DOCKETED	
Docket Number:	09-AFC-08C
Project Title:	Genesis Solar Energy Project
TN #:	234780
Document Title:	GSEP Heavy Equipment Parking Cover PTA
Description:	Petition To Amend; Genesis Solar Energy Project 09-AFC-08C; for the addition of a Heavy Equipment Parking (shade) Structure; PTA discusses Conditions of Certification; PTA does not suggest any actual changes to the Conditions of Certification
Filer:	Averell Rose
Organization:	Genesis Solar Inc, Nextera Energy
Submitter Role:	Applicant
Submission Date:	9/16/2020 8:01:59 AM
Docketed Date:	9/16/2020

Genesis Solar, LLC

(9-AFC-8)

Petition to Amend

Submitted by

Genesis Solar, LLC

August 2020

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Executive Summary

Genesis Solar, LLC as project owner, petitions the California Energy Commission (CEC or Commission) to comply with the Condition of Certification Compliance-13, Gen-1 and Gen-8 regarding the manner of regulation of new construction at the Genesis Solar Facility. Genesis Solar, LLC proposes to construct a Heavy Equipment Covered Parking Structure. The structure will create permanent, open-air shade for parking of heavy equipment. The structure would be constructed of steel with concrete foundations. The structure would be sited on the area currently used for mobile equipment parking (e.g. front loader, tractor, man lift, telescopic fork lift, all terrain crane, and similar).

Per the CEC Condition of certification, this compliance proposal is being submitted for approval due to the following condition decisions.

COMPLIANCE-13

The project owner must petition the Energy Commission pursuant to Title 20, California code of Regulations section 1769, in order to modify the project (including linear facilities) design, operation or performance requirements, and to transfer ownership or operational control of the facility. It is the responsibility of the project owner to contact the CPM to determine if a proposed project change should be considered a project modification pursuant of section 1769. Implementation of a project modification without first securing Energy Commission, or Energy Commission staff approval, may result in enforcement action that could result in civil penalties in accordance with section 25534 of the Public Resources Code.

A petition is required for amendments and for staff approved project modifications as specified below. Both shall be filed as a "Petition to Amend." Staff will determine if the change is significant or insignificant. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to the CPM, who will file it with the Energy Commission's Dockets Unit in accordance with Title 20, California Code of Regulations, section 1209.

GEN-1

The project owner shall design, construct, and inspect the project in accordance with the 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval (the CBSC in effect is the edition that has been adopted by the California Building Standards Commission and published at least 180 days previously). The project owner shall ensure that all the provisions of the above applicable codes are enforced during the construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility. All transmission facilities (lines, switchyards, switching stations and substations) are covered in the conditions of certification in the Transmission System Engineering section of this document. In the event that the initial engineering designs are submitted to the CBO when the successor to the 2007 CBSC is in effect, the 2007 CBSC provisions shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict

between a general requirement and a specific requirement, the specific requirement shall govern. The project owner shall ensure that all contracts with contractors, subcontractors, and suppliers clearly specify that all work performed and materials supplied comply with the codes listed above.

GEN-8

The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. The project owner shall notify the CPM after obtaining the CBO's final approval. The project owner shall retain one set of approved engineering plans, specifications, and calculations (including all approved changes) at the project site or at another accessible location during the operating life of the project. Electronic copies of the approved plans, specifications, calculations, and marked-up as-builts shall be provided to the CBO for retention by the CPM.

1.0 Introduction

1.1 Overview

By this amendment Genesis Solar, LLC, petitions the Commission to consider the stated Condition of Certification to add a Heavy Equipment Covered Parking Structure.

The Heavy Equipment Covered Parking Structure:

Consists of a red-iron steel structure, I-beam construction with light weight deck material. Supported by 24 concrete foundations, one per vertical support member. Structure to be painted tan, consistent with coloring of existing structures nearby.

Approximate dimensions: Total width of 200' consisting of 8 low bays and 2 high bays. Low bays 12' high x 12' deep. High bays 20' high x 40' deep. See included drawings for details.

The Structure to be located in an open area currently being used for equipment parking. Location is east of the Administration Building and Warehouse, north of Water Treatment facility area (see drawings).

All engineering and construction to be performed by an outside contractor.

This Amendment contains all of the information that is required pursuant to the Siting Regulations (California Code of Regulations [CCR] Title 20, Section 1769, Post Certification Amendments and Changes). The information necessary to fulfill the requirements of Section 1769(a)(1) is contained in Sections 1.0 through 5.0 as summarized in Table 1 below.

TABLE 1

Informational Requirements for Post-Certification Amendments and Changes in accordance with Title 20 California Code of Regulations

Section 1769(a)(1) Requirement	Section of Petition Fulfilling Requirement
(A) A complete description of the proposed modifications, including new language for any conditions that will be affected.	2.0
(B) A discussion of the necessity for the proposed changes	2.2
(C) If the modification is based on information that was known by the petitioner during the certification proceeding, an explanation why the issue was not raised at that time	2.2
(D) If the modification is based on new information that changes or undermines the assumptions, rationale, findings, or other bases of the final decision, an explanation of why the change should be permitted	2.2
(E) An analysis of the impacts the modification may have on the environment and proposed measures to mitigate any significant adverse impacts	1.3
(F) A discussion of the impact of the modification on the facility's ability to comply with applicable laws, ordinances, regulations, and standards;	1.3
(G) A discussion of how the modification affects the public	4.0
(H) A list of property owners potentially affected by the modification.	5.1
(I) A discussion of the potential effect on nearby property owners, the public and the parties in the application proceedings.	5.2

1.2 Ownership of Genesis Solar, LLC

Genesis Solar, LLC is a wholly owned subsidiary of NextEra Energy Resources.

1.3 Summary of Environmental Impacts

The Siting Regulations require that an analysis be conducted to address the potential impacts the proposed project change may have on the environment and proposed measures to mitigate any potentially significant adverse impacts (Title 20, CCR, Section 1769 (a)(1)(E)). The regulations also require a discussion of the impact of the proposed change on the facility's ability to comply with applicable laws, ordinances, regulations and standards ("LORS") (Title 20, CCR Section 1769 (a)(1)(F)).

Section 3.0 of this Amendment includes a discussion of the potential environmental impacts associated with the proposed additions and a discussion of the consistency of the change with LORS. Section 3.0 concludes that there would be no significant environmental impacts associated with implementing the construction of a Heavy Equipment Covered Parking Structure specified in this Amendment and that the project would continue to comply with all applicable LORS.

The proposed changes to the site will not adversely impact the environment.

2.0 Description of Project Changes

This section includes a complete description of the proposed modification consistent with the Siting Regulations (Title 20, CCR, Section 1769 (a)(1)(A)).

The proposed Heavy Equipment Covered Parking Structure consists of a red-iron steel structure of I-beam construction with light weight deck material. It shall be supported by 24 concrete foundations, one per vertical support member. Structure to be painted tan. Approximate dimensions: Total width of 200' consisting of 8 low bays and 2 high bays. Low bays 12' high x 12' deep. High bays 20' high x 40' deep (see drawings). The Structure to be located in an open area currently being used for equipment parking. Location is east of the Administration Building and Warehouse, north of Water Treatment facility area (see drawings). All engineering and construction to be performed by qualified contractors.

2.1 Changes to Condition of Certification

By way of background, the Decision for the Genesis Solar facility describes in GEN-1 any alterations or additions will be presented to the CPM 30 days before commencement of work.

"Once the certificate of occupancy has been issued, the project owner shall inform the CPM at least 30 days prior to any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility that requires CBO approval for compliance with the above codes. The CPM will then determine if the CBO needs to approve the work." (Decision, pg. 4)

The original Condition of Certification to the Decision will not be affected by the addition of the Heavy Equipment Covered Parking Structure. The Structure will be constructed to CBO specifications and inspected by the CBO as required. (Decision p.2)

Additionally, the implementation of the proposed Heavy Equipment Covered Parking Structure will not adversely affect the Conditions of Certification listed to ensure that the Genesis Solar Energy Project will be designed and constructed in conformance with the applicable LORS pertinent to the engineering aspects summarized in the Decision. (Decision, p. 3)

2.2 Necessity of Proposed Changes

The Siting Regulations require a discussion of the necessity for the proposed modification to GEN-1 and GEN-8 and whether the change is based on information known by the petitioner during the certification proceeding (Title 20, CCR, Sections 1769 (a)(1)(B), and (C)).

As described in Section 2.1 above, structural changes to the site does not change the decision as it is stated in GEN-1 and GEN-8. At the time of original approval, the project owner did not consider the need for a Heavy Equipment Covered Parking Structure. The extreme weather conditions at Genesis Solar have given rise to concerns of mobile heavy equipment deterioration. Genesis Solar, LLC proposes to build a Heavy Equipment Covered Parking Structure to protect the integrity of this necessary equipment.

3.0 Environmental Analysis of Proposed Project Changes and Consistency with LORS

The Amendment does not change the design or operation of the plant equipment. Accordingly, the proposed addition to the plant does not modify GEN-1 or GEN-8 and will not result in any significant adverse environmental impact.

The proposed change has no possible potential impact on the following environmental disciplines: Biological Resources, Cultural Resources, Geology and Paleontology, Hazardous Materials Management, Land Use, Noise and Vibration, Socioeconomics, Soil and Water Resources, Traffic and Transportation, Waste Management, and Worker Safety and Fire Protection.

3.1 Air Quality

The proposed changes that incorporate GEN-1 and GEN-8 will not cause any change to air quality.

3.2 Impact to Public Health

The proposed changes that incorporate GEN-1 and GEN-8 will have no effect on public health. Genesis Solar is well outside of the city of Blythe and approximately 11 miles from the I-10 Wiley's Well Road rest area. There are no neighbors near the facility and no threat to outside public residences.

3.3 Consistency of Amendment with the Certification and LORS

The Siting Regulations require a discussion of the consistency of the proposed project revisions with the applicable laws, ordinances, regulations, and standards (LORS) and whether the modifications are based upon new information that changes or undermines the assumptions, rationale, findings, or other bases of the final decision (Title 14, CCR Section 1769 (a)(1)(D)). If the project is no longer consistent with the certification, the petition for project change must provide an explanation for why the modification should be permitted.

This Amendment is consistent with all applicable LORS and is not based on new information that changes or undermines any bases for the Decision. The findings and conclusions contained in the Decision for the project are still applicable to the project as modified.

4.0 Potential Effects on the Public

This section discusses the potential effects on the public that may result from the modification proposed in this request for approval, per the Siting Regulations (Title 20, CCR, Section 1769(a) (1) (G)).

The proposed changes will not affect the public. There are no residential homes, hospitals or schools within a 20-mile radius of the plant.

5.0 List of Property Owners and Potential Effects on Property Owners

5.1 List of Property Owners

In accordance with the Siting Regulations (Title 20, CCR, Section 1769(a)(1)(H)), the project owner will provide the Compliance Project Manager for the project a list of all property owners whose property is located within 500 feet of the project.

There are no property owners within 500 feet of the project.

5.2 Potential Effects on Property Owners

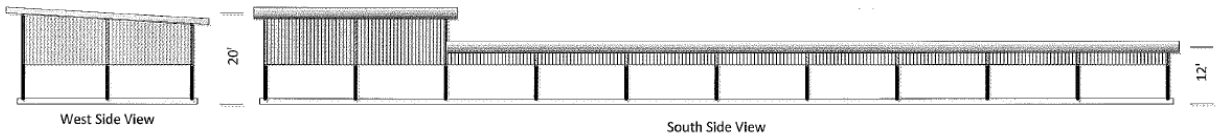
This section addresses potential effects of the modification proposed in this Amendment on nearby property owners, the public, and parties in the application proceeding, per the Siting Regulations (Title 20, CCR, Section 1769 (a)(1)(I)).

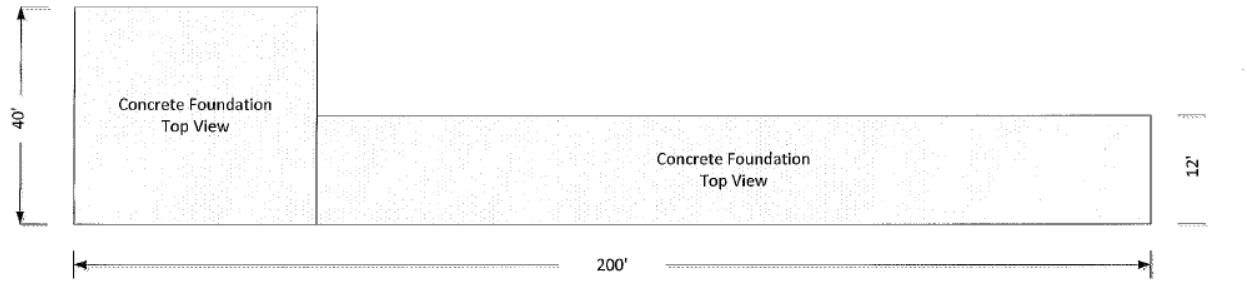
There are no property owners within 500 feet of the project.

6.0 Included Drawings

1)	T1	Lead Sheet_Heavy Equipment Cover
2)	S1.0	General Notes
3)	S1.1	General Notes and Details
4)	S2.0	Foundation Plan
5)	S3.0	Framing Plan
6)	S3.1	Sections
7)	S4.0	Foundation Details
8)	S5.0	Framing Details
9)	S5.1	Framing Details
10)	800.0617	Structural Calculations

Elevation View, Heavy Equipment Covered Parking Structure





GENESIS SOLAR LLC

HEAVY EQUIPMENT COVERED PARKING

SGN-7209

11995 WILEY'S WELL ROAD
BLYTHE, CALIFORNIA 92225

SCOPE OF WORK STATEMENT:

THESE IMPROVEMENTS CONSIST OF THE FOLLOWING WORK TO BE DONE ACCORDING TO THESE PLANS AND SPECIFICATIONS: PROVIDE NEW COVER ED PARKING AREA FOR EQUIPMENT.

PROJECT ADDRESS:

SGN-7209
11995 WILEY'S WELL ROAD
BLYTHE, CALIFORNIA 92225

OWNER

GENESIS SOLAR LLC

700 UNIVERSE BLVD
JUPITER, FL 33408
TELEPHONE: (760) 921-1411

ENGINEERING CONTACTS

DESERT ENGINEERS
75401 PAINTED DESERT DRIVE
INDIAN WELLS, CALIFORNIA 92210
(760) 568-9600

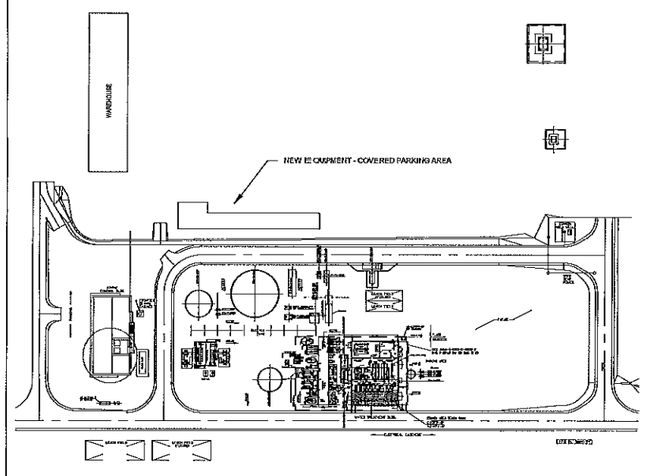
STRUCTURAL ENGINEER - BRAIN GOTTLIEB, PE

NO.#	REMARKS	DATE
1	PLAN CHECK CORRECTIONS	4/17/17
2	PLAN CHECK CORRECTIONS	5/27/17

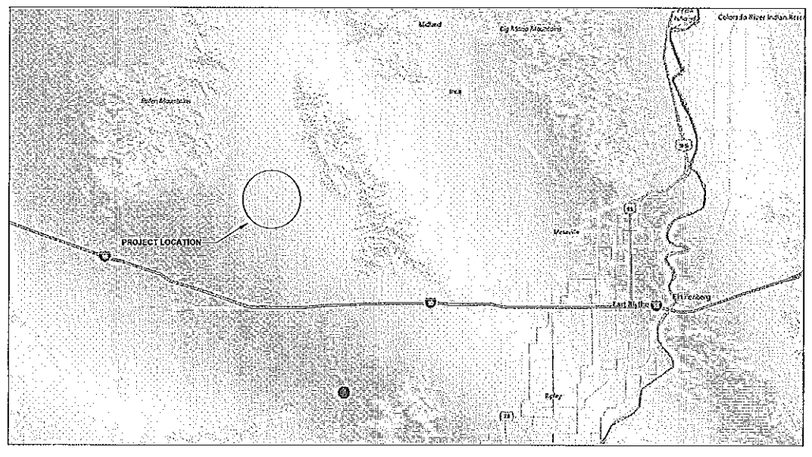
REGISTERED PROFESSIONAL ENGINEER
DENNIS HURVITZ
M21082
Exp. 6/17
MECHANICAL
05/16/17

DESERT ENGINEERS
CONSULTING ENGINEERS
MECHANICAL ELECTRICAL PLUMBING AND STRUCTURAL DESIGN
75401 PAINTED DESERT DRIVE INDIAN WELLS, CA 92210
760 / 568 / 9600
Http://DESERTENGINEERS.COM

HEAVY EQUIPMENT COVERED PARKING
GENESIS SOLAR SGN-7209
11995 Wiley's Well Road
Blythe, CA. 92225



SITE/FACILITY PLAN
NO SCALE



VICINITY MAP
NO SCALE

SHEET INDEX

T-1.0	PROJECT TITLE COVER SHEET
S1.0	GENERAL NOTES
S1.1	GENERAL NOTES AND DETAILS
S2.0	FOUNDATION PLAN
S3.0	FRAMING PLAN
S3.1	SECTIONS
S4	FOUNDATION DETAILS
S5	FRAMING DETAILS
S5.1	FRAMING DETAILS

APPLICABLE CODES

THE WORK SHOWN ON THESE DRAWINGS SHALL BE USED FOR CONSTRUCTION.

APPLICABLE CODES:
2016 CALIFORNIA BUILDING CODE (CBC), TITLE 24 PART 2
2016 CALIFORNIA ELECTRICAL CODE (CEC), TITLE 24 PART 3
2016 CALIFORNIA MECHANICAL CODE (CMC), TITLE 24, PART 4
2016 CALIFORNIA PLUMBING CODE (CPC), TITLE 24, PART 5
2016 CALIFORNIA FIRE CODE, TITLE 24 PART 9.

Bureau Veritas North America
Plan review approval of documents does not authorize construction to proceed in violation of any federal state, nor local regulation, whether shown or not.

Doug Talmage
Digitally signed by Doug Talmage
DN: cn=Doug Talmage, o=BVNA, ou=Power and Utilities, email=doug.talmage@us.bureauveritas.com, c=US
Reason: Reviewed for Code Compliance (STRUCTURAL)
Date: 2017.05.18 11:58:15 -07'00'

Dennis Hurvitz
Digitally signed by Dennis Hurvitz
DN: cn=Dennis Hurvitz, o=Desert Engineers, ou=Desert Engineers, email=Dennis@desertengineers.com, c=US
Reason: I am the author of this document
Date: 2017.05.17 17:31:31 -07'00'

DRAWN BY:	
DATE	12/28/16
SCALE	
JOB NO.	
SHEET	T-1.0
OF	SHEETS

GENERAL NOTES

PERFORM CONSTRUCTION AND WORKMANSHIP IN COMPLIANCE WITH THE DRAWINGS, SPECIFICATIONS AND THE 2016 CALIFORNIA BUILDING CODE (2016 CBC) & 2015 INTERNATIONAL BUILDING CODE (2015 IBC).

GOVERNING CODE AUTHORITY CITY OF BLYTHE, CALIFORNIA.

THE CONTRACTOR SHALL COORDINATE THE WORK OF ALL TRADES AND VERIFY ALL DIMENSIONS PRIOR TO THE START OF CONSTRUCTION. NOTIFY THE STRUCTURAL ENGINEER OF ANY DISCREPANCIES OR INCONSISTENCIES. DO NOT SCALE DRAWINGS.

ALL DETAILS, SECTIONS, AND NOTES SHOWN ON THE DRAWINGS ARE INTENDED TO BE TYPICAL AND SHALL APPLY TO SIMILAR SITUATIONS ELSEWHERE, UNLESS NOTED OTHERWISE. SPECIFIC NOTES AND DETAILS ON THE DRAWINGS TAKE PRECEDENCE OVER THESE GENERAL NOTES AND TYPICAL DETAILS.

CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS AT THE SITE AND SHALL REPORT ANY DISCREPANCIES TO THE STRUCTURAL ENGINEER.

MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS ARE TO BE CONSIDERED PART OF THE DOCUMENT PACKAGE AND ARE TO BE USED TO DEFINE LOCATION AND CONFIGURATIONS INCLUDING BUT NOT LIMITED TO CONCRETE CURB HEIGHT AND LOCATION. FLOOR DRAINS, SLAB DEPRESSIONS, ROOF OPENINGS, DUCT PENETRATIONS, ELECTRICAL CONDUIT RUNS, CONNECTIONS FOR PIPES, DUCTS AND EQUIPMENT, DOORS, WINDOWS, NON-BEARING INTERIOR AND EXTERIOR WALLS, SLOPES, STAIRS, RAILINGS, AND WATERPROOFING.

REFER TO THE ELECTRICAL/MECHANICAL SPECIFICATIONS (WHERE APPLICABLE) FOR INFORMATION NOT COVERED BY THESE GENERAL NOTES OR THE STRUCTURAL DRAWINGS.

ALL OMISSIONS OR CONFLICTS BETWEEN THE VARIOUS ELEMENTS FOR THE WORKING DRAWINGS (AND/OR ELECTRICAL/MECHANICAL SPECIFICATIONS WHERE APPLICABLE) SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND STRUCTURAL ENGINEER BEFORE PROCEEDING WITH ANY OF THE WORK INVOLVED. APPROVAL BY GOVERNING AGENCY DOES NOT CONSTITUTE AUTHORITY TO DEVIATE FROM THE PLANS OR SPECIFICATIONS.

THE CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE, UNLESS OTHERWISE SHOWN. THEY DO NOT INDICATE MEANS AND METHODS OF CONSTRUCTION. CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. PROVIDE ADEQUATE ERECTION SHORING, BRACING AND GUYS THAT COMPLY WITH LOCAL STATE, OSHA AND NATIONAL SAFETY STANDARDS.

THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL EXCAVATION PROCEDURES INCLUDING LAGGING, SHORING AND PROTECTION OF ADJACENT PROPERTY, STRUCTURES, STREETS AND UTILITIES COMPLYING WITH ALL LOCAL STATES OSHA, AND NATIONAL SAFETY STANDARDS. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS AT THE SITE AND SHALL REPORT ANY DISCREPANCIES TO THE STRUCTURAL ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL WORK AND MATERIALS INCLUDING THOSE FURNISHED BY SUB-CONTRACTORS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR BRACING AND SHORING ALL EXCAVATIONS, TEMPORARY AND EXISTING STRUCTURES AND PARTIALLY COMPLETED PORTIONS OF THE WORK TO ASSURE THE SAFETY OF ANY OF ALL WORK AND MATERIALS INCLUDING THOSE PERSONS COMING IN CONTACT WITH THE WORK.

THE CONTRACTOR SHALL INVESTIGATE THE SITE FOR FILLED EXCAVATIONS OR BURIED STRUCTURES SUCH AS FOUNDATIONS, CESSPOOLS, ETC. IF ANY SUCH STRUCTURES ARE FOUND, THE STRUCTURAL ENGINEER SHALL BE IMMEDIATELY NOTIFIED.

OBSERVATION VISITS TO THE SITE BY FIELD REPRESENTATIVES OF THE STRUCTURAL ENGINEER DO NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES, OR METHODS OF CONSTRUCTION. CONSTRUCTION SUPPORT SERVICES PERFORMED BY REPRESENTATIVES OF THE STRUCTURAL ENGINEER SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES PERFORMED BY OTHERS. OBSERVATION VISITS TO THE SITE BY THE ENGINEERS FIELD REPRESENTATIVES SHALL NEITHER BE CONSTRUED AS INSPECTION NOR APPROVAL OF CONSTRUCTION

FOR PROPER FIELD OBSERVATION BY THE STRUCTURAL ENGINEER, THE STRUCTURAL ENGINEER SHALL BE NOTIFIED OF THE VARIOUS CONSTRUCTION PHASES.

NOTIFY THE STRUCTURAL ENGINEER WHEN DRAWINGS BY OTHERS SHOW OPENINGS, HOLES, POCKETS, ETC., IN STRUCTURAL ELEMENTS BUT ARE NOT SPECIFICALLY DETAILED ON THE STRUCTURAL DOCUMENTS.

DURING AND AFTER CONSTRUCTION, BUILDER AND/OR OWNER SHALL KEEP LOADS ON STRUCTURE WITHIN THE LIMITS OF DESIGN LOADS.

ALL CODES AND SPECIFICATIONS NOTED ON THESE DRAWINGS SHALL BE THE LATEST APPROVED EDITIONS AND REVISIONS BY THE GOVERNING CODE AUTHORITY HAVING JURISDICTION OVER THIS PROJECT.

THE CONTRACTOR SHALL REVIEW AND STAMP ALL SHOP DRAWINGS PRIOR TO SUBMISSION TO THE STRUCTURAL ENGINEER. REVIEW THE SHOP DRAWINGS FOR COMPLETENESS AND COMPLIANCE WITH THE CONTRACT DOCUMENTS AND SPECIFICATIONS. SUBMIT A WRITTEN REQUEST TO THE STRUCTURAL ENGINEER FOR APPROVAL OF ANY MODIFICATION OR SUBSTITUTION. SUBSTITUTIONS AND MODIFICATIONS MUST BE APPROVED PRIOR TO SUBMISSION OF THE SHOP DRAWINGS TO THE STRUCTURAL ENGINEER. CLOUD THE SHOP DRAWINGS AT LOCATIONS OF ALL MODIFICATIONS. MAINTAIN A COPY OF ALL APPROVED SHOP DRAWINGS AT SITE DURING CONSTRUCTION.

SHOP DRAWINGS SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT, ARCHITECT AND STRUCTURAL ENGINEER PRIOR TO FABRICATION WITH SUFFICIENT TIME FOR REVIEW OF DESIGN INTENT (MINIMUM OF 10 WORKING DAYS).

ALL ASTM DESIGNATIONS SHALL BE AS AMENDED TO DATE UNLESS NOTED OTHERWISE.

IN NO CASE SHALL WORKING DIMENSIONS BE SCALED FROM PLANS, SECTIONS OR DETAILS ON THE STRUCTURAL DRAWINGS.

VIBRATIONAL EFFECTS OF MECHANICAL EQUIPMENT HAVE NOT BEEN CONSIDERED BY THE STRUCTURAL ENGINEER.

NO FRAMING OF ANY TYPE SHALL BE CONCEALED PRIOR TO INSPECTION BY GOVERNING AGENCIES.

GRADING AND DRAINAGE, ALL PAVING, FLAT WORK AND PLANTERS NEXT TO BUILDING SHALL BE PROPERLY GRADED TO CARRY WATER AWAY FROM BUILDINGS.

NO CHANGES ARE TO BE MADE TO THOSE PLANS WITHOUT THE KNOWLEDGE AND CONSENT OF THE STRUCTURAL ENGINEER WHOSE SIGNATURE APPEARS HEREON.

CONTINUOUS (OR SPECIAL) INSPECTION SHALL MEAN INSPECTION DONE CONTINUOUSLY BY A REGISTERED SPECIAL INSPECTOR CURRENTLY LICENSED BY THE STATE AND THE CITY AND APPROVED BY THE ENGINEER.

FOUNDATION

REFER TO SOIL INVESTIGATION BY: TERRACON CONSULTANTS, INC.
DATED: APRIL 18, 2014 JOB# 60145006 SOIL INVESTIGATION AND ADDENDUM SHALL BE CONSIDERED PART OF THE CONTRACT DOCUMENTS.

ALLOWABLE SOIL PRESSURE: 4000 PSF, ALL REQUIRED FILL AND BACKFILL SHALL BE COMPACTED TO AT LEAST (95%) OF THE MAXIMUM DENSITY OBTAINABLE BY THE ASTM DESIGNATION (D-1557-70T) METHOD OF COMPACTION.

CARRY ALL FOOTINGS A MINIMUM OF 18" INTO NATURAL GRADE OR APPROVED COMPACTED FILL. ACTUAL ELEVATION OF BOTTOM OF FOOTINGS SHALL BE AS DIRECTED BY THE SOILS ENGINEER DURING CONSTRUCTION.

ALL FOOTINGS SHALL BE INSPECTED BY THE BUILDING DEPARTMENT PRIOR TO POURING CONCRETE.

ALL WATER SHALL BE REMOVED FROM FOUNDATION EXCAVATIONS PRIOR TO POURING CONCRETE.

AT ALL POST TENSIONED FOUNDATIONS, SHOP DRAWING SHALL BE SUBMITTED FOR REVIEW BY THE BUILDING DEPARTMENT AND STRUCTURAL ENGINEER.

CAST IN PLACE CONCRETE

SCHEDULE OF STRUCTURAL CONCRETE 28 DAY STRENGTHS AND TYPES:

LOCATION IN STRUCTURE	STRENGTH (P.S.I)	TYPE
SLAB ON GRADE / FOOTINGS	4000 (U.N.O)	HARDROCK
WALLS	4000 (U.N.O)	HARDROCK

CEMENT SHALL CONFORM TO ASTM C150. TYPE V CEMENT SHALL BE USED. MIX DESIGN TO BE IN ACCORDANCE WITH CBC SECTION 1902.2 AND 1905.

PROVIDE SILICEOUS, NORMAL WEIGHT AGGREGATES OF NATURAL SAND AND ROCK CONSISTING OF SILICA OR COMPOUNDS OTHER THAN CALCIUM OR MAGNESIUM CARBONATE FOR HARDROCK CONCRETE. AGGREGATES ARE TO COMPLY WITH ASTM C33 WITH PROVEN SHRINKAGE CHARACTERISTICS OF LESS THAN 0.05%.

ALL REINFORCING STEEL, DOWELS, ANCHOR BOLTS, AND OTHER INSERTS SHALL BE SECURED IN POSITION PRIOR TO POURING CONCRETE OR GROUT. ALL REINFORCEMENT SHALL BE SECURELY HELD IN PLACE WHILE PLACING CONCRETE. IF REQUIRED, ADDITIONAL BARS OR STIRRUPS SHALL BE PROVIDED BY THE CONTRACTOR TO FURNISH SUPPORT FOR ALL BARS.

ANCHOR BOLTS SHALL BE EMBEDDED INTO CONCRETE PER I.B.C. SECTION 1908 AND TABLE 1908.2 OR UNLESS NOTED OTHERWISE.

THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT PLACED IN CAST-IN-PLACE CONCRETE. TOLERANCES SHALL BE AS PER AMERICAN CONCRETE INSTITUTE (ACI-318).

CAST AGAINST AND PERMANENTLY EXPOSED TO GROUND = 3"

FORMED CONCRETE EXPOSED TO EARTH OR WEATHER
- #6 THROUGH #18 BARS = 2"
- #5 BARS W31 OR 631 WIRE, AND SMALLER = 1 1/2"

NOT EXPOSED TO WEATHER OR GROUND
- #14 AND #18 BARS = 1 1/2"
- #11 BAR AND SMALLER = 1"

BEAMS, COLUMNS AND WALL JAMBS PRIMARY REINFORCEMENT, TIES STIRRUPS, AND SPIRALS
- #3 THROUGH # 11 BARS = 1 1/2"
- #14 AND #18 BARS = 2 1/2"

SLABS ON GRADE
- #3 THROUGH #11 BARS = AT CENTER RESTING ON STIRRUPS IN PLACE PRIOR TO POUR

BARS PARALLEL TO COLD JOINTS
- #3 THROUGH #11 BARS = 2

THE CONTRACTOR SHALL PLACE ALL CONCRETE IN COMPLIANCE WITH ACI 301 AND ACI 304.

SUBMIT SHOP DRAWINGS TO THE OWNER AND STRUCTURAL ENGINEER INDICATING LOCATIONS OF ALL CONCRETE CONSTRUCTION JOINTS FOR REVIEW PRIOR TO PLACING CONCRETE. LOCATE JOINTS AT LOCATIONS TO MINIMIZE THE EFFECTS OF SHRINKAGE AS WELL AS LOCATIONS OF MINIMUM SHEAR STRESS.

PROVIDE KEYS IN CONSTRUCTION JOINTS UNLESS DETAILED OTHERWISE. THOROUGHLY CLEAN, REMOVE ALL LAITANCE AND THOROUGHLY WET AND REMOVE STANDING WATER IN CONSTRUCTION JOINTS BEFORE PLACING NEW CONCRETE AT VERTICAL JOINTS SLUSH WITH A COAT OF NEAT CEMENT BEFORE PLACING NEW CONCRETE.

ALL CONCRETE SHALL BE MAINTAINED ABOVE 50 DEGREES FAHRENHEIT AND IN A MOIST CONDITION A MINIMUM OF 7 DAYS AFTER PLACEMENT.

SLUMP IN CONCRETE USED FOR FLAT SURFACES SHALL NOT EXCEED 4 INCHES.

PROJECTING CORNERS OF COLUMNS, BEAMS, WALLS, ETC SHALL BE FORMED WITH A 3/4 INCH CHAMFER, UNLESS NOTED OTHERWISE ON THE ARCHITECT'S DRAWINGS.

ELECTRICAL CONDUIT AND MECHANICAL PIPES IN EXCESS OF 1 INCH DIAMETER SHALL NOT BE EMBEDDED IN CONCRETE UNLESS DETAILED. CONDUIT AND PIPES LESS THAN 1 INCH IN DIAMETER MAY BE EMBEDDED IN SLAB ON GRADE, AND ELEVATED SLABS PROVIDED THE SPACING EXCEEDS 2 INCHES ON CENTER IN HORIZONTAL RUNS, AND ARE PLACED WITHIN THE MIDDLE ONE-THIRD OF THE SECTION DEPTH.

PROVIDE CORNER BARS IN ALL WALLS AND AT WALL INTERSECTIONS TO MATCH SIZE AND SPACING OF HORIZONTAL BARS ON THOSE WALLS.

LOCATION OF SLOTTED INSERTS, WELD PLATES AND ALL OTHER ITEMS TO BE EMBEDDED IN CONCRETE SHALL BE COORDINATED WITH ARCHITECTURAL AND MECHANICAL DRAWINGS.

REINFORCING BARS SHALL NOT BE WELDED UNLESS SPECIFICALLY NOTED ON THE DRAWING AS BEING WELDED. WELDED REINFORCING SHALL CONFORM TO ASTM A706.

ALL CONCRETE WORK SHALL CONFORM TO THE LATEST ACI CODE AND DETAILING MANUAL. ALL CONCRETE CONSTRUCTION PER INTERNATIONAL BUILDING CODE.

DIMENSIONS ARE NOT FURNISHED TO SIMPSON "HDA" OR "PA" TYPE HOLDOWNS, IT IS THE RESPONSIBILITY OF THE CONTRACTOR'S SUPERINTENDENT. THE FRAMING CONTRACTOR AND THE CONCRETE CONTRACTOR TO LOCATE THE EXACT LOCATION REFER TO THE DETAILS AND MANUFACTURER'S SPECIFICATIONS FOR PROPER INSTALLATION

COARSE AGGREGATE OR CONCRETE SHALL NOT CONTAIN LIGNITE, STEEL OR OTHER MATERIALS THAT MAY BE DETRIMENTAL TO THE CONCRETE.

FLY ASH MAYBE SUBSTITUTED FOR A PORTION FOR THE CEMENT. A MAXIMUM OF 20% OF THE CEMENT MAY BE REPLACED BY FLY ASH. WHEN REPLACEMENT IS USED THE REPLACED CEMENT SHALL BE SUBSTITUTED WITH ONE AND ONE HALF TIMES WITH FLY ASH, WATER CEMENT RATIOS SHALL BE BASED ON THE WATER/CEMENT FLY ASH RATIO.

MIX DESIGN SHALL NOT CONTAIN LESS THAN A WATER/CEMENT RATIO OF 0.28.

FOUNDATION (WIDTHS AND DEPTHS), AND REINFORCING AS SHOWN ON PLANS ARE SUPERSEDED BY LOCAL CODES OR ORDINANCES WHICH REQUIRE INCREASES OF THE SAME.

CONCRETE MIX AND STRENGTH F'c AT 28 DAYS, SHALL CONFORM TO THE FOLLOWING TABLE:

LOCATION	UNIT WEIGHT	F'c	MIN CEMENT	MAX W/C#	AIR ENTRAINMENT
SLAB ON GRADE	145 PCF	4000 PSI	470 LB/YD	0.45	3%
FOOTINGS	145 PCF	4000 PSI	470 LB/YD	0.45	3%

REFERENCE I.B.C. SECTION 1904 WHEN SOIL CONTAINS MORE THAN 0.1% SULFATE CONCENTRATION AS STATED IN THE GEOTECHNICAL REPORT.

IF STRENGTH DATA FROM FIELD EXPERIENCE OR TRIAL MIXTURES ARE NOT AVAILABLE, THE MAXIMUM W/C RATIO SHALL BE AS SPECIFIED IN ACI 318 TABLES 4.2.1 AND 4.3.1.

ALL REINFORCING SHALL BE SUPPORTED IN CONFORMANCE WITH THE MANUAL OF STANDARD PRACTICE FOR REINFORCED CONCRETE CONSTRUCTION (THE LATEST ADDITION).

REFER TO MECHANICAL AND ELECTRICAL DRAWINGS FOR MISCELLANEOUS ITEMS TO BE CAST INTO CONCRETE.

INSPECTION IS REQUIRED FOR ALL CONCRETE 3000 PSI OR GREATER BY APPROVED SPECIAL INSPECTOR.

REINFORCING STEEL

PROVIDE REINFORCING STEEL COMPLYING WITH ASTM A615, GRADE 60. PROVIDE REINFORCING STEEL TO BE WELDED COMPLYING WITH ASTM A706, GRADE 60. FOR REINFORCING STEEL AT DUCTILE MOMENT FRAMES AND SHEAR WALLS, PROVIDE REINFORCING STEEL MEETING ASTM A706 AND ACTUAL YIELD STRENGTH BASED ON MILL TESTS NOT TO EXCEED SPECIFIED YIELD BY MORE THAN 18000 PSI AND THE RATIO OF ACTUAL ULTIMATE TENSILE STRESS TO ACTUAL YIELD TENSILE STRESS SHALL NOT BE LESS THAN 1.25.

PROVIDE WELDED WIRE FABRIC COMPLYING WITH ASTM A82 AND A185. LAP WELDED WIRE FABRIC MINIMUM 1-1/2 SPACES OR 12 INCHES. PROVIDE DEFORMED WIRE STIRRUPS COMPLYING WITH ASTM A496 AND A497.

ALL BARS SHALL BE FREE OF LOOSE AND FLAKY RUST AND SCALE, GREASE OR OTHER MATERIALS WHICH MIGHT AFFECT OR IMPAIR BOND.

LAP REINFORCING STEEL AT SPLICES, AT WELL STAGGERED LOCATIONS AND TO THE FOLLOWING MINIMUM LENGTHS UNLESS NOTED OTHERWISE:

#3 AND #4	2'-0"	#8	3'-3"
#5	2'-6"	#9	6'-9"
#6	3'-0"	#10	8'-6"
#7	4'-3"	#11	10'-6"

SPLICE REINFORCING STEEL WHERE INDICATED PER PLAN.

ALL REINFORCING SHALL BE SECURELY TIED AND BRACED IN PLACE PRIOR TO PLACING CONCRETE.

MINIMUM CLEAR DISTANCES BETWEEN BARS INCLUDING AREAS AT SPLICES SHALL BE 1 INCH OR 1 BAR DIAMETER, WHICHEVER IS GREATER. MINIMUM CLEAR DISTANCE AT COLUMNS SHALL BE 1-1/2 INCHES OR 1-1/2 BAR DIAMETERS, WHICHEVER IS GREATER.

DOWELS BETWEEN FOOTINGS AND WALLS OR COLUMNS SHALL BE THE SAME SIZE, GRADE, SPACING AND NUMBER AS THE SPECIFIED VERTICAL REINFORCING AND SHALL LAP AS NOTED ABOVE, UNLESS NOTED OTHERWISE.

WELDING OF REINFORCING STEEL SHALL ONLY OCCUR WITH ASTM A706 BARS AND USING E-90XX LOW HYDROGEN ELECTRODES COMPLYING WITH ANSI/AWS D1.4.

ALL REINFORCING BAR BENDS SHALL BE MADE COLD.

SUBMIT SHOP DRAWINGS TO ARCHITECT INDICATING REINFORCING PLACEMENT FOR REVIEW PRIOR TO FABRICATION. PREPARE SHOP DRAWINGS IN CONFORMANCE WITH ACI 315.

ABBREVIATIONS

AB	ANCHOR BOLT
ABV	ABOVE
BAR	REINFORCING BAR
BB	BOARD
BLKG	BLOCKING
BLW	BELOW
BM	BEAM
BN	BOUNDARY NAIL
BOB	BOTTOM OF BEAM
BW	BOTH WAYS
CF	CONTINOUS FOOTING
CIDH	CAST-IN DRILLED HOLE
CJ	CEILING JOIST
CL	CENTERLINE
COL	COLUMN
CONC	CONCRETE
CONT	CONTINOUS
CPE	CONT PANEL EDGES
D	DEPTH
DBL	DOUBLE
DF	DOUGLAS FIR
DIA	DIAMETER
DO	DITTO
(E)	EXISTING
EJ	EXPANSION JOINT
EN	EDGE NAIL
EQ	EQUAL
EW	EACH WAY
FB	FLOOR BEAM
FG	FINISH GRADE
FJ	FLOOR JOIST
FLR	FLOOR
FMG	FRAMING
FN	FIELD NAIL
FOC	FACE OF CONCRETE
FOM	FACE OF MASONRY
FOS	FACE OF STUDS
FP	FULL PENETRATION
FTG	FOOTING
GA	GAUGE
GALV	GALVANIZED
GLB	GLUE-LAMINATED BEAM
GR BM	GRADE BEAM
GWB	GYPSUM WALLBOARD
GT	GIRDER TRUSS
H	HIGH
HDR	HEADER
HGT	HEIGHT
HGR	HANGER
HORIZ	HORIZONTAL
HSS	HOLLOW STRUCTURAL STEEL
HT	HIP TRUSS
KP	KING POST
L	LOW
LT WT	LIGHT WEIGHT
LVL	LAMINATED VENEER LUMBER

ABBREVIATIONS

RF	ROOF
RJ	ROOF JOIST
RR	ROOF RAFTER
RT	ROOF TRUSSES
SIM	SIMILAR
SIMP	SIMPSON PRODUCT
SM	SHEAR MAX
SMS	SHEET METAL SCREW
SQ	SQUARE
SS	SELECT STRUCTURAL
SSW	SIMPSON STRONG WALL
STD	STANDARD
STL	STEEL
SV	SHEAR WALL
THK	THICK
THRD	THREADED
TN	TOE NAIL
TOC	TOP OF CONCRETE
TOL	TOP OF LEDGER
TOM	TOP OF MASONRY
TOP	TOP OF PLYWOOD
TOS	TOP OF SHEATHING
TOW	TOP OF WALL
TSG	TAPPERED STEEL GIRDER
TYP	TYPICAL
U.N.O	UNLESS NOTED OTHERWISE
VERT	VERTICAL
W	WIDTH OF FOOTING
W/	WITH
WP	WEAKENED PLANE JOINT
WWF	WELDED WIRE FABRIC
DIA @	DIAMETER
@	AT
MAS	MASONRY
MAX	MAXIMUM
MB	MACHINE BOLT
MI	MALLEABLE IRON
MIN	MINIMUM
MLB	MICRO LAM BEAM
NEW	NEW
NG	NATURAL GRADE
O/	OVER
OC	ON CENTER
PJ	POUR JOINT
PLB	PARALLAM BEAM
PLWD	PLYWOOD
PT	PRESSURE TREATED
RB	ROOF BEAM
REINF	REINFORCING
REQ'D	REQUIRED

CONTRACTORS RESPONSIBILITY

EACH CONTRACTOR OR SUB-CONTRACTOR RESPONSIBLE FOR THE CONSTRUCTION OF THE WIND AND/OR SEISMIC RESISTING SYSTEM THAT IS LISTED IN THE STATEMENT OF SPECIAL INSPECTIONS SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE BUILDING OFFICIAL AND THE OWNER PRIOR TO THE COMMENCEMENT OF WORK REQUIRING SPECIAL INSPECTION. THE CONTRACTOR'S STATEMENT OF RESPONSIBILITY SHALL CONTAIN THE FOLLOWING:

1. ACKNOWLEDGEMENT OF AWARENESS OF THE SPECIAL REQUIREMENTS CONTAINED IN THE STATEMENT OF SPECIAL INSPECTIONS.
2. ACKNOWLEDGEMENT THAT CONTROL WILL BE EXERCISED TO OBTAIN CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS APPROVED BY THE BUILDING OFFICIAL.
3. PROCEDURES FOR EXERCISING CONTROL WITHIN THE CONTRACTOR'S ORGANIZATION, THE METHOD AND FREQUENCY OF REPORTING AND THE DISTRIBUTION OF THE REPORTS.
4. IDENTIFICATION AND QUALIFICATIONS OF THE PERSON(S) EXERCISING SUCH CONTROL AND THEIR POSITION(S) IN THE ORGANIZATION.

NOTE
ALL NOTES ON THIS SHEET SHALL APPLY TO EACH SHEET OF THIS SET OF STRUCTURAL DRAWINGS

STRUCTURAL STEEL

STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE AISC SPECIFICATION FOR THE DESIGN FABRICATION AND ERECTION OF STRUCTURAL STEEL BUILDINGS (LATEST EDITION). ALL COLUMN AND DOUBLER PLATES SHALL CONFORM TO ASTM A-572, GRADE 50, FY=50 KSI, AND THE FOLLOWING ASTM STANDARD SPECIFICATIONS, UNLESS NOTED OTHERWISE:
- ALL STRUCTURAL STEEL UNLESS NOTED BELOW = ASTM A992 (50 KSI)
- TUBES = ASTM A500, GRADE B (46 KSI)
- THREADED ROUND STOCK = ASTM A36
- HIGH STRENGTH BOLTS = SEE NOTE BELOW

MILL CERTIFICATES SHALL ACCOMPANY ALL STRUCTURAL STEEL. ALL STRUCTURAL STEEL SHALL BE IDENTIFIABLE IN THE FIELD WITH THE CORRESPONDING MILL CERTIFICATES.

ALL BOLTS SHALL BE UNFINISHED, CONFORMING TO ASTM A307 OF SIZES SHOWN ON DRAWINGS, UNLESS NOTED OTHERWISE.

HIGH STRENGTH BOLTS:
- PROVIDE HIGH STRENGTH BOLTS, NUTS AND WASHERS COMPLYING WITH ASTM A325.
- ALL HIGH STRENGTH BOLTS SHALL BE SLIP-CRITICAL HIGH STRENGTH BOLTS (A325-SC) UNLESS NOTED OTHERWISE.
- ASSEMBLE HIGH STRENGTH BOLTS IN COMPLIANCE WITH THE SPECIFICATION OF STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS.
- TIGHTEN A325-N BOLTS TO A SNUG TIGHT CONDITION. TIGHTEN A325-SC BOLTS TO AT LEAST THE MINIMUM PROPER TENSION USING ONE OF THE FOLLOWING TIGHTENING METHODS: TURN-OF-NUT, CALIBRATED WRENCH OR DIRECT TENSION INDICATOR TIGHTENING.

HEADED STUD ANCHORS SHALL BE MANUFACTURED FROM C1015, C1017, OR C1020 COLD DRAWN STEEL CONFORMING TO ASTM A108 (50 KSI). STUD SIZE SHALL BE AS NOTED ON PLANS.

SUBMIT SHOP DRAWINGS TO THE STRUCTURAL ENGINEER FOR REVIEW PRIOR TO FABRICATION. INDICATE A WELDING PROCEDURE FOR DUCTILE MOMENT FRAMES INCLUDING THE SEQUENCE OF WELDING AT GIRDER TO COLUMN AND COLUMN TO BASE PLATE CONNECTIONS AND COLUMN SPLICES AS WELL AS THE SEQUENCE OF WELDING WITHIN EACH FRAME. SHOP DRAWINGS SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT, ARCHITECT AND STRUCTURAL ENGINEER PRIOR TO FABRICATION WITH SUFFICIENT TIME FOR REVIEW OF DESIGN INTENT (MINIMUM OF 10 WORKING DAYS) ALSO SEE NEXT 3 NOTES BELOW.

A WELDING PROCEDURE SPECIFICATION (W.P.S.) PER A.W.S. D1.1 SHALL BE DEVELOPED BY THE FABRICATOR/ERECTOR AND APPROVED BY THE ENGINEER OF RECORD OR HIS DESIGNEE. THE W.P.M. SHALL INCLUDE THE WELDING PARAMETERS AND PROCEDURES RECOMMENDED BY THE ELECTRODE MANUFACTURER.

COMPLETE JOINT PENETRATION GROOVE WELDS SHALL HAVE A FILLER METAL WITH A NOTCH TOUGHNESS OF 20 FOOT-POUNDS AVERAGE AT 70 DEGREES FAHRENHEIT.

WELD STRUCTURAL STEEL IN COMPLIANCE WITH AWS D1.1-10. WELDERS SHALL BE CERTIFIED AS REQUIRED BY THE GOVERNING CODE AUTHORITY. WELDING SHALL BE DONE BY THE ELECTRIC ARC PROCESS USING APPROVED COATED RODS. WELDING MAYBE PERFORMED USING THE SUBMERGED ARC PROCESS WITH AUTOMATIC WELDING (SAW-1). USE E-90xx LOW HYDROGEN ELECTRODES FOR WELDING OF REINFORCING STEEL. PERFORM SHOP WELDING BY AN APPROVED FABRICATOR.

UNLESS A LARGER SIZE FILLET WELD IS INDICATED, PROVIDE MINIMUM SIZE OF WELD PER AISC. WELD LENGTHS INDICATED ARE THE NET EFFECTIVE LENGTH REQUIRED.

FIELD CUTTING OR BURNING OF STRUCTURAL STEEL IS NOT PERMITTED WITHOUT WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER.

SPLICING OF STRUCTURAL STEEL MEMBERS WHERE NOT DETAILED IS PROHIBITED WITHOUT PRIOR APPROVAL. IF APPROVED, THE CONTRACTOR SHALL HAVE THE CONNECTION TESTED BY ULTRASONIC TESTING METHOD BY AN INDEPENDENT TESTING LAB.

AS REQUIRED APPLY SPRAYED FIREPROOFING OVER STRUCTURAL STEEL WITH MONOKOTE MK6/CBF OR MK/6D AS MANUFACTURED BY W.R. GRACE AND COMPANY AS APPROVED BY ICC EVALUATION REPORT NO 4607. OBTAIN APPROVAL FOR SUBSTITUTE PRODUCTS AS INDICATED IN GENERAL SECTION. HOURLY FIRE RESISTIVE REQUIREMENTS SHALL BE DETERMINED USING TABLE 17-A OF THE CBC.

WHERE EXPOSED STEEL SURFACES ARE EXPOSED TO VIEW IN THE FINISHED WORK. USE ONLY MATERIALS THAT ARE SMOOTH AND FREE FROM SURFACE BLEMISHES. REMOVE SUCH BLEMISHES BY GRINDING OR WELDING AND GRINDING PRIOR TO CLEANING AND APPLICATION OF FINISHES.

SHOP PRIME ALL STRUCTURAL STEEL, EXCEPT AT CONNECTION LOCATIONS, AND STEEL WHICH REQUIRES FIREPROOFING.

BOLT HOLES IN STEEL SHALL BE 1/16 INCH LARGER IN DIAMETER THAN THE NORMAL SIZE OF THE BOLT USED EXCEPT AS NOTED.

FABRICATOR SHALL REVIEW THE WELDING PROCESS AND MATERIALS TO ENSURE CONFORMANCE WITH THE LATEST SAC/FEMA GUIDELINES AND RECOMMENDATIONS.

MINIMUM NOMINAL TENSILE STRENGTH OF WELD METAL SHALL BE 70 KSI.

STRUCTURAL STEEL CONTRACTOR IS RESPONSIBLE FOR VERIFYING AND COORDINATING ALL DIMENSIONS AND ELEVATIONS SHOWN ON STRUCTURAL DRAWINGS WITH MECHANICAL/ELECTRICAL DRAWINGS IN CASE OF CONFLICTS THE ENGINEER OF RECORD IS TO BE NOTIFIED.

CONTINUOUS INSPECTION REQUIRED FOR ALL FIELD WELDING BY APPROVED SPECIAL INSPECTOR.

STRUCTURAL OBSERVATION

STRUCTURAL OBSERVATION IS REQUIRED IN ACCORDANCE W/ SECTION 1704.6 OF THE 2016 CALIFORNIA BUILDING CODE. STRUCTURAL OBSERVATION SHALL BE REQUIRED ON FOUNDATIONS PRIOR TO POUR BY A CALIFORNIA LICENSED CIVIL AND/OR STRUCTURAL ENGINEER.

STATEMENT OF SPECIAL INSPECTIONS

IN ADDITION TO THE REGULAR INSPECTIONS, THE FOLLOWING CHECKED ITEMS WILL ALSO REQUIRE SPECIAL INSPECTION IN ACCORDANCE WITH SEC. 1709 OF THE INTERNATIONAL BUILDING CODE & SEC 1704 & 1705 OF THE CBC

ITEM	REQUIRED?	REMARKS
SOILS COMPLIANCE PRIOR TO FOUNDATION INSPECTION	YES	SEE SOILS REPORT
STRUCTURAL CONCRETE OVER 2,500 PSI	YES	4000 PSI
FIELD WELDING	YES	

SEE SHEET S-1.1 FOR ADDITIONAL INFORMATION

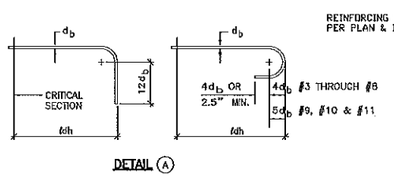
TESTS AND INSPECTIONS

1. PROVIDE ALL STRUCTURAL MATERIAL FROM TESTED STOCK, FURNISH COPIES OF TEST REPORTS TO ARCHITECT & GOVERNING CODE AUTHORITY UPON REQUEST.
2. SEE SPECIAL INSPECTION TABLE(S) ON SHEET S-1.1 FOR CONCRETE, SOILS AND STEEL.
3. THE USE OF ROLLED STEEL SECTIONS, BOLTS, & OR REBAR MANUFACTURED OUTSIDE THE UNITED STATES WILL REQUIRE VERIFICATION THAT THE PRODUCTS COMPLY WITH APPLICABLE ASTM STANDARD. FOREIGN STEEL WILL REQUIRE MILL CERTIFICATES, & REPRESENTATIVE TESTING BY AGENCIES APPROVED BY THE GOVERNING CODE AUTHORITY TO DEMONSTRATE COMPLIANCE. ALL FOREIGN BOLTS & CONNECTORS SHALL BE APPROVED BY THE GOVERNING CODE AUTHORITY.
4. A TESTING LABORATORY SHALL PROVIDE CONTINUOUS INSPECTION, COMPLYING WITH CHAPTER 17 OF THE 2016 CBC FOR THE FOLLOWING:
   - A. FIELD WELDING
   - B. CONCRETE

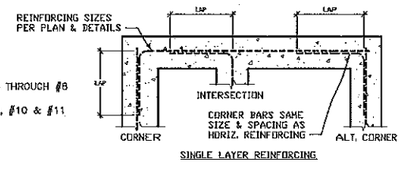
REBAR SPLICE AND EMBED LENGTH SCHEDULE

BAR #	CONC. f'c = 4000 PSI						
	LAP SPLICE LENGTHS			DEVELOPMENT LENGTH			
	COLUMNS	TOP BAR	OTHER	COLUMNS	TOP BAR	OTHER	STANDARD HOOKS l_{dh}
3	12"	21"	16"	8"	16"	12"	6"
4	12"	27"	21"	8"	21"	16"	8"
5	21"	51"	39"	15"	39"	30"	11"
6	25"	61"	47"	18"	47"	36"	13"
7	30"	89"	69"	21"	69"	53"	15"
8	34"	102"	78"	24"	78"	60"	17"
9	38"	115"	88"	27"	88"	68"	19"
10	43"	129"	99"	31"	99"	77"	22"
11	47"	143"	110"	34"	110"	85"	24"

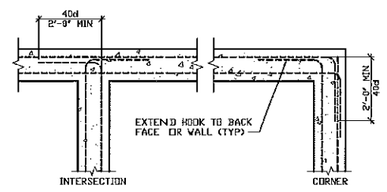
NOTES:
1. LAP SPLICES IN BEAMS ARE NOT PERMITTED WITHIN JOINTS, NOR WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH FROM THE FACE OF THE JOINT, NOR AT CENTER 1/3 OF BEAM SPAN FOR BOTTOM REINFORCING, NOR AT END 1/3 OF BEAM SPAN FOR TOP REINFORCING.
2. LAP SPLICES IN BEAMS SHALL BE PERMITTED ONLY IF HOOP REINFORCEMENT IS PROVIDED AT A MAXIMUM SPACING OF 4" O/C ALONG THE LAP LENGTH.
3. WHEN BARS OF DIFFERENT SIZE ARE LAP SPLICED IN COMPRESSION, SPLICE LENGTH SHALL BE OF THE DEVELOPMENT LENGTH OF LARGER BAR OR SPLICE LENGTH OF SMALLER BAR.
4. COLUMN LAP SPLICE LENGTH SPECIFIED IS WHERE TIES ARE USED THROUGHOUT THE LAP SPLICE LENGTH. FOR OTHER CONDITIONS USE 30db AS THE COLUMN LAP SPLICE LENGTH.
5. LENGTHS SHOWN ARE FOR HOOKS WITH SIDE COVER (NORMAL TO PLANE OF HOOK) NOT LESS THAN 2-1/2" AND FOR 90° HOOK, COVER ON BAR EXTENSION BEYOND HOOK NOT LESS THAN 2". FOR OTHER CONDITIONS MULTIPLY ABOVE STANDARD HOOK DEVELOPMENT LENGTH BY 1.43.
6. SPLICE AND EMBEDMENT LENGTHS ARE IN INCHES. SPLICES SHALL BE CLASS "B".
7. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12" CONCRETE BELOW, OTHER BARS ARE BOTTOM OR VERTICAL BARS.
WHERE REQUIRED EMBEDMENT CANNOT BE OBTAINED WITH STRAIGHT BARS, PROVIDE 180° OR 90° HOOK EQUALING LENGTH BELOW.
SCHEDULE IS FOR GRADE 60 BARS EXCEPT #3 AND #4 WHICH ARE FOR GRADE 40 BARS.



DETAIL (A)

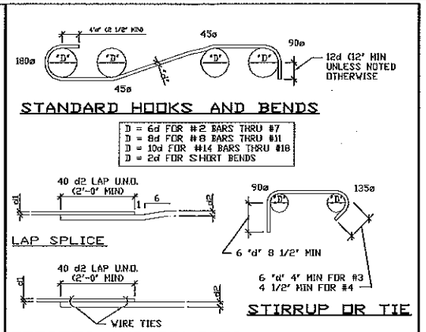


REINFORCING LAYOUT



NOTE:
1. WHERE SINGLE LAYER OF REINF OCCURS, BEND REINF AS SHOWN FOR OUTSIDE BARS.
2. DETAIL APPLIES TO FOOTINGS, BEAMS AND CONCRETE WALLS
3. d = BAR DIAMETER

TYP REINFORCING AT INTERSECTION



STANDARD HOOKS AND BENDS

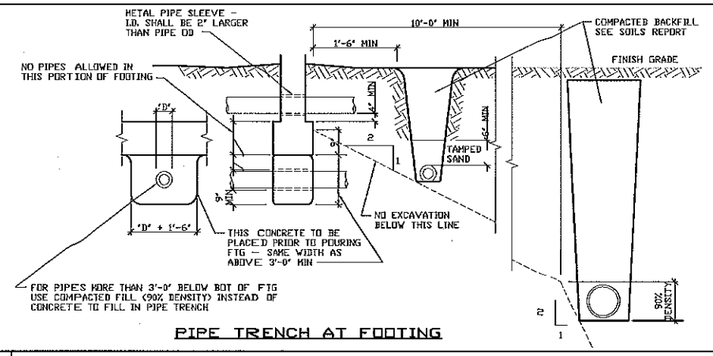
D = 6d FOR #2 BARS THRU #7
D = 8d FOR #8 BARS THRU #11
D = 10d FOR #14 BARS THRU #18
D = 2d FOR SHORT BENDS

STIRRUP OR TIE

OFFSETS AND SPLICES

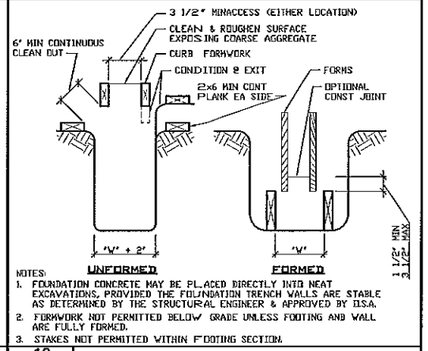
1 / S-1.1 GENERAL DETAIL

5 / S-1.1 GENERAL DETAIL



PIPE TRENCH AT FOOTING

8 / S-1.1 GENERAL DETAIL



NOTES:
1. FOUNDATION CONCRETE MAY BE PLACED DIRECTLY INTO NEAT EXCAVATIONS, PROVIDED THE FOUNDATION TRENCH WALLS ARE STABLE AS DETERMINED BY THE STRUCTURAL ENGINEER & APPROVED BY B.S.A.
2. FORWORK NOT PERMITTED BELOW GRADE UNLESS FOOTING AND WALL ARE FULLY FORMED.
3. STAKES NOT PERMITTED WITHIN FOOTING SECTION.

10 / S-1.1 GENERAL DETAIL

(CBC 2016) TABLE 1705A2.1 REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION

TYPE OF VERIFICATION AND INSPECTIONS	CONTINUOUS	PERIODIC	REFERENCED STANDARD [a]	IBC REFERENCE
1. MATERIAL VERIFICATION OF HIGH-STRENGTH BOLTS, NUTS AND WASHERS:				
a. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS	-	X	AISC 360, SECTION A3.3 AND APPLICABLE ASTM MATERIAL STANDARDS	-
b. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED	-	X	-	-
2. INSPECTION OF HIGH-STRENGTH BOLTING:				
a. SNUG TIGHT JOINTS	-	X	AISC 360, SECTION M2.5	-
b. PRETENSIONED AND SLIP-CRITICAL JOINTS USING TURN-OF-NUT WITH MATCHMARKING, TWIST-OFF BOLT OR DIRECT TENSION INDICATOR METHODS OF INSTALLATION	-	X		-
c. PRETENSIONED AND SLIP-CRITICAL JOINTS USING TURN-OF-NUT WITHOUT MATCHMARKING OR CALIBRATED WRENCH METHODS OF INSTALLATION	X	-		-
3. MATERIAL VERIFICATION OF STRUCTURAL STEEL AND COLD-FORMED STEEL DECK:				
a. FOR STRUCTURAL STEEL, IDENTIFICATION MARKINGS TO CONFORM TO AISC 360	-	X	AISC 360, SECTION A3.1	2203A.1
b. FOR OTHER STEEL, IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS	-	X	APPLICABLE ASTM MATERIAL STANDARDS	-
c. MANUFACTURER'S CERTIFIED TEST REPORTS	-	X	-	-
4. MATERIAL VERIFICATION OF WELD FILLER MATERIALS:				
a. IDENTIFICATION MARKINGS TO CONFORM TO AWS SPECIFICATION IN THE APPROVED CONSTRUCTION DOCUMENTS	-	X	AISC 360, SECTION A3.5 AND APPLICABLE AWS A5 DOCUMENTS	-
b. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED	-	X	-	-
5. INSPECTION OF WELDING:				
a. STRUCTURAL STEEL AND COLD-FORMED STEEL DECK:				
1. COMPLETE AND PARTIAL JOINT PENETRATION GROOVE WELDS	X	-	AWS D1.1 AWS D1.8	1705A2.1
2. MULTIPASS FILLET WELDS	X	-		
3. SINGLE-PASS FILLET WELDS > 5/16"	X	-		
4. PLUG AND SLOT WELDS	X	-		
5. SINGLE-PASS FILLET WELDS ≤ 5/16"	-	X		
6. FLOOR AND ROOF DECK WELDS	-	X	AWS D1.3	
b. REINFORCING STEEL:				
1. VERIFICATION OF WELDABILITY OF REINFORCING STEEL OTHER THAN ASTM A706	-	X	AWS D1.4, ACI 318: SECTIONS 26.6.4.1, 18.2.8, 25.5.7.4	-
2. REINFORCING STEEL RESISTING FLEXURAL AND AXIAL FORCES IN INTERMEDIATE AND SPECIAL MOMENT FRAMES, AND BOUNDARY ELEMENTS OF SPECIAL STRUCTURAL WALLS OF CONCRETE AND SHEAR REINFORCEMENT	X	-		-
3. SHEAR REINFORCEMENT	X	-		-
4. OTHER REINFORCING STEEL	-	X		-

FOR SI: 1 inch = 25.4 mm
a. WHERE APPLICABLE, SEE ALSO SECTION 1705A.12, SPECIAL INSPECTION FOR SEISMIC RESISTANCE.

1 REVISED

16 / S-1.1 SPECIAL INSPECTION TABLE (STEEL)

(CBC 2016) TABLE 1705.3 REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION

TYPE OF VERIFICATION AND INSPECTIONS	CONTINUOUS	PERIODIC	REFERENCED STANDARD [a]	IBC REFERENCE
1. INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT	-	X	ACI 318: Ch. 20, 25.2 25.3, 26.5.1-26.5.3	1908.4
3. INSPECT ANCHORS CAST IN CONCRETE	-	X	ACI 318: 17.8.2	-
5. VERIFYING USE OF REQUIRED DESIGN MIX	-	X	ACI 318: Ch. 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
6. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE	X	-	ASTM C172 ASTM C31 ACI 318: 26.4.5, 26.12	1908.10
7. INSPECTION OF CONCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES	X	-	ACI 318: 26.4.5	1908.6, 1908.7, 1908.8
8. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES	-	X	ACI 318: 26.4.7-26.4.9	1908.9
12. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED	-	X	ACI 318: 26.10.1(b)	-

FOR SI: 1 inch = 25.4 mm
a. WHERE APPLICABLE, SEE ALSO SECTION 1705.12 SPECIAL INSPECTION FOR SEISMIC RESISTANCE.
b. SPECIFIC REQUIREMENTS FOR SPECIAL INSPECTIONS SHALL BE INCLUDED IN THE RESEARCH REPORT FOR THE ANCHOR ISSUED BY AN APPROVED SOURCE IN ACCORDANCE WITH 1703.2 IN ACI 318, OR OTHER QUALIFICATION PROCEDURES. WHERE SPECIFIC REQUIREMENTS ARE NOT PROVIDED, SPECIAL INSPECTION REQUIREMENTS SHALL BE SPECIFIED BY THE REGISTERED DESIGN PROFESSIONAL AND SHALL BE APPROVED BY THE BUILDING OFFICIAL PRIOR TO THE COMMENCEMENT OF THE WORK.

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18 / S-1.1 SPECIAL INSPECTION TABLE (CONCRETE)

(CBC 2016) TABLE 1705.6 REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS

TYPE OF VERIFICATION AND INSPECTIONS	CONTINUOUS SPECIAL INSPECTIONS	PERIODIC SPECIAL INSPECTIONS
1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY	-	X
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL	-	X
3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS	-	X
4. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL	X	-
5. PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY	-	X

1 REVISED

15 / S-1.1 SPECIAL INSPECTION TABLE (SOILS)

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20 / S-1.1 BG DISCLAIMER

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B.G. STRUCTURAL ENGINEERING, INC.
LIC. NO. C33047
BRIAN GOTTLIEB
CIVIL ENGINEER
(760) 568-3563 FAX
(760) 568-6681 E-MAIL: Cal@pgstructural.com
75-175 HEGLE DRIVE, SUITE 206
PALM DESERT, CA 92211

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CONSULTING ENGINEERS
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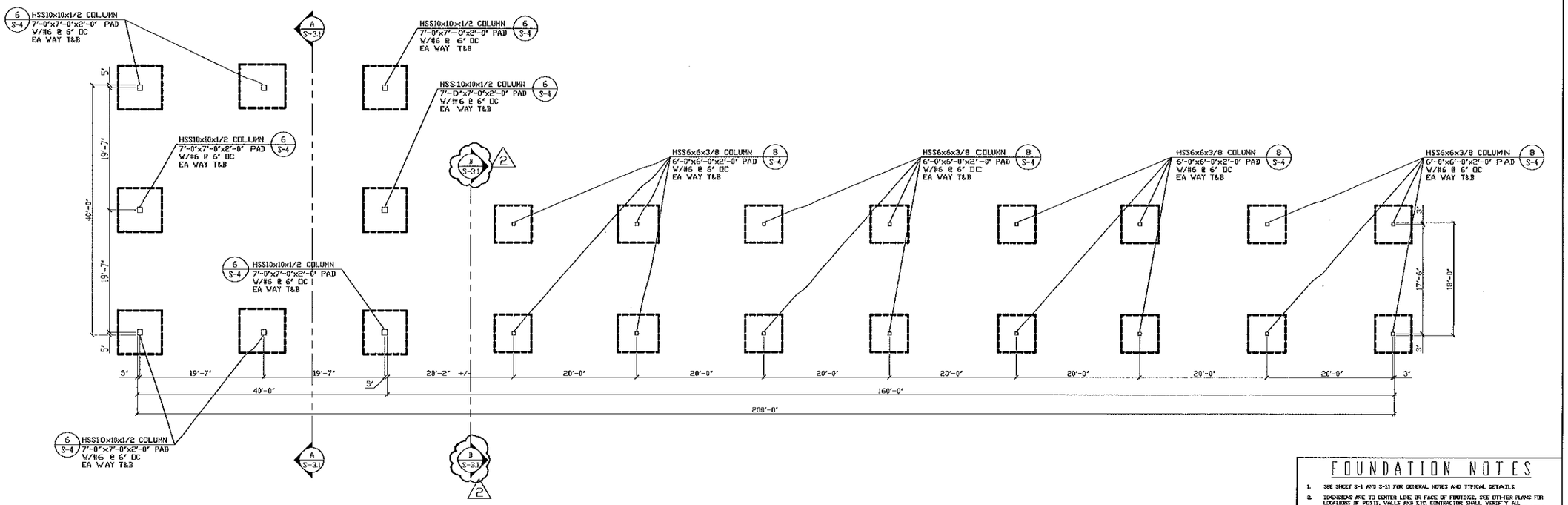
GENERAL NOTES & DETAILS

HEAVY EQUIPMENT COVERED PARKING
GENESIS SOLAR SGN-7209
11995 Wiley's Well Road
Blythe, CA. 92225

DRAWN BY:	SB
DATE	3/16/17
SCALE	N.T.S.
JOB NO.	800.0617
SHEET	S-1.1
OF	SHEETS



HEAVY EQUIPMENT COVERED PARKING - FOUNDATION PLAN

SCALE: 1/8" = 1'-0"

FOUNDATION NOTES

1. SEE SHEET S-1 AND S-11 FOR GENERAL NOTES AND TYPICAL DETAILS
2. DIMENSIONS ARE TO CENTER LINE OR FACE OF FOOTINGS, SEE OTHER PLANS FOR LOCATIONS OF POSTS, WALLS AND ETC. CONTRACTOR SHALL VERIFY ALL DIMENSIONS WITH THE OWNER AND ARCHITECT PRIOR TO COMMENCEMENT OF WORK.
3. ALL CONTINUOUS FOOTINGS SHALL EXTEND A DISTANCE EQUAL TO THE FOOTING DEPTH BEYOND THE END OF THE STUD WALL, UNLESS NOTED OTHERWISE. NO EXTENSION IS REQUIRED WHERE CONTINUOUS FOOTINGS CHANGE DIRECTION, UNLESS NOTED OTHERWISE.
4. VERIFY LOCATIONS OF ALL UNDERGROUND CONDUITS WITH THE ELECTRICAL, MECHANICAL AND PLUMBING DRAWINGS.
5. WRITTEN VERIFICATION FROM SOILS ENGINEER THAT HE HAS REVIEWED FOUNDATION PLANS AND DETAILS FOR CONFORMANCE WITH SOILS REPORT SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT.
6. SOILS ENGINEER SHALL BE RETAINED TO OBSERVE ALL GRADING, EXCAVATION, COMPACTION AND FOUNDATION CONSTRUCTION PROCEDURES.
7. PAD PREPARATION AND SOIL COMPACTION IF ANY REQUIRED SHALL BE DONE PER THE SOILS REPORT RECOMMENDATIONS.
8. ALL WELDING TO BE DONE IN A BUILDING DEPARTMENT APPROVED SHOP. IF FIELD WELDING IS REQUIRED, APPROVAL TO BE BY ARCHITECT OR STRUCTURAL ENGINEER - SPECIAL INSPECTION PROVIDED BY OWNER IS REQUIRED FOR ALL FIELD WELDING.
9. VERIFY ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS PRIOR TO COMMENCEMENT OF WORK.
10. SOILS ENGINEER TO REVIEW AND APPROVE ALL FOUNDATIONS AND FOUNDATION DETAILS PER FINAL SOILS REPORT PRIOR TO ISSUANCE OF PERMIT.
11. BACKFILL SHALL BE IN PLACE & SUBJECT TO INSPECTION PRIOR TO POURING THE GRADE BEAM / SLAB.
12. PRIOR TO THE CONTRACTOR REQUESTING A BUILDING DEPARTMENT FOUNDATION INSPECTION, THE SOILS ENGINEER SHALL ADVISE THE BUILDING OFFICIAL, IN WRITING, THAT:
    a) THE BUILDING PAD WAS PREPARED IN ACCORDANCE WITH THE SOILS REPORT
    b) THE UTILITY TRENCHES HAVE BEEN PROPERLY BACKFILLED AND COMPACTED, AND
    c) THE FOUNDATION EXCAVATIONS COMPLY WITH THE INTENT OF THE SOILS REPORT
13. ADDITIONAL TESTS AS PROOF OF COMPLIANCE MAY BE REQUIRED BY THE BUILDING OFFICIAL TO BE MADE AT NO EXPENSE TO THE JURISDICTION (CBC 1704.2)

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"SOILS COMPACTION TEST AND APPROVAL REQUIRED BY SOILS ENGINEER AFTER FOUNDATION EXCAVATION AND CERTIFICATE OF ACCEPTANCE SHALL BE READY AT TIME OF FOUNDATION INSPECTION. THIS IS TO BE PROVIDED FOR ANY FOUNDATION WORK AT THE REQUEST OF THE INSPECTOR."

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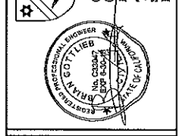
B.G. STRUCTURAL ENGINEERING, INC.
LIC. NO. C33047
BRIAN GOTTLIEB - CIVIL ENGINEER
(760) 568-2451 FAX
(760) 568-5681 EMAIL: Cad@bgstructural.com
75-175 MERLE DRIVE, SUITE 200, PALM DESERT, CA 92211



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FOUNDATION PLAN

HEAVY EQUIPMENT COVERED PARKING
GENESIS SOLAR SGN-7209
11995 Wiley's Well Road
Blythe, CA. 92225

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DATE	3/16/17
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JOB NO.	800.0617
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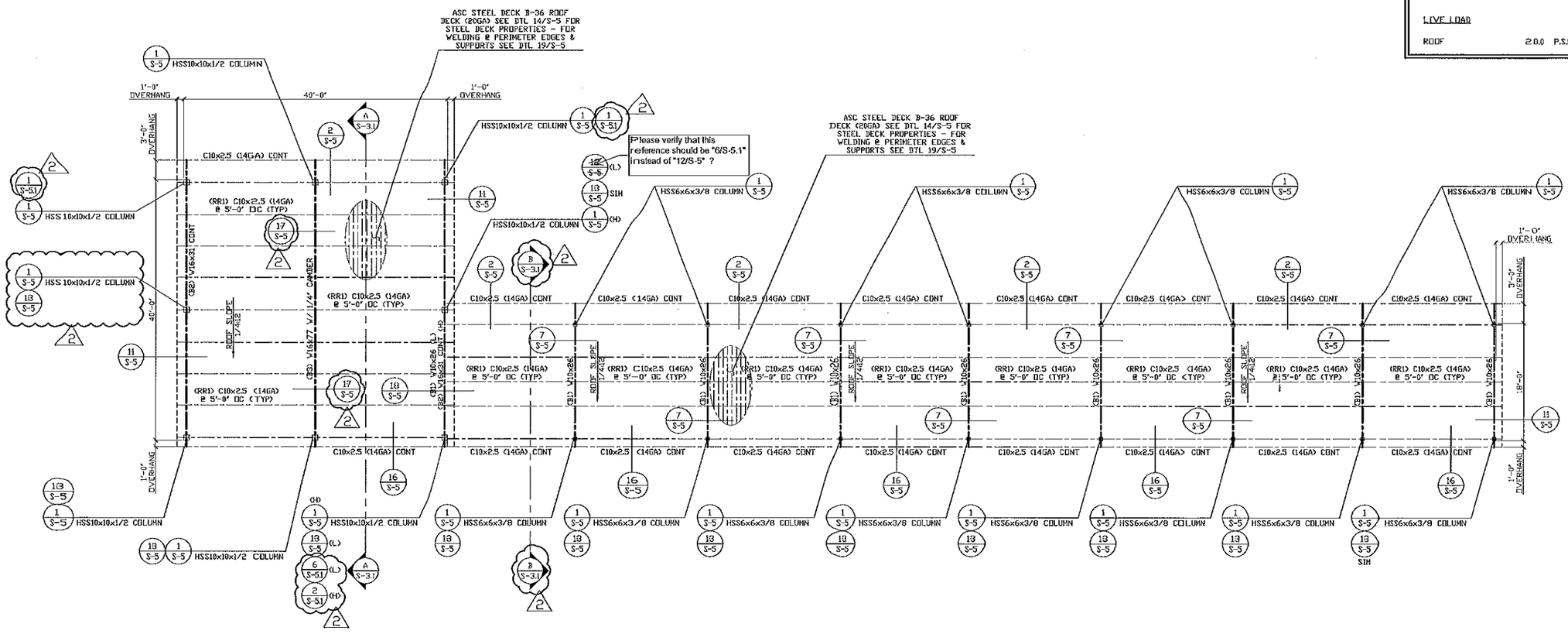
OF	SHEETS



HEAVY EQUIPMENT COVERED PARKING - FRAMING PLAN

SCALE: 1/8" = 1'-0"

ROOF LOADS

DEAD LOAD

FLAT ROOF 5.0 P.S.F.

LIVE LOAD

ROOF 20.0 P.S.F.

FRAMING NOTES

1. SEE SHEET S-1 AND S-1.1 FOR GENERAL NOTES AND TYPICAL DETAILS.
2. PROVIDE STRIPPING WHERE REQUIRED TO PROVIDE A UNIFORM SURFACE WHERE FLUSH JOIST AND BEAMS ARE DIFFERENT DEPTH.
3. SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL STRUCTURAL STEEL FOR ENGINEER'S REVIEW PRIOR TO FABRICATION.
4. ALL FIELD WELDING SHALL BE DONE BY CERTIFIED WELDERS UNDER THE OBSERVATION OF AN APPROVED SPECIAL INSPECTOR. SUCH INSPECTOR SHALL SUBMIT HIS/HER CREDENTIALS FOR REVIEW OF APPROVAL BY THE LOCAL CITY DEPARTMENT OF BUILDING & SAFETY PRIOR TO REPORTING TO THE JOBSITE.
5. ALL CONNECTORS TO BE 'SIDPSTN' OR APPROVED EQUAL GUND.
6. ALL SHOP WELDING SHALL BE DONE BY A FABRICATOR APPROVED BY THE LOCAL CITY DEPARTMENT OF BUILDING & SAFETY PER CBC SECTION 1704.2 OR IN LIEU OF FABRICATOR APPROVAL, THE OWNER MAY EMPLOY A SPECIAL INSPECTOR, WHICH IS TO BE APPROVED BY THE LOCAL CITY DEPARTMENT OF BUILDING & SAFETY, WHO WILL INSPECT ALL PHASES OF SHOP WELDING DURING SUCH TIMES THE WELDING IS TAKING PLACE. THE FABRICATOR OR SPECIAL INSPECTOR SHALL SUBMIT THEIR CREDENTIALS FOR REVIEW AND APPROVAL BY THE DEPARTMENT OF BUILDING & SAFETY PRIOR TO THE START OF FABRICATION OR INSPECTION.

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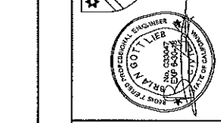
LIC. NO. C39047
BRIAN GOTTLIEB - CIVIL ENGINEER
(760) 568-3553 FAX
(760) 568-5681 EMAIL: Cad@bgstructural.com
75-175 MERLE DRIVE, SUITE 200, PALM DESERT, CA. 92211



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FRAMING PLAN

HEAVY EQUIPMENT COVERED PARKING
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11995 Wiley's Well Road
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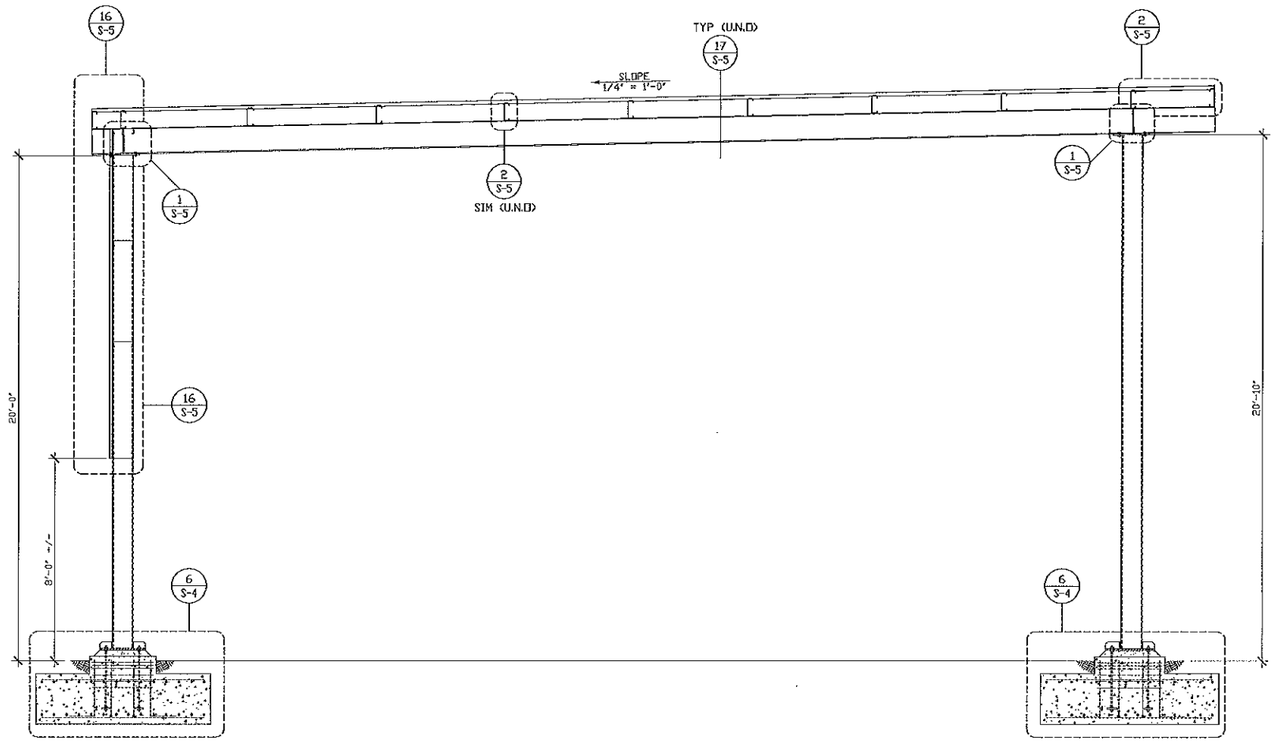
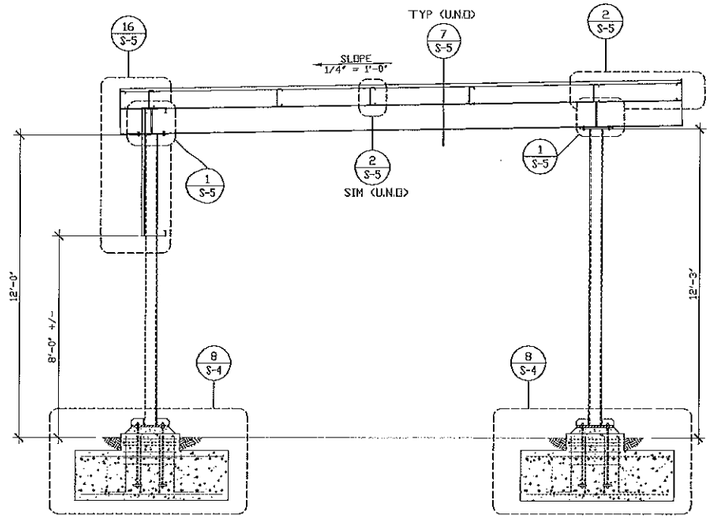
OF	SHEETS



HEAVY EQUIPMENT COVERED PARKING - SECTION A

SCALE: 3/8" = 1'-0"



HEAVY EQUIPMENT COVERED PARKING - SECTION B

SCALE: 3/8" = 1'-0"

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Doug Talmage

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BRIAN GOTTLIEB - CIVIL ENGINEER
(760) 568-3553 FAX
(760) 568-5651 EMAIL: Cae@bgstructural.com
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PALM DESERT, CA. 92211

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MECHANICAL ELECTRICAL PLUMBING AND STRUCTURAL DESIGN
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SECTIONS

HEAVY EQUIPMENT COVERED PARKING
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Blythe, CA. 92225

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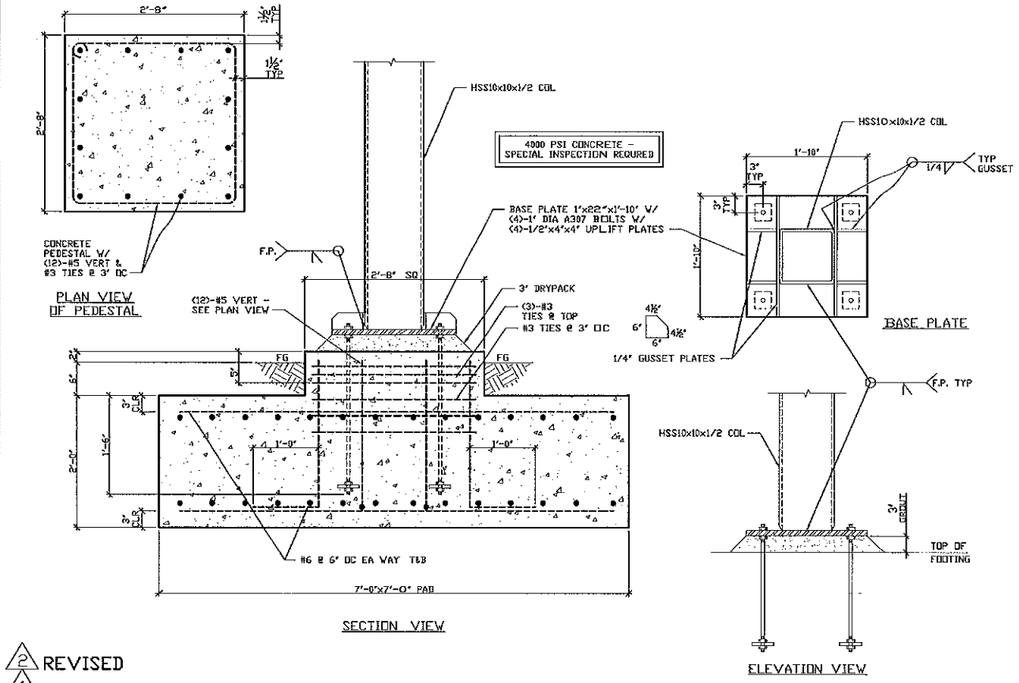
DATE	3/16/17
SCALE	AS NOTED
JOB NO.	800.0617
SHEET	1

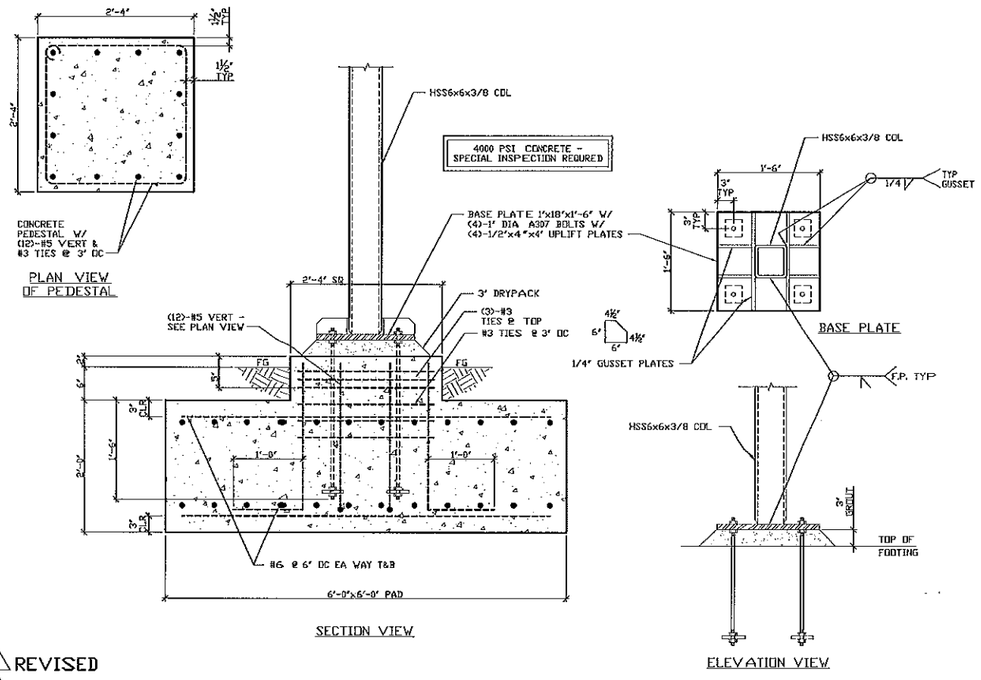
S-3.1

OF SHEETS



2 REVISED
1 REVISED

6 S-4 FOUNDATION DETAIL



2 REVISED
1 REVISED

8 S-4 FOUNDATION DETAIL

11 S-4	FOUNDATION DETAIL	12 S-4	FOUNDATION DETAIL	13 S-4	FOUNDATION DETAIL	14 S-4	FOUNDATION DETAIL	15 S-4	FOUNDATION DETAIL
16 S-4	FOUNDATION DETAIL	17 S-4	FOUNDATION DETAIL	18 S-4	FOUNDATION DETAIL	19 S-4	FOUNDATION DETAIL	20 S-4	BG DISCLAIMER

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Dennis Hurvitz — Digitally signed by Dennis Hurvitz DN: cn=Dennis Hurvitz, o=Desert Engineers, ou=Desert Engineers, email=Dennis@cdesertengineers.com, c=US Reason: I am the author of this document Date: 2017.05.11 11:35:40 -07'00'

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LIC. NO. C33047
BRIAN GOTTLIEB - CIVIL ENGINEER
(760) 568-5553 FAX
(760) 568-5681 EMAIL: Cat@bgstructural.com
75-175 MERLE DRIVE, SUITE 200, PALM DESERT, CA 92211

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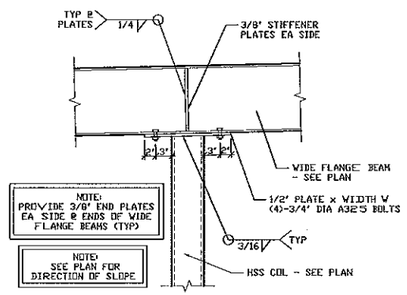
Blythe, CA. 92225

DRAWN BY:	SB
DATE	3/16/17
SCALE	N.T.S.
JOB NO.	800.0617
SHEET	S-4
OF	SHEETS



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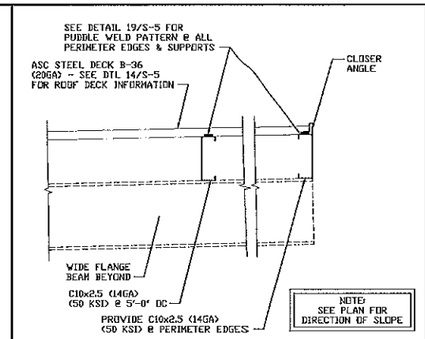

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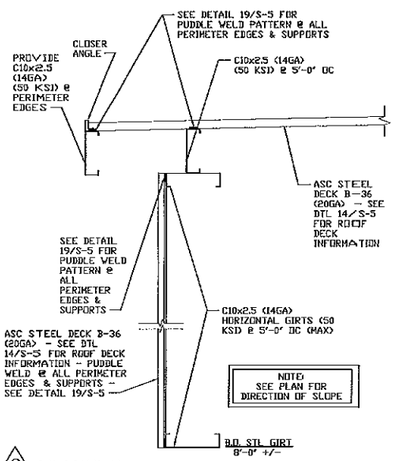

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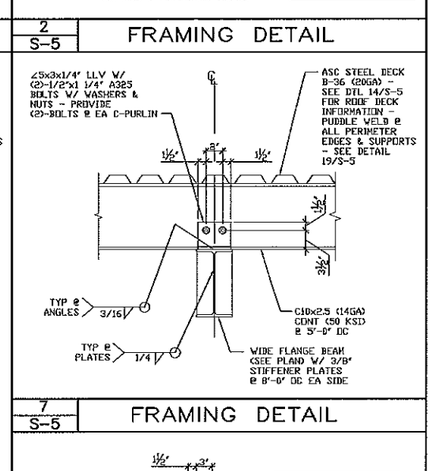

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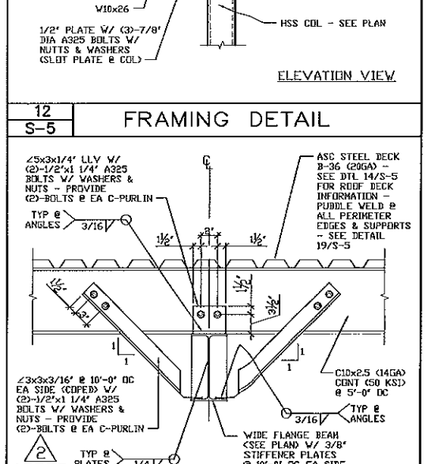

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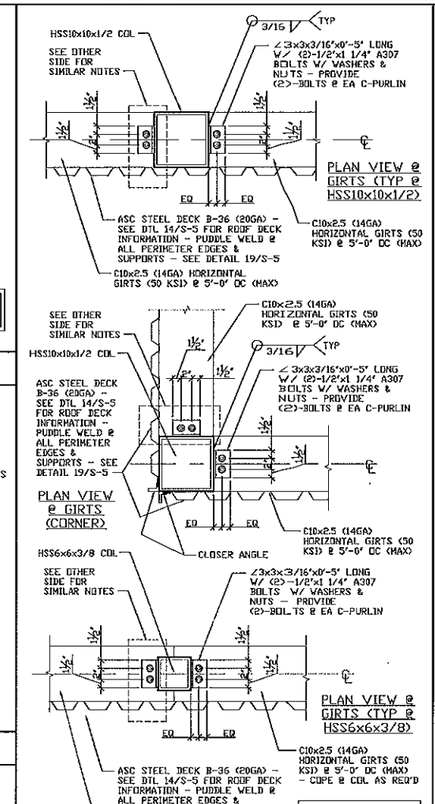

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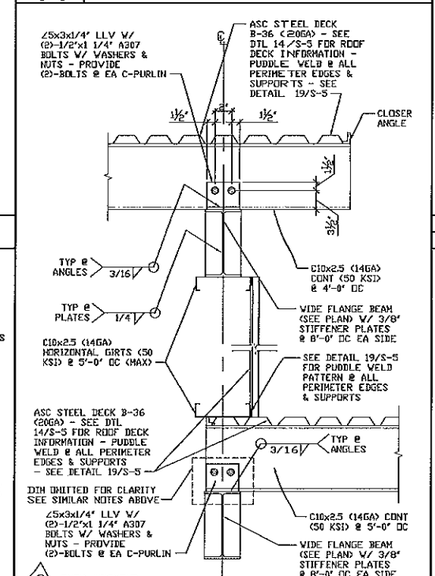
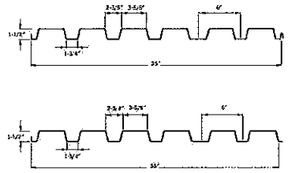


2 REVISED

18 S-5 FRAMING DETAIL

ASC Steel Deck

B-36 Roof Deck



B-36 Nestable

The **B-36 profile** has been enhanced via physical testing to give you the highest diaphragm shear values of any of our prior B-series profiles.

Note: B 35 1/4" – Sacramento

B-36 Section Properties

Gauge	Weight (psf)	I (in4)	S+ (in3)	S- (in3)
22	1.68	0.178	0.18	0.195
20	2.04	0.22	0.235	0.246
18	2.7	0.302	0.321	0.336
16	3.36	0.379	0.407	0.415

1. Section properties are based on minimum 33ksi steel (fy).

B-36 Allowable Reactions (plf)

Gauge	Bearing Length 1"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"
22	416	468	520	572	625	677	729
	1007	1103	1213	1363	1513	1663	1813
20	700	776	853	929	1005	1082	1158
	1495	1617	1739	1897	2088	2280	2472
18	1443	1568	1693	1818	1943	2068	2193
	2734	2909	3084	3258	3436	3710	3985
16	2434	2608	2782	2957	3131	3305	3480
	4350	4578	4806	5034	5262	5490	5786

1. The top value reflects the allowable reaction at the panel end supports.
2. The bottom value reflects the allowable reaction at the interior supports.
3. Values are in pounds per linear foot.

B-36 Allowable Total (DL + LL) Uniform Load (psf)

Span Condition	Gauge		Span 5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"	9'0"	9'6"	10'0"
SINGLE SPAN	22	Stress	109	90	76	65	56	49	43	38	34	30	27
		Deflection	93	70	54	42	34	28	23	19	16	14	12
	20	Stress	143	118	99	85	73	64	56	49	44	40	36
		Deflection	115	87	67	53	42	34	28	23	20	17	14
	18	Stress	195	161	136	115	100	87	76	68	60	54	49
		Deflection	158	119	92	72	58	47	39	32	27	23	20
	16	Stress	247	205	172	146	126	110	97	86	76	69	62
		Deflection	199	149	115	90	72	59	49	40	34	29	25
DOUBLE SPAN	22	Stress	119	98	82	70	60	53	46	41	37	33	30
		Deflection	119	98	82	70	60	53	46	41	37	33	28
	20	Stress	150	124	104	89	76	66	58	52	46	41	37
		Deflection	150	124	104	89	76	66	58	52	46	41	35
	18	Stress	204	169	142	121	104	91	80	71	63	57	51
		Deflection	204	169	142	121	104	91	80	71	63	56	48
	16	Stress	252	209	175	149	129	112	99	87	78	70	63
		Deflection	252	209	175	149	129	112	99	87	78	70	60
TRIPLE SPAN	22	Stress	148	122	103	88	76	66	58	51	46	41	37
		Deflection	148	122	102	80	64	52	43	36	30	26	22
	20	Stress	187	155	130	111	95	83	73	65	58	52	47
		Deflection	187	155	126	99	79	65	53	44	37	32	27
	18	Stress	255	211	177	151	130	113	100	88	79	71	64
		Deflection	255	211	173	136	109	89	73	61	51	44	37
	16	Stress	315	261	219	187	161	140	123	109	97	87	79
		Deflection	315	261	217	171	137	111	92	76	64	55	47

1. Stress based on allowable flexural stress of 22.8 ksi.
2. Deflection based on maximum deflection of L/240.
3. Adequate bearing must be provided.
4. See page 31 for General Notes.

2 Preformed Metal Roof Deck

ASC STEEL DECK INFORMATION SHEET

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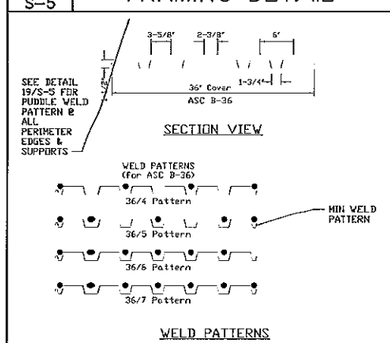
14 S-5 FRAMING DETAIL



WELD PATTERNS

19 S-5 FRAMING DETAIL

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20 S-5 BG DISCLAIMER

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LIC. NO. C33047
BRIAN GOTTLIEB - CIVIL ENGINEER
(760) 568-3553 FAX
(760) 568-5681 EMAIL: Cat@pgstructural.com
75-175 MERLE DRIVE, SUITE 204,
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FRAMING DETAILS

HEAVY EQUIPMENT COVERED PARKING
GENESIS SOLAR SGN-7209
11995 Wiley's Well Road
Blythe, CA. 92225

DRAWN BY:	SB
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JOB NO.	800.0617
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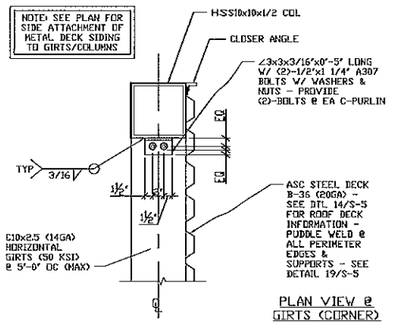
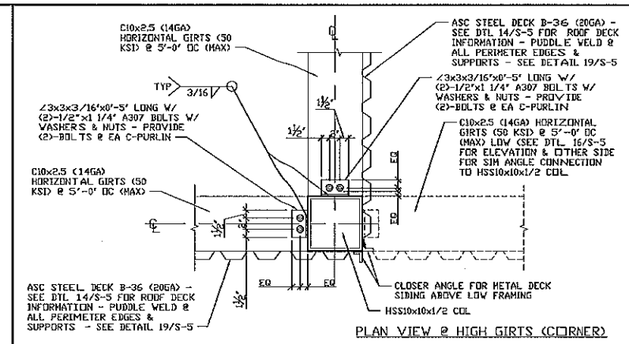
NOTE: SEE PLAN FOR SIDE ATTACHMENT OF METAL DECK SIDING TO GIRTS/COLUMNS



PLAN VIEW @ GIRTS (CORNER)

1 S-5.1 FRAMING DETAIL

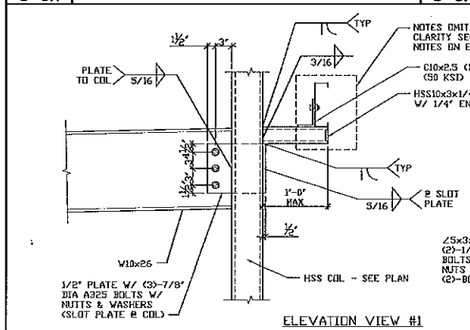


PLAN VIEW @ HIGH GIRTS (CORNER)

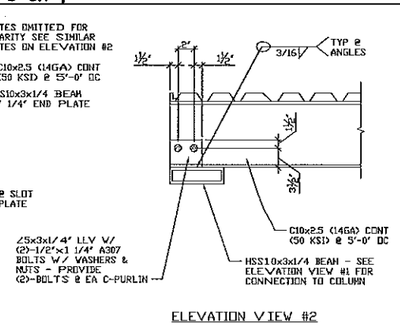
2 S-5.1 FRAMING DETAIL

4 S-5.1 FRAMING DETAIL

5 S-5.1 FRAMING DETAIL



ELEVATION VIEW #1



ELEVATION VIEW #2

6 S-5.1 FRAMING DETAIL

8 S-5.1 FRAMING DETAIL

9 S-5.1 FRAMING DETAIL

10 S-5.1 FRAMING DETAIL

11 S-5.1 FRAMING DETAIL

12 S-5.1 FRAMING DETAIL

13 S-5.1 FRAMING DETAIL

14 S-5.1 FRAMING DETAIL

15 S-5.1 FRAMING DETAIL

16 S-5.1 FRAMING DETAIL

17 S-5.1 FRAMING DETAIL

18 S-5.1 FRAMING DETAIL

19 S-5.1 FRAMING DETAIL

20 S-5.1 BG DISCLAIMER

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Dennis Hurvitz

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(760) 568-3553
(760) 568-5681 FAX
EMAIL: Civil@bgstructural.com
75-175 MERLE DRIVE, SUITE 200,
PALM DESERT, CA 92211

REGISTERED PROFESSIONAL ENGINEER BRIAN GOTTLIEB No. C33047 EXP. 6-30-18 CIVIL STATE OF CALIFORNIA

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MECHANICAL-ELECTRICAL-PLUMBING AND STRUCTURAL DESIGN
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DRAWN BY:	SB
DATE	3/16/17
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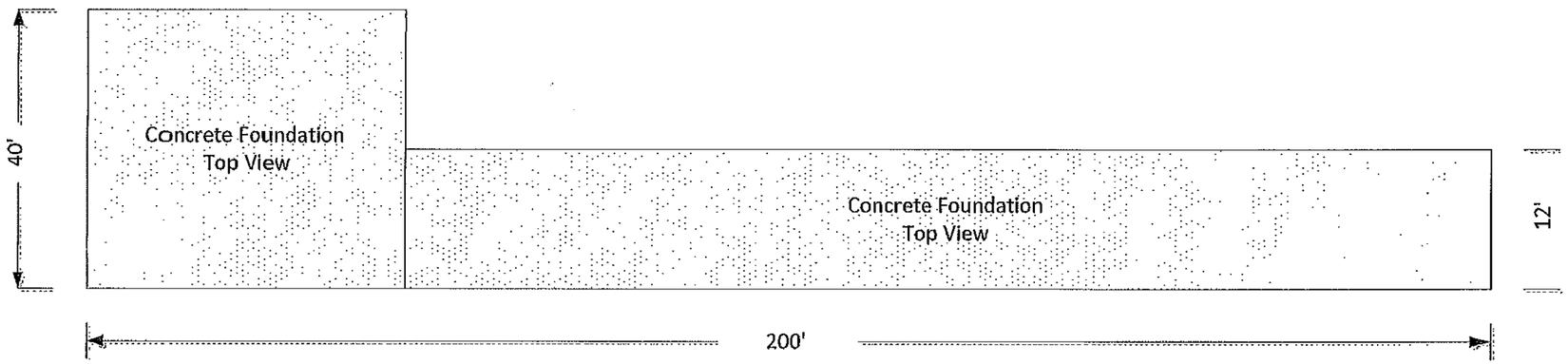
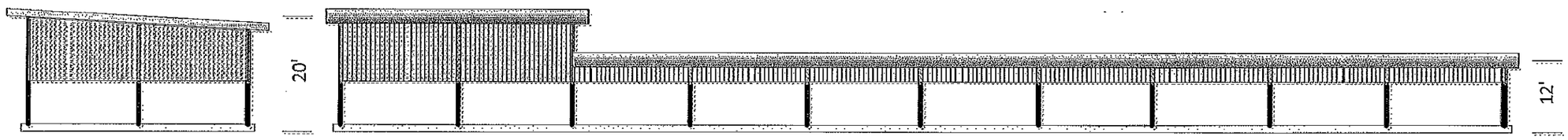
JOB NO.	800.0617
SHEET	S-5.1
OF	SHEETS

Notes:
1. Roof Cover to Extend Past Vertical Supports by 3'.
2. Footing of Vertical Supports 6" above ground with square footing and Anchor Bolts for Structure Connection.
3. Slope Foundation to the South/ Back Side and Install Sumps every 40' with Drain Valves for Rain Water.
4. Foundation to have Metal Plates at surface for Welding Structures Vertical Supports to.





West Side View

South Side View

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75-175 Merle Drive, Suite 200
Palm Desert, CA 92211
(760) 568-3553 (760) 568-5681 Fax

Genesis Solar Energy Center - Heavy Equipment Covered Parking

Desert Engineers
75401 Painted Desert Drive
Indian Wells, CA 92210

Job Number: 800.0617

March 16, 2017

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Heavy Equipment Covered Parking - Sheet Index

Loads	1
Steel Roof Decking	2 – 4
Heavy Equipment Covered Parking Rafters / Girts / Beams	5 – 31
Heavy Equipment Covered Parking Lateral Analysis including (Design Spreadsheets, Columns, Base Plates and Footings)	32 – 108

Genesis Solar – Heavy Equipment Covered Parking 800.0617

Loads

Dead Load - Steel Decking

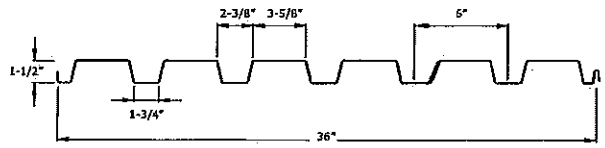
Steel Decking	3.0
Misc	2.0
Total	**5.0 P.S.F.**

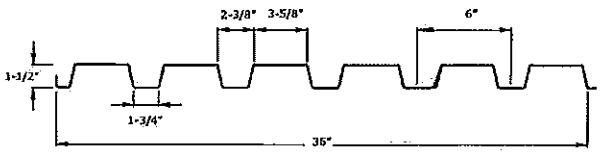
Live Load

Roof	**20.0 P.S.F.**

ASC Steel Deck

B-36 Roof Deck





B-36 Nestable

The **B-36 profile** has been enhanced via physical testing to give you the highest diaphragm shear values of any of our prior B-series profiles.

Note: B 35 1/4" – Sacramento

B-36 Section Properties

Gauge	Weight (psf)	I (In4)	S+ (In3)	S- (In3)
22	1.68	0.178	0.18	0.195
20	2.04	0.22	0.235	0.246
18	2.7	0.302	0.321	0.336
16	3.36	0.379	0.407	0.415

1. Section properties are based on minimum 38 ksi steel (Fy).

B-36 Allowable Reactions (plf)

Gauge	Bearing Length 1"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"
22	416	468	520	572	625	677	729
	1007	1103	1213	1363	1513	1663	1813
20	700	776	853	929	1005	1082	1158
	1495	1617	1739	1897	2088	2280	2472
18	1443	1568	1693	1818	1943	2068	2193
	2734	2909	3084	3258	3436	3710	3985
16	2434	2608	2782	2957	3131	3305	3480
	4350	4578	4806	5034	5262	5490	5786

1. The top value reflects the allowable reaction at the panel end supports.
2. The bottom value reflects the allowable reaction at the interior supports.
3. Values are in pounds per linear foot.

B-36 Allowable Total (DL + LL) Uniform Load (psf)

Span Condition	Gauge		Span 5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"	9'0"	9'6"	10'0"[3]
SINGLE SPAN	22	Stress	109	90	76	65	56	49	43	38	34	30	27
		Deflection	93	70	54	42	34	28	23	19	16	14	12
	20	Stress	143	118	99	85	73	64	56	49	44	40	36
		Deflection	115	87	67	53	42	34	28	23	20	17	14
	18	Stress	195	161	136	115	100	87	76	68	60	54	49
		Deflection	158	119	92	72	58	47	39	32	27	23	20
	16	Stress	247	205	172	146	126	110	97	86	76	69	62
		Deflection	199	149	115	90	72	59	49	40	34	29	25
DOUBLE SPAN	22	Stress	119	98	82	70	60	53	46	41	37	33	30
		Deflection	119	98	82	70	60	53	46	41	37	33	28
	20	Stress	150	124	104	89	76	66	58	52	46	41	37
		Deflection	150	124	104	89	76	66	58	52	46	41	35
	18	Stress	204	169	142	121	104	91	80	71	63	57	51
		Deflection	204	169	142	121	104	91	80	71	63	56	48
	16	Stress	252	209	175	149	129	112	99	87	78	70	63
		Deflection	252	209	175	149	129	112	99	87	78	70	60
TRIPLE SPAN	22	Stress	148	122	103	88	76	66	58	51	46	41	37
		Deflection	148	122	102	80	64	52	43	36	30	26	22
	20	Stress	187	155	130	111	95	83	73	65	58	52	47
		Deflection	187	155	126	99	79	65	53	44	37	32	27
	18	Stress	255	211	177	151	130	113	100	88	79	71	64
		Deflection	255	211	173	136	109	89	73	61	51	44	37
	16	Stress	315	261	219	187	161	140	123	109	97	87	79
		Deflection	315	261	217	171	137	111	92	76	64	55	47

1. Stress based on allowable flexural stress of 22.8 ksi.
2. Deflection based on maximum deflection of L/240.
3. Adequate bearing must be provided.
4. See page 31 for General Notes.

ASC Steel Deck

B-36 Roof Deck

ASC™ STEEL DECK *Leading the way . . .*
A BlueScope Steel Company

B-36 Allowable Diaphragm Shear (q) and Flexibility Factor (F)

Gauge	Seam Attachment		No. Puddle Welds		Span 5'0"	6'0"	7'0"	8'0"	9'0"	10'0"
22	Button Punch	12" O.C.	4	q	320	320	320	320	310	280
				F	14.5 + 222R	14.7 + 185R	14.8 + 159R	15.0 + 139R	15.2 + 123R	15.4 + 111R
		24" O.C.	4	q	260	260	260	250	250	220
				F	17.4 + 222R	17.6 + 185R	17.9 + 159R	18.1 + 139R	18.4 + 123R	18.6 + 111R
	Top Seam Weld	12" O.C.	4	q	360	360	360	360	360	360
				F	6.9 + 222R	6.1 + 185R	5.7 + 159R	5.4 + 139R	5.1 + 123R	4.9 + 111R
		24" O.C.	4	q	280	280	270	270	270	270
				F	8.1 + 222R	7.2 + 185R	6.6 + 159R	6.2 + 139R	5.8 + 123R	5.6 + 111R
	Side Seam Weld	12" O.C.	4	q	519	492	473	458	447	438
				F	7.1 + 222R	6.6 + 185R	6.2 + 159R	5.9 + 139R	5.7 + 123R	5.5 +111R
		24" O.C.	4	q	337	309	290	276	264	256
				F	9.5 + 222R	8.9 + 185R	8.4 + 159R	8.0 + 139R	7.7 + 123R	7.4 + 111R
	Button Punch	12" O.C.	7	q	570	570	560	500	450	410
				F	13.8 + 56R	14.1 + 46R	14.3 + 39R	14.6 + 34R	14.8 + 31R	15.1 + 28R
		24" O.C.	7	q	510	500	500	450	400	360
				F	15.2 + 56R	15.5 + 46R	15.8 + 39R	16.2 + 34R	16.5 + 31R	16.8 + 28R
	Top Seam Weld	12" O.C.	7	q	700	700	690	690	620	560
				F	12.5 + 56R	11.1 + 46R	10.0 + 39R	9.2 + 34R	8.6 + 31R	8.2 + 28R
		24" O.C.	7	q	610	610	600	600	540	490
				F	13.9 + 56R	12.3 + 46R	11.1 + 39R	10.2 + 34R	9.5 + 31R	9.0 + 28R
	Side Seam Weld	12" O.C.	7	q	596	555	525	504	487	473
				F	6.9 + 56R	6.5 + 46R	6.2 + 39R	6.0 + 34R	5.7 + 31R	5.6 + 28R
		24" O.C.	7	q	414	372	343	321	304	291
				F	8.8 + 56R	8.4 + 46R	8.1 + 39R	7.8 + 34R	7.5 + 31R	7.3 + 28R
20	Button Punch	12" O.C.	4	q	420	420	410	410	380	350
				F	11.0 + 129R	11.2 + 107R	11.3 + 92R	11.5 + 80R	11.7 + 71R	11.8 +64R
		24" O.C.	4	q	340	340	340	330	310	280
				F	13.0 + 129R	13.2 + 107R	13.4 + 92R	13.6 + 80R	13.8 + 71R	14.1 + 64R
	Top Seam Weld	12" O.C.	4	q	450	450	450	440	440	440
				F	5.4 + 129R	5.0 + 107R	4.6 + 92R	4.4 + 80R	4.1 + 71R	4.0 + 64R
		24" O.C.	4	q	340	340	340	340	340	340
				F	6.4 + 129R	5.8 + 107R	5.3 + 92R	5.0 + 80R	4.7 + 71R	4.5 + 64R
	Side Seam Weld	12" O.C.	4	q	805	756	721	694	674	658
				F	5.9 + 129R	5.5 + 107R	5.3 + 92R	5.0 + 80R	4.8 + 71R	4.6 + 64R
		24" O.C.	4	q	543	494	458	432	412	395
				F	7.7 + 129R	7.3 + 107R	6.9 + 92R	6.6 + 80R	6.4 + 71R	6.2 + 64R
	Button Punch	12" O.C.	7	q	740	740	710	630	560	500
				F	10.4 + 32R	10.6 + 27R	10.8 + 23R	11.0 + 20R	11.3 + 18R	11.5 + 16R
		24" O.C.	7	q	670	660	640	560	500	450
				F	11.3 + 32R	11.6 + 27R	11.8 + 23R	12.1 + 20R	12.4 + 18R	12.6 + 16R
	Top Seam Weld	12" O.C.	7	q	900	890	880	840	750	680
				F	9.6 + 32R	8.5 + 27R	7.8 + 23R	7.2 + 20R	6.7 + 18R	6.4 + 16R
		24" O.C.	7	q	790	780	770	740	660	600
				F	10.6 + 32R	9.4 + 27R	8.5 + 23R	7.9 + 20R	7.4 + 18R	7.0 + 16R
	Side Seam Weld	12" O.C.	7	q	939	865	812	773	742	718
				F	5.7 + 32R	5.4 + 27R	5.2 + 23R	5.0 + 20R	4.8 + 18R	4.7 + 16R
		24" O.C.	7	q	677	602	549	510	479	455
				F	7.0 + 32R	6.8 + 27R	6.6 + 23R	6.4 + 20R	6.2 + 18R	6.0 + 16R

1. The allowable diaphragm shears "q" are listed in pounds per linear foot (plf).
2. See page 31 for General Notes.

ASC Steel Deck

B-36 Roof Deck

B-36 Allowable Diaphragm Shear (q) and Flexibility (F)

Gauge	Seam Attachment	No. Puddle Welds			Span 5'0"	6'0"	7'0"	8'0"	9'0"	10'0"
18	Button Punch	12" O.C.	4	q	806	697	619	562	517	482
				F	5.9 + 54R	6.7 +45R	7.5 + 39R	8.2 + 34R	9.0 + 30R	9.7 + 27R
		24" O.C.	4	q	736	626	548	489	444	408
				F	6.3 + 54R	7.2 + 45R	8.2 + 39R	9.2 + 34R	10.2 + 30R	11.2 + 27R
	Top Seam Weld	12" O.C.	4	q	1215	1112	1032	968	917	878
				F	5.0 + 54R	4.8 + 45R	4.7 + 39R	4.5 + 34R	4.4 + 30R	4.2 + 27R
		24" O.C.	4	q	940	834	752	688	638	598
				F	6.0 + 54R	5.9 + 45R	5.7 + 39R	5.6 + 34R	5.5 + 30R	5.4 + 27R
	Side Seam Weld	12" O.C.	4	q	1580	1482	1406	1341	1291	1251
				F	4.3 + 54R	4.1 + 45R	3.9 + 39R	3.7 + 34R	3.6 + 30R	3.5 + 27R
		24" O.C.	4	q	1123	1018	940	875	826	785
				F	5.3 + 54R	5.1 + 45R	5.0 + 39R	4.8 + 34R	4.7 + 30R	4.5 + 27R
	Button Punch	12" O.C.	7	q	1176	1008	889	800	731	677
				F	5.0 + 14R	5.7 + 11R	6.4 + 10R	7.1 + 9R	7.9 + 8R	8.6 + 7R
		24" O.C.	7	q	1102	932	811	721	651	596
				F	5.2 + 14R	6.0 + 11R	6.9 + 10R	7.7 + 9R	8.6 + 8R	9.5 + 7R
	Top Seam Weld	12" O.C.	7	q	1538	1359	1232	1138	1064	1007
				F	4.6 + 14R	4.5 + 11R	4.4 + 10R	4.3 + 9R	4.2 + 8R	4.1 + 7R
		24" O.C.	7	q	1258	1079	952	858	785	727
				F	5.2 + 14R	5.2 + 11R	5.2 + 10R	5.1 + 9R	5.1 + 8R	5.1 + 7R
	Side Seam Weld	12" O.C.	7	q	1911	1732	1606	1511	1438	1380
				F	4.0 + 14R	3.9 + 11R	3.8 + 10R	3.7 + 9R	3.6 + 8R	3.5 + 7R
		24" O.C.	7	q	1445	1266	1139	1044	971	913
				F	4.8 + 14R	4.7 + 11R	4.6 + 10R	4.5 + 9R	4.5 + 8R	4.4 + 7R
16	Button Punch	12" O.C.	4	q	1155	991	874	788	721	668
				F	4.3 + 28R	4.9 + 23R	5.5 + 20R	6.1 + 17R	6.7 + 15R	7.3 + 14R
		24" O.C.	4	q	1077	912	794	706	639	584
				F	4.5 + 28R	5.2 + 23R	5.9 + 20R	6.6 + 17R	7.4 + 15R	8.1 + 14R
	Top Seam Weld	12" O.C.	4	q	1683	1529	1421	1344	1286	1242
				F	3.8 + 28R	3.6 + 23R	3.5 + 20R	3.4 + 17R	3.4 + 15R	3.3 + 14R
		24" O.C.	4	q	1341	1181	1068	984	920	871
				F	4.4 + 28R	4.3 + 23R	4.3 + 20R	4.2 + 17R	4.1 + 15R	4.1 + 14R
	Side Seam Weld	12" O.C.	4	q	2138	1992	1893	1823	1773	1736
				F	3.3 + 28R	3.1 + 23R	3.0 + 20R	2.9 + 17R	2.8 + 15R	2.7 + 14R
		24" O.C.	4	q	1570	1412	1303	1224	1164	1118
				F	3.9 + 28R	3.8 + 23R	3.7 + 20R	3.7 + 17R	3.6 + 15R	3.5 + 14R
	Button Punch	12" O.C.	7	q	1652	1408	1234	1105	1005	927
				F	3.7 + 6.9R	4.2 + 5.8R	4.7 + 5R	5.3 + 4.3R	5.8 + 3.9R	6.4 + 3.5R
		24" O.C.	7	q	1570	1323	1150	1018	916	835
				F	3.8 + 6.9R	4.4 + 5.8R	5.0 + 5R	5.6 + 4.3R	6.3 + 3.9R	6.9 + 3.5R
	Top Seam Weld	12" O.C.	7	q	2212	1982	1821	1705	1617	1550
				F	3.4 + 6.9R	3.4 + 5.8R	3.3 + 5R	3.3 + 4.3R	3.2 + 3.9R	3.2 + 3.5R
		24" O.C.	7	q	1850	1610	1442	1317	1221	1147
				F	3.8 + 6.9R	3.8 + 5.8R	3.8 + 5R	3.8 + 4.3R	3.8 + 3.9R	3.8 + 3.5R
	Side Seam Weld	12" O.C.	7	q	2696	2476	2326	2221	2144	1895
				F	3.1 + 6.9R	3.0 + 5.8R	2.9 + 5R	2.8 + 4.3R	2.8 + 3.9R	2.7 + 3.5R
		24" O.C.	7	q	2091	1858	1694	1575	1485	1415
				F	3.5 + 6.9R	3.5 + 5.8R	3.5 + 5R	3.4 + 4.3R	3.4 + 3.9R	3.4 + 3.5R

1. The allowable diaphragm shears "q" are listed in pounds per linear foot (plf).
2. See page 31 for General Notes.

PROJECT	B.G. STRUCTURAL ENGINEERING	SHEET NO. 5
Genesis Solar – Heavy Equipment Covered Parking		JOB NO. 800.0617
ITEM Roof Rafters / Girt		DATE Mar. 2017
		ENGINEER BG

ROOF RAFTERS / GIRTS

RR1

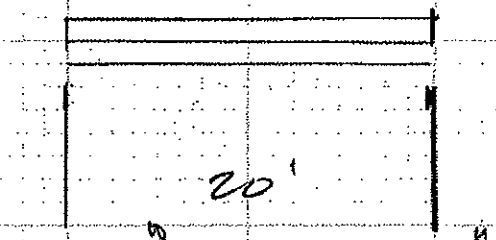
$w = 25(5) + 7 = 132\ ^{\#}/_{FT}$

$V = \frac{132(20)}{2} = 1320^{\#}$

$M = \frac{132(20)^2}{8} = 6.6^{K\text{-}FT}$

$S_{REQ} = \frac{6.6(12)}{30} = 2.64\ IN^3$

$< 3.27\ IN^3$



USE C10 x 2.5 x 14 GA. @ 5'-0" OC.

GIRT

WIND LOAD

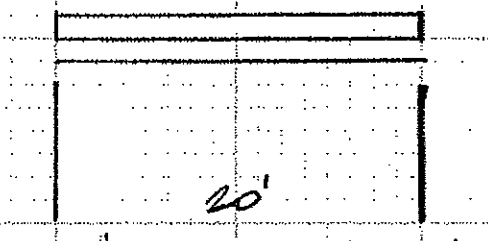
$w = 18(5) + 7 = 97\ ^{\#}/_{FT}$

$V = \frac{97(20)}{2} = 970^{\#}$

$M = \frac{97(20)^2}{8} = 4.850^{K\text{-}FT}$

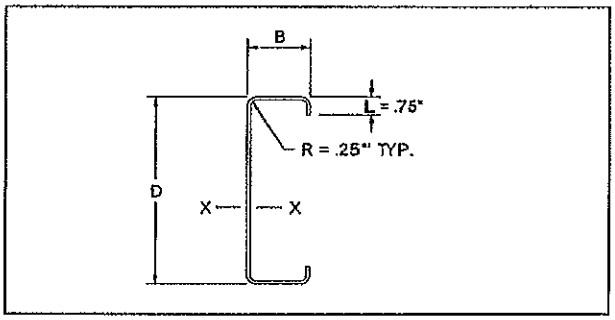
$S_{REQ} = \frac{4.850(12)}{30} = 1.94\ IN^3$

$< 3.27\ IN^3$



USE C10 x 2.5 x 14 GA. @ 5'-0" OC

FLEXOSPAN C PURLIN AND GIRT SECTION PROPERTIES



SECTION ALLOWABLES (CEES)

SECTION				AXIS X-X			AXIS Y-Y		
D X B	GA	WEIGHT LB/LF	AREA IN^2	Ix IN^4	Sx IN^3	Rx IN	Iy IN^4	Sy IN^3	Ry IN
6 X 2.5 C	16	2.3952	0.70446	3.9487	1.3162	2.3676	0.6032	0.3515	0.925
	14	2.9736	0.87458	4.8704	1.6235	2.3599	0.7374	0.4297	0.918
	12	4.1121	1.2094	6.647	2.2157	2.3444	0.988	0.5759	0.904
8 X 2.5 C	16	2.8018	0.82406	7.758	1.9395	3.0683	0.661	0.3623	0.896
	14	3.4815	1.024	9.587	2.3966	3.0597	0.809	0.433	0.889
	12	4.8234	1.4186	13.132	3.2831	3.0425	1.084	0.5942	0.874
8 X 3.5 C	14	3.9895	1.1734	11.933	2.9831	3.189	1.847	0.7511	1.255
	12	5.5347	1.6278	16.393	4.0982	3.1734	2.502	1.0173	1.24
10 X 2.5 C	14	3.9895	1.1734	16.351	3.2701	3.7329	0.862	0.452	0.857
	12	5.5347	1.6278	22.455	4.491	3.714	1.155	0.6066	0.842
10 X 3.5 C	14	4.4974	1.3228	20.03	4.006	3.8913	1.98	0.7699	1.224
	12	6.246	1.837	27.576	5.5152	3.8744	2.683	1.0433	1.209
12 X 2.5 C	14	4.4974	1.3228	25.461	4.2436	4.3873	0.903	0.4585	0.826
	12	6.246	1.837	35.033	5.8388	4.3669	1.21	0.6154	0.812
12 X 3.5 C	14	5.0054	1.4722	30.773	5.1289	4.572	2.087	0.7838	1.191
	12	6.9572	2.0462	42.434	7.0723	4.5538	2.827	1.0624	1.176

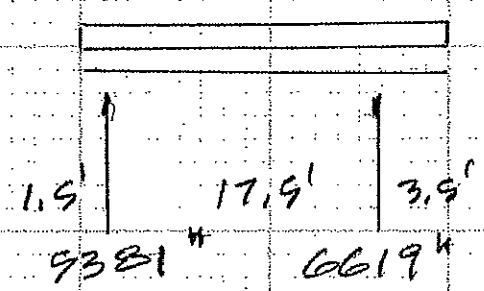
Flexospan - 253 Railroad St. Sandy Lake, PA 16145 - 1-800-245-0396

PROJECT	B.G. STRUCTURAL ENGINEERING	SHEET NO.
Genesis Solar – Heavy Equipment Covered Parking		JOB NO. 800.0617
ITEM Beams		DATE Mar. 2017
		ENGINEER BG

BEAMS

B1

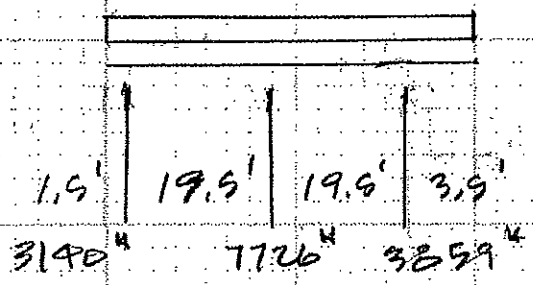
W = 25(20) = 500 #/FT



USE W10 x 26

B2

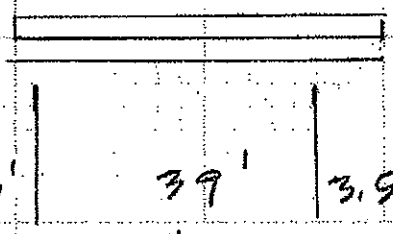
W = 25(11.9) = 288 #/FT



USE W16 x 31 CONT

B3

W = 500 #/FT



USE W16 x 77 w/ 1/4" CAMBER

B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

Printed: 3 MAR 2017, 10:39AM

Steel Beam

File = s:\E0AEZR~G\86YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. # : KW-06003989 Licensee : BG STRUCTURAL ENGINEERING

Description : Beam B1

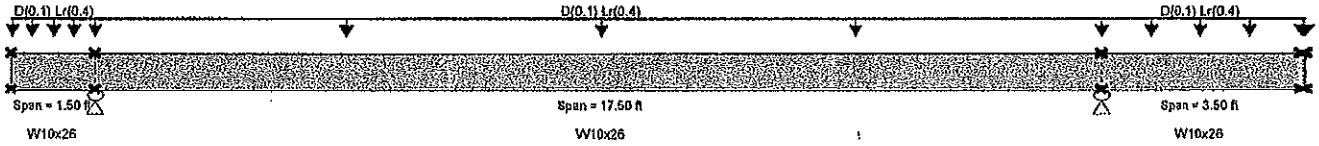
CODE REFERENCES

Calculations per AISC 360-10, IBC 2015, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Completely Unbraced
Bending Axis : Major Axis Bending

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



Applied Loads

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

Beam self weight calculated and added to loading
Load for Span Number 1
Uniform Load : D = 0.10, Lr = 0.40 k/ft, Tributary Width = 1.0 ft
Load for Span Number 2
Uniform Load : D = 0.10, Lr = 0.40 k/ft, Tributary Width = 1.0 ft
Load for Span Number 3
Uniform Load : D = 0.10, Lr = 0.40 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.439 : 1	Maximum Shear Stress Ratio =	0.089 : 1
Section used for this span	W10x26	Section used for this span	W10x26
Ma : Applied	19.680 k-ft	Va : Applied	4.779 k
Mn / Omega : Allowable	44.838 k-ft	Vn/Omega : Allowable	53.560 k
Load Combination	+D+Lr+H, LL Comb Run (*L*)	Load Combination	+D+Lr+H, LL Comb Run (*LL)
Location of maximum on span	8.633ft	Location of maximum on span	17.500 ft
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 2

Maximum Deflection

Max Downward Transient Deflection	0.204 in	Ratio =	1,027 >=360
Max Upward Transient Deflection	-0.055 in	Ratio =	649 >=360
Max Downward Total Deflection	0.261 in	Ratio =	804 >=180
Max Upward Total Deflection	-0.071 in	Ratio =	507 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+L+H, LL Comb Run (**L)													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+L+H, LL Comb Run (*L*)													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+L+H, LL Comb Run (*LL)													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+L+H, LL Comb Run (L**)													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56

B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

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ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28

Steel Beam

Lic. # : KW-06003989
Licensee : BG STRUCTURAL ENGINEERING

Description : Beam B1

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+D+L+H, LL Comb Run (L*L)													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+L+H, LL Comb Run (LL*)													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+L+H, LL Comb Run (LLL)													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+Lr+H, LL Comb Run (*L)													
Dsgn. L = 1.50 ft	1	0.002	0.017		-0.14	0.14	130.42	78.09	1.00	1.00	0.93	80.34	53.56
Dsgn. L = 17.50 ft	2	0.066	0.034	3.26	-3.22	3.26	83.06	49.74	1.27	1.00	1.84	80.34	53.56
Dsgn. L = 3.50 ft	3	0.041	0.034		-3.22	3.22	130.42	78.09	1.00	1.00	1.84	80.34	53.56
+D+Lr+H, LL Comb Run (*L*)													
Dsgn. L = 1.50 ft	1	0.002	0.085		-0.14	0.14	130.42	78.09	1.00	1.00	4.57	80.34	53.56
Dsgn. L = 17.50 ft	2	0.439	0.087	19.68	-0.77	19.68	74.88	44.84	1.14	1.00	4.64	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+Lr+H, LL Comb Run (*LL)													
Dsgn. L = 1.50 ft	1	0.002	0.083		-0.14	0.14	130.42	78.09	1.00	1.00	4.43	80.34	53.56
Dsgn. L = 17.50 ft	2	0.408	0.089	18.48	-3.22	18.48	75.73	45.35	1.16	1.00	4.78	80.34	53.56
Dsgn. L = 3.50 ft	3	0.041	0.034		-3.22	3.22	130.42	78.09	1.00	1.00	1.84	80.34	53.56
+D+Lr+H, LL Comb Run (L**)													
Dsgn. L = 1.50 ft	1	0.008	0.020		-0.59	0.59	130.42	78.09	1.00	1.00	1.09	80.34	53.56
Dsgn. L = 17.50 ft	2	0.090	0.021	4.14	-0.77	4.14	76.45	45.78	1.17	1.00	1.11	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+Lr+H, LL Comb Run (L*L)													
Dsgn. L = 1.50 ft	1	0.008	0.018		-0.59	0.59	130.42	78.09	1.00	1.00	0.95	80.34	53.56
Dsgn. L = 17.50 ft	2	0.061	0.034	3.01	-3.22	3.22	88.49	52.99	1.35	1.00	1.84	80.34	53.56
Dsgn. L = 3.50 ft	3	0.041	0.034		-3.22	3.22	130.42	78.09	1.00	1.00	1.84	80.34	53.56
+D+Lr+H, LL Comb Run (LL*)													
Dsgn. L = 1.50 ft	1	0.008	0.086		-0.59	0.59	130.42	78.09	1.00	1.00	4.59	80.34	53.56
Dsgn. L = 17.50 ft	2	0.433	0.086	19.45	-0.77	19.45	75.01	44.92	1.15	1.00	4.61	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+Lr+H, LL Comb Run (LLL)													
Dsgn. L = 1.50 ft	1	0.008	0.083		-0.59	0.59	130.42	78.09	1.00	1.00	4.45	80.34	53.56
Dsgn. L = 17.50 ft	2	0.402	0.089	18.25	-3.22	18.25	75.86	45.43	1.16	1.00	4.75	80.34	53.56
Dsgn. L = 3.50 ft	3	0.041	0.034		-3.22	3.22	130.42	78.09	1.00	1.00	1.84	80.34	53.56
+D+S+H													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750Lr+0.750L+H, LL Comb Run (*													
Dsgn. L = 1.50 ft	1	0.002	0.018		-0.14	0.14	130.42	78.09	1.00	1.00	0.96	80.34	53.56
Dsgn. L = 17.50 ft	2	0.073	0.028	3.53	-2.61	3.53	80.44	48.17	1.23	1.00	1.49	80.34	53.56
Dsgn. L = 3.50 ft	3	0.033	0.028		-2.61	2.61	130.42	78.09	1.00	1.00	1.49	80.34	53.56
+D+0.750Lr+0.750L+H, LL Comb Run (*													
Dsgn. L = 1.50 ft	1	0.002	0.069		-0.14	0.14	130.42	78.09	1.00	1.00	3.69	80.34	53.56
Dsgn. L = 17.50 ft	2	0.353	0.070	15.85	-0.77	15.85	74.94	44.88	1.15	1.00	3.76	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750Lr+0.750L+H, LL Comb Run (*													
Dsgn. L = 1.50 ft	1	0.002	0.067		-0.14	0.14	130.42	78.09	1.00	1.00	3.59	80.34	53.56
Dsgn. L = 17.50 ft	2	0.330	0.072	14.96	-2.61	14.96	75.73	45.35	1.16	1.00	3.87	80.34	53.56
Dsgn. L = 3.50 ft	3	0.033	0.028		-2.61	2.61	130.42	78.09	1.00	1.00	1.49	80.34	53.56
+D+0.750Lr+0.750L+H, LL Comb Run (L													
Dsgn. L = 1.50 ft	1	0.006	0.020		-0.48	0.48	130.42	78.09	1.00	1.00	1.09	80.34	53.56
Dsgn. L = 17.50 ft	2	0.092	0.021	4.20	-0.77	4.20	76.25	45.66	1.17	1.00	1.12	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750Lr+0.750L+H, LL Comb Run (L													
Dsgn. L = 1.50 ft	1	0.006	0.018		-0.48	0.48	130.42	78.09	1.00	1.00	0.98	80.34	53.56
Dsgn. L = 17.50 ft	2	0.069	0.028	3.34	-2.61	3.34	81.03	48.52	1.24	1.00	1.49	80.34	53.56
Dsgn. L = 3.50 ft	3	0.033	0.028		-2.61	2.61	130.42	78.09	1.00	1.00	1.49	80.34	53.56
+D+0.750Lr+0.750L+H, LL Comb Run (L													
Dsgn. L = 1.50 ft	1	0.006	0.069		-0.48	0.48	130.42	78.09	1.00	1.00	3.71	80.34	53.56
Dsgn. L = 17.50 ft	2	0.349	0.070	15.68	-0.77	15.68	75.08	44.96	1.15	1.00	3.74	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750Lr+0.750L+H, LL Comb Run (L													

B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

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Steel Beam

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ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. #: KW-06003989 License to: BG STRUCTURAL ENGINEERING

Description : Beam B1

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
Dsgn. L = 1.50 ft	1	0.006	0.067		-0.48	0.48	130.42	78.09	1.00	1.00	3.61	80.34	53.56
Dsgn. L = 17.50 ft	2	0.325	0.072	14.78	-2.61	14.78	75.86	45.43	1.16	1.00	3.85	80.34	53.56
Dsgn. L = 3.50 ft	3	0.033	0.028		-2.61	2.61	130.42	78.09	1.00	1.00	1.49	80.34	53.56
+D+0.750L+0.750S+H, LL Comb Run (**													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+H, LL Comb Run (*L													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+H, LL Comb Run (*L													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+H, LL Comb Run (L'													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+H, LL Comb Run (L'													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+H, LL Comb Run (Ll													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+H, LL Comb Run (Ll													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.60W+H													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.70E+H													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750Lr+0.750L+0.450W+H, LL Con													
Dsgn. L = 1.50 ft	1	0.002	0.018		-0.14	0.14	130.42	78.09	1.00	1.00	0.96	80.34	53.56
Dsgn. L = 17.50 ft	2	0.073	0.028	3.53	-2.61	3.53	80.44	48.17	1.23	1.00	1.49	80.34	53.56
Dsgn. L = 3.50 ft	3	0.033	0.028		-2.61	2.61	130.42	78.09	1.00	1.00	1.49	80.34	53.56
+D+0.750Lr+0.750L+0.450W+H, LL Con													
Dsgn. L = 1.50 ft	1	0.002	0.069		-0.14	0.14	130.42	78.09	1.00	1.00	3.69	80.34	53.56
Dsgn. L = 17.50 ft	2	0.353	0.070	15.85	-0.77	15.85	74.94	44.88	1.15	1.00	3.76	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750Lr+0.750L+0.450W+H, LL Con													
Dsgn. L = 1.50 ft	1	0.002	0.067		-0.14	0.14	130.42	78.09	1.00	1.00	3.59	80.34	53.56
Dsgn. L = 17.50 ft	2	0.330	0.072	14.96	-2.61	14.96	75.73	45.35	1.16	1.00	3.87	80.34	53.56
Dsgn. L = 3.50 ft	3	0.033	0.028		-2.61	2.61	130.42	78.09	1.00	1.00	1.49	80.34	53.56
+D+0.750Lr+0.750L+0.450W+H, LL Con													
Dsgn. L = 1.50 ft	1	0.006	0.020		-0.48	0.48	130.42	78.09	1.00	1.00	1.09	80.34	53.56
Dsgn. L = 17.50 ft	2	0.092	0.021	4.20	-0.77	4.20	76.25	45.66	1.17	1.00	1.12	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750Lr+0.750L+0.450W+H, LL Con													
Dsgn. L = 1.50 ft	1	0.006	0.018		-0.48	0.48	130.42	78.09	1.00	1.00	0.98	80.34	53.56
Dsgn. L = 17.50 ft	2	0.069	0.028	3.34	-2.61	3.34	81.03	48.52	1.24	1.00	1.49	80.34	53.56
Dsgn. L = 3.50 ft	3	0.033	0.028		-2.61	2.61	130.42	78.09	1.00	1.00	1.49	80.34	53.56
+D+0.750Lr+0.750L+0.450W+H, LL Con													
Dsgn. L = 1.50 ft	1	0.006	0.069		-0.48	0.48	130.42	78.09	1.00	1.00	3.71	80.34	53.56
Dsgn. L = 17.50 ft	2	0.349	0.070	15.68	-0.77	15.68	75.08	44.96	1.15	1.00	3.74	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750Lr+0.750L+0.450W+H, LL Con													
Dsgn. L = 1.50 ft	1	0.006	0.067		-0.48	0.48	130.42	78.09	1.00	1.00	3.61	80.34	53.56
Dsgn. L = 17.50 ft	2	0.325	0.072	14.78	-2.61	14.78	75.86	45.43	1.16	1.00	3.85	80.34	53.56
Dsgn. L = 3.50 ft	3	0.033	0.028		-2.61	2.61	130.42	78.09	1.00	1.00	1.49	80.34	53.56
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56

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75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

Printed: 3 MAR 2017, 10:39AM

Steel Beam

File = s:\E0AEZR~G86YX6A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. # : KW-06003989 Licensee : BG STRUCTURAL ENGINEERING

Description : Beam B1

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+0.5250E+H, LL Con													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+0.5250E+H, LL Con													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+0.5250E+H, LL Con													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+0.5250E+H, LL Con													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+D+0.750L+0.750S+0.5250E+H, LL Con													
Dsgn. L = 1.50 ft	1	0.002	0.020		-0.14	0.14	130.42	78.09	1.00	1.00	1.07	80.34	53.56
Dsgn. L = 17.50 ft	2	0.096	0.021	4.37	-0.77	4.37	75.86	45.43	1.16	1.00	1.14	80.34	53.56
Dsgn. L = 3.50 ft	3	0.010	0.008		-0.77	0.77	130.42	78.09	1.00	1.00	0.44	80.34	53.56
+0.60D+0.60W+0.60H													
Dsgn. L = 1.50 ft	1	0.001	0.012		-0.09	0.09	130.42	78.09	1.00	1.00	0.64	80.34	53.56
Dsgn. L = 17.50 ft	2	0.058	0.013	2.62	-0.46	2.62	75.86	45.43	1.16	1.00	0.68	80.34	53.56
Dsgn. L = 3.50 ft	3	0.006	0.005		-0.46	0.46	130.42	78.09	1.00	1.00	0.26	80.34	53.56
+0.60D+0.70E+0.60H													
Dsgn. L = 1.50 ft	1	0.001	0.012		-0.09	0.09	130.42	78.09	1.00	1.00	0.64	80.34	53.56
Dsgn. L = 17.50 ft	2	0.058	0.013	2.62	-0.46	2.62	75.86	45.43	1.16	1.00	0.68	80.34	53.56
Dsgn. L = 3.50 ft	3	0.006	0.005		-0.46	0.46	130.42	78.09	1.00	1.00	0.26	80.34	53.56

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+Lr+H	-0.0710	0.000
+D+Lr+H	2	0.2613	8.750		0.0000	0.000
	3	0.0000	8.750	+D+Lr+H	-0.1620	3.500

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Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

Printed: 3 MAR 2017, 10:39AM

Steel Beam

File = s:\EQAEZR~C\86YX6A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. #: KW-06003989 Licensee: BG STRUCTURAL ENGINEERING

Description : Beam B1

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum		5.381	6.619	
Overall MINimum		-0.140	-0.026	
+D+H		1.256	1.580	
+D+L+H, LL Comb Run (**L)		1.256	1.580	
+D+L+H, LL Comb Run (*L*)		1.256	1.580	
+D+L+H, LL Comb Run (*LL)		1.256	1.580	
+D+L+H, LL Comb Run (L**)		1.256	1.580	
+D+L+H, LL Comb Run (L*L)		1.256	1.580	
+D+L+H, LL Comb Run (LL*)		1.256	1.580	
+D+L+H, LL Comb Run (LLL)		1.256	1.580	
+D+Lr+H, LL Comb Run (**L)		1.116	3.120	
+D+Lr+H, LL Comb Run (*L*)		4.756	5.079	
+D+Lr+H, LL Comb Run (*LL)		4.616	6.619	
+D+Lr+H, LL Comb Run (L**)		1.881	1.554	
+D+Lr+H, LL Comb Run (L*L)		1.741	3.094	
+D+Lr+H, LL Comb Run (LL*)		5.381	5.054	
+D+Lr+H, LL Comb Run (LLL)		5.241	6.594	
+D+S+H		1.256	1.580	
+D+0.750Lr+0.750L+H, LL Comb Run (*		1.151	2.735	
+D+0.750Lr+0.750L+H, LL Comb Run (*		3.881	4.204	
+D+0.750Lr+0.750L+H, LL Comb Run (*		3.776	5.359	
+D+0.750Lr+0.750L+H, LL Comb Run (L		1.725	1.560	
+D+0.750Lr+0.750L+H, LL Comb Run (L		1.620	2.715	
+D+0.750Lr+0.750L+H, LL Comb Run (L		4.350	4.185	
+D+0.750Lr+0.750L+H, LL Comb Run (L		4.245	5.340	
+D+0.750L+0.750S+H, LL Comb Run (**		1.256	1.580	
+D+0.750L+0.750S+H, LL Comb Run (*L		1.256	1.580	
+D+0.750L+0.750S+H, LL Comb Run (*L		1.256	1.580	
+D+0.750L+0.750S+H, LL Comb Run (L'		1.256	1.580	
+D+0.750L+0.750S+H, LL Comb Run (L'		1.256	1.580	
+D+0.750L+0.750S+H, LL Comb Run (LI		1.256	1.580	
+D+0.750L+0.750S+H, LL Comb Run (LI		1.256	1.580	
+D+0.60W+H		1.256	1.580	
+D+0.70E+H		1.256	1.580	
+D+0.750Lr+0.750L+0.450W+H, LL Corr		1.151	2.735	
+D+0.750Lr+0.750L+0.450W+H, LL Corr		3.881	4.204	
+D+0.750Lr+0.750L+0.450W+H, LL Corr		3.776	5.359	
+D+0.750Lr+0.750L+0.450W+H, LL Corr		1.725	1.560	
+D+0.750Lr+0.750L+0.450W+H, LL Corr		1.620	2.715	
+D+0.750Lr+0.750L+0.450W+H, LL Corr		4.350	4.185	
+D+0.750Lr+0.750L+0.450W+H, LL Corr		4.245	5.340	
+D+0.750L+0.750S+0.450W+H, LL Com		1.256	1.580	
+D+0.750L+0.750S+0.450W+H, LL Com		1.256	1.580	
+D+0.750L+0.750S+0.450W+H, LL Com		1.256	1.580	
+D+0.750L+0.750S+0.450W+H, LL Com		1.256	1.580	
+D+0.750L+0.750S+0.450W+H, LL Com		1.256	1.580	
+D+0.750L+0.750S+0.450W+H, LL Com		1.256	1.580	
+D+0.750L+0.750S+0.450W+H, LL Com		1.256	1.580	
+D+0.750L+0.750S+0.5250E+H, LL Cor		1.256	1.580	
+D+0.750L+0.750S+0.5250E+H, LL Cor		1.256	1.580	
+D+0.750L+0.750S+0.5250E+H, LL Cor		1.256	1.580	
+D+0.750L+0.750S+0.5250E+H, LL Cor		1.256	1.580	
+D+0.750L+0.750S+0.5250E+H, LL Cor		1.256	1.580	
+D+0.750L+0.750S+0.5250E+H, LL Cor		1.256	1.580	
+D+0.750L+0.750S+0.5250E+H, LL Cor		1.256	1.580	
+0.60D+0.60W+0.60H		0.753	0.948	
+0.60D+0.70E+0.60H		0.753	0.948	
D Only		1.256	1.580	
Lr Only, LL Comb Run (**L)		-0.140	1.540	
Lr Only, LL Comb Run (*L*)		3.500	3.500	
Lr Only, LL Comb Run (*LL)		3.360	5.040	
Lr Only, LL Comb Run (L**)		0.626	-0.026	
Lr Only, LL Comb Run (L*L)		0.486	1.514	
Lr Only, LL Comb Run (LL*)		4.126	3.474	

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Project Descr:
Project ID: 800.0617

Printed: 3 MAR 2017, 10:39AM

Steel Beam

File = s:\E0AEZR~G\86YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. # : KW-06003989
Licensee : BG STRUCTURAL ENGINEERING

Description : Beam B1

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Lr Only, LL Comb Run (LLL)		3.986	5.014	
L Only, LL Comb Run (**L)				
L Only, LL Comb Run (*L*)				
L Only, LL Comb Run (*LL)				
L Only, LL Comb Run (L**)				
L Only, LL Comb Run (L*L)				
L Only, LL Comb Run (LL*)				
L Only, LL Comb Run (LLL)				
S Only				
W Only				
E Only				
H Only				

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Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

Printed: 3 MAR 2017, 10:59AM

Steel Beam

File = s:\E0AEZR~G\86YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. # : KW-06003989 Licensee : BG STRUCTURAL ENGINEERING

Description : Beam B2

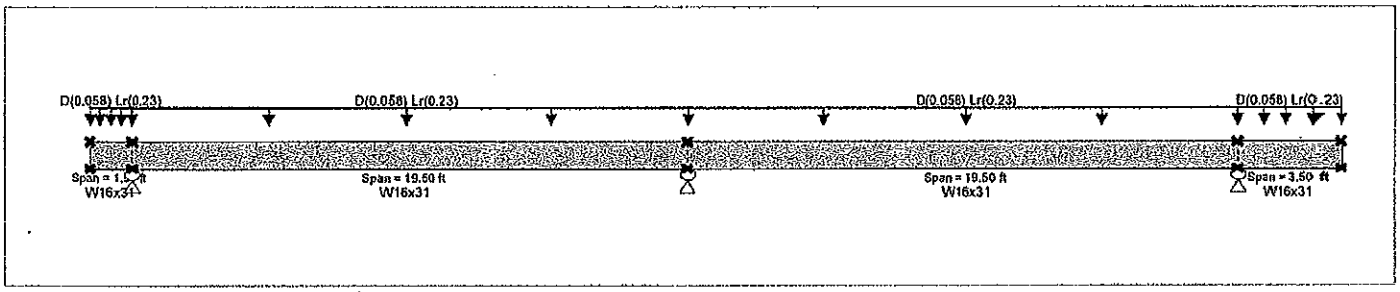
CODE REFERENCES

Calculations per AISC 360-10, IBC 2015, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Completely Unbraced
Bending Axis : Major Axis Bending

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



Applied Loads

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

Beam self weight calculated and added to loading
Load for Span Number 1
Uniform Load : D = 0.0580, Lr = 0.230 k/ft, Tributary Width = 1.0 ft
Load for Span Number 2
Uniform Load : D = 0.0580, Lr = 0.230 k/ft, Tributary Width = 1.0 ft
Load for Span Number 3
Uniform Load : D = 0.0580, Lr = 0.230 k/ft, Tributary Width = 1.0 ft
Load for Span Number 4
Uniform Load : D = 0.0580, Lr = 0.230 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.229 : 1	Maximum Shear Stress Ratio =	0.044 : 1
Section used for this span	W16x31	Section used for this span	W16x31
Ma : Applied	10.861 k-ft	Va : Applied	3.874 k
Mn / Omega : Allowable	47.456 k-ft	Vn/Omega : Allowable	87.450 k
Load Combination	+D+Lr+H, LL Comb Run (*L*L)	Load Combination	+D+Lr+H, LL Comb Run (*LL*)
Location of maximum on span	8.320 ft	Location of maximum on span	19.500 ft
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 2

Maximum Deflection

Max Downward Transient Deflection	0.050 in	Ratio =	4,659 >=360
Max Upward Transient Deflection	-0.013 in	Ratio =	2,774 >=360
Max Downward Total Deflection	0.061 in	Ratio =	3806 >=180
Max Upward Total Deflection	-0.016 in	Ratio =	2220 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+L+H, LL Comb Run (**L)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+L+H, LL Comb Run (**L*)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+L+H, LL Comb Run (**LL)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45

B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

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Steel Beam

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ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. # : KW-06003989 Licensee : BG STRUCTURAL ENGINEERING

Description : Beam B2

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+L+H, LL Comb Run (*L**)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+L+H, LL Comb Run (*L*L)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+L+H, LL Comb Run (*LL*)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+L+H, LL Comb Run (*LLL)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+L+H, LL Comb Run (L***)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+L+H, LL Comb Run (L**L)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+L+H, LL Comb Run (L*L*)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+L+H, LL Comb Run (L*LL)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+L+H, LL Comb Run (LL**)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+L+H, LL Comb Run (LL*L)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+L+H, LL Comb Run (LLL*)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+L+H, LL Comb Run (LLLL)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+Lr+H, LL Comb Run (***L)													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.055	0.012	2.52	-3.72	3.72	113.75	68.11	1.79	1.00	1.05	131.18	87.45
Dsgn. L = 19.50 ft	3	0.037	0.013	1.44	-3.72	3.72	168.50	100.90	2.65	1.00	1.12	131.18	87.45
Dsgn. L = 3.50 ft	4	0.015	0.013		-1.95	1.95	225.00	134.73	1.00	1.00	1.12	131.18	87.45
+D+Lr+H, LL Comb Run (**L*)													
Dsgn. L = 1.50 ft	1	0.001	0.004		-0.10	0.10	225.00	134.73	1.00	1.00	0.38	131.18	87.45

B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
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Project Descr:
Project ID: 800.0617

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ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Licensee: BG STRUCTURAL ENGINEERING
LIC. # : KW-06003989

Steel Beam

Description : Beam B2

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
Dsgn. L = 19.50 ft	2	0.085	0.041	0.73	-9.54	9.54	187.21	112.10	2.94	1.00	3.57	131.18	87.45
Dsgn. L = 19.50 ft	3	0.218	0.041	10.46	-9.54	10.46	80.01	47.91	1.26	1.00	3.57	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+Lr+H, LL Comb Run (**LL)													
Dsgn. L = 1.50 ft	1	0.001	0.005		-0.10	0.10	225.00	134.73	1.00	1.00	0.40	131.18	87.45
Dsgn. L = 19.50 ft	2	0.081	0.040	0.81	-9.18	9.18	190.27	113.93	2.99	1.00	3.48	131.18	87.45
Dsgn. L = 19.50 ft	3	0.204	0.040	9.81	-9.18	9.81	80.40	48.14	1.26	1.00	3.48	131.18	87.45
Dsgn. L = 3.50 ft	4	0.015	0.013		-1.95	1.95	225.00	134.73	1.00	1.00	1.12	131.18	87.45
+D+Lr+H, LL Comb Run (*L**)													
Dsgn. L = 1.50 ft	1	0.001	0.030		-0.10	0.10	225.00	134.73	1.00	1.00	2.63	131.18	87.45
Dsgn. L = 19.50 ft	2	0.224	0.041	10.71	-9.54	10.71	79.76	47.76	1.25	1.00	3.59	131.18	87.45
Dsgn. L = 19.50 ft	3	0.086	0.015	0.38	-9.54	9.54	186.19	111.49	2.93	1.00	1.33	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+Lr+H, LL Comb Run (*L*L)													
Dsgn. L = 1.50 ft	1	0.001	0.030		-0.10	0.10	225.00	134.73	1.00	1.00	2.64	131.18	87.45
Dsgn. L = 19.50 ft	2	0.229	0.041	10.86	-9.18	10.86	79.25	47.46	1.25	1.00	3.58	131.18	87.45
Dsgn. L = 19.50 ft	3	0.090	0.014	-0.00	-9.18	9.18	170.53	102.12	2.68	1.00	1.24	131.18	87.45
Dsgn. L = 3.50 ft	4	0.015	0.013		-1.95	1.95	225.00	134.73	1.00	1.00	1.12	131.18	87.45
+D+Lr+H, LL Comb Run (*LL*)													
Dsgn. L = 1.50 ft	1	0.001	0.027		-0.10	0.10	225.00	134.73	1.00	1.00	2.35	131.18	87.45
Dsgn. L = 19.50 ft	2	0.190	0.044	8.53	-15.00	15.00	131.77	78.90	2.07	1.00	3.87	131.18	87.45
Dsgn. L = 19.50 ft	3	0.187	0.044	8.25	-15.00	15.00	134.06	80.27	2.11	1.00	3.85	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+Lr+H, LL Comb Run (*LLL)													
Dsgn. L = 1.50 ft	1	0.001	0.027		-0.10	0.10	225.00	134.73	1.00	1.00	2.36	131.18	87.45
Dsgn. L = 19.50 ft	2	0.191	0.044	8.66	-14.65	14.65	127.88	76.58	2.01	1.00	3.86	131.18	87.45
Dsgn. L = 19.50 ft	3	0.175	0.043	7.53	-14.65	14.65	139.85	83.74	2.20	1.00	3.76	131.18	87.45
Dsgn. L = 3.50 ft	4	0.015	0.013		-1.95	1.95	225.00	134.73	1.00	1.00	1.12	131.18	87.45
+D+Lr+H, LL Comb Run (L***)													
Dsgn. L = 1.50 ft	1	0.003	0.008		-0.36	0.36	225.00	134.73	1.00	1.00	0.68	131.18	87.45
Dsgn. L = 19.50 ft	2	0.050	0.012	2.25	-4.00	4.00	132.85	79.55	2.09	1.00	1.05	131.18	87.45
Dsgn. L = 19.50 ft	3	0.048	0.012	2.13	-4.00	4.00	138.00	82.64	2.17	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+Lr+H, LL Comb Run (L**L)													
Dsgn. L = 1.50 ft	1	0.003	0.008		-0.36	0.36	225.00	134.73	1.00	1.00	0.70	131.18	87.45
Dsgn. L = 19.50 ft	2	0.052	0.012	2.38	-3.65	3.65	116.87	69.98	1.84	1.00	1.04	131.18	87.45
Dsgn. L = 19.50 ft	3	0.037	0.013	1.47	-3.65	3.65	166.84	99.90	2.62	1.00	1.12	131.18	87.45
Dsgn. L = 3.50 ft	4	0.015	0.013		-1.95	1.95	225.00	134.73	1.00	1.00	1.12	131.18	87.45
+D+Lr+H, LL Comb Run (L*L*)													
Dsgn. L = 1.50 ft	1	0.003	0.005		-0.36	0.36	225.00	134.73	1.00	1.00	0.48	131.18	87.45
Dsgn. L = 19.50 ft	2	0.085	0.041	0.54	-9.47	9.47	187.15	112.06	2.94	1.00	3.57	131.18	87.45
Dsgn. L = 19.50 ft	3	0.219	0.041	10.48	-9.47	10.48	79.89	47.84	1.26	1.00	3.57	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+Lr+H, LL Comb Run (L*LL)													
Dsgn. L = 1.50 ft	1	0.003	0.005		-0.36	0.36	225.00	134.73	1.00	1.00	0.48	131.18	87.45
Dsgn. L = 19.50 ft	2	0.080	0.040	0.63	-9.12	9.12	190.20	113.89	2.99	1.00	3.48	131.18	87.45
Dsgn. L = 19.50 ft	3	0.205	0.040	9.84	-9.12	9.84	80.27	48.07	1.26	1.00	3.48	131.18	87.45
Dsgn. L = 3.50 ft	4	0.015	0.013		-1.95	1.95	225.00	134.73	1.00	1.00	1.12	131.18	87.45
+D+Lr+H, LL Comb Run (LL**)													
Dsgn. L = 1.50 ft	1	0.003	0.030		-0.36	0.36	225.00	134.73	1.00	1.00	2.64	131.18	87.45
Dsgn. L = 19.50 ft	2	0.222	0.041	10.59	-9.47	10.59	79.82	47.80	1.25	1.00	3.58	131.18	87.45
Dsgn. L = 19.50 ft	3	0.085	0.015	0.40	-9.47	9.47	186.76	111.83	2.93	1.00	1.33	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+Lr+H, LL Comb Run (LL*L)													
Dsgn. L = 1.50 ft	1	0.003	0.030		-0.36	0.36	225.00	134.73	1.00	1.00	2.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.226	0.041	10.74	-9.12	10.74	79.31	47.49	1.25	1.00	3.56	131.18	87.45
Dsgn. L = 19.50 ft	3	0.089	0.014	-0.00	-9.12	9.12	171.23	102.53	2.69	1.00	1.24	131.18	87.45
Dsgn. L = 3.50 ft	4	0.015	0.013		-1.95	1.95	225.00	134.73	1.00	1.00	1.12	131.18	87.45
+D+Lr+H, LL Comb Run (LLL*)													
Dsgn. L = 1.50 ft	1	0.003	0.027		-0.36	0.36	225.00	134.73	1.00	1.00	2.36	131.18	87.45
Dsgn. L = 19.50 ft	2	0.188	0.044	8.39	-14.94	14.94	132.72	79.47	2.09	1.00	3.86	131.18	87.45
Dsgn. L = 19.50 ft	3	0.187	0.044	8.28	-14.94	14.94	133.68	80.05	2.10	1.00	3.85	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+Lr+H, LL Comb Run (LLLL)													
Dsgn. L = 1.50 ft	1	0.003	0.027		-0.36	0.36	225.00	134.73	1.00	1.00	2.38	131.18	87.45
Dsgn. L = 19.50 ft	2	0.189	0.044	8.52	-14.58	14.58	128.90	77.19	2.03	1.00	3.84	131.18	87.45
Dsgn. L = 19.50 ft	3	0.175	0.043	7.55	-14.58	14.58	139.40	83.48	2.19	1.00	3.76	131.18	87.45
Dsgn. L = 3.50 ft	4	0.015	0.013		-1.95	1.95	225.00	134.73	1.00	1.00	1.12	131.18	87.45
+D+S+H													

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Steel Beam

File = s:\E0AEZR~G86YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. # : KW-06003989 Licensee : BG STRUCTURAL ENGINEERING

Description : Beam B2

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+H, LL Comb Run (*													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.68	131.18	87.45
Dsgn. L = 19.50 ft	2	0.054	0.012	2.48	-3.80	3.80	117.44	70.33	1.85	1.00	1.06	131.18	87.45
Dsgn. L = 19.50 ft	3	0.040	0.011	1.60	-3.80	3.80	159.58	95.56	2.51	1.00	0.98	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45
+D+0.750Lr+0.750L+H, LL Comb Run (*													
Dsgn. L = 1.50 ft	1	0.001	0.005		-0.10	0.10	225.00	134.73	1.00	1.00	0.45	131.18	87.45
Dsgn. L = 19.50 ft	2	0.071	0.034	1.06	-8.17	8.17	190.97	114.35	3.00	1.00	2.94	131.18	87.45
Dsgn. L = 19.50 ft	3	0.173	0.034	8.36	-8.17	8.36	80.65	48.29	1.27	1.00	2.94	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+H, LL Comb Run (*													
Dsgn. L = 1.50 ft	1	0.001	0.005		-0.10	0.10	225.00	134.73	1.00	1.00	0.47	131.18	87.45
Dsgn. L = 19.50 ft	2	0.069	0.033	1.13	-7.90	7.90	190.97	114.35	3.00	1.00	2.87	131.18	87.45
Dsgn. L = 19.50 ft	3	0.162	0.033	7.88	-7.90	7.90	81.29	48.68	1.28	1.00	2.87	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45
+D+0.750Lr+0.750L+H, LL Comb Run (*													
Dsgn. L = 1.50 ft	1	0.001	0.024		-0.10	0.10	225.00	134.73	1.00	1.00	2.14	131.18	87.45
Dsgn. L = 19.50 ft	2	0.179	0.034	8.62	-8.17	8.62	80.40	48.14	1.26	1.00	2.96	131.18	87.45
Dsgn. L = 19.50 ft	3	0.071	0.014	0.73	-8.17	8.17	190.97	114.35	3.00	1.00	1.26	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+H, LL Comb Run (*													
Dsgn. L = 1.50 ft	1	0.001	0.025		-0.10	0.10	225.00	134.73	1.00	1.00	2.15	131.18	87.45
Dsgn. L = 19.50 ft	2	0.183	0.034	8.73	-7.90	8.73	79.89	47.84	1.26	1.00	2.95	131.18	87.45
Dsgn. L = 19.50 ft	3	0.069	0.014	0.06	-7.90	7.90	190.97	114.35	3.00	1.00	1.19	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45
+D+0.750Lr+0.750L+H, LL Comb Run (*													
Dsgn. L = 1.50 ft	1	0.001	0.022		-0.10	0.10	225.00	134.73	1.00	1.00	1.93	131.18	87.45
Dsgn. L = 19.50 ft	2	0.156	0.036	6.99	-12.27	12.27	131.64	78.83	2.07	1.00	3.17	131.18	87.45
Dsgn. L = 19.50 ft	3	0.152	0.036	6.71	-12.27	12.27	134.50	80.54	2.11	1.00	3.15	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+H, LL Comb Run (*													
Dsgn. L = 1.50 ft	1	0.001	0.022		-0.10	0.10	225.00	134.73	1.00	1.00	1.94	131.18	87.45
Dsgn. L = 19.50 ft	2	0.157	0.036	7.09	-12.00	12.00	127.95	76.61	2.01	1.00	3.16	131.18	87.45
Dsgn. L = 19.50 ft	3	0.143	0.035	6.17	-12.00	12.00	139.79	83.70	2.20	1.00	3.08	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45
+D+0.750Lr+0.750L+H, LL Comb Run (L													
Dsgn. L = 1.50 ft	1	0.002	0.008		-0.29	0.29	225.00	134.73	1.00	1.00	0.68	131.18	87.45
Dsgn. L = 19.50 ft	2	0.051	0.012	2.28	-4.02	4.02	131.83	78.94	2.07	1.00	1.06	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.13	-4.02	4.02	138.32	82.83	2.17	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+H, LL Comb Run (L													
Dsgn. L = 1.50 ft	1	0.002	0.008		-0.29	0.29	225.00	134.73	1.00	1.00	0.69	131.18	87.45
Dsgn. L = 19.50 ft	2	0.052	0.012	2.38	-3.76	3.76	119.93	71.81	1.88	1.00	1.05	131.18	87.45
Dsgn. L = 19.50 ft	3	0.040	0.011	1.62	-3.76	3.76	158.37	94.83	2.49	1.00	0.98	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45
+D+0.750Lr+0.750L+H, LL Comb Run (L													
Dsgn. L = 1.50 ft	1	0.002	0.005		-0.29	0.29	225.00	134.73	1.00	1.00	0.47	131.18	87.45
Dsgn. L = 19.50 ft	2	0.071	0.034	0.93	-8.12	8.12	190.97	114.35	3.00	1.00	2.94	131.18	87.45
Dsgn. L = 19.50 ft	3	0.174	0.034	8.38	-8.12	8.38	80.59	48.26	1.27	1.00	2.94	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+H, LL Comb Run (L													
Dsgn. L = 1.50 ft	1	0.002	0.005		-0.29	0.29	225.00	134.73	1.00	1.00	0.48	131.18	87.45
Dsgn. L = 19.50 ft	2	0.069	0.033	1.00	-7.86	7.86	190.97	114.35	3.00	1.00	2.87	131.18	87.45
Dsgn. L = 19.50 ft	3	0.163	0.033	7.90	-7.86	7.90	80.97	48.48	1.27	1.00	2.87	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45
+D+0.750Lr+0.750L+H, LL Comb Run (L													
Dsgn. L = 1.50 ft	1	0.002	0.025		-0.29	0.29	225.00	134.73	1.00	1.00	2.15	131.18	87.45
Dsgn. L = 19.50 ft	2	0.177	0.034	8.53	-8.12	8.53	80.40	48.14	1.26	1.00	2.95	131.18	87.45
Dsgn. L = 19.50 ft	3	0.071	0.014	0.75	-8.12	8.12	190.97	114.35	3.00	1.00	1.26	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+H, LL Comb Run (L													
Dsgn. L = 1.50 ft	1	0.002	0.025		-0.29	0.29	225.00	134.73	1.00	1.00	2.16	131.18	87.45
Dsgn. L = 19.50 ft	2	0.181	0.034	8.64	-7.86	8.64	79.95	47.87	1.26	1.00	2.94	131.18	87.45
Dsgn. L = 19.50 ft	3	0.069	0.014	0.08	-7.86	7.86	190.97	114.35	3.00	1.00	1.19	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45

B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

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Steel Beam

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ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. # : KW-06003989 Licensee : BG STRUCTURAL ENGINEERING

Description : Beam B2

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+D+0.750Lr+0.750L+H, LL Comb Run (L													
Dsgn. L = 1.50 ft	1	0.002	0.022		-0.29	0.29	225.00	134.73	1.00	1.00	1.94	131.18	87.45
Dsgn. L = 19.50 ft	2	0.154	0.036	6.89	-12.22	12.22	132.53	79.36	2.08	1.00	3.16	131.18	87.45
Dsgn. L = 19.50 ft	3	0.152	0.036	6.73	-12.22	12.22	134.12	80.31	2.11	1.00	3.15	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+H, LL Comb Run (L													
Dsgn. L = 1.50 ft	1	0.002	0.022		-0.29	0.29	225.00	134.73	1.00	1.00	1.95	131.18	87.45
Dsgn. L = 19.50 ft	2	0.155	0.036	6.99	-11.96	11.96	128.90	77.19	2.03	1.00	3.15	131.18	87.45
Dsgn. L = 19.50 ft	3	0.143	0.035	6.19	-11.96	11.96	139.40	83.48	2.19	1.00	3.08	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (**													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (**													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (**													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (*L													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (*L													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (*L													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (L'													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (L'													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (L'													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (L'													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (L'													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (L'													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (L'													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (L'													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (Li													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45

B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

Printed: 3 MAR 2017, 10:59AM
File = S:\E0AEZR~G\86YX5A~1.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. # : KW-06003989
Licensee : BG STRUCTURAL ENGINEERING

Steel Beam

Description : Beam B2

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (LI													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (LI													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+H, LL Comb Run (LI													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.60W+H													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.70E+H													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.68	131.18	87.45
Dsgn. L = 19.50 ft	2	0.054	0.012	2.48	-3.80	3.80	117.44	70.33	1.85	1.00	1.06	131.18	87.45
Dsgn. L = 19.50 ft	3	0.040	0.011	1.60	-3.80	3.80	159.58	95.56	2.51	1.00	0.98	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.001	0.005		-0.10	0.10	225.00	134.73	1.00	1.00	0.45	131.18	87.45
Dsgn. L = 19.50 ft	2	0.071	0.034	1.06	-8.17	8.17	190.97	114.35	3.00	1.00	2.94	131.18	87.45
Dsgn. L = 19.50 ft	3	0.173	0.034	8.36	-8.17	8.36	80.65	48.29	1.27	1.00	2.94	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.001	0.005		-0.10	0.10	225.00	134.73	1.00	1.00	0.47	131.18	87.45
Dsgn. L = 19.50 ft	2	0.069	0.033	1.13	-7.90	7.90	190.97	114.35	3.00	1.00	2.87	131.18	87.45
Dsgn. L = 19.50 ft	3	0.162	0.033	7.88	-7.90	7.90	81.29	48.68	1.28	1.00	2.87	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.001	0.024		-0.10	0.10	225.00	134.73	1.00	1.00	2.14	131.18	87.45
Dsgn. L = 19.50 ft	2	0.179	0.034	8.62	-8.17	8.62	80.40	48.14	1.26	1.00	2.96	131.18	87.45
Dsgn. L = 19.50 ft	3	0.071	0.014	0.73	-8.17	8.17	190.97	114.35	3.00	1.00	1.26	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.001	0.025		-0.10	0.10	225.00	134.73	1.00	1.00	2.15	131.18	87.45
Dsgn. L = 19.50 ft	2	0.183	0.034	8.73	-7.90	8.73	79.89	47.84	1.26	1.00	2.95	131.18	87.45
Dsgn. L = 19.50 ft	3	0.069	0.014	0.06	-7.90	7.90	190.97	114.35	3.00	1.00	1.19	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.001	0.022		-0.10	0.10	225.00	134.73	1.00	1.00	1.93	131.18	87.45
Dsgn. L = 19.50 ft	2	0.156	0.036	6.99	-12.27	12.27	131.64	78.83	2.07	1.00	3.17	131.18	87.45
Dsgn. L = 19.50 ft	3	0.152	0.036	6.71	-12.27	12.27	134.50	80.54	2.11	1.00	3.15	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.001	0.022		-0.10	0.10	225.00	134.73	1.00	1.00	1.94	131.18	87.45
Dsgn. L = 19.50 ft	2	0.157	0.036	7.09	-12.00	12.00	127.95	76.61	2.01	1.00	3.16	131.18	87.45
Dsgn. L = 19.50 ft	3	0.143	0.035	6.17	-12.00	12.00	139.79	83.70	2.20	1.00	3.08	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.002	0.008		-0.29	0.29	225.00	134.73	1.00	1.00	0.68	131.18	87.45
Dsgn. L = 19.50 ft	2	0.051	0.012	2.28	-4.02	4.02	131.83	78.94	2.07	1.00	1.06	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.13	-4.02	4.02	138.32	82.83	2.17	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.002	0.008		-0.29	0.29	225.00	134.73	1.00	1.00	0.69	131.18	87.45
Dsgn. L = 19.50 ft	2	0.052	0.012	2.38	-3.76	3.76	119.93	71.81	1.88	1.00	1.05	131.18	87.45

B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

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Engineer: BG
Project Descr:
Project ID: 800.0617

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Steel Beam

File = s:\EDAEZR~GV86YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. #: KW-06003985 Licensee: BG STRUCTURAL ENGINEERING

Description : Beam B2

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
Dsgn. L = 19.50 ft	3	0.040	0.011	1.62	-3.76	3.76	158.37	94.83	2.49	1.00	0.98	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45
+D+0.750Lr+0.750L+0.450W+H, LL Con													
Dsgn. L = 1.50 ft	1	0.002	0.005		-0.29	0.29	225.00	134.73	1.00	1.00	0.47	131.18	87.45
Dsgn. L = 19.50 ft	2	0.071	0.034	0.93	-8.12	8.12	190.97	114.35	3.00	1.00	2.94	131.18	87.45
Dsgn. L = 19.50 ft	3	0.174	0.034	8.38	-8.12	8.38	80.59	48.26	1.27	1.00	2.94	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+0.450W+H, LL Con													
Dsgn. L = 1.50 ft	1	0.002	0.005		-0.29	0.29	225.00	134.73	1.00	1.00	0.48	131.18	87.45
Dsgn. L = 19.50 ft	2	0.069	0.033	1.00	-7.86	7.86	190.97	114.35	3.00	1.00	2.87	131.18	87.45
Dsgn. L = 19.50 ft	3	0.163	0.033	7.90	-7.86	7.90	80.97	48.48	1.27	1.00	2.87	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45
+D+0.750Lr+0.750L+0.450W+H, LL Con													
Dsgn. L = 1.50 ft	1	0.002	0.025		-0.29	0.29	225.00	134.73	1.00	1.00	2.15	131.18	87.45
Dsgn. L = 19.50 ft	2	0.177	0.034	8.53	-8.12	8.53	80.40	48.14	1.26	1.00	2.95	131.18	87.45
Dsgn. L = 19.50 ft	3	0.071	0.014	0.75	-8.12	8.12	190.97	114.35	3.00	1.00	1.26	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+0.450W+H, LL Con													
Dsgn. L = 1.50 ft	1	0.002	0.025		-0.29	0.29	225.00	134.73	1.00	1.00	2.16	131.18	87.45
Dsgn. L = 19.50 ft	2	0.181	0.034	8.64	-7.86	8.64	79.95	47.87	1.26	1.00	2.94	131.18	87.45
Dsgn. L = 19.50 ft	3	0.069	0.014	0.08	-7.86	7.86	190.97	114.35	3.00	1.00	1.19	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45
+D+0.750Lr+0.750L+0.450W+H, LL Con													
Dsgn. L = 1.50 ft	1	0.002	0.022		-0.29	0.29	225.00	134.73	1.00	1.00	1.94	131.18	87.45
Dsgn. L = 19.50 ft	2	0.154	0.036	6.89	-12.22	12.22	132.53	79.36	2.08	1.00	3.16	131.18	87.45
Dsgn. L = 19.50 ft	3	0.152	0.036	6.73	-12.22	12.22	134.12	80.31	2.11	1.00	3.15	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750Lr+0.750L+0.450W+H, LL Con													
Dsgn. L = 1.50 ft	1	0.002	0.022		-0.29	0.29	225.00	134.73	1.00	1.00	1.95	131.18	87.45
Dsgn. L = 19.50 ft	2	0.155	0.036	6.99	-11.96	11.96	128.90	77.19	2.03	1.00	3.15	131.18	87.45
Dsgn. L = 19.50 ft	3	0.143	0.035	6.19	-11.96	11.96	139.40	83.48	2.19	1.00	3.08	131.18	87.45
Dsgn. L = 3.50 ft	4	0.012	0.010		-1.60	1.60	225.00	134.73	1.00	1.00	0.92	131.18	87.45
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45

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Project Descr:
Project ID: 800.0617

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ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Licensee : BG STRUCTURAL ENGINEERING

Steel Beam

Lic. # : KW-06003989

Description : Beam B2

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
Dsgn. L = 19.50 ft	3	0.049	0.012	2.11	-4.07	4.07	139.40	83.48	2.19	1.00	1.05	131.18	87.45
Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.008		-0.10	0.10	225.00	134.73	1.00	1.00	0.66	131.18	87.45
Dsgn. L = 19.50 ft	2	0.053	0.012	2.38	-4.07	4.07	128.90	77.19	2.03	1.00	1.07	131.18	87.45
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B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

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Steel Beam

Description : Beam B2

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
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Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
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Dsgn. L = 3.50 ft	4	0.004	0.004		-0.55	0.55	225.00	134.73	1.00	1.00	0.31	131.18	87.45
+0.60D+0.60W+0.60H													
Dsgn. L = 1.50 ft	1	0.000	0.005		-0.06	0.06	225.00	134.73	1.00	1.00	0.40	131.18	87.45
Dsgn. L = 19.50 ft	2	0.032	0.007	1.43	-2.44	2.44	128.90	77.19	2.03	1.00	0.64	131.18	87.45
Dsgn. L = 19.50 ft	3	0.029	0.007	1.26	-2.44	2.44	139.40	83.48	2.19	1.00	0.63	131.18	87.45
Dsgn. L = 3.50 ft	4	0.002	0.002		-0.33	0.33	225.00	134.73	1.00	1.00	0.19	131.18	87.45
+0.60D+0.70E+0.60H													
Dsgn. L = 1.50 ft	1	0.000	0.005		-0.06	0.06	225.00	134.73	1.00	1.00	0.40	131.18	87.45
Dsgn. L = 19.50 ft	2	0.032	0.007	1.43	-2.44	2.44	128.90	77.19	2.03	1.00	0.64	131.18	87.45
Dsgn. L = 19.50 ft	3	0.029	0.007	1.26	-2.44	2.44	139.40	83.48	2.19	1.00	0.63	131.18	87.45
Dsgn. L = 3.50 ft	4	0.002	0.002		-0.33	0.33	225.00	134.73	1.00	1.00	0.19	131.18	87.45

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+Lr+H	-0.0162	0.000
+D+Lr+H	2	0.0615	9.100		0.0000	0.000
+D+Lr+H	3	0.0584	10.530	+D+Lr+H	-0.0023	0.390
	4	0.0000	10.530	+D+Lr+H	-0.0355	3.500

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4	Support 5
Overall MAXimum		3.140	7.726	3.859	
Overall MINimum		0.018	-0.020	0.003	
+D+H		0.798	2.120	0.999	
+D+L+H, LL Comb Run (***L)		0.798	2.120	0.999	

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Fax: 1-760-568-5681

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Engineer: BG
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Steel Beam

Lic. #: KW-06003989

Description : Beam B2

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4	Support 5
+D+L+H, LL Comb Run (**L*)		0.798	2.120	0.999	
+D+L+H, LL Comb Run (**LL)		0.798	2.120	0.999	
+D+L+H, LL Comb Run (*L**)		0.798	2.120	0.999	
+D+L+H, LL Comb Run (*L*L)		0.798	2.120	0.999	
+D+L+H, LL Comb Run (*LL*)		0.798	2.120	0.999	
+D+L+H, LL Comb Run (*LLL)		0.798	2.120	0.999	
+D+L+H, LL Comb Run (L***)		0.798	2.120	0.999	
+D+L+H, LL Comb Run (L**L)		0.798	2.120	0.999	
+D+L+H, LL Comb Run (L*L*)		0.798	2.120	0.999	
+D+L+H, LL Comb Run (L*LL)		0.798	2.120	0.999	
+D+L+H, LL Comb Run (LL**)		0.798	2.120	0.999	
+D+L+H, LL Comb Run (LL*L)		0.798	2.120	0.999	
+D+L+H, LL Comb Run (LLL*)		0.798	2.120	0.999	
+D+L+H, LL Comb Run (LLLL)		0.798	2.120	0.999	
+D+Lr+H, LL Comb Run (***L)		0.816	2.011	1.894	
+D+Lr+H, LL Comb Run (**L*)		0.517	4.923	2.961	
+D+Lr+H, LL Comb Run (**LL)		0.535	4.814	3.856	
+D+Lr+H, LL Comb Run (*L**)		2.760	4.923	0.718	
+D+Lr+H, LL Comb Run (*L*L)		2.778	4.814	1.614	
+D+Lr+H, LL Comb Run (*LL*)		2.480	7.726	2.680	
+D+Lr+H, LL Comb Run (*LLL)		2.498	7.618	3.576	
+D+Lr+H, LL Comb Run (L***)		1.159	2.100	1.002	
+D+Lr+H, LL Comb Run (L**L)		1.177	1.991	1.897	
+D+Lr+H, LL Comb Run (L*L*)		0.879	4.903	2.964	
+D+Lr+H, LL Comb Run (L*LL)		0.897	4.795	3.859	
+D+Lr+H, LL Comb Run (LL**)		3.121	4.903	0.722	
+D+Lr+H, LL Comb Run (LL*L)		3.140	4.795	1.617	
+D+Lr+H, LL Comb Run (LLL*)		2.841	7.706	2.684	
+D+Lr+H, LL Comb Run (LLLL)		2.859	7.598	3.579	
+D+S+H		0.798	2.120	0.999	
+D+0.750Lr+0.750L+H, LL Comb Run (*		0.811	2.038	1.670	
+D+0.750Lr+0.750L+H, LL Comb Run (*		0.587	4.222	2.470	
+D+0.750Lr+0.750L+H, LL Comb Run (*		0.601	4.141	3.142	
+D+0.750Lr+0.750L+H, LL Comb Run (*		2.269	4.222	0.788	
+D+0.750Lr+0.750L+H, LL Comb Run (*		2.283	4.141	1.460	
+D+0.750Lr+0.750L+H, LL Comb Run (*		2.059	6.324	2.260	
+D+0.750Lr+0.750L+H, LL Comb Run (*		2.073	6.243	2.931	
+D+0.750Lr+0.750L+H, LL Comb Run (L		1.069	2.105	1.001	
+D+0.750Lr+0.750L+H, LL Comb Run (L		1.082	2.024	1.673	
+D+0.750Lr+0.750L+H, LL Comb Run (L		0.859	4.207	2.473	
+D+0.750Lr+0.750L+H, LL Comb Run (L		0.872	4.126	3.144	
+D+0.750Lr+0.750L+H, LL Comb Run (L		2.541	4.207	0.791	
+D+0.750Lr+0.750L+H, LL Comb Run (L		2.554	4.126	1.462	
+D+0.750Lr+0.750L+H, LL Comb Run (L		2.330	6.309	2.262	
+D+0.750Lr+0.750L+H, LL Comb Run (L		2.344	6.228	2.934	
+D+0.750L+0.750S+H, LL Comb Run (**		0.798	2.120	0.999	
+D+0.750L+0.750S+H, LL Comb Run (**		0.798	2.120	0.999	
+D+0.750L+0.750S+H, LL Comb Run (**		0.798	2.120	0.999	
+D+0.750L+0.750S+H, LL Comb Run (*L		0.798	2.120	0.999	
+D+0.750L+0.750S+H, LL Comb Run (*L		0.798	2.120	0.999	
+D+0.750L+0.750S+H, LL Comb Run (*L		0.798	2.120	0.999	
+D+0.750L+0.750S+H, LL Comb Run (*L		0.798	2.120	0.999	
+D+0.750L+0.750S+H, LL Comb Run (L*		0.798	2.120	0.999	
+D+0.750L+0.750S+H, LL Comb Run (L*		0.798	2.120	0.999	
+D+0.750L+0.750S+H, LL Comb Run (L*		0.798	2.120	0.999	
+D+0.750L+0.750S+H, LL Comb Run (L*		0.798	2.120	0.999	
+D+0.750L+0.750S+H, LL Comb Run (LL		0.798	2.120	0.999	
+D+0.750L+0.750S+H, LL Comb Run (LL		0.798	2.120	0.999	
+D+0.750L+0.750S+H, LL Comb Run (LL		0.798	2.120	0.999	
+D+0.750L+0.750S+H, LL Comb Run (LL		0.798	2.120	0.999	
+D+0.60W+H		0.798	2.120	0.999	
+D+0.70E+H		0.798	2.120	0.999	
+D+0.750Lr+0.750L+0.450W+H, LL Com		0.811	2.038	1.670	
+D+0.750Lr+0.750L+0.450W+H, LL Com		0.587	4.222	2.470	

B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

Printed: 3 MAR 2017, 10:59AM
File = s:\E0AEZR~GVB6YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. # : KW-06003989 Licensee : BG STRUCTURAL ENGINEERING

Steel Beam

Description : Beam B2

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4	Support 5
+D+0.750Lr+0.750L+0.450W+H, LL Com		0.601	4.141	3.142	
+D+0.750Lr+0.750L+0.450W+H, LL Com		2.269	4.222	0.788	
+D+0.750Lr+0.750L+0.450W+H, LL Com		2.263	4.141	1.460	
+D+0.750Lr+0.750L+0.450W+H, LL Com		2.059	6.324	2.260	
+D+0.750Lr+0.750L+0.450W+H, LL Com		2.073	6.243	2.931	
+D+0.750Lr+0.750L+0.450W+H, LL Com		1.069	2.105	1.001	
+D+0.750Lr+0.750L+0.450W+H, LL Com		1.082	2.024	1.673	
+D+0.750Lr+0.750L+0.450W+H, LL Com		0.859	4.207	2.473	
+D+0.750Lr+0.750L+0.450W+H, LL Com		0.872	4.126	3.144	
+D+0.750Lr+0.750L+0.450W+H, LL Com		2.541	4.207	0.791	
+D+0.750Lr+0.750L+0.450W+H, LL Com		2.554	4.126	1.462	
+D+0.750Lr+0.750L+0.450W+H, LL Com		2.330	6.309	2.262	
+D+0.750Lr+0.750L+0.450W+H, LL Com		2.344	6.228	2.934	
+D+0.750L+0.750S+0.450W+H, LL Com		0.798	2.120	0.999	
+D+0.750L+0.750S+0.450W+H, LL Com		0.798	2.120	0.999	
+D+0.750L+0.750S+0.450W+H, LL Com		0.798	2.120	0.999	
+D+0.750L+0.750S+0.450W+H, LL Com		0.798	2.120	0.999	
+D+0.750L+0.750S+0.450W+H, LL Com		0.798	2.120	0.999	
+D+0.750L+0.750S+0.450W+H, LL Com		0.798	2.120	0.999	
+D+0.750L+0.750S+0.450W+H, LL Com		0.798	2.120	0.999	
+D+0.750L+0.750S+0.450W+H, LL Com		0.798	2.120	0.999	
+D+0.750L+0.750S+0.450W+H, LL Com		0.798	2.120	0.999	
+D+0.750L+0.750S+0.450W+H, LL Com		0.798	2.120	0.999	
+D+0.750L+0.750S+0.450W+H, LL Com		0.798	2.120	0.999	
+D+0.750L+0.750S+0.450W+H, LL Com		0.798	2.120	0.999	
+D+0.750L+0.750S+0.450W+H, LL Com		0.798	2.120	0.999	
+D+0.750L+0.750S+0.450W+H, LL Com		0.798	2.120	0.999	
+D+0.750L+0.750S+0.450W+H, LL Com		0.798	2.120	0.999	
+D+0.750L+0.750S+0.5250E+H, LL Con		0.798	2.120	0.999	
+D+0.750L+0.750S+0.5250E+H, LL Con		0.798	2.120	0.999	
+D+0.750L+0.750S+0.5250E+H, LL Con		0.798	2.120	0.999	
+D+0.750L+0.750S+0.5250E+H, LL Con		0.798	2.120	0.999	
+D+0.750L+0.750S+0.5250E+H, LL Con		0.798	2.120	0.999	
+D+0.750L+0.750S+0.5250E+H, LL Con		0.798	2.120	0.999	
+D+0.750L+0.750S+0.5250E+H, LL Con		0.798	2.120	0.999	
+D+0.750L+0.750S+0.5250E+H, LL Con		0.798	2.120	0.999	
+D+0.750L+0.750S+0.5250E+H, LL Con		0.798	2.120	0.999	
+D+0.750L+0.750S+0.5250E+H, LL Con		0.798	2.120	0.999	
+D+0.750L+0.750S+0.5250E+H, LL Con		0.798	2.120	0.999	
+D+0.750L+0.750S+0.5250E+H, LL Con		0.798	2.120	0.999	
+D+0.750L+0.750S+0.5250E+H, LL Con		0.798	2.120	0.999	
+0.60D+0.60W+0.60H		0.479	1.272	0.599	
+0.60D+0.70E+0.60H		0.479	1.272	0.599	
D Only		0.798	2.120	0.999	
Lr Only, LL Comb Run (***L)		0.018	-0.108	0.895	
Lr Only, LL Comb Run (**L*)		-0.280	2.803	1.962	
Lr Only, LL Comb Run (**LL)		-0.262	2.695	2.857	
Lr Only, LL Comb Run (*L**)		1.962	2.803	-0.280	
Lr Only, LL Comb Run (*L*L)		1.980	2.695	0.615	
Lr Only, LL Comb Run (*LL*)		1.682	5.606	1.682	
Lr Only, LL Comb Run (*LLL)		1.700	5.498	2.577	
Lr Only, LL Comb Run (L***)		0.362	-0.020	0.003	
Lr Only, LL Comb Run (L**L)		0.380	-0.128	0.899	
Lr Only, LL Comb Run (L*L*)		0.081	2.783	1.966	
Lr Only, LL Comb Run (L*LL)		0.099	2.675	2.861	
Lr Only, LL Comb Run (LL**)		2.324	2.783	-0.277	
Lr Only, LL Comb Run (LL*L)		2.342	2.675	0.618	
Lr Only, LL Comb Run (LLL*)		2.043	5.586	1.685	
Lr Only, LL Comb Run (LLLL)		2.062	5.478	2.580	
L Only, LL Comb Run (***L)					
L Only, LL Comb Run (**L*)					
L Only, LL Comb Run (**LL)					

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Palm Desert, CA. 92211
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Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

Printed: 3 MAR 2017, 10:59AM

Steel Beam

File = s:\E0AEZR~G\86YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28

Lic. #: KW-06003989 Licensee: BG STRUCTURAL ENGINEERING

Description : Beam B2

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4	Support 5
L Only, LL Comb Run (*L**)					
L Only, LL Comb Run (*L*L)					
L Only, LL Comb Run (*LL*)					
L Only, LL Comb Run (*LLL)					
L Only, LL Comb Run (L***)					
L Only, LL Comb Run (L**L)					
L Only, LL Comb Run (L*L*)					
L Only, LL Comb Run (L*LL)					
L Only, LL Comb Run (LL**)					
L Only, LL Comb Run (LL*L)					
L Only, LL Comb Run (LLL*)					
L Only, LL Comb Run (LLLL)					
S Only					
W Only					
E Only					
H Only					

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Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

Printed: 3 MAR 2017, 10:51AM

Steel Beam

File = s:\EOAEZR-G\86YX5A-F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. # : KW-06003989 Licensee : BG STRUCTURAL ENGINEERING

Description : Beam B3

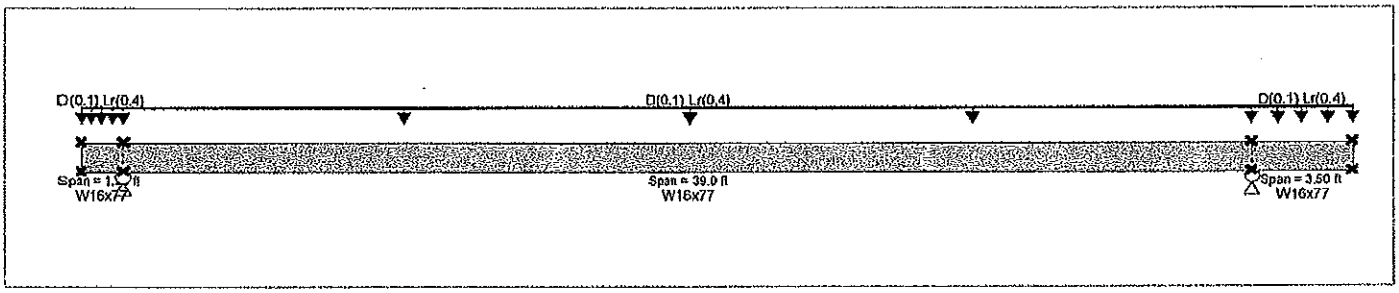
CODE REFERENCES

Calculations per AISC 360-10, IBC 2015, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Completely Unbraced
Bending Axis : Major Axis Bending

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



Applied Loads

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

Beam self weight calculated and added to loading
Load for Span Number 1
Uniform Load : D = 0.10, Lr = 0.40 k/ft, Tributary Width = 1.0 ft
Load for Span Number 2
Uniform Load : D = 0.10, Lr = 0.40 k/ft, Tributary Width = 1.0 ft
Load for Span Number 3
Uniform Load : D = 0.10, Lr = 0.40 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.631 : 1	Maximum Shear Stress Ratio =	0.076 : 1
Section used for this span	W16x77	Section used for this span	W16x77
Ma : Applied	109.061 k-ft	Va : Applied	11.337 k
Mn / Omega : Allowable	172.965 k-ft	Vn/Omega : Allowable	150.150 k
Load Combination	+D+Lr+H, LL Comb Run (*L*)	Load Combination	+D+Lr+H, LL Comb Run (*LL)
Location of maximum on span	19.500ft	Location of maximum on span	39.000 ft
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 2

Maximum Deflection

Max Downward Transient Deflection	0.654 in	Ratio =	715 >=360
Max Upward Transient Deflection	-0.080 in	Ratio =	452 >=360
Max Downward Total Deflection	0.936 in	Ratio =	500 >=180
Max Upward Total Deflection	-0.114 in	Ratio =	316 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+L+H, LL Comb Run (**L)													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+L+H, LL Comb Run (*L*)													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+L+H, LL Comb Run (*LL)													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+L+H, LL Comb Run (L**)													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15

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Project ID: 800.0617

Printed: 3 MAR 2017, 10:51AM

Steel Beam

File = s:\E0AEZR~G\86YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. #: KW-06003989 Licensee : BG STRUCTURAL ENGINEERING

Description : Beam B3

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+D+L+H, LL Comb Run (L*L)													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+L+H, LL Comb Run (LL*)													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+L+H, LL Comb Run (LLL)													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+Lr+H, LL Comb Run (**L)													
Dsgn. L = 1.50 ft	1	0.001	0.022		-0.20	0.20	625.00	374.25	1.00	1.00	3.37	225.23	150.15
Dsgn. L = 39.00 ft	2	0.182	0.024	31.81	-3.53	31.81	291.38	174.48	1.15	1.00	3.54	225.23	150.15
Dsgn. L = 3.50 ft	3	0.009	0.013		-3.53	3.53	625.00	374.25	1.00	1.00	2.02	225.23	150.15
+D+Lr+H, LL Comb Run (*L*)													
Dsgn. L = 1.50 ft	1	0.001	0.075		-0.20	0.20	625.00	374.25	1.00	1.00	11.23	225.23	150.15
Dsgn. L = 39.00 ft	2	0.631	0.075	109.06	-1.08	109.06	288.85	172.97	1.14	1.00	11.27	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+Lr+H, LL Comb Run (*LL)													
Dsgn. L = 1.50 ft	1	0.001	0.074		-0.20	0.20	625.00	374.25	1.00	1.00	11.17	225.23	150.15
Dsgn. L = 39.00 ft	2	0.622	0.076	107.84	-3.53	107.84	289.36	173.27	1.14	1.00	11.34	225.23	150.15
Dsgn. L = 3.50 ft	3	0.009	0.013		-3.53	3.53	625.00	374.25	1.00	1.00	2.02	225.23	150.15
+D+Lr+H, LL Comb Run (L**)													
Dsgn. L = 1.50 ft	1	0.002	0.023		-0.65	0.65	625.00	374.25	1.00	1.00	3.44	225.23	150.15
Dsgn. L = 39.00 ft	2	0.189	0.023	32.79	-1.08	32.79	289.86	173.57	1.15	1.00	3.46	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+Lr+H, LL Comb Run (L*L)													
Dsgn. L = 1.50 ft	1	0.002	0.022		-0.65	0.65	625.00	374.25	1.00	1.00	3.38	225.23	150.15
Dsgn. L = 39.00 ft	2	0.181	0.023	31.58	-3.53	31.58	291.64	174.63	1.15	1.00	3.53	225.23	150.15
Dsgn. L = 3.50 ft	3	0.009	0.013		-3.53	3.53	625.00	374.25	1.00	1.00	2.02	225.23	150.15
+D+Lr+H, LL Comb Run (LL*)													
Dsgn. L = 1.50 ft	1	0.002	0.075		-0.65	0.65	625.00	374.25	1.00	1.00	11.24	225.23	150.15
Dsgn. L = 39.00 ft	2	0.629	0.075	108.84	-1.08	108.84	289.11	173.12	1.14	1.00	11.26	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+Lr+H, LL Comb Run (LLL)													
Dsgn. L = 1.50 ft	1	0.002	0.074		-0.65	0.65	625.00	374.25	1.00	1.00	11.18	225.23	150.15
Dsgn. L = 39.00 ft	2	0.621	0.075	107.61	-3.53	107.61	289.61	173.42	1.14	1.00	11.33	225.23	150.15
Dsgn. L = 3.50 ft	3	0.009	0.013		-3.53	3.53	625.00	374.25	1.00	1.00	2.02	225.23	150.15
+D+S+H													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750Lr+0.750L+H, LL Comb Run (*													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.38	225.23	150.15
Dsgn. L = 39.00 ft	2	0.184	0.023	32.10	-2.92	32.10	290.68	174.18	1.15	1.00	3.52	225.23	150.15
Dsgn. L = 3.50 ft	3	0.008	0.011		-2.92	2.92	625.00	374.25	1.00	1.00	1.67	225.23	150.15
+D+0.750Lr+0.750L+H, LL Comb Run (*													
Dsgn. L = 1.50 ft	1	0.001	0.062		-0.20	0.20	625.00	374.25	1.00	1.00	9.28	225.23	150.15
Dsgn. L = 39.00 ft	2	0.520	0.062	90.05	-1.08	90.05	289.11	173.12	1.14	1.00	9.32	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750Lr+0.750L+H, LL Comb Run (*													
Dsgn. L = 1.50 ft	1	0.001	0.061		-0.20	0.20	625.00	374.25	1.00	1.00	9.23	225.23	150.15
Dsgn. L = 39.00 ft	2	0.514	0.062	89.13	-2.92	89.13	289.36	173.27	1.14	1.00	9.37	225.23	150.15
Dsgn. L = 3.50 ft	3	0.008	0.011		-2.92	2.92	625.00	374.25	1.00	1.00	1.67	225.23	150.15
+D+0.750Lr+0.750L+H, LL Comb Run (L													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.54	0.54	625.00	374.25	1.00	1.00	3.44	225.23	150.15
Dsgn. L = 39.00 ft	2	0.189	0.023	32.84	-1.08	32.84	289.86	173.57	1.15	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750Lr+0.750L+H, LL Comb Run (L													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.54	0.54	625.00	374.25	1.00	1.00	3.39	225.23	150.15
Dsgn. L = 39.00 ft	2	0.183	0.023	31.93	-2.92	31.93	291.13	174.33	1.15	1.00	3.51	225.23	150.15
Dsgn. L = 3.50 ft	3	0.008	0.011		-2.92	2.92	625.00	374.25	1.00	1.00	1.67	225.23	150.15
+D+0.750Lr+0.750L+H, LL Comb Run (L													
Dsgn. L = 1.50 ft	1	0.001	0.062		-0.54	0.54	625.00	374.25	1.00	1.00	9.29	225.23	150.15
Dsgn. L = 39.00 ft	2	0.519	0.062	89.88	-1.08	89.88	289.11	173.12	1.14	1.00	9.32	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750Lr+0.750L+H, LL Comb Run (L													

B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

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Steel Beam

File = s:\E OAEZR-GB6YX5A-F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. # : KW-06003989 Licensee: BG STRUCTURAL ENGINEERING

Description : Beam B3

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
Dsgn. L = 1.50 ft	1	0.001	0.062		-0.54	0.54	625.00	374.25	1.00	1.00	9.24	225.23	150.15
Dsgn. L = 39.00 ft	2	0.513	0.062	88.96	-2.92	88.96	289.61	173.42	1.14	1.00	9.36	225.23	150.15
Dsgn. L = 3.50 ft	3	0.008	0.011		-2.92	2.92	625.00	374.25	1.00	1.00	1.67	225.23	150.15
+D+0.750L+0.750S+H, LL Comb Run (**													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+H, LL Comb Run (*L													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+H, LL Comb Run (*L													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+H, LL Comb Run (L'													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+H, LL Comb Run (L'													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+H, LL Comb Run (LI													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+H, LL Comb Run (LI													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.60W+H													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.70E+H													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.38	225.23	150.15
Dsgn. L = 39.00 ft	2	0.184	0.023	32.10	-2.92	32.10	290.88	174.18	1.15	1.00	3.52	225.23	150.15
Dsgn. L = 3.50 ft	3	0.008	0.011		-2.92	2.92	625.00	374.25	1.00	1.00	1.67	225.23	150.15
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.001	0.062		-0.20	0.20	625.00	374.25	1.00	1.00	9.28	225.23	150.15
Dsgn. L = 39.00 ft	2	0.520	0.062	90.05	-1.08	90.05	289.11	173.12	1.14	1.00	9.32	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.001	0.061		-0.20	0.20	625.00	374.25	1.00	1.00	9.23	225.23	150.15
Dsgn. L = 39.00 ft	2	0.514	0.062	89.13	-2.92	89.13	289.36	173.27	1.14	1.00	9.37	225.23	150.15
Dsgn. L = 3.50 ft	3	0.008	0.011		-2.92	2.92	625.00	374.25	1.00	1.00	1.67	225.23	150.15
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.54	0.54	625.00	374.25	1.00	1.00	3.44	225.23	150.15
Dsgn. L = 39.00 ft	2	0.189	0.023	32.84	-1.08	32.84	289.86	173.57	1.15	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.54	0.54	625.00	374.25	1.00	1.00	3.39	225.23	150.15
Dsgn. L = 39.00 ft	2	0.183	0.023	31.93	-2.92	31.93	291.13	174.33	1.15	1.00	3.51	225.23	150.15
Dsgn. L = 3.50 ft	3	0.008	0.011		-2.92	2.92	625.00	374.25	1.00	1.00	1.67	225.23	150.15
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.001	0.062		-0.54	0.54	625.00	374.25	1.00	1.00	9.29	225.23	150.15
Dsgn. L = 39.00 ft	2	0.519	0.062	89.88	-1.08	89.88	289.11	173.12	1.14	1.00	9.32	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750Lr+0.750L+0.450W+H, LL Corr													
Dsgn. L = 1.50 ft	1	0.001	0.062		-0.54	0.54	625.00	374.25	1.00	1.00	9.24	225.23	150.15
Dsgn. L = 39.00 ft	2	0.513	0.062	88.96	-2.92	88.96	289.61	173.42	1.14	1.00	9.36	225.23	150.15
Dsgn. L = 3.50 ft	3	0.008	0.011		-2.92	2.92	625.00	374.25	1.00	1.00	1.67	225.23	150.15
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15

B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:

Project ID: 800.0617

Printed: 3 MAR 2017, 10:51AM

Steel Beam

File = s:\E0AEZR~G\86YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. # : KW-06003989 Licensee : BG STRUCTURAL ENGINEERING

Description : Beam B3

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+0.450W+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+0.5250E+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+0.5250E+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+0.5250E+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+0.5250E+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+D+0.750L+0.750S+0.5250E+H, LL Com													
Dsgn. L = 1.50 ft	1	0.001	0.023		-0.20	0.20	625.00	374.25	1.00	1.00	3.43	225.23	150.15
Dsgn. L = 39.00 ft	2	0.190	0.023	33.01	-1.08	33.01	289.61	173.42	1.14	1.00	3.47	225.23	150.15
Dsgn. L = 3.50 ft	3	0.003	0.004		-1.08	1.08	625.00	374.25	1.00	1.00	0.62	225.23	150.15
+0.60D+0.60W+0.60H													
Dsgn. L = 1.50 ft	1	0.000	0.014		-0.12	0.12	625.00	374.25	1.00	1.00	2.06	225.23	150.15
Dsgn. L = 39.00 ft	2	0.114	0.014	19.81	-0.65	19.81	289.61	173.42	1.14	1.00	2.08	225.23	150.15
Dsgn. L = 3.50 ft	3	0.002	0.002		-0.65	0.65	625.00	374.25	1.00	1.00	0.37	225.23	150.15
+0.60D+0.70E+0.60H													
Dsgn. L = 1.50 ft	1	0.000	0.014		-0.12	0.12	625.00	374.25	1.00	1.00	2.06	225.23	150.15
Dsgn. L = 39.00 ft	2	0.114	0.014	19.81	-0.65	19.81	289.61	173.42	1.14	1.00	2.08	225.23	150.15
Dsgn. L = 3.50 ft	3	0.002	0.002		-0.65	0.65	625.00	374.25	1.00	1.00	0.37	225.23	150.15

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+Lr+H	-0.1141	0.000
+D+Lr+H	2	0.9364	19.500		0.0000	0.000
	3	0.0000	19.500	+D+Lr+H	-0.2649	3.500

B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.06-17

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Steel Beam

File = s:\E0AEZR~G\88YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. #: KW-06003989 Licensee: BG STRUCTURAL ENGINEERING

Description : Beam B3

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum		12.106	13.357	
Overall MINimum		-0.063	-0.012	
+D+H		3.694	4.094	
+D+L+H, LL Comb Run (**L)		3.694	4.094	
+D+L+H, LL Comb Run (*L*)		3.694	4.094	
+D+L+H, LL Comb Run (*LL)		3.694	4.094	
+D+L+H, LL Comb Run (L**)		3.694	4.094	
+D+L+H, LL Comb Run (L*L)		3.694	4.094	
+D+L+H, LL Comb Run (LL*)		3.694	4.094	
+D+L+H, LL Comb Run (LLL)		3.694	4.094	
+D+Lr+H, LL Comb Run (**L)		3.631	5.557	
+D+Lr+H, LL Comb Run (*L*)		11.494	11.894	
+D+Lr+H, LL Comb Run (*LL)		11.431	13.357	
+D+Lr+H, LL Comb Run (L**)		4.306	4.082	
+D+Lr+H, LL Comb Run (L*L)		4.243	5.545	
+D+Lr+H, LL Comb Run (LL*)		12.106	11.882	
+D+Lr+H, LL Comb Run (LLL)		12.043	13.345	
+D+S+H		3.694	4.094	
+D+0.750Lr+0.750L+H, LL Comb Run (*		3.647	5.191	
+D+0.750Lr+0.750L+H, LL Comb Run (*		9.544	9.944	
+D+0.750Lr+0.750L+H, LL Comb Run (*		9.497	11.041	
+D+0.750Lr+0.750L+H, LL Comb Run (L		4.153	4.085	
+D+0.750Lr+0.750L+H, LL Comb Run (L		4.106	5.182	
+D+0.750Lr+0.750L+H, LL Comb Run (L		10.003	9.935	
+D+0.750Lr+0.750L+H, LL Comb Run (L		9.956	11.032	
+D+0.750L+0.750S+H, LL Comb Run (**		3.694	4.094	
+D+0.750L+0.750S+H, LL Comb Run (*L		3.694	4.094	
+D+0.750L+0.750S+H, LL Comb Run (*L		3.694	4.094	
+D+0.750L+0.750S+H, LL Comb Run (L*		3.694	4.094	
+D+0.750L+0.750S+H, LL Comb Run (L*		3.694	4.094	
+D+0.750L+0.750S+H, LL Comb Run (LL		3.694	4.094	
+D+0.750L+0.750S+H, LL Comb Run (LL		3.694	4.094	
+D+0.60W+H		3.694	4.094	
+D+0.70E+H		3.694	4.094	
+D+0.750Lr+0.750L+0.450W+H, LL Corr		3.647	5.191	
+D+0.750Lr+0.750L+0.450W+H, LL Corr		9.544	9.944	
+D+0.750Lr+0.750L+0.450W+H, LL Corr		9.497	11.041	
+D+0.750Lr+0.750L+0.450W+H, LL Corr		4.153	4.085	
+D+0.750Lr+0.750L+0.450W+H, LL Corr		4.106	5.182	
+D+0.750Lr+0.750L+0.450W+H, LL Corr		10.003	9.935	
+D+0.750Lr+0.750L+0.450W+H, LL Corr		9.956	11.032	
+D+0.750L+0.750S+0.450W+H, LL Com		3.694	4.094	
+D+0.750L+0.750S+0.450W+H, LL Com		3.694	4.094	
+D+0.750L+0.750S+0.450W+H, LL Com		3.694	4.094	
+D+0.750L+0.750S+0.450W+H, LL Com		3.694	4.094	
+D+0.750L+0.750S+0.450W+H, LL Com		3.694	4.094	
+D+0.750L+0.750S+0.450W+H, LL Com		3.694	4.094	
+D+0.750L+0.750S+0.450W+H, LL Com		3.694	4.094	
+D+0.750L+0.750S+0.5250E+H, LL Corr		3.694	4.094	
+D+0.750L+0.750S+0.5250E+H, LL Con		3.694	4.094	
+D+0.750L+0.750S+0.5250E+H, LL Con		3.694	4.094	
+D+0.750L+0.750S+0.5250E+H, LL Con		3.694	4.094	
+D+0.750L+0.750S+0.5250E+H, LL Corr		3.694	4.094	
+D+0.750L+0.750S+0.5250E+H, LL Con		3.694	4.094	
+D+0.750L+0.750S+0.5250E+H, LL Con		3.694	4.094	
+0.60D+0.60W+0.60H		2.217	2.456	
+0.60D+0.70E+0.60H		2.217	2.456	
D Only		3.694	4.094	
Lr Only, LL Comb Run (**L)		-0.063	1.463	
Lr Only, LL Comb Run (*L*)		7.800	7.800	
Lr Only, LL Comb Run (*LL)		7.737	9.263	
Lr Only, LL Comb Run (L**)		0.612	-0.012	
Lr Only, LL Comb Run (L*L)		0.549	1.451	
Lr Only, LL Comb Run (LL*)		8.412	7.788	

B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

Printed: 3 MAR 2017, 10:51AM

Steel Beam

File = s:\EOAEZR~G\86YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28

Lic. # : KW-06003989 Licensee : BG STRUCTURAL ENGINEERING

Description : Beam B3

Vertical Reactions

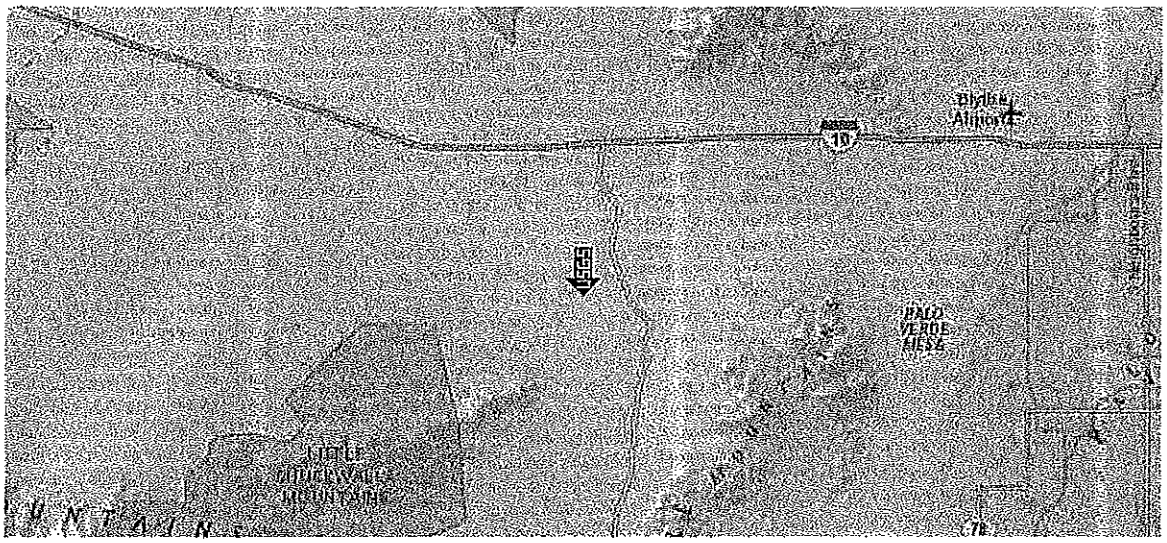
Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Lr Only, LL Comb Run (LLL)		8.349	9.251	
L Only, LL Comb Run (**L)				
L Only, LL Comb Run (*L*)				
L Only, LL Comb Run (*LL)				
L Only, LL Comb Run (L**)				
L Only, LL Comb Run (L*L)				
L Only, LL Comb Run (LL*)				
L Only, LL Comb Run (LLL)				
S Only				
W Only				
E Only				
H Only				

USGS Design Maps Summary Report

User-Specified Input

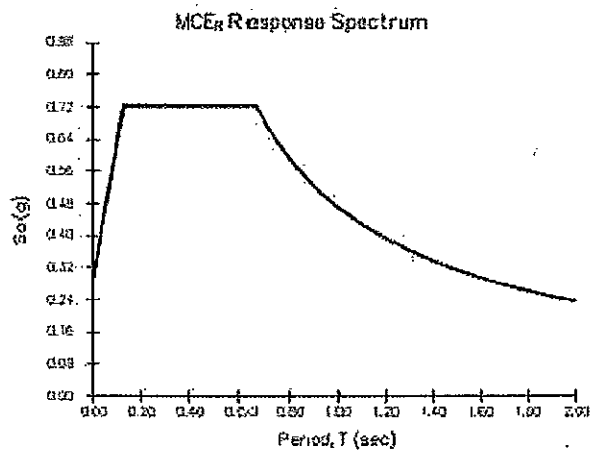
Report Title	Genesis Solar Fri March 3, 2017 19:21:41 UTC
Building Code Reference Document	2012/2015 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	33.5594°N, 114.9111°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

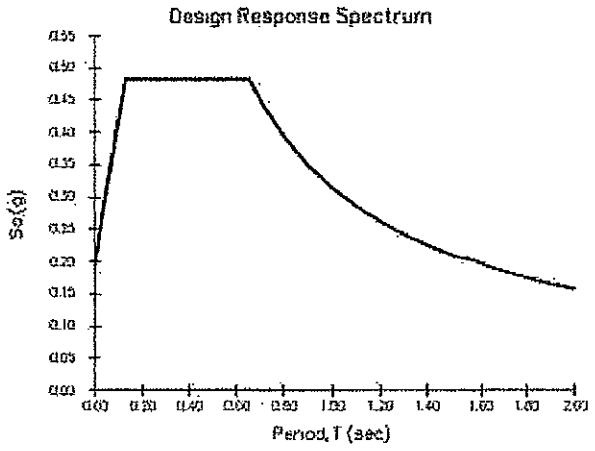


USGS-Provided Output

S_S =	0.524 g	S_{MS} =	0.724 g	S_{DS} =	0.483 g
S_1 =	0.248 g	S_{M1} =	0.472 g	S_{D1} =	0.314 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





Although this information is a product of the U.S. Geological Survey, we provide no warranty, expressed or implied, as to the accuracy of the data contained therein. This tool is not a substitute for technical subject-matter knowledge.

MecaWind Pro v2.2.7.5 per ASCE 7-10

Developed by MECA Enterprises, Inc. Copyright www.mecaenterprises.com

Date	: 3/6/2017	Project No.	: 800.0617
Company Name	: B.G. Structural Engineering, I	Designed By	: BG
Address	: 75-175 Merle Drive	Description	: Genesis Solar - Low Roof
City	: Palm Desert	Customer Name	:
State	: CA.	Proj Location	: Blythe, CA.

File Location: J:\Jobs\800\800.0617 Heavy Equipment Covered Parking\800.0617 Wind 2 Low Roof.wnd

Input Parameters: Envelope Procedure per ASCE 7-10 Chapter 28 Part 1

Basic Wind Speed(V)	= 110.00 mph				
Structural Category	= II	Exposure Category	=	C	
Natural Frequency	= N/A	Flexible Structure	=	No	
Importance Factor	= 1.00	Kd Directional Factor	=	0.85	
Alpha	= 9.50	Zg	=	900.00	ft
At	= 0.11	Bt	=	1.00	
Am	= 0.15	Bm	=	0.65	
Cc	= 0.20	l	=	500.00	ft
Epsilon	= 0.20	Zmin	=	15.00	ft
Pitch of Roof	= 0.25 : 12	Slope of Roof(Theta)	=	1.19	Deg
D: Roof Len along Ridge	= 200.00 ft	L: Horizontal Width	=	12.00	ft
h: Mean Roof Ht	= 12.00 ft	Type of Roof	=	MONOSLOPE	

Gust Factor Calculations

Gust Factor Category I Rigid Structures - Simplified Method

Gust1: For Rigid Structures (Nat. Freq.>1 Hz) use 0.85 = 0.85

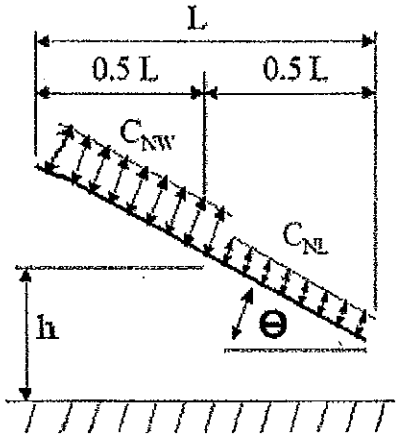
Gust Factor Category II Rigid Structures - Complete Analysis

Zm:	0.6*Ht	=	15.00 ft
lzm:	Cc*(33/Zm)^0.167	=	0.23
Lzm:	l*(Zm/33)^Epsilon	=	427.06 ft
Q:	(1/(1+0.63*((B+Ht)/Lzm)^0.63))^0.5	=	0.95
Gust2:	0.925*((1+1.7*lzm*3.4*Q)/(1+1.7*3.4*lzm))	=	0.90

Gust Factor Summary

Not a Flexible Structure use the Lessor of Gust1 or Gust2 = 0.85

Open Building-Monoslope Roof per Figure 27.4-4:



Normal to Ridge - Open Building - Monoslope Roof per Figure 27.4-4:

Gamma = 0 degrees, Obstructed Wind Flow

Load Case	Cnw	Cnl	Windward Wind Pres. psf	Leeward Wind Pres. psf
A	-0.500	-1.200	-5.699	-13.679
B	-1.100	-0.600	-12.539	-6.839

Normal to Ridge - Base Reactions - Roof +GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof Windward	-5.70	1201	.00	0.28	6.84	13.7	.0	.0
Roof Leeward	-13.68	1201	.00	0.68	16.41	-16.5	.0	.0
Total	.00	2402	.00	0.97	23.25	-2.8	.0	.0

Normal to Ridge - Base Reactions - Roof -GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof Windward	-12.54	1201	.00	0.63	15.05	30.1	.0	.0
Roof Leeward	-6.84	1201	.00	0.34	8.21	-8.2	.0	.0
Total	.00	2402	.00	0.97	23.25	21.9	.0	.0

Normal to Ridge - Base Reactions - Roof MIN

Description	Press psf	Area* ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Total	.00	0	.00	.00	.00	.0	.0	.0

Notes - Normal to Ridge

Normal to Eave - Open Building - Monoslope Roof per Figure 27.4-4:

Gamma = 180 degrees, Obstructed Wind Flow

Load Case	Cnw	Cnl	Windward Wind Pres. psf	Leeward Wind Pres. psf
A	-0.500	-1.200	-5.699	-13.679
B	-1.100	-0.600	-12.539	-6.839

Normal to Eave - Base Reactions - Roof +GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof Windward	-5.70	1200	.00	0.01	6.84	342.1	.0	.0
Roof Leeward	-13.68	1200	.00	0.02	16.41	-820.5	.0	.0
Total	.00	2400	.00	0.03	23.25	-478.4	.0	.0

Normal to Eave - Base Reactions - Roof -GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof Windward	-12.54	1200	.00	0.02	15.05	752.6	.0	.0
Roof Leeward	-6.84	1200	.00	0.01	8.21	-410.2	.0	.0
Total	.00	2400	.00	0.03	23.25	342.3	.0	.0

Normal to Eave - Base Reactions - Roof MIN

Description	Press psf	Area* ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Total	.00	0	.00	.00	.00	.0	.0	.0

Notes - Normal to Eave

Along Ridge - Open Building - Monoslope Roof per Figure 27.4-4:

Gamma = 90 degrees, Obstructed Wind Flow

Length Along Ridge of Roof	Roof Angle (Theta)	Load Case	Cn psf	Wind Press Along Ridge psf

<= 12.0	Theta<=45 deg	A	-1.200	-13.679
		B	0.500	5.699
>12.0&<=2*12.0	Theta<=45 deg	A	-0.900	-10.259
		B	0.500	5.699
>2*12	Theta<=45 deg	A	-0.600	-6.839
		B	0.300	3.420

Along Ridge - Base Reactions - Roof +GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof (0 to h)	-13.68	1272	.00	0.04	17.40	818.3	-1635.5	3.9
Roof (h to 2h)	-10.26	1272	.00	0.03	13.05	613.7	-1070.1	2.5
Roof (>2h)	-6.84	18656	.00	0.30	127.59	6000.6	1531.1	-3.6
Total	.00	21200	.00	0.37	158.04	7432.5	-1174.5	2.8

Along Ridge - Base Reactions - Roof -GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof (0 to h)	5.70	1272	.00	-0.02	-7.25	-340.9	681.5	-1.6
Roof (h to 2h)	5.70	1272	.00	-0.02	-7.25	-340.9	594.5	-1.4
Roof (>2h)	3.42	18656	.00	-0.15	-63.80	-3000.3	-765.6	1.8
Total	.00	21200	.00	-0.18	-78.30	-3682.2	510.4	-1.2

Along Ridge - Base Reactions - Roof MIN

Description	Press psf	Area* ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Total	.00	0	.00	.00	.00	.0	.0	.0

Notes - Along Ridge

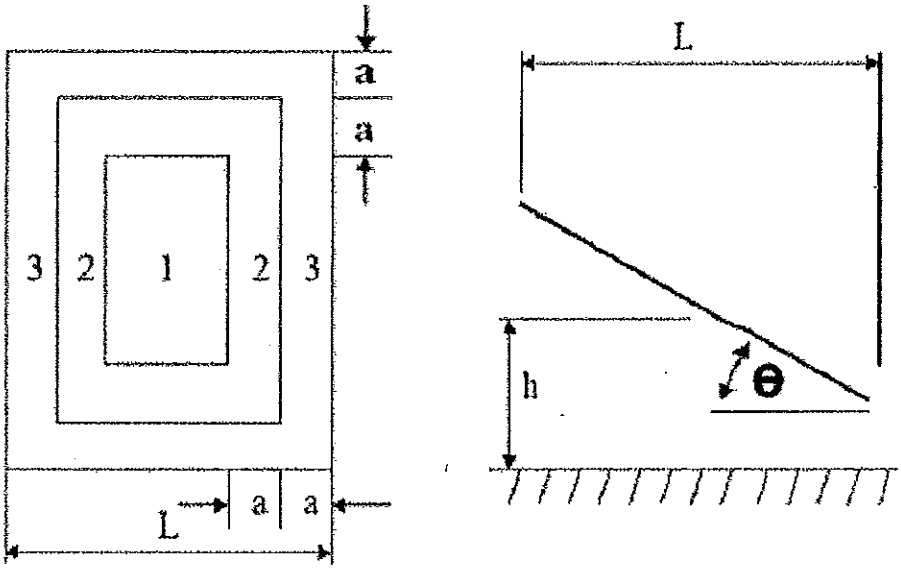
Total Base Reaction Summary

Description	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Normal to Ridge Roof +GCpi	.0	1.0	23.3	-2.8	.0	.0
Normal to Ridge Roof -GCpi	.0	1.0	23.3	21.9	.0	.0
Normal to Ridge Roof MIN	.0	.0	.0	.0	.0	.0
Normal to Eave Roof +GCpi	.0	0.0	23.3	-478.4	.0	.0
Normal to Eave Roof -GCpi	.0	0.0	23.3	342.3	.0	.0
Normal to Eave Roof MIN	.0	.0	.0	.0	.0	.0
Along Ridge Roof +GCpi	.0	0.4	158.0	7432.5	-1174.5	2.8
Along Ridge Roof -GCpi	.0	-0.2	-78.3	-3682.2	510.4	-1.2
Along Ridge Roof MIN	.0	.0	.0	.0	.0	.0

Notes Applying to MWFRS Reactions:

Note (1) Cnw- Net Press (contrib from top and bottom surf) for windward roof surf.
Note (2) Cnl- Net Press (contrib from top and bottom surf) for leeward roof surf.
Note (3) Cn- Net Press (contributions from top and bottom surfaces).
Note (4) + = Pressure acting toward surface, - = Pressure acting away from surface.
Note (5) Per Fig 27.4-1, Note 9, Use greater of Shear calculated with or without roof.
Note (6) X= Along Building ridge, Y = Normal to Building Ridge, Z = Vertical
Note (7) MIN = Minimum pressures on Walls = 9.6 psf and Roof = 4.8 psf
Note (8) MIN area is the area of the surface onto a vertical plane normal to wind.
Note (9) Total Roof Area (incl OH Top) = 3600.78 sq. ft

Wind Pressure on Components and Cladding (Ch 30 Part 5)



Monoslope Roof

All pressures shown are based upon ASD Design, with a Load Factor of .6

Width of Pressure Coefficient Zone "a" = = 3.00 ft

Description	Width ft	Span ft	Area ft^2	Zone	Cn Max	Cn Min	Max P psf	Min P psf
Zone 1	1.00	1.00	1.0	1	0.55	-1.28	9.60	-14.59
Zone 2	1.00	1.00	1.0	2	0.86	-1.93	9.84	-21.97
Zone 3	1.00	1.00	1.0	3	1.10	-3.84	12.49	-43.76
Zone 4	1.00	1.00	1.0	1	0.55	-1.28	9.60	-14.59
Zone 5	1.00	1.00	1.0	1	0.55	-1.28	9.60	-14.59

Project Name: Genesis Solar Heavy Equipment Covered Parking - Low Roof

Address: 11995 Wiley's Well Road, Blythe, CA

LOADS:

Roof 1 :

DEAD LOADS:

Pitch = 0.25:12

Steel Decking	3.00	PSF
Misc.	2.00	
DL=	**5.00**	**PSF**
Slope Correction =	**1.00**	
DL=	**5.00**	**PSF**
LL=	**20.00**	**PSF**
TL=	**25.00**	**PSF**

WALLS:

Exterior Wall:

DEAD LOADS:

Steel Decking	3.00	PSF
Girts	3.00	
Misc.	1.00	
DL=	**7.00**	**PSF**

Project Name: Genesis Solar Heavy Equipment Covered Parking - Low Roof - 80

Address: 11995 Wiley's Well Road, Blythe, CA

LATERAL LOADING

2015 CBC
SEISMIC

Ht. Abv.Gnd.(Ft) = **12**
I= **1.00**
"R" Factor = **2.5**
Site Class = **C**
Latitude = **33.559**
Longitude = **-114.911**
Occupancy Catetory = **II**

Cu = **1.4**
C_t = **0.02**
x = **0.75**
Ta = **0.129**
T_L = **8**
ρ = **1.3**

S_S = **0.524**	Fa = **1.1904**	S_{DS} = **0.416**	SDC (S_{DS}) = **C**
S_1 = **0.248**	Fv = **1.552**	S_{D1} = **0.257**	SDC (S_{D1}) = **D**

USE: SDC = D

BASE SHEAR

Per ASCE7 Eq. 12.8-2 — C_s = 0.166 — **GOVERNS**

Not to exceed-

Per ASCE7 Eq. 12.8-3 — C_s = 0.796

Not less than-

Per ASCE7 Eq. 12.8-5 — C_s = 0.010

Use- 0.010

0.166 STRENGTH DESIGN

0.119 WORKING STRESS DESIGN

(DIVIDE BY 1.4)

Level	Wpx	Hi	Wi*Hi	%	Vi	ρVi	A	ρVi (psf)
RF	22.70K	12'	272.4 'K	1.000	**2.70**	**3.51**	3542	**0.99**
Totals=	22.70K		272.4 'K	1.000	**2.70K**	**3.51K**		

Project Name: Genesis Solar Heavy Equipment Covered Parking - Low Roof - 80

Address: 11995 Wiley's Well Road, Blythe, CA

2015 CBC
WIND

Max. Wind Load = 14.53 psf
(Refer to wind load calcs.attached)

USE Wind Unit Load = 18psf

N/S Direction:

Wind Areas:

Level =	RF		
(Sq. Ft.)			
A1	88.00		
A2	0.00		
A3	0.00		
A4	0.00		

Wind Force:

Level =	RF			
(Lbs.)				
F A1	1584			
F A2	0			
F A3	0			
F A4	0			
Total =	**1584**	**0**	**0**	**1.58K**

SEISMIC GOVERNS

E/W Direction:

Wind Areas:

Level =	RF		
(Sq. Ft.)			
A1	644.00		
A2	0.00		
A3	0.00		
A4	0.00		

Wind Force:

Level =	RF			
(Lbs.)				
F A1	11592			
F A2	0			
F A3	0			
F A4	0			
Total =	**11592**	**0**	**0**	**11.59K**

WIND GOVERNS

SEISMIC WEIGHTS:

SEISMIC AREAS (sq. ft.)

RF1	RF2	RF3	RF4			
3542.0	0.0	0.0				
	0.0	0.0				
		0.0				
TOTAL = 3542	0	0	0	0	0	0 SF

SEISMIC WEIGHTS:

RF	A	w (psf)	Wi
Roof 1:	3542	5.00	17714
Roof 2:	0	0.00	0
Roof 3:	0	16.00	0
Roof 4:	0	21.00	0
Ext. Walls:	712	7.00	4984
Int. Walls:	0	0.00	0
		Roof Total =	22,698 lbs.

Exterior Walls:

RF

H	L	A
4	178	712.0
0	0	0.0
0	0	0.0
		0.0
	TOTAL =	712 SF

Interior Walls:

RF

H	L	A
0	0	0.0
0	0	0.0
0	0	0.0
		0.0
	TOTAL =	0 SF

SHEAR WALLS: Level = RF

Unit Load = 0.99 psf Sds= 0.42 Uplift LC =0.6D+.7E = 0.6D+0.7(ρ*Qe-0.2*Sds*D) = 0.6D-0.14*Sds*D+0.7*ρ*Qe RM D factor= 0.541782

Line	Trib. Area	Shear (lbs)	Above (lbs)	Total (lbs	Length(s) (ft	v (plf)	Use SW #	HD segment length	Wrm (plf)	Wwall (psf)	Add'l point load	Wall Hgt.	OTM	0.5418*D Factored RM	Uplift	Use
1	440	436		436	2.00	217.8	2 - Stl Cols	2	10	17	0	12	5226	232	3154	N/A
2	440	436		436	2.00	217.8	2 - Stl Cols	2	10	17	0	12	5226	232	3154	N/A
3	440	436		436	2.00	217.8	2 - Stl Cols	2	10	17	0	12	5226	232	3154	N/A
4	440	436		436	2.00	217.8	2 - Stl Cols	2	0	17	0	12	5226	221	3161	N/A
5	440	436		436	2.00	217.8	2 - Stl Cols	2	0	17	0	12	5226	221	3161	N/A
6	440	436		436	2.00	217.8	2 - Stl Cols	2	0	17	0	12	5226	221	3161	N/A
7	440	436		436	2.00	217.8	2 - Stl Cols	2	0	17	0	12	5226	221	3161	N/A
8	253	250		250	2.00	125.2	2 - Stl Cols	2	0	17	0	12	3005	221	1758	N/A
9	0	0		0	1.00	0.0	1	0	0	17	0	12	0	0	0	N/A
10	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
11	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
12	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
13	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
14	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
15	0	0		0	1.00	0.0	1	0	0	17	0	12.5	0	0	0	N/A
16	0	0		0	1.00	0.0	1	0	0	17	0	14.5	0	0	0	N/A
17	0	0		0	1.00	0.0	1	0	0	17	0	10.5	0	0	0	N/A
18	0	0		0	1.00	0.0	1	0	0	17	0	10.5	0	0	0	N/A
19	0	0		0	1.00	0.0	1	0	0	17	0	10.5	0	0	0	N/A
20	0	0		0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
21	0	0		0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
A	1610	1594		1594	8.00	199.2	8 - Stl Cols	8	10	17	0	12	19123	3710	2032	N/A
B	2013	1992		1992	8.00	249.1	8 - Stl Cols	8	10	17	0	12	23909	3710	2664	N/A
C	0	0		0	3.00	0.0	1	0	10	17	0	12	0	0	0	N/A
D	0	0		0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
E	0	0		0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
F	0	0		0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
G	0	0		0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
H	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
I	0	0		0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
J	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
K	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
L	0	0		0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
M	0	0		0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
N	0	0		0	1.00	0.0	1	0	0	17	0	14.5	0	0	0	N/A
O	0	0		0	1.00	0.0	1	0	0	17	0	10.5	0	0	0	N/A
P	0	0		0	1.00	0.0	1	0	0	17	0	12.5	0	0	0	N/A
Q	0	0		0	1.00	0.0	1	0	0	17	0	10.5	0	0	0	N/A
R	0	0		0	1.00	0.0	1	0	0	17	0	10.5	0	0	0	N/A
S	0	0		0	1.00	0.0	1	0	0	17	0	10.5	0	0	0	N/A
T	0	0		0	1.00	0.0	1	0	0	17	0	12	0	0	0	N/A
U	0	0		0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
V	0	0		0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A

SHEAR WALLS: Level = RF **Wind Check**

	Wind Unit Loads: 18.00							HD segment			Add'l			0.67 Factored		
Line		Shear (lbs)	V Above (lbs)	V Total (lbs)	Length(s) (ft)	v (plf)	Use SW #	length	Wrm (plf)	Wwall (ps	point load	Wall Hgt	OTM	RM	Uplift	Use
1	100	1800	0	1800	2.00	900.0	2 - Stl Cols	2	10	17	0	12	21600	287	13461	N/A
2	100	1800	0	1800	2.00	900.0	2 - Stl Cols	2	10	17	0	12	21600	287	13461	N/A
3	100	1800	0	1800	2.00	900.0	2 - Stl Cols	2	10	17	0	12	21600	287	13461	N/A
4	100	1800	0	1800	2.00	900.0	2 - Stl Cols	2	0	17	0	12	21600	273	13469	N/A
5	100	1800	0	1800	2.00	900.0	2 - Stl Cols	2	0	17	0	12	21600	273	13469	N/A
6	100	1800	0	1800	2.00	900.0	2 - Stl Cols	2	0	17	0	12	21600	273	13469	N/A
7	100	1800	0	1800	2.00	900.0	2 - Stl Cols	2	0	17	0	12	21600	273	13469	N/A
8	58	1044	0	1044	2.00	522.0	2 - Stl Cols	2	0	17	0	12	12528	273	7740	N/A
9	0	0	0	0	1.00	0.0	1	0	0	17	0	12	0	0	0	N/A
10	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
11	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
12	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
13	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
14	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
15	0	0	0	0	1.00	0.0	1	0	0	17	0	13	0	0	0	N/A
16	0	0	0	0	1.00	0.0	1	0	0	17	0	15	0	0	0	N/A
17	0	0	0	0	1.00	0.0	1	0	0	17	0	11	0	0	0	N/A
18	0	0	0	0	1.00	0.0	1	0	0	17	0	11	0	0	0	N/A
19	0	0	0	0	1.00	0.0	1	0	0	17	0	11	0	0	0	N/A
20	0	0	0	0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
21	0	0	0	0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
A	50	900	0	900	8.00	112.5	8 - Stl Cols	8	10	17	0	12	10800	4588	819	N/A
B	58	1044	0	1044	8.00	130.5	8 - Stl Cols	8	10	17	0	12	12528	4588	1047	N/A
C	0	0	0	0	3.00	0.0	1	0	10	17	0	12	0	0	0	N/A
D	0	0	0	0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
E	0	0	0	0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
F	0	0	0	0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
G	0	0	0	0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
H	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
I	0	0	0	0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
J	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
K	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
L	0	0	0	0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
M	0	0	0	0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
N	0	0	0	0	1.00	0.0	1	0	0	17	0	15	0	0	0	N/A
O	0	0	0	0	1.00	0.0	1	0	0	17	0	11	0	0	0	N/A
P	0	0	0	0	1.00	0.0	1	0	0	17	0	13	0	0	0	N/A
Q	0	0	0	0	1.00	0.0	1	0	0	17	0	11	0	0	0	N/A
R	0	0	0	0	1.00	0.0	1	0	0	17	0	11	0	0	0	N/A
S	0	0	0	0	1.00	0.0	1	0	0	17	0	11	0	0	0	N/A
T	0	0	0	0	1.00	0.0	1	0	0	17	0	12	0	0	0	N/A
U	0	0	0	0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
V	0	0	0	0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A

PROJECT	B.G. STRUCTURAL ENGINEERING	SHEET NO.
Genesis Solar Heavy Equipment Covered Parking		JOB NO. 800.0617
ITEM Lateral – Col. – Low Roof		DATE Mar. 2017
		ENGINEER BG

LATERAL - Typical Columns - Low Roof

INPUT:

Vertical Load (F_v) =	6619.00	lbs
Column Height (H) =	12.00	ft
# of Columns =	2	
Seismic Load =	436.00	lbs
Wind Load =	1800.00	lbs
Actual Column Defection =	1.19	in

FORMULA:

$F_{Seismic}$ = (1.4)(Seismic Load)(1/# of Columns) = 0.31 kips

F_{Wind} = (Wind Load)(1/# of Columns) = 0.90 kips

Governing Load = 0.90 kips

M_O = (Governing Load)(H) = 10.80 kips-ft

USE: HSS 6x6x3/8

OMEGA:

F_{Omega} = (Governing Load)(1.25) = 1.13 kips

$M_{O,\,Omega}$ = (F_{Omega})(H) = 13.50 kips-ft

Δ_O = (Actual Column Deflection)(2.5) = 2.97 in

$\Delta_{Allowable}$ = (0.025)(H)(12) = 3.60 in

$\Delta = \Delta_O < \Delta_{Allowable}$ OK

B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

Printed: 6 MAR 2017, 10:40AM

Steel Column

File = s:\E0AEZR~G\86YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. #: KW-06003989 Licensee: BG STRUCTURAL ENGINEERING

Description : Lateral - Typical Column - Low Roof

Code References

Calculations per AISC 360-10, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

Steel Section Name :	HSS6x6x3/8
Analysis Method :	Allowable Strength
Steel Stress Grade	
Fy : Steel Yield	46.0 ksi
E : Elastic Bending Modulus	19,000.0 ksi

Overall Column Height 12.0 ft
Top & Bottom Fixity Top Free, Bottom Fixed
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for X-X Axis buckling = 12 ft, K = 2.1
Y-Y (depth) axis :
Unbraced Length for Y-Y Axis buckling = 12 ft, K = 2.1

Applied Loads

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

Column self weight included : 329.760 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 12.0 ft, D = 1.580, LR = 5.039 k
BENDING LOADS . . .
Lat. Point Load at 12.0 ft creating Mx-x, W = 0.90 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = 0.2012 : 1
Load Combination +D+0.60W+H
Location of max.above base 0.0 ft
At maximum location values are . . .
Pa : Axial 1.910 k
Pn / Omega : Allowable 42.434 k
Ma-x : Applied -6.480 k-ft
Mn-x / Omega : Allowable 36.267 k-ft
Ma-y : Applied 0.0 k-ft
Mn-y / Omega : Allowable 36.267 k-ft

PASS Maximum Shear Stress Ratio = 0.009451 : 1
Load Combination +D+0.60W+H
Location of max.above base 0.0 ft
At maximum location values are . . .
Va : Applied 0.540 k
Vn / Omega : Allowable 57.137 k

Maximum SERVICE Load Reactions . .

Top along X-X	0.0 k
Bottom along X-X	0.0 k
Top along Y-Y	0.0 k
Bottom along Y-Y	0.90 k

Maximum SERVICE Load Deflections . . .

Along Y-Y 1.188 in at 12.0 ft above base
for load combination : W Only

Along X-X 0.0 in at 0.0 ft above base
for load combination :

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
	Stress Ratio	Status	Location	Stress Ratio	Status	Location
+D+H	0.045	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+L+H	0.045	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+Lr+H	0.164	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+S+H	0.045	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750Lr+0.750L+H	0.134	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750L+0.750S+H	0.045	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.60W+H	0.201	PASS	0.00 ft	0.009	PASS	0.00 ft
+D+0.70E+H	0.045	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750Lr+0.750L+0.450W+H	0.201	PASS	0.00 ft	0.007	PASS	0.00 ft
+D+0.750L+0.750S+0.450W+H	0.157	PASS	0.00 ft	0.007	PASS	0.00 ft
+D+0.750L+0.750S+0.525OE+H	0.045	PASS	0.00 ft	0.000	PASS	0.00 ft
+0.60D+0.60W+0.60H	0.192	PASS	0.00 ft	0.009	PASS	0.00 ft
+0.60D+0.70E+0.60H	0.027	PASS	0.00 ft	0.000	PASS	0.00 ft

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Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

Printed: 6 MAR 2017, 10:40AM

Steel Column

File = s:\E0AEZR~G\86YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. # : KW-06003989
Licensee : BG STRUCTURAL ENGINEERING

Description : Lateral - Typical Column - Low Roof

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base
+D+H		k		k	1.910 k
+D+L+H		k		k	1.910 k
+D+Lr+H		k		k	6.949 k
+D+S+H		k		k	1.910 k
+D+0.750Lr+0.750L+H		k		k	5.689 k
+D+0.750L+0.750S+H		k		k	1.910 k
+D+0.60W+H		k	0.540	k	1.910 k
+D+0.70E+H		k		k	1.910 k
+D+0.750Lr+0.750L+0.450W+H		k	0.405	k	5.689 k
+D+0.750L+0.750S+0.450W+H		k	0.405	k	1.910 k
+D+0.750L+0.750S+0.5250E+H		k		k	1.910 k
+0.60D+0.60W+0.60H		k	0.540	k	1.146 k
+0.60D+0.70E+0.60H		k		k	1.146 k
D Only		k		k	1.910 k
Lr Only		k		k	5.039 k
L Only		k		k	k
S Only		k		k	k
W Only		k	0.900	k	k
E Only		k		k	k
H Only		k		k	k

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
+D+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.60W+H	0.0000	in	0.000	ft	0.713	in	12.000	ft
+D+0.70E+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L+0.450W+H	0.0000	in	0.000	ft	0.534	in	12.000	ft
+D+0.750L+0.750S+0.450W+H	0.0000	in	0.000	ft	0.534	in	12.000	ft
+D+0.750L+0.750S+0.5250E+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D+0.60W+0.60H	0.0000	in	0.000	ft	0.713	in	12.000	ft
+0.60D+0.70E+0.60H	0.0000	in	0.000	ft	0.000	in	0.000	ft
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
W Only	0.0000	in	0.000	ft	1.188	in	12.000	ft
E Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
H Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

Steel Section Properties : HSS6x6x3/8

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Steel Column

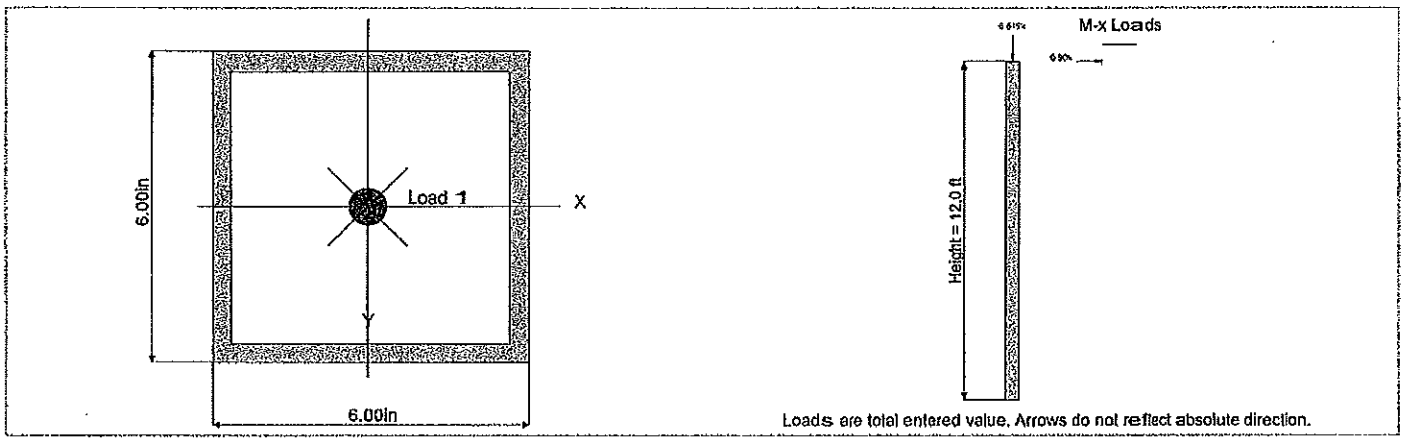
File = s:\E0AEZR~G\86YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. # : KW-06003989 Licensee : BG STRUCTURAL ENGINEERING

Description : Lateral - Typical Column - Low Roof

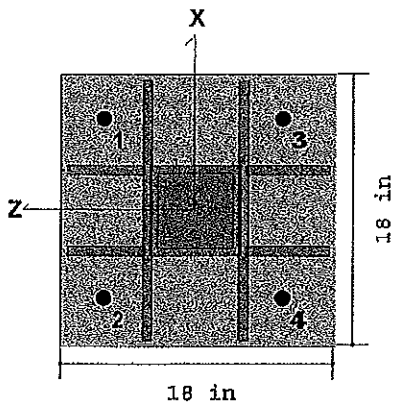
Steel Section Properties : HSS6x6x3/8

Depth	=	6.000 in	I xx	=	39.50 in^4	J	=	64.600 in^4
Design Thick	=	0.349 in	S xx	=	13.20 in^3			
Width	=	6.000 in	R xx	=	2.280 in			
Wall Thick	=	0.375 in	Zx	=	15.800 in^3			
Area	=	7.580 in^2	I yy	=	39.500 in^4	C	=	22.100 in^3
Weight	=	27.480 plf	S yy	=	13.200 in^3			
			R yy	=	2.280 in			

Ycg = 0.000 in



Genesis Solar Heavy - BP1



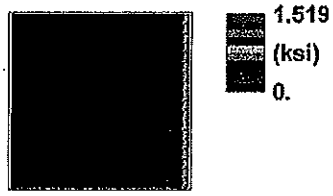
Stiffened Base Plate Connection

Base Plate Thickness	: 1. in
Base Plate Fy	: 36. ksi
Bearing Surface Fp	: 3.315 ksi
Anchor Bolt Diameter	: 1. in
Anchor Bolt Material	: A307
Anchor Bolt Fu	: 60. ksi
Column Shape	: HSS6x6x6
Steel Code	: AISC 14th:LRFD
Concrete Code	: ACI 318-11

(With IBC 2012 Amendments)

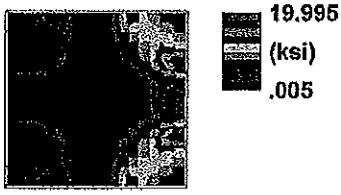
Bearing Pressure

Maximum Bearing 1.519 ksi
Max/Allowable Ratio .458 ACI 9-6
(ABIF = 1.000)



Base Plate Stress

Maximum Stress 19.995 ksi
Max/Allowable Ratio .411 ACI 9-4
(ASIF = 1.000)



Anchor Bolts

Bolt	X (in)	Z (in)	Tens.(k)	Vx (k)	Vz (k)	Fnt (ksi)	ft (ksi)	Fnv (ksi)	fv (ksi)	Unity	Combination
1	6.	6.	12.135	0.	-.576	45.	15.451	27.	.733	.458 (T)	ACI 9-6 (22)
2	-6.	6.	12.135	0.	-.576	45.	15.451	27.	.733	.458 (T)	ACI 9-6 (22)
3	6.	-6.	12.135	0.	.576	45.	15.451	27.	.733	.458 (T)	ACI 9-6 (23)
4	-6.	-6.	12.135	0.	.576	45.	15.451	27.	.733	.458 (T)	ACI 9-6 (23)

Note: Fnt and Fnv shown above include phi factors.

Loads

	P (k)	Vx (k)	Vz (k)	Mx (k-ft)	Mz (k-ft)
DL	1.58				
LL	5.039				
WL			1.44	19.2	
EL*			.496	5.952	

Anchor Bolt Embed Capacity Results

Note: All capacities shown include phi factors

Single Bolt Tension Envelope Results

LC	Bolt	Tens.(k)	Nsa(k)	Ncb(k)	Npn(k)	Nsb(k)	Unity	Ductility	Load(k)	Steel(in2)
22	1	12.135	27.27	0.	25.2	0.	.482	N.A.	12.135	.27

Single Bolt Vx Envelope Results

LC	Bolt	Vx (k)	Vz (k)	Vsa(k)	VcbXx(k)	VcbXz(k)	VcbZz(k)	VcbZx(k)	Vcp (k)	VxUnity	VzUnity
1	1	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.

Seismic Ductility & Anchor Reinforcement Results

LC	Bolt	Vx (k)	Vz (k)	VxUnity	VzUnity	Vx-Duct	Vx-L(k)	Vx-St(in2)	Vz-Duct	Vz-L(k)	Vz-St(in2)
1	1	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.

Single Bolt Vz Envelope Results

LC	Bolt	Vx (k)	Vz (k)	Vsa(k)	VcbXx(k)	VcbXz(k)	VcbZz(k)	VcbZx(k)	Vcp (k)	VxUnity	VzUnity
1	1	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.

Seismic Ductility & Anchor Reinforcement Results

LC	Bolt	Vx (k)	Vz (k)	VxUnity	VzUnity	Vx-Duct	Vx-L(k)	Vx-St(in2)	Vz-Duct	Vz-L(k)	Vz-St(in2)
1	1	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.

Single Bolt: Combined Tension and Shear Capacity Envelope Results

LC	Bolt	Nn(k)	Vnx(k)	Vnz(k)	SRSS	Interaction
22	1	25.2	0.	0.	.482	.482

Group Bolt: Tension Capacity Envelope Results

LC	Group	Tens.(k)	Nsa.(k)	Ncb.(k)	Nsb.(k)	Unity	Ductility	Load(k)	Steel(in^2)
1	T-1	0.	0.	0.	0.	N.A.	N.A.	0.	0.

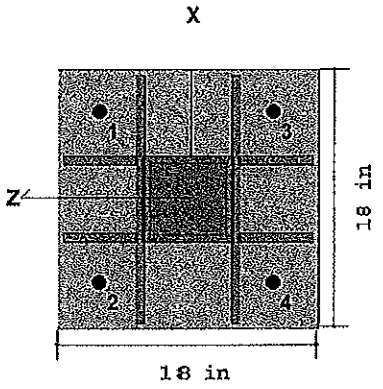
Vz Shear Groups Capacity Envelope Results

LC	Gr	Type	Failure	Vx (k)	Vz (k)	Vsa(k)	VcbXx(k)	VcbXz(k)	VcbZz(k)	VcbZx(k)	Vcp (k)	VxUnity	VzUnity
3	S-1	+Vz	Full	0.	.72	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.36	0.	0.	0.	0.	0.	0.	N.A.	N.A.

Seismic Ductility & Anchor Reinforcement Results

LC	Gr	Type	Failure	Vx (k)	Vz (k)	VxUnity	VzUnity	Vx-Duct	Vx-L(k)	Vx-St(in2)	Vz-Duct	Vz-L(k)	Vz-St(in2)
3	S-1	+Vz	Full	0.	.72	N.A.	N.A.	N.A.	0.	0.	N.A.	.72	.0 16
			Nr Edge	0.	.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008

Company : **BG Structural Engineering** March 15, 2017
Designer : **BG**
Job Number : **800.0617** **Genesis Solar Heavy - BP1** Checked By:_____



Bolt	X (in)	Z (in)
1	6.	6.
2	-6.	6.
3	6.	-6.
4	-6.	-6.

Geometry and Materials

Length **18. in**
Width **18. in**
Thickness **1. in**
Base Plate Fy **36. ksi**
Base Plate E **29000. ksi**
Bearing Fp **3.315 ksi**
Bearing Fc' **3. ksi**
Pedestal Length **36 in**
Pedestal Width **36 in**
Pedestal Height **36 in**
Analyze Base Plate as Rigid
Pp Based on AISC J8 Criteria
Steel Code: **AISC 14th:LRFD**
Concrete Code: **ACI 318-11 (With IBC 2012 Amendments)**
AB Head: **Heavy Hex**
Seismic Reduction %: **25.**
Square Base Plate Required

Column Shape **HSS6x6x6**
Column eX **0. in**
Column eZ **0. in**
Column to Edge Min (X) **1. in**
Column to Edge Min (Z) **1. in**
HSS Tube X-sides welded
HSS Tube Z-sides welded
Stiffened Base Plate Connection
Vx Shear Lug NOT present
Vz Shear Lug NOT present
NW Concrete
Concrete Cracked
ABs NOT Welded to Base Plate

Anchor Bolt Diameter **1. in**
Anchor Bolt Material **A307**
Anchor Bolt Fu **60. ksi**
Anchor Bolt Fy **36. ksi**
Anchor Bolt E **29000. ksi**
AB Stretch Length **6. in**
AB to AB Min Spacing **6 in**
AB to Stiffner Min Spacing **1.5 in**
AB to Column Min Spacing **2 in**
AB to Edge Min Spacing **3 in**
AB Row Min Spacing **3 in**
Priority is AB to Edge Spacing
Include Threads for AB Design
AB Fv, Ft based on AISC Criteria
Total AB Length: **24. in**
Supp. Reinforcement Present
Anchor Reinforcement Present
Tension Anchor Reinf Bar Fy: **60. ksi**
Shear Anchor Reinf Bar Fy:**60. ksi**

Loads

	P (k)	Vx (k)	Vz (k)	Mx (k-ft)	Mz (k-ft)
DL	1.58				
LL	5.039				
WL			1.44	19.2	
EL			.496	5.952	

Base Plate Stress and Bearing Result

Combination	Load Sets	Base Plate Stress (ksi) Allowable	ASIF	U.C.	Bearing Pressure (ksi) Allowable	ABIF	U.C.
ASCE Strength 1 (1)	1.4DL	48.6	1.	.005	3.315	1.	.002
ASCE Strength 2 (a) (2)	1.2DL+1.6LL	48.6	1.	.02	3.315	1.	.009
ASCE Strength 3 (b) (3)	1.2DL+.5WL	48.6	1.	.128	3.315	1.	.141
ASCE Strength 3 (b) (4)	1.2DL-.5WL	48.6	1.	.128	3.315	1.	.141
ASCE Strength 4 (a) (5)	1.2DL+.5LL+1WL	48.6	1.	.257	3.315	1.	.28
ASCE Strength 4 (a) (6)	1.2DL+.5LL-1WL	48.6	1.	.257	3.315	1.	.28
ASCE Strength 5 (7)	1.2DL+.5LL+1EL	48.6	1.	.089	3.315	1.	.077
ASCE Strength 5 (8)	1.2DL+.5LL-1EL	48.6	1.	.089	3.315	1.	.077
ASCE Strength 6 (9)	.9DL+1WL	48.6	1.	.247	3.315	1.	.287
ASCE Strength 6 (10)	.9DL-1WL	48.6	1.	.247	3.315	1.	.287
ASCE Strength 7 (11)	.9DL+1EL	48.6	1.	.08	3.315	1.	.087
ASCE Strength 7 (12)	.9DL-1EL	48.6	1.	.08	3.315	1.	.087
ACI 9-1 (13)	1.4DL	48.6	1.	.005	3.315	1.	.002

Company : BG Structural Engineering
Designer : BG
Job Number : 800.0617

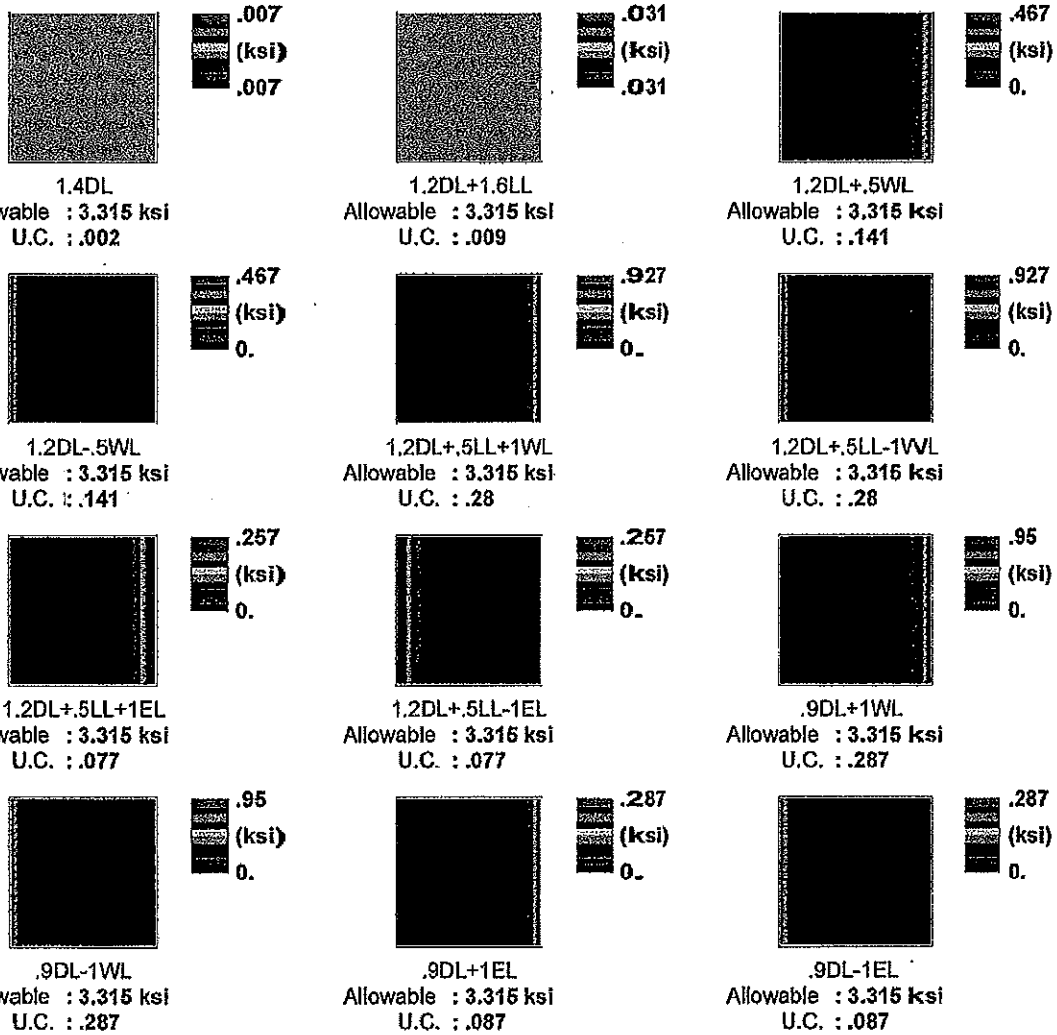
Genesis Solar Heavy - BP1

March 15, 2017
Checked By:_____

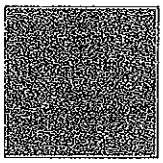
Base Plate Stress and Bearing Results (continued

Combination	Load Sets	Base Plate Stress (ksi) Allowable	ASIF	U.C.	Bearing Pressure (ksi) Allowable	ASIF	U.C.
ACI 9-2(a) (14)	1.2DL+1.6LL	48.6	1.	.02	3.315	1.	.009
ACI 9-3(a) (15)	1.2DL+1LL	48.6	1.	.014	3.315	1.	.006
ACI 9-3(d) (16)	1.2DL+.8WL	48.6	1.	.201	3.315	1.	.229
ACI 9-3(d) (17)	1.2DL-.8WL	48.6	1.	.201	3.315	1.	.229
ACI 9-4 (18)	1.2DL+1LL+1.6WL	48.6	1.	.411	3.315	1.	.448
ACI 9-4 (19)	1.2DL+1LL-1.6WL	48.6	1.	.411	3.315	1.	.448
ACI 9-5 (20)	1.2DL+1LL+1EL	48.6	1.	.092	3.315	1.	.065
ACI 9-5 (21)	1.2DL+1LL-1EL	48.6	1.	.092	3.315	1.	.065
ACI 9-6 (22)	.9DL+1.6WL	48.6	1.	.391	3.315	1.	.458
ACI 9-6 (23)	.9DL-1.6WL	48.6	1.	.391	3.315	1.	.458
ACI 9-7 (24)	.9DL+1EL	48.6	1.	.08	3.315	1.	.087
ACI 9-7 (25)	.9DL-1EL	48.6	1.	.08	3.315	1.	.087

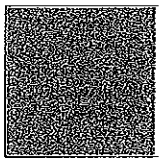
Bearing Contours



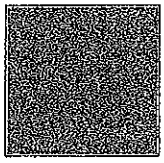
Bearing Contours (continued)



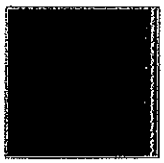
1.4DL
Allowable : 3.315 ksi
U.C. : .002



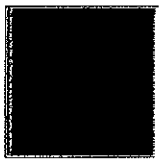
1.2DL+1.6LL
Allowable : 3.315 ksi
U.C. : .009



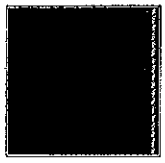
1.2DL+1LL
Allowable : 3.315 ksi
U.C. : .006



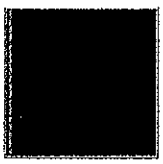
1.2DL+.8WL
Allowable : 3.315 ksi
U.C. : .229



1.2DL-.8WL
Allowable : 3.315 ksi
U.C. : .229



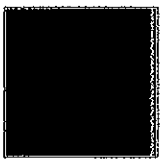
1.2DL+1LL+1.6WL
Allowable : 3.315 ksi
U.C. : .448



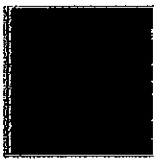
1.2DL+1LL-1.6WL
Allowable : 3.315 ksi
U.C. : .448

1.2DL+1LL+1EL
Allowable : 3.315 ksi
U.C. : .065

1.2DL+1LL-1EL
Allowable : 3.315 ksi
U.C. : .065

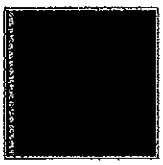


.9DL+1.6WL
Allowable : 3.315 ksi
U.C. : .458



.9DL-1.6WL
Allowable : 3.315 ksi
U.C. : .458

.9DL+1EL
Allowable : 3.315 ksi
U.C. : .087



.9DL-1EL
Allowable : 3.315 ksi
U.C. : .087

Company : BG Structural Engineering
Designer : BG
Job Number : 800.0617

March 15, 2017

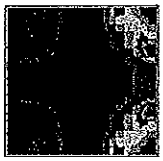
Genesis Solar Heavy - BP1

Checked By:_____

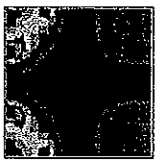
Base Plate Stress Contour

1.4DL
Allowable : 48.6 ksi
U.C. : .005

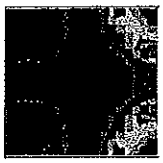
1.2DL+1.6LL
Allowable : 48.6 ksi
U.C. : .02



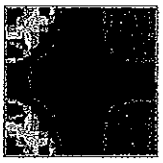
1.2DL+.5WL
Allowable : 48.6 ksi
U.C. : .128



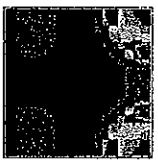
1.2DL-.5WL
Allowable : 48.6 ksi
U.C. : .128



1.2DL+.5LL+1WL
Allowable : 48.6 ksi
U.C. : .257

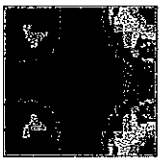


1.2DL+.5LL-1WL
Allowable : 48.6 ksi
U.C. : .257



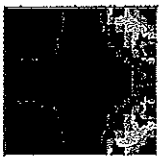
1.2DL+.5LL+1EL
Allowable : 48.6 ksi
U.C. : .089

1.2DL+.5LL-1EL
Allowable : 48.6 ksi
U.C. : .089

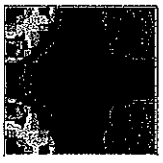


.9DL+1WL
Allowable : 48.6 ksi
U.C. : .247

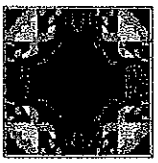
.9DL-1WL
Allowable : 48.6 ksi
U.C. : .247



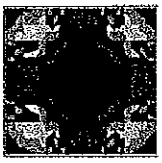
.9DL+1EL
Allowable : 48.6 ksi
U.C. : .08



.9DL-1EL
Allowable : 48.6 ksi
U.C. : .08



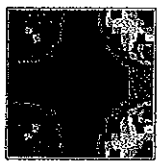
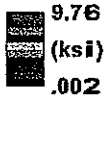
1.4DL
Allowable : 48.6 ksi
U.C. : .005



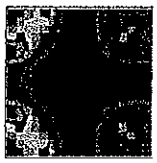
1.2DL+1.6LL
Allowable : 48.6 ksi
U.C. : .02

1.2DL+1LL
Allowable : 48.6 ksi
U.C. : .014

Base Plate Stress Contours (continued)



9.76
(ksi)
.002

1.2DL+.8WL
Allowable : 48.6 ksi
U.C. : .201

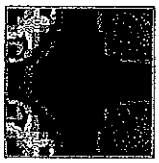
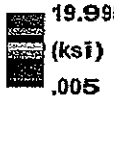


9.76
(ksi)
.002

1.2DL-.8WL
Allowable : 48.6 ksi
U.C. : .201

19.995
(ksi)
.005

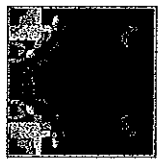
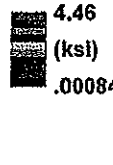
1.2DL+1LL+1.6WL
Allowable : 48.6 ksi
U.C. : .411



19.995
(ksi)
.005

1.2DL+1LL-1.6WL
Allowable : 48.6 ksi
U.C. : .411

4.46
(ksi)
.000845475

1.2DL+1LL+1EL
Allowable : 48.6 ksi
U.C. : .092



4.46
(ksi)
.000845475

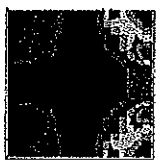
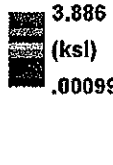
1.2DL+1LL-1EL
Allowable : 48.6 ksi
U.C. : .092

19.015
(ksi)
.005

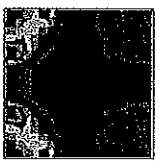
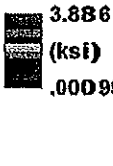
.9DL+1.6WL
Allowable : 48.6 ksi
U.C. : .391

19.015
(ksi)
.005

.9DL-1.6WL
Allowable : 48.6 ksi
U.C. : .391



3.886
(ksi)
.000995643

.9DL+1EL
Allowable : 48.6 ksi
U.C. : .08



3.886
(ksi)
.000995644

.9DL-1EL
Allowable : 48.6 ksi
U.C. : .08

Anchor Bolt Results

Note: Fnt and Fnv shown below include phi factors.

Combination	Load Sets	Bolt	Tens.(k)	Vx (k)	Vz (k)	Fnt (ksi)	ft (ksi)	Fnv (ksi)	fv (ksi)	Unity
ASCE Strength 1 (1)	1.4DL	1	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		2	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		3	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		4	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
ASCE Strength 2 (a) (2)	1.2DL+1.6LL	1	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		2	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		3	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		4	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
ASCE Strength 3 (b) (3)	1.2DL+.5WL	1	3.403	0.	-.18	45.	4.333	27.	.229	.128 (T)
		2	3.403	0.	-.18	45.	4.333	27.	.229	.128 (T)
		3	.227	0.	-.18	45.	.289	27.	.229	.011 (S)
		4	.227	0.	-.18	45.	.289	27.	.229	.011 (S)

Company : **BG Structural Engineering** March 15, 2017
Designer : **BG**
Job Number : **800.0617** **Genesis Solar Heavy - BP1** Checked By:_____

Anchor Bolt Results (continued)

Combination	Load Sets	Bolt	Tens.(k)	Vx (k)	Vz (k)	Fnt (ksi)	ft (ksi)	Fnv (ksi)	fv (ksi)	Unity
ASCE Strength 3 (b) (4)	1.2DL-.5WL	1	.227	0.	.18	45.	.289	27.	.229	.011 (S)
		2	.227	0.	.18	45.	.289	27.	.229	.011 (S)
		3	3.403	0.	.18	45.	4.333	27.	.229	.128 (T)
		4	3.403	0.	.18	45.	4.333	27.	.229	.128 (T)
ASCE Strength 4 (a) (5)	1.2DL+.5LL+1WL	1	6.644	0.	-.36	45.	8.459	27.	.458	.251 (T)
		2	6.644	0.	-.36	45.	8.459	27.	.458	.251 (T)
		3	.427	0.	-.36	45.	.544	27.	.458	.023 (S)
		4	.427	0.	-.36	45.	.544	27.	.458	.023 (S)
ASCE Strength 4 (a) (6)	1.2DL+.5LL-1WL	1	.427	0.	.36	45.	.544	27.	.458	.023 (S)
		2	.427	0.	.36	45.	.544	27.	.458	.023 (S)
		3	6.644	0.	.36	45.	8.459	27.	.458	.251 (T)
		4	6.644	0.	.36	45.	8.459	27.	.458	.251 (T)
ASCE Strength 5 (7)	1.2DL+.5LL+1EL	1	1.262	0.	-.124	45.	1.607	27.	.158	.048 (T)
		2	1.262	0.	-.124	45.	1.607	27.	.158	.048 (T)
		3	.003	0.	-.124	45.	.003	27.	.158	.008 (S)
		4	.003	0.	-.124	45.	.003	27.	.158	.008 (S)
ASCE Strength 5 (8)	1.2DL+.5LL-1EL	1	.003	0.	.124	45.	.003	27.	.158	.008 (S)
		2	.003	0.	.124	45.	.003	27.	.158	.008 (S)
		3	1.262	0.	.124	45.	1.607	27.	.158	.048 (T)
		4	1.262	0.	.124	45.	1.607	27.	.158	.048 (T)
ASCE Strength 6 (9)	.9DL+1WL	1	7.436	0.	-.36	45.	9.468	27.	.458	.281 (T)
		2	7.436	0.	-.36	45.	9.468	27.	.458	.281 (T)
		3	.563	0.	-.36	45.	.717	27.	.458	.023 (S)
		4	.563	0.	-.36	45.	.717	27.	.458	.023 (S)
ASCE Strength 6 (10)	.9DL-1WL	1	.563	0.	.36	45.	.717	27.	.458	.023 (S)
		2	.563	0.	.36	45.	.717	27.	.458	.023 (S)
		3	7.436	0.	.36	45.	9.468	27.	.458	.281 (T)
		4	7.436	0.	.36	45.	9.468	27.	.458	.281 (T)
ASCE Strength 7 (11)	.9DL+1EL	1	2.046	0.	-.124	45.	2.605	27.	.158	.077 (T)
		2	2.046	0.	-.124	45.	2.605	27.	.158	.077 (T)
		3	.13	0.	-.124	45.	.166	27.	.158	.008 (S)
		4	.13	0.	-.124	45.	.166	27.	.158	.008 (S)
ASCE Strength 7 (12)	.9DL-1EL	1	.13	0.	.124	45.	.166	27.	.158	.008 (S)
		2	.13	0.	.124	45.	.166	27.	.158	.008 (S)
		3	2.046	0.	.124	45.	2.605	27.	.158	.077 (T)
		4	2.046	0.	.124	45.	2.605	27.	.158	.077 (T)
ACI 9-1 (13)	1.4 DL	1	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		2	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		3	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		4	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
ACI 9-2(a) (14)	1.2DL+1.6LL	1	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		2	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		3	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		4	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
ACI 9-3(a) (15)	1.2DL+1LL	1	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		2	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		3	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		4	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
ACI 9-3(d) (16)	1.2DL+.8WL	1	5.743	0.	-.288	45.	7.312	27.	.367	.217 (T)
		2	5.743	0.	-.288	45.	7.312	27.	.367	.217 (T)
		3	.411	0.	-.288	45.	.524	27.	.367	.018 (S)
		4	.411	0.	-.288	45.	.524	27.	.367	.018 (S)
ACI 9-3(d) (17)	1.2DL-.8WL	1	.411	0.	.288	45.	.524	27.	.367	.018 (S)
		2	.411	0.	.288	45.	.524	27.	.367	.018 (S)
		3	5.743	0.	.288	45.	7.312	27.	.367	.217 (T)
		4	5.743	0.	.288	45.	7.312	27.	.367	.217 (T)

Company : **BG Structural Engineering** March 15, 2017
Designer : **BG**
Job Number : **800.0617** **Genesis Solar Heavy - BP1** Checked By:_____

Anchor Bolt Results (continued)

Combination	Load Sets	Bolt	Tens.(k)	Vx (k)	Vz (k)	Fnt (ksi)	ft (ksi)	Fnv (ksi)	fv (ksi)	Unity
ACI 9-4 (18)	1.2DL+1LL+1.6WL	1	10.664	0.	-.576	45.	13.577	27.	.733	.402 (T)
		2	10.664	0.	-.576	45.	13.577	27.	.733	.402 (T)
		3	.689	0.	-.576	45.	.877	27.	.733	.036 (S)
		4	.689	0.	-.576	45.	.877	27.	.733	.036 (S)
ACI 9-4 (19)	1.2DL+1LL-1.6WL	1	.689	0.	.576	45.	.877	27.	.733	.036 (S)
		2	.689	0.	.576	45.	.877	27.	.733	.036 (S)
		3	10.664	0.	.576	45.	13.577	27.	.733	.402 (T)
		4	10.664	0.	.576	45.	13.577	27.	.733	.402 (T)
ACI 9-5 (20)	1.2DL+1LL+1EL	1	.671	0.	-.124	45.	.854	27.	.158	.025 (T)
		2	.671	0.	-.124	45.	.854	27.	.158	.025 (T)
		3	0.	0.	-.124	45.	0.	27.	.158	.008 (S)
		4	0.	0.	-.124	45.	0.	27.	.158	.008 (S)
ACI 9-5 (21)	1.2DL+1LL-1EL	1	0.	0.	.124	45.	0.	27.	.158	.008 (S)
		2	0.	0.	.124	45.	0.	27.	.158	.008 (S)
		3	.671	0.	.124	45.	.854	27.	.158	.025 (T)
		4	.671	0.	.124	45.	.854	27.	.158	.025 (T)
ACI 9-6 (22)	.9DL+1.6WL	1	12.135	0.	-.576	45.	15.451	27.	.733	.458 (T)
		2	12.135	0.	-.576	45.	15.451	27.	.733	.458 (T)
		3	.949	0.	-.576	45.	1.209	27.	.733	.036 (S)
		4	.949	0.	-.576	45.	1.209	27.	.733	.036 (S)
ACI 9-6 (23)	.9DL-1.6WL	1	.949	0.	.576	45.	1.209	27.	.733	.036 (S)
		2	.949	0.	.576	45.	1.209	27.	.733	.036 (S)
		3	12.135	0.	.576	45.	15.451	27.	.733	.458 (T)
		4	12.135	0.	.576	45.	15.451	27.	.733	.458 (T)
ACI 9-7 (24)	.9DL+1EL	1	2.046	0.	-.124	45.	2.605	27.	.158	.077 (T)
		2	2.046	0.	-.124	45.	2.605	27.	.158	.077 (T)
		3	.13	0.	-.124	45.	.166	27.	.158	.008 (S)
		4	.13	0.	-.124	45.	.166	27.	.158	.008 (S)
ACI 9-7 (25)	.9DL-1EL	1	.13	0.	.124	45.	.166	27.	.158	.008 (S)
		2	.13	0.	.124	45.	.166	27.	.158	.008 (S)
		3	2.046	0.	.124	45.	2.605	27.	.158	.077 (T)
		4	2.046	0.	.124	45.	2.605	27.	.158	.077 (T)

Load Combinations

LC	Combination	Load Sets
1	ASCE Strength 1	1.4DL
2	ASCE Strength 2 (a)	1.2DL+1.6LL
3	ASCE Strength 3 (b)	1.2DL+.5WL
4	ASCE Strength 3 (b)	1.2DL-.5WL
5	ASCE Strength 4 (a)	1.2DL+.5LL+1WL
6	ASCE Strength 4 (a)	1.2DL+.5LL-1WL
7	ASCE Strength 5	1.2DL+.5LL+1EL
8	ASCE Strength 5	1.2DL+.5LL-1EL
9	ASCE Strength 6	.9DL+1WL
10	ASCE Strength 6	.9DL-1WL
11	ASCE Strength 7	.9DL+1EL
12	ASCE Strength 7	.9DL-1EL
13	ACI 9-1	1.4DL
14	ACI 9-2(a)	1.2DL+1.6LL
15	ACI 9-3(a)	1.2DL+1LL
16	ACI 9-3(d)	1.2DL+.8WL
17	ACI 9-3(d)	1.2DL-.8WL
18	ACI 9-4	1.2DL+1LL+1.6WL
19	ACI 9-4	1.2DL+1LL-1.6WL
20	ACI 9-5	1.2DL+1LL+1EL
21	ACI 9-5	1.2DL+1LL-1EL
22	ACI 9-6	.9DL+1.6WL

Company : BG Structural Engineering
Designer : BG
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Checked By:____

Load Combinations (continued)

LC	Combination	Load Sets
23	ACI 9-6	.9DL-1.6WL
24	ACI 9-7	.9DL+1EL
25	ACI 9-7	.9DL-1EL

Anchor Bolt Embed Capacity Results

Note: All capacities shown include phi factors.

Single Bolt: Tension Capacity

LC	Bolt	Tens.(k)	Nsa(k)	Ncb(k)	Npn(k)	Nsb(k)	Unity	Ductility	Load(k)	Steel(in2)
1	1	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	2	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	3	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	4	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
2	1	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	2	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	3	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	4	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
3	1	3.403	27.27	0.	25.2	0.	.135	N.A.	3.403	.076
	2	3.403	27.27	0.	25.2	0.	.135	N.A.	3.403	.076
	3	.227	27.27	0.	25.2	0.	.009	N.A.	.227	.005
	4	.227	27.27	0.	25.2	0.	.009	N.A.	.227	.005
4	1	.227	27.27	0.	25.2	0.	.009	N.A.	.227	.005
	2	.227	27.27	0.	25.2	0.	.009	N.A.	.227	.005
	3	3.403	27.27	0.	25.2	0.	.135	N.A.	3.403	.076
	4	3.403	27.27	0.	25.2	0.	.135	N.A.	3.403	.076
5	1	6.644	27.27	0.	25.2	0.	.264	N.A.	6.644	.148
	2	6.644	27.27	0.	25.2	0.	.264	N.A.	6.644	.148
	3	.427	27.27	0.	25.2	0.	.017	N.A.	.427	.009
	4	.427	27.27	0.	25.2	0.	.017	N.A.	.427	.009
6	1	.427	27.27	0.	25.2	0.	.017	N.A.	.427	.009
	2	.427	27.27	0.	25.2	0.	.017	N.A.	.427	.009
	3	6.644	27.27	0.	25.2	0.	.264	N.A.	6.644	.148
	4	6.644	27.27	0.	25.2	0.	.264	N.A.	6.644	.148
7	1	1.262	27.27	0.	18.9	0.	.067	N.A.	1.262	.028
	2	1.262	27.27	0.	18.9	0.	.067	N.A.	1.262	.028
	3	.003	27.27	0.	18.9	0.	0.	N.A.	.003	6.02116e-5
	4	.003	27.27	0.	18.9	0.	0.	N.A.	.003	6.01972e-5
8	1	.003	27.27	0.	18.9	0.	0.	N.A.	.003	6.01948e-5
	2	.003	27.27	0.	18.9	0.	0.	N.A.	.003	6.01952e-5
	3	1.262	27.27	0.	18.9	0.	.067	N.A.	1.262	.028
	4	1.262	27.27	0.	18.9	0.	.067	N.A.	1.262	.028
9	1	7.436	27.27	0.	25.2	0.	.295	N.A.	7.436	.165
	2	7.436	27.27	0.	25.2	0.	.295	N.A.	7.436	.165
	3	.563	27.27	0.	25.2	0.	.022	N.A.	.563	.013
	4	.563	27.27	0.	25.2	0.	.022	N.A.	.563	.013
10	1	.563	27.27	0.	25.2	0.	.022	N.A.	.563	.013
	2	.563	27.27	0.	25.2	0.	.022	N.A.	.563	.013
	3	7.436	27.27	0.	25.2	0.	.295	N.A.	7.436	.165
	4	7.436	27.27	0.	25.2	0.	.295	N.A.	7.436	.165
11	1	2.046	27.27	0.	18.9	0.	.108	N.A.	2.046	.045
	2	2.046	27.27	0.	18.9	0.	.108	N.A.	2.046	.045
	3	.13	27.27	0.	18.9	0.	.007	N.A.	.13	.003
	4	.13	27.27	0.	18.9	0.	.007	N.A.	.13	.003

Single Bolt: Tension Capacity (continued)

LC	Bolt	Tens.(k)	Nsa(k)	Ncb(k)	Npn(k)	Nsb(k)	Unity	Ductility	Load(k)	Steel(in2)
12	1	.13	27.27	0.	18.9	0.	.007	N.A.	.13	.003
	2	.13	27.27	0.	18.9	0.	.007	N.A.	.13	.003
	3	2.046	27.27	0.	18.9	0.	.108	N.A.	2.046	.045
	4	2.046	27.27	0.	18.9	0.	.108	N.A.	2.046	.045
13	1	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	2	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	3	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	4	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
14	1	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	2	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	3	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	4	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
15	1	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	2	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	3	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	4	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
16	1	5.743	27.27	0.	25.2	0.	.228	N.A.	5.743	.128
	2	5.743	27.27	0.	25.2	0.	.228	N.A.	5.743	.128
	3	.411	27.27	0.	25.2	0.	.016	N.A.	.411	.009
	4	.411	27.27	0.	25.2	0.	.016	N.A.	.411	.009
17	1	.411	27.27	0.	25.2	0.	.016	N.A.	.411	.009
	2	.411	27.27	0.	25.2	0.	.016	N.A.	.411	.009
	3	5.743	27.27	0.	25.2	0.	.228	N.A.	5.743	.128
	4	5.743	27.27	0.	25.2	0.	.228	N.A.	5.743	.128
18	1	10.664	27.27	0.	25.2	0.	.423	N.A.	10.664	.237
	2	10.664	27.27	0.	25.2	0.	.423	N.A.	10.664	.237
	3	.689	27.27	0.	25.2	0.	.027	N.A.	.689	.015
	4	.689	27.27	0.	25.2	0.	.027	N.A.	.689	.015
19	1	.689	27.27	0.	25.2	0.	.027	N.A.	.689	.015
	2	.689	27.27	0.	25.2	0.	.027	N.A.	.689	.015
	3	10.664	27.27	0.	25.2	0.	.423	N.A.	10.664	.237
	4	10.664	27.27	0.	25.2	0.	.423	N.A.	10.664	.237
20	1	.671	27.27	0.	18.9	0.	.035	N.A.	.671	.015
	2	.671	27.27	0.	18.9	0.	.035	N.A.	.671	.015
	3	0.	27.27	0.	18.9	0.	0.	N.A.	0.	0.
	4	0.	27.27	0.	18.9	0.	0.	N.A.	0.	0.
21	1	0.	27.27	0.	18.9	0.	0.	N.A.	0.	0.
	2	0.	27.27	0.	18.9	0.	0.	N.A.	0.	0.
	3	.671	27.27	0.	18.9	0.	.035	N.A.	.671	.015
	4	.671	27.27	0.	18.9	0.	.035	N.A.	.671	.015
22	1	12.135	27.27	0.	25.2	0.	.482	N.A.	12.135	.27
	2	12.135	27.27	0.	25.2	0.	.482	N.A.	12.135	.27
	3	.949	27.27	0.	25.2	0.	.038	N.A.	.949	.021
	4	.949	27.27	0.	25.2	0.	.038	N.A.	.949	.021
23	1	.949	27.27	0.	25.2	0.	.038	N.A.	.949	.021
	2	.949	27.27	0.	25.2	0.	.038	N.A.	.949	.021
	3	12.135	27.27	0.	25.2	0.	.482	N.A.	12.135	.27
	4	12.135	27.27	0.	25.2	0.	.482	N.A.	12.135	.27
24	1	2.046	27.27	0.	18.9	0.	.108	N.A.	2.046	.045
	2	2.046	27.27	0.	18.9	0.	.108	N.A.	2.046	.045
	3	.13	27.27	0.	18.9	0.	.007	N.A.	.13	.003
	4	.13	27.27	0.	18.9	0.	.007	N.A.	.13	.003
25	1	.13	27.27	0.	18.9	0.	.007	N.A.	.13	.003
	2	.13	27.27	0.	18.9	0.	.007	N.A.	.13	.003
	3	2.046	27.27	0.	18.9	0.	.108	N.A.	2.046	.045
	4	2.046	27.27	0.	18.9	0.	.108	N.A.	2.046	.045

Single Bolt: Shear Capacity

LC	Bolt	Vx (k)	Vz (k)	Vsa(k)	VcbXx(k)	VcbXz(k)	VcbZz(k)	VcbZx(k)	Vcp (k)	VxUnity	VzUnity
1	1	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
2	1	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
3	1	0.	.18	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.18	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.18	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.18	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
4	1	0.	-.18	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.18	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.18	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.18	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
5	1	0.	.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
6	1	0.	-.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
7	1	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
8	1	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
9	1	0.	.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
10	1	0.	-.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.36	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
11	1	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
12	1	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
13	1	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
14	1	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.

Single Bolt: Shear Capacity (continued)

LC	Bolt	Vx (k)	Vz (k)	Vsa(k)	VcbXx(k)	VcbXz(k)	VcbZz(k)	VcbZx(k)	Vcp (k)	VxUnity	VzUnity
15	1	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
16	1	0.	.288	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.288	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.288	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.288	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
17	1	0.	-.288	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.288	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.288	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.288	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
18	1	0.	.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
19	1	0.	-.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
20	1	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
21	1	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
22	1	0.	.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
23	1	0.	-.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.576	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
24	1	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
25	1	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.124	14.18	0.	0.	0.	0.	0.	N.A.	N.A.

Single Bolt: Seismic Ductility & Anchor Reinforcement Results

LC	Bolt	Vx (k)	Vz (k)	VxUnity	VzUnity	Vx-Duct	Vx-L(k)	Vx-St(in2)	Vz-Duct	Vz-L(k)	Vz-St(in2)
1	1	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	2	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	3	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	4	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
2	1	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	2	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	3	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	4	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.

Single Bolt: Seismic Ductility & Anchor Reinforcement Results (continued)

LC	Bolt	Vx (k)	Vz (k)	VxUnity	VzUnity	Vx-Duct	Vx-L(k)	Vx-St(in2)	Vz-Duct	Vz-L(k)	Vz-St(in2)
3	1	0.	.18	N.A.	N.A.	N.A.	0.	0.	N.A.	.18	.004
	2	0.	.18	N.A.	N.A.	N.A.	0.	0.	N.A.	.18	.004
	3	0.	.18	N.A.	N.A.	N.A.	0.	0.	N.A.	.18	.004
	4	0.	.18	N.A.	N.A.	N.A.	0.	0.	N.A.	.18	.004
4	1	0.	-.18	N.A.	N.A.	N.A.	0.	0.	N.A.	.18	.004
	2	0.	-.18	N.A.	N.A.	N.A.	0.	0.	N.A.	.18	.004
	3	0.	-.18	N.A.	N.A.	N.A.	0.	0.	N.A.	.18	.004
	4	0.	-.18	N.A.	N.A.	N.A.	0.	0.	N.A.	.18	.004
5	1	0.	.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
	2	0.	.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
	3	0.	.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
	4	0.	.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
6	1	0.	-.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
	2	0.	-.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
	3	0.	-.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
	4	0.	-.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
7	1	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	2	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	3	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	4	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
8	1	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	2	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	3	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	4	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
9	1	0.	.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
	2	0.	.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
	3	0.	.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
	4	0.	.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
10	1	0.	-.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
	2	0.	-.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
	3	0.	-.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
	4	0.	-.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
11	1	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	2	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	3	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	4	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
12	1	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	2	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	3	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	4	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
13	1	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	2	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	3	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	4	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
14	1	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	2	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	3	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	4	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
15	1	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	2	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	3	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	4	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
16	1	0.	.288	N.A.	N.A.	N.A.	0.	0.	N.A.	.288	.006
	2	0.	.288	N.A.	N.A.	N.A.	0.	0.	N.A.	.288	.006
	3	0.	.288	N.A.	N.A.	N.A.	0.	0.	N.A.	.288	.006
	4	0.	.288	N.A.	N.A.	N.A.	0.	0.	N.A.	.288	.006

Single Bolt: Seismic Ductility & Anchor Reinforcement Results (continued)

LC	Bolt	Vx (k)	Vz (k)	VxUnity	VzUnity	Vx-Duct	Vx-L(k)	Vx-St(in2)	Vz-Duct	Vz-L(k)	Vz-St(in2)
17	1	0.	-.288	N.A.	N.A.	N.A.	0.	0.	N.A.	.288	.006
	2	0.	-.288	N.A.	N.A.	N.A.	0.	0.	N.A.	.288	.006
	3	0.	-.288	N.A.	N.A.	N.A.	0.	0.	N.A.	.288	.006
	4	0.	-.288	N.A.	N.A.	N.A.	0.	0.	N.A.	.288	.006
18	1	0.	.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
	2	0.	.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
	3	0.	.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
	4	0.	.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
19	1	0.	-.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
	2	0.	-.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
	3	0.	-.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
	4	0.	-.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
20	1	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	2	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	3	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	4	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
21	1	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	2	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	3	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	4	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
22	1	0.	.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
	2	0.	.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
	3	0.	.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
	4	0.	.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
23	1	0.	-.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
	2	0.	-.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
	3	0.	-.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
	4	0.	-.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
24	1	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	2	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	3	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	4	0.	.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
25	1	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	2	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	3	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003
	4	0.	-.124	N.A.	N.A.	N.A.	0.	0.	N.A.	.124	.003

Single Bolt: Combined Tension and Shear Capacity

LC	Bolt	Nn(k)	Vnx(k)	Vnz(k)	SRSS	Interaction
1	1	25.2	0.	0.	0.	N.A.
	2	25.2	0.	0.	0.	N.A.
	3	25.2	0.	0.	0.	N.A.
	4	25.2	0.	0.	0.	N.A.
2	1	25.2	0.	0.	0.	N.A.
	2	25.2	0.	0.	0.	N.A.
	3	25.2	0.	0.	0.	N.A.
	4	25.2	0.	0.	0.	N.A.
3	1	25.2	0.	0.	.135	N.A.
	2	25.2	0.	0.	.135	N.A.
	3	25.2	0.	0.	.009	N.A.
	4	25.2	0.	0.	.009	N.A.
4	1	25.2	0.	0.	.009	N.A.
	2	25.2	0.	0.	.009	N.A.
	3	25.2	0.	0.	.135	N.A.
	4	25.2	0.	0.	.135	N.A.
5	1	25.2	0.	0.	.264	.264
	2	25.2	0.	0.	.264	.264
	3	25.2	0.	0.	.017	N.A.
	4	25.2	0.	0.	.017	N.A.
6	1	25.2	0.	0.	.017	N.A.
	2	25.2	0.	0.	.017	N.A.
	3	25.2	0.	0.	.264	.264
	4	25.2	0.	0.	.264	.264
7	1	18.9	0.	0.	.067	N.A.
	2	18.9	0.	0.	.067	N.A.
	3	18.9	0.	0.	.000143361	N.A.
	4	18.9	0.	0.	.000143327	N.A.
8	1	18.9	0.	0.	.000143321	N.A.
	2	18.9	0.	0.	.000143322	N.A.
	3	18.9	0.	0.	.067	N.A.
	4	18.9	0.	0.	.067	N.A.
9	1	25.2	0.	0.	.295	.295
	2	25.2	0.	0.	.295	.295
	3	25.2	0.	0.	.022	N.A.
	4	25.2	0.	0.	.022	N.A.
10	1	25.2	0.	0.	.022	N.A.
	2	25.2	0.	0.	.022	N.A.
	3	25.2	0.	0.	.295	.295
	4	25.2	0.	0.	.295	.295
11	1	18.9	0.	0.	.108	N.A.
	2	18.9	0.	0.	.108	N.A.
	3	18.9	0.	0.	.007	N.A.
	4	18.9	0.	0.	.007	N.A.
12	1	18.9	0.	0.	.007	N.A.
	2	18.9	0.	0.	.007	N.A.
	3	18.9	0.	0.	.108	N.A.
	4	18.9	0.	0.	.108	N.A.
13	1	25.2	0.	0.	0.	N.A.
	2	25.2	0.	0.	0.	N.A.
	3	25.2	0.	0.	0.	N.A.
	4	25.2	0.	0.	0.	N.A.
14	1	25.2	0.	0.	0.	N.A.
	2	25.2	0.	0.	0.	N.A.
	3	25.2	0.	0.	0.	N.A.
	4	25.2	0.	0.	0.	N.A.

Single Bolt: Combined Tension and Shear Capacity (continued)

LC	Bolt	Nn(k)	Vnx(k)	Vnz(k)	SRSS	Interaction
15	1	25.2	0.	0.	0.	N.A.
	2	25.2	0.	0.	0.	N.A.
	3	25.2	0.	0.	0.	N.A.
	4	25.2	0.	0.	0.	N.A.
16	1	25.2	0.	0.	.228	.228
	2	25.2	0.	0.	.228	.228
	3	25.2	0.	0.	.016	N.A.
	4	25.2	0.	0.	.016	N.A.
17	1	25.2	0.	0.	.016	N.A.
	2	25.2	0.	0.	.016	N.A.
	3	25.2	0.	0.	.228	.228
	4	25.2	0.	0.	.228	.228
18	1	25.2	0.	0.	.423	.423
	2	25.2	0.	0.	.423	.423
	3	25.2	0.	0.	.027	N.A.
	4	25.2	0.	0.	.027	N.A.
19	1	25.2	0.	0.	.027	N.A.
	2	25.2	0.	0.	.027	N.A.
	3	25.2	0.	0.	.423	.423
	4	25.2	0.	0.	.423	.423
20	1	18.9	0.	0.	.035	N.A.
	2	18.9	0.	0.	.035	N.A.
	3	18.9	0.	0.	0.	N.A.
	4	18.9	0.	0.	0.	N.A.
21	1	18.9	0.	0.	0.	N.A.
	2	18.9	0.	0.	0.	N.A.
	3	18.9	0.	0.	.035	N.A.
	4	18.9	0.	0.	.035	N.A.
22	1	25.2	0.	0.	.482	.482
	2	25.2	0.	0.	.482	.482
	3	25.2	0.	0.	.038	N.A.
	4	25.2	0.	0.	.038	N.A.
23	1	25.2	0.	0.	.038	N.A.
	2	25.2	0.	0.	.038	N.A.
	3	25.2	0.	0.	.482	.482
	4	25.2	0.	0.	.482	.482
24	1	18.9	0.	0.	.108	N.A.
	2	18.9	0.	0.	.108	N.A.
	3	18.9	0.	0.	.007	N.A.
	4	18.9	0.	0.	.007	N.A.
25	1	18.9	0.	0.	.007	N.A.
	2	18.9	0.	0.	.007	N.A.
	3	18.9	0.	0.	.108	N.A.
	4	18.9	0.	0.	.108	N.A.

Tension Bolt Groups

Group	Bolt List
T-1	1, 2, 3, 4

Shear Bolt Groups

Group	Type	Failure	Bolt List
S-1	+Vz	Full	1, 2, 3, 4
		Nr Edge	1, 2
		SideFull	1, 3
		SideNr	1

Shear Bolt Groups (continued)

Group	Type	Failure	Bolt List
S-2	-Vz	Full	1, 2, 3, 4
		Nr Edge	3, 4
		SideFull	1, 3
		SideNr	3
S-3	+Vx	Full	1, 2, 3, 4
		Nr Edge	1, 3
		SideFull	1, 2
		SideNr	1
S-4	-Vx	Full	1, 2, 3, 4
		Nr Edge	2, 4
		SideFull	1, 2
		SideNr	2

Anchor Bolt Group Embed Capacity Results

Note: All capacities shown include phi factors

Group Bolt: Tension Capacity

LC	Group	Tens.(k)	Nsa(k)	Ncbg(k)	Nsbg(k)	Unity	Ductility	Load(k)	Steel(in)
1	T-1	0.	0.	0.	0.	N.A.	N.A.	0.	0.
2	T-1	0.	0.	0.	0.	N.A.	N.A.	0.	0.
3	T-1	7.26	0.	0.	0.	N.A.	N.A.	7.26	.161
4	T-1	7.26	0.	0.	0.	N.A.	N.A.	7.26	.161
5	T-1	14.141	0.	0.	0.	N.A.	N.A.	14.141	.314
6	T-1	14.141	0.	0.	0.	N.A.	N.A.	14.141	.314
7	T-1	2.53	0.	0.	0.	N.A.	N.A.	2.53	.056
8	T-1	2.53	0.	0.	0.	N.A.	N.A.	2.53	.056
9	T-1	15.999	0.	0.	0.	N.A.	N.A.	15.999	.356
10	T-1	15.999	0.	0.	0.	N.A.	N.A.	15.999	.356
11	T-1	4.351	0.	0.	0.	N.A.	N.A.	4.351	.097
12	T-1	4.351	0.	0.	0.	N.A.	N.A.	4.351	.097
13	T-1	0.	0.	0.	0.	N.A.	N.A.	0.	0.
14	T-1	0.	0.	0.	0.	N.A.	N.A.	0.	0.
15	T-1	0.	0.	0.	0.	N.A.	N.A.	0.	0.
16	T-1	12.309	0.	0.	0.	N.A.	N.A.	12.309	.274
17	T-1	12.309	0.	0.	0.	N.A.	N.A.	12.309	.274
18	T-1	22.705	0.	0.	0.	N.A.	N.A.	22.705	.505
19	T-1	22.705	0.	0.	0.	N.A.	N.A.	22.705	.505
20	T-1	1.342	0.	0.	0.	N.A.	N.A.	1.342	.03
21	T-1	1.342	0.	0.	0.	N.A.	N.A.	1.342	.03
22	T-1	26.169	0.	0.	0.	N.A.	N.A.	26.169	.582
23	T-1	26.169	0.	0.	0.	N.A.	N.A.	26.169	.582
24	T-1	4.351	0.	0.	0.	N.A.	N.A.	4.351	.097
25	T-1	4.351	0.	0.	0.	N.A.	N.A.	4.351	.097

Shear Groups: Shear Capacity

LC	Gr	Type	Failure	Vx (k)	Vz (k)	Vsa(k)	VcbgXx(k)	VcbgXz(k)	VcbgZz(k)	VcbgZx(k)	Vcpg(k)	VxUnity	VzUnity
3	S-1	+Vz	Full	0.	.72	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.36	0.	0.	0.	0.	0.	0.	N.A.	N.A.

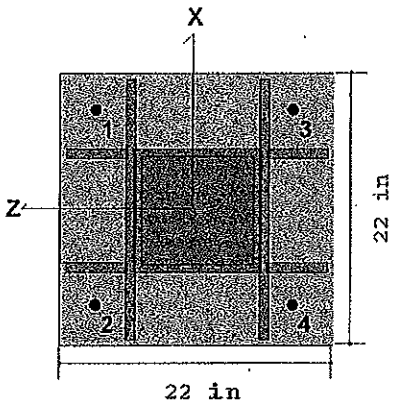
Shear Groups: Shear Capacity (continued)

LC	Gr	Type	Failure	Vx (k)	Vz (k)	Vsa(k)	VcbgXx(k)	VcbgXz(k)	VcbgZz(k)	VcbgZx(k)	Vcpg(k)	VxUnity	VzUnity
4	S-2	-Vz	Full	0.	-.72	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-.36	0.	0.	0.	0.	0.	0.	N.A.	N.A.
5	S-1	+Vz	Full	0.	1.44	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.72	0.	0.	0.	0.	0.	0.	N.A.	N.A.
6	S-2	-Vz	Full	0.	-1.44	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-.72	0.	0.	0.	0.	0.	0.	N.A.	N.A.
7	S-1	+Vz	Full	0.	.496	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.248	0.	0.	0.	0.	0.	0.	N.A.	N.A.
8	S-2	-Vz	Full	0.	-.496	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-.248	0.	0.	0.	0.	0.	0.	N.A.	N.A.
9	S-1	+Vz	Full	0.	1.44	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.72	0.	0.	0.	0.	0.	0.	N.A.	N.A.
10	S-2	-Vz	Full	0.	-1.44	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-.72	0.	0.	0.	0.	0.	0.	N.A.	N.A.
11	S-1	+Vz	Full	0.	.496	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.248	0.	0.	0.	0.	0.	0.	N.A.	N.A.
12	S-2	-Vz	Full	0.	-.496	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-.248	0.	0.	0.	0.	0.	0.	N.A.	N.A.
16	S-1	+Vz	Full	0.	1.152	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.576	0.	0.	0.	0.	0.	0.	N.A.	N.A.
17	S-2	-Vz	Full	0.	-1.152	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-.576	0.	0.	0.	0.	0.	0.	N.A.	N.A.
18	S-1	+Vz	Full	0.	2.304	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	1.152	0.	0.	0.	0.	0.	0.	N.A.	N.A.
19	S-2	-Vz	Full	0.	-2.304	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-1.152	0.	0.	0.	0.	0.	0.	N.A.	N.A.
20	S-1	+Vz	Full	0.	.496	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.248	0.	0.	0.	0.	0.	0.	N.A.	N.A.
21	S-2	-Vz	Full	0.	-.496	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-.248	0.	0.	0.	0.	0.	0.	N.A.	N.A.
22	S-1	+Vz	Full	0.	2.304	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	1.152	0.	0.	0.	0.	0.	0.	N.A.	N.A.
23	S-2	-Vz	Full	0.	-2.304	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-1.152	0.	0.	0.	0.	0.	0.	N.A.	N.A.
24	S-1	+Vz	Full	0.	.496	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.248	0.	0.	0.	0.	0.	0.	N.A.	N.A.
25	S-2	-Vz	Full	0.	-.496	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-.248	0.	0.	0.	0.	0.	0.	N.A.	N.A.

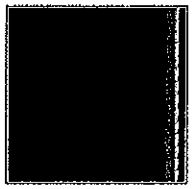
Shear Groups: Seismic Ductility & Anchor Reinforcement Results

LC	Gr	Type	Failure	Vx (k)	Vz (k)	VxUnity	VzUnity	Vx-Duct	Vx-L(k)	Vx-St(in2)	Vz-Duct	Vz-L(k)	Vz-St(in2)
3	S-1	+Vz	Full	0.	.72	N.A.	N.A.	N.A.	0.	0.	N.A.	.72	.016
			Nr Edge	0.	.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
4	S-2	-Vz	Full	0.	-.72	N.A.	N.A.	N.A.	0.	0.	N.A.	.72	.016
			Nr Edge	0.	-.36	N.A.	N.A.	N.A.	0.	0.	N.A.	.36	.008
5	S-1	+Vz	Full	0.	1.44	N.A.	N.A.	N.A.	0.	0.	N.A.	1.44	.032
			Nr Edge	0.	.72	N.A.	N.A.	N.A.	0.	0.	N.A.	.72	.016
6	S-2	-Vz	Full	0.	-1.44	N.A.	N.A.	N.A.	0.	0.	N.A.	1.44	.032
			Nr Edge	0.	-.72	N.A.	N.A.	N.A.	0.	0.	N.A.	.72	.016
7	S-1	+Vz	Full	0.	.496	N.A.	N.A.	N.A.	0.	0.	N.A.	.496	.011
			Nr Edge	0.	.248	N.A.	N.A.	N.A.	0.	0.	N.A.	.248	.006
8	S-2	-Vz	Full	0.	-.496	N.A.	N.A.	N.A.	0.	0.	N.A.	.496	.011
			Nr Edge	0.	-.248	N.A.	N.A.	N.A.	0.	0.	N.A.	.248	.006
9	S-1	+Vz	Full	0.	1.44	N.A.	N.A.	N.A.	0.	0.	N.A.	1.44	.032
			Nr Edge	0.	.72	N.A.	N.A.	N.A.	0.	0.	N.A.	.72	.016
10	S-2	-Vz	Full	0.	-1.44	N.A.	N.A.	N.A.	0.	0.	N.A.	1.44	.032
			Nr Edge	0.	-.72	N.A.	N.A.	N.A.	0.	0.	N.A.	.72	.016
11	S-1	+Vz	Full	0.	.496	N.A.	N.A.	N.A.	0.	0.	N.A.	.496	.011
			Nr Edge	0.	.248	N.A.	N.A.	N.A.	0.	0.	N.A.	.248	.006
12	S-2	-Vz	Full	0.	-.496	N.A.	N.A.	N.A.	0.	0.	N.A.	.496	.011
			Nr Edge	0.	-.248	N.A.	N.A.	N.A.	0.	0.	N.A.	.248	.006
16	S-1	+Vz	Full	0.	1.152	N.A.	N.A.	N.A.	0.	0.	N.A.	1.152	.026
			Nr Edge	0.	.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
17	S-2	-Vz	Full	0.	-1.152	N.A.	N.A.	N.A.	0.	0.	N.A.	1.152	.026
			Nr Edge	0.	-.576	N.A.	N.A.	N.A.	0.	0.	N.A.	.576	.013
18	S-1	+Vz	Full	0.	2.304	N.A.	N.A.	N.A.	0.	0.	N.A.	2.304	.051
			Nr Edge	0.	1.152	N.A.	N.A.	N.A.	0.	0.	N.A.	1.152	.026
19	S-2	-Vz	Full	0.	-2.304	N.A.	N.A.	N.A.	0.	0.	N.A.	2.304	.051
			Nr Edge	0.	-1.152	N.A.	N.A.	N.A.	0.	0.	N.A.	1.152	.026
20	S-1	+Vz	Full	0.	.496	N.A.	N.A.	N.A.	0.	0.	N.A.	.496	.011
			Nr Edge	0.	.248	N.A.	N.A.	N.A.	0.	0.	N.A.	.248	.006
21	S-2	-Vz	Full	0.	-.496	N.A.	N.A.	N.A.	0.	0.	N.A.	.496	.011
			Nr Edge	0.	-.248	N.A.	N.A.	N.A.	0.	0.	N.A.	.248	.006
22	S-1	+Vz	Full	0.	2.304	N.A.	N.A.	N.A.	0.	0.	N.A.	2.304	.051
			Nr Edge	0.	1.152	N.A.	N.A.	N.A.	0.	0.	N.A.	1.152	.026
23	S-2	-Vz	Full	0.	-2.304	N.A.	N.A.	N.A.	0.	0.	N.A.	2.304	.051
			Nr Edge	0.	-1.152	N.A.	N.A.	N.A.	0.	0.	N.A.	1.152	.026
24	S-1	+Vz	Full	0.	.496	N.A.	N.A.	N.A.	0.	0.	N.A.	.496	.011
			Nr Edge	0.	.248	N.A.	N.A.	N.A.	0.	0.	N.A.	.248	.006
25	S-2	-Vz	Full	0.	-.496	N.A.	N.A.	N.A.	0.	0.	N.A.	.496	.011
			Nr Edge	0.	-.248	N.A.	N.A.	N.A.	0.	0.	N.A.	.248	.006

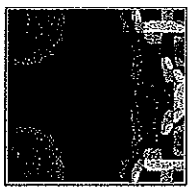
Genesis Solar Heavy - BP2



Bearing Pressure
Maximum Bearing 1.36 ksi
Max/Allowable Ratio .501 ASCE Strength 7
(ABIF = 1.000)



Base Plate Stress
Maximum Stress 19.17 ksi
Max/Allowable Ratio .394 ACI 9-5
(ASIF = 1.000)



Stiffened Base Plate Connection

Base Plate Thickness	: 1. in
Base Plate Fy	: 36. ksi
Bearing Surface Fp	: 2.712 ksi
Anchor Bolt Diameter	: 1. in
Anchor Bolt Material	: A307
Anchor Bolt Fu	: 60. ksi
Column Shape	: HSS10x10x8
Steel Code	: AISC 14th:LRFD
Concrete Code	: ACI 318-11

(With IBC 2012 Amendments)

Anchor Bolts

Bolt	X (in)	Z (in)	Tens.(k)	Vx (k)	Vz (k)	Fnt (ksi)	ft (ksi)	Fnv (ksi)	fv (ksi)	Unity	Combination
1	8.	8.	14.075	0.	-.56	45.	17.921	27.	.713	.531 (T)	ASCE Strength 7 (11)
2	-8.	8.	14.075	0.	-.56	45.	17.921	27.	.713	.531 (T)	ASCE Strength 7 (11)
3	8.	-8.	14.075	0.	.56	45.	17.921	27.	.713	.531 (T)	ASCE Strength 7 (12)
4	-8.	-8.	14.075	0.	.56	45.	17.921	27.	.713	.531 (T)	ASCE Strength 7 (12)

Note: Fnt and Fnv shown above include phi factors.

Loads

	P (k)	Vx (k)	Vz (k)	Mx (k-ft)	Mz (k-ft)
DL	4.094				
LL	9.263				
WL			1.01	21.21	
EL*			2.24	47.04	

Anchor Bolt Embed Capacity Results

Note: All capacities shown include phi factors

Single Bolt Tension Envelope Results

LC	Bolt	Tens.(k)	Nsa(k)	Ncb(k)	Npn(k)	Nsb(k)	Unity	Ductility	Load(k)	Steel(in2)
11	1	14.075	27.27	0.	18.9	0.	.745	N.A.	14.075	.313

Single Bolt Vx Envelope Results

LC	Bolt	Vx (k)	Vz (k)	Vsa(k)	VcbXx(k)	VcbXz(k)	VcbZz(k)	VcbZx(k)	Vcp (k)	VxUnity	VzUnity
1	1	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.

Seismic Ductility & Anchor Reinforcement Results

LC	Bolt	Vx (k)	Vz (k)	VxUnity	VzUnity	Vx-Duct	Vx-L(k)	Vx-St(in2)	Vz-Duct	Vz-L(k)	Vz-St(in2)
1	1	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.

Single Bolt Vz Envelope Results

LC	Bolt	Vx (k)	Vz (k)	Vsa(k)	VcbXx(k)	VcbXz(k)	VcbZz(k)	VcbZx(k)	Vcp (k)	VxUnity	VzUnity
1	1	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.

Seismic Ductility & Anchor Reinforcement Results

LC	Bolt	Vx (k)	Vz (k)	VxUnity	VzUnity	Vx-Duct	Vx-L(k)	Vx-St(in2)	Vz-Duct	Vz-L(k)	Vz-St(in2)
1	1	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.

Single Bolt: Combined Tension and Shear Capacity Envelope Results

LC	Bolt	Nn(k)	Vnx(k)	Vnz(k)	SRSS	Interaction
11	1	18.9	0.	0.	.745	.745

Group Bolt: Tension Capacity Envelope Results

LC	Group	Tens.(k)	Nsa.(k)	Ncb.(k)	Nsb.(k)	Unity	Ductility	Load(k)	Steel(in^2)
1	T-1	0.	0.	0.	0.	N.A.	N.A.	0.	0.

Vz Shear Groups Capacity Envelope Results

LC	Gr	Type	Failure	Vx (k)	Vz (k)	Vsa(k)	VcbXx(k)	VcbXz(k)	VcbZz(k)	VcbZx(k)	Vcp (k)	VxUnity	VzUnity
3	S-1	+Vz	Full	0.	.505	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.252	0.	0.	0.	0.	0.	0.	N.A.	N.A.

Seismic Ductility & Anchor Reinforcement Results

LC	Gr	Type	Failure	Vx (k)	Vz (k)	VxUnity	VzUnity	Vx-Duct	Vx-L(k)	Vx-St(in2)	Vz-Duct	Vz-L(k)	Vz-St(in2)
3	S-1	+Vz	Full	0.	.505	N.A.	N.A.	N.A.	0.	0.	N.A.	.505	.011
			Nr Edge	0.	.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006

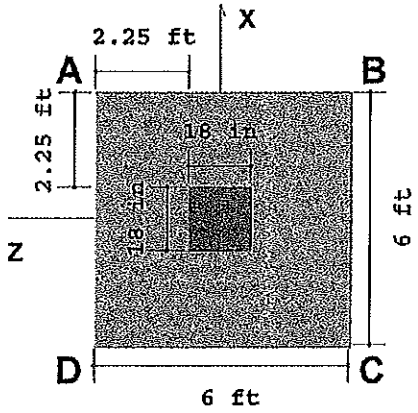
Company : BG Structural Engineering
Designer : KDC
Job Number : 800.0617

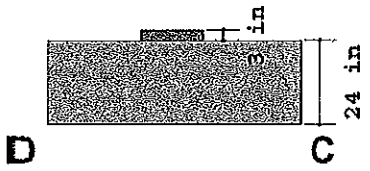
March 15, 2017

Genesis Solar Heavy Pad-1

Checked By:_____

Sketch





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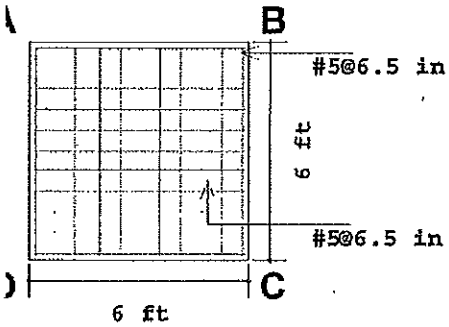
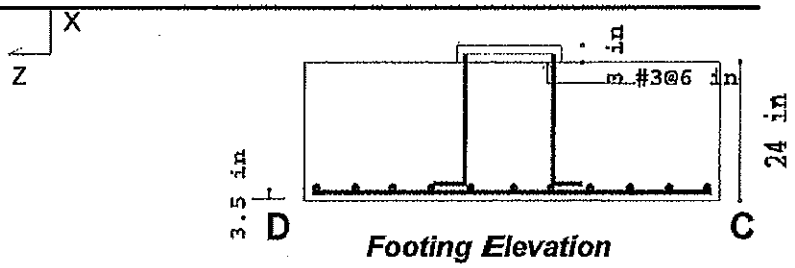
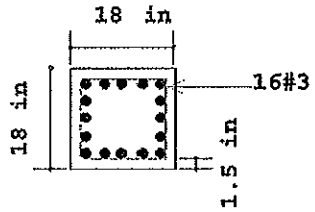


Bottom Rebar Plan



Footing Elevation



Pedestal Rebar Plan

Geometry, Materials and Criteria

Length	:6 ft	eX :0 in	Gross Allow. Bearing	: 1995 psf (gross)	Steel fy	:60 ksi
Width	:6 ft	eZ :0 in	Concrete Weight	: 145 pcf	Minimum Steel	:.0018
Thickness	:24 in	pX :18 in	Concrete f'c	:4 ksi	Maximum Steel	:.0075
Height	:3 in	pZ :18 in	Design Code	:ACI 318-05		

Footing Top Bar Cover	:3.5 in	Overturning Safety Factor	:1.5	Phi for Flexure	:0.9
Footing Bottom Bar Cover	:3.5 in	Coefficient of Friction	:0.35	Phi for Shear	:0.75
Pedestal Longitudinal Bar Cover	:1.5 in	Passive Resistance of Soil	:.25 k	Phi for Bearing	:0.65

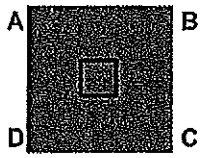
Company : **BG Structural Engineering** March 15, 2017
Designer : **KDC**
Job Number : **800.0617** **Genesis Solar Heavy Pad-1** Checked By:_____

Loads

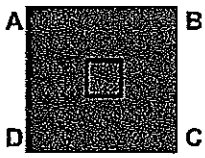
	P (k)	Vx (k)	Vz (k)	Mx (k-ft)	Mz (k-ft)	Overburden (psf)
DL	1.58					100
EL			.496	5.952		
WL			1.44	19.2		
RLL	5.039					

Soil Bearing

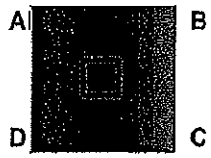
Description	Categories and Factors	Gross Allow.(psf)	Max Bearing (psf)	Max/Allowable Ratio
ASCE 2.4.1-1	1DL	1995	429.905 (A)	.215
ASCE 2.4.1-2	1DL+1LL	1995	429.905 (A)	.215
ASCE 2.4.1-3a	1DL+1WL	1995	873.451 (B)	.438
ASCE 2.4.1-3b	1DL+.7EL	1995	523.938 (B)	.263
ASCE 2.4.1-3c	1DL+.75LL+.75WL	1995	762.405 (B)	.382
ASCE 2.4.1-3d	1DL+.75LL+.7EL	1995	523.938 (B)	.263
ASCE 2.4.1-4	.6DL+1WL	1995	805.271 (B)	.404
ASCE 2.4.1-5	.6DL+.7EL	1995	351.976 (B)	.176



1DL
QA: 429.905 psf
QB: 429.905 psf
QC: 429.905 psf
QD: 429.905 psf
NAZ: -1 in
NAX: -1 in

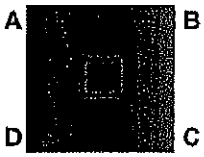


1DL+1LL
QA: 429.905 psf
QB: 429.905 psf
QC: 429.905 psf
QD: 429.905 psf
NAZ: -1 in
NAX: -1 in

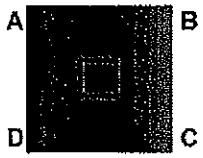


1DL+1WL
QA: 0 psf
QB: 873.451 psf
QC: 873.451 psf
QD: 0 psf
NAZ: 70.875 in
NAX: -1 in

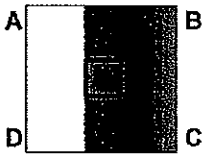
1DL+.7EL
QA: 335.871 psf
QB: 523.938 psf
QC: 523.938 psf
QD: 335.871 psf
NAZ: 200.586 in
NAX: -1 in



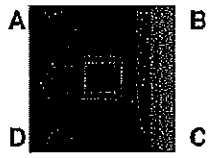
1DL+.75LL+.75WL
QA: 97.405 psf
QB: 762.405 psf
QC: 762.405 psf
QD: 97.405 psf
NAZ: 82.546 in
NAX: -1 in



1DL+.75LL+.7EL
QA: 335.871 psf
QB: 523.938 psf
QC: 523.938 psf
QD: 335.871 psf
NAZ: 200.586 in
NAX: -1 in



.6DL+1WL
QA: 0 psf
QB: 805.271 psf
QC: 805.271 psf
QD: 0 psf
NAZ: 46.126 in
NAX: -1 in



.6DL+.7EL
QA: 163.909 psf
QB: 351.976 psf
QC: 351.976 psf
QD: 163.909 psf
NAZ: 134.752 in
NAX: -1 in

Company : BG Structural Engineering
Designer : KDC
Job Number : 800.0617
Genesis Solar Heavy Pad-1
March 15, 2017
Checked By:_____

Footing Flexure Design (Bottom Bars)

Description	Categories and Factors	Mu-XX (k-ft)	Z Dir As (in^2)	Mu-ZZ (k-ft)	X Dir As (in^2)
ACI-99 9-1	1.4DL+1.7LL	.848	.009	.848	.009
ACI-99 9-2	1.05DL+1.275LL+1.275WL	7.226	.08	.636	.007
ACI-99 9-3	.9DL+1.3WL	7.655	.084	.545	.006
IBC 16-5	1.2DL+1LL+1EL	2.257	.025	.727	.008
IBC 16-6	.9DL+1EL	2.076	.023	.545	.006

Footing Flexure Design (Top Bars)

Description	Categories and Factors	Mu-XX (k-ft)	Z Dir As (in^2)	Mu-ZZ (k-ft)	X Dir As (in^2)
SW+OB	1SW+1OB-(ACI-99 9-3,ACI-99 9-3)	5.815	0	.047	0

Moment Capacity of Plain Concrete Section Along XX and ZZ= 84.18k-ft,84.18k-ft Per Chapter 22 of ACI 318.

Footing Shear Check

Two Way (Punching) Vc: 780.106 k One Way (X Dir. Cut) Vc 183.855 k One Way (Z Dir. Cut) Vc: 183.855 k

		Punching		X Dir. Cut		Z Dir. Cut	
Description	Categories and Factors	Vu(k)	Vu/⌀Vc	Vu(k)	Vu/⌀Vc	Vu(k)	Vu/⌀Vc
ACI-99 9-1	1.4DL+1.7LL	1.445	.002	.19	.001	.19	.001
ACI-99 9-2	1.05DL+1.275LL+1.275WL	1.179	.002	1.934	.014	.143	.001
ACI-99 9-3	.9DL+1.3WL	1.34	.002	2.076	.015	.122	0
IBC 16-5	1.2DL+1LL+1EL	1.239	.002	.577	.004	.163	.001
IBC 16-6	.9DL+1EL	.929	.002	.537	.004	.122	0

Pedestal Design

Shear Check Results (Envelope):
Shear Along X Direction Vc: 36.287 k Vs: 35.205 k Vu: 0 k Vu/⌀ Vn: 0 ⌀: .75
Shear Along Z Direction Vc: 36.287 k Vs: 35.205 k Vu: 1.872 k Vu/⌀ Vn: .035
Pedestal Ties: #3 @ 6 in

Bending Check Results (Envelope):
Unity Check: .391 Phi : .9 Parme Beta: .65
Pu : 0 k Mux : 24.96 k-ft Muz: : 0 k-ft
Pn : 0 k Mnx : 71.004 k-ft Mnz: : NA
Mnox: NA Mnoz : NA
Pedestal Bars: 16 #3 % Steel: .545

Compression Development Length Pedestal Bars (Envelope):
Lreq.: 7.115 in Lpro.: 18.875 in Lreq./Lpro.: .377

Concrete Bearing Check (Vertical Loads Only)

Bearing Bc : 2203.2 k

Description	Categories and Factors	Bearing Bu (k)	Bearing Bu/⌀Bc
ACI-99 9-1	1.4DL+1.7LL	21.667	.015
ACI-99 9-2	1.05DL+1.275LL+1.275WL	16.25	.011
ACI-99 9-3	.9DL+1.3WL	13.929	.01
IBC 16-5	1.2DL+1LL+1EL	18.572	.013
IBC 16-6	.9DL+1EL	13.929	.01

Company : **BG Structural Engineering** March 15, 2017
Designer : **KDC**
Job Number : **800.0617** **Genesis Solar Heavy Pad-1** Checked By:_____

Overturning Check (Service)

Description	Categories and Factors	Mo-XX (k-ft)	Ms-XX (k-ft)	Mo-ZZ (k-ft)	Ms-ZZ (k-ft)	OSF-XX	OSF-ZZ
ASCE 2.4.1-1	1DL	.43	46.86	.43	46.86	108.898	108.898
ASCE 2.4.1-2	1DL+1LL	.43	46.86	.43	46.86	108.898	108.898
ASCE 2.4.1-3a	1DL+1WL	19.63	50.1	.43	46.86	2.552	108.898
ASCE 2.4.1-3b	1DL+.7EL	4.597	47.641	.43	46.86	10.364	108.898
ASCE 2.4.1-3c	1DL+.75LL+.75WL	14.83	49.29	.43	46.86	3.324	108.898
ASCE 2.4.1-3d	1DL+.75LL+.7EL	4.597	47.641	.43	46.86	10.364	108.898
ASCE 2.4.1-4	.6DL+1WL	19.458	31.356	.258	28.116	1.611	108.898
ASCE 2.4.1-5	.6DL+.7EL	4.425	28.897	.258	28.116	6.531	108.898

Mo-XX: Governing Overturning Moment about AD or BC
Ms-XX: Governing Stablizing Moment about AD or BC
OSF-XX: Ratio of Ms-XX to Mo-XX

Sliding Check (Service)

Description	Categories and Factors	Va-XX (k)	Vr-XX (k)	Va-ZZ (k)	Vr-ZZ (k)	SR-XX	SR-ZZ
ASCE 2.4.1-1	1DL	0	5.667	0	5.667	NA	NA
ASCE 2.4.1-2	1DL+1LL	0	5.667	0	5.667	NA	NA
ASCE 2.4.1-3a	1DL+1WL	0	5.667	1.44	5.667	NA	3.935
ASCE 2.4.1-3b	1DL+.7EL	0	5.667	.347	5.667	NA	16.321
ASCE 2.4.1-3c	1DL+.75LL+.75WL	0	5.667	1.08	5.667	NA	5.247
ASCE 2.4.1-3d	1DL+.75LL+.7EL	0	5.667	.347	5.667	NA	16.321
ASCE 2.4.1-4	.6DL+1WL	0	3.5	1.44	3.5	NA	2.431
ASCE 2.4.1-5	.6DL+.7EL	0	3.5	.347	3.5	NA	10.081

Va-XX: Applied Lateral Force to Cause Sliding Along XX Axis
Vr-XX: Resisting Lateral Force Against Sliding Along XX Axis
SR-XX: Ratio of Vr-XX to Va-XX

MecaWind Pro v2.2.7.5 per ASCE 7-10

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Date	: 3/6/2017	Project No.	: 800.0617
Company Name	: B.G. Structural Engineering, I	Designed By	: BG
Address	: 75-175 Merle Drive	Description	: Genesis Solar - High Roof
City	: Palm Desert	Customer Name	:
State	: CA.	Proj Location	: Blythe, CA.

File Location: J:\Jobs\800\800.0617 Heavy Equipment Covered Parking\800.0617 Wind 1 High Roof.wnd

Input Parameters: Envelope Procedure per ASCE 7-10 Chapter 28 Part 1

Basic Wind Speed(V)	=	110.00 mph			
Structural Category	=	II	Exposure Category	=	C
Natural Frequency	=	N/A	Flexible Structure	=	No
Importance Factor	=	1.00	Kd Directional Factor	=	0.85
Alpha	=	9.50	Zg	=	900.00 ft
At	=	0.11	Bt	=	1.00
Am	=	0.15	Bm	=	0.65
Cc	=	0.20	l	=	500.00 ft
Epsilon	=	0.20	Zmin	=	15.00 ft
Pitch of Roof	=	0.25 : 12	Slope of Roof(Theta)	=	1.19 Deg
D: Roof Len along Ridge	=	40.00 ft	L: Horizontal Width	=	40.00 ft
h: Mean Roof Ht	=	20.00 ft	Type of Roof	=	MONOSLOPE

Gust Factor Calculations

Gust Factor Category I Rigid Structures - Simplified Method

Gust1: For Rigid Structures (Nat. Freq.>1 Hz) use 0.85 = 0.85

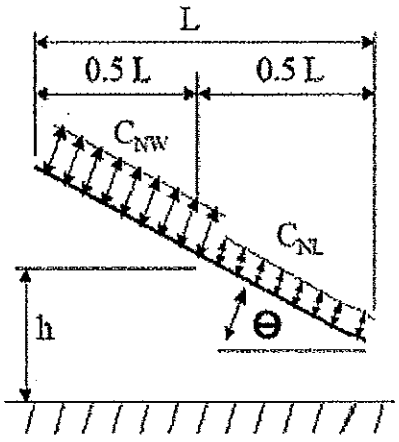
Gust Factor Category II Rigid Structures - Complete Analysis

Zm: 0.6*Ht	=	15.00 ft
lzm: Cc*(33/Zm)^0.167	=	0.23
Lzm: l*(Zm/33)^Epsilon	=	427.06 ft
Q: (1/(1+0.63*((B+Ht)/Lzm)^0.63))^0.5	=	0.92
Gust2: 0.925*((1+1.7*lzm*3.4*Q)/(1+1.7*3.4*lzm))	=	0.88

Gust Factor Summary

Not a Flexible Structure use the Lessor of Gust1 or Gust2 = 0.85

Open Building-Monoslope Roof per Figure 27.4-4:



Normal to Ridge - Open Building - Monoslope Roof per Figure 27.4-4:

Gamma = 0 degrees, Obstructed Wind Flow

Load Case	Cnw	Cnl	Windward Wind Pres. psf	Leeward Wind Pres. psf
A	-0.500	-1.200	-6.055	-14.533
B	-1.100	-0.600	-13.322	-7.266

Normal to Ridge - Base Reactions - Roof +GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof Windward	-6.06	801	.00	0.20	4.84	28.3	.0	.0
Roof Leeward	-14.53	801	.00	0.48	11.63	-48.5	.0	.0
Total	.00	1601	.00	0.69	16.47	-20.2	.0	.0

Normal to Ridge - Base Reactions - Roof -GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof Windward	-13.32	801	.00	0.44	10.66	62.3	.0	.0
Roof Leeward	-7.27	801	.00	0.24	5.81	-24.3	.0	.0
Total	.00	1601	.00	0.69	16.47	38.0	.0	.0

Normal to Ridge - Base Reactions - Roof MIN

Description	Press psf	Area* ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Total	.00	0	.00	.00	.00	.0	.0	.0

Notes - Normal to Ridge

Normal to Eave - Open Building - Monoslope Roof per Figure 27.4-4:

Gamma = 180 degrees, Obstructed Wind Flow

Load Case	Cnw	Cnl	Windward Wind Pres. psf	Leeward Wind Pres. psf
A	-0.500	-1.200	-6.055	-14.533
B	-1.100	-0.600	-13.322	-7.266

Normal to Eave - Base Reactions - Roof +GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof Windward	-6.06	800	.00	0.10	4.84	50.5	.0	.0
Roof Leeward	-14.53	800	.00	0.24	11.63	-111.5	.0	.0
Total	.00	1600	.00	0.34	16.47	-61.0	.0	.0

Normal to Eave - Base Reactions - Roof -GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof Windward	-13.32	800	.00	0.22	10.66	111.1	.0	.0
Roof Leeward	-7.27	800	.00	0.12	5.81	-55.7	.0	.0
Total	.00	1600	.00	0.34	16.47	55.3	.0	.0

Normal to Eave - Base Reactions - Roof MIN

Description	Press psf	Area* ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Total	.00	0	.00	.00	.00	.0	.0	.0

Notes - Normal to Eave

Along Ridge - Open Building - Monoslope Roof per Figure 27.4-4:

Gamma = 90 degrees, Obstructed Wind Flow

Length Along Ridge of Roof	Roof Angle (Theta)	Load Case	Cn psf	Wind Press Along Ridge psf

<= 20.0	Theta<=45 deg	A	-1.200	-14.533
		B	0.500	6.055
>20.0&<=2*20.0	Theta<=45 deg	A	-0.900	-10.900
		B	0.500	6.055

Along Ridge - Base Reactions - Roof +GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof (0 to h)	-14.53	800	.00	0.24	11.63	4.8	-116.3	2.4
Roof (h to 2h)	-10.90	800	.00	0.18	8.72	3.6	87.2	-1.8
Total	.00	1600	.00	0.42	20.35	8.5	-29.1	0.6

Along Ridge - Base Reactions - Roof -GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof (0 to h)	6.06	800	.00	-0.10	-4.84	-2.0	48.4	-1.0
Roof (h to 2h)	6.06	800	.00	-0.10	-4.84	-2.0	-48.4	1.0
Total	.00	1600	.00	-0.20	-9.69	-4.0	.0	.0

Along Ridge - Base Reactions - Roof MIN

Description	Press psf	Area* ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Total	.00	0	.00	.00	.00	.0	.0	.0

Notes - Along Ridge

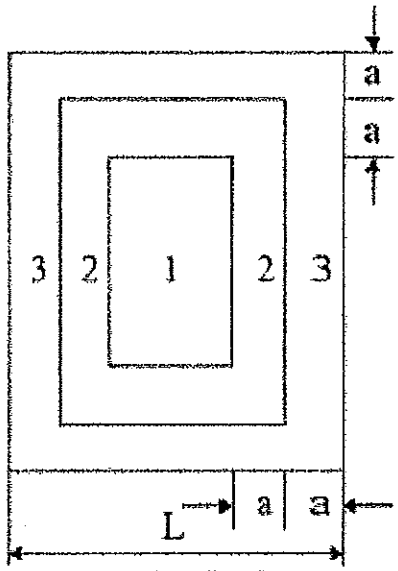
Total Base Reaction Summary

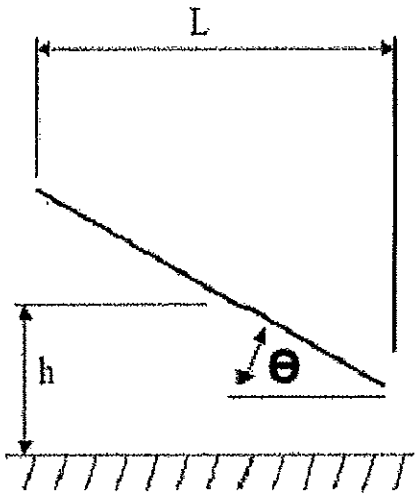
Description	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Normal to Ridge Roof +GCpi	.0	0.7	16.5	-20.2	.0	.0
Normal to Ridge Roof -GCpi	.0	0.7	16.5	38.0	.0	.0
Normal to Ridge Roof MIN	.0	.0	.0	.0	.0	.0
Normal to Eave Roof +GCpi	.0	0.3	16.5	-61.0	.0	.0
Normal to Eave Roof -GCpi	.0	0.3	16.5	55.3	.0	.0
Normal to Eave Roof MIN	.0	.0	.0	.0	.0	.0
Along Ridge Roof +GCpi	.0	0.4	20.3	8.5	-29.1	0.6
Along Ridge Roof -GCpi	.0	-0.2	-9.7	-4.0	.0	.0
Along Ridge Roof MIN	.0	.0	.0	.0	.0	.0

Notes Applying to MWFRS Reactions:

Note (1) Cnw- Net Press (contrib from top and bottom surf) for windward roof surf.
Note (2) Cnl- Net Press (contrib from top and bottom surf) for leeward roof surf.
Note (3) Cn- Net Press (contributions from top and bottom surfaces).
Note (4) + = Pressure acting toward surface, - = Pressure acting away from surface.
Note (5) Per Fig 27.4-1, Note 9, Use greater of Shear calculated with or without roof.
Note (6) X= Along Building ridge, Y = Normal to Building Ridge, Z = Vertical
Note (7) MIN = Minimum pressures on Walls = 9.6 psf and Roof = 4.8 psf
Note (8) MIN area is the area of the surface onto a vertical plane normal to wind.
Note (9) Total Roof Area (incl OH Top) = 1840.40 sq. ft

Wind Pressure on Components and Cladding (Ch 30 Part 5)





Monoslope Roof

All pressures shown are based upon ASD Design, with a Load Factor of .6

Width of Pressure Coefficient Zone "a" = = 4.00 ft

Description	Width ft	Span ft	Area ft^2	Zone	Cn Max	Cn Min	Max P psf	Min P psf
Zone 1	1.00	1.00	1.0	1	0.55	-1.28	9.60	-15.50
Zone 2	1.00	1.00	1.0	2	0.86	-1.93	10.46	-23.34
Zone 3	1.00	1.00	1.0	3	1.10	-3.84	13.27	-46.49
Zone 4	1.00	1.00	1.0	1	0.55	-1.28	9.60	-15.50
Zone 5	1.00	1.00	1.0	1	0.55	-1.28	9.60	-15.50

Project Name: Genesis Solar Heavy Equipment Covered Parking - High Roof

Address: 11995 Wiley's Well Road, Blythe, CA

LOADS:

Roof 1 :.

DEAD LOADS:

Pitch = 0.25:12

Steel Decking	3.00 PSF
Misc.	2.00
DL=	**5.00 PSF**
Slope Correction =	**1.00**
DL=	**5.00 PSF**
LL=	**20.00 PSF**
TL=	**25.00 PSF**

WALLS:

Exterior Wall:

DEAD LOADS:

Steel Decking	3.00 PSF
Girts	3.00
Misc.	1.00
DL=	**7.00 PSF**

Project Name: Genesis Solar Heavy Equipment Covered Parking - High Roof - 8(

Address: 11995 Wiley's Well Road, Blythe, CA

LATERAL LOADING

2015 CBC
SEISMIC

Ht. Abv.Gnd.(Ft) = **21**
I= **1.00**
"R" Factor = **2.5**
Site Class = **C**
Latitude = **33.559**
Longitude = **-114.911**
Occupancy Catetory = **II**

Cu = **1.4**
C_t = **0.02**
x = **0.75**
Ta = **0.196**
T_L = **8**
ρ = **1.3**

S_S = **0.524** Fa = **1.1904** S_{DS} = **0.416** SDC (S_{Ds}) = **C**
S_1 = **0.248** Fv = **1.552** S_{D1} = **0.257** SDC (S_{D1}) = **D**

USE: SDC = D

BASE SHEAR

Per ASCE7 Eq. 12.8-2 C_s = 0.166 **GOVERNS**

Not to exceed-

Per ASCE7 Eq. 12.8-3 C_s = 0.523

Not less than-

Per ASCE7 Eq. 12.8-5 C_s = 0.010

Use- 0.010

0.166 STRENGTH DESIGN
0.119 WORKING STRESS DESIGN
(DIVIDE BY 1.4)

Level	Wpx	Hi	Wi*Hi	%	Vi	ρVi	A	ρvi (psf)
RF	12.60K	21'	264.6 'K	1.000	**1.50**	**1.95**	1848	**1.05**
Totals=	12.60K		264.6 'K	1.000	**1.50K**	**1.95K**		

Project Name: Genesis Solar Heavy Equipment Covered Parking - High Roof - 8(

Address: 11995 Wiley's Well Road, Blythe, CA

2015 CBC
WIND

Max. Wind Load = 14.53 psf
(Refer to wind load calcs.attached)

USE Wind Unit Load = 18psf

N/S Direction:

Wind Areas:

Level =	RF		
(Sq. Ft.)			
A1	105.00		
A2	0.00		
A3	0.00		
A4	0.00		

Wind Force:

Level =	RF				
(Lbs.)					
F A1	1890				
F A2	0				
F A3	0				
F A4	0				
Total =	**1890**	**0**	**0**	**1.89K**	**SEISMIC GOVERNS**

E/W Direction:

Wind Areas:

Level =	RF		
(Sq. Ft.)			
A1	110.00		
A2	0.00		
A3	0.00		
A4	0.00		

Wind Force:

Level =	RF				
(Lbs.)					
F A1	1980				
F A2	0				
F A3	0				
F A4	0				
Total =	**1980**	**0**	**0**	**1.98K**	**WIND GOVERNS**

SEISMIC WEIGHTS:

SEISMIC AREAS (sq. ft.)

RF1	RF2	RF3	RF4			
1848.0	0.0	0.0				
	0.0	0.0				
		0.0				
TOTAL =	1848	0	0	0	0	0	0	SF

SEISMIC WEIGHTS:

RF	A	w (psf)	Wi
Roof 1:	1848	5.00	9242
Roof 2:	0	0.00	0
Roof 3:	0	16.00	0
Roof 4:	0	21.00	0
Ext. Walls:	480	7.00	3360
Int. Walls:	0	0.00	0
		Roof Total =	12,602 lbs.

Exterior Walls:

RF

H	L	A
6	80	480.0
0	0	0.0
0	0	0.0
		0.0
	TOTAL =	480 SF

Interior Walls:

RF

H	L	A
0	0	0.0
0	0	0.0
0	0	0.0
		0.0
	TOTAL =	0 SF

SHEAR WALLS: Level = RF

Unit Load = 1.05 psf Sds= 0.42 Uplift LC =0.6D+.7E = 0.6D+0.7(ρ*Qe-0.2*Sds*D) = 0.6D-0.14*Sds*D+0.7*ρ*Qe RM D factor= 0.541782

								HD segment			Add'l			0.5416*D Factored		
Line	Trib. Area	Shear (lbs)	Above (lbs	Total (lbs	Length(s) (ft	v (plf)	Use SW #	length	Wrm (plf)	Wwall (psf)	point load	Wall Hgt.	OTM	RM	Uplift	Use
1	506	533		533	3.00	177.7	3 - Stl Cols	3	10	17	0	21	11192	895	3986	N/A
2	858	904		904	2.00	451.9	2 - Stl Cols	2	10	17	0	21	18978	398	11735	N/A
3	726	765		765	3.00	254.9	3 - Stl Cols	3	10	17	0	21	16058	895	5870	N/A
4	0	0		0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
5	0	0		0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
6	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
7	0	0		0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
8	0	0		0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
9	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
10	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
11	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
12	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
13	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
14	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
15	0	0		0	1.00	0.0	1	0	0	17	0	12.5	0	0	0	N/A
16	0	0		0	1.00	0.0	1	0	0	17	0	14.5	0	0	0	N/A
17	0	0		0	1.00	0.0	1	0	0	17	0	10.5	0	0	0	N/A
18	0	0		0	1.00	0.0	1	0	0	17	0	10.5	0	0	0	N/A
19	0	0		0	1.00	0.0	1	0	0	17	0	10.5	0	0	0	N/A
20	0	0		0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
21	0	0		0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
A	483	509		509	3.00	169.6	3 - Stl Cols	3	10	17	0	21	10683	895	3789	N/A
B	819	863		863	2.00	431.3	2 - Stl Cols	2	10	17	0	21	18115	398	11190	N/A
C	567	597		597	3.00	199.1	3 - Stl Cols	3	10	17	0	21	12541	895	4508	N/A
D	0	0		0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
E	0	0		0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
F	0	0		0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
G	0	0		0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
H	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
I	0	0		0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
J	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
K	0	0		0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
L	0	0		0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
M	0	0		0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
N	0	0		0	1.00	0.0	1	0	0	17	0	14.5	0	0	0	N/A
O	0	0		0	1.00	0.0	1	0	0	17	0	10.5	0	0	0	N/A
P	0	0		0	1.00	0.0	1	0	0	17	0	12.5	0	0	0	N/A
Q	0	0		0	1.00	0.0	1	0	0	17	0	10.5	0	0	0	N/A
R	0	0		0	1.00	0.0	1	0	0	17	0	10.5	0	0	0	N/A
S	0	0		0	1.00	0.0	1	0	0	17	0	10.5	0	0	0	N/A
T	0	0		0	1.00	0.0	1	0	0	17	0	12	0	0	0	N/A
U	0	0		0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
V	0	0		0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A

SHEAR WALLS: **Level = RF** **Wind Check**

Wind Unit Loads: 18.00								HD segment			Add'l			0.67 Factored		
Line		Shear (lbs)	V Above (lbs)	V Total (lbs)	Length(s) (ft)	v (plf)	Use SW #	length	Wrm (plf)	Vwall (ps	point load	Wall Hgt	OTM	RM	Uplift	Use
1	92	1656	0	1656	3.00	552.0	3 - Stl Cols	3	10	17	0	21	34776	1107	13033	N/A
2	156	2808	0	2808	2.00	1404.0	2 - Stl Cols	2	10	17	0	21	58968	492	36932	N/A
3	92	1656	0	1656	3.00	552.0	3 - Stl Cols	3	10	17	0	21	34776	1107	13033	N/A
4	0	0	0	0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
5	0	0	0	0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
6	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
7	0	0	0	0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
8	0	0	0	0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
9	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
10	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
11	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
12	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
13	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
14	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
15	0	0	0	0	1.00	0.0	1	0	0	17	0	13	0	0	0	N/A
16	0	0	0	0	1.00	0.0	1	0	0	17	0	15	0	0	0	N/A
17	0	0	0	0	1.00	0.0	1	0	0	17	0	11	0	0	0	N/A
18	0	0	0	0	1.00	0.0	1	0	0	17	0	11	0	0	0	N/A
19	0	0	0	0	1.00	0.0	1	0	0	17	0	11	0	0	0	N/A
20	0	0	0	0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
21	0	0	0	0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
A	92	1656	0	1656	3.00	552.0	3 - Stl Cols	3	10	17	0	21	34776	1107	13033	N/A
B	156	2808	0	2808	2.00	1404.0	2 - Stl Cols	2	10	17	0	21	58968	492	36932	N/A
C	108	1944	0	1944	3.00	648.0	3 - Stl Cols	3	10	17	0	21	40824	1107	15375	N/A
D	0	0	0	0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
E	0	0	0	0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
F	0	0	0	0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
G	0	0	0	0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
H	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
I	0	0	0	0	1.00	0.0	1	0	0	17	0	8	0	0	0	N/A
J	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
K	0	0	0	0	1.00	0.0	1	0	0	17	0	10	0	0	0	N/A
L	0	0	0	0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
M	0	0	0	0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
N	0	0	0	0	1.00	0.0	1	0	0	17	0	15	0	0	0	N/A
O	0	0	0	0	1.00	0.0	1	0	0	17	0	11	0	0	0	N/A
P	0	0	0	0	1.00	0.0	1	0	0	17	0	13	0	0	0	N/A
Q	0	0	0	0	1.00	0.0	1	0	0	17	0	11	0	0	0	N/A
R	0	0	0	0	1.00	0.0	1	0	0	17	0	11	0	0	0	N/A
S	0	0	0	0	1.00	0.0	1	0	0	17	0	11	0	0	0	N/A
T	0	0	0	0	1.00	0.0	1	0	0	17	0	12	0	0	0	N/A
U	0	0	0	0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A
V	0	0	0	0	1.00	0.0	1	0	0	17	0	9	0	0	0	N/A

LATERAL - Typical Columns - High Roof

INPUT:

Vertical Load (F_v) =	13357.00	lbs
Column Height (H) =	21.00	ft
# of Columns =	2	
Seismic Load =	904.00	lbs
Wind Load =	2808.00	lbs
Actual Column Defection =	1.53	in

FORMULA:

$F_{Seismic}$ = (1.4)(Seismic Load)(1/# of Columns) = 0.63 kips

F_{Wind} = (Wind Load)(1/# of Columns) = 1.40 kips

Governing Load = 1.40 kips

M_O = (Governing Load)(H) = 29.48 kips-ft

USE: HSS 10x10x1/2

OMEGA:

F_{Omega} = (Governing Load)(1.25) = 1.76 kips

$M_{O,Omega}$ = (F_{Omega})(H) = 36.86 kips-ft

Δ_O = (Actual Column Deflection)(2.5) = 3.82 in

$\Delta_{Allowable}$ = (0.025)(H)(12) = 6.30 in

$\Delta = \Delta_O < \Delta_{Allowable}$ OK

B.G. Structural Engineering, Inc.
75-175 Merle Drive
Palm Desert, CA. 92211
Phone: 1-760-568-3553
Fax: 1-760-568-5681

Project Title: Genesis Solar Heavy Equipment Covered Parking
Engineer: BG
Project Descr:
Project ID: 800.0617

Printed: 6 MAR 2017, 10:17AM

Steel Column

File = s:\E0AEZR~G\86YX6A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. #: KW-06003989 Licensee: BG STRUCTURAL ENGINEERING

Description : Lateral - Typical Column - High Roof

Code References

Calculations per AISC 360-10, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

Steel Section Name :	HSS10x10x1/2
Analysis Method :	Allowable Strength
Steel Stress Grade	
Fy : Steel Yield	46.0 ksi
E : Elastic Bending Modulus	19,000.0 ksi

Overall Column Height 21.0 ft
Top & Bottom Fixity Top Free, Bottom Fixed
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for X-X Axis buckling = 21 ft, K = 2.1
Y-Y (depth) axis :
Unbraced Length for Y-Y Axis buckling = 21 ft, K = 2.1

Applied Loads

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

Column self weight included : 1,311.66 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 21.0 ft, D = 4.094, LR = 9.263 k
BENDING LOADS . . .
Lat. Point Load at 21.0 ft creating Mx-x, W = 1.40 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = 0.1635 :1
Load Combination +D+0.750Lr+0.750L+0.450W+H
Location of max.above base 0.0 ft
At maximum location values are . . .
Pa : Axial 12.353 k
Pn / Omega : Allowable 90.116 k
Ma-x : Applied -13.230 k-ft
Mn-x / Omega : Allowable 139.331 k-ft
Ma-y : Applied 0.0 k-ft
Mn-y / Omega : Allowable 139.331 k-ft

PASS Maximum Shear Stress Ratio = 0.006351 :1
Load Combination +D+0.60W+H
Location of max.above base 0.0 ft
At maximum location values are . . .
Va : Applied 0.840 k
Vn / Omega : Allowable 132.259 k

Maximum SERVICE Load Reactions . .

Top along X-X	0.0 k
Bottom along X-X	0.0 k
Top along Y-Y	0.0 k
Bottom along Y-Y	1.40 k

Maximum SERVICE Load Deflections . . .

Along Y-Y 1.528 in at 21.0 ft above base
for load combination : W Only

Along X-X 0.0 in at 0.0 ft above base
for load combination :

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
	Stress Ratio	Status	Location	Stress Ratio	Status	Location
+D+H	0.060	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+L+H	0.060	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+Lr+H	0.163	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+S+H	0.060	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750Lr+0.750L+H	0.137	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750L+0.750S+H	0.060	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.60W+H	0.157	PASS	0.00 ft	0.006	PASS	0.00 ft
+D+0.70E+H	0.060	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750Lr+0.750L+0.450W+H	0.163	PASS	0.00 ft	0.005	PASS	0.00 ft
+D+0.750L+0.750S+0.450W+H	0.125	PASS	0.00 ft	0.005	PASS	0.00 ft
+D+0.750L+0.750S+0.5250E+H	0.060	PASS	0.00 ft	0.000	PASS	0.00 ft
+0.60D+0.60W+0.60H	0.145	PASS	0.00 ft	0.006	PASS	0.00 ft
+0.60D+0.70E+0.60H	0.036	PASS	0.00 ft	0.000	PASS	0.00 ft

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Engineer: BG
Project Descr:
Project ID: 800.0617

Printed: 6 MAR 2017, 10:17AM

Steel Column

File = s:\E0AEZR~G\86YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28

Lic. # : KW-06003989 Licensee : BG STRUCTURAL ENGINEERING

Description : Lateral - Typical Column - High Roof

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base
+D+H		k		k	5.406 k
+D+L+H		k		k	5.406 k
+D+Lr+H		k		k	14.669 k
+D+S+H		k		k	5.406 k
+D+0.750Lr+0.750L+H		k		k	12.353 k
+D+0.750L+0.750S+H		k		k	5.406 k
+D+0.60W+H		k	0.840	k	5.406 k
+D+0.70E+H		k		k	5.406 k
+D+0.750Lr+0.750L+0.450W+H		k	0.630	k	12.353 k
+D+0.750L+0.750S+0.450W+H		k	0.630	k	5.406 k
+D+0.750L+0.750S+0.5250E+H		k		k	5.406 k
+0.60D+0.60W+0.60H		k	0.840	k	3.243 k
+0.60D+0.70E+0.60H		k		k	3.243 k
D Only		k		k	5.406 k
Lr Only		k		k	9.263 k
L Only		k		k	k
S Only		k		k	k
W Only		k	1.400	k	k
E Only		k		k	k
H Only		k		k	k

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
+D+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.60W+H	0.0000	in	0.000	ft	0.917	in	21.000	ft
+D+0.70E+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L+0.450W+H	0.0000	in	0.000	ft	0.687	in	21.000	ft
+D+0.750L+0.750S+0.450W+H	0.0000	in	0.000	ft	0.687	in	21.000	ft
+D+0.750L+0.750S+0.5250E+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D+0.60W+0.60H	0.0000	in	0.000	ft	0.917	in	21.000	ft
+0.60D+0.70E+0.60H	0.0000	in	0.000	ft	0.000	in	0.000	ft
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
W Only	0.0000	in	0.000	ft	1.528	in	21.000	ft
E Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
H Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

Steel Section Properties : HSS10x10x1/2

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Project ID: 800.0617
Project Descr:

Printed: 6 MAR 2017, 10:17AM

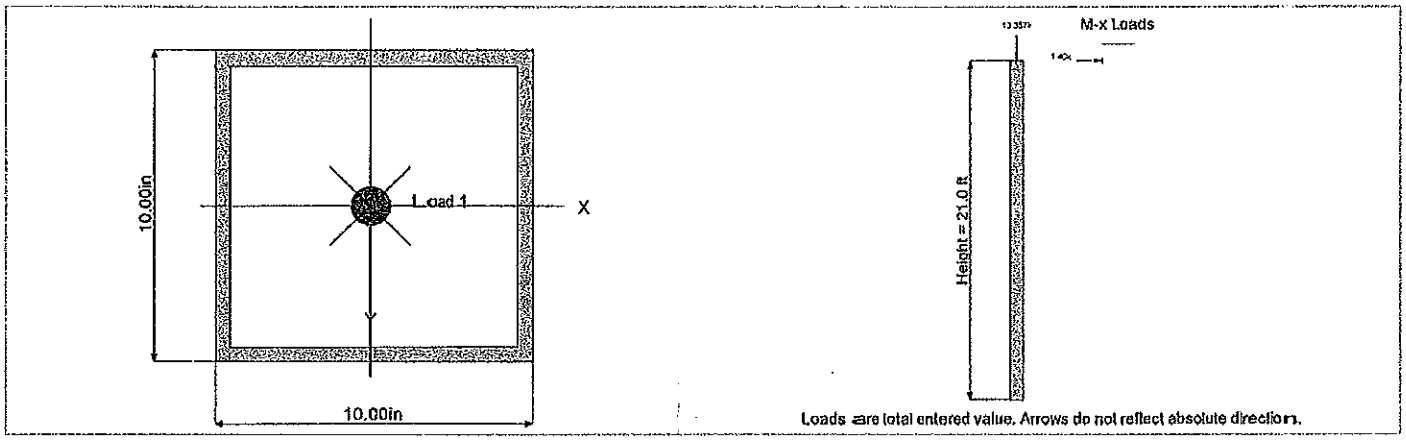
Steel Column

File = s:\E0AEZR~G\66YX5A~F.EC6
ENERCALC, INC. 1983-2017, Build:6.17.2.28, Ver:6.17.2.28
Lic. #: KW-060039B9 Licensee: BG STRUCTURAL ENGINEERING

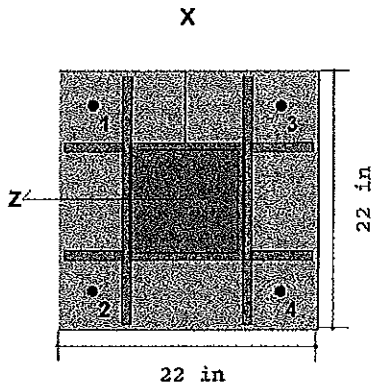
Description : Lateral - Typical Column - High Roof

Steel Section Properties : HSS 10x10x1/2

Depth	=	10.000 in	I xx	=	256.00 in^4	J	=	412.000 in^4
Design Thick	=	0.465 in	S xx	=	51.20 in^3			
Width	=	10.000 in	R xx	=	3.860 in			
Wall Thick	=	0.500 in	Z x	=	60.700 in^3			
Area	=	17.200 in^2	I yy	=	256.000 in^4	C	=	84.200 in^3
Weight	=	62.460 plf	S yy	=	51.200 in^3			
			R yy	=	3.860 in			
Ycg	=	0.000 in						



Company : **BG Structural Engineering** March 15, 2017
Designer : **BG**
Job Number : **800.0617** **Genesis Solar Heavy - BP2** Checked By:_____



Bolt	X (in)	Z (in)
1	8.	8.
2	-8.	8.
3	8.	-8.
4	-8.	-8.

Geometry and Materials

Length	**22. in**	Column Shape	**HSS10x10x8**	Anchor Bolt Diameter	**1. in**
Width	**22. in**	Column eX	**0. in**	Anchor Bolt Material	**A307**
Thickness	**1. in**	Column eZ	**0. in**	Anchor Bolt Fu	**60. ksi**
Base Plate Fy	**36. ksi**	Column to Edge Min (X)	**1. in**	Anchor Bolt Fy	**36. ksi**
Base Plate E	**29000. ksi**	Column to Edge Min (Z)	**1. in**	Anchor Bolt E	**29000. ksi**
Bearing Fp	**2.712 ksi**	**HSS Tube X-sides welded**		AB Stretch Length	**6. in**
Bearing Fc'	**3. ksi**	**HSS Tube Z-sides welded**		AB to AB Min Spacing	**6 in**
Pedestal Length	**36 in**	**Stiffened Base Plate Connection**		AB to Stiffner Min Spacing	**1.5 in**
Pedestal Width	**36 in**	**Vx Shear Lug NOT present**		AB to Column Min Spacing	**2 in**
Pedestal Height	**36 in**	**Vz Shear Lug NOT present**		AB to Edge Min Spacing	**3 in**
Analyze Base Plate as Rigid				AB Row Min Spacing	**3 in**
Pp Based on AISC J8 Criteria				**Priority is AB to Edge Spacing**	
Steel Code:	**AISC 14th:LRFD**			**Include Threads for AB Design**	
Concrete Code:	**ACI 318-11 (With IBC 2012 Amendments)**			**AB Fv, Ft based on AISC Criteria**	
AB Head:	**Heavy Hex**	**NW Concrete**		Total AB Length:	**24. in**
Seismic Reduction %:	**25.**	**Concrete Cracked**		**Supp. Reinforcement Present**	
Square Base Plate Required		**ABs NOT Welded to Base Plate**		**Anchor Reinforcement Present**	
				Tension Anchor Reinf Bar Fy:	**60. ksi**
				Shear Anchor Reinf Bar Fy:	**60. ksi**

Loads

	P (k)	Vx (k)	Vz (k)	Mx (k-ft)	Mz (k-ft)
DL	**4.094**				
LL	**9.263**				
WL			**1.01**	**21.21**	
EL			**2.24**	**47.04**	

Base Plate Stress and Bearing Result

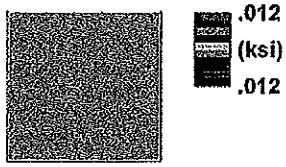
		Base Plate Stress (ksi)			Bearing Pressure (ksi)		
Combination	Load Sets	Allowable	ASIF	U.C.	Allowable	ABIF	U.C.
ASCE Strength 1 (1)	1.4DL	48.6	1.	.007	2.712	1.	.004
ASCE Strength 2 (a) (2)	1.2DL+1.6LL	48.6	1.	.025	2.712	1.	.015
ASCE Strength 3 (b) (3)	1.2DL+.5WL	48.6	1.	.094	2.712	1.	.107
ASCE Strength 3 (b) (4)	1.2DL-.5WL	48.6	1.	.094	2.712	1.	.107
ASCE Strength 4 (a) (5)	1.2DL+.5LL+1WL	48.6	1.	.186	2.712	1.	.213
ASCE Strength 4 (a) (6)	1.2DL+.5LL-1WL	48.6	1.	.186	2.712	1.	.213
ASCE Strength 5 (7)	1.2DL+.5LL+1EL	48.6	1.	.382	2.712	1.	.492
ASCE Strength 5 (8)	1.2DL+.5LL-1EL	48.6	1.	.382	2.712	1.	.492
ASCE Strength 6 (9)	.9DL+1WL	48.6	1.	.17	2.712	1.	.223
ASCE Strength 6 (10)	.9DL-1WL	48.6	1.	.17	2.712	1.	.223
ASCE Strength 7 (11)	.9DL+1EL	48.6	1.	.366	2.712	1.	.501
ASCE Strength 7 (12)	.9DL-1EL	48.6	1.	.366	2.712	1.	.501
ACI 9-1 (13)	1.4DL	48.6	1.	.007	2.712	1.	.004

Company : **BG Structural Engineering** March 15, 2017
Designer : **BG**
Job Number : **800.0617** **Genesis Solar Heavy - BP2** Checked By:_____

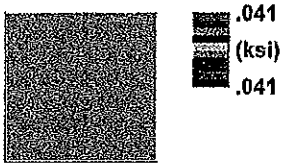
Base Plate Stress and Bearing Results (continued

Combination	Load Sets	Base Plate Stress (ksi) Allowable	ASIF	U.C.	Bearing Pressure (ksi) Allowable	ABIF	U.C.
ACI 9-2(a) (14)	1.2DL+1.6LL	48.6	1.	.025	2.712	1.	.015
ACI 9-3(a) (15)	1.2DL+1LL	48.6	1.	.018	2.712	1.	.011
ACI 9-3(d) (16)	1.2DL+.8WL	48.6	1.	.142	2.712	1.	.175
ACI 9-3(d) (17)	1.2DL-.8WL	48.6	1.	.142	2.712	1.	.175
ACI 9-4 (18)	1.2DL+1LL+1.6WL	48.6	1.	.295	2.712	1.	.343
ACI 9-4 (19)	1.2DL+1LL-1.6WL	48.6	1.	.295	2.712	1.	.343
ACI 9-5 (20)	1.2DL+1LL+1EL	48.6	1.	.394	2.712	1.	.485
ACI 9-5 (21)	1.2DL+1LL-1EL	48.6	1.	.394	2.712	1.	.485
ACI 9-6 (22)	.9DL+1.6WL	48.6	1.	.267	2.712	1.	.36
ACI 9-6 (23)	.9DL-1.6WL	48.6	1.	.267	2.712	1.	.36
ACI 9-7 (24)	.9DL+1EL	48.6	1.	.366	2.712	1.	.501
ACI 9-7 (25)	.9DL-1EL	48.6	1.	.366	2.712	1.	.501

Bearing Contours



1.4DL
Allowable : 2.712 ksi
U.C. : .004



1.2DL+1.6LL
Allowable : 2.712 ksi
U.C. : .015

1.2DL+.5WL
Allowable : 2.712 ksi
U.C. : .107

1.2DL-.5WL
Allowable : 2.712 ksi
U.C. : .107

1.2DL+.5LL+1WL
Allowable : 2.712 ksi
U.C. : .213

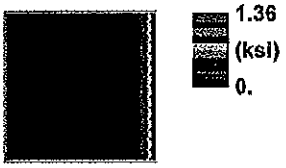
1.2DL+.5LL-1WL
Allowable : 2.712 ksi
U.C. : .213

1.2DL+.5LL+1EL
Allowable : 2.712 ksi
U.C. : .492

1.2DL+.5LL-1EL
Allowable : 2.712 ksi
U.C. : .492

.9DL+1WL
Allowable : 2.712 ksi
U.C. : .223

.9DL-1WL
Allowable : 2.712 ksi
U.C. : .223



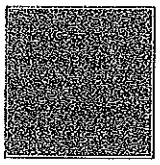
.9DL+1EL
Allowable : 2.712 ksi
U.C. : .501

.9DL-1EL
Allowable : 2.712 ksi
U.C. : .501

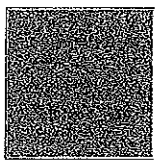
Company : BG Structural Engineering
Designer : BG
Job Number : 800.0617

March 15, 2017
Genesis Solar Heavy - BP2
Checked By:_____

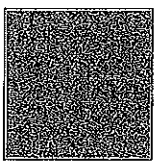
Bearing Contours (continued)



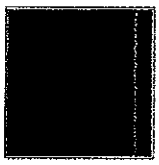
1.4DL
Allowable : 2.712 ksi
U.C. : .004



1.2DL+1.6LL
Allowable : 2.712 ksi
U.C. : .015



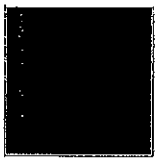
1.2DL+1LL
Allowable : 2.712 ksi
U.C. : .011



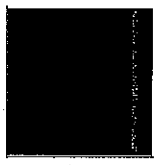
1.2DL+.8WL
Allowable : 2.712 ksi
U.C. : .175

1.2DL-.8WL
Allowable : 2.712 ksi
U.C. : .175

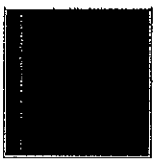
1.2DL+1LL+1.6WL
Allowable : 2.712 ksi
U.C. : .343



1.2DL+1LL-1.6WL
Allowable : 2.712 ksi
U.C. : .343



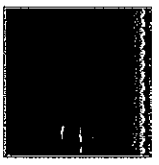
1.2DL+1LL+1EL
Allowable : 2.712 ksi
U.C. : .485



1.2DL+1LL-1EL
Allowable : 2.712 ksi
U.C. : .485

.9DL+1.6WL
Allowable : 2.712 ksi
U.C. : .36

.9DL-1.6WL
Allowable : 2.712 ksi
U.C. : .36



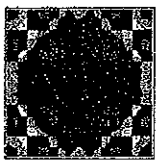
.9DL+1EL
Allowable : 2.712 ksi
U.C. : .501

.9DL-1EL
Allowable : 2.712 ksi
U.C. : .501

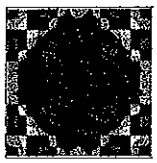
Company : BG Structural Engineering
Designer : BG
Job Number : 800.0617

March 15, 2017
Genesis Solar Heavy - BP2
Checked By:____

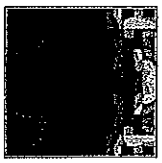
Base Plate Stress Contour



1.4DL
Allowable : 48.6 ksi
U.C. : .007



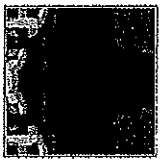
1.2DL+1.6LL
Allowable : 48.6 ksi
U.C. : .025



1.2DL+.5WL
Allowable : 48.6 ksi
U.C. : .094

1.2DL-.5WL
Allowable : 48.6 ksi
U.C. : .094

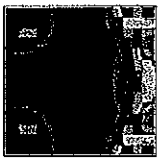
1.2DL+.5LL+1WL
Allowable : 48.6 ksi
U.C. : .186



1.2DL+.5LL-1WL
Allowable : 48.6 ksi
U.C. : .186

1.2DL+.5LL+1EL
Allowable : 48.6 ksi
U.C. : .382

1.2DL+.5LL-1EL
Allowable : 48.6 ksi
U.C. : .382

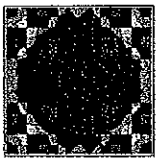


.9DL+1WL
Allowable : 48.6 ksi
U.C. : .17

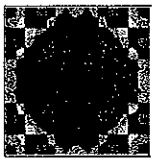
.9DL-1WL
Allowable : 48.6 ksi
U.C. : .17

.9DL+1EL
Allowable : 48.6 ksi
U.C. : .366

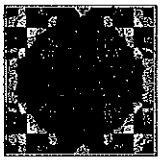
.9DL-1EL
Allowable : 48.6 ksi
U.C. : .366



1.4DL
Allowable : 48.6 ksi
U.C. : .007



1.2DL+1.6LL
Allowable : 48.6 ksi
U.C. : .025



1.2DL+1LL
Allowable : 48.6 ksi
U.C. : .018

Company : BG Structural Engineering
Designer : BG
Job Number : 800.0617

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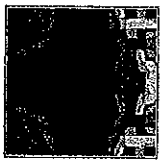
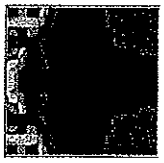
Genesis Solar Heavy - BP2

Checked By:_____

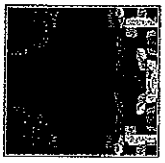
Base Plate Stress Contours (continued)



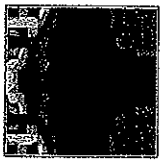
1.2DL+.8WL
Allowable : 48.6 ksi
U.C. : .142



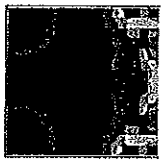
1.2DL-.8WL
Allowable : 48.6 ksi
U.C. : .142



1.2DL+1LL+1.6WL
Allowable : 48.6 ksi
U.C. : .295



1.2DL+1LL-1.6WL
Allowable : 48.6 ksi
U.C. : .295

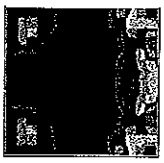


1.2DL+1LL+1EL
Allowable : 48.6 ksi
U.C. : .394

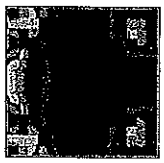
1.2DL+1LL-1EL
Allowable : 48.6 ksi
U.C. : .394

.9DL+1.6WL
Allowable : 48.6 ksi
U.C. : .267

.9DL-1.6WL
Allowable : 48.6 ksi
U.C. : .267



.9DL+1EL
Allowable : 48.6 ksi
U.C. : .366



.9DL-1EL
Allowable : 48.6 ksi
U.C. : .366

Company : **BG Structural Engineering** March 15, 2017
Designer : **BG**
Job Number : **800.0617** **Genesis Solar Heavy - BP2** Checked By:_____

Anchor Bolt Results

Note: Fnt and Fnv shown below include phi factors.

Combination	Load Sets	Bolt	Tens.(k)	Vx (k)	Vz (k)	Fnt (ksi)	ft (ksi)	Fnv (ksi)	fv (ksi)	Unity
ASCE Strength 1 (1)	1.4DL	1	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		2	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		3	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		4	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
ASCE Strength 2 (a) (2)	1.2DL+1.6LL	1	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		2	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		3	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		4	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
ASCE Strength 3 (b) (3)	1.2DL+.5WL	1	2.094	0.	-.126	45.	2.667	27.	.161	.079 (T)
		2	2.094	0.	-.126	45.	2.667	27.	.161	.079 (T)
		3	.035	0.	-.126	45.	.045	27.	.161	.008 (S)
		4	.035	0.	-.126	45.	.045	27.	.161	.008 (S)
ASCE Strength 3 (b) (4)	1.2DL-.5WL	1	.035	0.	.126	45.	.045	27.	.161	.008 (S)
		2	.035	0.	.126	45.	.045	27.	.161	.008 (S)
		3	2.094	0.	.126	45.	2.667	27.	.161	.079 (T)
		4	2.094	0.	.126	45.	2.667	27.	.161	.079 (T)
ASCE Strength 4 (a) (5)	1.2DL+.5LL+1WL	1	4.263	0.	-.252	45.	5.428	27.	.321	.161 (T)
		2	4.263	0.	-.252	45.	5.428	27.	.321	.161 (T)
		3	.08	0.	-.252	45.	.102	27.	.321	.016 (S)
		4	.08	0.	-.252	45.	.102	27.	.321	.016 (S)
ASCE Strength 4 (a) (6)	1.2DL+.5LL-1WL	1	.08	0.	.252	45.	.102	27.	.321	.016 (S)
		2	.08	0.	.252	45.	.102	27.	.321	.016 (S)
		3	4.263	0.	.252	45.	5.428	27.	.321	.161 (T)
		4	4.263	0.	.252	45.	5.428	27.	.321	.161 (T)
ASCE Strength 5 (7)	1.2DL+.5LL+1EL	1	12.527	0.	-.56	45.	15.949	27.	.713	.473 (T)
		2	12.527	0.	-.56	45.	15.949	27.	.713	.473 (T)
		3	.612	0.	-.56	45.	.779	27.	.713	.035 (S)
		4	.612	0.	-.56	45.	.779	27.	.713	.035 (S)
ASCE Strength 5 (8)	1.2DL+.5LL-1EL	1	.612	0.	.56	45.	.779	27.	.713	.035 (S)
		2	.612	0.	.56	45.	.779	27.	.713	.035 (S)
		3	12.527	0.	.56	45.	15.949	27.	.713	.473 (T)
		4	12.527	0.	.56	45.	15.949	27.	.713	.473 (T)
ASCE Strength 6 (9)	.9DL+1WL	1	5.812	0.	-.252	45.	7.4	27.	.321	.219 (T)
		2	5.812	0.	-.252	45.	7.4	27.	.321	.219 (T)
		3	.299	0.	-.252	45.	.381	27.	.321	.016 (S)
		4	.299	0.	-.252	45.	.381	27.	.321	.016 (S)
ASCE Strength 6 (10)	.9DL-1WL	1	.299	0.	.252	45.	.381	27.	.321	.016 (S)
		2	.299	0.	.252	45.	.381	27.	.321	.016 (S)
		3	5.812	0.	.252	45.	7.4	27.	.321	.219 (T)
		4	5.812	0.	.252	45.	7.4	27.	.321	.219 (T)
ASCE Strength 7 (11)	.9DL+1EL	1	14.075	0.	-.56	45.	17.921	27.	.713	.531 (T)
		2	14.075	0.	-.56	45.	17.921	27.	.713	.531 (T)
		3	.83	0.	-.56	45.	1.057	27.	.713	.035 (S)
		4	.83	0.	-.56	45.	1.057	27.	.713	.035 (S)
ASCE Strength 7 (12)	.9DL-1EL	1	.83	0.	.56	45.	1.057	27.	.713	.035 (S)
		2	.83	0.	.56	45.	1.057	27.	.713	.035 (S)
		3	14.075	0.	.56	45.	17.921	27.	.713	.531 (T)
		4	14.075	0.	.56	45.	17.921	27.	.713	.531 (T)
ACI 9-1 (13)	1.4DL	1	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		2	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		3	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		4	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
ACI 9-2(a) (14)	1.2DL+1.6LL	1	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		2	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		3	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		4	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)

Company : BG Structural Engineering
Designer : BG
Job Number : 800.0617

Genesis Solar Heavy - BP2

March 15, 2017
Checked By:_____

Anchor Bolt Results (continued)

Combination	Load Sets	Bolt	Tens.(k)	Vx (k)	Vz (k)	Fnt (ksi)	ft (ksi)	Fnv (ksi)	fv (ksi)	Unity
ACI 9-3(a) (15)	1.2DL+1LL	1	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		2	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		3	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
		4	0.	0.	0.	33.8	0.	18.	N.A.	0. (T)
ACI 9-3(d) (16)	1.2DL+.8WL	1	4.13	0.	-.202	45.	5.259	27.	.257	.156 (T)
		2	4.13	0.	-.202	45.	5.259	27.	.257	.156 (T)
		3	.166	0.	-.202	45.	.211	27.	.257	.013 (S)
		4	.166	0.	-.202	45.	.211	27.	.257	.013 (S)
ACI 9-3(d) (17)	1.2DL-.8WL	1	.166	0.	.202	45.	.211	27.	.257	.013 (S)
		2	.166	0.	.202	45.	.211	27.	.257	.013 (S)
		3	4.13	0.	.202	45.	5.259	27.	.257	.156 (T)
		4	4.13	0.	.202	45.	5.259	27.	.257	.156 (T)
ACI 9-4 (18)	1.2DL+1LL+1.6WL	1	7.111	0.	-.404	45.	9.053	27.	.514	.268 (T)
		2	7.111	0.	-.404	45.	9.053	27.	.514	.268 (T)
		3	.17	0.	-.404	45.	.216	27.	.514	.025 (S)
		4	.17	0.	-.404	45.	.216	27.	.514	.025 (S)
ACI 9-4 (19)	1.2DL+1LL-1.6WL	1	.17	0.	.404	45.	.216	27.	.514	.025 (S)
		2	.17	0.	.404	45.	.216	27.	.514	.025 (S)
		3	7.111	0.	.404	45.	9.053	27.	.514	.268 (T)
		4	7.111	0.	.404	45.	9.053	27.	.514	.268 (T)
ACI 9-5 (20)	1.2DL+1LL+1EL	1	11.303	0.	-.56	45.	14.391	27.	.713	.426 (T)
		2	11.303	0.	-.56	45.	14.391	27.	.713	.426 (T)
		3	.439	0.	-.56	45.	.559	27.	.713	.035 (S)
		4	.439	0.	-.56	45.	.559	27.	.713	.035 (S)
ACI 9-5 (21)	1.2DL+1LL-1EL	1	.439	0.	.56	45.	.559	27.	.713	.035 (S)
		2	.439	0.	.56	45.	.559	27.	.713	.035 (S)
		3	11.303	0.	.56	45.	14.391	27.	.713	.426 (T)
		4	11.303	0.	.56	45.	14.391	27.	.713	.426 (T)
ACI 9-6 (22)	.9DL+1.6WL	1	9.883	0.	-.404	45.	12.583	27.	.514	.373 (T)
		2	9.883	0.	-.404	45.	12.583	27.	.514	.373 (T)
		3	.561	0.	-.404	45.	.714	27.	.514	.025 (S)
		4	.561	0.	-.404	45.	.714	27.	.514	.025 (S)
ACI 9-6 (23)	.9DL-1.6WL	1	.561	0.	.404	45.	.714	27.	.514	.025 (S)
		2	.561	0.	.404	45.	.714	27.	.514	.025 (S)
		3	9.883	0.	.404	45.	12.583	27.	.514	.373 (T)
		4	9.883	0.	.404	45.	12.583	27.	.514	.373 (T)
ACI 9-7 (24)	.9DL+1EL	1	14.075	0.	-.56	45.	17.921	27.	.713	.531 (T)
		2	14.075	0.	-.56	45.	17.921	27.	.713	.531 (T)
		3	.83	0.	-.56	45.	1.057	27.	.713	.035 (S)
		4	.83	0.	-.56	45.	1.057	27.	.713	.035 (S)
ACI 9-7 (25)	.9DL-1EL	1	.83	0.	.56	45.	1.057	27.	.713	.035 (S)
		2	.83	0.	.56	45.	1.057	27.	.713	.035 (S)
		3	14.075	0.	.56	45.	17.921	27.	.713	.531 (T)
		4	14.075	0.	.56	45.	17.921	27.	.713	.531 (T)

Load Combinations

LC	Combination	Load Sets
1	ASCE Strength 1	1.4DL
2	ASCE Strength 2 (a)	1.2DL+1.6LL
3	ASCE Strength 3 (b)	1.2DL+.5WL
4	ASCE Strength 3 (b)	1.2DL-.5WL
5	ASCE Strength 4 (a)	1.2DL+.5LL+1WL
6	ASCE Strength 4 (a)	1.2DL+.5LL-1WL
7	ASCE Strength 5	1.2DL+.5LL+1EL
8	ASCE Strength 5	1.2DL+.5LL-1EL
9	ASCE Strength 6	.9DL+1WL
10	ASCE Strength 6	.9DL-1WL

Company : BG Structural Engineering
Designer : BG
Job Number : 800.0617

Genesis Solar Heavy - BP2

March 15, 2017
Checked By:_____

Load Combinations (continued)

LC	Combination	Load Sets
11	ASCE Strength 7	.9DL+1EL
12	ASCE Strength 7	.9DL-1EL
13	ACI 9-1	1.4DL
14	ACI 9-2(a)	1.2DL+1.6LL
15	ACI 9-3(a)	1.2DL+1LL
16	ACI 9-3(d)	1.2DL+.8WL
17	ACI 9-3(d)	1.2DL-.8WL
18	ACI 9-4	1.2DL+1LL+1.6WL
19	ACI 9-4	1.2DL+1LL-1.6WL
20	ACI 9-5	1.2DL+1LL+1EL
21	ACI 9-5	1.2DL+1LL-1EL
22	ACI 9-6	.9DL+1.6WL
23	ACI 9-6	.9DL-1.6WL
24	ACI 9-7	.9DL+1EL
25	ACI 9-7	.9DL-1EL

Anchor Bolt Embed Capacity Results

Note: All capacities shown include phi factors.

Single Bolt: Tension Capacity

LC	Bolt	Tens.(k)	Nsa(k)	Ncb(k)	Npn(k)	Nsb(k)	Unity	Ductility	Load(k)	Steel(in2)
1	1	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	2	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	3	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	4	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
2	1	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	2	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	3	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	4	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
3	1	2.094	27.27	0.	25.2	0.	.083	N.A.	2.094	.047
	2	2.094	27.27	0.	25.2	0.	.083	N.A.	2.094	.047
	3	.035	27.27	0.	25.2	0.	.001	N.A.	.035	.00077788
	4	.035	27.27	0.	25.2	0.	.001	N.A.	.035	.000777882
4	1	.035	27.27	0.	25.2	0.	.001	N.A.	.035	.00077788
	2	.035	27.27	0.	25.2	0.	.001	N.A.	.035	.000777875
	3	2.094	27.27	0.	25.2	0.	.083	N.A.	2.094	.047
	4	2.094	27.27	0.	25.2	0.	.083	N.A.	2.094	.047
5	1	4.263	27.27	0.	25.2	0.	.169	N.A.	4.263	.095
	2	4.263	27.27	0.	25.2	0.	.169	N.A.	4.263	.095
	3	.08	27.27	0.	25.2	0.	.003	N.A.	.08	.002
	4	.08	27.27	0.	25.2	0.	.003	N.A.	.08	.002
6	1	.08	27.27	0.	25.2	0.	.003	N.A.	.08	.002
	2	.08	27.27	0.	25.2	0.	.003	N.A.	.08	.002
	3	4.263	27.27	0.	25.2	0.	.169	N.A.	4.263	.095
	4	4.263	27.27	0.	25.2	0.	.169	N.A.	4.263	.095
7	1	12.527	27.27	0.	18.9	0.	.663	N.A.	12.527	.278
	2	12.527	27.27	0.	18.9	0.	.663	N.A.	12.527	.278
	3	.612	27.27	0.	18.9	0.	.032	N.A.	.612	.014
	4	.612	27.27	0.	18.9	0.	.032	N.A.	.612	.014
8	1	.612	27.27	0.	18.9	0.	.032	N.A.	.612	.014
	2	.612	27.27	0.	18.9	0.	.032	N.A.	.612	.014
	3	12.527	27.27	0.	18.9	0.	.663	N.A.	12.527	.278
	4	12.527	27.27	0.	18.9	0.	.663	N.A.	12.527	.278

Single Bolt: Tension Capacity (continued)

LC	Bolt	Tens.(k)	Nsa(k)	Ncb(k)	Npn(k)	Nsb(k)	Unity	Ductility	Load(k)	Steel(in2)
9	1	5.812	27.27	0.	25.2	0.	.231	N.A.	5.812	.129
	2	5.812	27.27	0.	25.2	0.	.231	N.A.	5.812	.129
	3	.299	27.27	0.	25.2	0.	.012	N.A.	.299	.007
	4	.299	27.27	0.	25.2	0.	.012	N.A.	.299	.007
10	1	.299	27.27	0.	25.2	0.	.012	N.A.	.299	.007
	2	.299	27.27	0.	25.2	0.	.012	N.A.	.299	.007
	3	5.812	27.27	0.	25.2	0.	.231	N.A.	5.812	.129
	4	5.812	27.27	0.	25.2	0.	.231	N.A.	5.812	.129
11	1	14.075	27.27	0.	18.9	0.	.745	N.A.	14.075	.313
	2	14.075	27.27	0.	18.9	0.	.745	N.A.	14.075	.313
	3	.83	27.27	0.	18.9	0.	.044	N.A.	.83	.018
	4	.83	27.27	0.	18.9	0.	.044	N.A.	.83	.018
12	1	.83	27.27	0.	18.9	0.	.044	N.A.	.83	.018
	2	.83	27.27	0.	18.9	0.	.044	N.A.	.83	.018
	3	14.075	27.27	0.	18.9	0.	.745	N.A.	14.075	.313
	4	14.075	27.27	0.	18.9	0.	.745	N.A.	14.075	.313
13	1	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	2	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	3	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	4	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
14	1	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	2	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	3	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	4	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
15	1	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	2	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	3	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
	4	0.	27.27	0.	25.2	0.	0.	N.A.	0.	0.
16	1	4.13	27.27	0.	25.2	0.	.164	N.A.	4.13	.092
	2	4.13	27.27	0.	25.2	0.	.164	N.A.	4.13	.092
	3	.166	27.27	0.	25.2	0.	.007	N.A.	.166	.004
	4	.166	27.27	0.	25.2	0.	.007	N.A.	.166	.004
17	1	.166	27.27	0.	25.2	0.	.007	N.A.	.166	.004
	2	.166	27.27	0.	25.2	0.	.007	N.A.	.166	.004
	3	4.13	27.27	0.	25.2	0.	.164	N.A.	4.13	.092
	4	4.13	27.27	0.	25.2	0.	.164	N.A.	4.13	.092
18	1	7.111	27.27	0.	25.2	0.	.282	N.A.	7.111	.158
	2	7.111	27.27	0.	25.2	0.	.282	N.A.	7.111	.158
	3	.17	27.27	0.	25.2	0.	.007	N.A.	.17	.004
	4	.17	27.27	0.	25.2	0.	.007	N.A.	.17	.004
19	1	.17	27.27	0.	25.2	0.	.007	N.A.	.17	.004
	2	.17	27.27	0.	25.2	0.	.007	N.A.	.17	.004
	3	7.111	27.27	0.	25.2	0.	.282	N.A.	7.111	.158
	4	7.111	27.27	0.	25.2	0.	.282	N.A.	7.111	.158
20	1	11.303	27.27	0.	18.9	0.	.598	N.A.	11.303	.251
	2	11.303	27.27	0.	18.9	0.	.598	N.A.	11.303	.251
	3	.439	27.27	0.	18.9	0.	.023	N.A.	.439	.01
	4	.439	27.27	0.	18.9	0.	.023	N.A.	.439	.01
21	1	.439	27.27	0.	18.9	0.	.023	N.A.	.439	.01
	2	.439	27.27	0.	18.9	0.	.023	N.A.	.439	.01
	3	11.303	27.27	0.	18.9	0.	.598	N.A.	11.303	.251
	4	11.303	27.27	0.	18.9	0.	.598	N.A.	11.303	.251
22	1	9.883	27.27	0.	25.2	0.	.392	N.A.	9.883	.22
	2	9.883	27.27	0.	25.2	0.	.392	N.A.	9.883	.22
	3	.561	27.27	0.	25.2	0.	.022	N.A.	.561	.012
	4	.561	27.27	0.	25.2	0.	.022	N.A.	.561	.012

Company : **BG Structural Engineering** March 15, 2017
Designer : **BG**
Job Number : **800.0617** **Genesis Solar Heavy - BP 2** Checked By:_____

Single Bolt: Tension Capacity (continued)

LC	Bolt	Tens.(k)	Nsa(k)	Ncb(k)	Npn(k)	Nsb(k)	Unity	Ductility	Load(k)	Steel(in2)
23	1	.561	27.27	0.	25.2	0.	.022	N.A.	.561	.012
	2	.561	27.27	0.	25.2	0.	.022	N.A.	.561	.012
	3	9.883	27.27	0.	25.2	0.	.392	N.A.	9.883	.22
	4	9.883	27.27	0.	25.2	0.	.392	N.A.	9.883	.22
24	1	14.075	27.27	0.	18.9	0.	.745	N.A.	14.075	.313
	2	14.075	27.27	0.	18.9	0.	.745	N.A.	14.075	.313
	3	.83	27.27	0.	18.9	0.	.044	N.A.	.83	.018
	4	.83	27.27	0.	18.9	0.	.044	N.A.	.83	.018
25	1	.83	27.27	0.	18.9	0.	.044	N.A.	.83	.018
	2	.83	27.27	0.	18.9	0.	.044	N.A.	.83	.018
	3	14.075	27.27	0.	18.9	0.	.745	N.A.	14.075	.313
	4	14.075	27.27	0.	18.9	0.	.745	N.A.	14.075	.313

Single Bolt: Shear Capacity

LC	Bolt	Vx (k)	Vz (k)	Vsa(k)	VcbXx(k)	VcbXz(k)	VcbZz(k)	VcbZx(k)	Vcp (k)	VxUnity	VzUnity
1	1	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
2	1	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
3	1	0.	.126	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.126	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.126	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.126	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
4	1	0.	-.126	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.126	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.126	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.126	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
5	1	0.	.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
6	1	0.	-.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
7	1	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
8	1	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
9	1	0.	.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
10	1	0.	-.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.252	14.18	0.	0.	0.	0.	0.	N.A.	N.A.

Single Bolt: Shear Capacity (continued)

LC	Bolt	Vx (k)	Vz (k)	Vsa(k)	VcbXx(k)	VcbXz(k)	VcbZz(k)	VcbZx(k)	Vcp (k)	VxUnity	VzUnity
11	1	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
12	1	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
13	1	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
14	1	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
15	1	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	0.	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
16	1	0.	.202	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.202	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.202	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.202	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
17	1	0.	-.202	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.202	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.202	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.202	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
18	1	0.	.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
19	1	0.	-.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
20	1	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
21	1	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
22	1	0.	.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
23	1	0.	-.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.404	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
24	1	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.

Single Bolt: Shear Capacity (continued)

LC	Bolt	Vx (k)	Vz (k)	Vsa(k)	VcbXx(k)	VcbXz(k)	VcbZz(k)	VcbZx(k)	Vcp (k)	VxUnity	VzUnity
25	1	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	2	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	3	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.
	4	0.	-.56	14.18	0.	0.	0.	0.	0.	N.A.	N.A.

Single Bolt: Seismic Ductility & Anchor Reinforcement Results

LC	Bolt	Vx (k)	Vz (k)	VxUnity	VzUnity	Vx-Duct	Vx-L(k)	Vx-St(in2)	Vz-Duct	Vz-L(k)	Vz-St(in2)
1	1	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	2	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	3	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	4	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
2	1	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	2	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	3	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	4	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
3	1	0.	.126	N.A.	N.A.	N.A.	0.	0.	N.A.	.126	.003
	2	0.	.126	N.A.	N.A.	N.A.	0.	0.	N.A.	.126	.003
	3	0.	.126	N.A.	N.A.	N.A.	0.	0.	N.A.	.126	.003
	4	0.	.126	N.A.	N.A.	N.A.	0.	0.	N.A.	.126	.003
4	1	0.	-.126	N.A.	N.A.	N.A.	0.	0.	N.A.	.126	.003
	2	0.	-.126	N.A.	N.A.	N.A.	0.	0.	N.A.	.126	.003
	3	0.	-.126	N.A.	N.A.	N.A.	0.	0.	N.A.	.126	.003
	4	0.	-.126	N.A.	N.A.	N.A.	0.	0.	N.A.	.126	.003
5	1	0.	.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
	2	0.	.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
	3	0.	.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
	4	0.	.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
6	1	0.	-.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
	2	0.	-.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
	3	0.	-.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
	4	0.	-.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
7	1	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	2	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	3	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	4	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
8	1	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	2	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	3	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	4	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
9	1	0.	.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
	2	0.	.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
	3	0.	.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
	4	0.	.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
10	1	0.	-.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
	2	0.	-.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
	3	0.	-.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
	4	0.	-.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
11	1	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	2	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	3	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	4	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
12	1	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	2	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	3	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	4	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012

Company : BG Structural Engineering
Designer : BG
Job Number : 800.0617
March 15, 2017
Genesis Solar Heavy - BP2
Checked By:_____

Single Bolt: Seismic Ductility & Anchor Reinforcement Results (continued)

LC	Bolt	Vx (k)	Vz (k)	VxUnity	VzUnity	Vx-Duct	Vx-L(k)	Vx-St(in2)	Vz-Duct	Vz-L(k)	Vz-St(in2)
13	1	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	2	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	3	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	4	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
14	1	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	2	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	3	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	4	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
15	1	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	2	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	3	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
	4	0.	0.	N.A.	N.A.	N.A.	0.	0.	N.A.	0.	0.
16	1	0.	.202	N.A.	N.A.	N.A.	0.	0.	N.A.	.202	.004
	2	0.	.202	N.A.	N.A.	N.A.	0.	0.	N.A.	.202	.004
	3	0.	.202	N.A.	N.A.	N.A.	0.	0.	N.A.	.202	.004
	4	0.	.202	N.A.	N.A.	N.A.	0.	0.	N.A.	.202	.004
17	1	0.	-.202	N.A.	N.A.	N.A.	0.	0.	N.A.	.202	.004
	2	0.	-.202	N.A.	N.A.	N.A.	0.	0.	N.A.	.202	.004
	3	0.	-.202	N.A.	N.A.	N.A.	0.	0.	N.A.	.202	.004
	4	0.	-.202	N.A.	N.A.	N.A.	0.	0.	N.A.	.202	.004
18	1	0.	.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
	2	0.	.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
	3	0.	.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
	4	0.	.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
19	1	0.	-.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
	2	0.	-.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
	3	0.	-.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
	4	0.	-.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
20	1	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	2	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	3	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	4	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
21	1	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	2	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	3	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	4	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
22	1	0.	.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
	2	0.	.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
	3	0.	.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
	4	0.	.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
23	1	0.	-.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
	2	0.	-.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
	3	0.	-.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
	4	0.	-.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
24	1	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	2	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	3	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	4	0.	.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
25	1	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	2	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	3	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012
	4	0.	-.56	N.A.	N.A.	N.A.	0.	0.	N.A.	.56	.012

Single Bolt: Combined Tension and Shear Capacity

LC	Bolt	Nn(k)	Vnx(k)	Vnz(k)	SRSS	Interaction

Single Bolt: Combined Tension and Shear Capacity (continued)

LC	Bolt	Nn(k)	Vnx(k)	Vnz(k)	SRSS	Interaction
1	1	25.2	0.	0.	0.	N.A.
	2	25.2	0.	0.	0.	N.A.
	3	25.2	0.	0.	0.	N.A.
	4	25.2	0.	0.	0.	N.A.
2	1	25.2	0.	0.	0.	N.A.
	2	25.2	0.	0.	0.	N.A.
	3	25.2	0.	0.	0.	N.A.
	4	25.2	0.	0.	0.	N.A.
3	1	25.2	0.	0.	.083	N.A.
	2	25.2	0.	0.	.083	N.A.
	3	25.2	0.	0.	.001	N.A.
	4	25.2	0.	0.	.001	N.A.
4	1	25.2	0.	0.	.001	N.A.
	2	25.2	0.	0.	.001	N.A.
	3	25.2	0.	0.	.083	N.A.
	4	25.2	0.	0.	.083	N.A.
5	1	25.2	0.	0.	.169	N.A.
	2	25.2	0.	0.	.169	N.A.
	3	25.2	0.	0.	.003	N.A.
	4	25.2	0.	0.	.003	N.A.
6	1	25.2	0.	0.	.003	N.A.
	2	25.2	0.	0.	.003	N.A.
	3	25.2	0.	0.	.169	N.A.
	4	25.2	0.	0.	.169	N.A.
7	1	18.9	0.	0.	.663	.663
	2	18.9	0.	0.	.663	.663
	3	18.9	0.	0.	.032	N.A.
	4	18.9	0.	0.	.032	N.A.
8	1	18.9	0.	0.	.032	N.A.
	2	18.9	0.	0.	.032	N.A.
	3	18.9	0.	0.	.663	.663
	4	18.9	0.	0.	.663	.663
9	1	25.2	0.	0.	.231	.231
	2	25.2	0.	0.	.231	.231
	3	25.2	0.	0.	.012	N.A.
	4	25.2	0.	0.	.012	N.A.
10	1	25.2	0.	0.	.012	N.A.
	2	25.2	0.	0.	.012	N.A.
	3	25.2	0.	0.	.231	.231
	4	25.2	0.	0.	.231	.231
11	1	18.9	0.	0.	.745	.745
	2	18.9	0.	0.	.745	.745
	3	18.9	0.	0.	.044	N.A.
	4	18.9	0.	0.	.044	N.A.
12	1	18.9	0.	0.	.044	N.A.
	2	18.9	0.	0.	.044	N.A.
	3	18.9	0.	0.	.745	.745
	4	18.9	0.	0.	.745	.745
13	1	25.2	0.	0.	0.	N.A.
	2	25.2	0.	0.	0.	N.A.
	3	25.2	0.	0.	0.	N.A.
	4	25.2	0.	0.	0.	N.A.
14	1	25.2	0.	0.	0.	N.A.
	2	25.2	0.	0.	0.	N.A.
	3	25.2	0.	0.	0.	N.A.
	4	25.2	0.	0.	0.	N.A.

Single Bolt: Combined Tension and Shear Capacity (continued)

LC	Bolt	Nn(k)	Vnx(k)	Vnz(k)	SRSS	Interaction
15	1	25.2	0.	0.	0.	N.A.
	2	25.2	0.	0.	0.	N.A.
	3	25.2	0.	0.	0.	N.A.
	4	25.2	0.	0.	0.	N.A.
16	1	25.2	0.	0.	.164	N.A.
	2	25.2	0.	0.	.164	N.A.
	3	25.2	0.	0.	.007	N.A.
	4	25.2	0.	0.	.007	N.A.
17	1	25.2	0.	0.	.007	N.A.
	2	25.2	0.	0.	.007	N.A.
	3	25.2	0.	0.	.164	N.A.
	4	25.2	0.	0.	.164	N.A.
18	1	25.2	0.	0.	.282	.282
	2	25.2	0.	0.	.282	.282
	3	25.2	0.	0.	.007	N.A.
	4	25.2	0.	0.	.007	N.A.
19	1	25.2	0.	0.	.007	N.A.
	2	25.2	0.	0.	.007	N.A.
	3	25.2	0.	0.	.282	.282
	4	25.2	0.	0.	.282	.282
20	1	18.9	0.	0.	.598	.598
	2	18.9	0.	0.	.598	.598
	3	18.9	0.	0.	.023	N.A.
	4	18.9	0.	0.	.023	N.A.
21	1	18.9	0.	0.	.023	N.A.
	2	18.9	0.	0.	.023	N.A.
	3	18.9	0.	0.	.598	.598
	4	18.9	0.	0.	.598	.598
22	1	25.2	0.	0.	.392	.392
	2	25.2	0.	0.	.392	.392
	3	25.2	0.	0.	.022	N.A.
	4	25.2	0.	0.	.022	N.A.
23	1	25.2	0.	0.	.022	N.A.
	2	25.2	0.	0.	.022	N.A.
	3	25.2	0.	0.	.392	.392
	4	25.2	0.	0.	.392	.392
24	1	18.9	0.	0.	.745	.745
	2	18.9	0.	0.	.745	.745
	3	18.9	0.	0.	.044	N.A.
	4	18.9	0.	0.	.044	N.A.
25	1	18.9	0.	0.	.044	N.A.
	2	18.9	0.	0.	.044	N.A.
	3	18.9	0.	0.	.745	.745
	4	18.9	0.	0.	.745	.745

Tension Bolt Groups

Group	Bolt List
T-1	1, 2, 3, 4

Shear Bolt Groups

Group	Type	Failure	Bolt List
S-1	+Vz	Full	1, 2, 3, 4
		Nr Edge	1, 2
		SideFull	1, 3
		SideNr	1

Company : BG Structural Engineering
Designer : BG
Job Number : 800.0617
March 15, 2017
Genesis Solar Heavy - BP2
Checked By:_____

Shear Bolt Groups (continued)

Group	Type	Failure	Bolt List
S-2	-Vz	Full	1, 2, 3, 4
		Nr Edge	3, 4
		SideFull	1, 3
		SideNr	3
S-3	+Vx	Full	1, 2, 3, 4
		Nr Edge	1, 3
		SideFull	1, 2
		SideNr	1
S-4	-Vx	Full	1, 2, 3, 4
		Nr Edge	2, 4
		SideFull	1, 2
		SideNr	2

Anchor Bolt Group Embed Capacity Results

Note: All capacities shown include phi factors

Group Bolt: Tension Capacity

LC	Group	Tens.(k)	Nsa(k)	Ncbg(k)	Nsbg(k)	Unity	Ductility	Load(k)	Steel(in)
1	T-1	0.	0.	0.	0.	N.A.	N.A.	0.	0.
2	T-1	0.	0.	0.	0.	N.A.	N.A.	0.	0.
3	T-1	4.259	0.	0.	0.	N.A.	N.A.	4.259	.095
4	T-1	4.259	0.	0.	0.	N.A.	N.A.	4.259	.095
5	T-1	8.687	0.	0.	0.	N.A.	N.A.	8.687	.193
6	T-1	8.687	0.	0.	0.	N.A.	N.A.	8.687	.193
7	T-1	26.277	0.	0.	0.	N.A.	N.A.	26.277	.584
8	T-1	26.277	0.	0.	0.	N.A.	N.A.	26.277	.584
9	T-1	12.221	0.	0.	0.	N.A.	N.A.	12.221	.272
10	T-1	12.221	0.	0.	0.	N.A.	N.A.	12.221	.272
11	T-1	29.81	0.	0.	0.	N.A.	N.A.	29.81	.662
12	T-1	29.81	0.	0.	0.	N.A.	N.A.	29.81	.662
13	T-1	0.	0.	0.	0.	N.A.	N.A.	0.	0.
14	T-1	0.	0.	0.	0.	N.A.	N.A.	0.	0.
15	T-1	0.	0.	0.	0.	N.A.	N.A.	0.	0.
16	T-1	8.592	0.	0.	0.	N.A.	N.A.	8.592	.191
17	T-1	8.592	0.	0.	0.	N.A.	N.A.	8.592	.191
18	T-1	14.56	0.	0.	0.	N.A.	N.A.	14.56	.324
19	T-1	14.56	0.	0.	0.	N.A.	N.A.	14.56	.324
20	T-1	23.484	0.	0.	0.	N.A.	N.A.	23.484	.522
21	T-1	23.484	0.	0.	0.	N.A.	N.A.	23.484	.522
22	T-1	20.887	0.	0.	0.	N.A.	N.A.	20.887	.464
23	T-1	20.887	0.	0.	0.	N.A.	N.A.	20.887	.464
24	T-1	29.81	0.	0.	0.	N.A.	N.A.	29.81	.662
25	T-1	29.81	0.	0.	0.	N.A.	N.A.	29.81	.662

Shear Groups: Shear Capacity

LC	Gr	Type	Failure	Vx (k)	Vz (k)	Vsa(k)	VcbgXx(k)	VcbgXz(k)	VcbgZz(k)	VcbgZx(k)	Vcpg(k)	VxUnity	VzUnity
3	S-1	+Vz	Full	0.	.505	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.252	0.	0.	0.	0.	0.	0.	N.A.	N.A.

Shear Groups: Shear Capacity (continued)

LC	Gr	Type	Failure	Vx (k)	Vz (k)	Vsa(k)	VcbgXx(k)	VcbgXz(k)	VcbgZz(k)	VcbgZx(k)	Vcpg(k)	VxUnity	VzUnity
4	S-2	-Vz	Full	0.	-.505	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-.252	0.	0.	0.	0.	0.	0.	N.A.	N.A.
5	S-1	+Vz	Full	0.	1.01	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.505	0.	0.	0.	0.	0.	0.	N.A.	N.A.
6	S-2	-Vz	Full	0.	-1.01	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-.505	0.	0.	0.	0.	0.	0.	N.A.	N.A.
7	S-1	+Vz	Full	0.	2.24	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	1.12	0.	0.	0.	0.	0.	0.	N.A.	N.A.
8	S-2	-Vz	Full	0.	-2.24	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-1.12	0.	0.	0.	0.	0.	0.	N.A.	N.A.
9	S-1	+Vz	Full	0.	1.01	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.505	0.	0.	0.	0.	0.	0.	N.A.	N.A.
10	S-2	-Vz	Full	0.	-1.01	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-.505	0.	0.	0.	0.	0.	0.	N.A.	N.A.
11	S-1	+Vz	Full	0.	2.24	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	1.12	0.	0.	0.	0.	0.	0.	N.A.	N.A.
12	S-2	-Vz	Full	0.	-2.24	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-1.12	0.	0.	0.	0.	0.	0.	N.A.	N.A.
16	S-1	+Vz	Full	0.	.808	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.404	0.	0.	0.	0.	0.	0.	N.A.	N.A.
17	S-2	-Vz	Full	0.	-.808	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-.404	0.	0.	0.	0.	0.	0.	N.A.	N.A.
18	S-1	+Vz	Full	0.	1.616	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.808	0.	0.	0.	0.	0.	0.	N.A.	N.A.
19	S-2	-Vz	Full	0.	-1.616	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-.808	0.	0.	0.	0.	0.	0.	N.A.	N.A.
20	S-1	+Vz	Full	0.	2.24	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	1.12	0.	0.	0.	0.	0.	0.	N.A.	N.A.
21	S-2	-Vz	Full	0.	-2.24	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-1.12	0.	0.	0.	0.	0.	0.	N.A.	N.A.
22	S-1	+Vz	Full	0.	1.616	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	.808	0.	0.	0.	0.	0.	0.	N.A.	N.A.
23	S-2	-Vz	Full	0.	-1.616	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-.808	0.	0.	0.	0.	0.	0.	N.A.	N.A.
24	S-1	+Vz	Full	0.	2.24	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	1.12	0.	0.	0.	0.	0.	0.	N.A.	N.A.
25	S-2	-Vz	Full	0.	-2.24	0.	0.	0.	0.	0.	0.	N.A.	N.A.
			Nr Edge	0.	-1.12	0.	0.	0.	0.	0.	0.	N.A.	N.A.

Shear Groups: Seismic Ductility & Anchor Reinforcement Results

LC	Gr	Type	Failure	Vx (k)	Vz (k)	VxUnity	VzUnity	Vx-Duct	Vx-L(k)	Vx-St(in2)	Vz-Duct	Vz-L(k)	Vz-St(in2)
3	S-1	+Vz	Full	0.	.505	N.A.	N.A.	N.A.	0.	0.	N.A.	.505	.011
			Nr Edge	0.	.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
4	S-2	-Vz	Full	0.	-.505	N.A.	N.A.	N.A.	0.	0.	N.A.	.505	.011
			Nr Edge	0.	-.252	N.A.	N.A.	N.A.	0.	0.	N.A.	.252	.006
5	S-1	+Vz	Full	0.	1.01	N.A.	N.A.	N.A.	0.	0.	N.A.	1.01	.022
			Nr Edge	0.	.505	N.A.	N.A.	N.A.	0.	0.	N.A.	.505	.011
6	S-2	-Vz	Full	0.	-1.01	N.A.	N.A.	N.A.	0.	0.	N.A.	1.01	.022
			Nr Edge	0.	-.505	N.A.	N.A.	N.A.	0.	0.	N.A.	.505	.011
7	S-1	+Vz	Full	0.	2.24	N.A.	N.A.	N.A.	0.	0.	N.A.	2.24	.05
			Nr Edge	0.	1.12	N.A.	N.A.	N.A.	0.	0.	N.A.	1.12	.025
8	S-2	-Vz	Full	0.	-2.24	N.A.	N.A.	N.A.	0.	0.	N.A.	2.24	.05
			Nr Edge	0.	-1.12	N.A.	N.A.	N.A.	0.	0.	N.A.	1.12	.025
9	S-1	+Vz	Full	0.	1.01	N.A.	N.A.	N.A.	0.	0.	N.A.	1.01	.022
			Nr Edge	0.	.505	N.A.	N.A.	N.A.	0.	0.	N.A.	.505	.011
10	S-2	-Vz	Full	0.	-1.01	N.A.	N.A.	N.A.	0.	0.	N.A.	1.01	.022
			Nr Edge	0.	-.505	N.A.	N.A.	N.A.	0.	0.	N.A.	.505	.011
11	S-1	+Vz	Full	0.	2.24	N.A.	N.A.	N.A.	0.	0.	N.A.	2.24	.05
			Nr Edge	0.	1.12	N.A.	N.A.	N.A.	0.	0.	N.A.	1.12	.025
12	S-2	-Vz	Full	0.	-2.24	N.A.	N.A.	N.A.	0.	0.	N.A.	2.24	.05
			Nr Edge	0.	-1.12	N.A.	N.A.	N.A.	0.	0.	N.A.	1.12	.025
16	S-1	+Vz	Full	0.	.808	N.A.	N.A.	N.A.	0.	0.	N.A.	.808	.018
			Nr Edge	0.	.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
17	S-2	-Vz	Full	0.	-.808	N.A.	N.A.	N.A.	0.	0.	N.A.	.808	.018
			Nr Edge	0.	-.404	N.A.	N.A.	N.A.	0.	0.	N.A.	.404	.009
18	S-1	+Vz	Full	0.	1.616	N.A.	N.A.	N.A.	0.	0.	N.A.	1.616	.036
			Nr Edge	0.	.808	N.A.	N.A.	N.A.	0.	0.	N.A.	.808	.018
19	S-2	-Vz	Full	0.	-1.616	N.A.	N.A.	N.A.	0.	0.	N.A.	1.616	.036
			Nr Edge	0.	-.808	N.A.	N.A.	N.A.	0.	0.	N.A.	.808	.018
20	S-1	+Vz	Full	0.	2.24	N.A.	N.A.	N.A.	0.	0.	N.A.	2.24	.05
			Nr Edge	0.	1.12	N.A.	N.A.	N.A.	0.	0.	N.A.	1.12	.025
21	S-2	-Vz	Full	0.	-2.24	N.A.	N.A.	N.A.	0.	0.	N.A.	2.24	.05
			Nr Edge	0.	-1.12	N.A.	N.A.	N.A.	0.	0.	N.A.	1.12	.025
22	S-1	+Vz	Full	0.	1.616	N.A.	N.A.	N.A.	0.	0.	N.A.	1.616	.036
			Nr Edge	0.	.808	N.A.	N.A.	N.A.	0.	0.	N.A.	.808	.018
23	S-2	-Vz	Full	0.	-1.616	N.A.	N.A.	N.A.	0.	0.	N.A.	1.616	.036
			Nr Edge	0.	-.808	N.A.	N.A.	N.A.	0.	0.	N.A.	.808	.018
24	S-1	+Vz	Full	0.	2.24	N.A.	N.A.	N.A.	0.	0.	N.A.	2.24	.05
			Nr Edge	0.	1.12	N.A.	N.A.	N.A.	0.	0.	N.A.	1.12	.025
25	S-2	-Vz	Full	0.	-2.24	N.A.	N.A.	N.A.	0.	0.	N.A.	2.24	.05
			Nr Edge	0.	-1.12	N.A.	N.A.	N.A.	0.	0.	N.A.	1.12	.025

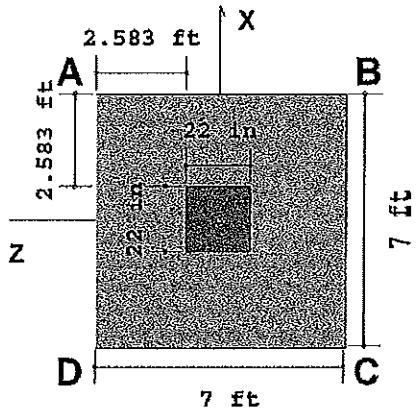
Company : BG Structural Engineering
Designer : KDC
Job Number : 800.0617

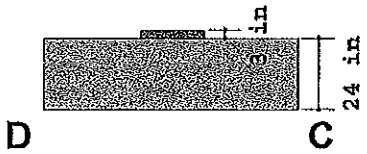
March 15, 2017

Genesis Solar Heavy Pad-2

Checked By:_____

Sketch





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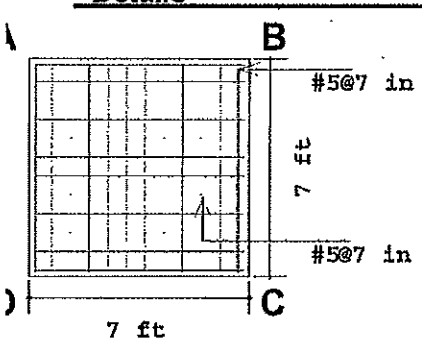
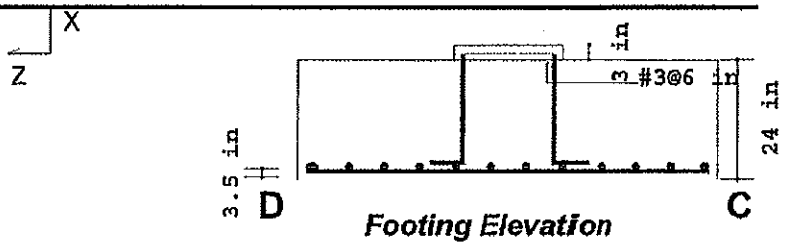
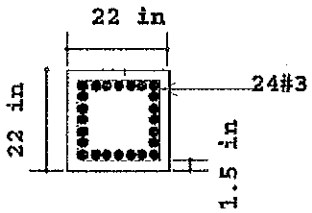


Bottom Rebar Plan



Footing Elevation



Pedestal Rebar Plan

Geometry, Materials and Criteria

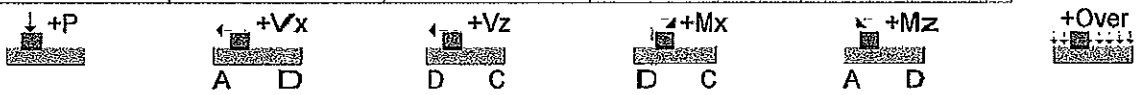
Length	: 7 ft	eX	: 0 in	Gross Allow. Bearing	: 1995 psf (gross)	Steel fy	: 60 ksi
Width	: 7 ft	eZ	: 0 in	Concrete Weight	: 145 pcf	Minimum Steel	: .0018
Thickness	: 24 in	pX	: 22 in	Concrete f'c	: 4 ksi	Maximum Steel	: .0075
Height	: 3 in	pZ	: 22 in	Design Code	: ACI 318-05		

Footing Top Bar Cover	: 3.5 in	Overturning Safety Factor	: 1.5	Phi for Flexure	: 0.9
Footing Bottom Bar Cover	: 3.5 in	Coefficient of Friction	: 0.35	Phi for Shear	: 0.75
Pedestal Longitudinal Bar Cover	: 1.5 in	Passive Resistance of Soil	: .25 k	Phi for Bearing	: 0.65

Company : **BG Structural Engineering** March 15, 2017
Designer : **KDC**
Job Number : **800.0617** **Genesis Solar Heavy Pad-2** Checked By:_____

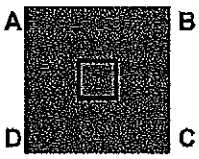
Loads

	P (k)	Vx (k)	Vz (k)	Mx (k-ft)	Mz (k-ft)	Overburden (psf)
DL	4.094					100
EL			2.24	47.04		
WL			1.01	21.21		
RLL	9.263					

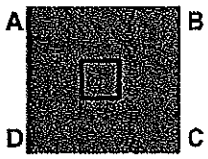


Soil Bearing

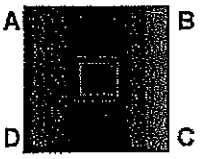
Description	Categories and Factors	Gross Allow.(psf)	Max Bearing (psf)	Max/Allowable Ratio
ASCE 2.4.1-1	1DL	1995	469.178 (A)	.235
ASCE 2.4.1-2	1DL+1LL	1995	469.178 (A)	.235
ASCE 2.4.1-3a	1DL+1WL	1995	800.446 (B)	.401
ASCE 2.4.1-3b	1DL+.7EL	1995	985.742 (B)	.494
ASCE 2.4.1-3c	1DL+.75LL+.75WL	1995	717.629 (B)	.36
ASCE 2.4.1-3d	1DL+.75LL+.7EL	1995	985.742 (B)	.494
ASCE 2.4.1-4	.6DL+1WL	1995	617.6 (B)	.31
ASCE 2.4.1-5	.6DL+.7EL	1995	959.876 (B)	.481



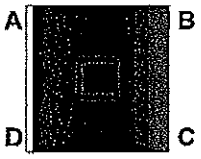
1DL
QA: 469.178 psf
QB: 469.178 psf
QC: 469.178 psf
QD: 469.178 psf
NAZ: -1 in
NAX: -1 in



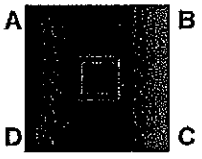
1DL+1LL
QA: 469.178 psf
QB: 469.178 psf
QC: 469.178 psf
QD: 469.178 psf
NAZ: -1 in
NAX: -1 in



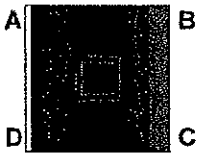
1DL+1WL
QA: 137.91 psf
QB: 800.446 psf
QC: 800.446 psf
QD: 137.91 psf
NAZ: 101.485 in
NAX: -1 in



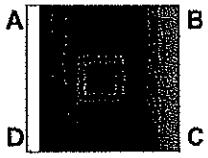
1DL+.7EL
QA: 0 psf
QB: 985.742 psf
QC: 985.742 psf
QD: 0 psf
NAZ: 79.962 in
NAX: -1 in



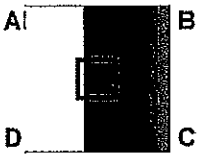
1DL+.75LL+.75WL
QA: 220.727 psf
QB: 717.629 psf
QC: 717.629 psf
QD: 220.727 psf
NAZ: 121.313 in
NAX: -1 in



1DL+.75LL+.7EL
QA: 0 psf
QB: 985.742 psf
QC: 985.742 psf
QD: 0 psf
NAZ: 79.962 in
NAX: -1 in



.6DL+1WL
QA: 0 psf
QB: 617.6 psf
QC: 617.6 psf
QD: 0 psf
NAZ: 76.576 in
NAX: -1 in



.6DL+.7EL
QA: 0 psf
QB: 959.876 psf
QC: 959.876 psf
QD: 0 psf
NAZ: 49.27 in
NAX: -1 in

Company : BG Structural Engineering
Designer : KDC
Job Number : 800.0617 Genesis Solar Heavy Pad-2
March 15, 2017
Checked By:_____

Footing Flexure Design (Bottom Bars)

Description	Categories and Factors	Mu-XX (k-ft)	Z Dir As (in^2)	Mu-ZZ (k-ft)	X Dir As (in^2)
ACI-99 9-1	1.4DL+1.7LL	2.589	.029	2.589	.029
ACI-99 9-2	1.05DL+1.275LL+1.275WL	9.38	.103	1.942	.021
ACI-99 9-3	.9DL+1.3WL	9.25	.102	1.664	.018
IBC 16-5	1.2DL+1LL+1EL	15.597	.172	2.219	.024
IBC 16-6	.9DL+1EL	16.997	.187	1.664	.018

Footing Flexure Design (Top Bars)

Description	Categories and Factors	Mu-XX (k-ft)	Z Dir As (in^2)	Mu-ZZ (k-ft)	X Dir As (in^2)
SW+OB	1SW+1OB-(IBC 16-6,ASCE 2.4.1-..	9.109	0	0	0

Moment Capacity of Plain Concrete Section Along XX and ZZ= 98.21k-ft,98.21k-ft Per Chapter 22 of ACI 318.

Footing Shear Check

Two Way (Punching) Vc: 861.819 k One Way (X Dir. Cut) Vc 214.497 k One Way (Z Dir. Cut) Vc: 214.497 k

		Punching		X Dir. Cut		Z Dir. Cut	
Description	Categories and Factors	Vu(k)	Vu/⌀Vc	Vu(k)	Vu/⌀Vc	Vu(k)	Vu/⌀Vc
ACI-99 9-1	1.4DL+1.7LL	4.062	.006	.699	.004	.699	.004
ACI-99 9-2	1.05DL+1.275LL+1.275WL	3.046	.005	2.845	.018	.524	.003
ACI-99 9-3	.9DL+1.3WL	2.612	.004	2.816	.018	.449	.003
IBC 16-5	1.2DL+1LL+1EL	3.707	.006	4.792	.03	.599	.004
IBC 16-6	.9DL+1EL	4.027	.006	5.377	.033	.449	.003

Pedestal Design

Shear Check Results (Envelope):
Shear Along X Direction Vc: 55.482 k Vs: 44.041 k Vu: 0 k Vu/⌀ Vn: 0 ⌀: .75
Shear Along Z Direction Vc: 55.482 k Vs: 44.041 k Vu: 2.24 k Vu/⌀ Vn: .03
Pedestal Ties: #3 @ 6 in

Bending Check Results (Envelope):
Unity Check: .399 Phi : .9 Parme Beta: .65
Pu : 0 k Mux : 47.04 k-ft Muz: : 0 k-ft
Pn : 0 k Mnx : 131.031 k-ft Mnz: : NA
Mnox: NA Mnoz : NA
Pedestal Bars: 24 #3 % Steel: .548

Compression Development Length Pedestal Bars (Envelope):
Lreq.: 7.115 in Lpro.: 18.875 in Lreq./Lpro.: .377

Concrete Bearing Check (Vertical Loads Only)

Bearing Bc : 3291.2 k

Description	Categories and Factors	Bearing Bu (k)	Bearing Bu/⌀Bc
ACI-99 9-1	1.4DL+1.7LL	32.186	.015
ACI-99 9-2	1.05DL+1.275LL+1.275WL	24.139	.011
ACI-99 9-3	.9DL+1.3WL	20.691	.01
IBC 16-5	1.2DL+1LL+1EL	27.588	.013
IBC 16-6	.9DL+1EL	20.691	.01

Overturning Check (Service)

Description	Categories and Factors	Mo-XX (k-ft)	Ms-XX (k-ft)	Mo-ZZ (k-ft)	Ms-ZZ (k-ft)	OSF-XX	OSF-ZZ
ASCE 2.4.1-1	1DL	.75	81.214	.75	81.214	108.293	108.293
ASCE 2.4.1-2	1DL+1LL	.75	81.214	.75	81.214	108.293	108.293
ASCE 2.4.1-3a	1DL+1WL	21.96	83.486	.75	81.214	3.802	108.293
ASCE 2.4.1-3b	1DL+.7EL	33.678	84.742	.75	81.214	2.516	108.293
ASCE 2.4.1-3c	1DL+.75LL+.75WL	16.657	82.918	.75	81.214	4.978	108.293
ASCE 2.4.1-3d	1DL+.75LL+.7EL	33.678	84.742	.75	81.214	2.516	108.293
ASCE 2.4.1-4	.6DL+1WL	21.66	51.001	.45	48.728	2.355	108.293
ASCE 2.4.1-5	.6DL+.7EL	33.378	52.256	.45	48.728	1.566	108.293

Mo-XX: Governing Overturning Moment about AD or BC
Ms-XX: Governing Stablizing Moment about AD or BC
OSF-XX: Ratio of Ms-XX to Mo-XX

Sliding Check (Service)

Description	Categories and Factors	Va-XX (k)	Vr-XX (k)	Va-ZZ (k)	Vr-ZZ (k)	SR-XX	SR-ZZ
ASCE 2.4.1-1	1DL	0	8.296	0	8.296	NA	NA
ASCE 2.4.1-2	1DL+1LL	0	8.296	0	8.296	NA	NA
ASCE 2.4.1-3a	1DL+1WL	0	8.296	1.01	8.296	NA	8.214
ASCE 2.4.1-3b	1DL+.7EL	0	8.296	1.568	8.296	NA	5.291
ASCE 2.4.1-3c	1DL+.75LL+.75WL	0	8.296	.758	8.296	NA	10.952
ASCE 2.4.1-3d	1DL+.75LL+.7EL	0	8.296	1.568	8.296	NA	5.291
ASCE 2.4.1-4	.6DL+1WL	0	5.078	1.01	5.078	NA	5.028
ASCE 2.4.1-5	.6DL+.7EL	0	5.078	1.568	5.078	NA	3.238

Va-XX: Applied Lateral Force to Cause Sliding Along XX Axis
Vr-XX: Resisting Lateral Force Against Sliding Along XX Axis
SR-XX: Ratio of Vr-XX to Va-XX