



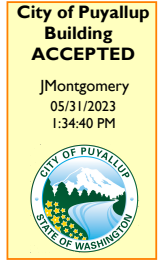
12503 Bel-Red Road, Suite 100
Bellevue, Washington 98005
(425) 450-4075 FAX (425) 450-4076

JOB PROLOGIS PUYALLUP 1 HVAC
SHEET NO. COVER OF
CALCULATED BY DV DATE 05/17/2023
CHECKED BY JH DATE
SCALE
JOB NUMBER 23-01.42

STRUCTURAL CALCULATIONS FOR:

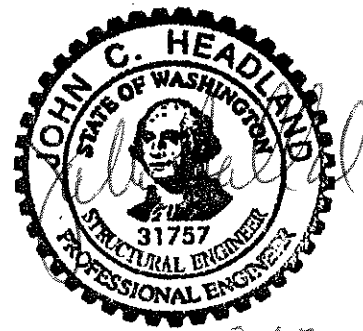
PROLOGIS PUYALLUP 1 HVAC
1601 INDUSTRIAL PARK WAY
PUYALLUP, WASHINGTON, 98371

PROVIDE LEGIBLE
COPY IN FIELD



PREPARED FOR:

SOPHEAP HILLE
BURGESS DESIGN
1200 FIFTH AVENUE, SUITE 400
SEATTLE, WA 98101



5-19-23

THE APPROVED CONSTRUCTION PLANS,
DOCUMENTS AND ALL ENGINEERING MUST
BE POSTED ON THE JOB AT ALL
INSPECTIONS IN A VISIBLE AND READILY
ACCESSIBLE LOCATION.

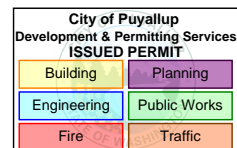
FULL SIZED LEDGIBLE COLOR PLANS ARE
REQUIRED TO BE PROVIDED BY THE
PERMITEE ON SITE FOR INSPECTION

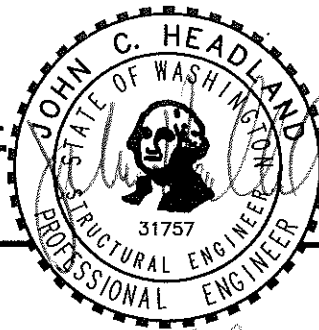
DESIGN CRITERIA:

CODE..... INTERNATIONAL BUILDING CODE, 2018 EDITION
WIND LOAD..... 110 MPH ZONE, EXPOSURE 'B'

SEISMIC DESIGN INFORMATION:

$S_s = 1.27$ $S_{DS} = 1.016$
 $S_1 = 0.437$
 $I_e = 1.0$
 $R_p = 6.0$ $a_p = 2.5$
SEISMIC DESIGN CATEGORY 'D'





5-19-23

(N)6-#10 SCREWS MIN.
BETWEEN UNIT & (N)
CURB (TYP. ALL 4
SIDES)

(N)MECHANICAL UNIT &
CURB BY MECHANICAL
CONTRACTOR (MAXIMUM
1080#)

VERIFY (E)MIN.
4-1/4"Ø LAG SCREWS
OR 6-#10SCREWS
EACH SIDE OF
(E)CURB

(N)6-#10 SCREWS MIN.
(TYP. ALL 4 SIDES)

(E)CONTINUOUS
WOOD PLATE
BY JOIST MFR.

(E)ROOF RTU CURB &
INSULATION

(E)ROOF SHEATHING

B-SKS-2

(E)STIFFENER

(E)JOIST
PER PLAN

VERIFY (E)4x8
DF#2 AT EACH
EDGE OF UNIT
w/SIMPSON
WP48 EA. END
OR SIMILAR

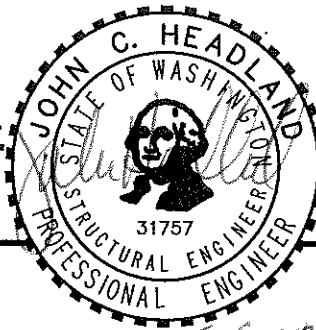
(E) 2x6 STIFFENERS

VERIFY (E)4x8 DF#2 BENEATH
EDGE OF UNIT WITH SIMPSON
LUS48 HANGER OR SIMILAR

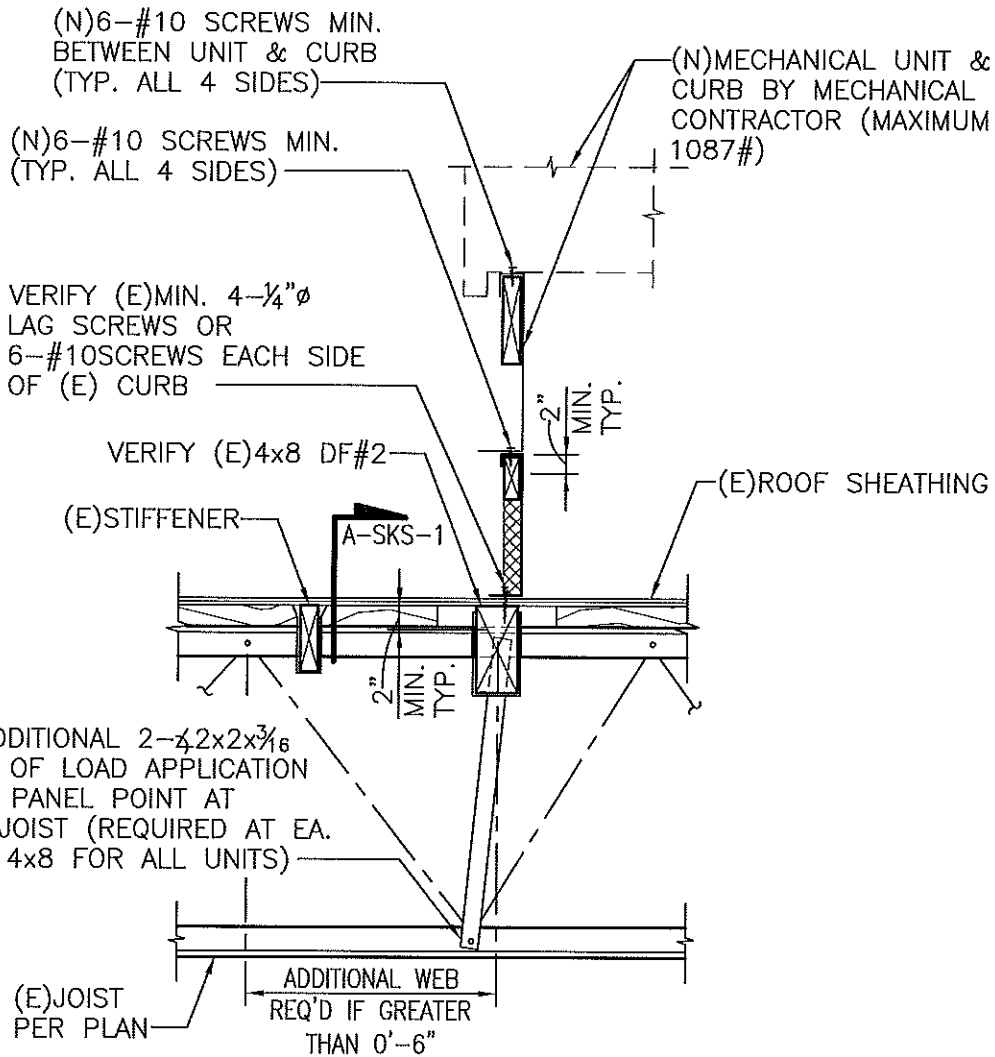
A-SKS-1

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

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic



5-19-23



B-SKS-2

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

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic



**SHUTLER
CONSULTING
ENGINEERS, INC.**

12503 Bel-Red Road, Suite 100
Bellevue, WA 98005
(425) 450-4075 * FAX (425) 450-4076

JOB _____
SHEET No. S-1 OF _____
CALCULATED BY _____
DATE _____
SCALE _____

Wind and Seismic forces on HVAC Unit - RTU 1

Unit data:

Unit base weight	1087 lbs.	Unit Dimensions	Curb Dimensions
Economize	0 lbs.	Height = 52 in.	Height = 27 in.
Curb	150 lbs.	Length = 88 in.	Length = 94.5 in.
Total weight	1237 lbs.	Width = 53 in.	Width = 79.75 in.
Weight used in calculations	1250 lbs., to include duct work, etc.		

Seismic:

$$F_p = (0.4 * a_p * S_{DS} * W_p) * (1 + 2 * (z/h)) / (R_p / I_p)$$

$$F_p = 635 \text{ lbs.} \quad \leq \text{Controls}$$

$$F_{p(max)} = 1.6 * S_{DS} * I_p * W_p$$

$$F_{p(max)} = 2032 \text{ lbs.}$$

$$F_{p(min)} = 0.3 * S_{DS} * I_p * W_p$$

$$F_{p(min)} = 381 \text{ lbs}$$

$$F_p = 444.50 \text{ lbs. (ASD)} \quad \leftarrow$$

$$W_p = 1250 \text{ lbs.}$$

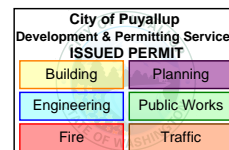
$$S_{DS} = 1.016$$

$$a_p = 2.5$$

$$R_p = 6.0$$

$$I_p = 1.0$$

$$z = h \Rightarrow z/h = 1.00$$



Wind: (Section 29.4.1 of ASCE 7-16)

$$F_h = q_h * (GC_r) * A_r \text{ (Horizontal Force)} \quad F_v = q_h * (GC_r) * A_r \text{ (Vertical Uplift Force)}$$

$$q_h = 0.00256 * K_z * K_{zt} * K_d * K_e * V^2 = 15.88 \text{ PSF}$$

$$F_h = 30.18 * A_r \text{ PSF}$$

$$F_v = 23.83 * A_r \text{ PSF}$$

- $F_h = 874.25 \text{ lbs. (Transverse Horizontal Force) ASD}$
- $F_h = 526.53 \text{ lbs. (Longitudinal Horizontal Force) ASD}$
- $F_v = 463.04 \text{ lbs. (Vertical Uplift Force) ASD}$

$$M_{OT} = 27410.83 \text{ in.-lbs. (Seismic)}$$

$$M_{OT} = 34532.73 \text{ in.-lbs. (Wind - Transverse)}$$

$$M_{OT} = 20798.12 \text{ in.-lbs. (Wind - Longitudinal)}$$

Basic Wind Speed = 100 MPH
Exposure = B
Average roof height = 35.00 ft.

$$K_z = 0.730 \text{ Table 30.3-1}$$

$$K_d = 0.85 \text{ Table 26.6-1}$$

$$K_{zt} = 1.0 \text{ Section 26.8.2}$$

$$K_e = 1.0 \text{ Section 26.9}$$

$$(GC_r) = \text{Horizontal Gust Factor} = 1.9$$

$$(GC_r) = \text{Vert Uplift Gust Factor} = 1.5$$

$$A_r = \text{Vert Proj Area (Transverse)} = 48.28 \text{ ft}^2$$

$$A_r = \text{Vert Proj Area (Longitudinal)} = 29.08 \text{ ft}^2$$

$$A_r = \text{Horizontal Projected Area} = 32.39 \text{ ft}^2$$

Load combinations:

- Case I 0.60 Dead + 0.6 Wind
- Case II 0.60 Dead + 0.7 Seismic

$$\text{Transverse Seismic Hold Down Force} = -31.29 \text{ lbs}$$

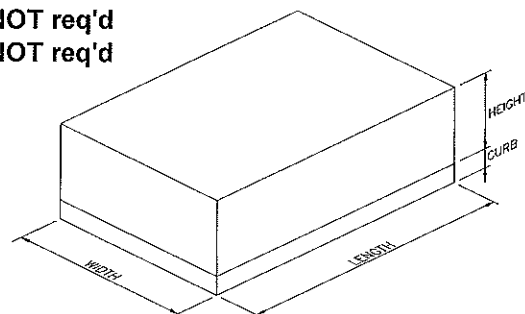
$$\text{Longitudinal Seismic Hold Down Force} = -84.94 \text{ lbs}$$

$$\text{Transverse Wind Hold Down Force} = 289.53 \text{ lbs}$$

$$\text{Longitudinal Wind Hold Down Force} = 76.61 \text{ lbs}$$

Hold down NOT req'd
Hold down NOT req'd

UPLIFT
UPLIFT



RTM ATTACHMENT

$$V = 741 \#$$

$$T = 290 \#$$

6-#10 - SCREWS

$$Z'_H = 114 (1.6) (0.7) \left(\frac{1.5}{1.9}\right) = 101 \#$$

$$Z'_V = 135 (1.6) (0.7) = 151 \#$$

$$\text{UNITY} = \frac{741 \#}{(12 \times 101)} + \frac{290 \#}{6(151)} = 0.93 \quad (\text{OK})$$

↑
USE 6 SCREWS PER SIDE

1/2" LAG SCREWS

$$Z'_H = 150 \# (1.6) (0.7) \left(\frac{1.5}{2}\right) = 126 \#$$

$$Z'_V = 225 \# (1.6) (0.7) (1.5) = 378 \#$$

$$\text{UNITY} = \frac{741 \#}{(8 \times 126)} + \frac{290 \#}{(4 \times 378)} = 0.93 \quad (\text{OK})$$

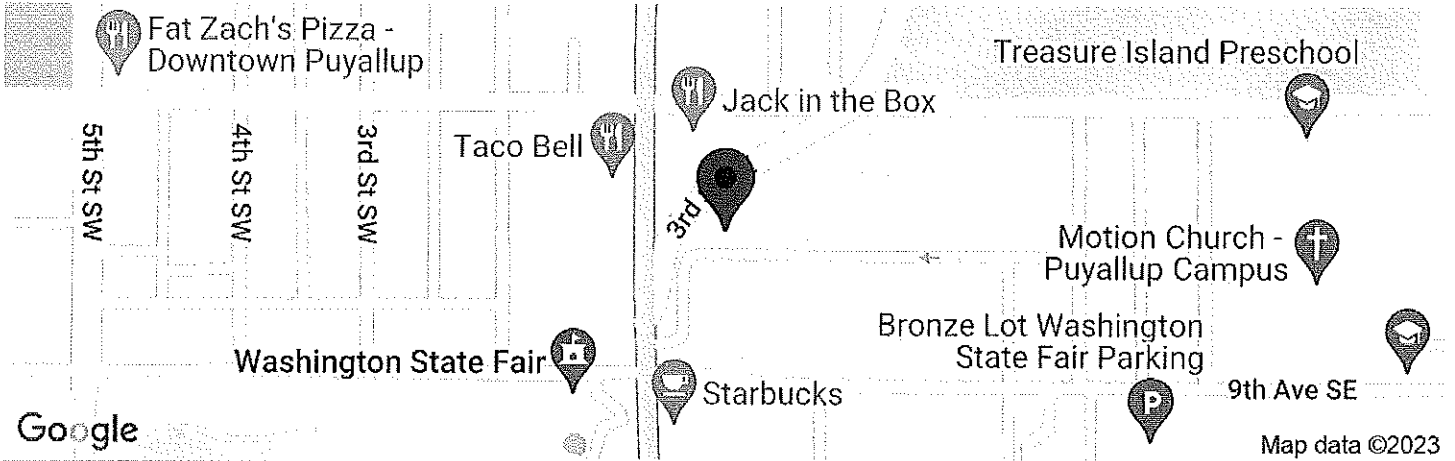


OSHPD

3-3

Puyallup, WA, USA

Latitude, Longitude: 47.1853785, -122.2928974



Date	5/15/2023, 6:43:58 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S _S	1.27	MCE _R ground motion. (for 0.2 second period)
S ₁	0.437	MCE _R ground motion. (for 1.0s period)
S _{MS}	1.524	Site-modified spectral acceleration value
S _{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S _{DS}	1.016	Numeric seismic design value at 0.2 second SA
S _{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

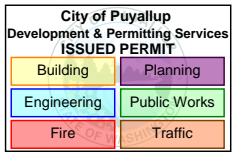
Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F _a	1.2	Site amplification factor at 0.2 second
F _v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.5	MCE _G peak ground acceleration
F _{PGA}	1.2	Site amplification factor at PGA
PGA _M	0.6	Site modified peak ground acceleration
T _L	6	Long-period transition period in seconds
SsRT	1.27	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.389	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.437	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.487	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGA _d	0.5	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA _{UH}	0.538	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C _{RS}	0.914	Mapped value of the risk coefficient at short periods
C _{R1}	0.898	Mapped value of the risk coefficient at a period of 1 s
C _v	1.354	Vertical coefficient

City of Puyallup
Development & Permitting Services
ISSUED PERMIT

Building	Planning
Engineering	Public Works
Fire	Traffic

PROVIDE LEGIBLE COPY IN FIELD

5-5



EXISTING EXHAUST FAN SCHEDULE table with columns: TAG, MAKE, MODEL, CAPACITY, RPM, MOTOR HP, etc.

EXISTING EXHAUST FAN SCHEDULE table with columns: TAG, MAKE, MODEL, CAPACITY, RPM, MOTOR HP, etc.

PACKAGED GAS ROOFTOP UNIT SCHEDULE table with columns: TAG, MAKE, MODEL, CAPACITY, etc.

ENERGY RECOVERY VENTILATOR SCHEDULE table with columns: TAG, MAKE, MODEL, CAPACITY, etc.

ELECTRIC DUCT COIL SCHEDULE table with columns: TAG, MAKE, MODEL, CAPACITY, etc.

DIFFUSER REGISTER AND GRILLE SCHEDULE table with columns: TAG, MAKE, MODEL, CAPACITY, etc.

NOTES: 1. FIELD DIMENSIONS FOR THIS TYPE... 2. FIELD DIMENSIONS FOR THIS TYPE... 3. FIELD DIMENSIONS FOR THIS TYPE...

DUCT CONSTRUCTION SCHEDULE table with columns: TAG, MAKE, MODEL, CAPACITY, etc.

NOTES: 1. FIELD DIMENSIONS FOR THIS TYPE... 2. FIELD DIMENSIONS FOR THIS TYPE... 3. FIELD DIMENSIONS FOR THIS TYPE...

DUCT INSULATION table with columns: TAG, MAKE, MODEL, CAPACITY, etc.

NOTES: 1. FIELD DIMENSIONS FOR THIS TYPE... 2. FIELD DIMENSIONS FOR THIS TYPE... 3. FIELD DIMENSIONS FOR THIS TYPE...



BURGESS DESIGN logo text.



METRIX ENGINEERS logo text.



MECHANICAL SCHEDULES

4-6

Thybar Corporation has a policy of continuous product improvement and reserves the right to change the product design without notice

SUBMITTAL

Standard configuration shown

1. Material: Galvanized Steel
2. Insulation: 1" Duct Liner
3. Gasket provided

Verify new and existing curb dimensions

APPROVED

APPROVED

PENDING CHANGES

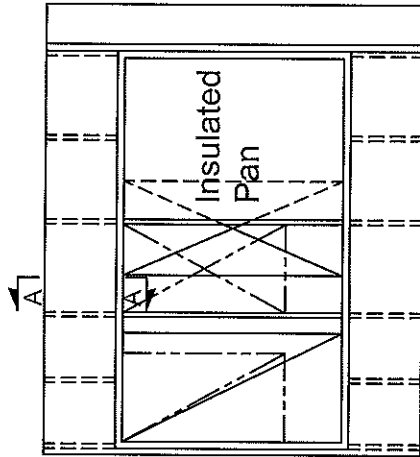
BY: / /

DATE: / /

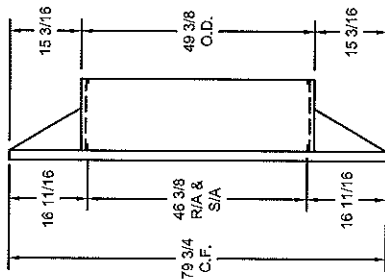
NOTE:
CONTRACTOR IS RESPONSIBLE FOR RAISING HEIGHT OF EXISTING CHANNELS TO BE FLUSH WITH TOP OF EXISTING CURB, TO INSURE PROPER SEAL WITH THYBAR CURB ADAPTOR.

Note - Airflow
3,400 CFM @
532.87 FPM Thru
S/A Opening.

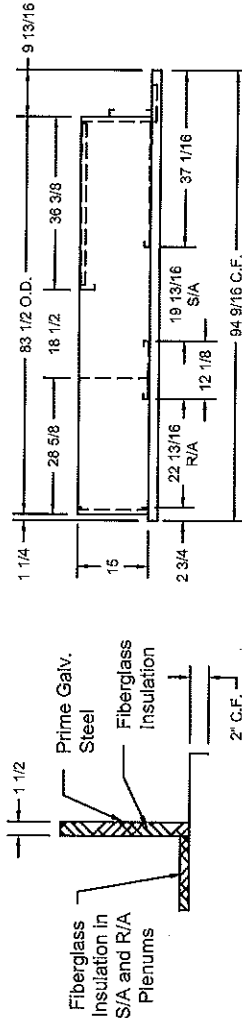
Note - Airflow
3,400 CFM @
464.06 FPM Thru
R/A Opening.



PLAN VIEW



END VIEW



ELEVATION VIEW

SECTION AA

Standard	X	CFM	3,400	Custom	CFM
The information contained in this drawing is the sole property of Thybar Corporation. Any reproduction in part or whole without the written consent of Thybar Corporation is prohibited.					
(DO NOT SCALE DRAWING) Unless otherwise specified dimensions are in inches tolerances are ± 1/16 ± 0.0625 ± 1°					
Retromate Standard Transitions New Trane WHC102H (00700) — 1085# Existing Carrier 48TMD028 (00968) — 2445#					
Qty.:	1	Job#:	Q-10070426		
Tag:	Prlogis	Drawn:	GS		
Rev:		File:	Q-10070426-1		
Date:	3/9/23				
Rev. Int.	Date	Description	REVISION HISTORY		



City of Puyallup
Development & Permitting Services
ISSUED PERMIT

Building	Planning
Engineering	Public Works
Fire	Traffic