARE MATERIALS AND FINISHES.
10. UNLESS NOTED OTHERWISE, ALL HARDWARE MAY BE INSTALLED IN EITHER DIRECTION (NUT/BOLT MAY BE ON EITHER SIDE OF CONNECTION).
11. WHEN NECESSARY, ADDITIONAL HOLES MAY BE DRILLED TO COMPLETE CONNECTION. ENGINEERING SHALL BE CONTRACTED PRIOR TO FIELD MODIFICATIONS OF PARTS.
12. EASE/WEST CABLE BRACING (C1) TO BE INSTALLED IN THE SPACE BETWEEN ANCHOR SETS (BAY).
13. MINIMUM CABLE BREAKING STRENGTH DETERMINED BY PROJECT SPECIFIC STRUCTURAL CALCULATIONS.
14. CABLE TO BE STAINLESS STEEL AIRCRAFT CABLE.
15. CABLE MAY BE OF ANY CONFIGURATION (IE. 7X7 OR 7X19) AS LONG AS IT MEETS THE REQUIREMENTS LISTED ON THIS SHEET.
16. LENGTH OF BRACES WILL VARY DEPENDENT ON PROJECT SPECIFICS.
17. TRANSVERSE BRACE SETS SHALL BE INSTALLED AT FREQUENCY INDICATED.
18. TRANSVERSE BRACES ARE NOT A REQUIREMENT OF THE STRUCTURAL MODELS. APA REQUIRES THEIR PRESENCE AS AN ASSEMBLY AID ONLY.
19. DUE TO IT'S NON-STRUCTURAL NATURE, TRANSVERSE BRACE PROFILE, THICKNESS, MATERIAL, STRENGTH, COATING, FREQUENCY, AND INSTALLATION MAY CHANGE AT ANY TIME AT THE DISCRETION OF APA, BY APPROVAL OF APA ENGINEERING.
20. WHERE TRANSVERSE BRACE CANNOT BE INSTALLED DUE TO NS CHORD (OUT OF NOMINAL LOCATION), BRACE SHALL BE RELOCATED TO NEXT NEAREST REASONABLE SPLICE.
21. TRANSVERSE BRACE MAY UTILIZE LOWER SPLICE BOLTS, WHERE PRESENT. SEE PURLIN SHEET FOR MORE INFORMATION.
22. EACH PV MODULE SHALL BE CLAMPED IN 4 PLACES.
23. A MAJORITY OF THE CLAMP BOLT FLANGES MUST TERMINATE OVER THE SLOT, AND NOT OVER THE KEYHOLE.
24. SPRING, & PANEL GUIDE MAY NOT BE PRESENT AT ALL LOCATIONS, OR ANY LOCATIONS.
25. ALL PANELS MUST BE GROUNDED/BONDED TO ZEE PURLINS. THIS MAY BE ACCOMPLISHED WITH THE PANEL GUIDE, BONDING WASHERS, DYNOBOND EQUIPMENT OR OTHER APPROVED GROUNDING DEVICE.

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SHEET NAME
CLAMPS & BRACES

PROJECT NUMBER
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DRAWING NUMBER
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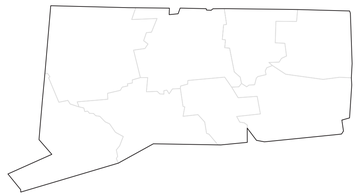
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APPROVED

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ANNE M. GRASSER
0036452
LICENSED PROFESSIONAL ENGINEER
05/12/2026

SOLAR PHOTOVOLTAIC GROUND MOUNT

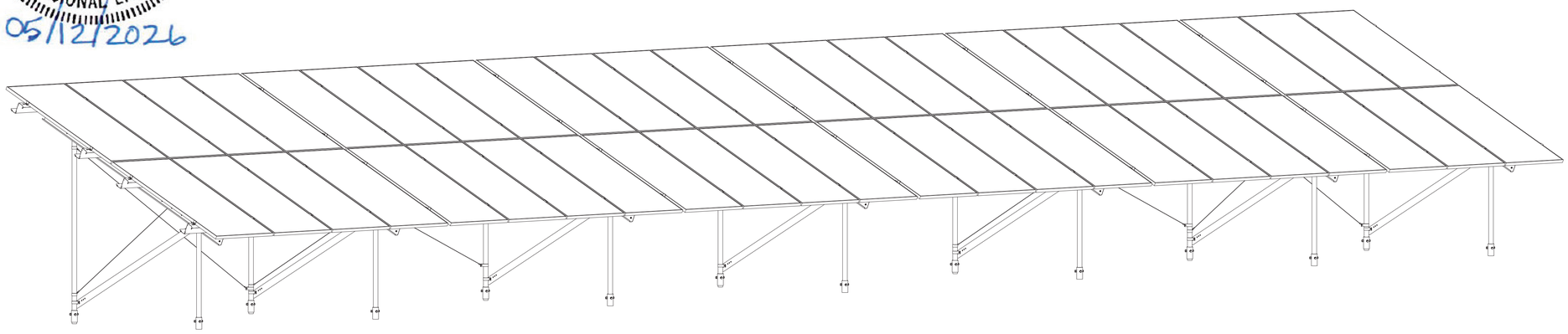


IMAGE FOR REFERENCE ONLY

SHEET INDEX		
STRUCTURAL		
S-000	B	STRUCTURAL COVER
S-100	B	RACKING OVERVIEW
S-300	A	STRUCTURAL COMPONENTS
S-400	A	CONNECTIONS
S-500	B	STRUCTURAL PURLINS
S-600	A	CLAMPS & BRACES

GOVERNING STRUCTURAL CODE/S

2021 INTERNATIONAL BUILDING CODE

PACKAGE COVERAGE – LOADING AND SETUP RANGES & CONSTANTS

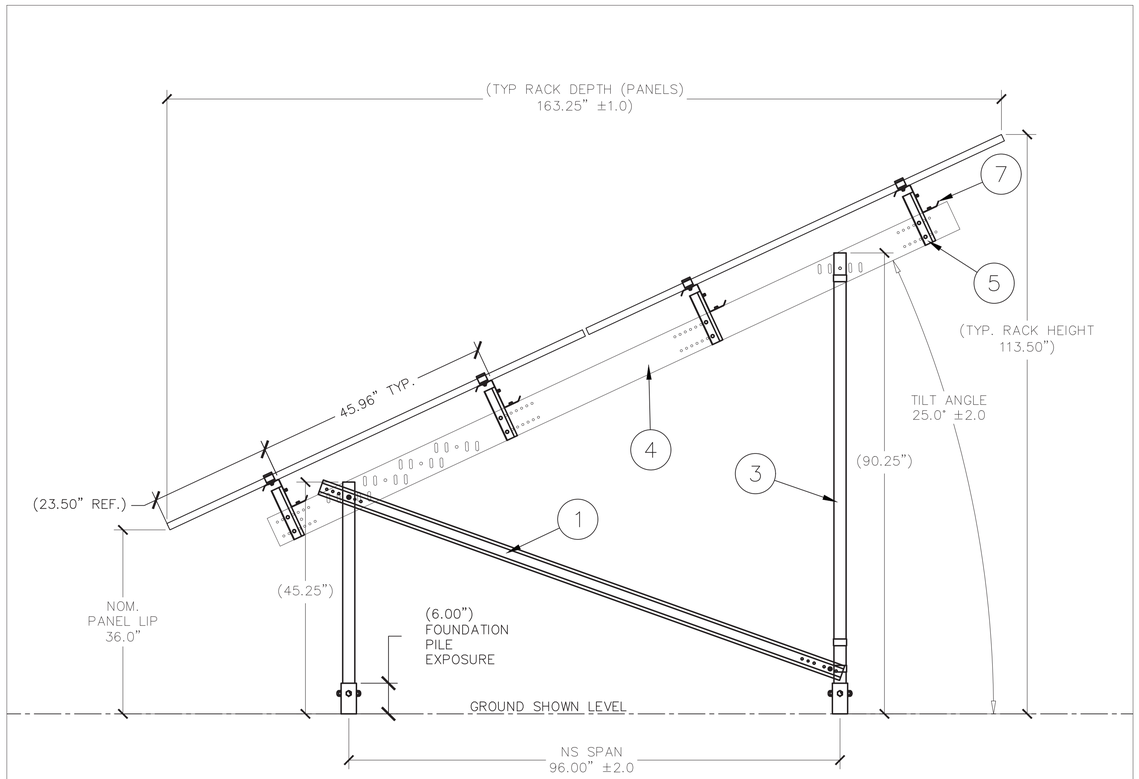
TILT ANGLES:	25°
MAX GROUND SNOW LOAD (PSF):	30
MIN FLAT ROOF SNOW LOAD (PSF):	30
MAX WIND LOADS (MPH):	113
WIND EXPOSURE CATEGORY:	C
MAX SEISMIC Ss:	0.187 g
MAX SEISMIC S1:	0.054 g

PV MODULE: PHONO PSxxxM8GFH-24/TNH OR SIMILAR

MAX. PANEL WIDTH:	44.65"
MAX. PANEL LENGTH:	89.69"
MAX. PANEL HEIGHT:	2.00"
MAX. PANEL WEIGHT:	71 LBS
RISK CATEGORY:	I
MAX FRONT LIP CLEARANCE:	42"

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NOTES: PV MODULE & MODULE RELATED DIMENSIONS THIS DETAIL ARE MAX ALLOWABLE, UNLESS SPECIFIED ELSEWHERE IN THIS PACKET.
DIMENSIONS TO GROUND ARE NOMINAL FROM LEVEL GROUND.

C1 | PROFILE VIEW: RACK OVERVIEW

PARTS LIST (BALLOONS THIS SHEET)			
ITEM	DESCRIPTION	SHAPE	DETAIL / SHEET
1	KNEE BRACE	CEE	B2 / S.300
3	FOUNDATION POST	POST	A6 / S.300
4	NS CHORD	CEE	D1 / S.300
5	ROLL BAR	MIXED	A4 / S.300
6	TRANSVERSE BRACE	HAT	D5 / S.600
7	ZEE PURLIN	ZEE	E1 / S.300
8	CABLE BRACE	CABLE	D4/ S.600

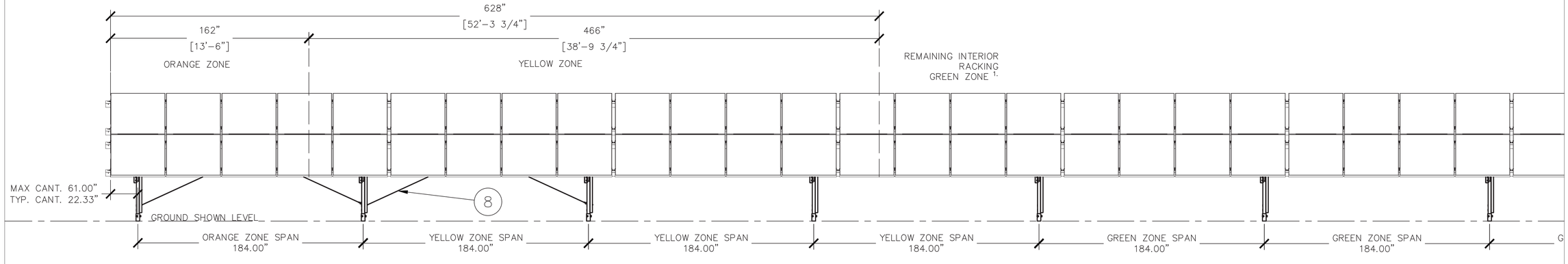
SEE VIEW A1 ON S600 FOR VIEW OF TRANSVERSE BRACE

NOTES:

1. STANDARD FRONT LIP HEIGHT AND TILT ANGLES MEASURED FROM LEVEL GROUND
2. FOUNDATION TESTING, WHERE REQUIRED, SHALL BE DONE ACCORDING TO THE "QUICK TEST METHOD" PER ASTM D1143 & D3689.
3. PRINT DIMENSIONS: DIMENSIONS SHOWN REFLECT POST HEIGHTS ON LEVEL GROUND. ON UNEVEN TERRAIN, REAR FOUNDATION POST HEIGHT WILL BE DICTATED BY FRONT LIP HEIGHT, PANEL TILT, AND NORTH/SOUTH POST SPACING.
4. ADDITIONAL TOLERANCES: POST PLUMBNESS SHOULD BE WITHIN ±2°
5. SPECIAL INSPECTIONS (WHERE REQUIRED):

SPECIAL INSPECTIONS ARE NOT REQUIRED BY APA SOLAR OR THE STRUCTURAL ENGINEER OF RECORD, THE JDI GROUP, WHERE REQUIRED BY OWNER, CUSTOMER, AND/OR AUTHORITY HAVING JURISDICTION, MINIMUM INSPECTION SHALL FOLLOW IBC OR LOCAL AHJ SPECIAL INSPECTIONS GUIDELINES.

*IMAGE REFERENCE ONLY.SHOWS STRUCTURAL MAXIMUMS. NOT INDICATIVE OF REQUIRED QUANTITIES.PLEASE REFER TO SITE SPECIFIC BUILD PLANS FOR SITE SPECIFIC REQUIRED SPANS/QUANTITIES.



NOTES: MAX CANTILEVER MEASURED FROM EDGE OF PANEL TO POST CENTER.
MAX SPAN MEASURED FROM PILE CENTER TO PILE CENTER.
POST QUANTITY AS REQUIRED TO SATISFY CANTILEVERS, SPANS, ROW LENGTH, & PANEL QUANTITY
1. WHERE ALLOWABLE PER THE CALCULATIONS PACKAGE. EXTERIOR/CORNER AREAS SHALL REMAIN ZONED YELLOW. SEE EXPLAINATION IN CALC PACKAGE.
SITE SPECIFIC BUILD PLANS SHALL DESIGNATE EXTERIOR/CORNER SPANS.

A1 | ELEVATION VIEW FROM FRONT (NORTH-FACING)

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REV.	DESCRIPTION	DATE
A	INITIAL RELEASE	4/23/2026
B	UPDATE DESIGN	5/1/2026

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DRAWN	REVIEWED	APPROVED	SIZE
PL	PL	JDI	D

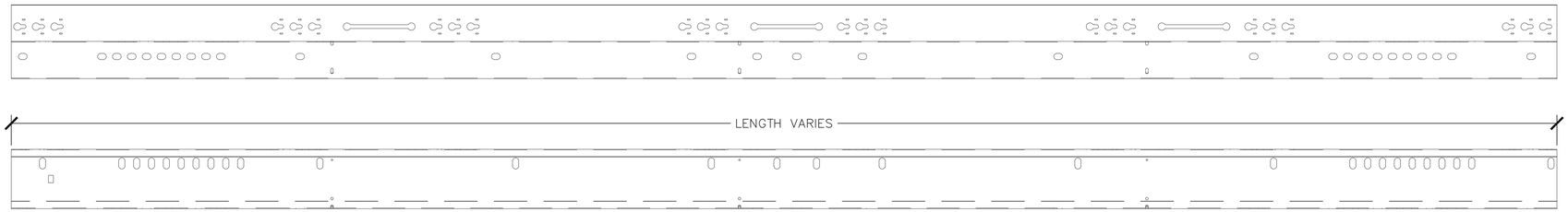
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PROJECT NUMBER: 260234

DRAWING NUMBER: S.100 | REV.: B

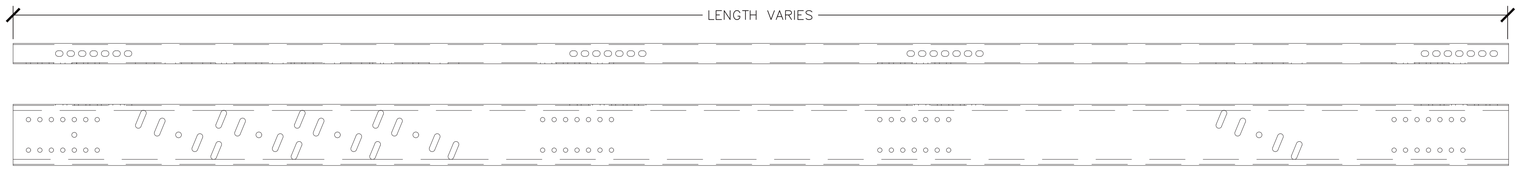
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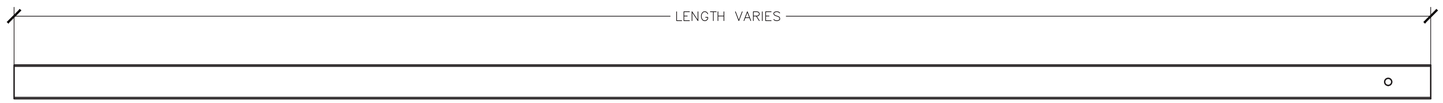
E1 | SIDE/TOP: ZEE PURLIN

IMAGE FOR REFERENCE ONLY



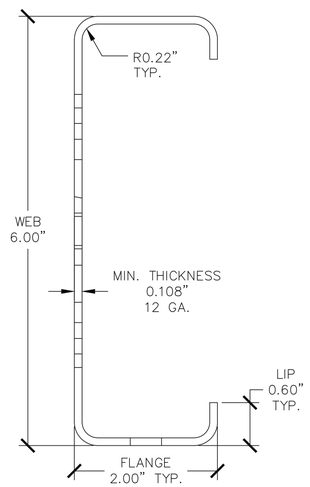
D1 | SIDE/TOP: NS CHORD

IMAGE FOR REFERENCE ONLY



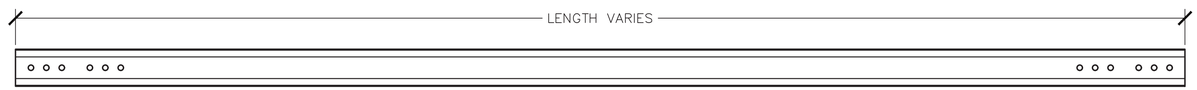
C1 | SIDE: FOUNDATION POST

MATERIAL: A653 HSLAS
STRENGTH: MIN. YIELD (Fy): 80 KSI.



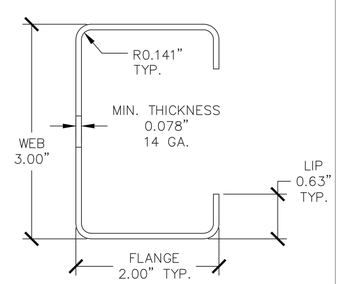
A1 | PROFILE: NS CHORD

IMAGE FOR REFERENCE ONLY



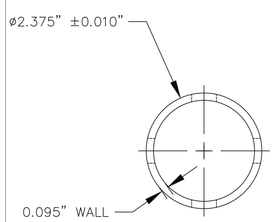
B2 | SIDE: KNEE BRACE

MATERIAL: A653 SS GR 80 CL1
STRENGTH: MIN. YIELD (Fy): 80 KSI.



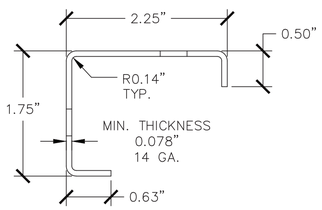
A2 | PROFILE: KNEE BRACE

MATERIAL: A570 CF STR. STL.
STRENGTH: MIN. YIELD (Fy): 50 KSI.

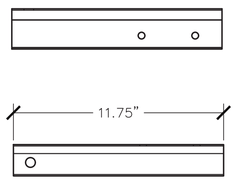


A3 | PROFILE: FOUNDATION POST

MATERIAL: A572 CF STR. STL.
STRENGTH: MIN. YIELD (Fy): 30 KSI.

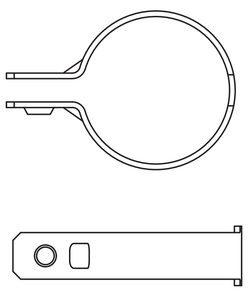


A4 | PROFILE: ROLL BAR



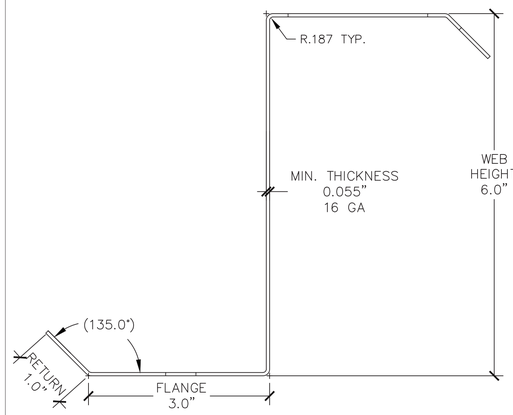
A5 | SIDE/TOP: ROLL BAR

IMAGE FOR REFERENCE ONLY



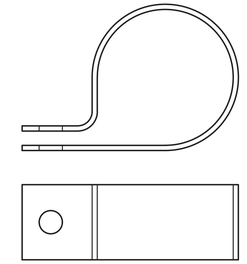
A6 | SIDE: CABLE BRACE CLAMP

MATERIAL: A653 STR. STL.
STRENGTH: MIN. YIELD (Fy): 80 KSI.



D5 | PART: ZEE PURLIN

IMAGE FOR REFERENCE ONLY



B6 | SIDE: KNEE BRACE CLAMP

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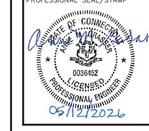
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REV	DESCRIPTION	DATE
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PL	PL	JDI	D

SHEET NAME
STRUCTURAL COMPONENTS

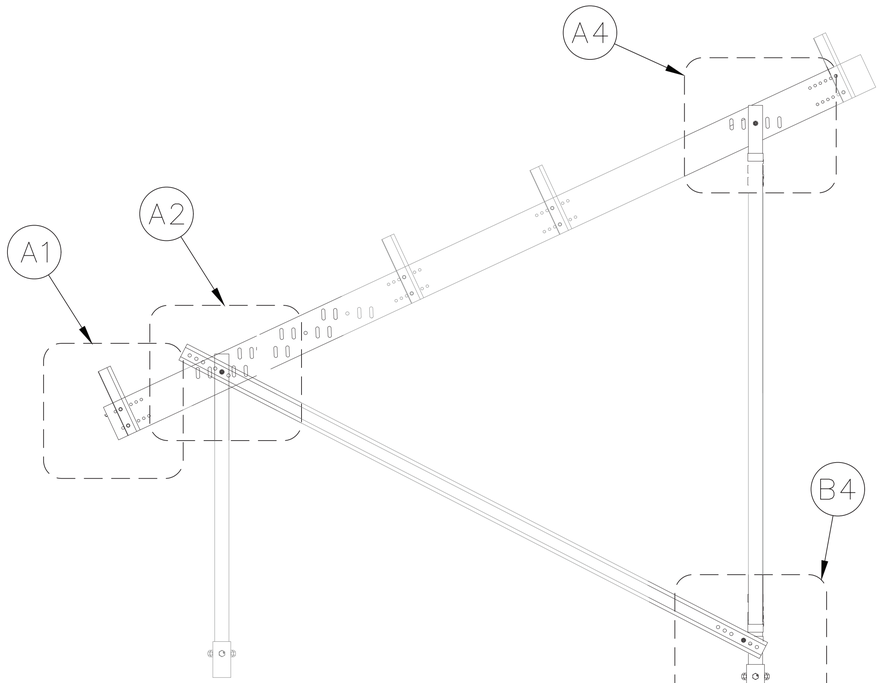
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IMAGE FOR REFERENCE ONLY



B1 | FOUNDATION SET CONNECTIONS OVERVIEW

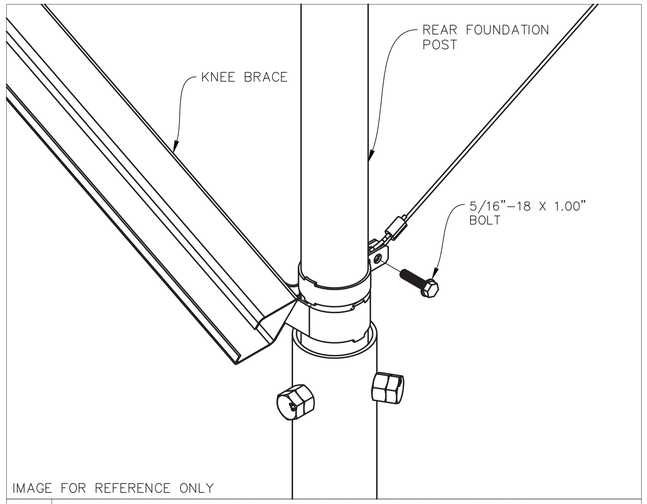
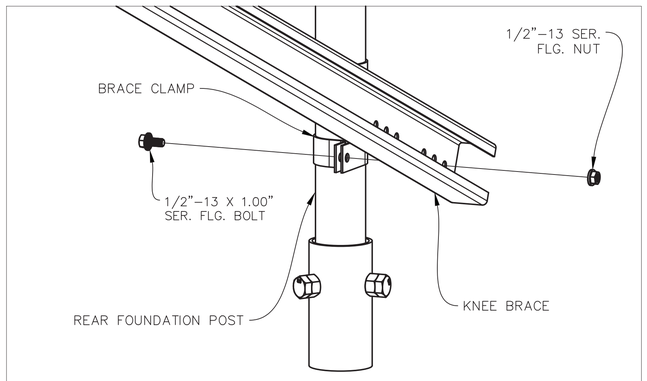


IMAGE FOR REFERENCE ONLY

D4 | CABLE BRACE–TO–REAR POST CONNECTION



*MIN. CONNECTION TORQUE: 40 FT–LBS

B4 | KNEE BRACE–TO–REAR POST

NOTES:

1. HARDWARE TORQUE VALUES:
   - 1A. ROLL BAR–TO–NS CHORD CONNECTION (VIEW A1)

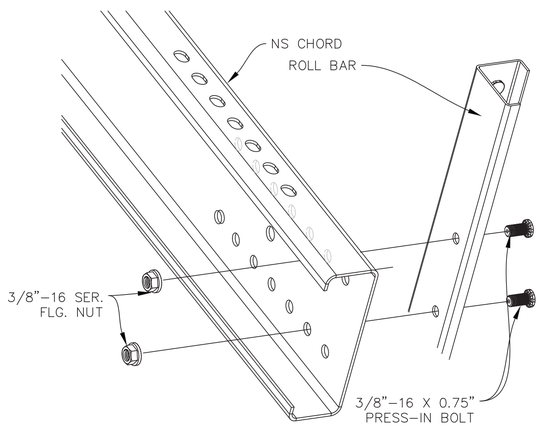
     3/8"–16 STAINLESS STEEL
     MIN.: 17.5 FT–LBS
     NOM.: 19.6 FT–LBS
     MAX.: 50.0 FT–LBS
   - 1B. KNEE BRACE–TO–REAR POST CONNECTION (VIEW B4)

     1/2"–13 CARBON STEEL GRADE 5 OR BETTER
     MIN.: 40 FT–LBS
   - 1C. KNEE BRACE–TO–FRONT POST CONNECTION (VIEW A2)

     REAR POST–TO–NS CHORD CONNECTION (VIEW A4)

     1/2"–13 CARBON STEEL GRADE 5 OR BETTER
     MIN.: 25 FT–LBS
2. DEPICTED HARDWARE AND PART PLACEMENT NOT INDICATIVE OF PREFERRED OR REQUIRED POSITIONS.
3. HOLE/SLOT PATTERNS IN PARTS ALLOW FOR DEVIATION FROM NOMINAL DIMENSIONS, MULTIPLE PART POSITIONS, AND MULTIPLE TILT ANGLES.
4. SEE INSTALLATION MANUAL FOR SETUP INSTRUCTIONS.
5. SERRATED FLANGED BOLTS MAY BE REPLACED WITH EQUIVALENT PRESS–IN BOLTS. SEE NOTE 10 FOR MORE OPTIONS.
6. PRESS–IN BOLTS, WHERE PRESENT, TO BE INSTALLED TO MANUFACTURERS RECOMMENDED VALUES.
7. OTHER SPECIFIC CONNECTIONS ELSEWHERE IN PRINT SET.
8. ROLL BAR MUST CONNECT TO THE CORRECT HOLES IN CEE CHANNEL (INNER, OR OUTER TYPICALLY), AS DETERMINED BY PV MODULE MANUFACTURERS ALLOWABLE CLAMPING ZONE.
9. USE CORRECT NOMINAL HOLES IN CEE TO CONNECT TO FOUNDATION POST, AS INDICATED. ADJACENT HOLES AND SLOTS FOR FIELD ADJUSTMENTS.
10. SERRATED HARDWARE MAY BE REPLACED WITH EQUIVALENT HARDWARE WITH WASHERS IF NECESSARY.
11. IN ALL DETAILS, THE PRESENCE OF TWO SETS OF HARDWARE INDICATES THE REQUIREMENT OF TWO SETS OF HARDWARE.
12. STAINLESS STEEL HARDWARE MAY BE REPLACED WITH GALVANIZED STEEL HARDWARE OR CORROSION AND STRENGTH COMPARABLE HARDWARE MATERIALS AND FINISHES.
13. UNLESS NOTED OTHERWISE, ALL HARDWARE MAY BE INSTALLED IN EITHER DIRECTION (NUT/BOLT MAY BE ON EITHER SIDE OF CONNECTION).
14. WHEN NECESSARY, ADDITIONAL HOLES MAY BE DRILLED TO COMPLETE CONNECTION. ENGINEERING SHALL BE CONTRACTED PRIOR TO FIELD MODIFICATIONS OF PARTS.

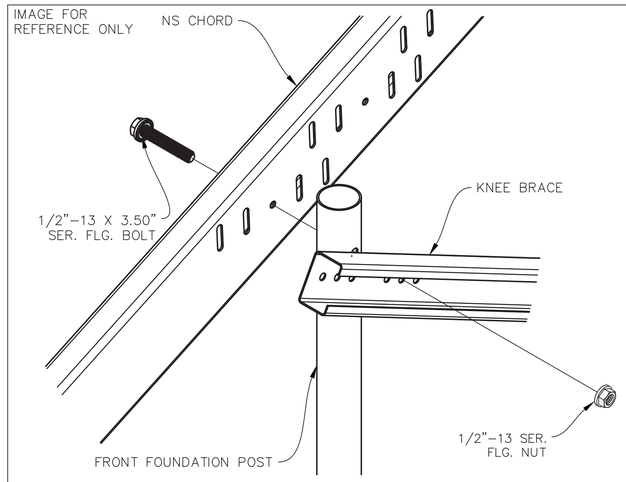
IMAGE FOR REFERENCE ONLY
ATTACHED TO OUTER HOLE SET FOR REFERENCE ONLY. SEE NOTES.



*MIN. CONNECTION TORQUE: 17.5 FT–LBS

A1 | CONNECTION: ROLL BAR–TO–NS CHORD

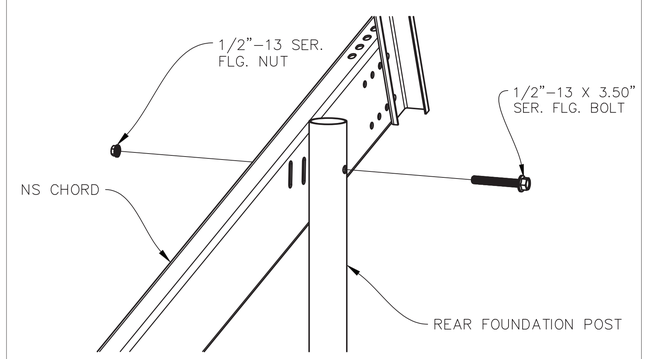
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*MIN. CONNECTION TORQUE: 25 FT–LBS

A2 | CONNECTION: KNEE BRACE–TO–FRONT POST

IMAGE FOR REFERENCE ONLY



*MIN. CONNECTION TORQUE: 25 FT–LBS

A4 | CONNECTION: REAR POST–TO–NS CHORD

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PAUL LAMER
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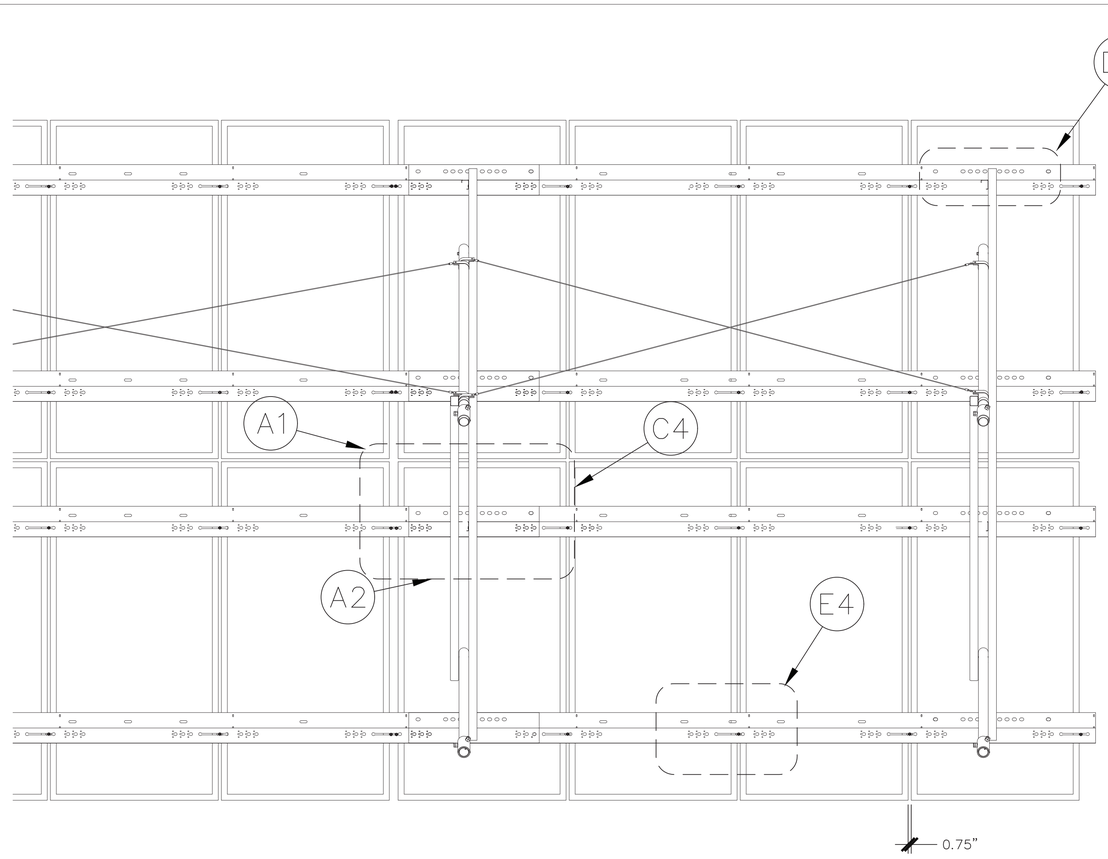
DRAWN	REVIEWED	APPROVED	SIZE
PL	PL	JDI	D

SHEET NAME: CONNECTIONS

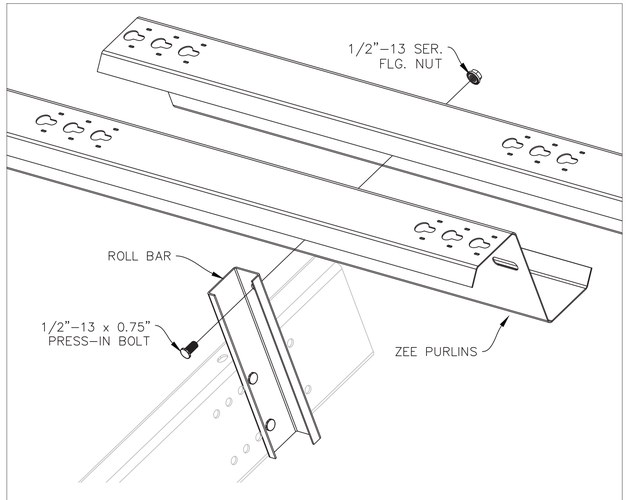
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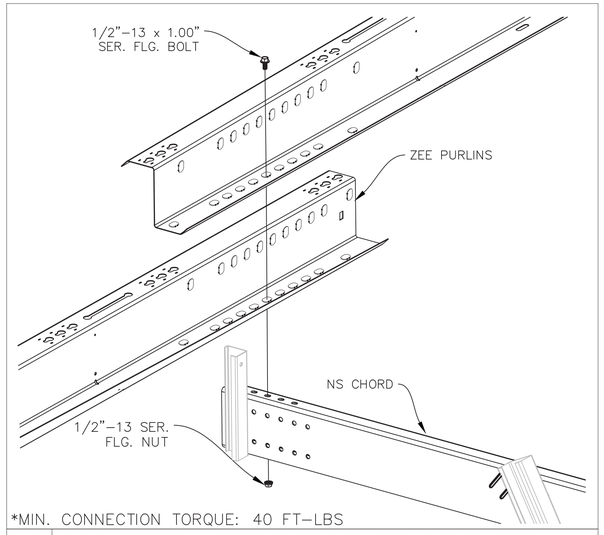


B1 | OVERVIEW: ZEE PURLIN CONNECTIONS (RACK UNDERSIDE)



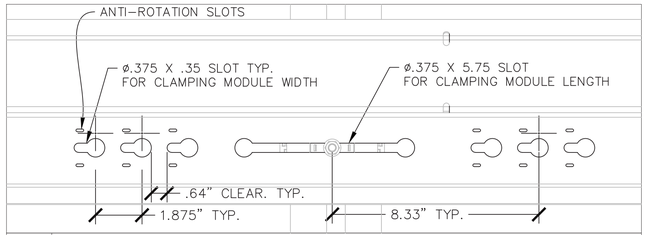
*MIN. CONNECTION TORQUE: 40 FT–LBS

A1 | CONNECTION: ZEE PURLINS–TO–ROLL BAR

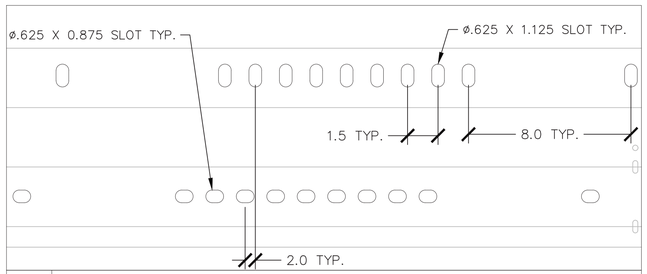


*MIN. CONNECTION TORQUE: 40 FT–LBS

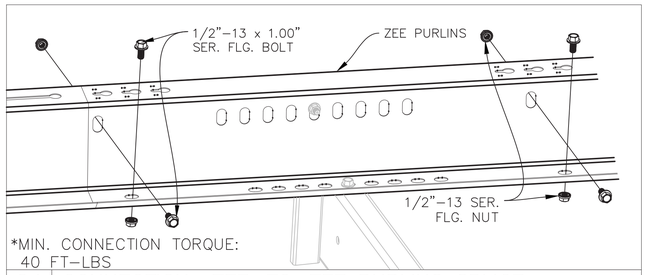
A2 | CONNECTION: ZEE PURLINS–TO–NS CHORD



E4 | DETAIL: ZEE PURLIN PANEL SLOTS



D4 | DETAIL: ZEE PURLIN SPLICE SLOTS



*MIN. CONNECTION TORQUE: 40 FT–LBS

C4 | CONNECTION: ZEE–TO–ZEE PURLINS SPLICE

NOTES:

1. HARDWARE TORQUE VALUES FOR STRUCTURAL PURLIN VIEWS): A1, A2, & C4

   1/2"–13 CARBON STEEL GRADE 5 OR BETTER
   MIN.: 40 FT–LBS

2. DEPICTED HARDWARE AND PART PLACEMENT NOT INDICATIVE OF PREFERRED OR REQUIRED POSITIONS.
3. HOLE/SLOT PATTERNS IN PARTS ALLOW FOR DEVIATION FROM NOMINAL DIMENSIONS, MULTIPLE PART POSITIONS, AND MULTIPLE TILT ANGLES.
4. SEE INSTALLATION MANUAL FOR SETUP INSTRUCTIONS.
5. SERRATED FLANGED BOLTS MAY BE REPLACED WITH EQUIVALENT PRESS–IN BOLTS.
6. PRESS–IN BOLTS, WHERE PRESENT, TO BE INSTALLED TO MANUFACTURERS RECOMMENDED VALUES.
7. OTHER SPECIFIC CONNECTIONS ELSEWHERE IN PRINT SET.
8. SERRATED HARDWARE MAY BE REPLACED WITH EQUIVALENT HARDWARE WITH WASHERS IF NECESSARY.
9. IN ALL DETAILS, THE PRESENCE OF TWO SETS OF HARDWARE INDICATES THE REQUIREMENT OF TWO SETS OF HARDWARE.
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11. UNLESS NOTED OTHERWISE, ALL HARDWARE MAY BE INSTALLED IN EITHER DIRECTION (NUT/BOLT MAY BE ON EITHER SIDE OF CONNECTION).
12. WHEN NECESSARY, ADDITIONAL HOLES MAY BE DRILLED TO COMPLETE CONNECTION. ENGINEERING SHALL BE CONTRACTED PRIOR TO FIELD MODIFICATIONS OF PARTS.
13. CONNECTION IN DETAIL A1 & A2 SHOWN IN NOMINAL POSITION. ACTUAL CONNECTION MAY BE ±6".
14. WHEN CONNECTIONS IN DETAIL A1 & A2 ARE AT THEIR MAX/MIN POSITIONS (±2") INTERFERING SPLICE HARDWARE MAY BE RELOCATED TO NEXT NEAREST SLOTS.
15. WHERE PRESENT, TRANSVERSE BRACE MAY UTILIZE LOWER SPLICE BOLTS. SEE CONNECTIONS SHEET FOR MORE INFORMATION.
16. ZEE–TO–ZEE SPLICE SHALL ALWAYS OVERLAP MINIMUM 32", AS INDICATED, EXCEPT AT ENDS OF ROW, WHERE NO SPLICE IS REQUIRED.
17. SPLICE MAY OVERLAP IN EITHER DIRECTION.
18. ZEE PURLIN MATERIAL AND FINISH ARE MANUFACTURED TO SPECIFICATIONS THAT MEET OR EXCEED OUR STANDARD PRODUCT WARRANTY.
19. ZEE PURLINS GALVANIZED TO CONFORM TO A MINIMUM THICKNESS DESIGNATION EQUAL TO G90 OR INLINE GALVANIZED TO COMPARABLE THICKNESS AS PER ASTM A1057.
20. TYPICAL ZEE PURLIN RETURN LIP ANGLE SHOWN. ACTUAL ANGLE MAY VARY.
21. SLOT DIMENSIONS FOR REFERENCE ONLY. FINAL SHAPE, FREQUENCY, AND DIMENSIONS MAY VARY.
22. LENGTH OF PURLIN VARIES BY PROJECT AND LOCATION WITHIN ARRAY.

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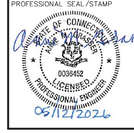
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B	UPDATED DESIGN	5/1/2026

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DRAWN	REVIEWED	APPROVED	SIZE
PL	PL	JDI	D

SHEET NAME
STRUCTURAL PURLINS

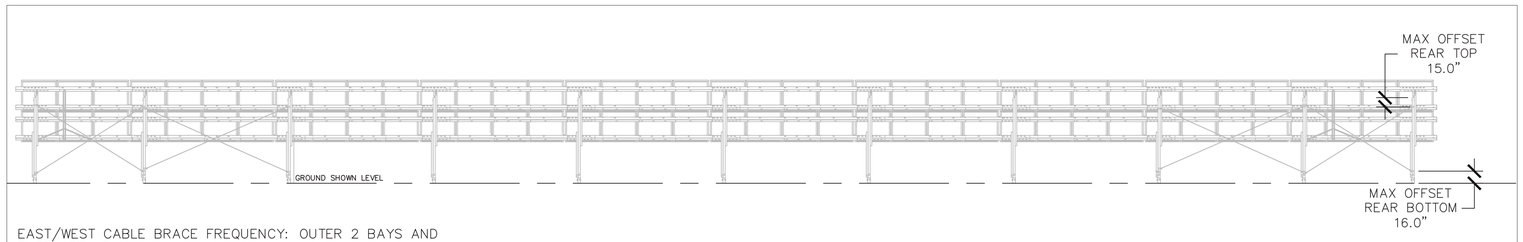
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S.500

REV.
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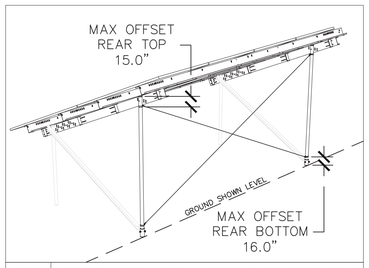
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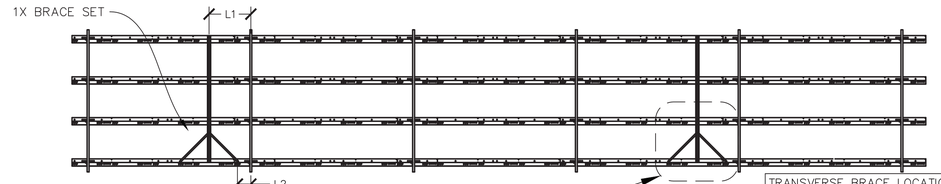


EAST/WEST CABLE BRACE FREQUENCY: OUTER 2 BAYS AND EVERY 7TH BAY.

E1 | REAR VIEW: CABLE BRACE FREQUENCY



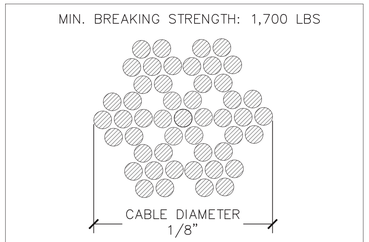
E5 | REAR ISO VIEW: CABLE PLACEMENT



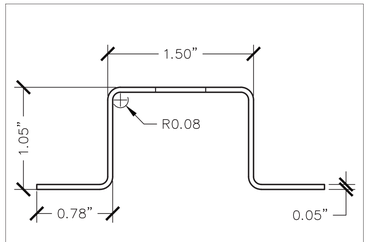
TRANSVERSE BRACE FREQUENCY:
1X BRACE SET AT FIRST & LAST SPLICE PER ROW
1X ADDITIONAL SET EVERY 200', MIN.
1X ADDITIONAL SET EVERY BAY THAT EXCEEDS A 260" SPAN LENGTH

TRANSVERSE BRACE LOCATION FROM CHORD		
MODULES PER BAY	L1	L2
>3	(70.25")	(12.00")
<4	(52.00")	(14.00")

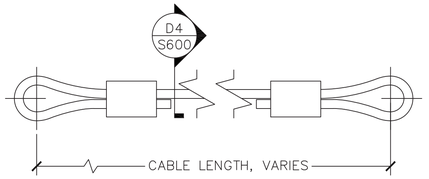
D1 | BOTTOM VIEW: TRANSVERSE BRACE LOCATIONS



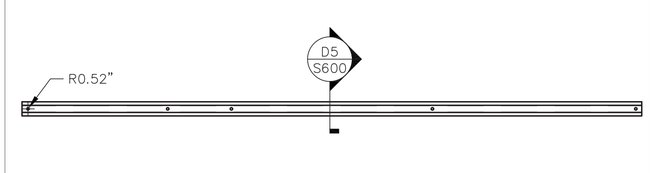
D4 | SEC.: CABLE BRACE



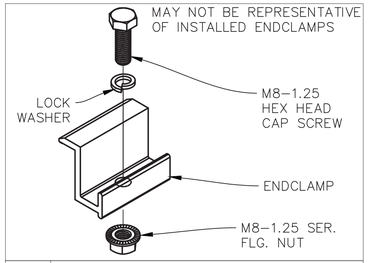
D5 | SECTION: TVS BRACE



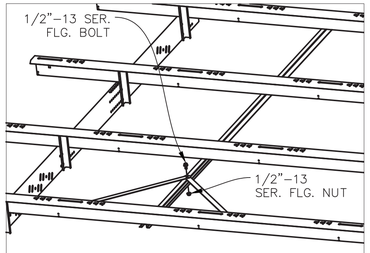
C1 | PART: CABLE BRACE



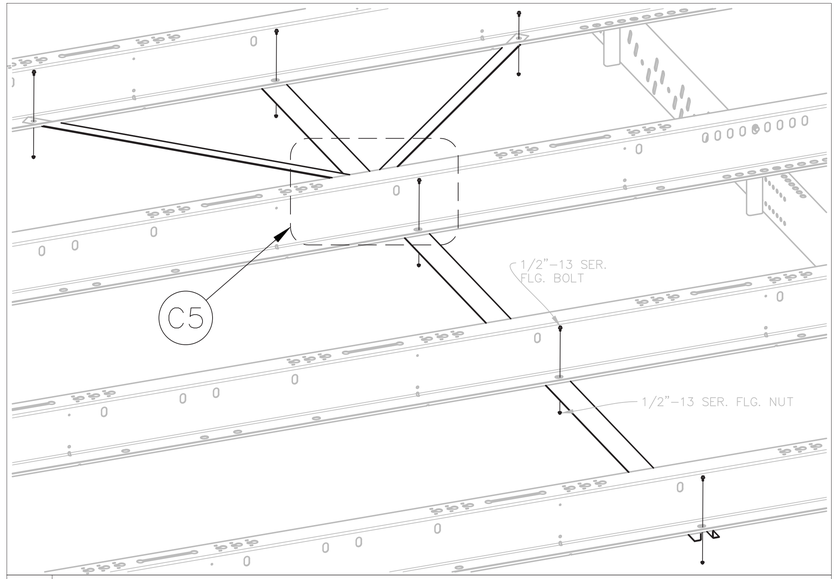
C2 | PART: TRANSVERSE BRACE (TVS BRACE)



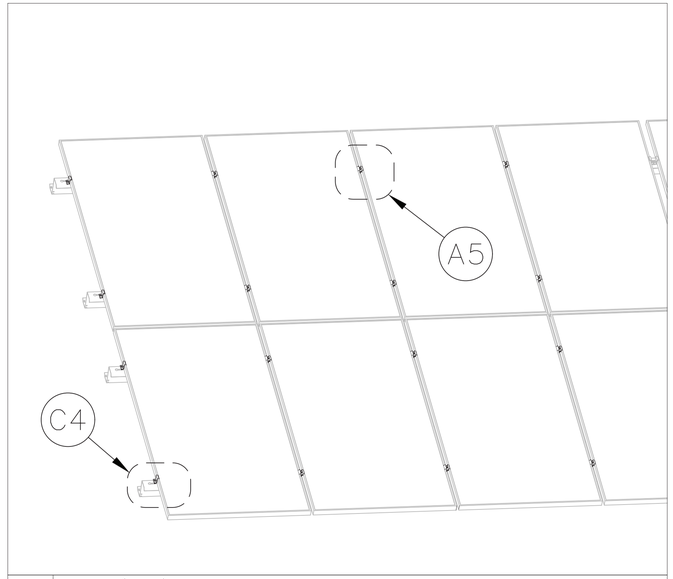
C4 | ASSEMBLY: ENDCLAMP



C5 | TVS BRACE ASSEMBLY

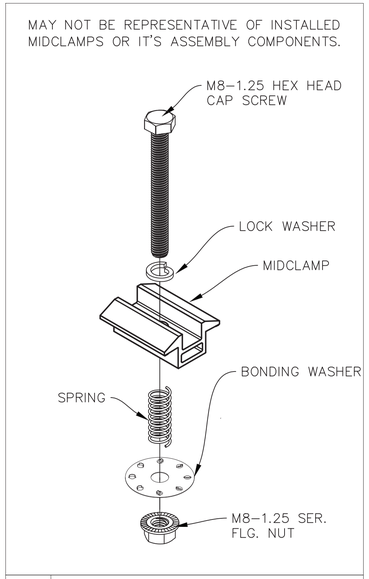


A1 | CONNECTION: TVS BRACE-TO-PURLIN



A3 | TOP (ISO) VIEW: PV CLAMP LOCATIONS

MAY NOT BE REPRESENTATIVE OF INSTALLED MIDCLAMPS OR IT'S ASSEMBLY COMPONENTS.



A5 | ASSEMBLY: MIDCLAMP

NOTES:

1. HARDWARE TORQUE VALUES:
   - 1A. TRANSVERSE BRACE CONNECTIONS (VIEWS A1 & C5)
     1/2"-13 CARBON STEEL GRADE 8 OR 5
     MIN.: 40 FT-LBS
   - 1B. FOR MID & END CLAMP CONNECTIONS (VIEWS A5 & C4)
     M8-1.25 STAINLESS STEEL
     MIN.: 14.0 FT-LBS
     NOM.: 15.6 FT-LBS
     MAX.: 25 FT-LBS
2. DEPICTED HARDWARE AND PART PLACEMENT NOT INDICATIVE OF PREFERRED OR REQUIRED POSITIONS.
3. HOLE/SLOT PATTERNS IN PARTS ALLOW FOR DEVIATION FROM NOMINAL DIMENSIONS, MULTIPLE PART POSITIONS, AND MULTIPLE TILT ANGLES.
4. SEE INSTALLATION MANUAL FOR SETUP INSTRUCTIONS.
5. SERRATED FLANGED BOLTS MAY BE REPLACED WITH EQUIVALENT PRESS-IN BOLTS. SEE NOTE 8 FOR MORE INFORMATION.
6. PRESS-IN BOLTS, WHERE PRESENT, TO BE INSTALLED TO MANUFACTURERS RECOMMENDED VALUES.
7. OTHER SPECIFIC CONNECTIONS ELSEWHERE IN PRINT SET.
8. SERRATED HARDWARE MAY BE REPLACED WITH EQUIVALENT HARDWARE WITH WASHERS IF NECESSARY.
9. STAINLESS STEEL HARDWARE MAY BE REPLACED WITH GALVANIZED STEEL HARDWARE OR CORROSION AND STRENGTH COMPARABLE HARDWARE MATERIALS AND FINISHES.
10. UNLESS NOTED OTHERWISE, ALL HARDWARE MAY BE INSTALLED IN EITHER DIRECTION (NUT/BOLT MAY BE ON EITHER SIDE OF CONNECTION).
11. WHEN NECESSARY, ADDITIONAL HOLES MAY BE DRILLED TO COMPLETE CONNECTION. ENGINEERING SHALL BE CONTRACTED PRIOR TO FIELD MODIFICATIONS OF PARTS.
12. EASE/WEST CABLE BRACING (C1) TO BE INSTALLED IN THE SPACE BETWEEN ANCHOR SETS (BAY).
13. MINIMUM CABLE BREAKING STRENGTH DETERMINED BY PROJECT SPECIFIC STRUCTURAL CALCULATIONS.
14. CABLE TO BE STAINLESS STEEL AIRCRAFT CABLE.
15. CABLE MAY BE OF ANY CONFIGURATION (IE. 7X7 OR 7X19) AS LONG AS IT MEETS THE REQUIREMENTS LISTED ON THIS SHEET.
16. LENGTH OF BRACES WILL VARY DEPENDENT ON PROJECT SPECIFICS.
17. TRANSVERSE BRACE SETS SHALL BE INSTALLED AT FREQUENCY INDICATED.
18. TRANSVERSE BRACES ARE NOT A REQUIREMENT OF THE STRUCTURAL MODELS. APA REQUIRES THEIR PRESENCE AS AN ASSEMBLY AID ONLY.
19. DUE TO IT'S NON-STRUCTURAL NATURE, TRANSVERSE BRACE PROFILE, THICKNESS, MATERIAL, STRENGTH, COATING, FREQUENCY, AND INSTALLATION MAY CHANGE AT ANY TIME AT THE DISCRETION OF APA, BY APPROVAL OF APA ENGINEERING.
20. WHERE TRANSVERSE BRACE CANNOT BE INSTALLED DUE TO NS CHORD (OUT OF NOMINAL LOCATION), BRACE SHALL BE RELOCATED TO NEXT NEAREST REASONABLE SPLICE.
21. TRANSVERSE BRACE MAY UTILIZE LOWER SPLICE BOLTS, WHERE PRESENT. SEE PURLIN SHEET FOR MORE INFORMATION.
22. EACH PV MODULE SHALL BE CLAMPED IN 4 PLACES.
23. A MAJORITY OF THE CLAMP BOLT FLANGES MUST TERMINATE OVER THE SLOT, AND NOT OVER THE KEYHOLE.
24. SPRING, & PANEL GUIDE MAY NOT BE PRESENT AT ALL LOCATIONS, OR ANY LOCATIONS.
25. ALL PANELS MUST BE GROUNDED/BONDED TO ZEE PURLINS. THIS MAY BE ACCOMPLISHED WITH THE PANEL GUIDE, BONDING WASHERS, DYNOBOND EQUIPMENT OR OTHER APPROVED GROUNDING DEVICE.

CUSTOMER

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RACKING TYPE

TITAN PRO

ENGINEER OF RECORD

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PROFESSIONAL SEAL/STAMP

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PROFESSIONAL ENGINEER
05/12/2026

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SITE STREET ADDRESS:
0 EXLEY RD

SITE CITY, STATE, ZIP:
PLAINFIELD, CT 06374

SHEET REVISIONS

REV.	DESCRIPTION	DATE
A	INITIAL RELEASE	4/23/2026

APPROVED

DRAWN	REVIEWED	APPROVED	SIZE
PL	PL	JDI	D

SHEET NAME
CLAMPS & BRACES

PROJECT NUMBER
260234

DRAWING NUMBER
S.600

REV.
A

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SCALE IS REDUCED WHEN SHEET SIZE IS 11" x 17"