City of West Linn
Planning & Development • 22500 Salamo Rd #1000 • West Linn, Oregon 97068
Telephone 503.656.4211 • Fax 503.656.4106 • westlinnoregon.gov

DEVELOPMENT REVIEW APPLICATION

For Office Use Only			
STAFF CONTACT: Chris Myers	PROJECT NO(S).: MISC-20-06		PRE-APPLICATION NO.: N/A
NON-REFUNDABLE FEE(S): $3500.00	REFUNDABLE DEPOSIT(S): -0-	TOTAL: $3500.00	

Type of Review (Please check all that apply):

- ☐ Annexation (ANX)
- ☐ Appeal and Review (AP)
- ☐ Conditional Use (CUP)
- ☐ Design Review (DR)
- ☐ Easement Vacation
- ☐ Extraterritorial Ext. of Utilities
- ☐ Final Plat or Plan (FP)
- ☐ Flood Management Area
- ☐ Hillside Protection & Erosion Control
- ☐ Historic Review
- ☐ Legislative Plan or Change
- ☐ Lot Line Adjustment (LLA)
- ☐ Minor Partition (MIP) (Preliminary Plat or Plan)
- ☐ Non-Conforming Lots, Uses & Structures
- ☐ Planned Unit Development (PUD)
- ☐ Pre-Application Conference (PA)
- ☐ Street Vacation
- ☐ Subdivision (SUB)
- X Temporary Uses
- ☐ Time Extension
- ☐ Variance (VAR)
- ☐ Water Resource Area Protection/Single Lot (WAP)
- ☐ Water Resource Area Protection/Wetland (WAP)
- ☐ Willamette & Tualatin River Greenway (WRG)
- ☐ Zone Change

Home Occupation, Pre-Application, Sidewalk Use, Sign Review Permit, and Temporary Sign Permit applications require different or additional application forms, available on the City website or at City Hall.

Site Location/Address: 4515 CEDAROAK DRIVE

Assessor's Map No.: 21E24ba
Tax Lot(s): 1800
Total Land Area: 11.2 Acres +/-

Brief Description of Proposal: ONE-YEAR TEMPORARY USE PERMIT AT 4515 CEDAROAK DRIVE (CEDAROAK PRIMARY SCHOOL) FOR A TEMPORARY PORTABLE CLASSROOM TO MEET NEW STATE-MANDATED COVID-19 SOCIAL DISTANCING REGULATIONS FOR SCHOOLS.

Applicant Name: (please print) REMO DOUGLAS — Phone: 503 673-7975
Address: 2755 BORLAND ROAD — Email: douglasr@wlwv.k12.or.us
City State Zip: TUALATIN, OR 97062

Owner Name (required): (please print) REMO DOUGLAS — Phone: 503-673-7975
Address: 2755 BORLAND ROAD — Email: douglasr@wlwv.k12.or.us
City State Zip: TUALATIN, OR 97062

Consultant Name: (please print) ANDREW TULL, 3J CONSULTING, INC — Phone: 503-545-1907
Address: 9600 SW NIMBUS, SUITE 100 — Email: Andrew.tull@3j-consulting.com
City State Zip: BEAVERTON, OR 97008

1. All application fees are non-refundable (excluding deposit). **Any overruns to deposit will result in additional billing.**
2. The owner/applicant or their representative should be present at all public hearings.
3. A decision may be reversed on appeal. No permit will be in effect until the appeal period has expired.
4. **One complete hard-copy set of application materials must be submitted with this application.**
   One complete digital set of application materials must also be submitted electronically in PDF format.
   If large sets of plans are required in application please submit one set.

The undersigned property owner(s) hereby authorizes the filing of this application, and authorizes on site review by authorized staff. I hereby agree to comply with all code requirements applicable to my application. Acceptance of this application does not infer a complete submittal. All amendments to the Community Development Code and to other regulations adopted after the application is approved shall be enforced where applicable. Approved applications and subsequent development is not vested under the provisions in place at the time of the initial application.

Applicant's signature — Date: 7/15/2020
Owner's signature *(required)* — Date: 7/15/2020

3J CONSULTING
9600 SW NIMBUS AVENUE, SUITE 100
BEAVERTON, OREGON 97008
PH: (503) 946.9365
WWW.3JCONSULTING.COM

July 15, 2020

Darren Wyss
Associate Planner
City of West Linn
22500 Salamo Road
West Linn, Oregon

Cedaroak Park Primary School
Temporary Portable

Dear Darren,

This application has been prepared on behalf of the West Linn-Wilsonville School District in order to request the placement of a temporary classroom at the Cedar Oak Park Primary School. The proposed structure will provide a temporary classroom at the school to help achieve the State of Oregon's mandatory COVID-19 social distancing standards. The District has submitted this application under the City's standards for Temporary Structures and Uses.

The site is located at 4515 Cedaroak Drive within the City of West Linn. The property is zoned R-10 and is home to the existing Cedaroak Park Primary School. The proposed structure will be a 28x64 foot temporary portable classroom which will be served by a small ramp and sidewalk. Attached herewith are preliminary site plans for the proposed structure and a land use application. The applicable standards for Chapter 35 have been addressed below.

Chapter 35 - TEMPORARY STRUCTURES AND USES

35.010 APPLICABILITY

Notwithstanding the limitations of use established by this code, the approval authority can authorize temporary uses consistent with the provisions of this chapter.

35.030 TEMPORARY USE STANDARDS

A. Temporary uses shall be approved if they meet the following standards:

1. Sites accommodating a temporary use shall be appropriate for the proposed use, as determined by the approval authority with consideration of the following:

a. The proposed site shall have adequate parking and circulation space consistent with Chapter 46 CDC, Off-Street Parking, Loading and Reservoir Areas; safe ingress and egress consistent with Chapter 48 CDC, Access, Egress and Circulation; and adequate line of sight and vision clearance per Chapter 42 CDC, Clear Vision Areas.

Applicant's Findings: The District proposes to place a single portable classroom on the site. No changes to site access, parking or vehicular circulation have been proposed as part of this application.

b. The proposed site shall have a paved or graveled surface sufficient to avoid dust generation and mud tracking from anticipated traffic or erosion control measures, consistent with Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual, rev. 2008, and shall be used to keep any mud, sediment and dust on site.

Applicant's Findings: The portable classroom will be placed on site using best management practices which will comply with the Clackamas County Erosion Prevention and Sediment Control Planning and Design Manual. The building will be served by a new aluminum ramp and sidewalk. The generation of dust and mud from traffic will be controlled on site during the construction period.

c. The proposed use shall conform to all applicable requirements of Chapter 27 CDC, Flood Management Areas; Chapter 28 CDC, Willamette and Tualatin River Protection; Chapter 32 CDC, Water Resource Area Protection; and other City regulations.

Applicant's Findings: The site is not affected by the Flood plain or the Willamette or Tualatin Rivers. The site does contain a stream an associated Water Resource Protection Area however the street and the associated buffer is on the north side of the property, well away from the proposed portable classroom. Chapters 27, 28, and 32 of the City's Community Development Code do not apply to this project.

d. The proposed temporary use shall not be materially detrimental to the public welfare, or injurious to the property or improvements in the immediate vicinity.

Applicant's Findings: The District has proposed to place the portable classroom on site in order to comply with State-mandated social distancing requirements. The proposed improvement is a benefit to the public. No public detriment or injury to the property or to other properties within the immediate vicinity are anticipated.

2. The approval authority may require that structures and trailers allowed as temporary uses for more than 60 days be screened from the view of occupants of any abutting residential and commercial structures, consistent with Chapter 44 CDC, unless the applicant demonstrates that such screening is not needed.

Applicant's Findings: The proposed structure is a modular classroom which will be placed on the site of the existing Cedaroak Park Primary School. The District considers this to be a

temporary placement, anticipating only a single year of use. The proposal is in response to the State-mandated social distancing requirements for schools.

Modular classrooms are commonly placed on existing school sites without the need for screening.

3. Drop boxes, trailers, or structures that serve a similar function are allowed, consistent with subsection A of this section, for registered nonprofit, religious or benevolent groups, orders or associations, when they are proposed to be located in General Commercial, Office Business Center, Campus Industrial, General Industrial, or Neighborhood Commercial districts.

Drop boxes and structures serving a similar function, not including trailers, shall not exceed seven feet in height or have a footprint of more than 25 square feet on a single site. Their color shall be limited to earth tones.

Applicant's Findings: No drop boxes, trailer or structures are proposed within any of the zones listed. This section does not apply to the application.

4. The property owner has authorized the proposed temporary use in writing.

Applicant's Findings: The District has provided a signed land use application authorizing the proposed temporary use.

B. The approval authority may attach conditions to any temporary use approval as needed to achieve compliance with the applicable standards of this section or otherwise protect public health, safety, and welfare.

Applicant's Findings: The District understands that the City's Planning Commission may impose conditions upon this application however, no unique conditions are anticipated or required.

35.050 DURATION OF TEMPORARY USES

Temporary uses may be allowed for no more than one year, with one additional renewal for no greater duration than the original approval, except as follows:

A. Construction trailers and associated parking and staging areas beyond the site approved for the associated development may be allowed for the duration of active construction projects.

B. Drop boxes, structures serving a similar function, and trailers authorized under CDC 35.030(A) will be allowed indefinitely, but they will be revoked if they are unused or abandoned for a period of

60 days or if material is not contained by the drop box or trailer and allowed to accumulate outside of the drop box, structure, or trailer.

Upon revocation of the approval, the applicant shall be responsible for removing the drop box, structure, or trailer unless it is abandoned; in that case, removal shall be the responsibility of the property owner.

Applicant's Findings: The District proposes to place the structure on site for a single year. If additional time is needed, the District will apply for a renewal of this application.

We trust that this application will be well received by the City. Please feel free to give me a call if you have any questions or need any additional clarification.

Sincerely,

Andrew Tull
Principal Planner
3J Consulting, Inc.

copy: Mr. Remo Douglas, West Linn-Wilsonville School District
Mr. Adam Neil, West Linn-Wilsonville School District
File

WEST LINN - WILSONVILLE SCHOOL DISTRICT
2020 PORTABLES

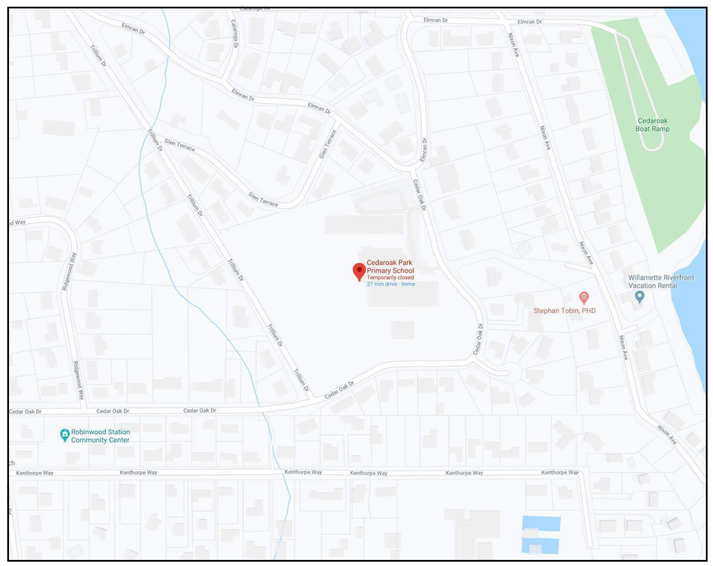
CEDAROAK PARK PRIMARY SCHOOL

LAND USE SUBMITTAL
JUNE 30, 2020

DRAWING LIST

A001 Site Plan
A002 Plan, Elevations & Section

IBI GROUP
907 SW Harvey Milk Street
Portland OR 97205 USA
PHONE: 503-226-6950



VICINITY MAP

CLIENT
West Linn - Wilsonville School District 3J

2755 SW Borland Road
West Linn, OR 97062

ISSUES

No.	DESCRIPTION	DATE

CONSULTANTS

SEAL

PRIME CONSULTANT
IBI GROUP
907 SW Harvey Milk Street
Portland OR 97205 USA
tel 503 226 6950 fax 503 273 9192
ibigroup.com

PROJECT
WLWV 2020 PORTABLES
CEDAROAK PARK PRIMARY SCHOOL

PROJECT NO:	
DRAWN BY:	**CHECKED BY:**
PROJECT MGR:	**APPROVED BY:**

SHEET TITLE
COVER SHEET

SHEET NUMBER	**ISSUE**
	1

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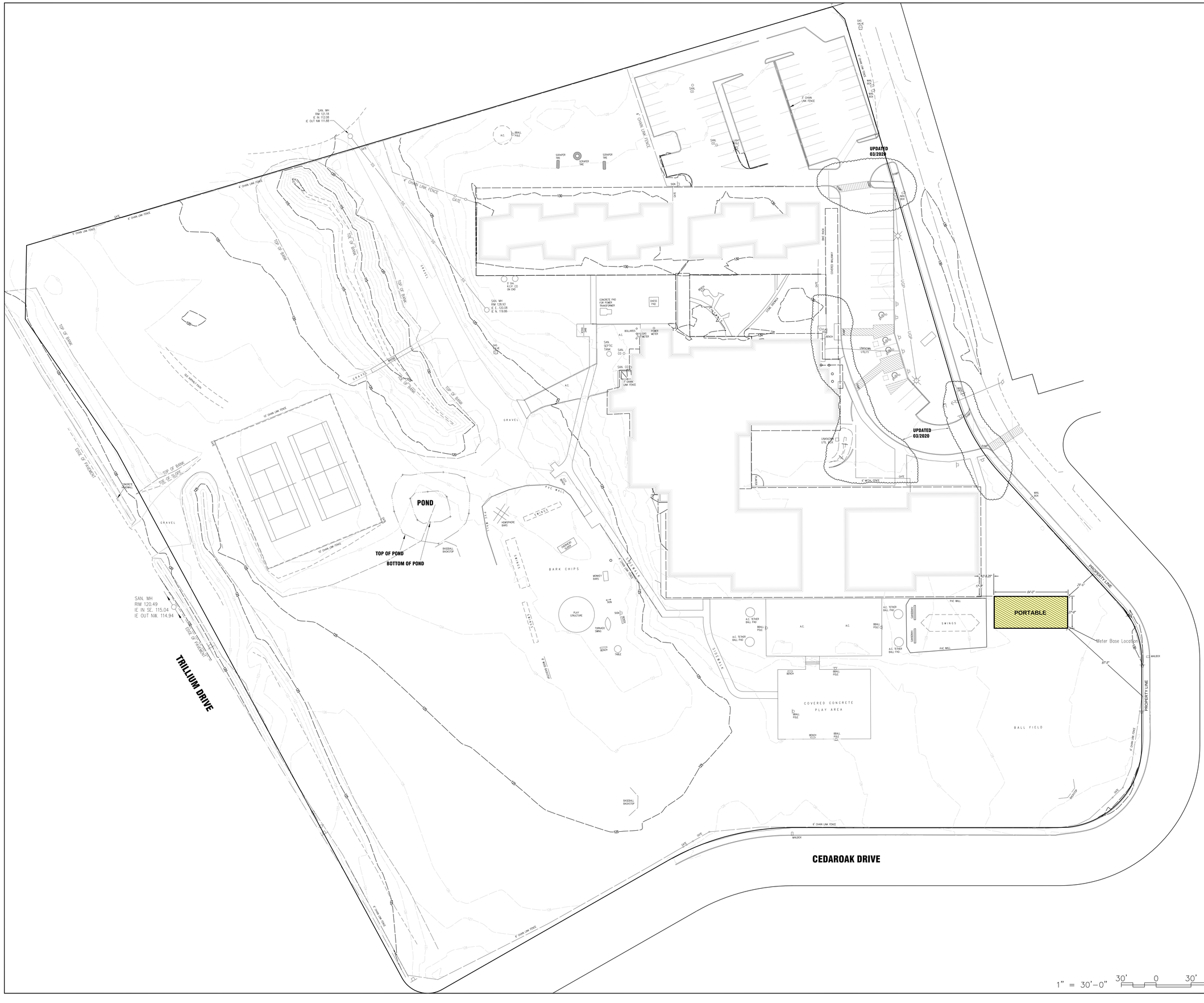

CLIENT

West Linn - Wilsonville School District 3J

2755 SW Borland Road
West Linn, OR 97062

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No.	DESCRIPTION	DATE

CONSULTANTS

SEAL

PRIME CONSULTANT

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IBI GROUP
907 SW Harvey Milk Street
Portland OR 97205 USA
tel 503 226 6950 fax 503 273 9192
ibigroup.com

PROJECT

WLWV 2020 PORTABLES

CEDAROAK PARK PRIMARY SCHOOL

PROJECT NO:	
DRAWN BY:	**CHECKED BY:**
PROJECT MGR:	**APPROVED BY:**

SHEET TITLE

SITE PLAN

SHEET NUMBER **A001**

ISSUE 1

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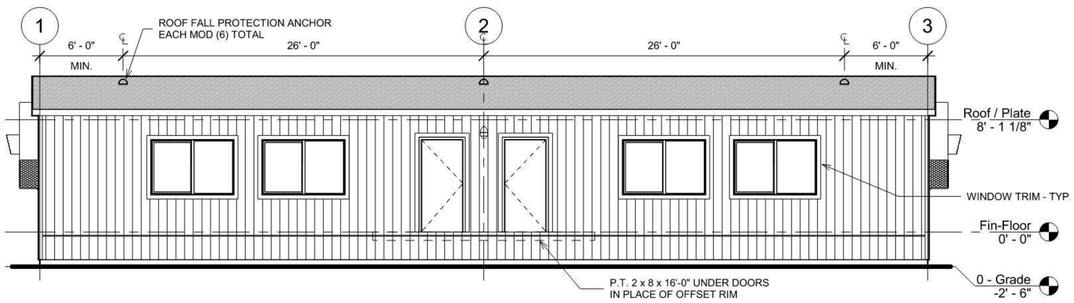
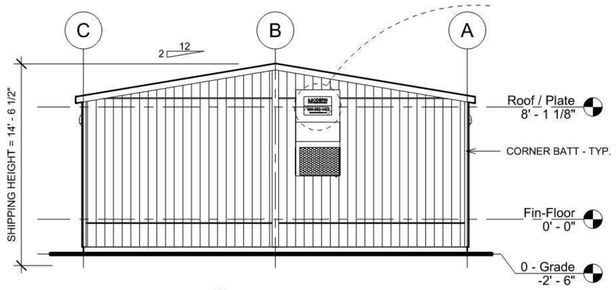
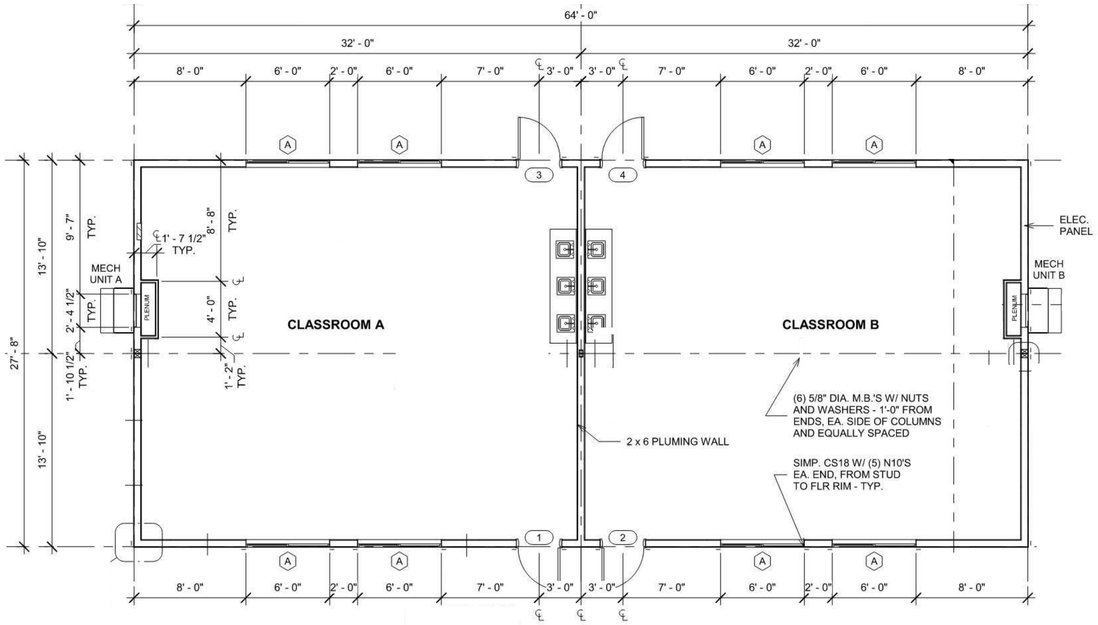


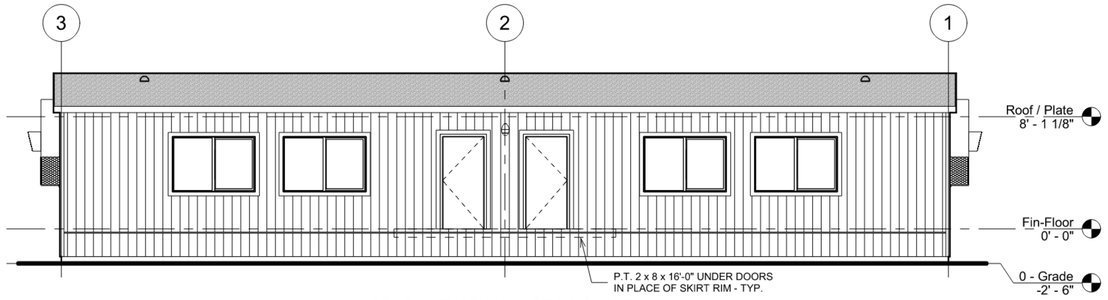
FRONT ELEVATION - NOT TO SCALE



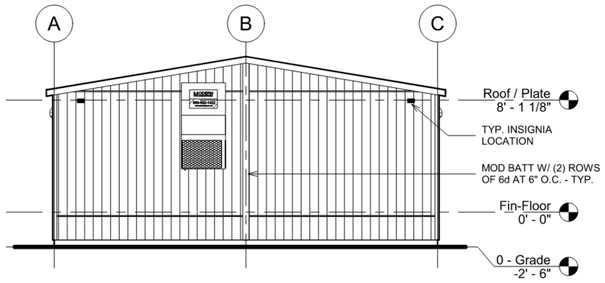
RIGHT SIDE ELEVATION - NOT TO SCALE



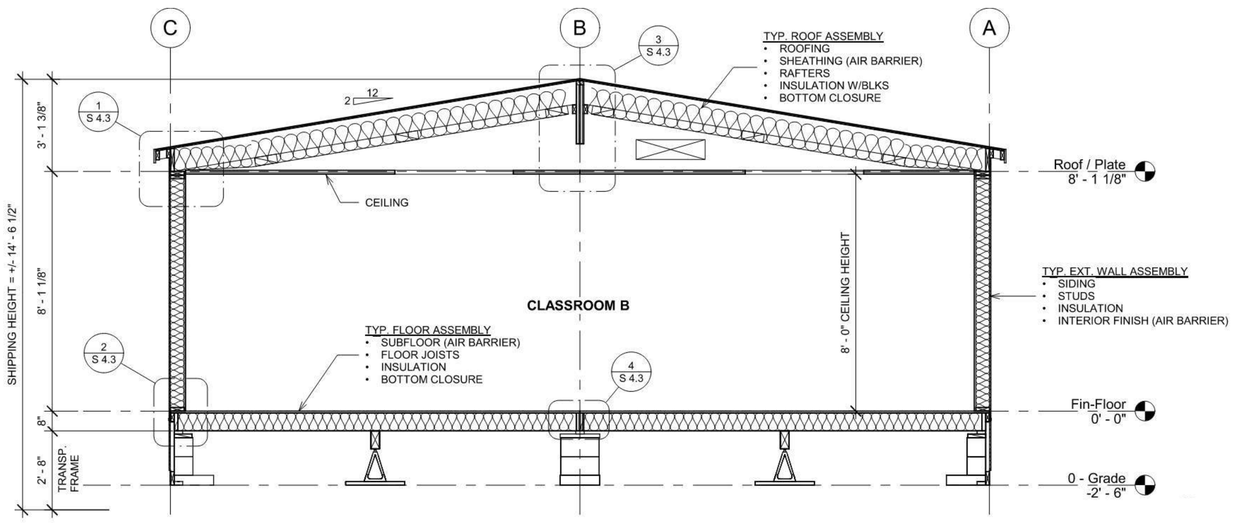
FLOOR PLAN - NOT TO SCALE



REAR ELEVATION - NOT TO SCALE



LEFT SIDE ELEVATION - NOT TO SCALE



BUILDING SECTION - NOT TO SCALE

CLIENT

West Linn - Wilsonville School District 3J

2755 SW Borland Road
West Linn, OR 97062

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tel 503 226 6950 fax 503 273 9192
ibigroup.com

PROJECT

WLWV 2020 PORTABLES

CEDAROAK PARK PRIMARY SCHOOL

PROJECT NO:	
DRAWN BY:	CHECKED BY:
PROJECT MGR:	APPROVED BY:

SHEET TITLE

PLAN, ELEVATIONS, AND SECTION

SHEET NUMBER **A002** ISSUE 1

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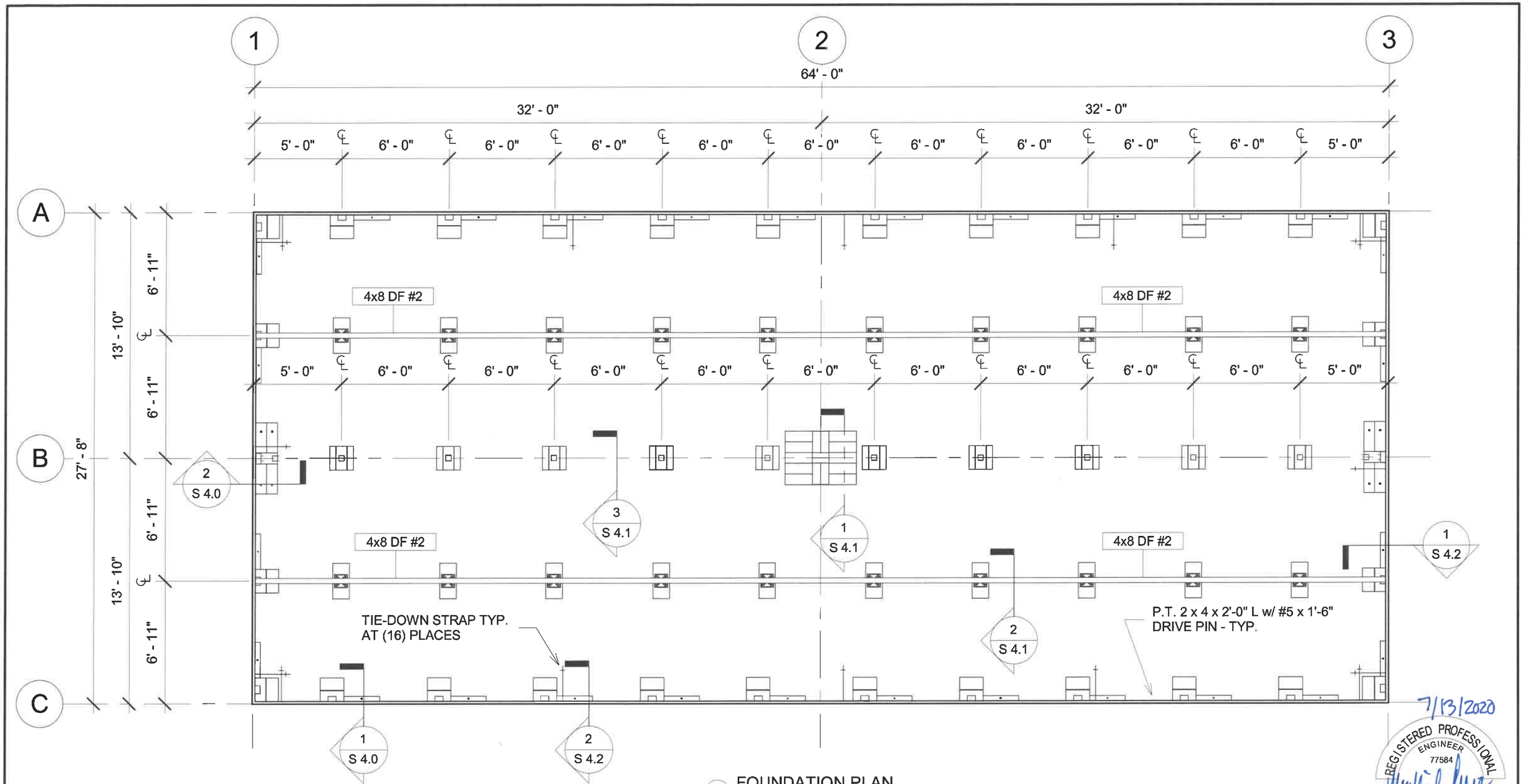


1 FOUNDATION PLAN
3/16" = 1'-0"

7/13/2020

REGISTERED PROFESSIONAL ENGINEER
77584
OREGON
MAY 22, 2015
MICHAEL C. LEWIS

EXPIRES: 12/31/2020

REV.	DESCRIPTION	DATE	BY

MODERN BUILDING SYSTEMS
MODERN BUILDING SYSTEMS, INC.
TELEPHONE: (503) 749-4949 FAX: (503) 749-4950
P.O. BOX 110, 9493 PORTER ROAD, AUMSVILLE, OR 97325
CHECK OUT OUR WEB PAGE: www.modernbuildingsystems.com

SHEET FOUNDATION PLAN
JOB# L.U. 2508-2509
PROJ. 28' x 64' MODULAR FOUNDATION
WEST LINN - WILSONVILLE SD
SHEET # S 1.0
ADDRESS 4515 S CEDAROAK DR., WEST LINN, OR 97068
DRW TS
DATE 7/13/20

FOUNDATION NOTES

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS. THIS STRUCTURE SHALL BE ADEQUATELY BRACED FOR WIND OR EARTHQUAKE FORCES AND TEMPORARY FORCES DURING SETTING AND ERECTION UNTIL ALL UNITS HAVE BEEN PERMANENTLY ATTACHED THERETO. REMOVE ORGANIC / SOD UNDER ALL BEARING PADS.

2. DESIGN LOADS:

ROOF DEAD LOAD	12 PSF
ROOF SNOW LOAD	25 PSF
FLOOR DEAD LOAD	10 PSF
FLOOR LIVE LOAD	50 PSF
WIND LOAD	Lambda = 1.0 Vult = 140 MPH (Vasd = 108 MPH) 3 SECOND GUST - EXP. B
SEISMIC	BEARING WALL SYSTEM: S_S = 1.500, F_a = 1.200 S_{DS} = 1.000, (PER ASCE 7-16, SEC. 12.8.1.3) RISK CATEGORY II I_e = 1.0, SEISMIC DESIGN CATEGORY D, SITE CLASS D
ALLOWABLE BEARING CAPACITY	1800 PSF AT GRAVEL

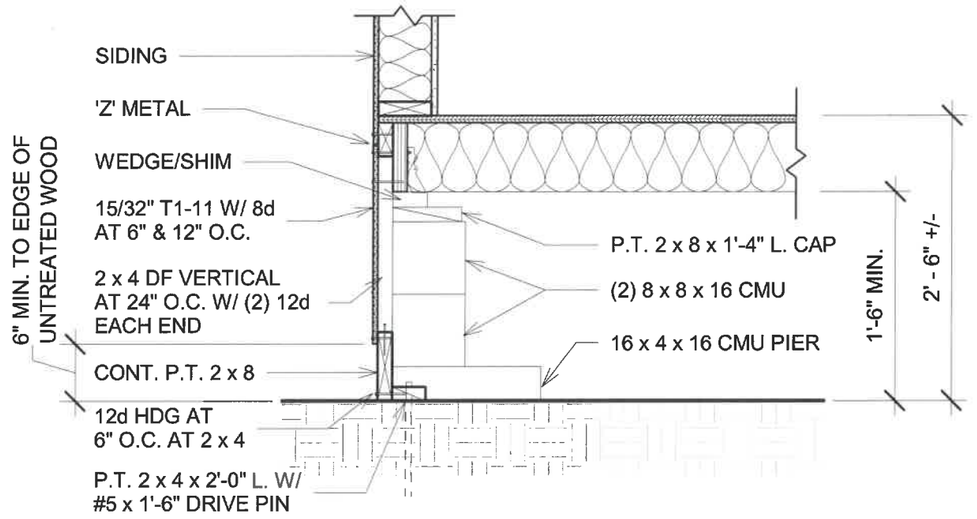
3. EXCEPT AS NOTED, DIMENSION LUMBER FOR FOUNDATION SHALL BE HEM-FIR, NO. 2 AND BETTER. TREATED LUMBER SHALL BE ACQ PRESSURE TREATED IN ACCORDANCE WITH AWPA STANDARD U1, USE CATEGORY UC4A, TO A MINIMUM RETENTION OF 0.40 PCF. AT PIECES IN CONTACT WITH GROUND, SAWN END GRAIN SHALL BE FIELD TREATED WITH 2% MIN. CONCENTRATION COPPER NAPHTHENATE. TREATED PLATE STOCK SHALL BE GOOD QUALITY AND SHALL NOT CONTAIN EXCESSIVE SPLITS, CHECKS OR WANE. 2 x 4 FRAMING SHALL BE HEM-FIR, STANDARD OR BETTER, TREATED 2 x 4 FRAMING SHALL MEET THE REQUIREMENTS SPECIFIED ABOVE.

4. ALL FASTENERS TO BE HOT DIPPED GALVANIZED (HDG) OR EQUAL AT P.T. MEMBERS.

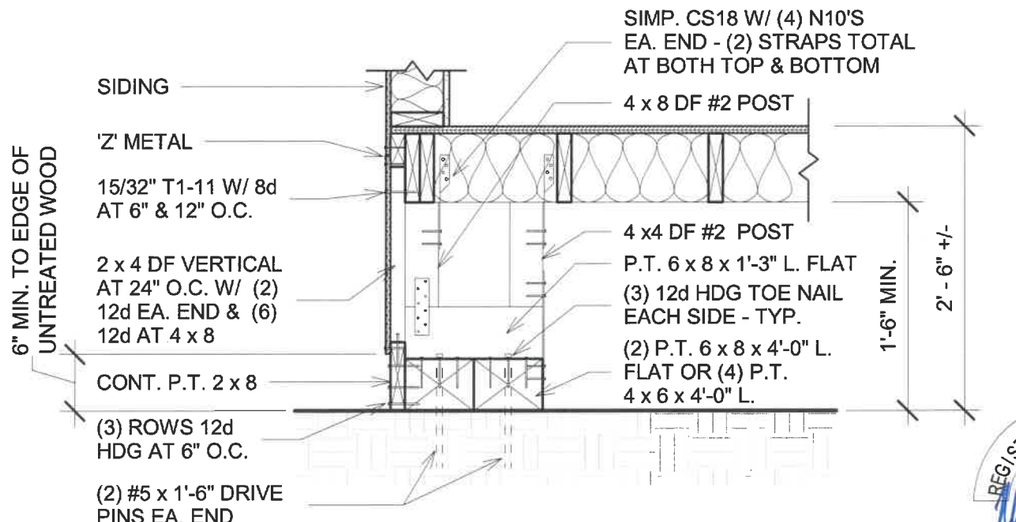
5. VENT CRAWL SPACE w/ (6) 15" SQ. METAL VENTS (MODERN STANDARD). INSTALL 6 MIL. VAPOR BARRIER ON GROUND IN ENTIRE CRAWL SPACE. LAP VAPOR BARRIER JOINTS MIN 12". (VAPOR BARRIER NOT REQUIRED AT ASPHALT OR CONCRETE IF OCCURS)

6. CONNECT STORM WATER FROM ROOF GUTTERS AND DOWNSPOUTS AND DIRECT AWAY FROM BUILDING PAD TO AN APPROVED DRAINAGE SYSTEM.

7. FOUNDATION PLANS AND DETAILS ARE NOT REVIEWED BY BCD OR L&I, EXCEPT FOR THE SUITABILITY OF THE DESIGN TO SUPPORT THE MODULAR BUILDING. APPROVAL AND INSPECTION OF THE FOUNDATION SYSTEM IS THE JURISDICTION OF THE LOCAL BUILDING OFFICIAL.



1 SIDEWALL FOOTING
3/4" = 1'-0"



2 ENDWALL COLUMN FOOTING
3/4" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
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MICHAEL C. LEWIS
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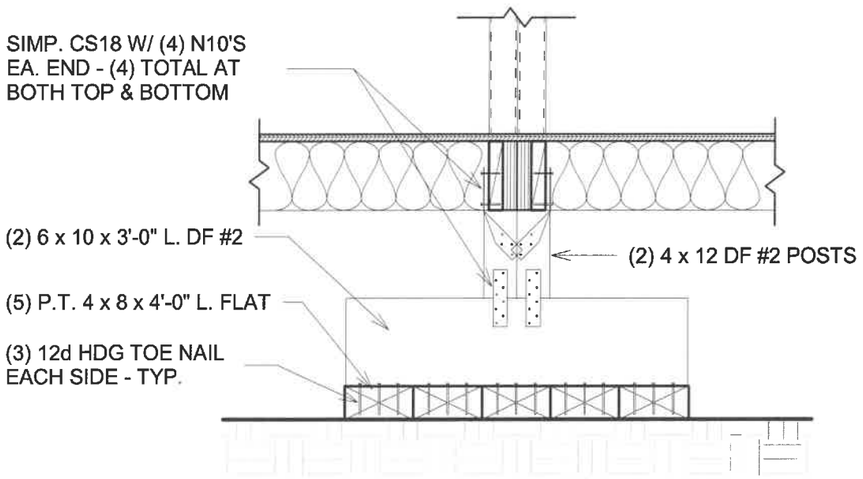
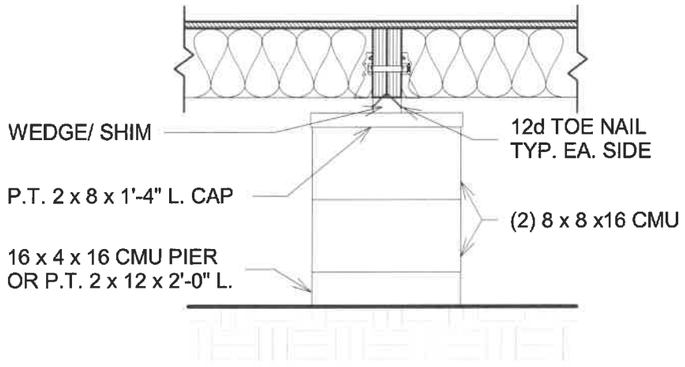
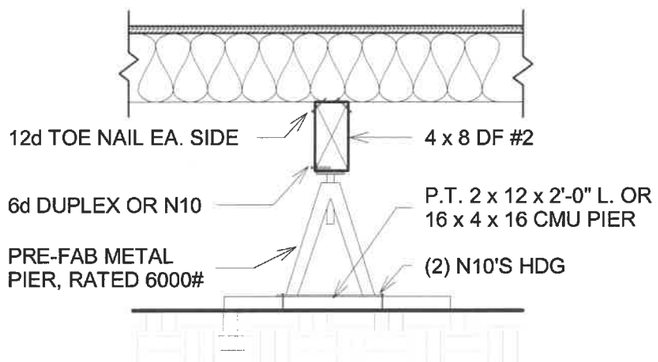


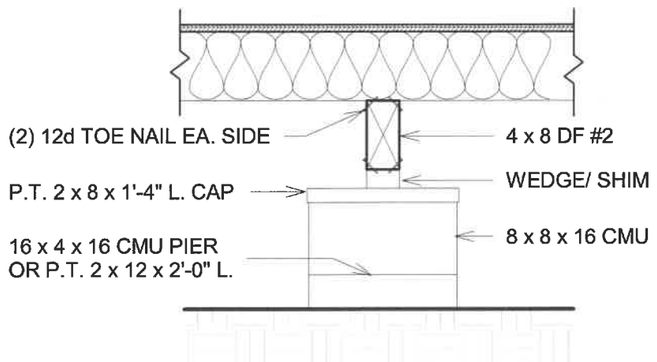
1 COLUMN FOOTING
3/4" = 1'-0"



3 MARRIAGE LINE FOOTING
3/4" = 1'-0"



2 MID-SPAN FOOTING
3/4" = 1'-0"



4 MID-SPAN FOOTING - ALTERNATE
3/4" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
77584
OREGON
MAY 22, 2015
MICHAEL C. LEWIS

EXPIRES: 12/31/2020

REV.	DESCRIPTION	DATE	BY

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SHEET FOUNDATION DETAILS

JOB# L.U. 2508-2509

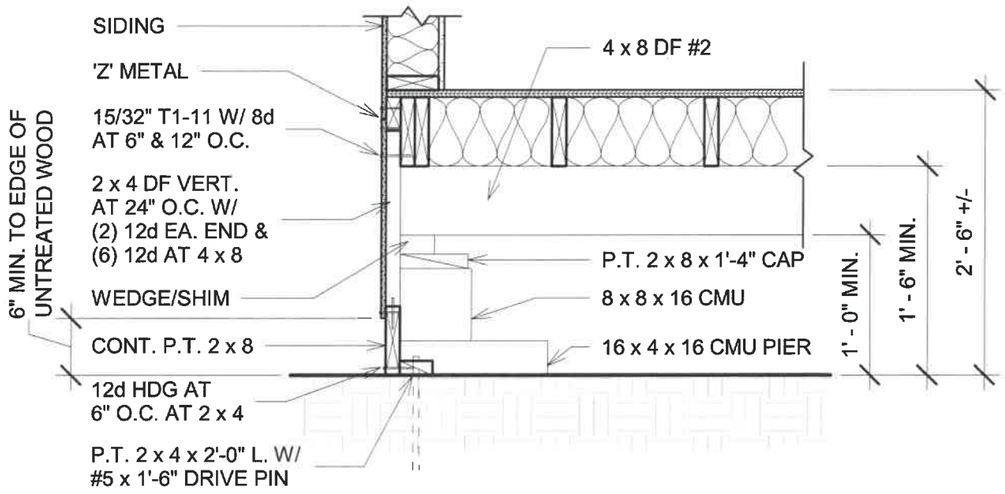
PROJ. 28' x 64' MODULAR FOUNDATION
WEST LINN - WILSONVILLE SD

SHEET # S 4.1

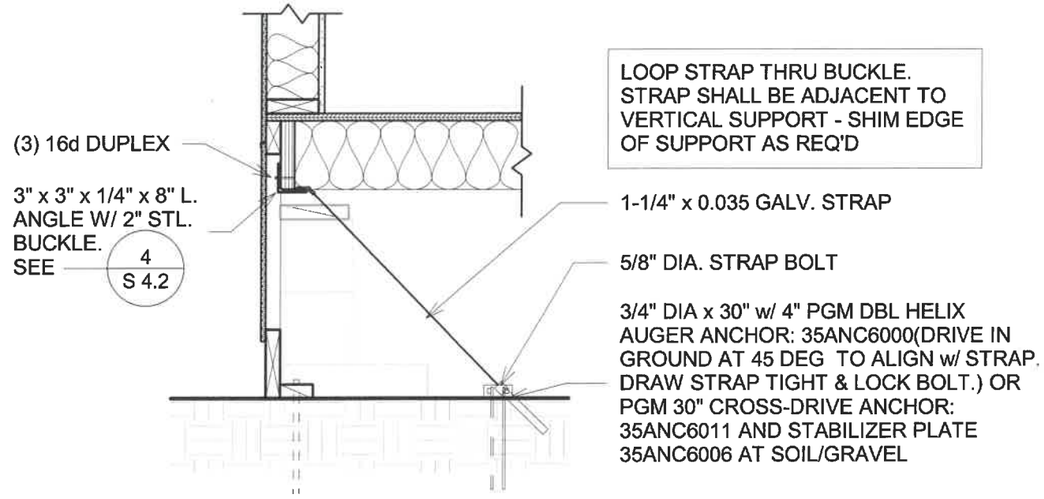
ADDRESS 4515 S CEDAROAK DR., WEST LINN, OR 97068

DRW TS

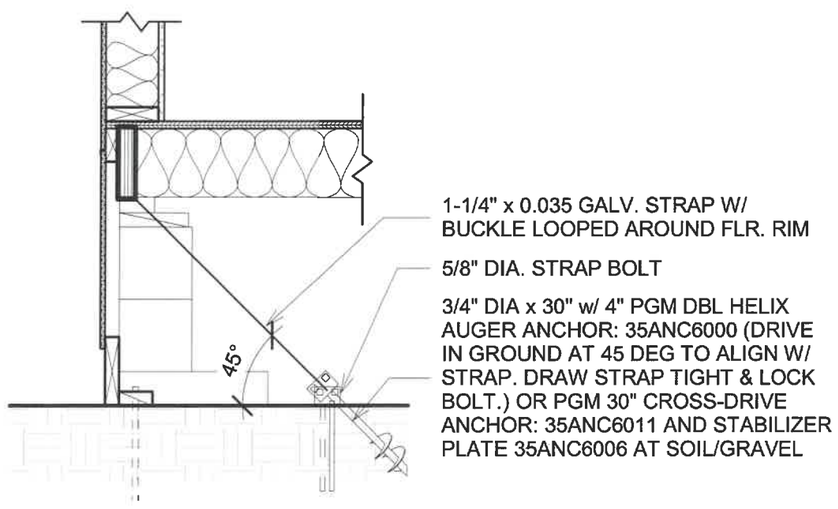
DATE 7/13/20



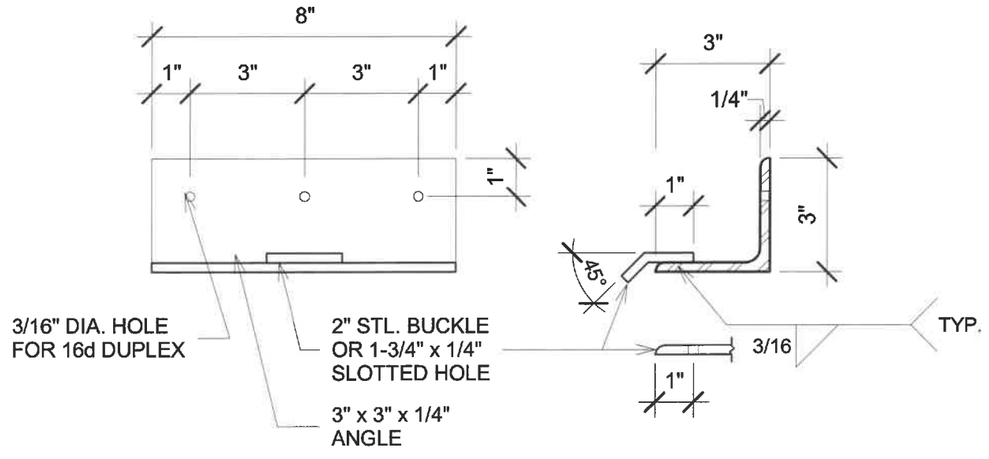
1 ENDWALL FOOTING AT BEAM
3/4" = 1'-0"



3 RETRO-FIT TIE-DOWN STRAP
3/4" = 1'-0"



2 TIE-DOWN STRAP
3/4" = 1'-0"



4 STEEL ANGLE & BUCKLE
3" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER 77584 OREGON MAY 22, 2015 MICHAEL C. LEWIS
EXPIRES: 12/31/2020

REV.	DESCRIPTION	DATE	BY

MODERN BUILDING SYSTEMS
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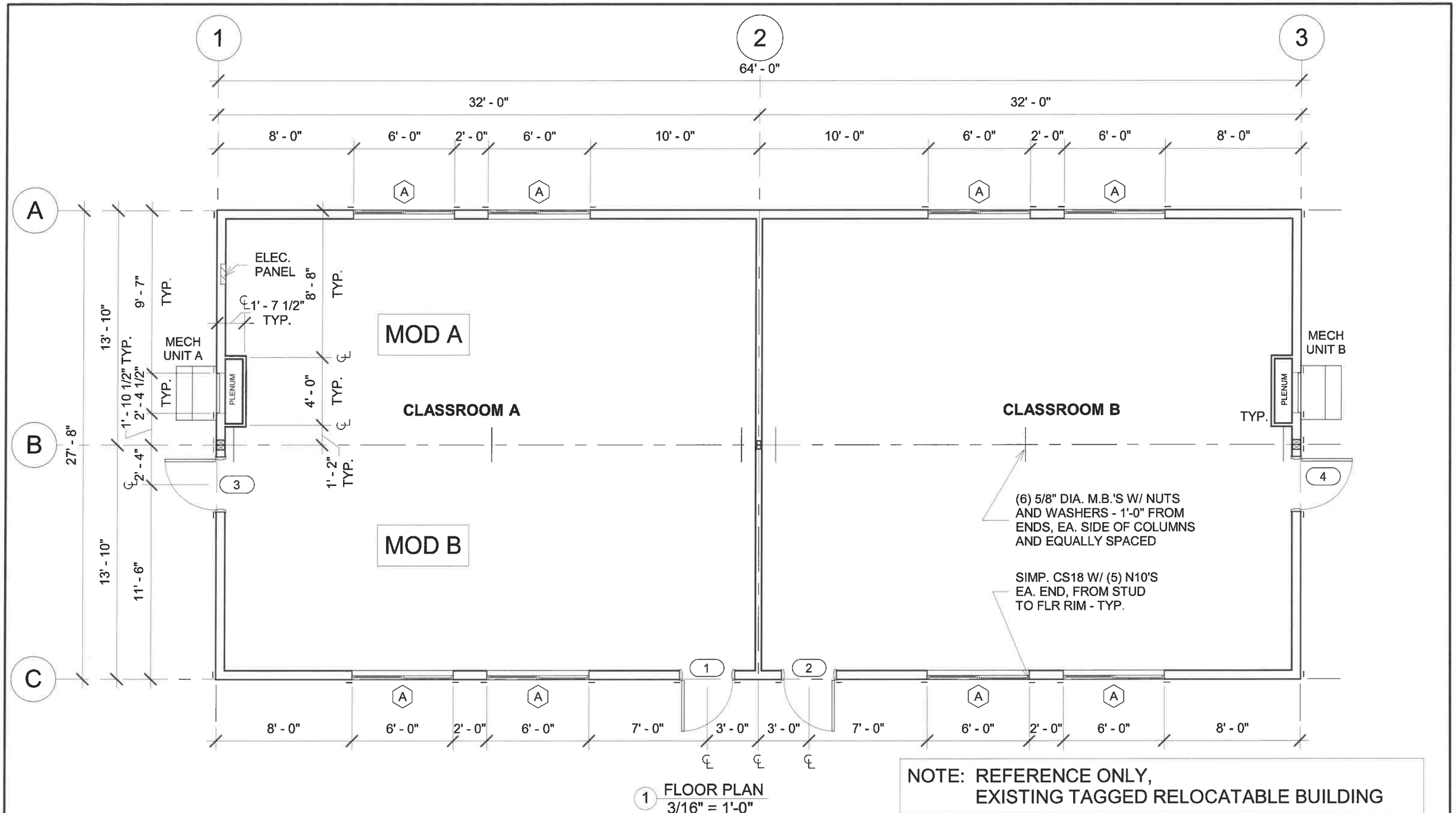
CHECK OUT OUR WEB PAGE: www.modernbuildingsystems.com

SHEET FOUNDATION DETAILS
JOB# L.U. 2508-2509
PROJ. 28' x 64' MODULAR FOUNDATION
WEST LINN - WILSONVILLE SD
SHEET # S 4.2
ADDRESS 4515 S CEDAROAK DR., WEST LINN, OR 97068
DRW TS
DATE 7/13/20



1 FLOOR PLAN
3/16" = 1'-0"

NOTE: REFERENCE ONLY,
EXISTING TAGGED RELOCATABLE BUILDING

REV.	DESCRIPTION	DATE	BY

MODERN BUILDING SYSTEMS

MODERN BUILDING SYSTEMS, INC.
TELEPHONE: (503) 749-4949 FAX: (503) 749-4950
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SHEET FLOOR PLAN

JOB# L.U. 2508-2509

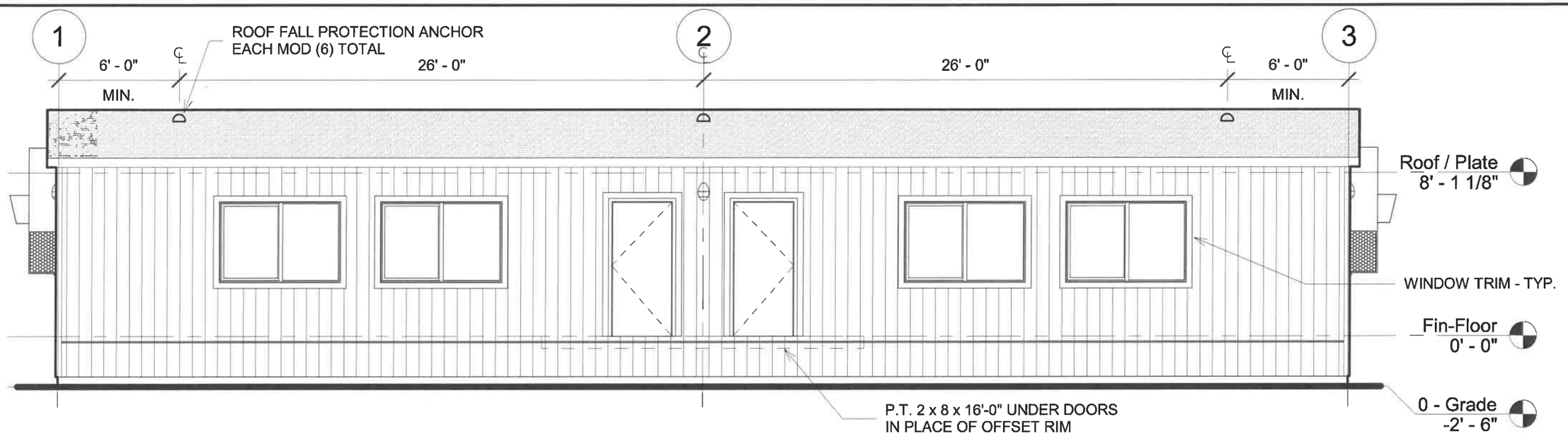
PROJ. 28' x 64' MODULAR FOUNDATION
WEST LINN - WILSONVILLE SD

SHEET # A 1.0

ADDRESS 4515 S CEDAROAK DR., WEST LINN, OR 97068

DRW TS

DATE 7/13/20



1 FRONT ELEVATION
3/16" = 1'-0"

24" X 16" SIGN
ON EA. MECH. UNIT

2 RIGHT SIDE ELEVATION
3/16" = 1'-0"

NOTE: REFERENCE ONLY,
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BUILDING

REV.	DESCRIPTION	DATE	BY

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SHEET EXTERIOR ELEVATIONS

JOB# L.U. 2508-2509

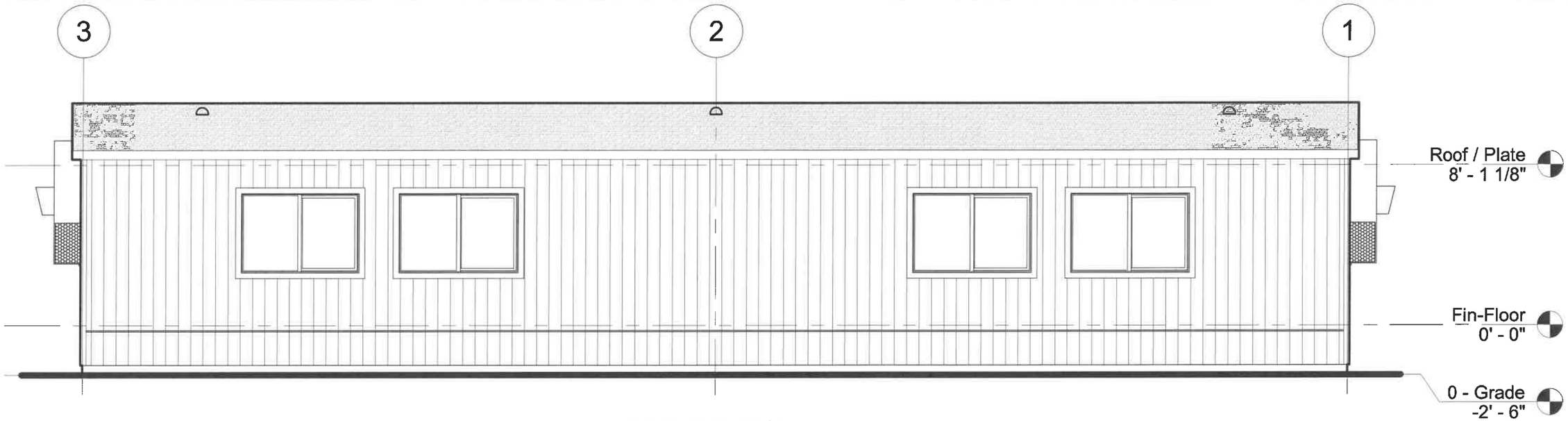
PROJ. 28' x 64' MODULAR FOUNDATION
WEST LINN - WILSONVILLE SD

SHEET # A 2.0

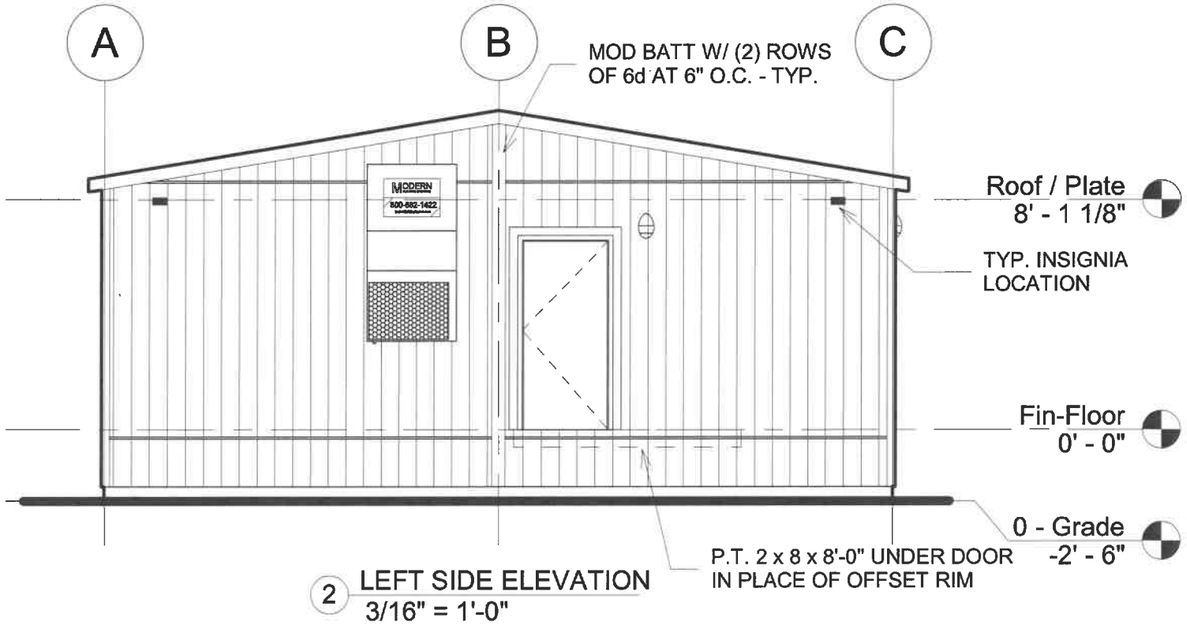
ADDRESS 4515 S CEDAROAK DR., WEST LINN, OR 97068

DRW TS

DATE 7/13/20



1 REAR ELEVATION
3/16" = 1'-0"



2 LEFT SIDE ELEVATION
3/16" = 1'-0"

NOTE: REFERENCE ONLY,
EXISTING TAGGED RELOCATABLE
BUILDING

REV.	DESCRIPTION	DATE	BY

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SHEET EXTERIOR ELEVATIONS

JOB# L.U. 2508-2509

PROJ. 28' x 64' MODULAR FOUNDATION
WEST LINN - WILSONVILLE SD

SHEET # A 2.1

ADDRESS 4515 S CEDAROAK DR., WEST LINN, OR 97068

DRW TS

DATE 7/13/20

LU 2508-2509

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JOB #28x64 Modular Generic Fdn

SHEET NO 1	OF	
CALCULATED BY MCL	DATE	7/9/2020
CHECKED BY	DATE	
SCALE		

STRUCTURAL FOUNDATION CALCULATIONS (PER 2018 IBC) FOR 28' X 64' MODULAR

MATERIAL SUMMARY	MS-1
FOUNDATION ANALYSIS	FDN-1 --> FDN-8
LOADING ANALYSIS	L-1 --> L-6

7/13/2020

REGISTERED PROFESSIONAL ENGINEER
77584
OREGON
MAY 22, 2015
MICHAEL C. LEWIS

EXPIRES: 12/31/20

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JOB #28x64 Modular Generic Fdn		
SHEET NO MS-1	OF MS-1	
CALCULATED BY MCL	DATE	7/9/2020
CHECKED BY	DATE	
SCALE		

MATERIAL SUMMARY FOR
28' X 64' MODULAR

FOUNDATION:

TYP EXT FTG	USE	USE +/- 16 in. SQ. PADS OR 2 x 12 x 24 in. P.T. PADS AT 6' O.C.	SEE FDN-1
TYP INTERIOR FTG	USE	USE +/- 16 in. SQ. PADS OR 2 x 12 x 24 in P.T. PADS AT 6' O.C.	SEE FDN-1
ENDWALL COLUMN FTG	USE	(2) (FLAT) P.T. HF #2, 6 x 8 x 4 ' L	SEE FDN-3,5
CNTR COLUMN FTG	USE	(5) (FLAT) P.T. HF #2, 4 x 8 x 4 ' L	SEE FDN-3,6
CNTR COLUMN FTG POST	USE	(2) DF #2, 6 x 10 x 3 ' L	SEE FDN-3,7
BLDG SIDE ANCHORS	USE	USE MIN (5) HOLD DOWNS AT EA SIDEWALL	SEE FDN-4
BLDG END ANCHORS	USE	USE MIN (3) HOLD DOWNS AT EA ENDWALL	SEE FDN-4

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JOB # 28x64 Modular Generic Fdn

SHEET NO FDN-1	OF FDN-0
CALCULATED BY MCL	7/9/2020
CHECKED BY	DATE

FOUNDATION DESIGN

MODULAR

BUILDING LENGTH (L) =	64.00 '	SITE TYPE =	GRAVEL
BUILDING WIDTH (B) =	27.67 '	MAX BRG PRESSURE =	1800 psf
FRAME RAIL OFFSET =	N/A		
FLOOR TRIB WIDTH =	6.92 '		
ROOF OVERHANG =	1.00 '		
ROOF TRIB WIDTH =	7.92 '		
WALL PLATE HEIGHT =	8.00 '	(ABOVE F.F.)	
TRANSVERSE WIND/SEIS. =	10309 #		
LONGIT. WIND/SEIS. =	5294 #		
WIND UPLIFT =	27099 #		
SNOW LOAD =	25 psf		
BUILDING WEIGHT =	44032 #	(No Snow)	
F.F. HEIGHT	2.50 '	(ABOVE GRADE)	
AVG. ROOF HEIGHT	13.00 '	(ABOVE GRADE)	
PIER PAD AREA	1.78 ft^2		

AT EXTERIOR FTG

LOAD TO SKIRTWALL 0 plf

DL = 7.92'(12 psf)+8'(10 psf)+6.92'/2(10 psf) = 210 plf
LL = 6.92' / 2 X 65 psf = 225 plf
SL = 7.92' X 25 psf = 198 plf
D + L = 434 plf
D + S = 407 plf
D + 0.75L +0.75S = 527 plf **CONTROLS**

PIER SPACING = 6.00 '
q = (527plf - 0plf) X (6') / 1.78 ft^2 = 1775 psf
∴ OK on GRAVEL

USE +/- 16 in. SQ. PADS OR 2 x 12 x 24 in. P.T. PADS AT 6' O.C.

AT INTERIOR FTG

DL = 6.92' (10 psf) = 69 plf
LL = 6.92' (65 psf) = 449 plf

D + L = 519 plf **CONTROLS**

PIER SPACING = 6.00 '
q = 519plf X (6') / 1.78 ft^2 = 1748 psf
∴ OK on GRAVEL

USE +/- 16 in. SQ. PADS OR 2 x 12 x 24 in P.T. PADS AT 6' O.C.

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JOB # 28x64 Modular Generic Fdn

SHEET NO FDN-2	OF FDN-8
CALCULATED BY MCL	7/9/2020
CHECKED BY	DATE
SCALE	

AT ENDWALL COLUMN FTG

COLUMN DL = 2202 #
COLUMN SL = 4149 #
DL = [3' (10 psf) + 10.5' (10 psf)] X 6.92' = 934 #
LL = 3' (65 psf) X 6.92' = 1348 #

D + L = 4484 #
D + S = 7285 # **CONTROLS**
D + 0.75L +0.75S = 7259 #
<9000# Therefore OK. (See FDN- 3,5)

AT MIDSPAN COLUMN FTG

COLUMN DL = 7338 #
COLUMN SL = 13830 #
DL = 6.92' (10 psf) (6') = 415 #
LL = 6.92' (65 psf) (6') = 2697 #

D + L = 10450 #
D + S = 21583 # **CONTROLS**
D + 0.75L +0.75S = 20148 #
<21600# Therefore OK. (See FDN- 3,6,7)

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JOB # 28x64 Modular Generic Fdn

SHEET NO FDN-3	OF FDN-8
CALCULATED BY MCL	7/9/2020
CHECKED BY	DATE
SCALE	

@ ENDWALL COLUMN FOOTING

TRY 2 (FLAT) P.T. HF #2, 6 x 8 x 4.00 ' L
Width (b) each = 0.63 '

Pmax = 1800psf X 2 X 0.63' X 4' = 9000 #

DL % = 43%
SL % = 57%

w_{DL} = 1800psf X 0.63' X 0.43 = 484 plf
w_{SL} = 1800psf X 0.63' X 0.57 = 641 plf

@ MIDSPAN COLUMN FOOTING

TRY 5 (FLAT) P.T. HF #2, 4 x 8 x 4.00 ' L
Width (b) each = 0.60 '

Pmax = 1800psf X 5 X 0.6' X 4' = 21600 #

DL % = 36%
SL % = 64%

W_{DL} = 1800psf X 0.6' X 0.36 = 388 plf
W_{SL} = 1800psf X 0.6' X 0.64 = 692 plf

@ MIDSPAN INTERMEDIATE POST

TRY 2 DF #2, 6 x 10 x 3.00 ' L
Width (b) each = 0.46 '

w_{DL} = 1800psf X 4' X 0.36 / 2 MEMBERS = 1293 plf
w_{SL} = 1800psf X 4' X 0.64 / 2 MEMBERS = 2307 plf

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JOB # 28x64 Modular Generic Fdn

SHEET NO FDN-4	OF FDN- 8
CALCULATED BY MCL	7/9/2020
CHECKED BY	DATE
SCALE	

MOD TRANSVERSE LOADING ANCHORAGE

N = 10309# /2094# = 5 ANCHORS

Mot = 10309# / 2 X 13' + 10309# / 2 X 2.5' + 27099# X 27.67' / 2 = 455 k-ft

Mr = 44032# X 27.67' / 2 = 609 k-ft

w/ ANCHORS = 5 X 2094# X 27.67' = 290 k-ft

TOTAL = (609k-ft X 0.6) + 290k-ft = 655 k-ft
> 455k-ft therefore OK

MIN NUMBER = 5 ANCHORS

USE MIN (5) HOLD DOWNS AT EA SIDEWALL

MOD LONGITUDINAL LOADING ANCHORAGE

N = 5294# /2094# = 3 ANCHORS

Mot = 5294# / 2 X 13' + 5294# / 2 X 2.5 ' + 27099# X 64' / 2 = 908 k-ft

Mr = 44032# X 64' / 2 = 1409 k-ft

w/ ANCHORS = 3 X 2094# X 64' = 402 k-ft

TOTAL = (1409k-ft X 0.6) + 402k-ft = 1247 k-ft
> 908k-ft therefore OK

MIN NUMBER = 3

USE MIN (3) HOLD DOWNS AT EA ENDWALL

MOBILE UNIT CONNECTION TO CHASSIS

(TRANSVERSE LOADING) T = 455 k-ft - (0.6) X 609 k-ft / 27.67 ft /2 = 1614 # PER STRAP

PER NAIL VALUE (SIMP C-2017 PG 302) 211 # DF

N= 12 NAILS 12 (MIN)

N/A

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Project Title: GENERIC FND ONLY
Engineer: MCL
Project ID: LU 2508-2509 & GENERIC
Project Descr: 28' X 64' MODULAR CLASSROOM

FDN-5 OF FDN-8

Printed: 9 JUL 2020, 3:28PM

Wood Beam

File: LU 2508-2509 28x64 Modular Generic Fdn Gravel Struct Calcs.ec6

Lic. # : KW-06009251
MODERN BUILDING SYSTEMS

DESCRIPTION: ENDWALL COLUMN FTG - LU 2508-2509 & Generic

CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2018

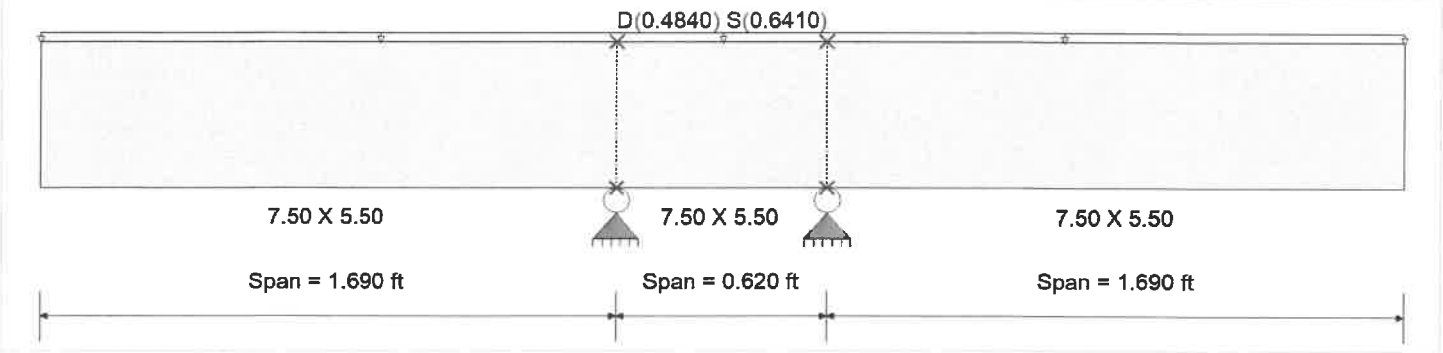
Wood Species : Hem Fir
Wood Grade : No.2

Beam Bracing : Completely Unbraced

Fb +	675.0 psi
Fb -	675.0 psi
Fc - Prll	500.0 psi
Fc - Perp	405.0 psi
Fv	95.0 psi
Ft	350.0 psi

E : Modulus of Elasticity

Ebend- xx	1,100.0 ksi
Eminbend - xx	400.0 ksi
Density	27.70 pcf



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.4840, S = 0.6410 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.657 : 1	Maximum Shear Stress Ratio	=	0.461 : 1
Section used for this span		7.50 X 5.50	Section used for this span		7.50 X 5.50
	=	509.85 psi		=	50.41 psi
	=	776.25 psi		=	109.25 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	1.690 ft	Location of maximum on span	=	1.232 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.017 in	Ratio =	2388 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.030 in	Ratio =	1360 >=240
Max Upward Total Deflection	-0.001 in	Ratio =	6519 >=240

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum		2.250	2.250	
Overall MINimum		1.282	1.282	
D Only		0.968	0.968	
+D+S		2.250	2.250	
+D+0.750S		1.930	1.930	
+0.60D		0.581	0.581	
S Only		1.282	1.282	

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Project Title: GENERIC FND ONLY
Engineer: MCL
Project ID: LU 2508-2509 & GENERIC
Project Descr: 28' X 64' MODULAR CLASSROOM

FDN-6 OF FDN-8

Printed: 9 JUL 2020, 3:29PM

Wood Beam

File: LU 2508-2509 28x64 Modular Generic Fdn Gravel Struct Calcs.ec6

Lic. # : KW-06009251
MODERN BUILDING SYSTEMS

DESCRIPTION: CNTR COLUMN FTG - LU 2508-2509 & Generic

CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2018

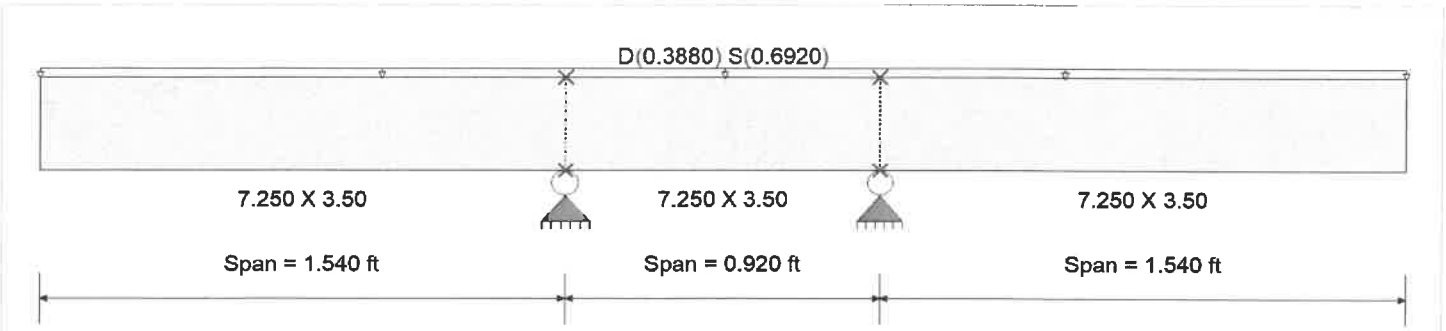
Wood Species : Hem Fir
Wood Grade : No.2

Beam Bracing : Completely Unbraced

Fb +	1,160.0 psi
Fb -	1,160.0 psi
Fc - Prll	1,300.0 psi
Fc - Perp	405.0 psi
Fv	95.0 psi
Ft	525.0 psi

E : Modulus of Elasticity

Ebend- xx	1,300.0 ksi
Eminbend - xx	470.0 ksi
Density	27.70 pcf



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.3880, S = 0.6920 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.778 : 1	Maximum Shear Stress Ratio	=	0.731 : 1
Section used for this span		7.250 X 3.50	Section used for this span		7.250 X 3.50
	=	1,038.23 psi		=	79.90 psi
	=	1,334.00 psi		=	109.25 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	1.540 ft	Location of maximum on span	=	0.920 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 2

Maximum Deflection

Max Downward Transient Deflection	0.053 in	Ratio =	696 >=360
Max Upward Transient Deflection	-0.004 in	Ratio =	2659 >=360
Max Downward Total Deflection	0.083 in	Ratio =	446 >=240
Max Upward Total Deflection	-0.006 in	Ratio =	1703 >=240

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum		2.160	2.160	
Overall MINimum		1.384	1.384	
D Only		0.776	0.776	
+D+S		2.160	2.160	
+D+0.750S		1.814	1.814	
+0.60D		0.466	0.466	
S Only		1.384	1.384	

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Project Title: GENERIC FND ONLY
Engineer: MCL
Project ID: LU 2508-2509 & GENERIC
Project Descr: 28' X 64' MODULAR CLASSROOM

FDN 7 OF FDN 8

Printed: 9 JUL 2020, 3:34PM

Wood Beam

File: LU 2508-2509 28x64 Modular Generic Fdn Gravel Struct Calcs.ec6

Lic. # : KW-06009251

MODERN BUILDING SYSTEMS

DESCRIPTION: CNTR COLUMN FTG INTERMEDIATE POST- LU 2508-2509 & Generic

CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2018

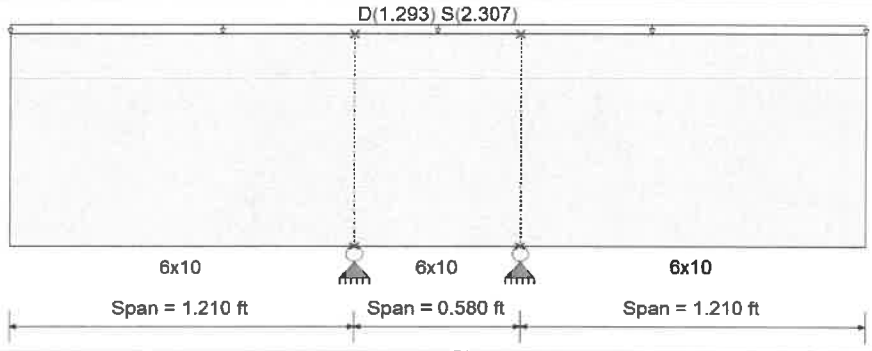
Wood Species : Douglas Fir - Larch
Wood Grade : No.2

Beam Bracing : Completely Unbraced

Fb +	875.0 psi
Fb -	875.0 psi
Fc - Prll	600.0 psi
Fc - Perp	625.0 psi
Fv	95.0 psi
Ft	425.0 psi

E : Modulus of Elasticity

Ebend- xx	1,300.0 ksi
Eminbend - xx	470.0 ksi
Density	32.210 pcf



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 1.293, S = 2.307 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.380 : 1	Maximum Shear Stress Ratio	=	0.750 : 1
Section used for this span		6x10	Section used for this span		6x10
	=	382.27 psi		=	81.97 psi
	=	1,005.39 psi		=	109.25 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	1.210 ft	Location of maximum on span	=	0.793 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.004 in	Ratio =	7216 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.006 in	Ratio =	4624 >=240
Max Upward Total Deflection	-0.000 in	Ratio =	19369 >=240

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum		5.400	5.400	
Overall MINimum		3.461	3.461	
D Only		1.940	1.940	
+D+S		5.400	5.400	
+D+0.750S		4.535	4.535	
+0.60D		1.164	1.164	
S Only		3.461	3.461	

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Project Title: GENERIC FND ONLY
Engineer: MCL
Project ID: LU 2508-2509 & GENERIC
Project Descr: 28' X 64' MODULAR CLASSROOM

FDH-8 OF FDH-8

Printed: 9 JUL 2020, 3:25PM

Wood Beam

File: LU 2508-2509 28x64 Modular Generic Fdn Gravel Struct Calcs.ec6

Lic. # : KW-06009251 MODERN BUILDING SYSTEMS

DESCRIPTION: (2) LVL RIDGE BEAM - LU 2508-2509 & GENERIC

CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Stress Design
Load Combination IBC 2018

Wood Species : Murphy LVL 3100Fb-2.0E x 24" Deep
Wood Grade : Manufactured

Fb +	2,736.0 psi
Fb -	2,736.0 psi
Fc - Prll	3,200.0 psi
Fc - Perp	750.0 psi
Fv	290.0 psi
Ft	2,100.0 psi

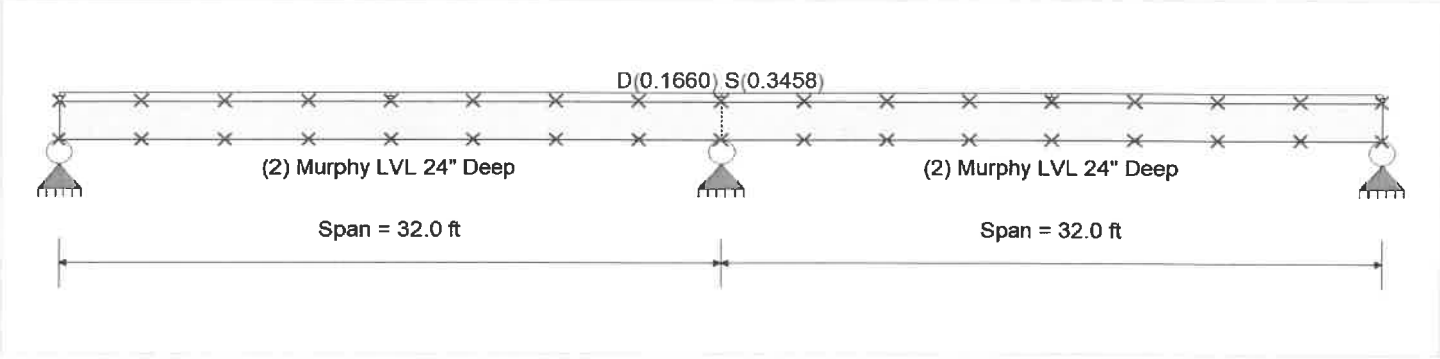
E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,800.0 ksi
Density	35.0 pcf

Beam Bracing : Beam bracing is defined as a set spacing over all spans

Unbraced Lengths

First Brace starts at ft from Left-Most support
Regular spacing of lateral supports on length of beam = 4.0 ft



Applied Loads

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

Beam self weight calculated and added to loads
Loads on all spans...
Uniform Load on ALL spans : D = 0.0120, S = 0.0250 ksf, Tributary Width = 13.830 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.924 : 1	Maximum Shear Stress Ratio	=	0.597 : 1
Section used for this span		(2) Murphy LVL 24" D	Section used for this span		(2) Murphy LVL 24" D
	=	2,822.45 psi		=	199.26 psi
	=	3,053.25 psi		=	333.50 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	32.000 ft	Location of maximum on span	=	30.074 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.494 in	Ratio =	777 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.756 in	Ratio =	507 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	6.351	21.168	6.351
Overall MINimum	4.149	13.830	4.149
D Only	2.202	7.338	2.202
+D+S	6.351	21.168	6.351
+D+0.750S	5.313	17.711	5.313
+0.60D	1.321	4.403	1.321
S Only	4.149	13.830	4.149

RXT'S ONLY

MODERN BUILDING SYSTEMS
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JOB #	28x64 Modular Generic Fdn		
SHEET NO	L-1	OF	L-6
CALCULATED BY	MCL	DATE	7/10/2020
CHECKED BY		DATE	
SCALE			

WIND ANALYSIS FOR ENCLOSED SIMPLE DIAPHRAGM LOW-RISE BUILDINGS - BASED ON IBC 2018 / ASCE 7-16 CHAPTER 28, PART 2

INPUT DATA

Risk Category =	RC	II		(Table 1.5-1)
Basic Wind Speed =	Vult	140	Vasd =108	mph (3 sec gust)(Fig 26.5-1)
Exposure Category =	EC	B		(Sec. 26.7)
Topographic Factor =	Kzt	1.00		(Sec. 26.8 & 26.8-1)
Adjustment Factor =	Lambda	1.00		(Sec 28.6-1)
Building Length =	L	64.00	ft	
Building width =	B	27.67	ft	8:34:44 AM
Building Height to Eave =	he	11.00	ft	
Building Height to Ridge =	hr	15.00	ft	
Eave Overhang	oh	1.00	ft	
Building End Zone =	a	3.00	ft	
Roof Pitch =	RP	2.0	:12	
Approx. Roof Angle =	RA	10	degrees	(Ref. Fig. 28.6-1)

OUTPUT

Wind Pressure, ps30 (Fig. 28.6-1)

Horizontal	A-ps30	35.10	psf
Horizontal	B-ps30	-14.50	psf
Horizontal	C-ps30	23.30	psf
Horizontal	D-ps30	-8.50	psf
Vertical	E-ps30	-37.30	psf
Vertical	F-ps30	-22.80	psf
Vertical	G-ps30	-26.00	psf
Vertical	H-ps30	-17.50	psf
O.H.	Eoh-ps30	-52.30	psf
O.H.	Goh-ps30	-40.90	psf

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JOB #	28x64 Modular Generic Fdn		
SHEET NO	L-2	OF	L-6
CALCULATED BY	MCL	DATE	7/10/2020
CHECKED BY		DATE	
SCALE			

Wind Pressure, ps

ps = Lambda * Kzt * ps30				Min Loading
Horizontal	A-ps	35.10	psf	16.00
Horizontal	B-ps	-14.50	psf	8.00
Horizontal	C-ps	23.30	psf	16.00
Horizontal	D-ps	-8.50	psf	8.00
Vertical	E-ps	-37.30	psf	0.00
Vertical	F-ps	-22.80	psf	0.00
Vertical	G-ps	-26.00	psf	0.00
Vertical	H-ps	-17.50	psf	0.00
O.H.	Eoh-ps	-52.30	psf	
O.H.	Goh-ps	-40.90	psf	

CASE A - Transverse Wind				**Min Loading**	
	A-tw	2317	lbs	1056	lbs
Set to 0	B-tw	-348	lbs	192	lbs
	C-tw	14865	lbs	10208	lbs
Set to 0	D-tw	-1972	lbs	1856	lbs
Total		17182	lbs (SD)	13312	lbs
Convert to ASD x		0.6		0.6	
Total Force on building side L =		**10309**	**lbs (ASD)**	**7987**	lbs

CASE B - Longitudinal Wind					
	A-lw	1211	lbs	552	lbs
	C-lw	7612	lbs	5227	lbs
Total		8823	lbs (SD)	5779	lbs
Convert to ASD x		0.6		0.6	
Total Force on building end B =		**5294**	**lbs (ASD)**	**3468**	**lbs**

CASE A - Transverse Uplift			
w/ gable end OH uplift	E-up	-3612	lbs
w/ gable end OH uplift	F-up	-2208	lbs
w/ gable end OH uplift	G-up	-21223	lbs
w/ gable end OH uplift	H-up	-14285	lbs
sidewall eaves OH uplift	Eoh-up	-451	lbs
sidewall eaves OH uplift	Goh-up	-3387	lbs
Total		**-45166**	**lbs (SD)**
Convert to ASD x		0.6	
Total Uplift Force =		**-27099**	**lbs (ASD)**

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JOB #28x64 Modular Generic Fdn

SHEET NO L-3	OF	L-6
CALCULATED BY MCL	DATE	7/9/2020
CHECKED BY	DATE	
SCALE		

28' x 64' MODULAR

SEISMIC per IBC 2018 / ASCE 7-16, Sec. 12.8 Equivalent Lateral Force Procedure

ASCE 7-16 Table 1.5-1	Risk Category		II	
ASCE 7-16 Table 1.5-2	Seismic Importance Factor	Ie =	1.00	
ASCE 7-16 Table 12.2-1	Response Modification Factor	R =	6.50	
ASCE 7-16 11.4.3	Site Class		D	
USGS Data	Short Spectral Response Accel.	Ss =	1.500	
ASCE 7-16 Table 11.4-1 & Sec 11.4.4	Site Coefficient	Fa =	1.200	
ASCE 7-16 Eqn. 11.4-1	Sms = Ss * Fa	Sms =	1.800	
ASCE 7-16 Eqn 11.4-3	Sds = 2/3 * Sms	Sds =	1.200	
ASCE 7-16 Sec. 12.8.1.3		Sds Max =	1.000	
USGS Data	Long Spectral Response Accel.	S1 =	0.600	
ASCE 7-16 Table 11.4-2	Site Coefficient	Fv =	1.700	
ASCE 7-16 Eqn. 11.4-2	Sm1 = S1 * Fv	Sm1 =	1.020	
ASCE 7-16 Eqn 11.4-4	Sd1 = 2/3 * Sm1	Sd1 =	0.680	
Short Period Transition Sec 11.4.6	Ts = Sd1 / Sds	Ts=	0.680	
Building Period Eqn. 12.8-7	Ta= Ct*hn^(x)= 0.02*13'^0.75	Ta=	0.137	
ACSE 7-16 Sec. 11.4.8	Check Ta <= 1.5*Ts, 0.137<=1.02		OK	
ASCE 7-16 Eqn. 12.8-2	Cs = Sds/(R/Ie)= 1.000/(6.50/1.00)	Cs =	0.154	
ASCE 7-16 Eqn. 12.8-3	Csmax: Not checked (conservative)			
ASCE 7-16 Eqn. 12.8-5	Csmin = 0.044*Sds*Ie >= 0.01	Csmin =	0.044	
ASCE 7-16 Eqn. 12.8-6	If S1> 0.6 Csmin = 0.5*S1/(R/Ie)	Csmin =	N/A	
ASCE 7-16 Table 11.6-1	Seismic Design Cat.		D	
	Base Shear			
ASCE 7-16 Eqn 12.8-1	V = Cs * W * 0.7	V =	0.108	W
ASCE 7-16 Eqn 12.8-5	V = Csmin * W * 0.7	Vmin =	0.031	W
IBC 2018 1605.3.1	Note: 0.7 converts to ASD			

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JOB #28x64 Modular Generic Fdn

SHEET NO L-4	OF	L-6
CALCULATED BY MCL	DATE	7/9/2020
CHECKED BY	DATE	
SCALE		

Building Weight Estimate

	Roof (psf)		Exterior Wall (psf)
Comp	2.5	15/32 T1-11	1.7
7/16 Shtg	1.5	2x6 @ 16	1.7
2x10 @24	1.9	R-21U	1.3
R-38L	1.8	5/8 Gyp	2.8
Drp Grd	1.8		0
	0		0
	0		0
Total	9.5		7.5

	Interior Wall (psf)		Floor (psf)
5/8 Gyp	2.8	Misc	1.0
2x4 @ 16	1.1	23/32 Shtg	2.5
5/8 Gyp	2.8	2x8 @ 16	2.2
	0	R-30U	1.6
	0		0
	0		0
Total	6.7		7.3

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JOB #28x64 Modular Generic Fdn

SHEET NO L-5	OF	L-6	
CALCULATED BY	MCL	DATE	7/9/2020
CHECKED BY		DATE	
SCALE			

Building Weight (con't)

No Snow	29.67 '	66.00 '	0.0 psf	=	0	lbs
Roof =	29.67 '	66.00 '	9.5 psf	=	18603	lbs
Ext. Wall =	8.00 '	183.34 '	7.5 psf	=	11000	lbs
Int. Wall =	8.00 '	28.00 '	6.7 psf	=	1501	lbs
Floor =	27.67 '	64.00 '	7.3 psf	=	12927	lbs
Chassis =				=	0	lbs
				=	0	lbs
Total				**W=**	**44032**	**lbs**

Wr = Total DL tributary to roof 24854 lbs
W1 = Total DL tributary to floor 19178 lbs

Fx Story (Shearwall) Force Table

Story	Height	Weight		Story Force - k Fx= wx*hx/ (∑ wx*hx)*V	Fx Coef = V*hx/(∑ wx*hx)	Story Shear
	(hx)	(wx)	(wx*hx)			(Vx)
R	11.00 '	24.85 k	273 k-ft	**4.03 k**	0.162	4.03 k
1	2.50 '	19.18 k	48 k-ft	**0.71 k**	0.037	4.74 k
Grade	0.00 '					
Sum (∑)		**44.03 k**	**321 k-ft**	**V= 4.74 k**	**= Base Shear**	

Shear Value Comparison	OK

ATC Hazards by Location

L-6 OF L-6

Search Information

Address:	4515 Cedar Oak Dr, West Linn, OR 97068, USA
Coordinates:	45.3888147, -122.6340361
Elevation:	126 ft
Timestamp:	2020-07-10T16:13:36.396Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	II
Site Class:	D-default

Basic Parameters

Name	Value	Description
S_S	0.858	MCE_R ground motion (period=0.2s)
S_1	0.383	MCE_R ground motion (period=1.0s) ≤ 0.600 ∴ OK
S_{MS}	1.029	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	0.686	Numeric seismic design value at 0.2s SA ≤ 1.000 ∴ OK
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.892	Coefficient of risk (0.2s)
CR_1	0.868	Coefficient of risk (1.0s)
PGA	0.386	MCE_G peak ground acceleration
F_{PGA}	1.214	Site amplification factor at PGA
PGA_M	0.469	Site modified peak ground acceleration
T_L	16	Long-period transition period (s)
SsRT	0.858	Probabilistic risk-targeted ground motion (0.2s)
SsUH	0.961	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.383	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.441	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.6	Factored deterministic acceleration value (1.0s)
PGAd	0.5	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

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

ULTIMATE FRICTION FACTORS AND ADHESION FOR DISSIMILAR MATERIALS
(NAVFAC DM 7.2, Table 1, p7.2-63)

Interface Materials	Friction factor	Friction angle, degrees
Mass concrete on the following foundation materials:		
Clean sound rock	0.70	35
Clean gravel, gravel-sand mixtures, coarse sand	0.55 to 0.60	29 to 31
Clean fine to medium sand, silty medium to coarse sand, silty or clayey gravel	0.45 to 0.55	24 to 29
Clean fine sand, silty or clayey fine to medium sand	0.35 to .045	19 to 24
Fine sandy silt, non-plastic silt	0.30 to 0.35	17 to 19
Very stiff and hard residual or pre-consolidated clay	0.40 to 0.50	22 to 26
Medium stiff and stiff clay and silty clay	0.30 to 0.35	17 to 19
(Masonry on foundation materials has same friction factors.)		
Steel sheet piles against the following soils:		
Clean gravel, gravel-sand mixtures, well-graded rock fill with spalls	0.40	22
Clean sand, silty sand-gravel mixture, single size hard rock fill	0.30	17
Silty sand, gravel or sand mixed with silt or clay	0.25	14
Fine sandy silt, non-plastic silt	0.20	11
Formed concrete or concrete sheet piling against the following soils:		
Clean gravel, gravel-sand mixtures, well-graded rock fill with spalls	0.40 to 0.50	22 to 26
Clean sand, silty sand-gravel mixture, single size hard rock fill	0.30 to 0.40	17 to 22
Silty sand, gravel or sand mixed with silt or clay	0.30	17
Fine sandy silt, non-plastic silt	0.25	14
Various structural materials:		
Masonry on masonry, igneous and metamorphic rocks:		
Dressed soft rock on dressed soft rock	0.70	35
Dressed hard rock on dressed soft rock	0.65	33
Dressed hard rock on dressed hard rock	0.55	29
Masonry on wood (cross grain)	0.50	26
Steel on steel at sheet pile interlocks	0.30	17

Interface Materials (Cohesion)	Adhesion C_a (psf)
Very soft cohesive soil (0 - 250 psf)	0 - 250
Soft cohesive soil (250 - 500 psf)	250 - 500
Medium stiff cohesive soil (500 - 1000 psf)	500 - 750
Stiff cohesive soil (1000 - 2000 psf)	750 - 950
Very stiff cohesive soil (2000 - 4000 psf)	950 - 1,300

PGM Inc

TIE DOWNS

ENGINEERED TIE DOWN SYSTEM

GENERAL NOTES

CO

DESIGN LOADS:

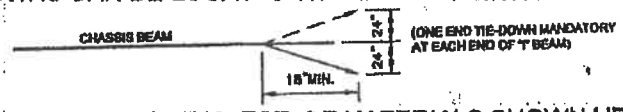
DESIGN LOADS:

* WIND ——— 15 PSF (70 MPH EXPOSURE "C") CAC T-25 and COMPLIES WITH 2018 IBC Vult = 115 MPH Exp C
* SOIL BEARING ——— 1000 PSF
* TIE DOWN STRAP ——— 3150# WORKING LOAD
* SEISMIC ZONE ——— 4 CAC T-25 AND 2015 IBC S_s=1.5 Fa=1.4 S_{DS}1.41 Site Class D

TIE DOWN STRAPS TO BE MIN. 1 1/4" WIDE x 0.035 THICKNESS ZINC PLATED AND MEET ASTM D-3953-97 ALT. STRAP; 1 1/4" WIDE X 0.029" THICK ZINC PLATED F'ult' =5400 LBS

* EARTH AUGERS ——— 2962 # (TESTED TO 4750# MIN.)
* CROSS DRIVES ——— 2962 # (TESTED TO 4750# MIN.)
* CONCRETE SLAB ANCHORS ——— 2962 # (CALCULATED)

1. THE CHARTS SHOW THE REQUIRED NUMBER OF TIE DOWNS ON THE SIDES AND ENDS OF THE MANUFACTURED HOME.
2. COMBINATIONS OF THE DIFFERENT TYPES OF TIE DOWNS CAN BE USED.
3. FOR ALL TIE DOWN INSTALLATIONS, THE MANUFACTURED HOME CHASSIS MEMBERS ARE SHOWN AS "I" BEAMS, (FOR ILLUSTRATION PURPOSE ONLY) CHASSIS BEAMS
4. SIDE TIE DOWNS ARE REQUIRED ALONG THE OUTSIDE CHASSIS BEAMS. END TIE DOWNS ARE REQUIRED AT EACH END OF EACH TRANSPORTABLE SECTION OF THE MANUFACTURED HOME.
5. END TIE DOWNS CAN BE LOCATED WITHIN 18" OF EITHER SIDE OF CHASSIS BEAM



6. THE SIZES, TYPES, LENGTHS, ECT, OF MATERIALS SHOWN HEREON ARE MINIMUM, LARGER, LONGER, HEAVIER MATERIALS SUPPLIED BY SAC INDUSTRIES, INC. MAY BE USED AT THE SAME SPACING AND LOCATION SHOWN.
7. ALL PARTS ARE COATED WITH RUST RESISTANT INDUSTRIAL SHOP PRIMER

STATE APPROVAL

PGM Inc
21822 Old Hwy 99
Centralia, WA 98532
888-265-8981

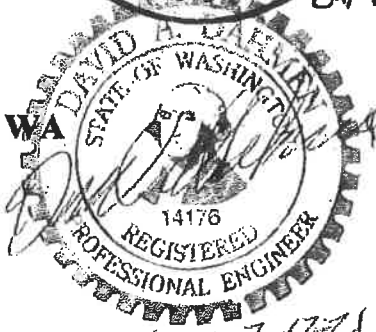
PACIFIC CONSULTING ENGINEERS
9739 North Vista Drive
Kingman, AZ 86401
PH 916-296-7376

ENGINEERS APPROVAL

OR

EXP 12/31/14

WA



EXP 7-17-15

ID

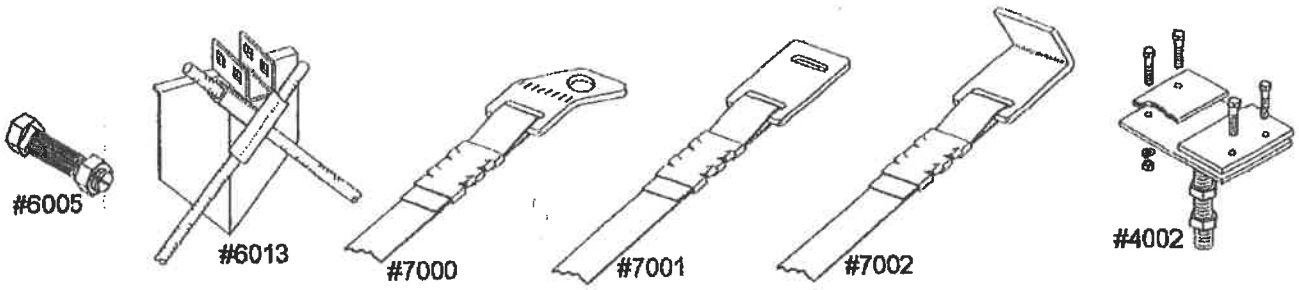
UT

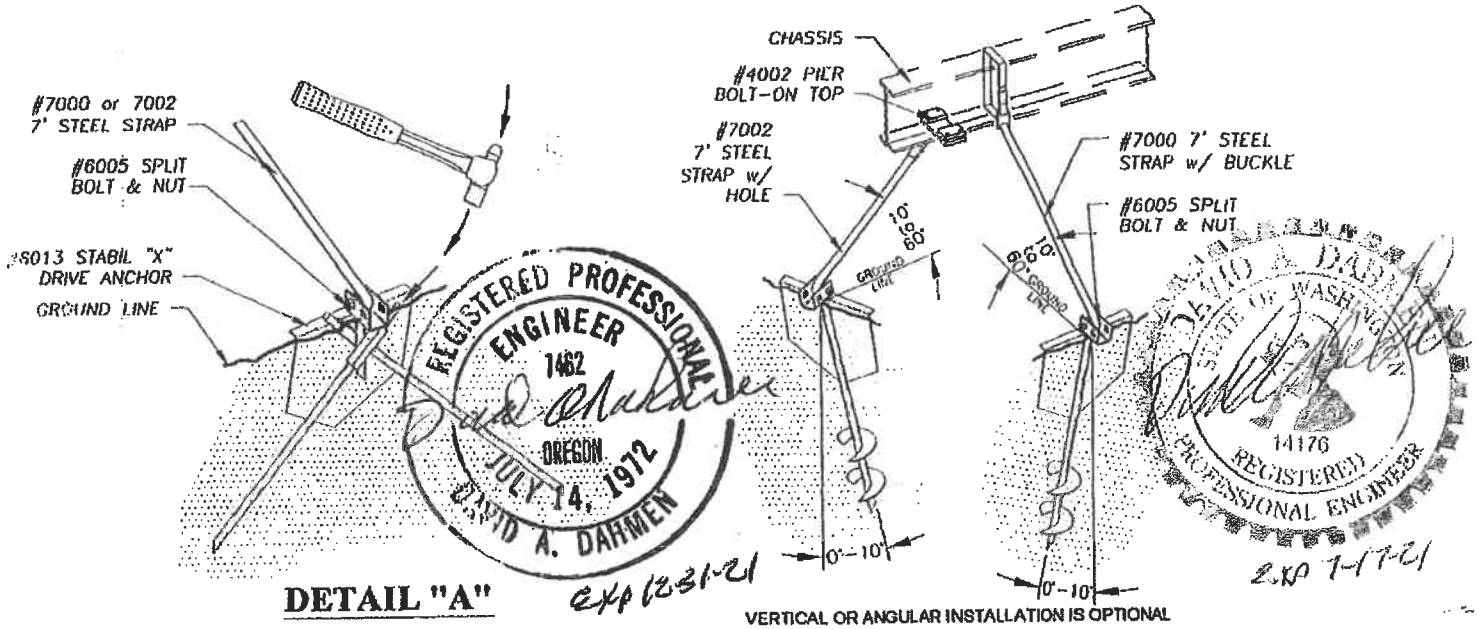
AZ

CA

NV

SAC IND. STABIL-X DRIVE TIE DOWN ANCHORS





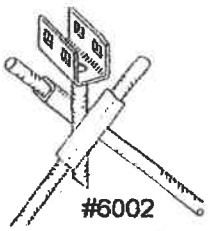
DETAIL "A"

VERTICAL OR ANGULAR INSTALLATION IS OPTIONAL

STABIL-X DRIVE TIE DOWN
SEE DETAIL "A"

INSTALLATION INSTRUCTIONS

1. CONTRACTORS WARNING: CHECK FIRST FOR UNDERGROUND UTILITIES.
2. DRIVE STABILIZER PLATE INTO GROUND.
3. DRIVE CROSS RODS THROUGH HEAD TUBES INTO SOIL AS SHOWN.
4. ATTACH STRAPS TO CHASSIS BEAM IN MANNER SHOWN.
5. IF ANGLE OF SIDE STRAP IS GREATER THEN 60°, STRAP CONNECTION CAN BE MADE FROM ANCHOR TO OPPOSITE CHASSIS BEAM.
6. INSERT STRAP THROUGH SPLIT BOLT. CUT OFF EXCESS STRAP AND TIGHTEN BOLT UNTIL STRAP IS SNUG.
7. #6002 ANCHOR CAN BE USED WHERE HARD OR ROCKY SOIL OCCURS. IF THE GROUND SURFACE IS OTHER THAN ROCKY SOIL OR MINIMUM 2" ASPHALT, USE STABIL-X ANCHOR OR ENCASE ANCHOR WITH 12"x12"x12" CUBE OF CONCRETE.
8. WHEN #6002 ANCHOR IS USED FOR ANY REQUIRED ANCHOR – (2) ANCHORS MUST BE USED AT THAT LOCATION.



#6002
SEE NOTE #7
AND NOTE #8

EARTH AUGERS						CROSS DRIVE ANCHORS						CONCRETE SLAB ANCHORS					
MAX. LENGTH OF MFG'D HOME	36'	54'	72'			MAX. LENGTH OF MFG'D HOME	36'	54'	72'			MAX. LENGTH OF MFG'D HOME	36'	54'	72'		
MIN. NO. OF SIDE TIE DOWNS	2	3	4			MIN. NO. OF SIDE TIE DOWNS	2	3	4			MIN. NO. OF SIDE TIE DOWNS	2	3	4		

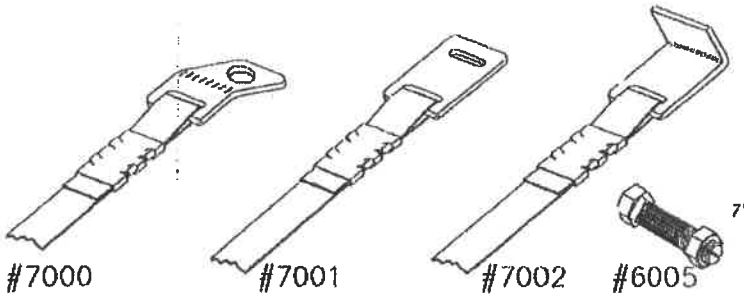
NOTE:

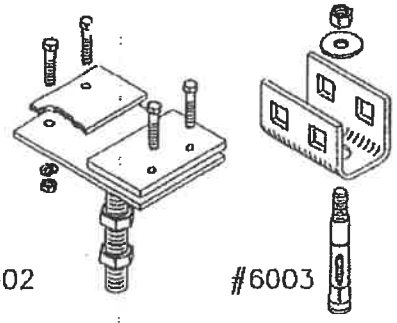
SIDE TIE–DOWNS: MUST BE WITHIN 24" OF THE END OF THE CHASSIS BEAM.

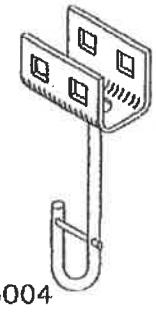
END TIE–DOWNS: CAN BE LOCATED WITHIN 24" OF EITHER SIDE OF CHASSIS BEAM ONE TIE–DOWN IS MANDATORY AT EACH END OF "I"BEAM (SEE PAGE #1 GENERAL NOTE #5).

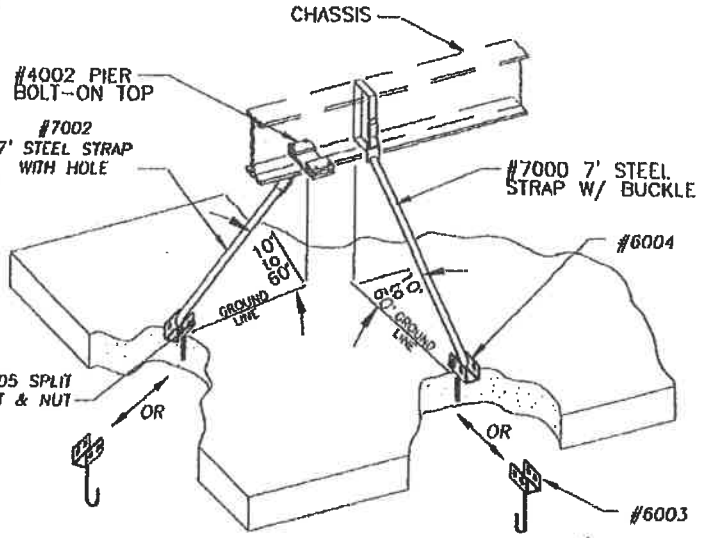
IF SIDE WALL TIE–DOWN GROUND ANCHOR LOCATION IS SUCH THAT THE ANGLE BETWEEN THE GROUND AND STRAP EXCEEDS 60°, CONNECT THE TIE STRAP TO THE INSIDE CHASSIS BEAM ON DOUBLE AND TRIPLE WIDES AND THE OPPOSITE CHASSIS BEAM ON SINGLE WIDES.

SAC IND. CONCRETE TIE DOWN ANCHORS

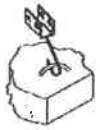








CONCRETE TIE-DOWN



ALTERNATE CONNECTION

INSTALLATION INSTRUCTIONS

NEW CONCRETE - #6004

1. PLACE CONCRETE ANCHOR INTO WET CONCRETE, AND ALLOW TO PROPERLY CURE.
2. ALTERNATE CONNECTION REQUIRES #5 REBAR PROPERLY EMBEDDED IN CONCRETE.

EXSISTING CONCRETE - #6003

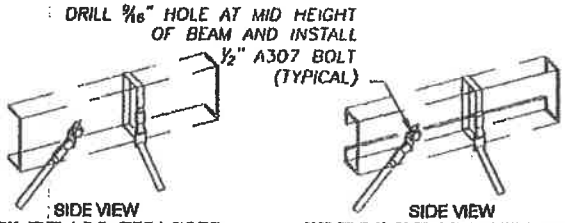
1. CONCRETE MUST BE A MINIMUM 3½" THICK AND IN GOOD CONDITION.
2. MINIMUM SLAB AREA OF EACH ANCHOR IS 28 SQUARE FEET.
3. DRILL PROPER SIZE HOLE IN SLAB, A MINIMUM OF 12" FROM ANY SIDE.
4. EXPANSION BOLT IS ⅝" x 3½" WITH MINIMUM 2¾" EMBEDMENT AND 6,180 POUNDS PULL OUT, 7,160 POUNDS SHEAR.

CHASSIS CONNECTION

1. ATTACH STRAPS TO CHASSIS BEAM IN MANNER SHOWN.
2. IF ANGLE OF SIDE STRAP IS GREATER THAN 60°, STRAP CONNECTION CAN BE MADE FROM ANCHOR TO OPPOSITE CHASSIS BEAM.
3. INSERT STRAP THROUGH SPLIT BOLT, CUT OFF EXCESS STRAP AND TIGHTEN BOLT UNTIL STRAP IS SNUG.

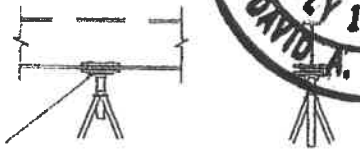
NOTE: SIDE TIE DOWNS ARE REQUIRED ALONG THE OUTSIDE CHASSIS BEAMS. END TIE DOWNS ARE REQUIRED AT EACH END OF EACH TRANSPORTABLE SECTION OF THE MANUFACTURED HOME.

NOTE: A COMBINATION OF DIFFERENT TYPES OF TIE DOWNS CAN BE USED.



"C" BEAM CHASSIS
SEE GENERAL NOTE #3

"RFC" BEAM CHASSIS
SEE GENERAL NOTE #3



END TIE DOWN

NOTE: END TIE DOWN CAN BE LOCATED WITHIN 18" OF EITHER SIDE OF CHASSI BEAM AXIS.

CONTRACTORS CERTIFICATION

I CERTIFY THAT I HAVE INSTALLED THE SAC IND., INC. ANCHORING SYSTEM AS PER THE INSTALLATION INSTRUCTIONS. I HAVE MADE NO MODIFICATIONS TO THE ANCHORING SYSTEM OR THE BUILDING STRUCTURE.

COMPANY NAME: _____ CONTRACTORS LIC. # _____

PGM Inc.

Soil Class	Soil Description	Test Probe Values (in lbs.)	Recommended PGM Part	PGM part description
1	Hard Rock or Rocky	N/A	# 6011 or # 6002	Cross Drive Anchor W/ 30" Rods Cross Drive Anchor W/ 30" Rods
2	Very Dense and or Cemented Sands, Coarse Gravel, Cobbles and Clays	550+	# 6000 # 6006 # 6013	30" Auger Anchor W/2 4" Helix 12" Stabilizer Plate Stabil X - Drive
3	Medium Dense Coarse Sands, Sandy Gravels, Very Very Stiff Silts & Clays	351 to 550	Available Upon Request	
4a	Loose to Medium Dense Sands, Firm to Stiff Clays & Silts, Alluvial Fill	276 to 350	Available Upon Request	
4b	Very Loose Sands, Firm Clays & Silts Alluvial Fill	175 to 275	Available Upon Request	

Please Note : Each State, County or Municipality may require a specific anchor from the groups shown above for each soil classification.

Check local and stata regulations first.

PGM Inc

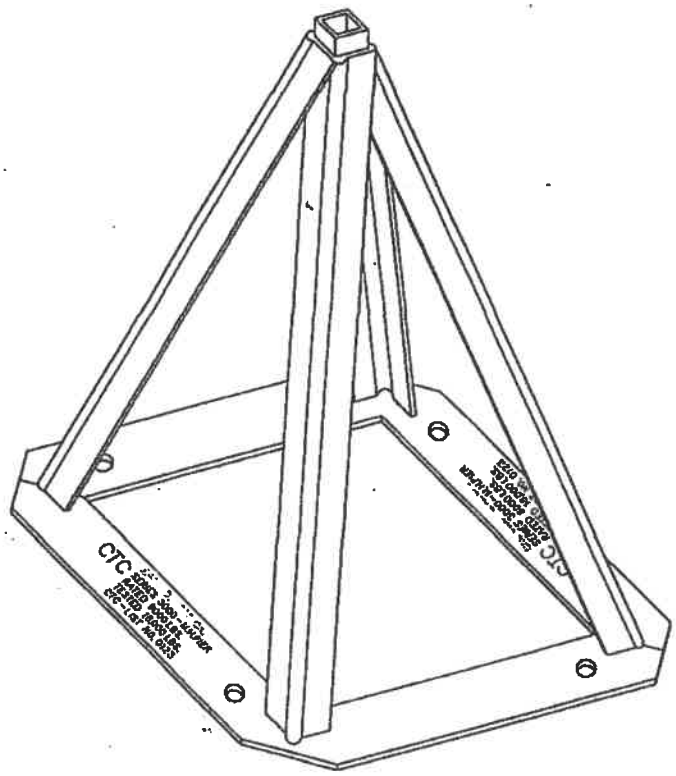
STEEL PIERS

ADJUSTABLE STEEL PIERS & TOPS

GENERAL NOTES

DESIGN LOADS:

* STEEL PIERS ---------- 6,000 LB. RATED LOAD CAPACITY
  18,000 LB. MINIMUM TESTED LOAD CAPACITY
* STEEL PIERS SHALL BE COATED WITH RUST RESISTANT COATING AND SHALL BE LISTED AND LABELED FOR THE FOLLOWING LOAD:
  VERTICAL=6,000 POUNDS MAXIMUM



ENGINEER APPROVAL

CA

REGISTERED PROFESSIONAL ENGINEER
7462
OREGON
JULY 14, 1972
DAVID A. DAHMEN
Exp 12-31-21

DAVID A. DAHMEN
STATE OF WASHINGTON
14176
REGISTERED
PROFESSIONAL ENGINEER
Exp 7-17-21

STATE APPROVAL

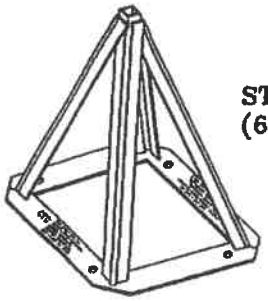
PGM Inc
21822 Old Hwy 99
Centralia, WA 98532
888-265-8981

PACIFIC CONSULTING ENGINEERS
9739 North Vista Drive
Kingman, AZ 86401
PH 916-296-7376

PGM Inc SYSTEM SET

BOLT–ON TOP

(TYPICAL)



STEEL PIER
(6,000 LB RATED)

NOTES

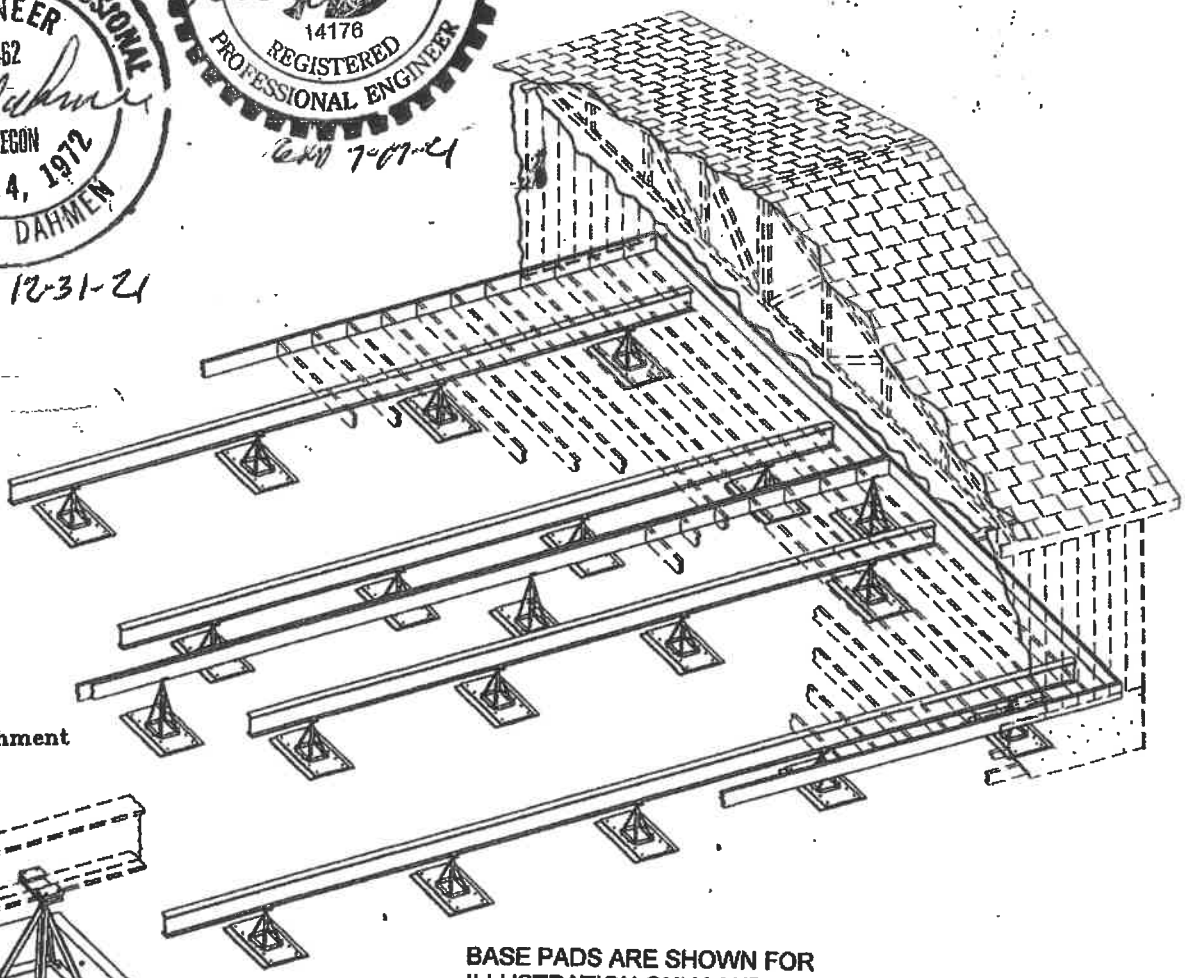
CHECK MANUFACTURED HOME SET UP INSTRUCTIONS FOR LOADS AND LOCATIONS.

REGISTERED PROFESSIONAL ENGINEER 7462 OREGON JULY 14, 1972 DAVID A. DAHMEN

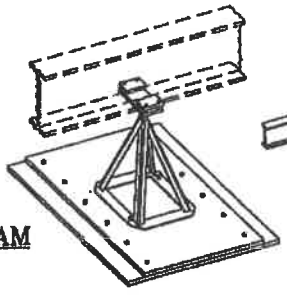
Exp 12-31-21

DAVID A. DAHMEN STATE OF WASHINGTON 14176 REGISTERED PROFESSIONAL ENGINEER

Exp 7-07-21

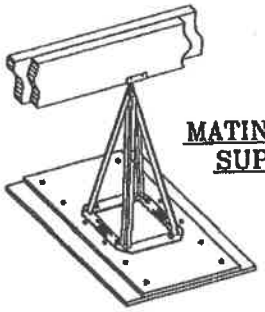


- **STATE APPROVED**
  Tested–Listed–Labeled
  Stamped in Base Plate
- **6,000 LB. RATED**
  3–1 Safety Factor
- **HOLES PRE–PUNCHED**
  In base for easy attachment to pad or footing

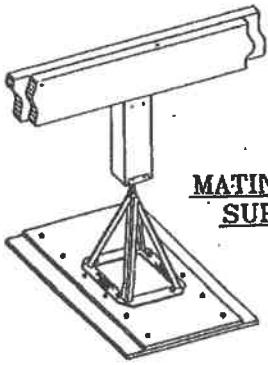


CHASSIS BEAM SUPPORT

BASE PADS ARE SHOWN FOR ILLUSTRATION ONLY AND ARE NOT A PART OF THE PIER APPROVAL

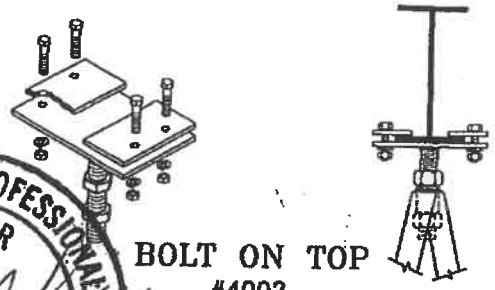


MATING LINE SUPPORT

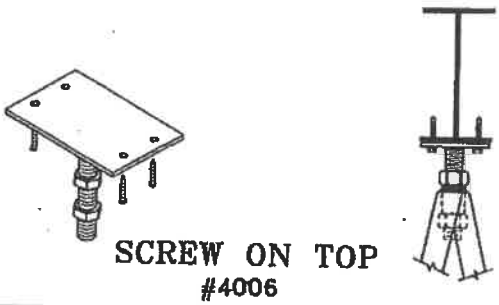


MATING LINE SUPPORT

ADJUSTABLE STEEL TOPS

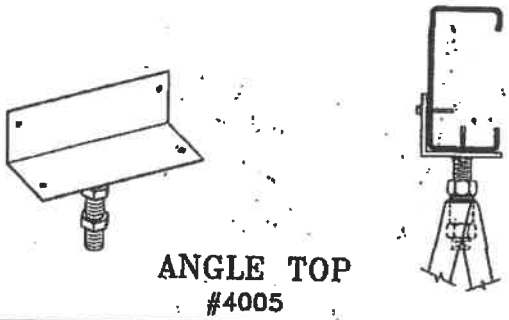


BOLT ON TOP
#4002

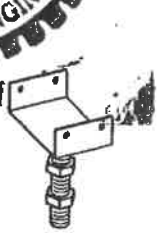


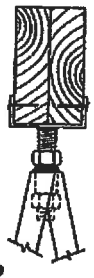
SCREW ON TOP
#4006

"L" TOP
#4003

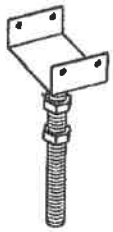


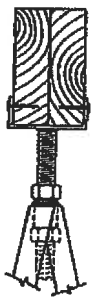
ANGLE TOP
#4005





5" SADDLE TOP
#4000





11" SADDLE TOP
#4001

INSTALLATION INSTRUCTIONS

#4000 – PLACE SADDLE TOP FLUSH AGAINST MAIN CHASSIS BEAM AND OR MATING LINE – MAXIMUM HEIGHT ADJUSTMENT OF TOP IS 2".

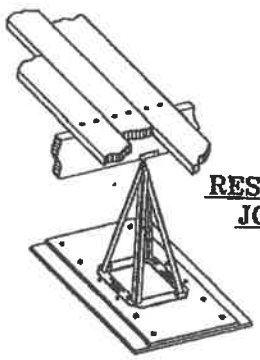
#4001 – 11" SADDLE CAN TO BE USED ON MATING LINE SUPPORTS, PORCHES AND DECKS – ATTACH TOP OF PIER WITH 2nd 3/4" NUT – MAXIMUM HEIGHT ADJUSTMENT OF TOP IS 8".

#4002 – ATTACH BOLT ON TOP TO "I" BEAM WITH (4) 3/8" BOLTS AND NUTS – WITH 2nd 3/4" NUT, ATTACH BOLT ON TOP TO PIER – MAXIMUM HEIGHT ADJUSTMENT OF TOP IS 2".

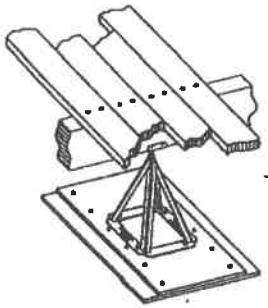
#4003 – PLACE "L" TOP FLUSH AGAINST MAIN BEAM – ALTERNATE "L" TOP DIRECTION EVERY OTHER PIER – MAXIMUM HEIGHT ADJUSTMENT OF TOP IS 2".

#4005 – PLACE ANGLE TOP FLUSH AGAINST MAIN BEAM ("C" BEAM or "RFC" BEAM) – MAXIMUM HEIGHT ADJUSTMENT OF TOP IS 2".

#4006 – ATTACH SCREW ON TOP TO MAIN CHASSIS BEAM WITH (4) #12 SMS TEK SCREWS. WHEN USED AT MATING LINE AND OR PERIMETER, ATTACH WITH NAILS OR SCREWS. MAXIMUM HEIGHT ADJUSTMENT OF TOP IS 2".



RESIDENTIAL FLOOR JOINT SUPPORT

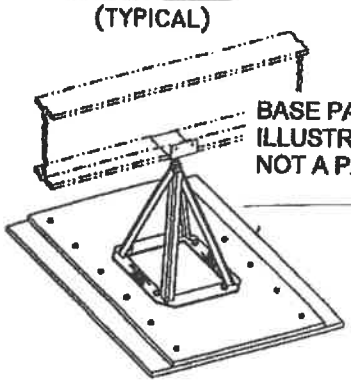


DECK SUPPORT

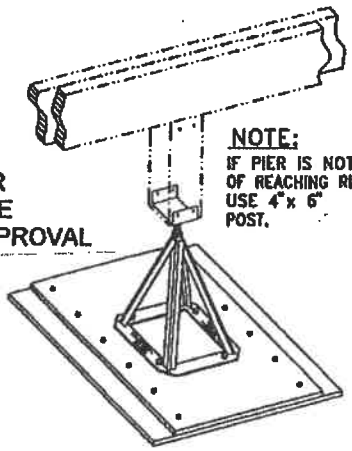
BASE PADS ARE SHOWN FOR ILLUSTRATION ONLY AND ARE NOT A PART OF THE PIER APPROVAL

ADJUSTABLE STEEL PIERS

CHASSIS BEAM SUPPORT
(TYPICAL)

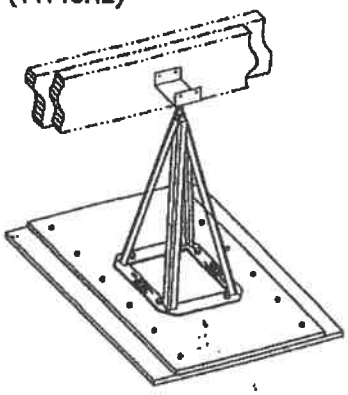


BASE PADS ARE SHOWN FOR ILLUSTRATION ONLY AND ARE NOT A PART OF THE PIER APPROVAL



NOTE:
IF PIER IS NOT CAPABLE OF REACHING RIDGE BEAM, USE 4"x 6" WOOD POST.

MATING LINE SUPPORT
(TYPICAL)



INSTALLATION INSTRUCTIONS

1. PREPARE A LEVEL SURFACE AT THE LOCATION OF EACH PIER TO INSURE A FULL CONTACT FOR THE FOOTING PAD. USE THE APPROPRIATE SIZE PAD FOR THE LOAD REQUIRED. REFER TO THE MANUFACTURERS SET UP MANUAL FOR SPECIFIC LOADS AND FOOTING SIZES.

2. SELECT THE APPROPRIATE SIZE PIERS FOR THE INSTALLATION BY DETERMINING THE PIER HEIGHT AT EACH SUPPORT LOCATION. MEASURE FROM THE TOP OF THE PAD TO THE BOTTOM OF THE CHASSIS BEAM TO INSURE THAT HEIGHT IS NO GREATER THAN 32".

3. SELECT THE APPROPRIATE TOP FOR THE CHASSIS BEAM OR MATING LINE. THE MAXIMUM ADJUSTMENT ON THE THREADED ROD ADJUSTER FOR CHASSIS BEAM SUPPORT IS 2". WHEN MORE HEIGHT IS NEEDED USE THE NEXT TALLER SIZE SUPPORT PIER.

4. PLACE THE PIER SUPPORT IN THE CENTER OF THE SUPPORT PAD. WHERE REQUIRED BY LOCAL CODE, ATTATCH THE SUPPORT PIER TO THE PAD USING APPROPRIATE FASTENERS. CAREFULLY ALIGN THE SUPPORT PIER AND TOP UNDER THE CHASSIS BEAM OR MATING LINE AND TIGHTEN UNTIL SNUG PLUS 1/2 TURN.

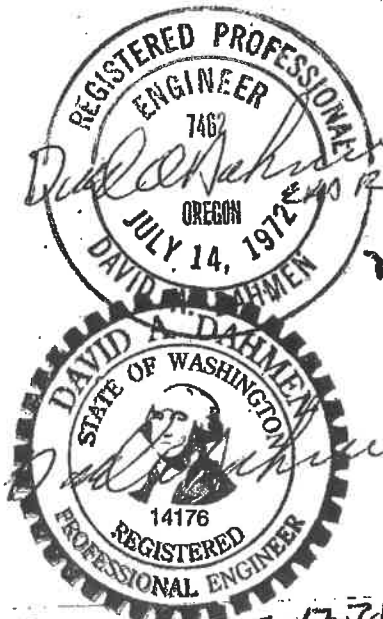
5. REPEAT THIS INSTALLATION PROCEDURE WITH EACH SUPPORT PIER. AFTER ALL THE SUPPORT PIERS HAVE BEEN INSTALLED, AND THE HOME SET UP HAS BEEN COMPLETED PER THE MANUFACTURERS SET UP INSTRUCTIONS, YOU MAY THEN REMOVE THE SAFTEY BLOCKING OF OTHER DEVICES USED TO LEVEL THE CHASSIS.

LABORATORY TESTING REPORT

PART No.	STAND SIZE	SAMPLE #1	SAMPLE #2	SAMPLE #3
3008	8"	23,100 Lbs.	24,600 Lbs.	23,200 Lbs.
3010	10"	25,130 Lbs.	25,950 Lbs.	24,320 Lbs.
3012	12"	27,200 Lbs.	26,500 Lbs.	26,300 Lbs.
3014	14"	27,700 Lbs.	28,175 Lbs.	26,175 Lbs.
3016	16"	28,250 Lbs.	27,700 Lbs.	23,400 Lbs.
3018	18"	26,400 Lbs.	33,300 Lbs.	25,500 Lbs.
3020	20"	24,950 Lbs.	25,000 Lbs.	23,225 Lbs.
3022	22"	20,500 Lbs.	22,400 Lbs.	24,200 Lbs.
3024	24"	22,225 Lbs.	21,650 Lbs.	23,000 Lbs.
3026	26"	22,250 Lbs.	21,500 Lbs.	19,700 Lbs.
3028	28"	20,550 Lbs.	23,720 Lbs.	21,310 Lbs.
3030	30'	22,950 Lbs.	26,550 Lbs.	21,500 Lbs.
3032	32"	21,200	22,000	21,900
3034	34"	20,900	21,200	21,000
3036	36"	20,500	19,900	19,800

PIER IDENTIFICATION STAMP

PGM Inc-Centralia, WA
SERIES 3000–M H PIER
RATED 6,000 LBS.
TESTED 18,000 LBS
C.T.C. LIST NO. 0123



STRUCTURAL ABBREVIATIONS

AB	ANCHOR BOLT
ADDL	ADDITIONAL
AFF	ABOVE FINISH FLOOR
ALT	ALTERNATE
ARCH	ARCHITECTURAL
ATR	ALL THREAD ROD
BLDG	BUILDING
BLKG	BLOCKING
BM	BEAM
BN	BOUNDARY NAIL
BOF	BOTTOM OF FOOTING
BOT	BOTTOM
BRNG	BEARING
BSMT	BASEMENT
BTWN	BETWEEN
C	CAMBER
CIP	CAST IN PLACE
CJ	CONTROL OR CONSTRUCTION JOINT
CJP	COMPLETE JOINT PENETRATION
CL	CENTERLINE
CLG	CEILING
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS
DBA	DEFORMED BAR ANCHOR
DBL	DOUBLE
DF/L	DOUGLAS FIR-LARCH
DIA	DIAMETER
DIAG	DIAGONAL
DIST	DISTANCE
DL	DEAD LOAD
DN	DOWN
DTL	DETAIL
DWG	DRAWING
(E)	EXISTING
EA	EACH
EF	EACH FACE
EL	ELEVATION
EN	EDGE NAIL
EOR	ENGINEER OF RECORD
EQ	EQUAL
EW	EACH WAY
EXT	EXTERIOR
FF	FINISH FLOOR
FN	FIELD NAIL
FLR	FLOOR
FDN	FOUNDATION
FT	FEET
FTG	FOOTING
GA	GAUGE
GALV	GALVANIZED
GLB	GLUE LAMINATED BEAM
GWB	GYPSUM WALL BOARD
HDG	HOT-DIP GALVANIZED
HDR	HEADER
HF	HEM-FIR
HT	HEIGHT
HORIZ	HORIZONTAL
HSA	HEADED STUD ANCHOR
HSS	HOLLOW STRUCTURAL SECTION
ID	INSIDE DIAMETER
IN	INCH
INT	INTERIOR
JST	JOIST
JT	JOINT
K	KIP(S)
KSI	KIPS PER SQUARE INCH
L	ANGLE
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LONG	LONGITUDINAL
LVL	LAMINATED VENEER LUMBER
LWC	LIGHT WEIGHT CONCRETE
MAX	MAXIMUM
MIN	MINIMUM
MIR	MIRROR
NIC	NOT IN CONTRACT
NOM	NOMINAL
NTE	NOT TO EXCEED
NTS	NOT TO SCALE
(N)	NEW
OC	ON CENTER
OD	OUTSIDE DIAMETER
OPP	OPPOSITE
OWJ	OPEN WEB JOIST
PAF	POWDER ACTUATED FASTENER
PERP	PERPENDICULAR
PJP	PARTIAL JOINT PENETRATION
PL	PLATE
PSI	POUNDS PER SQUARE INCH
PSF	POUNDS PER SQUARE FOOT
PT	PRESSURE TREATED
QTY	QUANTITY
RAD	RADIUS
REF	REFERENCE
REINF	REINFORCING
REQD	REQUIRED
REV	REVISED, REVISION
SC	SLIP CRITICAL
SHT	SHEET
SHT'G	SHEATHING
SIM	SIMILAR
SMS	SHEET METAL SCREW
SOG	SLAB ON GRADE
SQ	SQUARE
SS	STAINLESS STEEL
STD	STANDARD
STL	STEEL
T&B	TOP AND BOTTOM
T&G	TONGUE AND GROVE
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL
TOF	TOP OF FOOTING
TOW	TOP OF WALL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VERT	VERTICAL
VIF	VERIFY IN FIELD
W/	WITH
W/O	WITHOUT
WF	WIDE FLANGE
WP	WORK POINT
WWR	WELDED WIRE REINFORCING

STRUCTURAL DRAWING SYMBOLS

DETAIL REFERENCE

DETAIL SECTION CUT

BUILDING OR WALL SECTION CUT

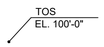
ELEVATION OF WALL OR FRAME

REVISION SYMBOL

GRID LINES


ROTATE VIEW SYMBOL

NORTH ARROW



REFERENCE ELEVATION


SURFACE - STEPPED


SURFACE - SLOPE UP


SURFACE - SLOPE DOWN


SURFACE - SLOPE TWO DIRECTIONS

STRUCTURAL NOTES:

GENERAL

THE CONTRACTOR IS RESPONSIBLE FOR VERIFICATION AND CORRELATION OF ALL ITEMS AND WORK NECESSARY FOR COMPLETION OF THE PROJECT AS INDICATED BY THE CONTRACT DOCUMENTS. SHOULD ANY QUESTION ARISE REGARDING THE CONTRACT DOCUMENTS OR SITE CONDITIONS, THE CONTRACTOR SHALL REQUEST INTERPRETATION AND CLARIFICATION FROM THE ENGINEER BEFORE BEGINNING THE PROJECT. THE ABSENCE OF SUCH REQUEST SHALL SIGNIFY THAT THE CONTRACTOR HAS REVIEWED AND FAMILIARIZED HIMSELF WITH ALL ASPECTS OF THE PROJECT AND HAS COMPLETE COMPREHENSION THEREOF. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONFORMANCE TO ALL SAFETY REGULATIONS DURING CONSTRUCTION.

THE CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. UNLESS OTHERWISE SPECIFICALLY NOTED, THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION OR CONSTRUCTION LOADS. ONLY THE CONTRACTOR SHALL PROVIDE ALL METHODS, DIRECTION AND RELATED EQUIPMENT NECESSARY TO PROTECT THE STRUCTURE, WORKMEN AND OTHER PERSONS AND PROPERTY DURING CONSTRUCTION. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, ENGAGE PROPERLY QUALIFIED PERSONS TO DETERMINE WHERE AND HOW TEMPORARY PRECAUTIONARY MEASURES SHALL BE USED AND INSPECT SAME IN THE FIELD. ANY MATERIAL NOT AS SPECIFIED OR IMPROPER MATERIAL INSTALLATION OR WORKMANSHIP SHALL BE REMOVED AND REPLACED WITH SPECIFIED MATERIAL IN A WORKMANLIKE MANNER AT THE CONTRACTOR'S EXPENSE.

THESE PLANS, SPECIFICATIONS, ENGINEERING AND DESIGN WORK ARE INTENDED SOLELY FOR THE PROJECT SPECIFIED HEREIN. MILLER CONSULTING ENGINEERS DISCLAIMS ALL LIABILITY IF THESE PLANS AND SPECIFICATIONS OR THE DESIGN, ADVICE AND INSTRUCTIONS ATTENDANT THERETO ARE USED ON ANY PROJECT OR AT ANY LOCATION OTHER THAN THE PROJECT AND LOCATION SPECIFIED HEREIN. OBSERVATION VISITS TO THE JOB SITE AND SPECIAL INSPECTIONS ARE NOT PART OF THE STRUCTURAL ENGINEER'S RESPONSIBILITY UNLESS THE CONTRACT DOCUMENTS SPECIFY OTHERWISE.

NON STRUCTURAL PORTIONS OF PROJECT, INCLUDING BUT NOT LIMITED TO PLUMBING, FIRE SUPPRESSION, ELECTRICAL, MECHANICAL, LAND USE, SITE PLANNING, EROSION CONTROL FLASHING AND WATER-PROOFING ARE BEYOND THE SCOPE OF THESE DRAWINGS AND ARE PROVIDED BY OTHERS.

BUILDING CODE

ALL PHASES OF THE WORK SHALL CONFORM TO THE 2019 OREGON STRUCTURAL SPECIALTY CODE, BASED ON THE 2018 INTERNATIONAL BUILDING CODE, INCLUDING ALL REFERENCE STANDARDS, UNLESS NOTED OTHERWISE.

DESIGN LOADS

THE FOLLOWING ARE THE DESIGN REQUIREMENTS:

STRUCTURAL DESIGN CRITERIA	
RISK CATEGORY	II
DESIGN LOADS	
FLOOR DEAD	5 PSF
FLOOR LIVE	100 PSF
SEISMIC DESIGN DATA	
IMPORTANCE FACTOR	IE = 1.0
SPECTRAL RESPONSE ACCELERATIONS	SS = 0.746, S1 = 0.378
SITE CLASS	D
SPECTRAL RESPONSE COEFFICIENTS	SDS = 0.598
SEISMIC DESIGN CATEGORY	D
BASIC SEISMIC FORCE RESISTING SYSTEM	EGRESS RAMPS
SEISMIC RESPONSE COEFFICIENT	F_P = 0.48*W
RESPONSE MODIFICATION FACTOR	a_p = 1.0, R_p = 2.5
ANALYSIS PROCEDURE USED	ASCE 7-10 EQUIVALENT LATERAL FORCE

ALUMINUM

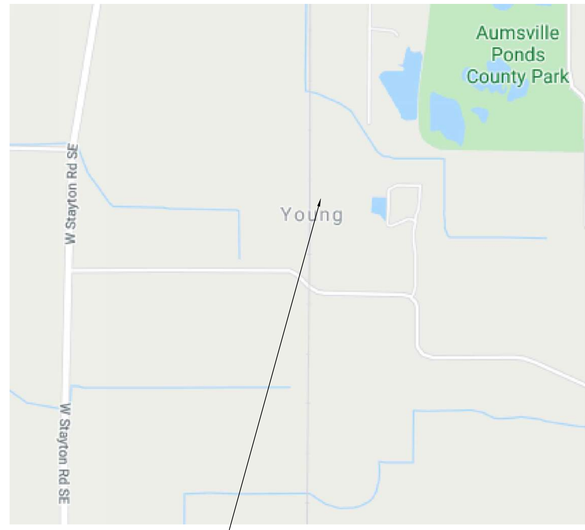
ALL STRUCTURAL ALUMINUM SHAPES AND PLATES TO BE 6061-T6 UNLESS NOTED OTHERWISE. ALL WELDS TO USE 4043 ALUMINUM FILLER ALLOY. A PROTECTIVE BARRIER SHALL BE PROVIDED BETWEEN ALL STEEL AND ALUMINUM TO PREVENT CORROSION. ALL WELDING TO CONFORM TO AMERICAN WELDING SOCIETY (AWS) D1.2. WELD LENGTHS SHOWN ARE EFFECTIVE AS SPECIFIED PER THE ALUMINUM DESIGN MANUAL. WELDING SHALL BE BY AWS CERTIFIED WELDERS FOR WELD TYPES SPECIFIED. WHERE WELD LENGTHS ARE NOT SHOWN, THE WELD SHALL BE FULL LENGTH OF MEMBERS BEING JOINED. ALL BUTT WELDS SHALL BE FULL PENETRATION WELDS UNLESS NOTED OTHERWISE ON STRUCTURAL DRAWINGS. ALL WELDS TO RECEIVE THE SAME FINISH COAT AS THE MEMBER BEING WELDED. ALL BOLTS IN CONTACT WITH ALUMINUM TO BE TYPE 304 STAINLESS STEEL WITH MATCHING NUTS. NUTS SHALL BE TIGHTENED TO A SNUG TIGHT CONDITION.

SPECIAL INSPECTION REQUIREMENTS:

ALUMINUM			CONTINUOUS	PERIODIC	
MATERIAL VERIFICATION OF STRUCTURAL ALUMINUM	1704.15			X	CERTIFIED MILL TEST REPORTS
MATERIAL VERIFICATION OF BOLTS				X	MANUFACTURER'S CERTIFIED TEST REPORTS
MATERIAL VERIFICATION OF WELD FILLER METALS		AWS D1.2 SECTION 5		X	MANUFACTURER'S CERTIFIED TEST REPORTS
VERIFYING USE OF PROPER WPS'S				X	COPY OF WELDING PROCEDURE SPECIFICATIONS
VERIFYING WELDER QUALIFICATIONS				X	COPY OF QUALIFICATION CARDS
COMPLETE AND PARTIAL JOINT PENETRATION GROOVE WELDS			X		ALL WELDS VISUALLY INSPECTED PER AWS 1.2, 5.5
MULTIPASS FILLET WELDS			X		
SINGLE PASS FILLET WELDS				X	

GENERAL RAMP NOTES:

1. THESE PLANS AND SPECIFICATIONS ARE NOT VALID FOR ANY OTHER ACCESS SYSTEMS, ONLY THOSE ACCESS SYSTEMS PRODUCED BY MAG ENTERPRISES LLC.
2. THE RAMP SYSTEM, STAIRS AND LANDINGS HAVE BEEN DESIGNED TO MEET IBC AND ICC/ANSI A117.1 2012 REQUIREMENTS FOR ACCESSIBLE FACILITIES. THE DESIGN LOADING CRITERIA IS 100 PSF LIVE LOAD.
3. THE MODULAR ALUMINUM RAMP SYSTEM SHALL BE A RIGID, FREE SPAN DESIGN, AND SHALL CONFORM TO THE CURRENT EDITION OF THE ALUMINUM ASSOCIATION SPECIFICATIONS AND GUIDELINES FOR ALUMINUM STRUCTURES.
4. ALL COMPONENTS TO BE MANUFACTURED USING 6061-T6 ALUMINUM ALLOY, WITH A MILL FINISH.
5. INSTALLATION CONTRACTORS SHALL BE RESPONSIBLE FOR COMPLYING WITH ACI (OSHA AND STATE LABOR AND INDUSTRIES STANDARDS AND REQUIREMENTS). CONTRACTORS SHALL ASSUME FULL RESPONSIBILITY FOR THE CONDITION OF THE STRUCTURES TO BE ACCESSED USING THE RAMP AND RELATED SYSTEMS.
6. WELDING SHALL BE IN ACCORDANCE WITH ANSI/AWS GAS METAL ARCH WELDING PROCESS BY EXPERIENCED OPERATORS.
7. LANDING, RAMP, AND STAIR WALKING SURFACES TO BE THRU FLOW POLYPROPYLENE INTERLOCKING PANELS, AS PER MANUFACTURER'S SPECIFICATIONS. TESTING MEETS OR EXCEEDS STANDARDS FOR DISTRIBUTED /CONCENTRATED LOAD, IZOD IMPACT, COEFFICIENT OF FRICTION AND SLIP RESISTANCE. DRAINAGE OPENINGS TO COMPLY WITH ANSI AII7.1, 302.3 OPENING (CURRENT APPLICABLE EDITION)
8. ADJUSTABLE LEG AND LEVELING FEET ARE ASSUMED TO BE PLACED ON SUITABLE FIRM BEARING MATERIAL ATOP UNDISTURBED SOIL.
9. STANDARD RAMP AND LANDING GUARDRAILS TO BE 42 INCH MINIMUM HEIGHT CAPABLE OF SUPPORTING AND ATTACHING REMOVABLE PICKET, WHEN THRESHOLD HEIGHTS EXCEED 30" ABOVE GRADE.
10. GUARDRAILS SHALL BE DESIGNED AND CONSTRUCTED FOR A LOAD OF 50 PLF APPLIED VERTICALLY DOWNWARD AT THE TOP OF THE GUARDRAIL.
11. HANDRAILS SHALL BE DESIGNED AND CONSTRUCTED FOR A LOAD OF 50 PLF APPLIED IN ANY DIRECTION.
12. GUARDRAILS WITH ATTACHED PICKETS SHALL BE CONSTRUCTED SO THAT A 4(FOUR) INCH SPHERE CAN NOT PASS THROUGH ANY OPENING IN THE RAIL.
13. ALL SURFACES AND WELDING JOINTS SHALL BE SMOOTH AND FREE FROM SHARP OR JAGGED EDGES.
14. ALL DESIGNS SHOWN HEREIN ARE SUBJECT TO CHANGE PENDING FIELD VERIFICATION OF EXISTING CONDITIONS.



N

1 S0.01 VICINITY MAP

N.T.S.

STRUCTURAL DRAWING INDEX

S0.01: STRUCTURAL NOTES
VICINITY MAP

S1.01: RAMP PLAN
RAMP ELEVATION

S8.01: RAMP PLAN/SECTION
LANDING PLAN/ SECTION
GUARDRAIL ELEVATION/DETAIL
RAMP ENTRANCE DETAIL

S8.02: DETAILS

THESE DRAWINGS HAVE BEEN DIGITALLY SIGNED IN ACCORDANCE WITH OREGON ADMINISTRATIVE RULE 820-025-0010. A DIGITAL SIGNATURE WATERMARK ON THIS PAGE INDICATES THIS SHEET IS PART OF AN ELECTRONICALLY SIGNED DOCUMENT. REFER TO INDEX ON THIS PAGE FOR ALL SHEETS INCLUDED WITH THIS DIGITAL SIGNATURE.

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DIGITALLY SIGNED
OREGON
MAY 14, 2019
ANTHONY L. BOUDON
EXPIRES: 12 - 31 - 2021

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30' ADA RAMP

NORTHWEST ACCESS PRODUCTS

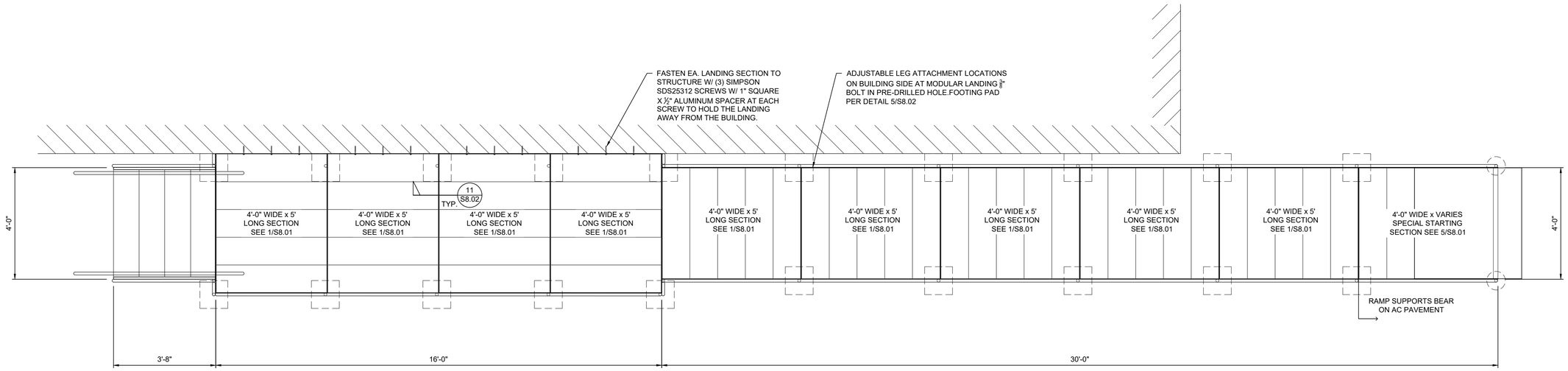
9493 PORTER RD SE
AUMSVILLE, OR

DRAWN BY:	ALB
CHECKED BY:	KMM
PROJECT NO:	200378
ISSUE DATE:	04.02.2020

REV.	DATE	DESCRIPTION

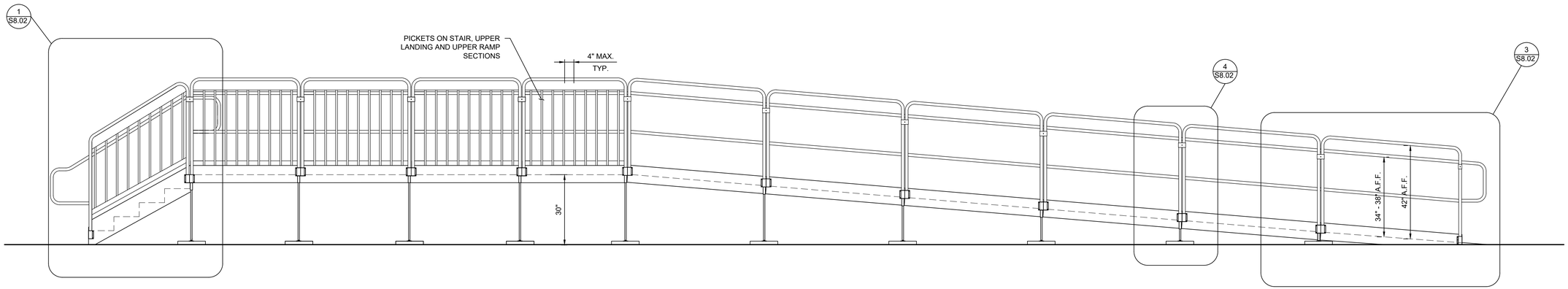
SHEET CONTENT
STRUCTURAL NOTES
SPECIAL INSPECTION

SHEET
S0.01



1 S1.01 TYPICAL 30' RAMP PLAN

1/2" = 1'-0"



2 S1.01 TYPICAL 30' RAMP ELEVATION

1/2" = 1'-0"

LINE IS 2 INCHES AT FULL SCALE
(IF NOT 2" - SCALE ACCORDINGLY)

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30' ADA RAMP
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DRAWN BY:	ALB
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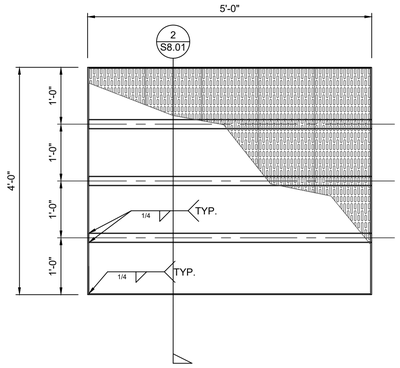
ISSUE DATE:	04.02.2020

REV.	DATE	DESCRIPTION

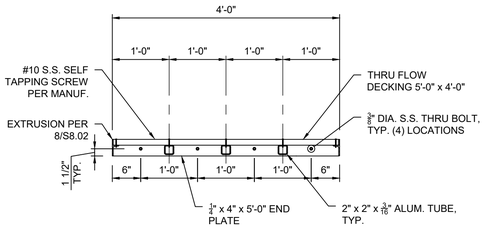
SHEET CONTENT
PLAN AND ELEVATION

SHEET
S1.01



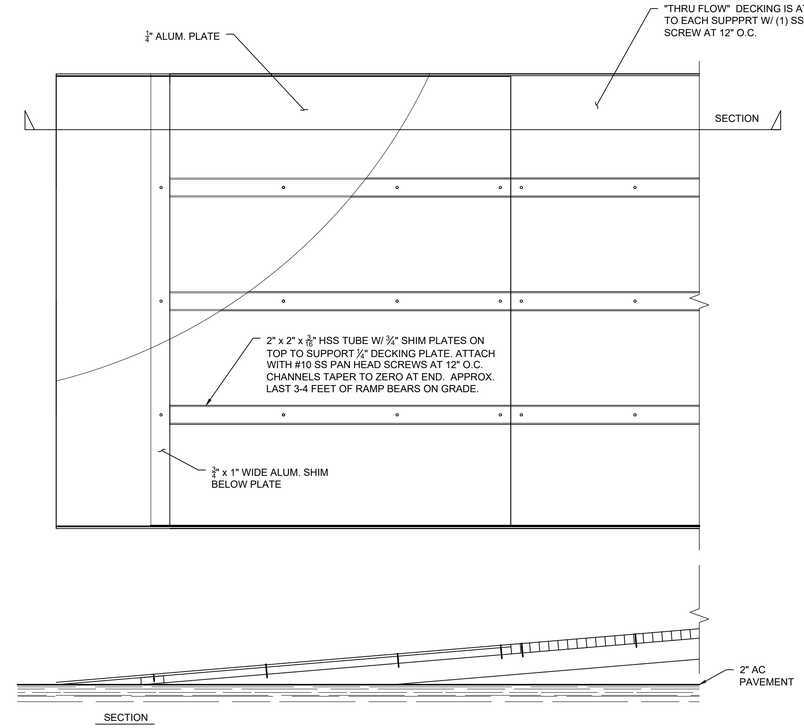
1 S8.01 4'-0" x 5'-0" PANEL PLAN

3/4" = 1'-0"



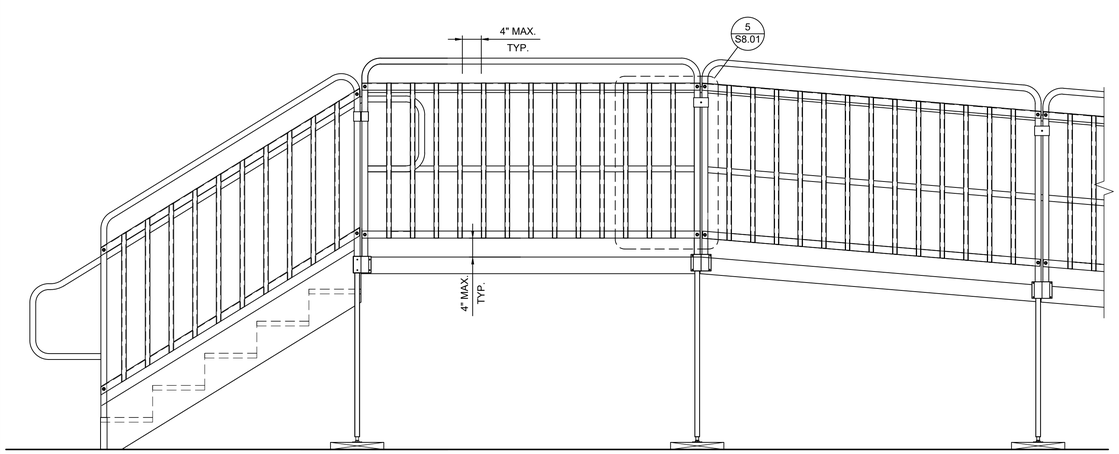
2 S8.01 4'-0" x 5'-0" PANEL SECTION

3/4" = 1'-0"



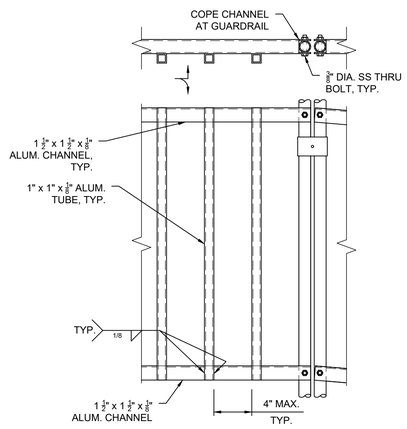
3 S8.01 RAMP ENTRANCE DETAIL

1 1/2" = 1'-0"



4 S8.01 TYPICAL GUARDRAIL PICKET ELEVATION

3/4" = 1'-0"



5 S8.01 PICKET DETAIL

1 1/2" = 1'-0"

LINE IS 2 INCHES AT FULL SCALE

(IF NOT 2" - SCALE ACCORDINGLY)

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30' ADA RAMP

NORTHWEST ACCESS PRODUCTS

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DRAWN BY:	ALB
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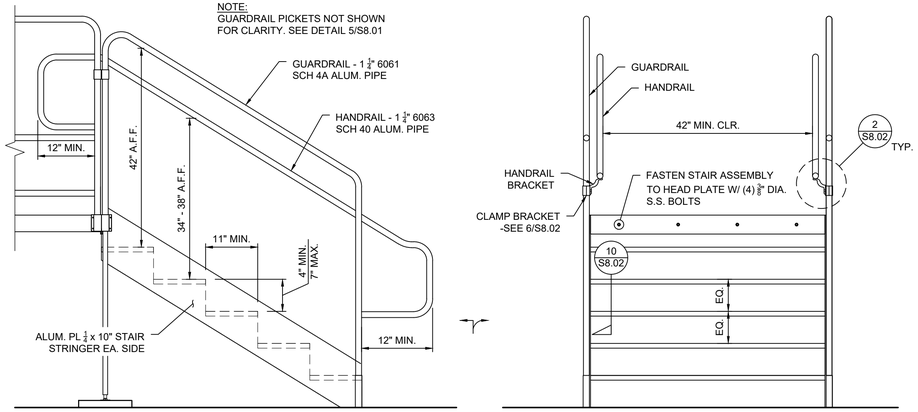
REV.	DATE	DESCRIPTION

SHEET CONTENT

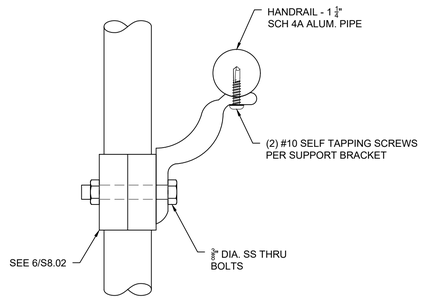
PANEL PLAN/SECTION
RAMP DETAIL
PICKET ELEVATION
PICKET DETAIL

SHEET
S8.01



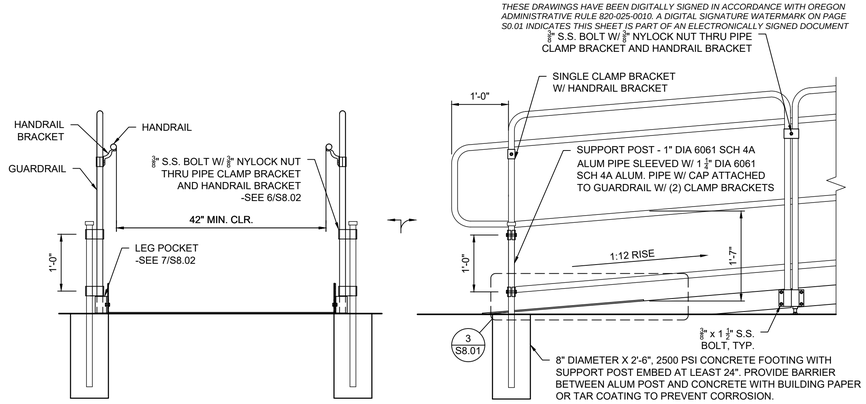
1 S8.02 STAIR ELEVATION

3/4" = 1'-0"



2 S8.02 HANDRAIL BRACKET

6" = 1'-0"



3 S8.02 RAMP ENTRANCE SECTION

3/4" = 1'-0"

4 S8.02 TYPICAL RAMP SECTION

3/4" = 1'-0"

5 S8.02 ADJUSTABLE LEG DETAIL

3" = 1'-0"

6 S8.02 PIPE CLAMP BRACKET

6" = 1'-0"

7 S8.02 LEG POCKET

6" = 1'-0"

8 S8.02 ALUMINUM EXTRUSION

6" = 1'-0"

9 S8.02 STAIR TREAD CONNECTION

3" = 1'-0"

10 S8.02 HANDRAIL BRACKET EXTRUSION

6" = 1'-0"

11 S8.02 PLATFORM SUPPORT CONNECTION

3" = 1'-0"

LINE IS 2 INCHES
AT FULL SCALE
(IF NOT 2" - SCALE ACCORDINGLY)

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30' ADA RAMP

NORTHWEST ACCESS PRODUCTS

9493 PORTER RD SE
AUMSVILLE, OR

DRAWN BY:	ALB
CHECKED BY:	KMM
PROJECT NO:	200378
ISSUE DATE:	04.02.2020

DESCRIPTION | DATE | REV.

SHEET CONTENT
DETAILS

SHEET
S8.02

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STRUCTURAL CALCULATIONS

30' ADA Ramp
9493 Porter Road SE, Aumsville OR
Northwest Access Products

April 2, 2020
Project No. 200378

13 pages

Principal Checked: KMM

*** LIMITATIONS ***

Miller Consulting Engineers, Inc. was retained in a limited capacity for this project. This design is based upon information provided by the client, who is solely responsible for accuracy of same. No responsibility and or liability is assumed by or is to be assigned to the engineer for items beyond that shown on these sheets.

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Building Code: 2019 Oregon Structural Specialty Code

Soils Report: No **Soils Report by:** N/A **Dated:** N/A

Soil Bearing: 1500 PSF **Retaining Walls:** No

Equivalent Fluid Pressure (active): N/A PCF **Passive bearing:** N/A PCF **Friction:** N/A

Structural System: Component

Vertical System: Aluminum Framing **Lateral Sys:** Aluminum Framing

Basic Design Loads:	**Element**	Floor			
	Load Type	Dead			
	Value (PSF)	5			
	Load Type	Live			
	Value (PSF)	100			
	Deflection Criteria	L/360			

Lateral Design Parameters:

Wind Design: ASCE 7-16 **Wind Speed (3 sec Gust):** 98 MPH

Exposure B

Importance Factors	I_W =	I_E =	I_S =	I_i =	**Risk Cat:**
	1.00 (ice)	1.00 (seismic)	1.00 (snow)	1.00 (ice)	II

Seismic Design

Seismic design parameters are based on published values from the USGS web site.

Latitude: 44.824896
Longitude: -122.865102

2% PE in 50 years, 0.2 sec SA = Ss

2% PE in 50 years, 1.0 sec SA = S1

(Site class B parameters are indicated on this page, for actual site class used in design, refer to seismic design summary)

Design Summary:

The attached calculations are for the design of a new 30' ADA ramp and platform with stairs. The ramp will be constructed with aluminum and supported by concrete footing pads at grade.

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Project Name 30' ADA Ramp Project # 200378

Location 9493 Porter Road SE, Aumsville OR

Client Northwest Access Products

By ALB Ck'd KMM Date 4/2/20

30' ADA Ramp

9493 Porter Rd SE, Aumsville, OR 97325, USA

Latitude, Longitude: 44.8248959, -122.8651024

Date	4/2/2020, 4:27:24 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S_S	0.746	MCE_R ground motion. (for 0.2 second period)
S_1	0.378	MCE_R ground motion. (for 1.0s period)
S_{MS}	0.897	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	0.598	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	1.203	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.344	MCE_G peak ground acceleration
F_{PGA}	1.256	Site amplification factor at PGA
PGA_M	0.432	Site modified peak ground acceleration
T_L	16	Long-period transition period in seconds
SsRT	0.746	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	0.847	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.378	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.44	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.5	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.881	Mapped value of the risk coefficient at short periods
C_{R1}	0.859	Mapped value of the risk coefficient at a period of 1 s

ASCE 7-16: SEISMIC DESIGN FORCE, SECTION 13.3

Elements of Structures, Nonstructural Components, and Equipment Supported by Structures

Site Class:	D (default)		*Section 20.3, Table 20.3-1*
Seismic Design Category:	D		*Section 11.6*
Risk Category:	II		*Table 1.5-1*
S_s =	150.00%		*Figure 22-1* → INCREASED S_s VALUE USED AT CLIENTS REQUEST WHICH IS CONSERVATIVE
S_1 =	37.80%		*Figure 22-2*
F_a =	1.20		*Table 11.4-1 (Linear interpolation is used)*
F_v =	1.92		*Table 11.4-2 (Linear interpolation is used)*
S_{MS} =	1.50		*Eqn. 11.4-1*
S_{M1} =	0.727		*Eqn. 11.4-2*
S_{DS} =	1.000		*Eqn. 11.4-3*
S_{D1} =	0.484		*Eqn. 11.4-4*
I_p =	1.00		*Section 13.1.3*
a_p =	1.0		*Table 13.6-1*
R_p =	2.5		*Table 13.6-1*
z =	2.5	*ft, Component attachment elevation w/ respect to grade*	
h =	2.5	*ft, Structure roof elevation with respect to grade*	
F_p =	0.480	* W_p	*Eqn. 13.3-1*
OR	1.600	* W_p	*Eqn. 13.3-2*
Not less than	0.300	* W_p	*Eqn. 13.3-3*

F_p =	**0.480**	*** W_p**	
$0.2S_{DS}W_p$ =	**0.200**	*** W_p**	*Sec. 13.3.1.2*

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RAILING DESIGN

DESIGN LOADS: 50 PSF OR 200 LBS POINT LOAD

TOP AND BOTTOM RAIL

MAX SPAN = 5'-0"

$M_{MAX} = (200\ LBS)(4')/(4)$
$= 200\ FT\text{-}LBS$

TRY 1¼" Ø SCH 40 ALUM PIPE
$I = 0.184\ IN^4$
$S = 0.222\ IN^3$

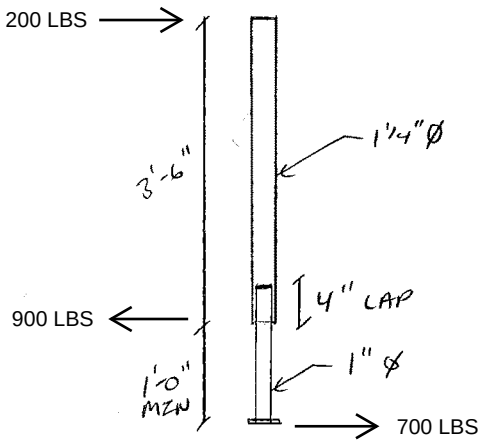
$f_b = (200\ FT\text{-}LBS)(12\ IN/FT)/(0.222\ IN^3)$
$= 10{,}811\ PSI < 18{,}000\ PSI$ OK

USE 1¼" Ø SCH40 6061-T6 ALUM RAIL

RAILING POST

HEIGHT = 3'-6"

$M_{MAX} = (200\ LBS)(3.5')$
$= 700\ FT\text{-}LBS$



TRY 1¼" Ø SCH40 ALUM PIPE W/ 1" Ø SCH 40 ALUM PIPE
COMBINED: $I = (0.184\ IN^4) + (0.083\ IN^4)$
$= 0.267\ IN^4$
1" Ø PIPE: $I = 0.083\ IN^4$
$S = 0.126\ IN^3$

1¼" Ø PIPE: $M = (700\ FT\text{-}LBS)(12\ IN/FT)(0.184\ IN^4)/(0.267\ IN^4)$
$= 5{,}789\ IN\text{-}LBS$

$f_b = (5{,}789\ IN\text{-}LBS)/(0.222\ IN^3)$
$= 26{,}076\ PSI \approx 25{,}000\ PSI \rightarrow$ WITHIN 5% OK

1" Ø PIPE: $M = (700\ FT\text{-}LBS)(12\ IN/FT)(0.083\ IN^4)/(0.267\ IN^4)$
$= 2{,}611\ IN\text{-}LBS$
$f_b = (2{,}611\ IN\text{-}LBS)/(0.126\ IN^3)$
$= 20{,}724\ PSI < 25{,}000\ PSI$

USE 1" Ø SCH40 6061-T6 ALUM PIPE SLEEVED INSIDE 1¼" Ø 6061-T6 ALUM PIPE

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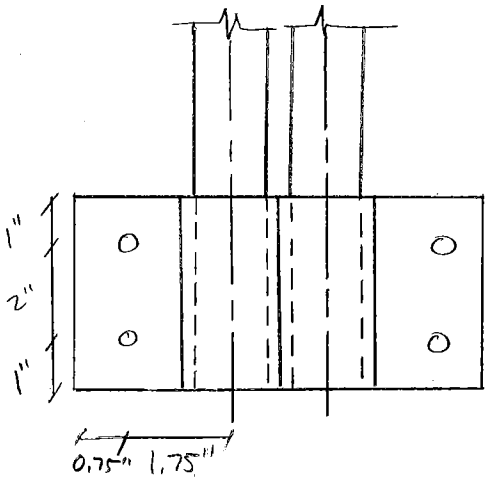
Project Name 30' ADA Ramp Project # 200378
Location 9493 Porter Road SE, Aumsville OR
Client Northwest Access Products
By ALB Ck'd KMM Date 4/2/20 Page 4 of 13

POST BRACKET CONNECTION



CHECK PLATE:

FORCE IN BRACKET = (200 LBS)(54")(12")/(2 BRACKETS)
= 450 LBS

$M_{BRACKET}$ = (450 LBS)(1.75")
= 787.5 IN-LBS

$f_b = \frac{(787.5 \text{ IN-LBS})}{(0.25")^2(4")/(6)}$

= 18,900 PSI < 21,000 PSI OK

USE 1/4" THICK 6061-T6 ALUM PLATE

CHECK BOLTS:

T = (450 LBS)/(2 BOLTS)(2.25")/(0.75")
= 675 LBS/BOLT

V = (105 PSF)(2')(5')/(2 BOLTS)
= 525 LBS/BOLT

T_{ALLOW} = (0.11 IN²)(65,000 PSI)
= 7,150 LBS

V_{ALLOW} = (0.11 IN²)(20,000 PSI)
= 2,200 LBS

$\frac{(675 \text{ LBS})}{(7,150 \text{ LBS})} + \frac{(525 \text{ LBS})}{(2,200 \text{ LBS})} = 0.33 < 1.0$ OK

USE 3/8" Ø SS BOLTS

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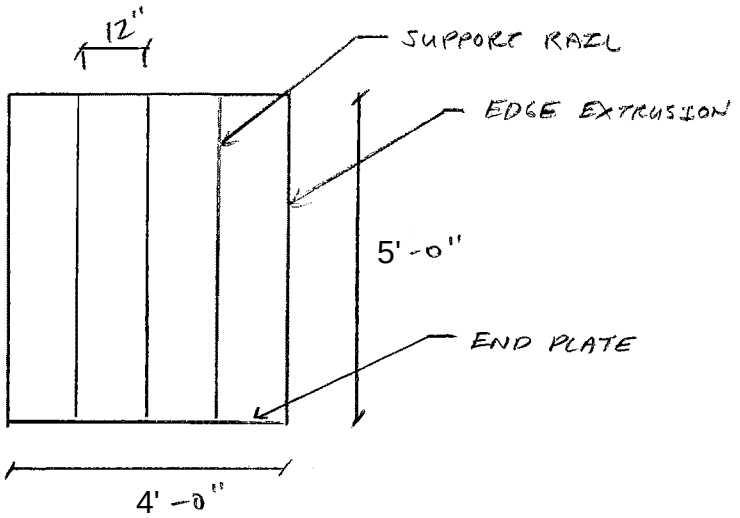
By ALB Ck'd KMM Date 4/2/20 Page 5 of 13

RAMP / PLATFORM DESIGN



CHECK SUPPORT RAILS:

TRY 2" x 2" x 3/16 ALUM TUBE

$I = 0.641\ IN^4$

$S = 0.641\ IN^3$

CHECK BENDING:

M_{MAX} = (105 PSF)(1')(5')^2/(8)

= 238 FT-LBS

$f_b = (238\ FT\text{-}LBS)(12\ IN/FT)/(0.641\ IN^3)$

= 6,143 PSI < 21,000 PSI OK

LOAD = (100 PSF LL) + (5 PSF DL)

= 105 PSF

OR 300 LB POINT LOAD

CHECK SHEAR:

$V_{MAX} = (105\ PSF)(1'\ O.C.)(5')/(2)$

= 263 LBS

$f_v = (263\ LBS)/(2)/(3/16")/(2")$

= 350 PSI < 12,000 PSI

$\Delta = \frac{(105\ PLF)/(12)(60")^4}{(384)(10{,}000{,}000)(0.641\ IN^4)} = 0.05" \Rightarrow L/1303$

USE 2" x 2" x 3/16" 6061-T6 ALUM TUBES

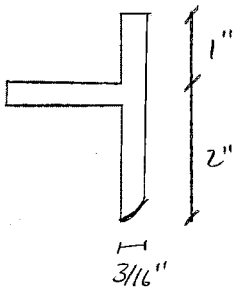
SEE NEXT PAGE FOR WELD CONNECTION TO END PLATE

CHECK EDGE EXTRUSIONS:

TRY 3/16" THICK ALUM SHAPE

$I = 1.2598\ IN^4$

$\bar{Y} = 1.8519\ IN$



CHECK BENDING:

$M_{MAX} = (300\ LBS)(5')/(4)$

= 375 FT-LBS

$f_b = (375\ FT\text{-}LBS)(12\ IN/FT)/((1.2598\ IN^4)/(1.8519\ IN))$

= 6,615 PSI < 21,000 PSI OK

CHECK SHEAR:

V_{MAX} = (105 PSF)(0.5')(5')/(2)

= 131 LBS

$f_v = (131\ LBS)/(3")/(3/16")$

= 233 PSI < 12,000 PSI OK

USE 3/16" THICK 6061-T6 ALUM SHAPE

SEE NEXT PAGE FOR WELD CONNECTION TO END PLATE

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Location 9493 Porter Road SE, Aumsville OR

Client Northwest Access Products

By ALB Ck'd KMM Date 4/2/20

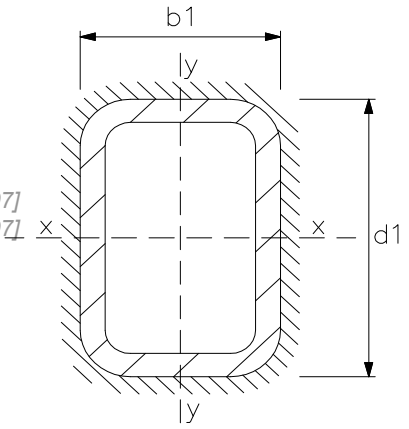
Fillet Weld Section Properties

HSS MEMBER (weld all around)

Vy =	263	lb (asd)	
Mx =		ft-lb (asd)	
Vx =		lb (asd)	
My =		ft-lb (asd)	
Weld size (w) =	0.2500	in	= 1/4 " fillet weld
Width (b1) =	2	in	Width of hss member
Depth (d1) =	2	in	Depth of hss member
b =	2.35	in	Outer width of weld
d =	2.35	in	Outer depth of weld
Atotal =	1.52	in^2	= 2.35*2.35-2*2
Ay =	0.7	in^2	
Ix =	1.10	in^4	
Sx =	0.94	in^3	
Ax =	0.7	in^2	
Iy =	1.10	in^4	
Sy =	0.94	in^3	
F_w/Ω =	5897	psi	=(11,500 psi)/(1.95)
Vcy =	**4128**	**lb**	= 5897*0.7
Mcx =	**462**	**ft-lb**	= 5897*0.94/12
Vcx =	**4128**	**lb**	= 5897*0.7
Mcy =	**462**	**ft-lb**	= 5897*0.94/12
Capacity =	0.06	< 1.00 OK	

Use 0.25" fillet weld

*[b = b1+2*w*.707]*
*[d = d1+2*w*.707]*

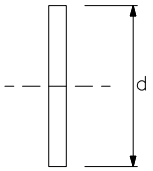


LINE (weld on one side)

V =	131	lb (asd)	
M =		ft-lb (asd)	
Weld size (w) =	0.2500	in	= 1/4 " fillet weld
Length of weld (d) =	3	in	
t =	0.18	in	Effective throat
A =	0.54	in^2	= 0.18*3
I =	0.41	in^4	= 0.18*3^3/12
S =	0.27	in^3	= 0.41/(3/2)
F_w/Ω =	5897	psi	=(11,500 psi)/(1.95)
Vc =	**6369**	**lb**	= 5897*0.54*2
Mc =	**265**	**ft-lb**	= 5897*0.27/12*2
Capacity =	0.02	< 1.00 OK	

Use 0.25" fillet weld

*[t = .707*w]*



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Location 9493 Porter Road SE, Aumsville OR

Client Northwest Access Products

By ALB Ck'd KMM Date 4/2/20

CHECK END PLATE

TRY 4" x 1/4" ALUM PLATE

$I = (1/4")(4")^3/(12)$

$= 1.33 \text{ IN}^4$

$S = (1/4")(4")^2/(6)$

$= 0.67 \text{ IN}^3$

CHECK BENDING:

$M_{MAX} = (105 \text{ PSF})(6'/2)(4')^2/(8)$

$= 630 \text{ FT-LBS}$

$f_b = (630 \text{ FT-LBS})(12^{IN}/_{FT})/(0.67 \text{ IN}^3)$

$= 11{,}284 \text{ PSI} < 28{,}000 \text{ PSI}$ OK

CHECK SHEAR:

$V_{MAX} = (105 \text{ PSF})(6'/2)(4')/(2)$

$= 630 \text{ LBS}$

$f_b = (630 \text{ LBS})/(0.25")/(4")$

$= 630 \text{ PSI} < 12{,}000 \text{ PSI}$ OK

USE 4" TALL x 1/4" THICK 6061-T6 ALUM END PLATE

STAIR DESIGN

STAIR SPAN = 6'-0"

STAIR WIDTH = 4'-0"

TREAD SUPPORT DESIGN:

TRY 3/16 THICK ALUM SHAPE

CHECK BENDING:

$M_{MAX} = (300 \text{ LBS})(4')/(4)$

$= 300 \text{ FT-LBS}$

$f_b = (300 \text{ FT-LBS})(12^{IN}/_{FT})/(0.68 \text{ IN}^3)$

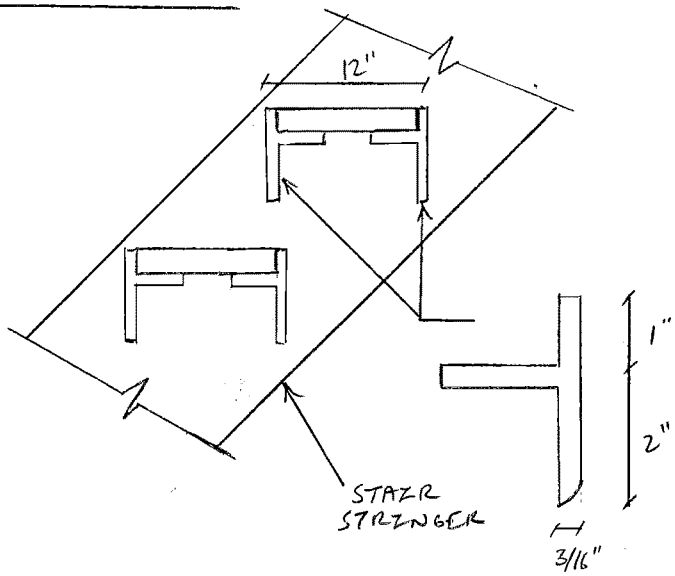
$= 5{,}294 \text{ PSI} < 21{,}000 \text{ PSI}$

CHECK SHEAR:

$V_{MAX} = (300 \text{ LBS})/(2)$

$= 150 \text{ LBS}$

$f_v = (1150 \text{ LBS})/(3")/(3/16") = 267 \text{ PSI} < 12{,}000 \text{ PSI}$



$I = 1.2598 \text{ IN}^4$

$\bar{Y} = 1.8519 \text{ IN}$

$S = 0.68 \text{ IN}^3$

USE 3/16" THICK 6061-T6 ALUM TREAD SUPPORTS

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STAIR STRINGER DESIGN

TRY 10" TALL x ¼" THICK ALUM PLATE

$I = (1/4")(10")^3/(12)$
$= 20.83 \text{ IN}^4$
$S = (1/4")(10")^2/(6)$
$= 4.17 \text{ IN}^3$

CHECK BENDING:

$M_{MAX} = (105 \text{ PSF})(2')(6')^2/(8)$
$= 945 \text{ FT-LBS}$

$f_b = (945 \text{ FT-LBS})(12 \text{ IN/FT})/(4.17 \text{ IN}^3)$
$= 2,722 \text{ PSI} < 28,000 \text{ PSI}$ OK

CHECK SHEAR:

$V_{MAX} = (105 \text{ PSF})(2')(6')/(2)$
$= 630 \text{ LBS}$

$f_v = (630 \text{ LBS})/(0.25")/(10")$
$= 252 \text{ PSI} < 12,000 \text{ PSI}$ OK

USE 10" TALL x ¼" THICK 6061-T6 ALUM PLATE

PLATFORM / RAMP / STAIR CONN

$V_{MAX} = (105 \text{ PSF})(4')(6')/(2)$
$= 1260 \text{ LBS}$

$V_{BOLT} = (1260 \text{ LBS})/(4 \text{ BOLTS})$
$= 315 \text{ LBS/BOLT}$

$V_{ALLOW} = (0.11 \text{ IN}^2)(20,000 \text{ PSI})$
$= 2,200 \text{ LBS} > 315 \text{ LBS}$

USE (4) 3/8" Ø SS BOLTS AT PANEL AND STAIR JOINT CONNECTIONS

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HANDRAIL BRACKET:

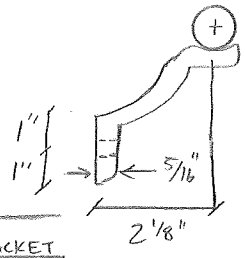
LOAD = (200 LBS)(2 1/8")/(1") = 425 LBS < 2,200 LBS

USE 3/16" Ø SS THROUGH BOLT

CHECK BENDING:

M = (200 LBS)(2 1/8") = 425 IN-LB

$f_b = \frac{(425\ \text{IN-LB})}{\left(\frac{(5/16)^2(1/2)}{6}\right)} = 17,408\ \text{PSI} < 21,000\ \text{PSI}$



USE 5/16 x 1 1/2" BRACKET

CLAMP BRACKET:

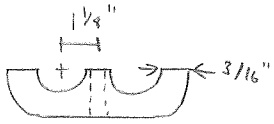
LOAD = 200 LBS < 2,200 LBS

USE 3/8" Ø SS THROUGH BOLT

CHECK BENDING:

M = (200 LBS)(1 1/8") = 225 LB-IN

$f_b = \frac{(225)}{\left(\frac{(5/16)^2(3")}{6}\right)} = 12,800\ \text{PSI} < 21,000\ \text{PSI}$



USE 3/16" x 3" BRACKET

FLAT PLATE AT ENTRY RAMP

LOAD = 300 LBS

$M = \frac{PL}{4} = (300\ \text{LB})(16")/(4) = 1200\ \text{IN-LBS}$

$S = (0.25")^2(12")/(6) = 0.125\ \text{IN}^3$

$f_b = (1200\ \text{IN-LBS})/(0.125\ \text{IN}^3) = 9,600\ \text{PSI} < 28,000\ \text{PSI}$ OK

USE 1/4" x 4' x 5' PLATE FOR SMOOTH TRANSITION TO FIRST RAMP

BASE CONNECTION DESIGN

200 LB POINT LOAD CONTROLS OVER SEISMIC (NO ⊥ REQUIRED)

END SUPPORT POST TO BE EMBEDED IN 8" Ø x 2'-6" DEEP FOOTING TO PROVIDE FIXITY AT END OF RAIL

⇒ SEE PG 10 FOR DESIGN

PLATFORM FOOTING:

TYPICAL FOOTING:

P = (2')(5')(105 PSF) = 1050 LBS

AREA REQUIRED = 1050 LBS / 1500 PSF
= 0.7 SQR FT - 10" x10" BEARING AREA REQUIRED

CHECK LATERAL: 700 LBS (SEE PG 3) < (1050 LBS)(μ = 0.6)(1.3) = 819 LBS OK NO SLIDING

USE MIN 10" SQR CONC BEARING BLOCK AT RAMP AND LANDING PLATFORMS SUPPORT LOCATIONS AND MIN 14" SQR CONC BEARING BLOCK AT INTERIOR DECK PLATFORM SUPPORT LOCATIONS

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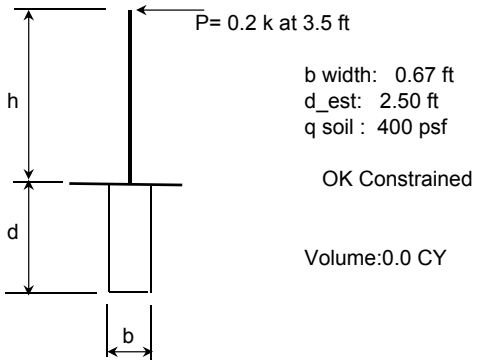
EMBEDDED POLE DESIGN

P	0.2	k		*Applied lateral force, kips*
h	3.5	ft		*distance from ground surface to P, ft*
q	400	psf/ft		*allowable soil-brg Table 1806.2, psf/ft*
b	0.67	ft	8"	*dia. or diagonal dimension of a 0.47 post, ft*
d_est	2.50	ft		*ESTIMATED embedment, ft 2.50 for pressure*

Constrained Condition

S_3	1000	psf	*q*d_est*
d^2	4.4		*4.25*P*1000*h/(S_3*b)*
d	2.11	ft	*depth of embedment, ft*

OK Constrained



POLE FOUNDATION ELEVATION

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RAMP AND STAIR SUPPORT DESIGN

(1" SCH 40 PIPE)

LOAD: (105 PSF)(4')(5 ')/(2) = 1,050 LBS

USE 1" SCH 40 PIPE W/ 6061-T6 ALUM

SEE NEXT PAGE FOR DESIGN

THOUGHBOLT FOR ADJUSTABLE LEGS:

P = 525 LBS

3/4" BOLT CAPACITY = 2,200 LBS > 525 LBS OK

USE 3/8" ϕ SS THROUGH BOLT FOR ADJUSTABLE SUPPORT LEGS

LATERAL LOADING

DEAD LOAD:

PIPE LEGS = (4) (1.2 lbs) = 4.8 LBS

PLATFORM = (5 PSF)(4 ')(5 ') = 100 LBS

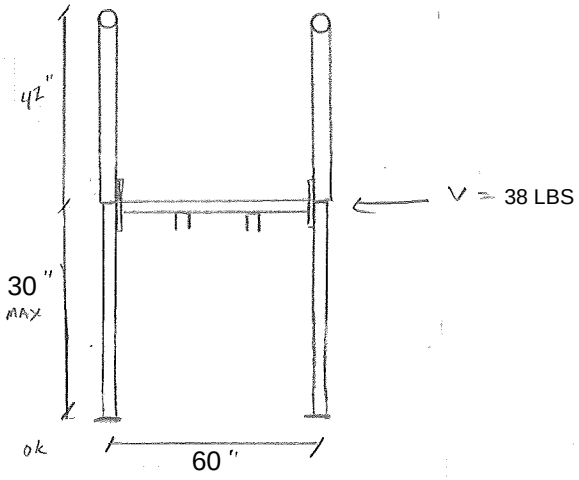
RAILING = (2) (16 LBS) = 32 LBS

TOTAL WEIGHT = 137 LBS

SEISMIC FORCE = (0.48)(137 LBS)(0.7)

V = 46 LBS

↳ SEE PAGE 3 FOR SEISMIC DESIGN COEF.



GLOBAL OVERTURNING

M_{OT} = (46 LBS)(30") = 1,380 IN-LBS

M_R = (0.6)(137 LBS)(60"/2) = 2,466 IN-LBS ok

FOS = 2,466 / 1,380 = 1.8 > 1.5 ok

CHECK BENDING OF SUPPORT POST:

P = (46 LBS)/(2) = 23 LBS

M = (23 LBS)(30") = 690 IN-LBS

$f_b = \frac{(690 \text{ IN-LBS})}{0.126 \text{ IN}^3}$ = 5,476 PSI < 25,000 PSI ok

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MOUNT ARM

Aluminum Tube Design:

Section Properties:

outside dia. =	1.32	in	
t =	0.133	in	
Scx =	0.134	in^3	
Scy =	0.134	in^3	
A =	0.50	in^2	
ae_y =	0.50	in	
ae_x =	0.50	in	
rx =	0.42	in^3	= SQRT(0.088/0.5)
ry =	0.42	in^3	= SQRT(0.088/0.5)
Ix =	0.088	in^4	
Iy =	0.088	in^4	
J =	0.176	in^4	
Rb =	0.594	in	= (1.32-0.133)/2

Material Properties:

Aluminum Grade: 6063-T5

Weld Filler Alloy: 4043

reaction does not occur within 1" from welded area

E =	10100	ksi
Fcy =	16	ksi
Fty =	16	ksi
Ftu =	30	ksi
Fy =	16	ksi
Weld shear cap. =	5641	psi (based on base metal strength)
ny =	1.65	
nu =	1.95	
na =	1.20	
Cb =	1	
k1 =	0.35	
k2 =	2.27	
kt =	1	

Btb =	28.80	ksi
Dtb =	1.51	
Ctb =	95.17	
Bs =	11.32	ksi
Ds =	0.04	
Cs =	122.46	
Bc =	17.35	ksi
Dc =	0.07	
Cc =	98.92	
Bp =	19.54	ksi
Dp =	0.09	
Bt =	19.20	ksi
Dt =	0.53	
Ct =	999.00	

Compression:

P =	1050	lb
Lb =	30	in
k =	1	
Slenderness, Rb/t =	4.5	
Fc =	9272	psi, from 3.4.10
b =	1.054	in
Slenderness, kL/r =	71.4	
Fc =	6263	psi, from 3.4.7
Fc =	6263	psi (controls)
fc =	2100	psi = 1050/0.5
	33.53%	

Compression in Column Elements: (3.4.10)

Slenderness Limitations: (Rb/t)

S1	S2
0	999

Stresses, psi:

Rb/t<S1	S1<Rb/t<S2	S2<Rb/t
N/A	9272	N/A

Compression in Columns: (3.4.7)

Slenderness Limitations: (kL/r)

S1	S2
0	99

Stresses, psi:

kL/r<S1	S1<kL/r<S2	S2<kL/r
N/A	6263	N/A

Use 6063-T5 1.32" dia. x 0.133" thick aluminum pipe

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