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PROJECT: GVH DISTRIBUTION

July 1, 2021

To: Weber County Building Inspection Department
Attn: Stan Berniche

Occupancy and Building Summary: Changed Construction to type II-A. Use to S-1. Occupant Load see G.0 Cover sheet for calculations.

A1.

A. Sheet index updated on G.0
B. No Hazardous Materials.
C. See cover sheet. Changed to S-1 Occupancy.
D. See G.0 for load calculation, Occupancy Load Factors, Restroom requirements and allowable area.
E. See G.0 for updated Load Calculations pertaining to S-1 occupancy.
F. See egress load calculation on G.0
G. Existing Plumbing (restrooms and drinking fountains) in the existing building satisfy requirements for the building with the new addition. See G.0.

A2.

A. See sheet A0.0 for accessible route path with note clouded. See parking labeled for Accessible stalls (existing) and Parking schedule. Clouded.
B. See A0.0 for accessible routes.

A3 A&B See A1.4 for fire extinguished locations and diagrams. See detail for Exit Doors including hardware and tactile signage.

A4 See A1.4 for egress calculations and updated note for S-1 Exception to 400’ distance. See A2.0 for section drawings qualifying for this exception.

A5

See sheet A1.4 and Sheet A3.0 showing hardware, signage, etc for egress doors, including detail drawing of said doors that meet IBC requirements.

N1

A. See G.) cover sheet “Project Information”. The R-values, updated from the panel provider are R-22.5 continuous insulation as a 3” panel. The IECC require R-13 + R-13 ci. However, there is a prescriptive method which uses U-factor. The U-factor of R-22.5ci meets and exceeds IECC requirements.
B. R-30ci is required per IECC. Detail on sheet A4.0/5 shows minimum thickness for polyiso insulation.
C. See sheet A4.0 for slab detail modified to meet insulative requirements for the slab.

N2

A. See glazing schedule on Sheet A3.0 for required U-factors and SGCH factor.

N3

A See sheet A3.0 for updated diagram showing skylight lighting basic calculations.

Thank you,

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Stan Berniche 6/15/21
Weber County Building Department

Re: DVH Companies Addition - Plan Review Comments.

Structural Comments
General:
S1. Structural fill requirements have been added to the footing schedule

Structural Drawings:
S2. Special inspection sheet has been added. Sheet S1.1

S3.
A. Response modification factor has been changed to 3.25

B. Cs is listed as 0.308 is correct. Sds=1.0 is allowed by ASCE 7 12.8.1.3. Cs was calculated using R=3.25 and Sds=1. 1/(3.25/1)=0.3077.

C. Bar sizes have been decreased in number and increase in diameter in the pier schedule.

S4
A. Concrete slab note has been modified.

B. Note has been added to sheet S2.0.

S5
A. SFRS sheet has been added to the drawings.

B. Note added to SFRS sheet.

C. Checked, no change to plans required.

S6
A. Dimensions added.

B. Soil added to detail.

C. Note 2 on detail 21/S3.0 was altered to clarify (8) bolts at beams and bolts for girder as required by joist manufacture.
   I. You can only see the bolts on one side of the beam. There are (4) bolts on the opposite side.
   II. Note was added to the SFRS sheet.

D.

I. Key notes have been corrected.
II. Not a drag connection, see item S5.C.

S7

A. Dimensions shown.

B.
I. Note was added to the SFRS sheet.
II. Dimensions added to details 3/S4.0,S4.1,S4.2. Adding dimensions to details 4/3/S4.0,S4.1,S4.2 would make the detail more difficult to interpret.

C. Typical work points noted on sheet S4.0.

Structural Calculations:

S8 Sds = 1.0 allowed per ASCE 7 12.8.1.3

S9 Cs was calculated using R=3.25 and Sds=1. 1/(3.25/1)=0.3077.

S10 HSS 8x8x3/16 worked better for detailing, upsizing from the 6x6.

S11 Sheet 20/34 was used to determine the size for downward forces the following sheet in the calcs sized the footing for uplift.

S12 Addressed in S8 and S9

S13 This is an in house MCAD sheet. The term hairpin was used when the program was written designing columns for a PEMB. Hairpin in this program implies there is confining steel to prevent concrete breakout and pryout.

S14 Calculations included

S15 Calculations included

S16 WCA was not award of storage racks. Submit differed submittal from rack manufacturer for review.

Thank you for the productive peer review. Please contact me with any questions that you may have.

Cliff Cole, S.E.
for: WCA Structural Engineering Inc.

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PROJECT: _____ PROJECT #: _____

CLIENT: _____ DATE: _____

TOPIC: _____ ENGINEER: _____

S6 D.II.

S5.C and. S6 D.II

Max lateral force Per frame.
52 kips.

Deck Capacity = 1105 plf.

$\frac{53000}{1105} = 48$ ft.

X Brace Bay = 24'-9"

49' - 24'-9" = 23'-4"

→ ½ each side or 11'-8"

11.67 (1105) = 12895 lbs.

12895 Ω = 25.8 Kips.

5/8" ϕ A325 Bolts. GF 12.4 K/Bolt.

25.8/12.4 = 2.08 Bolts

(4) Are Provided.

18" of 5/16 fillet weld Provided

Weld Capacity

9.9 K/in (18") = 177 kips.

OK.

S15

Axial load on Collectors

25.8 Kips.

Axial Capacity of w12x22

29' tall Braced in the weak Direction

197 Kips.

25.6 << 197

Column with axial loads only:

Designed by: CRC

Member: Shear collector for frames

Loading information:

Column length: $l = 29\,ft$

Unbraced length: $L_x = 30\cdot ft$

$L_y = 1\cdot ft$

Column Size: $Shape = "W12X22"$

Axial Loads:

Dead load: $Pdl = (0)k$

Live load: $Pll = (0)k\cdot 0$

Snow load: $Psl = (0)k\cdot 0$

Wind load: $Pw = (0)k$

EQ load: $Peq = (25.8)k$

Loading combinations:

1. - 1.4D
2. - 1.2D+ 1.6L+ 0.5S
3. - 1.2D+ 1.0L+ 1.6S
4. - 1.2D+ 0.8W+ 1.6S
5. - 1.2D+ 1.0L+ 1.6W+ 0.5S
6. - 1.2D+ 1.0L+ 1.0E+0.2S

(•) ASTM A992 ( ) ASTM A36

Yield Stress: $Fy = 50\,ksi$ Modulus of elasticity: $E = 29000\,ksi$ Resistance factor for compression: $\phi_c = 0.9$

AISC table and defining propert

Factored axial loads

factored axial loads - P:

$P1 = Pdl\cdot 1.4$ $P2 = Pdl\cdot 1.2 + Pll\cdot 1.6 + Psl\cdot 0.5$ $P3 = Pdl\cdot 1.2 + Pll\cdot 1.0 + Psl\cdot 1.6$

$P4 = Pdl\cdot 1.2 + Pw\cdot 0.8 + Psl\cdot 1.6$ $P5 = Pdl\cdot 1.2 + Pll\cdot 1.0 + Psl\cdot 0.5 + Pw\cdot 1.6$ $P6 = Pdl\cdot 1.2 + Pll\cdot 1.0 + Psl\cdot 0.2 + Peq\cdot 1.0$

$P = \max(P1, P2, P3, P4, P5, P6)$

Factored axial loads

Axial

Assume K=1 in both cases: $K1 = 1$

$$Fex = \frac{\pi^2\cdot E}{\left(\frac{K1\cdot L_x}{r_x}\right)^2}$$ (E3-4)

$$F_{crE32x} = \left(0.658^{\frac{Fy}{Fex}}\right)\cdot Fy$$ (E3-2)

$F_{crE33x} = 0.877\cdot Fex$ (E3-3)

$F_{crx} = if\left(Fex \geq 0.44\cdot Fy, F_{crE32x}, F_{crE33x}\right)$ $F_{crx} = 33.7\,ksi$

$$Fey = \frac{\pi^2\cdot E}{\left(\frac{K1\cdot L_y}{r_y}\right)^2}$$ (E3-4)

$$F_{crE32y} = \left(0.658^{\frac{Fy}{Fey}}\right)\cdot Fy$$ (E3-2)

$F_{crE33y} = 0.877\cdot Fey$ (E3-3)

$F_{cry} = if\left(Fey \geq 0.44\cdot Fy, F_{crE32y}, F_{crE33y}\right)$ $F_{cry} = 49.3\,ksi$

$F_{cr} = if\left(F_{cry} < F_{crx}, F_{cry}, F_{crx}\right)$

Nominal compressive strength:

$P_n = F_{cr}\cdot A$ (E3-1) $P_n = 218.7\,k$

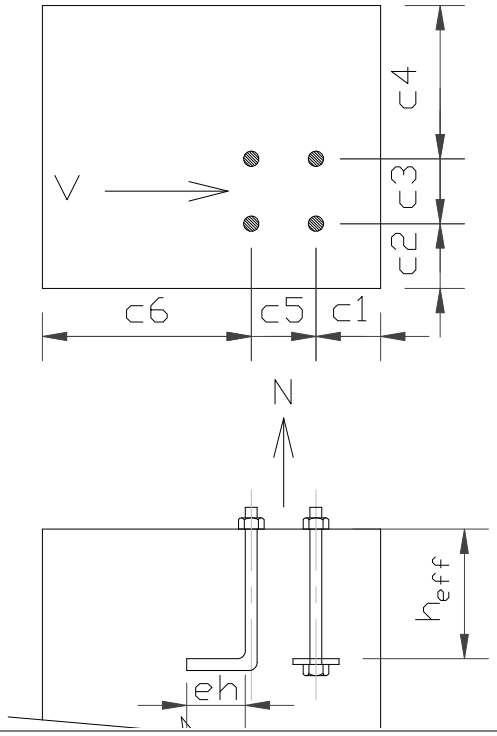
Axial

$P = 25.8\,k$

$\phi_c\cdot P_n = 196.8\,k$ $Unity = \frac{P}{\phi_c\cdot P_n}$ $Unity = 0.13$

Braced frame anchor rod tension and shear in concrete

member thickness:	$h_a := 48 \cdot in$	
edge distance in shear direction:	$c_1 := 3.5 \cdot in$	
edge distance perp to shear:	$c_2 := 3 \cdot in$	
center distance perp to shear:	$c_3 := 7 \cdot in$	
long edge distance perp to shear:	$c_4 := 31 \cdot in$	
center distance in shear direction:	$c_5 := 9.25 \cdot in$	
long edge distance in shear direct:	$c_6 := 3.5 \cdot in$	
Working shear force:(LRFD)	$V_{ua} := 18.55 \cdot k$	
Working tension force:(LRFD)	$N_{ua} := 52.4 \cdot k$	
concrete strength: (8 ksi max) 17.2.7	$f_c := 4000 \cdot psi$	
bolt/rod diameter 4" max: 17.3.2.2	$d_a := .75 \cdot in$	
number of fasteners in group:	$n := 8$	
depth of embedment:	$h_{ef} := 11 \cdot in$	
bolt/rod head or washer area: 17.4.2.8	$BH_a := 4 \cdot in^2$	
Abolt type:	$AB := \text{"AB9"}$	



Too See

Wind or Seismic design:	$WorS := \text{"S"}$	
Will plate be placed on grout:	$grout := \text{"Y"}$	
Will anchors be cast in place:	$place := \text{"Y"}$	("N"=post-installed): epoxy only option
Hairpin reinforcing to eliminate pryout concrete breakout:	$hairpin := \text{"Y"}$	("N"=No hairpins)
size of stirrup reinforcing:	$stir := 4$	(place 0.0 if no stirrups used)
Spacing of reinforcing stirrups:	$spac := 9 \cdot in$	
Will bolts be welded to plate:	$weld := \text{"N"}$	
If plate used - plate thickness:	$plth := 1 \cdot in$	17.4.3.5
bolt/rod leg length:	$e_h := 0 \cdot in$	(3da<eh<4.5da) $d_a \cdot 4.5 = 3.38 \cdot in$
Will abolts be torqued:	$Torque := \text{"Y"}$	
Is light wt concrete used:	$ltwt := \text{"N"}$	
Will tension loading be constant:	$Tconstant := \text{"N"}$	
Is anchor installed in an condition indoor:	$Indoor := \text{"Y"}$	
Will Ωo be required & value. 17.2.3.4.3 and 17.2.3.5.3c	$\Omega_o := 2$	(ASCE 7 table 12.2-1) if no tension, omega may be 1 $V_{uaa} := if(WorS = \text{"S"}, V_{ua} \cdot \Omega_o, V_{ua})$
Post installed installation quality: 17.3.3	$Install := \text{"H"}$	High (H) or Low (L)
Post installed concrete quality: 17.3.3	$CQ := \text{"H"}$	High (H) or Low (L)

Too See

General info and properties

$f_{uta} := if(AB = \text{"AB1"}, 65 \cdot ksi, if(AB = \text{"AB2"}, 60 \cdot ksi, if(AB = \text{"AB3"}, 70 \cdot ksi, if(AB = \text{"AB4"}, 125 \cdot ksi, if(AB = \text{"AB5"}, 150 \cdot ksi, if$

$f_{uta} := if\left[(AB = \text{"AB6"}) \cdot (d_a \le 1 \cdot in), 120 \cdot ksi, if\left[(AB = \text{"AB6"}) \cdot (d_a > 1 \cdot in) \cdot (d_a \le 1.5 \cdot in), 105 \cdot ksi, if\left[(d_a > 1.5 \cdot in), 90 \cdot ksi, f_{uta}\right]\right]\right]$

$f_{uta} = 85 \cdot ksi$

$f_{ya} := if(AB = \text{"AB1"}, 51 \cdot ksi, if(AB = \text{"AB2"}, 36 \cdot ksi, if(AB = \text{"AB3"}, 36 \cdot ksi, if(AB = \text{"AB4"}, 109 \cdot ksi, if(AB = \text{"AB5"}, 130 \cdot ksi, if($

$f_{ya} := if\left[(AB = \text{"AB6"}) \cdot (d_a \le 1 \cdot in), 92 \cdot ksi, if\left[(AB = \text{"AB6"}) \cdot (d_a > 1 \cdot in) \cdot (d_a \le 1.5 \cdot in), 81 \cdot ksi, if(d_a > 1.5 \cdot in, 58 \cdot ksi, f_{ya})\right]\right]$

$f_{ya} = 55 \cdot ksi$

Will anchor be governed by being ductile or brittle: R17.2.3.4.2

$f_{ratio} := \frac{f_{uta}}{f_{ya}}$ $\quad f_{ratio} = 1.55$

Anchor Areas:

$A_{seN} := if\left(d_a = 0.25 \cdot in, 0.032 \cdot in^2, if\left(d_a = 0.375 \cdot in, 0.078 \cdot in^2, if\left(d_a = 0.5 \cdot in, 0.142 \cdot in^2, if\left(d_a = 0.625 \cdot in, 0.226 \cdot in^2, if\left(d_a = 0.75 \cdot in\right.\right.\right.\right.\right.$

$A_{seN} = 0.33 \cdot in^2$

Critical spacing for Breakout, Bond in Tension and Breakout:

Table 17.4.5.2 bond stresses

$\tau_{uncr} := if[(Indoor = \text{"Y"}) \cdot (Tconstant = \text{"Y"}) \cdot (WorS = \text{"S"}), 1 \cdot ksi \cdot 0.4 \cdot 0.4, \text{if}[(Indoor = \text{"Y"}) \cdot (Tconstant = \text{"Y"}) \cdot (WorS = \text{"W"}), 1 \cdot$

$\tau_{uncr} = 400 \cdot psi$

$\tau_{cr} := if[(Indoor = \text{"Y"}) \cdot (Tconstant = \text{"Y"}) \cdot (WorS = \text{"S"}), 0.3 \cdot ksi \cdot 0.8 \cdot 0.4, \text{if}[(Indoor = \text{"Y"}) \cdot (Tconstant = \text{"Y"}), 0.3 \cdot ksi \cdot 0.4, if[(Ind$

$\tau_{cr} = 240 \cdot psi$

$c_{Na} := 10 \cdot d_a \cdot \sqrt{\left(\frac{\tau_{uncr}}{1100 \cdot psi}\right)}$ $\quad c_{Na} = 4.52 \cdot in$ (17.4.5.1d)

$c_{a1} := if\left(V_{ua} \ne 0 \cdot lb, c_1, min\left(c_1, c_2, c_4, c_6\right)\right)$

definition of c.a1 $c_{a1} = 3.5 \cdot in$

$c_{a2} := if\left[V_{ua} \ne 0 \cdot lb, min\left(c_2, c_4\right), if\left[\frac{c_{a1}}{in} = \left(c_1 \vee c_6\right), min\left(c_2, c_4\right), min\left(c_1, c_6\right)\right]\right]$ definition of c.a2 $c_{a2} = 3 \cdot in$

$c_{a11752} := if\left(c_{a2} \wedge h_a < 1.5 \cdot c_{a1}, max\left(\frac{max\left(c_2, c_4\right)}{1.5}, \frac{c_3}{3}, \frac{min\left(h_a, c_{a1}\right)}{1.5}\right), c_{a1}\right)$ 17.5.2.4 $c_{a11752} = 3.5 \cdot in$

(17.2.1.1)

$S_{cbit} := 3 \cdot h_{ef}$ $\quad S_{cbit} = 33 \cdot in$

$S_{cbin} := 2 \cdot c_{Na}$ $\quad S_{cbin} = 9.05 \cdot in$

$S_{cbis} := 3 \cdot c_{a1}$ $\quad S_{cbis} = 10.5 \cdot in$

Calculating f factors: 17.3.3

$\phi_{bt} := if\left(f_{ratio} \ge 1.5, 0.75, 0.65\right)$ $\quad \phi_{bs} := if\left(f_{ratio} \ge 1.5, 0.65, 0.6\right)$

$\phi_{bt} = 0.75$ bolt in tension $\quad \phi_{bs} = 0.65$ bolt in shear

$\phi_{cs} := if(hairpin = "Y", 0.75, 0.7)$

$\phi_{cs} = 0.75$ concrete in shear

$\phi_{ct} := if(hairpin = "Y", 0.75, 0.7)$

$\phi_{ct} = 0.75$ concrete in tension (cast in anchor)

$\phi_{ctpi} := if[(hairpin = "Y")\cdot(Install = "H")\cdot(CQ = "H"), 0.75, if[(hairpin = "N")\cdot(Install = "H")\cdot(CQ = "H"), .65, if[(hairpin = "$

$\phi_{ctpi} = 0.75$ concrete in tension (post installed)

General info and properties

Bolt Capacity in Tension

Steel Strength for Fastener in Tension: (17.4.1.2)

$N_{sa} := n\cdot A_{seN}\cdot min(f_{uta}, 1.9\cdot f_{ya}, 125\cdot ksi)$ $\phi_{bt} N_{sa} = 170.34\cdot k$ > $N_{ua} = 52.4\cdot k$ $\phi_{bt} = 0.75$

Bolt Capacity in Tension

Geometry and factors

Projected area of failure surface:

$$area1 := \left(\frac{c_5}{2} + if(1.5\cdot h_{ef} > c_1, c_1, 1.5\cdot h_{ef})\right)\cdot\left(\frac{c_3}{2} + if(1.5\cdot h_{ef} > c_2, c_2, 1.5\cdot h_{ef})\right) \qquad area1 = 52.81\cdot in^2$$

$$area2 := \left(\frac{c_5}{2} + if(1.5\cdot h_{ef} > c_6, c_6, 1.5\cdot h_{ef})\right)\cdot\left(\frac{c_3}{2} + if(1.5\cdot h_{ef} > c_2, c_2, 1.5\cdot h_{ef})\right) \qquad area2 = 52.81\cdot in^2$$

$$area3 := \left(\frac{c_5}{2} + if(1.5\cdot h_{ef} > c_1, c_1, 1.5\cdot h_{ef})\right)\cdot\left(\frac{c_3}{2} + if(1.5\cdot h_{ef} > c_4, c_4, 1.5\cdot h_{ef})\right) \qquad area3 = 162.5\cdot in^2$$

$$area4 := \left(\frac{c_5}{2} + if(1.5\cdot h_{ef} > c_6, c_6, 1.5\cdot h_{ef})\right)\cdot\left(\frac{c_3}{2} + if(1.5\cdot h_{ef} > c_4, c_4, 1.5\cdot h_{ef})\right) \qquad area4 = 162.5\cdot in^2$$

$A_{Nc} := area1 + area2 + area3 + area4$ $A_{Nc} = 430.62\cdot in^2$ $A_{Nc} := if\left[A_{Nc} < \left[n\cdot(1.5\cdot h_{ef})^2\right], A_{Nc}, n\cdot(1.5\cdot h_{ef})^2\right]$

(if three edge distances or more are smaller than hef, then hef shall be reduced to cmax/1.5 in ANc and equations 17.4.2.1 thru 17.4.2.5) 17.4.2.3 If more than four anchors are used, hand calc cmax.

$\alpha 1 := if(c_1 < 1.5\cdot h_{ef}, c_1, 0\cdot in)$ $\alpha 2 := if(c_2 < 1.5\cdot h_{ef}, c_2, 0\cdot in)$ $\alpha 4 := if(c_4 < 1.5\cdot h_{ef}, c_4, 0\cdot in)$ $\alpha 6 := if(c_6 < 1.5\cdot h_{ef}$

$\beta 1 := if(c_1 < 1.5\cdot h_{ef}, 1, 0)$ $\beta 2 := if(c_2 < 1.5\cdot h_{ef}, 1, 0)$ $\beta 4 := if(c_4 < 1.5\cdot h_{ef}, 1, 0)$ $\beta 6 := if(c_6 < 1.5\cdot h_{ef}, 1, 0)$

$\beta := \beta 1 + \beta 2 + \beta 4 + \beta 6$ $\beta = 3$ $c_{amax} := max(\alpha 1, \alpha 2, \alpha 4, \alpha 6)$ R17.4.2.3 $c_{amax} = 3.5\cdot in$

$s_{max} := if(n = 1, 2\cdot c_{amax}, max(c_3, c_5))$ $s_{max} = 9.25\cdot in$

$$h_{pef} := if\left(\beta \geq 3, max\left(\frac{c_{amax}}{1.5}, \frac{s_{max}}{3}\right), h_{ef}\right)$$

$c_{amin} := min(c_1, c_2, c_4, c_6)$

Projected surface area for single anchor:

$A_{Nc} = 430.62\cdot in^2$

$A_{Nco} := 9\cdot h_{pef}^2$ (17.4.2.1c)

$A_{Nc} := if(A_{Nc} > n\cdot A_{Nco}, n\cdot A_{Nco}, A_{Nc})$ R17.4.2.1 $A_{Nco} = 85.56\cdot in^2$

$$\psi_{edN} := if\left[c_{amin} \geq 1.5\cdot h_{pef}, 1.0, 0.7 + 0.3\cdot\left(\frac{c_{amin}}{1.5\cdot h_{pef}}\right)\right]$$ (17.4.2.5a-b)

17.4.2.2 $A_{Nc} = 430.62\cdot in^2$

$k_c := if(place = \text{"Y"}, 24, 17)$

17.4.2.6

$\psi_{cN} := if(place = \text{"Y"}, 1.25, 1.4)$

17.7.6 post installed anchors. adhesive anchors only included. if undercut of expansion used, use catalog values.

$c_{acadhesive} := 2 \cdot h_{ef}$

$$\psi_{cpN} := if\left(c_{amin} \geq c_{acadhesive}, 1, \frac{c_{amin}}{c_{acadhesive}}\right) \quad \text{(17.4.2.7a-b)} \qquad \psi_{cpN} = 0.14$$

$$\psi_{cpN} := if\left(\psi_{cpN} \leq \frac{1.5 \cdot h_{ef}}{c_{acadhesive}}, \frac{1.5 \cdot h_{ef}}{c_{acadhesive}}, \psi_{cpN}\right) \quad \text{17.4.2.7} \qquad \psi_{cpN} = 0.75$$

$\lambda_a := if[(place = \text{"N"}) \cdot (ltwt = \text{"Y"}), 0.6 \cdot .075, \text{if}[(place = \text{"Y"}) \cdot (ltwt = \text{"Y"}), 0.75, 1]]$ 17.2.6 and Table 19.2.4.2

$$N_{b1} := k_c \cdot \lambda_a \cdot \sqrt{\frac{f_c}{psi}} \cdot h_{pef}^{1.5} \cdot \frac{lb}{in^{1.5}} \quad \text{(17.4.2.2a)} \qquad N_{b1} = 8.22 \cdot k$$

$$N_{b2} := 16 \cdot \frac{lb}{in^{1.5}} \cdot \sqrt{\frac{f_c}{psi}} \cdot h_{pef}^{1.5} \quad \text{(17.4.2.2b)} \qquad N_{b2} = 5.48 \cdot k$$

17.4.2.2

$N_b := if\left[\left(place = \text{"Y"} \wedge h_{ef} \geq 11 \cdot in \wedge h_{ef} \leq 25 \cdot in\right), N_{b2}, N_{b1}\right]$ $N_b = 5.48 \cdot k$

$$N_{cb} := \frac{\left(A_{Nc} \cdot \psi_{edN} \cdot \psi_{cN} \cdot \psi_{cpN} \cdot N_b\right)}{A_{Nco}} \quad \text{(17.4.2.1a)} \qquad N_{cb} = 23.13 \cdot k$$

$$N_{cbg} := \frac{\left(A_{Nc} \cdot \psi_{edN} \cdot \psi_{ecN} \cdot \psi_{cN} \cdot \psi_{cpN} \cdot N_b\right)}{A_{Nco}} \quad \text{(17.4.2.1b)} \qquad N_{cbg} = 23.13 \cdot k$$

Geometry and factors

Concrete Breakout in Tension

17.4.2.9

$control_2 := if\left(\phi_{ct} \cdot 0.75 N_{cb} < N_{ua} \wedge hairpin = \text{"Y"}, \text{"concrete breakout. OK with hairpins "}, if\left(\phi_{ct} 0.75 \cdot N_{cb} < N_{ua} \wedge hairpin = \text{"N"}, '\right.\right.$

Concrete Breakout in Tension

Anchor Pullout

$A_{brg} := if\left(e_h = 0 \cdot in, BH_a \cdot n, e_h \cdot d_a \cdot n\right)$

$N_p := if\left(e_h = 0 \cdot in, 8 \cdot A_{brg} \cdot f_c, 0.9 \cdot f_c \cdot e_h \cdot d_a \cdot n\right)$ (17.4.3.4 & 17.4.3.5)

17.4.3.6 no service load cracking has been determined: $\psi_{cP} := 1$

$N_{pn} := \psi_{cP} \cdot N_p$ (17.4.3.1)

Anchor Pullout

Side face blowout in tension

Side face blowout in tension:

$c_{a2} = 3 \cdot in$

$c_{a1} = 3.5 \cdot in$

$N_{sb1} := 160 \cdot psi \cdot c_{a1} \cdot \sqrt{A_{brg}} \cdot \sqrt{\frac{f_c}{psi}}$ (17.4.4.1) $N_{sb1} = 200.35 \cdot k$

$N_{sb} := if\left[c_{a2} < 3 \cdot c_{a1}, \left(1 + \frac{c_{a2}}{c_{a1}}\right) \cdot 0.25 \cdot N_{sb1}, N_{sb1}\right]$ $N_{sb} = 93.02 \cdot k$

$test := if\left(n > 1 \wedge c_3 = 0, c_5, if\left(n > 1 \wedge c_5 = 0, c_3, min\left(c_3, c_5\right)\right)\right)$

$test = 7 \cdot in$

$N_{sbg} := if\left[\left(1 + \frac{test}{6 \cdot c_{a1}}\right) \cdot \left(N_{sb1}\right) > n \cdot \left(N_{sb1}\right), n \cdot \left(N_{sb1}\right), \left(1 + \frac{test}{6 \cdot c_{a1}}\right) \cdot \left(N_{sb1}\right)\right]$ (17.4.4.2) $N_{sbg} = 267.14 \cdot k$

$N_{sbg} \cdot 0.75 \phi_{ct} = 150.26 \cdot k$ $N_{ua} = 52.4 \cdot k$

Side face blowout in tension

Bond Strength of Adhesive

Bond Strength of adhesive anchors

$A_{Nao} := \left(2 \cdot c_{Na}\right)^2$ (17.4.5.1c)

$area1a := \left(if\left(\frac{c_5}{2} < \frac{c_{Na}}{2}, \frac{c_5}{2}, \frac{c_{Na}}{2}\right) + if\left(c_{Na} > c_1, c_1, c_{Na}\right)\right) \cdot \left(if\left(\frac{c_3}{2} < \frac{c_{Na}}{2}, \frac{c_3}{2}, \frac{c_{Na}}{2}\right) + if\left(c_{Na} > c_2, c_2, c_{Na}\right)\right)$

$area2a := \left(if\left(\frac{c_5}{2} < \frac{c_{Na}}{2}, \frac{c_5}{2}, \frac{c_{Na}}{2}\right) + if\left(c_{Na} > c_6, c_6, c_{Na}\right)\right) \cdot \left(if\left(\frac{c_3}{2} < \frac{c_{Na}}{2}, \frac{c_3}{2}, \frac{c_{Na}}{2}\right) + if\left(c_{Na} > c_2, c_2, c_{Na}\right)\right)$

$area3a := \left(if\left(\frac{c_5}{2} < \frac{c_{Na}}{2}, \frac{c_5}{2}, \frac{c_{Na}}{2}\right) + if\left(c_{Na} > c_1, c_1, c_{Na}\right)\right) \cdot \left(if\left(\frac{c_3}{2} < \frac{c_{Na}}{2}, \frac{c_3}{2}, \frac{c_{Na}}{2}\right) + if\left(c_{Na} > c_4, c_4, c_{Na}\right)\right)$

$area4a := \left(if\left(\frac{c_5}{2} < \frac{c_{Na}}{2}, \frac{c_5}{2}, \frac{c_{Na}}{2}\right) + if\left(c_{Na} > c_6, c_6, c_{Na}\right)\right) \cdot \left(if\left(\frac{c_3}{2} < \frac{c_{Na}}{2}, \frac{c_3}{2}, \frac{c_{Na}}{2}\right) + if\left(c_{Na} > c_4, c_4, c_{Na}\right)\right)$

$A_{Na} := area1a + area2a + area3a + area4a$ $A_{Na} = 138.79 \cdot in^2$

$\psi_{edNa} := if\left[c_{amin} \geq c_{Na}, 1.0, 0.7 + 0.3 \cdot \left(\frac{c_{amin}}{c_{Na}}\right)\right]$ (17.4.5.4a-b)

$N_{ba} := \lambda_a \cdot \tau_{cr} \cdot \pi \cdot d_a \cdot h_{ef}$ (17.4.5.2) $N_{ba} = 6.22 \cdot k$

$N_a := \left(\frac{A_{Na}}{A_{Nao}}\right) \cdot \psi_{edNa} \cdot \psi_{cpNa} \cdot N_{ba}$ (17.4.5.1a) $N_a = 9.49 \cdot k$

$$N_{ag} := \left(\frac{A_{Na}}{A_{Nao}}\right) \cdot \psi_{edNa} \cdot \psi_{cpNa} \cdot \psi_{ecNa} \cdot N_{ba} \qquad \text{(17.4.5.1b)} \qquad N_{ag} = 9.49 \cdot k$$

Bond Strength of Adhesive

Bolt Shear Capacity

Steel Strength in shear:

$$A_{seV} := A_{seN}$$

$$V_{sa} := if\left(place = \text{"Y"}, A_{seV} \cdot min\left(f_{uta}, 1.9 \cdot f_{ya}, 125 \cdot ksi\right) \cdot n, 0.6 \cdot A_{seV} \cdot min\left(f_{uta}, 1.9 \cdot f_{ya}, 125 \cdot ksi\right) \cdot n\right) \qquad \text{(17.5.1.2a-b)}$$

$$V_{sa} := if\left(grout = \text{"Y"}, 0.8 \cdot V_{sa}, V_{sa}\right) \qquad \text{17.5.1.2} \qquad V_{ua} = 37100\ lb \qquad \phi_{bs} \cdot V_{sa} = 118102.4\ lb$$

Bolt Shear Capacity

Concrete Breakout in Shear

Concrete breakout strength of anchor in shear:

$$A_{Vc} := if\left[\left(c_2 < 1.5c_{a11752} \wedge c_4 < 1.5 \cdot c_{a11752}\right), \left[\left(c_2 + c_3 + c_4\right) \cdot 1.5c_{a11752}\right], if\left[\left(c_2 > 1.5 \cdot c_{a11752} \wedge c_4 \geq 1.5 \cdot c_{a11752}\right), \left[\left(1.5c_{a}\right.\right.\right.$$

$$A_{Vco} := 4.5 \cdot \left(c_{a11752}\right)^2 \qquad \text{(17.5.2.1c)}$$

$$c_{amin2} := min\left(c_2, c_4\right)$$

$$\psi_{edV} := if\left[c_{amin2} \geq 1.5 \cdot c_{a11752}, 1.0, 0.7 + 0.3 \cdot \left(\frac{c_{amin2}}{1.5 \cdot c_{a11752}}\right)\right] \qquad \text{(17.5.2.6a-b)}$$

$$\psi_{hV} := if\left[\left(h_a < 1.5 \cdot c_{a11752}\right) \wedge \left[\sqrt{\frac{\left(1.5 \cdot c_{a11752}\right)}{h_a}} > 1\right], \sqrt{\frac{\left(1.5 \cdot c_{a11752}\right)}{h_a}}, 1\right] \qquad \text{(17.5.2.8)} \qquad \sqrt{\frac{\left(1.5 \cdot c_{a11752}\right)}{h_a}}$$

$$\psi_{cV} := if[stir = 0, 1.0, if[(stir \neq 0) \cdot (spac > 4 \cdot in), 1.2, if[(stir \geq 4) \cdot (spac \leq 4 \cdot in), 1.4, 1]]] \qquad \text{17.5.2.7}$$

$$x := if\left[\left[weld = \text{"Y"} \wedge plth \geq \left(0.375 \cdot in + 0.5 \cdot d_a\right)\right], 8, 7\right]$$

$$V_b := x \cdot \frac{lb}{in^{1.5}} \left(\frac{h_{ef}}{d_a}\right)^{0.2} \cdot \sqrt{\frac{d_a}{in}} \cdot \sqrt{\frac{f_c}{psi}} \cdot c_{a11752}{}^{1.5} \qquad \text{(17.5.2.2a)} \qquad x \cdot \frac{lb}{in^{1.5}} \left(\frac{h_{ef}}{d_a}\right)^{0.2} \cdot \sqrt{\frac{d_a}{in}} \cdot \sqrt{\frac{f_c}{psi}} \cdot c_{a11752}{}^{1.5} = 4.3 \cdot k$$

$$V_{ba} := min\left[\frac{lb}{in^{1.5}} \cdot 9 \cdot \lambda_a \cdot \sqrt{\frac{f_c}{psi}} \cdot \left(c_{a11752}\right)^{1.5}, V_b\right] \qquad \text{(17.5.2.3)} \qquad min\left[\frac{lb}{in^{1.5}} \cdot 9 \cdot \lambda_a \cdot \sqrt{\frac{f_c}{psi}} \cdot \left(c_{a11752}\right)^{1.5}, V_b\right] = 3.73 \cdot k$$

$$V_{cb} := \left(\frac{A_{Vc}}{A_{Vco}}\right) \cdot \psi_{edV} \cdot \psi_{hV} \cdot \psi_{cV} \cdot V_b \qquad \text{(17.5.2.2b)}$$

Concrete Breakout in Shear

Concrete Pryout

Concrete Pryout strength:

$k_{cp} := if\left(h_{ef} < 2.5 \cdot in, 1, 2\right)$ 17.5.3.1

$V_{cp} := k_{cp} \cdot if\left(place = \text{"Y"}, N_{cb}, min\left(N_{cb}, N_a\right)\right)$ (17.5.3.1a) $V_{cp} = 46.25 \cdot k$

$V_{cpg} := k_{cp} \cdot if\left(place = \text{"Y"}, N_{cbg}, min\left(N_{cbg}, N_{ag}\right)\right)$ (17.5.3.1b) Same value since no eccentricity

Concrete Pryout

Summary $interaction = 0.77$

$control =$

	1
1	"Bolt capacity in tension OK"
2	"concrete breakout. OK with hairpins "
3	"Pull out strength OK"
4	"Concrete sideface blowout. OK"
5	"Bond strength of adhesive anchor. OK or NA"
6	"Bolt/rod shear capacity OK."
7	"concrete breakout in shear. OK with hairpins "
8	"concrete pryout in shear. OK with hairpins "
9	"Bond strength of adhesive under constant load OK. or NA"
10	"Interaction shear and tension OK"
11	"Confining steel required"
12	"Stirrups required"

COM*check* Software Version 4.1.5.3

Mechanical Compliance Certificate

Project Information

Energy Code:	90.1 (2016) Standard
Project Title:	GVH Distribution Warehouse Expanision
Location:	Ogden, Utah
Climate Zone:	5b
Project Type:	Addition

Construction Site:
2458 Rulon White Blvd.
Ogden, UT 84404

Owner/Agent:

Designer/Contractor:
Develop Architects
1144 E. 2800 N.
Ogden, UT 84414
801-644-4926

Mechanical Systems List

Quantity	System Type & Description
4	HVAC System 1 (Single Zone):

Heating: 1 each - Duct Furnace, Gas, Capacity = 400 kBtu/h
Proposed Efficiency = 81.00% Ec, Required Efficiency: 80.00 % Ec
Fan System: FAN SYSTEM 1 -- Compliance (Motor nameplate HP method) : Passes

Fans:
FAN 1 Supply, Constant Volume, 7000 CFM, 0.5 motor nameplate hp, 0.8 fan efficiency grade

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 90.1 (2016) Standard requirements in COM*check* Version 4.1.5.3 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Kenneth Gibbs - Sr. Project Manager		6/14/2021
Name - Title	Signature	Date

COM*check* Software Version 4.1.5.3

Inspection Checklist

Energy Code: 90.1 (2016) Standard

Requirements: 100.0% were addressed directly in the COM*check* software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
4.2.2, 6.4.4.2.1, 6.7.2 [PR2][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
4.2.2, 8.4.1.1, 8.4.1.2, 8.7 [PR6][2]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the electrical systems and equipment and document where exceptions are claimed. Feeder connectors sized in accordance with approved plans and branch circuits sized for maximum drop of 3%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.7.2.4 [PR5][1]	Detailed instructions for HVAC systems commissioning included on the plans or specifications for projects >=50,000 ft2.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Warehouses and semiheated spaces.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Footing / Foundation Inspection	Complies?	Comments/Assumptions
6.4.3.7 [FO9][3]	Freeze protection and snow/ice melting system sensors for future connection to controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.4.1.4, 6.4.1.5 [ME1][2]	HVAC equipment efficiency verified. Non-NAECA HVAC equipment labeled as meeting 90.1.	Efficiency:_____	Efficiency:_____	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Mechanical Systems list for values.*
6.4.3.4.1 [ME3][3]	Stair and elevator shaft vents have motorized dampers that automatically close.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.4.3.4.2, 6.4.3.4.3 [ME4][3]	Outdoor air and exhaust systems have motorized dampers that automatically shut when not in use and meet maximum leakage rates. Check gravity dampers where allowed.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.3.4.5 [ME39][3]	Enclosed parking garage ventilation has automatic contaminant detection and capacity to stage or modulate fans to 50% or less of design capacity.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.4.3.4.4 [ME5][3]	Ventilation fans >0.75 hp have automatic controls to shut off fan when not required.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.3.8 [ME6][1]	Demand control ventilation provided for spaces >500 ft2 and >25 people/1000 ft2 occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow >3,000 cfm.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.5.3.2.1 [ME40][2]	DX cooling systems >= 75 kBtu/h (>= 65 kBtu/h effective 1/2016) and chilled-water and evaporative cooling fan motor hp >= ¼ designed to vary supply fan airflow as a function of load and comply with operational requirements.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. *See the Mechanical Systems list for values.*
6.4.4.1.1 [ME7][3]	Insulation exposed to weather protected from damage. Insulation outside of the conditioned space and associated with cooling systems is vapor retardant.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.4.1.2 [ME8][2]	HVAC ducts and plenums insulated per Table 6.8.2. Where ducts or plenums are installed in or under a slab, verification may need to occur during Foundation Inspection.	R-_____	R-_____	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.4.1.3 [ME9][2]	HVAC piping insulation thickness. Where piping is installed in or under a slab, verification may need to occur during Foundation Inspection.	_____ in.	_____ in.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.4.4.1.4 [ME41][3]	Thermally ineffective panel surfaces of sensible heating panels have insulation >= R-3.5.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.4.4.2.1 [ME10][2]	Ducts and plenums having pressure class ratings are Seal Class A construction.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.4.2.2 [ME11][3]	Ductwork operating >3 in. water column requires air leakage testing.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.5.2.3 [ME19][3]	Dehumidification controls provided to prevent reheating, recooling, mixing of hot and cold airstreams or concurrent heating and cooling of the same airstream.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Cooling capacity 40 kBtu/h.
6.5.2.4.1 [ME68][3]	Humidifiers with airstream mounted preheating jackets have preheat auto-shutoff value set to activate when humidification is not required.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.5.2.4.2 [ME69][3]	Humidification system dispersion tube hot surfaces in the airstreams of ducts or air-handling units insulated >= R-0.5.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.5.2.5 [ME70][3]	Preheat coils controlled to stop heat output whenever mechanical cooling, including economizer operation, is active.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.5.2.6 [ME106][3]	Units that provide ventilation air to multiple zones and operate in conjunction with zone heating and cooling systems are prevented from using heating or heat recovery to warm supply air above 60°F when representative building loads or outdoor air temperature indicate that most zones demand cooling.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.5.3.6 [ME72][2]	Motors for fans >= 1/12 hp and < 1 hp are electronically-commutated motors or have a minimum motor efficiency of 70%. These motors are also speed adjustable for either balancing or remote control.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.5.3.4 [ME108][2]	Parallel-flow fan-powered VAV air terminals have automatic controls to a) turn off the terminal fan except when space heating is required or if required for ventilation; b) turn on the terminal fan as the first stage of heating before the heating coil is activated; and c) during heating for warmup or setback temperature control, either operate the terminal fan and heating coil without primary air or reverse the terminal damper logic and provide heating from the central air handler through primary air.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.5.3.7 [ME109][2]	Required minimum outdoor air rate is the larger of minimum outdoor air rate or minimum exhaust air rate required by Standard 62.1, Standard 170, or applicable codes or accreditation standards. Outdoor air ventilation systems shall comply with one of the following: a) design minimum system outdoor air provided < 135% of the required minimum outdoor air rate, b) dampers, ductwork, and controls allow the system to supply <= the required minimum outdoor air rate with a single set-point adjustment., or c) system includes exhaust air energy recovery complying with Section 6.5.6.1.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.5.3.3 [ME42][3]	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. *See the Mechanical Systems list for values.*
6.5.4.2 [ME25][3]	HVAC pumping systems with >= 3 control values designed for variable fluid flow (see section details).			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.5.6.1 [ME56][1]	Exhaust air energy recovery on systems meeting Tables 6.5.6.1-1, and 6.5.6.1-2.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.5.7.1 [ME100][2]	Conditioned supply air to space with mechanical exhaust <= the greater of criteria of supply flow, required ventilation rate, exhaust flow minu the available transffer air (see section details).			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.5.7.2.1 [ME32][2]	Kitchen hoods >5,000 cfm have make up air >=50% of exhaust air volume.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
6.5.7.2.4 [ME49][3]	Approved field test used to evaluate design air flow rates and demonstrate proper capture and containment of kitchen exhaust systems.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.5.8.1 [ME34][2]	Unenclosed spaces that are heated use only radiant heat.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.4.3.9 [ME63][2]	Heating for vestibules and air curtains with integral heating include automatic controls that shut off the heating system when outdoor air temperatures > 45F. Vestibule heating and cooling systems controlled by a thermostat in the vestibule with heating setpoint <= 60F and cooling setpoint >= 80F.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
6.5.10 [ME73][3]	Doors separating conditioned space from the outdoors have controls that disable/reset heating and cooling system when open.			☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Loading dock.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
8.4.2 [EL10][2]	At least 50% of all 125 volt 15- and 20-Amp receptacles are controlled by an automatic control device.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
8.4.3 [EL11][2]	New buildings have electrical energy use measurement devices installed. Where tenant spaces exist, each tenant is monitored separately. In buildings with a digital control system the energy use is transmitted to to control system and displayed graphically.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
10.4.1 [EL9][2]	Electric motors meet requirements where applicable.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
6.4.3.1.2 [FI3][3]	Thermostatic controls have a 5 °F deadband.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.3.2 [FI20][3]	Temperature controls have setpoint overlap restrictions.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.3.3.1 [FI21][3]	HVAC systems equipped with at least one automatic shutdown control.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.3.3.2 [FI22][3]	Setback controls allow automatic restart and temporary operation as required for maintenance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.4.3.6 [FI6][3]	When humidification and dehumidification are provided to a zone, simultaneous operation is prohibited. Humidity control prohibits the use of fossil fuel or electricity to produce RH > 30% in the warmest zone humidified and RH < 60% in the coldest zone dehumidified.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.7.2.1 [FI7][3]	Furnished HVAC as-built drawings submitted within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.7.2.2 [FI8][3]	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.7.2.3 [FI9][1]	An air and/or hydronic system balancing report is provided for HVAC systems serving zones >5,000 ft2 of conditioned area.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
6.7.2.4 [FI10][1]	HVAC control systems have been tested to ensure proper operation, calibration and adjustment of controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
10.4.3 [FI24][2]	Elevators are designed with the proper lighting, ventilation power, and standby mode.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

PVE
Consulting Mechanical & Electrical Engineers

1040 North 2200 West, Suite 100
Salt Lake City, Utah 84116
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Website: http://www.pve-ut.com
Email: info@pve-ut.com

July 27th, 2021

EK Bailey Construction

1243 North Washington Boulevard

Ogden, Utah 84404

RE: GVH Companies Addition – Weber County Building Inspection Department comments

Electrical Review Comments:

E1. Please provide stamped electrical sheets. The provided set did not include a PE Stamp. Please Address.

A. Sheets E101, E501 and E601 were not included in the submittal package.

Response: We have included a complete new set of Electrical Drawings with PE Stamp.

E2. Sheet E201: Please address the following:

A. Please clarify how the new panel and transformer will be protected from physical damage. Forklifts. etc. are generally utilized in these types of spaces. Bollards or other provision for protection should be incorporated into the plan

Response: See latest plans, the new panels and transformer has been deleted.

E3. Sheet E301: Please address the following:

A. Please show emergency lights at the exterior side of all exits. IBC 1008.3.2 #5 requires where buildings are required to have two or more exits, emergency power for illumination shall be provided at all exit doors.

Response: The exterior lights at the egress doors have emergency battery packs, , see new plans E301 and E501.

B. Please provide additional information regarding the proposed lighting controls, refer to energy comments below.

Response: See drawing E501, luminaire schedule for Type's HB & HBE in the description column, they include the required energy options required.

C. Please provide electrical panel schedules, as well as a one-line diagram for the proposed new panels. Include proposed conductor sizes, grounding of the transformer. Mounting detail for the transformer etc.

Response: See latest plans, the new panels and transformer has been deleted.

Consulting Mechanical & Electrical Engineers

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Email: info@pve-ut.com

D. Provide emergency egress lighting per IBC 1008.3 for each area required to provide 2 means of egress.

Response: See new drawing E301 with egress lights shown half shaded in red.

E. Provide illuminated exit signs in all locations which are required to be provided with two means of egress, per IBC 1013.1. Exit signs shall be visible from all points until the exit discharge, including within exits. Please provide exit signs at all exit and exit access doorways, additionally provide signs such that they at least one exit is visible (typically every one hundred feet and at all changes in direction.

Response: See new drawing E301 for exit sign locations.

Energy Review Comments (Electrical):

N4. Provide occupancy sensors in the following locations: conference rooms; private offices; break room; restrooms; and all other rooms 300 square feet or less as required by IECCC405.2.1.

Response: We do not have any of these type rooms.

N5. For lighting not controlled by occupancy sensors, please address the following:

A. Please clarify how automatic lighting shutoff will be provided as required by IECCC405.2.2.1. Also provide information for occupant override in accordance with this section.

Response: See drawing E501, luminaire schedule for Type's HB & HBE, they include "High-Low" occupancy operation for this purpose.

B. Please clarify how lighting controls are provided for each area to allow for a minimum of 50% uniform lighting reduction as required by IECC C405.2.2.2.

Response: See drawing E501, luminaire schedule for Type's HB & HBE, they include "High-Low" occupancy operation for this purpose.

N6. IECC C405.2.3 requires independent daylight responsive (photo-sensor) controls be provided for luminaires within day light zones. Please address.

Response: See drawing E501, luminaire schedule for Type's HB & HBE, they include photocells for this purpose.

N7. Please provide a lighting power analysis for the interior lighting (i.e., COMcheck), in accordance with IECCC 405.4. (Envelope Compliance Certificate is referencing ASHRAE 90.1 – all energy compliance documents must reference the same code, not a mixture of 2018 IECC and ASHRAE).

Response: We have provided Exterior Lighting COMcheck ASHRAE 90.1, see drawing E501.

N8. Please provide a lighting power analysis for the exterior lighting (i.e., COMcheck), in accordance with IECCC 405.5.1. (Envelope Compliance Certificate is referencing ASHRAE

Consulting Mechanical & Electrical Engineers

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Salt Lake City, Utah 84116
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Email: info@pve-ut.com

90.1 – all energy compliance documents must reference the same code, not a mixture of 2018 IECC and ASHRAE).

Response: We have provided Exterior Lighting COMcheck ASHRAE 90.1, see drawing E501.

Ronald L. Wamsley

Ronald L. Wamsley

Project Manager

908 WEST GORDON AVE., SUITE #3
LAYTON, UT 84041
(801) 547-8133

June 10, 2021

FIRST REVIEW
WC^3 Project #: *221-525-024X*
Weber County

Weber County
Building Inspection Department
2380 Washington Boulevard, Suite 240
Ogden, Utah 84401
Phone: (801) 399-8374

Attention: Stan Berniche Building Official

Subject: GVH Companies Addition – Plan Review Comments 1st Review

Mr. Berniche:

West Coast Code Consultants, Inc. (WC^3) has completed the first review of the proposed GVH Companies Addition project located in Oden, UT. This review was based upon the following:

1. Architectural drawings dated 12/21/2020 by Develop Architects , sealed and signed by Chad Bailey , Licensed Architect. An Envelope Certificate (ECC) was also provided.
2. Structural drawings by Develop Architects , sealed and signed by Cliff R Cole , Professional Structural Engineer.
3. Mechanical drawings by Develop Architects , sealed and signed by Patrick T. Cantrell , Professional Engineer.
4. Electrical drawings by PVE.

The 2018 International Codes and 2017 NEC, as adopted by the State of Utah, were used as the basis of our review. Specific comments regarding this project are enclosed with this cover letter. If you have any questions regarding this review, please contact me.

Sincerely,

Mike Molyneux , P.E.
Senior Plan Review Engineer

Attachment: Comments

Plan Review Comments

Project Name: GVH Companies Addition
Location(s): 2458 North Rulon Boulevard, Oden, UT
Checked By: Todd Snider

Code Review by: Rob Sears
Structural by: Scott Porter
MEP by: George Williams

OCCUPANCY & BUILDING SUMMARY:

Type of Construction	Use Group*(s)*	Occupant Load	Risk Category	Square Footage	Building Height	Sprinklers
II-B	F-1	480*	II	48,004 ft²*	1-story, 22-feet	NFPA 13

***** - Items noted with an asterisk may change as a result of the plan review comments.

GENERAL INFORMATION:

The submitted documents for the above-mentioned project, as outlined in the cover letter, have been reviewed. The following comments address areas of concern, non-compliance with the governing code, potential errors, or omissions in the proposed design. The appropriate design professional must address each comment below and submit a written response in addition to revised plans and calculations if necessary. **Please cloud any revisions made to the construction drawings and provide the date of the latest revision on each revised sheet.**

CODE REVIEW COMMENTS:

A1. Cover Sheet G.0: Please address the following:

A. The sheet index indicates Sheet A1.1 is part of the plan set. This does not appear to be provided, please provide.

I. The sheet index also does not appear to be updated to the current set as there are multiple sheets that have been provided but not listed on the sheet index. Sheets A1.1B, A1.1C, A1.2B, and A1.4. Please ensure the sheet index is updated with all applicable sheets.

B. Please clarify if this building will contain hazardous materials as outlined in IBC Section 307.

I. If the building has hazardous materials, please provide a report per IBC 414.1.3 indicating the quantity of hazardous materials to be stored in this building. Provide information for how they will be stored and used. Verify that hazardous materials will not exceed the limits of IBC Tables 307.1(1) or 307.1(2), or provide information for *control areas* per IBC 414.2 or Hazardous occupancies per IBC 307 and 415.

C. Per plans indicate that the addition is a warehouse, but the occupancy group is listed as F-1. Per IBC 306.1, F-1 occupancies are for fabrication or packaging. Please clarify. If this is a warehouse it would be an S-1 occupancy per IBC 311.2

D. Area analysis, please address the following:

I. The area of the existing building does not appear to be included in the allowable area analysis. It appears that this is an addition to an existing building. As such the allowable area of the building must account for the entire building including the existing.

a. Based on the square footage of the combined buildings, the allowable area for a sprinklered F-1 occupancy with II-B construction will be exceeded. Please review and address.

E. Occupant Load calculations: Please address the following:

I. The total occupant load is listed as both 475 and 480. Please update the values to represent the same information.

II. An occupant load factor (OLF) of 100 SF/occupant was used. Per IBC Table 1004.5, this matches an industrial function for an F-1. However, if this is a warehouse space it appears that the OLF should be 500 SF/person.

F. Plans indicate that 108 inches of egress width is being provided, however, egress plans on Sheet A1.4 show only two exit doors. These doors are 3'-0" doors and would provide less than 70 inches of egress width between them. Please coordinate.

I. It appears that additional exit doors will be required for the addition.

G. The plumbing fixtures are indicated as not being a part of this scope of work. Please clarify the scope of work for this permit. If this is a shell only, then plumbing can be done as part of the next phase. Otherwise, please provide the plumbing fixture calculations per IBC 2902.

I. Provide complete information for required toilet facilities, including accessibility requirements per ICC A117.1-09.

A2. Sheet A0.0: Please address the following:

A. IEBC 305.7 requires that when an addition or alteration to an existing building includes an area of primary function, it must be provided with an accessible route. Please address the following:

I. Please show the accessible route from the public way or the accessible parking spaces to the new addition.

II. No accessible parking spaces are being shown on the site plan. Please provide information per IBC 1106.1, and show the number and location of accessible parking stalls.

a. Provide details and dimensions per ICC A117.1-09 Section 502 for accessible stalls including stall widths, access aisles, and signage.

b. Verify the number of Van accessible stalls per IBC 1106.5.

B. Per IBC 1028.5, egress is required to be continuous to the public way. Please indicate the unobstructed access to the public way for the new exit doors from the addition.

A3. Sheet A1.1A: Please address the following:

A. Please indicate the size and location of portable fire extinguishers as required by IBC 906.3. Based on the proposed locations, please address the following:

I. Provide details for the mounting of Fire Extinguishers and verify the fire extinguishers will not project more than 4 inches over the walking surface as required by IBC 1003.3.3. This may require recessed fire extinguisher cabinets.

B. Per IBC 1013.4: Please provide tactile exit signs at all exterior exit doorways.

A4. Sheet A1.4: Please address the following:

A. Egress route #1 and #2 appear to show travel going through the locations of the racks. Per IBC 1017.3 the travel distance measurement must be shown along the natural and unobstructed path. Please update the travel distance path. Travel paths need to be drawn rectilinearly, straight lines at right angles, to allow travel around obstructions.

I. It appears that the travel distance will exceed the 250 feet allowed by IBC Table 1017.2 and additional exits may be required. Please address.

A5. Sheet A3.0: Please address the following:

A. The new doors 101 and 102 do not appear to provide sufficient information on the proposed hardware to be installed. Please provide sufficient information regarding the hardware to verify compliance with IBC 1010.

I. Please verify that locks will not prevent egress from doors unless permitted by IBC 1010.1.9.4.

B. Provide a note or otherwise indicate that door hardware shall meet the requirements of IBC 1010.1.9.1. Hardware shall not require pinching, tight grasping, or twisting of the wrist in order to operate.

C. Include in the door elevation details the mounting heights for the door hardware in accordance with IBC 1010.1.9.2. All locks, door handles, pulls, latches, or other operating hardware is required to be located between 36 and 48 inches above finished floor.

MECHANICAL REVIEW COMMENTS:

M1. Sheet M0.2: Please address the following:

A. Please update the Mechanical Compliance Certificate to reference the ASHRAE 90.1 as per the Envelope Compliance Certificate. *(Envelope Compliance Certificate is referencing ASHRAE 90.1-all energy compliance documents must reference the same code, not a mixture of 2018 IECC and ASHRAE)*

M2. Sheet M2.1: Please address the following:

A. MAU-1 and MAU-2 must be included in the mechanical schedules on Sheet M0.2. It's unclear how the proposed addition will be heated and or cooled. Only mechanical ventilation is provided.

I. The Mechanical Compliance Certificate indicates (2) duct furnaces with fans.

B. Please clarify how MAU-1 and MAU-2 are mounted. Is this equipment ground mounted, wall mounted, or roof mounted? Provide associated details.

I. If roof mounted: Please provide information showing how access will be provided to the mechanical equipment on the roof, per IMC 306.5.

a. Provide roof top access with permanently affixed ladders for access to roof top mechanical equipment per IMC 306.5. The proposed equipment requires climbing more than 16' above grade.

b. IMC 304.11 & IFGC 206.6 requires guards be provided where mechanical equipment and roof top access is provided within 10 feet of the edge of the roof.

Please provide information for the guards. Coordinate with the architectural drawings to show this information.

PLUMBING REVIEW COMMENTS:

No plumbing review comments.

ELECTRICAL REVIEW COMMENTS:

E1. Please provide stamped electrical sheets. The provided set did not include a PE stamp. Please address.

A. Sheets E101, E501 and E601 were not included in the submittal package.

E2. Sheet E201: Please address the following:

A. Please clarify how the new panel and transformer will be protected from physical damage. Forklifts, etc. are generally utilized in these types of spaces. Bollards or other provision for protection should be incorporated into the plan.

E3. Sheet E301: Please address the following:

A. Please show emergency lights at the exterior side of all required exits. IBC 1008.3.2 #5 requires where buildings are required to have two or more exits, emergency power for illumination shall be provided at all exit doors.

B. Please provide additional information regarding the proposed lighting controls, refer to the energy comments below.

C. Please provide electrical panel schedules, as well as a one-line diagram for the proposed new panels. Include proposed conductor sizes, grounding of the transformer, mounting details for the transformer etc.

D. Provide emergency egress lighting per IBC 1008.3 for each area required to provide 2 means of egress.

E. Provide illuminated exit signs in all locations which are required to be provided with two means of egress, per IBC 1013.1. Exit signs shall be visible from all points until the exit discharge, including within exits. Please provide exit signs at all exit and exit access doorways, additionally provide signs such that they at least one exit sign is visible (typically every one hundred feet and at all changes in direction.)

ENERGY REVIEW COMMENTS:

N1. Please provide complete information on the plans showing the extent of the thermal envelope and the corresponding R-values as required by IECC C402.1.3. The plans must list insulation types, thicknesses and R-values in the details and sections. These values must correspond with the values on the Envelope Compliance Certificate.

A. Clarify what the R-value is for the insulated metal panels and provide manufacturer information justifying the proposed values. (R21.6 continuous)

B. Show on the plans an R-38 continuous roof insulation value and required thickness of proposed product.

C. The Envelope Compliance Certificate (ECC) provided indicates R-10 floor slab insulation will be provided. The section views show this insulation terminating at the bottom of the slab. For slab insulation to be counted in the design of the envelope, it must extend to the top of the slab-on-grade, as noted in IECC C402.2.5. Please address as Details on A4.0 do not comply.

N2. Please indicate the maximum U-factor and SHGC for all windows and glazed openings in accordance with IECC C402.4.3. Please add require U-factor assembly values to Sheet A3.0.

A. The U-factor specified for the windows is less than the default value listed in Table C303.1.3(1) of the IECC. IECC C303.1.3 requires the U-factors for the windows be certified by an independent laboratory per NFRC 100 and labeled as such by the manufacturer. Please note this requirement on the plans.

N3. IECC C402.4.2 requires a minimum skylight fenestration area for areas greater than 2,500 square feet with a 15-foot ceiling. Please show a basic calculation demonstrating compliance or reference any applicable exceptions.

N4. Provide occupancy sensors in the following locations: conference rooms; private offices; break room; restrooms; and all other rooms 300 square feet or less as required by IECC C405.2.1.

N5. For lighting not controlled by occupancy sensors. please address the following:

A. Please clarify how automatic lighting shutoff will be provided as required by IECC C405.2.2.1. Also, provide information for the occupant override, in accordance with this section.

B. Please clarify how lighting controls are provided for each area to allow for a minimum of 50% uniform lighting reduction, as required by IECC C405.2.2.2.

N6. IECC C405.2.3 requires independent daylight responsive (photo-sensor) controls be provided for luminaires within day light zones. Please address.

N7. Please provide a lighting power analysis for the interior lighting (i.e., COMcheck), in accordance with IECC C405.4. *(Envelope Compliance Certificate is referencing ASHRAE 90.1- <u>all</u> energy compliance documents must reference the same code, not a mixture of 2018 IECC and ASHRAE)*

N8. Please provide a lighting power analysis for the exterior lighting (i.e., COMcheck), in accordance with IECC C405.5.1. *(Envelope Compliance Certificate is referencing ASHRAE 90.1- <u>all</u> energy compliance documents must reference the same code, not a mixture of 2018 IECC and ASHRAE)*

STRUCTURAL COMMENTS:

General:

S1. The geotechnical report calls for varying thicknesses of structural fill dependent upon the load to the footings. The plans do not currently list the structural fill requirements beneath the footings. Because the structural engineer is the only one with knowledge of actual loading to the footings, please clearly state the fill requirements on the structural plans.

Structural Drawings:

S2. The plans must provide a "Statement of Special Inspections" per IBC 1704.2.3 and as defined in IBC 1704.3. Not only should this list all special inspection and structural testing items that are required by the IBC, but detail the extent and frequency of the inspections/tests. Please note that the applicable requirements from AISC 341-16 Tables J6.1, J6.2, J6.3, J7.1, J7.2, J7.3, and J8.1 will need to be included in addition to concrete, soils, and other applicable special inspections. Please address.

S3. Sheet S1.0: Please address the following:

A. The seismic reduction value R is listed as 3.5 for OCBFs. Per ASCE 7-16 Table 12.2-1, this should be 3.25. Please address.

B. Cs is listed as 0.308. Based on the Sds value and R value it appears that Cs should be 0.364. Please address.

C. The concrete pier schedule does not show the layout of piers with more than 8 vertical bars. Please address per IBC §107.2.1.

S4. Sheet S2.0: Please address the following:

A. Notes indicate that the floor slab is to be on 4" free-draining gravel. The geotechnical report indicates that floor slabs also require 18" min structural fill. Please indicate this requirement.

B. There are footings along grid 1. It appears that these footings will overlap existing spread/continuous footings. This may require eccentric footings, removing portions of foundation walls, etc. It is unclear what will be required. Please provide additional notes and details to define the construction against the existing building per IBC §107.2.1.

S5. Sheet S2.1: Please address the following:

A. In accordance with Section A4 of AISC 341, the drawings must clearly designate all members that are part of the seismic-force-resisting-system (SFRS) and their connections. Please clearly call out all chords and drag members and ensure that their connections are properly accounted for on the plans.

B. Per Section D2.2 of AISC 341-16, all connections which are part of the SFRS are required to transfer forces through bolts or welds, not both. Bolted connections are required to be pretensioned with slip critical faying surfaces. Please clarify this for all SFRS member details.

C. It appears that all perimeter beams will act as chords and collectors. Please provide connections capable of transferring the overstrength level collector loads and chord loads across columns.

S6. Sheet S3.0: Please address the following:

A. Detail 6/S3.0 shows a column base plate with anchor bolts. The anchor bolt spacing is not specified. Please clarify per IBC §107.2.1

B. Detail 15/S3.0 shows a 4ft max dimension and a 30" min dimension. It is unclear what these dimensions refer to. It is assumed that the 30" min dimension should be from the ground level to the bottom of footing to provide adequate frost depth. It is assumed that the 4ft max dimension should be shown to the top of the concrete foundation wall. Please clarify per IBC §107.2.1.

C. Detail 21/S3.0 shows a bearing plate with "(10) ¾" dia A325 bolts". Please address the following:

I. Detail 25/S3.0 which this detail references appears to show only 6 bolts. Please address.

II. This bolted connection appears to function as a chord and collector connection. Per AISC 341-16 §D2.2(d) all bolts shall be pretensioned high-strength bolts with faying surfaces meeting the requirements of slip critical connections. Please indicate these requirements.

D. Detail 25/S3.0: Please address the following:

I. Keynotes 5 and 6 reference 21/S3.1. There is no sheet S3.1. Please clarify if these should reference 21/S3.1.

II. It appears that the beams in this connection will be required to act as the chords and collectors. Please submit calculations for the connection with chord forces and overstrength level collector forces.

S7. Sheet S4.0: Please address the following. These comments also apply to similar details on sheets S4.1 and S4.2.

A. Detail 2/S4.0: Dimensions to anchor bolts are not shown. Please address per IBC §107.2.1.

B. Detail 3/S4.0 and 4/S4.0: The beam to gusset connection uses bolts. Please address the following:

I. Per AISC 341-16 §D2.2(d) all bolts shall be pretensioned high-strength bolts with faying surfaces meeting the requirements of slip critical connections. Please indicate these requirements.

II. The bolt spacings are not specified. Please address per IBC §107.2.1.

C. Please specify work points for the various brace connections per IBC §107.2.1.

Structural Calculations:

S8. Page 2/136 of the calculations shows Sds=1.000. The structural notes and ATC Hazards by Location website give Sds=1.184. Please address.

S9. Page 2/136 of the calculations shows Cs=0.308. It appears that this should be Sds/(R/Ie)=1.184/(3.25/1)=0.364. Please address.

S10. Page 18/136 shows HSS 6x6x1/4 interior grid 1 columns. The plans show HSS 8x8x3/16. Please address.

S11. Page 20/136 shows a braced frame footing calculation. The calculation does not appear to be considering wind or seismic uplift from the braced frame. Please address.

S12. Page 22/136: Sds=1.0 and Cs=0.308 are being used. These appear to be the incorrect values. Please address.

S13. Pages 29 and 32 show anchor bolt calculations with hairpins required. It is unclear where these calculations apply to as there do not appear to be any hairpin reinforcing shown on the drawings. Please clarify.

S14. Please provide calculations for the braced frame anchor bolts including concrete provisions from ACI 318-14 Chapter 17.

S15. Please provide calculations for the collector beams with overstrength level axial loads per ASCE 7-16 §12.10.2.

S16. Please provide calculations for storage racks and rack anchorage per ASCE 7-16 §15.5.3.1.

If you have any questions regarding the above comments, please contact Mike Molyneux at mikem@wc-3.com or by phone at (801) 547-8133.

[END]