HOMEnz PERMIT DOCUMENTS

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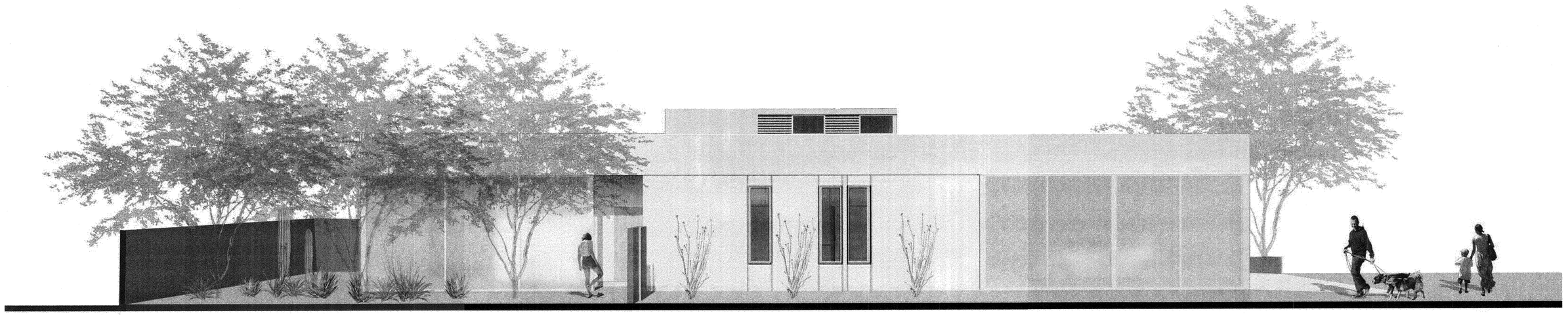
HOMEnz

Sustainable Net-Zero Single Family Home Design

City of Phoenix | Marlene Imirzian & Associates Architects



STRUCTURAL INSULATED PANELS (SIPS PANEL)

PART 1 GENERAL
1.01 SUMMARY
A. Section Includes: Structural Insulated Panels (SIPs).
B. Related Sections: Section(s) related to this section include:
1.Section 06100 Rough Carpentry
2.Section 06090 Wood and Plastics Fastenings
1.02 SYSTEM DESCRIPTION
Structural Insulated Panels (SIPs) consist of oriented strand board (OSB) laminated with structural adhesives to an insect resistant EPS insulation core, and SIP Manufacturer supplied connecting splines, sealants, and SIP screws.
1.03 REFERENCES
A. ACSE 7 – Minimum Loads for Buildings and other Structures.
B. ASTM C578 – Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
C. ASTM E1803 – Standard Test Method for Determining Structural Capacities of Insulated Panels.
D. DOC PS2 – Performance Standard for Wood-based Structural-Use Panels.
E. ICC ES AC04 – Acceptance Criteria for Sandwich Panels.
F. ICC ES AC05 – Acceptance Criteria for Sandwich Panel Adhesives.
G. ICC ES AC12 – Acceptance Criteria for Foam Plastic Insulation.
H. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
I. ASTM E1333- Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber.
J. EPA - Registered products listing.
1.04 SUBMITTALS
A. Product Data:
1. SIP Code Compliance: Submit a code report / material listing report for SIPs showing evidence of compliance with code requirements as an alternate method of construction. Submit current compliance report from an international Accreditation Service (IAS) Accredited Product Certification Agency that has demonstrated compliance with ISO Guide 65, *General requirements for bodies operating product certification systems*, showing conformance to the International Building Code (IBC) and International Residential Code (IRC).
a.Shear Wall use: The submitted code report / material listing report shall include all load cases for transverse, axial and racking shear loading for the SIPs. The report must demonstrate that the SIPs may be used as shear walls in all Seismic Design Categories A, B, C, D, E and F.
2. EPS Code Compliance: Submit ICC ES code report for EPS foam with evidence of compliance with code. Submit current compliance report numbers from ICC ES with conformance to the International Building Code (IBC) and International Residential Code (IRC). Code report shall include compliance with ICC ES AC12.
3. Manufacturer's Instructions: Submit SIP Manufacturer's construction detail book and load design charts.
B. Calculations: Submit structural calculations by a design professional registered in the state the project is being constructed in and qualified to perform the design work.
C. Shop Drawings: Submit shop drawings for SIPs showing layout, elevations, product components and accessories.
D. Quality Assurance Submittals - Submit the following:
1. SIPs: Submit SIP product certificate showing compliance to Third Party Quality Control program of Underwriters Laboratories, Inc.
2. EPS Core: Submit EPS insulation manufacturer's certificate showing compliance to Third Party Quality Control program of Underwriters Laboratories, Inc.
3. Labels: Submit a copy of the label approved by the Inspection Agency certifying that manufacturer of panels complies with specified performance characteristics and physical properties.
4. SIPA Manufacturer Member in Good Standing: Submit SIPA certificate as evidence showing SIP Manufacturer is a SIPA manufacturing member in good standing.
5. Formaldehyde Emission Rates: Submit evidence that the SIP manufacturer has tested the panels in accordance with ASTM E1333 by and IAS accredited testing laboratory and the result of the testing shows formaldehyde levels below .03 ppm.
E. Fire Resistant Assemblies - Submit the following:
1. Submit UL construction number or a code report / material listing report describing each fire-rated assembly.
2. Submit UL certificate showing flame spread and smoke developed information.
F. Warranty: Submit SIP manufacturer's standard warranty document.
G. Sound Transmission Class: Submit the following:
1. Third party test data demonstrating SIP wall assembly STC rating of 46,52,58,59.
Note to Specifier Select the STC Rating as required for each area of construction. Delete STC ratings not required.

1.05 QUALITY ASSURANCE
A. Installer Qualifications: Installer shall be experienced in performing work of this section and should have specialized in installation of work similar to that required for this project.
B.Source Limitations: Obtain all SIPs through one manufacturer. All accessories to be furnished or recommended by the SIP manufacturer.
C. SIP Manufacturer shall be a Manufacturing Member, in good standing, of the Structural Insulated Panel Association (SIPA).
1.06 REGULATORY REQUIREMENTS
A.SIPs shall be recognized for compliance in a current IAS accredited evaluation report or material listing report compliant with the 2018 IBC and 2018 IRC.
B.Pre-installation Meeting: Conduct pre-installation meeting to verify project requirements, foundation/structural system/substrate conditions, SIP manufacturer's installation instructions and SIP manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.
1.07 DELIVERY, STORAGE & HANDLING
A. Ordering: Comply with SIP manufacturer's ordering instructions and lead time requirements to avoid construction delays.
B. Delivery: Deliver materials from SIP manufacturer with identification labels or markings intact.
C. Off-load SIPs from truck and handle using fork lift or other means to prevent damage to SIPs.
D. SIPs shall be fully supported in storage and prevented from contact with the ground. Stack SIPs on pallets or on supports at a maximum of four feet on center.
E. SIPs shall be fully protected from weather. Protect against exposure to rain, water, dirt, mud, and other residue that may affect SIP performance. Cover stored SIPs with breathable protective wraps. SIPs shall be stored in a protected area.
1.08 WARRANTY
A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
B. Manufacturer's Warranty: SIP Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
1. Warranty Period: Twenty (20) years from the date of issue of the warranty.

PART 2 PRODUCTS
2.01 MANUFACTURES / SUPPLIERS
A. Premier SIPs, 19757 57th Avenue East, Puyallup, WA 98375 Phone 800-275-7086
B. Premier SIPs, 1155 Business Park Drive-Bldg "A", Dixon, CA 95620-4303. Phone 707-678-6900
2.02 MATERIALS
A. SIPs consisting of the following:
1. EPS core UL certified for fire and physical properties of ASTM C578 Type I EPS with borate insect resistant treatment. Insulation manufacturer shall provide Third Party UL certificate.
2. OSB identified with APA or PFS performance mark with Exposure I durability rating and performance in accordance with DOC PS-2 span rating 24/16 or greater.
3. Laminating Adhesives shall be in conformance with ICC ES AC05 – Acceptance Criteria for Sandwich Panel Adhesives
2.03 ACCESSORIES
A. Splines: OSB, Premier SIP Spline, or I-beam for use in joining SIPs shall be supplied by SIPs manufacturer.
B. Fasteners: corrosion resistant SIP screws compatible with SIP system shall be provided by the SIPs manufacturer.
1. Wood Screws for attachment to wood members
2. Heavy Duty Metal Screws for attachment to metal members (16 gauge to 1/4")
3. Light Duty Metal Screws for attachment to metal decks (18 gauge or thinner)
C. SIP Mastic: Shall be specifically designed for use with SIPs. Mastic must be compatible with all components of the SIP. Mastic shall be provided by the SIP manufacturer.
D. Dimensional Lumber: SPF, #2 or better, or engineered equivalent unless otherwise required by structural drawings.
E. Vapor Retarder SIP Tape: Tape with an adhesive suitable for indoor use, min. 6 inch wide for use on SIP joints, 18 inch wide for use at roof beams. SIP Tape shall be supplied by the SIP manufacturer.
2.04 FABRICATION
A. Sizes: SIPs shall be fabricated in accordance with approved Shop Drawings
B. Thermal Resistance, R-value
2.05 9 1/4" (114 mm) thick SIP with R-value of 37.0 at 75ºF and an R-value of 40.0 at 40ºF
2.06 11 1/4" (165 mm) thick SIP with R-value of 45.0 at 75ºF and an R-value of 49.0 at 40ºF

2.010 PRODUCT SUBSTITUTIONS
A. Substitutions: No substitutions permitted.
2.011 RELATED MATERIALS
A. Related Materials: Refer to other sections for related materials as follows:
1.Dimensional Lumber: SPF #2 or better or pre-engineered equivalent: Refer to Division 6 Carpentry Sections.
2.012 SOURCE QUALITY
A. Source Quality Assurance: Each SIP component required shall be supplied by SIP manufacturer and shall be obtained from selected SIP manufacturer or its approved supplier.
1. Each SIP shall be labeled indicating UL or other ISO Guide 65 approved Third Party certification.
2. Provide evidence of UL Third Party inspection and labeling of all insulation used in manufacture of SIPs.
3. SIP manufacturer shall provide Lamination/R-Value Warranty documents for building owner acceptance and execution. Manufacturer's standard forms will be submitted.
4. Provide SIPs with EPS treated for insect resistance. Treatment shall be EPA registered.
5. Dimensional Tolerance - shall comply with values listed in the manufacturer's Quality Control Manual.
B. Source Quality: Obtain SIPs from a single manufacturer.

PART 3 EXECUTION
3.01 MANUFACTURER'S INSTRUCTIONS
A. Compliance: Comply with manufacturer's ICC-ES or material listing report, Load Design Charts, Detail Book, Shop Drawings, and Product data, including product technical bulletins, for installation.
3.02 EXAMINATION
A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.
1. Verify conditions of foundation/structural system/substrate and other conditions which affect installation of SIPs. Any adverse conditions shall be reported in writing to the SIP manufacturer and the design professional. Do not proceed with installation until adverse conditions are corrected.
3.03 INSTALLATION
A. SIP Installation:
1. SIP Supports: Provide level and square foundation/structural system/substrate that support wall and/or roof SIPs. For wall SIPs, hold sill plate back from edge of rim board 1/2" (12 mm) to allow full bearing of OSB skins. Provide 1 1/2" (38 mm) diameter access holes in plating to align with electrical wire chases in SIPs. Provide adequate bracing of SIPs during erection. Remove debris from plate area prior to SIP placement.
2. SIP Fastening: Connect SIPs by nails or staples as shown on drawings. Screws of equal strength may be substituted for nails and staples as specified by engineer. SIP mastic must be used together with each fastening techniques. Where SIP Screw Fasteners are used, provide a minimum of 1" (25.4 mm) penetration into support. Join SIPs using plates and splines. Secure attachment with nails, staples, or screws, and SIP mastic. Apply SIP mastic following SIP manufacturer recommendations.
3. SIP Tape: Provide SIP Tape at joints between SIP wall panels, roof panels and at intersection of SIP roof and wall panels and as shown in SIP Manufacturer's details.
4. Vapor Retarders: Provide vapor retarders mandated by building code.
5. Thermal Barriers: Interior surfaces of SIPs shall be finished with a minimum 15-minute thermal barrier, such as gypsum wallboard, nominal 1" (25 mm) wood panelling, or other approved materials. Apply code approved thermal barriers according to SIP manufacturer's recommendations.
6. Restrictions: Do not install SIPs directly on concrete. Do not put plumbing in SIPs without consulting SIP manufacturer. Do not over cut skins for field-cut openings and do not cut skins for electrical chases. SIPs shall be protected from exposure to solvents and their vapors that damage the EPS foam core.
7. Remove and replace insulated wall or roof SIPs which have become excessively wet or damaged before proceeding with installation of additional SIPs or other work.
3.04 FIELD QUALITY REQUIREMENTS
A. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
1. Site Visits: [Specify number and duration of periodic site visits.].
3.05 PROTECTION
A. Protection: Protect installed product and finish surfaces from damage during construction.
1. Roof SIPs: Protect roof SIPs from weather by roofing materials to provide temporary protection at the end of the day or when rain or snow is imminent.
2. Alter installation, cover SIPs to prevent contact with water on each exposed SIP edges and faces.

ARCHITECTURAL ABBREVIATIONS

A	
ABV	ABOVE
ACT	ACOUSTIC
AD	AREA DRAIN
ADD	ADDENDUM
ADJ	ADJACENT
AFF	ABOVE FINISHED FLOOR
AL	ALUMINUM
ALT	ALTERNATE
ANOD	ANODIZED
AP	ACCESS PANEL
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
B	
BD	BOARD
BET	BETWEEN
BITUM	BITUMINOUS
BKG	BACKING
BLDG	BUILDING
BLKG	BLOCKING
BM	BENCHMARK
B.O.	BOTTOM OF
BOT	BOTTOM
B.O.S.	BOTTOM OF STEEL
BUR	BUILT UP ROOFING
C	
C	COURSE
CAB	CABINET
CB	CATCH BASIN
CEM	CEMENT, CEMENTITOUS
CHKD	CHECKERED
CJ	CONTROL JOINT
CL	CENTERLINE
CLG	CEILING
CLR	CLEAR
COL	COLUMN
CONC	CONCRETE
CONT	CONTINUOUS
CORR	CORRUGATED
CPT	CARPET
CSWK	CASEWORK
CTR	CENTER
D	
D	DEEP OR DEPTH
DET	DETAIL
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DIAG	DIAGONAL
DIFF	DIFFUSER
DIM	DIMENSION
DN	DOWN
DR	DRAIN
DWG	DRAWING
E	
E	EAST
EA	EACH
EIFS	EXTERIOR INSULATION FINISH SYSTEM
EJ	EXPANSION JOINT
ELEC	ELECTRIC, ELECTRICAL
EL	ELEVATION
ELEV	ELEVATOR
EMER	EMERGENCY
ENCL	ENCLOSURE
E.O.S.	EDGE OF SLAB
EQ	EQUAL
EQPT	EQUIPMENT
EXH	EXHAUST
EXP	EXPOSED, EXPANSION
EXT	EXTERIOR
F	
FA	FIRE ALARM
FCO	FLOOR CLEAN OUT
FD	FLOOR DRAIN
FEC	FIRE EXTINGUISHER CABINET
FF	FINISH FLOOR
FL	FLOOR
FLASH	FLASHING
FLEX	FLEXIBLE
F.O.	FACE OF
F.O.C.	FACE OF CONCRETE
F.O.S.	FACE OF STUD
FT	FOOT
FTG	FOOTING
FURN	FURNITURE
FUT	FUTURE
F.V.	FIELD VERIFY
G	
GA	GAGE, GAUGE
GAL	GALLON
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GD, GR	GRADE
GENL	GENERAL
GFCI	GROUND-FAULT CIRCUIT INTERRUPTER
GL	GLASS
GYP	GYPSUM
H	
H	HIGH
HB	HOSE BIBB
HDWR	HARDWARE
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HPT	HIGH POINT
HR	HOUR
HT	HEIGHT
HVAC	HEATING, VENTILATION, AIR CONDITIONING
I	
ID	INSIDE DIAMETER
IN	INCH
INCL	INCLUDE, INCLUDING
INFO	INFORMATION
INSUL	INSULATION
INT	INTERIOR
INV	INVERT
J	
JST	JOIST
JB	JUNCTION BOX
JT	JOINT

K	
KPL	KICK PLATE
L	
L	LENGTH; LONG
LAM	LAMINATE
LAV	LAVATORY
LB	POUND
LIN	LINEAR, LINEAL
LPT	LOW POINT
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LT	LIGHT
M	
M	METERS
MACH	MACHINE
MAN	MANUAL
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MED	MEDIUM
MET	METAL
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MM	MILLIMETER
M.O.	MASONRY OPENING
MOD	MODULAR, MODULE
MTD	MOUNTED
MTG	MOUNTING
N	
N	NORTH
NA	NOT APPLICABLE
NAT	NATURAL
NE	NORTHEAST
NIC	NOT-IN-CONTRACT AND NOT PART OF THIS APPLICATION
NO	NUMBER
NRC	NOISE REDUCTION COEFFICIENT
NTS	NOT TO SCALE
NW	NORTHWEST
O	
OC	ON CENTER
OD	OUTSIDE DIAMETER, OVERFLOW DRAIN
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OPP	OPPOSITE
OVHD	OVERHEAD
OZ	OUNCE
P	
PART	PARTIAL
PC	PIECE
PCF	POUNDS PER CUBIC FEET
PCI	POUNDS PER CUBIC INCH
PERF	PERFORATED
PERP	PERPENDICULAR
PL	PLATE
P.LAM	PLASTIC LAMINATE
PLF	POUNDS PER LINEAL FOOT
PNL	PANEL
PR	PAIR
PREFAB	PREFABRICATED
PREP	PREPARE, PREPARATION
PROJ	PROJECT
PROP	PROPERTY
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POINT, PAINT
PTD	PAINTED
PTN	PARTITION
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
PLYWD	PLYWOOD
Q	
QTR	QUARTER
QTY	QUANTITY
R	
R	RISER, RADIUM
RA	RETURN AIR
RAD	RADIUS
RB	RESILIENT BASE
RCP	REFLECTED CEILING
RD	ROOF DRAIN
REF	REFERENCE
REINF	REINFORCING
REQD	REQUIRED
REQT	REQUIREMENT
RET	RETURN
REV	REVISE, REVISION
RH	RIGHT HAND
RM	ROOM
R.O.	ROUGH OPENING
R.O.W.	RIGHT OF WAY
S	
S	SOUTH
SC	SOLID CORE
SCHED	SCHEDULE
SD	STORM DRAIN
SE	SOUTHEAST
SECT	SECTION
SHT	SHEET
SIM	SIMILAR
SPEC	SPECIFIED, SPECIFICATION
SPKLR	SPRINKLER
SPKR	SPEAKER
SQ	SQUARE
SST	STAINLESS STEEL
STC	SOUND TRANSMITTION CLASS
STD	STANDARD
STRUCT	STRUCTURE, STRUCTURAL
SUSP	SUSPENDED
SW	SOUTHWEST
SYM	SYMMETRICAL, SYMMETRICALLY
SYST	SYSTEM

T	
T	TREAD
TBC	TACKBOARD
TC	TOP OF CURB, TOP OF CONCRETE
TEL	TELEPHONE
TEMP	TEMPORARY
THERM	THERMAL
THK	THICK, THICKNESS
THRU	THROUGH
T.O.	TOP OF
T.O.S.	TOP OF STEEL
T.O.W.	TOP OF WALL
TYP.	TYPICAL
U	
UL	UNDERWRITERS LABORATORY
UNFIN	UNFINISHED
U.N.O.	UNLESS NOTED OTHERWISE
V	
VAC	VACUUM
VB	VAPOR BARRIER
VERT	VERTICAL
VIF	VERIFY IN FIELD
VOL	VOLUME
W	
W	WIDE, WIDTH, WEST
W/	WITH
WD	WOOD
W/O	WITHOUT
WP	WORK POINT
WP / GFCI	WEATHERPROOF COVER GROUND FAULT CIRCUIT INTERRUPTER
WT	WEIGHT
X	
XFMR	TRANSFORMER
Y	
YD	YARD

PROJECT GENERAL NOTES

THE FOLLOWING NOTES APPLY TO ALL DRAWINGS:

1. ALL PARTS OF THE WORK - INCLUDING MATERIALS, METHODS, ASSEMBLIES, ETC... MUST CONFORM TO THE MINIMUM REQUIREMENTS OF THE GOVERNING REGULATIONS OF ALL FEDERAL, STATE, DISTRICT AND LOCAL AUTHORITIES HAVING JURISDICTION OVER THE PROJECT AS WELL AS THOSE GREATER REQUIREMENTS INDICATED BY THE CONTRACT DOCUMENTS, NO PART OF THE CONTRACT DOCUMENTS MAY BE CONSTRUED TO REQUIRE OR PERMIT WORK CONTRARY TO A GOVERNING REGULATION.
2. THE ARCHITECTURAL DRAWINGS ARE PART OF A LARGER SET OF DRAWINGS WHICH, WHEN COMPLETE, CONSISTS OF ALL DRAWINGS LISTED ON THE SHEET INDEX. THE WORK DESCRIBED BY THE DRAWINGS OF ANY ONE DISCIPLINE MAY BE AFFECTED BY THE WORK OF ANOTHER DISCIPLINE AND MAY REQUIRE REFERENCE BY THE CONTRACTOR. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW AND COORDINATE THE WORK OF ALL SUBCONTRACTORS, TRADES, AND SUPPLIERS WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS BEFORE COMMENCING CONSTRUCTION, AND TO ASSURE THAT ALL PARTIES ARE AWARE OF ALL REQUIREMENTS, REGARDLESS OF WHERE THE REQUIREMENTS OCCUR IN THE CONTRACT DOCUMENTS, WHICH MIGHT AFFECT THE WORK OF THAT PARTY.
3. THE ARCHITECTURAL DRAWINGS ESTABLISH AND COORDINATE THE FINISHED APPEARANCE AND LOCATION OF ALL THE EXPOSED ELEMENTS OF THE WORK OF ALL THE TRADES, INCLUDING THAT WORK WHICH IS ILLUSTRATED PRIMARILY ON DRAWINGS OF OTHER DISCIPLINES. LOCATIONS SHOWN ON OTHER DRAWINGS ARE SCHEMATIC, UNLESS OTHERWISE NOTED ON THE ARCHITECTURAL DRAWINGS. THE ARCHITECTURAL DRAWINGS TAKE PRECEDENCE FOR THE FINISHED APPEARANCE AND LOCATION OF ALL PARTS OF THE WORK.
4. FINISH FLOOR ELEVATIONS ARE TO TOP OF CONCRETE FLOOR SLAB UNLESS NOTED OTHERWISE. WHERE THE CONCRETE IS DEPRESSED TO ACCOMODATE CONCRETE FILL, CONCRETE WEAR SLABS, WATERPROOFING, RAISED FLOORS AND OTHER SIMILAR FLOOR ASSEMBLIES, FINISHED FLOOR ELEVATIONS ARE TO TOP OF FINISHED FLOOR ASSEMBLY INDICATED.
5. EXCEPT WHERE DIRECTED TO PLACE ITEMS OF THE WORK AT THE APPROXIMATE LOCATIONS SHOWN, DO NOT SCALE DRAWINGS FOR DIMENSIONAL INFORMATION. ALL ELEMENTS OF THE DRAWINGS MAY NOT BE DRAWN TO EXACT SCALE, ALL DIMENSIONS REQUIRED ARE SHOWN, OR MAY BE DERIVED FROM THOSE SHOWN ON THE FLOOR PLANS, DETAILS, ELEVATIONS, SECTIONS, SCHEDULES, AND SPECIFICATIONS.
6. PRIOR TO START OF CONSTRUCTION, CONTRACTOR SHALL CONTACT UTILITY SERVICES TO VERIFY LOCATIONS OF ALL UNDER GROUND UTILITIES.

CONDITION FOR USE OF PLANS

Agreement

The City of Phoenix (the "City") is making these draft model construction drawings (the "Plans") available free of charge and "as is," and subject to the terms and conditions of this Agreement.

No Warranty. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED. YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF THE PLANS, THAT THE PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS. You expressly acknowledge and agree that neither the City nor any design professionals who prepared the Plans accept any responsibility for the accuracy or completeness of the drawings, and that both the City any design professionals who prepared these draft plans disclaim all warranties, express or implied, with respect to the Plans and your use of the same.

You Assume All Liability. IN NO EVENT SHALL THE CITY OR ITS AFFILIATES OR ANY DESIGNERS WHO PREPARED THE PLANS BE LIABLE FOR ANY INDIRECT, PUNITIVE, INCIDENTAL, SPECIAL, EXEMPLARY OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN ANY WAY CONNECTED WITH YOUR USE OF THE PLANS IN ANY MANNER, including but not limited to economic loss, damage to property, and damage for personal injury arising out of your use of the Plans.

You Expressly Agree to Engage a Design Professional, Licensed Contractor and Inspectors as required. You expressly agree that the Plans are "as is" and in draft form and that you must seek professional assistance to guide you through the design and construction of the Plans. You agree that you will have the Plans reviewed and approved by a local professional and duly licensed architect and/or engineer as well as a licensed contractor before the start of any construction. **Your right to use the Plans is expressly conditioned on your agreement to engage a licensed architect and/or engineer and a licensed contractor prior to construction and to comply with all local building codes, zoning requirements, and other applicable laws, regulations, ordinances, and requirements, and to ascertain that the Plans are suitable for the intended site.** You agree that you will maintain, and will cause your design professionals, builders and other contractors involved in the Project, to maintain sufficient liability and other insurance coverages with insurance companies licensed in the applicable locations, as necessary to cover all of your obligations under this Agreement and applicable law.

Indemnity. YOU AGREE TO INDEMNIFY AND DEFEND THE CITY AND ITS AFFILIATES, DESIGN PROFESSIONALS OR OTHER LICENSORS WHO CONTRIBUTED TO THE PLANS, AND THEIR RESPECTIVE OFFICERS, DIRECTORS, OWNERS, AGENTS, REPRESENTATIVES, CONTRACTORS, EMPLOYEES, ATTORNEYS, INSURERS AND ASSIGNS OF THE FOREGOING (COLLECTIVELY, THE "INDEMNIFIED PARTIES") AND HOLD THEM HARMLESS FROM AND AGAINST ANY AND ALL LOSSES, DEMANDS, CAUSES OF ACTION, DAMAGES, LIABILITY AND COSTS AND EXPENSES, INCLUDING REASONABLE ATTORNEYS' FEES, INCURRED OR SUSTAINED BY ANY OF THE INDEMNIFIED PARTIES IN CONNECTION WITH (I) THE USE, CONSTRUCTION OF, MODIFICATION OF, MISINTERPRETATION OR ALTERATION OF, OR REUSE BY, YOU OR OTHERS OF THE PLANS; (II) ANY NEGLIGENCE OR OTHER ACTS OR OMISSIONS BY YOU OR ANY OF YOUR CONTRACTORS, SUBCONTRACTORS, SUPPLIERS, EMPLOYEES, DESIGNERS, ARCHITECTS, ENGINEERS, CONSULTANTS, ADVISORS, AGENTS OR REPRESENTATIVES; AND (III) ANY BREACH BY YOU OR ANY OF YOUR CONTRACTORS, SUBCONTRACTORS, SUPPLIERS, EMPLOYEES, DESIGNERS, ARCHITECTS, ENGINEERS, CONSULTANTS, ADVISORS, AGENTS OR REPRESENTATIVES OF ANY OF THE PROVISIONS OF THIS AGREEMENT.

ADD ALTERNATES

1. ROOF MOUNTED PHOTOVOLTAIC ARRAY INC. POWER INVERTER
2. VEHICLE CHARGING STATION

PROJECT DIRECTORY

ARCHITECT

Marlene Imirzian & Associates LLC, Architects
8906 North central Avenue
Phoenix, Arizona 85020

CONTACTS:
Marlene Imirzian
Phone: 602.943.5279

STRUCTURAL ENGINEER

SCL Consulting, LLC
1753 East Broadway, Suite 101-517
Tempe, Arizona 85282

CONTACTS:
Bob Grothman, PE
Phone: 480.264.0587

MECHANICAL, PLUMBING, & ELECTRICAL ENGINEER

Henderson Engineers, Inc.
5343 North 16th St #460
Phoenix, AZ 85016

CONTACTS:
Omid Mottahed, P.E., LEED AP BD+C
Phone: 602.336.5200

SHEET INDEX

APPLICABLE CODES:

THE PHOENIX BUILDING CONSTRUCTION CODE (PBCC) INCLUDES THE FOLLOWING MODEL CODES W/ LOCAL AMENDMENTS)

2018 INTERNATIONAL RESIDENTIAL CODE
2018 INTERNATIONAL BUILDING CODE
2017 NATIONAL ELECTRIC CODE
2018 INTERNATIONAL ENERGY CONSERVATION CODE
PHOENIX ZONING ORDINANCE

ARCHITECTURAL SYMBOL LEGEND

ROOM NAME
101
150 SF
— ROOM NAME AND NUMBER TAG

XXX — DOOR / OPENING NUMBER

XX — WINDOW TAG

1 / A101 SIM — DETAIL TAG
DETAIL VIEW
SHEET NUMBER

XXX — KEYNOTE

Name / Elevation — ELEVATION DATUM

1 / A101 SIM — EXTERIOR ELEVATION TAG
ELEVATION VIEW
SHEET NUMBER

1 / A101 SIM — BUILDING SECTION TAG
SECTION VIEW
SHEET NUMBER

1 / A101 SIM — WALL SECTION TAG
SECTION VIEW
SHEET NUMBER

1 — REVISION TAG

ALIGN — ALIGNED ELEMENTS TAG

FIELD COPY

Marlene Imirzian & Associates LLC, Architects
8906 North Central Avenue
Phoenix, AZ 85020
602 943 5279 v
602 943 5673 f

REGISTERED ARCHITECT
CERTIFICATE NO.
26113
Marlene Imirzian
STATE OF ARIZONA
05/17/2019
EXPIRES ON 3/31/2022

HOMEnz

REV	DATE:	ISSUED FOR:
	05/17/2019	PERMIT REVIEW 2018 CODE UPDATES

REVISED

CITY OF PHOENIX
Planning and Development Department
By
(DARRELL POINT)
SEP 17 2019
This set of plans has been reviewed for PHOENIX CONSTRUCTION CODE prior to issuance of Building Permit and shall be kept at the construction site. Such review shall not prevent the Building Official from requiring correction of errors in the plans where such errors are subsequently found to be in violation of any law or ordinance.
RADV 1904201-01

DRAWING NO: A0.01
JOB NO: 2305

SHEET INDEX, PROJECT DIRECTORY, NOTES

3/17/2019 10:28:09 AM

WINDOW SCHEDULE								
WINDOW NO	WIDTH	HEIGHT	SILL HEIGHT	FRAME MATERIAL	GLAZING MATERIAL	SHGC	VLT	COMMENTS
1	4' - 0"	7' - 1"	0"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	STOREFRONT FIXED *
3A	4' - 0"	10' - 0"	0"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	STOREFRONT GLAZING *
3B	14' - 10"	10' - 0"	0"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	OPERABLE STOREFRONT GLAZING *
5	2' - 0"	7' - 0"	2' - 0"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	CASEMENT
6	4' - 0"	7' - 0"	2' - 0"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	CASEMENT
7A	12' - 7"	10' - 0"	0"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	OPERABLE STOREFRONT GLAZING *
7B	7' - 6"	10' - 0"	0"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	OPERABLE STOREFRONT GLAZING
7C	3' - 8"	3' - 0"	14' - 2"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	
7D	3' - 8"	3' - 0"	14' - 2"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	
7E	3' - 8"	3' - 0"	14' - 2"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	
7F	3' - 8"	3' - 0"	14' - 2"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	
7G	3' - 2"	3' - 0"	14' - 2"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	
7H	3' - 2"	3' - 0"	14' - 2 5/8"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	
8	2' - 0"	7' - 0"	2' - 0"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	CASEMENT
9	2' - 0"	7' - 0"	2' - 0"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	CASEMENT
10	2' - 0"	7' - 0"	2' - 0"	FIBERGLASS	SOLARBAN 70XL	0.15	0.19	CASEMENT

* WIN. 1: TEMPERED GLASS
WIN. 3A, 3B, 7A: FIRST LITE IMMEDIATELY ADJACENT TO DOOR TO BE TEMPERED GLASS

DOOR SCHEDULE						
DOOR NO.	Type	WIDTH	HEIGHT	THICKNESS	Material	Comments
1A	SWING	3' - 0"	7' - 0"	2"	Mtl	EXTERIOR INSULATED HOLLOW METAL, R-11
1B	CLOSET SLIDER	8' - 0"	6' - 8"		WOOD	
2A	SWING	2' - 6"	6' - 8"	2"	WOOD	
2B	CLOSET SLIDER	6' - 0"	6' - 8"		WOOD	
3A	SWING	3' - 0"	7' - 0"	2"	Mtl	EXTERIOR INSULATED HOLLOW METAL, R-11
3B	SWING	3' - 0"	7' - 0"	2"	Mtl	EXTERIOR INSULATED HOLLOW METAL, R-11
3C	CLOSET SLIDER	6' - 10"	6' - 8"		WOOD	
4A	SWING	2' - 6"	6' - 8"	2"	WOOD	
5A	SWING	3' - 0"	6' - 8"	2"	WOOD	
6A	SWING	3' - 0"	6' - 8"	2"	WOOD	
7A	SWING	3' - 0"	7' - 0"	2"	Mtl	EXTERIOR INSULATED HOLLOW METAL, R-11
7B	SWING	3' - 0"	7' - 0"	2"	Mtl	EXTERIOR INSULATED HOLLOW METAL, R-11
8A	SLIDER	6' - 0"	6' - 8"		WOOD	
8B	SWING	3' - 0"	6' - 8"	2"	WOOD	
8C	CLOSET SLIDER	11' - 0"	6' - 8"		WOOD	
10A	SWING	3' - 0"	6' - 8"	2"	WOOD	
10B	SWING	3' - 0"	6' - 8"	2"	WOOD	
10C	CLOSET SLIDER	6' - 10"	6' - 8"		WOOD	
11A	SWING	3' - 0"	7' - 0"	2"	Mtl	EXTERIOR INSL HM R-11, 20 MIN RATED, SELF-CLOSING, SELF-LATCHING
12A	SWING	6' - 0"	7' - 0"	2"	Mtl	EXTERIOR INSL HM R-11, 20 MIN RATED, SELF-CLOSING, SELF-LATCHING
B411		18' - 11 1/2"	10' - 5 1/2"	3"		

ROOM AREA		
DL	NAME	AREA
1	ENTRY	100 SF
2	HALF BATH	50 SF
3	DINING ROOM	250 SF
4	PANTRY	20 SF
5	MASTER BATH	80 SF
6	MASTER BEDROOM	180 SF
7	FAMILY ROOM	370 SF
8	BEDROOM 2	150 SF
9	BATHROOM	70 SF
10	BEDROOM 1	150 SF
14	MASTER CLOSET	60 SF
15	LIVING ROOM	260 SF
16	KITCHEN	240 SF
LIVABLE		1980 SF
11	GARAGE	490 SF
12	MECH	40 SF
13	PATIO	140 SF
UNDER ROOF		670 SF
TOTAL AREA		2650 SF

ROOM SCHEDULE									
			WALL FINISH						
NUMBER	ROOM NAME	FLOOR FINISH	NORTH	EAST	SOUTH	WEST	CEILING FINISH	CEILING HIGHT	
1	ENTRY	CONC-1	-	GYP	GYP	GYP	GYP	8' - 0"	
2	HALF BATH	TILE	TILE	TILE/ GYP	GYP	TILE GYP	GYP	7' - 0"	
3	DINING ROOM	CONC-1	GYP	GYP	GYP	GYP	GYP	10' - 0"	
4	PANTRY	CONC-1	GYP	GYP	GYP	GYP	GYP	9' - 0"	
5	MASTER BATH	TILE	TILE	TILE	TILE	TILE	GYP	9' - 0"	
6	MASTER BEDROOM	CARPET	GYP	GYP	GYP	GYP	GYP	9' - 0"	
7	FAMILY ROOM	CONC-1	GYP	GYP	GYP	GYP	GYP	10' - 0"	
8	BEDROOM 2	CARPET	GYP	GYP	GYP	GYP	GYP	9' - 0"	
9	BATHROOM	TILE	TILE	TILE	TILE	TILE	GYP	9' - 0"	
10	BEDROOM 1	CARPET	GYP	GYP	GYP	GYP	GYP	9' - 0"	
11	GARAGE	CONC-2	EIFS	EIFS	-	-	EXT GYP	10' - 10"	
12	MECH	CONC-2	GYP	GYP	GYP	GYP	EXT GYP	9' - 0"	
13	PATIO	CONC-2	EIFS	-	-	EIFS	EXT GYP	10' - 0"	
14	MASTER CLOSET	CARPET	-	GYP	GYP	GYP	GYP	9' - 0"	
15	LIVING ROOM	CONC-1	GYP	GYP	GYP	GYP	GYP	10' - 0"	
16	KITCHEN	CONC-1	GYP	GYP	GYP	GYP	GYP	8' - 0"	

REFLECTED CEILING PLAN- GENERAL NOTES

1. REFER TO HVAC PLANS FOR ALL CEILING MOUNTED SUPPLY REGISTERS AND RETURN AIR GRILLS FOR GENERAL LOCATION ONLY. ARCHITECTURAL RCP'S SUPERCEED FOR ALL CEILING MOUNTED SUPPLY REGISTERS AND RETURN AIR GRILLS.
2. ALL DOWNLIGHTS AND DIFFUSERS SHALL BE CENTERED WITH COFFERS ABOVE U.N.O.
3. ALL LINEAR LIGHT FIXTURES SHALL BE CENTERED WITH COFFERS ABOVE U.N.O.
4. REFER TO ELECTRICAL LIGHTING DRAWINGS FOR LIGHT FIXTURE TYPES.

ROOM FINISH KEY - ABBREVIATIONS

CONC-1	GROUND & POLISHED CONCRETE
CONC-2	SEALED CONCRETE FINISH
TILE	CERAMIC TILE
CPT	CARPET
EXT GYP	EXTERIOR GRADE GYPSUM WALL BOARD, PAINTED
GYP	GYPSUM WALL BOARD, PAINTED

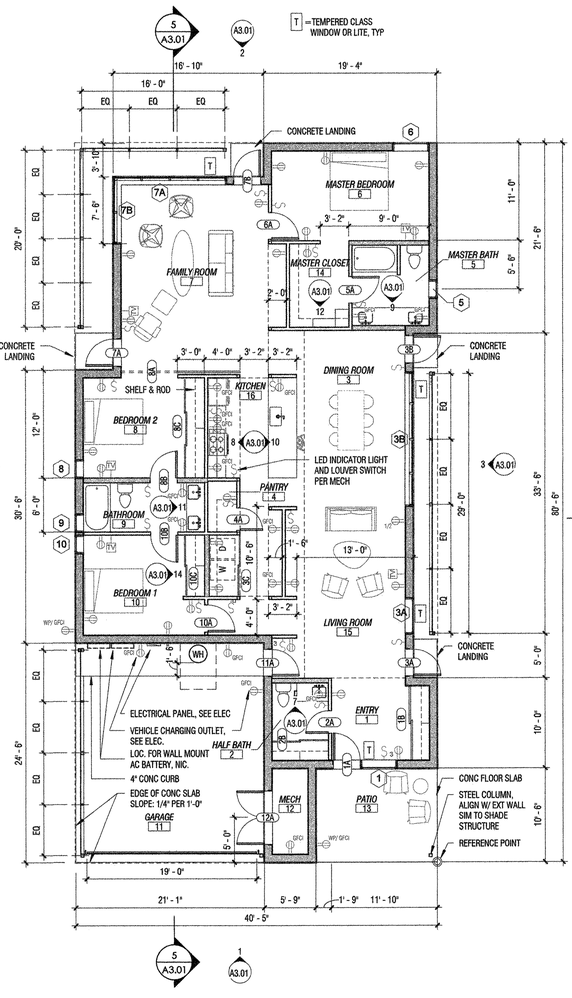
WALL LEGEND

- EXTERIOR WALL: 1" DRAINABLE EXTERIOR INSULATED FINISH SYSTEM OVER WEATHER BARRIER OVER 9 1/4" OSB CLAD STRUCTURAL INSULATED POLYISOCYANURATE WALL PANEL BY PREMIER BUILDING SYSTEMS ESR-1882
- INTERIOR PARTITION PLUMBING WALL: 5/8" GYPBOARD OVER 2X6 STUDS 16" OC, TYP. FULL HEIGHT TO CEILING
- TYPICAL INTERIOR PARTITION: 5/8" GYPBOARD OVER 2X4 STUDS 16" OC, TYP. FULL HEIGHT TO CEILING

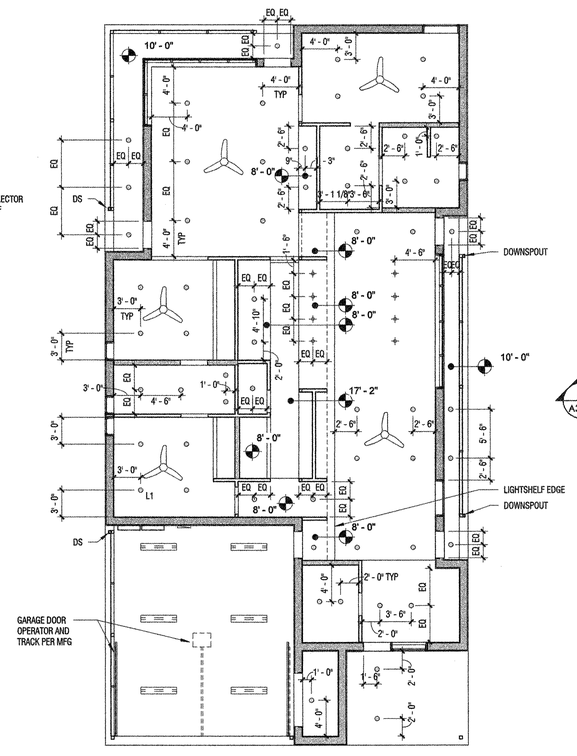
GENERAL NOTES

1. GENERAL CONTRACTOR SHALL NOTIFY ARCHITECT AND OWNER'S REPRESENTATIVE OF ALL DISCREPANCIES BETWEEN CONSTRUCTION DOCUMENTS AND EXISTING CONDITIONS VERBALLY WITHIN EIGHT (8) HOURS OF DISCOVERY AND CONFIRM IN WRITING WITHIN TWO (2) DAYS OF DISCOVERY WITH THE NATURE OF AND PROPOSED RESOLUTION OF ALL DISCREPANCIES.
2. ALL WORK OF THIS CONTRACT SHALL COMPLY WITH ACCEPTED BUILDING PRACTICES AND ALL CODES HAVING JURISDICTION OVER THIS PROJECT.
3. ALL TRADES AND SUBCONTRACTORS SHALL DIRECT ALL QUESTIONS, CHANGES AND REQUESTS THROUGH THE GENERAL CONTRACTOR, WHO SHALL SUBMIT ALL REQUESTS, CHANGES OR QUESTIONS TO THE ARCHITECT.
4. THE GENERAL NOTES AND DETAILS APPLY THROUGHOUT THE PROJECT UNLESS OTHERWISE NOTED OR SHOWN. ALL WORK THAT IS EITHER IMPLIED OR REASONABLY INFERABLE FROM THE CONTRACT DOCUMENTS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE CONTRACTOR SHALL COORDINATE THE WORK OF ALL TRADES AND SEE THAT ALL CUTTING AND PATCHING REQUIRED FOR THE INSTALLATION OF ALL MATERIALS BY ALL TRADES IS PROPERLY EXECUTED, AS DESCRIBED WITHIN THIS SCOPE OF WORK SHOWN ON THE DRAWINGS OR ISSUED DOCUMENTS.
6. ALL WRITTEN DIMENSIONS SHALL HAVE PRECEDENCE OVER ALL OTHERS. DO NOT SCALE DRAWINGS FOR DIMENSIONAL INFORMATION. ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR AT THE JOB SITE PRIOR TO BID SUBMITTAL. START OF SHOP DRAWINGS, START OF CONSTRUCTION, AND/OR FABRICATION OF MATERIALS.
7. VERIFY FIELD CONDITIONS PRIOR TO COMMENCEMENT OF EACH PORTION OF WORK. THE CONTRACT DOCUMENTS ARE COMPLEMENTARY AND WHAT IS REQUIRED BY ONE SHALL BE AS BINDING AS IF REQUIRED BY ALL. THE CONTRACTOR SHALL COORDINATE ALL PORTIONS OF THE WORK AS DESCRIBED IN THE CONTRACT DOCUMENTS. NOTIFY THE ARCHITECT FOR RESOLUTION OF ALL DISCREPANCIES PRIOR TO CONSTRUCTION.
8. PROTECT ALL STEEL IN CONTACT W/ EARTH W/ ONE COAT OF WR MEADOWS MEL-ROL LM LIQUID WATERPROOFING MEMBRANE (ASTM C836, D412, D1970, C794, 412, E96, D751, D4833) OR EQUAL.
9. DIMENSIONS REFERENCED EXTERIOR FACE OF OSB AT EXTERIRO WALLS. INTERIOR FINISH FACE AT INTERIOR WALLS

Marlene Imirzian & Associates LLC, Architects
8906 North Central Avenue
Phoenix, AZ 85020
602 943 5279 v
602 943 5673 f



FLOOR PLAN 1
Scale: 1/8" = 1'-0"



REFLECTED CEILING PLAN 2
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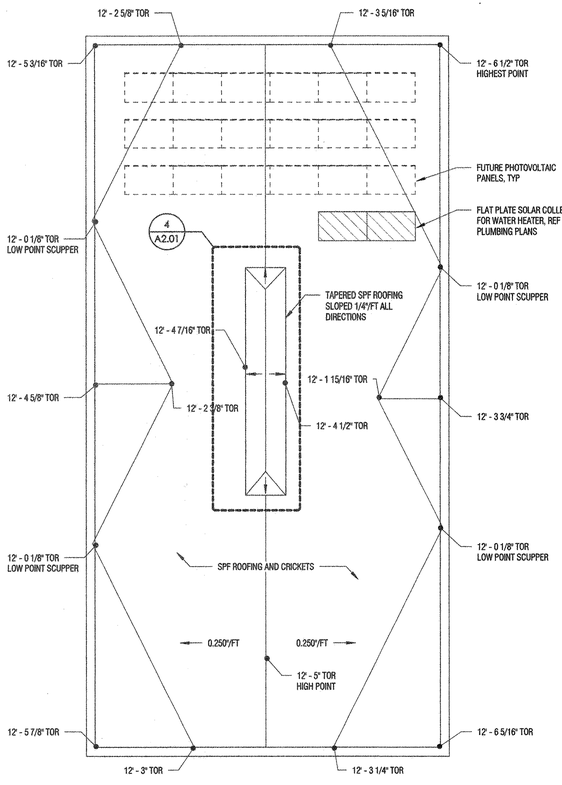
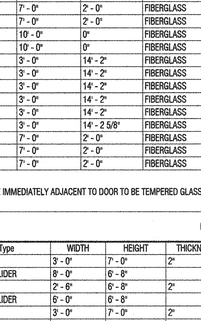


ROOF PLAN 3
Scale: 1/8" = 1'-0"



SOLAR CHIMNEY PLAN 4
Scale: 1/8" = 1'-0"

REGISTERED ARCHITECT
CERTIFICATE NO.
26113
Marlene Imirzian
DATE SIGNED 05/17/2019
ARIZONA U.S.A.
EXPIRES ON 3/31/2022

HOMEnz

FIELD COPY

REV	DATE:	ISSUED FOR:
	05/17/2019	PERMIT REVIEW 2018 CODE UPDATES
	9/16/2019	REVISIONS

REVISED

CITY OF PHOENIX
Planning and Development Department
By: DANIELL HUNT
SEP 17 2019
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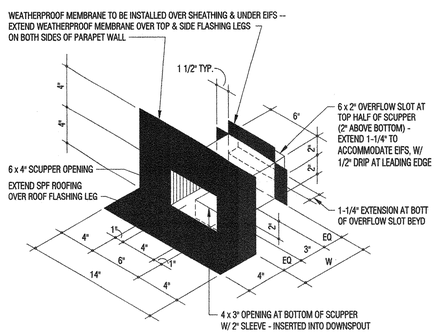
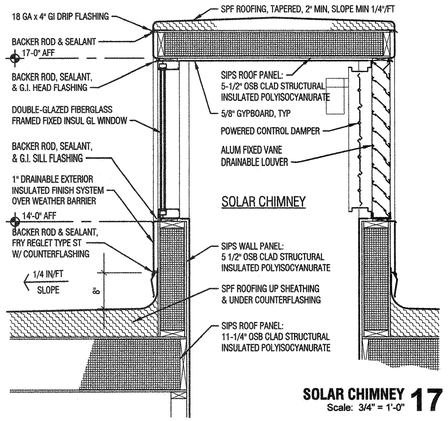
DRAWING NO: A2.01
JOB NO: 2305

FLOOR PLAN, RCP, & ROOF PLAN

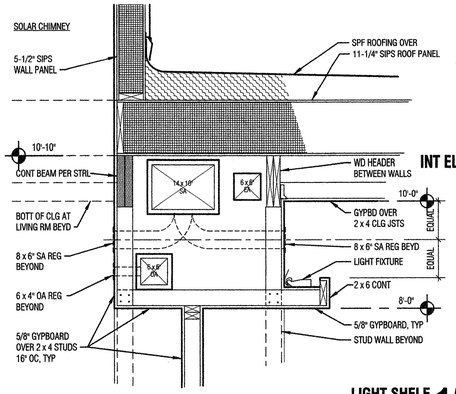
3/17/2019 11:10:06 AM



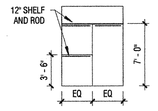
SCUPPER DETAIL 19
Scale: 1 1/2" = 1'-0"



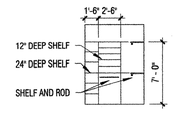
SOLAR CHIMNEY 17
Scale: 3/4" = 1'-0"



LIGHT SHELF 15
Scale: 3/4" = 1'-0"



INT ELEV- TYPL CLOSET 14
Scale: 1/8" = 1'-0"



INT ELEV - MAST CLOSET 12
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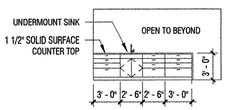
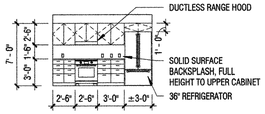


INT ELEV- KITCHEN ISLAND 10
Scale: 1/8" = 1'-0"



INT ELEV- KITCHEN 8
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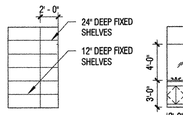

INT ELEV - PANTRY 13
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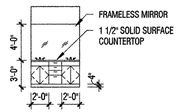
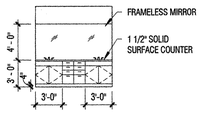
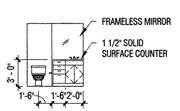


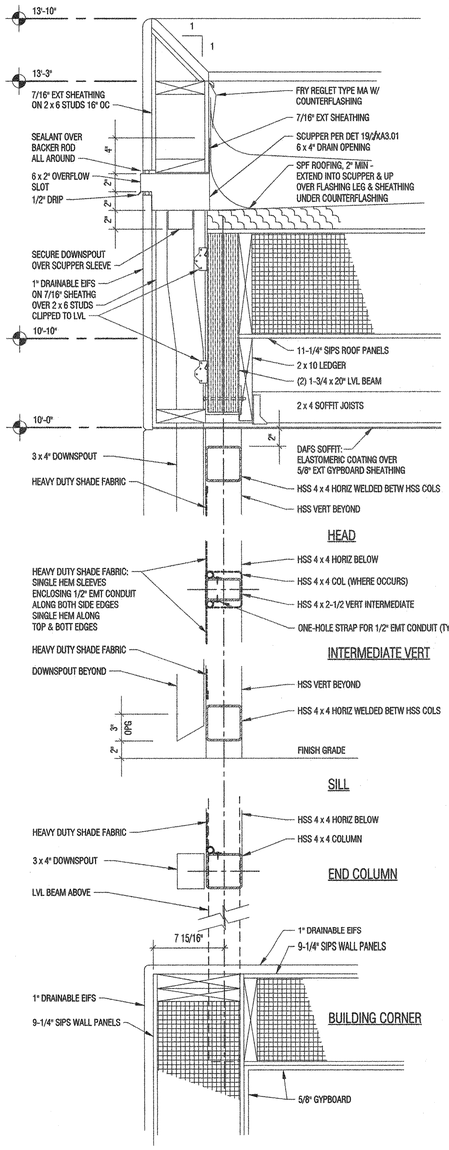
INT ELEV- BATHROOM 11
Scale: 1/8" = 1'-0"



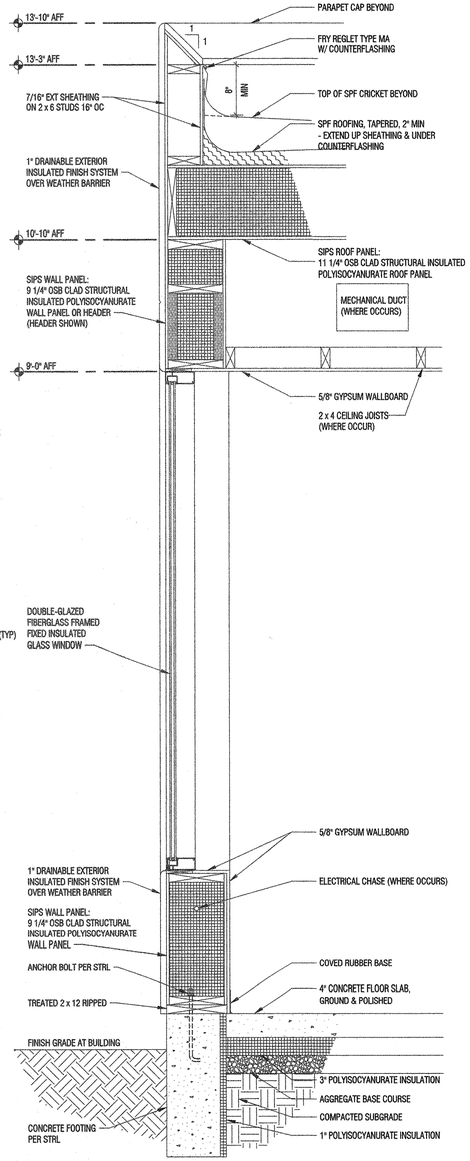
INT ELEV- MASTER BATH 9
Scale: 1/8" = 1'-0"



INT ELEV- POWDER RM 7
Scale: 1/8" = 1'-0"



EXTERIOR DETAILS 18
Scale: 1 1/2" = 1'-0"



WALL SECTION 16
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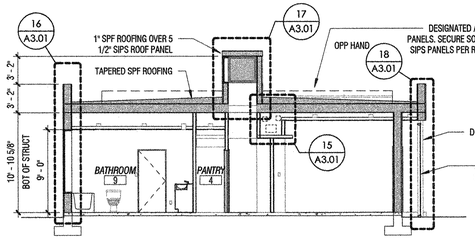
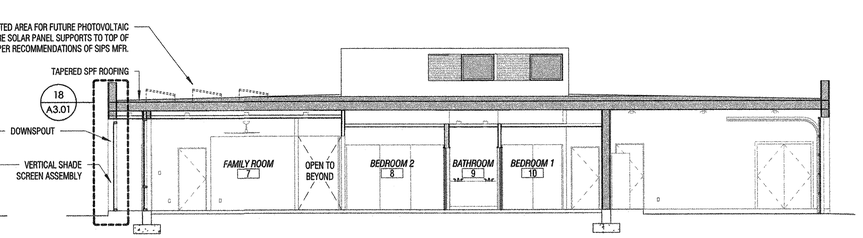
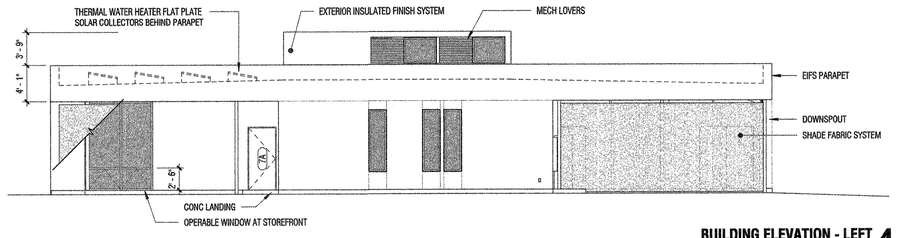


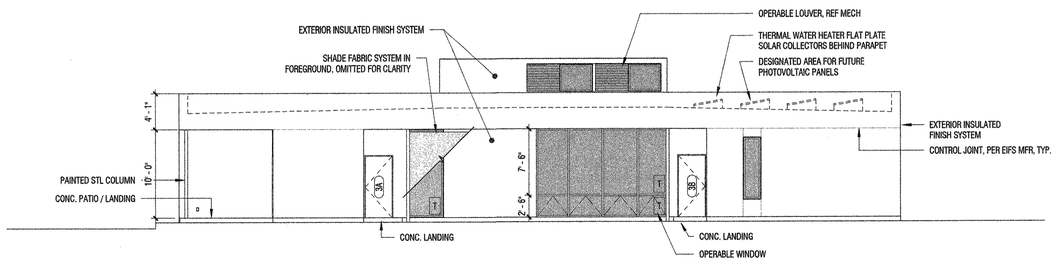
BUILDING SECTION 6
Scale: 1/8" = 1'-0"



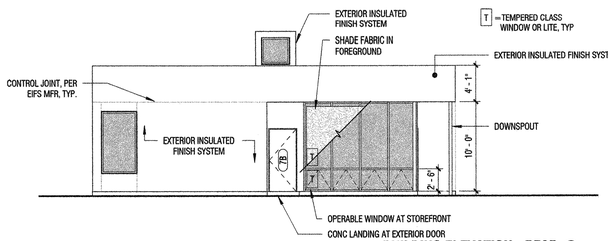
BUILDING SECTION 5
Scale: 1/8" = 1'-0"



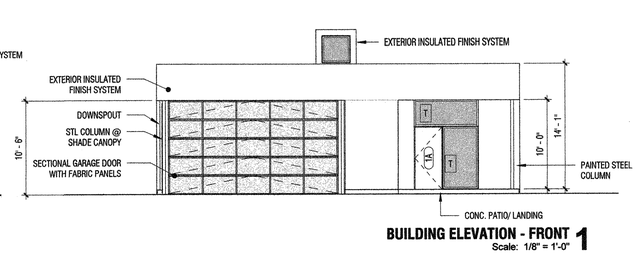
BUILDING ELEVATION - LEFT 4
Scale: 1/8" = 1'-0"



BUILDING ELEVATION - RIGHT 3
Scale: 1/8" = 1'-0"



BUILDING ELEVATION - REAR 2
Scale: 1/8" = 1'-0"



BUILDING ELEVATION - FRONT 1
Scale: 1/8" = 1'-0"

Marlene Imirzian & Associates LLC, Architects
8906 North Central Avenue
Phoenix, AZ 85020
602 943 5279 v
602 943 5673 f

REGISTERED ARCHITECT
CERTIFICATE NO.
26113
Marlene Imirzian
STATE OF ARIZONA
05/17/2019
EXPIRES ON 3/31/2022

HOMEnz

FIELD COPY

REV	DATE:	ISSUED FOR:
	05/17/2019	PERMIT REVIEW 2018 CODE UPDATES
	9/16/2019	REVISIONS

REVISED

CITY OF PHOENIX
Planning and Development Department
By: (CARRELL HUNT)
SEP 17 2019
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DRAWING NO: A3.01
JOB NO: 2305

ELEVATIONS, SECTIONS, & DETAILS

9/17/2019 10:28:13 AM

DESIGN SPECIFICATIONS

- DESIGN IS IN ACCORDANCE WITH THE 2018 INTERNATIONAL BUILDING CODE.
- MINIMUM 28 DAY CONCRETE CYLINDER STRENGTH SHALL BE:

FOOTINGS	3000 PSI
SLABS ON GROUND	3500 PSI
FOUNDATION WALLS	3000 PSI

- REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60.
- STRUCTURAL STEEL PLATES, ANGLES, ANCHOR BOLTS, AND OTHER ROLLED MEMBERS SHALL CONFORM TO ASTM A36.
- RECTANGULAR OR SQUARE HSS MEMBERS SHALL CONFORM TO ASTM A500 GRADE B.
- ADHESIVE SYSTEM SHALL BE HILTI HIT-HY200 OR APPROVED EQUAL.
- STRUCTURAL INSULATED PANELS SHALL BE PREMIER SIPS MANUFACTURED BY INSULFOAM, A CARLISLE COMPANY.
- STRUCTURAL WOOD FRAMING SHALL CONFORM TO NFPA NATIONAL DESIGN SPECIFICATIONS (OR MEET ALL THE MINIMUM PUBLISHED VALUES) AS FOLLOWS:

ALL WOOD FRAMING: SPECIES: SPRUCE-PINE-FIR GRADE: No. 1/ No. 2 (U.N.O.)

- LAMINATED VENEER LUMBER SHALL MEET THE FOLLOWING MINIMUM DESIGN VALUES:

E =	1,900,000 PSI
Fb =	2,600 PSI
Fc-par =	2,510 PSI
Fc-perp =	750 PSI
Fv =	285 PSI

- TIMBERSTRAND PARALLAM STRAND LUMBER (PSL) SHALL MEET THE FOLLOWING MINIMUM DESIGN VALUES.

E =	1,800,000 PSI
Fb =	2,400 PSI
Fc-par =	2,500 PSI
Fc-perp =	545 PSI
Fv =	190 PSI

- PREFABRICATED WALL AND ROOF PANELS SHALL BE PREMIER SIPS OR APPROVED EQUAL.
- ASSUMED BEARING CAPACITY FOR SPREAD FOOTINGS IS 1500 PSF. BEARING CAPACITY SHALL BE VERIFIED BY GEOTECHNICAL ENGINEER.
- DESIGN LOADS:

ROOF LIVE LOAD 20 PSF

LIVE LOAD REDUCTION PER IBC 2018 CHAPTER 16 IS INCLUDED

WIND LOAD (ASCE 7-16)

RISK CATEGORY	II
IMPORTANCE FACTOR	Iw = 1.00
BASIC WIND SPEED	V = 102 MPH
EXPOSURE	C
INTERNAL PRESSURE COEFFICIENT	GCpi = +/- 0.18
COMPONENTS AND CLADDING	REFER TO TABLE THIS SHEET

SEISMIC LOAD (IBC 2018)

RISK CATEGORY	II
IMPORTANCE FACTOR	Ie = 1.00
SPECTRAL RESPONSE ACCELERATIONS	SS = 17.9% g S1 = 6.50% g
SPECTRAL RESPONSE COEFFICIENTS	SDS = 0.191 g SD1 = 0.104 g
SEISMIC RESPONSE COEFFICIENT	Cs = 0.095
RESPONSE MODIFICATION FACTOR	R = 2
SOIL SITE CLASS	D
SEISMIC DESIGN CATEGORY	B
BASIC SEISMIC FORCE RESISTING SYSTEM	LIGHT FRAME SHEAR WALLS
ANALYSIS PROCEDURE	EQUIVALENT LATERAL FORCE PROCEDURE
DESIGN BASE SHEAR	V = 0.095*W

- RESISTANCE TO LATERAL LOADS ON STRUCTURE IS PROVIDED BY SHEAR WALLS AND ROOF DIAPHRAGMS. CONTRACTOR SHALL PROVIDE SUFFICIENT TEMPORARY BRACING UNTIL ALL LATERAL SUPPORT SYSTEMS ARE IN PLACE AND FUNCTIONAL.
- ALL STRUCTURAL FRAMING AND CONNECTIONS HAVE BEEN DESIGNED FOR THE FINAL COMPLETED CONDITION AND HAVE NOT BEEN INVESTIGATED FOR POTENTIAL LOADINGS ENCOUNTERED DURING ERECTION AND CONSTRUCTION. ANY INVESTIGATION OF THE STRUCTURAL FRAMING AND CONNECTIONS FOR ADEQUACY DURING THE ERECTION AND CONSTRUCTION PROCESS IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- CONTRACTOR IS RESPONSIBLE FOR ALL MEANS AND METHODS OF CONSTRUCTION AND ALL JOB SITE SAFETY.

GENERAL NOTES

EARTHWORK

- FOOTINGS SHALL BE CAST ON UNDISTURBED SUBSOIL. IF DESIGN CAPACITY IS NOT ENCOUNTERED AT THE ELEVATIONS SHOWN, FOOTINGS MUST BE LOWERED. CONSULT ENGINEER BEFORE PROCEEDING.
- NO HOLES, TRENCHES OR DISTURBANCES OF THE SOIL SHALL BE ALLOWED WITHIN THE VOLUME DESCRIBED BY 45 DEGREE LINES SLOPING FROM THE BOTTOM EDGE OF THE FOOTING. IF SUCH ARE REQUIRED, FOOTINGS MUST BE LOWERED.
- TOPSOIL AND FILL BELOW SLABS ON GROUND SHALL BE REMOVED. AGGREGATE BASE COURSE UNDER SLABS ON GROUND SHALL BE AS SPECIFIED ON PLANS.

MISCELLANEOUS

- DIMENSIONS OF EXISTING CONSTRUCTION OR CONSTRUCTION IN PROGRESS SHALL BE VERIFIED AND COORDINATED PRIOR TO FABRICATION OF STRUCTURAL COMPONENTS.
- VERIFY AND COORDINATE, WITH ALL CONTRACTORS, THE LOCATION OF ALL ARCHITECTURAL AND MECHANICAL APPURTENANCES AND OPENINGS.

STRUCTURAL INSULATED PANELS

- PREMIER SIPS PANELS SHALL CONFORM TO THE 2018 INTERNATIONAL BUILDING CODE.
- PREMIER SIPS PANEL SHOP DRAWINGS SHALL BE PREPARED BY PREMIER SIPS SUPPLIER AND SHALL INCLUDE PANEL LAYOUT, ELEVATIONS, PRODUCT COMPONENTS AND ACCESSORIES.
- PREMIER SIPS PANEL SHOP DRAWINGS SHALL BE APPROVED BY ENGINEER OF RECORD PRIOR TO FABRICATION.
- DIMENSIONAL LUMBER SHALL BE SPF No. 1/No. 2 OR BETTER.
- PREMIER SIPS PANELS SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH APPROVED SHOP DRAWINGS.

CONCRETE

- FORMWORK SHALL BE DESIGNED IN ACCORDANCE WITH THE ACI "MANUAL OF CONCRETE PRACTICE", LATEST EDITION.
- REINFORCING STEEL SHALL BE DETAILED AND PLACED IN ACCORDANCE WITH THE ACI "MANUAL OF CONCRETE PRACTICE", LATEST EDITION, UNLESS OTHERWISE NOTED.
- LAP ALL WALL BARS 30 DIAMETERS UNLESS OTHERWISE DETAILED. LAP WELDED WIRE MESH 6 INCHES.
- CONCRETE PROTECTION FOR REINFORCING BARS SHALL BE IN ACCORDANCE WITH THE "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE", LATEST EDITION.
- SLABS ON GRADE SHALL BE CAST ALLOWING A SUFFICIENT NUMBER OF JOINTS TO ADEQUATELY CONTROL SHRINKAGE CRACKING. SAWCUTTING SHALL BE DONE AS SOON AS SAWCUT WILL NOT RAVEL CONCRETE OR WITHIN 18 HOURS MAXIMUM OF INITIAL POURING OPERATION.
- ALLOW AT LEAST 24 HOURS BEFORE POURING ADJACENT WALL SECTIONS BETWEEN CONSTRUCTION JOINTS.
- DO NOT PLACE OR CUT HOLES IN CONCRETE SLABS OR WALLS WITHOUT PRIOR APPROVAL OF THE ENGINEER.
- EXTERIOR EXPOSED CONCRETE SHALL BE AIR-ENTRAINED. AIR CONTENT SHALL BE 5 PERCENT (+/-1 1/2 PERCENT).
- PIPES AND CONDUITS EMBEDDED IN OR PASSING THROUGH STRUCTURAL MEMBERS MUST BE APPROVED BY THE STRUCTURAL ENGINEER. PIPE AND CONDUITS EMBEDDED IN CONCRETE SHALL NOT BE LARGER THAN 2 INCHES IN OUTSIDE DIAMETER AT THEIR WIDEST POINT OR FITTING OR 1/3 OF THE THICKNESS OF THE SLAB, BEAM OR WALL.
- ELECTRICAL CONDUIT OR PIPES EMBEDDED IN OR PASSING THROUGH SLABS, BEAMS OR WALLS SHALL BE LOCATED AND PLACED SO THAT:
  1. THEY ARE NOT CLOSER THAN THREE DIAMETERS ON CENTER.
  2. THE CONCRETE COVER IS NOT LESS THAN 2 INCHES.
  3. THEY RUN BETWEEN REINFORCING AND DO NOT DISPLACE IT IN ANY MANNER.
- ALUMINUM CONDUITS SHALL NOT BE PLACED IN CONCRETE.
- CHAMFER ALL EXPOSED CONCRETE CORNERS. SEE ARCHITECTURAL/STRUCTURAL DRAWINGS FOR REQUIREMENTS.
- PROPER CURING PROCEDURES SHALL BE USED FOR SLAB ON GRADE TO PREVENT CURLING.
- CALCIUM CHLORIDE SHALL NOT BE USED IN CONCRETE MIXES.

STRUCTURAL STEEL

- STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE AISC "STEEL CONSTRUCTION MANUAL", LATEST EDITION, AND THE AISC "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES", LATEST EDITION.
- ALL STRUCTURAL AND MISCELLANEOUS STEEL WHICH SHALL REMAIN EXPOSED TO VIEW SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE AISC "SPECIFICATION FOR ARCHITECTURALLY EXPOSED STRUCTURAL STEEL", LATEST EDITION, WITHOUT GAPS OR OPEN JOINTS.
- ALL WELDING SHALL COMPLY WITH AWS D1.1 USING E70XX ELECTRODES. ALL WELDING TO BE DONE BY AWS PREQUALIFIED WELDERS, CERTIFIED FOR WELDS MADE. PROVIDE CONTINUOUS MINIMUM SIZED WELDS PER AISC REQUIREMENTS, UNLESS NOTED OTHERWISE.
- THE MINIMUM SIZE OF FILLET WELDS SHALL BE AS SPECIFIED IN TABLE J2.4 IN THE AISC "STEEL CONSTRUCTION MANUAL".
- COLUMN BASE PLATES SHALL HAVE OVERSIZED HOLES WITH PLATE WASHERS (MINIMUM 3/8-INCH THICK) PROVIDED WITH ANCHOR RODS.
- GROUT UNDER BASE PLATES IN ACCORDANCE WITH THE "AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES", LATEST EDITION.
- CLEAN, PREPARE, AND SHOP PRIME EXTERIOR EXPOSED STRUCTURAL STEEL MEMBERS IN ACCORDANCE WITH SPECIFICATIONS.
- WHILE THE DESIGN DOCUMENTS MAY REFERENCE OSHA, THEY ARE NOT INTENDED TO SPECIFICALLY IDENTIFY ALL APPLICABLE OSHA REQUIREMENTS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO IDENTIFY AND COMPLY WITH ALL APPLICABLE OSHA REQUIREMENTS.
- REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL MISCELLANEOUS STEEL.

WOOD FRAMING

- ERECTION OF ALL WOOD FRAMING SHALL CONFORM TO THE NATIONAL FOREST PRODUCTS ASSOCIATION DESIGN SPECIFICATIONS, AMERICAN PLYWOOD ASSOCIATION, LATEST EDITIONS.
- THE STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE DRAWINGS OF ALL OTHER DISCIPLINES AND THE SPECIFICATIONS. THE CONTRACTOR SHALL VERIFY THE REQUIREMENTS OF OTHER TRADES AS TO SLEEVES, CHASES, HANGERS, INSERTS, ANCHORS, HOLES, AND OTHER ITEMS TO BE PLACED OR SET IN THE STRUCTURAL WORK.
- DRAWINGS INDICATE GENERAL AND TYPICAL DETAILS OF CONSTRUCTION. WHERE CONDITIONS ARE NOT SPECIFICALLY SHOWN, SIMILAR DETAILS OF CONSTRUCTION SHALL BE USED, SUBJECT TO APPROVAL BY THE ENGINEER.
- ALL STRUCTURAL SYSTEMS RELATING TO WOOD FRAMING WHICH ARE TO BE COMPOSED OF COMPONENTS TO BE FIELD ERECTED SHALL BE SUPERVISED BY THE SUPPLIER DURING MANUFACTURING, DELIVERY, HANDLING, STORAGE, AND ERECTION IN ACCORDANCE WITH THE SUPPLIER'S INSTRUCTIONS AND REQUIREMENTS.
- LOADING APPLIED TO THE STRUCTURE DURING THE PROCESS OF CONSTRUCTION SHALL NOT EXCEED THE SAFE LOAD-CARRYING CAPACITY OF THE STRUCTURAL MEMBERS. THE LIVE LOADS USED IN THE DESIGN OF THIS STRUCTURE ARE INDICATED IN THE "DESIGN SPECIFICATIONS". DO NOT APPLY ANY CONSTRUCTION LOADS UNTIL STRUCTURAL FRAMING IS PROPERLY CONNECTED TOGETHER AND UNTIL ALL TEMPORARY BRACING IS IN PLACE.
- ALL NAILING SHALL BE CAREFULLY DRIVEN AND NOT OVERDRIVEN. THE USE OF STAPLES IS PROHIBITED.
- WALL AND ROOF SHEATHING NAILS SHALL BE HOT-DIPPED GALVANIZED.
- CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL REQUIRED SHEAR WALL ANCHORS.
- LAMINATED MEMBERS SHALL BE CAMBERED FOR DEAD LOAD DEFLECTION.
- NAILING OF WOOD FRAMING MEMBERS SHALL CONFORM TO THE MINIMUM NAILING SCHEDULE, UNLESS DETAILED OTHERWISE.
- ALL FRAMING EXPOSED TO THE WEATHER OR IN CONTACT WITH CONCRETE SHALL BE PRESSURE-TREATED IN ACCORDANCE WITH THE AMERICAN WOOD PRESERVERS ASSOCIATION SPECIFICATIONS. WHERE POSSIBLE, ALL CUTS AND HOLES SHOULD BE COMPLETED BEFORE TREATMENT. CUTS AND HOLES DUE TO THE ON-SITE FABRICATION SHALL BE BRUSHED WITH 2 COATS OF COPPER NAPHTHENATE SOLUTION CONTAINING A MINIMUM OF 2% METALLIC COPPER IN SOLUTION (PER AWPA STANDARD M4).

SPECIAL STRUCTURAL INSPECTION

SPECIAL STRUCTURAL INSPECTION BY SPECIAL OBSERVERS SATISFACTORY TO THE BUILDING OFFICIAL IS REQUIRED FOR THE FOLLOWING TYPES OF WORK IN CONFORMANCE WITH CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE (IBC).

FABRICATORS:
THE SPECIAL INSPECTOR SHALL VERIFY THAT THE FOLLOWING FABRICATORS OF STRUCTURAL LOAD-BEARING MEMBERS AND ASSEMBLIES COMPLY WITH CONSTRUCTION DOCUMENTS AND IBC CHAPTER 17:
1. STRUCTURAL STEEL FABRICATOR
2. PREMIER SIPS PANELS

STRUCTURAL STEEL:
THE SPECIAL INSPECTOR SHALL PROVIDE PERIODIC INSPECTION OF STEEL FRAMING TO VERIFY COMPLIANCE WITH THE DETAILS SHOWN ON THE APPROVED CONSTRUCTION DOCUMENTS, INCLUDING MATERIAL IDENTIFICATION MARKS AND CERTIFIED MILL TEST REPORTS.

WELDING:
THE SPECIAL INSPECTOR SHALL VERIFY WELDERS CERTIFIED PER AWS QUALIFICATION FOR TYPE OF WELDING REQUIRED AND TO PROVIDE PERIODIC INSPECTION OF FILLET WELDS IN COMPLIANCE WITH AWS D1.1.

CONCRETE:
THE SPECIAL INSPECTOR SHALL PROVIDE THE FOLLOWING:
1. VERIFY COMPLIANCE OF MATERIAL CERTIFICATES AND TEST REPORTS AS REQUIRED BY CONSTRUCTION DOCUMENTS.
2. PERIODIC VERIFICATION OF REQUIRED DESIGN MIX.
3. PERIODIC INSPECTION OF GRADE, SIZE, AND PLACEMENT OF REINFORCEMENT STEEL.
4. PERIODIC INSPECTION AT TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE TEMPERATURE OF THE CONCRETE.
5. PERIODIC INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.
6. PERIODIC INSPECTION FOR MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.
7. PERIODIC INSPECTION OF BOLTS INSTALLED IN CONCRETE (STRESS INCREASES PER IBC SECTION 1912.5 NOT USED).

BEARING CAPACITY, BACKFILL AND COMPACTION:
THE SPECIAL INSPECTOR SHALL PROVIDE THE FOLLOWING:
1. PRIOR TO PLACEMENT OF THE PREPARED FILL, DETERMINE THE SITE HAS BEEN PREPARED IN ACCORDANCE WITH THE APPROVED SOILS REPORT.
2. DURING PLACEMENT AND COMPACTION OF THE FILL MATERIAL, DETERMINE THAT THE MATERIAL USED AND THE MAXIMUM LIFT THICKNESS COMPLY WITH THE APPROVED GEOTECHNICAL PRACTICES.
3. DETERMINE, ON A PERIODIC BASIS, THAT THE IN-PLACE DRY DENSITY OF THE COMPACTED FILL COMPLIES WITH THE APPROVED GEOTECHNICAL PRACTICES.
4. PRIOR TO PLACEMENT OF FOOTING CONCRETE THAT ASSUMED BEARING CAPACITY IS ACHIEVED.

POST INSTALLED ANCHOR SYSTEM:
THE SPECIAL INSPECTOR SHALL PROVIDE THE FOLLOWING:
1. VERIFY ON THE JOBSITE DURING ANCHOR INSTALLATION THE ANCHOR TYPE, ANCHOR DIMENSIONS, BASE MATERIAL TYPE, BASE MATERIAL COMPRESSION STRENGTH, HOLE DIMENSIONS, ADHESIVE TYPE, HOLE CLEANING PROCEDURES, ANCHOR SPACING, EDGE DISTANCES, BASE MATERIAL THICKNESS, ANCHOR EMBEDMENT, AND TIGHTENING TORQUE FOLLOW THE STRICT RECOMMENDATIONS OF THE MANUFACTURER AND THE APPLICABLE ICC REPORT.
2. VERIFY THE INITIAL INSTALLATIONS OF EACH TYPE AND SIZE OF ANCHOR BY CONSTRUCTION PERSONNEL ON SITE. SUBSEQUENT INSTALLATIONS OF THE SAME ANCHOR TYPE AND SIZE BY THE SAME CONSTRUCTION PERSONNEL ARE PERMITTED TO BE PERFORMED IN THE ABSENCE OF THE SPECIAL INSPECTOR.
3. PERFORM ADDITIONAL INITIAL INSPECTIONS WHEN ANY CHANGES IN THE ANCHOR PRODUCT BEING INSTALLED OR PERSONNEL PERFORMING THE INSTALLATION ARE MADE.

SCHEDULING OF SPECIAL STRUCTURAL INSPECTIONS:
CONTRACTOR SHALL ALLOW A MINIMUM OF 48 HOURS NOTIFICATION TO ENGINEER FOR THE SCHEDULING OF SPECIAL STRUCTURAL INSPECTIONS.

FIELD COPY

CITY OF PHOENIX
Planning and Development Department
By: (ORIELLY CHEN)
JUL 23 2019
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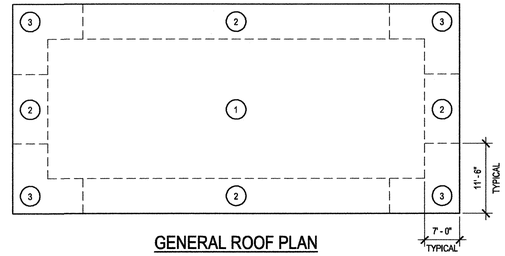
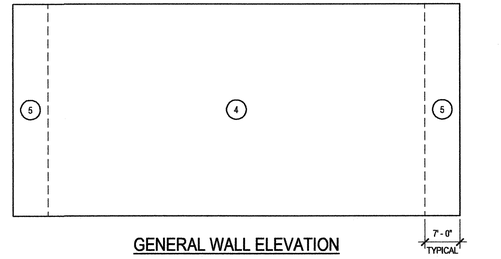


GENERAL ROOF PLAN



GENERAL WALL ELEVATION

AREA	DESIGN WIND PRESSURE, PSF EFFECTIVE WIND AREA, SF 1	10	20	50	100	200	> 500	DESCRIPTION
1	-36.1	-36.1	-33.7	-30.6	-28.2	-25.8	-22.7	ROOF INTERIOR ZONE
2	-47.7	-47.7	-44.6	-40.5	-37.5	-34.4	-30.4	END ZONE REGION OF THE ROOF SURFACE LOCATED WITHIN 7'-0" OF THE BUILDING PERIMETER
3	-65.0	-65.0	-58.8	-50.7	-44.6	-38.5	-30.4	END ZONE REGION OF THE ROOF SURFACE LOCATED WITHIN 11'-6" OF THE BUILDING CORNER
1-3 (+)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	ALL ROOF ZONES
4 (+)	20.8	20.8	19.8	18.6	17.7	16.8	16.0	WALL INTERIOR ZONE
4 (-)	-21.6	-21.6	-20.8	-20.4	-19.4	-18.5	-17.3	
5 (+)	20.8	20.8	19.8	18.6	17.7	16.8	16.0	END ZONE REGION OF THE WALL SURFACE LOCATED WITHIN 7'-0" OF THE BUILDING CORNER
5 (-)	-38.1	-38.1	-25.8	-23.4	-21.6	-19.7	-17.3	

NOTES:

1. NEGATIVE PRESSURES ACT AWAY FROM COMPONENT SURFACE. POSITIVE PRESSURES ACT TOWARD COMPONENT SURFACES.
2. WIND UPLIFT PRESSURE ON CANOPIES AND ROOF OVERHANGS SHALL BE 40 PSF.

WIND PROVISIONS FOR COMPONENTS AND CLADDING TABLE

1 / S0.00

SCALE: 12" = 1'-0"

DRAWING ABBREVIATION LEGEND:

AB - ANCHOR BOLT	GA - GAUGE	PERIM - PERIMETER
ATL - ALTERNATE	GALV - GALVANIZED	PC - PRECAST / PRESTRESSED
ARCH - ARCHITECTURAL	GC - GENERAL CONTRACTOR	PL - STEEL PLATE DESIGNATION
		PLMBG - PLUMBING
BLDG - BUILDING	HORIZ - HORIZONTAL	PRTD - PRESSURE TREATED
BM - BEAM	HSS - HOLLOW STRUCTURAL SECTION	PSF - POUND PER SQUARE FOOT
BOT - BOTTOM	HT - HEIGHT	PSL - PARALLAM STRAND LUMBER
BRG - BEARING	HVAC - HEATING, VENTILATING AND AIR CONDITIONING	PT - POST TENSIONED
C - CHANNEL DESIGNATION		R - RADIUS
CIP - CAST-IN-PLACE	IBC - INTERNATIONAL BUILDING CODE	RD - ROOF DRAIN
CL - CENTER LINE	ID - INSIDE DIAMETER	REINF - REINFORCING
CLR - CLEAR DISTANCE	I.F. - INSIDE FACE	REQD - REQUIRED
CMU - CONCRETE MASONRY UNIT	INT - INTERIOR	RTU - ROOF TOP UNIT
COL - COLUMN		
CONC - CONCRETE	JBE - JOIST BEARING ELEVATION	SCHED - SCHEDULE
CONT - CONTINUOUS		SIM - SIMILAR
CONTR - CONTRACTOR	K - KIP (1000 POUNDS)	SHT - SHEET
CJ - SLAB CONTROL OR CONSTRUCTION JOINT	KLF - KIP PER LINEAR FOOT	SPA - SPACE / SPACES
	L - STEEL ANGLE DESIGNATION	SPEC - SPECIFICATION
D - DEPTH	LLH - LONG LEG HORIZONTAL	SQ - SQUARE
D/B - DESIGN BUILD	LLV - LONG LEG VERTICAL	SS - STAINLESS STEEL
DIA - DIAMETER	LP - LOW POINT	STL - STEEL
DIM - DIMENSION	LSL - LAMINATED STRAND LUMBER	STR - STRUCTURAL
DN - DOWN	LVL - LAMINATED VENEER LUMBER	
DTL - DETAIL		THK - THICK / THICKNESS
DWG - DRAWING	MAX - MAXIMUM	TO - TOP OF
DWL - DOWEL	MEP - MECHANICAL, ELECTRICAL AND PLUMBING	TOF - TOP OF FOOTING
	MIN - MINIMUM	TOL - TOP OF LEDGE ELEV
EA - EACH	MTL - METAL	TOP - TOP OF PIER ELEV
EJ - EXPANSION JOINT		TOS - TOP OF SLAB
ELEV - ELEVATION	NIC - NOT IN CONTRACT	TOSB - TOP OF STEEL BEAM
EMBED - EMBEDMENT	NOM - NOMINAL	TOW - TOP OF WALL ELEV
EQ - EQUAL	NTS - NOT TO SCALE	
EW - EACH WAY	N-S - NORTH-SOUTH DIRECTION	UNO - UNLESS NOTED OTHERWISE
E-W - EAST-WEST DIRECTION		
EXIST - EXISTING	OC - ON CENTER	VERT - VERTICAL
EXP - EXPANSION	OD - OUTSIDE DIAMETER	VIF - VERIFY IN FIELD
EXT - EXTERIOR	OF - OUTSIDE FACE	
	OH - OVER HEAD	WCJ - WALL CONTROL OR CONSTRUCTION JOINT
FD - FLOOR DRAIN	OPP - OPPOSITE	W/ - WITH
FDN - FOUNDATION		W/O - WITHOUT
FF - FINISH FLOOR		WD - WOOD
FTG - FOOTING		W - WIDE FLANGE DESIGNATION
		WP - WORKING POINT
		WT - WEIGHT
		WWF - WELDED WIRE FABRIC

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REGISTERED PROFESSIONAL ENGINEER
45776
ROBERT H. GROTHMAN
10 Sept 2019
ARIZONA U.S.A.

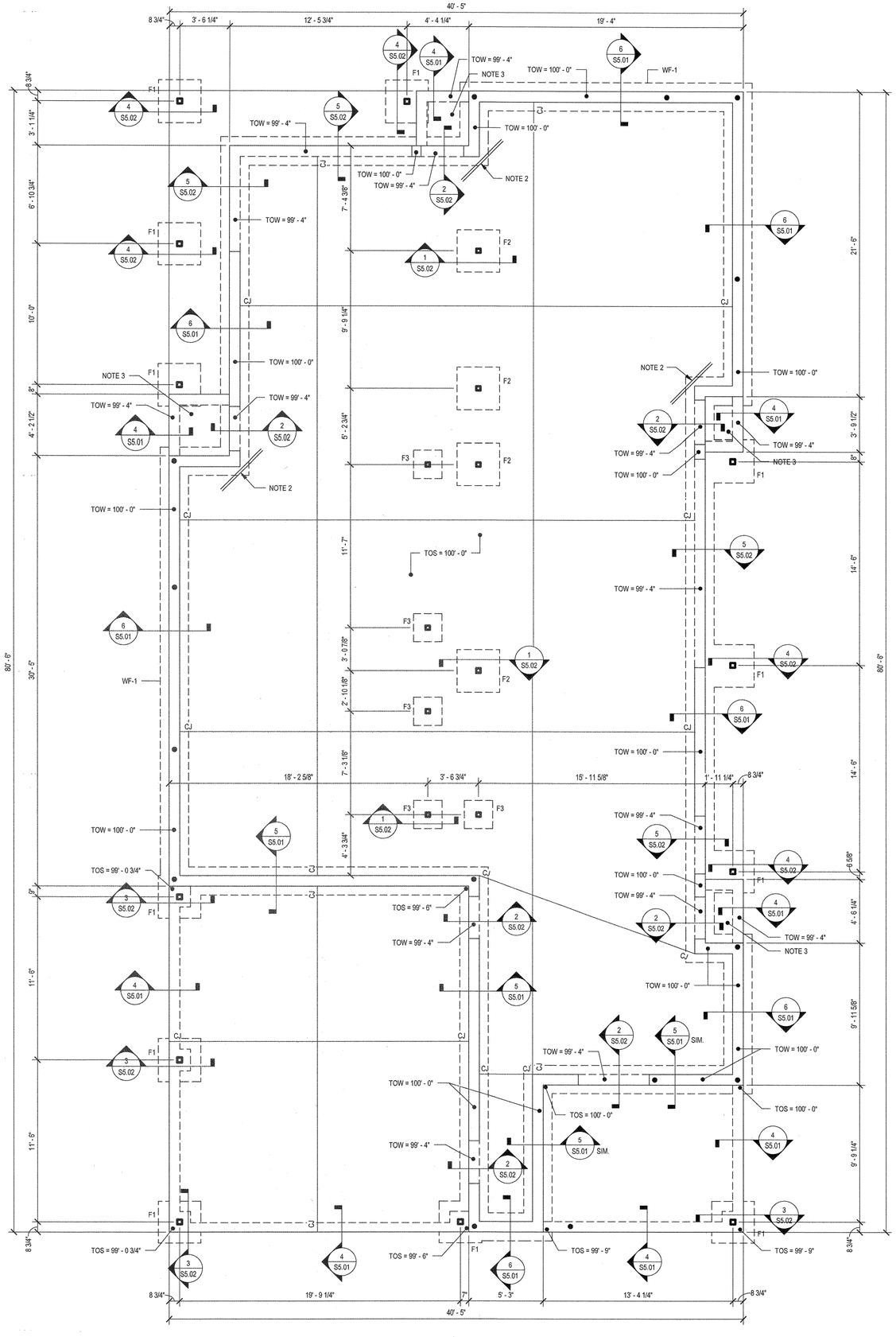
Home NZ

R	DATE:	ISSUED
	5/17/19	PERMIT REVIEW 2018 CODE UPDATES

DRAWING **S0.00**

JOB NO: **2305**

GENERAL NOTES



1 S1.01 FOUNDATION PLAN

SCALE: 1/4" = 1'-0"

FOUNDATION PLAN NOTES:

- SEE GENERAL NOTES ON SHEET S0.00 FOR ADDITIONAL INFORMATION.
- TYPICAL FLOOR SLAB 4" CONCRETE SLAB ON GRADE WITH 6x6xW2.1xW2.1 W.W.M. TOP OF SLAB ELEVATION = 100' - 0", UNLESS NOTED OTHERWISE (TOS = 0'-0") ON PLAN.
- TOP OF EXTERIOR FOOTING ELEVATION = 98' - 0" UNLESS NOTED OTHERWISE (TOF = 0'-0") ON PLAN.
- TOP OF EXTERIOR WALL ELEVATION = 100' - 0", UNLESS NOTED OTHERWISE (TOW = 0'-0") ON PLAN.
- FOR TYPICAL CONCRETE FOUNDATION WALL CORNER AND INTERSECTION SEE SECTIONS 2/S5.01 AND 3/S5.01.
- PROVIDE STEEL REINFORCEMENT AROUND OPENINGS IN CONCRETE WALLS AND SLABS AS SHOWN IN DETAIL 7/S5.01.
- F# = FOOTING MARK, SEE FOOTING SCHEDULE ON SHEET S5.01.
- WF-# = WALL FOOTING MARK, SEE FOOTING SCHEDULE ON SHEET S5.01.
- CJ = SLAB ON GRADE CONTROL OR CONSTRUCTION JOINT, SEE DETAIL 1/S5.01.
- ● = SIMPSON HOLDOWN, SEE SHEAR WALL SCHEDULE ON SHEET S5.01.
- NOTE 1 = DOWEL FOOTING AND FOUNDATION WALL REINFORCEMENT TO EXISTING FOUNDATION WITH (2) - #5 DOWELS 2'-0" LONG WITH EPOXY ADHESIVE (6" MINIMUM EMBEDMENT).
- NOTE 2 = PROVIDE (2) - #5 BARS 4'-0" LONG AT CENTER OF SLAB ON GRADE. PROVIDE BARS AT ALL SLAB INSIDE CORNERS THAT ARE NOT AT SLAB CONTROL JOINTS. SEE PLAN FOR TYPICAL PLACEMENT OF SLAB BARS.
- NOTE 3 = 4" CONCRETE SLAB ON GRADE WITH 6x6xW2.1xW2.1 W.W.M. (1/4" PER FOOT PITCH AWAY FROM BUILDING).

FIELD COPY

CITY OF PHOENIX
Planning and Development Department
By: SHELLY CHIEN
JUL 23 2019
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ROBERT H. GROTHMAN
REGISTERED ARIZONA U.S.A.
3/31/2022

Home NZ

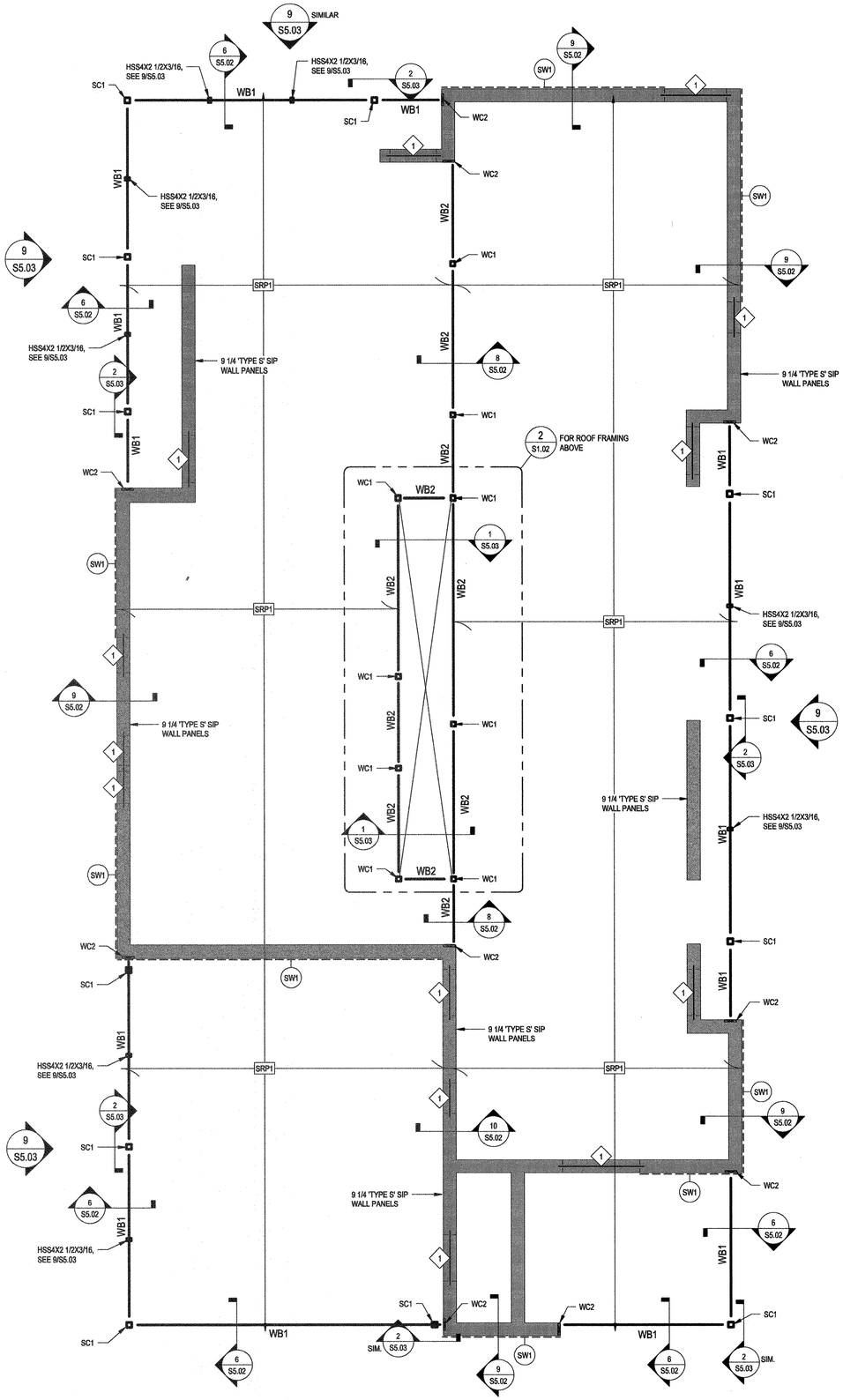
REV	DATE:	ISSUED FOR:
	5/17/19	PERMIT REVIEW 2018 CODE UPDATES

DRAWING NO: S1.01

JOB NO: 2305

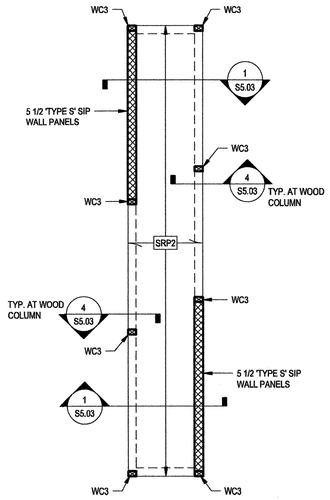
FOUNDATION PLAN

6/26/2019 5:55:07 AM



1 S1.02 ROOF FRAMING PLAN

SCALE: 1/4" = 1'-0"



2 S1.02 PARTIAL ROOF FRAMING PLAN

SCALE: 1/4" = 1'-0"

ROOF FRAMING PLAN NOTES:

- SEE GENERAL NOTES ON SHEET S0.00 FOR ADDITIONAL INFORMATION.
- SEE NAILING SCHEDULE ON SHEET S5.01 FOR TYPICAL NAILING REQUIREMENTS.
- WB# = WOOD BEAM BELOW ROOF FRAMING, SEE WOOD BEAM SCHEDULE ON SHEET S5.01.
- WC# = WOOD COLUMN BELOW ROOF FRAMING, SEE WOOD COLUMN SCHEDULE ON SHEET S5.01.
- SC# = STEEL COLUMN BELOW SECOND FLOOR FRAMING, SEE STEEL COLUMN SCHEDULE ON SHEET S5.01.
- = 9 1/4" 'TYPE S' SIP WALL PANEL SYSTEM TYPICAL, UNLESS NOTED OTHERWISE ON PLAN. FOR TYPICAL CORNER CONNECTIONS SEE DETAILS 7/S5.03 AND 8/S5.03. FOR TYPICAL WALL TOP PLATE SPLICE SEE DETAIL 3/S5.03 AND FOR TYPICAL WALL SPLINE SEE SECTION 5/S5.03.
- SRP# = SIP ROOF PANEL SYSTEM, SEE SIP ROOF PANEL SCHEDULE ON SHEET S5.01.
- (#) = WOOD HEADER BELOW ROOF FRAMING, SEE WOOD HEADER SCHEDULE ON SHEET S5.01.
- (SW#) = 'TYPE S' SIP PANEL SHEAR WALL BELOW ROOF FRAMING, SEE SHEAR WALL SCHEDULE ON SHEET S5.01.

FIELD COPY

CITY OF PHOENIX
Planning and Development Department
By: (SHELLY CHEN)
JUL 23 2019
This set of plans has been reviewed for STRUCTURAL and ~~ARCHITECTURAL~~ requirements prior to issuance of Building Permit and shall be kept at the construction site. Such review shall not prevent the Building Official from requiring correction of errors in the plans where such errors are subsequently found to be in violation of any law or ordinance.

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R	DATE:	ISSUED
	5/17/19	PERMIT REVIEW
		2018 CODE UPDATES

DRAWING **S1.02**

JOB NO: **2305**

ROOF FRAMING PLAN

NAILING SCHEDULE

CONNECTION	FASTENING	LOCATION
FLOOR FRAMING		
FLOOR FRAMING TO SILL OR GIRDER	(3) 8d COMMON (2 1/2" x 0.131") (3) 3" x 0.131" NAILS	TOENAIL
BRIDGING TO FLOOR FRAMING	(3) 8d COMMON (2 1/2" x 0.131") (3) 3" x 0.131" NAILS	TOENAIL EACH END
WALL FRAMING		
SOLE PLATE TO FLOOR FRAMING OR BLOCKING	16d COMMON (3 1/2" x 0.162") AT 8" OC 3"x0.131" NAILS AT 16" OC	TYPICAL NAIL FACE
SOLE PLATE TO JOIST OR BLOCK AT BRACED WALL PANEL	(3) 16d COMMON (3 1/2" x 0.162") AT 16" OC (4) 3"x0.131" NAILS AT 16" OC	BRACED WALL PANELS
TOP PLATE TO STUD	(2) 16d COMMON (3 1/2" x 0.162")	END NAIL
STUD TO SOLE PLATE	(2) 16d COMMON (3 1/2" x 0.162")	END NAIL
STUD TO SOLE PLATE	(4) 8d COMMON (3 1/2" x 0.131")	TOENAIL
DOUBLE STUDS	16d (3 1/2" x 0.135") AT 24" OC 3" x 0.131" NAIL AT 8" OC	FACE NAIL
DOUBLE TOP PLATES	16d (3 1/2" x 0.135") AT 24" OC 3" x 0.131" NAIL AT 12" OC	TYPICAL FACE NAIL
DOUBLE TOP PLATES	(8) 16d (3 1/2" x 0.162") (12) 3" x 0.131" NAILS	LAP SPLICE
BLOCKING BETWEEN JOISTS OR RIM BOARD TO TOP PLATE	(3) 8d COMMON (3 1/2" x 0.131") (3) 3" x 0.131" NAILS	TOENAIL
RIM BOARD TO TOP PLATE	8d COMMON (2 1/2" x 0.131") AT 6" OC 3" x 0.131" NAILS AT 6" OC	TOENAIL
TOP PLATES, LAPS AND INTERSECTIONS	(2) 16d COMMON (3 1/2" x 0.162") (3) 3" x 0.131" NAILS	FACE NAIL
BUILT UP CORNER STUDS	16d COMMON (3 1/2" x 0.162") 3" x 0.131" NAILS	24" OC 16" OC
MISCELLANEOUS		
CONTINUOUS HEADER, TWO PIECES	16d COMMON (3 1/2" x 0.162")	16" ON ALONG EDGE
CONTINUOUS HEADER TO STUD	(4) 8d COMMON (2 1/2" x 0.131")	TOENAIL
BUILT UP GIRDER AND BEAMS	20d COMMON (4" x 0.192") AT 32" OC 3" x 0.131" NAILS	FACE NAIL AT TOP AND BOTTOM STAGGERED ON OPPOSITE SIDES.
BUILT UP GIRDER AND BEAMS	(2) 20d COMMON (4" x 0.192") (3) 3" x 0.131" NAILS	FACE NAIL AT ENDS AND AT EACH SPLICE
ROOF AND CEILING FRAMING		
ROOF FRAMING TO PLATE	(3) 8d COMMON (2 1/2" x 0.131") (5) 3" x 0.131" NAILS	TOENAIL
CEILING JOISTS, LAPS OVER PARTITIONS (SEE SECTION 2308.10.4.1, TABLE 2308.10.4.1)	(3) 16d COMMON (3 1/2" x 0.162") MINIMUM, TABLE 2308.10.4.1 (4) 3" x 0.131" NAILS	FACE NAIL
CEILING JOISTS TO PARALLEL RAFTERS (SEE SECTION 2308.10.4.1, TABLE 2308.10.4.1)	(3) 16d COMMON (3 1/2" x 0.162") MINIMUM, TABLE 2308.10.4.1 (4) 3" x 0.131" NAILS	FACE NAIL
RAFTER TO PLATE (SEE SECTION 2308.10.1, TABLE 2308.10.4.1)	(3) 8d COMMON (2 1/2" x 0.131") (3) 3" x 0.131" NAILS	TOENAIL
2" PLANKS	16d COMMON (3 1/2" x 0.162")	AT EACH BEARING
COLLAR TIE TO RAFTER	(3) 10d COMMON (3"x0.148") (4) 3" x 0.131" NAILS	FACE NAIL
JACK RAFTER TO HIP	(3) 10d COMMON (3"x0.148") (4) 3" x 0.131" NAILS	TOENAIL
JACK RAFTER TO HIP	(2) 16d COMMON (3 1/2"x0.162") (3) 3" x 0.131" NAILS	FACE NAIL
TO 2-BY RIDGE BEAM	(2) 16d COMMON (3 1/2"x0.162") (3) 3" x 0.131" NAILS	TOENAIL
TO 2-BY RIDGE BEAM	(2) 16d COMMON (3 1/2"x0.162") (3) 3" x 0.131" NAILS	FACE NAIL
JOIST TO BAND JOIST	(3) 16d COMMON (3 1/2"x0.162") (4) 3" x 0.131" NAILS	FACE NAIL

NOTES:
- COMMON OR BOX NAILS ARE PERMITTED TO BE USE EXCEPT WHERE OTHERWISE STATED.
- THIS SCHEDULE IS BASED UPON THE "FASTENING SCHEDULE" IN IBC 2018 TABLE 2304.10.1 ANY QUESTIONS OR ITEMS NOT INCLUDED ON THE ABOVE SCHEDULE SHALL BE BROUGHT TO THE ENGINEERS IMMEDIATE ATTENTION.
- THIS SCHEDULE CONTAINS THE MINIMUM FASTENING AND IS TO BE USED UNLESS A FASTENING WITH GREATER CAPACITY IS SHOWN OR NOTED IN THE PLANS AND SECTIONS.
- ALL JOIST TO JOIST, JOIST TO BEAM, AND BEAM TO BEAM CONNECTIONS SHALL BE MADE WITH JOIST HANGERS.

FOOTING SCHEDULE

MARK	FOOTING SIZE	FOOTING REINFORCEMENT	FOOTING TYPE
F1	3'-0" x 3'-0" x 12" DEEP	3 - #5 E.W.	SPREAD FOOTING
F2	3'-0" x 3'-0" x 12" DEEP	3 - #5 E.W.	THICKENED SLAB
F3	2'-0" x 2'-0" x 12" DEEP	2 - #5 E.W.	THICKENED SLAB
WF-1	2'-0" x 12" DEEP	2 - #5 CONT.	WALL FOOTING
WF-2	2'-0" x 12" DEEP	2 - #5 CONT.	THICKENED SLAB

STEEL COLUMN SCHEDULE

MARK	SIZE	BASE PLATE (W x L x t) AND CONNECTORS	DETAILS
SC1	HSS4X4X3/16	10" x 10" x 3/4" W/ (4) - 3/4" DIA. ANCHOR BOLTS	7/S5.02

WOOD BEAM SCHEDULE

MARK	QUANTITY-SIZE	REMARKS
WB1	(2) 1 3/4" X 20" LVL	11/S5.02
WB2	(2) 1 3/4" X 11 1/4" LVL	11/S5.02

WOOD COLUMN SCHEDULE

MARK	QUANTITY-SIZE	REMARKS
WC1	3 1/2" X 3 1/2" PSL	NOTE 1
WC2	2X10	-
WC3	4X6	-

- NOTE 1 = PROVIDE SIMPSON CBSQ44-SDS2 COLUMN BASE AND SIMPSON PC4Z POST CAP TYPICAL WITH SIMPSON RTC44 POST CAPS AT CORNER CONDITIONS.

SIP ROOF PANEL SCHEDULE

MARK	PANEL CORE THICKNESS	BOTTOM PANEL SHEATHING	TOP PANEL SHEATHING	SPLINE MEMBER	PANEL ATTACHMENT		PANEL BRG. ELEVATION	COMMENTS
					SUPPORTS	SPLINE		
SRP1	11 1/4" (TYPE L)	7/16" OSB	5/8" OSB	4X12 (NOTE 4)	PBS #14 PANEL SCREW AT 12" O.C. (NOTE 3)	8d NAILS AT 3" O.C. (NOTE 5)	110' - 8"	NOTE 1, 2 AND 7
SRP2	5 1/2" (TYPE S)	7/16" OSB	5/8" OSB	'TYPE S' (NOTE 5)	PBS #14 PANEL SCREW AT 12" O.C. (NOTE 3)	8d NAILS AT 6" O.C. (NOTE 5)	117' - 0"	NOTE 1 AND 2

- NOTE 1 = DENOTES DIRECTION OF PLANK SPAN.
- NOTE 2 = COORDINATE OPENINGS FOR HVAC EQUIPMENT, PLUMBING, ETC. W/ DESIGNATED CONTRACTORS.
- NOTE 3 = PROVIDE MINIMUM 1" PENETRATION INTO PANEL SUPPORT.
- NOTE 4 = FOR SPLINE DETAIL SEE SECTION 6/S5.03.
- NOTE 5 = FOR SPLINE DETAIL SEE SECTION 5/S5.03.
- NOTE 6 = ALL NAILS ARE BOX NAILS UNLESS INDICATED OTHERWISE.
- NOTE 7 = ROOF PANELS HAVE BEEN DESIGNED FOR AN ADDITIONAL 4 PSF DEAD LOAD TO ACCOUNT FOR FUTURE SOLAR PANEL WEIGHT.

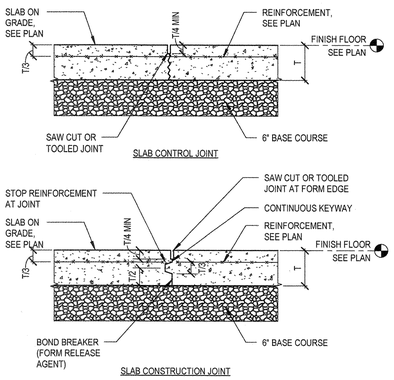
SHEAR WALL SCHEDULE

MARK	SIP PANEL SIZE	TOP AND BOTTOM PLATES	SHEATHING TYPE	SHEATHING ATTACHMENT (NOTE 3)			FASTENER TYPE	STUDS AT END OF WALL	HOLDOWN OR STRAP AT END OF WALL	DETAILS	REMARKS
				TOP	BOTTOM	SPLINE					
SW1	9 1/4" SIP PANEL (TYPE S)	4X10 (TOP) 2X10 (BOTTOM)	7/16" OSB	2 ROWS 6" O.C. STAGGERED	2 ROWS 6" O.C. STAGGERED	1 ROW 4" O.C.	8d NAILS	4X10	SIMPSON DTTZ2 HOLDOWN AT EA. END (NOTE 2)	3/S5.03 AND 5/S5.03	NOTE 1

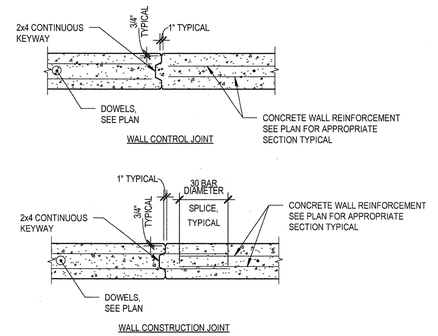
- NOTE 1 = ANCHOR BOTTOM PLATE TO CONCRETE FOUNDATION WITH 5/8" X 8" SIMPSON TITEN HD CONCRETE SCREWS AT 32" O.C. MAXIMUM WITH 1/4"x2"x2" PLATE WASHER.
- NOTE 2 = PROVIDE POST INSTALLED 1/2" DIA. THREADED ROD (8" MINIMUM EMBEDMENT WITH EPOXY ADHESIVE) WITH 1/4"x2"x2" WASHER.
- NOTE 3 = ALL NAILS ARE BOX NAILS UNLESS INDICATED OTHERWISE.

WOOD HEADER SCHEDULE

MARK	HEADER SIZE	SHOULDER STUD EA. END	FULL HEIGHT STUD EA. END	DETAIL
1	PREMIER INSUL-BEAM II	(1) - 2X10	(1) - 2X10	12/S5.02



1 S5.01 SECTION
SCALE: 1/2" = 1'-0"



2 S5.01 SECTION
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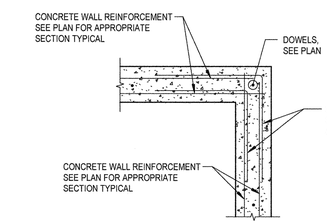

3 S5.01 DETAIL
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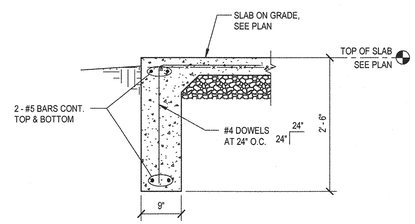

4 S5.01 SECTION
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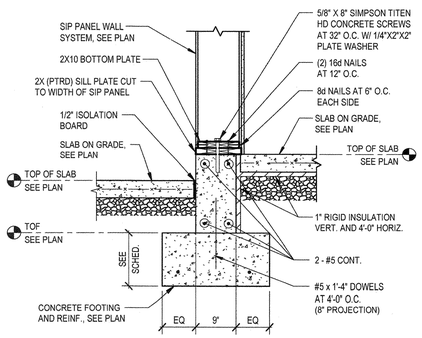

5 S5.01 SECTION
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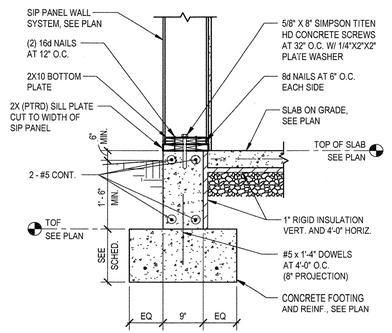
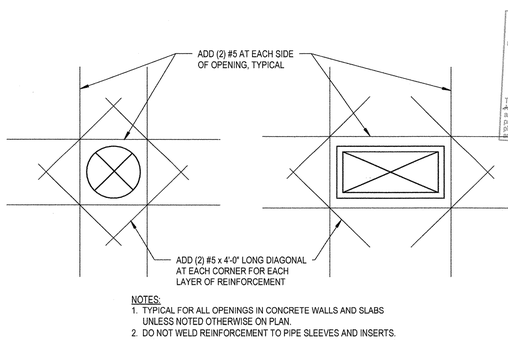


6 S5.01 SECTION
SCALE: 3/4" = 1'-0"



NOTES:
1. TYPICAL FOR ALL OPENINGS IN CONCRETE WALLS AND SLABS UNLESS NOTED OTHERWISE ON PLAN.
2. DO NOT WELD REINFORCEMENT TO PIPE SLEEVES AND INSERTS.

7 S5.01 DETAIL
SCALE: 1/2" = 1'-0"

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6/28/2019

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REV	DATE:	ISSUED FOR:
	5/17/19	PERMIT REVIEW 2018 CODE UPDATES
1	6/25/19	CITY COMMENTS

CITY OF PHOENIX
Planning and Development Department
By: (SHELLY CHEN)
JUL 23 2019
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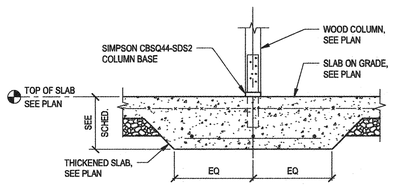
DRAWING NO: S5.01
JOB NO: 2305

SCHEDULES, SECTION AND DETAILS

6/28/2019 5:51:54 AM



1 S5.02 **SECTION**

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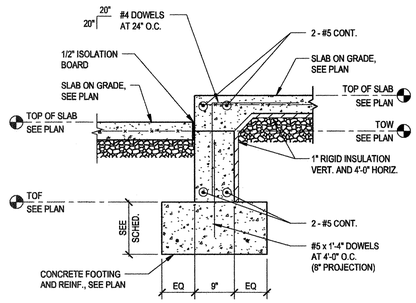

2 S5.02 **SECTION**

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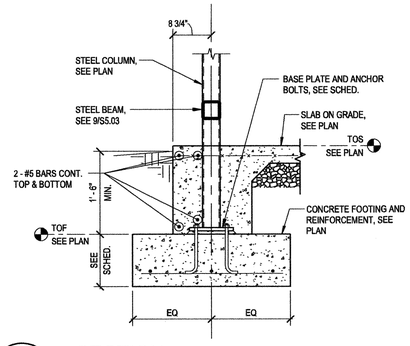

3 S5.02 **SECTION**

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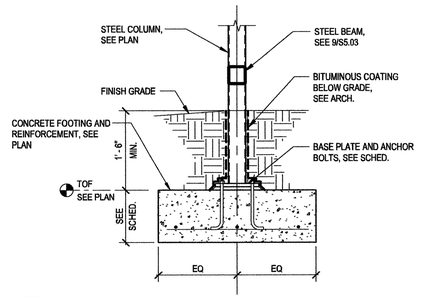

4 S5.02 **SECTION**

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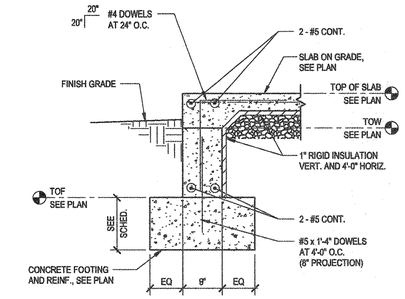

5 S5.02 **SECTION**

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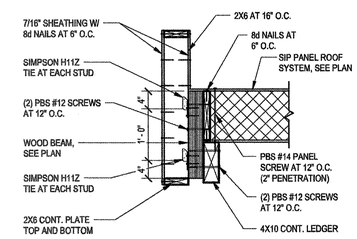

6 S5.02 **SECTION**

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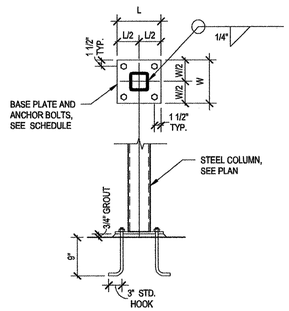

7 S5.02 **SECTION**

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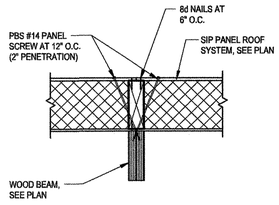

8 S5.02 **SECTION**

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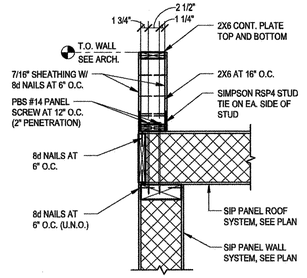

9 S5.02 **SECTION**

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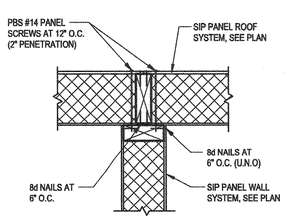

10 S5.02 **SECTION**

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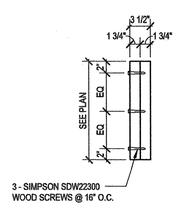
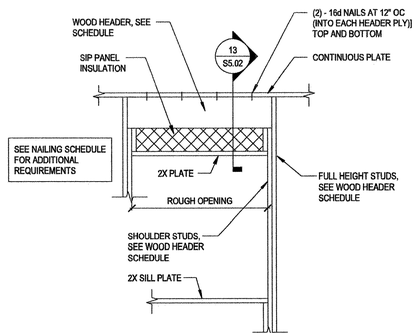


2 - PLY LVL

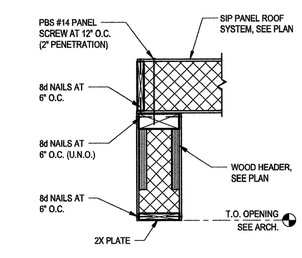
11 S5.02 **SECTION**

SCALE: 1" = 1'-0"



12 S5.02 **DETAIL**

SCALE: 3/4" = 1'-0"



13 S5.02 **SECTION**

SCALE: 3/4" = 1'-0"

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R	DATE:	ISSUED
	5/17/19	PERMIT REVIEW 2018 CODE UPDATES

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Planning and Development Department
By: (SHELLY CHENT)
JUL 23 2019
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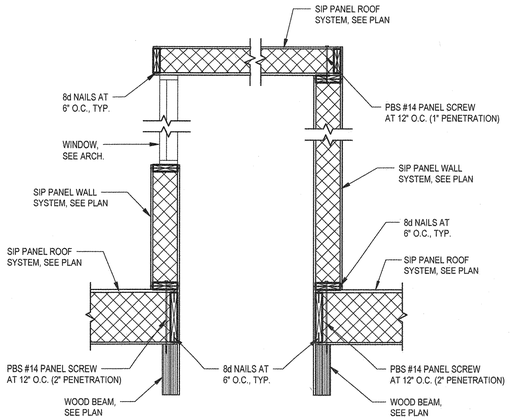
DRAWING **S5.02**

JOB NO: **2305**

SECTIONS AND DETAILS



1 S5.03 **SECTION**
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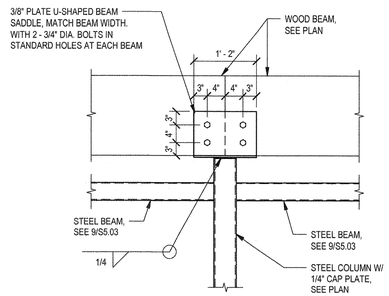

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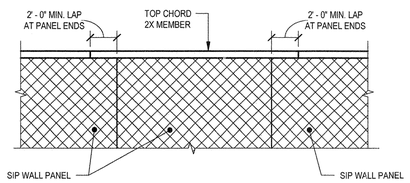

3 S5.03 **DETAIL**
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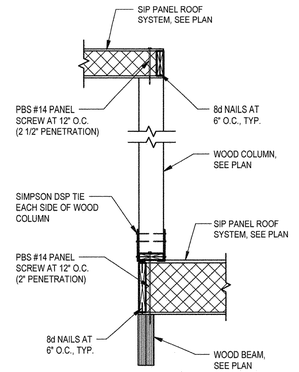

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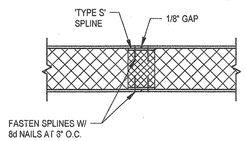
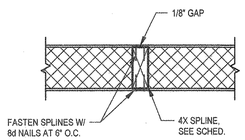
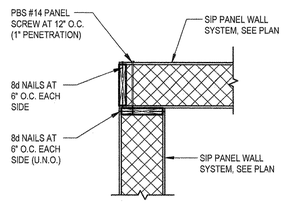


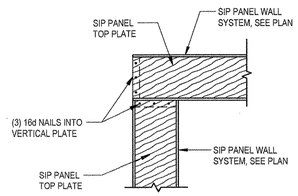
5 S5.03 **SECTION**
SCALE: 3/4" = 1'-0"



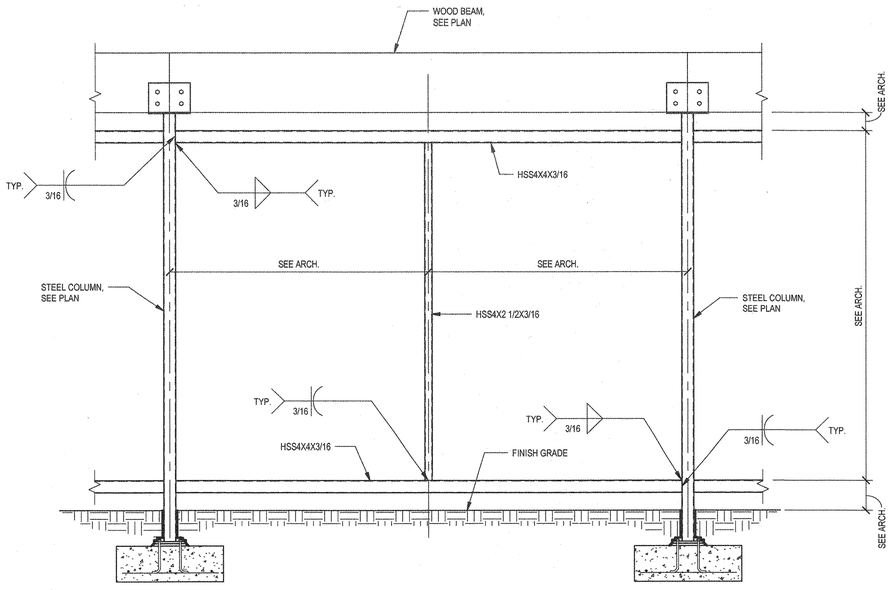
6 S5.03 **SECTION**
SCALE: 3/4" = 1'-0"



7 S5.03 **DETAIL**
SCALE: 3/4" = 1'-0"



8 S5.03 **DETAIL**
SCALE: 3/4" = 1'-0"



9 S5.03 **ELEVATION**
SCALE: 1/2" = 1'-0"

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CITY OF PHOENIX
Planning and Development Department
By: (SHELLY CHEN)
JUL 23 2019
This set of plans has been reviewed for STRUCTURAL and ~~ARCHITECTURAL~~ requirements prior to issuance of Building Permit and shall be kept at the construction site. Such review shall not prevent the Building Official from requiring correction of errors in the plans where such errors are subsequently found to be in violation of any law or ordinance.

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REV	DATE:	ISSUED FOR:
	5/17/19	PERMIT REVIEW 2018 CODE UPDATES

DRAWING NO: S5.03
JOB NO: 2305

SECTIONS AND DETAILS

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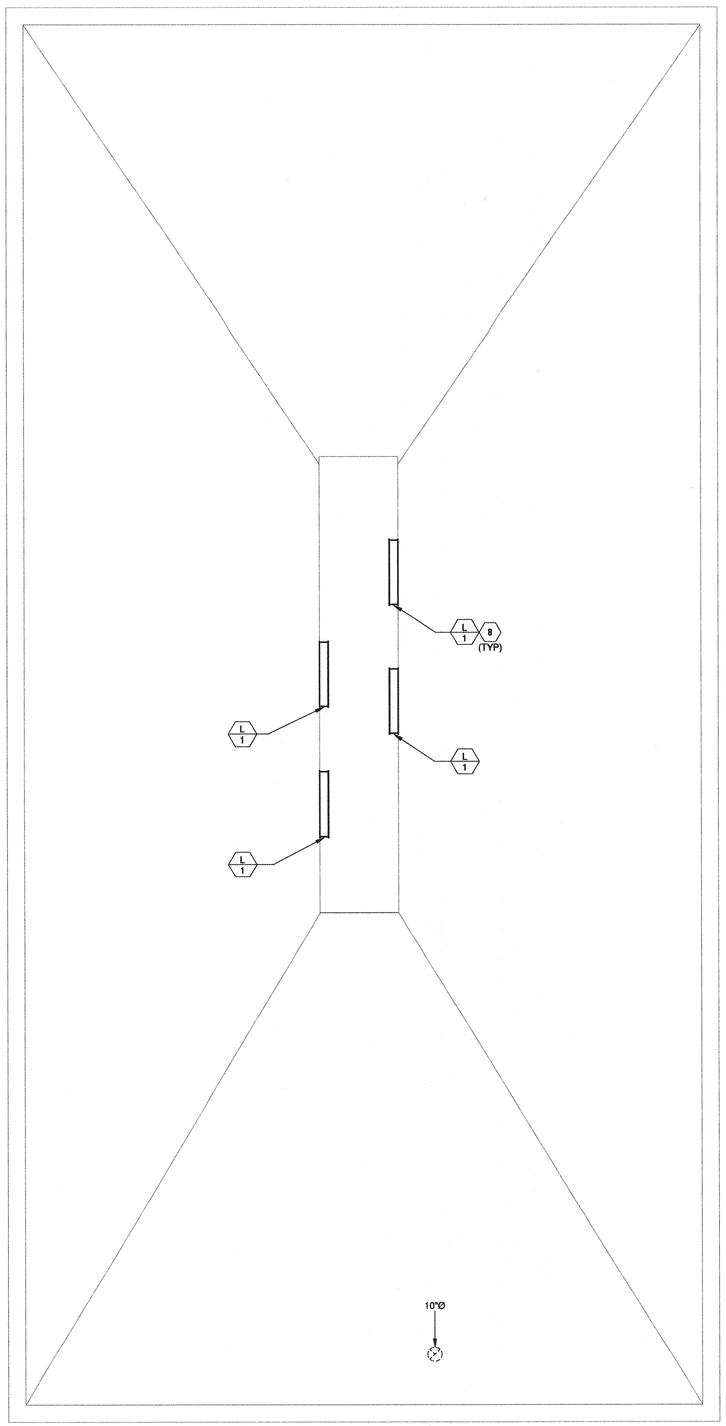
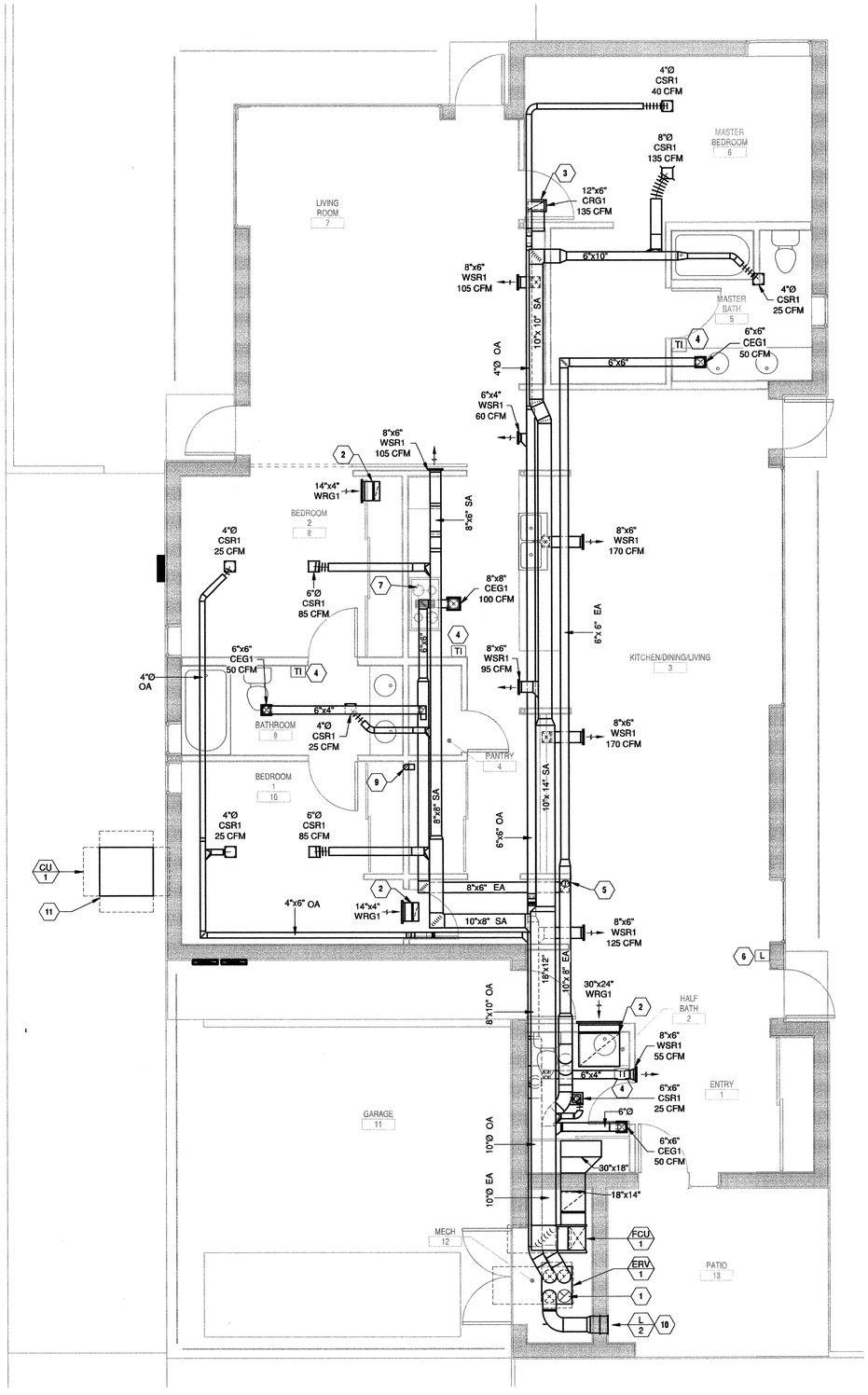


② HVAC ROOF PLAN
1/4" = 1'-0"



① HVAC FLOOR PLAN
1/4" = 1'-0"

MECHANICAL PLAN NOTES

1 EXHAUST AIR DUCT FROM ERV-1 UP THRU ROOF. TERMINATE WITH ROOF CAP WITH BACKDRAFT DAMPER AND BIRD SCREEN.
2 RETURN GRILLE WITH TRANSFER DUCT. TURN DUCT UP 90 DEGREES FOR SOUND MITIGATION.
3 CEILING MOUNTED RETURN GRILLE WITH TRANSFER DUCT. EXTEND TRANSFER DUCT INTO PLENUM AS SHOWN.
4 WALL MOUNTED 30-MINUTE AUTO SHUTOFF TIMER FOR ERV HIGH SPEED CONTROL. REFER TO SEQUENCE OF OPERATIONS FOR DETAILS.
5 SEVEN-DAY PROGRAMMABLE THERMOSTAT WITH CAPABILITY OF PROGRAMMING MULTIPLE SET POINTS PER DAY. THERMOSTAT SHALL SHALL INCLUDE THE CAPABILITY TO SET BACK ZONE TEMPERATURES DOWN TO 55ºF OR UP TO 85ºF.
6 GREEN LED WALL PLATE INDICATOR LIGHT. INDICATOR SHALL FIT IN A STANDARD SINGLE GANG OUTLET BOX. REFER TO SEQUENCE OF OPERATIONS FOR DETAILS.
7 RECIRCULATING UNDER-CABINET HOOD ABOVE STOVE. HOOD WILL NOT BE DUCTED TO THE OUTSIDE OF THE HOUSE.
8 NATURAL VENTILATION LOUVERS MOUNTED IN WALLS OF SOLAR CHIMNEY.
9 4" DRYER VENT UP THROUGH ROOF. TERMINATE WITH DRYER VENT CAP, INCLUDING BACKDRAFT DAMPER BUT NO BIRD SCREEN. DUCT EQUIVALENT LENGTH SHALL BE 15 FT MAXIMUM.
10 OUTDOOR AIR INTAKE LOUVER TO BE MOUNTED CLOSE TO UNDERSIDE OF PATIO OVERHANG. LOCATE LOUVER MINIMUM 3 FT BELOW ROOFTOP EXHAUST TERMINATION.
11 INSTALL HEAT PUMP CONDENSING UNIT AT GRADE ON 6" CONCRETE PAD.

GENERAL NOTES

A. ROUND AND RECTANGULAR SUPPLY, RETURN, AND OUTSIDE AIR DUCTWORK SHALL BE CONSTRUCTED PER SMACNA STANDARDS OF GALVANIZED STEEL SHEET METAL OF THE FOLLOWING THICKNESSES:

SMALLER THAN 18 INCHES: 26 GAGE
18-24 INCHES: 24 GAGE
LARGER THAN 20 INCHES: IN ACCORDANCE WITH SMACNA STANDARDS

B. ROUND AND RECANGULAR GENERAL EXHAUST AIR DUCTWORK SHALL BE CONSTRUCTED PER SMACNA STANDARDS OF 24 GAUGE ALUMINUM SHEET METAL.

C. DRYER EXHAUST DUCT SHALL BE 4 INCH DIAMETER, MINIMUM 28 GAUGE ALUMINUM DUCTWORK WITH SMOOTH INTERIOR FINISH.

D. THE USE OF FLEXIBLE DUCTWORK SHALL BE LIMITED TO 5 FT IN LENGTH AT REGISTER CONNECTIONS.

E. SUPPLY AND OUTSIDE AIR DUCTWORK SHALL BE INSULATED WITH R-6 FIBERGLASS DUCT WRAP WITH HEAVY DUTY FOIL-SCRIM-KRAFT FACING, AND WITH JOINTS TAPED WITH 3 INCH WIDE FOIL TAPE.

F. JOINTS, LONGITUDINAL AND TRANSVERSE SEAMS, AND CONNECTIONS IN DUCTWORK SHALL BE SECURELY FASTENED AND SEALED WITH WELDS, GASKETS, MASTICS (ADHESIVES), MASTIC-PLUS-EMBEDDED-FABRIC SYSTEMS, LIQUID SEALANTS OR TAPES. TAPES AND MASTICS USED TO SEAL METALLIC AND FLEXIBLE AIR DUCTS AND FLEXIBLE AIR CONNECTORS SHALL COMPLY WITH UL 181B AND SHALL BE MARKED "181 B-FX" FOR PRESSURE SENSITIVE TAPE OR "181BM" FOR MASTIC.

G. PROVIDE COPPER REFRIGERANT TUBING LINE SET SIZED AS RECOMMENDED BY EQUIPMENT MANUFACTURER AND OF LENGTH AS REQUIRED FOR THE INSTALLATION. ROUTE FROM FAN COIL UNIT, INSIDE HOUSE IN CEILING AND DOWN THROUGH EXTERIOR WALL TO HEAT PUMP CONDENSING UNIT. PROVIDE QUICK-CONNECT FLARE TUBING COMPRESSION FITTINGS OR SOLDER CONNECTIONS AS REQUIRED TO MATCH THE CONNECTIONS OF THE CONDENSING UNIT AND EVAPORATOR COIL.

H. PROVIDE MINIMUM 1 INCH THICK FOAMED PLASTIC INSULATION, ARMAFLEX OR EQUAL, ON REFRIGERANT SUCTION AND LIQUID LINES.

J. PROVIDE SHEET METAL COVER FOR REFRIGERANT PIPING INSULATION EXPOSED TO WEATHER AT CONDENSING UNIT. PAINT TO MATCH HOUSE.

K. ALL SPACE ABOVE CEILINGS WHERE DUCTWORK IS ROUTED IS A RETURN AIR PLENUM. ALL MATERIALS LOCATED IN PLENUM SHALL MEET APPLICABLE CODE REQUIREMENTS FOR THIS PURPOSE.

FIELD COPY

CITY OF PHOENIX
Planning and Development Department
By: (CARRELL HUNT)
JUL 23 2019
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HOME NZ

Registered Professional Engineer (Mechanical) CERTIFICATE NO. 42439 MARCUS E. SANCHEZ Date Signed ARIZONA U.S.A. Expires 03/31/2020

REV	DATE:	ISSUED FOR:
	5/17/19	PERMIT REVIEW 2018 CODE UPDATES

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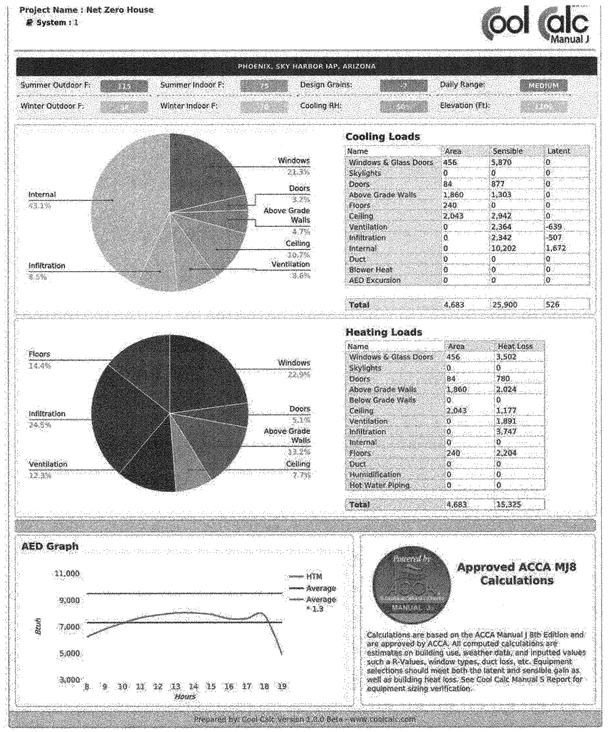
DRAWING M-1.01
JOB NO: 2305

HVAC PLAN

MARCUS E. SANCHEZ



1 HVAC LOAD CALCULATIONS
NTS

FAN COIL UNIT SCHEDULE (HEAT PUMP)

MARK	MANUFACTURER	MODEL	SUPPLY FAN				COOLING COIL						HEAT PUMP HEATING COIL			ELECTRICAL				WEIGHT (LBS)	NOTES
			CFM	ESP (IN)	BHP	NOM HP	TH (MBH)	SH (MBH)	EAT (°F DB)	EAT (°F WB)	LAT (°F DB)	LAT (°F WB)	REFR TYPE	MIN OUT (MBH)	AMBIENT (DB)	EAT (°F DB)	LAT (°F DB)	V/PH	MCA	MOCP	DISC TYPE	STARTER TYPE		
FCU-1	LENNOX	CBA38MV-042	1,000	0.8	1.0	1.0	28.1	28.1	78	60	51.4	49.5	R-410A	15.5	31	70	95.2	208 / 1	10	15	FACTORY	FACTORY	189	ALL

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. ASSOCIATED CONDENSING UNIT SHALL BE BY THE SAME MANUFACTURER.
B. FOR COOLING, EQUIPMENT SIZED FOR 115°F AMBIENT TEMPERATURE. HEAT PUMP HEATING CAPACITY BASED ON AMBIENT TEMPERATURE LISTED.
C. PROVIDE 2" MERV 8, PLEATED THROWAWAY AIR FILTERS.
D. PROVIDE WITH BOTTOM INLET CONNECTION AND BOTTOM RETURN AIR PLENUM WITH INTEGRAL 2" FILTER RACK.
E. PROVIDE WITH TOP OUTLET CONNECTION.
F. PROVIDE WITH 7-DAY PROGRAMMABLE THERMOSTAT WITH STAGED HEATING AND COOLING CAPABILITY AS REQUIRED FOR OPERATION OF HEATING, COOLING AND ECONOMIZER CONTROLS. REFER TO SEQUENCE OF OPERATION.
G. PROVIDE FACTORY MOUNTED STARTER AND DISCONNECT SWITCH INSTALLED ON SERVICE SIDE OF UNIT.
H. DISCONNECT FURNISHED BY ELECTRICAL CONTRACTOR.
J. PROVIDE SINGLE POINT POWER CONNECTION.
K. SPECIFIED FAN ESP ACCOUNTS FOR DUCT LOSSES EXTERNAL TO UNIT. FILTER LOSS IS AT A MAXIMUM OF 400 FPM FACE VELOCITY.
L. PROVIDE MOTOR HORSEPOWER TO OVERCOME INTERNAL UNIT STATIC PRESSURE DROP PLUS SPECIFIED EXTERNAL STATIC PRESSURE DROP. NOMINAL MOTOR HP SHALL BE NO LARGER THAN THE FIRST AVAILABLE NOMINAL MOTOR SIZE GREATER THAN THE REQUIRED BHP.
M. SELECT EQUIPMENT FOR ELEVATION OF 1100 FEET ABOVE SEA LEVEL.
N. PROVIDE AUXILIARY DRAIN PAN WITH FLOOD DETECTOR SWITCH TO SHUT OFF UNIT WHEN WATER IS PRESENT IN DRAIN PAN.

HEAT PUMP CONDENSING UNIT SCHEDULE

MARK	SERVICE	MANUFACTURER	MODEL	REFR TYPE	COOLING CAPACITY		HEATING CAPACITY			ELECTRICAL				WEIGHT (LBS)	NOTES
					TOTAL (MBH)	MIN EFF (SEER)	HEAT PUMP (MBH)	AMBIENT (DB)	MIN EFF HSPF	MCA	MOCP	V / PH	DISC TYPE		
CU-1	FCU-1	LENNOX	XP25-036-230	R-410A	28.1	21.5	27.187	31	10	20.3	30	208 / 1	FACTORY	277	ALL

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NOTES:

A. PROVIDE LOW AMBIENT CONTROL TO 30°F.
B. EQUIPMENT SIZED FOR 115°F AMBIENT TEMPERATURE.
C. HEAT PUMP (MBH) IS EQUIPMENT CAPACITY AT AMBIENT TEMPERATURE INDICATED.
D. CONTRACTOR SHALL VERIFY WITH EQUIPMENT SUPPLIER EXACT QUANTITY AND SIZE OF REFRIGERANT PIPING.
E. PROVIDE LIQUID LINE FILTER DRYER AND SIGHT GLASS.
F. PROVIDE CONCRETE HOUSEKEEPING PAD.
G. PROVIDE FACTORY MOUNTED DISCONNECT INSTALLED ON SERVICE SIDE OF UNIT.
H. STARTERS FOR ALL MOTORS SHALL BE FURNISHED INTEGRAL WITH UNIT.
J. PROVIDE CONDENSER COIL HAIL GUARDS.

ENERGY RECOVERY VENTILATION UNIT SCHEDULE

MARK	MANUFACTURER	MODEL	SUPPLY FAN (HIGH SPEED)		SUPPLY FAN (LOW SPEED)		EXHAUST FAN (HIGH SPEED)		EXHAUST FAN (LOW SPEED)		ELECTRICAL			WEIGHT (LBS)	NOTES
			CFM	ESP (IN)	CFM	ESP (IN)	CFM	ESP (IN)	CFM	ESP (IN)	V/PH	MCA	MOCP		
ERV-1	ZEHNDER	COMFOAIR 550 ERV	275	0.8	100	0.5	250	0.5	85	0.5	230/1	5A	15A	104	ALL

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. PROVIDE 2 INCH MERV 8, PLEATED THROWAWAY AIR FILTERS IN EACH AIRSTREAM.
B. DISCONNECT SWITCH(ES) FURNISHED BY ELECTRICAL CONTRACTOR.
C. STARTER(S) INTERGRAL TO UNIT.
D. MOUNT ERV ON STRUCTURAL STAND. HEIGHT TO BE DETERMINED BY MANUFACTURER'S INSTALLATION REQUIREMENTS.

GRILLE, REGISTER AND DIFFUSER SCHEDULE

MARK	MANUFACTURER	SERVICE	MODEL	CONSTRUCTION TYPE	MOUNTING LOCATION	FACE SIZE (IN)	MAX. NC	MAX. PRESS. DROP (IN. W.C.)	NOTES
WSR1	HART COOLEY	SUPPLY	682	STEEL	WALL	SEE PLANS	25	0.10	B,D
CSR1	HART COOLEY	SUPPLY	A714MS	STEEL	CEILING	8X8	25	0.10	A-D
CEG1	HART COOLEY	EXHAUST	RH45	ALUMINUM	CEILING	SEE PLANS	25	0.08	B,D
CRG1	HART COOLEY	RETURN	RH45	ALUMINUM	CEILING	SEE PLANS	25	0.08	B
WRG1	HART COOLEY	RETURN	RH45	ALUMINUM	WALL	SEE PLANS	25	0.08	B

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. 4-WAY THROW PATTERN UNLESS OTHERWISE INDICATED BY FLOW ARROWS ON DRAWINGS.
B. NECK SIZE SHOWN ON DRAWINGS. PROVIDE BRANCH DUCT TO MATCH NECK SIZE UNLESS OTHERWISE SHOWN ON DRAWINGS.
C. DOUBLE DEFLECTION BLACES SHALL BE ADJUSTABLE.
D. PROVIDE OPPOSED BLADE DAMPER ADJUSTABLE FROM FACE OF DEVICE.

LOUVER SCHEDULE

MARK	TYPE	MANUFACTURER	MODEL	QUANTITY	SIZE (W" x H")	NOTES
L-1	COMBINATION LOUVER / DAMPER	GREENHECK	EACC-601	4	44 x 36	A-E,G
L-2	FIXED BLADE LOUVER	GREENHECK	ESD-635	1	12 x 12	A,B,C,F

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REVISED

NOTES:

A. PROVIDE 1/2" MESH STEEL BIRD SCREEN.
B. PROVIDE ANODIZED FINISH.
C. FRAME TYPE SHALL MATCH WALL CONSTRUCTION. COORDINATE WITH ARCHITECT.
D. PROVIDE WITH INTEGRAL 24 V CONCEALED ACTUATOR.
E. REFER TO SEQUENCE OF OPERATION FOR DAMPER OPERATION.
F. PROVIDE WITH MOTOR-OPERATED DAMPER AND INTERLOCK DAMPER WITH ERV-1.
G. COORDINATE LOUVER HEIGHT WITH ADJACENT WINDOWS.

CITY OF PHOENIX
Planning and Development Department
By: [CARDELL HURT]
SEP 17 2019
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CONDITIONS FOR USE OF PLANS (APPLIES TO ALL SHEETS)

Agreement

The City of Phoenix (the "City") is making these draft model construction drawings (the "Plans") available free of charge and "as is," and subject to the terms and conditions of this Agreement.

No Warranty. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED. YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF THE PLANS, THAT THE PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS. You expressly acknowledge and agree that neither the City nor any design professionals who prepared the Plans accept any responsibility for the accuracy or completeness of the drawings, and that both the City any design professionals who prepared these draft plans disclaim all warranties, express or implied, with respect to the Plans and your use of the same.

You Assume All Liability. IN NO EVENT SHALL THE CITY OR ITS AFFILIATES OR ANY DESIGNERS WHO PREPARED THE PLANS BE LIABLE FOR ANY INDIRECT, PUNITIVE, INCIDENTAL, SPECIAL, EXEMPLARY OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN ANY WAY CONNECTED WITH YOUR USE OF THE PLANS IN ANY MANNER, including but not limited to economic loss, damage to property, and damage for personal injury arising out of your use of the Plans.

You Expressly Agree to Engage a Design Professional, Licensed Contractor and Inspectors as required. You expressly agree that the Plans are "as is" and in draft form and that you must seek professional assistance to guide you through the design and construction of the Plans. You agree that you will have the Plans reviewed and approved by a local professional and duly licensed architect and/or engineer as well as a licensed contractor before the start of any construction. **Your right to use the Plans is expressly conditioned on your agreement to engage a licensed architect and/or engineer and a licensed contractor prior to construction and to comply with all local building codes, zoning requirements, and other applicable laws, regulations, ordinances, and requirements, and to ascertain that the Plans are suitable for the intended site.** You agree that you will maintain, and will cause your design professionals, builders and other contractors involved in the Project, to maintain sufficient liability and other insurance coverages with insurance companies licensed in the applicable locations, as necessary to cover all of your obligations under this Agreement and applicable law.

Indemnity. YOU AGREE TO INDEMNIFY AND DEFEND THE CITY AND ITS AFFILIATES, DESIGN PROFESSIONALS OR OTHER LICENSORS WHO CONTRIBUTED TO THE PLANS, AND THEIR RESPECITVE OFFICERS, DIRECTORS, OWNERS, AGENTS, REPRESENTATIVES, CONTRACTORS, EMPLOYEES, ATTORNEYS, INSURERS AND ASSIGNS OF THE FOREGOING (COLLECTIVELY, THE "INDEMNIFIED PARTIES") AND HOLD THEM HARMLESS FROM AND AGAINST ANY AND ALL LOSSES, DEMANDS, CAUSES OF ACTION, DAMAGES, LIABILITY AND COSTS AND EXPENSES, INCLUDING REASONABLE ATTORNEYS' FEES, INCURRED OR SUSTAINED BY ANY OF THE INDEMNIFIED PARTIES IN CONNECTION WITH (I) THE USE, CONSTRUCTION OF, MODIFICATION OF, MISINTERPRETATION OR ALTERATION OF, OR REUSE BY, YOU OR OTHERS OF THE PLANS; (II) ANY NEGLIGENCE OR OTHER ACTS OR OMISSIONS BY YOU OR ANY OF YOUR CONTRACTORS, SUBCONTRACTORS, SUPPLIERS, EMPLOYEES, DESIGNERS, ARCHITECTS, ENGINEERS, CONSULTANTS, ADVISORS, AGENTS OR REPRESENTATIVES; AND (III) ANY BREACH BY YOU OR ANY OF YOUR CONTRACTORS, SUBCONTRACTORS, SUPPLIERS, EMPLOYEES, DESIGNERS, ARCHITECTS, ENGINEERS, CONSULTANTS, ADVISORS, AGENTS OR REPRESENTATIVES OF ANY OF THE PROVISIONS OF THIS AGREEMENT.

SEQUENCE OF OPERATIONS

SPLIT SYSTEM HEAT PUMP, FCU-1/CU-1

NORMAL OPERATION
- SPLIT SYSTEM SHALL STAGE HEATING AND COOLING TO MAINTAIN PROGRAMMED TEMPERATURE SETPOINTS
- DEFAULT COOLING SETPOINT SHALL BE 78°F
- DEFAULT HEATING SETPOINT SHALL BE 70°F

NATURAL VENTILATION MODE
- AN OUTDOOR AIR TEMPERATURE SENSOR AND ECONOMIZER CONTROLLER SHALL BE UTILIZED TO ACTIVATE NATURAL VENTILATION MODE
- NATURAL VENTILATION MODE SHALL BE ACTIVE WHEN THE THERMOSTAT CALLS FOR COOLING AND OUTDOOR TEMPERATURE IS BELOW 78°F
- NATURAL VENTILATON MODE SHALL SERVE AS FIRST STAGE OF COOLING.
- IN NATURAL VENTILATION MODE:
  1. LOUVERS LOCATED IN SOLAR CHIMNEY SHALL OPEN AUTOMATICALLY.
  2. A WALL MOUNTED INDICATOR LIGHT LOCATED NEAR THE PATIO DOOR SHALL ACTIVATE, SIGNALING FAVORABLE CONDITIONS.
  3. OWNER SHALL OPEN WINDOWS WHEN INDICATOR LIGHT IS ACTIVATED.

ENERGY RECOVERY VENTILATOR, ERV-1

NORMAL OPERATION
- ERV-1 SHALL HAVE TWO SPEEDS: LOW AND HIGH.
- UNIT SHALL OPERATE IN LOW SPEED UNTIL HIGH SPEED IS ACTIVATED BY ANY WALL BUTTON LOCATED IN A BATHROOM OR THE KITCHEN.
- ONCE ACTIVATED, ERV SHALL RUN IN HIGH SPEED FOR 30 MINUTES BEFORE RETURNING TO NORMAL LOW SPEED OPERATION.

NATURAL VENTILATION MODE
- DURING NATURAL VENTILATION MODE, ERV SHALL BE OFF UNTIL ACTIVATED BY A WALL BUTTON LOCATED IN A BATHROOM OR THE KITCHEN.
- ONCE ACTIVATED, ERV SHALL RUN IN HIGH SPEED FOR 30 MINUTES.
- IF AFTER 30 MINUTES THE SYSTEM IS STILL IN NATURAL VENTILATION MODE, ERV SHALL TURN OFF.
- IF AFTER 30 MINUTES THE SYSTEM IS NO LONGER IN NATURAL VENTILATION MODE AND HAS RETURNED TO NORMAL OPERATION, THE ERV SHALL RETURN TO NORMAL LOW SPEED OPERATION.

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HOME NZ

Registered Professional Engineer (Mechanical) CERTIFICATE NO. 42439 MARCUS E. SANCHEZ Date Signed ARIZONA U.S.A. Expires 03/31/2020

Sep 17 2019

REV	DATE:	ISSUED FOR:
	5/17/19	PERMIT REVIEW 2018 CODE UPDATES
	9/16/19	REVISIONS

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EXPIRES 6/30/2020

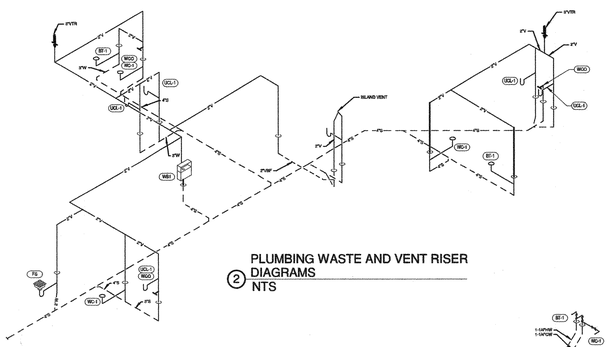
DRAWING M-201

JOB NO: 2305

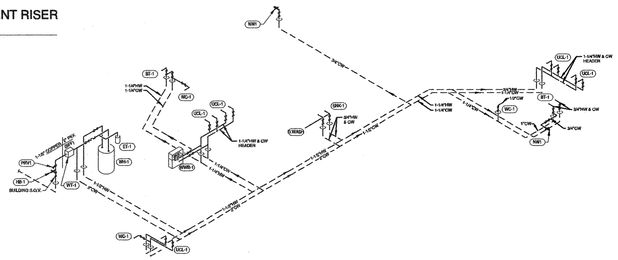
MECHANICAL SCHEDULES

MARCUS E. SANCHEZ

3/17/2019 1:14:37 PM



2 PLUMBING WASTE AND VENT RISER DIAGRAMS
NTS



3 PLUMBING WATER RISER DIAGRAMS
NTS

1) Total number of water supply fixture unit values: (IRC P2903.6)

TYPE OF FIXTURE OR GROUP OF FIXTURES	NUMBER OF FIXTURES EXST	NUMBER OF FIXTURES ADD'L		FIXTURE UNIT VALUE		TOTAL FIXTURE UNITS
Bathtub (with/without overhead shower)			X	1.4	=	
Clothes Washer		1	X	1.4	=	1.40
Dishwasher		1	X	1.4	=	1.40
Full-Bath Group with Bathtub (with or without shower head) or Shower Stall		2	X	3.6	=	7.20
Half-Bath Group (water closet and lavatory)		1	X	2.6	=	2.6
Hose Bibb (include only 2)		2	X	2.5	=	5.0
Kitchen Group (dishwasher and sink with or without garbage disposal)		1	X	2.5	=	2.5
Kitchen Sink			X	1.4	=	
Laundry Group (clothes washer standpipe and laundry tub)			X	2.5	=	
Laundry Tub			X	1.4	=	
Lavatory			X	0.7	=	
Shower Stall			X	1.4	=	
Water Closet (tank type)			X	2.2	=	
Other* (Specify)			X		=	
Other* (Specify)			X		=	
				Total		20.10

*For fixture unit values not listed, choose a fixture with similar flow characteristics (IRC P2903.6(1))

2) Total developed length of the water supply line from the water meter to the most remote water using fixture (this includes hot and cold water branches) = 82 feet multiplied by 1.2 (compensation for the pressure loss through fittings) = 98 feet. (IRC AP201.3)

CONDITIONS FOR USE OF PLANS (APPLIES TO ALL SHEETS)

Agreement

The City of Phoenix (the "City") is making these draft model construction drawings (the "Plans") available free of charge and "as is," and subject to the terms and conditions of this Agreement.

No Warranty. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED. YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF THE PLANS, THAT THE PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS. You expressly acknowledge and agree that neither the City nor any design professionals who prepared the Plans accept any responsibility for the accuracy or completeness of the drawings, and that both the City any design professionals who prepared these draft plans disclaim all warranties, express or implied, with respect to the Plans and your use of the same.

You Assume All Liability. IN NO EVENT SHALL THE CITY OR ITS AFFILIATES OR ANY DESIGNERS WHO PREPARED THE PLANS BE LIABLE FOR ANY INDIRECT, PUNITIVE, INCIDENTAL, SPECIAL, EXEMPLARY OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN ANY WAY CONNECTED WITH YOUR USE OF THE PLANS IN ANY MANNER, including but not limited to economic loss, damage to property, and damage for personal injury arising out of your use of the Plans.

You Expressly Agree to Engage a Design Professional, Licensed Contractor and Inspectors as required. You expressly agree that the Plans are "as is" and in draft form and that you must seek professional assistance to guide you through the design and construction of the Plans. You agree that you will have the Plans reviewed and approved by a local professional and duly licensed architect and/or engineer as well as a licensed contractor before the start of any construction. **Your right to use the Plans is expressly conditioned on your agreement to engage a licensed architect and/or engineer and a licensed contractor prior to construction and to comply with all local building codes, zoning requirements, and other applicable laws, regulations, ordinances, and requirements, and to ascertain that the Plans are suitable for the intended site.** You agree that you will maintain, and will cause your design professionals, builders and other contractors involved in the Project, to maintain sufficient liability and other insurance coverages with insurance companies licensed in the applicable locations, as necessary to cover all of your obligations under this Agreement and applicable law.

Indemnity. YOU AGREE TO INDEMNIFY AND DEFEND THE CITY AND ITS AFFILIATES, DESIGN PROFESSIONALS OR OTHER LICENSORS WHO CONTRIBUTED TO THE PLANS, AND THEIR RESPECITVE OFFICERS, DIRECTORS, OWNERS, AGENTS, REPRESENTATIVES, CONTRACTORS, EMPLOYEES, ATTORNEYS, INSURERS AND ASSIGNS OF THE FOREGOING (COLLECTIVELY, THE "INDEMNIFIED PARTIES") AND HOLD THEM HARMLESS FROM AND AGAINST ANY AND ALL LOSSES, DEMANDS, CAUSES OF ACTION, DAMAGES, LIABILITY AND COSTS AND EXPENSES, INCLUDING REASONABLE ATTORNEYS' FEES, INCURRED OR SUSTAINED BY ANY OF THE INDEMNIFIED PARTIES IN CONNECTION WITH (I) THE USE, CONSTRUCTION OF, MODIFICATION OF, MISINTERPRETATION OR ALTERATION OF, OR REUSE BY, YOU OR OTHERS OF THE PLANS; (II) ANY NEGLIGENCE OR OTHER ACTS OR OMISSIONS BY YOU OR ANY OF YOUR CONTRACTORS, SUBCONTRACTORS, SUPPLIERS, EMPLOYEES, DESIGNERS, ARCHITECTS, ENGINEERS, CONSULTANTS, ADVISORS, AGENTS OR REPRESENTATIVES; AND (III) ANY BREACH BY YOU OR ANY OF YOUR CONTRACTORS, SUBCONTRACTORS, SUPPLIERS, EMPLOYEES, DESIGNERS, ARCHITECTS, ENGINEERS, CONSULTANTS, ADVISORS, AGENTS OR REPRESENTATIVES OF ANY OF THE PROVISIONS OF THIS AGREEMENT.

MARCUS E. SANCHEZ

PLUMBING FIXTURE SCHEDULE

FIXTURES IN THIS SCHEDULE OR THEIR APPROVED EQUIVALENT ARE PROVIDED BY THE PLUMBING CONTRACTOR. SUBMIT SHOP DRAWINGS ON EACH OF THESE ITEMS. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION AND INSTALLATION REQUIREMENTS. VERIFY ROUGH-IN REQUIREMENTS WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS. REFER TO THE ARCHITECTURAL DRAWINGS FOR THE PLUMBING FIXTURE MOUNTING HEIGHTS.

PLUMBING PLAN MARK	Description
B. TUB	ADA TUB WITH SHOWER USE. THINK EVOLVE OR SIMILAR.
FS	FLOOR SINK
HB	EXTERIOR HOSE BIBB.
K. SINK	UNDERCOUNTER MOUNTED SS SINK, SINGLE BOWL, KITCHEN FAUCET
LAV	ADA LAV W DECK MOUNTED FAUCET
WC	STANDARD HEIGHT WC. DUAL FLUSH.
WMB	WASHING MACHINE BOX.
WT	WATER TREAMENT SYSTEM - FLOWTECH HOME OR EQUAL.

PLUMBING PIPE MATERIAL SCHEDULE

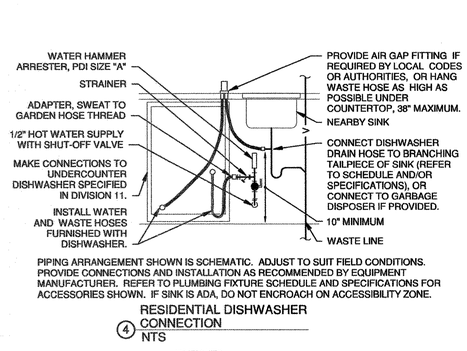
PIPING SYSTEM	ABBREVIATION	PIPING MATERIAL
VENT (ABOVE GRADE)	V	PVC
SANITARY DRAINAGE (BELOW GRADE)	S, W	SCHEDULE 40 PVC (SOLID WALL)
POTABLE WATER - 2" & SMALLER (BELOW GRADE)	CW, HW	TYPE K SOFT ANNEALED COPPER, POLYETHYLENE (PEX "A")
CONDENSATE DRAIN - 1" & SMALLER	CD	SCHEDULE 40 PVC (SOLID WALL)
REFER TO SPECIFICATIONS FOR FITTINGS, INSTALLATION REQUIREMENTS AND FURTHER INFORMATION		

ELECTRIC STORAGE WATER HEATER SCHEDULE

MARK	MANUFACTURER	MODEL#	AREA SERVED	TANK SIZE (GALLONS)	ELECTRICAL DATA VOLTS	PHASE	KW	RECOVERY (GPH)	NOTES
WH-1	HTP/SOLAR SKIES	DB-80-40-EB	HOME	80	120	1	6	65	A, B, C, D

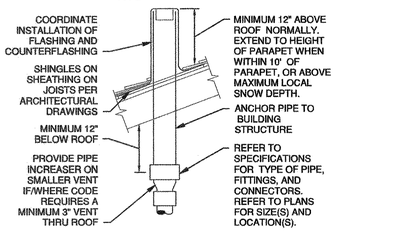
NOTES:

A. 80°F TEMPERATURE RISE WITH 120°F OPERATING TEMPERATURE
B. SINGLE ELEMENT
C. FURNISH WITH IMMERSION THERMOSTAT
D. SOLAR THERMAL WATER HEATER. PROVIDE WITH THERMAL SOLAR COLLECTOR (REFER TO ARCHITECTURAL DRAWINGS), CIRCULATION PUMP, DRAINBACK TANK, EXPANSION TANK, AND CONTROLLER.



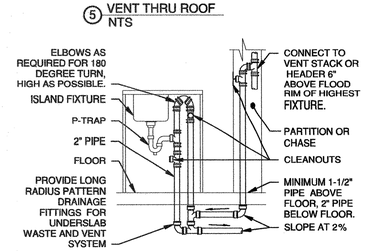
PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. PROVIDE CONNECTIONS AND INSTALLATION AS RECOMMENDED BY EQUIPMENT MANUFACTURER. REFER TO PLUMBING FIXTURE SCHEDULE AND SPECIFICATIONS FOR ACCESSORIES SHOWN. IF SINK IS ADA, DO NOT ENCROACH ON ACCESSIBILITY ZONE.

4 RESIDENTIAL DISHWASHER CONNECTION
NTS



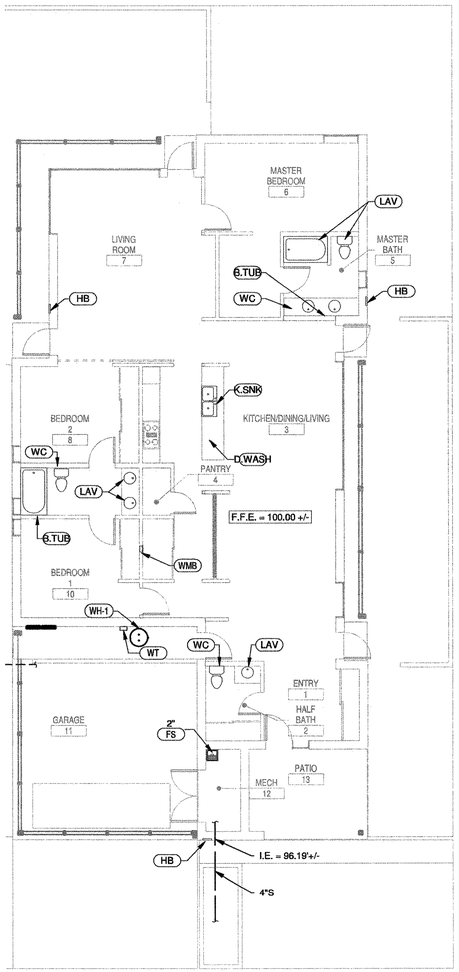
LOCATE VTR MINIMUM THREE FEET FROM PROPERTY LINE, TEN FEET HORIZONTAL OR THREE FEET VERTICAL ABOVE ANY BUILDING OPENING OR FRESH AIR INTAKE, TWENTY FIVE FEET FROM ANY OPENING OR FRESH AIR INTAKE IN MEDICAL FACILITIES AND ONE FOOT FROM ANY VERTICAL SURFACE. REFER TO CODES FOR OTHER VENT TERMINATION REQUIREMENTS. LOCATE VTR MINIMUM 18" FROM ADJACENT WALL, ROOF PEAK, GUTTER, EXPANSION JOINT, EQUIPMENT CURB, OR OTHER ROOF FEATURE. OFFSET IN CEILING SPACE WHERE REQUIRED TO MEET THESE CONDITIONS. INSULATE LAST SIX FEET OF VENT PIPE INSIDE BUILDING PER SPECIFICATIONS.

5 VENT THRU ROOF
NTS



ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. COMBINE VENTS FOR MORE THAN ONE FIXTURE MINIMUM 6" ABOVE HIGHEST FIXTURE FLOOD RIM IF POSSIBLE, OR PROVIDE SEPARATE LOOP FOR EACH ISLAND FIXTURE IF NOT POSSIBLE. REFER TO LOCAL CODE FOR ADDITIONAL INFORMATION.

6 ISLAND FIXTURE VENT
NTS



1 PLUMBING LEVEL 1 PLAN - AREA A
1/8" = 1'-0"

GENERAL NEW NOTES:

1. DRAWINGS ARE DIAGRAMMATIC ONLY AND REPRESENT THE GENERAL SCOPE OF THE WORK. REVIEW THE GENERAL NOTES, SPECIFICATIONS AND PLANS FOR ADDITIONAL REQUIREMENTS THAT MAY NOT BE SPECIFICALLY CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY THE ARCHITECT OF ANY CONFLICTS OR DISCREPANCIES PRIOR TO SUBMISSION OF BID.
2. PROVIDE TO THE ARCHITECT OR OWNER A COPY OF INSPECTION REPORTS AND APPROVAL CERTIFICATES FROM LOCAL AND STATE INSPECTIONS, REFER TO SPECIFICATIONS.
3. INSTALLATION SHALL COMPLY WITH LEGALLY CONSTITUTED CODES AND THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.
4. PLANS AND SPECIFICATIONS GOVERN WHERE THEY EXCEED CODE REQUIREMENTS.
5. VERIFY LOCATION AND DEPTH OF UTILITIES AT POINTS OF CONNECTION BEFORE START OF PIPING INSTALLATION.
6. REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF PLUMBING FIXTURES.
7. DO NOT SCALE FLOOR PLANS FOR EXACT HORIZONTAL LOCATION OF PIPE ROUTING.
8. INSTALL CONCEALED PIPING TIGHT TO THE STRUCTURE AND AS HIGH AS POSSIBLE. INSTALL EXPOSED PIPING TIGHT TO THE STRUCTURE, WALL OR CEILING AND AS HIGH AS POSSIBLE. COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS.
9. VALVES SHALL BE LINE SIZE UNLESS OTHERWISE NOTED.
10. COORDINATE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
11. COORDINATE PIPING INSTALLATION WITH STRUCTURAL GRADE BEAMS, FOOTINGS, COLUMN PIERS, ETC. SLEEVE PIPING THROUGH GRADE BEAMS, FOOTING, ETC. WHERE REQUIRED AND AS NOTED ON PLANS. COORDINATE SLEEVE INSTALLATIONS WITH THE ARCHITECT, STRUCTURAL ENGINEER, STRUCTURAL CONTRACTOR AND GENERAL CONTRACTOR BEFORE CONCRETE IS INSTALLED.
12. COORDINATE PIPE ROUTING AWAY FROM ELECTRICAL PANELS. DO NOT INSTALL PIPING OVER ELECTRICAL PANELS.
13. PAINT ALL EXPOSED WATER PIPING USING RUST INHIBITOR PAINT. PAINT AND COLOR SHALL BE COORDINATED WITH THE ARCHITECT AND / OR OWNER.
14. COORDINATE ALL ROOF PENETRATIONS WITH OTHER TRADES. MAINTAIN 10' MINIMUM CLEARANCE FROM ALL AIR INTAKES. MAINTAIN 2' CLEARANCE FROM ALL OTHER EQUIPMENT.

1. START-UP INFORMATION		
Calculated Flow Rate (Hunter's Curve):	27	GPM
Irrigation Flow Rate:	0	GPM
Mechanical Flow Rate:	0	GPM
Total System Flow Rate:	27	GPM
Elevation of Water Service Entrance:	100	Feet
**Static Elevation:	103	Feet
Minimum Pressure Required at Most Remote/Demanding Fixture:	25	PSI
Developed Length to Most Remote Fixture:	85	Feet
**Design Pipe Friction Pressure Loss	4	PSI Per 100 Feet
2. PRESSURE LOSSES		
Elevation Change to Most Remote Fixture:	1.3	PSI
Friction Loss in Piping, Valves and Fittings (120% of Piping)	4.1	PSI
Safety Factor:	5	PSI
Service Meter Loss:	5	PSI
Backflow Preventer Loss:	0	PSI
Water Filter Loss:	0	PSI
Water Softener Loss:	0	PSI
Water Softener Backflow Preventer Loss:	0	PSI
TMV Loss:	0	PSI
Submeter Loss:	0	PSI
Ice Machine Filter & BFP Loss	0	PSI
3. SYSTEM REQUIREMENTS		
Minimum Required Pressure at Water Service Entrance:	40.4	PSI

Water Meter Size - Per City of Phoenix Technical Guidelines is 3/4" x 3/4" (based on 36 SFU)

BASIS OF DESIGN FOR THE DOMESTIC WATER DISTRIBUTION, SIZING, AND PLUMBING FIXTURE SELECTION AS SHOWN IN THIS DOCUMENTS ARE BASED UPON A MINIMUM AVAILABLE WATER SERVICE PRESSURE OF 40.4 PSI AT THE POINT OF CONNECTION TO THE UTILITY WATER SERVICE PIPING. SHOULD AVAILABLE DOMESTIC WATER PRESSURE BE LESS THAN 40.4 PSI, AT MINIMUM 27 GPM, THEN OWNER SHALL BE RESPONSIBLE FOR PROVIDING A DOMESTIC WATER BOOSTER PUMP SYSTEM. SHOULD AVAILABLE WATER PRESSURE BE GREATER THAN 80 PSI, THEN OWNER SHALL BE RESPONSIBLE FOR PROVIDING A PRESSURE REDUCING VALVE TO REDUCE DOMESTIC WATER DISTRIBUTION PRESSURES BELOW 80 PSI.

2018 IPC FIXTURE LOADING

FIXTURE TYPE	QTY	D.F.U. (EA)	TOTAL D.F.U.	HOT S.F.U. (EA)	COLD S.F.U. (EA)	COMBINED S.F.U. (EA)	TOTAL S.F.U. (HOT)	TOTAL S.F.U. (COLD)	TOTAL SERVICE S.F.U.
BATHROOM GROUP (1.6 GPF FLUSH TANK)	2	5.0	10.0	1.50	2.70	3.60	3	5.4	7.2
PRIVATE CLOTHES WASHER RESIDENTIAL	1	2.0	2.0	1.00	1.00	1.40	1	1	1.4
DISHWASHER (RESIDENTIAL)	1	2.0	2.0	1.40	0.00	1.40	1.4	0	1.4
PUBLIC SINK (KITCHEN OR BREAKROOM)	1	2.0	2.0	3.00	3.00	4.00	3	3	4.0
PRIVATE LAVATORY	3	1.0	3.0	0.50	0.50	0.70	1.5	1.5	2.1
SHOWER (PRIVATE- ONE HEAD)	2	2.0	4.0	1.00	1.00	1.40	2	2	2.8
WALL HYDRANT	3	0.0	0.0	0.00	5.00	5.00	0	15	15.0
PRIVATE / PUBLIC WC (1.6 GPF FLUSHOMETER TANK)	1	4.0	4.0	0.00	2.2	2.00	0	2	2.0
TOTAL UNITS:	14		27.0				11.9	29.9	35.9

PLUMBING SYMBOLS

THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED.

PIPING LINETYPES

- CW — DOMESTIC COLD WATER (CW)
- SCW — SOFTENED COLD WATER (SCW)
- HW — DOMESTIC HOT WATER (HW)
- HWR — DOMESTIC HOT WATER RECIRC. (HWR)
- T — TRAP PRIMER LINE (T)
- S — SOIL PIPING - ABOVE FLOOR (S)
- -S- — SOIL PIPING - BELOW FLOOR (S)
- W — WASTE PIPING - ABOVE FLOOR (W)
- -W- — WASTE PIPING - BELOW FLOOR (W)
- VBG — VENT BELOW GRADE (VBG)
- VBF — VENT BELOW FLOOR (VBF)
- CD — CONDENSATE DRAIN (CD)
- WS — WATER SERVICE (WS)
- V — VENT PIPING (V)

PIPING SYMBOLS

- SHUTOFF VALVE
- HOSE BIBB (HB)

ABBREVIATIONS

ADA	AMERICANS WITH DISABILITIES ACT
AFF	ABOVE FINISHED FLOOR
BFF	BELOW FINISHED FLOOR
BFG	BELOW FINISHED GRADE
DN	DOWN
DFU	DRAINAGE FIXTURE UNIT
FFA	FROM FLOOR ABOVE
GPM	GALLONS PER MINUTE
HD	HEAD, HUB DRAIN
HZ	HERTZ
IE	INVERT ELEVATION
IN WC	INCHES OF WATER COLUMN
KW	KILOWATT
MAX	MAXIMUM
MBH	1000 BTU PER HOUR
MIN	MINIMUM
PH/Ø	PHASE
PRV	PRESSURE REDUCING VALVE
TFA	TO FLOOR ABOVE
TFB	TO FLOOR BELOW
TYP	TYPICAL
VTR	VENT THROUGH ROOF
W/	WITH
WC	WATER COLUMN
WSFU	WATER SUPPLY FIXTURE UNIT

ANNOTATION

(1) PLUMBING EQUIPMENT DESIGNATION. (CONTRACTOR FURNISHED AND INSTALLED). REFER TO PLUMBING FIXTURE OR EQUIPMENT SCHEDULES

STANDARD MOUNTING HEIGHTS

REFER TO THE ARCHITECTURAL DRAWINGS FOR PLUMBING FIXTURE MOUNTING HEIGHTS. UNO, INSTALL PLUMBING FIXTURES WITH THE MOUNTING HEIGHTS AS LISTED BELOW WITH FINAL APPROVAL BY THE ARCHITECT.

LAVATORY OR SINK HEIGHT	31" FLOOR TO RIM
WATER CLOSET HEIGHT	15" FLOOR TO RIM
TUB VALVES HEIGHT	32" FLOOR TO CENTERLINE
HOSE BIBBS	36" AFF TO CENTERLINE
NON-FREEZE WALL HYDRANTS	18" AFG TO CENTERLINE

USE THE DEFAULT MOUNTING HEIGHTS SHOWN ABOVE UNLESS NOTED OTHERWISE IN THE SPECIFICATIONS OR ELSEWHERE. MOUNTING HEIGHTS LISTED ARE ABOVE FINISHED FLOOR (AFF) OR ABOVE FINISHED GRADE (AFG). ALL DEVICES SHALL BE INSTALLED IN COMPLIANCE WITH CURRENT ADA AND LOCAL REQUIREMENTS.

Sheet List - Plumbing

Sheet Number	Sheet Name	Sheet Order
P-001	PLUMBING PLAN	
Grand total: 1		

Marlene Imirzian & Associates LLC, Architects
8906 North Central Avenue
Phoenix, AZ 85020
602 943 5279 v
602 943 5673 f

HOME NZ

Registered Professional Engineer (Retired) CERTIFICATE NO. 42439 MARCUS E. SANCHEZ Date Signed ARIZONA U.S.A. Expires 03/31/2020

REV	DATE:	ISSUED FOR:
	5/17/2019	PERMIT REVIEW
		2018 CODE UPDATES

HENDERSON ENGINEERS
5343 NORTH 16TH STREET, SUITE 460
PHOENIX, AZ 85016
TEL (602) 336-5200 FAX (602) 336-5201
WWW.HENDERSONENGINEERS.COM
1850001585
AZ. CORPORATE NO: 10470-0
EXPIRES 6/30/2020

CITY OF PHOENIX Planning and Development Department
By: (GARRELL HUNT) JUL 23 2019
This set of plans has been reviewed for PHOENIX CONSTRUCTION CODE prior to issuance of Building Permit and shall be kept at the construction site. Such review shall not prevent the Building Official from requiring correction of errors in plans, construction when in violation of any law or ordinance.

DRAWING P-0.01 JOB NO: 2305

FIELD COPY

PLUMBING PLAN

ELECTRICAL SYMBOLS

THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED. V3.00

STANDARD MOUNTING HEIGHTS

CONTROLS (TOP OF DEVICE)	48"
PHOTOCELLS	144"
RECEPTACLES	16"
RECEPTACLES (EXTERIOR)	24"
RECEPTACLES (GARAGES)	24"
RECEPTACLES (POOLS)	27"
RECEPTACLES (ABOVE COUNTER)	+6" ABOVE BACKSPLASH/COUNTER, 40" MAX
RECEPTACLES IN EQUIPMENT ROOMS	44"
SAFETY SWITCHES (TOP OF DEVICE)	48"
SWITCHES (TOP OF DEVICE)	44"
TELEVISION OUTLETS	REFER TO ARCH DRAWINGS
VISIBLE APPLIANCES (CENTERLINE)	84"

INSTALL OUTLET BOXES AT THE MOUNTING HEIGHTS SHOWN ABOVE UNO IN THE CONSTRUCTION DOCUMENTS. MOUNTING HEIGHTS LISTED ABOVE, OR ELSEWHERE IN THE CONSTRUCTION DOCUMENTS, ARE AFF OR AFG TO BOTTOM OF OUTLET BOX, UNO. ALL DEVICES SHALL BE INSTALLED IN COMPLIANCE WITH CURRENT ADA AND LOCAL REQUIREMENTS.

ABBREVIATIONS

AF	AMPERE FUSE SIZE
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLING UNIT
AIC	AMPERE INTERRUPTING CAPACITY
AS	AMPERE SWTICH SIZE
AT	AMPERE TRIP SETTING
ATS	AUTOMATIC TRANSFER SWITCH
AV	AUDIO VISUAL
BAS	BUILDING AUTOMATION SYSTEM
BKR	BREAKER
C	CONDUIT
CAT	CATEGORY
CATV	CABLE TELEVISION SYSTEM
CCTV	CLOSED CIRCUIT TELEVISION
CD	CANDELA
CKT	CIRCUIT
CODE	APPLICABLE CODE ADOPTED BY JURISDICTION
CT	CURRENT TRANSFORMER
CTR	CENTER
CVD	CUMULATIVE VOLTAGE DROP
D/DEMO	DEMOLITION
DPDT	DOUBLE-POLE, DOUBLE-THROW
DPST	DOUBLE-POLE, SINGLE-THROW
E/ETR/EX	EXISTING TO REMAIN
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EM	EMERGENCY
EMS	ENERGY MANAGMENT SYSTEM
ELV	ELECTRONIC LOW-VOLTAGE
EWC	ELECTRIC WATER COOLER
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FACP	FIRE ALARM CONTROL PANEL
FCA	FAULT CURRENT AMPS AVAILABLE
FCU	FAN COIL UNIT
FF	FINISHED FLOOR
FLA	FULL LOAD AMPS
FLR	FLOOR
GC	GENERAL CONTRACTOR
GEC	GROUNDING ELECTRODE CONDUCTOR
GES	GROUNDING ELECTRODE SYSTEM
GFR	GROUND FAULT RELAY
G	GROUND
IG	ISOLATED GROUND
ISC	SHORT CIRCUIT CURRENT
JB/J-BOX	JUNCTION BOX
LF	LINEAR FEET
LRA	LOCKED ROTOR AMPS
LTG/LTS	LIGHTING/LIGHTS
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MFR	MANUFACTURER
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MLV	MAGNETIC LOW-VOLTAGE
MOCP	MAXIMUM OVERCURRENT PROTECTION
MTD	MOUNTED
N/A	NOT APPLICABLE
NF	NON-FUSED
NL	NIGHT LIGHT (24HR ON)
NRTL	NATIONALLY RECOGNIZED TESTING LABORATORY (CSA, ETL, NSF, UL)
NTS	NOT TO SCALE
OS	OCCUPANCY SENSOR
P	POLE
PART	PARTIAL CIRCUIT
PH/Ø	PHASE
PNL	PANEL
PNLBD	PANELBOARD
PROVIDE	FURNISH AND INSTALL
PT	POTENTIAL TRANSFORMER
QTY	QUANTITY
R/REL	RELOCATE
RCPT	RECEPTACLE
RLA	RUNNING LOAD AMPS
RTU	ROOFTOP UNIT
SCCR	SHORT-CIRCUIT CURRENT RATING
SD	SMOKE DUCT DETECTOR
SF	SQUARE FEET
SPDT	SINGLE-POLE, DOUBLE-THROW
SPST	SINGLE-POLE, SINGLE-THROW
SSBJ	SUPPLY-SIDE BONDING JUMPER
ST	SHUNT TRIP
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TBB	TELECOMMUNICATIONS BONDING BACKBONE
TBD	TO BE DETERMINED
TGB	TELECOMMUNICATIONS GROUND BUS BAR
TL	TWISTLOCK
TMGB	TELECOMMUNICATIONS MAIN GROUND BUS BAR
TX/XFMR	TRANSFORMER
TYP	TYPICAL
U/F	UNDERFLOOR
U/G	UNDERGROUND
U/S	UNDERSLAB
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
UPS	UNITERRUPTIBLE POWER SUPPLY
VD	VOLTAGE DROP
VFD	VARIABLE FREQUENCY DRIVE
VS	VACANCY SENSOR
W	WIRE
W/	WITH
WP	WEATHER PROOF
WR	WEATHER RESISTANT
WT	WATERTIGHT
XP	EXPLOSION PROFF

LINETYPE LEGEND

THROUGHOUT THE DRAWINGS DIFFERENT LINETYPES ARE USED IN COMBINATION WITH THE SYMBOLS TO INDICATE THE STATUS OF ITEMS AS EXISTING, TO BE DEMOLISHED, TO BE INCLUDED AS PART OF NEW WORK AND/OR ITEMS WHICH ARE ANTICIPATED TO BE PROVIDED IN THE FUTURE. THE STATUS OF ITEMS USING THESE LINETYPES ARE RELATIVE TO THE VIEW IN WHICH THEY APPEAR. PHASING SHOWN IN DRAWINGS IS NOT INTENDED TO FULLY DESCRIBE ALL NECESSARY CONSTRUCTION PHASING, WHICH IS DETERMINED BY THE CONTRACTOR AS PART OF THEIR RESPONSIBILITIES. ANY SUCH PHASES DESCRIBED IN THE CONSTRUCTION DOCUMENTS ARE GENERAL AND ONLY INTENDED TO INDICATE A BROAD ORDER FOR THE SAKE OF DESCRIBING THE PROJECT. THE FOLLOWING LINETYPES MAY BE USED ON ANY DEVICE, EQUIPMENT, NOTE, LINE, SHAPE, ETC.

EXISTING ——————
DEMOLISH — — — —
NEW ——————
FUTURE - - - - - - - -

POWER EQUIPMENT & DEVICES

ELECTRICAL PANELBOARD (SURFACE OR FLUSH MOUNT)

200/3/150/3R — DISCONNECT SWITCH - "200/3/150/3R" DENOTES AMPERES/POLE/FUSE/NEMA ENCLOSURE RATING, NF= NON-FUSED, CB= CIRCUIT BREAKER (200/3/CB), NO VALUE (200/3/150) FOR NEMA ENCLOSURE MEANS STANDARD NEMA 1 RATING

ANNOTATION

1/E1 — DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER

CIRCUITING & WIRING

7 5 3 OR P1-3,5,7 [R#] P1 — HOMERUN TO PANELBOARD. INFORMATION AT ARROWS ARE CIRCUIT NUMBERS AND PANELBOARD FOR TERMINATION. REFER TO PANELBOARD SCHEDULES FOR BRANCH CIRCUIT CONDUCTOR SIZES.

INDICATES RELAY NUMBER

CIRCUIT CONTINUATION OR PARTIAL CIRCUIT

CONDUIT CONCEALED

CONDUIT IN/UNDER FLOOR/GROUND CONSTRUCTION

CONNECTION POINT OR EQUIPMENT TERMINATION

EQUIPMENT TERMINATION

BRANCH CIRCUIT CONDUCTOR TABLE

WHERE TICK MARKS ARE NOT SHOWN, THE FOLLOWING SHALL GOVERN:

# OF POLES	HOT (PHASE)*	NEUTRAL (GROUNDED)**	GROUNDING***
1P	(1)	(1) UNO	(1)
2P	(2)	(1) UNO	(1)
3P	(3)	(1) UNO	(1)

* PROVIDE ADDITIONAL CONDUCTORS THROUGH ENTIRE CIRCUIT (SWITCHED, UNSWITCHED/EM, ETC.) AS INDICATED THROUGHOUT CONSTRUCTION DOCUMENTS AND AS REQUIRED FOR A COMPLETE AND WORKING SYSTEM.

** REFER TO SPECIFICATIONS FOR LIMITATIONS ON SHARING NEUTRAL (GROUNDED) CONDUCTORS. DO NOT CIRCUIT AS A MULTI-WIRE BRANCH CIRCUIT, UNO.

REFER TO SPECIFICATIONS, PLANS, NOTES, WIRING AND CONTROL DIAGRAMS FOR ADDITIONAL CIRCUITING REQUIREMENTS.

ELECTRICAL ONE-LINE & RISER DIAGRAM

###AS 3P FRS NEMA # — CIRCUIT BREAKER (RATINGS AS INDICATED)

PANELBOARD, SINGLE OR MULTI-SECTION (REFER TO SCHEDULES)

TX## — TRANSFORMER (TYPE AND RATINGS AS INDICATED)

MDP SWITCHBOARD ELEC ROOM ### AMPS 480Y/277V 3Ø 4W — SWITCHGEAR, SWITCHBOARD AND/OR DISTRIBUTION PANELBOARD (TYPE, RATING, DEVICES AND ACCESSORIES AS INDICATED)

— CIRCUIT IDENTIFICATION (REFER TO CIRCUIT SCHEDULE)

UTILITY METER (M) — UTILITY METER (AS REQUIRED BY UTILITY)

CURRENT TRANSFORMER RATING AS SPECIFIED OR REQUIRED

LIGHTING

A a — LIGHT FIXTURE

a = LOWER CASE LETTER IS SWITCH IDENTIFIER

A = UPPER CASE LETTER INDICATES LIGHT FIXTURE TYPE

REFER TO LIGHT FIXTURE SCHEDULE FOR MORE INFORMATION

BOXES, LIGHTING CONTROL & WIRING DEVICES

$# — SWITCH LETTER DESIGNATIONS AS FOLLOWS:
BLANK = SINGLE
3 = THREE-WAY
M = FRACTIONAL HORSEPOWER MANUAL CONTROLLER

SIMPLEX RECEPTICAL - NEMA 5-20R, UNO

DUPLEX RECEPTICAL - NEMA 5-20R, UNO

DOUBLE DUPLEX RECEPTICAL - NEMA 5-20R, UNO

SPECIAL RECEPTICAL - NEMA TYPE AS NOTED

OR GFCI — GFCI TYPE RECEPTACLE*

RECEPTACLE INSTALLED ABOVE COUNTER OR BACKSPLASH

RECEPTACLE INSTALLED IN CEILING

GFCI DEVICE
WP = WEATHER PROOF COVER
WR = WEATHER RESISTANT

CEILING/FLOOR MOUNT JUNCTION/OUTLET BOX

WALL MOUNT JUNCTION/OUTLET BOX

R# — WALL ROUGH-IN TELEVISION
TV = TELEVISION ROUGH-IN

* SYMBOL DEMONSTRATED WITH DUPLEX RECEPTACLE, WHEN USED IN COMBINATION WITH OTHER DEVICES MEANING IS SIMILAR FOR THOSE DEVICE TYPES.

PANELBOARD: SES

BUS AMPS: 200A
MAIN SIZE/TYPE: 200A M.C.B.
VOLTS/PHASE: 120/240 V 1P/3W
SUPPLIED BY: UTILITY TRANSFORMER

DWELLING UNIT
SERVICE SQUARE FOOTAGE: 3200

FAULT CURRENT: 10,792
AIC RATED: FULLY RATED
AIC RATING: 22,000
SERVES: RESIDENCE
MOUNTING: SURFACE
LOCATION: EXTERIOR

EQUIPMENT GROUND BUS
SERVICE ENTRANCE RATED

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	GND SIZE	BKR AMP	P	PHASE A		PHASE B		P	BKR AMP	GND SIZE	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1	LTG - GENERAL LTG A (AFCI)		1	12	12	20	1	0	3000			2	50	10	6		Z	ELECTRIC CAR	2
3	LTG - GENERAL LTG B (AFCI)		1	12	12	20	1			0	3000								4
5	LTG - GENERAL LTG C (AFCI)		1	12	12	20	1	0	4000			2	40	10	8		Z	RANGE	6
7	RCPT - BEDROOM A (AFCI)		1	12	12	20	1			0	4000								8
9	RCPT - BEDROOM B (AFCI)		1	12	12	20	1	0	2111			2	30	10	10		C	COOLING - COND UNIT	10
11	RCPT - LIVING RM A (AFCI)		1	12	12	20	1			0	2111								12
13	RCPT - LIVING RM B (AFCI)		1	12	12	20	1	0	3000			2	30	10	10		U	WATER HEATER	14
15	RCPT - EXTERIOR (AFCI)		1	12	12	20	1			0	3000								16
17	RCPT - KITCHEN A (AFCI)		1	12	12	20	1	0	3000			2	30	10	10		U	DRYER	18
19	RCPT - KITCHEN B (AFCI)		1	12	12	20	1			0	3000								20
21	RCPT - FRIDGE (GFCI)		1	12	12	20	1	0	832			2	15	12	12		M	FAN - INDOOR UNIT	22
23	RCPT - DINING (AFCI)		1	12	12	20	1			0	832								24
25	RCPT - WASHER (GFCI)		1	12	12	20	1	0	175			2	15	12	12		M	ERV	26
27	RCPT - GARAGE (AFCI)		1	12	12	20	1			0	175								28
29	RCPT - ATTIC (AFCI)		1	12	12	20	1	0	0			1	20	12	12	1		RCPT- GARAGE (GFCI)	30
31	MISC - FIRE ALARM		1	12	12	20	1			0	0	1	20	12	12	1		RCPT- GARAGE DOOR (AFCI)	32
33	SPARE					20	1	0	0			1	20					SPARE	34
35	SPARE					20	1			0	0	1	20					SPARE	36
37	SPARE					20	1	0	0			1	20					SPARE	38
39	EQUIPPED SPACE						1			0	0	1						EQUIPPED SPACE	40
41	EQUIPPED SPACE						1	0	0			1						EQUIPPED SPACE	42
			TOTAL LOAD (VA):					16118 VA		16118 VA									
			TOTAL AMPS:					134 A		134 A									

PANELBOARD NOTES

NOTE 1: PER NEC 220.14(J), VA LOADS FOR LIGHTING AND RECEPTACLE CIRCUITS INCLUDED IN NEC-220 LIGHTING LOAD CALCULATIONS (BASED ON SQUARE FOOTAGE)

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100 %	0 VA
COOLING (C)	5041 VA	100 %	5041 VA
HEATING (H)	0 VA	0 %	0 VA
LIGHTING/RECEPTACLE (L) (PER NEC-220)	9600 VA	55 %	5310 VA
MOTORS (M)	350 VA	100 %	350 VA
SUPPLEMENTAL HEAT (U)	12000 VA	100 %	12000 VA
MISC EQUIP (Z)	14000 VA	100 %	14000 VA
REFRIGERATION (F)	0 VA	100 %	0 VA
SIGN/DISPLAY (D)	0 VA	125 %	0 VA
KITCHEN (K)	0 VA	100 %	0 VA
LARGEST MOTOR	1400 VA	125 %	1750 VA
SHOW WINDOW (W)	0 VA	125 %	0 VA
TRACK LIGHTING	0 VA	100 %	0 VA

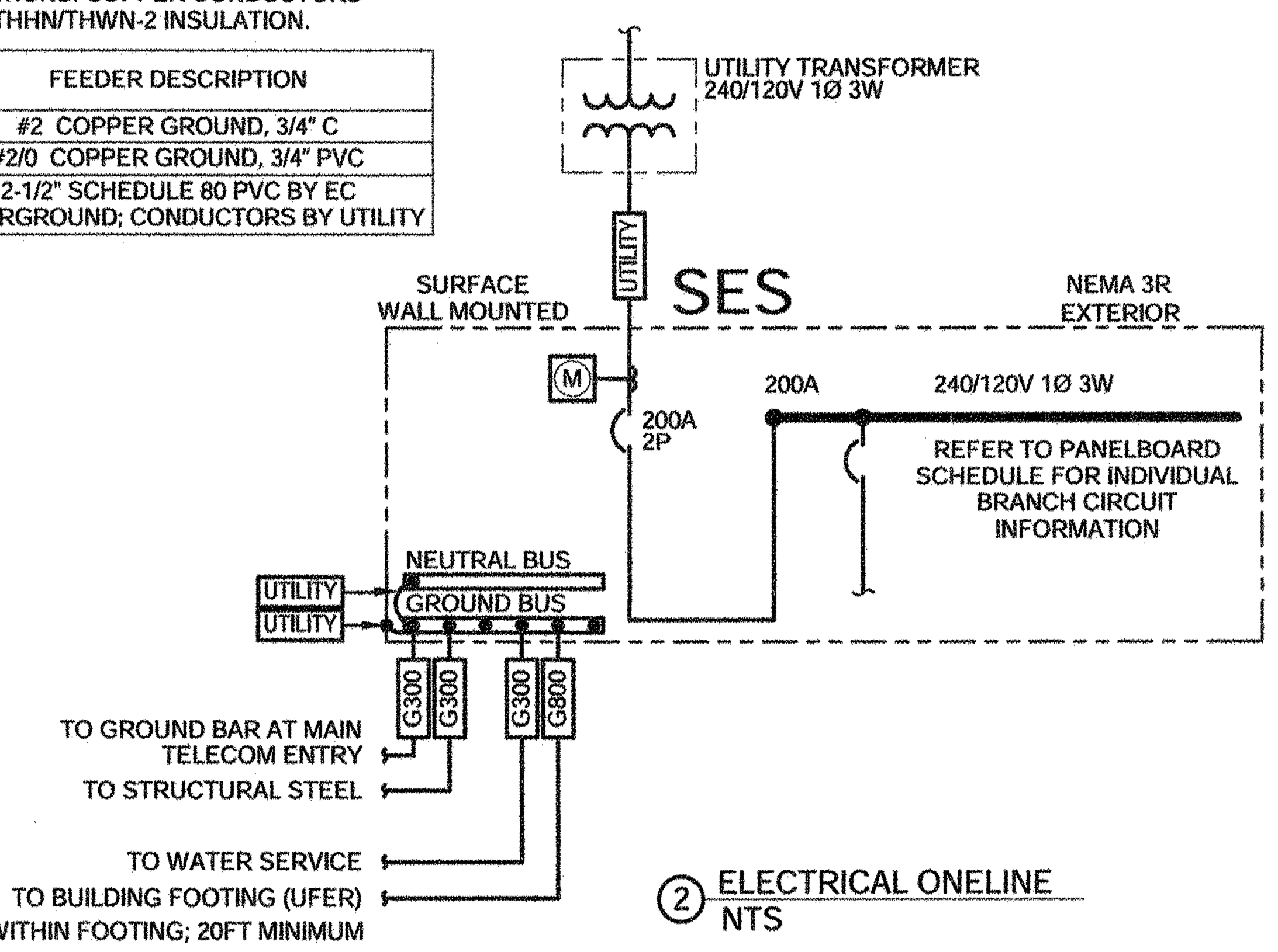
PANELBOARD TOTALS

TOTAL CONNECTED LOAD	43350 VA
TOTAL NEC LOAD	38451 VA
TOTAL CONNECTED CURRENT	181 A
TOTAL NEC DEMAND CURRENT	160 A

CIRCUIT SCHEDULE:

ALL CONDUCTOR SIZES ARE BASED ON 75 DEG C RATED TERMINATIONS. COPPER CONDUCTORS ARE BASED ON THHN/THWN-2 INSULATION.

FEEDER TAG	FEEDER DESCRIPTION
G300	#2 COPPER GROUND, 3/4" C
G800	#2/0 COPPER GROUND, 3/4" PVC
UTILITY	2-1/2" SCHEDULE 80 PVC BY EC UNDERGROUND; CONDUCTORS BY UTILITY



2 ELECTRICAL ONELINE
NTS

CONDITIONS FOR USE OF PLANS (APPLIES TO ALL SHEETS)

Agreement

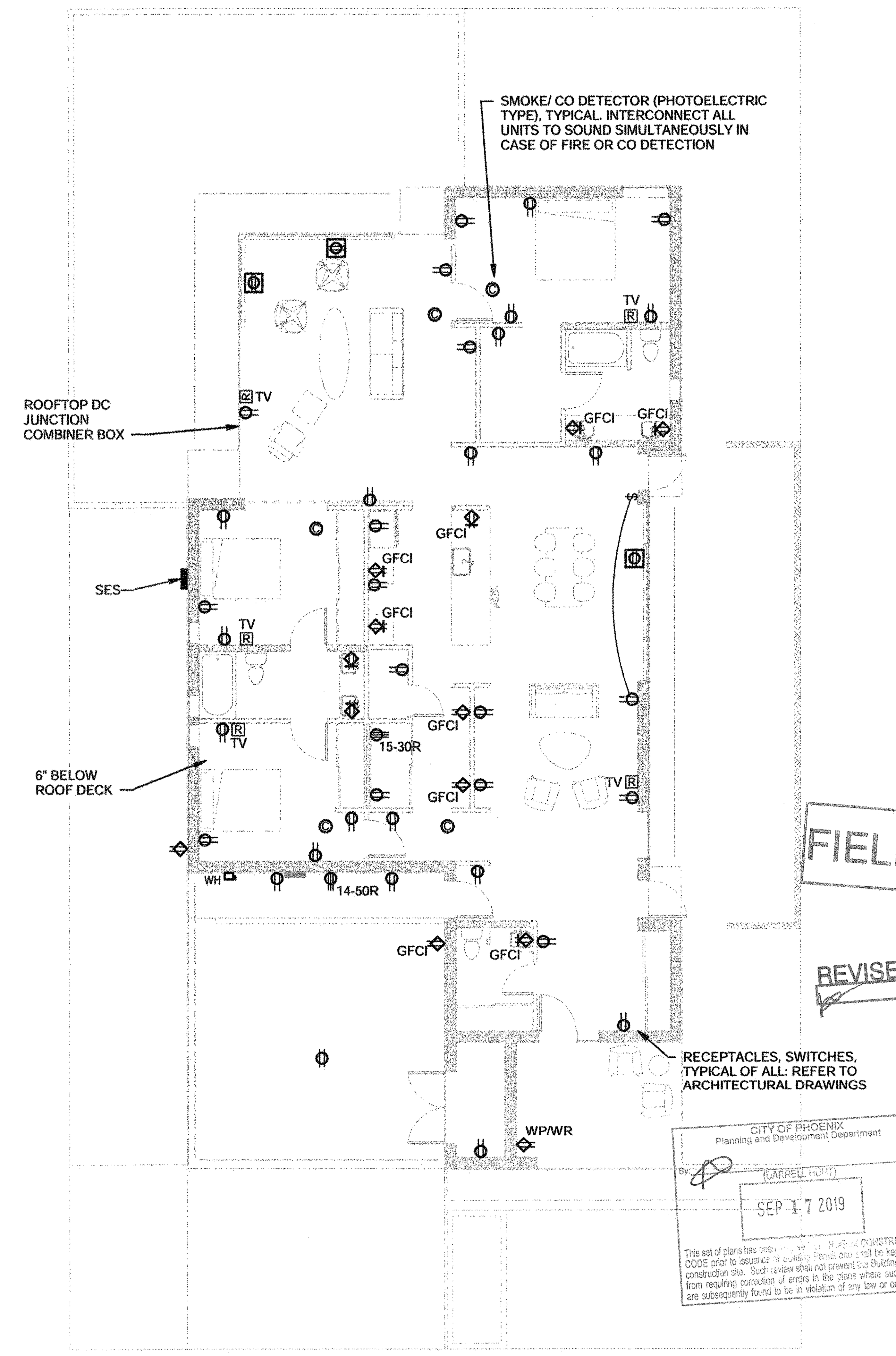
The City of Phoenix (the "City") is making these draft model construction drawings (the "Plans") available free of charge and "as is," and subject to the terms and conditions of this Agreement.

No Warranty. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED. YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF THE PLANS, THAT THE PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS. You expressly acknowledge and agree that neither the City nor any design professionals who prepared the Plans accept any responsibility for the accuracy or completeness of the drawings, and that both the City any design professionals who prepared these draft plans disclaim all warranties, express or implied, with respect to the Plans and your use of the same.

You Assume All Liability. IN NO EVENT SHALL THE CITY OR ITS AFFILIATES OR ANY DESIGNERS WHO PREPARED THE PLANS BE LIABLE FOR ANY INDIRECT, PUNITIVE, INCIDENTAL, SPECIAL, EXEMPLARY OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN ANY WAY CONNECTED WITH YOUR USE OF THE PLANS IN ANY MANNER, including but not limited to economic loss, damage to property, and damage for personal injury arising out of your use of the Plans.

You Expressly Agree to Engage a Design Professional, Licensed Contractor and Inspectors as required. You expressly agree that the Plans are "as is" and in draft form and that you must seek professional assistance to guide you through the design and construction of the Plans. You agree that you will have the Plans reviewed and approved by a local professional and duly licensed architect and/or engineer as well as a licensed contractor before the start of any construction. **Your right to use the Plans is expressly conditioned on your agreement to engage a licensed architect and/or engineer and a licensed contractor prior to construction and to comply with all local building codes, zoning requirements, and other applicable laws, regulations, ordinances, and requirements, and to ascertain that the Plans are suitable for the intended site.** You agree that you will maintain, and will cause your design professionals, builders and other contractors involved in the Project, to maintain sufficient liability and other insurance coverages with insurance companies licensed in the applicable locations, as necessary to cover all of your obligations under this Agreement and applicable law.

Indemnity. YOU AGREE TO INDEMNIFY AND DEFEND THE CITY AND ITS AFFILIATES, DESIGN PROFESSIONALS OR OTHER LICENSORS WHO CONTRIBUTED TO THE PLANS, AND THEIR RESPECITVE OFFICERS, DIRECTORS, OWNERS, AGENTS, REPRESENTATIVES, CONTRACTORS, EMPLOYEES, ATTORNEYS, INSURERS AND ASSIGNS OF THE FOREGOING (COLLECTIVELY, THE "INDEMNIFIED PARTIES") AND HOLD THEM HARMLESS FROM AND AGAINST ANY AND ALL LOSSES, DEMANDS, CAUSES OF ACTION, DAMAGES, LIABILITY AND COSTS AND EXPENSES, INCLUDING REASONABLE ATTORNEYS' FEES, INCURRED OR SUSTAINED BY ANY OF THE INDEMNIFIED PARTIES IN CONNECTION WITH (I) THE USE, CONSTRUCTION OF, MODIFICATION OF, MISINTERPRETATION OR ALTERATION OF, OR REUSE BY, YOU OR OTHERS OF THE PLANS; (II) ANY NEGLIGENCE OR OTHER ACTS OR OMISSIONS BY YOU OR ANY OF YOUR CONTRACTORS, SUBCONTRACTORS, SUPPLIERS, EMPLOYEES, DESIGNERS, ARCHITECTS, ENGINEERS, CONSULTANTS, ADVISORS, AGENTS OR REPRESENTATIVES; AND (III) ANY BREACH BY YOU OR ANY OF YOUR CONTRACTORS, SUBCONTRACTORS, SUPPLIERS, EMPLOYEES, DESIGNERS, ARCHITECTS, ENGINEERS, CONSULTANTS, ADVISORS, AGENTS OR REPRESENTATIVES OF ANY OF THE PROVISIONS OF THIS AGREEMENT.



1 POWER PLAN
1/8" = 1'-0"

Marlene Imirzian & Associates LLC, Architects
8906 North Central Avenue
Phoenix, AZ 85020
602 943 5279 v
602 943 5673 f

HOME NZ

Registered Professional Engineer (Electrical) CERTIFICATE NO. 39542 OMID MOTTAHED Date Signed ARIZONA, U.S.A.
EXPIRES 9/30/21

Sep 17 2019

REV	DATE:	ISSUED FOR:
	5/17/19	PERMIT REVIEW 2018 CODE UPDATES
	9/16/19	REVISIONS

FIELD COPY

REVISED

CITY OF PHOENIX Planning and Development Department — SEP 17 2019

HENDERSON ENGINEERS
5343 NORTH 16TH STREET, SUITE 460
PHOENIX, AZ 85016
TEL (602) 336-5200 FAX (602) 336-5201
WWW.HENDERSONENGINEERS.COM
1850001585
AZ. CORPORATE NO: 10470-0
EXPIRES 6/30/2020

DRAWING E-1.01

JOB NO: 2305

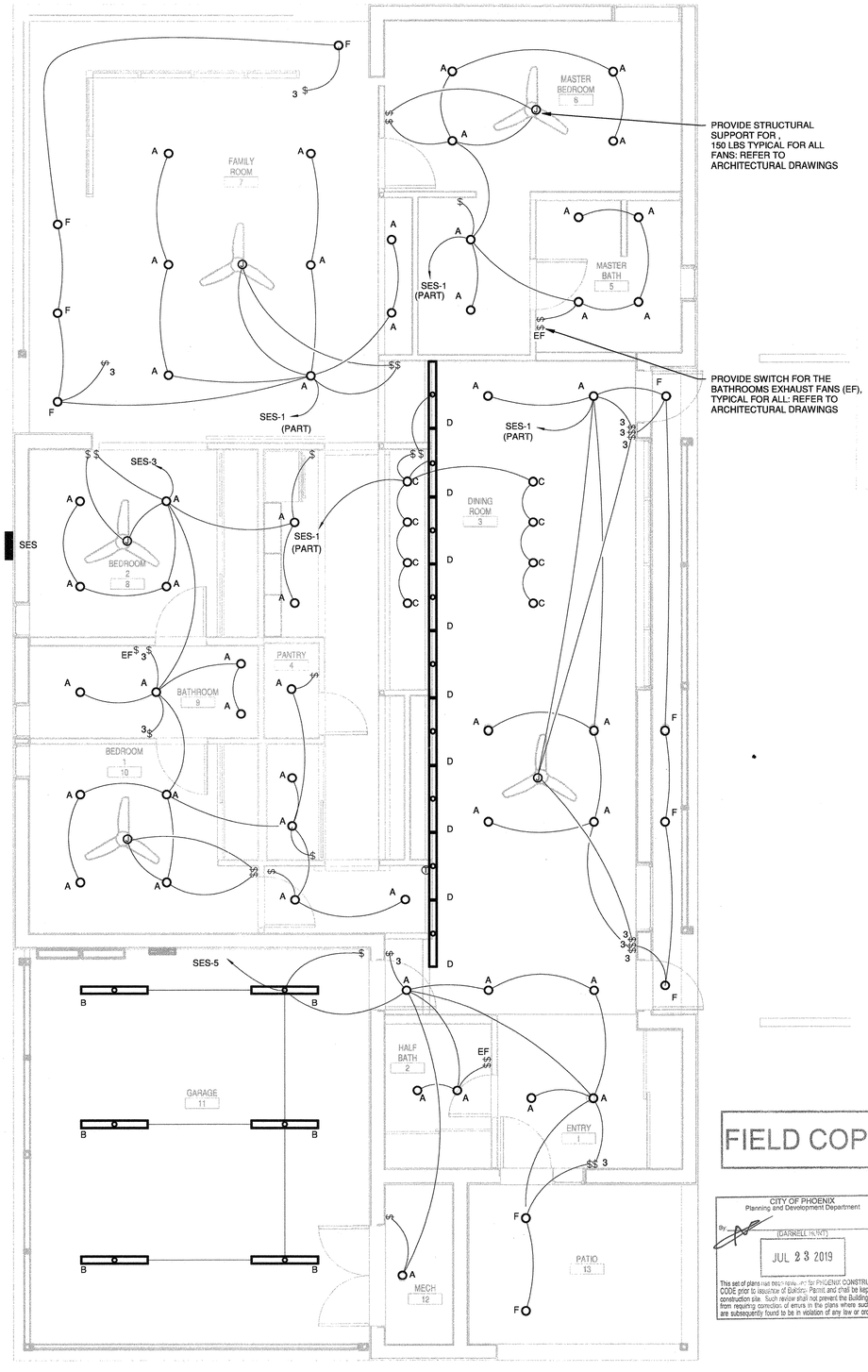
POWER PLAN

9/17/2019 1:14:40 PM

OMID M. MOTTAHED

LIGHT FIXTURE SCHEDULE

TYPE	MANUFACTURER	MODEL	LAMPS NO.	LAMPS TYPE	LAMPS VOLT	PHASE	BALLAST INPUT WATTS	BALLAST INPUT VA	DESCRIPTION	NOTES	Count
A	TBD	SELECTED BY ARCHITECT	1	LED	120		14	16	6" RECESSED CAN LIGHT		53
B	TBD	SELECTED BY ARCHITECT	1	LED	120	1	40	42	EXTERIOR LINEAR PENDANT LIGHT		6
C	TBD	SELECTED BY ARCHITECT	1	LED	120	1	60	62	PENDANT LIGHTING OVER KITCHEN COUNTER		8
D	TBD	SELECTED BY ARCHITECT	1	LED	120		40	42	STRIP LIGHT AT LIGHT SHELF		9
F	TBD	SELECTED BY ARCHITECT	1	LED	120		12	14	6" RECESSED EXTERIOR CAN LIGHT DAMP LOCATION		10



1 LIGHTING LEVEL 1 RCP - AREA A
1/4" = 1'-0"

FIELD COPY

CITY OF PHOENIX
Planning and Development Department
By: (DARRELL HUNT)
JUL 23 2019
This set of plans has been reviewed for PHOENIX CONSTRUCTION CODE prior to issuance of Building Permits and shall be kept at the construction site. Such review shall not prevent the Building Official from requiring correction of errors in the plans where such errors are subsequently found to be in violation of any law or ordinance.

Marlene Imirzian & Associates LLC, Architects
8906 North Central Avenue
Phoenix, AZ 85020
602 943 5279 v
602 943 5673 f

Registered Professional Engineer (General)
CERTIFICATE NO.
39542
OMID
MOTTAHED
Date Signed
ARIZONA, U.S.A.
EXPIRES 9/30/21

Jul 18 2019

HOME NZ

REV	DATE:	ISSUED FOR:
	5/17/19	PERMIT REVIEW 2018 CODE UPDATES

HENDERSON ENGINEERS
5343 NORTH 16TH STREET, SUITE 460
PHOENIX, AZ 85016
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WWW.HENDERSONENGINEERS.COM
1850001585
AZ. CORPORATE NO: 10470-0
EXPIRES 6/30/2020

DRAWING
E-1.02

JOB NO:
2305

LIGHTING PLAN

OMID M. MOTTAHED

7/18/2019 12:47:07 PM

City of Phoenix
PLANNING & DEVELOPMENT DEPARTMENT

Special Inspection Certificate
Structural

200 W. Washington Street, 2nd Floor, Phoenix, AZ 85003
Phone (602) 262-7811 (voice) or (602) 534-5500 (TTY), Fax (602) 534-3274
(General Requirements and Instructions on the backside of form)
Form effective January 1, 2014 **POST AT JOB SITE WITH PERMIT**

TO BE COMPLETED BY REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE

Project Name:	Project Address:	Permit No.
Home NZ	NA	Plan Log No.
Project Owner/Owner's Agent Name:	Mailing Address:	Phone No.
Registered Design Professional of Record Name: Robert Grothman	Mailing Address: 1753 E Broadway Rd, Suite 101-517, Tempe AZ	Phone No. 480-286-6040
Firm Name: SCL Consulting	Email Address: bob.grothman@sclco.com	Fax No. 480-264-0587

I hereby affirm that I am familiar with the design of this project and have been designated by the Owner/owner(s) Agent as the registered design professional in responsible charge for implementing the Structural Special Inspections Program required by the City of Phoenix Building Construction Code Sections 110.3.9 and 1704. I have determined that the types of work checked below require Structural Special Inspection and that the individual(s) or firm(s) named below are qualified to perform the special inspections. I understand and agree to inform the project owner, the contractor(s), and the special inspector(s) about all of the Structural Special Inspection Program requirements and limitations, including that the Special Inspector(s) must be independent third-party individual(s) or firm(s) and shall not be the installing contractor(s).

(Seal, Sign, and Date)

YES	NO ✓	TYPES OF WORK REQUIRING SPECIAL STRUCTURAL INSPECTION (Attach Supplement if Necessary)	QUALIFIED SPECIAL INSPECTOR INDIVIDUAL(S) OR FIRM(S) (Attach Supplement if Necessary)
X		Inspection of Fabricators	Robert Grothman /SCL Consulting
X		Steel Construction	Robert Grothman/SCL Consulting
X		Concrete Construction	Robert Grothman /SCL Consulting
		Masonry Construction	
		Wood Construction	
X		Post Installed Anchors	Robert Grothman /SCL Consulting
X		Epoxy Adhesive System	Robert Grothman /SCL Consulting

All special inspection reports were reviewed and found to be in conformance with the approved construction documents.

REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE _____ _____
SIGNATURE **DATE**

For more information or for a copy of this publication in an alternate format, contact Planning & Development at (602) 262-7811 voice / (602) 534-5500 TTY.

S: Special Inspection Certificate, Structural
WEB\dsd_trt_pdf_00211

TRT/DOC/00211
128-193D Rev. 12/13

City of Phoenix
PLANNING & DEVELOPMENT DEPARTMENT

Residential Water Meter
Worksheet

In order to determine the required water meter and water supply line size, the following information must be provided and completed by the applicant.

Address of Project: RPRS 180034

1) Total number of water supply fixture unit values: (IRC P2903.6)

TYPE OF FIXTURE OR GROUP OF FIXTURES	NUMBER OF FIXTURES			FIXTURE UNIT VALUE		TOTAL FIXTURE UNITS
	EXST	ADD'L				
Bathtub (with/without overhead shower)			X	1.4	=	
Clothes Washer	1		X	1.4	=	1.4
Dishwasher			X	1.4	=	
Full-Bath Group with Bathtub (with or without shower head) or Shower Stall	2		X	3.6	=	7.2
Half-Bath Group (water closet and lavatory)	1		X	2.6	=	2.6
Hose Bibb (include only 2)	2		X	2.5	=	5
Kitchen Group (dishwasher and sink with or without garbage disposal)	1		X	2.5	=	2.5
Kitchen Sink			X	1.4	=	
Laundry Group (clothes washer standpipe and laundry tub)			X	2.5	=	
Laundry Tub			X	1.4	=	
Lavatory	2		X	0.7	=	1.4
Shower Stall			X	1.4	=	
Water Closet (tank type)			X	2.2	=	
Other* (Specify)			X		=	
Other* (Specify)			X		=	
					Total	20.1

***For fixture unit values not listed, choose a fixture with similar flow characteristics** (IRC P2903.6(1))

2) Total developed length of the water supply line from the water meter to the most remote water using fixture (this includes hot and cold water branches) = _____ feet multiplied by 1.2 (compensation for the pressure loss through fittings) = _____ feet. (IRC AP201.3)

3) Base water pressure = _____ psi

4) The highest water supply outlet is _____ feet above / below the elevation at the water meter.
(circle one)

For more information or for a copy of this publication in an alternate format, contact Planning & Development at (602) 262-7811 voice / (602) 534-5500 TTY.

Calculating Adjusted Water Pressure:

Base Water Pressure:	psi
Pressure Reducing Valve: (If a pressure reducing valve is installed, reduce the base water pressure by 20%)	psi
Elevation Difference: (Where the highest water supply outlet is located above the source of supply, deduct 0.5 psi for each foot of difference in elevation. Where the highest water supply outlet is below the source of supply, add 0.5 psi for each foot of difference in elevation)	psi
Special Equipment: (Deduct all pressure losses caused by special equipment such as a backflow preventer, water filter, or water softener. Pressure loss data shall be obtained from the manufacturer of such equipment. **The applicant must submit this information at the time of permit application.**	psi
Special Plumbing Fixtures: Deduct pressure in excess of 8 psi caused by the installation of special plumbing fixtures such as pressure balanced or thermostatic mixing bath tubs, bidets, or showers and flushometer tank water closets. See IRC Table P2903.1 for residual pressure at point of outlet discharge.	psi
Adjusted Water Pressure:	psi

Note: If the base water pressure is unknown or not available, use the lowest pressure range available per IRC Table AP201.1. In this case, the adjusted water pressure does not need to be calculated.

Office Use Only

Adjusted Water Pressure: _____ psi (See reverse side for calculating AWP)

Water Meter Size: _____ (Per PDD Technical Guideline for Water Meter Sizing)

Supply Line Size: _____ (Per IRC Table AP201.1)

SCL Consulting
1753 E. Broadway Rd Suite 101-517
Tempe, AZ 85282
480-264-0587

JOB TITLE PHX HOMEnz

JOB NO. 5054.18.01 SHEET NO. 1
CALCULATED BY DWG DATE 1/31/18
CHECKED BY DATE

CS2018 Ver 2018.03.17 www.struware.com

FIELD COPY

STRUCTURAL CALCULATIONS

FOR

PHX HOMEnz

Phoenix, AZ

SCL Consulting
1753 E. Broadway Rd Suite 101-517
Tempe, AZ 85282
480-264-0587

JOB TITLE PHX HOMEnz

JOB NO. 5054.18.01 SHEET NO. 2
CALCULATED BY DWG DATE 1/31/18
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Code Search

Code: International Building Code 2018

Occupancy:

Occupancy Group = R Residential

Risk Category & Importance Factors:

Risk Category =	II
Wind factor =	1.00
Snow factor =	1.00
Seismic factor =	1.00

Type of Construction:

Fire Rating:

Roof =	0.0 hr
Floor =	0.0 hr

Building Geometry:

Roof angle (θ)	0.25 / 12	1.2 deg
Building length (L)	80.0 ft	
Least width (B)	40.0 ft	
Mean Roof Ht (h)	11.5 ft	
Parapet ht above grd	13.7 ft	
Minimum parapet ht	2.2 ft	

Live Loads:

Roof
0 to 200 sf: 20 psf
200 to 600 sf: 24 - 0.02Area, but not less than 12 psf
over 600 sf: 12 psf

Floor:

Typical Floor	40 psf
Partitions	15 psf

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1753 E. Broadway Rd Suite 101-517
Tempe, AZ 85282
480-264-0587

JOB TITLE PHX HOMEnz

JOB NO. 5054.18.01 SHEET NO. 3
CALCULATED BY DWG DATE 1/31/18
CHECKED BY DATE

Wind Loads : ASCE 7- 16

Ultimate Wind Speed	102 mph
Nominal Wind Speed	79 mph
Risk Category	II
Exposure Category	C
Enclosure Classif.	Enclosed Building
Internal pressure	+/-0.18
Directionality (Kd)	0.85
Kh case 1	0.849
Kh case 2	0.849
Type of roof	Monoslope

Topographic Factor (Kzt)

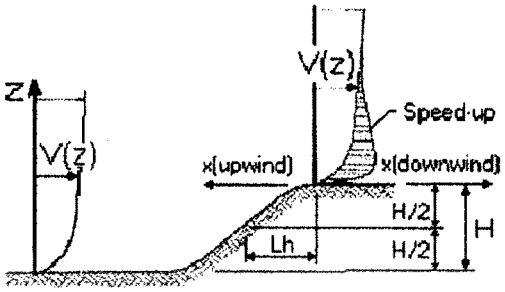
Topography		Flat
Hill Height	(H)	0.0 ft
Half Hill Length (Lh)		0.0 ft
Actual H/Lh	=	0.00
Use H/Lh	=	0.00
Modified Lh	=	0.0 ft
From top of crest: x =		0.0 ft
Bldg up/down wind?		downwind

H/Lh= 0.00 K_1 = 0.000
x/Lh = 0.00 K_2 = 0.000
z/Lh = 0.00 K_3 = 1.000

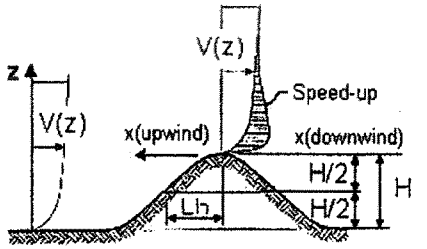
At Mean Roof Ht:

Kzt = $(1+K_1K_2K_3)^2$ = 1.00

H< 15ft;exp C
∴ Kzt=1.0



ESCARPMENT



2D RIDGE or 3D AXISYMMETRICAL HILL

Gust Effect Factor

h =	11.5 ft
B =	40.0 ft
/z (0.6h) =	15.0 ft

Flexible structure if natural frequency < 1 Hz (T > 1 second).
If building h/B>4 then may be flexible and should be investigated.
h/B = 0.29 Rigid structure (low rise bldg)

G = 0.85 Using rigid structure default

Rigid Structure

ē =	0.20	
ℓ =	500 ft	
z_{min} =	15 ft	
c =	0.20	
g_Q, g_v =	3.4	
L_z =	427.1 ft	
Q =	0.93	
I_z =	0.23	
G =	0.89	use G = 0.85

Flexible or Dynamically Sensitive Structure

34 ncy (η_1) =	0.0 Hz			
Damping ratio (β) =	0			
/b =	0.65			
/α =	0.15			
Vz =	86.1			
N_1 =	0.00			
R_n =	0.000			
R_h =	28.282	η =	0.000	h = 11.5 ft
R_B =	28.282	η =	0.000	
R_L =	28.282	η =	0.000	
g_R =	0.000			
R =	0.000			
Gf =	0.000			

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JOB TITLE PHX HOMEnz

JOB NO. 5054.18.01 SHEET NO. 4
CALCULATED BY DWG DATE 1/31/18
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Enclosure Classification

Test for Enclosed Building: Ao < 0.01Ag or 4 sf, whichever is smaller

Test for Open Building: All walls are at least 80% open.
Ao ≥ 0.8Ag

Test for Partially Enclosed Building: Predominately open on one side only

	Input			Test	
Ao	500.0	sf	Ao ≥ 1.1Aoi	NO	
Ag	600.0	sf	Ao > 4' or 0.01Ag	YES	
Aoi	1000.0	sf	Aoi / Agi ≤ 0.20	YES	Building is NOT Partially Enclosed
Agi	10000.0	sf			

Conditions to qualify as Partially Enclosed Building. Must satisfy all of the following:
Ao ≥ 1.1Aoi
Ao > smaller of 4' or 0.01 Ag
Aoi / Agi ≤ 0.20
Where:
Ao = the total area of openings in a wall that receives positive external pressure.
Ag = the gross area of that wall in which Ao is identified.
Aoi = the sum of the areas of openings in the building envelope (walls and roof) not including Ao.
Agi = the sum of the gross surface areas of the building envelope (walls and roof) not including Ag.

Test for Partially Open Building: A building that does not qualify as open, enclosed or partially enclosed. (This type building will have same wind pressures as an enclosed building.

Reduction Factor for large volume partially enclosed buildings (Ri) :

If the partially enclosed building contains a single room that is unpartitioned , the internal pressure coefficient may be multiplied by the reduction factor Ri.

Total area of all wall & roof openings (Aog): 0 sf
Unpartitioned internal volume (Vi) : 0 cf
Ri = 1.00

Ground Elevation Factor (Ke)

Grd level above sea level = 0.0 ft Ke = 1.0000
Constant = 0.00256 Adj Constant = 0.00256

ATC Hazards by Location

Search Information

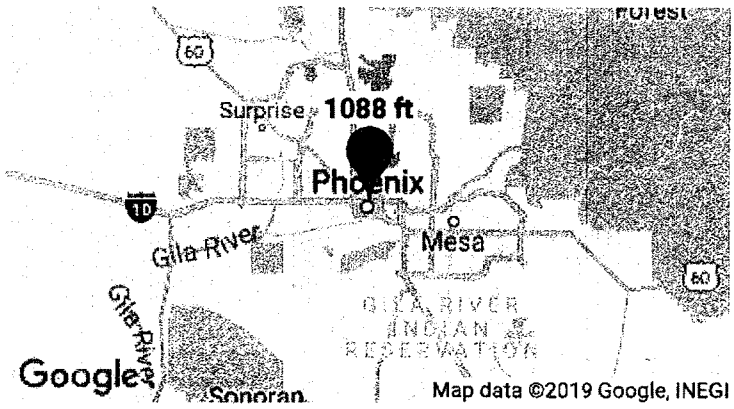
Address: Phoenix, AZ, USA

Coordinates: 33.4483771, -112.07403729999999

Elevation: 1088 ft

Timestamp: 2019-05-17T16:50:27.693Z

Hazard Type: Wind



ASCE 7-16		ASCE 7-10		ASCE 7-05	
MRI 10-Year	71 mph	MRI 10-Year	76 mph	ASCE 7-05 Wind Speed	90 mph
MRI 25-Year	78 mph	MRI 25-Year	84 mph		
MRI 50-Year	83 mph	MRI 50-Year	90 mph		
MRI 100-Year	88 mph	MRI 100-Year	96 mph		
Risk Category I	96 mph	Risk Category I	105 mph		
Risk Category II	102 mph	Risk Category II	115 mph		
Risk Category III	109 mph	Risk Category III-IV	120 mph		
Risk Category IV	113 mph				

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

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JOB TITLE PHX HOMEnz

JOB NO. 5054.18.01 SHEET NO. 6
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Wind Loads - MWFRS h≤60' (Low-rise Buildings) except for open buildings

Kz = Kh (case 1) = 0.85
Base pressure (qh) = **19.2 psf**
GCpi = +/-0.18

Edge Strip (a) = 4.0 ft
End Zone (2a) = 8.0 ft
Zone 2 length = 20.0 ft

Wind Pressure Coefficients

	CASE A				CASE B		
Surface	GCpf	θ = 1.2 deg w/-GCpi	w/+GCpi		GCpf	w/-GCpi	w/+GCpi
1	0.40	0.58	0.22		-0.45	-0.27	-0.63
2	-0.69	-0.51	-0.87		-0.69	-0.51	-0.87
3	-0.37	-0.19	-0.55		-0.37	-0.19	-0.55
4	-0.29	-0.11	-0.47		-0.45	-0.27	-0.63
5					0.40	0.58	0.22
6					-0.29	-0.11	-0.47
1E	0.61	0.79	0.43		-0.48	-0.30	-0.66
2E	-1.07	-0.89	-1.25		-1.07	-0.89	-1.25
3E	-0.53	-0.35	-0.71		-0.53	-0.35	-0.71
4E	-0.43	-0.25	-0.61		-0.48	-0.30	-0.66
5E					0.61	0.79	0.43
6E					-0.43	-0.25	-0.61

Ultimate Wind Surface Pressures (psf)

1		11.1	4.2		-5.2	-12.1
2		-9.8	-16.7		-9.8	-16.7
3		-3.7	-10.6		-3.7	-10.6
4		-2.1	-9.0		-5.2	-12.1
5					11.1	4.2
6					-2.1	-9.0
1E		15.2	8.3		-5.8	-12.7
2E		-17.1	-24.0		-17.1	-24.0
3E		-6.7	-13.6		-6.7	-13.6
4E		-4.8	-11.7		-5.8	-12.7
5E					15.2	8.3
6E					-4.8	-11.7

Parapet

Windward parapet = 28.8 psf (GCpn = +1.5)
Leeward parapet = -19.2 psf (GCpn = -1.0)

Windward roof overhangs = 13.5 psf (upward) add to windward roof pressure

Horizontal MWFRS Simple Diaphragm Pressures (psf)

Transverse direction (normal to L)

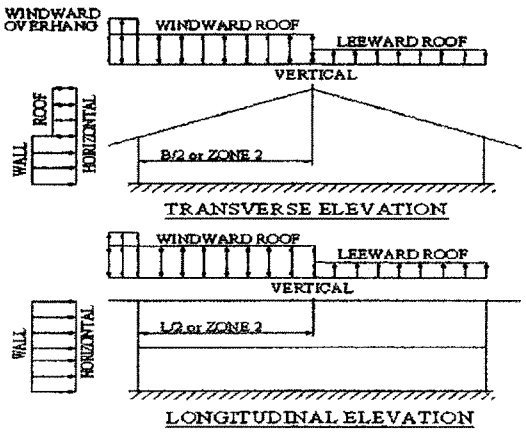
Interior Zone: Wall 13.3 psf
Roof -6.1 psf **
End Zone: Wall 20.0 psf
Roof -10.4 psf **

Longitudinal direction (parallel to L)

Interior Zone: Wall 13.3 psf
End Zone: Wall 20.0 psf

** NOTE: Total horiz force shall not be less than that determined by neglecting roof forces (except for MWFRS moment frames).

The code requires the MWFRS be designed for a min ultimate force of 16 psf multiplied by the wall area plus an 8 psf force applied to the vertical projection of the roof.



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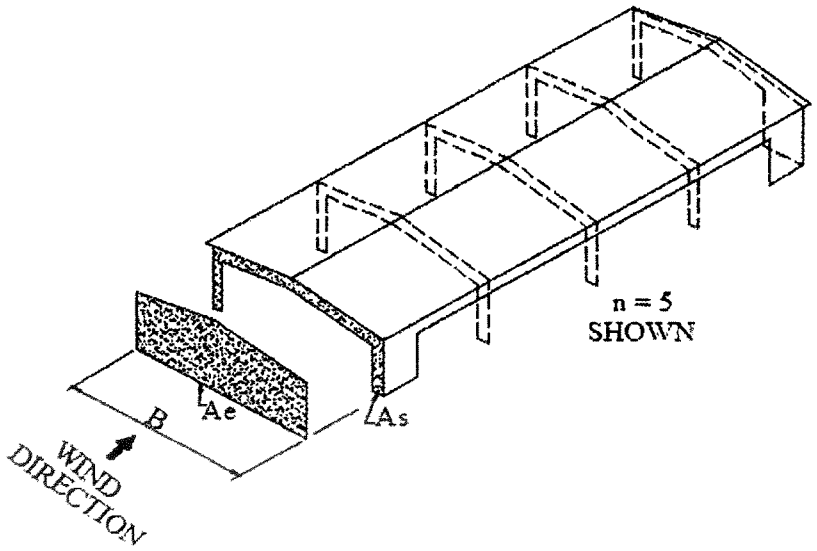
Wind Loads - h≤60' Longitudinal Direction MWFRS On Open or Partially Enclosed Buildings with Transverse Frames and Pitched Roofs

ASCE 7-16 procedure

Base pressure (qh) = **19.2 psf**
GCpi = +/-0.18 Enclosed bldg, procdure doesn't apply
Roof Angle (θ) = 1.2 deg



B=	40.0 ft
# of frames (n) =	5
Solid are of end wall including fascia (As) =	1,500.0 sf
Roof ridge height =	11.9 ft
Roof eave height =	11.5 ft
Total end wall area if soild (Ae) =	468.3 sf

Longidinal Directional Force (F) = pAe

p= qh [(GCpf)windward -(GCpf)leeward] K_B K_S

Solidarity ratio (Φ) =	3.203
n =	5
KB =	0.8
KS =	10.906
Zones 5 & 6 area =	421.9 sf
5E & 6E area =	46.4 sf
(GCpf) windward - (GCpf) leeward] =	0.725
p =	121.5 psf

Total force to be resisted by MWFRS (F) = **56.9 kips** applied at the centroid of the end wall area Ae

Note: The longidudinal force acts in combination with roof loads calculated elsewhere for an open or partially enclosed building.

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Ultimate Wind Pressures

Wind Loads - Components & Cladding : h ≤ 60'

Kh (case 1) =	0.85	h =	11.5 ft	0.2h = 2.3 ft
Base pressure (qh) =	**19.2 psf**	0.6h =	6.9 ft	
Minimum parapet ht =	2.2 ft	GCpi =	+/-0.18	
Roof Angle (θ) =	1.2 deg	qi = qh =	19.2 psf	
Type of roof =	Monoslope			

Roof

	Surface Pressure (psf)								User Input	
Area	10 sf	20 sf	50 sf	100 sf	200 sf	350 sf	500 sf	1000 sf	75 sf	300 sf
Negative Zone 1	-36.1	-33.7	-30.6	-28.2	-25.8	-23.9	-22.7	-22.7	-29.2	-24.4
Negative Zone 1'	-20.8	-20.6	-20.8	-20.8	-17.9	-16.0	-16.0	-16.0	-20.8	-16.2
Negative Zone 2	-47.7	-44.6	-40.5	-37.5	-34.4	-31.9	-30.4	-30.4	-38.6	-32.6
Negative Zone 3	-65	-58.8	-50.7	-44.6	-36.5	-33.5	-30.4	-30.4	-47.1	-34.9
Positive All Zones	16	16	16	16	16.0	16.0	16.0	16.0	16.0	16.0
Overhang Zone 1&1'	-32.7	-32.1	-31.3	-30.7	-25.8	-21.8	-19.2	-19.2	-31.0	-22.9
Overhang Zone 2	-44.2	-40.1	-34.7	-30.6	-26.5	-23.2	-21.1	-21.1	-32.3	-24.2
Overhang Zone 3	-61.5	-54.3	-44.9	-37.7	-30.6	-24.8	-21.1	-21.1	-40.7	-26.4

Overhang pressures in the table above assume an internal pressure coefficient (Gcpi) of 0.0
Overhang soffit pressure equals adj wall pressure (which includes internal pressure of 3.5 psf)

Parapet

qp = 19.2 psf

		Surface Pressure (psf)						User Input
Solid Parapet Pressure		10 sf	20 sf	50 sf	100 sf	200 sf	500 sf	40 sf
CASE A:	Zone 2 :	61.5	57.5	52.2	48.3	44.3	39.0	53.5
	Zone 3 :	78.8	71.7	62.4	55.4	48.3	39.0	64.7
CASE B :	Interior zone :	-36.3	-34.5	-32.1	-30.2	-28.4	-25.9	-32.6
	Corner zone :	-41.5	-38.8	-35.1	-32.3	-29.6	-25.9	-36.0

Walls

	GCp +/- GCpi				Surface Pressure at h				User Input	
Area	10 sf	100 sf	200 sf	500 sf	10 sf	100 sf	200 sf	500 sf	20 sf	50 sf
Negative Zone 4	-1.17	-1.01	-0.96	-0.90	-20.8	-19.4	-18.5	-17.3	-21.6	-20.4
Negative Zone 5	-1.44	-1.12	-1.03	-0.90	-36.1	-21.6	-19.7	-17.3	-25.8	-23.4
Positive Zone 4 & 5	1.08	0.92	0.87	0.81	20.8	17.7	16.8	16.0	19.8	18.6

Note: GCp reduced by 10% due to roof angle <= 10 deg.

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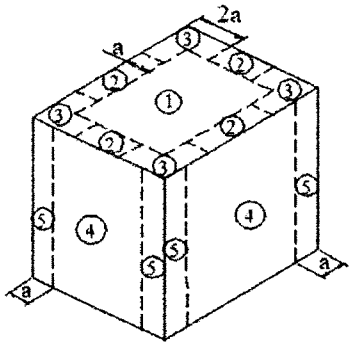
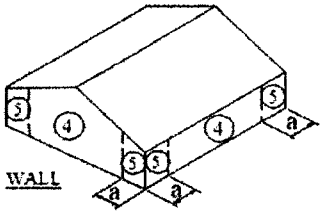
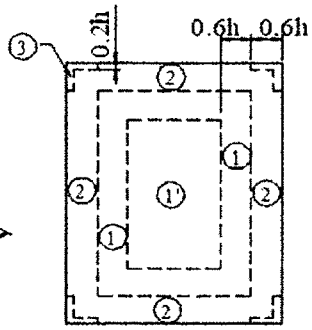
Location of C&C Wind Pressure Zones - ASCE 7-16



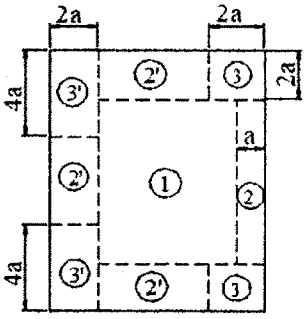
Roofs w/ $\theta \leq 10°$
and all walls
h > 60'



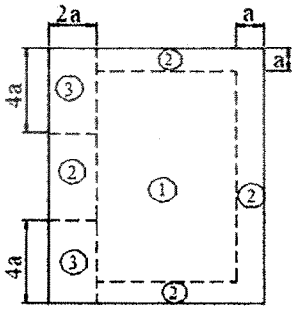
Walls h ≤ 60'
& alt design h<90'



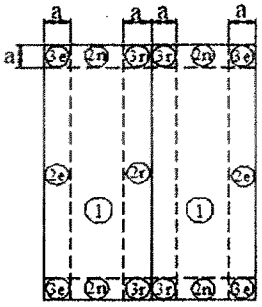
Gable, Sawtooth and
Multispan Gable $\theta \leq 7$ degrees &
Monoslope ≤ 3 degrees
h ≤ 60' & alt design h<90'



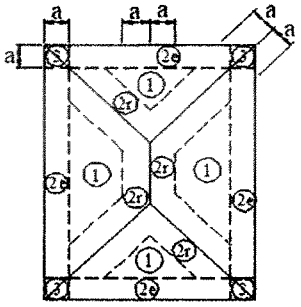
Monoslope roofs
$3° < \theta \leq 10°$
h ≤ 60' & alt design h<90'



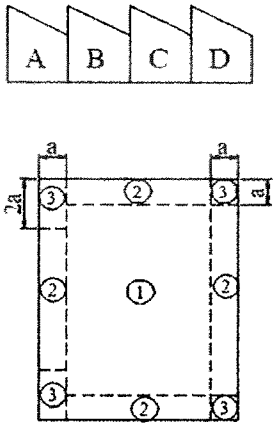
Monoslope roofs
$10° < \theta \leq 30°$
h ≤ 60' & alt design h<90'



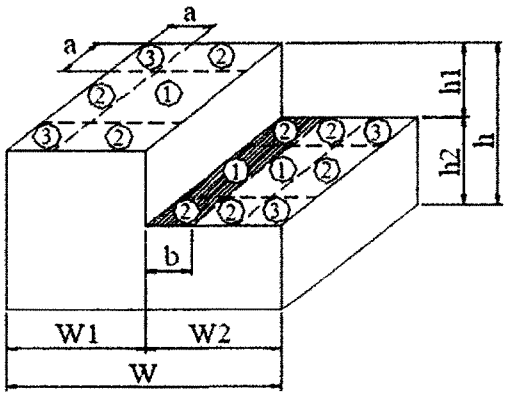
Multispan Gable &
Gable $7° < \theta \leq 45°$

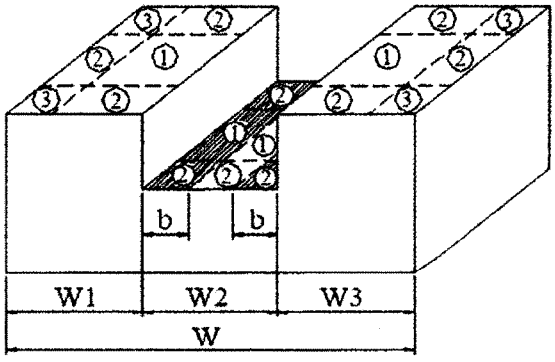


Hip $7° < \theta \leq 27°$



Sawtooth $10° < \theta \leq 45°$
h ≤ 60' & alt design h<90'





Stepped roofs $\theta \leq 3°$
h ≤ 60' & alt design h<90'

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JOB TITLE PHX HOMEnz
JOB NO. 5054.18.01 SHEET NO. 10
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Seismic Loads: IBC 2018 Strength Level Forces

Risk Category : II
Importance Factor (I) : 1.00
Site Class : D

Ss (0.2 sec) = 17.90 %g
S1 (1.0 sec) = 6.50 %g

Fa =	1.600	Sms =	0.286	S_{DS} =	0.191	Design Category =	B
Fv =	2.400	Sm1 =	0.156	S_{D1} =	0.104	Design Category =	B

Seismic Design Category = **B**

Redundancy Coefficient p = 1.00
Number of Stories: 1
Structure Type: All other building systems
Horizontal Struct Irregularities: No plan Irregularity
Vertical Structural Irregularities: No vertical Irregularity

Flexible Diaphragms: Yes
Building System: **Bearing Wall Systems**
Seismic resisting system: **Light frame walls with shear panels - all other materials**
System Structural Height Limit: **Height not limited**
Actual Structural Height (hn) = 11.9 ft

DESIGN COEFFICIENTS AND FACTORS

Response Modification Coefficient (R) = 2
Over-Strength Factor (Ωo) = 2
Deflection Amplification Factor (Cd) = 2
S_{DS} = 0.191
S_{D1} = 0.104

Seismic Load Effect (E) = Eh +/-Ev = $p\,Q_E$ +/- $0.2S_{DS}\,D$ = Qe +/- 0.000D Q_E = horizontal seismic force
Special Seismic Load Effect (Em) = Emh +/- Ev = $\Omega o\,Q_E$ +/- $0.2S_{DS}\,D$ = 2Qe +/- 0.038D D = dead load

PERMITTED ANALYTICAL PROCEDURES

Simplified Analysis - Use Equivalent Lateral Force Analysis

Equivalent Lateral-Force Analysis - Permitted

Building period coef. (C_T) =	0.020			Cu = 1.69
Approx fundamental period (Ta) =	$C_T h_n^x$ =	0.128 sec	x= 0.75	Tmax = CuTa = 0.217
User calculated fundamental period (T) =		sec		Use T = 0.128
Long Period Transition Period (TL) =	ASCE7 map =	6		
Seismic response coef. (Cs) =	$S_{DS}I/R$ =	0.095		
need not exceed Cs =	Sd1 I /RT =	0.406		
but not less than Cs =		0.010		
USE Cs =		0.095		

Design Base Shear V = 0.095W

Model & Seismic Response Analysis - Permitted (see code for procedure)

ALLOWABLE STORY DRIFT

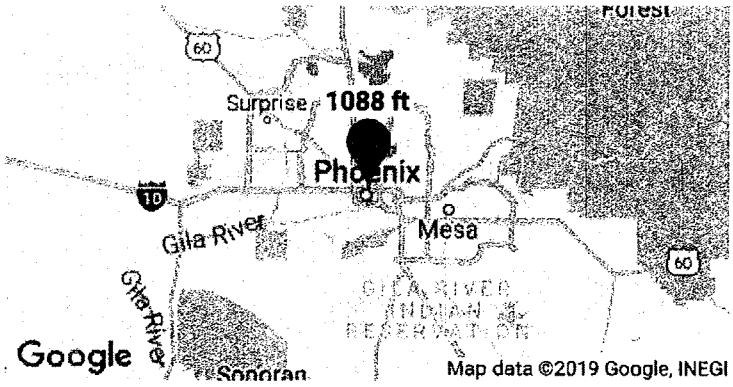
Structure Type: All other structures

Allowable story drift Δa = 0.020hsx where hsx is the story height below level x

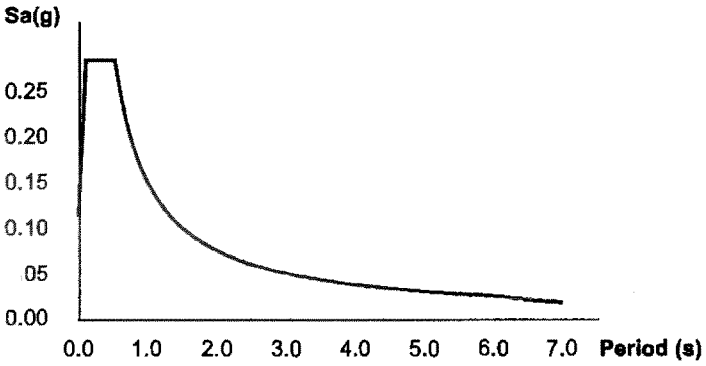
ATC Hazards by Location

Search Information

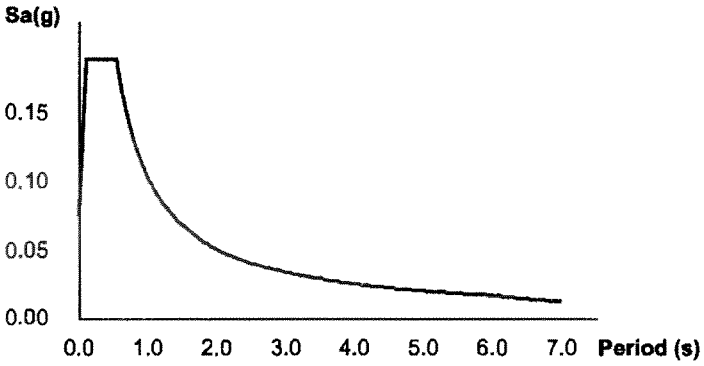
Address:	Phoenix, AZ, USA
Coordinates:	33.4483771, -112.07403729999999
Elevation:	1088 ft
Timestamp:	2019-05-17T16:51:06.075Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	II
Site Class:	D-default



MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	0.179	MCE_R ground motion (period=0.2s)
S_1	0.065	MCE_R ground motion (period=1.0s)
S_{MS}	0.286	Site-modified spectral acceleration value
S_{M1}	0.155	Site-modified spectral acceleration value
S_{DS}	0.19	Numeric seismic design value at 0.2s SA
S_{D1}	0.103	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	B	Seismic design category
F_a	1.6	Site amplification factor at 0.2s
F_v	2.4	Site amplification factor at 1.0s

CR_S	0.926	Coefficient of risk (0.2s)
CR_1	0.929	Coefficient of risk (1.0s)
PGA	0.079	MCE_G peak ground acceleration
F_{PGA}	1.6	Site amplification factor at PGA
PGA_M	0.126	Site modified peak ground acceleration
T_L	6	Long-period transition period (s)
SsRT	0.179	Probabilistic risk-targeted ground motion (0.2s)
SsUH	0.193	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.065	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.07	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.6	Factored deterministic acceleration value (1.0s)
PGAd	0.5	Factored deterministic acceleration value (PGA)

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JOB NO. 5054.18.01 SHEET NO. 13
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CHECKED BY DATE

Roof Design Loads

Items	Description	Multiple	psf (max)	psf (min)
Roofing	4 ply composite, no gravel		2.0	1.5
Insulation	Polystyrene foam roof board	x 7.5	1.5	1.5
Roofing	Sip Panel System		6.0	6.0
Framing	Wood 2x4 @16"		2.2	2.2
Ceiling	5/8" gypsum		2.8	2.5
Mech & Elec	Mech. & Elec.		1.0	0.0
	Solar Panels and Racks		4.0	4.0
			0.0	0.0
		Actual Dead Load	○ 19.5	○ 17.7
		Use this DL instead	◉ 22.0	◉ 9.0
		Live Load	20.0	0.0
		Snow Load	0.0	0.0
		Ultimate Wind (zone 2 - 100sf)	16.0	-31.3
ASD Loading		D + Lr	42.0	-
		D + 0.75(0.6*W + Lr)	44.2	-
		0.6*D + 0.6*W	-	-13.4
LRFD Loading		1.2D + 1.6 Lr + 0.5W	66.4	-
		1.2D + 1.0W + 0.5Lr	52.4	-
		0.9D + 1.0W	-	-23.2

Roof Live Load Reduction Roof angle 0.25 / 12 1.2 deg

0 to 200 sf: 20.0 psf
200 to 600 sf: 24 - 0.02Area, but not less than 12 psf
over 600 sf: 12.0 psf

	300 sf	18.0 psf
	400 sf	16.0 psf
	500 sf	14.0 psf
User Input:	450 sf	15.0 psf

ORIGINAL LATERAL ANALYSIS HAS BEEN DESIGNED USING THE 2012 IBC AND ASCE-10.

1) SWITCHING FROM THE 2012 IBC TO THE 2018 IBC THE MWFRS WIND LOADS HAVE DECREASED FROM:

IBC 2012		IBC 2018
$W_{INT} = 16.9$ PSF	→	$W_{INT} = 13.3$ PSF
$W_{END} = 25.4$ PSF		$W_{END} = 20.0$ PSF

2) THE SEISMIC BASE SHEAR FACTOR INCREASED FROM 0.091 TO 0.095, THIS IS LESS THAN A 5% INCREASE.

THE CURRENT LATERAL RESISTING SYSTEM DESIGN IS ADEQUATE FOR THE CHANGE FROM IBC 2012 TO IBC 2018

DESIGN SIP PANEL WALL AND ROOF SYSTEM:

GRAVITY LOADS: $DL_R = 22$ PSF
$L_R = 20$ PSF

LATERAL LOADS: (ULTIMATE LOADS)
$W_{INT} = 16.9$ PSF
W_{END} (8 ft) $= 25.4$ PSF
} MWFRS

$W_{WALL} = 30$ PSF (c+c)

SEISMIC BASE SHEAR: $V = 0.091(W)$

IBC 2018/ASCE-16
$W_{INT} = 13.3$ PSF
$W_{END} = 20.0$ PSF
$V = 0.095(W)$

BUILDING WEIGHT: $W_R = 22\,(40.417)(80.5) = 71{,}579$ lb

$W_w = 10$ PSF $(250$ ft$)(10.67/2) = 13325$ lb

$T = 84{,}904$ lb

$V = 0.091\,(84{,}904) = 7{,}727$ lb

LATERAL WIND AT ROOF DIAPHRAGM:

$W_{INT} = 16.9$ PSF $(11.5/2 + 2) = 131$ PLF
$W_{END} = 25.4$ PSF $(11.5/2 + 2) = 197$ PLF
} BOTH DIRECTIONS

CHECK WIND VS. SEISMIC: (0.6W OR 0.7E)

NORTH/SOUTH: $E = 0.7\,\frac{(7727\text{ lb})}{40.417\text{ ft}} = 133.83$ PLF

$W_{INT} = 0.6\,(131$ PLF$) = 78.6$ PLF

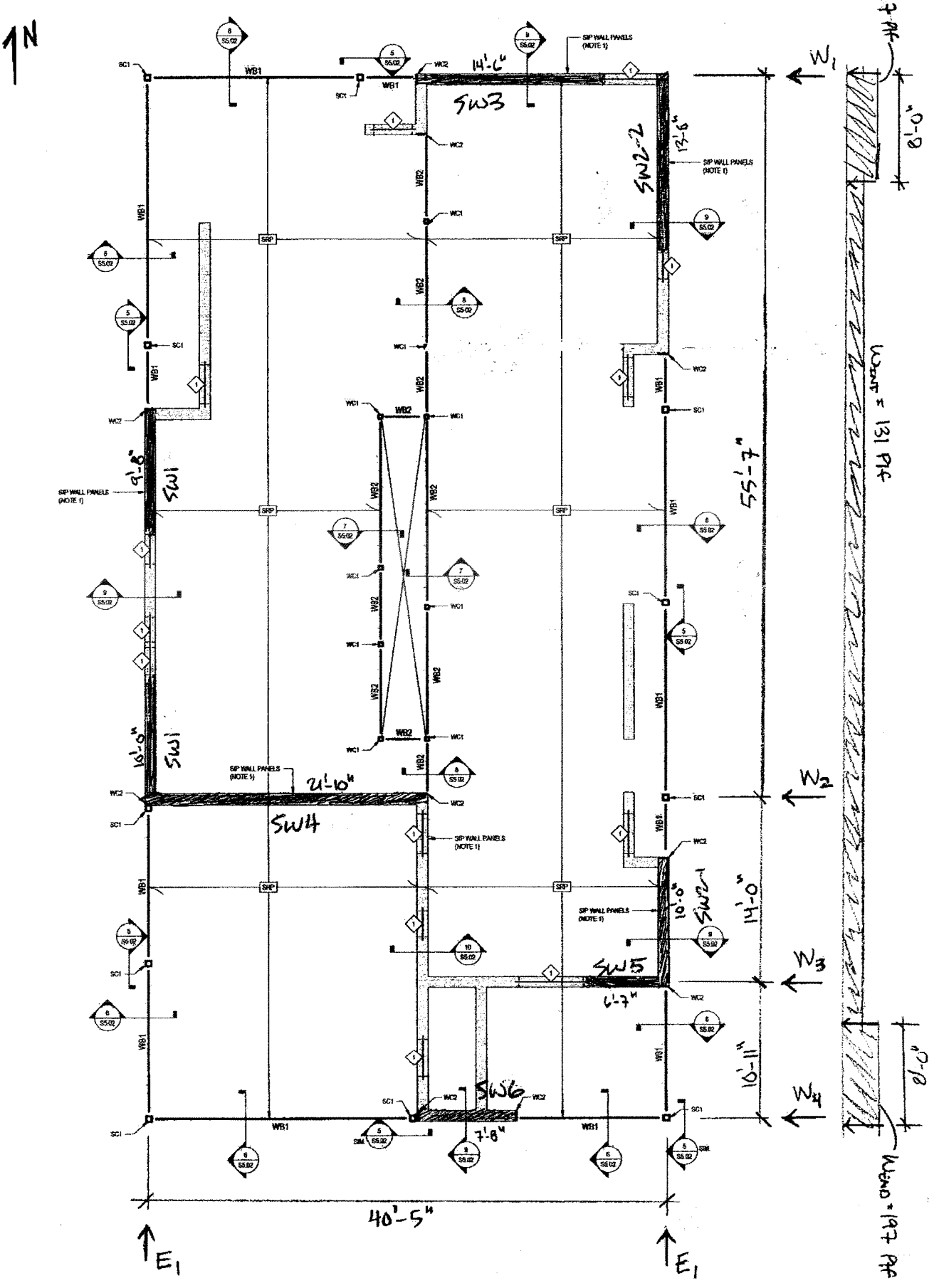
EAST/WEST: $E = 0.7\,\frac{(7727\text{ lb})}{80.5\text{ ft}} = 67.2$ PLF

$W_{INT} = 0.6\,(131$ PLF$) = 78.6$ PLF

∴ SEISMIC CONTROLS DESIGN IN NORTH/SOUTH DIRECTION WHILE WIND CONTROLS DESIGN IN THE EAST/WEST DIRECTION

PHX HOME 13 LATERAL ANALYSIS AND GRAVITY LOADS:

(ULTIMATE LOADS FOR WIND & SEISMIC)



LATERAL LOADS ON PHX HOME#3:

NORTH/SOUTH: $E_1 = \frac{7727\ lb}{2} = 3863.5\ lb$

EAST/WEST: $W_1 = 197(8) + 131(19.792) = 4169\ lb$

$W_2 = 131(55.584/2 + 14/2) = 4558\ lb$

$W_3 = 131(14/2 + 2.917) + 197(2.5415) = 1800\ lb$

$W_4 = 197(10.917/2) \cong 1075.4\ lb$

GRAVITY LOADS ON PHX HOME#3:

1) NORTH/SOUTH EXT. WALLS AND INT. WALLS RUNNING EAST/WEST:

$DL_R = 22(2ft) = 44\ plf$
$L_R = 20(2ft) = 40\ plf$
} $T_L = 84\ plf$

2) WEST EXT. WALL:

$DL_R = 22(18.25/2) = 201\ plf$
$L_R = 20(18.25/2) = 182.5\ plf$
} $T_L = 383.5\ plf$

3) EAST EXT. WALL:

$DL_R = 22(18.67/2) = 205.3\ plf$
$L_R = 20(18.67/2) = 186.6\ plf$
} $T_L = 391.9\ plf$

WALL WEIGHT:

9 1/4" SIP PANEL = 6.0 PSF
(2 LAYERS GYP) = 5.6 PSF (ONE ON EACH SIDE)

USE: 12.0 PSF FOR WALL WEIGHT INT. & EXT.

PHX HOMEnz - West Shear Walls (Seismic from the N/S)

V total (LB) = 3863.5

	H	B	Deflection	R	%	Force (LB)	shear (PLF)
SW2-1	10.67	10	0.05926	16.87	0.438	1693	-
SW2-2	10.67	13.67	0.04622	21.64	0.562	2171	-
			Totals	38.51	1.00	3864	0

Deflection= (0.0004 (H*H*H)/B) + (.001*H)

R= (1/Deflection)

%= (R/Sum R)

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Tempe, AZ 85282

Project No. 5054.18.01 **Engineer:** DWG
Title: PHX HOMEnz **Date:** 2/28/2018

Shear Wall Check: SW1 DL(wall) = 12 psf

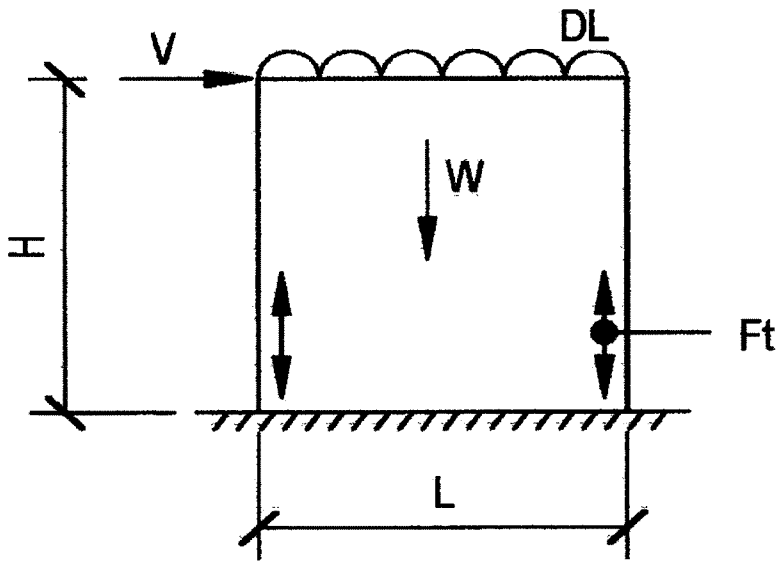
Shear Force:	V =	1.932 kips	
Wall Height	H =	10.67 ft.	
Wall Length	L =	9.67 ft.	
Wall Weight	W =	1.24 kips	
Roof Dead Load	DL =	0.201 klf	(West Ext. Wall)

Check Overturing: 0.6DL = 0.7E Wind/Seismic Factor: 0.7

Moment Overturning	=	14.43 K-ft	
Moment Resisting	=	9.23 K-ft	
Uplift (F_t)	=	0.54 kips	Holdown Required

Shear Wall Force:

v = 139.86 plf (V/L)*0.7



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Project No. 5054.18.01 **Engineer:** DWG
Title: PHX HOMEnz **Date:** 2/28/2018

Shear Wall Check: SW2-1 DL(wall) = **12** psf

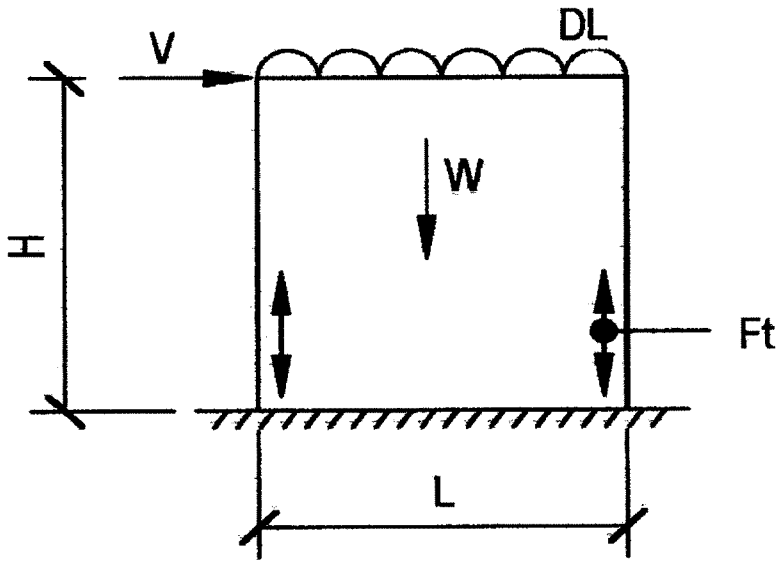
Shear Force:	**V** =	1.693 kips	
Wall Height	H =	10.67 ft.	
Wall Length	L =	10 ft.	
Wall Weight	W =	1.28 kips	
Roof Dead Load	DL =	0.205 klf	(East Ext. Wall)

Check Overturing: 0.6DL = 0.7E Wind/Seismic Factor: 0.7

Moment Overturning	=	12.65 K-ft	
Moment Resisting	=	9.99 K-ft	
Uplift (F_t)	=	0.27 kips	Holdown Required

Shear Wall Force:

v = 118.51 plf (V/L)*0.7



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Project No. 5054.18.01 **Engineer:** DWG
Title: PHX HOMEnz **Date:** 2/28/2018

Shear Wall Check: SW2-2 DL(wall) = 12 psf

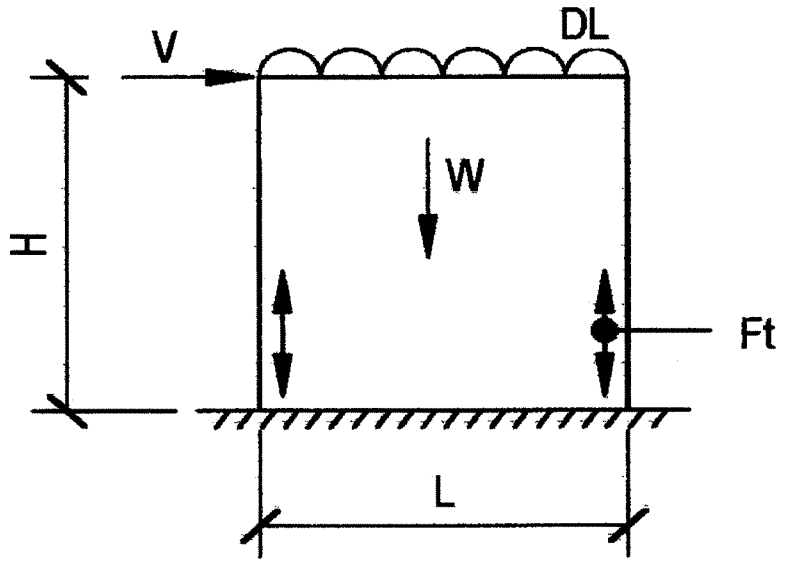
Shear Force:	V =	2.171 kips	
Wall Height	H =	10.67 ft.	
Wall Length	L =	13.67 ft.	
Wall Weight	W =	1.75 kips	
Roof Dead Load	DL =	0.205 klf	(East Ext. Wall)

Check Overturing: 0.6DL = 0.7E Wind/Seismic Factor: 0.7

Moment Overturning	=	16.22 K-ft	
Moment Resisting	=	18.67 K-ft	
Uplift (Ft)	=	0.00 kips	No Holdown Required

Shear Wall Force:

v = 111.17 plf (V/L)*0.7



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Project No. 5054.18.01 **Engineer:** DWG
Title: PHX HOMEnz **Date:** 2/28/2018

Shear Wall Check: SW3 DL(wall) = **12** psf

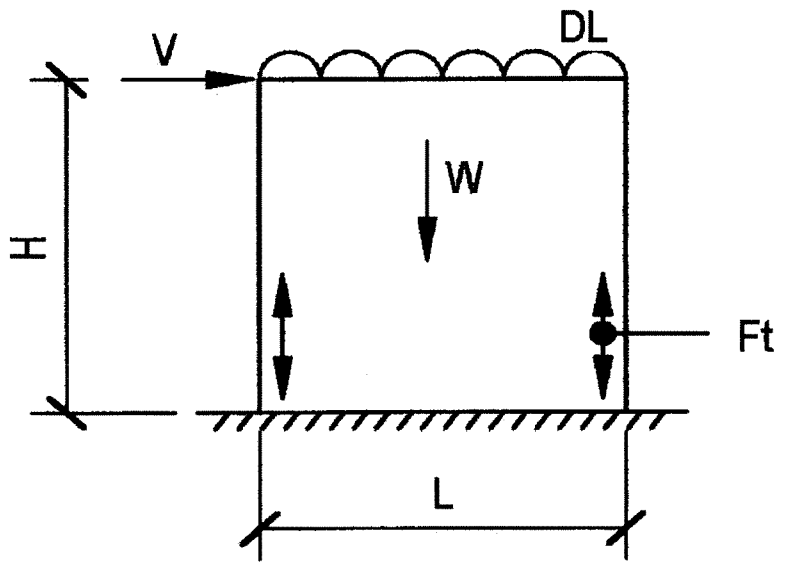
Shear Force:	**V =**	**4.169** kips	
Wall Height	H =	**10.67** ft.	
Wall Length	L =	**14.5** ft.	
Wall Weight	W =	1.86 kips	
Roof Dead Load	DL =	**0.044** klf	(Ext Non-Brg Wall)

Check Overturing: 0.6DL = 0.6W Wind/Seismic Factor: **0.6**

Moment Overturning	=	26.69 K-ft	
Moment Resisting	=	10.85 K-ft	
Uplift (Ft)	=	1.09 kips	Holdown Required

Shear Wall Force:

v = 172.51 plf (V/L)*0.6



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Project No. 5054.18.01 **Engineer:** DWG
Title: PHX HOMEnz **Date:** 2/28/2018

Shear Wall Check: SW4 DL(wall) = **12** psf

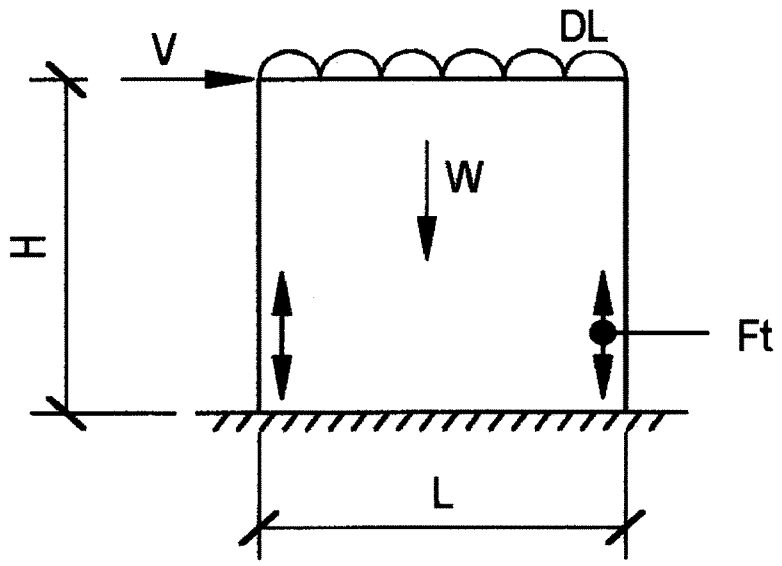
Shear Force:	**V =**	4.558 kips	
Wall Height	H =	**10.67** ft.	
Wall Length	L =	**21.33** ft.	
Wall Weight	W =	2.73 kips	
Roof Dead Load	DL =	**0.044** klf	(Int. Wall)

Check Overturing: 0.6DL = 0.6W Wind/Seismic Factor: **0.6**

Moment Overturning	=	29.18 K-ft	
Moment Resisting	=	23.48 K-ft	
Uplift (Ft)	=	0.27 kips	Holdown Required

Shear Wall Force:

v = 128.21 plf (V/L)*0.6



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Project No. 5054.18.01 **Engineer:** DWG
Title: PHX HOMEnz **Date:** 2/28/2018

Shear Wall Check: SW5 DL(wall) = **12** psf

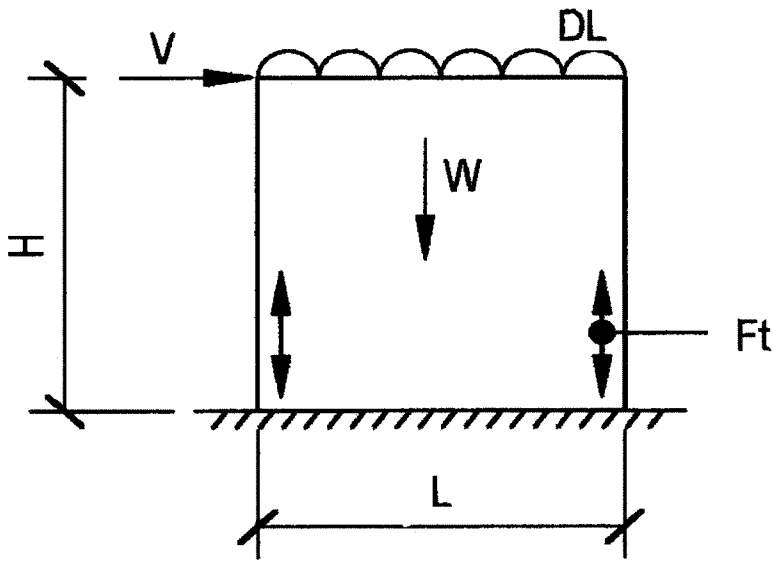
Shear Force:	V =	**1.8** kips	
Wall Height	H =	**10.67** ft.	
Wall Length	L =	**6.584** ft.	
Wall Weight	W =	0.84 kips	
Roof Dead Load	DL =	**0.044** klf	(Int. Wall)

Check Overturing: 0.6DL = 0.6W Wind/Seismic Factor: **0.6**

Moment Overturning	=	11.52 K-ft	
Moment Resisting	=	2.24 K-ft	
Uplift (Ft)	=	1.41 kips	Holdown Required

Shear Wall Force:

v = 164.03 plf (V/L)*0.6



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Project No. 5054.18.01 **Engineer:** DWG
Title: PHX HOMEnz **Date:** 2/28/2018

Shear Wall Check: SW6 DL(wall) = **12** psf

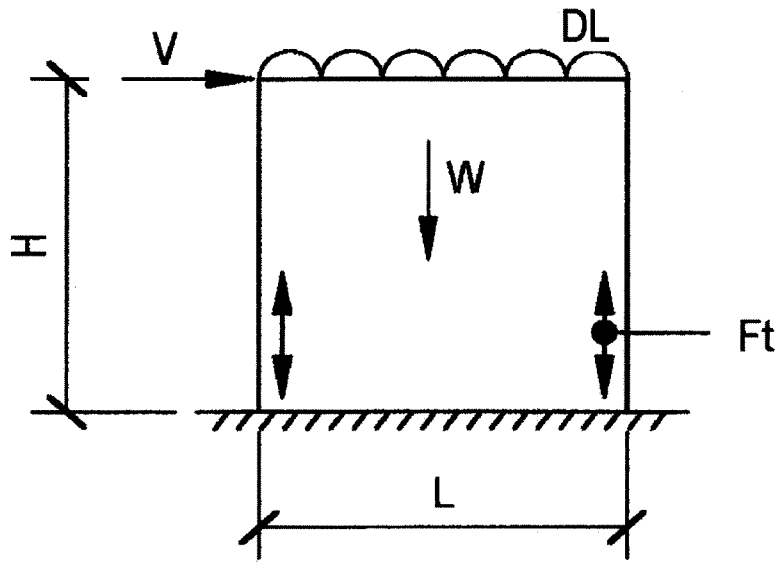
Shear Force:	**V =**	**1.0754** kips	
Wall Height	H =	**10.67** ft.	
Wall Length	L =	**7.67** ft.	
Wall Weight	W =	0.98 kips	
Roof Dead Load	DL =	**0.044** klf	(Int. Wall)

Check Overturing: 0.6DL = 0.6W Wind/Seismic Factor: **0.6**

Moment Overturning	=	6.88 K-ft	
Moment Resisting	=	3.04 K-ft	
Uplift (Ft)	=	0.50 kips	Holdown Required

Shear Wall Force:

v = 84.13 plf (V/L)*0.6



25

HDU/DTT

Holdowns

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

HDU holdowns are pre-deflected during the manufacturing process, virtually eliminating deflection under load due to material stretch. They use Simpson Strong-Tie® Strong-Drive® SDS Heavy-Duty Connector screws which install easily, reduce fastener slip and provide a greater net section when compared to bolts.

The DTT tension ties are designed for lighter-duty holdown applications on single 2x posts. The DTT1Z is installed with nails or Simpson Strong-Tie Strong-Drive SD Connector screws and the DTT2Z installs easily with the Strong-Drive SDS Heavy-Duty Connector screws (included). The DTT1Z holdowns have been tested for use in designed shearwalls and prescriptive braced wall panels as well as prescriptive wood-deck applications (see p. 337 for deck applications).

For more information on holdown options, contact Simpson Strong-Tie.

HDU Special Features:

- Holdown designs virtually eliminate deflection due to material stretch
- Uses Strong-Drive SDS Heavy-Duty Connector screws which install easily, reduce fastener slip, and provide a greater net section area of the post compared to bolts
- Strong-Drive SDS Heavy-Duty Connector screws are supplied with the holdowns to ensure proper fasteners are used
- No stud bolts to countersink at openings

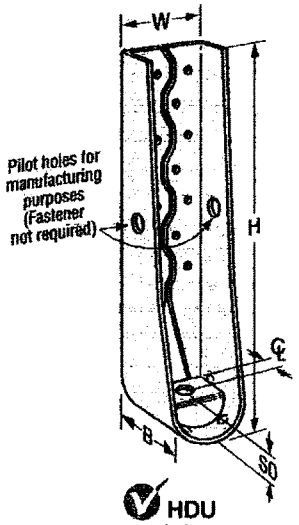
Material: See table

Finish: HDU — Galvanized; DTT1Z and DTT2Z — ZMAX® coating; DTT2SS — stainless steel

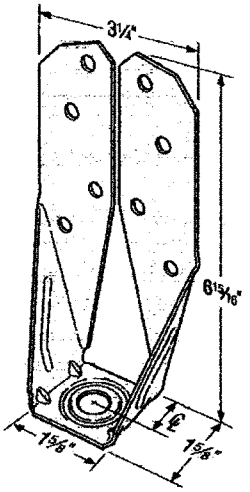
Installation:

- See General Notes on pp. 75–76
- The HDU requires no additional washer, the DTT requires a standard-cut washer (included with DTT2Z) be installed between the nut and the seat
- Strong-Drive SDS Heavy-Duty Connector screws install best with a low-speed high-torque drill with a ⅜" hex-head driver

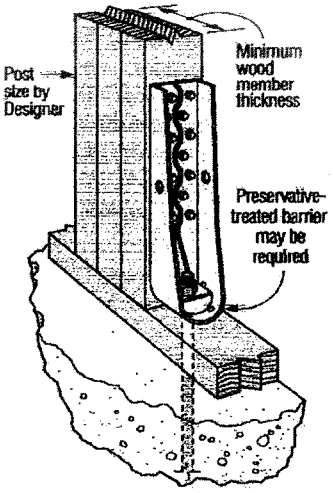
Codes: See p. 14 for Code Reference Key Chart



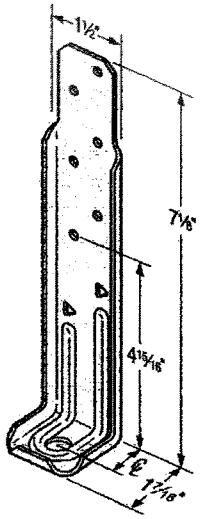
HDU
U.S. Patents
5,979,130



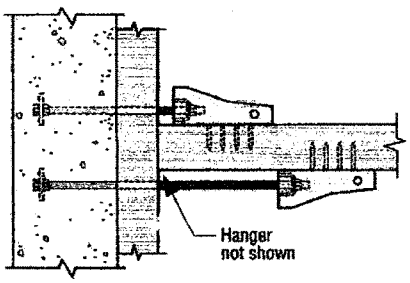
DTT2Z
U.S. Patent
8,555,580



Vertical HDU Installation



DTT1Z
U.S. Patent
Pending



Horizontal HDU Offset Installation
(Plan view)

See Holdown and Tension Tie General Notes on p. 76.

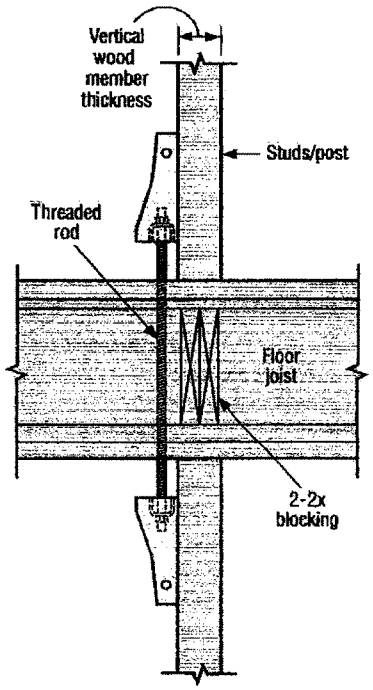
HDU/DTT

Holdowns (cont.)

These products are available with additional corrosion protection. For more information, see p. 18.

Model No.	Ga.	Dimensions (in.) W	H	B	℄	SO	Fasteners Anchor Bolt Dia. (in.)	Post Fasteners	Minimum Wood Member Thickness (in.)	Allowable Tension Loads (160)[1] OF/SP	SPF/HF	Deflection at Allowable Load (in.)	Code Ref.
DTT1Z	14	1½	7⅛	1⅞₁₆	¾	⅜₁₆	⅜	(6) SD #9 x 1½"	1½	840	840	0.170	IF2, L10, FL
								(6) 10d x 1½"		910	640	0.167	
								(8) 10d x 1½"		910	850	0.167	
DTT2Z	14	3¼	6¹⁵⁄₁₆	1⅛	¹⁵⁄₁₆	⅜₁₆	½	(8) ¼" x 1½" SDS	1½	1,825	1,800	0.105	I6, L8, FL
								(8) ¼" x 1½" SDS	3	2,145	1,835	0.128	
DTT2Z-SDS2.5								(8) ¼" x 2½" SDS	3	2,145	2,105	0.128	
HDU2-SDS2.5	14	3	8¹¹⁄₁₆	3¼	1⅝₁₆	1⅜	⅝	(6) ¼" x 2½" SDS	3	3,075	2,215	0.088	
HDU4-SDS2.5	14	3	10¹⁵⁄₁₆	3¼	1⅝₁₆	1⅜	⅝	(10) ¼" x 2½" SDS	3	4,565	3,285	0.114	
HDU5-SDS2.5	14	3	13¾₁₆	3¼	1⅝₁₆	1⅜	⅝	(14) ¼" x 2½" SDS	3	5,645	4,065	0.115	
HDU8-SDS2.5	10	3	16⅝	3½	1⅜	1½	⅞	(20) ¼" x 2½" SDS	3	6,765	4,870	0.116	
									3½	6,970	5,020	0.116	
									4½	7,870	5,665	0.113	
HDU11-SDS2.5	10	3	22¼	3½	1⅜	1½	1	(30) ¼" x 2½" SDS	5½	9,335	6,865	0.137	
									7¼	11,175	8,045	0.137	
HDU14-SDS2.5	7	3	25¹¹⁄₁₆	3½	1⅝₁₆	1⅝₁₆	1	(36) ¼" x 2½" SDS	4x6[3,4]	10,770	7,755	0.122	170
									7¼[3]	14,390	10,435	0.177	I6, L8, FL
									5½[2,3]	14,445	10,350	0.172	

1. See pp. 75–76 for Holdown and Tension Tie General Notes.
2. Noted HDU14 allowable loads are based on a 5½" wide post (6x6 min.).
3. HDU14 requires heavy-hex anchor nut to achieve tabulated loads (supplied with holdown).
4. Loads are applicable to installation on either narrow or wide face of post.



Typical HDU Tie Between Floors

DESIGN SIP PANEL SHEAR WALLS & BRG WALLS:

WALL PROPERTIES: 9¼" SIP PANEL "TYPE S" ✓
H = 10'-8"

WALL ALLOWABLE LOADS:
- TRANSVERSE LOAD = 61 plf (TL) ✓
- AXIAL LOADS = 4351 plf SPSS ✓
- IN-PLANE SHEAR = 700 PLF (IPS) ✓ ⚠1 RHG 4/24/19

* INTERPOLATE FROM TABLE

⚠RHG 6/24/19

INTERACTION: $\frac{W}{TL} + \frac{G}{AL} + \frac{V}{IPS} \leq 1.00$

W = TRANSVERSE WIND LOAD
G = GRAVITY LOADS
V = SHEAR WALL FORCE

WALL MARK	W (PSF)	G (PLF)	V (PLF)	INTERACTION	
SW1	$^{0.29}_{0.6(30)-18}$	$383.5^{0.09}$	$139.86^{0.20}$	0.58	ok ✓
SW2-1	$^{0.29}18$	$391.9^{0.09}$	$118.51^{0.17}$	0.55	ok ✓
SW2-2	18	391.9	$111.17^{0.16}$	0.54	ok ✓
SW3	18	$84^{0.02}$	$172.51^{0.25}$	0.56	ok ✓
SW4	18	84	$128.21^{0.19}$	0.50	ok ✓
SW5	18	84	$87.58^{0.13}$	0.44	ok ✓
SW6	18	84	$164.03^{0.24}$	0.55	ok ✓

⚠1 RHG 6/24/19

HOLDOWN REQUIRED:

SW5 CONTROLS ⇒ F_{uplift} = 1.41 K

∴ PROVIDE SIMPSON DTT2Z
T_{ALL} = 1800 lb > 1410 lb
WHERE REQUIRED

DESIGN SIP PANEL SHEAR WALLS & BRG WALLS:

WALL PROPERTIES: 9¼" SIP PANEL "TYPE S" ✓
H = 10'-8"

WALL ALLOWABLE LOADS: TRANSVERSE LOAD = 109 PSF (TL)

AXIAL LOADS = ~~[illegible]~~ 4399 PLF SPSS

IN-PLANE SHEAR = 700 PLF (IPS)

INTERACTION: $\frac{W}{TL} + \frac{G}{AL} + \frac{V}{IPS} \leq 1.00$

W = TRANSVERSE WIND LOAD
G = GRAVITY LOADS
V = SHEAR WALL FORCE

WALL MARK	W (PSF)	G (PLF)	V (PLF)	INTERACTION	
SW1	0.6(30) = 18	383.5	139.86	0.46	OK ✓
SW2-1	18	391.9	118.51	0.44	OK ✓
SW2-2	18	391.9	111.17	0.42	OK ✓
SW3	18	84	172.51	0.43	OK ✓
SW4	18	84	128.21	0.38	OK ✓
SW5	18	84	87.58	0.19	OK ✓
SW6	18	84	164.03	0.43	OK ✓

HOLDOWN REQUIRED:

SW5 CONTROLS ⇒ F_{UPLIFT} = 1.41 K

∴ PROVIDE SIMPSON DTT2Z
T_{ALL} = 1800 lb > 1410 lb
WHERE REQUIRED

DESIGN SIP PANEL ROOF & DIAPHRAGM:

WORST CASE SPAN = 21'-6"

GRAVITY LOADS = $D_L + L_R = 22 + 20 = 42$ PSF (TRANSVERSE)

DIAPHRAGM SHEAR:

NORTH/SOUTH: $V_d = \frac{3863.5\,(0.7)}{80.5\text{ ft}} = 33.6$ PLF

EAST/WEST: $V_d = \frac{4169.0\,(0.6)}{40.417\text{ ft}} = 61.9$ PLF

ALLOWABLE LOADS:

DIAPHRAGM ALLOWABLE = 430 PLF

(22 ft) 11¼ SIP PANEL ⇒ 69 PSF (TRANSVERSE LOAD)
(19 ft) 11¼ SIP PANEL ⇒

DESIGN SPAN 1:

SPAN = 21'-6"

TRY: 11¼" SIP PANEL (TYPE L)

CHECK $D_L \leq 0.25$ (ALLOWABLE) ⇒ 0.25 (83 PSF) = 20.75 PSF

$D_L = 19.5$ PSF < 20.75 PSF ok✓

INTERACTION:

$$\frac{61.9\text{ PLF}}{430\text{ PLF}} + \frac{42\text{ PSF}}{69\text{ PSF}} = 0.753 < 1.0 \quad \text{ok}\checkmark$$

∴ USE 11¼ SIP PANEL (TYPE L) W/ 4x12 AT SPLINE LOCATIONS

PBS Panel R-Values

Type I modified EPS core

Core Thickness	R-Value at 75°	R-Value at 40°	R-Value at 25°
3-1/2"	15	16	17
5-1/2"	23	25	26
7-1/4"	30	32	33
9-1/4"	37	40	42
11-1/4"	45	49	51

PBS Panel Weights

Type I modified EPS core

Core Thickness	OSB Skin Thickness		
	7/16"	5/8"	3/4"
3-1/2"	3.3	4.6	5.5
5-1/2"	3.5	4.8	5.7
7-1/4"	3.7	5.0	5.9
9-1/4"	3.9	5.2	6.1
11-1/4"	4.0	5.4	6.2

Load Charts with a Built in Safety Factor (Refer to current Listing Reports for up to date load tables)

All of Premier's load charts have a built-in safety factor. We have taken our SIPs products' ultimate load at failure and divided this number by 3. The result is then used as the design load value.

Table 1: Maximum Allowable Uniform Transverse Load (psf) – Type S Panels[1,3]

Panel Core Thickness (in)	Deflection Limit[2]	Panel Span (ft)									
		4[4]	8	10	12	14	16	18	20	22	24
3.5	L/360	100	43	29	21	16	10				
	L/240	143	60	42	33	25	16				
	L/180	143*	61*	57	46	34	22				
5.5	L/360	105	52	39	30	24	18	15	11		
	L/240	162	78	58	36	32	28	22	16		
	L/180	191*	80*	60*	46*	40	34	29	21		
7.25	L/360	120	61	60	42	34	26	21	15	13	11
	L/240	179*	85*	75*	61	50	39	31	23	21	18
	L/180	179*	85*	75*	69*	60*	50*	42	31	28	24
9.25	L/360	131	80	66	52	43	33	28	22	20	18
	L/240	168*	86*	71*	57*	51*	46*	42*	34	30	26
	L/180	168*	86*	71*	57*	51*	46*	42*	39*	37*	34*
11.25	L/360	132	94*	76*	51	50	48	38	28	24	20
	L/240	163*	94*	76*	59*	55*	51*	45*	39*	36*	31
	L/180	163*	94*	76*	59*	55*	51*	45*	39*	36*	33*

[1] Table values assume a simply supported panel with 1.5 in. of continuous bearing on facing at supports. Permanent loads, such as dead load, shall not exceed 0.25 times the tabulated load. Panels shall use OSB surface splines not less than 7/16 in. thick inserted below the facing on each side of the panel.

[2] Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of adopted building code.

[3] Tabulated values for 8 ft walls apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to supports. Tabulated values for other lengths are based on the strong-axis of the facing material oriented parallel to the span direction.

[4] Panels spanning 4 ft shall be a minimum of 8 ft long spanning a minimum of two 4 ft spans. No single span condition is allowed.

[5] For wall panel capacities utilizing a zero bearing configuration (Figure 2), the allowable load shall be determined using C_v=0.86.

*An asterisk (*) indicates the value shown is governed by the average peak load divided by 3.

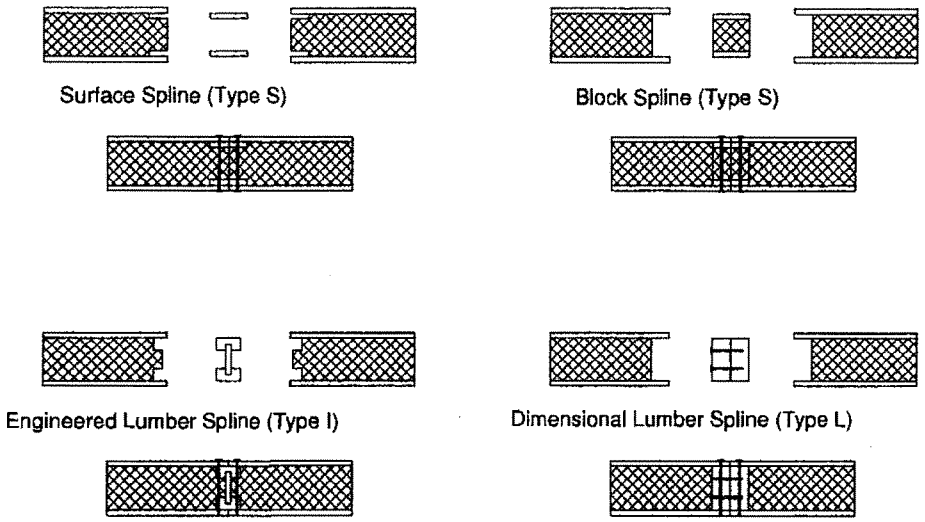


Figure 1: SIP Spline Types

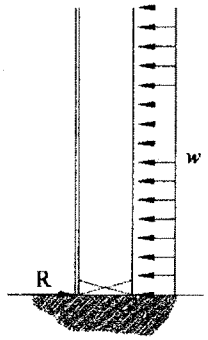


Figure 2: Zero Bearing Support

Table 2: Maximum Allowable Uniform Transverse Load (psf) – Type I Panels[1,3]

Panel Core Thickness (in)	Deflection Limit[2]	Panel Span (ft)									
		4[4]	8	10	12	14	16	18	20	22	24
7.25	L/360	132	136	93	60	50	40	31	21	19	16
	L/240	318*	148*	107*	91	75	59	45	31	27	23
	L/180	318*	148*	107*	92*	87	78	60	41	36	30
9.25	L/360	197	164*	124*	72	67	61	48	34	29	24
	L/240	336*	164*	124*	107*	96	84*	70	49	43	36
	L/180	336*	164*	124*	107*	96	84*	76	65	56	47
11.25	L/360	258	143*	103*	86	83	77*	61	42	37	32
	L/240	318*	143*	103*	93*	85	77*	68	59*	54	46
	L/180	318*	143*	103*	93*	85	77*	68	59*	54	49*

[1] Table values assume a simply supported panel with 1.5 in. of continuous bearing on facing at supports. Permanent loads, such as dead load, shall not exceed 0.25 times the tabulated load. Splines consist of one wood I-beam, 2.25 in. wide flange (minimum) with a depth equal to the core thickness, spaced not to exceed 48 in. on center.
[2] Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of adopted building code.
[3] Tabulated values for 8 ft walls apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to supports. Tabulated values for other lengths are based on the strong-axis of the facing material oriented parallel to the span direction.
[4] Panels spanning 4 ft shall be a minimum of 8 ft long spanning a minimum of two 4 ft spans. No single span condition is allowed.
*An asterisk (*) indicates the value shown is governed by the average peak load divided by 3.

Table 3: Maximum Allowable Uniform Transverse Load (psf) – Type L Panels[1,3]

Panel Core Thickness (in)	Deflection Limit[2]	Panel Span (ft)									
		4[4]	8	10	12	14	16	18	20	22	24
3.5	L/360	103	45	33	24	18	11				
	L/240	225	68	47	34	26	17				
	L/180	297*	91	61	45	34	23				
5.5	L/360	307*	129	57	42	34	25	20	15		
	L/240	307*	182*	87	61	49	37	30	22		
	L/180	307*	182*	112*	80	65	49	39	29		
7.25	L/360	253	171	82	66	54	41	32	23		
	L/240	288*	188*	128	100	81	61	48	35		
	L/180	288*	188*	133*	117*	105	80	63	45		
✱9.25	L/360	286	188*	117	101	80	58	47	36	32	27
	L/240	326*	188*	147*	134*	120	90	71	52	47	41
	L/180	326*	188*	147*	134*	121	108*	93	68	61	53
✱11.25	L/360	327*	188*	167*	141	116	91	75	58	47	36
	L/240	327*	188*	167*	153*	132	110*	97	83*	69	53
	L/180	327*	188*	167*	153*	132	110*	97	83*	83	70

[1] Table values assume a simply supported panel with 1.5 in. of continuous bearing on facing at supports. Permanent loads, such as dead load, shall not exceed 0.25 times the tabulated load. Splines consist of #2 or better, Hem-Fir, 1.5 in. wide with a depth equal to the core thickness, spaced to provide not less than two members for every 48 in. of panel width.
[2] Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of adopted building code.
[3] Tabulated values for 8 ft walls apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to supports. Tabulated values for other lengths are based on the strong-axis of the facing material oriented parallel to the span direction.
[4] Panels spanning 4 ft shall be a minimum of 8 ft long spanning a minimum of two 4 ft spans. No single span condition is allowed.
*An asterisk (*) indicates the value shown is governed by the average peak load divided by 3.

Table 4: Maximum Allowable Uniform Axial Load (plf) – Type S Panels[1,2,3,4]

Panel Core Thickness (in)	Panel Span (ft)					
	8	10	12	16	20	24
3.5	3500	2553	2453	2117		
5.5	4250	4043	3373	3923	2817	2183
7.25	4917	4327	4473	4197	3497	3067
9.25	4600	4414	4228	4417	3389	3248
11.25	3889	3959	4028	4408	3837*	3333

[1] Splines consist of OSB surface splines not less than 7/16 in. thick inserted below the facing on each side of the panel. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.
[2] Uniform Axial loads may be applied in accordance with Section 5.5.1. Concentrated point loads shall be addressed in accordance with Section 5.5.2 and Table 6.
[3] Both facings must bear on the supporting foundation or structure.
[4] Tabulated values for 8 ft walls apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to supports.
* Limited by 1/8 in. deflection (compression)

Table 5: Maximum Allowable Uniform Axial Loads (plf) – Type L Panels[1,2,3,4]

Panel Core Thickness (in)	Panel Span (ft)					
	8	10	12	16	20	24
3.5	4723	3903	3273	2623		
5.5	5850	5890	4277	4310	2933	2837
7.25	6807	6110	5557	5180	4837	4083
✱ 9.25	5473	5709	5946	5948	4729*	4250
11.25	5667	5474	5281	5775*	4729*	4223

[1] Splines consist of #2 or better, Hem-Fir, 1.5 in. wide with a depth equal to the core thickness, spaced to provide not less than two members for every 48 in. of panel width. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.
[2] Axial loads shall be applied concentrically to the top of the panel through repetitive members spaced not more than 24 in. on center. Such members shall be fastened to a rim board or similar member to distribute along the top of the SIP panel.
[3] Both facings must bear on the supporting foundation or structure.
[4] Tabulated values for 8 ft walls apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to supports.
* Limited by 1/8 in. deflection (compression)

Table 9: Allowable In-Plane Shear Strength (Pounds per Foot) for SIP Shear Walls 3.5 in. through 11.25 in. core thickness Wind and Seismic Loads in Seismic Design Categories A, B and C[1,2]

Spline Type[3]	Framing Minimum SG[4]	Minimum Facing Connections[2]			Shear Strength (plf)
		Chord[2]	Plate[2]	Spline[3]	
Block, Surface or Lumber Spline (Type S, Type L)	0.50	0.113"x 2-1/2" nails, 6" oc	0.113"x 2-1/2" nails, 6" oc	(7/16" thick, 3" wide spline) 0.113"x 2-1/2" nails, 6" oc	410
	0.50	0.113"x 2-3/8" nails, 6" oc stagger (2 rows)	0.113"x 2-3/8" nails, 6" oc	(7/16" thick, 4" wide spline) 0.113"x 2-3/8" nails, 6" oc	460
	→ 0.42	0.113"x 2-3/8" nails, 6" oc stagger (2 rows)	0.113"x 2-3/8" nails, 6" oc stagger (2 rows)	(7/16" thick, 4" wide spline) 0.113"x 2-3/8" nails, 4" oc	700
	0.42	0.148"x 2-3/8" nails, 6" oc stagger (2 rows)	0.148"x 2-3/8" nails, 3" oc	(23/32" thick, 4" wide spline) 0.148"x 2-3/8" nails, 3" oc stagger (2 rows)	1000

[1] Maximum in-plane shear dimension ratio shall not exceed 2:1 (height : width) for resisting wind or seismic loads.
[2] Chords, hold-downs and connections to other structural elements must be designed by a registered design professional in accordance with accepted engineering practice.
[3] Spline type at interior panel-to-panel joints only, solid chord members are required at each end of each shear wall segment.
[4] Required connections must be made on each side of the panel. Dimensional or engineered lumber shall have an equivalent specific gravity not less than specified.

Table 10: Allowable In-Plane Shear Strength (Pounds per Foot) for SIP Shear Walls (Seismic Loads in Seismic Design Categories A, B, C, D, E and F)[1,2]

Spline Type[3]	Framing Minimum SG[4]	Minimum Facing Connections[2]			Shear Strength (plf)
		Chord[2]	Plate[2]	Spline[3]	
Block, Surface, or Lumber Spline (Type S, Type L)	0.50	0.113"x 2-1/4" nails, 6" oc	0.113"x 2-1/4" nails, 3" oc	(7/16" thick, 3" wide spline) 0.113"x 2-1/4" nails, 6" oc	360
	0.50	0.113"x 2-1/4" nails, 6" oc	0.113"x 2-1/4" nails, 6" oc	(3/4" thick, 3" wide spline) 0.113"x 2-1/4" nails, 6" oc	360
Block, Surface, or Lumber Spline (Type S, Type L)	0.50	0.113" x 2-3/8" nails, 3" oc Staggered (3/8" edge distance and 3/4" edge distance)	0.113" x 2-3/8" round head nails, 3" oc Staggered (3/8", 3/4" edge distance)	(23/32" thick, 3" wide spline) 0.113" x 2-3/8" nails, 3" oc Staggered (3/8" edge distance and 3/4" edge distance)	720
Block, Surface, or Lumber Spline (Type S, Type L)	0.50	0.113" x 2-3/8" nails, 2" oc Staggered (3/8" edge distance and 3/4" edge distance)	0.113" x 2-3/8" round head nails, 2" oc Staggered (3/8", 3/4" edge distance)	(23/32" thick, 3" wide spline) 0.113" x 2-3/8" nails, 2" oc Staggered (3/8" edge distance and 3/4" edge distance)	920

[1] Maximum in-plane shear dimension ratio are defined in Section 5.8.2.
[2] Chords, hold-downs and connections to other structural elements must be designed by a registered design professional in accordance with accepted engineering practice.
[3] Spline type at interior panel-to-panel joints only, solid chord members are required at each end of each shear wall segment.
[4] Required connections must be made on each side of the panel. Dimensional or engineered lumber shall have an equivalent specific gravity not less than specified.

Table 11: Maximum Allowable In-Plane Shear (Pounds per Foot) For Diaphragms Subjected to Wind or Seismic Loading[1]

Minimum Connections[2]				Shear Strength (plf)	Max. Aspect Ratio
Interior Supports[2] (Figure 4a)	Surface Spline[3] (Figure 4b)	Boundary[4] (Figure 4c)			
		Support	Spline		
PBS #14 Panel Screw with 1" penetration 12" oc	0.113" x 2.5" nails, 3" oc 7/16" x 4" OSB Spline	PBS #14 Panel Screw with 1" penetration 12" oc	0.113" x 2.5" nails, 6" oc	430	4:1
PBS #14 Panel Screw with 1" penetration 12" oc	0.113" x 2.5" nails, 3" oc, 2 rows, staggered 7/16" x 4" OSB Spline	PBS #14 Panel Screw with 1" penetration 3" oc	0.113" x 2.5" nails, 4" oc	530	4:1
PBS #14 Panel Screw with 1" penetration 2" oc	0.113" x 2.5" nails, 3" oc, 2 rows, staggered 7/16" x 4" OSB Spline	PBS #14 Panel Screw with 1" penetration 2" oc	0.113" x 2.5" nails, 1.5" oc	750	4:1
PBS #14 Panel Screw with 1" penetration 4" oc	0.113" x 2.5" nails, 3" oc, 2 rows, staggered 7/16" x 4" OSB Spline	PBS #14 Panel Screw with 1" penetration 4" oc	0.113" x2 .5" nails, 3" oc	915	3:1
PBS #14 Panel Screw with 1" penetration 4" oc	0.113" x 2.5" nails, 6" oc, 2 rows, staggered 23/32" x 4" OSB Spline	PBS #14 Panel Screw with 1" penetration 4" oc	0.113" x 2.5" nails, 6" oc	1130	3:1

[1] The maximum diaphragm length-to-width ratio of shall not exceed 4:1. Load may be applied parallel to continuous panel joints.
[2] Interior supports shall be spaced not to exceed 12 ft on center and have a minimum width of 3.5 in. and a specific gravity of 0.42 or greater. Specified fasteners are required on both sides of panel joint where panels are joined over a support. See Figure 4a.
[3] Top spline only, at interior panel-to-panel joints. Specified fasteners are required on both sides of panel joint. See Figures 4b.
[4] Boundary spline shall be solid 1.5 inch wide, minimum, and have a specific gravity of 0.42 or greater. Boundary supports shall have a minimum width of 3.5 in. and a specific gravity of 0.42 or greater. Specified spline fasteners are required through both facings. See Figure 4c.

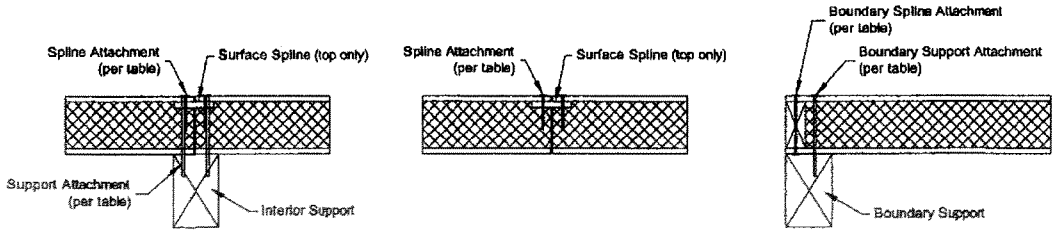


Figure 4a: Interior Support **Figure 4b: Surface Spline** **Figure 4c: Boundary**

Figure 4: Diaphragm Connection Types

Table 12: Fire Rated Assemblies[1]

Designation	Orientation	Type	Rating	Directory
U524	Vertical	Bearing Wall	1-Hour	Underwriters Laboratories
P517	Horizontal	Ceiling	1-Hour	Underwriters Laboratories
P822	Horizontal	Floor/Ceiling	1-Hour	Underwriters Laboratories
PRS021109-24	Vertical	Bearing Wall	1-Hour	NTA, Inc.
PRS021109-23	Horizontal	Ceiling	1-Hour	NTA, Inc.

[1] Construction details and assembly status shall be obtained from the fire resistance directory of the noted organization. NTA, Inc. assemblies may be obtained from www.ntainc.com.

DESIGN WOOD HEADER:

HEADER 1: L = 4'-0" * INTERIOR HEADER AT GARAGE

LOAD: D_L = 22 PSF (20) = 440 PLF
L_R = 20 PSF (20) = 400 PLF

TOTAL LOAD: $D+L_R$ = 840 PLF

∴ PROVIDE PREMIER INSUL-BEAM II HEADER W/ (1) TRIMMER STUD
P_{ALL} = 1575 PLF > 840 PLF

CHECK SHOULDER STUD:

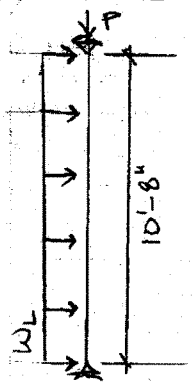
H = 9'-0"

LOAD: D_L = 440 PLF (4/2) = 880 lb
L_R = 400 PLF (4/2) = 800 lb
TL = 1680 lb

∴ PROVIDE (1) TRIMMER STUD, TYPICAL (2x10)

DESIGN KING STUDS: (WIND = 30 PSF ULTIMATE)

H = 10'-8"



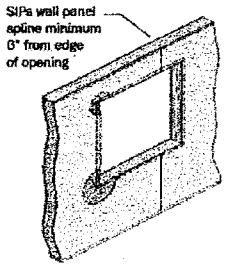
P_{DL} = 440(2) = 880 lb
P_{LR} = 400 (2) = 800 lb

W_L = 30 PSF (4/2 +1) = 90 PLF (ULT.)

∴ PROVIDE (1) 2x10 KING STUD

Load Chart 8: Allowable Header Loads (plf)
Condition 2–Panel is Not Continuous Over Opening (Splines)

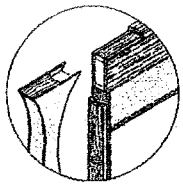
Header Depth	Deflection	Header Span (ft.)			
		4'	6'	8'	10'
12"	L/480	345	243	156	99
	L/360	450	295	190	125
	L/240	630	382	236*	153*
18"	L/480	705	388	254	235
	L/360	750*	482	302*	281*
	L/240	750*	482	302*	281*
24"	L/480	698	582*	368*	350*
	L/360	895*	582*	368*	350*
	L/240	895*	582*	368*	350*



* indicates ultimate load divided by 3 for the design capacity.
In all cases where a concentrated load is placed over on opening or the design loads exceed the capacity of a panel header, Premier Insul-Beam II should be used if possible or an engineered header assembly is required.
More information on this chart can be found in Technical Bulletin #10 (www.premiersips.com).

Load Chart 9: Premier Insul-Beam II Header Loads (plf)

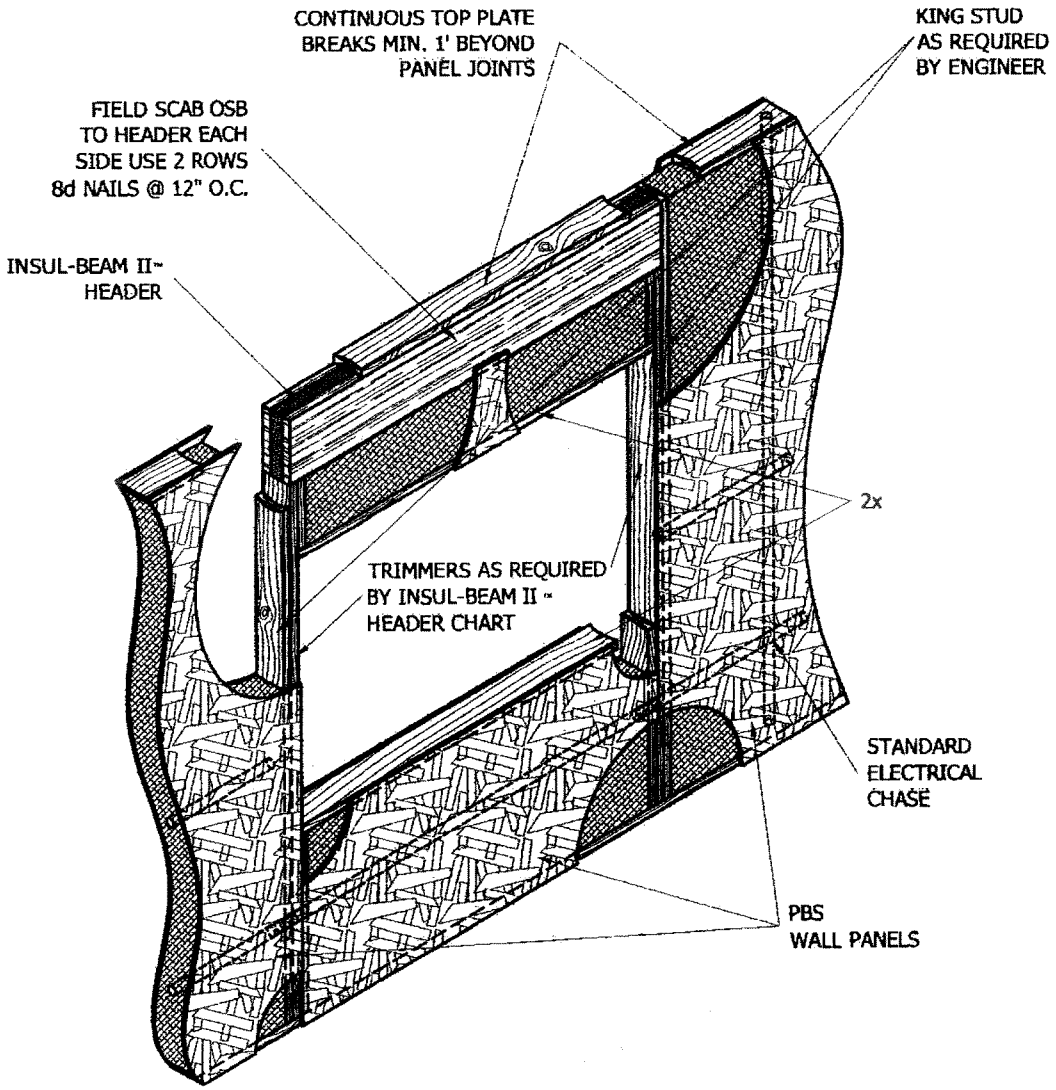
No. of Trimmer Studs	Deflection	Header Span (ft.)						
		2'	3'	4'	5'	6'	7'	8'
1	L/480	3150	2100	1575	1260	1050	900	788
	L/360	3150	2100	1575	1260	1050	900	788
→	L/240	3150	2100	1575	1260	1050	900	788
2	L/480	6300	4200	3150	2520	2100	1800	1545
	L/360	6300	4200	3150	2520	2100	1800	1575
	L/240	6300	4200	3150	2520	2100	1800	1575



No. of Trimmer Studs	Deflection	Header Span (ft.)							
		9'	10'	11'	12'	13'	14'	15'	16'
1	L/480	700	630	573	458	360	288	234	193
	L/360	700	630	573	525	480	384	313	257
	L/240	700	630	573	525	485	450	420	386
2	L/480	1085	791	594	458	360	288	234	193
	L/360	1400	1055	792	610	480	384	313	257
	L/240	1400	1245	792	864	720	577	469	386

Values listed for each deflection represent the least value of the bearing capacity of the trimmer, shear or bending capacity of the header or the actual deflection at the design load.
Refer to Technical Bulletin #30 for supporting headers in Premier SIPs wall panels (www.premiersips.com).
Note: Trimmer stud design capacities must be reviewed.

Wall Details: Insul-Beam Header PBS-201



PBS-201 INSUL-BEAM HEADER 8-17-07

PREMIER SIPS

SCL Consulting
structural · civil · landscape
1753 E. Broadway Rd.
Suite 101-517
Tempe, AZ 85282

Project Title: PHX HOMEnz
Engineer: RHG
Project Descr:

Project ID: 5054.18.01

37

Printed: 28 FEB 2018, 8:39AM

Wood Column

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-[illegible] Licensee : SCL Consulting

Description : Shoulder Stud (Typical Header)

Code References

Calculations per 2018 NDS, IBC 2018, CBC 2018, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Analysis Method :	Allowable Stress Design		
End Fixities	Top & Bottom Pinned		
Overall Column Height	9 ft		
(Used for non-slender calculations)			
Wood Species	Spruce - Pine - Fir		
Wood Grade	No. 1/No. 2		
Fb +	875 psi	Fv	135 psi
Fb -	875 psi	Ft	450 psi
Fc - Prll	1150 psi	Density	26.21 pcf
Fc - Perp	425 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1400	1400	1400 ksi
Minimum	510	510	

Wood Section Name	2x10		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	1.50 in	Allow Stress Modification Factors	
Exact Depth	9.250 in	Cf or Cv for Bending	1.10
Area	13.875 in^2	Cf or Cv for Compression	1.0
Ix	98.932 in^4	Cf or Cv for Tension	1.10
Iy	2.602 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Factor	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0 *NDS 15.3.2*
		Use Cr : Repetitive ?	No

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Fully braced against buckling along X-X Axis
Y-Y (depth) axis : Unbraced Length for X-X Axis buckling = 9 ft, K = 1.0

Applied Loads

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

Column self weight included : 22.729 lbs * Dead Load Factor
AXIAL LOADS . . .
Header Load: Axial Load at 9.0 ft, D = 0.880, L = 0.80 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.1177 : 1**

Load Combination	+D+L+H
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are . . .	
Applied Axial	1.703 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	1,042.95 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D+0.70E+0.60H
Location of max.above base	9.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	216.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a
Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Rati	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	0.900	0.918	0.06848	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+L+H	1.000	0.907	0.1177	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+Lr+H	1.250	0.878	0.05156	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+S+H	1.150	0.890	0.05529	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.750Lr+0.750L+H	1.250	0.878	0.08583	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.750L+0.750S+H	1.150	0.890	0.09205	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.60W+H	1.600	0.834	0.04240	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.70E+H	1.600	0.834	0.04240	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.750Lr+0.750L+0.450W+H	1.600	0.834	0.07058	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.750L+0.750S+0.450W+H	1.600	0.834	0.07058	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.750L+0.750S+0.5250E+H	1.600	0.834	0.07058	PASS	0.0 ft	0.0	PASS	9.0 ft
+0.60D+0.60W+0.60H	1.600	0.834	0.02544	PASS	0.0 ft	0.0	PASS	9.0 ft

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Project Descr:

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ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Wood Column

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Shoulder Stud (Typical Header)

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+0.60D+0.70E+0.60H	1.600	0.834	0.02544	PASS	0.0 ft	0.0	PASS	9.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+D+H						0.903					
+D+L+H						1.703					
+D+Lr+H						0.903					
+D+S+H						0.903					
+D+0.750Lr+0.750L+H						1.503					
+D+0.750L+0.750S+H						1.503					
+D+0.60W+H						0.903					
+D+0.70E+H						0.903					
+D+0.750Lr+0.750L+0.450W+H						1.503					
+D+0.750L+0.750S+0.450W+H						1.503					
+D+0.750L+0.750S+0.5250E+H						1.503					
+0.60D+0.60W+0.60H						0.542					
+0.60D+0.70E+0.60H						0.542					
D Only						0.903					
Lr Only											
L Only						0.800					
S Only											
W Only											
E Only											
H Only											

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	0.000 in	0.000 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	0.000 in	0.000 ft
+D+0.750L+0.750S+0.450W+H	0.0000 in	0.000 ft	0.000 in	0.000 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	0.000 in	0.000 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	0.000 in	0.000 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

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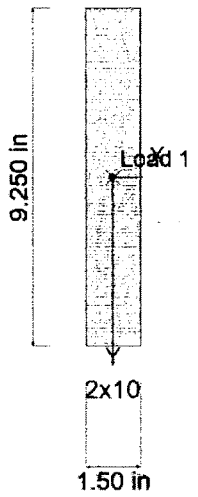
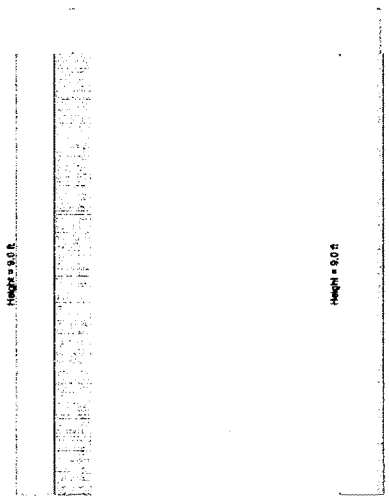
Sketches





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Description : King Stud (Typical Header)

Code References

Calculations per 2018 NDS, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Analysis Method :	Allowable Stress Design		
End Fixities	Top & Bottom Pinned		
Overall Column Height	10.67 ft		
(Used for non-slender calculations)			
Wood Species	Spruce - Pine - Fir		
Wood Grade	No. 1/No. 2		
Fb +	875.0 psi	Fv	135.0 psi
Fb -	875.0 psi	Ft	450.0 psi
Fc - Prll	1,150.0 psi	Density	26.210 pcf
Fc - Perp	425.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,400.0	1,400.0	1,400.0 ksi
Minimum	510.0	510.0	

Wood Section Name	2x10		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	1.50 in	Allow Stress Modification Factors	
Exact Depth	9.250 in	Cf or Cv for Bending	1.10
Area	13.875 in^2	Cf or Cv for Compression	1.0
Ix	98.932 in^4	Cf or Cv for Tension	1.10
Iy	2.602 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Factor	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0 *NDS 15.3.2*
		Use Cr : Repetitive ?	No

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Fully braced against buckling along X-X Axis
Y-Y (depth) axis : Unbraced Length for X-X Axis buckling = 10.67 ft, K = 1.0

Applied Loads

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

Column self weight included : 26.946 lbs * Dead Load Factor
AXIAL LOADS . . .
Header Load: Axial Load at 10.670 ft, D = 0.880, L = 0.80 k
BENDING LOADS . . .
Lat. Uniform Load creating Mx-x, W = 0.090 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.2908 : 1**
Load Combination +D+0.60W+H
Governing NDS Forumla Comp + Mxx, NDS Eq. 3.9-3
Location of max.above base 5.299 ft
At maximum location values are . . .
Applied Axial 0.9069 k
Applied Mx 0.7684 k-ft
Applied My 0.0 k-ft
Fc : Allowable 1,374.94 psi

PASS Maximum Shear Stress Ratio = **0.1442 : 1**
Load Combination +D+0.60W+H
Location of max.above base 0.0 ft
Applied Design Shear 31.145 psi
Allowable Shear 216.0 psi

Maximum SERVICE Lateral Load Reactions . .
Top along Y-Y 0.4802 k — Bottom along Y-Y 0.4802 k
Top along X-X 0.0 k — Bottom along X-X 0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y 0.1915 in at 5.371 ft above base
for load combination : W Only
Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	0.900	0.876	0.07209	PASS	0.0 ft	0.0	PASS	10.670 ft
+D+L+H	1.000	0.859	0.1246	PASS	0.0 ft	0.0	PASS	0.670 ft
+D+Lr+H	1.250	0.813	0.05591	PASS	0.0 ft	0.0	PASS	10.670 ft
+D+S+H	1.150	0.832	0.05942	PASS	0.0 ft	0.0	PASS	10.670 ft
+D+0.750Lr+0.750L+H	1.250	0.813	0.09290	PASS	0.0 ft	0.0	PASS	10.670 ft
+D+0.750L+0.750S+H	1.150	0.832	0.09873	PASS	0.0 ft	0.0	PASS	10.670 ft
+D+0.60W+H	1.600	0.747	0.2908	PASS	5.299 ft	0.1442	PASS	0.0 ft
+D+0.70E+H	1.600	0.747	0.04754	PASS	0.0 ft	0.0	PASS	10.670 ft
+D+0.750Lr+0.750L+0.450W+H	1.600	0.747	0.2272	PASS	5.371 ft	0.1081	PASS	0.0 ft

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Wood Column

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Description : King Stud (Typical Header)

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+0.750L+0.750S+0.450W+H	1.600	0.747	0.2272	PASS	5.371 ft	0.1081	PASS	0.0 ft
+D+0.750L+0.750S+0.5250E+H	1.600	0.747	0.07899	PASS	0.0 ft	0.0	PASS	10.670 ft
+0.60D+0.60W+0.60H	1.600	0.747	0.2859	PASS	5.299 ft	0.1442	PASS	0.0 ft
+0.60D+0.70E+0.60H	1.600	0.747	0.02852	PASS	0.0 ft	0.0	PASS	10.670 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction k @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
+D+H					0.907				
+D+L+H					1.707				
+D+Lr+H					0.907				
+D+S+H					0.907				
+D+0.750Lr+0.750L+H					1.507				
+D+0.750L+0.750S+H					1.507				
+D+0.60W+H			0.288	0.288	0.907				
+D+0.70E+H					0.907				
+D+0.750Lr+0.750L+0.450W+H			0.216	0.216	1.507				
+D+0.750L+0.750S+0.450W+H			0.216	0.216	1.507				
+D+0.750L+0.750S+0.5250E+H					1.507				
+0.60D+0.60W+0.60H			0.288	0.288	0.544				
+0.60D+0.70E+0.60H					0.544				
D Only					0.907				
Lr Only									
L Only					0.800				
S Only									
W Only			0.480	0.480					
E Only									
H Only									

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	0.115 in	5.371 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	0.086 in	5.371 ft
+D+0.750L+0.750S+0.450W+H	0.0000 in	0.000 ft	0.086 in	5.371 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	0.115 in	5.371 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	0.192 in	5.371 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

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Wood Column

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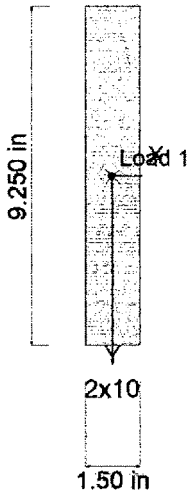
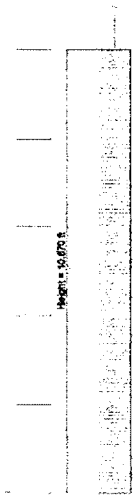
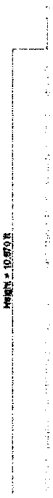
Description : King Stud (Typical Header)

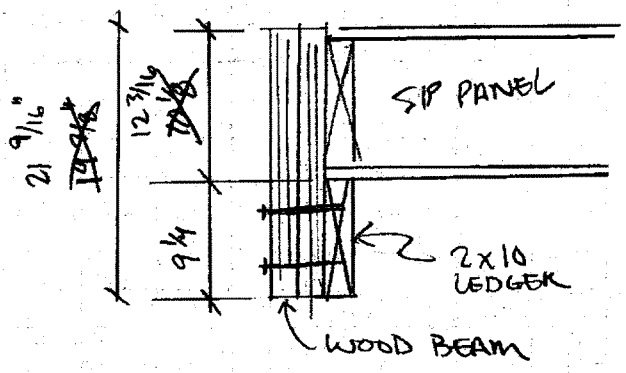
Sketches







DESIGN EXTERIOR BEAMS & COLUMNS:



EXT. WOOD BEAM: (@ LIVING ROOM EXT. WALL)

L = 20'-6"

LOAD: DL = 22 PSF (21.50/2) = 236.5 PLF
LR = 20 PSF (21.50/2) = 215 PLF

∴ PROVIDE (2) 1 3/4" x 20" LVL AT EXT. CURTAIN WALLS

EXT. STEEL COLUMN: (@ GARAGE DOOR CORNER)

H = ~~10'-6"~~ 12'-0"

- UNBRACED BOTH DIRECTIONS

LOAD: DL = 1.48 + 2.56 = 4.04 K
LR = 1.25 + 2.15 = 3.4 K

∴ PROVIDE HSS5x5x1/4 STEEL COLUMN

LEDGER CONNECTION:

SCREWS AT 12" o.c. ⇒ TL = 236.5 + 215 = 451.5 lb

#12 ROOFING SCREWS ⇒ V_{ALL} = 581 lb

∴ PROVIDE (2) #14 SCREWS AT 12" O.C. TYP.

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Wood Beam

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Description : Exterior Wood Beam Design

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019 , ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design Load
Combination :ASCE 7-16

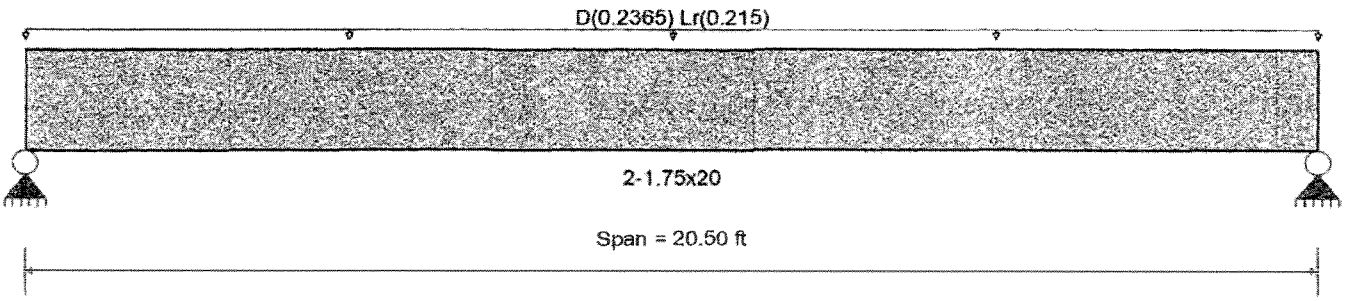
Wood Species : Trus Joist
Wood Grade : MicroLam LVL 1.9 E

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,600.0 psi
Fb -	2,600.0 psi
Fc - Prll	2,510.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	1,555.0 psi

E : Modulus of Elasticity

Ebend- xx	1,900.0 ksi
Eminbend - xx	965.71 ksi
Density	42.0 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.2365, Lr = 0.2150 , Tributary Width = 1.0 ft, (Roof Loads)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.421 : 1**	Maximum Shear Stress Ratio	=	**0.244 : 1**
Section used for this span		**2-1.75x20**	Section used for this span		**2-1.75x20**
fb : Actual	=	1,274.93 psi	fv : Actual	=	87.01 psi
FB : Allowable	=	3,031.88 psi	Fv : Allowable	=	356.25 psi
Load Combination		+D+Lr+H	Load Combination		+D+Lr+H
Location of maximum on span	=	10.250 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.194 in	Ratio =	1269 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.425 in	Ratio =	578 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 20.50 ft	1	0.318	0.185	0.90	0.933	1.00	1.00	1.00	1.00	1.00	13.50	694.09	2182.95	2.21	47.37	256.50
+D+L+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 20.50 ft	1	0.286	0.166	1.00	0.933	1.00	1.00	1.00	1.00	1.00	13.50	694.09	2425.50	2.21	47.37	285.00
+D+Lr+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 20.50 ft	1	0.421	0.244	1.25	0.933	1.00	1.00	1.00	1.00	1.00	24.79	1,274.93	3031.88	4.06	87.01	356.25
+D+S+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 20.50 ft	1	0.249	0.145	1.15	0.933	1.00	1.00	1.00	1.00	1.00	13.50	694.09	2789.33	2.21	47.37	327.75
+D+0.750Lr+0.750L+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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structural·civil·landscape
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Suite 101-517
Tempe, AZ 85282

Project Title: PHX HOMEnz
Engineer: RHG
Project Descr:

Project ID: 5054.18.01

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Wood Beam

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Exterior Wood Beam Design

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 20.50 ft	1	0.373	0.216	1.25	0.933	1.00	1.00	1.00	1.00	1.00	21.97	1,129.72	3031.88	3.60	77.10	356.25
+D+0.750L+0.750S+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 20.50 ft	1	0.249	0.145	1.15	0.933	1.00	1.00	1.00	1.00	1.00	13.50	694.09	2789.33	2.21	47.37	327.75
+D+0.60W+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 20.50 ft	1	0.179	0.104	1.60	0.933	1.00	1.00	1.00	1.00	1.00	13.50	694.09	3880.81	2.21	47.37	456.00
+D+0.70E+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 20.50 ft	1	0.179	0.104	1.60	0.933	1.00	1.00	1.00	1.00	1.00	13.50	694.09	3880.81	2.21	47.37	456.00
+D+0.750Lr+0.750L+0.450W+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 20.50 ft	1	0.291	0.169	1.60	0.933	1.00	1.00	1.00	1.00	1.00	21.97	1,129.72	3880.81	3.60	77.10	456.00
+D+0.750L+0.750S+0.450W+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 20.50 ft	1	0.179	0.104	1.60	0.933	1.00	1.00	1.00	1.00	1.00	13.50	694.09	3880.81	2.21	47.37	456.00
+D+0.750L+0.750S+0.5250E+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 20.50 ft	1	0.179	0.104	1.60	0.933	1.00	1.00	1.00	1.00	1.00	13.50	694.09	3880.81	2.21	47.37	456.00
+0.60D+0.60W+0.60H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 20.50 ft	1	0.107	0.062	1.60	0.933	1.00	1.00	1.00	1.00	1.00	8.10	416.45	3880.81	1.33	28.42	456.00
+0.60D+0.70E+0.60H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 20.50 ft	1	0.107	0.062	1.60	0.933	1.00	1.00	1.00	1.00	1.00	8.10	416.45	3880.81	1.33	28.42	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr+H	1	0.4255	10.325		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 — Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	4.837	4.837
Overall MINimum	2.204	2.204
+D+H	2.633	2.633
+D+L+H	2.633	2.633
+D+Lr+H	4.837	4.837
+D+S+H	2.633	2.633
+D+0.750Lr+0.750L+H	4.286	4.286
+D+0.750L+0.750S+H	2.633	2.633
+D+0.60W+H	2.633	2.633
+D+0.70E+H	2.633	2.633
+D+0.750Lr+0.750L+0.450W+H	4.286	4.286
+D+0.750L+0.750S+0.450W+H	2.633	2.633
+D+0.750L+0.750S+0.5250E+H	2.633	2.633
+0.60D+0.60W+0.60H	1.580	1.580
+0.60D+0.70E+0.60H	1.580	1.580
D Only	2.633	2.633
Lr Only	2.204	2.204
L Only		
S Only		
W Only		
E Only		
H Only		

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Wood Beam

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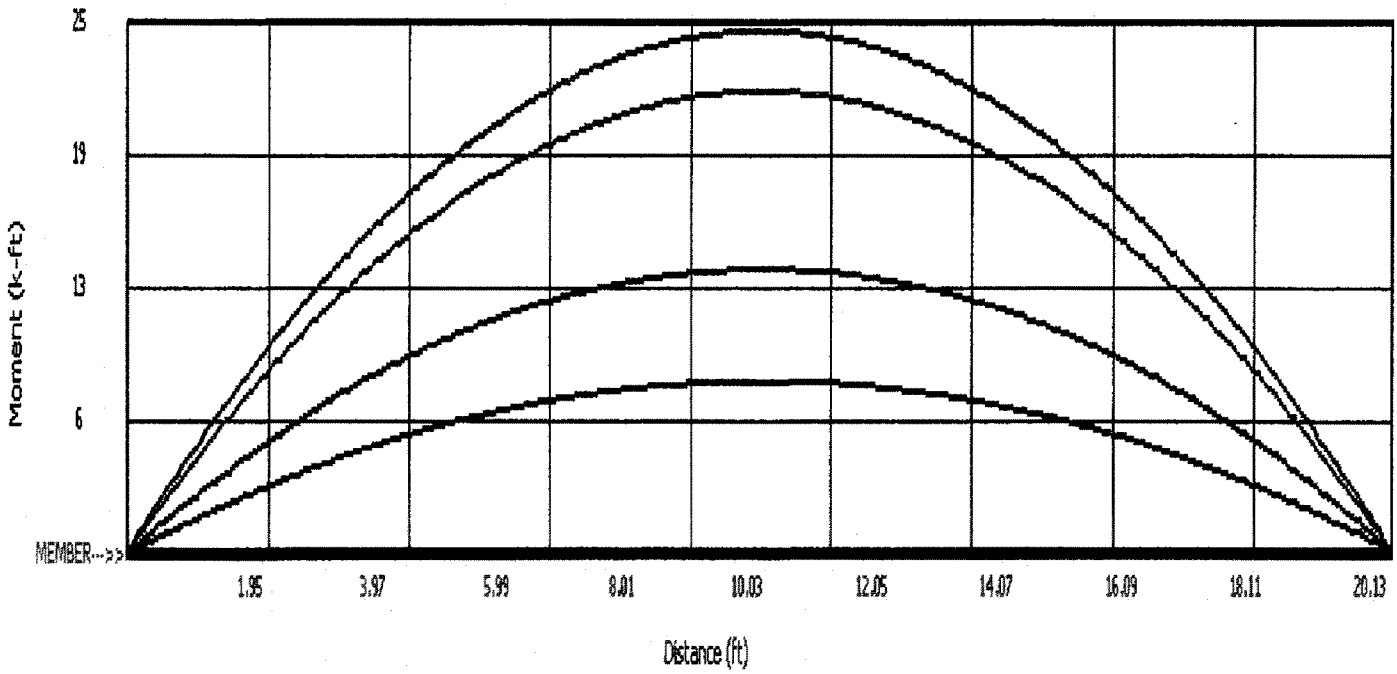
Description : Exterior Wood Beam Design



+D+H
+D+L+H
+D+Lr+H
+D+S+H
+D+0.75DL+0.75DL+H
+D+0.75DL+0.75DS+H
+D+0.60W+H
+D+0.70E+H
+D+0.75DL+0.75DL+0.45DW+H
+D+0.75DL+0.75DS+0.45DW+H
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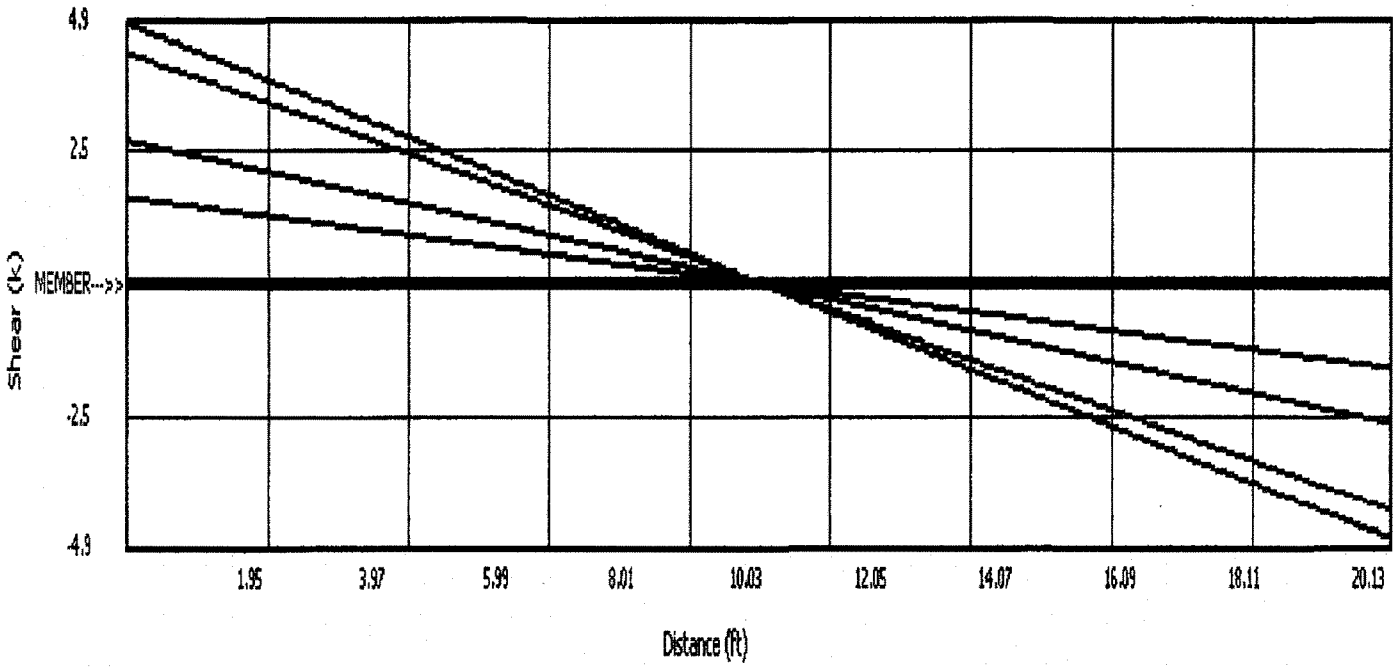
+0.60D+0.60W+0.60H
+0.60D+0.70E+0.60H



+D+H
+D+L+H
+D+Lr+H
+D+S+H
+D+0.75DL+0.75DL+H
+D+0.75DL+0.75DS+H
+D+0.60W+H
+D+0.70E+H
+D+0.75DL+0.75DL+0.45DW+H
+D+0.75DL+0.75DS+0.45DW+H
+D+0.75DL+0.75DS+0.525DE+H
+0.60D+0.60W+0.60H
+0.60D+0.70E+0.60H

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Wood Beam

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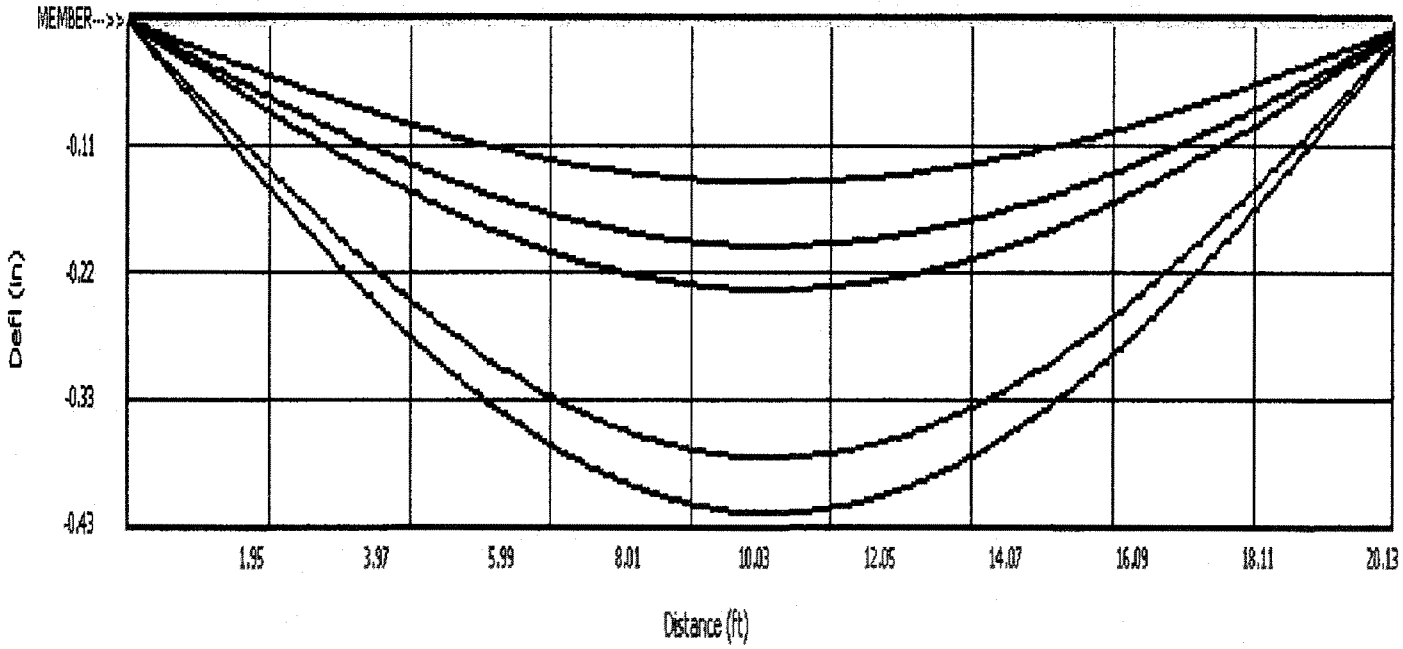

+D+H
+D+L+H
+D+Lr+H
+D+S+H
+D+0.75DL+0.75DL+H
+D+0.75DL+0.75DS+H
+D+0.6DW+H
+D+0.7DE+H
+D+0.75DL+0.75DL+0.45DW+H
+D+0.75DL+0.75DS+0.45DW+H
+D+0.75DL+0.75DS+0.525DE+H
+0.6DD+0.6DW+0.6DH
+0.6DD+0.7DE+0.6DH
D Only
Lr Only
L Only
S Only
W Only
E Only
H Only

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Steel Column

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ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

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Description : Ext. Steel Column Design

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name : **HSS5x5x1/4**
Analysis Method : Allowable Strength
Steel Stress Grade
Fy : Steel Yield 46.0 ksi
E : Elastic Bending Modulus 29,000.0 ksi

Overall Column Height 10.5 ft
Top & Bottom Fixity Top & Bottom Pinned
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for X-X Axis buckling = 10.5 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for Y-Y Axis buckling = 10.5 ft, K = 1.0

Applied Loads

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

Column self weight included : 163.628 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 10.50 ft, D = 4.040, LR = 3.40 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.08551** : 1
Load Combination +D+Lr+H
Location of max.above base 0.0 ft
At maximum location values are . . .
Pa : Axial 7.604 k
Pn / Omega : Allowable 88.919 k
Ma-x : Applied 0.0 k-ft
Mn-x / Omega : Allowable 17.468 k-ft
Ma-y : Applied 0.0 k-ft
Mn-y / Omega : Allowable 17.468 k-ft

PASS Maximum Shear Stress Ratio = **0.0** : 1
Load Combination
Location of max.above base 0.0 ft
At maximum location values are . . .
Va : Applied 0.0 k
Vn / Omega : Allowable 0.0 k

Maximum 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 0.0 k

Maximum Load Deflections . . .
Along Y-Y 0.0 in at 0.0 ft above base
for load combination :
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	0.047	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+L+H	0.047	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+Lr+H	0.086	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+S+H	0.047	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750Lr+0.750L+H	0.076	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750L+0.750S+H	0.047	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.60W+H	0.047	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.70E+H	0.047	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750Lr+0.750L+0.450W+H	0.076	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750L+0.750S+0.450W+H	0.047	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750L+0.750S+0.5250E+H	0.047	PASS	0.00 ft	0.000	PASS	0.00 ft
+0.60D+0.60W+0.60H	0.028	PASS	0.00 ft	0.000	PASS	0.00 ft
+0.60D+0.70E+0.60H	0.028	PASS	0.00 ft	0.000	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	k	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments @ Base	Mx - End Moments @ Top	k-ft	My - End Moments @ Base	My - End Moments @ Top
+D+H	4.204										

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Steel Column

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Description : Ext. Steel Column Design

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Mx - End Moments k-ft @ Base	@ Top	My - End Moments @ Base	@ Top
+D+H	4.204								
+D+Lr+H	7.604								
+D+S+H	4.204								
+D+0.750Lr+0.750L+H	6.754								
+D+0.750L+0.750S+H	4.204								
+D+0.60W+H	4.204								
+D+0.70E+H	4.204								
+D+0.750Lr+0.750L+0.450W+H	6.754								
+D+0.750L+0.750S+0.450W+H	4.204								
+D+0.750L+0.750S+0.5250E+H	4.204								
+0.60D+0.60W+0.60H	2.522								
+0.60D+0.70E+0.60H	2.522								
D Only	4.204								
Lr Only	3.400								
L Only									
S Only									
W Only									
E Only									
H Only									

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Mx - End Moments k-ft @ Base	@ Top	My - End Moments @ Base	@ Top
Axial @ Base	Maximum	7.604								
"	Minimum									
Reaction, X-X Axis Base	Maximum	4.204								
"	Minimum	4.204								
Reaction, Y-Y Axis Base	Maximum	4.204								
"	Minimum	4.204								
Reaction, X-X Axis Top	Maximum	4.204								
"	Minimum	4.204								
Reaction, Y-Y Axis Top	Maximum	4.204								
"	Minimum	4.204								
Moment, X-X Axis Base	Maximum	4.204								
"	Minimum	4.204								
Moment, Y-Y Axis Base	Maximum	4.204								
"	Minimum	4.204								
Moment, X-X Axis Top	Maximum	4.204								
"	Minimum	4.204								
Moment, Y-Y Axis Top	Maximum	4.204								
"	Minimum	4.204								

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	0.000	in	0.000	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	0.000	in	0.000	ft
+D+0.750L+0.750S+0.450W+H	0.0000	in	0.000	ft	0.000	in	0.000	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	0.000	in	0.000	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

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Steel Column

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Description : Ext. Steel Column Design

Maximum Deflections for Load Combinations

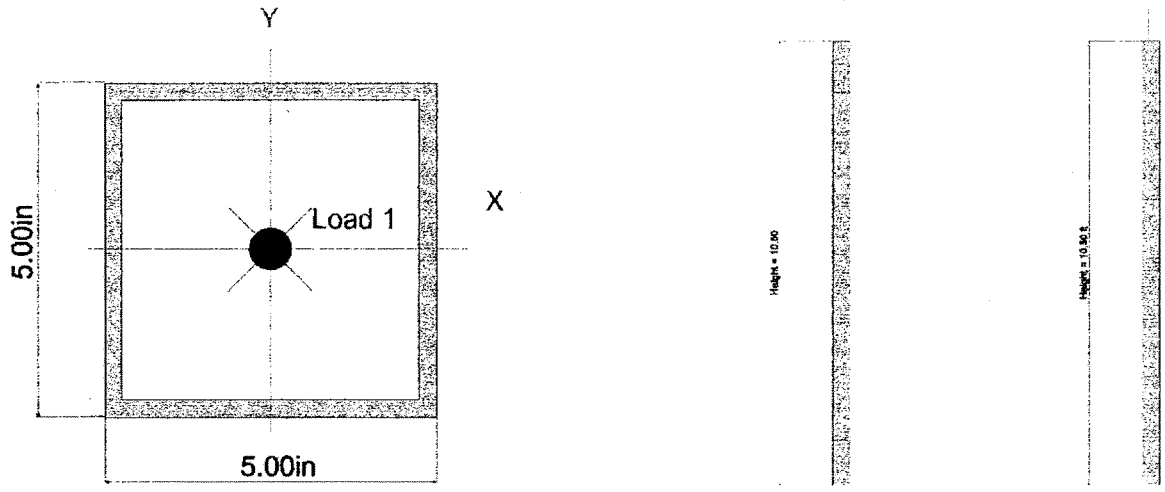
Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
W Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
E Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
H Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

Steel Section Properties : HSS5x5x1/4

Depth	=	5.000 in	I xx	=	16.00 in^4	J	=	25.600 in^4
Design Thick	=	0.233 in	S xx	=	6.41 in^3			
Width	=	5.000 in	R xx	=	1.930 in			
Wall Thick	=	0.250 in	Zx	=	7.610 in^3			
Area	=	4.300 in^2	I yy	=	16.000 in^4	C	=	10.500 in^3
Weight	=	15.584 plf	S yy	=	6.410 in^3			
			R yy	=	1.930 in			

Ycg = 0.000 in

Sketches



Screw Fastener Capacities in OSB

In order to finish a project that utilizes Premier Panels for the walls and roof of the structure, many types of materials need to be fastened to the panels. These materials can include, siding, roofing materials, other structural elements, cabinets, and a host of other items.

In many of these applications screws are the preferred fasteners. Data on the pullout and lateral withdrawal capacities of screws into OSB have not been readily accessible. To help clarify the performance of screws installed in OSB, a major manufacturer of OSB, took it upon itself to generate data on various screws installed in OSB. The OSB was exposed to three different environments. Fifteen repetitions of both direct and lateral withdrawal of each screw type, in each of the three environmental conditions were conducted. The following tables summarize the lowest, ultimate average, value achieved for a particular screw type when installed in three different thicknesses of OSB.

Average Direct Withdrawl (Pullout) - lbs.

Screw Size	7/16" OSB	5/8" OSB	3/4" OSB
#6 Deck Screw	177	272	324
#8 Deck Screw	182	309	359
#10 Deck Screw	198	355	363
#12 Roofing Screw	190	312	360
#14 Roofing Screw	177	340	393

These values are ultimate values. Appropriate safety factors should be applied to obtain design values.

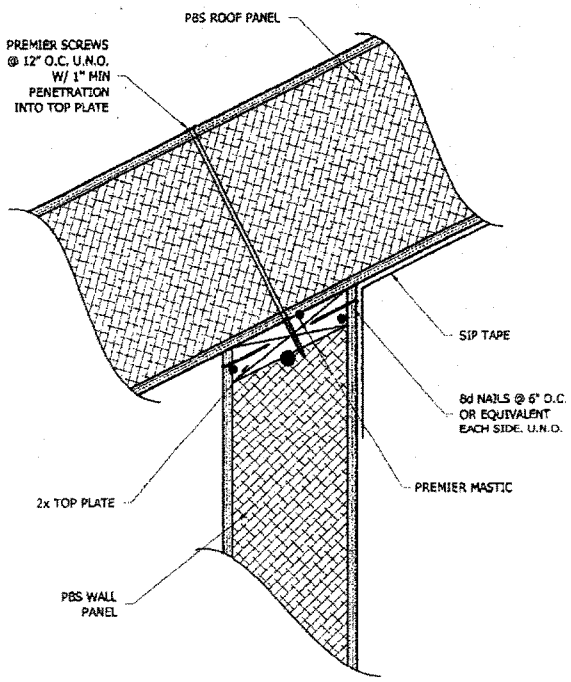
Average Lateral Withdrawl (Shear) - lbs.

Screw Size	7/16" OSB	5/8" OSB	3/4" OSB
#6 Deck Screw	198	273	295
#8 Deck Screw	118	197	224
#10 Deck Screw	143	260	301
#12 Roofing Screw	436	581	561
#14 Roofing Screw	466	630	797

These values are ultimate values. Appropriate safety factors should be applied to obtain design values.

Application:

- Dimensional 2x's require a minimum 1" penetration.
- Wall connections require that screws be used 2' o.c.
- Roof connections require that screws be used 1' o.c.
- Frequency of screw fasteners depend on the imposed loads that the SIPs panels must resist. Follow the requirements specified on your shop drawings.



DESIGN INTERIOR BEAMS & COLUMNS:

INT. BEAM 1: (@ LIVING ROOM AREA)

$L = 9'-3"$

LOAD: $DL = 22(20\text{ ft}) = 440$ PLF
$L_R = 20(20\text{ ft}) = 400$ PLF

∴ PROVIDE (2) 1¾" x 9¼" LVL WOOD BEAM

INT. BEAM 2: (@ KITCHEN AREA)

$L = 14'-7"$

LOAD: $DL = 22\text{ PSF}(10.875) = 240$ PLF
$L_R = 20\text{ PSF}(10.875) = 218$ PLF

∴ PROVIDE (2) 1¾" x 11¼" LVL WOOD BEAM

INT. WOOD COLUMN DESIGN:

$H = 10'-8" - 11.25" = 9'-9"$

- UNBRACED IN Y-DIRECTION
FULLY BRACED IN X-DIRECTION

LOAD: $DL = 2.08 + 1.52 = 3.60$ k
$L_R = 1.85 + 1.35 = 3.20$ k
} @ LIVING ROOM

∴ PROVIDE 3½ x 3½ PSL COLUMN (PSL 1.8E)

SCL Consulting
structural · civil · landscape
1753 E. Broadway Rd.
Suite 101-517
Tempe, AZ 85282

Project Title: PHX HOMEnz
Engineer: RHG
Project Descr:

Project ID: 5054.18.01

53

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Wood Beam

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC8
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Int. Wood Beam 1

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress
Design Load Combination ASCE 7-16

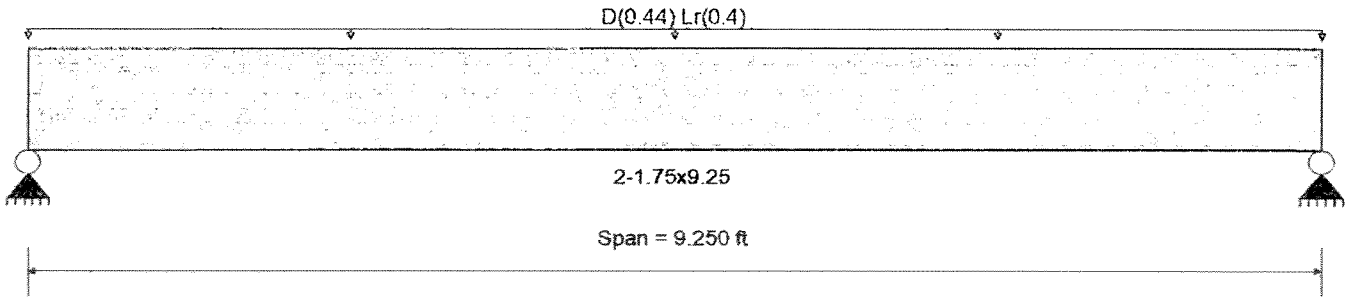
Wood Species : Trus Joist
Wood Grade : MicroLam LVL 1.9 E

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2600 psi
Fb -	2600 psi
Fc - Prll	2510 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	1555 psi

E : Modulus of Elasticity

Ebend- xx	1900 ksi
Eminbend - xx	965.71 ksi
Density	42 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.440, Lr = 0.40 , Tributary Width = 1.0 ft, (Roof Loads)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.672 : 1	Maximum Shear Stress Ratio	=	0.429 : 1
Section used for this span		2-1.75x9.25	Section used for this span		2-1.75x9.25
fb : Actual	=	2,184.28 psi	fv : Actual	=	152.79 psi
FB : Allowable	=	3,250.00 psi	Fv : Allowable	=	356.25 psi
Load Combination		+D+Lr+H	Load Combination		+D+Lr+H
Location of maximum on span	=	4.625 ft	Location of maximum on span	=	8.507 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.151 in	Ratio =	734 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.321 in	Ratio =	345 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.250 ft	1	0.494	0.315	0.90	1.000	1.00	1.00	1.00	1.00	1.00	4.81	1,155.71	2340.00	1.74	30.84	256.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.250 ft	1	0.445	0.284	1.00	1.000	1.00	1.00	1.00	1.00	1.00	4.81	1,155.71	2600.00	1.74	80.84	285.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.250 ft	1	0.672	0.429	1.25	1.000	1.00	1.00	1.00	1.00	1.00	9.09	2,184.28	3250.00	3.30	152.79	356.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.250 ft	1	0.387	0.247	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.81	1,155.71	2990.00	1.74	80.84	327.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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Project Title: PHX HOMEnz
Engineer: RHG
Project Descr:

Project ID: 5054.18.01

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Wood Beam

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Int. Wood Beam 1

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 9.250 ft	1	0.593	0.378	1.25	1.000	1.00	1.00	1.00	1.00	1.00	8.02	1,927.14	3250.00	2.91	134.81	356.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.250 ft	1	0.387	0.247	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.81	1,155.71	2990.00	1.74	80.84	327.75
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.250 ft	1	0.278	0.177	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.81	1,155.71	4160.00	1.74	80.84	456.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.250 ft	1	0.278	0.177	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.81	1,155.71	4160.00	1.74	80.84	456.00
+D+0.750Lr+0.750L+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.250 ft	1	0.463	0.296	1.60	1.000	1.00	1.00	1.00	1.00	1.00	8.02	1,927.14	4160.00	2.91	134.81	456.00
+D+0.750L+0.750S+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.250 ft	1	0.278	0.177	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.81	1,155.71	4160.00	1.74	80.84	456.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.250 ft	1	0.278	0.177	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.81	1,155.71	4160.00	1.74	80.84	456.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.250 ft	1	0.167	0.106	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.88	693.43	4160.00	1.05	48.51	456.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.250 ft	1	0.167	0.106	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.88	693.43	4160.00	1.05	48.51	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr+H	1	0.3209	4.659		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 — Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.929	3.929
Overall MINimum	1.850	1.850
+D+H	2.079	2.079
+D+L+H	2.079	2.079
+D+Lr+H	3.929	3.929
+D+S+H	2.079	2.079
+D+0.750Lr+0.750L+H	3.466	3.466
+D+0.750L+0.750S+H	2.079	2.079
+D+0.60W+H	2.079	2.079
+D+0.70E+H	2.079	2.079
+D+0.750Lr+0.750L+0.450W+H	3.466	3.466
+D+0.750L+0.750S+0.450W+H	2.079	2.079
+D+0.750L+0.750S+0.5250E+H	2.079	2.079
+0.60D+0.60W+0.60H	1.247	1.247
+0.60D+0.70E+0.60H	1.247	1.247
D Only	2.079	2.079
Lr Only	1.850	1.850
L Only		
S Only		
W Only		
E Only		
H Only		

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Project Descr:

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Wood Beam

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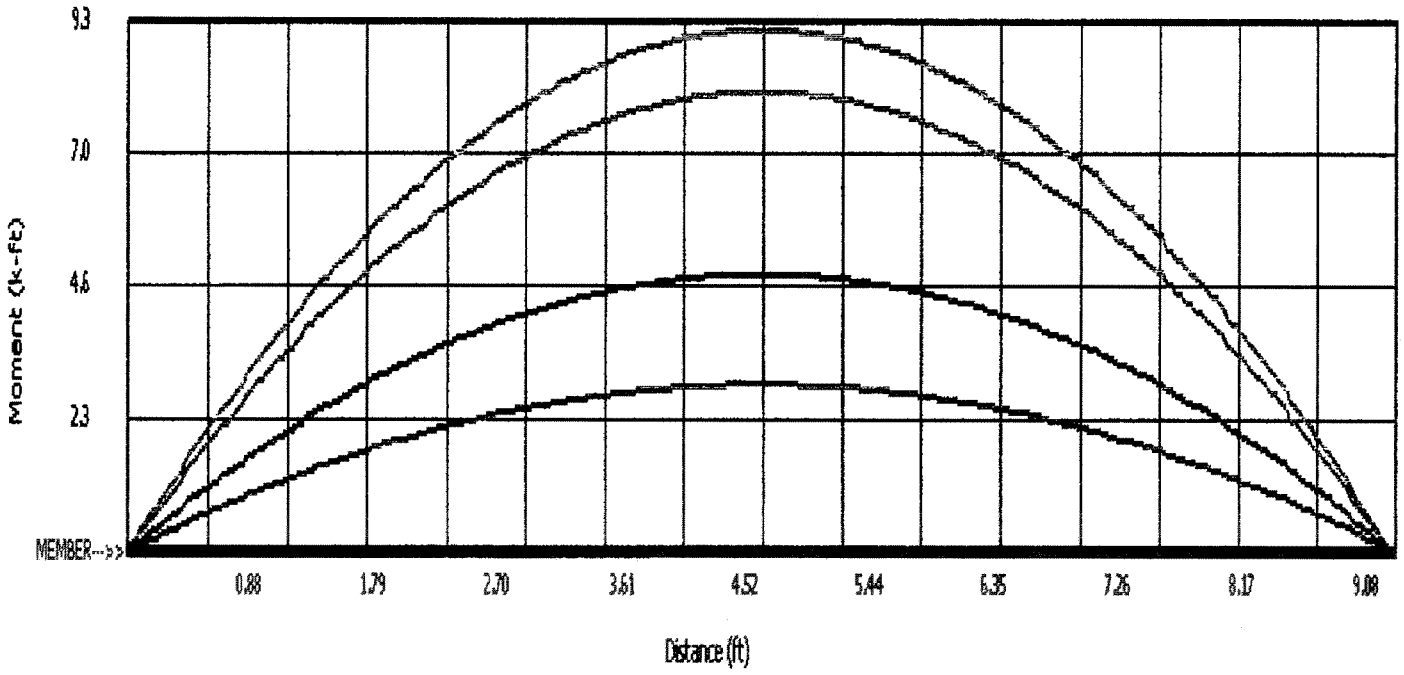
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Int. Wood Beam 1



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+D+0.6W+H | +D+0.7E+H | +D+0.75Lr+0.75L+0.45W+H | +D+0.75L+0.75S+0.45W+H | +D+0.75L+0.75S+0.525E+H | +0.6D+0.6W+0.6H
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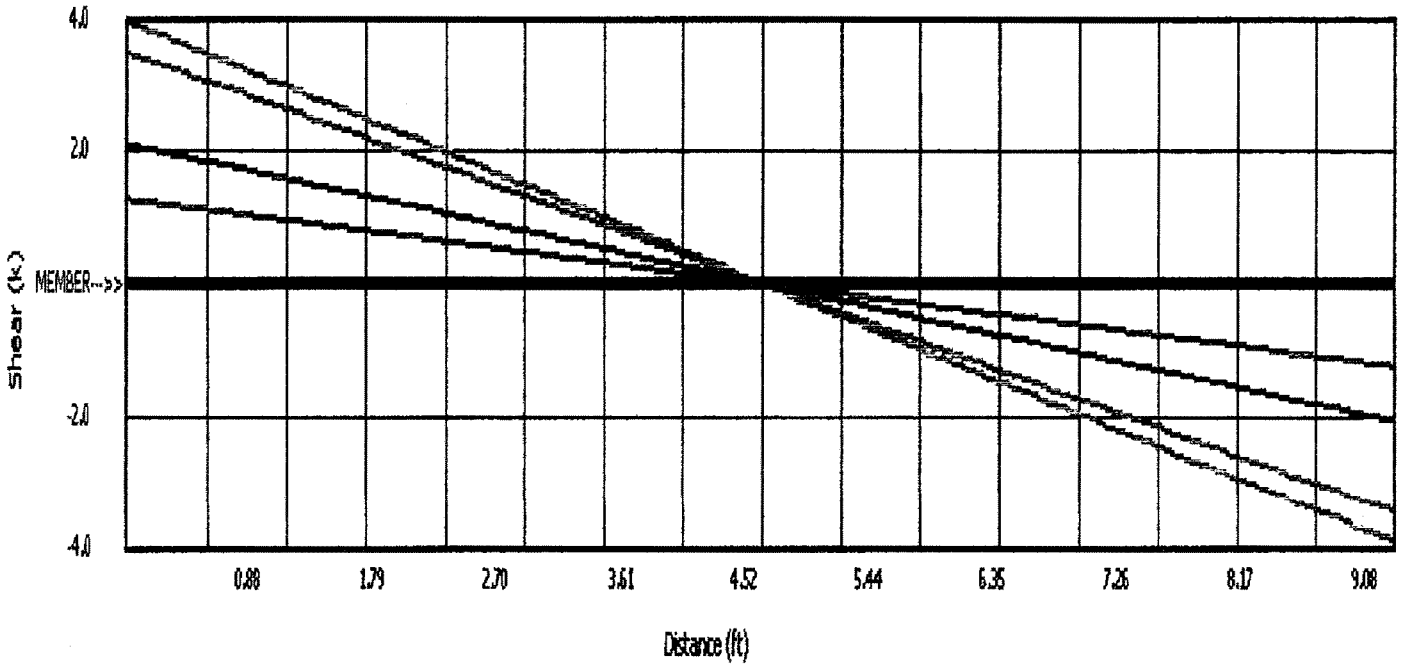

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+D+0.6W+H | +D+0.7E+H | +D+0.75Lr+0.75L+0.45W+H | +D+0.75L+0.75S+0.45W+H | +D+0.75L+0.75S+0.525E+H | +0.6D+0.6W+0.6H
+0.6D+0.7E+0.6H

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Wood Beam

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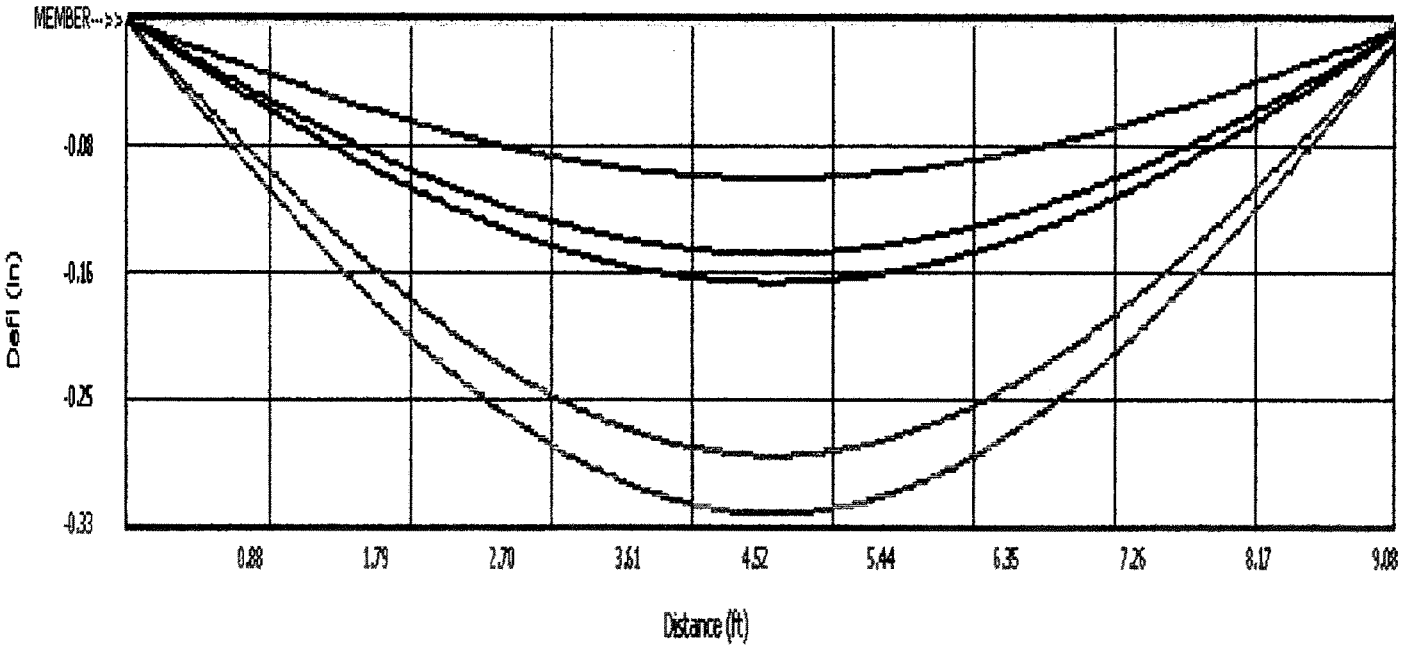
Description : Int. Wood Beam 1



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+D+L+H
+D+Lr+H
+D+S+H
+D+0.75Lr+0.75L+H
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+D+0.60W+H
+D+0.70E+H
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+D+0.75L+0.75S+0.525E+H
+0.60D+0.60W+0.60H
+0.60D+0.70E+0.60H
D Only
Lr Only
L Only
S Only
W Only
E Only
H Only

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Project Title: PHX HOMEnz
Engineer: RHG
Project Descr:

Project ID: 5054.18.01

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Wood Beam

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ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

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Description : Int. Wood Beam 2

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination ASCE 7-16

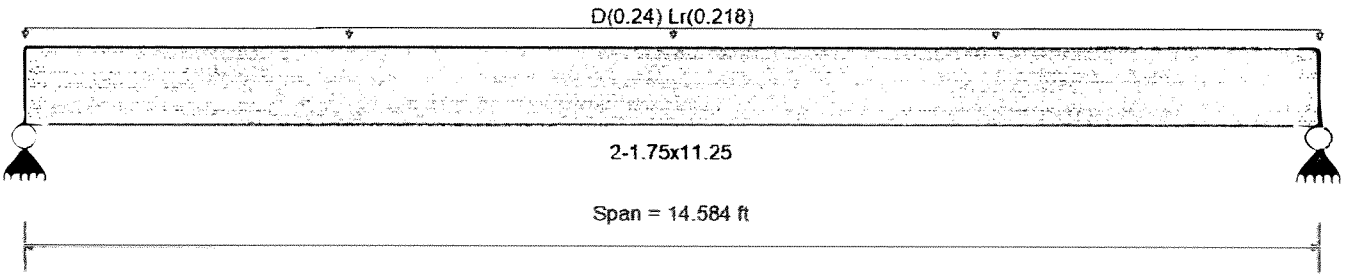
Wood Species : Trus Joist
Wood Grade : MicroLam LVL 1.9 E

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,600.0 psi
Fb -	2,600.0 psi
Fc - Prll	2,510.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	1,555.0 psi

E : Modulus of Elasticity

Ebend- xx	1,900.0 ksi
Eminbend - xx	965.71 ksi
Density	42.0 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.240, Lr = 0.2180 , Tributary Width = 1.0 ft, (Roof Loads)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.624 : 1	Maximum Shear Stress Ratio	=	0.321 : 1
Section used for this span		2-1.75x11.25	Section used for this span		2-1.75x11.25
fb : Actual	=	2,028.82 psi	fv : Actual	=	114.23 psi
FB : Allowable	=	3,250.00 psi	Fv : Allowable	=	356.25 psi
Load Combination		+D+Lr+H	Load Combination		+D+Lr+H
Location of maximum on span	=	7.292 ft	Location of maximum on span	=	13.679 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.283 in	Ratio =	618 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.609 in	Ratio =	287 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	Fv
+D+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.584 ft	1	0.464	0.239	0.90	1.000	1.00	1.00	1.00	1.00	1.00	6.69	1,086.76	2340.00	1.61	61.19	256.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.584 ft	1	0.418	0.215	1.00	1.000	1.00	1.00	1.00	1.00	1.00	6.69	1,086.76	2600.00	1.61	61.19	285.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.584 ft	1	0.624	0.321	1.25	1.000	1.00	1.00	1.00	1.00	1.00	12.48	2,028.82	3250.00	3.00	114.23	356.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.584 ft	1	0.363	0.187	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.69	1,086.76	2990.00	1.61	61.19	327.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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Project Descr:

Project ID: 5054.18.01

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Wood Beam

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Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Int. Wood Beam 2

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 14.584 ft	1	0.552	0.283	1.25	1.000	1.00	1.00	1.00	1.00	1.00	11.03	1,793.31	3250.00	2.65	100.97	356.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.584 ft	1	0.363	0.187	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.69	1,086.76	2990.00	1.61	61.19	327.75
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.584 ft	1	0.261	0.134	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.69	1,086.76	4160.00	1.61	61.19	456.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.584 ft	1	0.261	0.134	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.69	1,086.76	4160.00	1.61	61.19	456.00
+D+0.750Lr+0.750L+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.584 ft	1	0.431	0.221	1.60	1.000	1.00	1.00	1.00	1.00	1.00	11.03	1,793.31	4160.00	2.65	100.97	456.00
+D+0.750L+0.750S+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.584 ft	1	0.261	0.134	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.69	1,086.76	4160.00	1.61	61.19	456.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.584 ft	1	0.261	0.134	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.69	1,086.76	4160.00	1.61	61.19	456.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.584 ft	1	0.157	0.081	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.01	652.06	4160.00	0.96	36.71	456.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.584 ft	1	0.157	0.081	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.01	652.06	4160.00	0.96	36.71	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr+H	1	0.6092	7.345		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 — Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.423	3.423
Overall MINimum	1.590	1.590
+D+H	1.834	1.834
+D+L+H	1.834	1.834
+D+Lr+H	3.423	3.423
+D+S+H	1.834	1.834
+D+0.750Lr+0.750L+H	3.026	3.026
+D+0.750L+0.750S+H	1.834	1.834
+D+0.60W+H	1.834	1.834
+D+0.70E+H	1.834	1.834
+D+0.750Lr+0.750L+0.450W+H	3.026	3.026
+D+0.750L+0.750S+0.450W+H	1.834	1.834
+D+0.750L+0.750S+0.5250E+H	1.834	1.834
+0.60D+0.60W+0.60H	1.100	1.100
+0.60D+0.70E+0.60H	1.100	1.100
D Only	1.834	1.834
Lr Only	1.590	1.590
L Only		
S Only		
W Only		
E Only		
H Only		

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Engineer: RHG
Project Descr:

Project ID: 5054.18.01

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Wood Beam

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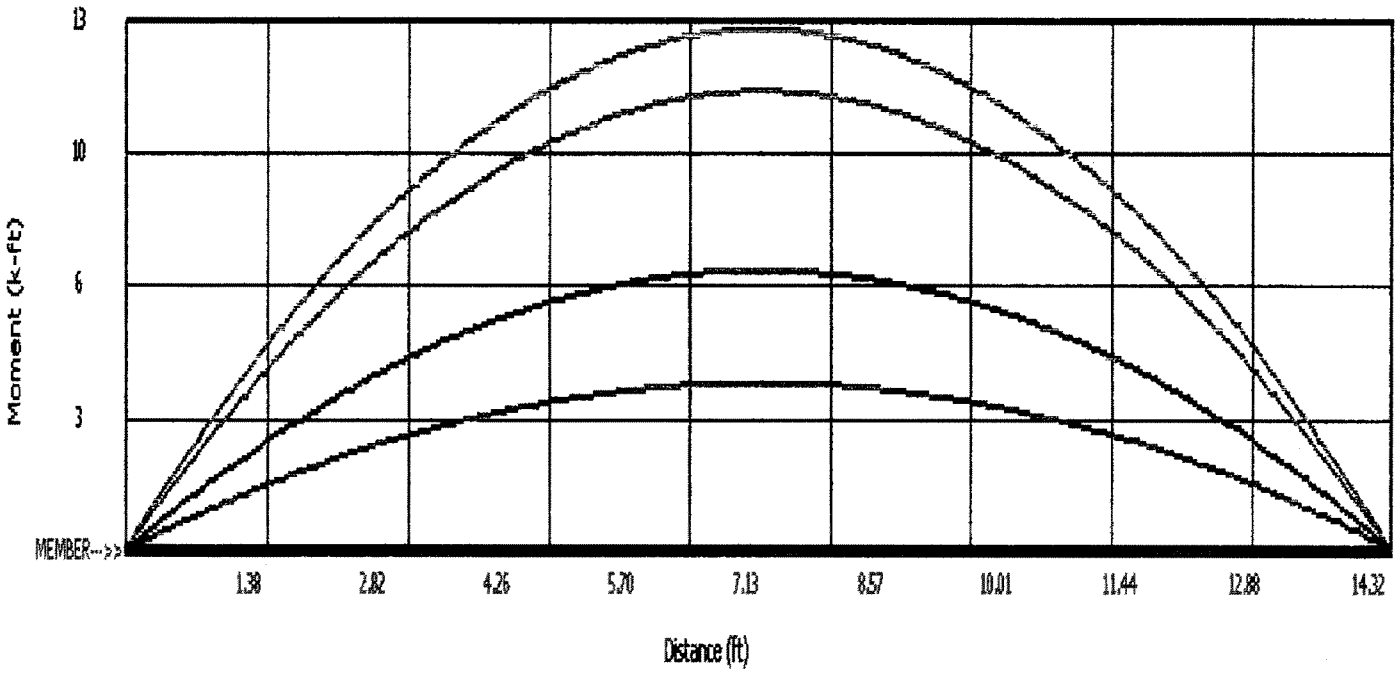
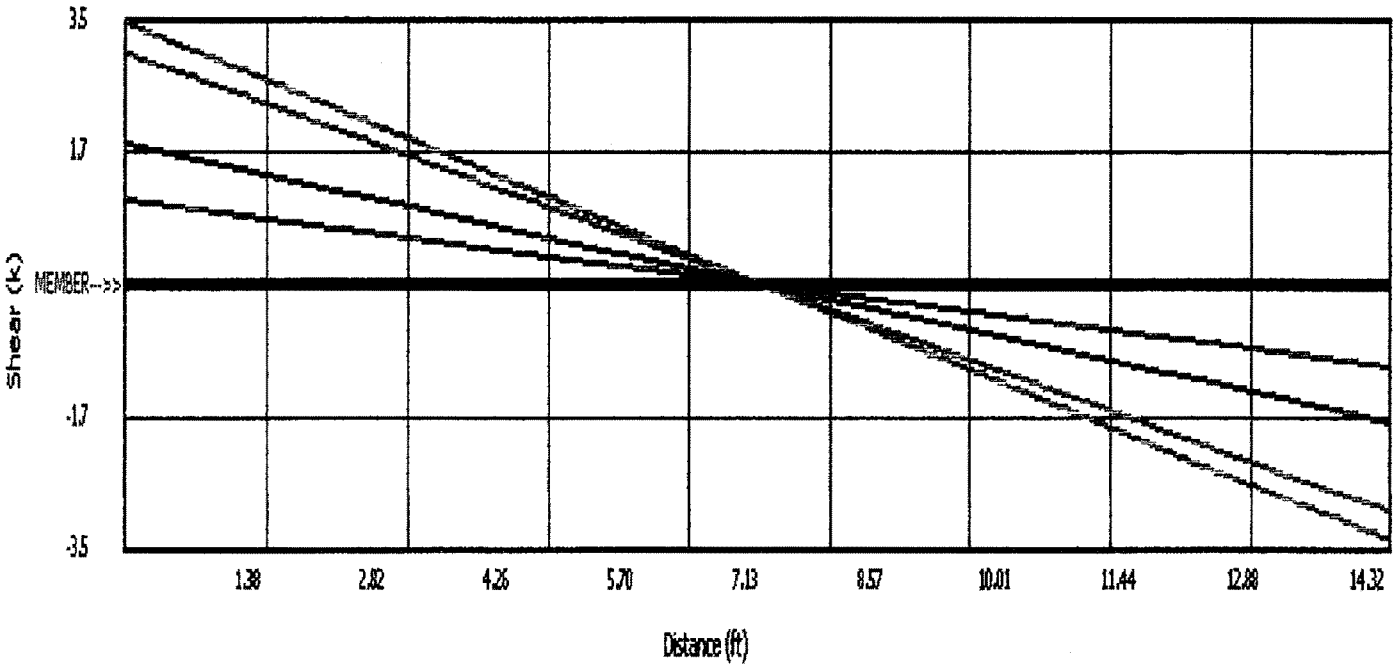
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 Licensee : SCL Consulting

Description : Int. Wood Beam 2



+D+H +D+L+H +D+Lr+H +D+S+H +D+0.75Lr+0.75L+H +D+0.75L+0.75S+H
+D+0.60W+H +D+0.70E+H +D+0.75Lr+0.75L+0.45W+H +D+0.75L+0.75S+0.45W+H +D+0.75L+0.75S+0.525E+H +0.60D+0.60W+0.60H
+0.60D+0.70E+0.60H



+D+H +D+L+H +D+Lr+H +D+S+H +D+0.75Lr+0.75L+H +D+0.75L+0.75S+H
+D+0.60W+H +D+0.70E+H +D+0.75Lr+0.75L+0.45W+H +D+0.75L+0.75S+0.45W+H +D+0.75L+0.75S+0.525E+H +0.60D+0.60W+0.60H
+0.60D+0.70E+0.60H

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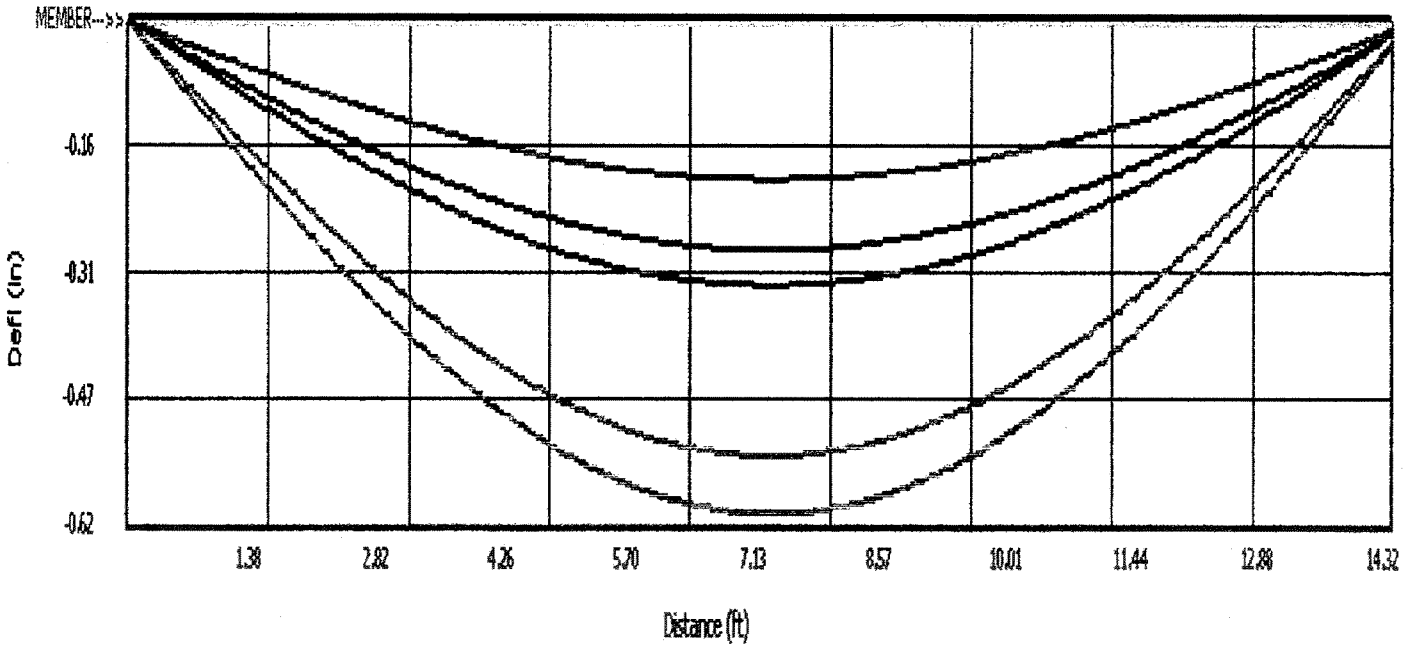
Wood Beam

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Int. Wood Beam 2



+D+H
+D+L+H
+D+Lr+H
+D+S+H
+D+0.75DL+0.75DL+H
+D+0.75DL+0.75DS+H
+D+0.6DW+H
+D+0.7DE+H
+D+0.75DL+0.75DL+0.45DW+H
+D+0.75DL+0.75DS+0.45DW+H
+D+0.75DL+0.75DS+0.525DE+H
+0.6DD+0.6DW+0.6DH
+0.6DD+0.7DE+0.6DH
D Only
Lr Only
L Only
S Only
W Only
E Only
H Only

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Wood Column

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ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

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Description : Int. Wood Column Design

Code References

Calculations per 2018 NDS, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Analysis Method : Allowable Stress Design
End Fixities : Top & Bottom Pinned
Overall Column Height : 9.750 ft
(Used for non-slender calculations)

Wood Species : Trus Joist
Wood Grade : Parallam PSL 1.8E

Fb +	2400 psi	Fv	190 psi
Fb -	2400 psi	Ft	1755 psi
Fc - Prll	2500 psi	Density	45.05 pcf
Fc - Perp	545 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1800	1800	1800 ksi
Minimum	914.88	914.88	

Wood Section Name: **3.5x3.5**
Wood Grading/Manuf.: Trus Joist
Wood Member Type: Parallam PSL

Exact Width	3.50 in	Area	12.250 in^2
Exact Depth	3.50 in	Ix	12.505 in^4
		Iy	12.505 in^4

Allow Stress Modification Factors

Cf or Cv for Bending	1.0
Cf or Cv for Compression	1.0
Cf or Cv for Tension	1.0
Cm : Wet Use Factor	1.0
Ct : Temperature Factor	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0 *NDS 15.3.2*
Use Cr : Repetitive ?	No

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Fully braced against buckling along X-X Axis
Y-Y (depth) axis : Unbraced Length for X-X Axis buckling = 9.750 ft, K = 1.0

Applied Loads

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

Column self weight included : 37.366 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 9.750 ft, D = 3.60, Lr = 3.20 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.8514 : 1**

Load Combination	+D+Lr+H
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are . . .	
Applied Axial	6.837 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	655.57 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D+0.70E+0.60H
Location of max.above base	9.750 ft
Applied Design Shear	0.0 psi
Allowable Shear	304.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

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

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	0.900	0.288	0.4590	PASS	0.0 ft	0.0	PASS	9.750 ft
+D+L+H	1.000	0.260	0.4567	PASS	0.0 ft	0.0	PASS	9.750 ft
+D+Lr+H	1.250	0.210	0.8514	PASS	0.0 ft	0.0	PASS	9.750 ft
+D+S+H	1.150	0.227	0.4542	PASS	0.0 ft	0.0	PASS	9.750 ft
+D+0.750Lr+0.750L+H	1.250	0.210	0.7518	PASS	0.0 ft	0.0	PASS	9.750 ft
+D+0.750L+0.750S+H	1.150	0.227	0.4542	PASS	0.0 ft	0.0	PASS	9.750 ft
+D+0.60W+H	1.600	0.165	0.4499	PASS	0.0 ft	0.0	PASS	9.750 ft
+D+0.70E+H	1.600	0.165	0.4499	PASS	0.0 ft	0.0	PASS	9.750 ft
+D+0.750Lr+0.750L+0.450W+H	1.600	0.165	0.7468	PASS	0.0 ft	0.0	PASS	9.750 ft
+D+0.750L+0.750S+0.450W+H	1.600	0.165	0.4499	PASS	0.0 ft	0.0	PASS	9.750 ft
+D+0.750L+0.750S+0.5250E+H	1.600	0.165	0.4499	PASS	0.0 ft	0.0	PASS	9.750 ft
+0.60D+0.60W+0.60H	1.600	0.165	0.270	PASS	0.0 ft	0.0	PASS	9.750 ft

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Wood Column

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ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

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Description : Int. Wood Column Design

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+0.60D+0.70E+0.60H	1.600	0.165	0.270	PASS	0.0 ft	0.0	PASS	9.750 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction k @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
+D+H					3.637				
+D+L+H					3.637				
+D+Lr+H					6.837				
+D+S+H					3.637				
+D+0.750Lr+0.750L+H					6.037				
+D+0.750L+0.750S+H					3.637				
+D+0.60W+H					3.637				
+D+0.70E+H					3.637				
+D+0.750Lr+0.750L+0.450W+H					6.037				
+D+0.750L+0.750S+0.450W+H					3.637				
+D+0.750L+0.750S+0.5250E+H					3.637				
+0.60D+0.60W+0.60H					2.182				
+0.60D+0.70E+0.60H					2.182				
D Only					3.637				
Lr Only					3.200				
L Only									
S Only									
W Only									
E Only									
H Only									

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	0.000 in	0.000 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	0.000 in	0.000 ft
+D+0.750L+0.750S+0.450W+H	0.0000 in	0.000 ft	0.000 in	0.000 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	0.000 in	0.000 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	0.000 in	0.000 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

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Wood Column

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

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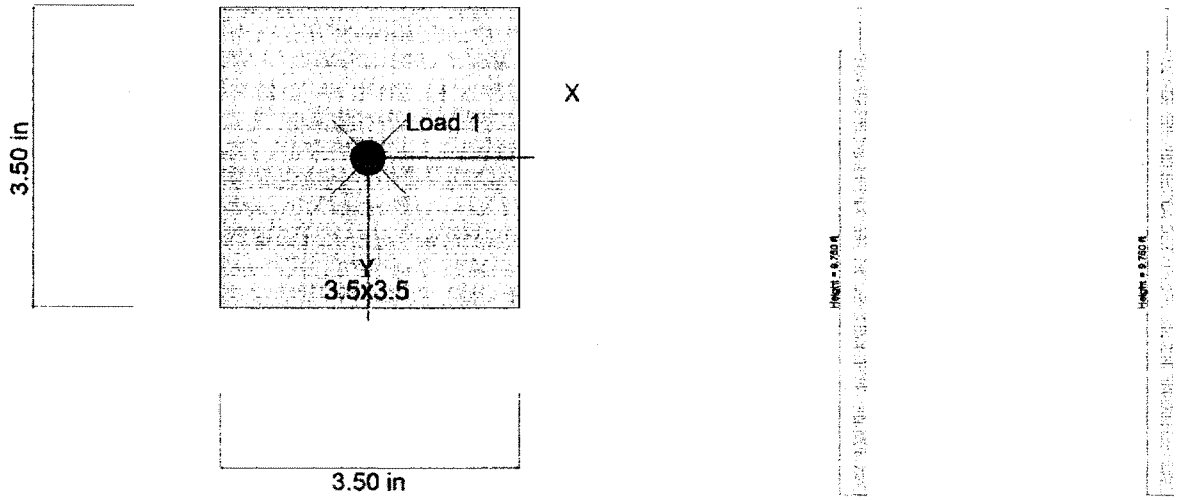
Description : Int. Wood Column Design

Sketches



64

CBS/CBSQ

Column Bases

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

The CBS column base installs with machine bolts and provides tested capacity. The 1" standoff (included) meets code requirements for structural posts installed in basements or exposed to weather or water splash. The CBSQ uses Simpson Strong-Tie® Strong-Drive® SDS Heavy-Duty Connector screws, which allow for fast installation, reduced reveal and high capacity, provides a greater net section area of the column compared to bolts.

Material: See table

Finish: Galvanized; available in HDG

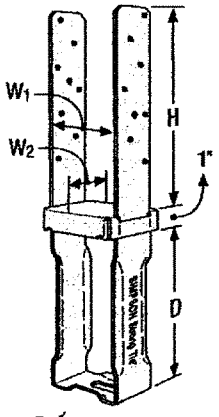
Installation:

- Use all specified fasteners; see General Notes.
- For CBS, install with two machine bolts.
- For CBSQ, install ¼" x 2" Strong-Drive SDS Heavy-Duty Connector screws, which are provided with the column base. (Lag screws will not achieve the same load.)
- For full loads, a minimum of 3" side cover shall be provided.
- Post bases do not provide adequate resistance to prevent members from rotating about the base and therefore are not recommended for non-top-supported installations (such as fences or unbraced carports).

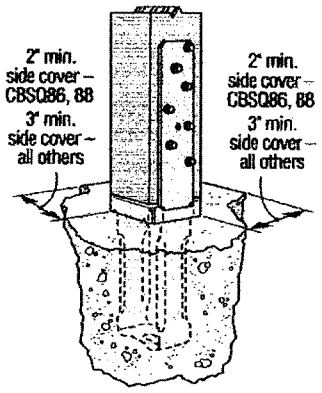
Ordering:

To order the CBSQ with screws, specify CBSQ-SDS2
To order without screws, specify CBSQ

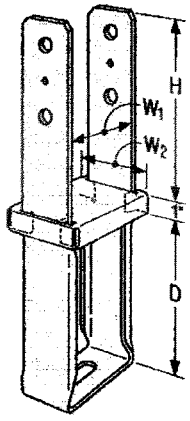
Codes: See p. 14 for Code Reference Key Chart



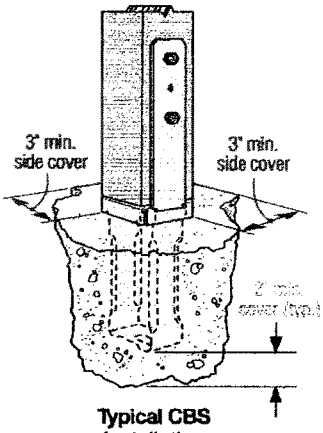
CBSQ-SDS2



Typical CBSQ-SDS2 Installation



CBS



Typical CBS Installation

These products are available with additional corrosion protection. For more information, see p. 18.

Model No.	Nominal Column Size	Material		Dimensions (in.)				Machine Bolts		Allowable Loads (DF/SP)			Code Ref.
		Base (ga.)	Strap (ga. x Width)	W_1	W_2	D	H	Qty.	Dia. (in.)	Non-Cracked Uplift	Cracked Uplift	Download	
Wind and Seismic Design Category A&B													
CBS44	4x4	12	10 ga. x 2¼	3⁹⁄₁₆	3½	7⅛	8⅜	2	⅝	5,390	4,845	10,975	170
CBS46	4x6	12	10 ga. x 3	3⁹⁄₁₆	5⁹⁄₁₆	7⁹⁄₁₆	8¹¹⁄₁₆	2	⅝	5,390	4,845	14,420	
CBS66	6x6	12	10 ga. x 3	5½	5½	6⅞	8¾	2	⅝	4,555	3,190	14,420	
Seismic Design Category C–F													
CBS44	4x4	12	10 ga. x 2¼	3⁹⁄₁₆	3½	7⅛	8⅜	2	⅝	5,390	4,070	10,975	170
CBS46	4x6	12	10 ga. x 3	3⁹⁄₁₆	5⁹⁄₁₆	7⁹⁄₁₆	8¹¹⁄₁₆	2	⅝	5,390	4,070	14,420	
CBS66	6x6	12	10 ga. x 3	5½	5½	6⅞	8¾	2	⅝	3,830	2,680	14,420	

See footnotes on p. 101.

CBSQ

Column Bases (cont.)

These products are available with additional corrosion protection. For more information, see p. 18.

	Model No.	Nominal Column Size	Material		Dimensions (in.)				Simpson Strong-Tie SDS Screws	Allowable Loads DF/SP			Code Ref.
			Base (ga.)	Strap (ga. x Width)	W_1	W_2	D	H		Non-Cracked Uplift	Cracked Uplift	Download	
	Wind and Seismic Design Category A&B												
SS	CBSQ44-SDS2	4x4	12	10 ga. x 2¼	3⁹⁄₁₆	3½	7⅛	8⅜	(14) ¼" x 2" SDS	5,390	4,845	10,975	I28, FL, L27
SS	CBSQ46-SDS2	4x6	12	10 ga. x 3	3⁹⁄₁₆	5⁵⁄₁₆	7¹³⁄₁₆	8¹¹⁄₁₆	(14) ¼" x 2" SDS	5,390	4,845	14,420	
SS	CBSQ66-SDS2	6x6	12	10 ga. x 3	5½	5½	6⅞	8¾	(14) ¼" x 2" SDS	4,555	3,190	14,420	
	CBSQ86-SDS2	6x8	12	7 ga. x 3	7½	5⅜	6⅛	8¹¹⁄₁₆	(12) ¼" x 2" SDS	3,975	2,780	20,915	
	CBSQ88-SDS2	8x8	12	7 ga. x 3	7½	7⅜	6⅛	8¹¹⁄₁₆	(12) ¼" x 2" SDS	3,975	2,780	22,225	
	Seismic Design Category C–F												
SS	CBSQ44-SDS2	4x4	12	10 ga. x 2¼	3⁹⁄₁₆	3½	7⅛	8⅜	(14) ¼" x 2" SDS	5,390	4,070	10,975	I28, FL, L27
SS	CBSQ46-SDS2	4x6	12	10 ga. x 3	3⁹⁄₁₆	5⁵⁄₁₆	7¹³⁄₁₆	8¹¹⁄₁₆	(14) ¼" x 2" SDS	5,390	4,070	14,420	
SS	CBSQ66-SDS2	6x6	12	10 ga. x 3	5½	5½	6⅞	8¾	(14) ¼" x 2" SDS	3,830	2,680	14,420	
	CBSQ86-SDS2	6x8	12	7 ga. x 3	7½	5⅜	6⅛	8¹¹⁄₁₆	(12) ¼" x 2" SDS	3,340	2,335	20,915	
	CBSQ88-SDS2	8x8	12	7 ga. x 3	7½	7⅜	6⅛	8¹¹⁄₁₆	(12) ¼" x 2" SDS	3,340	2,335	22,225	

1. Loads may not be increased by short-term loading.
2. For higher downloads, solid pack grout under 1"-standoff plate before installing CBS or CBSQ into concrete. Base download on column or concrete, according to the code.
3. Concrete shall have a minimum compressive strength, f'_c = 2,500 psi.
4. Multiply Seismic and Wind ASD load values by 1.4 or 1.6 respectively to obtain LRFD capacities.
5. In accordance with IBC Section 1613.1, detached one- and two-family dwellings in Seismic Design Category (SDC) C may use "Wind and SDC A&B" allowable loads.
6. Download shall be reduced where limited by the design capacity of the column. See pp. 383–385 for common post allowable loads.
7. Designer is responsible for concrete design.
8. Structural composite lumber columns have sides that either show the wide face or the edges of the lumber strands/veneers known as the narrow face. Values in the tables reflect installation into the wide face. See technical bulletin T-C-SCLCLM at **strongtie.com** for load reductions due to narrow face installations.

PCZ/EPCZ

Post Caps

PCZ/EPCZ post caps are designed with their post and beam flanges in-line so that one PCZ/EPCZ model can accommodate several post sizes. The PCZ/EPCZ now uses easier-to-install 10d common nails. An alternate choice of fasteners is Strong-Drive® #9 x 1½" SD Connector screws. ZMAX® finish is standard to meet exposure conditions in many environments. See additional corrosion information at **strongtie.com/info**.

Material: 16 gauge

Finish: ZMAX coating

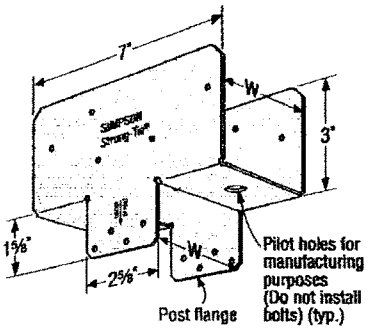
Installation:

- Use all specified fasteners; see General Notes
- Do not install bolts into pilot holes

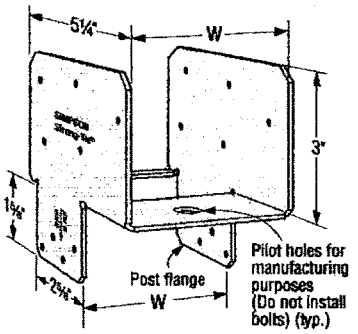
Options:

- For end conditions, specify EPCZ post caps
- For heavy-duty applications, see CCQ and CC Series
- For retrofit applications, see AC and LCE Series

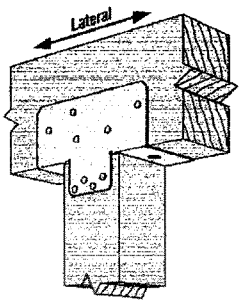
Codes: See p. 14 for Code Reference Key Chart



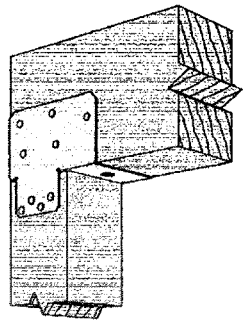
PCZ



EPCZ



Typical PCZ Post Cap Installation



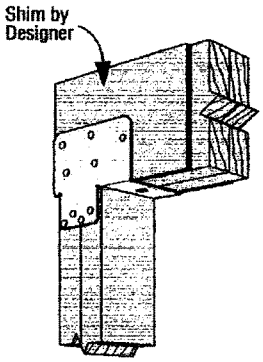
Typical EPCZ End Post Cap Installation

These products are available with additional corrosion protection. For more information, see p. 18.

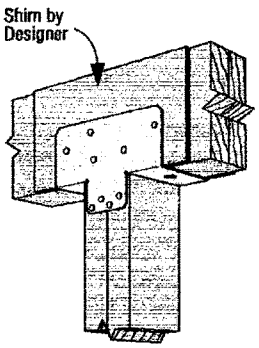
These products are approved for installation with the Strong-Drive® SD Connector screw. See pp. 39–40 for more information.

	Model No.[7]	W (in.)	Fasteners[5,8] Beam	Fasteners[5,8] Post	Post Size	Allowable Loads (DF/SP) PCZ Uplift (160)	PCZ Lateral (160)	EPCZ Uplift (160)	EPCZ Lateral (160)	Code Ref.
	PC4Z	3⅜	(10) 10d	(8) 10d	(2) 2x4[4]	1,480	1,120	1,130	895	
					4x4	1,480	1,260	1,130	1,075	
					4x6	1,480	1,260	1,130	1,230	
					4x8	1,480	1,380	1,130	1,230	
	PC6Z	5½	(10) 10d	(8) 10d	4x6	1,480	1,260	1,435	1,075	
					6x6	1,480	1,295	1,435	1,230	
					6x8	1,480	1,380	1,435	1,230	
	PC8Z	7½	(10) 10d	(8) 10d	4x8	1,480	1,260	1,435	1,075	
					6x8	1,480	1,295	1,435	1,230	
					8x8	1,480	1,380	1,435	1,230	

1. Allowable loads have increased for wind or earthquake with no further increase allowed; reduce where other loads govern.
2. Uplift loads do not apply to spliced conditions. Spliced conditions must be detailed by the Designer to transfer tension loads between spliced members by means other than the post cap.
3. Structural composite lumber columns have sides that show either the wide face or the edges of the lumber strands/veneers. Values in the tables reflect installation into the wide face and do not allow for installation into the narrow face.
4. Post and beam may consist of multiple members provided they are connected independently of the post cap fasteners.
5. 10d x 2½" (0.148" dia. x 2½" long) nails may be used with no load reduction for uplift and 0.85 of the table loads for lateral.
6. Strong-Drive® SD9 x 1½" Connector screws may be substituted for table fasteners with no load reduction.
7. Models available for rough size lumber, specify RZ suffix. Ex. PC4RZ.
8. **Nails:** 10d = 0.148" dia. x 3" long. See pp. 26–27 for other nail sizes and information. **Screws:** SD9112 = 0.131" dia. x 1½" long.



EPCZ Post Cap Installed on Double 2x Members



PCZ Post Cap Installed on Double 2x Members

AC/ACE/LPCZ/LCE/RTC

Post Caps

The LCE4's universal design provides high capacity while eliminating the need for rights and lefts. For use with 4x or 6x lumber. LPCZ — Adjustable design allows greater connection versatility.

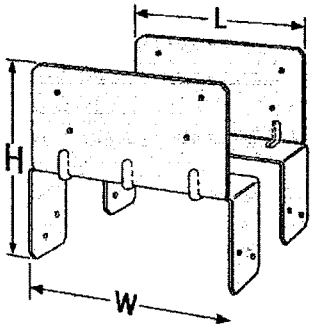
Material: LCE4 — 20 gauge; AC, ACE, LPC4Z — 18 gauge; LPC6Z — 16 gauge; RTC — 14 gauge

Finish: Galvanized. Some products available in ZMAX® coating and stainless steel; see Corrosion Information, pp. 15–18.

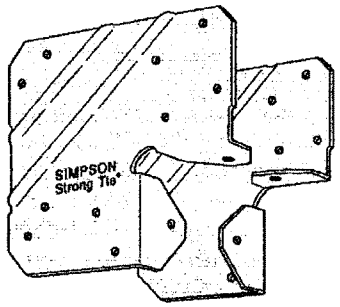
Installation:

- Use all specified fasteners; see General Notes
- Install all models in pairs. LPCZ — 2½" beams may be used if 10d x 1½" nails are substituted for 10d commons

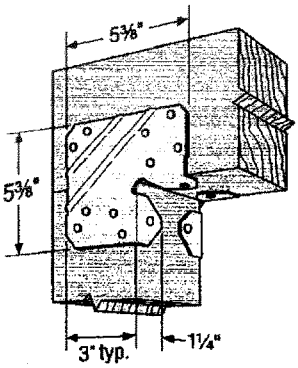
Codes: See p. 14 for Code Reference Key Chart



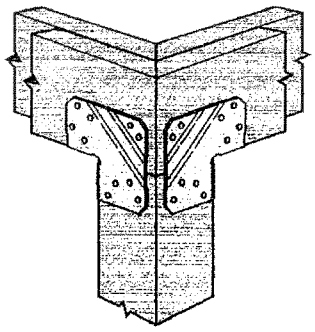
LPCZ



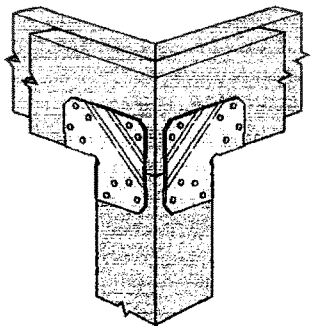
LCE4



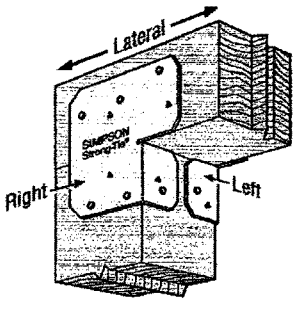
Typical LCE4 Installation
(For 4x or 6x lumber)



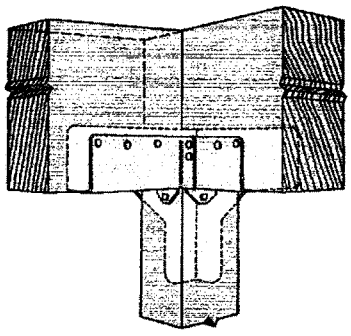
Typical LCE4 Corner Installation
(See note 7)



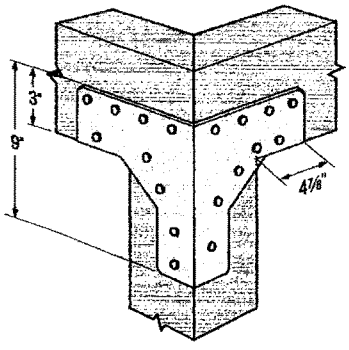
Typical LCE4Z Installation
(Mitered corner)



Typical ACE Installation
(AC similar)



RTC44 Installation
(Square cut)



RTC44 Installation
(Mitered corner)

AC/ACE/LPCZ/LCE/RTC

Post Caps (cont.)

These products are available with additional corrosion protection. For more information, see p. 18.

These products are approved for installation with the Strong-Drive® SD Connector screw. See pp. 39–40 for more information.

	Model No.	Dimensions (in.)		Total No. Fasteners		Allowable Loads (DF/SP) (160)[1]		Code Ref.
		W	L	Beam	Post	Uplift	Lateral	
SS	AC4 (Min.)	3⅜	6½	(8) 16d	(8) 16d	1,430	715	I12, I27, L4, L5, FL
SS	AC4 (Max.)	3⅜	6½	(14) 16d	(14) 16d	2,500	1,070	
	AC4RZ (Min.)	4	7	(8) 16d	(8) 16d	1,430	715	I12, L5, FL
	AC4RZ (Max.)	4	7	(14) 16d	(14) 16d	2,500	1,070	
SS	ACE4 (Min.)	—	4½	(6) 16d	(6) 16d	1,070	715	I12, L4, FL
SS	ACE4 (Max.)	—	4½	(10) 16d	(10) 16d	1,785	1,070	
SS	LCE4	—	5⅜	(14) 16d	(10) 16d	1,905[7]	1,425	IP1, L18, FL
SS	AC6 (Min.)	5½	8½	(8) 16d	(8) 16d	1,430	715	I12, I27, L4, L5, FL
SS	AC6 (Max.)	5½	8½	(14) 16d	(14) 16d	2,500	1,070	
	AC6RZ (Min.)	6	9	(8) 16d	(8) 16d	1,430	715	I12, I27, L5, FL
	AC6RZ (Max.)	6	9	(14) 16d	(14) 16d	2,500	1,070	
SS	ACE6 (Min.)	—	6½	(6) 16d	(6) 16d	1,070	715	I12, L4, FL
SS	ACE6 (Max.)	—	6½	(10) 16d	(10) 16d	1,785	1,070	
	LPC4Z	3⅜	3½	(8) 10d	(8) 10d	760	325	I12, I27, L4, L5, FL
	LPC6Z	5⅜	5½	(8) 10d	(8) 10d	915	490	I12, FL

1. Allowable loads have been increased for wind or earthquake with no further increase allowed; reduce where other loads govern.
2. Loads apply only when used in pairs.
3. LPCZ lateral load is in the direction parallel to the beam.
4. Min. nailing quantity and load values — fill all round holes; Max. nailing quantities and load values — fill round and triangle holes.
5. Uplift loads do not apply to splice conditions.
6. Spliced conditions must be detailed by the Designer to transfer tension loads between spliced members by means other than the post cap.
7. LCE4 uplift load for mitered-corner conditions is 985 lb. (DF/SP) or 845 lb. (SPF). Lateral loads do not apply.
8. Structural composite lumber columns have sides that show either the wide face or the edges of the lumber strands/veneers. Values in the tables reflect installation into the wide face. See technical bulletin T-C-SCLCLM at **strongtie.com** for values on the narrow face (edge).
9. **Nails:** 16d = 0.162" dia. x 3½" long, 10d = 0.148" dia. x 3" long. See pp. 26–27 for other nail sizes and information.

	Model No.	Dimensions (in.)		Total No. of Fasteners		DF/SP Uplift Loads	SPF Uplift Loads
		W	L	Beam	Post	Total Uplift (160)	Total Uplift (160)
SS	LCE4Z (Mitered corner)	5⅜	5⅜	(14) 16d	(10) 16d	985	845

1. The allowable download for the mitered LCE4 connection is limited to bearing of the mitered section on the post and shall be determined by the Designer.
2. Connectors must be installed in pairs to achieve listed loads.

	Model No.	Dimensions (in.)		Total No. of Fasteners		DF/SP Uplift Loads			SPF Uplift Loads		
		W	L	Beam	Post	Side Beam	Main Beam	Total	Side Beam	Main Beam	Total
	RTC44[1] (Mitered corner)	3⅜	4¾	(16) 16d	(10) 16d	900	900	1,800	775	775	1,550
	RTC44[2] (Square cut)	3⅜	4¾	(16) 16d	(10) 16d	925	1,230	1,760	795	1,060	1,515

1. The allowable download for the mitered RTC44 connection is limited to bearing of the mitered beams on the post and shall be determined by the Designer.
2. The allowable download for the main beam in the square-cut RTC44 connection is limited to bearing of the beam on the post and shall be determined by the Designer. The side beam allowable download is 1,170 lb..
3. The combined uplift loads applied to all beams in the connector must not exceed the total allowable uplift load listed in the table.

DESIGN FOUNDATION:

EXT. WALL FOOTING: BEARING CAP = 1500 PSF

LOAD: $DL = 22\ PSF\ (21.167/2) = 233\ PLF$
$L_R = 20\ PSF\ (21.167/2) = 212\ PLF$

$DL_W = 15\ PSF\ (11.5\ A) = 115\ PLF$

∴ PROVIDE 2'-0" x 12" CONC. FOOTING W/ (2) #5 CONT.

INT. WALL FOOTING:

LOAD: $DL = 22\ PSF\ (20) = 440\ PLF$
$L_R = 20\ PSF\ (20) = 400\ PLF$

$DL_W = 115\ PLF$

∴ PROVIDE 2'-0" x 12" CONC. THICKENED SLAB W/ (2) #5 CONT.

EXT. COLUMN PADS:

LOAD: $DL = 4.204^K$, $L_R = 3.40^K$ } HSS 5x5x¼ COL.

∴ PROVIDE 3'-0" x 3'-0" x 12" SPREAD FOOTING W/ (3)-#5 E.W.

INT. COLUMN PAD:

LOAD: $DL = 3.637^K$, $L_R = 3.20^K$ } 3½x3½ PSL COL.

∴ PROVIDE 3'-0" x 3'-0" x 12" SPREAD FOOTING W/ (3) #5 E.W.

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Suite 101-517
Tempe, AZ 85282

Project Title: PHX HOMEnz
Engineer: RHG
Project Descr:

Project ID: 5054.18.01

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Wall Footing

Description : Ext. Wall Footing

Code References

Calculations per ACI 318-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
AutoCalc Footing Weight as DL :		Yes

Soil Design Values

Allowable Soil Bearing	=	1.50 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Reference Depth below Surface	=	2.0 ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

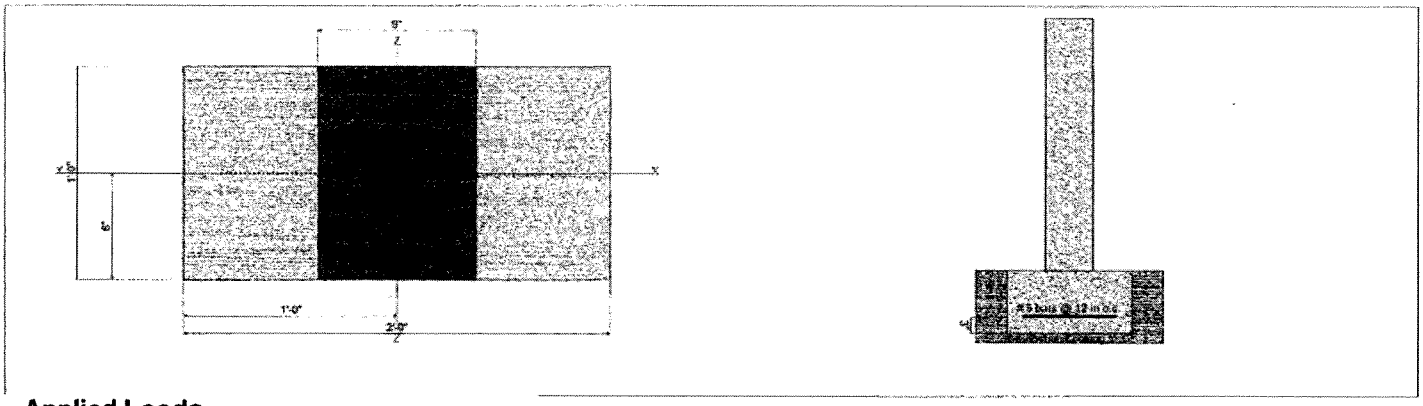
Increases based on footing Width

Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft
Adjusted Allowable Bearing Pressure	=	1.50 ksf

Dimensions

Footing Width	=	2 ft	Footing Thickness	=	12.0 in	Bars along X-X Axis	
Wall Thickness	=	9.0 in	Rebar Centerline to Edge of Concrete...			Bar spacing	= 12.00
Wall center offset			at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 5
from center of footing	=	0 in					

Reinforcing



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	0.3480	0.2120						k
OB : Overburden	=								ksf
V-x	=								k
M-zz	=								k-ft
Vx applied	=	in above top of footing							

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Wall Footing

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Ext. Wall Footing

DESIGN SUMMARY

Design OK

	Factor of Safety	Item	Applied	Capacity	Governing Load Combination
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift

	Utilization Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.2833	Soil Bearing	0.4250 ksf	1.50 ksf	+D+Lr+H
PASS	0.008891	Z Flexure (+X)	0.1079 k-ft	12.131 k-ft	+1.20D+1.60Lr+0.50L+
PASS	0.004621	Z Flexure (-X)	0.05606 k-ft	12.131 k-ft	+0.90D+E+0.90H
PASS	n/a	1-way Shear (+X)	0.0 psi	82.158 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Actual Soil Bearing Stress -X	Actual Soil Bearing Stress +X	Actual / Allowable Ratio
+D+H	1.50 ksf	0.0 in	0.3190 ksf	0.3190 ksf	0.213
+D+L+H	1.50 ksf	0.0 in	0.3190 ksf	0.3190 ksf	0.213
+D+Lr+H	1.50 ksf	0.0 in	0.4250 ksf	0.4250 ksf	0.283
+D+S+H	1.50 ksf	0.0 in	0.3190 ksf	0.3190 ksf	0.213
+D+0.750Lr+0.750L+H	1.50 ksf	0.0 in	0.3985 ksf	0.3985 ksf	0.266
+D+0.750L+0.750S+H	1.50 ksf	0.0 in	0.3190 ksf	0.3190 ksf	0.213
+D+0.60W+H	1.50 ksf	0.0 in	0.3190 ksf	0.3190 ksf	0.213
+D+0.70E+H	1.50 ksf	0.0 in	0.3190 ksf	0.3190 ksf	0.213
+D+0.750Lr+0.750L+0.450W+H	1.50 ksf	0.0 in	0.3985 ksf	0.3985 ksf	0.266
+D+0.750L+0.750S+0.450W+H	1.50 ksf	0.0 in	0.3190 ksf	0.3190 ksf	0.213
+D+0.750L+0.750S+0.5250E+H	1.50 ksf	0.0 in	0.3190 ksf	0.3190 ksf	0.213
+0.60D+0.60W+0.60H	1.50 ksf	0.0 in	0.1914 ksf	0.1914 ksf	0.128
+0.60D+0.70E+0.60H	1.50 ksf	0.0 in	0.1914 ksf	0.1914 ksf	0.128

Overturning Stability

Units : k-ft

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding SafetyRatio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
+1.40D+1.60H	0.0872	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.40D+1.60H	0.0872	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+0.50Lr+1.60L+1.60H	0.08509	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+0.50Lr+1.60L+1.60H	0.08509	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+1.60L+0.50S+1.60H	0.07474	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+1.60L+0.50S+1.60H	0.07474	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+1.60Lr+0.50L+1.60H	0.1079	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+1.60Lr+0.50L+1.60H	0.1079	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+1.60Lr+0.50W+1.60H	0.1079	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+1.60Lr+0.50W+1.60H	0.1079	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+0.50L+1.60S+1.60H	0.07474	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+0.50L+1.60S+1.60H	0.07474	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+1.60S+0.50W+1.60H	0.07474	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+1.60S+0.50W+1.60H	0.07474	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+0.50Lr+0.50L+W+1.60H	0.08509	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+0.50Lr+0.50L+W+1.60H	0.08509	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+0.50L+0.50S+W+1.60H	0.07474	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
+1.20D+0.50L+0.50S+W+1.60H	0.07474	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK

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Wall Footing

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ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

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Description : Ext. Wall Footing

. +1.20D+0.50L+0.20S+E+1.60H	0.07474	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
. +1.20D+0.50L+0.20S+E+1.60H	0.07474	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK

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Project Title: PHX HOMEnz
Engineer: RHG
Project Descr:

Project ID: 5054.18.01

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Wall Footing

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Ext. Wall Footing

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
. +0.90D+W+0.90H	0.05606	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
. +0.90D+W+0.90H	0.05606	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
. +0.90D+E+0.90H	0.05606	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
. +0.90D+E+0.90H	0.05606	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK

One Way Shear

Units : k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+0.50Lr+1.60L+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+1.60L+0.50S+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+1.60Lr+0.50L+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+1.60Lr+0.50W+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+0.50L+1.60S+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+1.60S+0.50W+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+0.50Lr+0.50L+W+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+0.50L+0.50S+W+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+0.50L+0.20S+E+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+0.90D+W+0.90H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+0.90D+E+0.90H	0 psi	0 psi	0 psi	82.158 psi	0	OK

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1753 E. Broadway Rd.
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Tempe, AZ 85282

Project Title: PHX HOMEnz
Engineer: RHG
Project Descr:

Project ID: 5054.18.01

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Wall Footing

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ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Int. Wall Footing

Code References

Calculations per ACI 318-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
AutoCalc Footing Weight as DL	:	Yes

Soil Design Values

Allowable Soil Bearing	=	1.50 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Reference Depth below Surface	=	1 ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

Increases based on footing Width

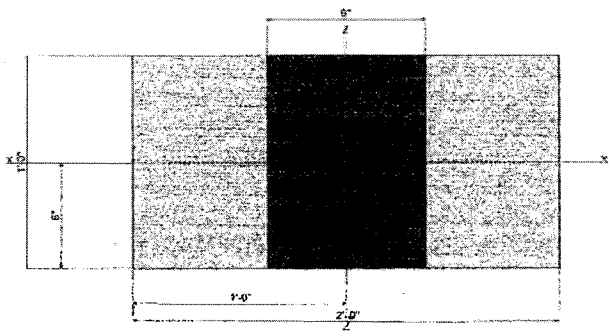
Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft

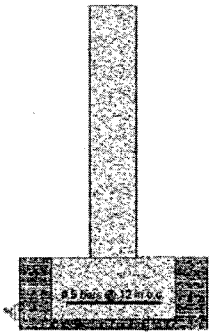
Adjusted Allowable Bearing Pressure = 1.50 ksf

Dimensions

Footing Width	=	2.0 ft	Footing Thickness	=	12.0 in	Bars along X-X Axis	
Wall Thickness	=	9.0 in	Rebar Centerline to Edge of Concrete...			Bar spacing	= 12.00
Wall center offset			at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 5
from center of footing	=	0 in					

Reinforcing





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	0.5550	0.40						k
OB : Overburden	=								ksf
V-x	=								k
M-zz	=								k-ft
Vx applied	=		in above top of footing						

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Wall Footing

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Description : Int. Wall Footing

DESIGN SUMMARY

Design OK

	Factor of Safety	Item	Applied	Capacity	Governing Load Combination
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift

	Utilization Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.4150	Soil Bearing	0.6225 ksf	1.50 ksf	+D+Lr+H
PASS	0.01331	Z Flexure (+X)	0.1615 k-ft	12.131 k-ft	+1.20D+1.60Lr+0.50L+
PASS	0.006120	Z Flexure (-X)	0.07424 k-ft	12.131 k-ft	+0.90D+E+0.90H
PASS	n/a	1-way Shear (+X)	0.0 psi	82.158 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Actual Soil Bearing Stress -X	Actual Soil Bearing Stress +X	Actual / Allowable Ratio
, +D+H	1.50 ksf	0.0 in	0.4225 ksf	0.4225 ksf	0.282
, +D+L+H	1.50 ksf	0.0 in	0.4225 ksf	0.4225 ksf	0.282
, +D+Lr+H	1.50 ksf	0.0 in	0.6225 ksf	0.6225 ksf	0.415
, +D+S+H	1.50 ksf	0.0 in	0.4225 ksf	0.4225 ksf	0.282
, +D+0.750Lr+0.750L+H	1.50 ksf	0.0 in	0.5725 ksf	0.5725 ksf	0.382
, +D+0.750L+0.750S+H	1.50 ksf	0.0 in	0.4225 ksf	0.4225 ksf	0.282
, +D+0.60W+H	1.50 ksf	0.0 in	0.4225 ksf	0.4225 ksf	0.282
, +D+0.70E+H	1.50 ksf	0.0 in	0.4225 ksf	0.4225 ksf	0.282
, +D+0.750Lr+0.750L+0.450W+H	1.50 ksf	0.0 in	0.5725 ksf	0.5725 ksf	0.382
, +D+0.750L+0.750S+0.450W+H	1.50 ksf	0.0 in	0.4225 ksf	0.4225 ksf	0.282
, +D+0.750L+0.750S+0.5250E+H	1.50 ksf	0.0 in	0.4225 ksf	0.4225 ksf	0.282
, +0.60D+0.60W+0.60H	1.50 ksf	0.0 in	0.2535 ksf	0.2535 ksf	0.169
, +0.60D+0.70E+0.60H	1.50 ksf	0.0 in	0.2535 ksf	0.2535 ksf	0.169

Overturning Stability

Units : k-ft

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding SafetyRatio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
, +1.40D+1.60H	0.1155	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.40D+1.60H	0.1155	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+0.50Lr+1.60L+1.60H	0.1185	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+0.50Lr+1.60L+1.60H	0.1185	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+1.60L+0.50S+1.60H	0.09899	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+1.60L+0.50S+1.60H	0.09899	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+1.60Lr+0.50L+1.60H	0.1615	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+1.60Lr+0.50L+1.60H	0.1615	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+1.60Lr+0.50W+1.60H	0.1615	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+1.60Lr+0.50W+1.60H	0.1615	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+0.50L+1.60S+1.60H	0.09899	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+0.50L+1.60S+1.60H	0.09899	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+1.60S+0.50W+1.60H	0.09899	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+1.60S+0.50W+1.60H	0.09899	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+0.50Lr+0.50L+W+1.60H	0.1185	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+0.50Lr+0.50L+W+1.60H	0.1185	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+0.50L+0.50S+W+1.60H	0.09899	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+0.50L+0.50S+W+1.60H	0.09899	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK

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Project Title: PHX HOMEnz
Engineer: RHG
Project Descr:

Project ID: 5054.18.01

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Wall Footing

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Description : Int. Wall Footing

. +1.20D+0.50L+0.20S+E+1.60H	0.09899	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
. +1.20D+0.50L+0.20S+E+1.60H	0.09899	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK

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ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

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Description : Int. Wall Footing

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
. +0.90D+W+0.90H	0.07424	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
. +0.90D+W+0.90H	0.07424	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
. +0.90D+E+0.90H	0.07424	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
. +0.90D+E+0.90H	0.07424	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK

One Way Shear — Units : k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+0.50Lr+1.60L+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+1.60L+0.50S+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+1.60Lr+0.50L+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+1.60Lr+0.50W+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+0.50L+1.60S+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+1.60S+0.50W+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+0.50Lr+0.50L+W+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+0.50L+0.50S+W+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+0.50L+0.20S+E+1.60H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+0.90D+W+0.90H	0 psi	0 psi	0 psi	82.158 psi	0	OK
+0.90D+E+0.90H	0 psi	0 psi	0 psi	82.158 psi	0	OK

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Project Title: PHX HOMEnz
Engineer: RHG
Project Descr:

Project ID: 5054.18.01

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General Footing

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ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

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Description : Ext. Column Spread Footing (HSS5x5x1/4)

Code References

Calculations per ACI 318-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	1.50 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	2.0 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

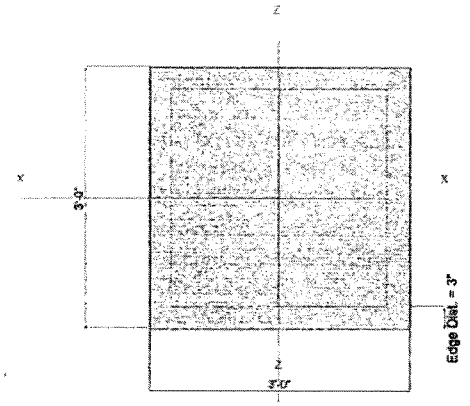
Width parallel to X-X Axis	=	3.0 ft
Length parallel to Z-Z Axis	=	3.0 ft
Footing Thickness	=	12.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in

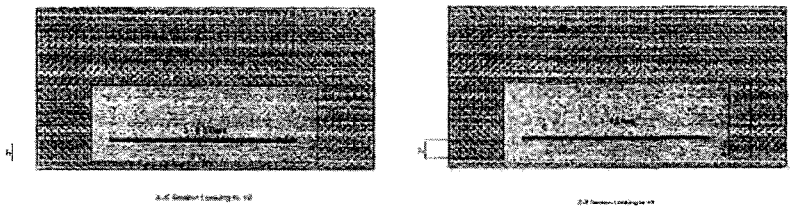


Reinforcing

Bars parallel to X-X Axis		
Number of Bars	=	3
Reinforcing Bar Size	=	# 5
Bars parallel to Z-Z Axis		
Number of Bars	=	3.0
Reinforcing Bar Size	=	# 5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	4.204	3.40						k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

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General Footing

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Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Ext. Column Spread Footing (HSS5x5x1/4)

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.7333	Soil Bearing	1.10 ksf	1.50 ksf	+D+Lr+H about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.1080	Z Flexure (+X)	1.311 k-ft/ft	12.131 k-ft/ft	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.1080	Z Flexure (-X)	1.311 k-ft/ft	12.131 k-ft/ft	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.1080	X Flexure (+Z)	1.311 k-ft/ft	12.131 k-ft/ft	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.1080	X Flexure (-Z)	1.311 k-ft/ft	12.131 k-ft/ft	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.09847	1-way Shear (+X)	8.090 psi	82.158 psi	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.09847	1-way Shear (-X)	8.090 psi	82.158 psi	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.09847	1-way Shear (+Z)	8.090 psi	82.158 psi	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.09847	1-way Shear (-Z)	8.090 psi	82.158 psi	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.1846	2-way Punching	30.338 psi	164.317 psi	+1.20D+1.60Lr+0.50L+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, +D+H	1.50	n/a	0.0	0.7221	0.7221	n/a	n/a	0.481
X-X, +D+L+H	1.50	n/a	0.0	0.7221	0.7221	n/a	n/a	0.481
X-X, +D+Lr+H	1.50	n/a	0.0	1.10	1.10	n/a	n/a	0.733
X-X, +D+S+H	1.50	n/a	0.0	0.7221	0.7221	n/a	n/a	0.481
X-X, +D+0.750Lr+0.750L+H	1.50	n/a	0.0	1.005	1.005	n/a	n/a	0.670
X-X, +D+0.750L+0.750S+H	1.50	n/a	0.0	0.7221	0.7221	n/a	n/a	0.481
X-X, +D+0.60W+H	1.50	n/a	0.0	0.7221	0.7221	n/a	n/a	0.481
X-X, +D+0.70E+H	1.50	n/a	0.0	0.7221	0.7221	n/a	n/a	0.481
X-X, +D+0.750Lr+0.750L+0.450W+H	1.50	n/a	0.0	1.005	1.005	n/a	n/a	0.670
X-X, +D+0.750L+0.750S+0.450W+H	1.50	n/a	0.0	0.7221	0.7221	n/a	n/a	0.481
X-X, +D+0.750L+0.750S+0.5250E+H	1.50	n/a	0.0	0.7221	0.7221	n/a	n/a	0.481
X-X, +0.60D+0.60W+0.60H	1.50	n/a	0.0	0.4333	0.4333	n/a	n/a	0.289
X-X, +0.60D+0.70E+0.60H	1.50	n/a	0.0	0.4333	0.4333	n/a	n/a	0.289
Z-Z, +D+H	1.50	0.0	n/a	n/a	n/a	0.7221	0.7221	0.481
Z-Z, +D+L+H	1.50	0.0	n/a	n/a	n/a	0.7221	0.7221	0.481
Z-Z, +D+Lr+H	1.50	0.0	n/a	n/a	n/a	1.10	1.10	0.733
Z-Z, +D+S+H	1.50	0.0	n/a	n/a	n/a	0.7221	0.7221	0.481
Z-Z, +D+0.750Lr+0.750L+H	1.50	0.0	n/a	n/a	n/a	1.005	1.005	0.670
Z-Z, +D+0.750L+0.750S+H	1.50	0.0	n/a	n/a	n/a	0.7221	0.7221	0.481
Z-Z, +D+0.60W+H	1.50	0.0	n/a	n/a	n/a	0.7221	0.7221	0.481
Z-Z, +D+0.70E+H	1.50	0.0	n/a	n/a	n/a	0.7221	0.7221	0.481
Z-Z, +D+0.750Lr+0.750L+0.450W+H	1.50	0.0	n/a	n/a	n/a	1.005	1.005	0.670
Z-Z, +D+0.750L+0.750S+0.450W+H	1.50	0.0	n/a	n/a	n/a	0.7221	0.7221	0.481
Z-Z, +D+0.750L+0.750S+0.5250E+H	1.50	0.0	n/a	n/a	n/a	0.7221	0.7221	0.481
Z-Z, +0.60D+0.60W+0.60H	1.50	0.0	n/a	n/a	n/a	0.4333	0.4333	0.289
Z-Z, +0.60D+0.70E+0.60H	1.50	0.0	n/a	n/a	n/a	0.4333	0.4333	0.289

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

All units k

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

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Project Descr:

Project ID: 5054.18.01

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General Footing

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Ext. Column Spread Footing (HSS5x5x1/4)

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	0.7357	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.40D+1.60H	0.7357	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.8431	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.8431	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.6306	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.6306	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60Lr+0.50L+1.60H	1.311	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60Lr+0.50L+1.60H	1.311	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	1.311	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	1.311	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50L+1.60S+1.60H	0.6306	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50L+1.60S+1.60H	0.6306	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.6306	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.6306	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50Lr+0.50L+W+1.60H	0.8431	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50Lr+0.50L+W+1.60H	0.8431	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50L+0.50S+W+1.60H	0.6306	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50L+0.50S+W+1.60H	0.6306	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50L+0.20S+E+1.60H	0.6306	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50L+0.20S+E+1.60H	0.6306	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +0.90D+W+0.90H	0.4730	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +0.90D+W+0.90H	0.4730	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +0.90D+E+0.90H	0.4730	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +0.90D+E+0.90H	0.4730	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.40D+1.60H	0.7357	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.40D+1.60H	0.7357	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.8431	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.8431	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.6306	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.6306	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60Lr+0.50L+1.60H	1.311	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60Lr+0.50L+1.60H	1.311	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	1.311	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	1.311	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50L+1.60S+1.60H	0.6306	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50L+1.60S+1.60H	0.6306	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.6306	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.6306	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50Lr+0.50L+W+1.60H	0.8431	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50Lr+0.50L+W+1.60H	0.8431	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50L+0.50S+W+1.60H	0.6306	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50L+0.50S+W+1.60H	0.6306	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50L+0.20S+E+1.60H	0.6306	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50L+0.20S+E+1.60H	0.6306	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +0.90D+W+0.90H	0.4730	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +0.90D+W+0.90H	0.4730	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +0.90D+E+0.90H	0.4730	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +0.90D+E+0.90H	0.4730	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	4.54 psi	4.54 psi	4.54 psi	4.54 psi	4.54 psi	82.16 psi	0.06	0.00
+1.20D+0.50Lr+1.60L+1.60H	5.20 psi	5.20 psi	5.20 psi	5.20 psi	5.20 psi	82.16 psi	0.06	0.00
+1.20D+1.60L+0.50S+1.60H	3.89 psi	3.89 psi	3.89 psi	3.89 psi	3.89 psi	82.16 psi	0.05	0.00
+1.20D+1.60Lr+0.50L+1.60H	8.09 psi	8.09 psi	8.09 psi	8.09 psi	8.09 psi	82.16 psi	0.10	0.00
+1.20D+1.60Lr+0.50W+1.60H	8.09 psi	8.09 psi	8.09 psi	8.09 psi	8.09 psi	82.16 psi	0.10	0.00
+1.20D+0.50L+1.60S+1.60H	3.89 psi	3.89 psi	3.89 psi	3.89 psi	3.89 psi	82.16 psi	0.05	0.00
+1.20D+1.60S+0.50W+1.60H	3.89 psi	3.89 psi	3.89 psi	3.89 psi	3.89 psi	82.16 psi	0.05	0.00
+1.20D+0.50Lr+0.50L+W+1.60H	5.20 psi	5.20 psi	5.20 psi	5.20 psi	5.20 psi	82.16 psi	0.06	0.00
+1.20D+0.50L+0.50S+W+1.60H	3.89 psi	3.89 psi	3.89 psi	3.89 psi	3.89 psi	82.16 psi	0.05	0.00
+1.20D+0.50L+0.20S+E+1.60H	3.89 psi	3.89 psi	3.89 psi	3.89 psi	3.89 psi	82.16 psi	0.05	0.00
+0.90D+W+0.90H	2.92 psi	2.92 psi	2.92 psi	2.92 psi	2.92 psi	82.16 psi	0.04	0.00

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Suite 101-517
Tempe, AZ 85282

Project Title: PHX HOMEnz
Engineer: RHG
Project Descr:

Project ID: 5054.18.01

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General Footing

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Ext. Column Spread Footing (HSS5x5x1/4)

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E+0.90H	2.92 psi	2.92 psi	2.92 psi	2.92 psi	2.92 psi	82.16 psi	0.04	0.00

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	17.03 psi	164.32psi	0.1036	OK
+1.20D+0.50Lr+1.60L+1.60H	19.52 psi	164.32psi	0.1188	OK
+1.20D+1.60L+0.50S+1.60H	14.60 psi	164.32psi	0.08884	OK
+1.20D+1.60Lr+0.50L+1.60H	30.34 psi	164.32psi	0.1846	OK
+1.20D+1.60Lr+0.50W+1.60H	30.34 psi	164.32psi	0.1846	OK
+1.20D+0.50L+1.60S+1.60H	14.60 psi	164.32psi	0.08884	OK
+1.20D+1.60S+0.50W+1.60H	14.60 psi	164.32psi	0.08884	OK
+1.20D+0.50Lr+0.50L+W+1.60H	19.52 psi	164.32psi	0.1188	OK
+1.20D+0.50L+0.50S+W+1.60H	14.60 psi	164.32psi	0.08884	OK
+1.20D+0.50L+0.20S+E+1.60H	14.60 psi	164.32psi	0.08884	OK
+0.90D+W+0.90H	10.95 psi	164.32psi	0.06663	OK
+0.90D+E+0.90H	10.95 psi	164.32psi	0.06663	OK

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Project Title: PHX HOMEnz
Engineer: RHG
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Project ID: 5054.18.01

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General Footing

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZWD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Int. Column Spread Footing (4x4 PSL)

Code References

Calculations per ACI 318-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	1.50 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	1 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

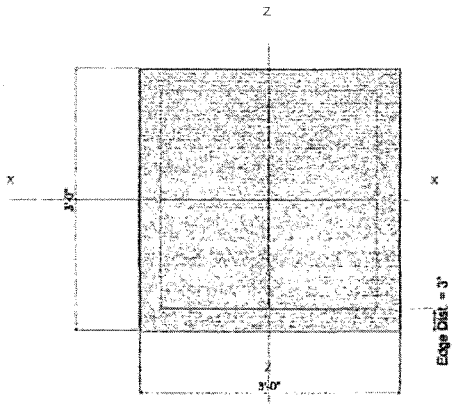
Width parallel to X-X Axis	=	3.0 ft
Length parallel to Z-Z Axis	=	3.0 ft
Footing Thickness	=	12.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in

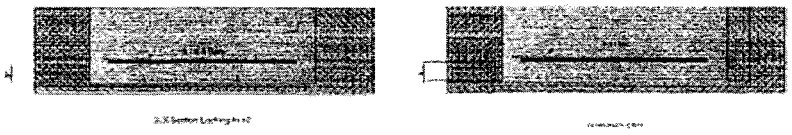
Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis		
Number of Bars	=	3.0
Reinforcing Bar Size	=	# 5
Bars parallel to Z-Z Axis		
Number of Bars	=	3.0
Reinforcing Bar Size	=	# 5



Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a

Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	3.637	3.20						k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

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General Footing

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ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Int. Column Spread Footing (4x4 PSL)

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.6767	Soil Bearing	1.015 ksf	1.50 ksf	+D+Lr+H about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.09773	Z Flexure (+X)	1.186 k-ft/ft	12.131 k-ft/ft	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.09773	Z Flexure (-X)	1.186 k-ft/ft	12.131 k-ft/ft	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.09773	X Flexure (+Z)	1.186 k-ft/ft	12.131 k-ft/ft	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.09773	X Flexure (-Z)	1.186 k-ft/ft	12.131 k-ft/ft	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.08907	1-way Shear (+X)	7.318 psi	82.158 psi	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.08907	1-way Shear (-X)	7.318 psi	82.158 psi	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.08907	1-way Shear (+Z)	7.318 psi	82.158 psi	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.08907	1-way Shear (-Z)	7.318 psi	82.158 psi	+1.20D+1.60Lr+0.50L+1.60H
PASS	0.1670	2-way Punching	27.443 psi	164.317 psi	+1.20D+1.60Lr+0.50L+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, +D+H	1.50	n/a	0.0	0.6591	0.6591	n/a	n/a	0.439
X-X, +D+L+H	1.50	n/a	0.0	0.6591	0.6591	n/a	n/a	0.439
X-X, +D+Lr+H	1.50	n/a	0.0	1.015	1.015	n/a	n/a	0.677
X-X, +D+S+H	1.50	n/a	0.0	0.6591	0.6591	n/a	n/a	0.439
X-X, +D+0.750Lr+0.750L+H	1.50	n/a	0.0	0.9258	0.9258	n/a	n/a	0.617
X-X, +D+0.750L+0.750S+H	1.50	n/a	0.0	0.6591	0.6591	n/a	n/a	0.439
X-X, +D+0.60W+H	1.50	n/a	0.0	0.6591	0.6591	n/a	n/a	0.439
X-X, +D+0.70E+H	1.50	n/a	0.0	0.6591	0.6591	n/a	n/a	0.439
X-X, +D+0.750Lr+0.750L+0.450W+H	1.50	n/a	0.0	0.9258	0.9258	n/a	n/a	0.617
X-X, +D+0.750L+0.750S+0.450W+H	1.50	n/a	0.0	0.6591	0.6591	n/a	n/a	0.439
X-X, +D+0.750L+0.750S+0.5250E+H	1.50	n/a	0.0	0.6591	0.6591	n/a	n/a	0.439
X-X, +0.60D+0.60W+0.60H	1.50	n/a	0.0	0.3955	0.3955	n/a	n/a	0.264
X-X, +0.60D+0.70E+0.60H	1.50	n/a	0.0	0.3955	0.3955	n/a	n/a	0.264
Z-Z, +D+H	1.50	0.0	n/a	n/a	n/a	0.6591	0.6591	0.439
Z-Z, +D+L+H	1.50	0.0	n/a	n/a	n/a	0.6591	0.6591	0.439
Z-Z, +D+Lr+H	1.50	0.0	n/a	n/a	n/a	1.015	1.015	0.677
Z-Z, +D+S+H	1.50	0.0	n/a	n/a	n/a	0.6591	0.6591	0.439
Z-Z, +D+0.750Lr+0.750L+H	1.50	0.0	n/a	n/a	n/a	0.9258	0.9258	0.617
Z-Z, +D+0.750L+0.750S+H	1.50	0.0	n/a	n/a	n/a	0.6591	0.6591	0.439
Z-Z, +D+0.60W+H	1.50	0.0	n/a	n/a	n/a	0.6591	0.6591	0.439
Z-Z, +D+0.70E+H	1.50	0.0	n/a	n/a	n/a	0.6591	0.6591	0.439
Z-Z, +D+0.750Lr+0.750L+0.450W+H	1.50	0.0	n/a	n/a	n/a	0.9258	0.9258	0.617
Z-Z, +D+0.750L+0.750S+0.450W+H	1.50	0.0	n/a	n/a	n/a	0.6591	0.6591	0.439
Z-Z, +D+0.750L+0.750S+0.5250E+H	1.50	0.0	n/a	n/a	n/a	0.6591	0.6591	0.439
Z-Z, +0.60D+0.60W+0.60H	1.50	0.0	n/a	n/a	n/a	0.3955	0.3955	0.264
Z-Z, +0.60D+0.70E+0.60H	1.50	0.0	n/a	n/a	n/a	0.3955	0.3955	0.264

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

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Tempe, AZ 85282

Project Title: PHX HOMEnz
Engineer: RHG
Project Descr:

Project ID: 5054.18.01

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Printed: 31 JAN 2018, 1:29PM

General Footing

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Int. Column Spread Footing (4x4 PSL)

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	PhiMn k-ft	Status
X-X, +1.40D+1.60H	0.6365	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.40D+1.60H	0.6365	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.7456	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.7456	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.5456	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.5456	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60Lr+0.50L+1.60H	1.186	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60Lr+0.50L+1.60H	1.186	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	1.186	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	1.186	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50L+1.60S+1.60H	0.5456	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50L+1.60S+1.60H	0.5456	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.5456	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.5456	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50Lr+0.50L+W+1.60H	0.7456	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50Lr+0.50L+W+1.60H	0.7456	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50L+0.50S+W+1.60H	0.5456	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50L+0.50S+W+1.60H	0.5456	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50L+0.20S+E+1.60H	0.5456	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D+0.50L+0.20S+E+1.60H	0.5456	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +0.90D+W+0.90H	0.4092	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +0.90D+W+0.90H	0.4092	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +0.90D+E+0.90H	0.4092	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +0.90D+E+0.90H	0.4092	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.40D+1.60H	0.6365	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.40D+1.60H	0.6365	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.7456	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.7456	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.5456	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.5456	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60Lr+0.50L+1.60H	1.186	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60Lr+0.50L+1.60H	1.186	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	1.186	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	1.186	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50L+1.60S+1.60H	0.5456	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50L+1.60S+1.60H	0.5456	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.5456	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.5456	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50Lr+0.50L+W+1.60H	0.7456	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50Lr+0.50L+W+1.60H	0.7456	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50L+0.50S+W+1.60H	0.5456	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50L+0.50S+W+1.60H	0.5456	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50L+0.20S+E+1.60H	0.5456	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D+0.50L+0.20S+E+1.60H	0.5456	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +0.90D+W+0.90H	0.4092	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +0.90D+W+0.90H	0.4092	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +0.90D+E+0.90H	0.4092	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +0.90D+E+0.90H	0.4092	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	3.93 psi	3.93 psi	3.93 psi	3.93 psi	3.93 psi	82.16 psi	0.05	0.00
+1.20D+0.50Lr+1.60L+1.60H	4.60 psi	4.60 psi	4.60 psi	4.60 psi	4.60 psi	82.16 psi	0.06	0.00
+1.20D+1.60L+0.50S+1.60H	3.37 psi	3.37 psi	3.37 psi	3.37 psi	3.37 psi	82.16 psi	0.04	0.00
+1.20D+1.60Lr+0.50L+1.60H	7.32 psi	7.32 psi	7.32 psi	7.32 psi	7.32 psi	82.16 psi	0.09	0.00
+1.20D+1.60Lr+0.50W+1.60H	7.32 psi	7.32 psi	7.32 psi	7.32 psi	7.32 psi	82.16 psi	0.09	0.00
+1.20D+0.50L+1.60S+1.60H	3.37 psi	3.37 psi	3.37 psi	3.37 psi	3.37 psi	82.16 psi	0.04	0.00
+1.20D+1.60S+0.50W+1.60H	3.37 psi	3.37 psi	3.37 psi	3.37 psi	3.37 psi	82.16 psi	0.04	0.00
+1.20D+0.50Lr+0.50L+W+1.60H	4.60 psi	4.60 psi	4.60 psi	4.60 psi	4.60 psi	82.16 psi	0.06	0.00
+1.20D+0.50L+0.50S+W+1.60H	3.37 psi	3.37 psi	3.37 psi	3.37 psi	3.37 psi	82.16 psi	0.04	0.00
+1.20D+0.50L+0.20S+E+1.60H	3.37 psi	3.37 psi	3.37 psi	3.37 psi	3.37 psi	82.16 psi	0.04	0.00
+0.90D+W+0.90H	2.53 psi	2.53 psi	2.53 psi	2.53 psi	2.53 psi	82.16 psi	0.03	0.00

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Project Title: PHX HOMEnz
Engineer: RHG
Project Descr:

Project ID: 5054.18.01

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Printed: 31 JAN 2018, 1:29PM

General Footing

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Int. Column Spread Footing (4x4 PSL)

One Way Shear

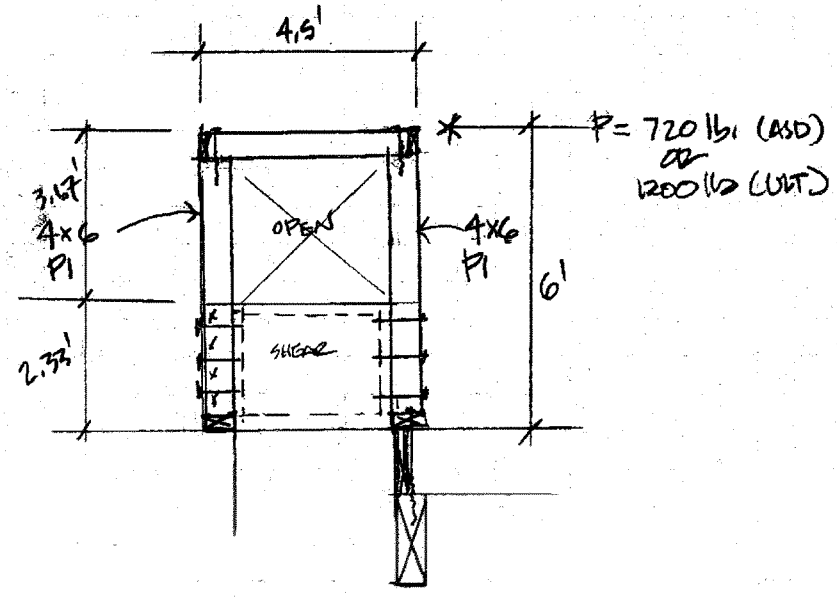
Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E+0.90H	2.53 psi	2.53 psi	2.53 psi	2.53 psi	2.53 psi	82.16 psi	0.03	0.00

Two-Way "Punching" Shear — All units k

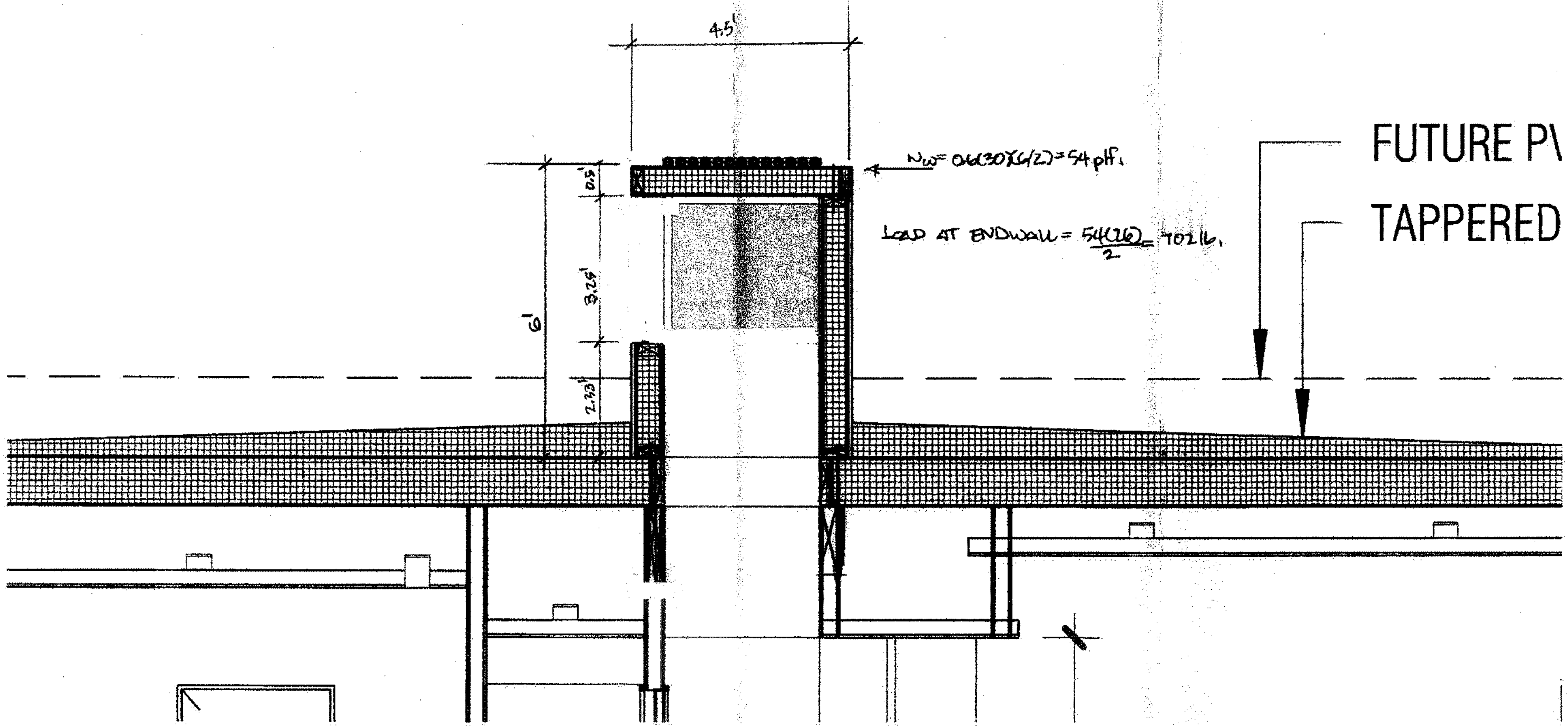
Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	14.73 psi	164.32psi	0.08966	OK
+1.20D+0.50Lr+1.60L+1.60H	17.26 psi	164.32psi	0.105	OK
+1.20D+1.60L+0.50S+1.60H	12.63 psi	164.32psi	0.07685	OK
+1.20D+1.60Lr+0.50L+1.60H	27.44 psi	164.32psi	0.167	OK
+1.20D+1.60Lr+0.50W+1.60H	27.44 psi	164.32psi	0.167	OK
+1.20D+0.50L+1.60S+1.60H	12.63 psi	164.32psi	0.07685	OK
+1.20D+1.60S+0.50W+1.60H	12.63 psi	164.32psi	0.07685	OK
+1.20D+0.50Lr+0.50L+W+1.60H	17.26 psi	164.32psi	0.105	OK
+1.20D+0.50L+0.50S+W+1.60H	12.63 psi	164.32psi	0.07685	OK
+1.20D+0.50L+0.20S+E+1.60H	12.63 psi	164.32psi	0.07685	OK
+0.90D+W+0.90H	9.47 psi	164.32psi	0.05764	OK
+0.90D+E+0.90H	9.47 psi	164.32psi	0.05764	OK

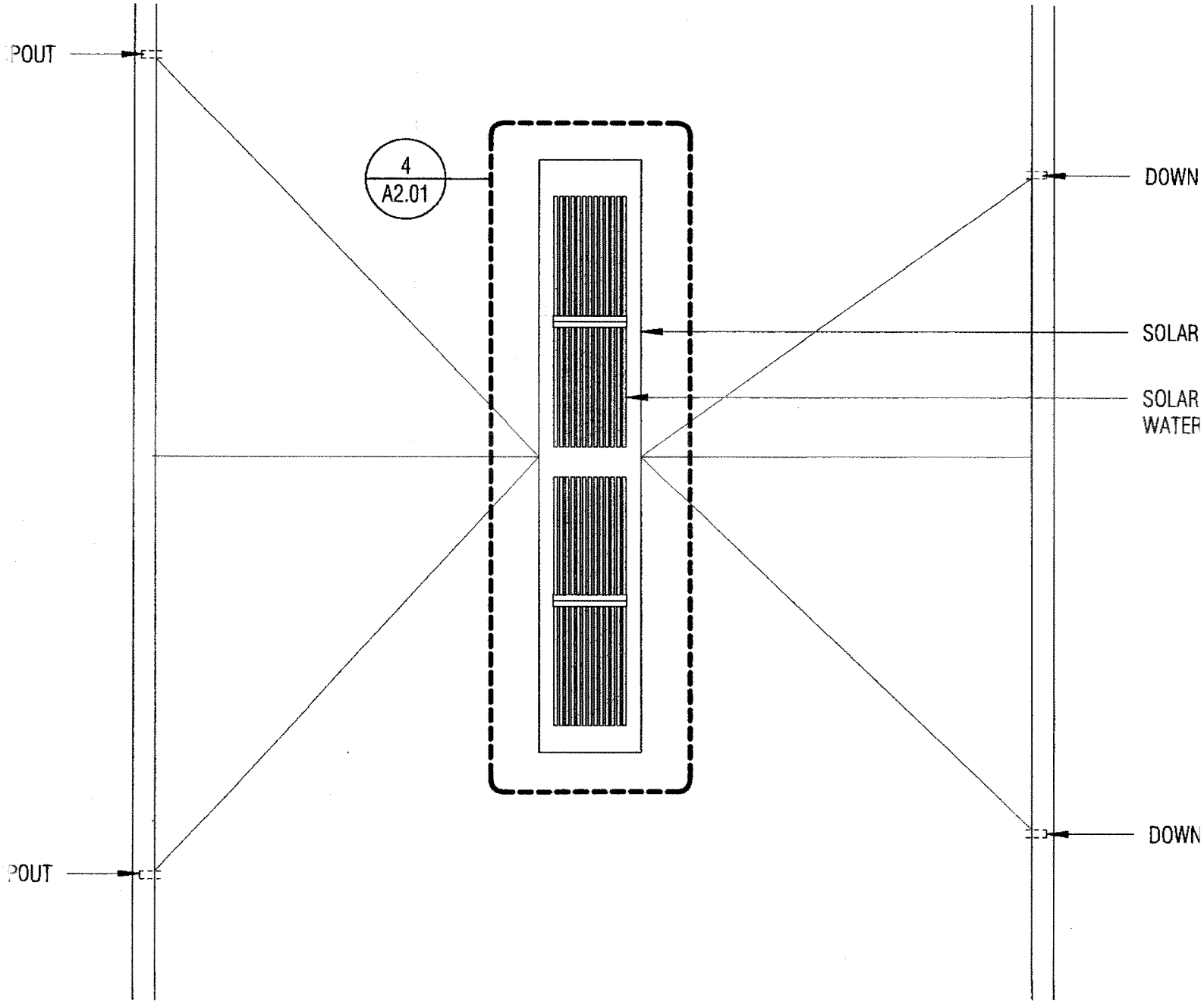
DESIGN FRAMING AT THERMAL CHIMNEY:

END WALL CONDITION:



∴ PROVIDE 4X6 POST IN THE CORNER AT EDGE OF ENDS.


4.5'
0.5'
3.25'
6'
2.33'
N_W= 0.6(30)(6/2)=54 plf.
LOAD AT ENDWALL = 54(26)/2 = 702 lb.
FUTURE P\
TAPPERED


POUT
4
A2.01
DOWN
SOLAR
SOLAR
WATER
DOWN
POUT

Wood Beam

Description : End Post P1 at Thermal Chimney

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design
Load Combination ASCE 7-16

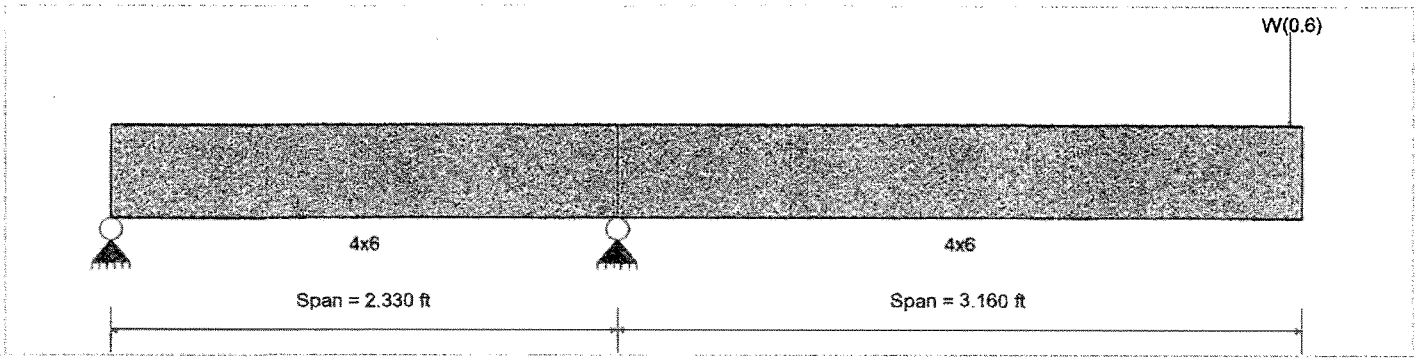
Wood Species : Spruce - Pine - Fir Wood
Grade : No. 1/No. 2

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	875 psi
Fb -	875 psi
Fc - Prll	1150 psi
Fc - Perp	425 psi
Fv	135 psi
Ft	450 psi

E : Modulus of Elasticity

Ebend- xx	1400ksi
Eminbend - xx	510ksi
Density	26.21pcf



Applied Loads

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

Load for Span Number 2
Point Load : W = 0.60 k @ 3.10 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.417 : 1	Maximum Shear Stress Ratio	=	0.173 : 1
Section used for this span		4x6	Section used for this span		4x6
fb : Actual	=	758.93psi	fv : Actual	=	37.32 psi
FB : Allowable	=	1,820.00psi	Fv : Allowable	=	216.00 psi
Load Combination		+D+0.60W+H	Load Combination		+D+0.60W+H
Location of maximum on span	=	2.330ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.271 in	Ratio =	278 >=240
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240
Max Downward Total Deflection	0.163 in	Ratio =	464 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.330 ft	1			0.90	1.300	1.00	1.00	1.00	1.00	1.00			1023.75	0.00	0.00	121.50
Length = 3.160 ft	2			0.90	1.300	1.00	1.00	1.00	1.00	1.00			1023.75	0.00	0.00	121.50
+D+L+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.330 ft	1			1.00	1.300	1.00	1.00	1.00	1.00	1.00			1137.50	0.00	0.00	135.00
Length = 3.160 ft	2			1.00	1.300	1.00	1.00	1.00	1.00	1.00			1137.50	0.00	0.00	135.00
+D+Lr+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.330 ft	1			1.25	1.300	1.00	1.00	1.00	1.00	1.00			1421.88	0.00	0.00	168.75
Length = 3.160 ft	2			1.25	1.300	1.00	1.00	1.00	1.00	1.00			1421.88	0.00	0.00	168.75

Wood Beam

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : End Post P1 at Thermal Chimney

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+S+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.330 ft	1			1.15	1.300	1.00	1.00	1.00	1.00	1.00			1308.13	0.00	0.00	155.25
Length = 3.160 ft	2			1.15	1.300	1.00	1.00	1.00	1.00	1.00			1308.13	0.00	0.00	155.25
+D+0.750Lr+0.750L+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.330 ft	1			1.25	1.300	1.00	1.00	1.00	1.00	1.00			1421.88	0.00	0.00	168.75
Length = 3.160 ft	2			1.25	1.300	1.00	1.00	1.00	1.00	1.00			1421.88	0.00	0.00	168.75
+D+0.750L+0.750S+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.330 ft	1			1.15	1.300	1.00	1.00	1.00	1.00	1.00			1308.13	0.00	0.00	155.25
Length = 3.160 ft	2			1.15	1.300	1.00	1.00	1.00	1.00	1.00			1308.13	0.00	0.00	155.25
+D+0.60W+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.330 ft	1	0.417	0.173	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.12	758.93	1820.00	0.48	37.32	216.00
Length = 3.160 ft	2	0.417	0.173	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.12	758.93	1820.00	0.36	37.32	216.00
+D+0.70E+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.330 ft	1			1.60	1.300	1.00	1.00	1.00	1.00	1.00			1820.00	0.00	0.00	216.00
Length = 3.160 ft	2			1.60	1.300	1.00	1.00	1.00	1.00	1.00			1820.00	0.00	0.00	216.00
+D+0.750Lr+0.750L+0.450W+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.330 ft	1	0.313	0.130	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.84	569.20	1820.00	0.36	27.99	216.00
Length = 3.160 ft	2	0.313	0.130	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.84	569.20	1820.00	0.27	27.99	216.00
+D+0.750L+0.750S+0.450W+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.330 ft	1	0.313	0.130	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.84	569.20	1820.00	0.36	27.99	216.00
Length = 3.160 ft	2	0.313	0.130	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.84	569.20	1820.00	0.27	27.99	216.00
+D+0.750L+0.750S+0.5250E+H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.330 ft	1			1.60	1.300	1.00	1.00	1.00	1.00	1.00			1820.00	0.00	0.00	216.00
Length = 3.160 ft	2			1.60	1.300	1.00	1.00	1.00	1.00	1.00			1820.00	0.00	0.00	216.00
+0.60D+0.60W+0.60H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.330 ft	1	0.417	0.173	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.12	758.93	1820.00	0.48	37.32	216.00
Length = 3.160 ft	2	0.417	0.173	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.12	758.93	1820.00	0.36	37.32	216.00
+0.60D+0.70E+0.60H					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.330 ft	1			1.60	1.300	1.00	1.00	1.00	1.00	1.00			1820.00	0.00	0.00	216.00
Length = 3.160 ft	2			1.60	1.300	1.00	1.00	1.00	1.00	1.00			1820.00	0.00	0.00	216.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	W Only	-0.0166	1.354
W Only	2	0.2714	3.160		0.0000	1.354

Vertical Reactions

Support notation : Far left is #1 — Values in KIPS

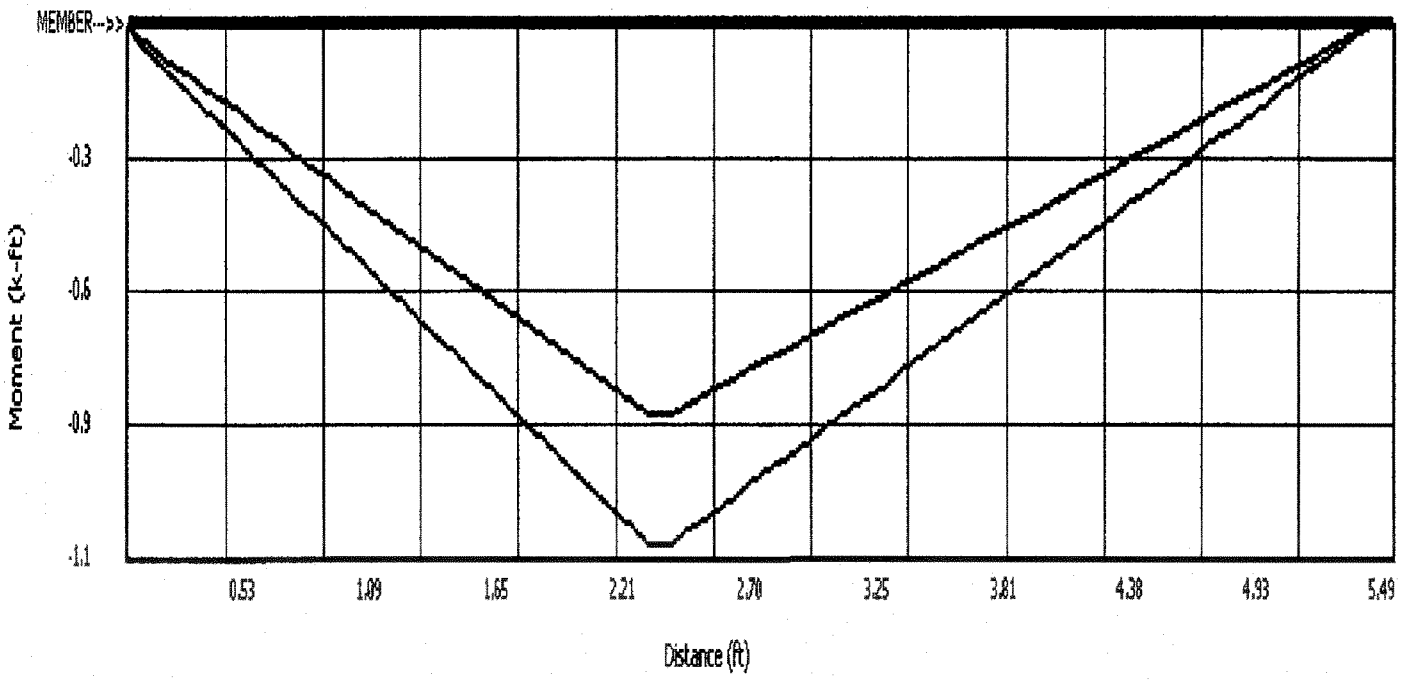
Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.798	1.398	
Overall MINimum	-0.479	1.398	
+D+H			
+D+L+H			
+D+Lr+H			
+D+S+H			
+D+0.750Lr+0.750L+H			
+D+0.750L+0.750S+H			
+D+0.60W+H	-0.479	0.839	
+D+0.70E+H			
+D+0.750Lr+0.750L+0.450W+H	-0.359	0.629	
+D+0.750L+0.750S+0.450W+H	-0.359	0.629	
+D+0.750L+0.750S+0.5250E+H			
+0.60D+0.60W+0.60H	-0.479	0.839	
+0.60D+0.70E+0.60H			
D Only			
Lr Only			
L Only			
S Only			
W Only	-0.798	1.398	
E Only			
H Only			

Wood Beam

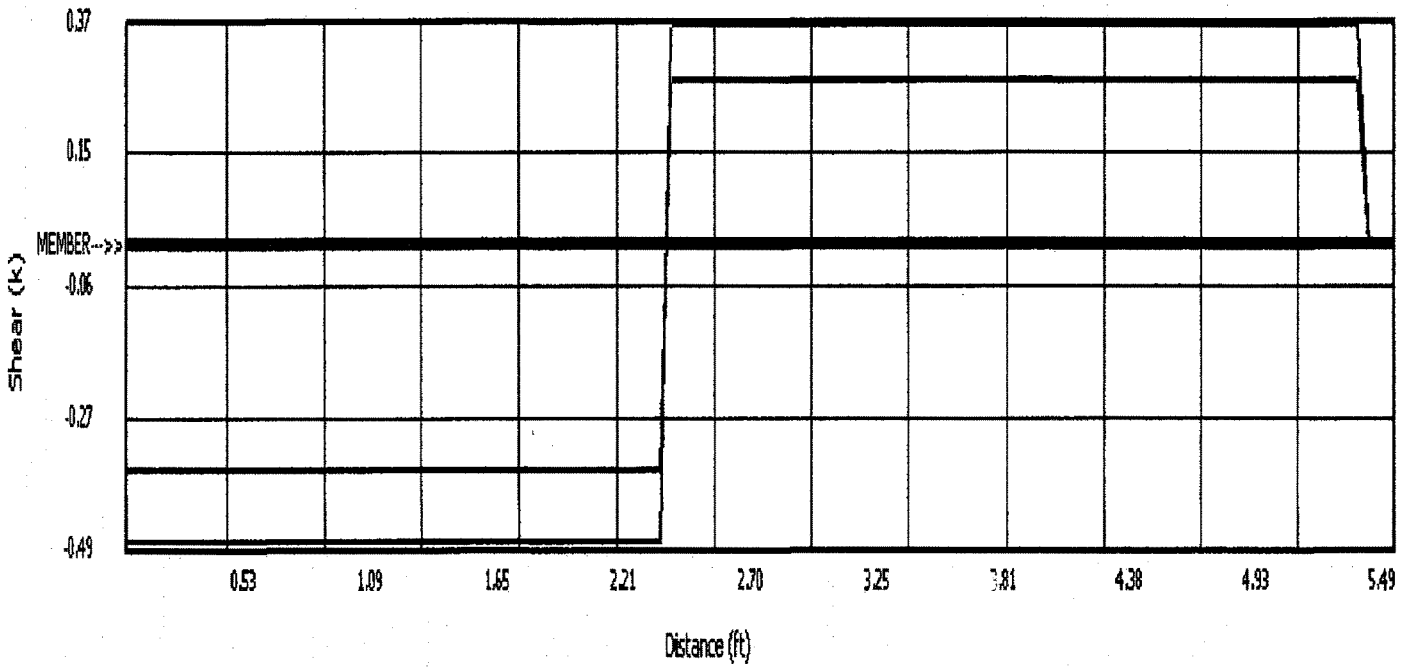
File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : End Post P1 at Thermal Chimney



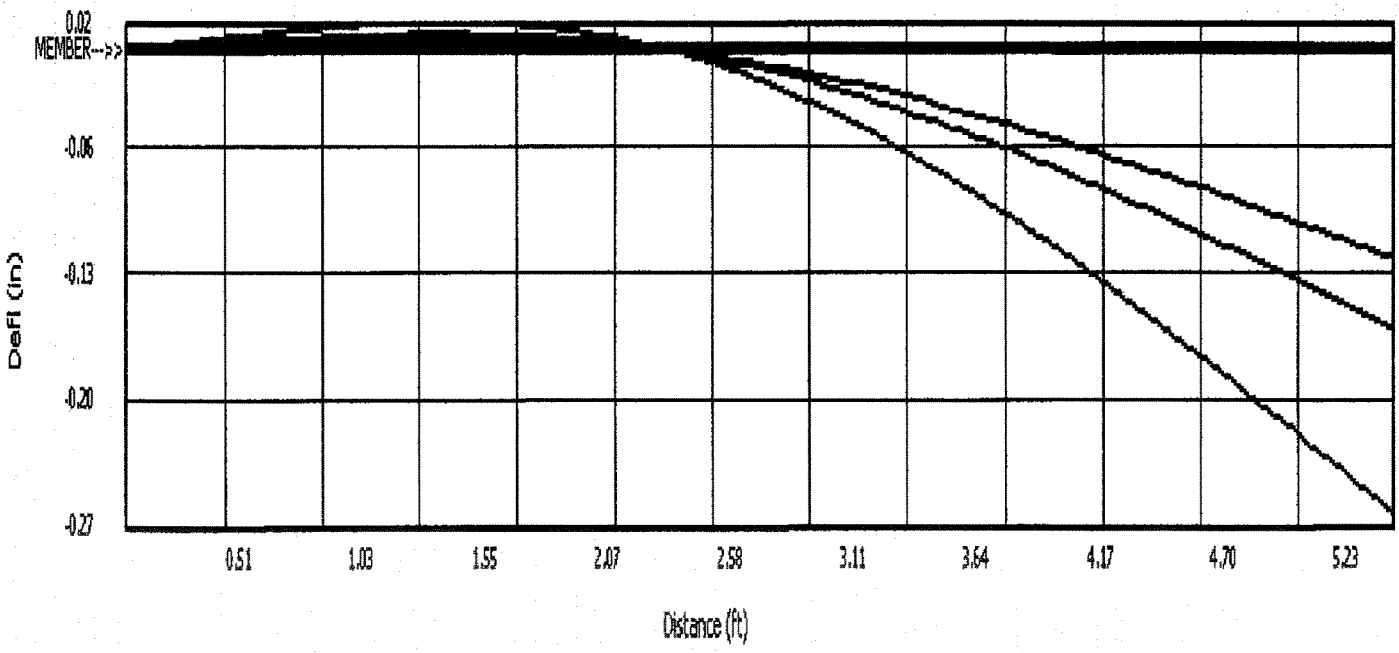
+D+H
+D+L+H
+D+Lr+H
+D+S+H
+D+0.75DL+0.75DL+H
+D+0.75DL+0.75DS+H
+D+0.60W+H
+D+0.70E+H
+D+0.75DL+0.75DL+0.450W+H
+D+0.75DL+0.75DS+0.450W+H
+D+0.75DL+0.75DS+0.525DE+H
+0.60D+0.60W+0.60H
+0.60D+0.70E+0.60H



+D+H
+D+L+H
+D+Lr+H
+D+S+H
+D+0.75DL+0.75DL+H
+D+0.75DL+0.75DS+H
+D+0.60W+H
+D+0.70E+H
+D+0.75DL+0.75DL+0.450W+H
+D+0.75DL+0.75DS+0.450W+H
+D+0.75DL+0.75DS+0.525DE+H
+0.60D+0.60W+0.60H
+0.60D+0.70E+0.60H

Wood Beam

Description : End Post P1 at Thermal Chimney



+D+H
+D+L+H
+D+Lr+H
+D+S+H
+D+0.75Lr+0.75L+H
+D+0.75L+0.75S+H
+D+0.6W+H
+D+0.7E+H
+D+0.75Lr+0.75L+0.45W+H
+D+0.75L+0.75S+0.45W+H
+D+0.75L+0.75S+0.525E+H
+0.6D+0.6W+0.6H
+0.6D+0.7E+0.6H
D Only
Lr Only
L Only
S Only
W Only
E Only
H Only

DSP/SSP/SP/SPH/RSP4/TSP

Stud Plate Ties (cont.)

These products are available with additional corrosion protection. For more information, see p. 18.

These products are approved for installation with the Strong-Drive® SD Connector screw. See pp. 39–40 for more information.

Model No.	Dimensions (in.)		Fasteners			Allowable Uplift Loads (160)			Code Ref.
	W	L	Studs	Double Top Plate	Single Sill Plate	Double Top Plate	Single Sill Plate[6]		
						DF/SP/SPF	DF/SP	SPF/HF	
SSP	1⅜	6¹⁵⁄₁₆	(4) 10d x 1½"	(3) 10d x 1½"	—	350	—	—	I17, L18, FL
				—	(1) 10d x 1½"	—	420	325	
			(4) 10d	(3) 10d	—	435	—	—	
				—	(1) 10d	—	455	420	
DSP	2¾	6¹⁵⁄₁₆	(8) 10d x 1½"	(6) 10d x 1½"	—	775	—	—	
				—	(2) 10d x 1½"	—	660	545	
			(8) 10d	(6) 10d	—	825	—	—	
				—	(2) 10d	—	825	600	
TSP	1½	7⅞	(6) 10d x 1½"	—	(3) 10d x 1½"	—	470[5]	425	FL
			(9) 10d x 1½"	(6) 10d x 1½"	—	755[4]	—	—	
				(6) 10d		1,015[4]			

1. Allowable loads have been increased 60% for wind or earthquake loading with no further increase allowed.
2. When cross-grain bending or cross-grain tension cannot be avoided, mechanical reinforcement to resist such forces should be considered.
3. Allowable loads for DSP installed to a rim board are 660 lb. (DF/SP), 545 lb. (SPF/HF).
4. Noted values only apply to DF/SP members. For SPF values, multiply by 0.86.
5. Southern pine allowable uplift load is 585 lb.
6. Allowable load for TSP installed to DF/SP top plate and SPF/HF stud is 450 lb.
7. **Nails:** 10d = 0.148" dia. x 3" long, 10d x 1½" = 0.148" dia. x 1½" long. See pp. 26–27 for other nail sizes and information.

Model No.	Dimensions (in.)		Stud	Plate Width	Fasteners		Allowable Uplift Loads				Code Ref.
	W	L			Stud1	Plate	DF/SP		SPF/HF		
							Side[8] (160)	Center[9] (160)	Side[8] (160)	Center[9] (160)	
SP1	3½	5⅛	2x	—	(6) 10d	(4) 10d	585	585	535	535	I17, FL, L6
SP2	3½	6⅝	2x	—	(6) 10d	(6) 10d	1,065	1,065	605	605	
SP4	3⅝	7¼	2x	4x	(6) 10d x 1½"	—	440	885	380	760	
SP6	5⅝	7¾	2x	6x	(6) 10d x 1½"	—	440	885	380	760	
SP8	7⅝	8⅝	2x	8x	(6) 10d x 1½"	—	440	885	380	760	
SPH4 or	3⅝	8¼	2x	4x	(10) 10d x 1½"	—	620	1,240	530	1,065	
SPH4R	4⅛	8¼			(12) 10d x 1½"	—	680	1,360	585	1,170	170
SPH6 or	5⅝	9¼	2x	6x	(10) 10d x 1½"	—	620	1,240	530	1,065	I17, FL, L6
SPH6R	6⅛	8¾			(12) 10d x 1½"	—	680	1,360	585	1,170	170
SPH8	7⅝	8⅜	2x	8x	(10) 10d x 1½"	—	620	1,240	530	1,065	I17, FL, L6
			2x	8x	(12) 10d x 1½"	—	680	1,360	585	1,170	
RSP4 (1)	2⅛	4½	2x	—	(4) 8d x 1½"	(4) 8d x 1½"	315	315	285	285	I17, L5, L6, FL
RSP4 (2)	2⅛	4½	2x	—	(4) 8d x 1½"	(4) 8d x 1½	450	450	370	370	

1. SP1/SP2 — drive one stud nail at an angle through the stud into the plate to achieve the table load (see illustration).
2. Allowable loads have been increased for wind or earthquake loading with no further increase allowed; reduce where other loads govern.
3. RSP4 — see installation details (1) and (2) for reference.
4. RSP4 — F_2 is 250 lb. (installation 1) and 250 lb. (installation 2). F_1 load is 210 lb. for both installations.
5. Maximum load for SPH in Southern Yellow Pine is 1,490 lb. for center loading and 745 lb. for side loading.
6. When cross-grain bending or cross-grain tension cannot be avoided, mechanical reinforcement to resist such forces should be considered.
7. For retrofit application see technical bulletin T-C-STRAPS at **strongtie.com**.
8. Use Side (eccentric) load when uplift loads are applied to only one face of the top plate.
9. Use Center (concentric) loads when uplift loads are applied at the centerline of the top plate, or where equal loads are applied to both sides of the top plate. Center loads should also be used for stud-to-bottom plate loads.
10. **Nails:** 10d = 0.148" dia. x 3" long, 10d x 1½" = 0.148" dia. x 1½" long, 8d x 1½" = 0.131" dia. x 1½" long. See pp. 26–27 for other nail sizes and information.

DSP/SSP/SP/SPH/RSP4/TSP

Stud Plate Ties

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

The stud plate tie series offers general solutions for connecting the stud to the top and bottom plates. All models can be used to make a connection to either the top or bottom plate, and several are suitable for double top plates and studs.

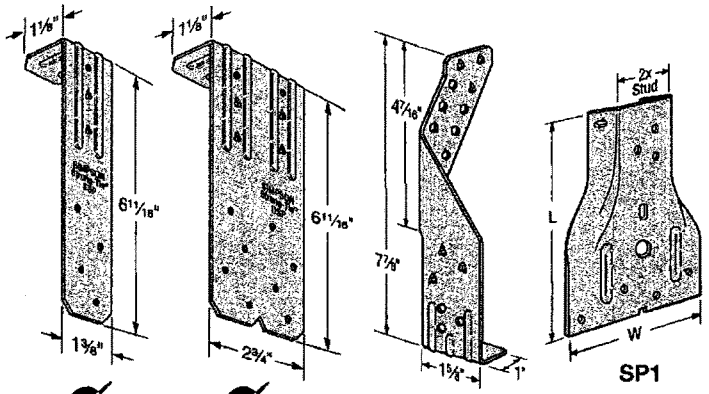
Material: DSP/SSP/SPH — 18 gauge; TSP — 16 gauge; all others — 20 gauge

Finish: Galvanized. Some products available in ZMAX® coating. See Corrosion Information, pp. 15–18.

Installation:

- Use all specified fasteners; see General Notes.
- TSP/DSP/SSP — Sill-plate installation: fill all round holes.
- TSP/DSP/SSP — Top-plate installation: fill all round and triangle holes
- SP1/SP2 — One of the 10d common stud nails is driven at a 45° angle through the stud into the plate.

Codes: See p. 14 for Code Reference Key Chart

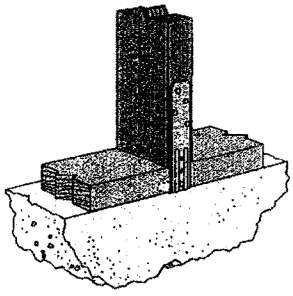


SSP
U.S. Patent
7,065,932
7,356,973

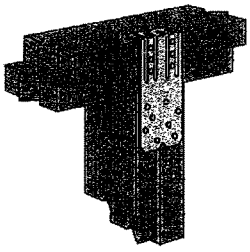
DSP
U.S. Patent
7,065,932
7,356,973

TSP
U.S. Patent
D618,085

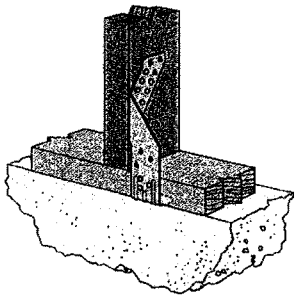
SP1



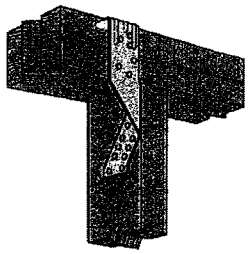
Typical SSP Installed to Sill Plate
(DSP similar for double stud)



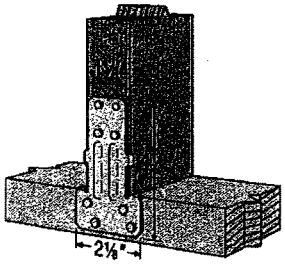
Typical DSP Installed to Top Plate
(SSP similar for single stud)



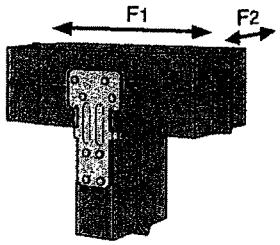
Typical TSP Installed to Sill Plate



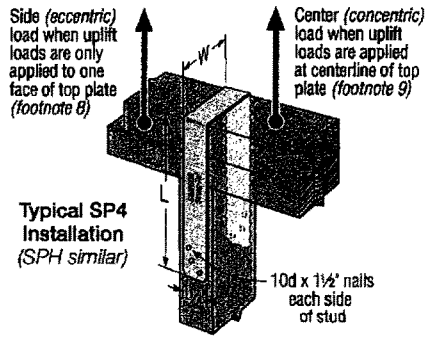
Typical TSP Installed to Top Plate



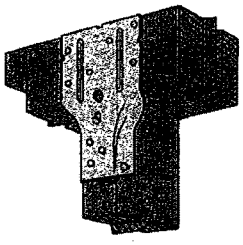
(1) Typical RSP4 Stud to Single Bottom Plate



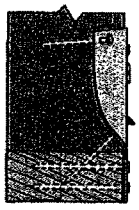
(2) Typical RSP4 Stud to Double Top Plate
(See footnote 4)



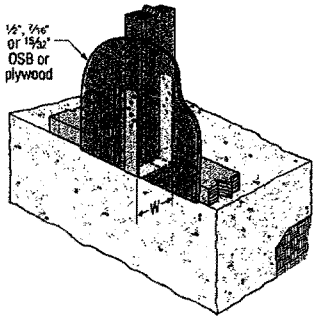
Typical SP4 Installation
(SPH similar)



Typical SP2 Installation



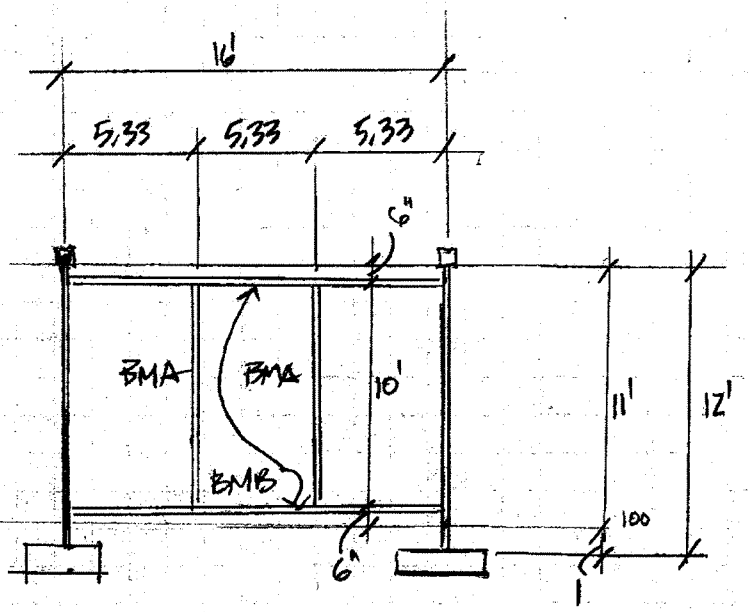
SP1 Nailing Profile



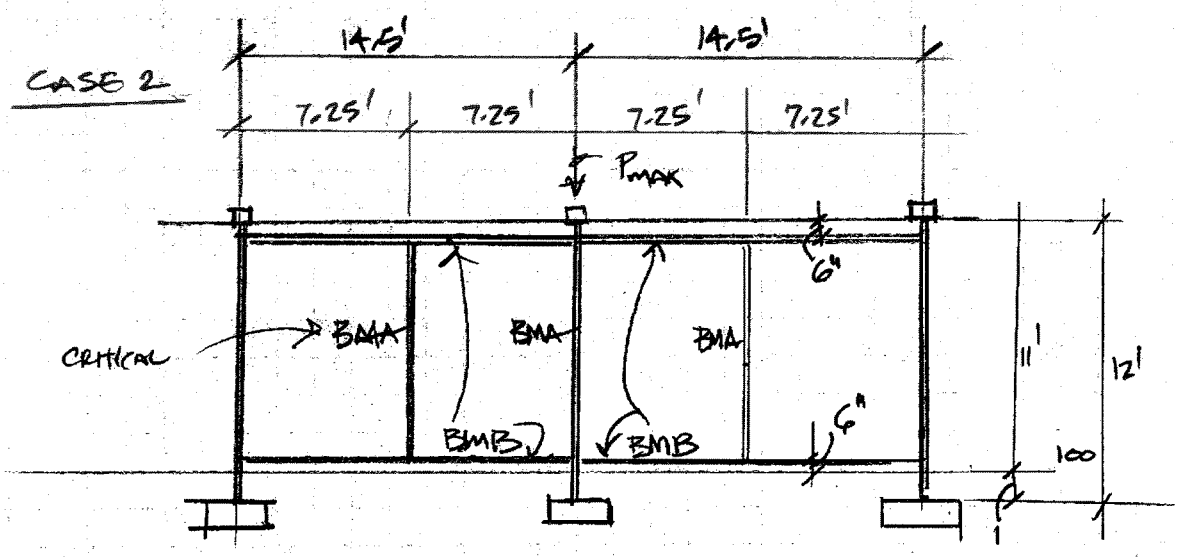
Typical SPH4R Installed on Bottom of 2x Stud Wall
(Sill plate anchorage not shown)

DESIGN WIND SCREEN FRAMING:

CASE I

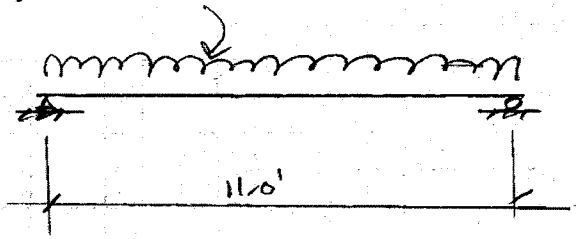


CASE 2



BMA DESIGN: w_w = 35 psf (ULTIMATE)

w_w = 7.25(35) = 254 plf



Steel Beam

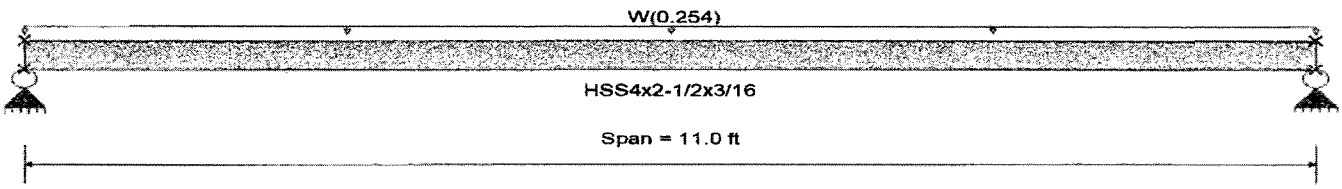
Description : Shade Framing (BMA)

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	46.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight NOT internally calculated and added
Uniform Load : W = 0.2540 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.376** : 1	Maximum Shear Stress Ratio =	**0.042** : 1
Section used for this span	**HSS4x2-1/2x3/16**	Section used for this span	**HSS4x2-1/2x3/16**
Ma : Applied	2.305 k-ft	Va : Applied	0.8382 k
Mn / Omega : Allowable	6.129 k-ft	Vn/Omega : Allowable	20.003 k
Load Combination	+D+0.60W+H	Load Combination	+D+0.60W+H
Location of maximum on span	5.500 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.674 in	Ratio =	195 >=180
Max Upward Transient Deflection	0.674 in	Ratio =	195 >=180
Max Downward Total Deflection	0.404 in	Ratio =	326 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <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 = 11.00 ft	1		0.000				10.24	6.13	1.00	1.00	-0.00	33.41	20.00
+D+L+H													
Dsgn. L = 11.00 ft	1		0.000				10.24	6.13	1.00	1.00	-0.00	33.41	20.00
+D+Lr+H													
Dsgn. L = 11.00 ft	1		0.000				10.24	6.13	1.00	1.00	-0.00	33.41	20.00
+D+S+H													
Dsgn. L = 11.00 ft	1		0.000				10.24	6.13	1.00	1.00	-0.00	33.41	20.00
+D+0.750Lr+0.750L+H													
Dsgn. L = 11.00 ft	1		0.000				10.24	6.13	1.00	1.00	-0.00	33.41	20.00
+D+0.750L+0.750S+H													
Dsgn. L = 11.00 ft	1		0.000				10.24	6.13	1.00	1.00	-0.00	33.41	20.00
+D+0.60W+H													
Dsgn. L = 11.00 ft	1	0.376	0.042	2.31		2.31	10.24	6.13	1.14	1.00	0.84	33.41	20.00
+D+0.70E+H													
Dsgn. L = 11.00 ft	1		0.000				10.24	6.13	1.00	1.00	-0.00	33.41	20.00
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 11.00 ft	1	0.282	0.031	1.73		1.73	10.24	6.13	1.14	1.00	0.63	33.41	20.00
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 11.00 ft	1	0.282	0.031	1.73		1.73	10.24	6.13	1.14	1.00	0.63	33.41	20.00
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 11.00 ft	1		0.000				10.24	6.13	1.00	1.00	-0.00	33.41	20.00
+0.60D+0.60W+0.60H													
Dsgn. L = 11.00 ft	1	0.376	0.042	2.31		2.31	10.24	6.13	1.14	1.00	0.84	33.41	20.00

Steel Beam

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ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10
Lic. # : KW-06009093
Licensee : SCL Consulting

Description : Shade Framing (BMA)

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
+0.60D+0.70E+0.60H													
Dsgn. L = 11.00 ft	1		0.000				10.24	6.13	1.00	1.00	-0.00	33.41	20.00

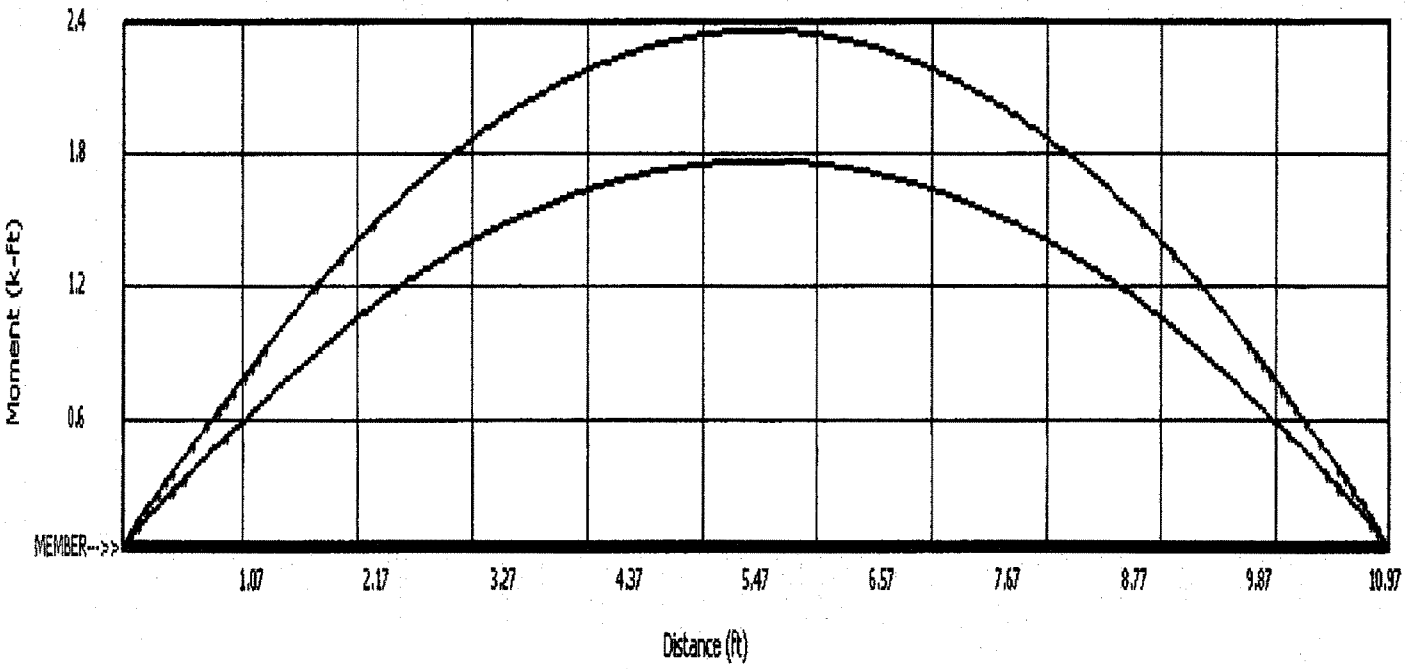
Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
W Only	1	0.6741	5.531		0.0000	0.000

Vertical Reactions

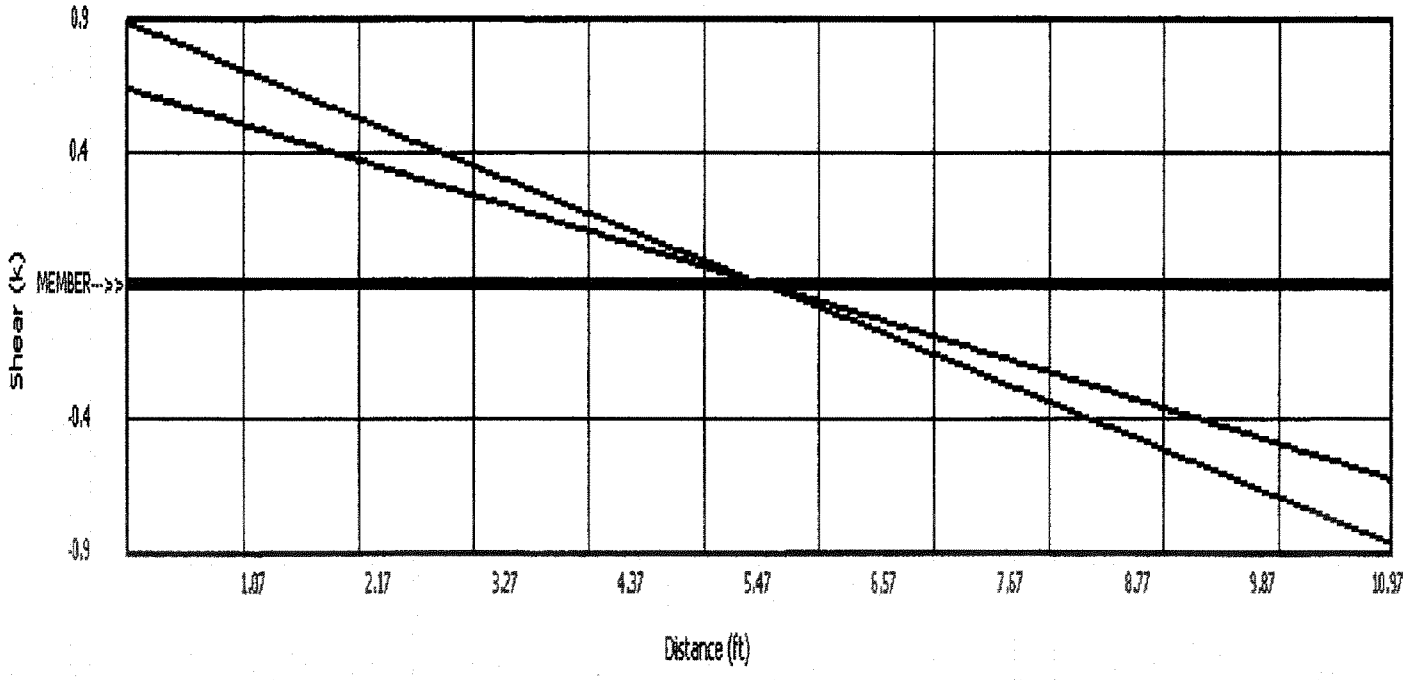
Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.397	1.397
Overall MINimum	0.629	0.629
+D+H		
+D+L+H		
+D+Lr+H		
+D+S+H		
+D+0.750Lr+0.750L+H		
+D+0.750L+0.750S+H		
+D+0.60W+H	0.838	0.838
+D+0.70E+H		
+D+0.750Lr+0.750L+0.450W+H	0.629	0.629
+D+0.750L+0.750S+0.450W+H	0.629	0.629
+D+0.750L+0.750S+0.5250E+H		
+0.60D+0.60W+0.60H	0.838	0.838
+0.60D+0.70E+0.60H		
D Only		
Lr Only		
L Only		
S Only		
W Only	1.397	1.397
E Only		
H Only		

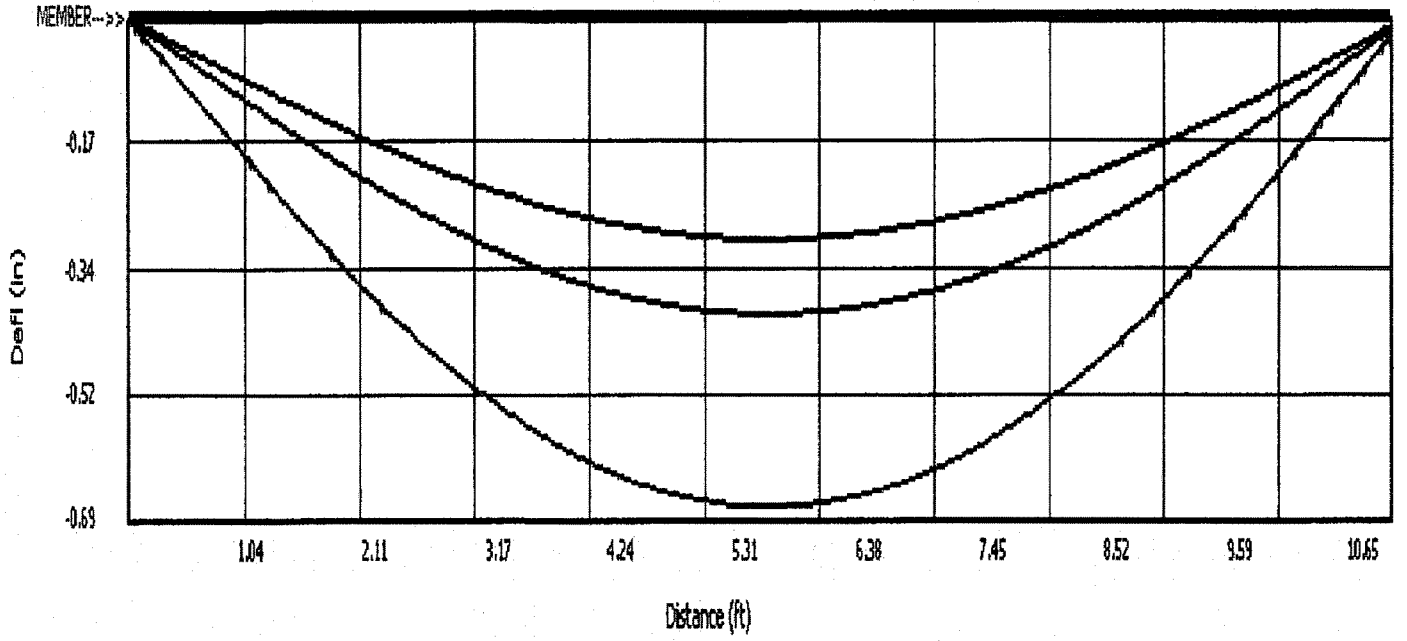


Steel Beam

Description : Shade Framing (BMA)

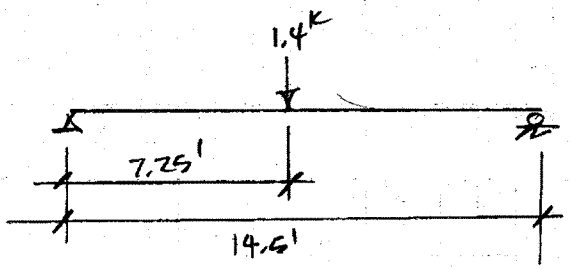


+D+H
+D+L+H
+D+Lr+H
+D+S+H
+D+0.75Lr+0.75L+H
+D+0.75L+0.75S+H
+D+0.6DW+H
+D+0.7DE+H
+D+0.75Lr+0.75L+0.45DW+H
+D+0.75L+0.75S+0.45DW+H
+D+0.75L+0.75S+0.525DE+H
+0.6DD+0.6DW+0.6DH
+0.6DD+0.7DE+0.6DH

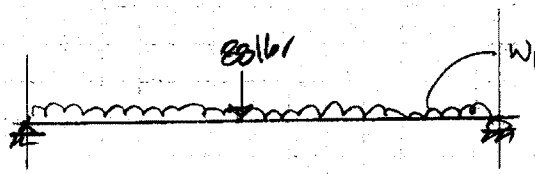


+D+H
+D+L+H
+D+Lr+H
+D+S+H
+D+0.75Lr+0.75L+H
+D+0.75L+0.75S+H
+D+0.6DW+H
+D+0.7DE+H
+D+0.75Lr+0.75L+0.45DW+H
+D+0.75L+0.75S+0.45DW+H
+D+0.75L+0.75S+0.525DE+H
+0.6DD+0.6DW+0.6DH
+0.6DD+0.7DE+0.6DH
D Only
Lr Only
L Only
S Only
W Only
E Only
H Only

DESIGN BMB:



STRONG AXIS



$w_{DL} = 1(11) + 20\,psf, = 31\,plf.$

WEAK AXIS

Title Block Line 1
You can change this area using the "Settings" menu item and then using the "Printing & Title Block" selection.
Title Block Line 6

Project Title: PHX HOMEnz
Engineer: RHG
Project Descr:

Project ID: 5054.18.01

100

Printed: 16 MAR 2018, 2:42PM

Steel Beam

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ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Shade Framing (BMB) Strong Axis

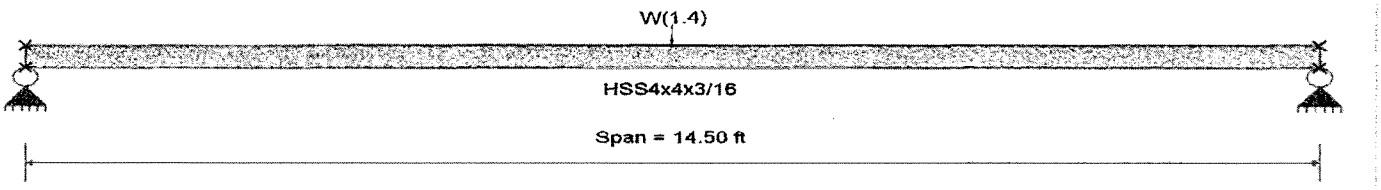
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

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

Fy : Steel Yield : 46.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight NOT internally calculated and added
Load(s) for Span Number 1
Point Load : W = 1.40 k @ 7.250 ft

STRENGTH — WK

$I = 0.361 + 0.145 = 0.51 < 1.0$ OK ✓

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.361 : 1	Maximum Shear Stress Ratio =	0.021 : 1
Section used for this span	HSS4x4x3/16	Section used for this span	HSS4x4x3/16
Ma : Applied	3.045 k-ft	Va : Applied	0.420 k
Mn / Omega : Allowable	8.424 k-ft	Vn/Omega : Allowable	20.003 k
Load Combination	+D+0.60W+H	Load Combination	+D+0.60W+H
Location of maximum on span	7.250ft	Location of maximum on span	7.250 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.853 in	Ratio =	203 >=180
Max Upward Transient Deflection	0.853 in	Ratio =	203 >=180
Max Downward Total Deflection	0.514 in	Ratio =	338 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <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 = 14.50 ft	1		0.000				14.07	8.42	1.00	1.00	-0.00	33.41	20.00
+D+L+H													
Dsgn. L = 14.50 ft	1		0.000				14.07	8.42	1.00	1.00	-0.00	33.41	20.00
+D+Lr+H													
Dsgn. L = 14.50 ft	1		0.000				14.07	8.42	1.00	1.00	-0.00	33.41	20.00
+D+S+H													
Dsgn. L = 14.50 ft	1		0.000				14.07	8.42	1.00	1.00	-0.00	33.41	20.00
+D+0.750Lr+0.750L+H													
Dsgn. L = 14.50 ft	1		0.000				14.07	8.42	1.00	1.00	-0.00	33.41	20.00
+D+0.750L+0.750S+H													
Dsgn. L = 14.50 ft	1		0.000				14.07	8.42	1.00	1.00	-0.00	33.41	20.00
+D+0.60W+H													
Dsgn. L = 14.50 ft	1	0.361	0.021	3.05		3.05	14.07	8.42	1.32	1.00	0.42	33.41	20.00
+D+0.70E+H													
Dsgn. L = 14.50 ft	1		0.000				14.07	8.42	1.00	1.00	-0.00	33.41	20.00
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 14.50 ft	1	0.271	0.016	2.28		2.28	14.07	8.42	1.32	1.00	0.32	33.41	20.00
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 14.50 ft	1	0.271	0.016	2.28		2.28	14.07	8.42	1.32	1.00	0.32	33.41	20.00
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 14.50 ft	1		0.000				14.07	8.42	1.00	1.00	-0.00	33.41	20.00
+0.60D+0.60W+0.60H													

Title Block Line 1
You can change this area using the "Settings" menu item and then using the "Printing & Title Block" selection.
Title Block Line 6

Project Title: PHX HOMEnz
Engineer: RHG
Project Descr:

Project ID: 5054.18.01

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Printed: 16 MAR 2018, 2:42PM

Steel Beam

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ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Shade Framing (BMB) Strong Axis

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 = 14.50 ft +0.60D+0.70E+0.60H	1	0.361	0.021	3.05		3.05	14.07	8.42	1.32	1.00	0.42	33.41	20.00
Dsgn. L = 14.50 ft	1		0.000				14.07	8.42	1.00	1.00	-0.00	33.41	20.00

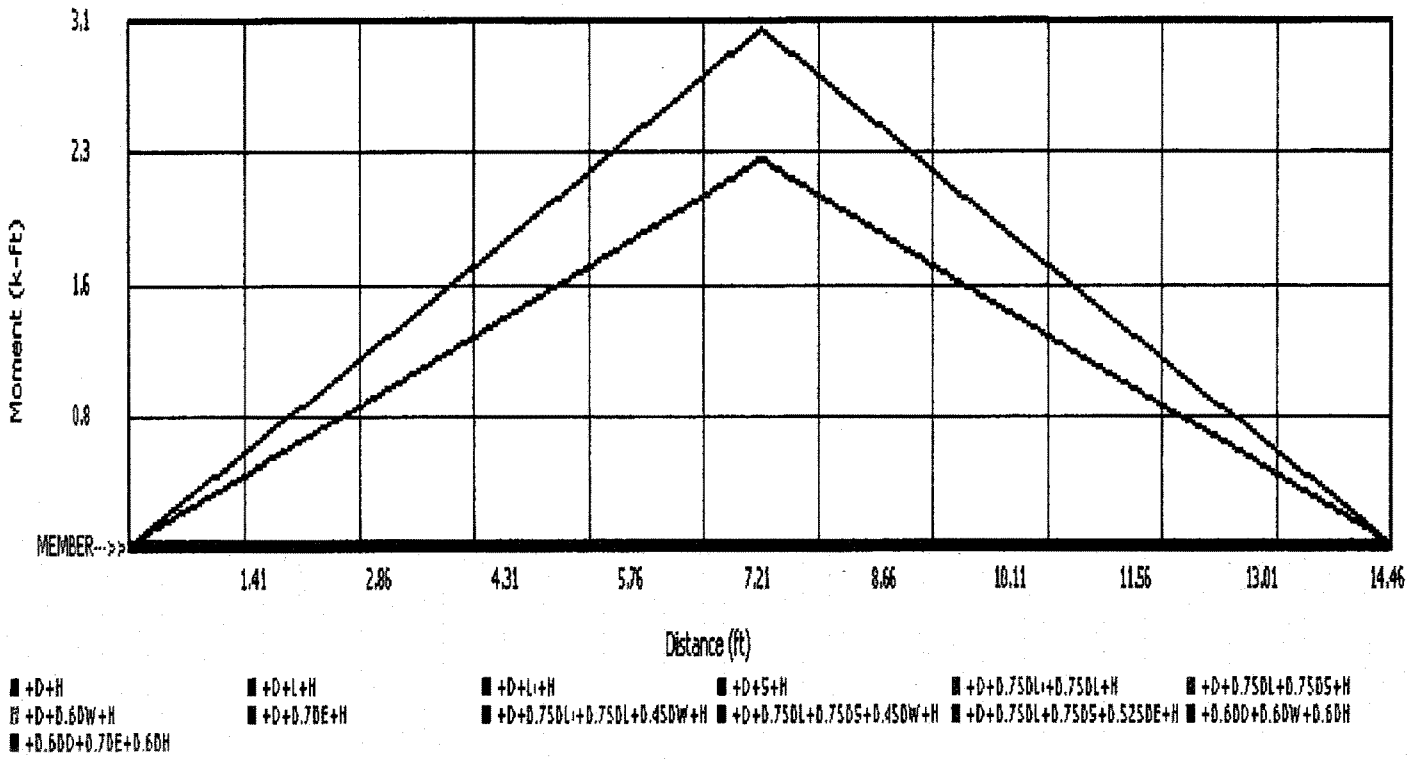
Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
W Only	1	0.8568	7.250		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 — Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.700	0.700
Overall MINimum	0.315	0.315
+D+H		
+D+L+H		
+D+Lr+H		
+D+S+H		
+D+0.750Lr+0.750L+H		
+D+0.750L+0.750S+H		
+D+0.60W+H	0.420	0.420
+D+0.70E+H		
+D+0.750Lr+0.750L+0.450W+H	0.315	0.315
+D+0.750L+0.750S+0.450W+H	0.315	0.315
+D+0.750L+0.750S+0.5250E+H		
+0.60D+0.60W+0.60H	0.420	0.420
+0.60D+0.70E+0.60H		
D Only		
Lr Only		
L Only		
S Only		
W Only	0.700	0.700
E Only		
H Only		



Steel Beam

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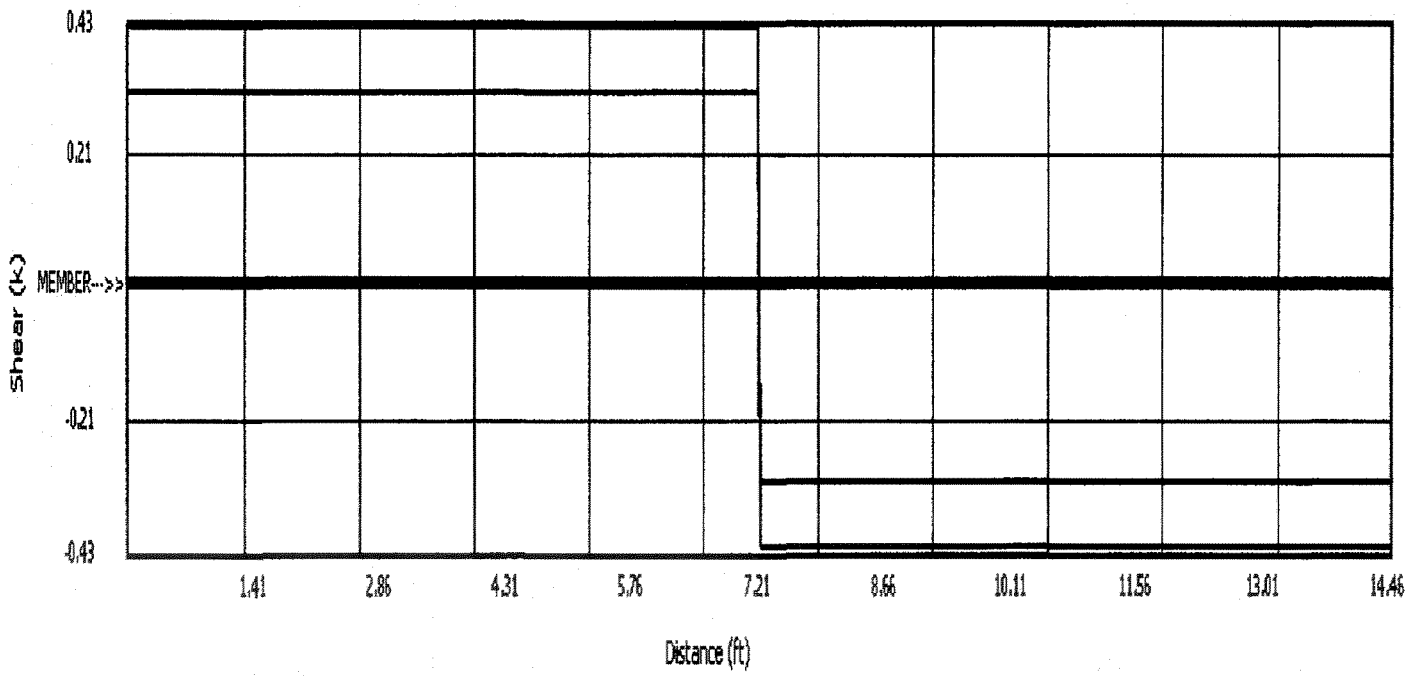
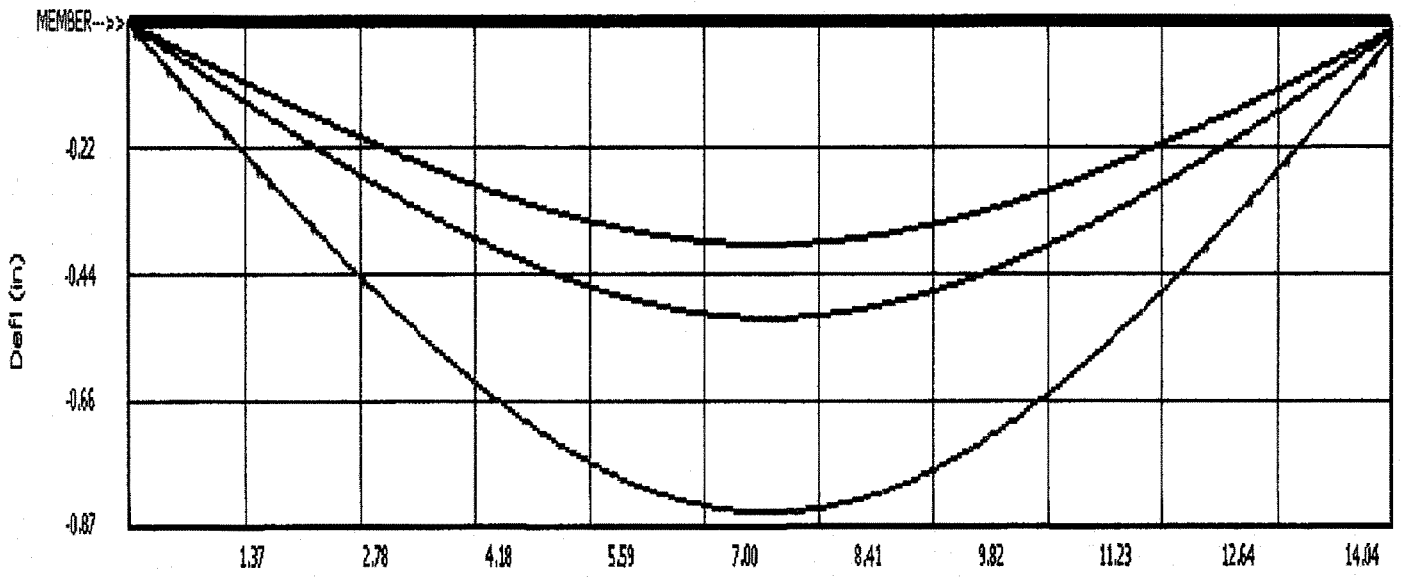
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Shade Framing (BMB) Strong Axis



+D+H
+D+L+H
+D+Lr+H
+D+S+H
+D+0.75DL+0.75DL+H
+D+0.75DL+0.75DS+H
+D+0.6DW+H
+D+0.7DE+H
+D+0.75DL+0.75DL+0.45DW+H
+D+0.75DL+0.75DS+0.45DW+H
+D+0.75DL+0.75DS+0.525DE+H
+0.6DD+0.6DW+0.6DH
+0.6DD+0.7DE+0.6DH



+D+H
+D+L+H
+D+Lr+H
+D+S+H
+D+0.75DL+0.75DL+H
+D+0.75DL+0.75DS+H
+D+0.6DW+H
+D+0.7DE+H
+D+0.75DL+0.75DL+0.45DW+H
+D+0.75DL+0.75DS+0.45DW+H
+D+0.75DL+0.75DS+0.525DE+H
+0.6DD+0.6DW+0.6DH
+0.6DD+0.7DE+0.6DH
D Only
L Only
S Only
W Only
E Only
H Only

Steel Beam

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ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10
Lic. # : KW-06009093 Licensee : SCL Consulting

Description : Shade Framing (BMB) Weak Axis

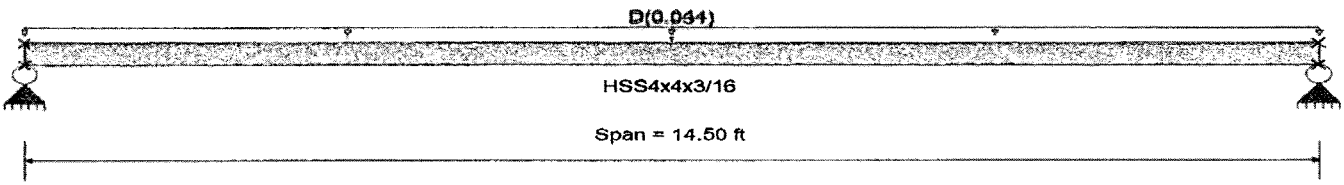
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

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

Fy : Steel Yield : 46.0 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(s) for Span Number 1
Point Load : D = 0.0440 k @ 7.250 ft

Uniform Load : D = 0.0310 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.145 : 1	Maximum Shear Stress Ratio =	0.016 : 1
Section used for this span	HSS4x4x3/16	Section used for this span	HSS4x4x3/16
Ma : Applied	1.221 k-ft	Va : Applied	0.3149 k
Mn / Omega : Allowable	8.424 k-ft	Vn/Omega : Allowable	20.003 k
Load Combination	+D+H	Load Combination	+D+H
Location of maximum on span	7.250ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.000 in	Ratio =	0 <360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.251 in	Ratio =	693 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mny	Mny/Omega	Cb	Rm	Summary of Shear Values Va Max	Vny	Vny/Omega
+D+H													
Dsgn. L = 14.50 ft	1	0.145	0.016	1.22		1.22	14.07	8.42	1.16	1.00	0.31	33.41	20.00
+D+L+H													
Dsgn. L = 14.50 ft	1	0.145	0.016	1.22		1.22	14.07	8.42	1.16	1.00	0.31	33.41	20.00
+D+Lr+H													
Dsgn. L = 14.50 ft	1	0.145	0.016	1.22		1.22	14.07	8.42	1.16	1.00	0.31	33.41	20.00
+D+S+H													
Dsgn. L = 14.50 ft	1	0.145	0.016	1.22		1.22	14.07	8.42	1.16	1.00	0.31	33.41	20.00
+D+0.750Lr+0.750L+H													
Dsgn. L = 14.50 ft	1	0.145	0.016	1.22		1.22	14.07	8.42	1.16	1.00	0.31	33.41	20.00
+D+0.750L+0.750S+H													
Dsgn. L = 14.50 ft	1	0.145	0.016	1.22		1.22	14.07	8.42	1.16	1.00	0.31	33.41	20.00
+D+0.60W+H													
Dsgn. L = 14.50 ft	1	0.145	0.016	1.22		1.22	14.07	8.42	1.16	1.00	0.31	33.41	20.00
+D+0.70E+H													
Dsgn. L = 14.50 ft	1	0.145	0.016	1.22		1.22	14.07	8.42	1.16	1.00	0.31	33.41	20.00
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 14.50 ft	1	0.145	0.016	1.22		1.22	14.07	8.42	1.16	1.00	0.31	33.41	20.00
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 14.50 ft	1	0.145	0.016	1.22		1.22	14.07	8.42	1.16	1.00	0.31	33.41	20.00

Steel Beam

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10
Lic. # : KW-06009093 Licensee : SCL Consulting

Description : Shade Framing (BMB) Weak Axis

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+0.750L+0.750S+0.5250E+H													
Dsgn. L = 14.50 ft	1	0.145	0.016	1.22		1.22	14.07	8.42	1.16	1.00	0.31	33.41	20.00
+0.60D+0.60W+0.60H													
Dsgn. L = 14.50 ft	1	0.087	0.009	0.73		0.73	14.07	8.42	1.16	1.00	0.19	33.41	20.00
+0.60D+0.70E+0.60H													
Dsgn. L = 14.50 ft	1	0.087	0.009	0.73		0.73	14.07	8.42	1.16	1.00	0.19	33.41	20.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
D Only	1	0.2511	7.291		0.0000	0.000

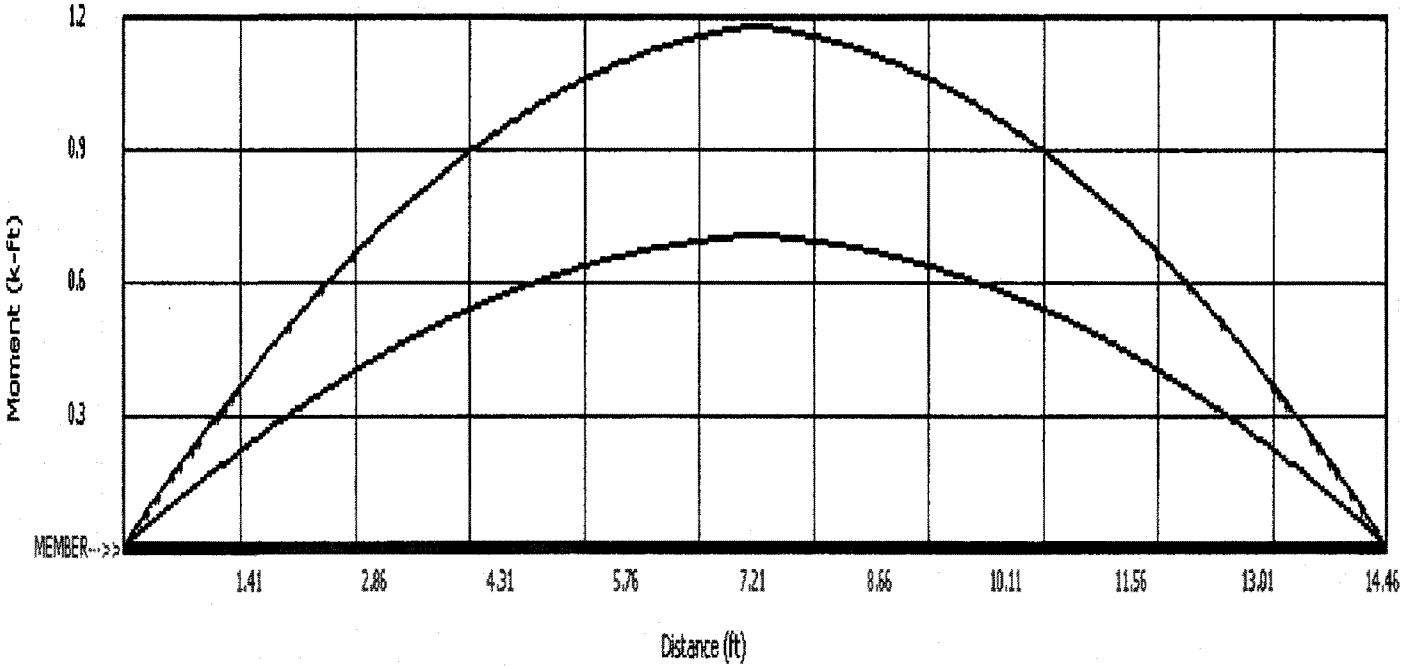
Vertical Reactions

Support notation : Far left is #1 Values in KIPS

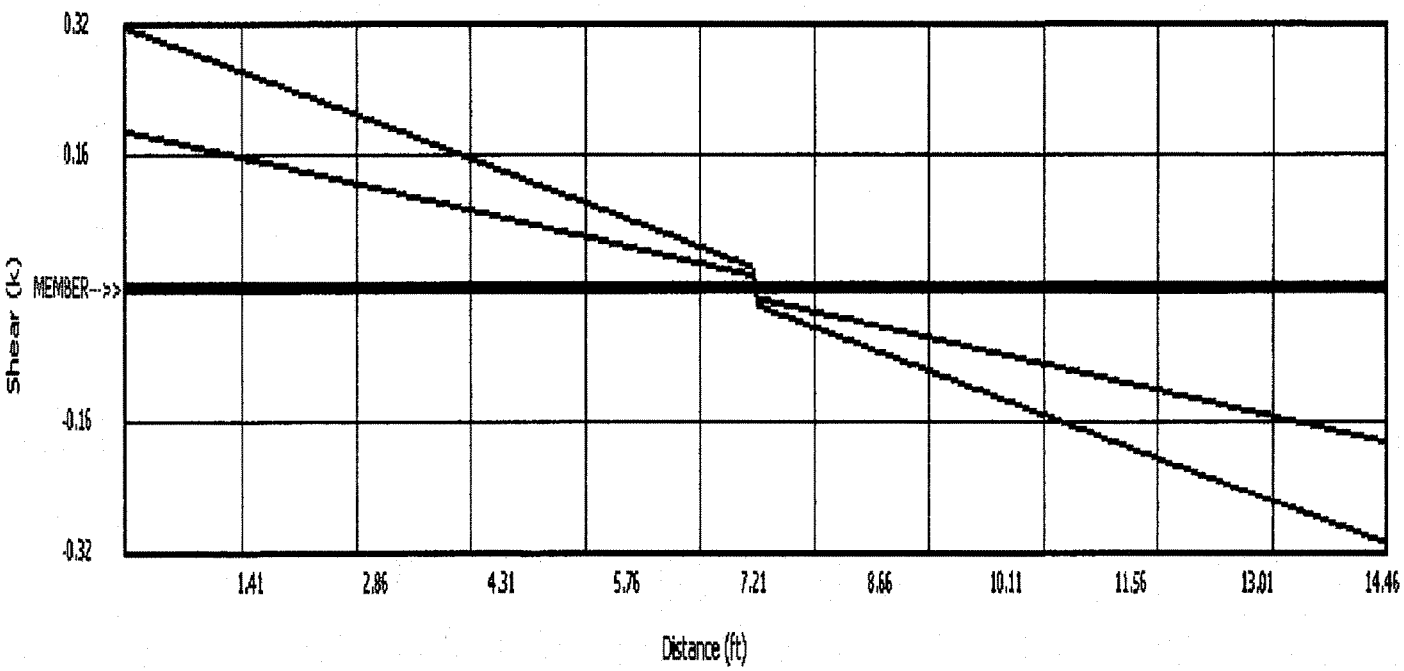
Load Combination	Support 1	Support 2
Overall MAXimum	0.315	0.315
Overall MINimum	0.189	0.189
+D+H	0.315	0.315
+D+L+H	0.315	0.315
+D+Lr+H	0.315	0.315
+D+S+H	0.315	0.315
+D+0.750Lr+0.750L+H	0.315	0.315
+D+0.750L+0.750S+H	0.315	0.315
+D+0.60W+H	0.315	0.315
+D+0.70E+H	0.315	0.315
+D+0.750Lr+0.750L+0.450W+H	0.315	0.315
+D+0.750L+0.750S+0.450W+H	0.315	0.315
+D+0.750L+0.750S+0.5250E+H	0.315	0.315
+0.60D+0.60W+0.60H	0.189	0.189
+0.60D+0.70E+0.60H	0.189	0.189
D Only	0.315	0.315
Lr Only		
L Only		
S Only		
W Only		
E Only		
H Only		

Steel Beam

Description : Shade Framing (BMB) Weak Axis



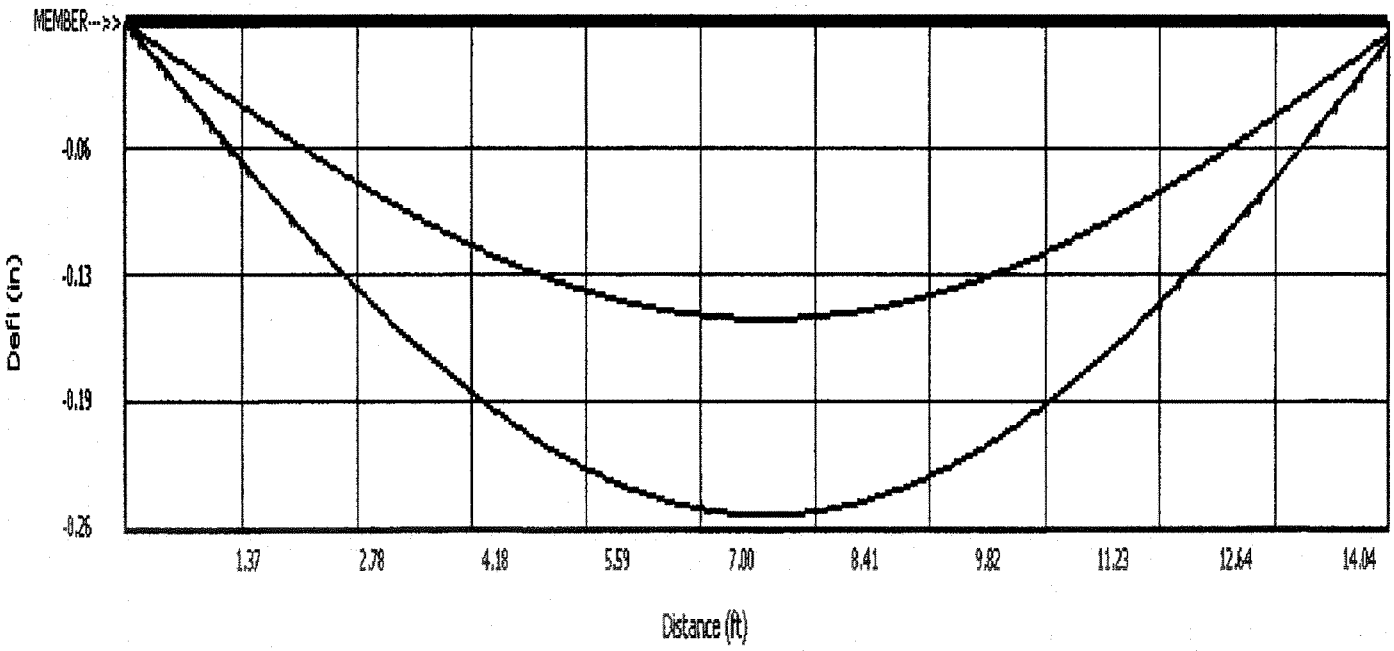
+D+H +D+L+H +D+Lr+H +D+S+H +D+0.75Lr+0.75L+H +D+0.75L+0.75S+H
+D+0.6W+H +D+0.7E+H +D+0.75Lr+0.75L+0.45W+H +D+0.75L+0.75S+0.45W+H +D+0.75L+0.75S+0.525E+H +0.6D+0.6W+0.6H
+0.6D+0.7E+0.6H



+D+H +D+L+H +D+Lr+H +D+S+H +D+0.75Lr+0.75L+H +D+0.75L+0.75S+H
+D+0.6W+H +D+0.7E+H +D+0.75Lr+0.75L+0.45W+H +D+0.75L+0.75S+0.45W+H +D+0.75L+0.75S+0.525E+H +0.6D+0.6W+0.6H
+0.6D+0.7E+0.6H

Steel Beam

Description : Shade Framing (BMB) Weak Axis



+D+H
+D+L+H
+D+Lr+H
+D+S+H
+D+0.75DL+0.75DL+H
+D+0.75DL+0.75DS+H
+D+0.60W+H
+D+0.70E+H
+D+0.75DL+0.75DL+0.45DW+H
+D+0.75DL+0.75DS+0.45DW+H
+D+0.75DL+0.75DS+0.525DE+H
+0.60D+0.60DW+0.60H
+0.60D+0.70E+0.60H
D Only
Lr Only
L Only
S Only
W Only
E Only
H Only

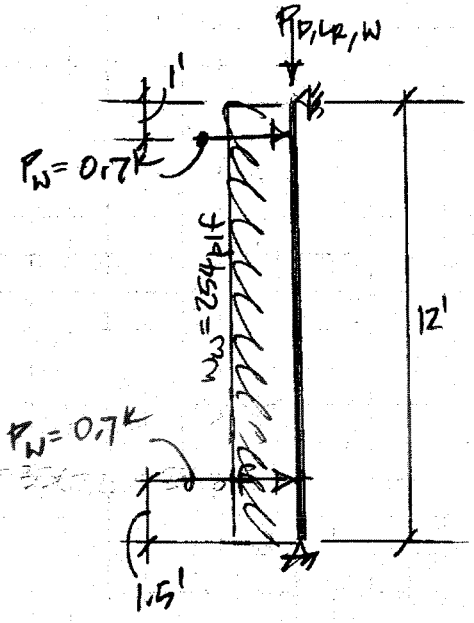
DESIGN COLUMNS AT WIND SCREEN

$P_{DL} = \frac{(237 + 40)}{1000} 14.5 = 4.02^K$ ← BM

ADD SCREEN WT = 4.02 + 2(0.32) = 4.7^K

$P_{RL} = \frac{20(21.5/2)}{1000} 14.5 = 3.12^K$

$P_{RW} = \frac{16(21.5/2)}{1000} 14.5 = 2.5^K$



Steel Column

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Ext. Steel Column Design (Including Wind Screen)

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2018, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name :	**HSS4x4x3/16**
Analysis Method :	Allowable Strength
Steel Stress Grade	
Fy : Steel Yield	46.0 ksi
E : Elastic Bending Modulus	29,000.0 ksi

Overall Column Height 12 ft
Top & Bottom Fixity Top & Bottom Pinned
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for X-X Axis buckling = 12 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for Y-Y Axis buckling = 12 ft, K = 1.0

Applied Loads

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

Column self weight included : 112.837 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 12.0 ft, D = 4.70, LR = 3.20, W = 2.50 k
BENDING LOADS . . .
Lat. Uniform Load creating Mx-x, W = 0.2540 k/ft
Lat. Point Load at 1.50 ft creating Mx-x, W = 0.70 k
Lat. Point Load at 11.0 ft creating Mx-x, W = 0.70 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.4684** : 1
Load Combination +D+0.750Lr+0.750L+0.450W+H
Location of max.above base 5.879 ft
At maximum location values are . . .
Pa : Axial 8.338 k
Pn / Omega : Allowable 39.766 k
Ma-x : Applied 2.452 k-ft
Mn-x / Omega : Allowable 8.424 k-ft
Ma-y : Applied 0.0 k-ft
Mn-y / Omega : Allowable 8.424 k-ft

PASS Maximum Shear Stress Ratio = **0.06758** : 1
Load Combination +D+0.60W+H
Location of max.above base 12.0 ft
At maximum location values are . . .
Va : Applied 1.352 k
Vn / Omega : Allowable 20.003 k

Maximum Load Reactions . .

Top along X-X	0.0 k
Bottom along X-X	0.0 k
Top along Y-Y	2.253 k
Bottom along Y-Y	2.195 k

Maximum Load Deflections . . .

Along Y-Y 0.8157 in at 6.040ft above base
for load combination :W Only

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

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	0.121	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+L+H	0.121	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+Lr+H	0.201	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+S+H	0.121	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750Lr+0.750L+H	0.181	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750L+0.750S+H	0.121	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.60W+H	0.467	PASS	5.88 ft	0.068	PASS	12.00 ft
+D+0.70E+H	0.121	PASS	0.00 ft	0.000	PASS	12.00 ft
+D+0.750Lr+0.750L+0.450W+H	0.468	PASS	5.88 ft	0.051	PASS	12.00 ft
+D+0.750L+0.750S+0.450W+H	0.366	PASS	5.88 ft	0.051	PASS	12.00 ft
+D+0.750L+0.750S+0.5250E+H	0.121	PASS	0.00 ft	0.000	PASS	12.00 ft
+0.60D+0.60W+0.60H	0.443	PASS	5.88 ft	0.068	PASS	12.00 ft
+0.60D+0.70E+0.60H	0.073	PASS	0.00 ft	0.000	PASS	12.00 ft

Steel Column

File = P:\58QER1~X\PWK9FE~B\Calcs\Enercalc\P26ZMD~0.EC6
ENERCALC, INC. 1983-2017, Build:10.17.12.10, Ver:10.17.12.10
Lic. # : KW-06009093 Licensee : SCL Consulting

Description : Ext. Steel Column Design (Including Wind Screen)

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Mx - End Moments @ Base	@ Top	My - End Moments @ Base	@ Top
	k			k		k-ft		k-ft	
+D+H	4.813								
+D+L+H	4.813								
+D+Lr+H	8.013								
+D+S+H	4.813								
+D+0.750Lr+0.750L+H	7.213								
+D+0.750L+0.750S+H	4.813								
+D+0.60W+H	6.313			1.317	1.352				
+D+0.70E+H	4.813								
+D+0.750Lr+0.750L+0.450W+H	8.338			0.988	1.014				
+D+0.750L+0.750S+0.450W+H	5.938			0.988	1.014				
+D+0.750L+0.750S+0.5250E+H	4.813								
+0.60D+0.60W+0.60H	4.388			1.317	1.352				
+0.60D+0.70E+0.60H	2.888								
D Only	4.813								
Lr Only	3.200								
L Only									
S Only									
W Only	2.500			2.195	2.253				
E Only									
H Only									

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Mx - End Moments @ Base	@ Top	My - End Moments @ Base	@ Top
		k			k		k-ft		k-ft	
Axial @ Base	Maximum	8.338			0.988	1.014				
"	Minimum									
Reaction, X-X Axis Base	Maximum	4.813								
"	Minimum	4.813								
Reaction, Y-Y Axis Base	Maximum	2.500			2.195	2.253				
"	Minimum	4.813								
Reaction, X-X Axis Top	Maximum	4.813								
"	Minimum	4.813								
Reaction, Y-Y Axis Top	Maximum	4.813								
"	Minimum	4.813								
Moment, X-X Axis Base	Maximum	4.813								
"	Minimum	4.813								
Moment, Y-Y Axis Base	Maximum	4.813								
"	Minimum	4.813								
Moment, X-X Axis Top	Maximum	4.813								
"	Minimum	4.813								
Moment, Y-Y Axis Top	Maximum	4.813								
"	Minimum	4.813								

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	0.489	in	6.040	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	0.367	in	6.040	ft
+D+0.750L+0.750S+0.450W+H	0.0000	in	0.000	ft	0.367	in	6.040	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	0.489	in	6.040	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

Steel Column

Description : Ext. Steel Column Design (Including Wind Screen)

Maximum Deflections for Load Combinations

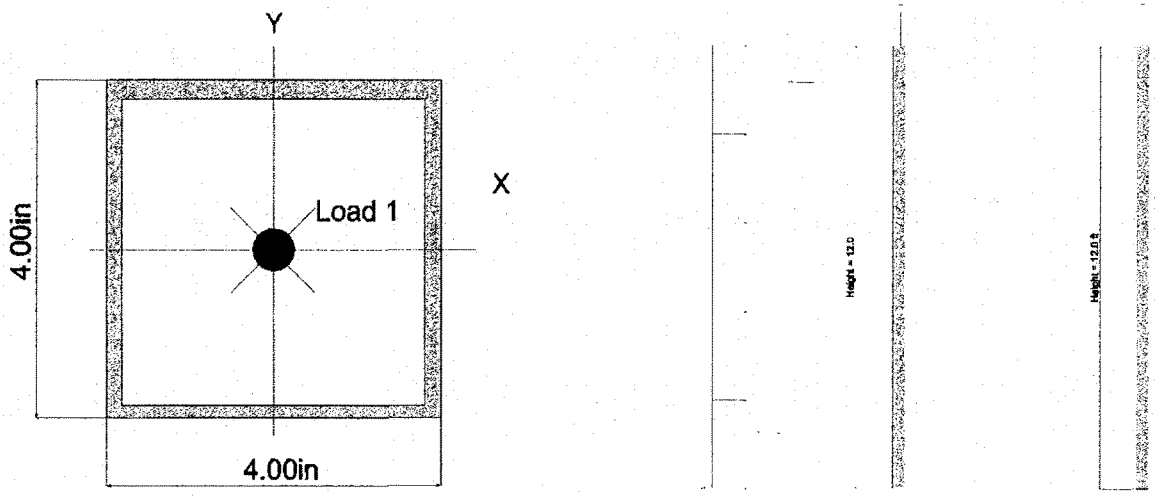
Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
W Only	0.0000	in	0.000	ft	0.816	in	6.040	ft
E Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
H Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

Steel Section Properties : HSS4x4x3/16

Depth	=	4.000 in	I xx	=	6.21 in^4	J	=	10.000 in^4
Design Thick	=	0.174 in	S xx	=	3.10 in^3			
Width	=	4.000 in	R xx	=	1.550 in			
Wall Thick	=	0.187 in	Zx	=	3.670 in^3			
Area	=	2.580 in^2	I yy	=	6.210 in^4	C	=	5.070 in^3
Weight	=	9.403 plf	S yy	=	3.100 in^3			
			R yy	=	1.550 in			

Ycg = 0.000 in

Sketches



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Steel Bar Grating

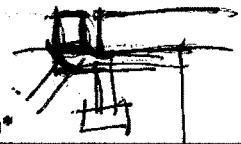
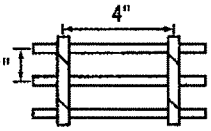
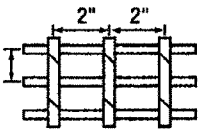
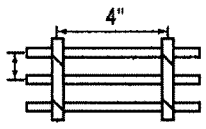
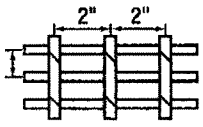
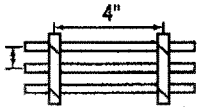
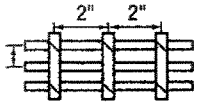
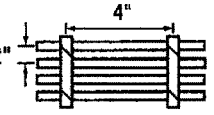
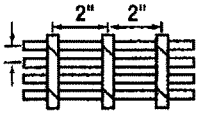
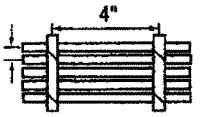
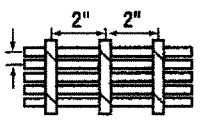


Table of Spacings

Part No.	Spacing	Open Area*	
19-W-4 19-DT-4 19-SL-4		78%	Bearing bars spaced at 1-3/16" on center and cross bars at 4" on center. The workhorse of industrial flooring, popular for platforms, catwalks, mezzanines, and stairways.
19-W-2 19-DT-2 19-SL-2		73%	Bearing bars spaced at 1-3/16" on center and cross bars at 2" on center. Excellent for short spans and applications where small wheeled carts continuously cross the grating surface.
15-W-4 15-DT-4 15-SL-4		75%	Bearing bars spaced at 15/16" on center and cross bars at 4" on center. The closer spaced bearing bars increase load capacity by more than 26% when compared to similar gratings produced with bearing bars at 1-3/16" on center.
15-W-2 15-DT-2 15-SL-2		69%	Bearing bars spaced at 15/16" on center and cross bars at 2" on center. The closer spaced bearing bars and cross bars provide additional flooring surface to support pedestrian and wheeled traffic.
11-W-4 11-DT-4 11-SL-4		68%	Bearing bars spaced at 11/16" on center and cross bars at either 4" or 2" on center. Types 11-4 and 11-2 with 3/16" thick bearing bars comply with the spacing requirements of the Americans with Disabilities Act. For ADA installations, specify that the bearing bars span perpendicular to the normal flow of traffic.
11-W-2 11-DT-2 11-SL-2		63%	
8-W-4 8-DT-4 8-SL-4		58%	Bearing bars spaced at 1/2" on center and cross bars at 4" or 2" on center. Types 8-4 and 8-2 comply with ADA spacing requirements. These products are popular for material handling platforms and mezzanines subject to continuous cart and dolly traffic.
8-W-2 8-DT-2 8-SL-2		54%	
7-W-4 7-DT-4 7-SL-4		53%	Bearing bars spaced at 7/16" on center and cross bars at 4" or 2" on center. Types 7-4 and 7-2 comply with ADA spacing requirements and are popular for applications in the public way. When specified with 3/16" thick bearing bars, 7-4 and 7-2 gratings have a net 1/4" clear opening between the bearing bars and commonly reject intrusion by high heeled shoes.
7-W-2 7-DT-2 7-SL-2		49%	

* Percentage of open area is based upon 3/16" thick bearing bars and .275" cross bars. Contact Grating Pacific if exact open area calculation is required for alternative bearing bar thicknesses or cross bar sizes.

How to Specify Steel Bar Grating

1. Select type of grating
   - "W" for welded steel grating
   - "DT" for dovetail pressure locked grating
   - "SL" for swage locked grating
2. Select bar spacing from table above
3. Select bearing bar size (consult load tables considering service loads and clear spans)
4. Specify plain, serrated, or Algrip surface
5. Specify banding or additional trim required
8. Specify finish
   - Bare steel (no finish)
   - Painted (red, black, silver, other)
   - Hot dip galvanized (per ASTM A-123)
   - Other
7. Specify fasteners (if required)

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Steel Bar Grating

8 Space (1/2") Load Table

Use this table when evaluating spans and loads for the following types of steel grating:

8-W-4, 8-W-2, 8-DT-4, 8-DT-2, 8-SL-4, & 8-SL-2

Bearing Bar Size (inches)	Approx. Weight psf *	Max. Ped. Span**	Sec. Prop.*** Sx in³ / Ix in⁴		Unsupported Span 2'-0	2'-6	3'-0	3'-6	4'-0	4'-6	5'-0	5'-6	6'-0	6'-6	7'-0	8'-0	9'-0
3/4 x 3/16	12.3	4'-9"	0.422 / 0.158	U	1,266	810	563	413	316	250	203	167					
				D	0.099	0.155	0.223	0.304	0.397	0.503	0.621	0.751					
				C	1,266	1,013	844	723	633	563	506	460					
				D	0.079	0.124	0.179	0.243	0.318	0.402	0.497	0.601					
1 x 1/8	11.0	5'-3"	0.500 / 0.250	U	1,500	960	667	490	375	296	240	198	167				
				D	0.074	0.116	0.166	0.226	0.298	0.377	0.466	0.563	0.670				
				C	1,500	1,200	1,000	857	750	667	600	546	500				
				D	0.060	0.093	0.134	0.182	0.238	0.302	0.372	0.451	0.536				
1 x 3/16	16.2	5'-10"	0.750 / 0.375	U	2,250	1,440	1,000	735	563	444	360	298	250	213			
				D	0.074	0.116	0.166	0.226	0.298	0.377	0.466	0.563	0.670	0.787			
				C	2,250	1,800	1,500	1,286	1,125	1,000	900	818	750	692			
				D	0.060	0.093	0.134	0.182	0.238	0.302	0.372	0.451	0.536	0.629			
1-1/4 x 1/8	13.6	6'-3"	0.781 / 0.488	U	2,344	1,500	1,042	765	586	463	375	310	260	222	191		
				D	0.060	0.093	0.134	0.182	0.239	0.302	0.372	0.451	0.536	0.629	0.730		
				C	2,344	1,875	1,563	1,339	1,172	1,042	938	852	781	721	670		
				D	0.048	0.074	0.107	0.146	0.191	0.241	0.298	0.360	0.429	0.504	0.584		
1-1/4 x 3/16	20.0	6'-11"	1.172 / 0.732	U	3,516	2,250	1,563	1,148	879	694	563	465	391	333	287	220	
				D	0.060	0.093	0.134	0.182	0.238	0.302	0.372	0.451	0.536	0.629	0.730	0.953	
				C	3,516	2,813	2,344	2,009	1,758	1,563	1,406	1,278	1,172	1,082	1,005	879	
				D	0.048	0.074	0.107	0.146	0.191	0.241	0.298	0.360	0.429	0.504	0.584	0.763	
1-1/2 x 1/8	16.2	7'-2"	1.125 / 0.844	U	3,375	2,160	1,500	1,102	844	667	540	446	375	320	276	211	
				D	0.050	0.078	0.112	0.152	0.199	0.251	0.310	0.376	0.447	0.524	0.608	0.794	
				C	3,375	2,700	2,250	1,929	1,688	1,500	1,350	1,227	1,125	1,039	964	844	
				D	0.040	0.062	0.089	0.122	0.159	0.201	0.248	0.300	0.358	0.420	0.487	0.636	
1-1/2 x 3/16	24.0	7'-11"	1.688 / 1.266	U	5,063	3,240	2,250	1,653	1,266	1,000	810	669	563	479	413	316	250
				D	0.050	0.078	0.112	0.152	0.199	0.251	0.310	0.376	0.447	0.524	0.608	0.794	1.006
				C	5,063	4,050	3,375	2,893	2,531	2,250	2,025	1,841	1,688	1,558	1,446	1,266	1,125
				D	0.040	0.062	0.089	0.122	0.159	0.201	0.248	0.300	0.358	0.420	0.487	0.636	0.804
1-3/4 x 1/8	18.9	8'-1"	1.531 / 1.340	U	4,594	2,940	2,042	1,500	1,148	907	735	607	510	435	375	287	227
				D	0.043	0.067	0.096	0.130	0.170	0.215	0.266	0.322	0.383	0.450	0.521	0.681	0.862
				C	4,594	3,675	3,063	2,625	2,297	2,042	1,838	1,671	1,531	1,414	1,313	1,148	1,021
				D	0.034	0.053	0.077	0.104	0.136	0.172	0.213	0.257	0.306	0.360	0.417	0.545	0.689
→ 1-3/4 x 3/16	27.9	8'-11"	2.297 / 2.010	U	6,891	4,410	3,063	2,250	1,723	1,361	1,103	911	766	652	563	431	340
				D	0.043	0.067	0.096	0.130	0.170	0.215	0.266	0.322	0.383	0.450	0.521	0.681	0.862
				C	6,891	5,513	4,594	3,938	3,445	3,063	2,756	2,506	2,297	2,120	1,969	1,723	1,531
				D	0.034	0.053	0.077	0.104	0.136	0.172	0.213	0.257	0.306	0.360	0.417	0.545	0.689
2 x 1/8	21.5	8'-11"	2.000 / 2.000	U	6,000	3,840	2,667	1,959	1,500	1,185	960	793	667	568	490	375	296
				D	0.037	0.058	0.084	0.114	0.149	0.189	0.233	0.282	0.335	0.393	0.456	0.596	0.754
				C	6,000	4,800	4,000	3,429	3,000	2,667	2,400	2,182	2,000	1,846	1,714	1,500	1,333
				D	0.030	0.047	0.067	0.091	0.119	0.151	0.186	0.225	0.268	0.315	0.365	0.477	0.603
2 x 3/16	31.8	9'-11"	3.000 / 3.000	U	9,000	5,760	4,000	2,939	2,250	1,778	1,440	1,190	1,000	852	735	563	444
				D	0.037	0.058	0.084	0.114	0.149	0.189	0.233	0.282	0.335	0.393	0.456	0.596	0.754
				C	9,000	7,200	6,000	5,143	4,500	4,000	3,600	3,273	3,000	2,769	2,571	2,250	2,000
				D	0.030	0.047	0.067	0.091	0.119	0.151	0.186	0.225	0.268	0.315	0.365	0.477	0.603
2-1/4 x 3/16	35.7	10'-10"	3.797 / 4.271	U	11,391	7,290	5,063	3,719	2,848	2,250	1,823	1,506	1,266	1,078	930	712	563
				D	0.033	0.052	0.074	0.101	0.132	0.168	0.207	0.250	0.298	0.350	0.406	0.530	0.670
				C	11,391	9,113	7,594	6,509	5,695	5,063	4,556	4,142	3,797	3,505	3,255	2,848	2,531
				D	0.026	0.041	0.060	0.081	0.106	0.134	0.166	0.200	0.236	0.280	0.324	0.424	0.536
2-1/2 x 3/16	39.6	11'-8"	4.688 / 5.859	U	14,063	9,000	6,250	4,592	3,516	2,778	2,250	1,860	1,563	1,331	1,148	879	694
				D	0.030	0.047	0.067	0.091	0.119	0.151	0.186	0.225	0.268	0.315	0.365	0.477	0.603
				C	14,063	11,250	9,375	8,036	7,031	6,250	5,625	5,114	4,688	4,327	4,018	3,516	3,125
				D	0.024	0.037	0.054	0.073	0.095	0.121	0.149	0.180	0.215	0.252	0.292	0.381	0.483

All loads and deflections are theoretical and based upon the gross sections of the bearing bars, using a fiber stress of 18,000 psi.

The values are not intended to be absolute since the actual load capacity will be affected by the slight variations in mill and manufacturing tolerances.

Grating for spans to the left of the heavy line have a deflection ≤ 1/4" for uniform loads of 100 psf.

U = uniform load in pounds/sq. ft.
C = concentrated load pounds/ft. of grating width
D = deflection in inches

* Weight per square foot based upon 8-W-4 grating. Add .60 psf for 2" on center cross bars. ** Maximum pedestrian load is defined as a 100# uniform load with deflection ≤ 1/4 inch. (The 1/4" maximum deflection criteria is considered consistent with pedestrian comfort, but may be exceeded for other loading conditions at the discretion of the specifying authority.) *** Section properties per foot of width.

Welded grating types 8-W-4 and 8-W-2 are available in bearing bar depths from 3/4" to 1-1/2".

Note: When gratings with serrated surface are specified, the depth of the grating required for a specific load will be 1/4" greater than that shown in these tables.

Panel Widths

Grating panels are available from stock in nominal 24" and 36" widths. When considering alternative widths, consult this table to select widths that will maintain uniform "out-to-out" spacing of the bearing bars. Specified widths deviating from this table will be fabricated to size with side banding and the bar spacing on one side of the finished panel will vary from the spacing throughout the remainder of the panel.

Number of Bearing Bars	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Panel Width	11/16"	1-3/16"	1-11/16"	2-3/16"	2-11/16"	3-3/16"	3-11/16"	4-3/16"	4-11/16"	5-3/16"	5-11/16"	6-3/16"	6-11/16"	7-3/16"	7-11/16"
Number of Bearing Bars	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Panel Width	8-3/16"	8-11/16"	9-3/16"	9-11/16"	10-3/16"	10-11/16"	11-3/16"	11-11/16"	12-3/16"	12-11/16"	13-3/16"	13-11/16"	14-3/16"	14-11/16"	15-3/16"
Number of Bearing Bars	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Panel Width	15-11/16"	16-3/16"	16-11/16"	17-3/16"	17-11/16"	18-3/16"	18-11/16"	19-3/16"	19-11/16"	20-3/16"	20-11/16"	21-3/16"	21-11/16"	22-3/16"	22-11/16"
Number of Bearing Bars	47	48	49	50	51	52	53	54	55	58	57	58	59	60	61
Panel Width	23-3/16"	23-11/16"	24-3/16"	24-11/16"	25-3/16"	25-11/16"	26-3/16"	26-11/16"	27-3/16"	27-11/16"	28-3/16"	28-11/16"	29-3/16"	29-11/16"	30-3/16"
Number of Bearing Bars	62	63	64	65	66	67	68	69	70	71	72				
Panel Width	30-11/16"	31-3/16"	31-11/16"	32-3/16"	32-11/16"	33-3/16"	33-11/16"	34-3/16"	34-11/16"	35-3/16"	35-11/16"				

Panel widths indicated are for gratings with 3/16" thick bearing bars. For 1/8" thick bearing bars deduct 1/16" from the stated values.

Indicates stock panel widths.

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H/TSP

SIMPSON Strong-Tie®

Seismic and Hurricane Ties

Simpson Strong-Tie® hurricane ties provide a positive connection between truss/rafter and the wall of the structure to resist wind and seismic forces.

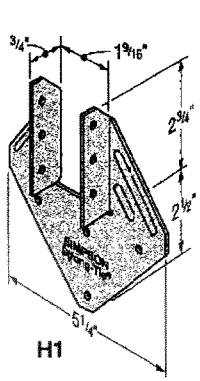
Material: See table

Finish: Galvanized. H7Z and H11Z — ZMAX® coating. Some models available in stainless steel or ZMAX; see Corrosion Information, pp. 15–18 or visit **strongtie.com**.

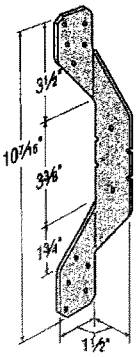
Installation:

- Use all specified fasteners; see General Notes.
- H1 can be installed with flanges facing inward (reverse of H1 installation drawing; number 1).
- H2.5T, H3 and H6 ties are shipped in equal quantities of right and left versions (right versions shown).
- Hurricane ties do not replace solid blocking.
- When installing ties on plated trusses (on the side opposite the truss plate) do not fasten through the truss plate from behind. This can force the truss plate off of the truss and compromise truss performance.
- H10A optional nailing to connect shear blocking, use 8d nails. Slots allow maximum field bending up to a pitch of 6:12, use H10A sloped loads for field bent installation.

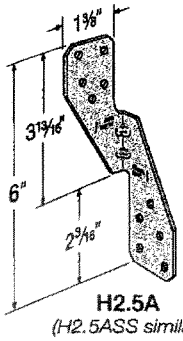
Codes: See p. 14 for Code Reference Key Chart



H1



H2A
(H2ASS similar)



H2.5A
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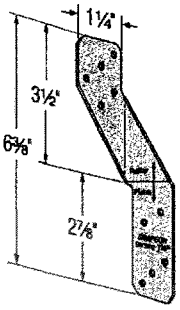
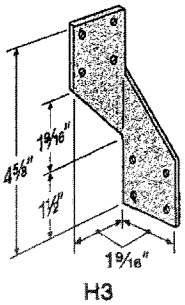
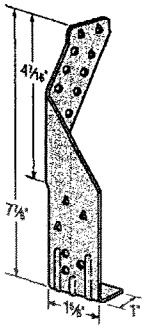


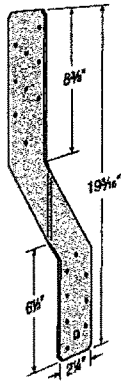
H2.5T



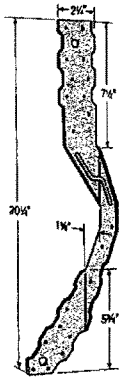
H3



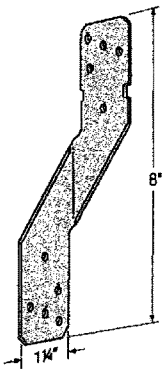
TSP



H6



H7Z



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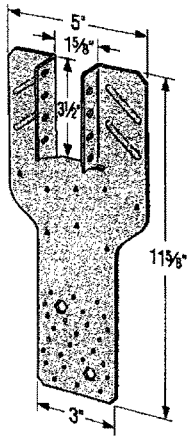
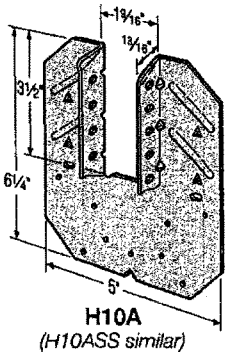
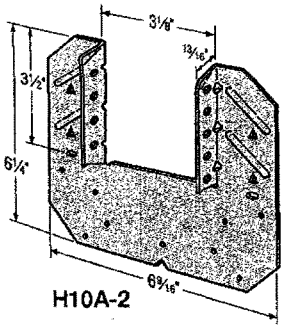


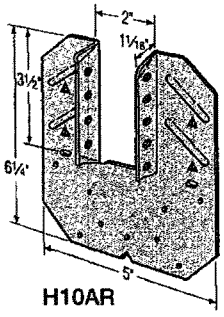
H10S



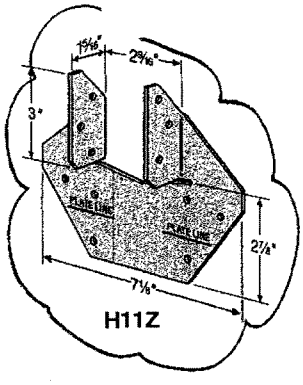
H10A
(H10ASS similar)



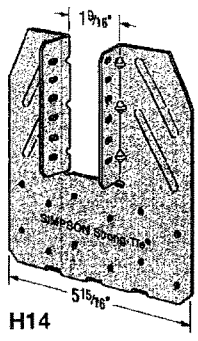
H10A-2



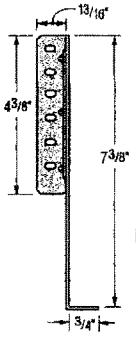
H10AR



H11Z



H14



H14 Profile

H/TSP

Seismic and Hurricane Ties (cont.)

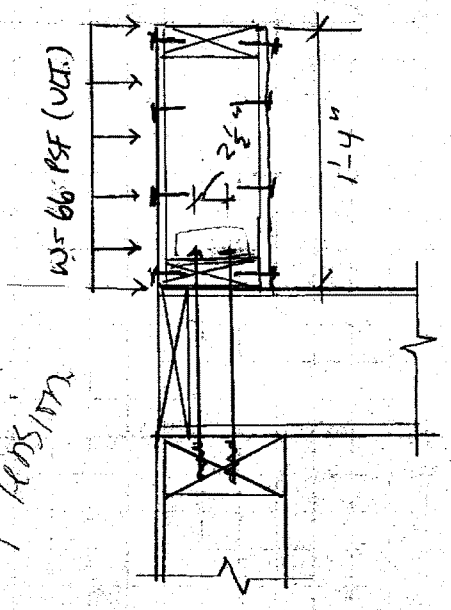
These products are available with additional corrosion protection. For more information, see p. 18.

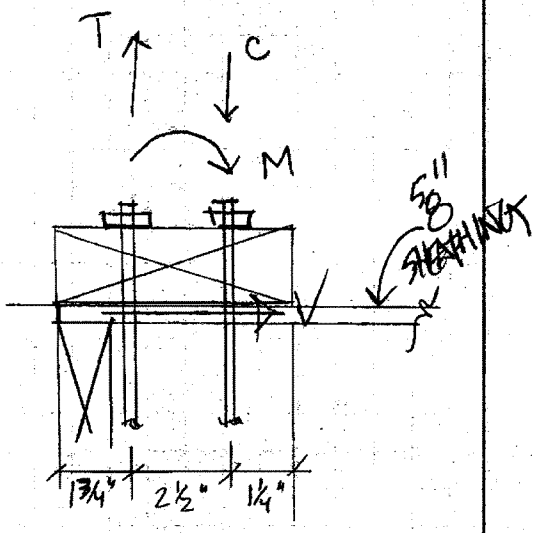
These products are approved for installation with the Strong-Drive® SD Connector screw. See pp. 39–40 for more information.

Model No.	Ga.	Fasteners			DF/SP Allowable Loads			Uplift with 8d x 1½" Nails (160)	SPF/HF Allowable Loads			Uplift with 8d x 1½" Nails (160)	Code Ref.
		To Rafters/ Truss	To Plates	To Studs	Uplift (160)	Lateral (160) F_1	Lateral (160) F_2		Uplift (160)	Lateral (160) F_1	Lateral (160) F_2		
H1	18	(6) 8d x 1½"	(4) 8d	—	585	485	165	455	400	415	140	370	I17, L5, L6, FL
H2A	18	(5) 8d x 1½"	(2) 8d x 1½"	(5) 8d x 1½"	575	130	55	—	495	130	55	—	IP1, L18, FL
H2ASS	18	(5) SS8D	(2) SS8D	(5) SS8D	400	130	55	400	345	130	55	345	170
H2.5A	18	(5) 8d	(5) 8d	—	600	110	110	575	535	110	110	495	I17, L5, L6, FL
H2.5ASS	18	(5) SS8D	(5) SS8D	—	440	75	70	365	380	75	70	310	170
H2.5T	18	(5) 8d	(5) 8d	—	545	135	145	425	545	135	145	425	IP1, L18, FL
H3	18	(4) 8d	(4) 8d	—	455	125	160	415	320	105	140	290	I17, L6, FL
H6	16	—	(8) 8d	(8) 8d	950	—	—	—	820	—	—	—	I17, FL
H7Z	16	(4) 8d	(2) 8d x 1½"	(8) 8d	985	400	—	—	845	345	—	—	
H8	18	(5) 10d x 1½"	(5) 10d x 1½"	—	795	95	90	630	565	95	90	510	L5, L10, L18, FL
H10A Sloped	18	(9) 10d x 1½"	(9) 10d x 1½"	—	855	590	285	—	760	505	285	—	I17, L5, L18, FL
H10A	18	(9) 10d x 1½"	(9) 10d x 1½"	—	1,140[7]	590	285	—	1,015	505	285	—	
H10ASS	18	(9) SSN10	(9) SSN10	—	970	565	170	—	835	485	170	—	170
H10AR	18	(9) 10d x 1½"	(9) 10d x 1½"	—	1,050	490	285	—	905	420	285	—	
H10S[9,10]	18	(8) 8d x 1½"	(8) 8d x 1½"[10]	(8) 8d	1,010	660	215	550	870	570	185	475	IP1, L18, FL
H10A-2	18	(9) 10d x 1½"	(9) 10d x 1½"	—	1,245	815	260	—	1,070	700	225	—	L18, FL
H11Z	18	(6) 16d x 2½"	(6) 16d x 2½"	—	830	525	760	—	715	450	655	—	170
H14	18	1 (12) 8d x 1½"	(13) 8d	—	1,350[7]	725	285	—	1,050	480	245	—	IP1, L18, FL
		2 (12) 8d x 1½"	(15) 8d	—	1,465	670	230	—	1,050	480	245	—	
TSP	16	(9) 10d x 1½"	(6) 10d x 1½"	—	740	310	190	—	635	265	160	—	FL
		(9) 10d x 1½"	(6) 10d	—	890	310	190	—	765	265	160	—	

1. Loads have been increased for wind or earthquake loading with no further increase allowed; reduce where other loads govern.
2. Allowable loads are for one anchor. A minimum rafter thickness of 2½" must be used when framing anchors are used on each side of the joist and on the same side of the plate (exeption: connectors installed such that nails on opposite side don't interfere).
3. Allowable DF/SP uplift load for stud to bottom plate installation (see detail 15) is 390 lb. (H2.5A); 265 lb. (H2.5ASS); and 310 lb. (H8). For SPF/HF values multiply these values by 0.86.
4. Allowable loads in the F_1 direction are not intended to replace diaphragm boundary members or cross-grain bending of the truss or rafter members.
5. When cross-grain bending or cross-grain tension cannot be avoided in the members, mechanical reinforcement to resist such forces may be considered.
6. Hurricane Ties are shown on the outside of the wall for clarity and assume a minimum overhang of 3½". Installation on the inside of the wall is acceptable (see General Instructions for the Installer notes s on p. 21). For uplift continuous load path, connections in the same area (i.e. truss to plate connector and plate to stud connector) must be on the same side of the wall. See technical bulletin T-C-HTIECONPATH at **strongtie.com** for more information.
7. Southern Pine allowable uplift loads for H10A = 1,340 lb. and for the H14 = 1,465 lb.
8. Refer to Simpson Strong-Tie® technical bulletin T-C-HTIEBEARING at **strongtie.com** for allowable bearing enhancement loads.
9. H10S can have the stud offset a maximum of 1" from rafter (center to center) for a reduced uplift of 890 lb. (DF/SP) and 765 lb. (SPF).
10. H10S nails to plates are optional for uplift but required for lateral loads.
11. Some load values for the stainless-steel connectors shown here are lower than those for the carbon-steel versions. Ongoing test programs have shown this to also be the case with other stainless-steel connectors in the product line that are installed with nails. Visit **strongtie.com/corrosion** for updated information.
12. The allowable loads of stainless-steel connectors match carbon-steel connectors when installed with Simpson Strong-Tie® stainless-steel, SCNR ring-shank nails. For more information, refer to engineering letter L-F-SSNAILS at **strongtie.com**.
13. Allowable DF/SP/SPF uplift load for the H2.5A fastened to a 2x4 truss bottom chord and double top plates using (5) 8d x 1½" nails into the top plates and (3) 8d x 1½" nails into the lowest three flange holes into the truss bottom chord is 260 lb. (160).
14. **Nails:** 16d x 2½" = 0.162" dia. x 2½" long, 10d = 0.148" dia. x 3" long, 10d x 1½" = 0.148" dia. x 1½" long, 8d = 0.131" dia. x 2½" long, 8d x 1½" = 0.131" dia. x 1½" long. See pp. 26–27 for other nail sizes and information.
15. **Screws:** Strong-Drive® SD #9 x 1½" (model SD9112) = 0.131" dia. x 1½" long (for the models marked with the orange flag only). Full table loads apply.

PARAPET DESIGN:





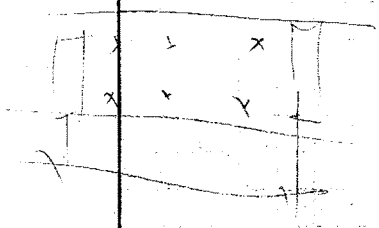
(ANCHORS AT 12" O.C.)

DESIGN PULLOUT FORCE:

$M = (66\ PSF)(1.33\ ft) = 87.8\ lb\text{-}ft/ft$

$\text{PULLOUT (T)} = \frac{0.6(87.8\ lb\text{-}ft)(12)}{2.5\ in} = 253.0\ lb$

$V = (66\ PSF)(1.33)(1\ ft) = 88\ lb$ ULT



#14 PBS SCREWS ⇒ $T_{ALL} = 172(1.6)(2\ in) = 550.4\ lb$

$V_{ALL} = 630\ lb$

$T = 253\ lb < 550.4\ lb$ } ok ✓
$V = 88\ lb < 630\ lb$ ULT

∴ PROVIDE (2) #14 PBS SCREWS AT 12" O.C. W/ MINIMUM 2" PENETRATION.

- CONNECT STUD TO PLATE W/ SIMPSON RSP4 STUD TIE EACH SIDE

UPLIFT = 285 lb > 253 lb

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Table 11.2B Cut Thread or Rolled Thread Wood Screw Reference Withdrawal Design Values, W[1]

Tabulated withdrawal design values, W, are in pounds per inch of thread penetration into side grain of wood member (see 11.2.2.1).

Specific Gravity, G[2]	Wood Screw Number										
	6	7	8	9	10	12	14	16	18	20	24
0.73	209	229	249	268	288	327	367	406	446	485	564
0.71	198	216	235	254	272	310	347	384	421	459	533
0.68	181	199	216	233	250	284	318	352	387	421	489
0.67	176	193	209	226	243	276	309	342	375	409	475
0.58	132	144	157	169	182	207	232	256	281	306	356
0.55	119	130	141	152	163	186	208	231	253	275	320
0.51	102	112	121	131	141	160	179	198	217	237	275
→ 0.50	98	107	117	126	135	154	172	191	209	228	264
0.49	94	103	112	121	130	147	165	183	201	219	254
0.47	87	95	103	111	119	136	152	168	185	201	234
0.46	83	91	99	107	114	130	146	161	177	193	224
0.44	76	83	90	97	105	119	133	148	162	176	205
0.43	73	79	86	93	100	114	127	141	155	168	196
0.42	69	76	82	89	95	108	121	134	147	161	187
0.41	66	72	78	85	91	103	116	128	141	153	178
0.40	63	69	75	81	86	98	110	122	134	146	169
0.39	60	65	71	77	82	93	105	116	127	138	161
0.38	57	62	67	73	78	89	99	110	121	131	153
0.37	54	59	64	69	74	84	94	104	114	125	145
0.36	51	56	60	65	70	80	89	99	108	118	137
0.35	48	53	57	62	66	75	84	93	102	111	130
0.31	38	41	45	48	52	59	66	73	80	87	102

1. Tabulated withdrawal design values, W, for wood screw connections shall be multiplied by all applicable adjustment factors (see Table 10.3.1).
2. Specific gravity, G, shall be determined in accordance with Table 11.3.3A.

Screw Fastener Capacities in OSB

In order to finish a project that utilizes Premier Panels for the walls and roof of the structure, many types of materials need to be fastened to the panels. These materials can include, siding, roofing materials, other structural elements, cabinets, and a host of other items.

In many of these applications screws are the preferred fasteners. Data on the pullout and lateral withdrawal capacities of screws into OSB have not been readily accessible. To help clarify the performance of screws installed in OSB, a major manufacturer of OSB, took it upon itself to generate data on various screws installed in OSB. The OSB was exposed to three different environments. Fifteen repetitions of both direct and lateral withdrawal of each screw type, in each of the three environmental conditions were conducted. The following tables summarize the lowest, ultimate average, value achieved for a particular screw type when installed in three different thicknesses of OSB.

Average Direct Withdrawl (Pullout) - lbs.

Screw Size	7/16" OSB	5/8" OSB	3/4" OSB
#6 Deck Screw	177	272	324
#8 Deck Screw	182	309	359
#10 Deck Screw	198	355	363
#12 Roofing Screw	190	312	360
#14 Roofing Screw	177	340	393

These values are ultimate values. Appropriate safety factors should be applied to obtain design values.

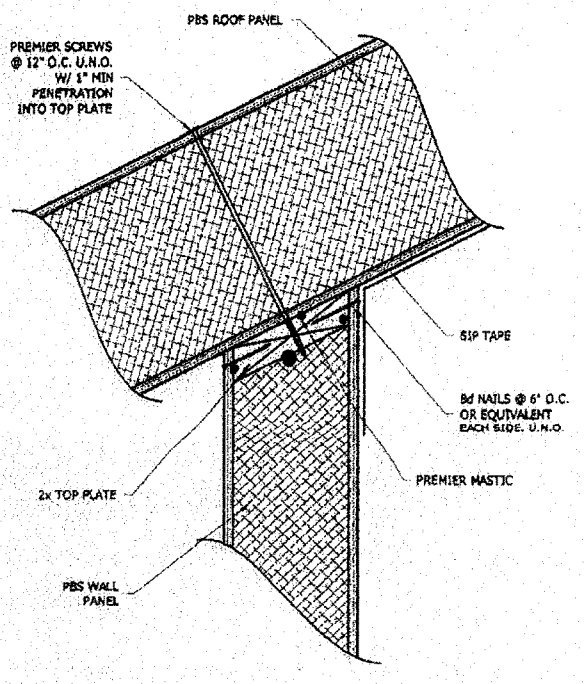
Average Lateral Withdrawl (Shear) - lbs.

Screw Size	7/16" OSB	5/8" OSB	3/4" OSB
#6 Deck Screw	198	273	295
#8 Deck Screw	118	197	224
#10 Deck Screw	143	260	301
#12 Roofing Screw	436	581	561
#14 Roofing Screw	466	630	797

These values are ultimate values. Appropriate safety factors should be applied to obtain design values.

Application:

- Dimensional 2x's require a minimum 1" penetration.
- Wall connections require that screws be used 2' o.c.
- Roof connections require that screws be used 1' o.c.
- Frequency of screw fasteners depend on the imposed loads that the SIPs panels must resist. Follow the requirements specified on your shop drawings.



DSP/SSP/SP/SPH/RSP4/TSP

Stud Plate Ties

This product is preferable to similar connectors because of a) easier installation, b) higher loads, c) lower installed cost, or a combination of these features.

The stud plate tie series offers general solutions for connecting the stud to the top and bottom plates. All models can be used to make a connection to either the top or bottom plate, and several are suitable for double top plates and studs.

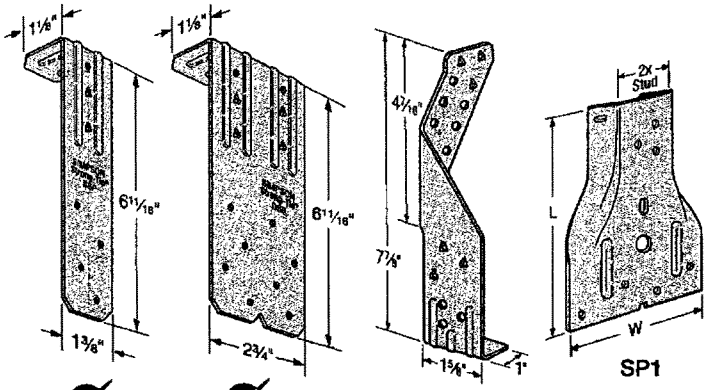
Material: DSP/SSP/SPH — 18 gauge; TSP — 16 gauge; all others — 20 gauge

Finish: Galvanized. Some products available in ZMAX® coating. See Corrosion Information, pp. 15–18.

Installation:

- Use all specified fasteners; see General Notes.
- TSP/DSP/SSP — Sill-plate installation: fill all round holes.
- TSP/DSP/SSP — Top-plate installation: fill all round and triangle holes
- SP1/SP2 — One of the 10d common stud nails is driven at a 45° angle through the stud into the plate.

Codes: See p. 14 for Code Reference Key Chart

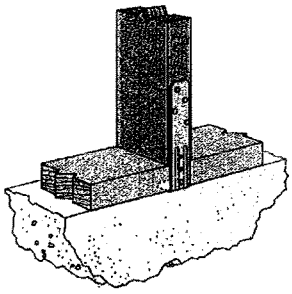


SSP
U.S. Patent
7,065,932
7,356,973

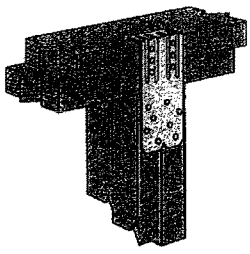
DSP
U.S. Patent
7,065,932
7,356,973

TSP
U.S. Patent
D616,085

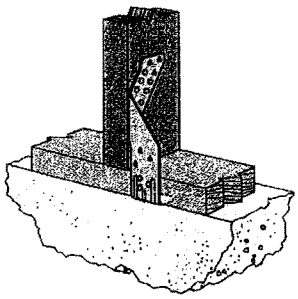
SP1



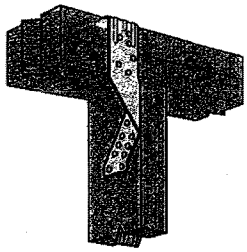
Typical SSP Installed to Sill Plate
(DSP similar for double stud)



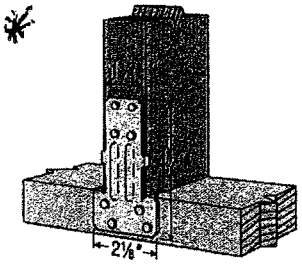
Typical DSP Installed to Top Plate
(SSP similar for single stud)



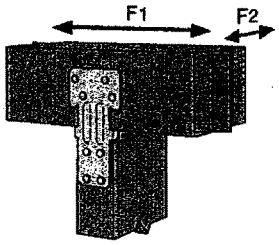
Typical TSP Installed to Sill Plate



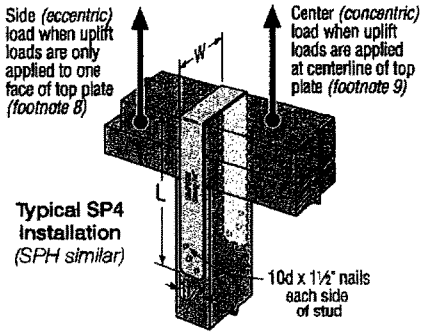
Typical TSP Installed to Top Plate



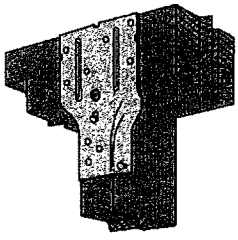
(1) Typical RSP4 Stud to Single Bottom Plate



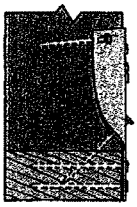
(2) Typical RSP4 Stud to Double Top Plate
(See footnote 4)



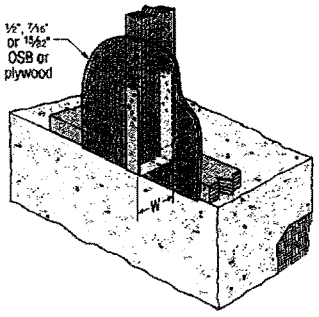
Typical SP4 Installation
(SPH similar)



Typical SP2 Installation



SP1 Nailing Profile



Typical SPH4R Installed on Bottom of 2x Stud Wall
(Sill plate anchorage not shown)

DSP/SSP/SP/SPH/RSP4/TSP

Stud Plate Ties (cont.)

These products are available with additional corrosion protection. For more information, see p. 18.

These products are approved for installation with the Strong-Drive® SD Connector screw. See pp. 39–40 for more information.

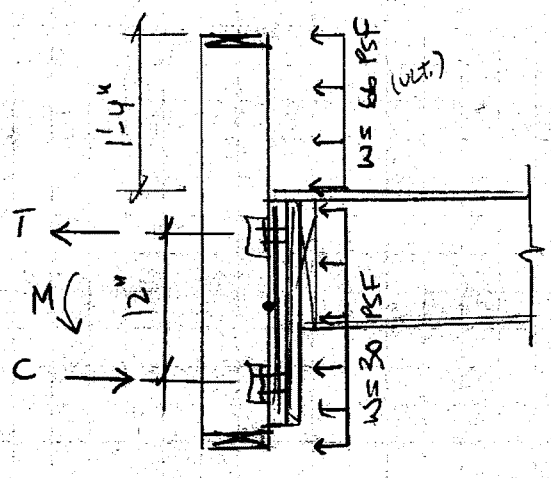
Model No.	Dimensions (in.) W	Dimensions (in.) L	Fasteners: Studs	Fasteners: Double Top Plate	Fasteners: Single Sill Plate	Allowable Uplift Loads (160): Double Top Plate DF/SP/SPF	Allowable Uplift Loads (160): Single Sill Plate[5] DF/SP	Allowable Uplift Loads (160): Single Sill Plate[5] SPF/HF	Code Ref.
SSP	1⅜	6¹¹⁄₁₆	(4) 10d x 1½"	(3) 10d x 1½"	—	350	—	—	I17, L18, FL
				—	(1) 10d x 1½"	—	420	325	
			(4) 10d	(3) 10d	—	435	—	—	
				—	(1) 10d	—	455	420	
DSP	2¾	6¹¹⁄₁₆	(8) 10d x 1½"	(6) 10d x 1½"	—	775	—	—	
				—	(2) 10d x 1½"	—	660	545	
			(8) 10d	(6) 10d	—	825	—	—	
				—	(2) 10d	—	825	600	
TSP	1½	7⅞	(6) 10d x 1½"	—	(3) 10d x 1½"	—	470[6]	425	FL
			(9) 10d x 1½"	(6) 10d x 1½"	—	755[4]	—	—	
				(6) 10d		1,015[4]			

1. Allowable loads have been increased 60% for wind or earthquake loading with no further increase allowed.
2. When cross-grain bending or cross-grain tension cannot be avoided, mechanical reinforcement to resist such forces should be considered.
3. Allowable loads for DSP installed to a rim board are 660 lb. (DF/SP), 545 lb. (SPF/HF).
4. Noted values only apply to DF/SP members. For SPF values, multiply by 0.86.
5. Southern pine allowable uplift load is 585 lb.
6. Allowable load for TSP installed to DF/SP top plate and SPF/HF stud is 450 lb.
7. **Nails:** 10d = 0.148" dia. x 3" long, 10d x 1½" = 0.148" dia. x 1½" long. See pp. 26–27 for other nail sizes and information.

Model No.	Dimensions (in.) W	Dimensions (in.) L	Stud	Plate Width	Fasteners: Stud1	Fasteners: Plate	Allowable Uplift Loads: DF/SP Side[8] (160)	DF/SP Center[9] (160)	SPF/HF Side[8] (160)	SPF/HF Center[9] (160)	Code Ref.
SP1	3½	5¹⁄₁₆	2x	—	(6) 10d	(4) 10d	585	585	535	535	I17, FL, L6
SP2	3½	6⅝	2x	—	(6) 10d	(6) 10d	1,065	1,065	605	605	
SP4	3⁹⁄₁₆	7¼	2x	4x	(6) 10d x 1½"	—	440	885	380	760	
SP6	5⁹⁄₁₆	7¾	2x	6x	(6) 10d x 1½"	—	440	885	380	760	
SP8	7⁹⁄₁₆	8⅝	2x	8x	(6) 10d x 1½"	—	440	885	380	760	
SPH4 or	3⁹⁄₁₆	8¾	2x	4x	(10) 10d x 1½"	—	620	1,240	530	1,065	
SPH4R	4¹⁄₁₆	8¼			(12) 10d x 1½"	—	680	1,360	585	1,170	I70
SPH6 or	5⁹⁄₁₆	9¼	2x	6x	(10) 10d x 1½"	—	620	1,240	530	1,065	I17, FL, L6
SPH6R	6¹⁄₁₆	8¾			(12) 10d x 1½"	—	680	1,360	585	1,170	I70
SPH8	7⁹⁄₁₆	8⅜	2x	8x	(10) 10d x 1½"	—	620	1,240	530	1,065	I17, FL, L6
			2x	8x	(12) 10d x 1½"	—	680	1,360	585	1,170	
RSP4 (1)	2⅛	4½	2x	—	(4) 8d x 1½"	(4) 8d x 1½"	315	315	285	285	I17, L5, L6, FL
RSP4 (2)	2⅛	4½	2x	—	(4) 8d x 1½"	(4) 8d x 1½	450	450	370	370	

1. SP1/SP2 — drive one stud nail at an angle through the stud into the plate to achieve the table load (see illustration).
2. Allowable loads have been increased for wind or earthquake loading with no further increase allowed; reduce where other loads govern.
3. RSP4 — see Installation details (1) and (2) for reference.
4. RSP4 — F_2 is 250 lb. (installation 1) and 250 lb. (installation 2). F_1 load is 210 lb. for both installations.
5. Maximum load for SPH in Southern Yellow Pine is 1,490 lb. for center loading and 745 lb. for side loading.
6. When cross-grain bending or cross-grain tension cannot be avoided, mechanical reinforcement to resist such forces should be considered.
7. For retrofit application see technical bulletin T-C-STRAPS at **strongtie.com**.
8. Use Side (eccentric) load when uplift loads are applied to only one face of the top plate.
9. Use Center (concentric) loads when uplift loads are applied at the centerline of the top plate, or where equal loads are applied to both sides of the top plate. Center loads should also be used for stud-to-bottom plate loads.
10. **Nails:** 10d = 0.148" dia. x 3" long, 10d x 1½" = 0.148" dia. x 1½" long, 8d x 1½" = 0.131" dia. x 1½" long. See pp. 26–27 for other nail sizes and information.

PARAPET DESIGN:



STUDS @ 16" O.C.

DESIGN PULLOUT FORCE:

$T = 152$ lb (ALLOWABLE)

∴ SIMPSON H11Z TIE $F_2 = 655$ lb

$T = 152$ lb < 655 lb

SCL Consulting
structural · civil · landscape
1753 E. Broadway Rd.
Suite 101-517
Tempe, AZ 85282

Project Title: Sunflower Duplex
Engineer: RHG
Project ID: 5084.18.01
Project Descr:

12

Printed: 28 SEP 2018, 11:47AM

General Beam Analysis

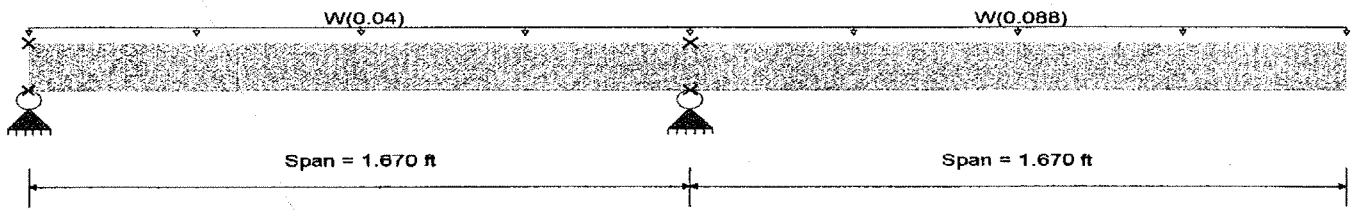
Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Parapet

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	1.670 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	1.670 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4



Applied Loads

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

Load for Span Number 1
Uniform Load : W = 0.040 k/ft, Tributary Width = 1.0 ft

Load for Span Number 2
Uniform Load : W = 0.0880 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Maximum Bending =	0.074 k-ft	Maximum Shear =	0.08818 k
Load Combination	+D+0.60W+H	Load Combination	+D+0.60W+H
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	1.670 ft	Location of maximum on span	1.670 ft
Maximum Deflection			
Max Downward Transient Deflection	0.000 in	0	
Max Upward Transient Deflection	0.000 in	0	
Max Downward Total Deflection	0.000 in	601970	
Max Upward Total Deflection	0.000 in	0	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Overall MAXimum Envelope													
Dsgn. L = 1.67 ft	1				-0.07	0.07					0.09		
Dsgn. L = 1.67 ft	2				-0.07	0.07					0.09		
+D+H													
Dsgn. L = 1.67 ft	1										-0.00		
Dsgn. L = 1.67 ft	2										-0.00		
+D+L+H													
Dsgn. L = 1.67 ft	1										-0.00		
Dsgn. L = 1.67 ft	2										-0.00		
+D+Lr+H													
Dsgn. L = 1.67 ft	1										-0.00		
Dsgn. L = 1.67 ft	2										-0.00		
+D+S+H													
Dsgn. L = 1.67 ft	1										-0.00		
Dsgn. L = 1.67 ft	2										-0.00		
+D+0.750Lr+0.750L+H													
Dsgn. L = 1.67 ft	1										-0.00		
Dsgn. L = 1.67 ft	2										-0.00		
+D+0.750L+0.750S+H													
Dsgn. L = 1.67 ft	1										-0.00		
Dsgn. L = 1.67 ft	2										-0.00		
+D+0.60W+H													
Dsgn. L = 1.67 ft	1				-0.07	0.07					0.09		
Dsgn. L = 1.67 ft	2				-0.07	0.07					0.09		
+D+0.70E+H													
Dsgn. L = 1.67 ft	1										-0.00		
Dsgn. L = 1.67 ft	2										-0.00		

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Project Descr:

122

Printed: 28 SEP 2018, 11:47AM

General Beam Analysis

Lic. # : KW-06009093 — Licensee : SCL Consulting

Description : Parapet

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 1.67 ft	1				-0.06	0.06					0.07		
Dsgn. L = 1.67 ft	2				-0.06	0.06					0.07		
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 1.67 ft	1				-0.06	0.06					0.07		
Dsgn. L = 1.67 ft	2				-0.06	0.06					0.07		
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 1.67 ft	1										-0.00		
Dsgn. L = 1.67 ft	2										-0.00		
+0.60D+0.60W+0.60H													
Dsgn. L = 1.67 ft	1				-0.07	0.07					0.09		
Dsgn. L = 1.67 ft	2				-0.07	0.07					0.09		
+0.60D+0.70E+0.60H													
Dsgn. L = 1.67 ft	1										-0.00		
Dsgn. L = 1.67 ft	2										-0.00		

Vertical Reactions

Support notation : Far left is #1 — Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.040	0.254	
Overall MINimum	-0.018	0.114	
+D+H			
+D+L+H			
+D+Lr+H			
+D+S+H			
+D+0.750Lr+0.750L+H			
+D+0.750L+0.750S+H			
+D+0.60W+H	-0.024	0.152	
+D+0.70E+H			
+D+0.750Lr+0.750L+0.450W+H	-0.018	0.114	
+D+0.750L+0.750S+0.450W+H	-0.018	0.114	
+D+0.750L+0.750S+0.5250E+H			
+0.60D+0.60W+0.60H	-0.024	0.152	
+0.60D+0.70E+0.60H			
D Only			
Lr Only			
L Only			
S Only			
W Only	-0.040	0.254	
E Only			
H Only			

H/TSP

Seismic and Hurricane Ties

Simpson Strong-Tie® hurricane ties provide a positive connection between truss/rafter and the wall of the structure to resist wind and seismic forces.

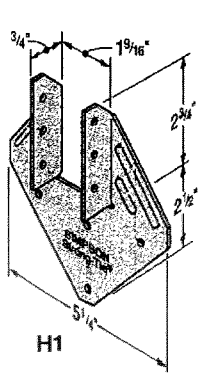
Material: See table

Finish: Galvanized. H7Z and H11Z — ZMAX® coating. Some models available in stainless steel or ZMAX; see Corrosion Information, pp. 15–18 or visit **strongtie.com**.

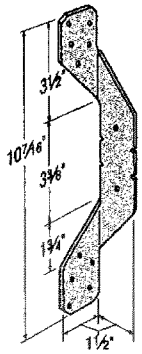
Installation:

- Use all specified fasteners; see General Notes.
- H1 can be installed with flanges facing inward (reverse of H1 installation drawing; number 1).
- H2.5T, H3 and H6 ties are shipped in equal quantities of right and left versions (right versions shown).
- Hurricane ties do not replace solid blocking.
- When installing ties on plated trusses (on the side opposite the truss plate) do not fasten through the truss plate from behind. This can force the truss plate off of the truss and compromise truss performance.
- H10A optional nailing to connect shear blocking, use 8d nails. Slots allow maximum field bending up to a pitch of 6:12, use H10A sloped loads for field bent installation.

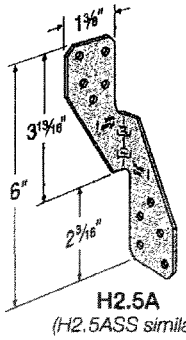
Codes: See p. 14 for Code Reference Key Chart



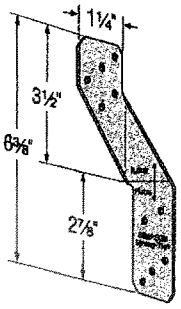
H1



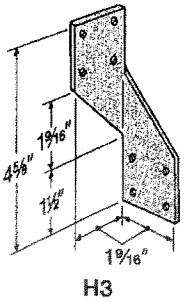
H2A
(H2ASS similar)



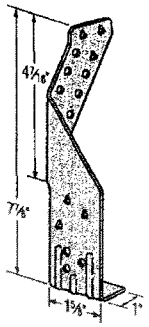
H2.5A
(H2.5ASS similar)



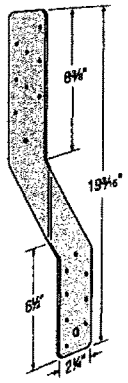
H2.5T



H3



TSP



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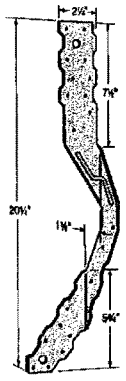
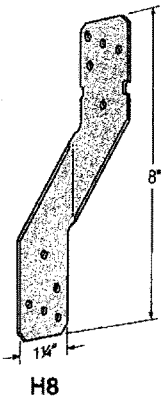


H7Z



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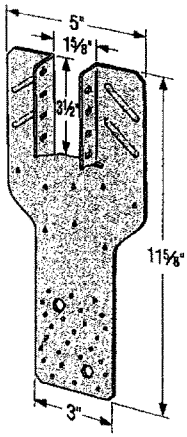
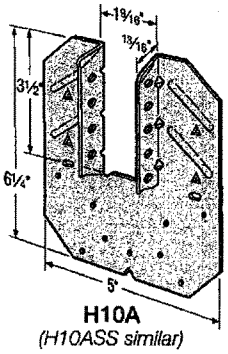
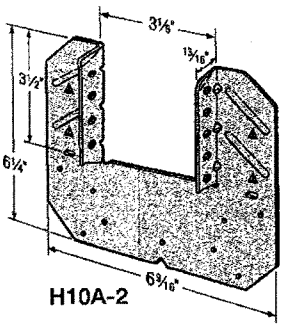


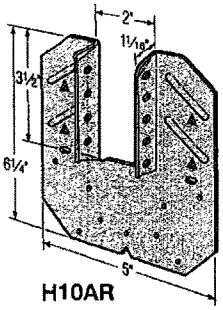
H10S



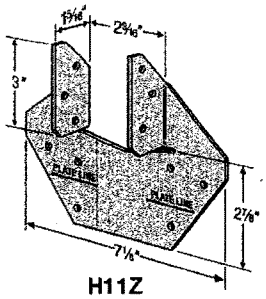
H10A
(H10ASS similar)



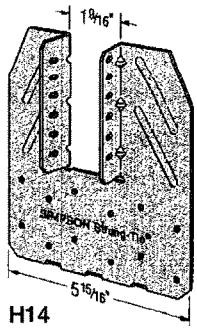
H10A-2



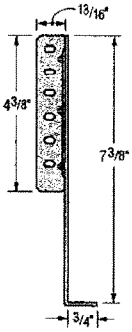
H10AR



H11Z



H14



H14 Profile

Seismic and Hurricane Ties (cont.)

These products are available with additional corrosion protection. For more information, see p. 18.

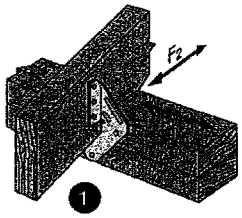
These products are approved for installation with the Strong-Drive® SD Connector screw. See pp. 39–40 for more information.

Model No.	Ga.	Fasteners			DF/SP Allowable Loads			Uplift with 8d x 1½" Nails (160)	SPF/HF Allowable Loads			Uplift with 8d x 1½" Nails (160)	Code Ref.
		To Rafters/ Truss	To Plates	To Studs	Uplift (160)	Lateral (160)			Uplift (160)	Lateral (160)			
						F_1	F_2			F_1	F_2		
H1	18	(6) 8d x 1½"	(4) 8d	—	585	485	165	455	400	415	140	370	I17, L5, L6, FL
H2A	18	(5) 8d x 1½"	(2) 8d x 1½"	(5) 8d x 1½"	575	130	55	—	495	130	55	—	IP1, L18, FL
SS H2ASS	18	(5) SS8D	(2) SS8D	(5) SS8D	400	130	55	400	345	130	55	345	170
H2.5A	18	(5) 8d	(5) 8d	—	600	110	110	575	535	110	110	495	I17, L5, L6, FL
SS H2.5ASS	18	(5) SS8D	(5) SS8D	—	440	75	70	365	380	75	70	310	170
H2.5T	18	(5) 8d	(5) 8d	—	545	135	145	425	545	135	145	425	IP1, L18, FL
SS H3	18	(4) 8d	(4) 8d	—	455	125	160	415	320	105	140	290	I17, L6, FL
H6	16	—	(8) 8d	(8) 8d	950	—	—	—	820	—	—	—	I17, FL
H7Z	16	(4) 8d	(2) 8d x 1½"	(8) 8d	985	400	—	—	845	345	—	—	
SS H8	18	(5) 10d x 1½"	(5) 10d x 1½"	—	795	95	90	630	565	95	90	510	L5, L10, L18, FL
H10A Sloped	18	(9) 10d x 1½"	(9) 10d x 1½"	—	855	590	285	—	760	505	285	—	I17, L5, L18, FL
H10A	18	(9) 10d x 1½"	(9) 10d x 1½"	—	1,140[7]	590	285	—	1,015	505	285	—	
SS H10ASS	18	(9) SSN10	(9) SSN10	—	970	565	170	—	835	485	170	—	170
H10AR	18	(9) 10d x 1½"	(9) 10d x 1½"	—	1,050	490	285	—	905	420	285	—	
H10S[9,10]	18	(8) 8d x 1½"	(8) 8d x 1½"[10]	(8) 8d	1,010	660	215	550	870	570	185	475	IP1, L18, FL
H10A-2	18	(9) 10d x 1½"	(9) 10d x 1½"	—	1,245	815	260	—	1,070	700	225	—	L18, FL
→ H11Z	18	(6) 16d x 2½"	(6) 16d x 2½"	—	830	525	760	—	715	450	655	—	170
H14	18	1 (12) 8d x 1½"	(13) 8d	—	1,350[7]	725	285	—	1,050	480	245	—	IP1, L18, FL
		2 (12) 8d x 1½"	(15) 8d	—	1,465	670	230	—	1,050	480	245	—	
TSP	16	(9) 10d x 1½"	(6) 10d x 1½"	—	740	310	190	—	635	265	160	—	FL
		(9) 10d x 1½"	(6) 10d	—	890	310	190	—	765	265	160	—	

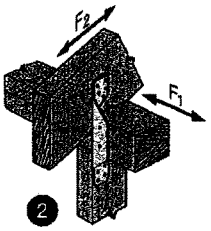
1. Loads have been increased for wind or earthquake loading with no further increase allowed; reduce where other loads govern.
2. Allowable loads are for one anchor. A minimum rafter thickness of 2½" must be used when framing anchors are used on each side of the joist and on the same side of the plate (exception: connectors installed such that nails on opposite side don't interfere).
3. Allowable DF/SP uplift load for stud to bottom plate installation (see detail 15) is 390 lb. (H2.5A); 265 lb. (H2.5ASS); and 310 lb. (H8). For SPF/HF values multiply these values by 0.86.
4. Allowable loads in the F_1 direction are not intended to replace diaphragm boundary members or cross-grain bending of the truss or rafter members.
5. When cross-grain bending or cross-grain tension cannot be avoided in the members, mechanical reinforcement to resist such forces may be considered.
6. Hurricane Ties are shown on the outside of the wall for clarity and assume a minimum overhang of 3½". Installation on the inside of the wall is acceptable (see General Instructions for the Installer notes s on p. 21). For uplift continuous load path, connections in the same area (i.e. truss to plate connector and plate to stud connector) must be on the same side of the wall. See technical bulletin T-C-HTIECONPATH at **strongtie.com** for more information.
7. Southern Pine allowable uplift loads for H10A = 1,340 lb. and for the H14 = 1,465 lb.
8. Refer to Simpson Strong-Tie® technical bulletin T-C-HTIEBEARING at **strongtie.com** for allowable bearing enhancement loads.
9. H10S can have the stud offset a maximum of 1" from rafter (center to center) for a reduced uplift of 890 lb. (DF/SP) and 765 lb. (SPF).
10. H10S nails to plates are optional for uplift but required for lateral loads.
11. Some load values for the stainless-steel connectors shown here are lower than those for the carbon-steel versions. Ongoing test programs have shown this to also be the case with other stainless-steel connectors in the product line that are installed with nails. Visit **strongtie.com/corrosion** for updated information.
12. The allowable loads of stainless-steel connectors match carbon-steel connectors when installed with Simpson Strong-Tie® stainless-steel, SCNR ring-shank nails. For more information, refer to engineering letter L-F-SSNAILS at **strongtie.com**.
13. Allowable DF/SP/SPF uplift load for the H2.5A fastened to a 2x4 truss bottom chord and double top plates using (5) 8d x 1½" nails into the top plates and (3) 8d x 1½" nails into the lowest three flange holes into the truss bottom chord is 260 lb. (160).
14. **Nails:** 16d x 2½" = 0.162" dia. x 2½" long, 10d = 0.148" dia. x 3" long, 10d x 1½" = 0.148" dia. x 1½" long, 8d = 0.131" dia. x 2½" long, 8d x 1½" = 0.131" dia. x 1½" long. See pp. 26–27 for other nail sizes and information.
15. **Screws:** Strong-Drive® SD #9 x 1½" (model SD9112) = 0.131" dia. x 1½" long (for the models marked with the orange flag only). Full table loads apply.

H/TSP

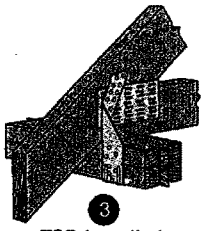
Seismic and Hurricane Ties (cont.)



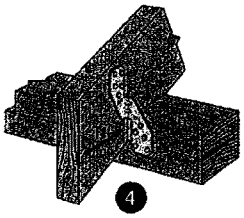
1 **H1 Installation**



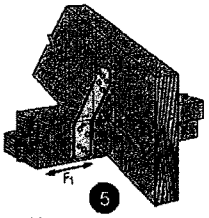
2 **H2A Installation**



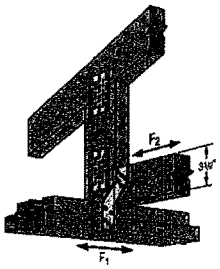
3 **TSP Installation**



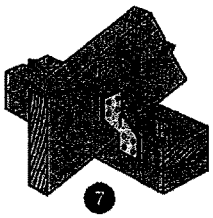
4 **H2.5A Installation**
(Nails into both top plates)



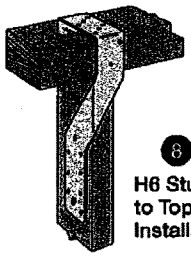
5 **H2.5T Installation**
(Nails into both top plates)



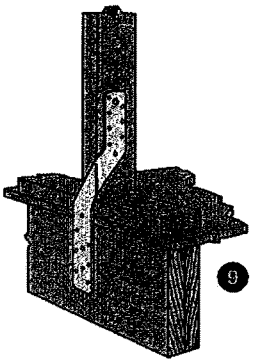
5 **H2.5T Installation**



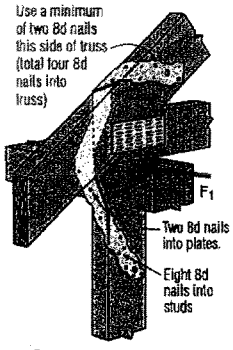
7 **H3 Installation**
(Nails into upper top plate)



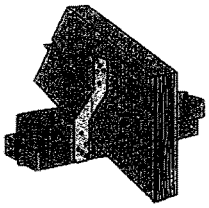
8 **H6 Stud to Top Plate Installation**



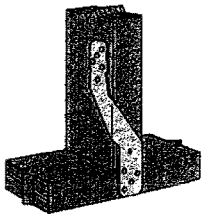
9 **H6 Stud to Rim Board Installation**



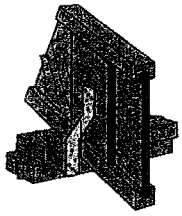
10 **H7Z Installation**



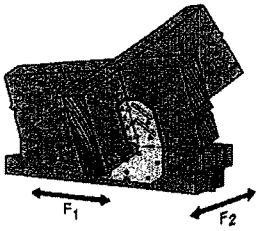
11 **H8 Attaching Rafter to Double Top Plates**



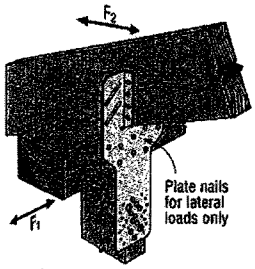
12 **H8 attaching Stud to Sill**
(4-8d into plate, 5-8d into stud, refer to footnote 3 for loads)



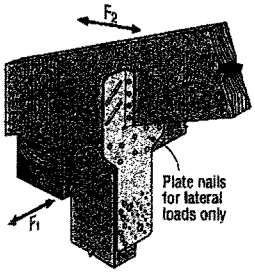
13 **H6 attaching I-Joist to Double Top Plates**



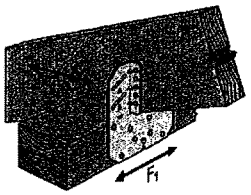
14 **H10A Field-Bent Installation**



15 **H10S Installation**



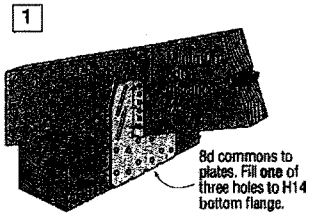
16 **H10S Installation with Stud Offset**



17 **H10A Installation**

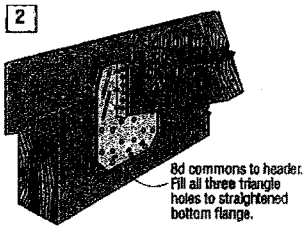
H10A optional nailing connects shear blocking to rafter. Use 8d common nails. Slot allows maximum field-bending up to a pitch of 6/12, use 75% of the table uplift load; bend one time only.

1



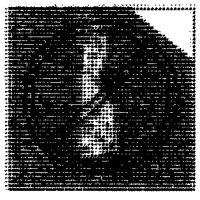
18 **H14 Installation to Double Top Plates**

2



19 **H14 Installation to Double 2x Header**

Avoid a Misinstallation



Do not make new holes or overdrive nails.

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Reissued 02/2018

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES

SECTION: 06 12 00—STRUCTURAL PANELS

FIELD COPY

REPORT HOLDER:

PREMIER BUILDING SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, INC.

19727 57TH AVENUE EAST
PUYALLUP, WASHINGTON 98375

EVALUATION SUBJECT:

PREMIER BUILDING SYSTEMS STRUCTURAL SANDWICH PANELS: TYPE S, TYPE I AND TYPE L

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 12 00—Structural Panels

REPORT HOLDER:

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(253) 271-3055
www.pbssips.com
tsavoy@insulfoam.com

EVALUATION SUBJECT:

PREMIER BUILDING SYSTEMS STRUCTURAL SANDWICH PANELS: TYPE S, TYPE I AND TYPE L

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2015, 2012, 2009 and 2006 *International Building Code®* (IBC)
- 2015, 2012, 2009 and 2006 *International Residential Code®* (IRC)
- BOCA® *National Building Code*/1999 (BNBC)
- 1999 *Standard Building Code©* (SBC)
- 1997 *Uniform Building Code*™ (UBC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Properties evaluated:

- Structural
- Fire resistance

1.2 Evaluation to the following green code(s) and/or standards:

- 2016 California Green Building Standards Code (CALGreen), Title 24, Part 11
- 2015, 2012 and 2008 ICC 700 *National Green Building Standard*™ (ICC 700-2015, ICC 700-2012 and ICC 700-2008)

Attributes verified:

- See Section 3.1

2.0 USES

Premier Building Systems Structural Sandwich Panels are used as roof and floor and load-bearing and nonload-bearing wall panels of Type V construction. The panels are alternatives to walls, floors, and roofs designed and fabricated in accordance with IBC Section 2306. When installed in accordance with Section 4.2.5, 4.2.6 or 4.2.7 of this evaluation report, the panels may be used as components of one-hour fire-resistance-rated assemblies.

The panels are alternatives to walls, floors, and roofs prescribed in IRC Sections R502, R602, and R802. An engineered design is required in accordance with IRC Section R301.1. Use of the panels under 2015 IRC Section R610, 2012 and 2009 IRC Section R613 is outside the scope of this evaluation report.

3.0 DESCRIPTION

3.1 General:

Premier Building Systems Structural Sandwich Panels are factory-assembled, laminated sandwich panels produced at locations listed in Table 1 of this report. The panels consist of expanded polystyrene (EPS) cores with wood-based structural-use sheathing facings. The panels are manufactured in Type S, Type I and Type L panel configurations as shown in Figures 1, 2, and 3, respectively. Type S panels are produced in widths ranging from 4 feet (1219 mm) to 8 feet (2438 mm) and lengths ranging from 8 feet (2438 mm) to 24 feet (7315 mm). Type I and Type L panels are produced in maximum 4-foot (1219 mm) widths and in lengths ranging from 8 feet (2438 mm) to 24 feet (7315 mm).

The attributes of the sandwich panels have been verified as conforming to the provisions of (i) CALGreen Sections A4.404.3.3 for premanufactured building systems; (ii) ICC 700-2015 and ICC 700-2012 Section 601.5 and 11.601.5 for prefabricated components; and (iii) ICC 700-2008 Section 601.5 for prefabricated components. Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

3.1.1 Type S Panel: The core for the Type S panel is recessed along the panel sides to receive nominally 3-inch-wide OSB surface splines or OSB block splines, as described in Section 3.2.4 of this report, and is recessed on the ends to receive nominally 2-by solid sawn dimensional lumber sized to match the core thickness. Figure 1 illustrates a typical Type S panel.

3.1.2 Type I Panel: The Type I panel is recessed along the panel sides to receive I-joist splines as described in

Section 3.2.4 of this report, and recessed on the ends to receive nominally 2-by solid sawn dimensional lumber sized to match the core thickness. Figure 2 illustrates a typical Type I panel.

3.1.3 Type L Panel: The Type L panel is recessed along the panel sides to receive lumber splines as described in Section 3.2.4 of this report, and recessed on the ends to receive nominally 2-by solid sawn dimensional lumber sized to match the core thickness. Figure 3 illustrates a typical Type L panel.

3.2 Materials:

3.2.1 Core: The core material is Insulfoam Type I expanded polystyrene (EPS) foam plastic (ESR-1788) with a nominal thickness ranging from $3^1/_2$ inches to $11^1/_4$ inches. The EPS is a Type I expanded polystyrene with a nominal density of 1 pcf complying with ASTM C578. The EPS has a flame spread index of not more than 75 and a smoked developed index of not more than 450 when tested in accordance with ASTM E84.

3.2.2 Facing: Panel facing material is $^7/_{16}$-, $^1/_2$-, $^5/_8$- or $^3/_4$-inch-thick (11.1, 12.7, 15.9 or 19.1 mm), Exposure 1, oriented strand board (OSB) with span ratings of $^{24}/_{16}$, $^{32}/_{16}$, $^{40}/_{20}$, and $^{48}/_{24}$, respectively, and complying with the performance-rated panel requirements specified in United States Voluntary Product Standard PS-2 (UBC Standard 23-3). The OSB is supplied by manufacturers listed in the approved quality control documentation.

3.2.3 Adhesive: The adhesive is a Type II, Class 2, laminating adhesive as specified in the approved quality control documentation, complying with the ICC-ES Acceptance Criteria for Sandwich Panel Adhesives (AC05).

3.2.4 Splines: The OSB surface splines for the Type S panels are nominally 3-inch-wide-by-$^7/_{16}$-inch-thick OSB as described in Section 3.2.2, or OSB block splines having a nominal 3-inch width and a depth sized to match the panel core thickness and consisting of $^7/_{16}$-, $^3/_4$-, or $^{23}/_{32}$-inch-thick (11.1, 19.1 or 18.3 mm) OSB facings as described in Section 3.2.2, laminated to both faces of an EPS core.

The splines for Type I panels must be International Beams (ESR-1290) IB-400 Series $9^1/_4$- and $11^1/_4$-inch-deep (235 and 286 mm) prefabricated wood I-joists with nominally 3-inch-wide-by-$1^1/_2$-inch-thick, No. 2 and better or 1650F_b-1.5E MSR solid sawn dimensional lumber flanges and $^3/_8$-inch-thick (11.1 mm) OSB webs, sized in depth to match the panel core thickness.

The splines for Type L panels must be nominally 2-by solid sawn dimensional lumber sized in depth to match the panel core thickness. Splines must be a minimum of No. 2 hem-fir with a minimum specific gravity of 0.43.

Figures 1, 2 and 3 illustrate the typical OSB surface, OSB block, I-joist, and nominally 2-by solid sawn dimensional lumber splines, respectively.

3.2.5 Horizontal Diaphragm Fasteners: When the panels are used in horizontal diaphragms, the fasteners used to attach the panels to underlying supports must be Premier SIPs proprietary screws. The screws are steel screws coated with corrosion-resistant materials, and have a 0.635-inch (16.13 mm) head diameter, 0.19-inch nominal shank diameter, 0.245-inch (6.22 mm) minimum thread diameter and various lengths ranging from 5 inches to 18 inches (127 to 457 mm). The minimum length of the threaded portion of the screws is 2 inches (51 mm).

4.0 DESIGN AND INSTALLATION

4.1 Design:

The allowable transverse, uniform axial, axial point, header, shearwall and diaphragm loads are as shown in Tables 2 through 12. Unless noted otherwise, the allowable transverse loads are uniform loads for panels installed under simply supported single span conditions. Continuous and multiple span installations and eccentric axial loads applied to one face of the panels used as walls are outside the scope of this report.

The tabulated allowable transverse load values in Table 2 are for Type S panels installed as roof and floor panels with a minimum $1^1/_2$-inch-wide (38 mm) continuous support in contact with the panel face at each end of panels. When Type S panels are installed as wall panels with single span, simply supported conditions, with the panels supported at each end by nominally 2-by dimensional lumber plates (No. 2 or better Douglas fir–larch with a minimum specific gravity of 0.50) installed in the core recesses, at each end of the panel. The tabulated allowable transverse load values in Table 2 must be adjusted by a multiplication factor of 0.85. Further reduction of the tabulated allowable transverse load values must be considered when lower grade and other species of lumber plates are used. The tabulated allowable transverse load values are applicable to Type S panels installed with the strong axis of OSB panel facers parallel to the wall height (panel span).

The allowable racking shear loads in Table 10 are applicable to the Type S and Type L panels used as shear walls for buildings in Seismic Design Categories A, B and C. For Type S panels used as shear walls as described in Table 11, the allowable racking shear values for these shear wall configurations are applicable to shear walls for buildings in Seismic Design Categories A through F with the seismic design coefficients of R = 6.5, Ω_o = 3.0, and C_d = 4.0, provided the panels are limited to use as nonload-bearing walls, except for Configuration C where the shearwall can also be load-bearing.

The seismic-force-resisting system consisting of the panels as shear walls, in whole or in part, must be designed and detailed in accordance with Section 2305 and 2306 of the IBC by a registered design professional.

Where loading conditions result in the panels resisting combined stresses, the sum of the ratios of actual loads over allowable loads must be less than 1.0.

4.2 Installation:

4.2.1 General: The panels must be installed in accordance with the manufacturer's published installation instructions and this report. A copy of the installation instructions must be available at all times on the jobsite during installation. Panel locations must comply with this evaluation report and the plans and specifications approved by the code official.

The panels must be connected to each other along their edges with field-installed OSB surface splines, OSB block splines, I-joist splines, or dimensional lumber splines. Unless noted otherwise in this report, OSB facings must be attached to the splines with 8d box nails, or equivalent, spaced at 6 inches (152 mm) on center.

Top and bottom plates installed into the recessed core of the wall panels must be dimensional lumber, sized to match the core thickness, and, unless noted otherwise in this report, fastened to both panel facings with 8d box

nails, or equivalent, spaced at 6 inches (152 mm) on center. Unless noted otherwise in this report, an EPS-compatible sealant recommended by Premier SIPs and acceptable to the code official is applied in accordance with the manufacturer's published installation instructions, along butting EPS core surfaces and any dimensional lumber surfaces, and along the bottom of the panel base plate before panel placement; excluding the interface between wood framing members and panel facings for panels used as shear walls described in Table 11. Figure 4 shows the details of the sealant used in panels used as shear walls described in Table 11. Typical installation details are shown in Figures 5 through 14. Structural calculations must be prepared to substantiate the details for the specific installation and loading conditions.

The wall panels used as load-bearing walls must be installed in a manner such that both panel facings of the wall panels are in contact, and sufficiently supported by the underlying structure; and the axial loads are uniformly and concentrically applied to the full thickness of the wall panels, including wall panel facings. The member, element, or structure supporting the bearing wall panels as shown in Figures 7, 8, and 9 must be designed for the bearing stress of the wall panels to the satisfaction to the code official.

Sill plates must be preservative-treated for decay resistance where required by 2015 IBC Section 2304.12.1.3, 2012. 2009 and 2006 IBC Section 2304.11.2.3, 2015, 2012 and 2009 IRC Section R317, 2006 IRC Section R319, BNBC Section 2311.4.3, SBC Section 2304.4.1 and UBC Section 2306.4, as applicable.

4.2.2 Wall Openings: The allowable gravity loads for the sandwich panels used as headers over wall openings are noted in Tables 8 and 9 of this report. SIP headers must have minimum $^{7}/_{16}$-inch-thick (11.1 mm) OSB facings as described in Section 3.2.2 and $3^{1}/_{2}$-inch-thick (89 mm) EPS cores as described in Section 3.2.1. Joints are permitted, provided the 2-by dimensional lumber top and bottom plates (No. 2 and better Douglas fir–larch with a minimum specific gravity of 0.50) are continuous and connected to the facings with 8d common or box nails spaced 6 inches (152 mm) on center, or equivalent. Minimum bearing at supports is $1^{1}/_{2}$ inches (38 mm), and both OSB facings must be supported. The minimum width of the panel between openings is 12 inches (305 mm). For other conditions, conventional framing techniques with headers must be designed and installed to the satisfaction of the code official.

4.2.3 Horizontal Diaphragm: Table 12 and Figure 15 describe the installation of Premier sandwich panels combined with wood-framing to form a horizontal diaphragm. Table 12 and Figure 15 also include types of fasteners and fastener spacing.

4.2.4 Thermal Barrier:

4.2.4.1 Wall, Roof and Floor: Minimum $^{1}/_{2}$-inch-thick (12.7 mm), regular gypsum wallboard complying with ASTM C36 or C1396 must be installed on the interior surface of wall and roof panels and the bottom side of floor panels having occupied space below the floor panel. The wallboard must be fastened to the face of the panels with 5d wallboard nails, or minimum $1^{1}/_{4}$-inch-long (31.7 mm), No. 6, Type S or Type W drywall screws spaced in accordance with ASTM C840 for use under the IBC, Table R702.3.5 of the IRC, or Table 25-G of the UBC using 16-inch-on-center (406.4 mm) framing spacing guidelines.

4.2.4.2 Floor Panels: An approved thermal barrier is required on the top surface of floor panels. See the footnotes in Tables 2, 3 and 4.

4.2.5 Panel Cladding:

4.2.5.1 Roof Covering: The roof covering must comply with Chapter 15 of the IBC, BNBC, SBC or UBC, or IRC Section R901, as applicable. Roofs with hot-asphalt or hot-coal tar pitch are prohibited. Underlayment and flashing must be installed in accordance with the applicable code.

4.2.5.2 Exterior Wall Covering: The exterior face of wall panels is required to be covered with a wall covering complying with the applicable code or recognized in a current ICC-ES evaluation report. A water-resistive barrier must be installed over the panels in accordance with IBC Section 1404.2, IRC Section R703.2, BNBC Section 1406.3.6, and UBC Section 1402, as applicable, prior to application of the wall covering. Where Portland cement plaster is used, compliance with IBC Sections 2510 and 2512, IRC Section R703.6.3 or UBC Section 2506.4, as applicable, is necessary. All exterior panel joints must be sealed with a compatible acrylic latex caulk.

4.2.6 One-Hour Fire-resistance-rated Limited Load-bearing Wall:

4.2.6.1 General: Walls constructed with the Premier Building System Type S panels, with minimum $^{7}/_{16}$-inch-thick (11 mm) OSB facings and a $3^{1}/_{2}$-inch-thick (92 mm) polystyrene foam plastic core, covered with two layers of $^{5}/_{8}$-inch-thick (15.9 mm) gypsum wallboard on both faces, are one-hour fire-resistance-rated limited load-bearing walls when installed in accordance with this section (Section 4.2.6). The maximum allowable axial load is 61 percent of the allowable axial load noted in Table 5 for Type S panels with a $3^{5}/_{8}$-inch thick (92 mm) core, but is not to exceed 1,833 pounds/foot (26.7 kN/m).

4.2.6.2 Splines: Nominally 4-inch-wide-by-$^{7}/_{16}$-inch-thick (11 mm) OSB surface splines must be installed between vertical joints, in precut channels in the core of the panels, beneath both panel facings. The splines must be secured to the OSB facings of the panels with an adhesive (APA AFG-01) and $1^{5}/_{8}$-inch-long (41 mm) Type S steel screws spaced 6 inches (152 mm) on center along the edges of each adjoining panel face.

4.2.6.3 End Plates: Nominally 2-by No. 2 Douglas fir–larch lumber with a depth to match the panels' core thickness must be installed at the top and bottom of panels in precut channels. The end plates must be secured to the OSB facer of the panels with caulk complying with ASTM C834 on the face in contact with the polystyrene core, and 8d box nails spaced 8 inches (203 mm) on center along the edge of both faces of the panels.

4.2.6.4 Gypsum Board: National Gypsum Co. Type FSW gypsum wallboard, $^{5}/_{8}$ inch thick (16 mm) by 4 feet wide (1219 mm), must be applied vertically in two layers to both sides of the wall panels. The first layer must be installed with $1^{5}/_{8}$-inch-long (41 mm), No. 6, Type S steel screws spaced 24 inches (610 mm) on center vertically and 16 inches (406 mm) on center horizontally. The vertical joints of the first gypsum board layer must be offset a minimum of 16 inches (406 mm) from the vertical spline joints of the sandwich panels. The second layer must be installed with 2-inch-long (51 mm, No. 6, Type S screws spaced 12 inches (305 mm) on center vertically and offset 12 inches (305 mm) from the first layer screws, and 16 inches (406 mm) on center horizontally, offset 8 inches (203 mm) from first layer screws. The second-layer joints

must be offset a minimum of 16 inches (406 mm) from the first-layer joints. The joints of the second layer of wallboard must be covered with joint tape and joint compound in accordance with ASTM C840 or GA-216. Screw heads on the second layer of wallboard must be covered with joint compound in accordance with ASTM C840 or GA-216. Where the panels are used as exterior walls, the gypsum board must be gypsum sheathing.

4.2.7 One-hour Fire-resistance-rated Limited Load-bearing Wall: Walls constructed with the Type L panels with a $5^1/_2$-inch-thick (140 mm) EPS core laminated between two sheets of $^7/_{16}$-inch (11 mm) OSB covered with one layer of gypsum wallboard on both panel faces, are one-hour fire-resistance-rated, limited load-bearing walls when installed in accordance with this section (Section 4.2.7). The maximum allowable axial load is 37 percent of the allowable axial load noted in Table 6 for Type L panels with a $5^1/_2$-inch-thick (140 mm) core, or 2,200 plf (32 kN/m), whichever is less.

The EPS core must be recessed $1^1/_2$ inches (38 mm) in from the edges of the OSB facers on the bottom and along both sides, and 3 inches along the top, to allow for the installation of nominally 2-by-6 wood splines (No. 2 hem-fir, minimum), bottom plate and double top plate.

Double nominally 2-by-6 wood splines must be installed into the recesses in the vertical edges of the panels. The double splines must be assembled using two nominally 2-by-6 wood splines nailed together with 16d coated sinker nails spaced at 24 inches (610 mm) on center, staggered along the stud length. The double splines must be installed in the recesses between the adjoining panels and secured to the OSB with 6d common nails spaced at 6 inches (152 mm) on center, after the surfaces to be in contact with the EPS core are caulked with mastic . The single bottom plate must be installed into the recess along the bottom edge of the wall assembly and secured to the OSB with 6d common nails spaced at 6 inches (152 mm) on center and to each wood spline with two 16d coated sinker nails, after the surfaces to be in contact with the EPS core are caulked with mastic. The first top plate must be installed into the recess along the top of the wall assembly and secured to each wood spline with two 16d coated sinker nails, after the surfaces to be in contact with the EPS core are caulked with mastic. The second top plate must be installed over the first and secured to the OSB with 6d common nails spaced at 6 inches (152 mm) on center and to the first top plate with 16d coated sinker nails spaced at 16 inches (406 mm) on center, staggered along the top plate length.

A single layer of Temple Inland's Type TG-C, $^5/_8$-inch-thick (16 mm) gypsum wallboard must be installed onto both faces of the wall. The wallboard must be secured to the OSB panel facers with 6d, phosphate-coated, cuppedead drywall nails, $1^5/_8$ inches (41 mm) long, spaced 8 inches (203 mm) on center along the wall perimeter, 12 inches (305 mm) on center vertically and 16 inches (406 mm) on center horizontally. The joints must be treated and taped, and the screw heads must be covered with joint compound, in accordance with ASTM C840 or GA-216. Where the panels are used as exterior walls, the exterior gypsum board must be gypsum sheathing.

4.2.8 One-hour Fire-resistance-rated Floor-Ceiling Assembly: Premier Type S panels with $7^1/_4$-inch-thick (184 mm) EPS cores laminated between two sheets of $^7/_{16}$-inch-thick (11 mm) OSB installed in accordance with this section (Section 4.2.8) are a one-hour fire-resistance-rated floor-ceiling assembly

Panels must be connected at the edge joints by inserting $3^1/_2$-inch-wide (89 mm) OSB surface splines into the prerouted slots in the EPS and fastening to the OSB facers of the panels with $1^1/_8$-inch-long (29 mm) drywall screws spaced 6 inches (152 mm) on center.

The bottom side of the panel must be covered with a base layer of $^5/_8$-inch-thick (16 mm), Type X gypsum wallboard complying with ASTM C36 or C1396 applied with the joints parallel to the spline joints offset by 24 inches (610 mm), with $1^1/_4$-inch-long (32 mm), Type S drywall screws spaced 12 inches (305 mm) on center in rows 24 inches (610 mm) on center. A face layer of $^5/_8$-inch-thick (16 mm) Type X gypsum wallboard must be applied at right angles to the base layer with 2-inch-long (51 mm) Type S drywall screws spaced 12 inches (305 mm) on center in rows spaced 16 inches (406 mm) on center. The joints of the face layer of gypsum board must be treated and taped, and the screw heads must be covered with joint compound, in accordance with ASTM C840 or GA-216.

The maximum allowable superimposed load is 40 psf (1915 Pa) and the maximum allowable span is 12 feet (3658 mm).

4.3 Special Inspection:

When Premier Building Systems SIPs shear walls are installed in buildings in IBC Seismic Design Categories C, D, E, or F; Seismic Design Categories C, D_0, D_1, D_2 and E for townhouses under the IRC; or Seismic Design Categories D_0, D_1, D_2 and E for detached one- and two-family dwellings under the IRC, periodic inspections of the fastening and anchoring of the shear wall assembly within the seismic-force-resisting system must be provided. Inspection must include connections of the assemblies to drag struts and hold-downs, in accordance with 2015 IBC Section 1705.11.1 or 1705.12.2, 2012 IBC Section 1705.10.1 or 1705.11.2, 2009 IBC Section 1706.2 or 1707.3, or 2006 IBC Section 1707.3, unless these are exempted by Section 1704.1 of the IBC.

5.0 CONDITIONS OF USE

The Premier Building Systems Structural Sandwich Panels described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The panels must be fabricated, identified and installed in accordance with this report and the manufacturer's published installation instructions. In the event of a conflict between this report and the manufacturer's published installation instructions, the more restrictive governs.

5.2 Design loads to be resisted by the panels must be determined in accordance with the applicable code, and must be equal to, or less than, the values given in Tables 2 through 12 of this report.

5.3 All construction documents specifying the building panels described in this report must comply with the design limitations of this report. Design calculations and details for the specific applications must be furnished to the code official verifying compliance with this report and applicable codes. The transfer of vertical loads and lateral loads from the roof or floor diaphragm into the shear wall and from the shear wall to the foundation must be addressed in the calculations. When Premier SIP shear walls are used in buildings that are more than one story tall,

calculations and details must be submitted to the code official showing the load path for the transfer of lateral and overturning forces from the upper-story shear walls to the foundation. The documents must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.4 All floor-to-wall and roof-to-wall details must be designed such that gravity loads are applied to the wall panels as a uniform concentric axial load over the entire wall panel thickness. The member, element, or structure supporting the bearing wall panels must be designed for the bearing stress of the wall panels to the satisfaction of the code official.

5.5 Connections and attachments of the panel are outside the scope of this report and must be addressed in the design calculations and details.

5.6 When used as shear walls under the IBC or IRC, the panels are recognized for use in Seismic Design Categories A, B and C, except as provided for in Section 4.1. Use of the panels as shear walls for buildings in Seismic Design Categories D through F, in combination with other types of lateral force–resisting systems, is outside the scope of this report.

5.7 Type S panels described in Table 11 of this evaluation report are for use as shear walls in buildings in IBC Seismic Design Categories A through F.

5.8 Special inspections must be as required in Section 4.3 of this evaluation report.

5.9 The foam plastic insulation of the panels must be separated from the interior of the building with a thermal barrier, installed in accordance with Section 4.2.4 of this report.

5.10 Use of the floor panels is limited to residential occupancies.

5.11 Use of the panels is limited to Type V construction.

5.12 For structures regulated under the IBC and IRC, use of the foam plastic in areas subject to damage from termites must be in accordance with 2012 IBC Section 2603.9 or 2015, 2009 and 2006 IBC Section 2603.8 and 2015, 2012 and 2009 IRC Section R318.4, or 2006 IRC Section R320.5.

5.13 For structures regulated under the SBC, the panels must not be placed within 6 inches (152 mm) of earth where the hazard of termite damage is very heavy, in accordance with SBC Figure 2304.1.4, without an approved method of protecting the foam plastic and structure from subterranean termite damage.

5.14 The panels must be installed such that the panel facings are protected against decay and termites in accordance with 2015 IBC Sections 2304.12.1.2 and 2304.12.1.5, or 2012, 2009 and 2006 IBC Sections 2304.11.2.2 and 2304.11.2.6, 2015, 2012 and 2009 IRC Sections R317 and R318, or 2006 IRC Sections R319 and R320, BNBC Section 2311.4.2, SBC Section 2304 and UBC Section 2306.8, as applicable.

5.15 The panels and their attachments are subject to inspection by the code official prior to covering with an approved water-resistive barrier or roof covering.

5.16 For installations of the roof panels, justification must be submitted to the code official demonstrating that the panels with the roof covering comply as a Class A, B, or C roof assembly, as required by IBC Section 2603.6, UBC Section 2602.5.3, or SBC Section 2603.7, as applicable, with the classification complying with the minimum classification requirements for the building.

5.17 When used under the IRC, the panels are limited to an engineered design under IRC Section R301.1.3, with engineering performed in accordance with this evaluation report.

5.18 The panels are produced at the manufacturing locations indicated in Table 1 of this report under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Sandwich Panels (AC04), dated February 2012 (editorially revised July 2015).

6.2 Reports of tests conducted in accordance with ASTM E119.

6.3 Report of a room corner fire test in accordance with UL 1715 or UBC Standard 26-3.

6.4 Report of a diaphragm load test.

6.5 Reports of header load tests.

6.6 Reports of cyclic racking shear load testing in accordance with Appendix A of AC04.

7.0 IDENTIFICATION

7.1 The panels must have a label bearing, at a minimum, the name and address of the panel manufacturer (Premier Building Systems or Extreme Panel Technologies), the product panel number, the plant identification number (see Table 1), the density of the panel core, and the evaluation report number (ESR-1882).

7.2 The I-joist splines are labeled with the company name of International Beams, Inc., and the evaluation report number (ESR-1290).

TABLE 1—MANUFACTURING LOCATIONS

LOCATIONS	LOCATION NUMBERS FOR PRODUCT IDENTIFICATION
Premier Building Systems 19727 57th Avenue East Puyallup, Washington 98375	PB-34
Premier Building Systems 1155 Business Park Drive, Building A Dixon, CA 95620	PB-33
Extreme Panel Technologies, Inc. 475 East 4th Street North Cottonwood, MN 56229	EPT-01

TABLE 2—ALLOWABLE UNIFORM TRANSVERSE LOADS FOR FACE SUPPORTED PREMIER TYPE S PANELS[1,2,3] (psf)

PANEL CORE THICKNESS (inches)	DEFLECTION	PANEL SPAN								
		8 ft	10 ft	12 ft	14 ft	16 ft	18 ft	20 ft	22 ft	24 ft
$3^1/_2$[4]	$L/360$	38	28	21	16	10	---	---	---	---
	$L/240$	54	43	32	24	16	---	---	---	---
	$L/180$	61*	57	45	34	21	---	---	---	---
$5^1/_2$[5]	$L/360$	49	38	30	24	18	14	11	---	---
	$L/240$	78	57	45	32	28	22	16	---	---
	$L/180$	80*	60*	46*	40*	34*	29	21	---	---
$7^1/_4$[6]	$L/360$	59	75	41	34	26	20	15	13	11
	$L/240$	84	75*	60	50	39	31	23	19	18
	$L/180$	85*	75*	69*	60*	50*	41	31	27	24
$9^1/_4$[7]	$L/360$	78	64	53	41	33	27	22	20	17
	$L/240$	86*	65*	57*	51*	46*	41	34	29	25
	$L/180$	86*	65*	57*	51*	46*	42	39*	37*	34
$11^1/_4$[7]	$L/360$	94*	75	51	49	47	38	28	24	21
	$L/240$	94*	76*	59*	55*	51*	45*	39*	36	31
	$L/180$	94*	76*	59*	55*	51*	45*	39*	36*	33*

For **SI:** 1 inch = 25.4 mm, 1 psf = 47.9 Pa, 1 foot = 304.8 mm.

[1]Floor panels must have a minimum $^3/_4$-inch-thick top skin or a minimum $^7/_{16}$-inch-thick top skin overlaid with minimum $^7/_{16}$-inch-thick finish flooring perpendicular to the panels.

[2]The tabulated values are for Type S panels installed as roof and floor panels with simply supported single span conditions with panels supported at each end on a minimum $1^1/_2$-inch-wide continuous support in contact with the panel face. When Type S panels are installed as wall panels with single span simply supported conditions with the panels supported each end by 2-by dimensional lumber plates (No.2 or better Douglas fir–larch with a minimum specific gravity of 0.50) installed in the core recesses each end of the panel, the tabulated values must be adjusted by a multiplication factor of 0.85. Further reduction on the tabulated allowable transverse load values must be considered when lower grade and other species of lumber plates are used. The tabulated values are applicable to panels installed with the strong axis of the OSB panel facers parallel to the panel span.

[3]Allowable loads with an asterisk, *, indicates a capacity based on the average peak test load divided by 3.

[4]$3^1/_2$-inch-thick core panels must be limited to a maximum span of 10 feet when used in roof applications.

[5]$5^1/_2$-inch-thick core panels must be limited to a maximum span of 12 feet when used in roof applications.

[6]$7^1/_4$-inch-thick core panels must be limited to a maximum span of 14 feet when used in roof applications.

[7]$9^1/_4$-inch- and $11^1/_4$-inch-thick core panels must be limited to a maximum span of 16 feet when used in roof applications.

TABLE 3—ALLOWABLE UNIFORM TRANSVERSE LOADS FOR FACE SUPPORTED PREMIER TYPE I PANELS (psf)

PANEL CORE THICKNESS (inches)	DEFLECTION	PANEL SPAN									
		4 ft[4]	8 ft	10 ft	12 ft	14 ft	16 ft	18 ft	20 ft	22 ft	24 ft
9 1/4[5]	L/360	185	164*	124*	71	66	60	48	34	29	24
	L/240	318*	164*	124*	107*	96*	84*	70	49	43	36
	L/180	318*	164*	124*	107*	96*	84*	76*	69	56	47
11 1/4[5]	L/360	244	143*	103*	84	83	77*	61	42	37	32
	L/240	318*	143*	103*	93*	85*	77*	68*	59*	54*	47
	L/180	318*	143*	103*	93*	85*	77*	68*	59*	54*	49*

For **SI:** 1 inch = 25.4 mm, 1 psf = 47.9 Pa, 1 foot = 304.8 mm.

[1]Floor panels must have a minimum 3/4-inch-thick top skin or a minimum 7/16-inch-thick top skin overlaid with minimum 7/16-inch-thick finish flooring perpendicular to the panels.
[2]The tabulated values are for panels installed as roof and floor panels with simply supported single span conditions with panels supported at each end on a minimum 1 1/2-inch-wide continuous support in contact with the panel face. Tabulated values are applicable to panels installed with the strong axis of the OSB panel facers parallel to the panel span.
[3]Allowable loads with an asterisk, *, indicates a capacity based on the average peak test load divided by 3.
[4]Panels spanning 4 feet must be a minimum of 8 feet long spanning a minimum of two 4 foot spans. No single span conditions shall be permitted.
[5]9 1/4- and 11 1/4-inch-thick core panels must be limited to a maximum span of 20 feet when used in roof applications.

TABLE 4—UNIFORM TRANSVERSE LOADS FOR FACE SUPPORTED PREMIER TYPE L PANELS[1,2,3] (psf)

PANEL CORE THICKNESS (inches)	DEFLECTION	PANEL SPAN									
		4 ft[4]	8 ft	10 ft	12 ft	14 ft	16 ft	18 ft	20 ft	22 ft	24 ft
3 1/2[5]	L/360	98	45	32	24	16	11	----	----	----	----
	L/240	215	67	47	34	24	16	----	----	----	----
	L/180	298*	90	61	44	34	22	----	----	----	----
5 1/2[6]	L/360	241	128	57	41	33	25	20	15	----	----
	L/240	288*	182*	86	60	49	37	29	22	----	----
	L/180	288*	182*	112*	79	65	49	39	29	----	----
7 1/4[7]	L/360	241	168	80	65	54	42	33	24	----	----
	L/240	288*	188*	126	99	81	61	49	34	----	----
	L/180	288*	188*	133*	117*	105	80	62	44	----	----
9 1/4[8]	L/360	274	188*	116	100	80	62	47	35	32	28
	L/240	326*	188*	147*	134*	120	92	70	52	46	41
	L/180	326*	188*	147*	134*	121*	108*	93	68	61	53
11 1/4[8]	L/360	327*	188*	167*	140	116	90	75	57	47	36
	L/240	327*	188*	167*	153*	132*	110*	97*	83*	69	53
	L/180	327*	188*	167*	153*	132*	110*	97*	83*	83*	70

For **SI:** 1 inch = 25.4 mm, 1 psf = 47.9 Pa, 1 foot = 304.8 mm.

[1]Floor panels must have a minimum 3/4-inch-thick top skin or a minimum 7/16-inch-thick top skin overlaid with minimum 7/16-inch-thick finish flooring perpendicular to the panels.
[2]The tabulated values are for roof and floor panels installed with simply supported single span conditions with panels supported at each end on a minimum 1 1/2-inch-wide continuous support in contact with the panel face. Tabulated values are applicable to panels installed with the strong axis of the OSB panel facers parallel to the panel span.
[3]Allowable loads with an asterisk, *, indicates a capacity based on the average peak test load divided by 3.
[4]Panels spanning 4 feet shall be a minimum of 8 feet long spanning a minimum of two 4 foot spans. No single span conditions must be permitted.
[5]3 1/2-inch thick core panels must be limited to a maximum span of 10 feet when used in roof applications.
[6]5 1/2-inch thick core panels must be limited to a maximum span of 14 feet when used in roof applications.
[7]7 1/4-inch thick core panels must be limited to a maximum span of 18 feet when used in roof applications.
[8]9 1/4 and 11 1/4-inch thick core panels shall be limited to a maximum span of 20 feet when used in roof applications.

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TABLE 5—ALLOWABLE UNIFORM AXIAL LOADS FOR PREMIER TYPE S PANELS (plf)[1,2,3,4,5]

PANEL CORE THICKNESS (inches)	PANEL SPAN					
	8 ft	10 ft	12 ft	16 ft	20 ft	24 ft
3 1/2	3,500	2,555	2,450	2,120	----	----
5 1/2	4,250	4,040	3,375	3,920	2,815	----
7 1/4	4,915	4,325	4,475	4,195	3,495	3,065
9 1/4	4,200	4,200	4,200	4,200	3,389	3,247
11 1/4	3,890	3,890	3,890	3,890	3,890	3,333

For **SI:** 1 inch = 25.4 mm, 1 plf = 14.6 N/m, 1 foot = 304.8 mm.

[1]For the allowable axial load on the fire-resistance-rated assembly, see Section 4.2.6.
[2]For combined loads; requirements in Section 4.1 must be applied.
[3]The tabulated loads are uniform axial loads applied concentrically to the full thickness of the panels, including panel facings.
[4]The tabulated values are for panels installed with strong axis of the OSB panel facers parallel to the wall height (panel span) and on concrete foundations. The member, element, or structure supporting the bearing wall panels, as shown in Figures 7, 8 and 9, must be designed for the bearing stress of the wall panels to the satisfaction to the code official.
[5] The maximum allowable axial load is limited to 71 percent of the reported allowable axial load when panels are used as shear walls.

TABLE 6—ALLOWABLE UNIFORM AXIAL LOADS FOR PREMIER TYPE L PANELS (plf)[1,2,3,4,5,6]

PANEL CORE THICKNESS (inches)	PANEL SPAN					
	8 ft	10 ft	12 ft	16 ft	20 ft	24 ft
3 1/2	4,725	3,905	3,095	2,350	----	----
5 1/2	5,850	5,890	4,280	4,310	2,933	----
7 1/4	6,850	6,110	5,555	5,180	4,835	4,080
9 1/4	5,470	5,470	5,470	5,470	5,470	4,250
11 1/4	4,500	4,333	4,167	3,750	3,750	3,333

For **SI:** 1 inch = 25.4 mm, 1 plf = 14.6 N/m, 1 foot = 304.8 mm.

[1]For the allowable axial load on fire-resistance-rated assembly, see Section 4.2.7.
[2]For combined loads; requirements in Section 4.1 must be applied.
[3]The tabulated loads are uniform axial loads applied concentrically to the full thickness of the panels, including panel facings.
[4]The tabulated values are for panels installed with strong axis of the OSB panel facers parallel to the wall height (panel span) on concrete foundations. The member, element, or structure supporting the bearing wall panels, as shown in Figures 7, 8 and 9, must be designed for the bearing stress of the wall panels to the satisfaction to the code official.
[5] The maximum allowable axial load is limited to 51 percent of the reported allowable axial load when panels are used as shear walls.
[6] The spacing of the lumber splines must not exceed 48 inches on center.

TABLE 7—ALLOWABLE CONCENTRATED AXIAL LOADS FOR PREMIER TYPE S AND L WALL PANELS (lbs)

	1 1/2-inch Minimum Bearing Width	3-inch Minimum Bearing Width
Standard Detail	2,040	2,450
Additional Cap Plate[1]	4,030	4,680

For **SI:** 1 inch = 25.4 mm, 1 lb. = 4.45 N.

[1]See Figure 14 of this report.
[2]For combined loads; requirements in Section 4.1 must be applied.
[3]The tabulated loads are concentrated axial loads applied concentrically to the full thickness of the panels, including panel facings.
[4]The tabulated values are for panels installed with strong axis of the OSB panel facers parallel to the wall height (panel span) on concrete foundations. The member, element, or structure supporting the bearing wall panels, as shown in Figures 7, 8 and 9, must be designed for the bearing stress of the wall panels to the satisfaction to the code official.

TABLE 8—ALLOWABLE UNIFORM GRAVITY LOADS FOR PREMIER SIP CONTINUOUS HEADER WITHOUT SPLINES[1,2,3] (plf)

HEADER DEPTH (inches)	DEFLECTION	HEADER SPAN			
		4 ft	6 ft	8 ft	10 ft
12	$L/360$	740	385	229	142
	$L/240$	740	385	229	142
	$L/180$	740	385	229	142
18	$L/360$	798	574	385	311
	$L/240$	798	574	385	311
	$L/180$	798	574	385	311
24	$L/360$	886	629	429	361
	$L/240$	886	629	429	361
	$L/180$	886	629	429	361

For **SI:** 1 inch = 25.4 mm, 1 plf = 14.6 N/m, 1 foot = 304.8 mm.

[1]Limited to ultimate failure load divided by a safety factor of 3.0.
[2]Support and connections must be designed for each installation. Where a concentrated load is placed over an opening or the design loads exceed the capacity of a SIP panel header, an engineered header assembly is required.
[3]Top and bottom plates must be nominal 2-by No. 2 or better Douglas fir–larch dimensional lumber having a minimum specific gravity of 0.50.

TABLE 9—ALLOWABLE UNIFORM GRAVITY LOADS FOR PREMIER SIP HEADER WITH OSB SPLINES[2,3] (plf)

HEADER DEPTH (inches)	DEFLECTION	HEADER SPAN			
		4 ft	6 ft	8 ft	10 ft
12	$L/360$	345	245	156	99
	$L/240$	450	295	190	125
	$L/180$	630	382	236[1]	153[1]
18	$L/360$	705[1]	388	255	235
	$L/240$	750[1]	482	302[1]	281[1]
	$L/180$	750[1]	482	302[1]	281[1]
24	$L/360$	700[1]	555[1]	368[1]	350[1]
	$L/240$	895[1]	555[1]	368[1]	350[1]
	$L/180$	895[1]	555[1]	368[1]	350[1]

For **SI:** 1 inch = 25.4 mm, 1 plf = 14.6 N/m, 1 foot = 304.8 mm.

[1]Limited to ultimate failure load divided by a safety factor of 3.0.
[2]Support and connections must be designed for each installation. Where a concentrated load is placed over an opening or the design loads exceed the capacity of a SIP panel header, an engineered header assembly is required.
[3]Top and bottom plates must be nominal 2-by No.2 or better Douglas fir–larch dimensional lumber having a minimum specific gravity of 0.50.

TABLE 10—ALLOWABLE SHEAR WALL LOADS FOR PREMIER WALL PANELS IN SEISMIC DESIGN CATEGORIES A, B, AND C[1,6]

PANEL TYPE	PANEL CORE THICKNESS (inches)	MINIMUM OSB FACE THICKNESS (inches)	MINIMUM FASTENING REQUIREMENTS[2]				ALLOWABLE RACKING SHEAR LOAD (plf)
			Framing Member[3]		Splines		
			Fasteners	Spacing	Fasteners	Spacing	
L or S	$3\frac{1}{2}$, $5\frac{1}{2}$, $7\frac{1}{4}$	$\frac{7}{16}$	8d box nail	6 inches	8d box nail	6 inches	300
S	$3\frac{1}{2}$, $5\frac{1}{2}$, $7\frac{1}{4}$	$\frac{7}{16}$	8d box nail	4 inches	No. 6 Screw[4]	4 inches	600[5]

For **SI:** 1 inch = 25.4 mm, 1 plf = 14.6 N/m.

[1]The maximum panel height-to-width ratio shall be 1:1.
[2]Fasteners are installed on both panel faces. Nails must comply with ASTM F1667 and have a minimum bending yield strength of 100 ksi (689 MPa).
[3]The wall framing includes a double nominally 2-by solid sawn dimensional lumber end post, a double nominally 2-by solid sawn dimensional lumber top plate and a single nominally 4-by solid sawn dimensional lumber bottom plate. The framing lumber must be a minimum of Douglas fir-larch having a minimum specific gravity of 0.50.
[4]Screws are No. 6 x $1\frac{1}{4}$-inch-long Type W drywall screws.
[5]Two top plates are required with fasteners attaching the OSB to both plates.
[6]The tabulated allowable racking shear loads are for panels installed with strong axis of the OSB panel facers parallel to the wall height (panel span). The member, element, or structure supporting the shear walls, as shown in Figures 7 through 9, must be designed and detailed by a registered design professional in accordance with this evaluation report to the satisfaction to the code official.

TABLE 11—ALLOWABLE SHEAR WALL LOADS FOR PREMIER WALL PANELS[1,2,9] IN SEISMIC DESIGN CATEGORIES A THROUGH F

SHEAR WALL PANEL			MINIMUM FASTENING REQUIREMENT[7,8]			ALLOWABLE RACKING SHEAR LOAD (plf)
Wall Configuration	Panel Type	Facing Thickness (in.)	End Posts[3,5]	Plates[4,5]	Spline[6]	
A	S	7/16	Two rows 8d box nails 3" O.C. staggered (3/8" edge distance and 3/4" edge distance)	Two rows 8d box nails 3" O.C. staggered (3/8" edge distance and 3/4" edge distance)	Two rows 8d box nails 3" O.C. staggered (3/8" edge distance and 3/4" edge distance)	570
B	S	7/16	Two rows 8d box nails 2" O.C. staggered (3/8" edge distance and 3/4" edge distance)	Two rows 8d box nails 2" O.C. staggered (3/8" edge distance and 3/4" edge distance)	Two rows 8d box nails 2" O.C. staggered (3/8" edge distance and 3/4" edge distance)	835
C[10]	L or S	7/16	Single row 8d box nails at 6" o.c.	Single row 8d box nails at 6" o.c.	Single row 8d box nails at 6" o.c.	300

For **SI:** 1 inch = 25.4 mm, 1 plf = 14.6 N/m.

[1]The maximum shear wall height to width aspect ratio is 1:1.
[2]The panel core thicknesses are 3 1/2 inches, 5 1/2 inches, and 7 1/4 inches.
[3]A single nominally 4-by solid sawn dimensional lumber and must be installed at each end of shear wall segment.
[4]A double nominally 2-by solid sawn dimensional lumber top plate and a single 2-by solid sawn lumber bottom plate.
[5]The framing members must be a minimum of No. 2 Douglas fir–larch having a minimum specific gravity of 0.50.
[6]OSB surface splines (23/32-inch-thick) or OSB block splines with 23/32-inch-thick OSB facers must be installed at interior panel-to-panel joints only. Solid sawn dimensional lumber end posts are required at each end of each shear wall segment.
[7]Fasteners are installed on both panel faces. Nails must comply with ASTM F1667 and have a minimum bending yield strength of 100 ksi (689 MPa).
[8]Connections of shear wall end posts, hold-downs, and plates to other structural elements must be designed by a registered design professional in accordance with the applicable code.
[9]The tabulated allowable racking shear loads are for panels installed with strong axis of the OSB panel facers parallel to the wall height (panel span) and supported directly on a rigid support, such as a concrete foundation. The member, element, or structure supporting the shear walls, as shown in Figures 7 through 9, must be designed and detailed by a registered design professional in accordance with this evaluation report to the satisfaction to the code official.
[10] Configuration C is recognized as both load-bearing and nonload-bearing shear walls under the following provisions:

a. When used as load-bearing shearwall panels, the allowable axial load must be determined in accordance with Table 5 or 6, as applicable, of this report.
b. A hold-down device must be attached to the vertical studs at each end of the shear wall assembly. Installation of the hold-down devices must be in accordance with the hold-down device manufacturer's instructions and as designed by the registered design professional.
c. The wall panels must be installed in a manner such that both facings of the wall panels are equally and uniformly restrained at the top and bottom of the panels. The member, element or structure supporting the shear wall and the vertical restraint provided to the facers of the SIPs at the top and bottom of wall panel must be designed and detailed by a registered design professional.
d. Shearwall assemblies may be used with a maximum shearwall height-to-length ratio of 3.5:1, provided the maximum wall height is 96 inches and no splines are used in the assembly. Wall heights greater than 96 inches are outside scope of this report.

TABLE 12—ALLOWABLE UNIFORM LOADS FOR PREMIER SIP DIAPHRAGMS[1]

MINIMUM OSB FACE THICKNESS (inches)	ATTACHMENTS						SHEAR (plf)
	Diaphragm Perimeter[2]		Panel Joints – Top Only[3]		Panel Joints – Top & Bottom[4]		
	Fasteners	Spacing	Fasteners	Spacing	Fasteners	Spacing	
7/16	PBS Screw[5]	12 inches	8d box nail	3 inches	8d box nail	6 inches	435[6]
7/16	PBS Screw[5]	3 inches	8d box nail	2 inches	8d box nail	4 inches	540[7]
7/16	PBS Screw[5]	2 inches	8d box nail	1 1/2 inches	8d box nail	3 inches	750[8]

For **SI:** 1 inch = 25.4 mm, 1 plf = 14.6 N/m.

[1]The joints of the panels in diaphragms are not staggered. The nominal thickness of diaphragm ranges from 4 inches to 12 inches and the maximum diaphragm length-to-width ratio shall be 4 1/2:1.
[2]See Figure 15 of this report.
[3]See Figure 16 of this report.
[4]See Figure 17 of this report.
[5]See description of Premier SIPs screw in Section 3.2.5 and Figures 15 through 17 for screw installation. The screws must have a minimum penetration of 2-inches into panel supports having a minimum of nominal 4 by 6, No. 2 or better hem fir solid sawn dimensional lumber with a minimum specific gravity of 0.43.
[6]The deflection of the 36 foot span for the diaphragm at 435 plf was 0.41 inch.
[7]The deflection of the 36 foot span for the diaphragm at 510 plf was 0.37 inch.
[8]The deflection of the 36 foot span for the diaphragm at 750 plf was 0.37 inch.

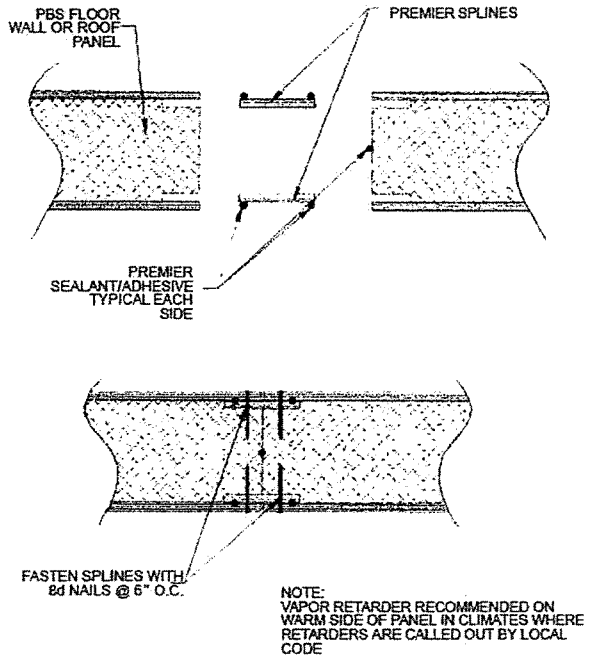


FIGURE 1

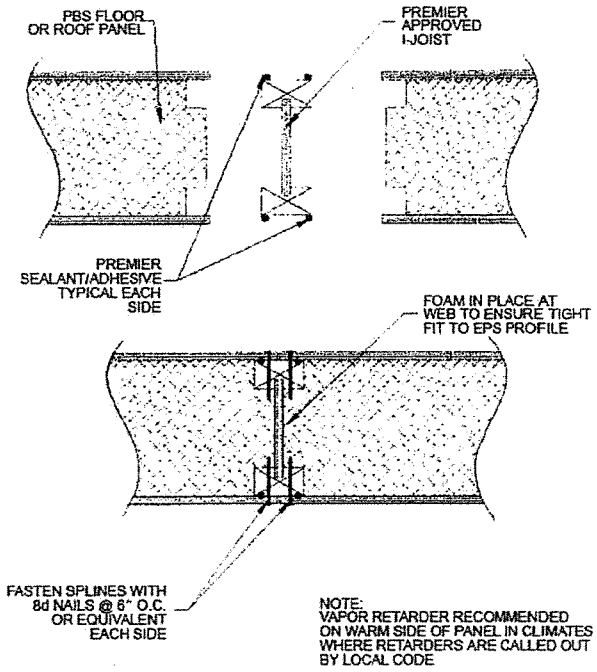


FIGURE 2

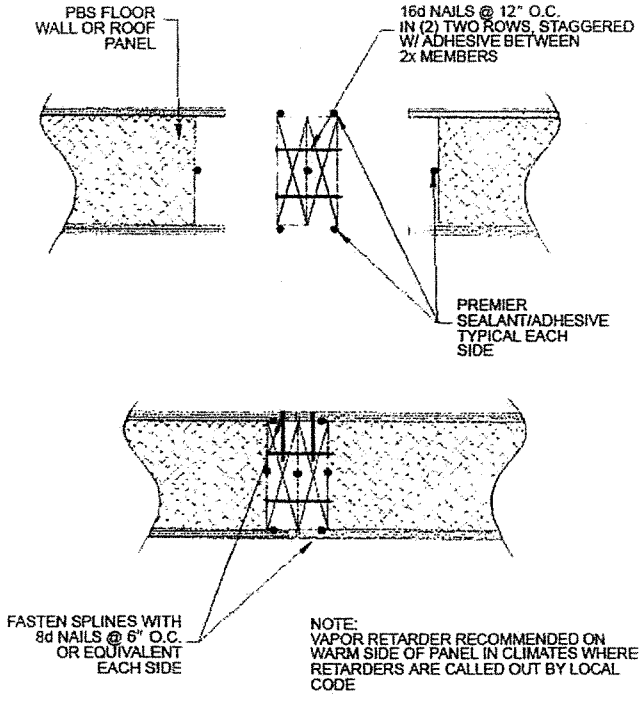


FIGURE 3

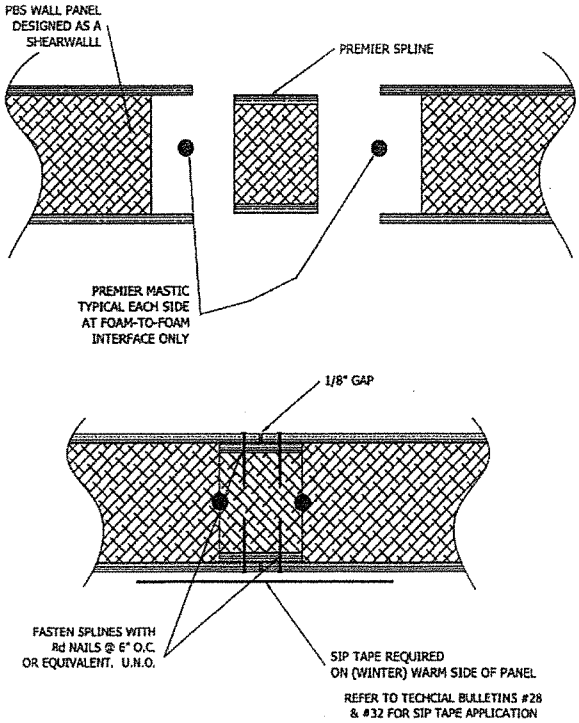


FIGURE 4

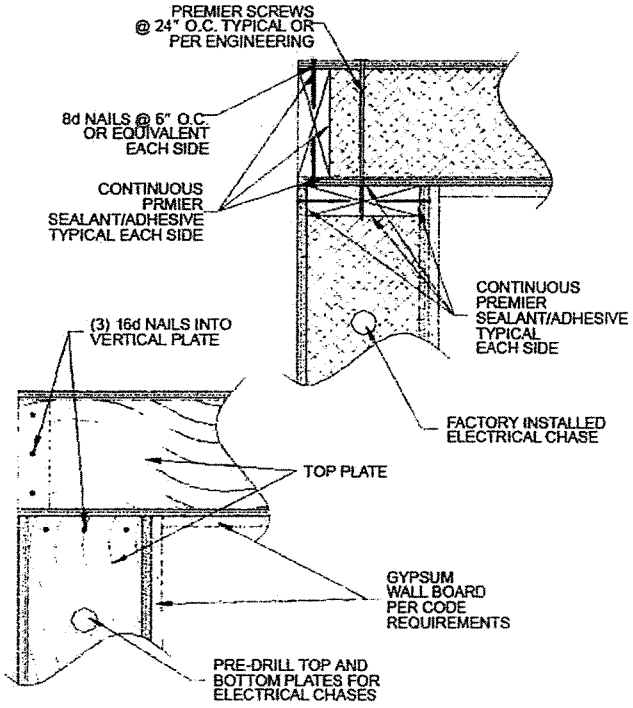


FIGURE 5

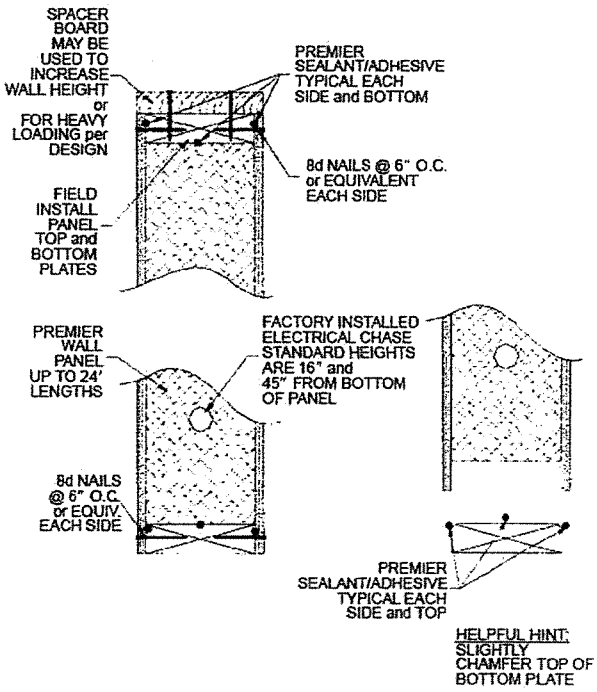


FIGURE 6

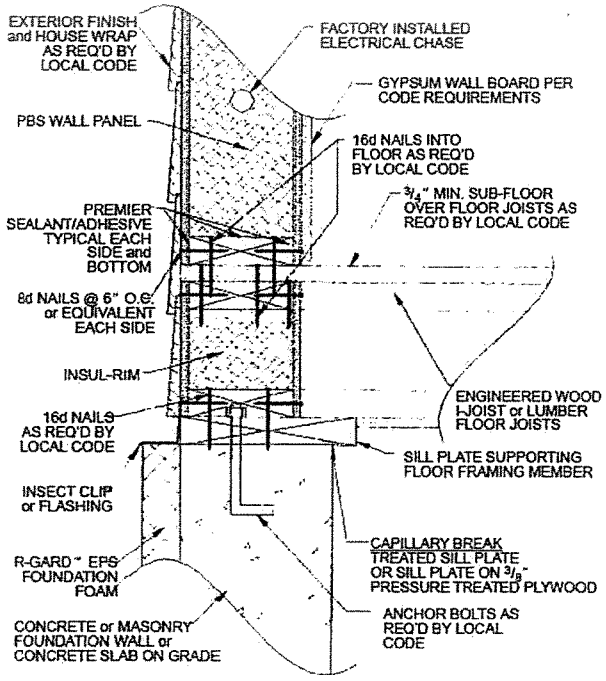


FIGURE 7

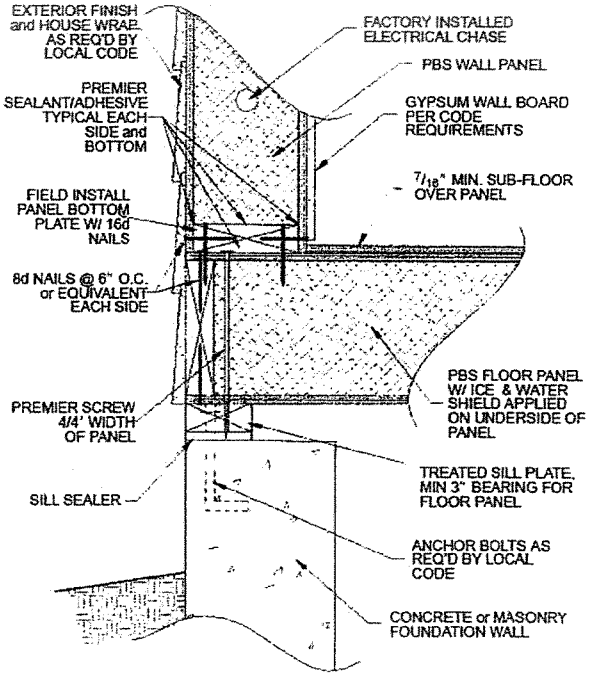


FIGURE 8

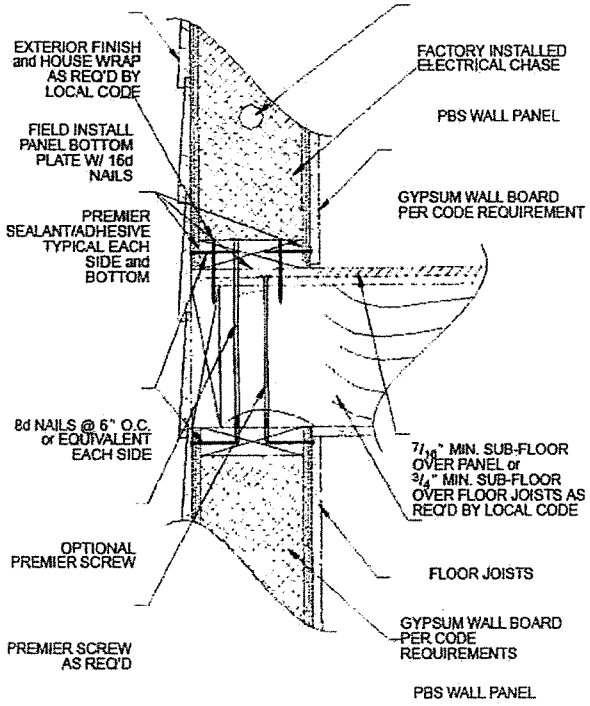


FIGURE 9

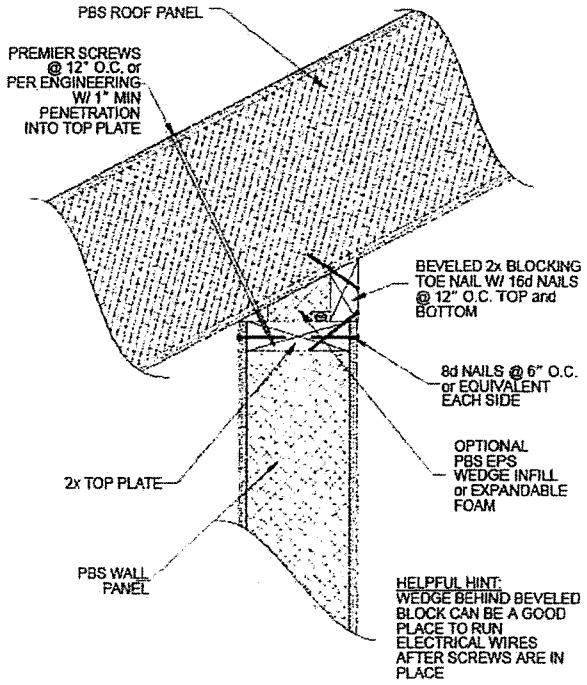


FIGURE 10

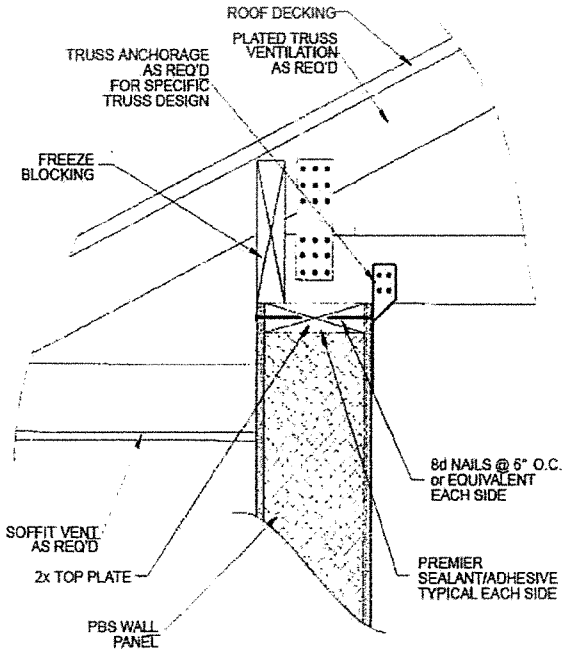


FIGURE 11

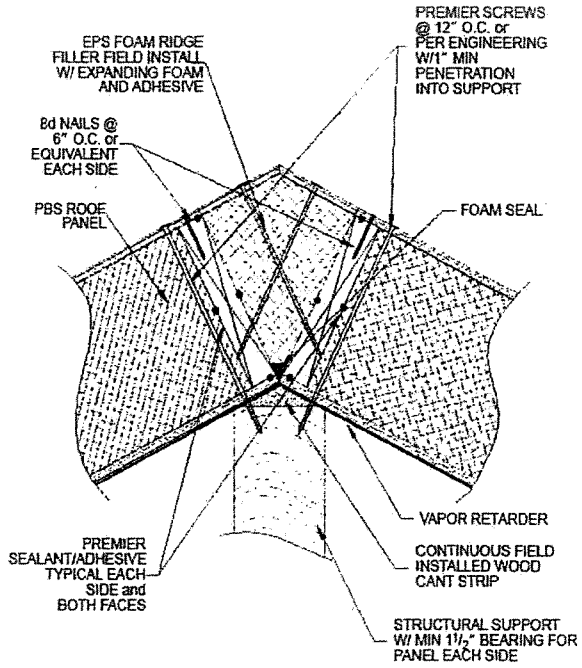


FIGURE 12

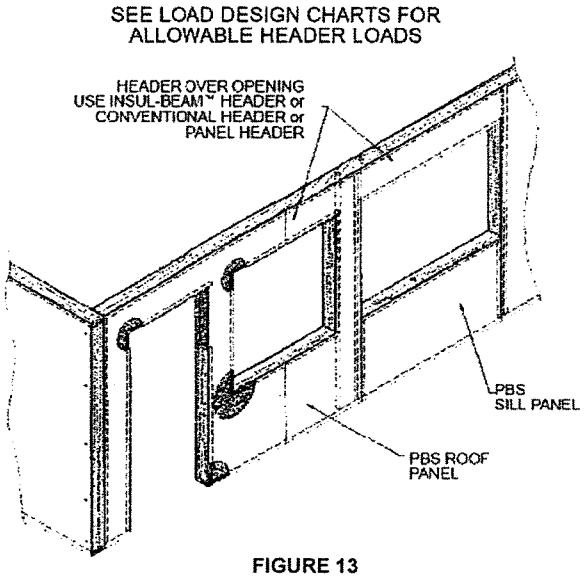


FIGURE 13

Premier Cap Plate - standard 2x lumber, 1 1/8" OSB or 1 1/8" OSL (Rimboard), which has been ripped to the overall width of the wall panel so that the OSB skins of the panel are covered by the ripped material

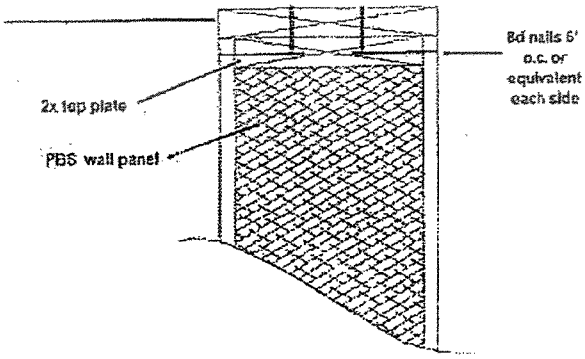


FIGURE 14

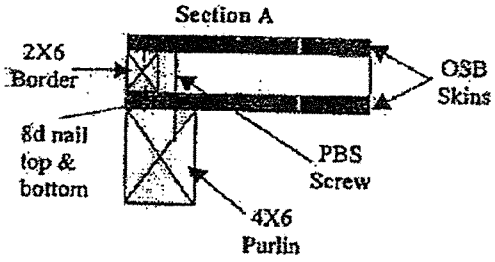


FIGURE 15

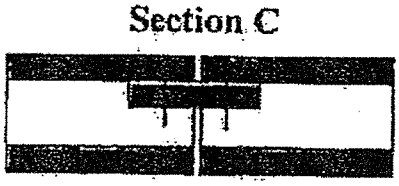


FIGURE 16

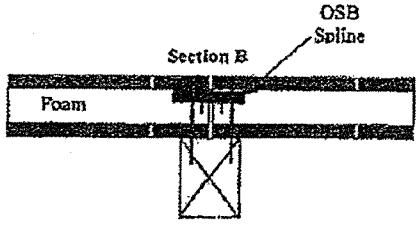


FIGURE 17

CSI 06 12 00
PRODUCT: Structural Insulated Panels (SIP)
DIVISION: Wood, Plastics and Composites
SECTION: Structural Panels

ACCREDITED Product Certification Agency

Report Holder
Premier Building Systems, LLC
18504 Canyon Road East
Puyallup, WA 98375

Manufacturing Locations

Premier Building Systems, LLC (NTA Plant #705)
18504 Canyon Road East
Puyallup, WA 98375

Additional Licensee
Extreme Panel Technologies, Inc. (NTA Plant #677)
475 East 4th Street North
Cottonwood, MN 56229

1. SUBJECT

1.1 ***PremierSIPs; Type S, Type I and Type L Structural Insulated Panels***

1.1.1 ***Wall SIPs 8 ft to 24 ft tall, 3-1/2 in. to 11-1/4 in. core thickness***

1.1.2 ***Floor and Roof SIPs 8 ft to 24 ft long, 3-1/2 in. to 11-1/4 in. core thickness***

1.1.3 ***Header SIPs 12 in., 18 in. and 24 in. depths, 3-1/4 in. to 7-1/4 in. core thickness for spans of 4 ft to 10 ft***

2. SCOPE

NTA, Inc. has evaluated the above product(s) for compliance with the applicable sections of the following codes:

2.1 2012, 2015 International Building Code (IBC)

2.2 2012, 2015 International Residential Code (IRC)

NTA, Inc. has evaluated the above product(s) in accordance with:

2.3 ICC-ES AC04-12(2015) Acceptance Criteria for Sandwich Panels

2.4 NTA IM 014 Structural Insulated Panel Evaluation

2.5 NTA IM36 Quality System Requirements

NTA, Inc. has evaluated the following properties of the above product(s):

2.6 Structural performance under axial, transverse and in-plane shear loads

2.7 Structural performance as a component of a rated fire resistive assembly

To obtain the most current NTA NER Report, visit www.ntainc.com/report.

3. USES

3.1 General. *PremierSIPs* are structural insulated roof, wall and floor panels capable of resisting transverse, axial and in-plane shear loads.

3.2 Construction Types. *PremierSIPs* shall be considered combustible building elements when determining the Type of Construction in accordance with IBC Chapter 6. (IM 014 NACU1)

3.3 Fire Resistive Assemblies. *PremierSIPs* may be used as a component of a fire-rated assembly if suitable evidence and details are submitted and approved by the authority having jurisdiction. (IM 014 ACU14) Details of fire rated assemblies can be found in Section 6.11.

4. DESCRIPTION

4.1 General. *PremierSIPs* are factory-assembled, engineered-wood-faced, structural insulated panels (SIP) with an expanded polystyrene (EPS) foam core. The SIPs are intended for use as load-bearing or non-load bearing wall panels, roof panels, floor panels and headers. The SIPs are available in 3-1/2 in. through 11-1/4 in. core thicknesses. The SIPs are custom made to the specifications for each use and are assembled under factory-controlled conditions. The maximum SIP size is 8 ft wide and up to 24 ft in length.

4.2 Materials

4.2.1 Facing. The facing consists of two single-ply oriented strand board (OSB) facings a minimum of 7/16 in. thick conforming to 2009 IRC Table 613.3.2 and DOC PS 2-92, Exposure 1, Rated Sheathing with a span index of 24/16. Panels may be manufactured with the facing strength axis oriented either parallel or perpendicular to the direction of SIP bending provided the appropriate strength values are used. (IM 014 ACU4)

4.2.2 Core. The core material is EPS foam conforming to ASTM C578, Type I. The foam core, up to 4 in. thickness, has a flame spread rating not exceeding 25 and a smoke-developed rating not exceeding 450 when tested in accordance with ASTM E84. The panels, up to 11-1/4 in. core thickness, comply with IBC Section 2603.3 Exception 4.

4.2.3 Adhesive. Facing materials are adhered to the core material using a structural adhesive. The adhesive is applied during the lamination process in accordance with the in-plant quality system documentation.

4.2.4 Material Sources. The facing, core and adhesive used in the construction of *PremierSIPs* shall be composed only of materials from approved sources as identified in the in-plant quality system documentation.

4.2.5 Splines. *PremierSIPs* are interconnected with surface splines or block splines (Type S panels), engineered structural splines (Type I panels) or dimensional lumber splines (Type L panels).

4.2.5.1 Surface Splines. Surface splines (Figure 1) consist of 3 in. or 4 in. wide by minimum 7/16 in. thick OSB facing material. At each panel joint, one surface spline is inserted into each of two tight-fitting slots in the core. The slots in the core are located just inside the facing.

4.2.5.2 Block Splines. Block splines (Figure 1) are manufactured in the same manner as the SIP except with an overall thickness that is 1 in. less than the overall thickness of the panel to be joined.

4.2.5.3 Structural Splines. Structural splines consist of one or more plies of dimensional lumber or an engineered wood product (Figure 1). Acceptable sources for engineered wood products are listed in the in-plant quality system documentation.

5. DESIGN

5.1 Overall Structural System. The scope of this report is limited to the evaluation of the SIP panel component. Panel connections and other details related to incorporation of the panel into the overall structural system of a building are beyond the scope of this report. (IM 014 NACU3)

5.2 Design Approval. Where required by the authority having jurisdiction, structures using *PremierSIPs* shall be designed by a registered design professional. Construction documents, including engineering calculations and drawings providing floor plans, window details, door details, and connector details, shall be submitted to the code official when application is made for a permit. The individual preparing such documents shall possess the necessary qualifications as required by the applicable code and the professional registration laws of the state where the construction is undertaken. Approved construction documents shall be available at all times on the jobsite during installation. (IM 014 NACU4)

5.3 Design Loads. Design loads to be resisted by the SIPs shall be as required under the applicable building code. Loads on the SIPs shall not exceed the loads noted in this report.

5.4 Allowable Loads. Allowable axial, transverse, and in-plane shear loads shall be selected from Tables 1 through 10. Calculations demonstrating that the loads applied are less than the allowable loads described in this report shall be submitted to the code official for approval. (IM 014 NACU5) For loading conditions not specifically addressed herein, structural members designed in accordance with accepted engineering practice shall be provided to meet applicable code requirements.

5.5 Concentrated Load. Axial loads shall be applied to the SIP through continuous members such as structural insulated roof or floor panels or repetitive members spaced at regular intervals of 24 in. on center or less. Such members shall be fastened to a rim board or similar member to distribute the load to the SIP. Where a rim board or similar member is not provided, the reaction at the end of each member shall not exceed the concentrated loads provided in Table 6. (IM 014 ACU12)

5.6 Eccentric and Side Loads. Axial loads shall be applied concentrically to the top of the SIP. Loads shall not be applied eccentrically or through framing attached to one side of the panel (such as balloon framing) except where additional engineering documentation is provided. (IM 014 ACU13)

5.7 Openings. Except as provided in Tables 7 and 8, openings in panels shall be reinforced with wood or steel designed in accordance with accepted engineering practice to resist all loads applied to the opening as required by the adopted code. Details for door and window openings shall be provided to clarify the manner of supporting axial, transverse and/or in-plane shear loads at openings. Such details shall be shown on approved design documents and subject to approval by the local authority having jurisdiction. (IM 014 ACU8)

5.8 In-Plane Shear Design. Shear walls utilizing block, surface or lumber splines shall be sized to resist all code required wind and seismic loads without exceeding the allowable loads provided in Table 9. Shear wall chords, hold-downs and connections to transfer shear forces between the wall and surrounding structure shall be designed in accordance with accepted engineering practice. The allowable loads provided in Table 9 as published, are limited to assemblies with height-to-width ratios not exceeding those published in Footnote 1 of Table 9. The allowable loads for shear walls using dimensional lumber splines may be adjusted in accordance with Footnote 5 of Tables 9 and 10. (IM 014 ACU17)

5.8.1 Seismic Design Categories A, B and C. The use of the shear wall configurations in Table 9 is limited to structures in Seismic Design Categories A, B and C. Where SIPs are used to resist seismic forces, the following factors shall be used for design: Response Modification Coefficient, R = 2.0; System Overstrength Factor, Ω_0= 2.5; Deflection Amplification Factor, C_d = 2.0.(IM 014 ACU16)

5.9 Horizontal Diaphragms. Horizontal diaphragms utilizing surface splines shall be sized to resist all code required wind and seismic loads without exceeding the allowable loads provided in Table 10. Diaphragm chords and connections to transfer shear forces between the diaphragm and surrounding structure shall be designed in accordance with accepted engineering practice. The maximum diaphragm length-to-width ratio shall not exceed those specified in Table 10. (IM 014 ACU18)

5.10 Combined Loads. Panels subjected to any combination of axial, transverse or in-plane shear loads shall be analyzed utilizing a straight line interaction.

5.11Plumbing Installation Restrictions. Plumbing and waste lines may extend at right angles through the wall panels but are not permitted vertically within the core. Lines shall not interrupt splines or panel plates unless approved by a registered design professional. (IM 014 NACU2)

6. INSTALLATION

6.1 General. *PremierSIPs* shall be fabricated, identified and erected in accordance with this report, the approved construction documents and the applicable code. In the event of a conflict between the manufacturer's published installation instructions and this report, this report shall govern. Approved construction documents shall be available at all times on the jobsite during installation.(IM 014 NACU7)

6.2 Splines. *PremierSIPs* are interconnected at the panel edges through the use of a spline. The spline type may be of any configuration listed in Section 4.2.5 as required by the specific design. The spline shall be secured in place with not less than 0.113 in. x 2.50 in. smooth shank nails (0.275 in. head diameter), 6 in. on center on both sides of the SIP or an approved equivalent fastener. All joints shall be sealed in accordance with the SIP manufacturer's installation instructions. Alternate spline connections may be required for SIPs subjected to in-plane shear forces. Such SIPs shall be interconnected exactly as required in Table 9 or Table 10 or as directed by the designer.

6.3 Plates. The top and bottom plates of the panels shall be dimensional lumber or engineered wood sized to match the core thickness of the panel. The plates shall be secured using not less than 0.113 in. x 2.50 in. nails (0.275 in. head diameter) spaced 6 in. on center on both sides of the panel or an approved equivalent fastener. Alternate plate connections may be required for panels subjected to in-plane shear forces and shall be interconnected as required in Table 9 or Table 10 or as directed by the designer.

6.4 Cutting and Notching. No field cutting or routing of the panels shall be permitted except as shown on approved drawings. (IM 014 NACU6)

6.5 Protection from Decay. SIPs that rest on exterior foundation walls shall not be located within 8 in. of exposed earth. SIPs supported by concrete or masonry that is in direct contact with earth shall be protected from the concrete or masonry by a moisture barrier.(IM 014 ACU6)

6.6 Protection from Termites. In areas subject to damage from termites, SIPs shall be protected from termites using an approved method. SIPs shall not be installed below grade or in contact with earth.(IM 014 ACU7) (IM 014 ACU22)

6.7 Heat-Producing Fixtures. Heat-producing fixtures shall not be installed in the SIPs unless protected by a method approved by the code official or documented in test reports. This limitation shall not be interpreted to prohibit heat-producing elements with suitable protection.(IM 014 NACU9)

6.8 Voids and Holes

6.8.1 Voids in Core. In lieu of openings designed in accordance with Section 5.7, the following voids are permitted. Voids may be provided in the panel core during fabrication at predetermined locations only. Voids parallel to the panel span shall be limited to a single 1.5 in. maximum diameter hole. Such voids shall be spaced a minimum of 4 ft on center, measured perpendicular to the panel span. Two ½ in. diameter holes may be substituted for the single 1.5 in. diameter hole provided they are maintained parallel and within 2 in. of each other. (IM 014 ACU11) Voids perpendicular to the panel span shall be limited to a single 1.5 in. maximum diameter hole placed not closer than 16 in. from the support. Additional voids in the same direction shall be spaced not less than 28 in. on center.

6.8.2 Holes in Panels. Holes may be placed in SIPs during fabrication at predetermined locations only. Except as noted herein, holes shall be limited to 4 in. x 4 in. square. The minimum distance between holes shall not be less than 4 ft on center measured perpendicular to the panel span and 24 in. on center measured parallel to the panel span. Not more than three holes shall be provided in a single line of holes parallel to the panel span. The holes may intersect voids permitted elsewhere in this report.

When SIPs with 9-1/4 in. or 11-1/4 in. core thickness are used horizontally, holes shall be limited to a maximum 8 in. diameter. The minimum distance between holes shall not be less than 4 ft on center measured perpendicular to the panel span and 4 ft on center measured parallel to the panel span. The minimum distance from the edge of any hole to the support of any SIP shall not be less than 24 in. and the minimum distance from the edge of any hole to any edge of an individual SIP shall not be less than 19 in. When more than three holes are present in a single line parallel to the panel span, the allowable loads in Tables 1 through 3 shall be reduced by 25%. (IM 014 ACU15)

6.9 Panel Cladding

6.9.1 Roof Covering. The roof covering, underlayment and flashing shall comply with the applicable codes. All roofing materials must be installed in accordance with the manufacturer's installation instructions. The use of roof coverings requiring the application of heat during installation shall be reviewed and approved by a registered design professional.

6.9.2 Exterior Wall Covering. Panels shall be covered on the exterior by a water-resistive barrier as required by the applicable code. The water-resistive barrier shall be attached with flashing in such a manner as to provide a continuous water-resistive barrier behind the exterior wall veneer.(IM 014 ACU9) The exterior facing of the SIP wall shall be covered with weather protection as required by the adopted building code or other approved materials.(IM 014 ACU10)

6.10 Interior Wall Covering. The foam plastic core shall be separated from the interior of the building by an approved thermal barrier of ½ in. gypsum wallboard or equivalent thermal barrier where required by IBC Section 2603.4.

6.11 Fire Rated Constructions.

6.11.1 Fire-rated, load-bearing, restrained and unrestrained floor and ceiling assembly using *PremierSIPs*; Type S Structural Insulated Panels – 1 hour. Figure 5.

6.11.1.1 (#1) Structural Insulated Panels. *PremierSIPs* consisting of minimum 7-1/2-in. thick expanded polystyrene (EPS) core laminated between two sheets of minimum 7/16-in. thick oriented strand board (OSB). Panels shall bear the PRS032808-3 listing mark. Maximum fire load shall not exceed 40 psf.

6.11.1.2 (#2) Gypsum Board. For ceiling (exposed side), U.S. Gypsum, *Firecode* (Type X) 5/8-in. thick, 4-ft wide by 10-ft long, applied in two layers. Inner layer installed with gypsum long dimension parallel to SIP spline and offset a minimum of 24-in. from the SIP spline joints. Gypsum joints perpendicular to SIP spline shall be staggered in adjacent panels not less than 7-ft Inner layer shall be secured to the OSB with #6 x 1-1/4-in., Type S, bugle head drywall screws spaced 12-in. on center in rows 24-in. on center. Second layer installed at right angles to inner layer with all joints offset not less than 24-in. from the inner layer. Second layer secured with #7 x 2-in., Type S, bugle head drywall screws spaced 12-in. on center in rows spaced 16-in. on center. Gypsum board joints in the second layer are covered with paper joint tape and joint compound. Screw heads are covered with joint compound.

6.11.1.3 (#3) Surface Spline. Minimum 7/16-in. thick by minimum 3-1/2-in. OSB placed in preformed slots below top (unexposed side). Spline secured with #6 x 1-1/4-in., Type S, bugle head drywall screws spaced 6-in. on center on each side of SIP joint. Block splines, consisting of 7/16-in. thick OSB laminated to nominal 6-1/2-in. EPS, are an acceptable alternative to surface splines.

6.11.2 Fire-rated, load-bearing wall assembly using *PremierSIPs*; Type L Structural Insulated Panels – 1 hour. Figure 6.

6.11.2.1 (#1) Structural Insulated Panels. *PremierSIPs* consisting of minimum 5-1/2-in. thick expanded polystyrene (EPS) core laminated between two sheets of minimum 7/16-in. thick oriented strand board (OSB). Panels shall bear the PRS032808-3 listing mark. Maximum fire load shall not exceed 2200 plf.

6.11.2.2 (#2) Gypsum Board. Standard Gypsum's Type SG-C, *TE generation 3* (Type C) 5/8-in. thick, 4-ft wide by 10-ft long, applied vertically in a single layer on both sides of the SIP. Vertical gypsum joints offset a minimum of 12-in. from SIP spline joints. Gypsum secured to the OSB with 1-5/8-in. long PC cupped head drywall nails spaced 12-in. on center vertically and 16-in. on center horizontally. Gypsum board joints are covered with paper joint tape and joint compound. Nail heads are covered with joint compound.

6.11.2.3 (#3) Spline. Double 2x6 #2 Hem-Fir dimensional lumber. Double lumber members are nailed together with 0.148-in. x 3-1/4-in. coated sinker nails (16d) spaced 24-in. on center staggered along the spline length. The double lumber spline is installed in the recesses between adjacent SIPs and secured to the OSB with 0.122 in. x 2-in. (6d common) nails spaced 6-in. on center. Caulk complying with ASTM C834 is applied to the spline surfaces in contact with the EPS.

6.11.2.4 (#4) Top Plate. Double 2x6 #2 Hem-Fir dimensional lumber. The first plate is installed in a 3-in. deep recess at the top of the SIP and secured to the OSB facings with 0.122-in. x 2-in. (6d common) nails spaced 6-in. on center. The first plate is also secured to each spline with (2) 0.148-in. x 3-1/4-in. (16d common) nails. The second plate is then placed above the first plate and secured to the OSB facings with

0.122-in. x 2-in. (6d common) nails spaced 6-in. on center. The second plate is also secured to the first plate with 0.148-in. x 3-1/4-in. coated sinker nails (16d) spaced 16-in. on center staggered along the plate length. Caulk complying with ASTM C834 is applied to the plate surfaces in contact with the EPS.

6.11.2.5 (#5) Bottom Plate. Single 2xt #2 Hem-Fir dimensional lumber. The plate is installed in a 1-1/2-in. deep recess at the bottom of the panel and secured to the OSB facings with 0.122-in. x 2-in. (6d common) nails spaced 6-in. on center. The plate is also secured to each spline with (2) 0.148-in. x 3-1/4-in. (16d common) nails. Caulk complying with ASTM C834 is applied to the plate surfaces in contact with the EPS.

7. CONDITIONS OF USE

7.1 *PremierSIPs* as described in this report comply with the codes listed in Section 2 above, subject to the following conditions:

7.1.1 Installation complies with this report and the approved construction documents.

7.1.2 This report applies only to the panel thicknesses specifically listed herein. (IM 014 ACU3)

7.1.3 In use panel heights/spans shall not exceed the values listed herein. Extrapolation beyond the values listed herein is not permitted. (IM 014 ACU2)

7.1.4 The panels are manufactured in the production facilities noted in this report. (IM 014 NACU8)

8. EVIDENCE SUBMITTED

NTA, Inc. has examined the following evidence to evaluate this product:

8.1 Review of each plant's quality assurance manual in accordance with NTA IM 036.

8.2 Plant certification inspection of manufacturer's production facilities, test procedures, frequency and quality control sampling methods, test equipment and equipment calibration procedures, test records, dates and causes of failures when applicable in accordance with NTA IM 036.

8.3 Qualification test data in accordance with ICC-ES Acceptance Criteria for Sandwich Panels (AC04), dated February 2012 (editorially revised July 2015).

8.4 Quality documentation complying with the ICC-ES Acceptance Criteria for Quality Documentation (AC 10).

8.5 Qualification test data in accordance with NTA IM 014 Standard Evaluation Plan 01 (IM 014 SEP 01).

8.6 Test data in accordance with ASTM E119 for fire rated construction.

8.7 Test data in accordance with ASTM E455 for diaphragm loads.

8.8 Test data related to header loads.

8.9 Periodic quality assurance audits of the production facilities.

8.10 Periodic verification testing in accordance with NTA, Inc. NTA IM 014 SEP 01.

Evaluation evidence and data are on file with NTA, Inc. NTA, Inc. is accredited by the International Accreditation Service (IAS) as follows:

ISO 17020 Inspection Agency (AA-682)
ISO 17025 Testing Laboratory (TL-259)
ISO 17065 Product Certification Agency (PCA-102)

The scope of accreditation related to testing, inspection or product certification pertain only to the test methods and/or standard referenced therein. Design parameters and the application of building code requirements, such as special inspection, have not been reviewed by IAS and are not covered in the accreditation. Product evaluations are performed under the direct supervision of Professional Engineers licensed in all jurisdictions within the United States as required by the building code and state engineering board rules.

9. FINDINGS

All products referenced herein are manufactured under an in-plant Quality Assurance program to ensure that the production quality meets or exceeds the requirements of the codes noted herein and the criteria as established by NTA, Inc. Furthermore, product must comply with the conditions of this report.

This report is subject to annual review.

10. IDENTIFICATION

Each eligible product shall be permanently marked to provide the following information:

10.1 The NTA, Inc. certification mark; either:
- **10.1.1** NTA's NER No. PRS032808-3, or
- **10.1.2** NTA's NER No. NER-1009

10.2 In-Plant quality assurance stamp
10.3 Identifier for production facility
10.4 Project or batch number

LISTED
PRS032808-3

CERTIFIED
NER-1009

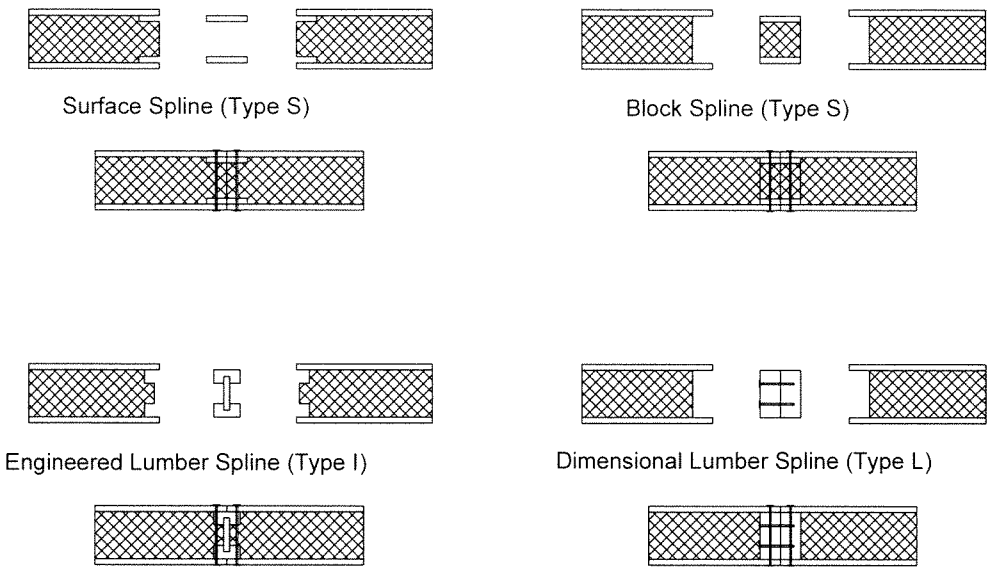


Figure 1: SIP Spline Types

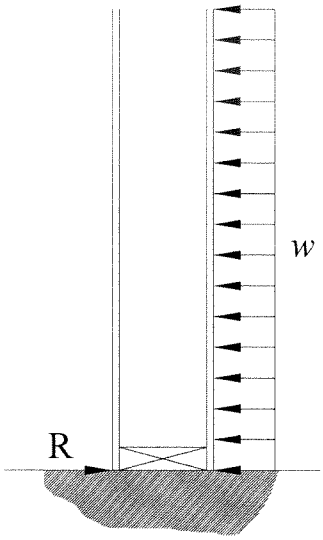


Figure 2: Zero Bearing Support

Table 1: Maximum Allowable Uniform Transverse Load (psf) – Type S Panels[1,3]

Panel Core Thickness (in.)	Deflection Limit[2]	Panel Span (ft)									
		4[4]	8	10	12	14	16	18	20	22	24
3.5	L/360	100	43	29	21	16	10				
	L/240	143	60	42	33	25	16				
	L/180	143*	61*	57	46	34	22				
5.5	L/360	105	52	39	30	24	18	15	11		
	L/240	162	78	58	36	32	28	22	16		
	L/180	191*	80*	60*	46*	40	34	29	21		
7.25	L/360	120	61	60	42	34	26	21	15	13	11
	L/240	179*	85*	75*	61	50	39	31	23	21	18
	L/180	179*	85*	75*	69*	60*	50*	42	31	28	24
9.25	L/360	131	80	66	52	43	33	28	22	20	18
	L/240	168*	86*	71*	57*	51*	46*	42*	34	30	26
	L/180	168*	86*	71*	57*	51*	46*	42*	39*	37*	34*
11.25	L/360	132	94*	76*	51	50	48	38	28	24	20
	L/240	163*	94*	76*	59*	55*	51*	45*	39*	36*	31
	L/180	163*	94*	76*	59*	55*	51*	45*	39*	36*	33*

[1] Table values assume a simply supported panel with 1.5 in. of continuous bearing on facing at supports. Permanent loads, such as dead load, shall not exceed 0.25 times the tabulated load. Panels shall use OSB surface splines not less than 7/16 in. thick inserted below the facing on each side of the panel.

[2] Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of adopted building code.

[3] Tabulated values for 8 ft walls apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to supports. Tabulated values for other lengths are based on the strong-axis of the facing material oriented parallel to the span direction.

[4] Panels spanning 4 ft shall be a minimum of 8 ft long spanning a minimum of two 4 ft spans. No single span condition is allowed.

[5] For wall panel capacities utilizing a zero bearing configuration (Figure 2), the allowable load shall be determined using C_v=0.86.

*An asterisk (*) indicates the value shown is governed by the average peak load divided by 3.

Table 2: Maximum Allowable Uniform Transverse Load (psf) – Type I Panels[1,3]

Panel Core Thickness (in.)	Deflection Limit[2]	Panel Span (ft)									
		4[4]	8	10	12	14	16	18	20	22	24
7.25	L/360	132	136	93	60	50	40	31	21	19	16
	L/240	318*	148*	107*	91	75	59	45	31	27	23
	L/180	318*	148*	107*	92*	87	78	60	41	36	30
9.25	L/360	197	164*	124*	72	67	61	48	34	29	24
	L/240	336*	164*	124*	107*	96	84*	70	49	43	36
	L/180	336*	164*	124*	107*	96	84*	76	65	56	47
11.25	L/360	258	143*	103*	86	83	77*	61	42	37	32
	L/240	318*	143*	103*	93*	85	77*	68	59*	54	46
	L/180	318*	143*	103*	93*	85	77*	68	59*	54	49*

[1] Table values assume a simply supported panel with 1.5 in. of continuous bearing on facing at supports. Permanent loads, such as dead load, shall not exceed 0.25 times the tabulated load. Splines consist of one wood I-beam, 2.25 in. wide flange (minimum) with a depth equal to the core thickness, spaced not to exceed 48 in. on center.

[2] Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of adopted building code.

[3] Tabulated values for 8 ft walls apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to supports. Tabulated values for other lengths are based on the strong-axis of the facing material oriented parallel to the span direction.

[4] Panels spanning 4 ft shall be a minimum of 8 ft long spanning a minimum of two 4 ft spans. No single span condition is allowed.

*An asterisk (*) indicates the value shown is governed by the average peak load divided by 3.

Table 3: Maximum Allowable Uniform Transverse Load (psf) – Type L Panels[1,3]

Panel Core Thickness (in.)	Deflection Limit[2]	Panel Span (ft)									
		4[4]	8	10	12	14	16	18	20	22	24
3.5	L/360	103	45	33	24	18	11				
	L/240	225	68	47	34	26	17				
	L/180	297*	91	61	45	34	23				
5.5	L/360	307*	129	57	42	34	25	20	15		
	L/240	307*	182*	87	61	49	37	30	22		
	L/180	307*	182*	112*	80	65	49	39	29		
7.25	L/360	253	171	82	66	54	41	32	23		
	L/240	288*	188*	128	100	81	61	48	35		
	L/180	288*	188*	133*	117*	105	80	63	45		
9.25	L/360	286	188*	117	101	80	58	47	36	32	27
	L/240	326*	188*	147*	134*	120	90	71	52	47	41
	L/180	326*	188*	147*	134*	121	108*	93	68	61	53
11.25	L/360	327*	188*	167*	141	116	91	75	58	47	36
	L/240	327*	188*	167*	153*	132	110*	97	83*	69	53
	L/180	327*	188*	167*	153*	132	110*	97	83*	83	70

[1] Table values assume a simply supported panel with 1.5 in. of continuous bearing on facing at supports. Permanent loads, such as dead load, shall not exceed 0.25 times the tabulated load. Splines consist of #2 or better, Hem-Fir, 1.5 in. wide with a depth equal to the core thickness, spaced to provide not less than two members for every 48 in. of panel width.

[2] Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of adopted building code.

[3] Tabulated values for 8 ft walls apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to supports. Tabulated values for other lengths are based on the strong-axis of the facing material oriented parallel to the span direction.

[4] Panels spanning 4 ft shall be a minimum of 8 ft long spanning a minimum of two 4 ft spans. No single span condition is allowed.

*An asterisk (*) indicates the value shown is governed by the average peak load divided by 3.

Table 4: Maximum Allowable Uniform Axial Load (plf) – Type S Panels[1,2,3,4]

Panel Core Thickness (in)	Panel Span (ft)					
	8	10	12	16	20	24
3.5	3500	2553	2453	2117		
5.5	4250	4043	3373	3923	2817	2183
7.25	4917	4327	4473	4197	3497	3067
9.25	4600	4414	4228	4417	3389	3248
11.25	3889	3959	4028	4408	3837*	3333

[1] Splines consist of OSB surface splines not less than 7/16 in. thick inserted below the facing on each side of the panel. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.
[2] Uniform Axial loads may be applied in accordance with Section 5.5.1. Concentrated point loads shall be addressed in accordance with Section 5.5.2 and Table 6.
[3] Both facings must bear on the supporting foundation or structure.
[4] Tabulated values for 8 ft walls apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to supports.
* Limited by 1/8 in. deflection (compression)

Table 5: Maximum Allowable Uniform Axial Loads (plf) – Type L Panels[1,2,3,4]

Panel Core Thickness (in)	Panel Span (ft)					
	8	10	12	16	20	24
3.5	4723	3903	3273	2623		
5.5	5850	5890	4277	4310	2933	2837
7.25	6807	6110	5557	5180	4837	4083
9.25	5473	5709	5946	5948	4729*	4250
11.25	5667	5474	5281	5775*	4729*	4223

[1] Splines consist of #2 or better, Hem-Fir, 1.5 in. wide with a depth equal to the core thickness, spaced to provide not less than two members for every 48 in. of panel width. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.
[2] Axial loads shall be applied concentrically to the top of the panel through repetitive members spaced not more than 24 in. on center. Such members shall be fastened to a rim board or similar member to distribute along the top of the SIP panel.
[3] Both facings must bear on the supporting foundation or structure.
[4] Tabulated values for 8 ft walls apply to panels constructed with the OSB strength axis oriented either parallel or perpendicular to supports.
* Limited by 1/8 in. deflection (compression)

Table 6: Maximum Allowable Axial Compression Point Loads (lbs) – Type S Panels[1,2,3,4]

Top Plate Configuration	1.5" Minimum Bearing Width	3" Minimum Bearing Width
Single 2x4 #2 or Better Hem-Fir Plate	2040	2450
Single 2x4 #2 or Better Hem-Fir Plate with 1-1/8 in. wide, 1.3E Rim Board Cap Plate	4030	4678

[1] Top plate secured to facings as required in Section 6.3
[2] Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.
[3] Concentrated loads shall be applied concentrically to the top of the panel.
[4] Tabulated values are based on the strong-axis of the facing material oriented parallel to the span direction.

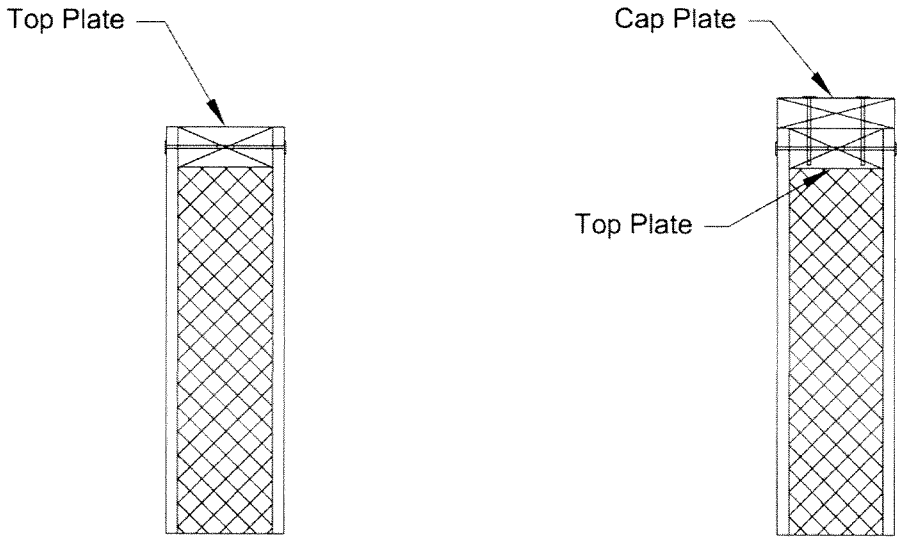


Figure 3: Top Plate Configurations

Table 7: Maximum Allowable Uniform SIP Header Vertical Loads (plf)
3-1/2 in. through 11-1/4 in. Core Thickness[1,2]

Header Depth[3] (in)	Deflection Limit[4]	Header Span (ft)			
		4	6	8	10
12	L/480	740	384	228	142
	L/360	740	384	229	142
	L/240	740	384	229	142
18	L/480	798	574	385	311
	L/360	798	574	385	311
	L/240	798	574	385	311
24	L/480	886	629	429	361
	L/360	886	629	429	361
	L/240	886	629	429	361

[1] Vertical loads only. Lateral loads shall be transferred to the edges of the openings through continuous plate(s) designed in accordance with accepted engineering practice. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.
[2] Tabulated values are based on the strong-axis of the facing material oriented perpendicular to the direction of header span.
[3] Minimum depth of facing above opening.
[4] Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of adopted building code.

Table 8: Maximum Allowable Uniform Header Loads (plf)
(Panel Splice a minimum of 6 in. from edge of opening) 3-1/2 in. through 11-1/4 in. Core Thickness[1,2]

Header Depth[3] (in)	Deflection Limit[4]	Header Span (ft)			
		4	6	8	10
12	L/480	345	243	156	99
	L/360	450	295	190	125
	L/240	630	382	236	153
18	L/480	705	388	254	235
	L/360	750	482	302	281
	L/240	750	482	302	281
24	L/480	698	556	368	350
	L/360	896	556	368	350
	L/240	896	556	368	350

[1] Vertical loads only. Lateral loads shall be transferred to the edges of the openings through continuous plate(s) designed in accordance with accepted engineering practice. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.
[2] Tabulated values are based on the strong-axis of the facing material oriented perpendicular to the direction of header span.
[3] Minimum depth of facing above opening.
[4] Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of adopted building code.

**Table 9: Allowable In-Plane Shear Strength (Pounds per Foot)
for SIP Shear Walls 3.5 in. through 11.25 in. core thickness
Wind and Seismic Loads in Seismic Design Categories A, B and C[1,2]**

Framing Minimum SG[4]	Minimum Facing Connections[2]			Shear Strength[5] (plf)
	Chord[2]	Plate[2]	Spline[3]	
0.50	0.113"x 2-1/2" nails, 6" on center	0.113"x 2-1/2" nails, 6" on center	Block or Surface Spline: (7/16" thick, 3" wide spline) 0.113"x 2-1/2" nails, 6" on center	410
			Lumber Spline: Double #2 Hem-Fir 2x dimensional lumber 0.148-in. x 3-1/4-in. coated sinker nails (16d) spaced 12-in. on center staggered along the spline length. Facing to Lumber connection 0.113"x 2-1/2" nails, 6" on center	
0.50	0.113"x 2-3/8" nails, 6" on center stagger (2 rows)	0.113"x 2-3/8" nails, 6" on center	Block or Surface Spline: (7/16" thick, 4" wide spline) 0.113"x 2-3/8" nails, 6" on center	460
			Lumber Spline: Double #2 Hem-Fir 2x dimensional lumber 0.148-in. x 3-1/4-in. coated sinker nails (16d) spaced 12-in. on center staggered along the spline length. Facing to Lumber connection 0.113"x 2-1/2" nails, 6" on center	
0.42	0.113"x 2-3/8" nails, 6" on center stagger (2 rows)	0.113"x 2-3/8" nails, 4" on center stagger (2 rows)	Block or Surface Spline: (7/16" thick, 4" wide spline) 0.113"x 2-3/8" nails, 4" on center	700
			Lumber Spline: Double #2 Hem-Fir 2x dimensional lumber 0.148-in. x 3-1/4-in. coated sinker nails (16d) spaced 12-in. on center staggered along the spline length. Facing to Lumber connection 0.113"x 2-1/2" nails, 6" on center	
0.42	0.148"x 2-3/8" nails, 6" on center stagger (2 rows)	0.148"x 2-3/8" nails, 3" on center	Block or Surface Spline: (23/32" thick, 4" wide spline) 0.148"x 2-3/8" nails, 3" on center stagger (2 rows)	1000

[1] Shear strength values, as published in this table, are limited to assemblies resisting wind or seismic forces when the aspect ratio (height:width) does not exceed 2:1. (IM 014 ACU17)
[2] Chords, hold-downs and connections to other structural elements must be designed by a registered design professional in accordance with accepted engineering practice.
[3] Spline type at interior panel-to-panel joints only, solid chord members are required at each end of each shear wall segment.
[4] Required connections must be made on each side of the panel. Dimensional or engineered lumber shall have an equivalent specific gravity not less than specified.
[5] For design to resist seismic forces, shear wall height-width ratios greater than 2:1, but not exceeding 3.5:1, are permitted for assemblies using lumber splines provided the allowable shear strength values in this table are multiplied by 2w/h.

Table 10: Maximum Allowable In-Plane Shear (Pounds per Foot)
For Diaphragms Subjected to Wind or Seismic Loading[1]

Minimum Connections[2]				Shear Strength (plf)	Max. Aspect Ratio
Interior Supports[2] (Figure 4a)	Surface Spline[3] (Figure 4b)	Boundary[4] (Figure 4c)			
		Support	Spline		
PBS #14 Panel Screw with 1" penetration 12" on center	0.113" x 2.5" nails, 3" on center 7/16" x 4" OSB Spline	PBS #14 Panel Screw with 1" penetration 12" on center	0.113" x 2.5" nails, 6" on center	430	4:1
PBS #14 Panel Screw with 1" penetration 12" on center	0.113" x 2.5" nails, 3" on center, 2 rows, staggered 7/16" x 4" OSB Spline	PBS #14 Panel Screw with 1" penetration 3" on center	0.113" x 2.5" nails, 4" on center	530	4:1
PBS #14 Panel Screw with 1" penetration 2" on center	0.113" x 2.5" nails, 3" on center, 2 rows, staggered 7/16" x 4" OSB Spline	PBS #14 Panel Screw with 1" penetration 2" on center	0.113" x 2.5" nails, 1.5" on center	750	4:1
PBS #14 Panel Screw with 1" penetration 4" on center	0.113" x 2.5" nails, 3" on center, 2 rows, staggered 7/16" x 4" OSB Spline	PBS #14 Panel Screw with 1" penetration 4" on center	0.113" x2 .5" nails, 3" on center	915	3:1
PBS #14 Panel Screw with 1" penetration 4" on center	0.113" x 2.5" nails, 6" on center, 2 rows, staggered 23/32" x 4" OSB Spline	PBS #14 Panel Screw with 1" penetration 4" on center	0.113" x 2.5" nails, 6" on center	1130	3:1

[1] The maximum diaphragm length-to-width ratio of shall not exceed 4:1. Load may be applied parallel to continuous panel joints.
[2] Interior supports shall be spaced not to exceed 12 ft on center and have a minimum width of 3.5 in. and a specific gravity of 0.42 or greater. Specified fasteners are required on both sides of panel joint where panels are joined over a support. See Figure 4a.
[3] Top spline only, at interior panel-to-panel joints. Specified fasteners are required on both sides of panel joint. See Figures 4b.
[4] Boundary spline shall be solid 1.5 inch wide, minimum, and have a specific gravity of 0.42 or greater. Boundary supports shall have a minimum width of 3.5 in. and a specific gravity of 0.42 or greater. Specified spline fasteners are required through both facings. See Figure 4c.

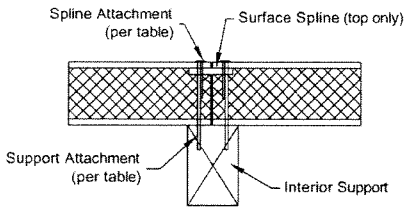


Figure 4a: Interior Support

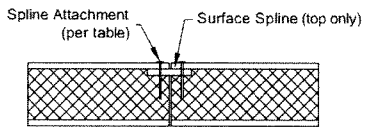


Figure 4b: Surface Spline

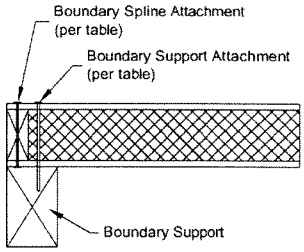
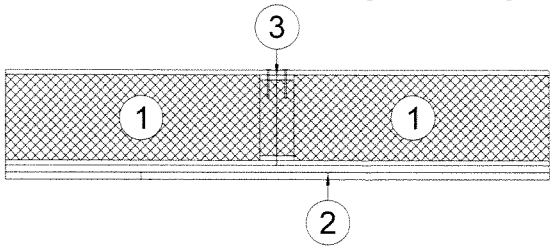


Figure 4c: Boundary

Figure 4: Diaphragm Connection Types

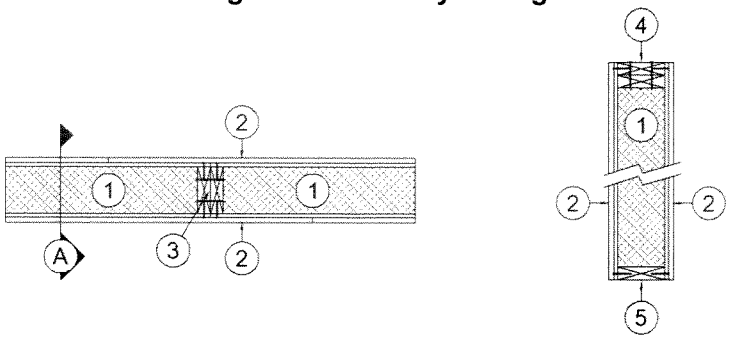
Load-Bearing, Restrained Floor/Ceiling Assembly Rating – 1 Hour
Load-Bearing, Unrestrained Floor/Ceiling Assembly Rating – 1 Hour



Vertical Section

Figure 5: Assembly Drawing for Fire Resistance

Load-Bearing Wall Assembly Rating – 1 Hour



Horizontal Section Section A

Figure 6: Assembly Drawing for Fire Resistance

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NLR-1010

NTA Listing Report

Report Holder
Premier Building Systems, LLC
18504 Canyon Road East
Puyallp, WA 98375

1. Subject
1.1 *PremierSIPs* wall assemblies identified in PRS032808-3 used as a Lateral Force Resistance System in Seismic Design Categories D, E, and F.

2. Standards
NTA, Inc. is listing the above product(s) for compliance with the applicable sections of the following standards:
2.1 ASCE/SEI 7-10 Section 11.1.4
2.2 ASCE/SEI 7-10 Section 12.2.1
2.3 ASTM E2126 Standard Test Methods for Cyclic (reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings.

3. **Manufacturing Quality Control**
NTA, Inc. has evaluated the above product(s) in accordance with:
3.1 NTA IM 014 Structural Insulated Panels
3.2 NTA IM 036 Quality System Requirements

4. Construction Components (Ref. Figure 1)
4.1 (#1) Structural Insulated Panels. *PremierSIPs* consisting of nominal 3 ½-inch thick EPS core laminated between two sheets of minimum 7/16-inch thick oriented strand board (OSB). SIP Panels shall bear the PRS032808-3 listing mark.
4.2 (#2) Splines. *PremierSIPs* for use in seismic construction are interconnected with Spline connections as described in Table 1. See Figure 2 for details of spline types and construction.
4.3 (#3) Chords and Top and Bottom Plates. *PremierSIPs* for use in seismic construction shall use #2 Douglas-fir larch lumber for Chords, Top Plates and Bottom Plates. Construction shall include a single 2x bottom plate, either a double 2x top plate or a single 4x top plate and either a double 2x or single 4x end chord.
4.4 Fasteners
4.4.1 **(#4) 8d Full Round Head Cooler Nails, 0.113-in. x 2-1/4-in.** Applied as described in Table 1.
4.4.2 **(#5) Full Round Head Pneumatic Nails, 0.135 x 3-1/4-in.** Applied in lumber to lumber connections for double top plates, double lumber chords and top and bottom plane to chord or spline connections.
4.5 (#6) Holdowns. Designed in accordance with accepted engineering practice to resist design chord forces.

5. Design
5.1 Design Approval. Where required by the authority having jurisdiction, structures using *PremierSIPs* shall be designed by a registered design professional. Construction documents, including engineering calculations and drawings providing floor plans, window details, door details, and connector details, shall be submitted to the code official when application is made for a permit. The individual preparing such documents shall possess the necessary qualifications as required by the applicable code and the professional registration laws of the state where the construction is undertaken. Approved construction documents shall be available at all times on the jobsite during installation.(IM 014 NACU4)
5.2 Connection to Structure. Designed in accordance with accepted engineering practice to transfer racking forces into the wall at the top and out of the wall at the base.
5.3 Design Loads. Design loads to be resisted by the SIP panels shall be as required under the applicable building code. Loads on the panels shall not exceed the loads noted in this report.
5.4 In-Plane Shear Design. Shear walls shall be sized to resist all code required wind and seismic loads without exceeding the allowable loads provided in Table 1. Shearwall chords, holdowns, and connections to transfer shear forces between the wall and surrounding structure shall be designed in accordance with accepted engineering practice. The allowable loads provided in Table 1, as published, are limited to assemblies with height-to-width ratios not exceeding 2:1. The allowable loads may be adjusted in accordance with Footnote 4 of Table 1. (IM 014 ACU17)
5.5 Seismic Design Categories. The shear wall configurations in Table 1 are permitted in Seismic Design Categories D, E and F. Such walls shall be designed using the seismic design coefficients and limitations provided in ASCE 7-10 for light-framed walls sheathed with wood structural panels rated for shear resistance (SFRS A13). These SIP panels shall

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use the following factors for design: Response Modification Coefficient, R = 6.5; System Overstrength Factor, Ω_0 = 3.0; Deflection Amplification Factor, C_d = 4.0.(IM 014 ACU16)

5.6 Adhesives and Sealants. Adhesives and sealants shall not be applied at wood-to-wood or spline-to-facing interfaces in shearwalls in Seismic Design Categories D, E and F. Adhesives and sealants may be applied to wood-to-foam or facing-to-foam interfaces. Flexible SIP tape may be applied over panel joints.

6. Markings

Each eligible product shall be permanently marked to provide the following information:

6.1 The NTA, Inc. listing mark, shown below.
6.2 NTA's NLR No. NLR-1010
6.3 Identifier for production facility
6.4 Project or batch number

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NLR-1010

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Table 1: Allowable In-Plane Shear Strength (Pounds per Foot) for SIP Shear Walls (Seismic Loads in Seismic Design Categories A, B, C, D, E and F)[1,2]

Spline Type[3]	Framing Minimum SG[4]	Minimum Facing Connections[2]			Shear Strength[5] (plf)
		Chord[2]	Plate[2]	Spline[3]	
Block, Surface, or Lumber Spline (Type S, Type L)	0.50	0.113"x 2-1/4" nails, 6" on center	0.113"x 2-1/4" nails, 3" on center	(7/16" thick, 3" wide spline) 0.113"x 2-1/4" nails, 6" on center	360
	0.50	0.113"x 2-1/4" nails, 6" on center	0.113"x 2-1/4" nails, 6" on center	(3/4" thick, 3" wide spline) 0.113"x 2-1/4" nails, 6" on center	360

[1] Shear strength values, as published in this table, are limited to assemblies resisting wind or seismic forces where the aspect ratio (height:width) does not exceed 1:1 for Type S panel connections or 2:1 for Type L panel connections. (IM 014 ACU17)

[2] Chords, hold-downs and connections to other structural elements must be designed by a registered design professional in accordance with accepted engineering practice.

[3] Spline type at interior panel-to-panel joints only, solid chord members are required at each end of each shear wall segment.

[4] Required connections must be made on each side of the panel. Dimensional or engineered lumber shall have an equivalent specific gravity not less than specified.

[5] For design to resist seismic forces, shear wall height-width ratios greater than 2:1, but not exceeding 3.5:1, are permitted for assemblies using lumber splines provided the allowable shear strength values in this table are multiplied by 2w/h.

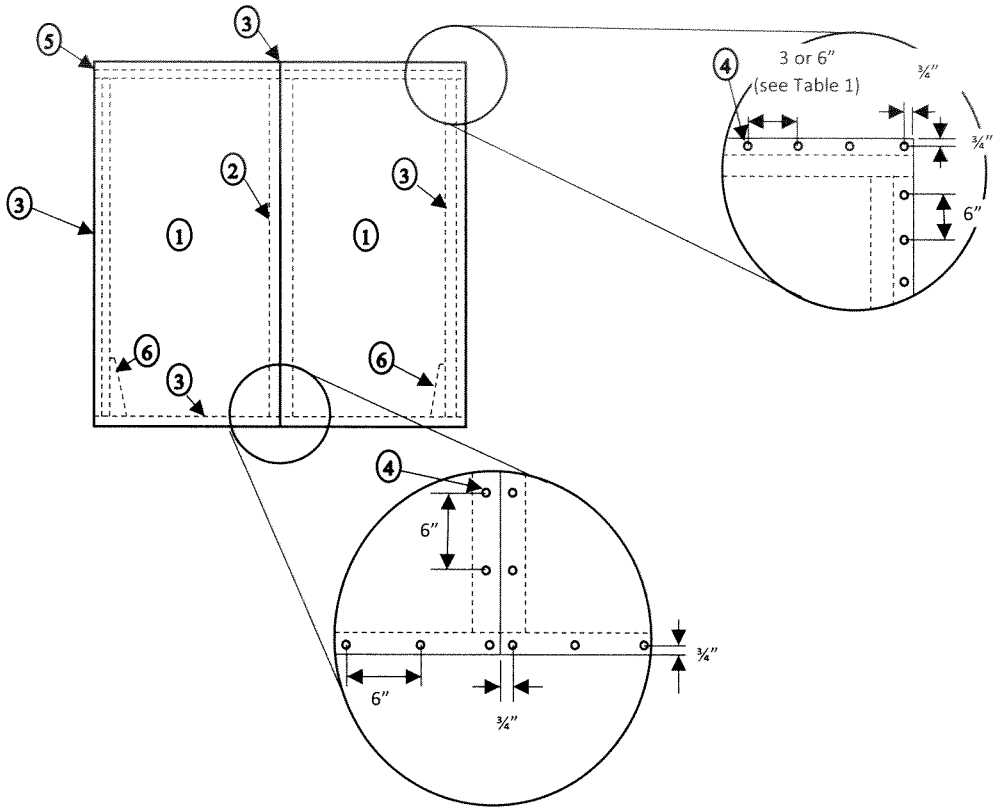

Figure 1: Typical Construction

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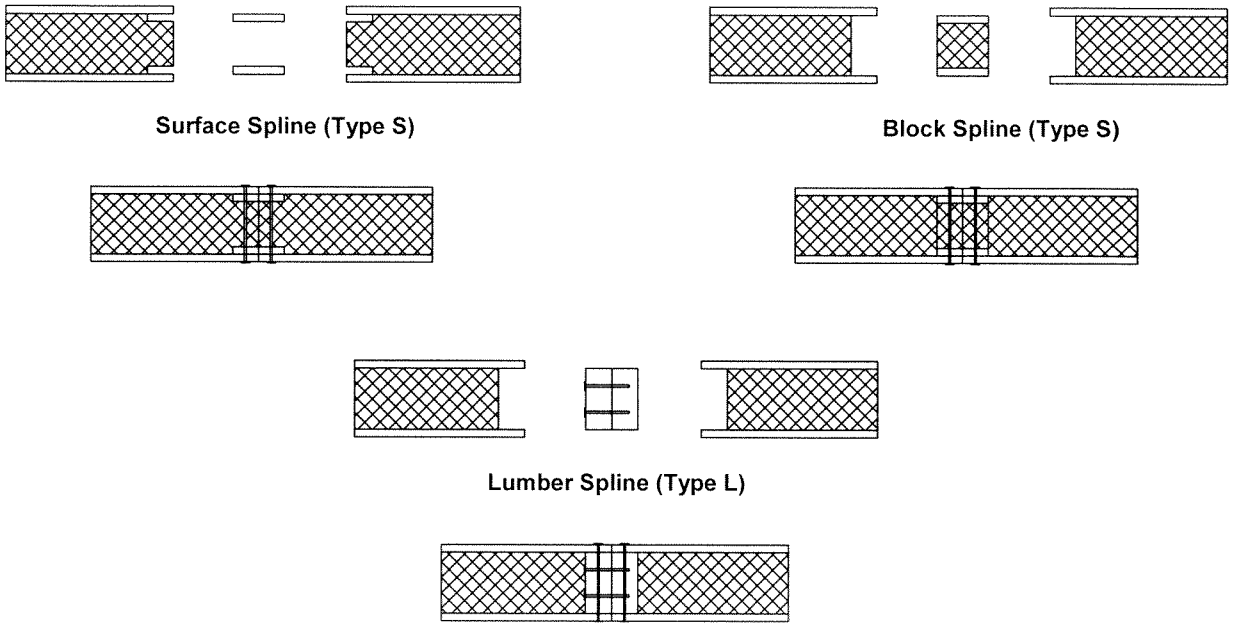

Figure 2: Spline Connection Types

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NLR-1011

NTA Listing Report
Report Holder
Premier Building Systems, LLC
18504 Canyon Road East
Puyallup, WA 98375

1. Subject
1.1 *PremierSIPs* wall assemblies identified in PRS032808-3 used as a Lateral Force Resistance System in Seismic Design Categories D, E, and F.

2. Standards
NTA, Inc. is listing the above product(s) for compliance with the applicable sections of the following standards:
2.1 ASCE/SEI 7-10 Section 11.1.4
2.2 ASCE/SEI 7-10 Section 12.2.1
2.3 ASTM E2126 Standard Test Methods for Cyclic (reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings.

3. **Manufacturing Quality Control**
NTA, Inc. has evaluated the above product(s) in accordance with:
3.1 NTA IM 014 Structural Insulated Panels
3.2 NTA IM 036 Quality System Requirements

4. Construction Components (Ref. Figure 1)
4.1 (#1) Structural Insulated Panels. *PremierSIPs* consisting of nominal 3 ½-inch thick EPS core laminated between two sheets of minimum 7/16-inch thick oriented strand board (OSB). SIP Panels shall bear the PRS032808-3 listing mark.
4.2 (#2) Splines. *PremierSIPs* for use in seismic construction are interconnected with Spline connections as described in Table 1.
4.3 (#3) Chords and Top and Bottom Plates. *PremierSIPs* for use in seismic construction shall use #2 Douglas-fir larch lumber for Chords, Top Plates and Bottom Plates. Construction shall include a single 2x bottom plate, either a double 2x top plate or a single 4x top plate and either a double 2x or single 4x end chord.

4.4 Fasteners
4.4.1 **(#4) 8d Full Round Head Cooler Nails, 0.113-in. x 2-3/8-in.** Applied as described in Table 1.
4.4.2 **(#5) 16d Full Round Head Common Nails, 0.162 x 3-in.** Applied in plate to chord connections.
4.4.3 **(#6) 16d Full Round Head Common Nails, 0.162 x 3-1/2-in.** Applied in lumber to lumber connections to join double lumber top plates and double lumber chords.
4.5 (#7) Holdowns. Designed in accordance with accepted engineering practice to resist design chord forces.

5. Design
5.1 Design Approval. Where required by the authority having jurisdiction, structures using *PremierSIPs* shall be designed by a registered design professional. Construction documents, including engineering calculations and drawings providing floor plans, window details, door details, and connector details, shall be submitted to the code official when application is made for a permit. The individual preparing such documents shall possess the necessary qualifications as required by the applicable code and the professional registration laws of the state where the construction is undertaken. Approved construction documents shall be available at all times on the jobsite during installation.(IM 014 NACU4)
5.2 Connection to Structure. Designed in accordance with accepted engineering practice to transfer racking forces into the wall at the top and out of the wall at the base.
5.3 Design Loads. Design loads to be resisted by the SIP panels shall be as required under the applicable building code. Loads on the panels shall not exceed the loads noted in this report.
5.4 In-Plane Shear Design. Shear walls shall be sized to resist all code required wind and seismic loads without exceeding the allowable loads provided in Table 1. Shearwall chords, holdowns, and connections to transfer shear forces between the wall and surrounding structure shall be designed in accordance with accepted engineering practice. The allowable loads provided in Table 1, as published, are limited to assemblies with height-to-width ratios not exceeding 2:1. The allowable loads may be adjusted in accordance with Footnote 4 of Table 1. (IM 014 ACU17)
5.5 Seismic Design Categories. The shear wall configurations in Table 1 are permitted in Seismic Design Categories D, E and F. Such walls shall be designed using the seismic design coefficients and limitations provided in ASCE 7-10 for light-framed walls sheathed with wood structural panels rated for shear resistance (SFRS A13). These SIP panels shall

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use the following factors for design: Response Modification Coefficient, R = 6.5; System Overstrength Factor, Ω_0 = 3.0; Deflection Amplification Factor, C_d = 4.0.(IM 014 ACU16)

5.6 Adhesives and Sealants. Adhesives and sealants shall not be applied at wood-to-wood or spline-to-facing interfaces in shearwalls in Seismic Design Categories D, E and F. Adhesives and sealants may be applied to wood-to-foam or facing-to-foam interfaces. Flexible SIP tape may be applied over panel joints.

6. Markings

Each eligible product shall be permanently marked to provide the following information:

6.1 The NTA, Inc. listing mark, shown below.
6.2 NTA's NLR No. NLR-1011
6.3 Identifier for production facility
6.4 Project or batch number

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NLR-1011

Table 1: Allowable In-Plane Shear Strength (Pounds per Foot) for SIP Shear Walls (Seismic Loads in Seismic Design Categories A, B, C, D, E and F)[1,2]

Spline Type[3]	Framing Minimum SG[4]	Minimum Facing Connections[2]			Shear Strength[5] (plf)
		Chord[2]	Plate[2]	Spline[3]	
Block, Surface, or Lumber Spline (Type S, Type L)	0.50	0.113" x 2-3/8" nails, 3" on center Staggered (3/8" edge distance and 3/4" edge distance)	0.113" x 2-3/8" round head nails, 3" on center Staggered (3/8", 3/4" edge distance)	(23/32" thick, 3" wide spline) 0.113" x 2-3/8" nails, 3" on center Staggered (3/8" edge distance and 3/4" edge distance)	720
	0.50	0.113" x 2-3/8" nails, 2" on center Staggered (3/8" edge distance and 3/4" edge distance)	0.113" x 2-3/8" round head nails, 2" on center Staggered (3/8", 3/4" edge distance)	(23/32" thick, 3" wide spline) 0.113" x 2-3/8" nails, 2" on center Staggered (3/8" edge distance and 3/4" edge distance)	920

[1] Shear strength values, as published in this table, are limited to assemblies resisting wind or seismic forces where the aspect ratio (height:width) does not exceed 1:1 for Type S panel connections or 2:1 for Type L panel connections. (IM 014 ACU17)

[2] Chords, hold-downs and connections to other structural elements must be designed by a registered design professional in accordance with accepted engineering practice.

[3] Spline type at interior panel-to-panel joints only, solid chord members are required at each end of each shear wall segment.

[4] Required connections must be made on each side of the panel. Dimensional or engineered lumber shall have an equivalent specific gravity not less than specified.

[5] For design to resist seismic forces, shear wall height-width ratios greater than 2:1, but not exceeding 3.5:1, are permitted for assemblies using lumber splines provided the allowable shear strength values in this table are multiplied by 2w/h.

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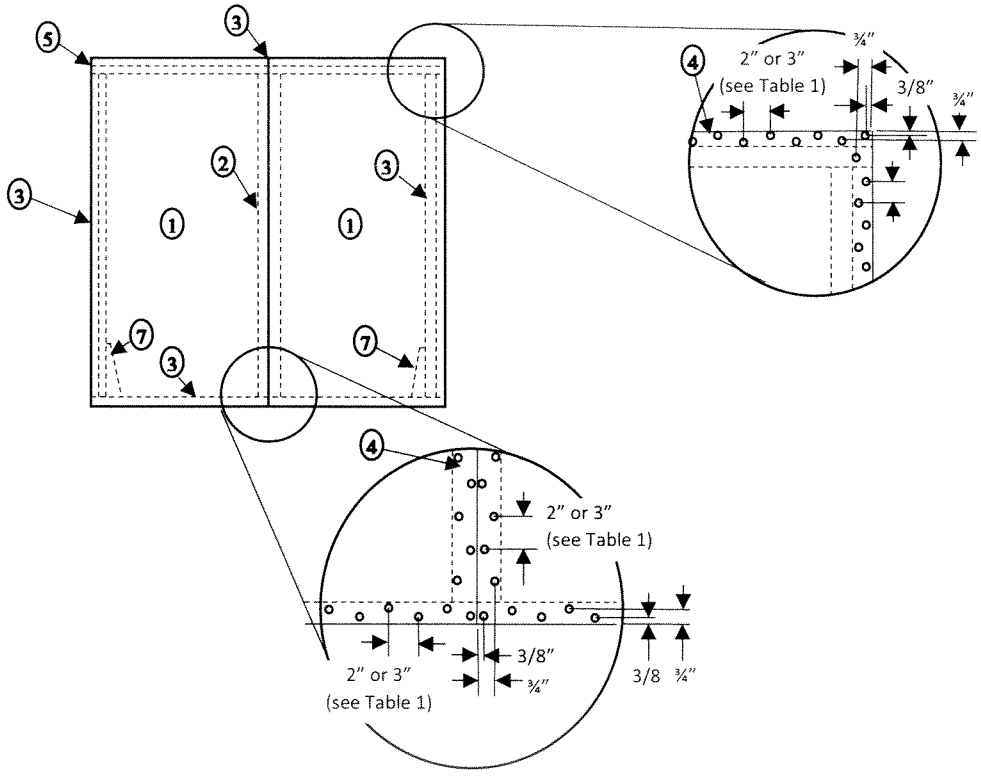

Figure 1: Typical Construction

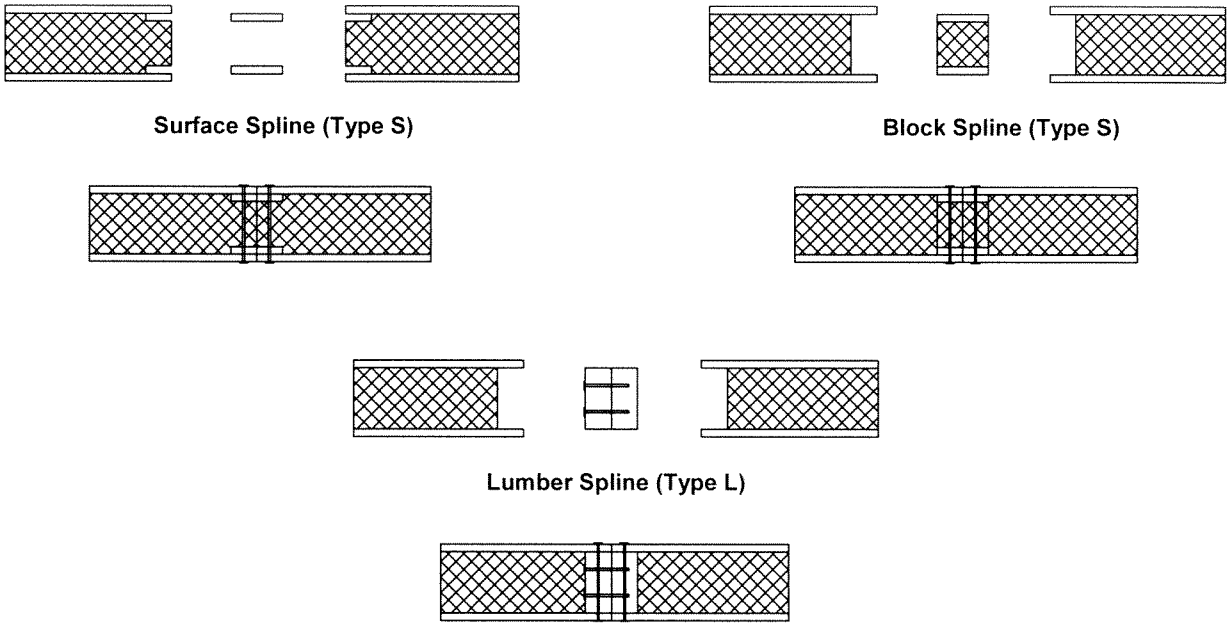

Figure 2: Spline Connection Types

Mr. Hodgson

June 20, 2019

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Mr. James Hodgson
Premier Building Systems, LLC ("Client")
18504 Canyon Road East
Puyallup, WA 98375

RE: REVISION OF NER-1009 TO ADD 2018 IBC AND 2018 IRC

Dear Mr. Hodgson:

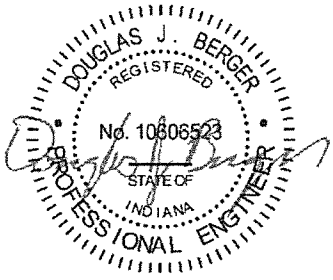
Please feel free to provide this letter to whom it may concern.

NTA, Inc. is currently processing a request by Premier Building Systems to evaluate and update their NTA Evaluation Report, NER-1009, to state compliance with the 2018 International Building Code and 2018 International Residential Code. While this process will take time to ensure due diligence, NTA does not anticipate discovering any issues that would prevent completing the revision in a timely manner. We expect a revised version of NER-1009 to be available on the NTA, Inc. website within approximately 30 days.

If you have any additional questions or comments regarding this matter please contact me at your convenience at (574) 773-7975.

Respectfully,

Doug Berger, P.E.
Senior Evaluation Engineer
NTA, Inc.



6/20/19

Home Energy Rating Certificate

Projected Report

Rating Date: 2019-09-05
Registry ID: Unregistered
Ekotrope ID: MvDakoG2

DESERT SKIES

HERS® Index Score:

30

Your home's HERS score is a relative performance score. The lower the number, the more energy efficient the home. To learn more, visit www.hersindex.com

Annual Savings

$2,275

*Relative to an average U.S. home

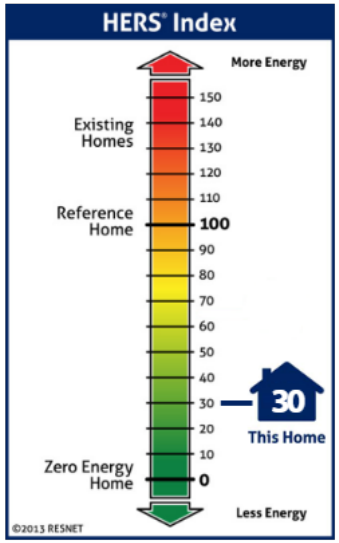
Home:

Phoenix, AZ

Builder:

Your Home's Estimated Energy Use:

	Use [MBtu]	Annual Cost
Heating	1.2	$40
Cooling	6.7	$228
Hot Water	1.2	$41
Lights/Appliances	19.1	$647
Service Charges		$158
Generation (e.g. Solar)	0.0	$0
Total:	**28.2**	**$1,114**



Home Feature Summary:

Home Type:	Single family detached
Model:	Home NZ
Community:	N/A
Conditioned Floor Area:	2,173 ft²
Number of Bedrooms:	3
Primary Heating System:	Air Source Heat Pump • Electric • 10 HSPF
Primary Cooling System:	Air Source Heat Pump • Electric • 21.5 SEER
Primary Water Heating:	Water Heater • Electric • 0.95 Energy Factor
House Tightness:	3 ACH50
Ventilation:	132.0 CFM • 69.0 Watts
Duct Leakage to Outside:	0 CFM25_PER_100SF
Above Grade Walls:	R-45
Ceiling:	Vaulted Roof, R-70
Window Type:	U-Value: 0.26, SHGC: 0.15
Foundation Walls:	N/A

This home meets or exceeds the criteria of the following:

Energy Star v3
Energy Star v3.1
2018 International Energy Conservation Code
2015 International Energy Conservation Code
2012 International Energy Conservation Code
2009 International Energy Conservation Code
2006 International Energy Conservation Code

Rating Completed by:

Energy Rater: Kevin Wiscombe
RESNET ID:1570099

Rating Company: Desert Skies Energy
127 W Juanita Ave #208, Mesa AZ 85210
6022820279

Rating Provider: Desert Skies Energy
127 W Juanita Ave #208, Mesa AZ 85210
6022820279

Kevin Wiscombe, Certified Energy Rater
Digitally signed: 9/5/19 at 3:26 PM

ekotrope™

Ekotrope RATER - Version:3.1.1.2245

IECC 2018 Performance Compliance

DESERT SKIES

Property
Phoenix, AZ
Model: Home NZ

Home NZ - No PV
Home NZ

Organization
Desert Skies Energy
Kevin Wiscombe

Builder

Inspection Status
Results are projected

Annual Energy Cost

Design	IECC 2018 Performance	As Designed
Heating	$135	$49
Cooling	$515	$285
Water Heating	$61	$61
Mechanical Ventilation	$34	$35
SubTotal - Used to determine compliance	**$746**	**$430**
Lights & Appliances w/out Ventilation	$557	$557
Onsite generation	$0	$0
Total	**$1,302**	**$987**

Requirements

✓	405.3	Performance-based compliance passes by 42.3%	
✓	R402.4.1.2	Air Leakage Testing	Air sealing is 3.00 ACH at 50 Pa. It must not exceed 5.00 ACH at 50 Pa.
✓	R402.5	Area-weighted average fenestration SHGC	
✓	R402.5	Area-weighted average fenestration U-Factor	
✓	R404.1	Lighting Equipment Efficiency	
✓	Mandatory Checklist	Mandatory code requirements that are not checked by Ekotrope must be met.	
✓	IRC M1505.4.3	Mechanical Ventilation Rate	
✓	R403.6.1	Mechanical Ventilation Efficacy	
✓	R405.2	Duct Insulation	

Design exceeds requirements for IECC 2018 Performance compliance by 42.3%.

As a 3rd party extension of the code jurisdiction utilizing these reports, I certify that this energy code compliance document has been created in accordance with the requirements of Chapter 4 of the adopted International Energy Conservation Code based on Climate Zone 2. If rating is Projected, I certify that the building design described herein is consistent with the building plans, specifications, and other calculations submitted with the permit application. If rating is Confirmed, I certify that the address referenced above has been inspected/tested and that the mandatory provisions of the IECC have been installed to meet or exceed the intent of the IECC or will be verified as such by another party.

Name: Kevin Wiscombe

Signature: 

Organization: Desert Skies Energy

Digitally signed: 9/6/19 at 4:12 PM

IECC 2018 Building UA Compliance

DESERT SKIES

Property
Phoenix, AZ
Model: Home NZ

Home NZ - No PV
Home NZ

Organization
Desert Skies Energy
Kevin Wiscombe

Builder

Inspection Status
Results are projected

Building UA

Elements	IECC Reference	As Designed
Ceilings	71.1	33.6
Above-Grade Walls	169.5	46.0
Windows, Doors and Skylights	271.6	155.3
Slab Floor:	154.6	57.0
Framed Floors	0.0	0.0
Foundation Walls	0.0	0.0
Rim Joists	0.0	0.0
Overall UA (Design must be equal or lower):	**666.8**	**291.9**

Requirements

✓	402.1.5	Total UA alternative for insulation and fenestration	
✓	402.3.2 Glazed Fenestration SHGC	Average SHGC: 0.15; Max SHGC: 0.25	
✓	R402.4.1.2	Air Leakage Testing	Air sealing is 3.00 ACH at 50 Pa. It must not exceed 5.00 ACH at 50 Pa.
✓	R402.5	Area-weighted average fenestration SHGC	
✓	R402.5	Area-weighted average fenestration U-Factor	
✓	R404.1	Lighting Equipment Efficiency	
✓	Mandatory Checklist	Mandatory code requirements that are not checked by Ekotrope must be met.	
✓	IRC M1505.4.3	Mechanical Ventilation Rate	
✓	R403.6.1	Mechanical Ventilation Efficacy	
✓	R403.3.3	Duct Testing	
✓	403.5.3	Hot water pipe insulation	

Design exceeds requirements for IECC 2018 Prescriptive compliance by 56.2%.

Name: Kevin Wiscombe
Organization: Desert Skies Energy
Signature:
Digitally signed: 9/6/19 at 4:12 PM