Amadi Aesthetics

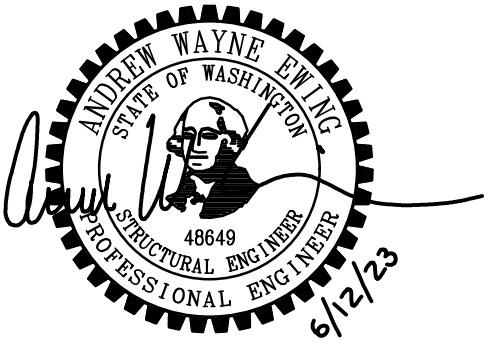
Mercer Island, WA

Structural Calculations

CALCULATIONS INCLUDED:

Pages 1 through 27

These calculations cover the scope of the plaza level housekeeping pads, the level one hot water heater support analysis, and the level one surgical light structural supports.



kpff

1601 5th Avenue, Suite 1600
Seattle, WA 98101 206.622.5822

KPFF Project No. 2300328
06/12/2023

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DESIGN SUMMARY

Date: *06/12/2023*
By: *GLS*

Design: *Equipment Support*

The scope of the structural work included in the Amadi Aesthetics project includes housekeeping pads at the plaza level to support a new backup generator, structural support for two new surgical lights, and am interior cold form wall analysis to support a new elevated hot water heater.

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DESIGN SUMMARY

Date: *06/12/2023*
By: *GLS*

Design: *Equipment Support*

Design Information from CT Engineering Phase 'F' Revisions drawings dated 03/28/2007

EARTHQUAKE DESIGN DATA:

SEISMIC IMPORTANCE FACTOR:	Ie = 1.0
SPECTRAL RESPONSE ACCELERATIONS:	Ss = 1.44 S1 = 0.49
SITE CLASS:	SITE CLASS C
SPECTRAL RESPONSE COEFFICIENTS:	SDS = 0.96 SD1 = 0.49
SEISMIC DESIGN CATEGORY:	SEISMIC DESIGN CATEGORY D
BASIC FORCE RESISTING SYSTEM:	BEARING WALL SYSTEM
DESIGN BASE SHEAR:	1876 KIPS
RESPONSE MODIFICATION FACTOR:	R = 5.0 SPECIAL REINFORCED CONCRETE SHEAR WALLS
ANALYSIS PROCEDURE:	EQUIVALENT LATERAL FORCE

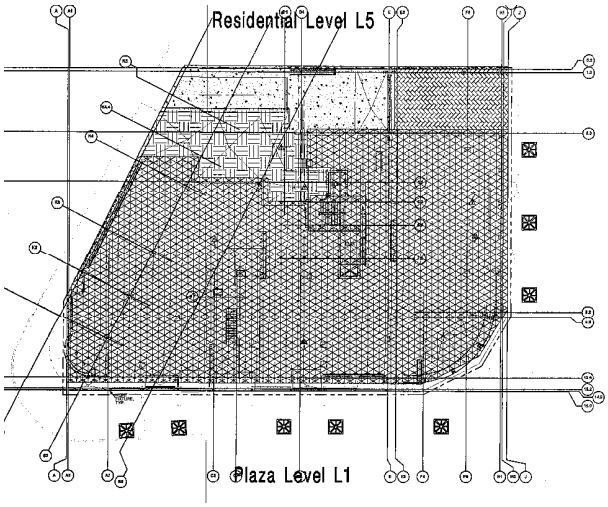
03000: CONCRETE
CONCRETE CONSTRUCTION SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUT STANDARD ACI 318-02 "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE".

CEMENT AND CONCRETE SHALL CONFORM TO IBC SECTION 1903. ADMIXTURES SHALL BE APPROVED BY THE ENGINEER OF RECORD AND SHALL COMPLY WITH ACI 318-02 SECTION 3.6. CONCRETE EXPOSED TO FREEZING AND THAWING SHALL HAVE AN AIR ENTRAINING ADMIXTURE CONFORMING TO IBC SECTION 1904.2. T USE OF WATER SOLUBLE CHLORIDE ION SHALL NOT BE USED.

CONTRACTOR SHALL SUBMIT MIX DESIGNS TO ENGINEER OF RECORD FOR APPROVA FOUR WEEKS PRIOR TO PLACING CONCRETE. MIX DESIGNS WILL BE REVIEWED FOR CONFORMANCE TO IBC SECTIONS 1904 AND 1905.

CONCRETE MIX DESIGNS SHALL MEET THE FOLLOWING REQUIREMENTS:

28 DAY STRENGTH f'c (PSI)	MAX. W/C RATIO	MAX. SLUMP (INCHES)	AIR ENTRAINMENT (PERCENT)	SPECIAL INSPECTION REQUIRED	LOCATION AND APPLICATION
2500	0.45	4±1	0±1	NO	INT. SLAB ON GRADE
2500	0.45	4±1	5±1	NO	EXT. SLAB ON GRADE
4000	0.45	5±1	0±1	YES	GRADE BEAMS
4000	0.45	5±1	0±1	YES	FOOTINGS
5000	0.39	5±1	0±1	YES	INTERIOR WALLS
5000	0.39	5±1	5±1	YES	EXTERIOR WALLS
5000	0.39	5±1	0±1	YES	COLUMNS
5000	0.41	4±1	0±1	YES	INT. ELEVATED SLABS
5000	0.41	4±1	5±1	YES	EXT. ELEVATED SLABS
6000	0.38	N/A	2±1	YES	SHOTCRETE
3000	0.45	5±1	0±1	YES	ALL OTHER CONCRETE



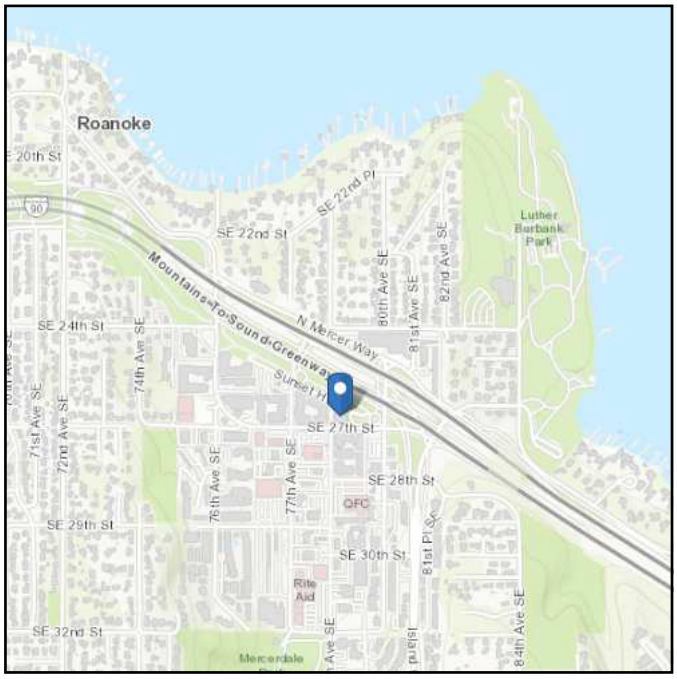
Design Load Summary

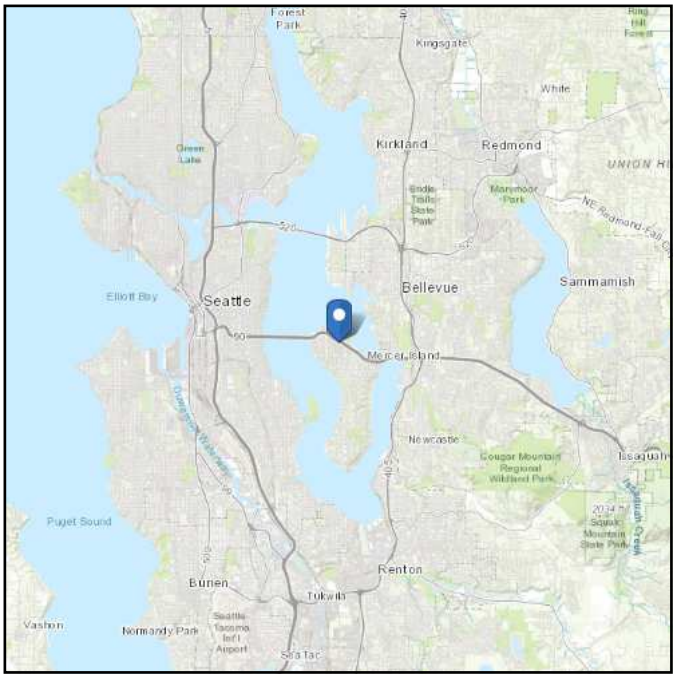
KEY	DESCRIPTION	LIVE LOAD	DEAD LOAD SW	DEAD LOAD WALLS	DEAD LOAD ADD'L	NOTE
	ROOF LEVEL	25 PSF	35 PSF	10 PSF	--	
	L5 - MEZZANINE INTERIOR	40 PSF	130 PSF	10 PSF	10 PSF	
	L5 - MEZZANINE PAVERS/PLANTERS	60 PSF	250 PSF	25 PSF	10 PSF	
	L5 - MEZZ. ROOFING	25 PSF	90 PSF	---	10 PSF	
	RESIDENTIAL EXTERIOR DECKS	60 PSF	SLAB SW	---	20 PSF	
	COMMERCIAL/EXITS	100 PSF	SLAB SW	35 PSF	20 PSF	
	RESIDENTIAL LIVING	40 PSF	SLAB SW	35 PSF	20 PSF	
	PARKING	50 PSF	SLAB SW	---	10 PSF	
	TRUCK ACCESS	250 PSF	SLAB SW	---	75 PSF	
	LANDSCAPE	25 PSF	SLAB SW	---	150 PSF	

ASCE 7 Hazards Report

Address:
7800 SE 27th St
Mercer Island, Washington
98040

Standard:	ASCE/SEI 7-16	**Latitude:**	47.586989
Risk Category:	II	**Longitude:**	-122.233304
Soil Class:	C - Very Dense Soil and Soft Rock	**Elevation:**	97.0179295973558 ft (NAVD 88)





Wind

Results:

Wind Speed	98 Vmph
10-year MRI	67 Vmph
25-year MRI	74 Vmph
50-year MRI	78 Vmph
100-year MRI	83 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Wed Jun 07 2023

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

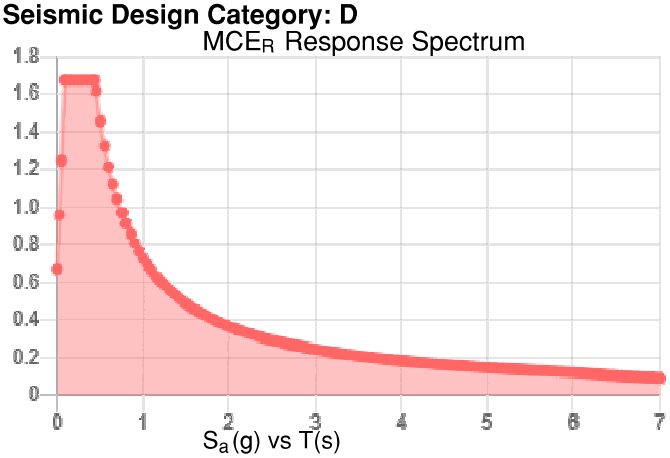
C - Very Dense Soil and Soft Rock

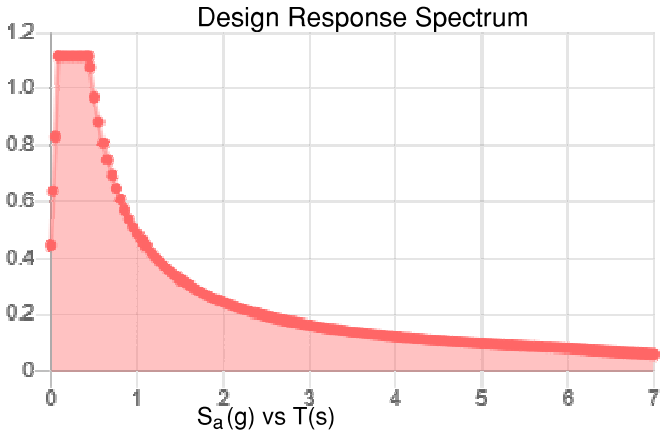
Site Soil Class:

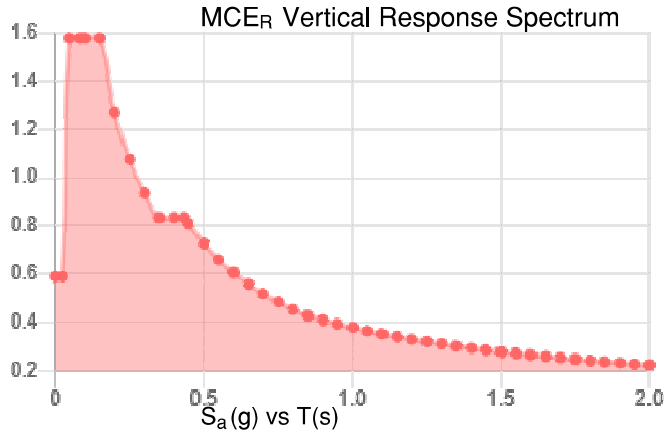
Results:

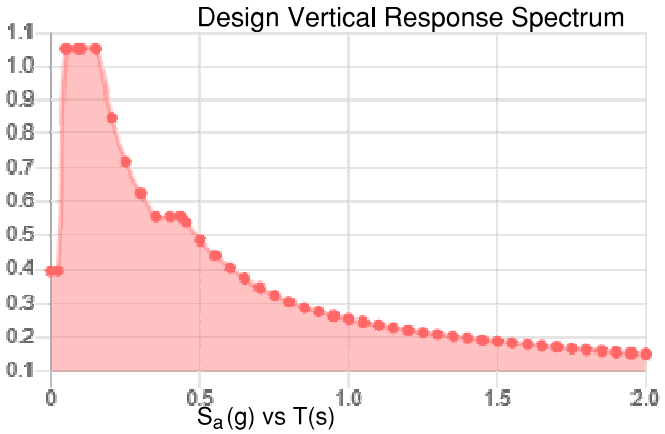
S_S :	1.392	S_{D1} :	0.485
S_1 :	0.485	T_L :	6
F_a :	1.2	PGA :	0.595
F_v :	1.5	PGA_M :	0.714
S_{MS} :	1.67	F_{PGA} :	1.2
S_{M1} :	0.727	I_e :	1
S_{DS} :	1.113	C_v :	1.178

Seismic Design Category: D









Data Accessed: **Wed Jun 07 2023**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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Risk category II Seismic Design Category D

Soil class C (from original drawings by CT Engineering dated 3/28/2007)

$S_{DS} = 1.113$ (See attached ASCE Design Hazards Report)

$R_{p1} = 2\frac{1}{2}$	$a_{p1} = 1$	$\Omega_{01} = 2$	(Generator)	$I_p = 1.5$
$R_{p2} = 1\frac{1}{2}$	$a_{p2} = 1$	$\Omega_{02} = 2$	(surgical light)	$I_p = 1.0$
$R_{p3} = 2\frac{1}{2}$	$a_{p3} = 1$	$\Omega_{03} = 2$	(water heater)	$I_p = 1.0$

Horizontal Force ASCE 7-16 13.3

$$F_p = \frac{0.4\, a_p\, S_{DS}\, W_p}{(R_p/I_p)}\left(1 + 2\,\frac{z}{h}\right)$$

$F_{pmin} = 0.3\, S_{DS}\, I_p\, W_p$

$F_{pmax} = 1.6\, S_{DS}\, I_p\, W_p$

Generator

$$F_{p1} = \frac{0.4\,(1)\,(1.113)\,(\text{~~3647 lb~~ 4700 \#})}{(2.5/1.5)}\left(1 + 2\,(0)\right) = \text{~~974~~ 1255 \#} \text{ lb}$$

$z = 0$ $F_{pmin} = \text{~~1827 lb~~ 2354 \#}$ governs

$F_{pmax} = \text{~~4742 lb~~ 12555 \#}$

Surgical Light

$$F_{p2} = \frac{0.4\,(1)\,(1.113)\,(300\text{ lb})}{(1.5/1)}\left(1 + 2\left(\frac{9}{68}\right)\right) = 113\text{ lb}$$ governs

$F_{p2min} = 100$ lb

$F_{p2max} = 534$ lb

Water Heater

$$F_{p3} = \frac{0.4\,(1)\,(1.113)\,(682\text{ lb})}{(2.5/1)}\left(1 + 2\left(\frac{8}{68}\right)\right) = 150\text{ lb}$$

$F_{p3min} = 228$ lb governs

$F_{p3max} = 1215$ lb

$W_p = 205\text{ lb} + 50\text{ gal} \times 8.34\text{ lb} = 682\text{ lb}$

Vertical Seismic Component $\pm 0.2\, S_{DS}\, W_p = 0.2(1.113)\, W_p = 0.223\, W_p$

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project: Amadi Aesthetics | by: GLS | sheet no.
location: Mercer Island, WA | date: 9/7/2023 | job no.
client:
Wind Loads @ Generator

Chapter 29 Wind Loads on Building Appurtenances and other Structures

Risk Category II, $V = 98$ mph, $K_{cl} = 0.85$, Exposure B,
Topographic factor, $K_{zt} = 1.0$, Ground Elevation factor, $K_e = 1.0$,
Gust-effect factor, $G = 0.85$, ~~[illegible]~~
Velocity pressure exposure coefficient, $K_z = 0.57$

$$q_z = 0.00256 K_z K_{zt} K_d K_e V^2 = 0.00256 (0.57)(1.0)(0.85)(1.0)(98\text{mph})^2$$
$$= 12 \text{ psf}$$

horizontal wind load

$$F = q_z G C_f A_f \qquad (29.4\text{-}1)$$
$$= (12 \text{ psf})(0.85)(1.33) A_f = 13.6 A_f$$

$h/D = 6.25'/3.1667' = 1.97 \rightarrow 2$ $\quad C_f = 1.3 + \frac{1.4-1.3}{7-1}(2) = 1.33$

$F_{dir1} = 13.6 \text{ psf} \times (6.25' \times 3.167') = 269$ lb
$F_{dir2} = 13.6 \text{ psf} \times (6.25' \times$ ~~8'~~ 9.5' $) =$ ~~680 lb~~ 808 #

∴ Seismic Lateral Loading Governs Design

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project Amadi Aesthetics | by GLS | sheet no.
location Mercer Island, WA | date 6/7/2023 | job no.
client
Gravity Loads @ Generator

Check Existing PT Slab for Generator & Slab

Unit weight w/ Enclosure = ~~5044 lb~~ 4700#

weight of Slab = 5" /12 x 150 pcf = 62.5 psf

Geofoam wt ~ 2 pcf x 2/12 = 0.333 psf → 0.5 psf

design slab to be 12" wider than generator all sides 100" x 60"

~~4700 lb~~ 4700# / (~~8.33'~~ 11.5' x 5') + 63 psf = ~~151 psf~~ 145 PSF

Existing structure capacity @ generator location (drawings by CT Engineering dated 2007)

DL SW = slab SW DL addL = 150 psf LL = 25 psf

weight of generator + slab < allowable DL addL

Structurally adequate by inspection

New Slab @ Air tank Storage will have lower loads than generator. Structurally adequate by inspection

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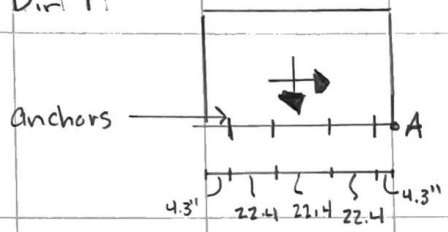
project: Amadi Aesthetics | by: GLS | sheet no.
location: Mercer Island, WA | date: 6/7/2023 | job no.
client:
Seismic Loads @ Generator

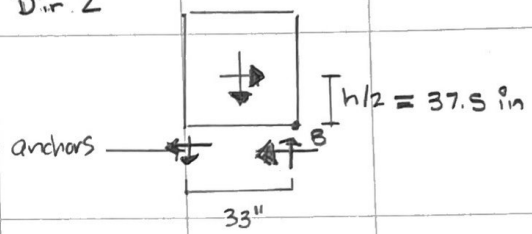
Basic Combinations w/ Seismic Load Effects ASCE 7-16 2.3.6

6. $1.2D + E_v + E_h + L + 0.2S = 1.443D + E_h$
7. $0.9D - E_v + E_h = 0.677D + E_h$

Dir 1



Dir 2



Load Case 6

$1.443D =$ ~~3047 lb~~ 4700# $\times 1.443 =$ ~~5263 lb~~ 6702# lb

$0.2S = 0.2(25psf) \times 7.9' \times 3.2' = 126$ lb

$E_h =$ ~~1827 lb~~ 2354 #

Check overturning

Dir 1

$\circlearrowleft \Sigma M_A = 0$ (~~5263~~ 6702# + 126 lb)(49 in) − ~~1827~~ 2354 # lb (37.5 in) = 246297 in-lb > 0 NO overturning

Dir 2

$\circlearrowleft \Sigma M_B = 0$ (~~5263~~ 6702# lb + 126 lb)(33 in/2) − ~~1827~~ 2354 # (37.5 in) = ~~20406~~ 24387 in-lb > 0 NO overturning

$V_{anchors} =$ ~~1827 lb~~ 2354 # / 8 × 2 = ~~457 lb~~ 295 # (Ω)

Load Case 7

$0.677D =$ ~~3047 lb~~ 4700# $\times 0.67 =$ ~~2188~~ 3182# lb

$E_h =$ ~~1827 lb~~ 2354 #

Check overturning

Dir 1

$\circlearrowleft \Sigma M_A = 0$ ~~2188~~ 3182# lb (49 in) − ~~1827~~ 2354 # lb (37.5 in) = ~~38700~~ 67643 # in-lb > 0 NO overt

Dir 2

$\circlearrowleft \Sigma M_B = 0$ ~~2188~~ 3182# lb (33 in/2) − ~~1827~~ 2354 # lb (37.5 in) = ~~-32411~~ -35772 # in-lb < 0 OVT

Tension in anchor (~~32411~~ 35772 in-lb / 33 in × 4 anchor) × 2 = ~~491 lb~~ 542 # (Ω)

$V_{anchors} =$ ~~1827 lb~~ 2354 # / 8 × 2 = ~~457 lb~~ 589 #

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project Amadi Aesthetics	by GLS	sheet no.	
location Mercer Island, WA	date 6/7/2023		
client		job no.	
Generator Anchor DGN			

542 #
T = ~~491 lb~~ V = ~~457 lb~~ 589 #

Generac SD40 Install Drawings specifies 5/8"Ø holes for anchors. ~~Water~~

Hilti KH-EZ CRC design strength in cracked concrete

$T\text{-}\phi N_n$ = 2235 lb @ f'_c = 3000 psi & 3 1/4" embedment

ϕV_n = 2410 lb @ f'_c = 3000 psi & 3 1/4" embedment.

Adequate By Inspection

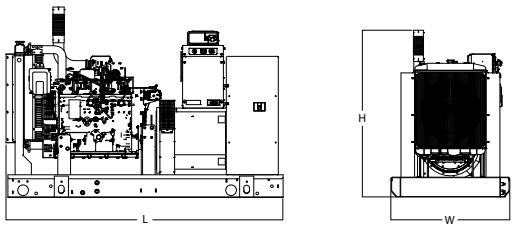
SD040 | 4.5L | 40 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

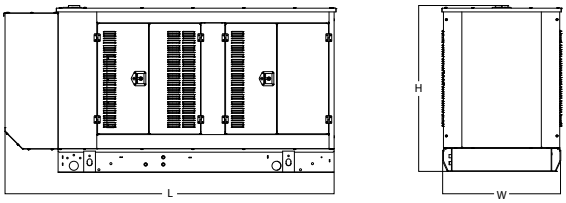
GENERAC | INDUSTRIAL POWER

DIMENSIONS AND WEIGHTS*



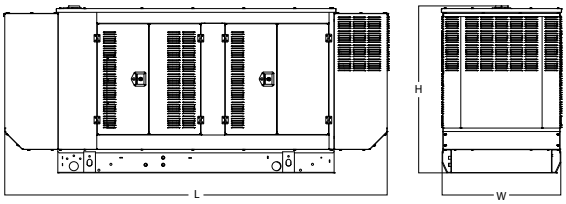
OPEN SET

Run Time - Hours	Usable Capacity - Gal (L)	L x W x H - in (mm)	Weight - lbs (kg)
No Tank	-	76.5 (1,942) x 37.4 (950) x 43.1 (1,095)	2,086 - 2,488 (946 - 1,128)
15	54 (204)	76.5 (1,942) x 37.4 (950) x 56.1 (1,425)	2,566 - 2,968 (1,164 - 1,346)
38	132 (500)	76.5 (1,942) x 37.4 (950) x 68.1 (1,730)	2,796 - 3,198 (1,268 - 1,450)
55	190 (719)	106.0 (2,692) x 37.4 (950) x 72.1 (1,831)	3,010 - 3,412 (1,366 - 1,548)
62	211 (799)	76.5 (1,942) x 37.4 (950) x 80.1 (2,035)	3,005 - 3,407 (1,363 - 1,545)
88	300 (1,136)	92.9 (2,360) x 37.4 (950) x 83.6 (2,124)	3,068 - 3,470 (1,391 - 1,573)
150	510 (1,931)	116.5 (2,960) x 46.5 (950) x 85.5 (2,171)	3,451 - 3,853 (1,567 - 1,749)



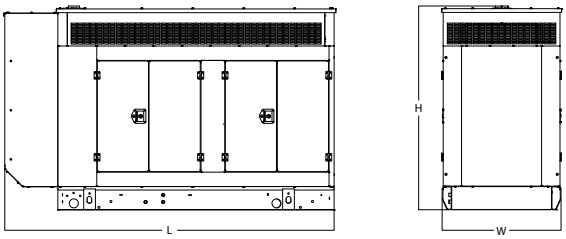
LEVEL 0 SOUND ATTENUATED ENCLOSURE

Run Time - Hours	Usable Capacity - Gal (L)	L x W x H - in (mm)	Weight - lbs (kg) Enclosure Only	
			Steel	Aluminum
No Tank	-	94.8 (2,409) x 38.0 (965) x 49.5 (1,258)		
15	54 (204)	94.8 (2,409) x 38.0 (965) x 62.5 (1,588)		
38	132 (500)	94.8 (2,409) x 38.0 (965) x 74.5 (1,893)		
55	190 (719)	106.0 (2,692) x 38.0 (965) x 78.5 (1,994)	447 (203)	225 (102)
62	211 (799)	94.8 (2,409) x 38.0 (965) x 86.5 (2,198)		
88	300 (1,136)	94.8 (2,409) x 38.0 (965) x 90.0 (2,287)		
150	510 (1,931)	116.5 (2,960) x 46.5 (965) x 91.9 (2,334)		



LEVEL 1 SOUND ATTENUATED ENCLOSURE

Run Time - Hours	Usable Capacity - Gal (L)	L x W x H - in (mm)	Weight - lbs (kg) Enclosure Only	
			Steel	Aluminum
No Tank	-	112.5 (2,857) x 38.0 (965) x 49.5 (1,258)		
15	54 (204)	112.5 (2,857) x 38.0 (965) x 62.5 (1,588)		
38	132 (500)	112.5 (2,857) x 38.0 (965) x 74.5 (1,893)		
55	190 (719)	112.5 (2,857) x 38.0 (965) x 78.5 (1,994)	526 (239)	225 (118)
62	211 (799)	112.5 (2,857) x 38.0 (965) x 86.5 (2,198)		
88	300 (1,136)	112.5 (2,857) x 38.0 (965) x 90.0 (2,287)		
150	510 (1,931)	116.5 (2,960) x 46.5 (965) x 91.9 (2,334)		



LEVEL 2 SOUND ATTENUATED ENCLOSURE

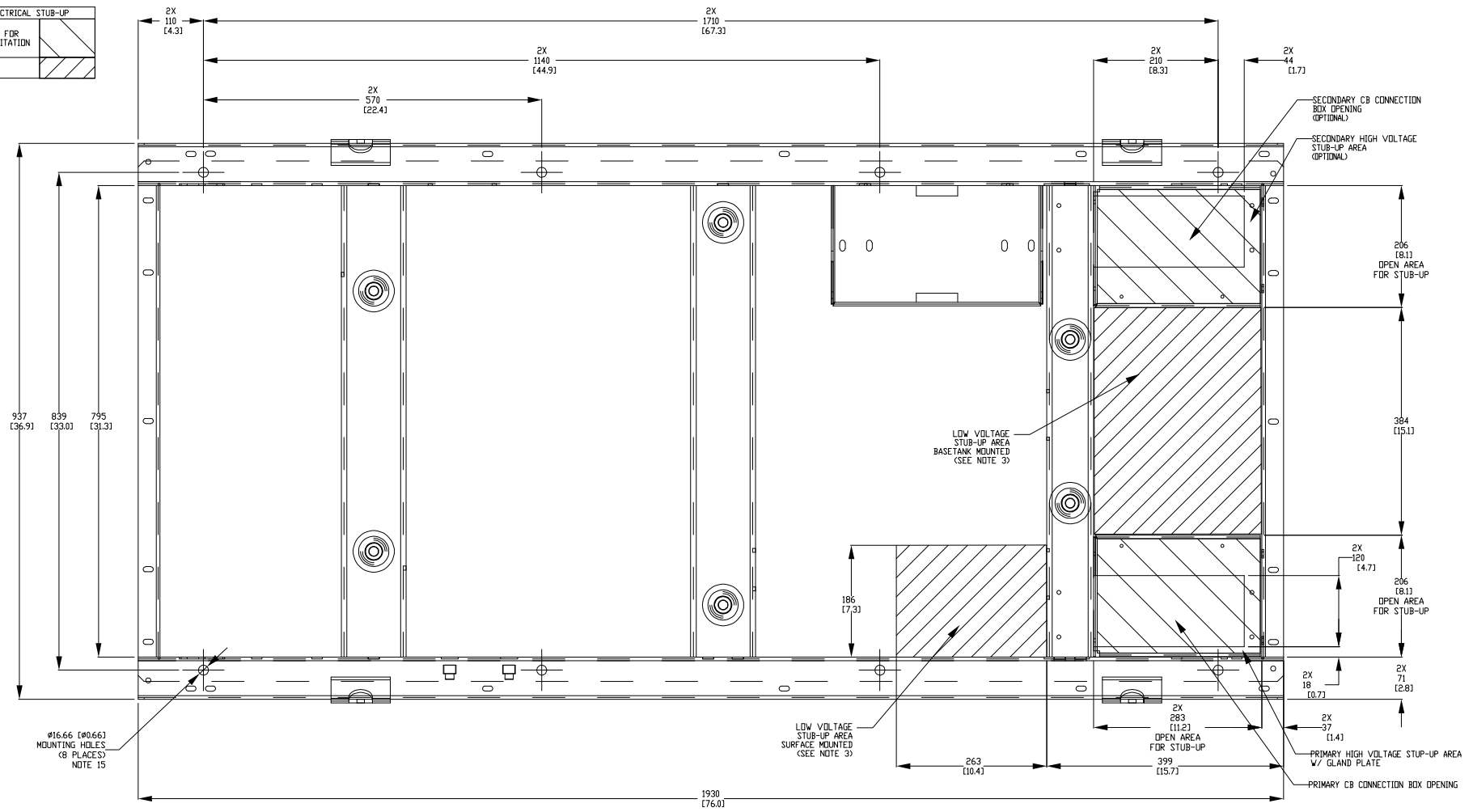
Run Time - Hours	Usable Capacity - Gal (L)	L x W x H - in (mm)	Weight - lbs (kg) Enclosure Only	
			Steel	Aluminum
No Tank	-	94.8 (2,409) x 38.0 (965) x 62.0 (1,574)		
15	54 (204)	94.8 (2,409) x 38.0 (965) x 75.0 (1,904)		
38	13	x 87.0 (2,209)		
55	19	) x 91.0 (2,310)	679 (308)	324 (147)
62	21	x 99.0 (2,514)		
88	300 (1,136)	94.8 (2,409) x 38.0 (965) x 102.5 (2,603)		
150	510 (1,931)	116.5 (2,960) x 46.5 (965) x 104.4 (2,650)		

See page 44 for tank info

* All measurements are approximate and for estimation purposes only. Specification characteristics may change without notice. Please contact a Generac Power Systems Industrial Dealer for detailed installation drawings.

Generac Power Systems, Inc. | P.O.Box 8 | Waukesha, WI 53189
P: (262) 544-4811

Part No. A0002195509
Rev. A 03/18/2022



DRAWING CREATED FROM PRO/ENGINEER 3D FILE. ECO MODIFICATION TO BE APPLIED TO SOLID MODEL ONLY.

DIMENSIONS ARE IN MILLIMETERS [INCHES]

INSTALLATION DRAWING

GENERAC

TITLE

STUB-UP
D4.5L 60HZ: SD035, PD032
SD040, PD036, SD050, PD045

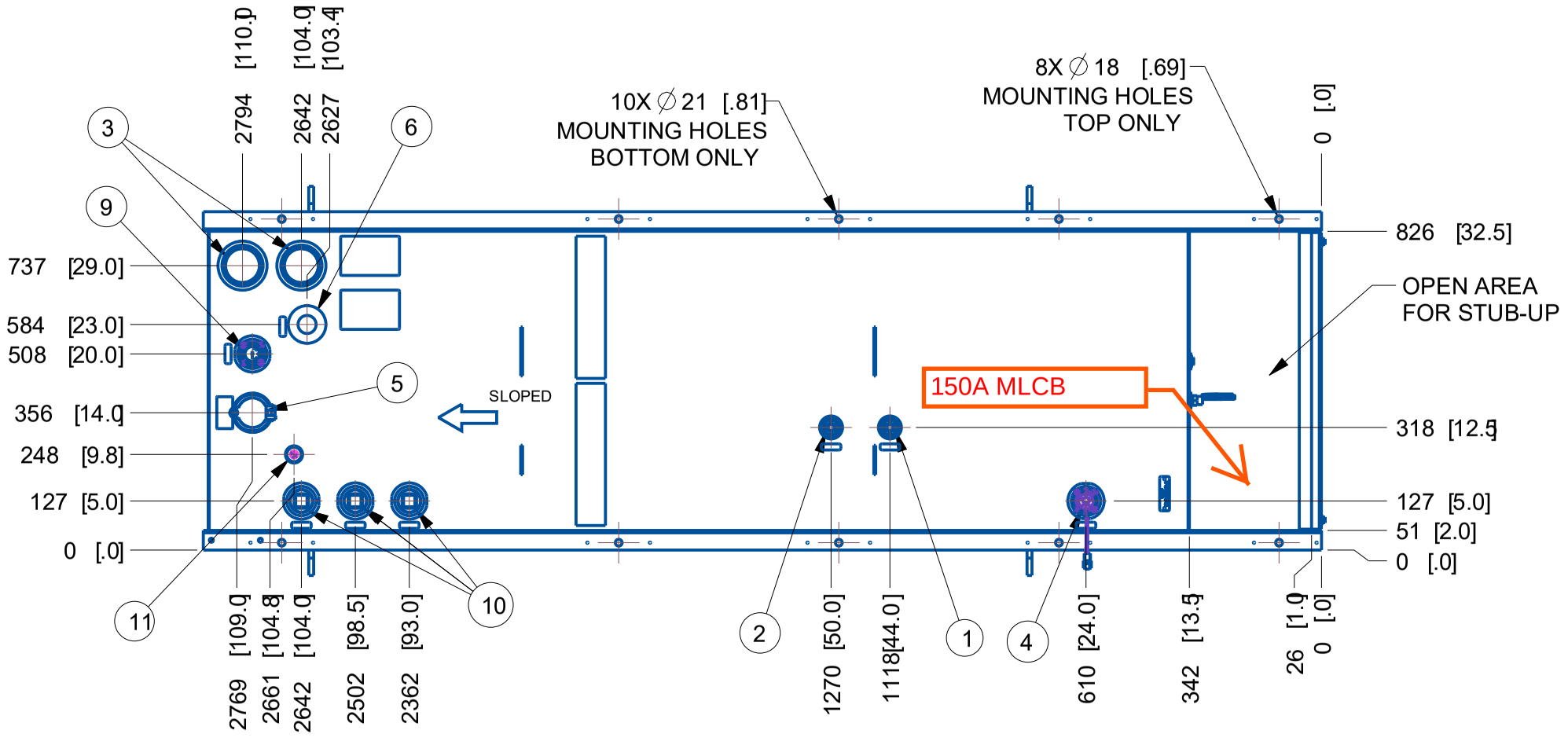
ISSUE DATE: 6/6 .1

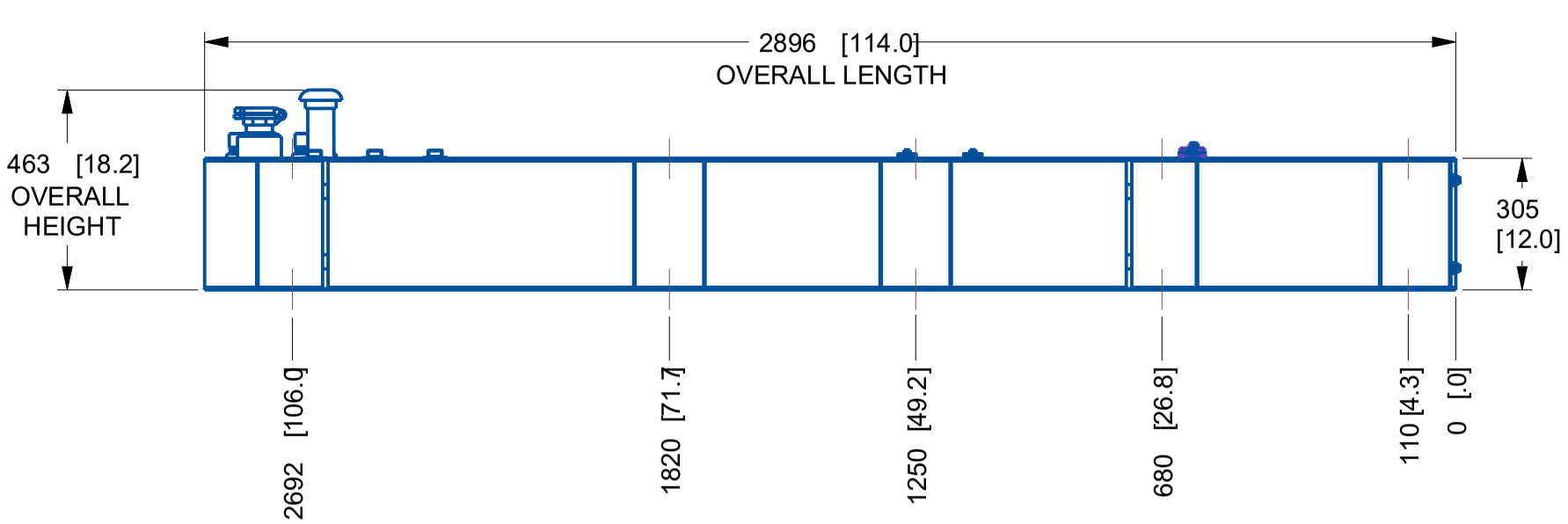
SIZE	CAGE NO	DWG NO	REV
B	N/A	A0002221718	A

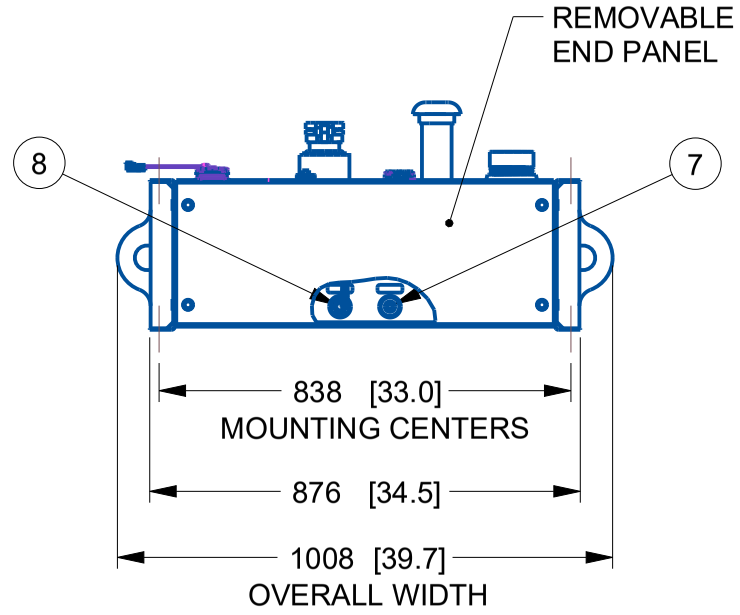
SCALE	0.15	WT-KG	SHEET 2 of 3

SH	REV	WINDCHILL VERSION
1/1	B	B.2

ITEM #	TANK FITTING	FUNCTION:
1	1/2" NPT COUPLING	FUEL SUPPLY
2	1/2" NPT COUPLING	FUEL RETURN
3	3" NPT WELD FLANGE	EMERGENCY VENT
4	FUEL SENSOR	FUEL LEVEL
5	2" NPT WELD FLANGE	FUEL FILL
6	2" NPT WELD FLANGE	VENT
7	1/2" NPT FITTING	DRAIN
8	1/2" NPT FITTING	LEAK DETECTOR
9	2" NPT WELD FLANGE	VISUAL FUEL LEVEL
10	2" NPT WELD FLANGE	SPARE, CUSTOMER USE
11	3/8" NPT FITTING	SPARE, DRAIN BACK







TANK P/N	A0001385492
TOTAL TANK CAPACITY	425 ltr [112 gal]
USABLE TANK CAPACITY	389 ltr [103 gal]
DRY WEIGHT	279 kg [614 lbs]

TANK IS UL-142 LISTED

NOTE:
1. MOUNTING BOLTS/STUDS FOR BASETANK TO MOUNTING SURFACE SHALL BE .625"-11 GRADE 5. (USE STANDARD SAE TORQUE SPECS).
2. DIMENSIONS ARE IN MILLIMETERS [INCHES].

DRAWING CREATED FROM PRO/ENGINEER 3D FILE. ECO MODIFICATION TO BE APPLIED TO SOLID MODEL ONLY.

INSTALLATION DRAWING

6/29/23

ELECTRONICALLY APPROVED
INSIDE WINDCHILL

GENERAC

TITLE
BASETANK
112G TOTAL/103G USEABLE
EXTERNAL FILL & VENT
A-GROUP

ISSUE DATE: 02/22/21

SIZE	CAGE NO	DWG NO	REV
B	N/A	A0001416829	B
SCALE 0.065	WT-KG 0.239	SHEET 44 of 84 1 of 1	

kpff
1601 5th Avenue, Suite 1600
Seattle, WA 98101 [206] 622-5822

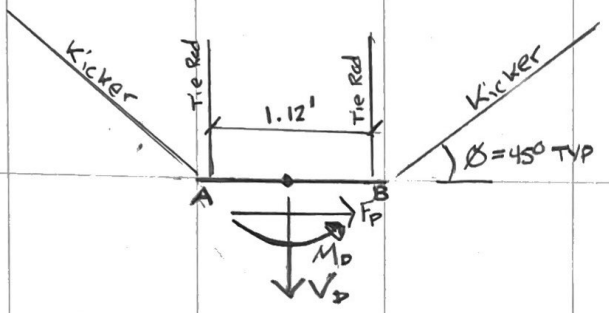
project Amadi Aesthetics	by GLS	sheet no. 1/3
location Mercer Island, WA	date 6/7/2023	job no.
client		
Loads @ Surgical Light		

Loads Per Manufacturer – NUVO MS-LED Surgical Light

Vertical = 300 LB

Polar Moment = 960 ft-lb

Seismic Load - see calcs F_p = 113 lb



Controlling Load Cases ASCE 7-16 2.3.6

1. 1.4 D
6. $1.2D + E_v^{0.2S_{DS}D} + E_h + L^{0} + 0.2S^{0} = 1.443D + E_h$
7. $0.9D - E_v + E_h = 0.677D + E_h$

Unfactored Loading

Joint A (Dead Loads)

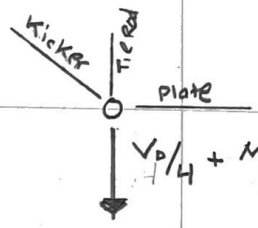
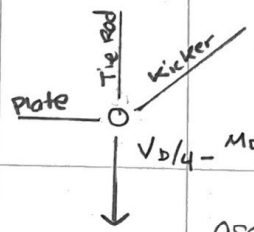


plate will load tie rod thru lower nut. no horizontal rxn. tie rod takes full vert load

$V_D/4 + M_D/(2\times1.12') = 300\#/4 + 960\,ft\text{-}lb/(2\times1.12\,ft) = 504$ lb

Joint B (Dead Loads)



$V_D/4 - M_D/(2\times1.12) = 300\#/4 - 960\,ft\text{-}lb/(2\times1.12) = 75\# - 429\# = -354\#$ (354# upward)

assume upward load is supported by kicker. resultant load in kicker creates horizontal load in plate. this load is resisted by adjacent kicker and results in additional vertical load in adjacent tie rod

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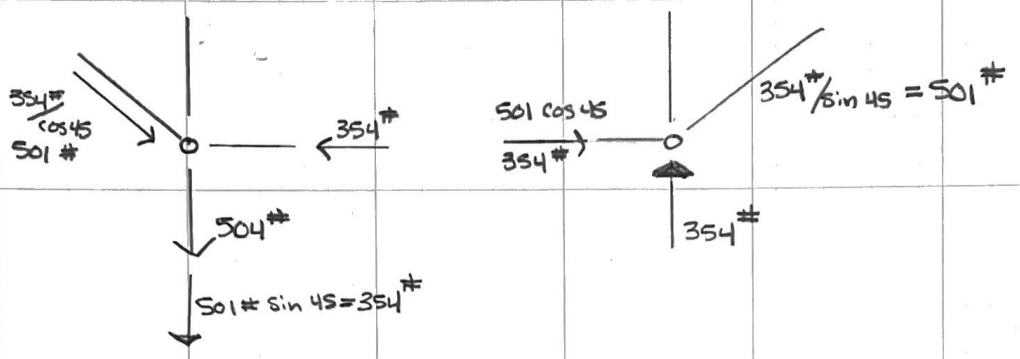
1601 5th Avenue, Suite 1600
Seattle, WA 98101 [206] 622-5822

project Amadi Aesthetics	by GLS	sheet no. 2/3
location Mercer Island, WA	date 6/7/2023	
client		job no.
Loads @ Surgical light		

Combined Joint A & B

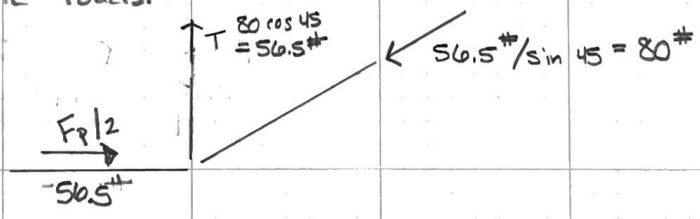


Tie Rod DL (unfactored) = 504# + 354# = 858#

Kicker Comp DL (unfactored) = 501#

Seismic Loads

-assume tie rods can only resist vertical loads in tension. Therefore, for joint stability & to resolve forces, only kickers in compression will resist seismic loads.



Load cases

1. $T_{tie\,rod} = 1.4\,(858^{\#}) = 1201^{\#}$
   $C_{kicker} = 1.4\,(501^{\#}) = 701^{\#}$ $T_{kicker} = 501^{\#}$

6. $T_{tie\,rod} = 1.443\,(858^{\#}) + 56.5^{\#} = 1292^{\#}$
   $C_{kicker} = 1.443\,(501^{\#}) + 80^{\#} = 803^{\#}$ $T_{kicker} = 723^{\#}$

7. $T_{tie\,rod} = 0.667\,(858^{\#}) + 56.5 = 629^{\#}$
   $C_{kicker} = 0.667\,(501^{\#}) + 80^{\#} = 414^{\#}$ $T_{kicker} = 334^{\#}$

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Seattle, WA 98101 [206] 622-5822

project	Amadi Aesthetics	by	GLS	sheet no.
location	Mercer Island, WA	date	6/7/2023	3/3
client				job no.
Loads @ Surgical light				

Check Tie Rod Tension

$\phi T_u = 0.9 F_y A_g = 0.9(36\,ksi)(0.2\,in^2) = 6.5^k \gg T_u = 1.292^k$ ✓OK

Check fillet weld

$\phi R_n = 3 \times 1.392\,^k/_{in} \times \pi(2\,in) = 26.2^k \gg T_u = 1.292^k$ ✓OK

↑ circumference of 2"ø Bar stock

Check L3x3x1/4 kicker

$L \approx (3^2 + 3^2)^{1/2} = 4.24\,ft$

$\phi T_n = 0.9 F_y A_g = 0.9 \times 36\,ksi \times 1.44\,in^2 = 46.7^k \gg T_u = 723^k$ ✓OK

$\phi P_n = 16.8^k$ @ 5ft AISC 360-16 Table 4-12 $> P_u = 803\,lb$ ✓OK

2nd Floor Anchorage

From tie rod $1.2(858^\#) + \Omega^2(0.223)(858^\#) + \Omega^2(56.5^\#)$

$= 1030^\# + 383^\# + 113^\# = 1526^\#$

Hilti KH-EZ 3/8"ø w/ 3 1/4" embedment $f'_c = 5{,}000\,psi$ (per original structural drawings)

$\phi T_n = 0.75\,(2765^\#) = 2074\,lb$ ✓OK $> T_u = 1292\,lb$

↑ seismic

From kicker

$\phi T_n = 2074\,lb > T_u = 803 \sin 45 = 568\,lb$ ✓OK

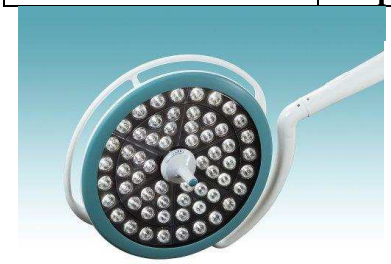
$\phi V_n = 5950\,lb \times 0.83 = 4939\,lb > V_u = 803 \cos 45 = 568\,lb$ ✓OK

↑ Conc thickness factor

SURGERY CENTER SERVICES
of America

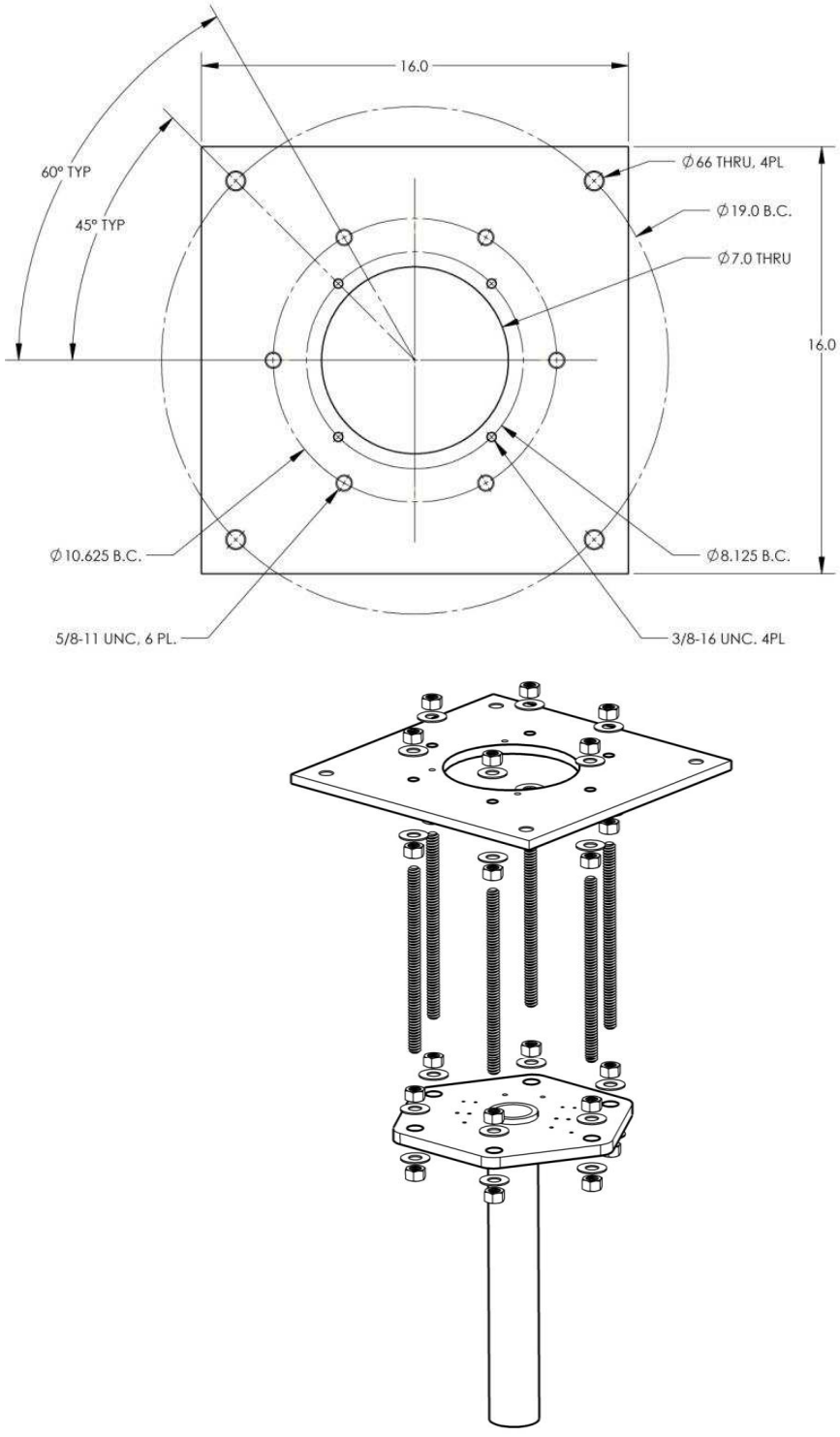
New Fixed Equipment Specifications
NUVO MS-LED Surgical Light

Vendor	**Nuvo**
Model No.	**MS-LED**
Description	**Ceiling mounted LED surgical lights**
Color/Finish	**White**
Overall Size	**See specs sheet**
Electrical	**120v 360 watts**
Plumbing	**N/A**
Mechanical	**Vertical Load = 300 lbs.** **Polar Moment Load = 960 ft-lbs.**
BTU's	**N/A**
Weight	**300 lbs vertical load (for three arms including two LED heads and one HD monitor). Polar moment = 960 ft-lbs.**
Remarks	**Contractor is responsible for ceiling supports, electrical & low voltage conduit & wiring feeds. Vendor will install the lights, monitors and video routers.** **Ceiling support is typically fabricated from unistrut with diagonal bracing. Ceiling plate is to be attached to the support structure approximately 4" above the finished ceiling height. Casting assembly is hung from the ceiling plate using long bolts (supplied by NUVO) and are held by double-nuts which are used to adjust the light to level. An electrical junction box should be installed above the ceiling plate. Wall control to be located near the circulator desk.**
Accessories	**Remote wall control** **Sterilizable handles** **Disposable sterile handle covers**



Mounting Plate preparation with an Interface Plate

If you choose to an Interface Plate in mounting your Light System, you should only use 5/8-11 A325 High Strength Threaded Rods, Hex Nuts and Washers. The following will illustrate the recommended hardware complement.



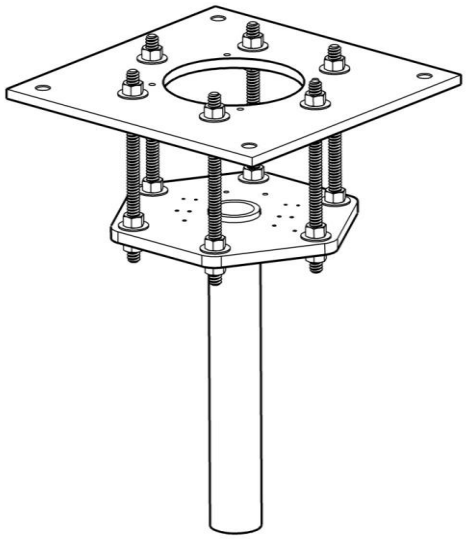


Figure 1: Ceiling Plate preparation with an Interface Plate

Table 2 — Hilti KH-EZ, KH-EZ P, KH-EZ PM, KH-EZ PL, KH-EZ C and KH-EZ CRC design Strength with concrete / pullout failure in uncracked concrete[1,2,3,4]

Nominal anchor diameter in. (mm)	Nominal Embed. Depth in. (mm)	Tension - ϕN_n				Shear - ϕV_n			
		f'_c = 2,500 psi (17.2 MPa) lb (kN)	f'_c = 3,000 psi (20.7 MPa) lb (kN)	f'_c = 4,000 psi (27.6 MPa) lb (kN)	f'_c = 6,000 psi (41.4 MPa) lb (kN)	f'_c = 2,500 psi (17.2 MPa) lb (kN)	f'_c = 3,000 psi (20.7 MPa) lb (kN)	f'_c = 4,000 psi (27.6 MPa) lb (kN)	f'_c = 6,000 psi (41.4 MPa) lb (kN)
1/4 (6.4)	1-5/8 (41)	585 (2.6)	620 (2.8)	675 (3.0)	765 (3.4)	1,075 (4.8)	1,180 (5.2)	1,360 (6.0)	1,670 (7.4)
	2-1/2 (64)	1,525 (6.8)	1,670 (7.4)	1,930 (8.6)	2,365 (10.5)	2,235 (9.9)	2,450 (10.9)	2,825 (12.6)	3,460 (15.4)
3/8 (9.5)	1-5/8 (41)	910 (4.0)	1,000 (4.4)	1,155 (5.1)	1,415 (6.3)	980 (4.4)	1,075 (4.8)	1,245 (5.5)	1,520 (6.8)
	2-1/8 (54)	1,490 (6.6)	1,635 (7.3)	1,885 (8.4)	2,310 (10.3)	1,605 (7.1)	1,760 (7.8)	2,030 (9.0)	2,485 (11.1)
	2-1/2 (64)	1,980 (8.8)	2,165 (9.6)	2,505 (11.1)	3,065 (13.6)	2,130 (9.5)	2,335 (10.4)	2,695 (12.0)	3,300 (14.7)
	3-1/4 (83)	3,085 (13.7)	3,375 (15.0)	3,900 (17.3)	4,775 (21.2)	6,640 (29.5)	7,275 (32.4)	8,400 (37.4)	10,290 (45.8)
1/2 (12.7)	2-1/4 (57)	1,645 (7.3)	1,800 (8.0)	2,080 (9.3)	2,550 (11.3)	1,770 (7.9)	1,940 (8.6)	2,240 (10.0)	2,745 (12.2)
	3 (76)	2,785 (12.4)	3,050 (13.6)	3,525 (15.7)	4,315 (19.2)	3,000 (13.3)	3,285 (14.6)	3,795 (16.9)	4,645 (20.7)
	4-1/4 (108)	5,070 (22.6)	5,555 (24.7)	6,415 (28.5)	7,855 (34.9)	10,920 (48.6)	11,965 (53.2)	13,815 (61.5)	16,920 (75.3)
5/8 (15.9)	3-1/4 (83)	3,240 (14.4)	3,550 (15.8)	4,100 (18.2)	5,025 (22.4)	3,490 (15.5)	3,825 (17.0)	4,415 (19.6)	5,410 (24.1)
	4 (102)	4,630 (20.6)	5,070 (22.6)	5,855 (26.0)	7,170 (31.9)	9,970 (44.3)	10,920 (48.6)	12,610 (56.1)	15,445 (68.7)
	5 (127)	6,705 (29.8)	7,345 (32.7)	8,485 (37.7)	10,390 (46.2)	14,445 (64.3)	15,825 (70.4)	18,270 (81.3)	22,380 (99.6)
3/4 (19.1)	4 (102)	4,380 (19.5)	4,795 (21.3)	5,540 (24.6)	6,785 (30.2)	9,430 (41.9)	10,330 (45.9)	11,930 (53.1)	14,610 (65.0)
	6-1/4 (159)	9,345 (41.6)	10,235 (45.5)	11,820 (52.6)	14,475 (64.4)	20,125 (89.5)	22,045 (98.1)	25,455 (113.2)	31,175 (138.7)

3.3.6

Table 3 — Hilti KH-EZ, KH-EZ P, KH-EZ PM, KH-EZ PL, KH-EZ C and KH-EZ CRC design Strength with concrete / pullout failure in cracked concrete[1,2,3,4,5]

Nominal anchor diameter in. (mm)	Nominal embed. in. (mm)	Tension - ϕN_n				Shear - ϕV_n			
		f'_c = 2,500 psi (17.2 MPa) lb (kN)	f'_c = 3,000 psi (20.7 MPa) lb (kN)	f'_c = 4,000 psi (27.6 MPa) lb (kN)	f'_c = 6,000 psi (41.4 MPa) lb (kN)	f'_c = 2,500 psi (17.2 MPa) lb (kN)	f'_c = 3,000 psi (20.7 MPa) lb (kN)	f'_c = 4,000 psi (27.6 MPa) lb (kN)	f'_c = 6,000 psi (41.4 MPa) lb (kN)
1/4 (6.4)	1-5/8 (41)	300 (1.3)	315 (1.4)	345 (1.5)	390 (1.7)	765 (3.4)	835 (3.7)	965 (4.3)	1,180 (5.2)
	2-1/2 (64)	760 (3.4)	830 (3.7)	960 (4.3)	1,175 (5.2)	1,585 (7.1)	1,735 (7.7)	2,000 (8.9)	2,450 (10.9)
3/8 (9.5)	1-5/8 (41)	475 (2.1)	520 (2.3)	600 (2.7)	730 (3.2)	695 (3.1)	760 (3.4)	880 (3.9)	1,080 (4.8)
	2-1/8 (54)	1,055 (4.7)	1,155 (5.1)	1,335 (5.9)	1,635 (7.3)	1,135 (5.0)	1,245 (5.5)	1,440 (6.4)	1,760 (7.8)
	2-1/2 (64)	1,400 (6.2)	1,535 (6.8)	1,775 (7.9)	2,170 (9.7)	1,510 (6.7)	1,655 (7.4)	1,910 (8.5)	2,340 (10.4)
	3-1/4 (83)	2,185 (9.7)	2,390 (10.6)	2,765 (12.3)	3,385 (15.1)	4,705 (20.9)	5,155 (22.9)	5,950 (26.5)	7,285 (32.4)
1/2 (12.7)	2-1/4 (57)	1,035 (4.6)	1,135 (5.0)	1,310 (5.8)	1,605 (7.1)	1,115 (5.0)	1,220 (5.4)	1,410 (6.3)	1,725 (7.7)
	3 (76)	1,755 (7.8)	1,920 (8.5)	2,220 (9.9)	2,715 (12.1)	1,890 (8.4)	2,070 (9.2)	2,390 (10.6)	2,925 (13.0)
	4-1/4 (108)	3,190 (14.2)	3,495 (15.5)	4,040 (18.0)	4,945 (22.0)	6,875 (30.6)	7,530 (33.5)	8,695 (38.7)	10,650 (47.4)
5/8 (15.9)	3-1/4 (83)	2,040 (9.1)	2,235 (9.9)	2,580 (11.5)	3,165 (14.1)	2,200 (9.8)	2,410 (10.7)	2,780 (12.4)	3,405 (15.1)
	4 (102)	3,140 (14.0)	3,510 (15.6)	3,845 (17.1)	4,515 (20.1)	6,760 (30.1)	7,560 (33.6)	8,280 (36.8)	9,725 (43.3)
	5 (127)	4,225 (18.8)	4,625 (20.6)	5,340 (23.8)	6,540 (29.1)	9,095 (40.5)	9,965 (44.3)	11,505 (51.2)	14,090 (62.7)
3/4 (19.1)	4 (102)	2,755 (12.3)	3,020 (13.4)	3,485 (15.5)	4,270 (19.0)	5,940 (26.4)	6,505 (28.9)	7,510 (33.4)	9,200 (40.9)
	6-1/4 (159)	5,885 (26.2)	6,445 (28.7)	7,440 (33.1)	9,115 (40.5)	12,670 (56.4)	13,880 (61.7)	16,030 (71.3)	19,630 (87.3)

1 See PTG Ed. 21 Section 3.1.8 to convert design strength value to ASD value.
2 Linear interpolation between embedment depths and concrete compressive strengths is not permitted.
3 Apply spacing, edge distance, and concrete thickness factors in Tables 6 through 15 as necessary. Compare to the steel values in Table 4. The lesser of the values is to be used for the design.
4 Tabular values are for normal weight concrete only. For lightweight concrete multiply design strength by λa as follows: For sand-lightweight, λa = 0.68. For all-lightweight, λa = 0.60.
5 Tabular values are for static loads only. For seismic tension loads, multiply cracked concrete tabular values in tension by the following reduction factors: 1/4-in diameter by 1-5/8-in nominal embedment depth - $a_{N,seis}$ = 0.60
All other sizes - $a_{N,seis}$ = 0.75
No reduction needed for seismic shear. See PTG Ed. 21 Section 3.1.8 for additional information on seismic applications.

Table 8 — Load Adjustment Factors for 3/8-in. diameter Hilti KH-EZ, KH-EZ C and KH-EZ CRC in uncracked [1,2]

3/8-in. KH-EZ uncracked concrete		Spacing factor in tension f_{AN}				Edge distance factor in tension f_{RN}				Spacing factor in shear [3] f_{AV}				Edge distance in shear								Conc. thickness factor in shear [4] f_{HV}			
														⊥ toward edge f_{RV}				II to and away from edge f_{RV}							
Embedment h_{nom}	in.	1-5/8	2-1/8	2-1/2	3-1/4	1-5/8	2-1/8	2-1/2	3-1/4	1-5/8	2-1/8	2-1/2	3-1/4	1-5/8	2-1/8	2-1/2	3-1/4	1-5/8	2-1/8	2-1/2	3-1/4	1-5/8	2-1/8	2-1/2	3-1/4
	(mm)	(41)	(54)	(64)	(83)	(41)	(54)	(64)	(83)	(41)	(54)	(64)	(83)	(41)	(54)	(64)	(83)	(41)	(54)	(64)	(83)	(41)	(54)	(64)	(83)
Spacing (s)/edge distance (c_a)/concrete thickness (h) - in. (mm)																									
1-1/2	(38)	n/a	n/a	n/a	n/a	0.58	0.62	0.63	0.57	n/a	n/a	n/a	n/a	0.49	0.32	0.25	0.08	0.58	0.62	0.50	0.17	n/a	n/a	n/a	n/a
2	(51)	n/a	n/a	n/a	n/a	0.76	0.75	0.75	0.66	n/a	n/a	n/a	n/a	0.75	0.49	0.38	0.13	0.76	0.75	0.75	0.26	n/a	n/a	n/a	n/a
2-1/4	(57)	0.84	0.74	0.70	0.65	0.86	0.82	0.81	0.70	0.65	0.62	0.60	0.55	0.90	0.59	0.46	0.16	0.90	0.82	0.81	0.31	n/a	n/a	n/a	n/a
2-1/2	(64)	0.88	0.77	0.72	0.67	0.95	0.91	0.88	0.75	0.67	0.63	0.61	0.55	1.00	0.69	0.54	0.18	1.00	0.91	0.88	0.37	n/a	n/a	n/a	n/a
3	(76)	0.95	0.82	0.77	0.70	1.00	1.00	1.00	0.85	0.71	0.66	0.63	0.56		0.90	0.71	0.24		1.00	1.00	0.48	n/a	n/a	n/a	n/a
3-1/4	(83)	0.99	0.85	0.79	0.72				0.90	0.72	0.67	0.64	0.57		1.00	0.80	0.27				0.54	0.95	n/a	n/a	n/a
3-1/2	(89)	1.00	0.88	0.81	0.73				0.95	0.74	0.68	0.65	0.58			0.89	0.30				0.61	0.98	n/a	n/a	n/a
4	(102)		0.93	0.86	0.77				1.00	0.78	0.71	0.68	0.59			1.00	0.37				0.74	1.00	0.91	0.84	n/a
4-1/2	(114)		0.99	0.90	0.80					0.81	0.73	0.70	0.60				0.44				0.88			0.89	n/a
4-3/4	(121)		1.00	0.93	0.82					0.83	0.75	0.71	0.60				0.48				0.96			0.91	0.639
5	(127)			0.95	0.83					0.84	0.76	0.72	0.61				0.52				1.00			0.94	0.655
6	(152)			1.00	0.90					0.91	0.81	0.76	0.63				0.68							1.00	0.718
7	(178)				0.97					0.98	0.86	0.81	0.65				0.86								0.775
8	(203)				1.00					1.00	0.91	0.85	0.67				1.00								0.829
9	(229)										0.97	0.90	0.69												0.879
10	(254)										1.00	0.94	0.71												0.927
11	(279)											0.98	0.74												0.972
12	(305)											1.00	0.76												1.000
14	(356)												0.80												
16	(406)												0.84												
18	(457)												0.89												
20	(508)												0.93												
24	(610)												1.000												

Table 9 — Load Adjustment Factors for 3/8-in. diameter Hilti KH-EZ, KH-EZ C and KH-EZ CRC in cracked [1,2]

3/8-in. KH-EZ cracked concrete		Spacing factor in tension f_{AN}				Edge distance factor in tension f_{RN}				Spacing factor in shear [3] f_{AV}				Edge distance in shear								Conc. thickness factor in shear [4] f_{HV}			
														⊥ toward edge f_{RV}				II to and away from edge f_{RV}							
Embedment h_{nom}	in.	1-5/8	2-1/8	2-1/2	3-1/4	1-5/8	2-1/8	2-1/2	3-1/4	1-5/8	2-1/8	2-1/2	3-1/4	1-5/8	2-1/8	2-1/2	3-1/4	1-5/8	2-1/8	2-1/2	3-1/4	1-5/8	2-1/8	2-1/2	3-1/4
	(mm)	(41)	(54)	(64)	(83)	(41)	(54)	(64)	(83)	(41)	(54)	(64)	(83)	(41)	(54)	(64)	(83)	(41)	(54)	(64)	(83)	(41)	(54)	(64)	(83)
Spacing (s)/edge distance (c_a)/concrete thickness (h) - in. (mm)																									
1-1/2	(38)	n/a	n/a	n/a	n/a	0.92	0.74	0.66	0.57	n/a	n/a	n/a	n/a	0.49	0.32	0.25	0.09	0.92	0.64	0.50	0.17	n/a	n/a	n/a	n/a
2	(51)	n/a	n/a	n/a	n/a	1.00	0.90	0.79	0.66	n/a	n/a	n/a	n/a	0.76	0.50	0.39	0.13	1.00	0.90	0.77	0.26	n/a	n/a	n/a	n/a
2-1/4	(57)	0.84	0.74	0.70	0.65	1.00	0.98	0.85	0.70	0.66	0.62	0.60	0.55	0.90	0.59	0.46	0.16	1.00	0.98	0.85	0.31	n/a	n/a	n/a	n/a
2-1/2	(64)	0.88	0.77	0.72	0.67	1.00	1.00	0.92	0.75	0.67	0.63	0.61	0.55	1.00	0.69	0.54	0.18	1.00	1.00	0.92	0.37	n/a	n/a	n/a	n/a
3	(76)	0.95	0.82	0.77	0.70	1.00		1.00	0.85	0.71	0.66	0.63	0.56	1.00	0.91	0.71	0.24	1.00	1.00	1.00	0.48	n/a	n/a	n/a	n/a
3-1/4	(83)	0.99	0.85	0.79	0.72				0.90	0.73	0.67	0.64	0.57		1.00	0.80	0.27				0.55	0.95	n/a	n/a	n/a
3-1/2	(89)	1.00	0.88	0.81	0.73				0.95	0.74	0.68	0.65	0.58			0.90	0.31				0.61	0.98	n/a	n/a	n/a
4	(102)		0.93	0.86	0.77				1.00	0.78	0.71	0.68	0.59			1.00	0.37				0.75	1.00	0.91	0.84	n/a
4-1/2	(114)		0.99	0.90	0.80					0.81	0.73	0.70	0.60				0.44				0.89		0.97	0.89	n/a
4-3/4	(121)		1.00	0.93	0.82					0.83	0.75	0.71	0.60				0.48				0.97		1.00	0.92	0.64
5	(127)			0.95	0.83					0.85	0.76	0.72	0.61				0.52				1.00			0.94	0.66
6	(152)			1.00	0.90					0.92	0.81	0.77	0.63				0.69							1.00	0.72
7	(178)				0.97					0.98	0.87	0.81	0.65				0.86								0.78
8	(203)				1.00					1.00	0.92	0.85	0.67				1.00								0.83
9	(229)										0.97	0.90	0.69												0.88
10	(254)										1.00	0.94	0.72												0.93
11	(279)											0.99	0.74												0.97
12	(305)											1.00	0.76												1.00
14	(356)												0.80												
16	(406)												0.85												
18	(457)												0.89												
20	(508)												0.93												
24	(610)												1.00												

1 Linear interpolation not permitted.

2 When combining multiple load adjustment factors (e.g. for a 4 anchor pattern in a corner with thin concrete member) the design can become very conservative. To optimize the design, use Hilti PROFIS Engineering software or perform anchor calculation using design equations from ACI 318-14 Chapter 17.

3 Spacing factor reduction in shear, f_{AV}, assumes an influence of a nearby edge. If no edge exists, then $f_{AV} = f_{AN}$.

4 Concrete thickness reduction factor in shear, f_{HV}, assumes an influence of a nearby edge. If no edge exists, then $f_{HV} = 1.0$.

If a reduction factor value is in a shaded cell, this indicates that this specific edge distance may not be permitted with a certain spacing (or vice versa). Check table 5 and figure 2 of this section to calculate permissable edge distance, spacing and concrete thickness combinations.

Cold Formed Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/ft^3]	Yield[ksi]	Fu[ksi]
1	A570 Gr.33	29500	11346	.3	.65	.49	33	52
2	A607 C1 Gr.55	29500	11346	.3	.65	.49	55	70

Cold Formed Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	I (90,270) [i...	I (0,180) [in4]
1	CF1A	8CU1.25X057	Beam	None	A570 Gr.33	Typical	.581	.057	4.41

Cold Formed Steel Design Parameters

	Label	Shape	Length[ft]	Lb-out[ft]	Lb-in[ft]	Lcomp top[...	Lcom...	L-torq...	K-out	K-in	Cb	R	a[ft]	Functi...
1	M1	600S162-54	12											Lateral

Member Point Loads (BLC 1 : Dead Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.171	5
2	M1	Y	-.171	7.416
3	M1	X	.171	5
4	M1	X	-.171	7.416

Member Point Loads (BLC 3 : Seismic X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.114	6

Member Distributed Loads (BLC 2 : Int "Wind" Load)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F,...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-.01	-.01	0	0

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Joint	Point	Distributed
1	Dead Load	DL		-1		4	
2	Int "Wind" Load	WL					1
3	Seismic X	EL				1	

Load Combinations

	Description	Sol...	PD...	SR...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
1	1.4D	Yes	Y		1	1.4																		
2	1.2D + 1.0...	Yes	Y		1	1.2	2	1																
3	1.2D - 1.0 ...	Yes	Y		1	1.2	2	-1																
4	0.9D + 1.0...	Yes	Y		1	.9	2	-1																
5	0.9D - 1.0W	Yes	Y		1	.9	2	-1																
6	1.423D + ...	Yes	Y		1	1.423			3	1														
7	1.423D - Ex	Yes	Y		1	1.423			3	-1														
8	0.667D + ...	Yes	Y		1	.667			3	1														
9	0.667D - Ex	Yes	Y		1	.667			3	-1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Moment [k-ft]	LC
1	N1	max	.034	9	.25	6	0	1
2		min	-.106	6	.117	8	0	1
3	N2	max	.106	7	.267	6	0	1
4		min	-.034	8	.125	8	0	1
5	Totals:	max	.12	2	.518	6		
6		min	-.12	4	.243	8		

Envelope Member Section Forces

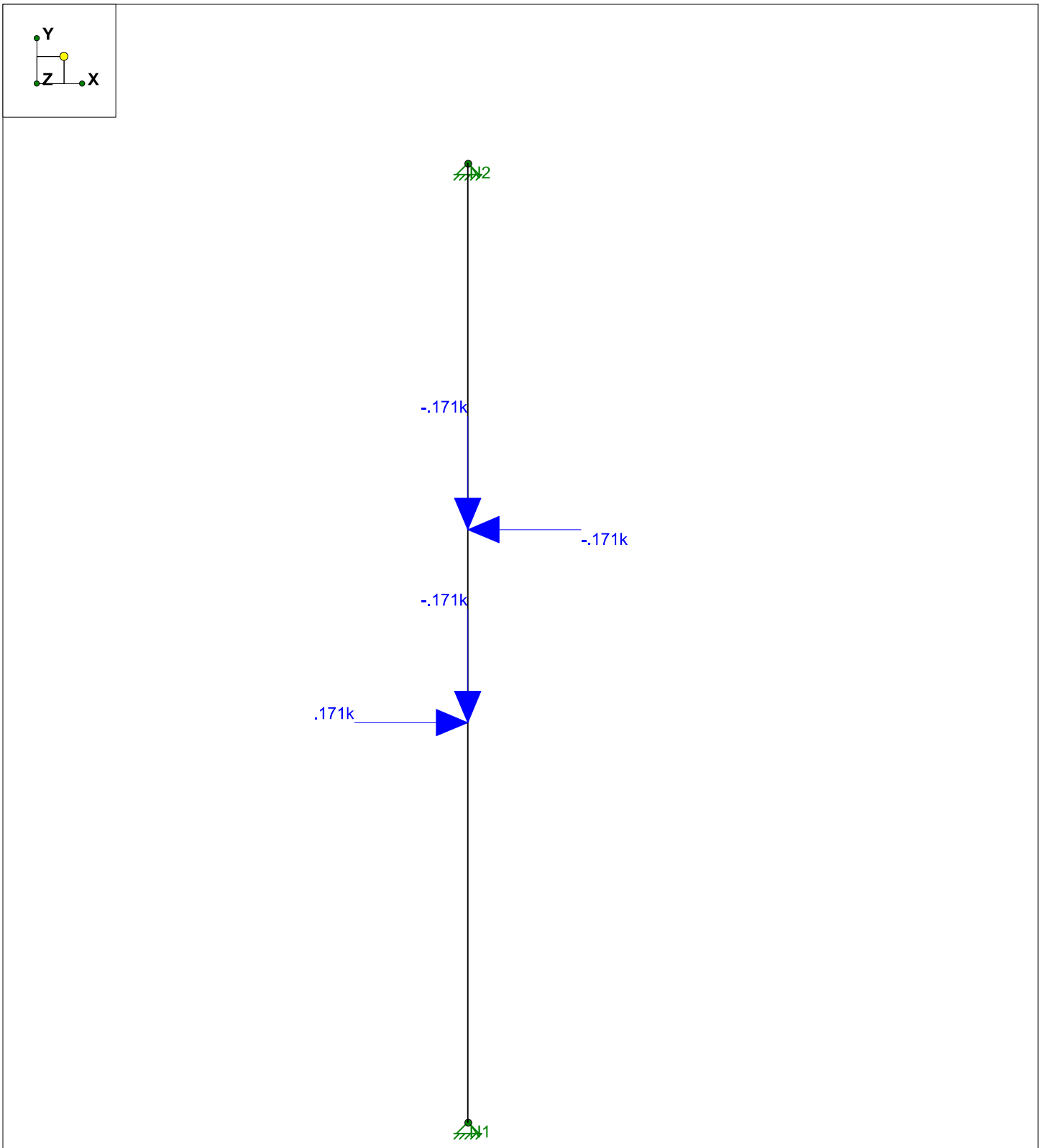
	Member	Sec		Axial[k]	LC	Shear[k]	LC	Moment[k-ft]	LC
1	M1	1	max	.25	6	.106	6	0	1
2			min	.117	8	-.034	9	0	1
3		2	max	.242	6	.106	6	.102	9
4			min	.114	8	-.034	9	-.318	6
5		3	max	-.004	8	-.034	9	.318	9
6			min	-.008	6	-.251	6	-.392	6
7		4	max	-.121	8	.106	7	.318	7
8			min	-.259	6	-.034	8	-.102	8
9		5	max	-.125	8	.106	7	0	1
10			min	-.267	6	-.034	8	0	1

Envelope Member End Reactions

	Member	Membe...		Axial[k]	LC	Shear[k]	LC	Moment[k-ft]	LC
1	M1	I	max	.25	6	.106	6	0	1
2			min	.117	8	-.034	9	0	1
3		J	max	-.125	8	.106	7	0	1
4			min	-.267	6	-.034	8	0	1

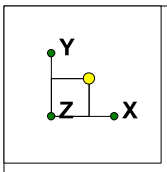
Envelope AISI S100-16: LRFD Cold Formed Steel Code Checks

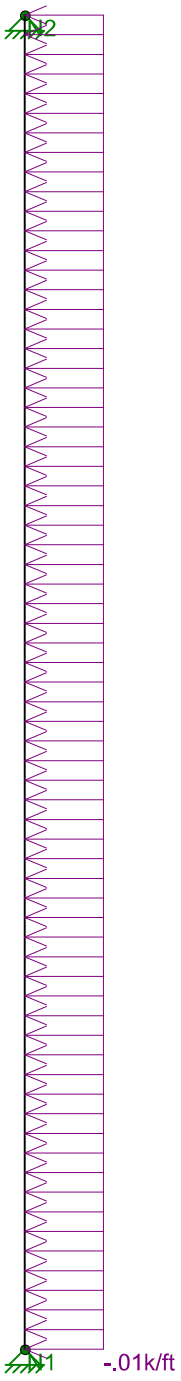
	Member	Shape	Code C...	Loc[ft]	LC	Shear C...	Loc[ft]	LC	Phi*Pn[k]	Phi*Tn[k]	Phi*Mn[k-ft]	phi...Cb		Eqn
1	M1	600S162-54	.631	4.875	6	.060	6	6	1.894	16.513	1.02	4....	1....	H1.2-1



Loads: BLC 1, Dead Load

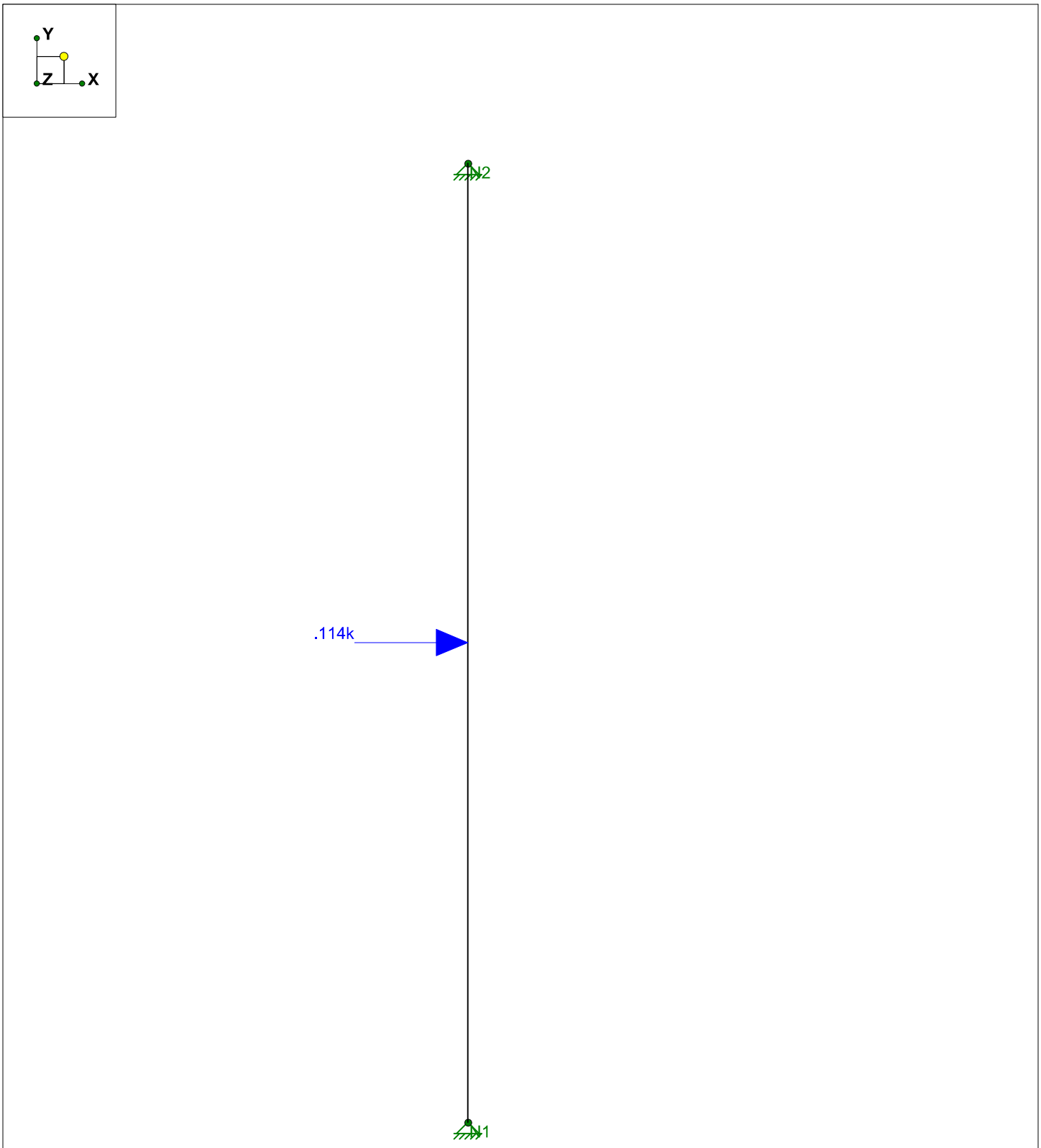
KPFF Consulting Engineers	Amadi Aesthetics - Hot Water Heater Stud Wall	SK - 3
GLS		June 12, 2023 at 3:09 PM
2300328		Stud Wall Dgn @ water heater.r2d





Loads: BLC 2, Int "Wind" Load

KPFF Consulting Engineers	Amadi Aesthetics - Hot Water Heater Stud Wall	SK - 4
GLS		June 12, 2023 at 3:09 PM
2300328		Stud Wall Dgn @ water heater.r2d

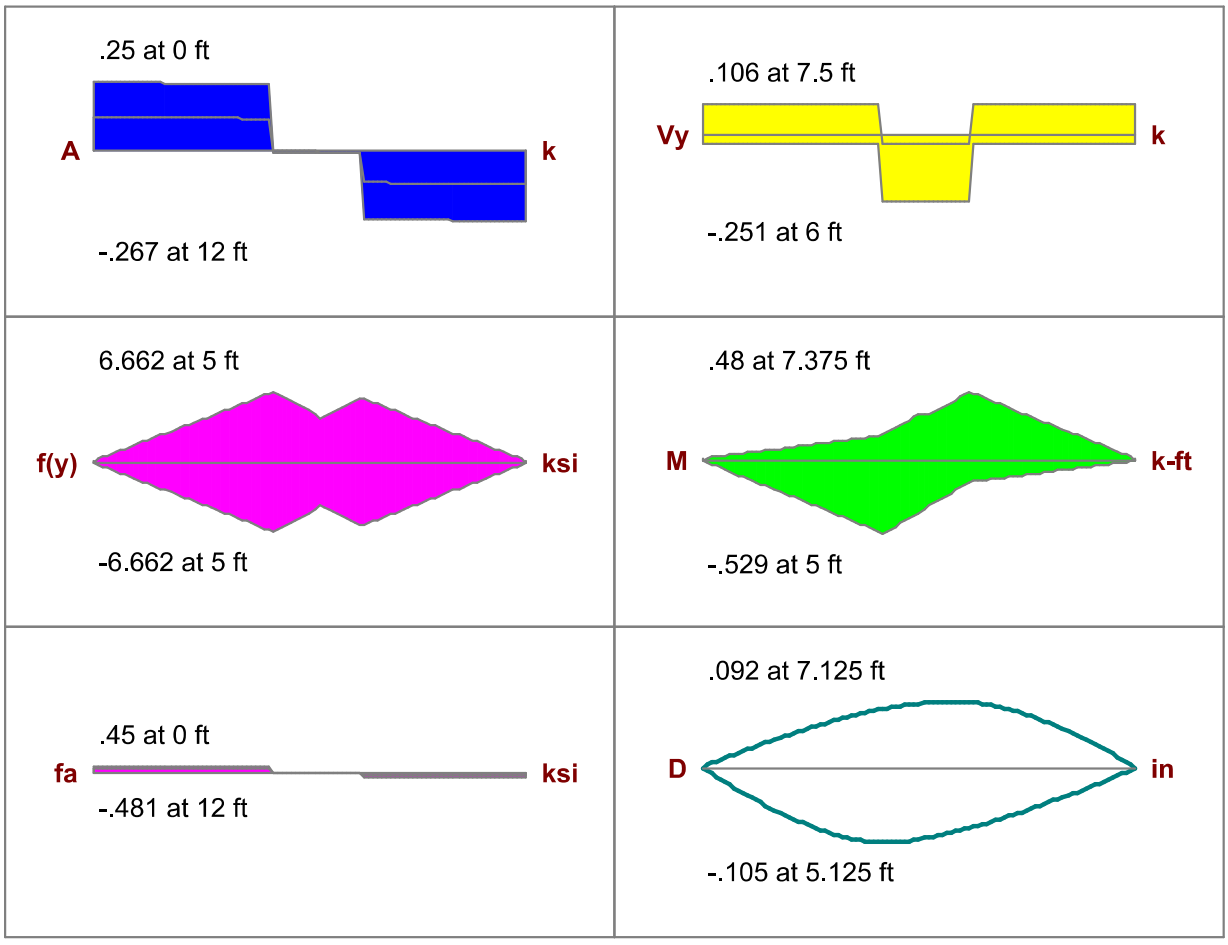


Loads: BLC 3, Seismic X

KPFF Consulting Engineers	Amadi Aesthetics - Hot Water Heater Stud Wall	SK - 5
GLS		June 12, 2023 at 3:09 PM
2300328		Stud Wall Dgn @ water heater.r2d

Column: ***M1***

Shape: **600S162-54**
Material: **A570 Gr.33**
Length: **12 ft**
I Joint: **N1**
J Joint: **N2**
Envelope
Code Check: **0.631 (LC 6)**
Report Based On 97 Sections



AISI S100-16: LRFD Code Check

Max Bending Check	**0.631 (LC 6)**	Max Shear Check	**0.060 (LC 6)**
Location	**4.875 ft**	Location	**6 ft**
Equation	**H1.2-1**	Max Defl Ratio	**L/1366**
Gov.∅ Equation	**F2/F3**		

R (I6.2.1) **Not Used**

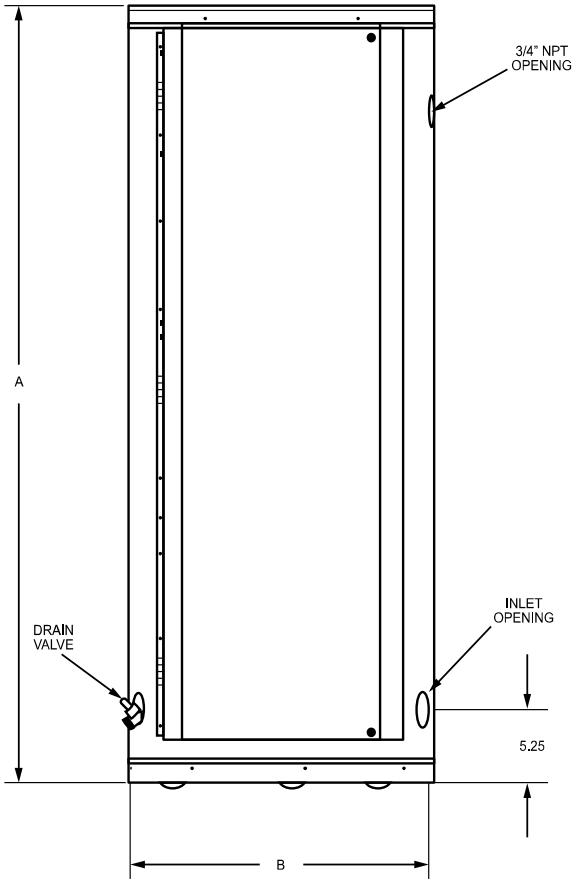
			Out Plane	In Plane
Fy	**33 ksi**	Lb	**12 ft**	**12 ft**
∅*Pn	**1.894 k**	KL/r	**252.383**	**63.492**
∅*Tn	**16.513 k**			
∅*Mn	**1.02 k-ft**	L Comp Flange	**12 ft**	
∅*Vn	**4.165 k**			
Cb	**1.688**			

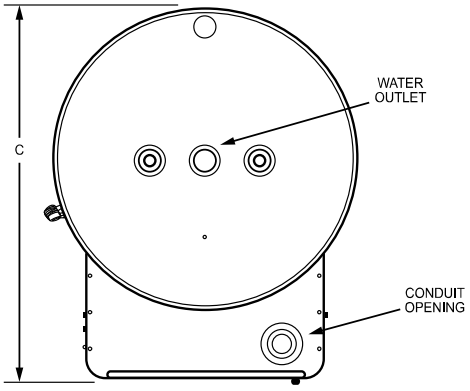
A eff. (Fy)	**.392 in^2**
A eff. (Fn)	**.556 in^2**
Iy eff.	**.18 in^4**
Sy eff. (L)	**.436 in^3**
Sy eff. (R)	**.149 in^3**
Iz eff.	**2.86 in^4**
Sz eff. (T)	**.953 in^3**
Sz eff. (B)	**.953 in^3**

Commercial Electric Water Heaters

OPTIONS

- UL and cUL listed conversion kits to adjust voltage and kW requirements in the field before and after installation
- ASME 160 psi (1103 kPa) tank construction
- International voltages – 220, 380, 400, 415, 575, and 600 volts, three phase available with Y connected elements
- MANIFOLD KITS – for multiple tank installations. Two heaters -part # 100109231, three heaters- part # 100109232 and four heaters- part # 100109233



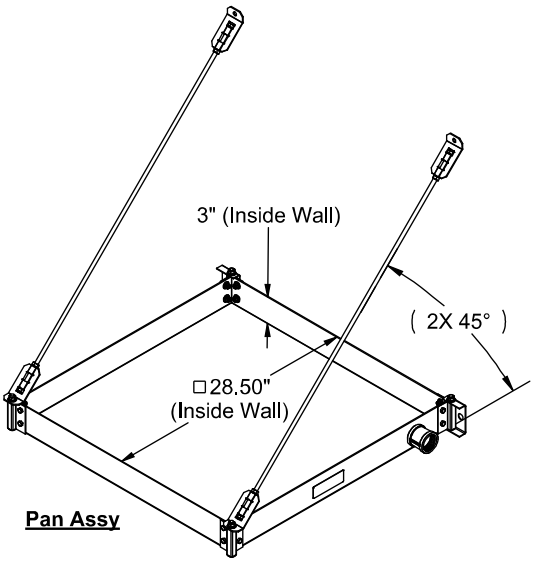


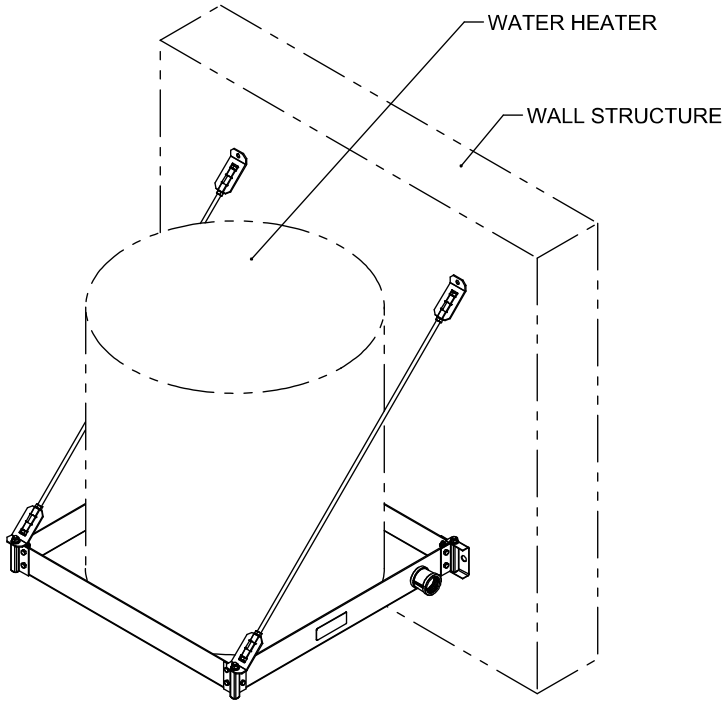
DIMENSIONS

Model Number	Tank Capacity		Dimensions						Inlet/ Outlet (NPT)	Approx. Shipping Weight	
			A		B		C				
	gal.	litre	Inches	MM	Inches	MM	Inches	MM	Inches	lbs	kG
DRE-52	50	189	55-3/4	142	21-3/4	55.2	27	68.6	1-1/4	265	120
DRE-80	80	302	60-1/4	153	25-1/2	64.8	31	78.7	1-1/4	280	127
DRE-120	119	450	62-1/4	158.1	29-1/2	75	35	88.9	1-1/4	390	177

For ASME Construction add "A" to the model number (example: DRE 52A 24).

PRODUCT SPECIFICATION DRAWING
QUICK STAND™ #60-SWHP-WM
Wall Mounted Equipment Platform



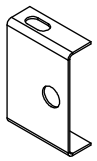


ALL DIMENSIONS IN INCHES

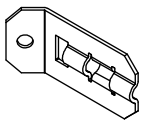
The #60-SWHP-WM Wall Mounted Equipment Platform is engineered to support water heaters up to 50 U.S. gallons, or other equipment, up to 750 pounds total weight. This time and labor savings tool is designed for the Professional Contractor. Design features requested by plumbers are incorporated into a professional platform and drain pan combination. See Installation Instructions for detail.

Product Information:

- Material:
  Pan: 12 gage CRS, galvanized
  Corner Brackets (4): 14 gage CRS, galvanized
  C-Brackets (2): 16 gage CRS, galvanized
  45° Brackets (4): 12 gage, CRS, galvanized
  Threaded Rod (2): Low carbon steel, zinc plated, 3/8" x 40.0" long
- Wide platform allows water heaters up to 28 ½" diameter
- Watertight corners and welded 1 ¼" steel drain body eliminate need for additional drain pan
- Static load rating 750 pounds with 2X safety factor (depending on structural anchorage)
- Professional Engineer stamped documentation available
- Galvanized steel construction
- Suspends with user-supplied 3/8" hardware/anchors to mount to wall, 4 places
- Installation instructions for mounting to concrete or framed wall structure available
- Patent Pending



"C" Bracket, 2 places



45° Bracket, 4 places

Product Submittal	
Job Name:	
Date:	
Part Number:	Qty:
Architect / Owner:	
Contractor:	
Notes:	

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