Purchasing and Contract Services

Klamath Falls:
541.885.1133 (office)
541.885.1215 (fax)
3201 Campus Drive
Snell Hall 217
Klamath Falls, OR 97601

Wilsonville:
503.821.1277 (office)
503.533.5190 (fax)
27500 SW Parkway Ave.
Wilsonville, OR 97070

REQUEST FOR QUOTES (RFQ) #2013-18

Issue Date: September 24, 2013

Project Name:	Softball Dugouts Replacement		
BID Due Date/Time:	October 3, 2013, 1:00 PM		
Mandatory Walkthrough:	September 27, 2013, 1:00 PM		
Project Coordinator:	Eric Rulofson	Phone:	541-885-1600
		Email:	Eric.Rulofson@oit.edu
Contract Coordinator:	George Marlton	Phone:	503-821-1277
		Email:	George.Marlton@oit.edu

SUBMIT QUOTES VIA EMAIL TO PURCHASING@OIT.EDU OR MAIL/HAND DELIVERY TO THE ABOVE WILSONVILLE ADDRESS TO GEORGE MARLTON

PLEASE NOTE: EMAIL SUBMISSIONS SHOULD HAVE "RFQ #2013-18" IN THE SUBJECT LINE

1. ANNOUNCEMENT AND SPECIAL INFORMATION

Quoters are required to read and understand and comply with all information contained within this RFQ. All quotes are binding upon Quoter for thirty (30) days from the RFQ Due Date/Time. All payments for services will be paid in accordance to OAR 580-061-0050. Quotes received after the RFQ Due Date/Time may not be considered. Travel and other expense reimbursement will only be reimbursed in accordance with the OIT Contractor's Travel Reimbursement Policy at the time the expense is incurred.

It will be the responsibility of potential Quoters to refer daily to the OUS Procurement Gateway website (https://secure.ous.edu/bid/) to check for any available addenda, response to clarifying questions, cancellations or other information pertaining to this Request for Quotes.

A **Mandatory Pre-Bid Conference** will be conducted on **September 27, 2013 at 1:00 PM in the Sunset Conference Room of the College Union located at 3201 Campus Drive, Klamath Falls, OR 97601**. Attendance will be documented through a sign-in sheet prepared by the Oregon Tech representative. Prime bidders who arrive more than 5 minutes after start of the time of the meeting (as stated in this solicitation and by the Oregon Tech's representative's watch) or after the discussion portion of the meeting (whichever comes first) shall not be permitted to sign in and will not be permitted to submit a bid on the project.

2. SCOPE

The purpose of this RFQ is hire a contractor to provide all necessary labor, materials and permits for the installation of new dugouts for the Oregon Tech softball field. This project will utilize some services and materials supplied by others through in kind donations. The successful contractor will be responsible for the following:

1. Provide all permits.
2. Complete the final grading and excavation (rough excavation done by others).
3. Provide, place, and compact aggregate per plans and specifications.
4. Provide and construct foundation forms per plans and specifications.

5. Provide and install in the foundation two ¾" PVC stub ups for future electricity and data in each dugout storage area (total of four, Owner to verify exact location).
6. Provide and install rebar in the concrete foundation and block per plans and specifications.
7. Pour and finish concrete per plans and specification (Owner supplied ready to pour concrete).
8. Provide mortar to construct dugout walls using concrete block per plans and specifications (concrete block and block installation supplied by others).
9. Provide, install and paint the metal columns per plans and specifications (paint color: green to match existing green on announcer's booth).
10. Provide and construct the roof framing per plans and specifications. Use plywood sheathing only.
11. Provide and install standing lock seam metal roof (roof color: green to match existing green on announcer's booth). Provide owner with drip edge detail.
12. Provide paint and paint all exposed wood surfaces to match metal roof (paint color and scheme to match existing green on announcer's booth).
13. Complete final site grading per the plans and specifications. Elevation to match existing dugouts.
14. Eave overhang to match existing announcer booth.
15. Provide all warranties and as built drawings.

The scope further includes the following drawings and structural engineering calculations from Precision Structural Engineering dated 7-8-13 and 6-19-13 respectively (See Exhibit A).

OIT Softball Dugouts drawing S1
OIT Softball Dugouts drawing S2
OIT Softball Dugouts drawing S3
OIT Softball Dugouts Engineering Calculations

*Note:
1) The excavation to be completed carefully to native soil, no extra backfill shall be used. Construction of foundation shall be built upon undisturbed native soil.
2) The Geotechnical Soil test, found on drawing S1, General Notes F, 1, is eliminated.
3) All reference to rollup door in the drawing S2, is eliminated.

All work shall be completed in accordance with the July 1, 2012 Oregon University System General Conditions for Public Improvement Contracts. Contractor shall further be required to complete an Owner safety orientation prior to commencement of work. Oregon Tech will utilize a contract form that is most convenient to Oregon Tech including but not limited to: OUS Retainer Program Supplement, Public Improvement Agreement or a Construction Purchase Order. Damages to existing site conditions caused by the contractor shall be the responsibility of the contractor to repair, replace, or rebuild as required. Site conditions: landscaping, irrigation, utilizes, grading, etc.

The Substantial Completion Deadline for this project is November 29, 2013. Time is of the essence for this project.

Owner furnished materials and labor:

- Concrete
- Concrete blocks

Damages to existing improvements caused by the contractor shall be the responsibility of the contractor to repair, replace, or rebuild as required. Improvements include; landscaping, irrigation, utilizes, grading, etc.

3. Quote

Quotes should be <u>short and concise</u> with the following information:

A. Description of items and services to be provided;
B. Price including all labor, materials, and permits;
C. Warranty information; and

D. Estimated completion of project upon contract execution.

4. Evaluation

The quote received by the lowest responsive responsible Quoter will be awarded a contract. The "lowest responsive responsible Quoter" is the lowest Quoter who has substantially complied with all requirements of the Request for Quote and who can be expected to deliver promptly and perform reliably.

OREGON INSTITUTE OF TECHNOLOGY
CERTIFICATIONS
RFQ #2013-18

Each Quoter must read, complete and submit a copy of this Oregon Institute of Technology Certification with their Quote. Failure to do so may result in rejection of Quote. By signature on this Certification the undersigned certifies that they are authorized to act on behalf of the Quoter and that under penalty of perjury the undersigned will comply with the following:

SECTION I. OREGON TAX LAWS
As required in ORS 305.385(6) the undersigned hereby certifies that to the best of the undersigned's knowledge, the Entity is not in violation of any Oregon Tax Laws. For purposes of this certification, "Oregon Tax Laws" means a state tax imposed by ORS 401.792 to 401.816 and ORS chapters 118, 314, 316, 317, 318, 320, 321 and 323; the elderly rental assistance program under ORS 310.630 to 310.706; and local taxes administered by the Department of Revenue under ORS 305.620. If a Contract is executed, this information will be reported to the Internal Revenue Service. Information not matching IRS records could subject Contractor to 31% backup withholding.

SECTION II. AFFIRMATIVE ACTION
The undersigned hereby certifies that they have not discriminated against Minority, Women or Emerging Small Business Enterprises in obtaining any required subcontracts, pursuant to OAR 580-061-0030(3).

SECTION III. COMPLIANCE WITH SOLICITATION
The undersigned further agrees and certifies that they:

1. Have read, understand and agree to be bound by and comply with all requirements, instructions, specifications, terms and conditions of the RFQ (including any attachments); and
2. Are an authorized representative of the Quoter, that the information provided is true and accurate, and that providing incorrect or incomplete information may be cause for rejection of the Quote or contract termination; and
3. Will furnish the designated item(s) and/or service(s) in accordance with the RFQ and Quote.

Firm Name:______________________________ Date:_____________________________________

Signature:_______________________________ Title:_____________________________________

Name (Type or Print):_________________________ Telephone:________________________________

Email:____________________________________ OR CCB # (if applicable):_______________________

Business Designation (check one):

☐ Corporation ☐ Partnership ☐ Sole Proprietorship ☐ Non-Profit ☐ Limited Liability Company

Oregon Certified Minority, Women, or Emerging Small Business: (Mark if applicable and certification #)

☐ Minority:__________________ ☐ Women:___________________ ☐ ESB:______________________

Self-Reported Minority, Women, or Emerging Small Business: (Mark if applicable)

☐ Minority:__________________ ☐ Women:___________________ ☐ ESB:_____________________

OREGON INSTITUTE OF TECHNOLOGY
INSTRUCTIONS TO QUOTERS

Quotes are subject to the applicable provisions and requirements of the Oregon Administrative Rules and Oregon Revised Statutes.

QUOTE PREPARATION

1. **QUOTE FORMAT**: Quotes must be must be submitted as indicated in the RFQ. Quotes may be submitted in writing to OIT office via e-mail, mail or in person.
2. **CONFORMANCE TO RFQ REQUIREMENTS**: Quotes must conform to the requirements of the RFQ. Unless otherwise specified, all items quoted are to be new, unused and not remanufactured in any way. Any requested attachments must be submitted with the quote and in the required format. Quote prices must be for the unit indicated on the quote. Failure to comply with all requirements may result in quote rejection.
3. **ADDENDA**: Only documents issued as addenda by OIT serve to change the RFQ in any way. No other directions received by the Quoter, written or verbal, serve to change the RFQ document. NOTE: IF YOU HAVE RECEIVED A COPY OF THE RFQ, YOU SHOULD CONSULT THE UNIVERSITY PROCUREMENT GATEWAY WEBSITE (https://secure.ous.edu/bid/) TO ENSURE THAT YOU HAVE NOT MISSED ANY ADDENDA OR ANNOUNCEMENTS. QUOTERS ARE NOT REQUIRED TO RETURN ADDENDUMS WITH THEIR QUOTE. HOWEVER, QUOTERS ARE RESPONSIBLE TO MAKE THEMSELVES AWARE OF, OBTAIN AND INCORPORATE ANY CHANGES MADE IN ANY ADDENDUMS ISSUED, AND TO INCORPORATE ANY CHANGES MADE BY ADDENDUM INTO THEIR FINAL QUOTE. FAILURE TO DO SO MAY, IN EFFECT, MAKE THE QUOTER'S QUOTE NON-RESPONSIVE, WHICH MAY CAUSE THE QUOTE TO BE REJECTED.
4. **USE of BRAND or TRADE NAMES**: Any brand or trade names used by OIT in RFQ specifications are for the purpose of describing and establishing the standard of quality, performance and characteristics desired and are not intended to limit or restrict competition. Quoters may submit quotes for substantially equivalent products to those designated unless the RFQ provides that a specific brand is necessary because of compatibility requirements, etc. All such brand substitutions shall be subject to approval by OIT.
5. **PRODUCT IDENTIFICATION**: Quoters must clearly identify all products quoted. Brand name and model or number must be shown. OIT reserves the right to reject any quote when the product information submitted with the quote is incomplete.
6. **FOB DESTINATION**: Unless specifically allowed in the RFQ, ***QUOTE PRICE MUST BE F.O.B. DESTINATION with all transportation and handling charges paid by the Quoter.***
7. **DELIVERY**: Delivery time must be shown in number of calendar days after receipt of purchase order.
8. **EXCEPTIONS**: Any deviation from quote specifications, or the Oregon Institute of Technology Purchase Order Terms and Conditions may result in quote rejection.
9. **SIGNATURE ON QUOTE**: Quotes must be signed by an authorized representative of the Quoter. Signature on a quote certifies that the quote is made without connection with any person, firm or corporation making a quote for the same goods and/or services and is in all respects fair and without collusion or fraud. Signature on a quote also certifies that the Quoter has read and fully understands all quote specifications, and the Oregon Institute of Technology Purchase Order Terms and Conditions (including insurance requirements). No consideration will be given to any claim resulting from quoting without comprehending all requirements of the RFQ.
10. **QUOTE MODIFICATION**: Quotes, once submitted, may be modified in writing before the time and date set for quote closing. Any modifications should be signed by an authorized representative, and state that the new document supersedes or modifies the prior quote. Quoters may not modify quotes after quote closing time.
11. **QUOTE WITHDRAWALS**: Quotes may be withdrawn by request in writing signed by an authorized representative and received by OIT prior to quote closing time. Quotes may also be withdrawn in person before quote closing time upon presentation of appropriate identification.

12. **QUOTE SUBMISSION**: Quotes may be submitted by returning to OIT Purchasing and Contract Services Office in the location designated in the introduction of the RFQ via e-mail, mail or in person but no oral or telephone quotes will be accepted. Envelopes, or e-mails containing Quotes should contain the RFQ Number and RFQ Title.

QUOTE EVALUATION AND AWARD

1. **PRIOR ACCEPTANCE OF DEFECTIVE PROPOSALS**: Due to limited resources, OIT generally will not completely review or analyze quotes which fail to comply with the requirements of the RFQ or which clearly are not the best quotes, nor will OIT generally investigate the references or qualifications of those who submit such quotes. Therefore, neither the return of a quote, nor acknowledgment that the selection is complete shall operate as a representation by OIT that an unsuccessful quote was complete, sufficient, or lawful in any respect.
2. **DELIVERY**: Significant delays in delivery may be considered in determining award if early delivery is required.
3. **CASH DISCOUNTS**: Cash discounts will not be considered for award purposes unless stated in the RFQ.
4. **PAYMENT**: Quotes which require payment in less than 30 days after receipt of invoice or delivery of goods, whichever is later, may be rejected.
5. **INVESTIGATION OF REFERENCES**: OIT reserves the right to investigate references and or the past performance of any Quoter with respect to its successful performance of similar services, compliance with specifications and contractual obligations, and its lawful payment of suppliers, sub-contractors, and workers. OIT may postpone the award or execution of the contract after the announcement of the apparent successful Quoter in order to complete its investigation. OIT reserves the right to reject any quote or to reject all quotes at any time prior to OIT's execution of a contract if it is determined to be in the best interest of OIT to do so.
6. **METHOD OF AWARD**: OIT reserves the right to make the award by item, groups of items or entire quote, whichever is in the best interest of OIT.
7. **QUOTE REJECTION**: OIT reserves the right to reject any and all quotes.
8. **QUOTE RESULTS**: Quoters who submit a quote will be notified of the RFQ results. Awarded quote files are public records and available for review by appointment.

Precision
Structural
Engineering, Inc.

STRUCTURAL ENGINEERING CALCULATIONS

PROJECT: OIT Softball Dugouts

PROJECT LOCATION: 3201 Campus Dr
Klamath Falls, OR 97601

PSE PROJECT NUMBER: KF213-3094

DATE: June 25, 2013

BY: Nabil Taha, Ph.D., P.E.

8-13-2013

STRUCTURAL
REGISTERED PROFESSIONAL
ENGINEER
19113PE
OREGON
MARCH 23, 2005
NABIL M. TAHA
EXPIRES: 6-2014

250-A Main Street
Klamath Falls, OR. 97601
E-Mail: info@structure1.com
Web: www.structure1.com
ph. (541) 850-6300
fax (541) 850-6233

Table of Contents:

250-A Main Street
Klamath Falls, OR. 97601
E-Mail: info@structure1.com
Web: www.structure1.com
ph. (541) 850-6300
fax (541) 850-6233

Precision Structural Engineering, Inc.

References:

1- Literature:

a. 2010 Oregon Structural Specialty Code (OSSC), based on the 2009 International Building Code (IBC)

b. Design of Wood Structures, Donald E. Breyer 4th ED.

c. Masonry Designers' Guide, TMC 5th Edition

2- Software:

a. RISA Foot Version 3.0,
RISA Technologies,
26212 Dimension Dr. Suite 200

b. Wood Works Design Office 2007,
American Forest & Paper Association

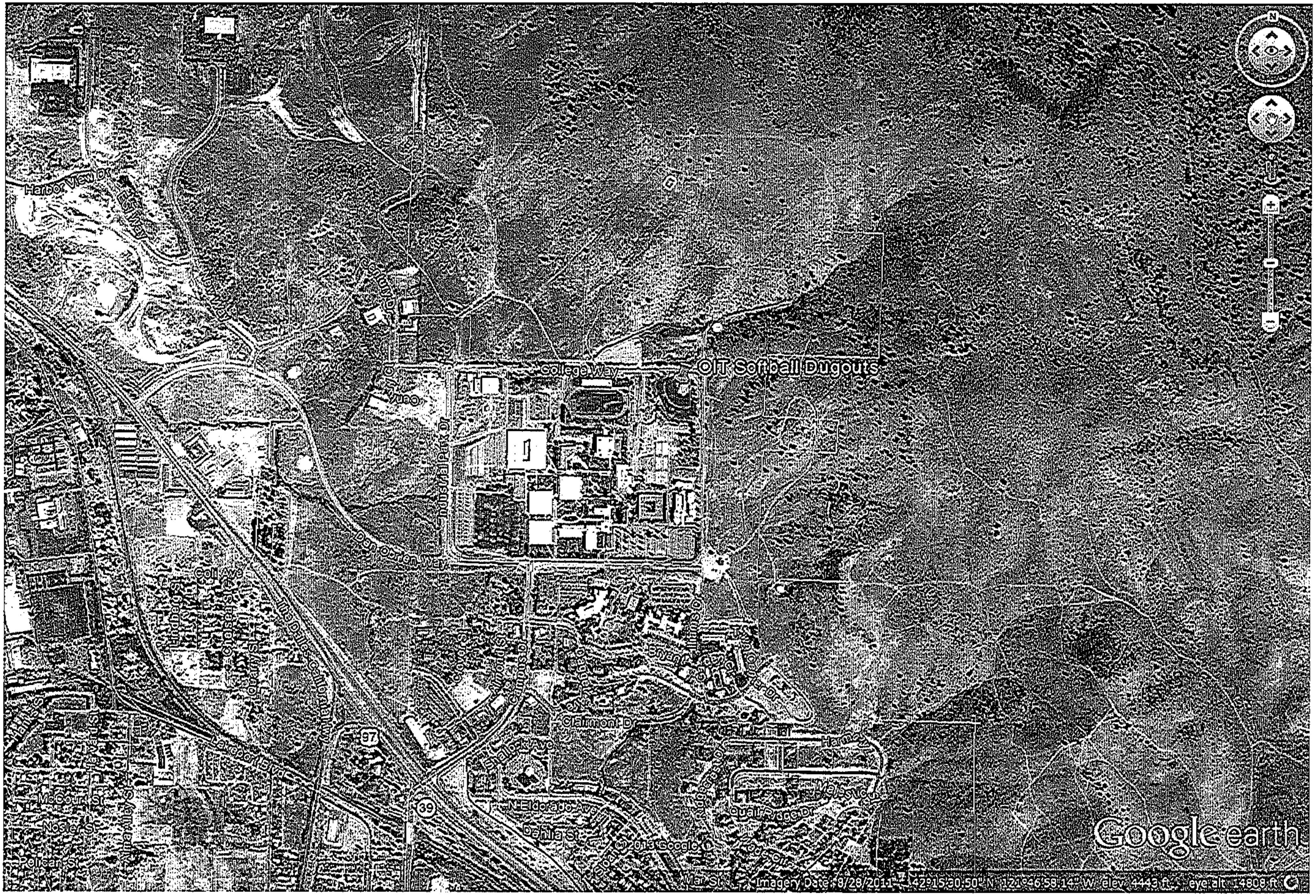
Precision
Structural
Engineering, Inc.

Design Criteria:

1- Location:	3201 Campus Dr. Klamath Falls, OR 97601 (Lat 42° 15' 31" Lon 121° 58' ")	
2- Seismic:	OC	II
	SDC	D
	Site Class	D
	S_{ms}	1.011
	S_{m1}	0.586
	S_{DS}	0.674
	S_{D1}	0.391
	I_E	1.0
	R	5.0
3- Wind:	Basic wind speed	95.0 mph (3 s. gust)
	Exposure	C
	I_W	1.0
4- Snow:	45 psf (ground) 32 psf (flat roof)	
5- Soil Bearing Capacity:	1500 psf (presumptive value from IBC)	
6- Gravity Loads:	DL Floor:	15 psf
	LL Floor:	40 psf
	DL Roof:	10 psf
	Exterior Walls:	81psf
7- Deflection Criteria:	Floor LL Deflection:	L/480
	Roof TL Deflection:	L/180

**Other criteria assumed as stated in design calculations.

250-A Main Street
Klamath Falls, OR. 97601
E-Mail: info@structure1.com
Web: www.structure1.com
ph. (541) 850-6300
fax (541) 850-6233


OIT Softball Dugouts
College Way
Dan O'Brien Way
Google earth
Imagery Date: 8/28/2011 42°15'30.50" N 121°46'58.14" W elev 4443 ft eye alt 14808 ft

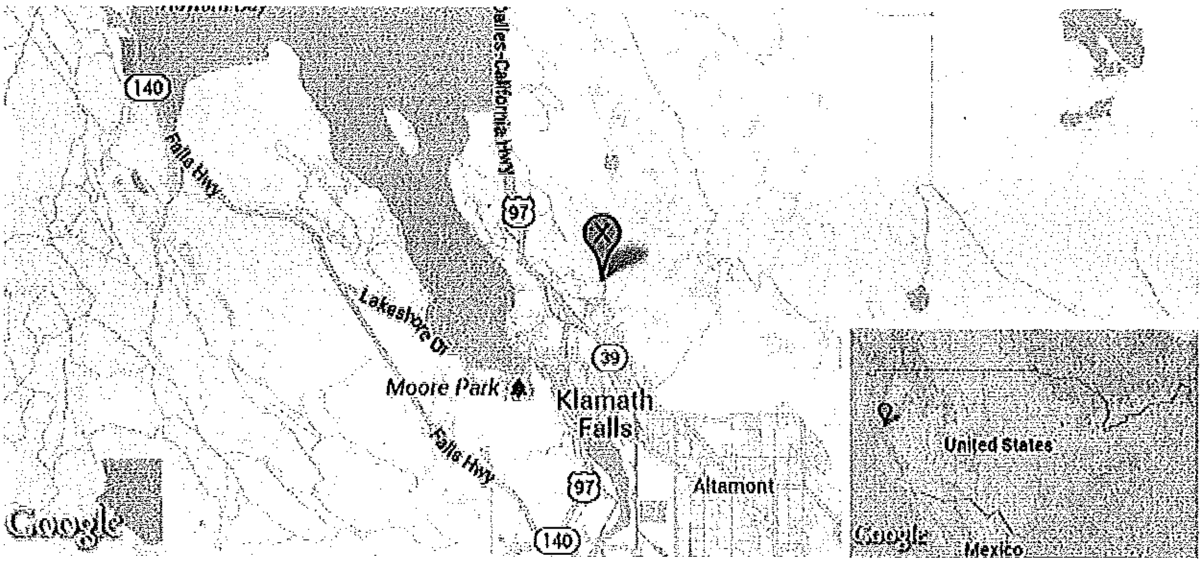
12

22

USGS Design Maps Summary Report

User–Specified Input

Report Title	OIT Softball Dugouts Tue June 18, 2013 22:49:29 UTC
Building Code Reference Document	ASCE 7-05 Standard (which makes use of 2002 USGS hazard data)
Site Coordinates	42.2586°N, 121.7827°W
Site Soil Classification	Site Class D – "Stiff Soil"
Occupancy Category	Occupancy Category I

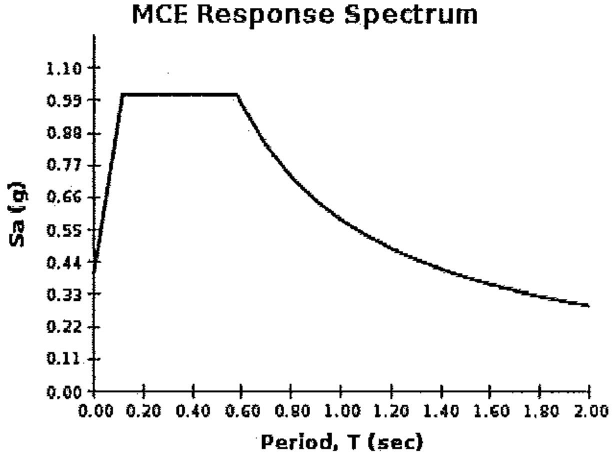


USGS–Provided Output

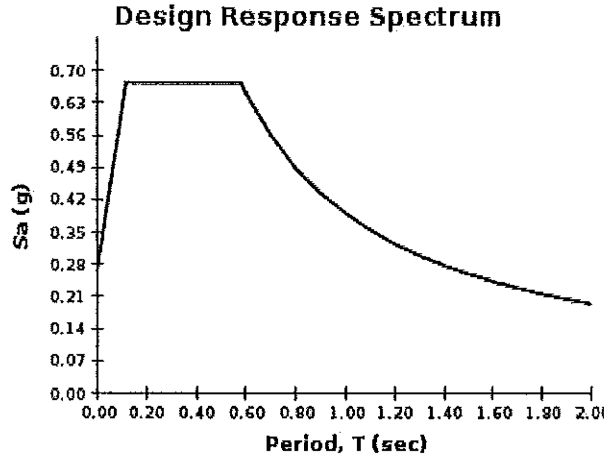
$S_S =$ 0.881 g $S_{MS} =$ 1.011 g $S_{DS} =$ 0.674 g

$S_1 =$ 0.341 g $S_{M1} =$ 0.586 g $S_{D1} =$ 0.391 g

MCE Response Spectrum



Design Response Spectrum



IBC SEISMIC DESIGN

EQUIVALENT LATERAL FORCE PROCEDURE

JOB NUMBER KF213-3094

DESIGNER RMH

Design Information

DATA	VALUE	SOURCE
S_1=	0.341	Seismic Design Parameters (Software)
S_{MS}=	1.011	Seismic Design Parameters (Software)
S_{M1}=	0.6	Seismic Design Parameters (Software)
I_E	1.0	ASCE 7-05 Table 11.5-1
Occupancy Category	2	IBC Table 1604.5
R	5	ASCE 7-05 Table 12.2-1
h_n	9	Height per ASCE 7-05
C_t	0.02	ASCE 7-05 Table 12.8-2

S_{MS}: Max considered spectral response acceleration for short periods

S_{M1}: Max considered spectral response acceleration for 1-second period

I_E: Seismic importance factor

R: Response modification factor

1) Design spectral response acceleration

S_{DS}: 5% Damped spectral response acceleration at short periods
S_{D1}: 5% Damped spectral response acceleration at 1 second period

$S_{DS}=2/3(S_{ms})$ $S_{DS}=$ 2/3 X 1.011 $S_{DS}=$ 0.674 [IBC Eq. 16-39]

$S_{D1}=2/3(S_{m1})$ $S_{D1}=$ 2/3 X 0.586 $S_{D1}=$ 0.391 [IBC Eq. 16-40]

2) Seismic design category

From Table IBC 1613.5.6(1) : D

From Table IBC 1613.5.6(2) : D

Governing Design Category D

3) Determine design base shear (V)

Equivalent Force Procedure
[ASCE 7-05, 12.8.1]

$V = C_s \times W$

C_s : Seismic Response Coefficient
W : Total dead load and other applicable loads

A. [ASCE 7-05, 12.8.1.1, Eq. 12.8-2]

$$C_S = \frac{S_{DS}}{R/I} \qquad C_S = \frac{0.674}{5} 1.0 \qquad C_S = 0.135$$

B. Nor greater than

$$C_S = \frac{S_{D1}}{T(R/I)}$$ [ASCE 7-05, 12.8.1.1, Eq. 12.8-3]

$T = T_a = C_t(h_n^x)$ [ASCE 7-05, 12.8.2.1, Eq. 12.8-7]

$$C_S = \frac{0.391 \times 1}{0.104 \times 5}$$

C_S= 0.752

T_a : Approximate Fundamental Period

$T = 0.020 \times 9^{0.75}$ T= 0.104

C. Nor less than [ASCE 7-05, 12.8.1.1, Eq. 12.8-5]

$C_S = 0.044 (S_{DS})(I)$ $C_S = 0.044 \times 0.674 \times 1$ $C_S = 0.0297$

Governing C_s = 0.135

$V = Cs \times W$ $V = 0.135 \times W$ Refer to sheet two for W and Calculated V

IBC SEISMIC DESIGN

VERTICLE FORCE DISTRIBUTION EQUIVALENT LATERAL FORCE PROCEDURE

JOB NUMBER KF213-3094

DESIGNER LAJ

1. Determine dead load at each level of building.

Structural portion		DL (PSF)	Area (SF)	Length (FT)	Height (FT)	Total Weight (LB)
a) Roof	Diaphram elevation from the base level in ft				8	
	Roof	15	492.2	NA	NA	7383
	Misc.	0	0	0	0	0
	Misc. (LBS)	0	NA	NA	NA	0
c) 5th floor	Diaphram elevation from the base level in ft				0	
	Ext. Walls	15	NA	0	0	0
	Int. Walls	10	NA	0	0	0
	Floor	15	0	NA	NA	0
	Misc.	0	0	0	0	0
	Misc. (LBS)	0	NA	NA	NA	0
d) 4th floor	Diaphram elevation from the base level in ft				0	
	Ext. Walls	15	NA	0	0	0
	Int. Walls	10	NA	0	0	0
	Floor	15	0	NA	NA	0
	Misc.	0	0	0	0	0
	Misc. (LBS)	0	NA	NA	NA	0
e) 3rd floor	Diaphram elevation from the base level in ft				0	
	Ext. Walls	15	NA	0	0	0
	Int. Walls	10	NA	0	0	0
	Floor	15	0	NA	NA	0
	Misc.	0	0	0	0	0
	Misc. (LBS)	0	NA	NA	NA	0
f) 2nd floor	Diaphram elevation from the base level in ft				0	
	Ext. Walls	0	NA	0	1	0
	Int. Walls	0	NA	0	0	0
	Floor	0	0	NA	NA	0
	Misc.	0	0	0	0	0
	Misc. (LBS)	0	NA	NA	NA	0
g) 1st floor	Ext. Walls	81	NA	86	4	27864
	Int. Walls	0	NA	0	4	0
	Misc.	0	0	0	0	0
					TOTAL DEAD LOAD (LB) =	35247

2) Determine verticle force distribution at each level ASCE 7-02 9.5.5.4 pg. 148

$F_x = C_{vx} \times V$ ASCE 7-02 Eq. 9.5.5.4-1

$$C_{vx} = \frac{w_x \times h_x^k}{\sum w_i h_i^k}$$ ASCE 7-02 Eq. 9.5.5.4-2

F_x: Lateral seismic force at any level

V: Seismic base shear (Kips)

w_x & w_i : The portion of the total gravity load of the structure (W) located or assigned to level i or x

h_x& h_x: The height (ft) from the base to level i or x diaphram.

k : An exponent related to the structures period (T) as follows;

$T \leq 0.5$ sec $k = 1$ $T \geq 2.5$ sec $k = 2$ $0.5 \leq T \leq 2.5$ Interpolate between 1 & 2

Refer to sheet one for V

V = 0.135 X W V = 0.135 X 35247 V= 4.751 (kips) T= 0.1039 k= 1

Level (floor)	Wall Height (ft)	Diaphram Height (Ft)	W_x (kips)	$W_x{*}h_x^k$	C_{vx}	F_x (kips)	Allowable F_x (kips)
Roof	5	8	7.383	59	1.000	4.75	3.39
5	0	0	0.000	0	0.000	0	0.00
4	0	0	0.000	0	0.000	0	0.00
3	0	0	0.000	0	0.000	0	0.00
2	4	0	13.932	0	0.000	0.00	0.00
			21.315	59	1.000	4.75	3.4

Note: The Total Shear shown in the right hand column is an "allowable" load.

MECAWind Version 2.1.1.3 per ASCE 7-05

Developed by MECA Enterprises, Inc. Copyright 2013 www.mecaenterprises.com

Date	: 6/18/2013	Project No.	:
Company Name	:	Designed By	:
Address	:	Description	:
City	:	Customer Name	:
State	:	Proj Location	:

File Location: C:\Program Files (x86)\MECAWind\Default.wnd

Detailed Wind Load Design(Method 2) per ASCE 7-05

All pressures shown are based upon ASD Design, with a Load Factor of 1

Basic Wind Speed(V)	= 95.00 mph	Structure Type	= Building
Structural Category	= II	Exposure Category	= C
Natural Frequency	= N/A	Flexible Structure	= No
Importance Factor	= 1.00	Kd Directional Factor	= 0.85
Alpha	= 9.50	Zg	= 900.00 ft
At	= 0.11	Bt	= 1.00
Am	= 0.15	Bm	= 0.65
Cc	= 0.20	l	= 500.00 ft
Epsilon	= 0.20	Zmin	= 15.00 ft
Slope of Roof	= 0.6 : 12	Slope of Roof(Theta)	= 2.86 Deg
Ht: Mean Roof Ht	= 7.75 ft	Type of Roof	= Monoslope
RHt: Ridge Ht	= 8.00 ft	Eht: Eave Height	= 7.50 ft
OH: Roof Overhang at Eave	= .00 ft	Roof Area	= 360.00 ft^2
Bldg Length Along Ridge	= 36.00 ft	Bldg Width Across Ridge	= 10.00 ft

Gust Factor Category I Rigid Structures - Simplified Method

Gust1: For Rigid Structures (Nat. Freq.>1 Hz) use 0.85 = 0.85

Gust Factor Category II Rigid Structures - Complete Analysis

Zm:	0.6*Ht	= 15.00 ft
lzm:	Cc*(33/Zm)^0.167	= 0.23
Lzm:	l*(Zm/33)^Epsilon	= 427.06 ft
Q:	(1/(1+0.63*((B+Ht)/Lzm)^0.63))^0.5	= 0.96
Gust2:	0.925*((1+1.7*lzm*3.4*Q)/(1+1.7*3.4*lzm))	= 0.90

Gust Factor Summary

Not a Flexible Structure use the Lessor of Gust1 or Gust2 = 0.85

Figure 6-5 Internal Pressure Coefficients for Buildings, GCpi

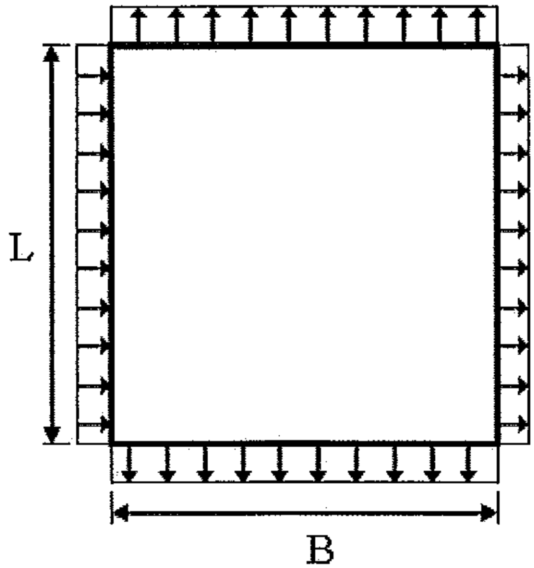
GCPi : Internal Pressure Coefficient = +/-0.55

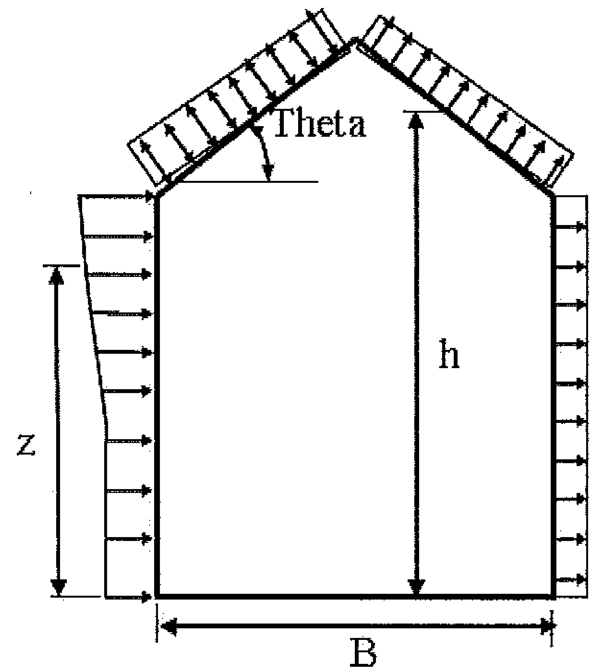
Reduction Factor for Large Volume Buildings, Ri

Aog:	Total Area of Openings in Bldg Envelope	= .00 ft^2
Vi:	Unpartitioned Internal Value	= .00 ft^3
Ri:	0.5*((1+1/(1+(Vi/(22800*Aog))^0.5))(Eqn. 6-16)	= 1.000

Notes: 1) +GCpi = +0.55 * Ri
Notes: 2) -GCpi = -0.55 * Ri

Figure 6-6 External Pressure Coefficients
Cp - Loads on Main Wind-Force Resisting Systems(Method 2)





Kh: 2.01*(Ht/Zg)^(2/Alpha)	=	0.85
Kht: Topographic Factor (Figure 6-4)	=	1.00
Qh: .00256*(V)^2*I*Kh*Kht*Kd	=	16.67 psf
Cpww: Windward Wall Cp(Ref Fig 6-6)	=	0.80
Roof Area	=	360.00 ft^2
Reduction Factor based on Roof Area	=	0.89

MWFRS-Wall Pressures for Wind Normal to 36 ft wall (Normal to Ridge)

Wall	Cp	Pressure +GCpi (psf)	Pressure -GCpi (psf)
Leeward Wall	-0.50	-16.25	2.08
Side Walls	-0.70	-19.09	-0.75

Wall	Elev ft	Kz	Kzt	qz psf	Press +GCpi	Press -GCpi	Total +/-GCpi
Windward	8.00	0.85	1.00	16.67	2.17	20.51	18.42

Note: 1) Total = Leeward GCPi + Windward GCPi

Roof - Dist from Windward Edge	Cp	Pressure +GCpi(psf)	Pressure -GCpi(psf)
0.0 ft to 3.9 ft	-1.03	-23.70	-5.36
3.9 ft to 7.8 ft	-0.80	-20.51	-2.17
7.8 ft to 10.0 ft	-0.60	-17.67	0.67

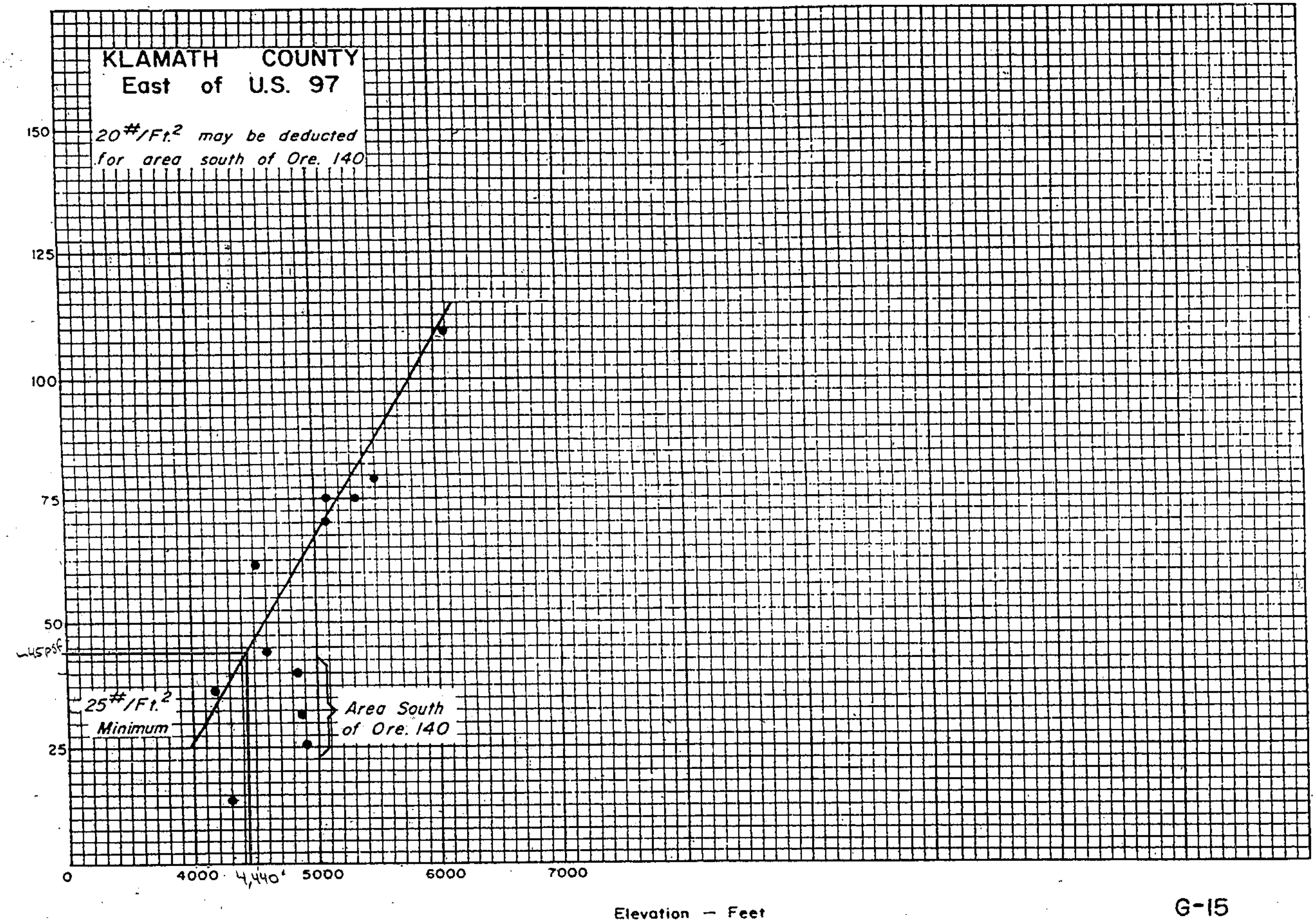
MWFRS-Wall Pressures for Wind Normal to 10 ft wall (Along Ridge)

Wall	Cp	Pressure +GCpi (psf)	Pressure -GCpi (psf)
Leeward Wall	-0.22	-12.29	6.05
Side Walls	-0.70	-19.09	-0.75

Wall	Elev ft	Kz	Kzt	qz psf	Press +GCpi	Press -GCpi	Total +/-GCpi
Windward	8.00	0.85	1.00	16.67	2.17	20.51	14.45

Note: 1) Total = Leeward GCPi + Windward GCPi

Roof - Dist from Windward Edge	Cp	Pressure +GCpi(psf)	Pressure -GCpi(psf)
0.0 ft to 3.9 ft	-0.90	-21.92	-3.58
3.9 ft to 7.8 ft	-0.90	-21.92	-3.58
7.8 ft to 15.5 ft	-0.50	-16.25	2.08
15.5 ft to 36.0 ft	-0.30	-13.42	4.92


KLAMATH COUNTY
East of U.S. 97
20#/Ft.2 may be deducted for area south of Ore. 140
150
125
100
75
50
~45psf
25
25#/Ft.2 Minimum
Area South of Ore. 140
0
4000
4,440'
5000
6000
7000
Elevation — Feet

G-15

IBC SNOW LOAD
SLOPED ROOF

PROJECT NUMBER KF213-3094

DESIGNER LAJ

P_s : Sloped roof snow load (PSF)
C_S : Slope factor [ASCE-7, Fig 7 - 05]
P_f : Flat roof snow load (PSF)
C_e : Exposure factor [IBC Table 1608.3.1]
C_t : Thermal factor [IBC Table 1608.3.2]
I : Snow load importance factor [IBC Table 1604.5]
P_g : Ground snow load

δ: Density of snow
h_d: Drift Height [ASCE-7, Fig 7-9, l_u=W from windward side]
S: roof slope for a rise of 1 = 24

1) Flat Roof Snow Load

$P_f = 0.7 \times C_e \times C_t \times I \times P_g$ [ASCE-7, Eq 7-1]

Cat., Exposure
C_e = C, Partially Exposed   I = 1.0

C_t = 1.0 P_g = 45

P_f = .7 x 1 x 1 x 1 x 45 = 32 (PSF)

2) Sloped Roof Snow Load

$P_s = C_S \times P_f$ [ASCE-7, Eq 7-05]

Roof slope = 0.5 / 12 = 2 °

C_s = 1.00 [ASCE-7 Fig 7-05]

P_s = 1.00 x 32

P_s = 32 (PSF)

Enter values from Code   Calculated Values

ROOF FRAMING ANALYSIS & DESIGN:

Pages 1,000 - 1,999

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PROJECT NO. KF 213-3094 SHEET 1001 OF ______

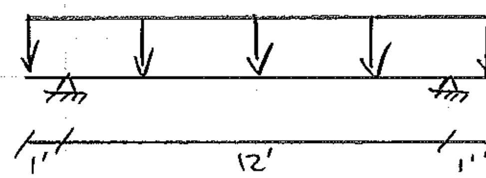
PROJECT NAME OIT Softball Dugouts DESIGNED BY LAJ DATE 6/21/2013

SUBJECT Roof Design CHECKED BY ______ DATE ______

Rafter Design:

DL_{roof} = 10psf
SL = 32psf

Trib width = 24"



Line Load = Area load × Tributary width

$W_D = 10psf \times \frac{16''}{12 in/ft} = 13.3$ plf

$W_S = 32psf \times \frac{16''}{12 in/ft} = 42.7$ plf

Use [2×8 No. 2 DFL @ 24" O.C.]

WoodWorks® SOFTWARE FOR WOOD DESIGN	COMPANY July 3, 2013 07:32	PROJECT KF213-3094 OIT Softball Dugouts Rafter Design

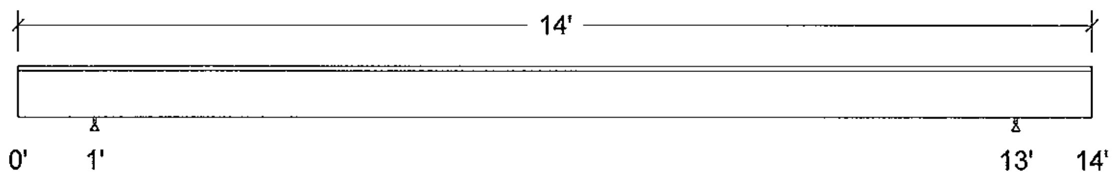
Design Check Calculation Sheet

WoodWorks Sizer 9.3

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	Location [ft] End	Magnitude Start	Magnitude End	Unit
DEAD LOAD	Dead	Full UDL	No			13.3		plf
SNOW LOAD	Snow	Full UDL	Yes			42.7		plf
Self-weight	Dead	Full UDL	No			2.6		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:					
Dead		111		111	
Snow		300		300	
Factored:					
Total		411		411	
Bearing:					
Capacity					
Joist		820		820	
Anal/Des					
Joist		0.50		0.50	
Load comb		#5		#8	
Length		0.50*		0.50*	
Min req'd		0.50*		0.50*	
Cb		1.75		1.75	
Cb min		1.75		1.75	

*Minimum bearing length setting used: 1/2" for interior supports

Lumber-soft, D.Fir-L, No.2, 2x8 (1-1/2"x7-1/4")

Supports: All - Non-wood

Roof joist spaced at 24.0" c/c; Total length: 14';

Lateral support: top= full, bottom= at supports; Repetitive factor: applied where permitted (refer to online help);

Analysis vs. Allowable Stress (psi) and Deflection (in) using NDS 2005 :

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 43	Fv' = 207	fv/Fv' = 0.21
Bending(+)	fb = 946	Fb' = 1428	fb/Fb' = 0.66
Bending(-)	fb = 26	Fb' = 1416	fb/Fb' = 0.02
Deflection:			
Interior Live	0.26 = L/560	0.60 = L/240	0.43
Total	0.40 = L/361	0.80 = L/180	0.50
Cantil. Live	-0.07 = L/175	0.10 = L/120	0.68
Total	-0.11 = L/113	0.13 = L/90	0.79

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	180	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	900	1.15	1.00	1.00	1.000	1.200	1.00	1.15	1.00	1.00	-	4
Fb'-	900	1.15	1.00	1.00	0.991	1.200	1.00	1.15	1.00	1.00	-	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million		1.00	1.00	-	-	-	-	1.00	1.00	-	4
Emin'	0.58 million		1.00	1.00	-	-	-	-	1.00	1.00	-	4

CRITICAL LOAD COMBINATIONS:

```
Shear      : LC #2  = D+S, V =    351, V design =    315 lbs
Bending(+) : LC #4  = D+S (pattern: sSs), M =   1036 lbs-ft
Bending(-) : LC #2  = D+S, M =     28 lbs-ft
Deflection: LC #4  =   (live)
            LC #4  =   (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load Patterns: s=S/2,  X=L+S or L+Lr,  _=no pattern load in this span
Load combinations: ICC-IBC
```

CALCULATIONS:

```
Deflection:  EI =     76e06 lb-in2
"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.
```

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2009), the National Design Specification (NDS 2005), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Continuous or Cantilevered Beams: NDS Clause 4.2.5.5 requires that normal grading provisions be extended to the middle 2/3 of 2 span beams and to the full length of cantilevers and other spans.
4. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.
5. The critical deflection value has been determined using maximum back-span deflection. Cantilever deflections do not govern design.

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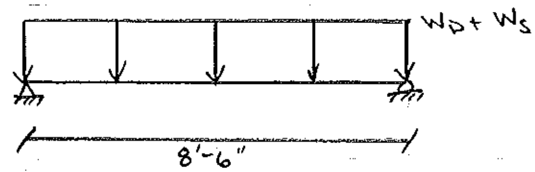
PROJECT NO. KF 213-3094 SHEET 1004 OF ______

PROJECT NAME OIT Softball Dugouts DESIGNED BY LAJ DATE 6/21/2013

SUBJECT Roof Design CHECKED BY N.O. DATE 7-8-13

Beam Design:



DL_{roof} = 10 psf
SL = 32 psf

Trib width = $\frac{12'}{2}$ = 6'

W = Area load × trib width

W_D = 10 psf × 6' = 60 plf
W_S = 32 psf × 6' = 192 plf

[Use 4x8 No. 2 DFL]

1008

	COMPANY	PROJECT
WoodWorks® SOFTWARE FOR WOOD DESIGN	June 21, 2013 16:22	KF213-3094 OIT Softball Dugouts (3) Beams

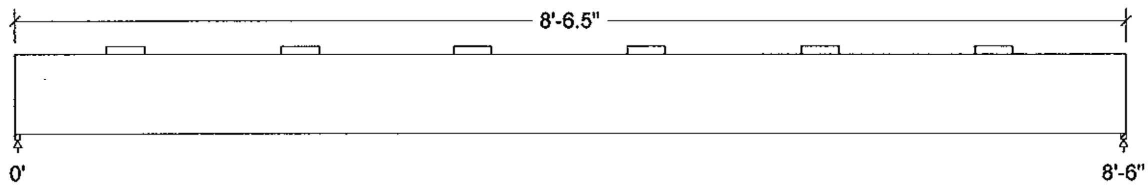
Design Check Calculation Sheet

WoodWorks Sizer 9.14

Loads:

Load	Type	Distribution	Pattern	Location [ft] Start	End	Magnitude Start	End	Unit
DEAD LOAD	Dead	Full UDL				60.0		plf
SNOW LOAD	Snow	Full UDL				192.0		plf
Self-weight	Dead	Full UDL				6.0		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



	0'		8'-6"
Unfactored:			
Dead	281		281
Snow	816		816
Factored:			
Total	1097		1097
Bearing:			
Capacity			
Beam	1097		1097
Anal/Des			
Beam	1.00		1.00
Load comb	#2		#2
Length	0.50		0.50
Min req'd	0.50		0.50
Cb	1.00		1.00
Cb min	1.00		1.00

Lumber-soft, D.Fir-L, No.2, 4x8 (3-1/2"x7-1/4")

Supports: All - Non-wood

Total length: 8'-6.5";

Lateral support: top= 16.00 bottom= at supports; [in]

Analysis vs. Allowable Stress (psi) and Deflection (in) using NDS 2005 :

Criterion	Analysis Value	Design Value	Analysis/Design
Shear	fv = 55	Fv' = 207	fv/Fv' = 0.27
Bending(+)	fb = 912	Fb' = 1343	fb/Fb' = 0.68
Live Defl'n	0.13 = L/804	0.28 = L/360	0.45
Total Defl'n	0.19 = L/530	0.42 = L/240	0.45

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	180	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	900	1.15	1.00	1.00	0.998	1.300	1.00	1.00	1.00	1.00	-	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million		1.00	1.00	-	-	-	-	1.00	1.00	-	2
Emin'	0.58 million		1.00	1.00	-	-	-	-	1.00	1.00	-	2

CRITICAL LOAD COMBINATIONS:

```
Shear    : LC #2  = D+S, V =   1097, V design =    935 lbs
Bending(+): LC #2  = D+S, M =   2330 lbs-ft
Deflection: LC #2  = D+S  (live)
            LC #2  = D+S  (total)
D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake
All LC's are listed in the Analysis output
Load combinations: ICC-IBC
```

CALCULATIONS:

```
Deflection: EI =    178e06 lb-in2
"Live" deflection = Deflection from all non-dead loads (live, wind, snow…)
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.
```

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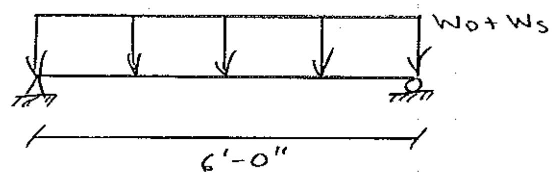
PROJECT NO. KF213-3094 SHEET 1006 OF

PROJECT NAME OIT Softball Dugouts DESIGNED BY Luke DATE 6/25/2013

SUBJECT Roof Design CHECKED BY N T DATE 7-8-13

Garage Header:



DL_{roof} = 10 psf
SL = 32 psf

Trib. width = $\frac{10.7'}{2}$ (roof) + 1' (overhang)

= 6.4'

$W_{D.roof}$ = 10 psf × 6.4'

= 64 plf

W_S = 32 psf × 6.4'

= 205 plf

DL (masonry) = 81 psf

$h_{block} = 8'' \times \frac{1'}{12''} = 0.7'$

W_D = DL(masonry) × h_{block}

= 81 psf × 0.7'

= 56.7 plf

$M = \frac{w\ell^2}{8} = \frac{326 \text{ plf } (6ft)^2}{8}$

M = 1,467 lb-ft

$V = \frac{w\ell}{2} = \frac{326 \text{ plf} \times 6ft}{2}$

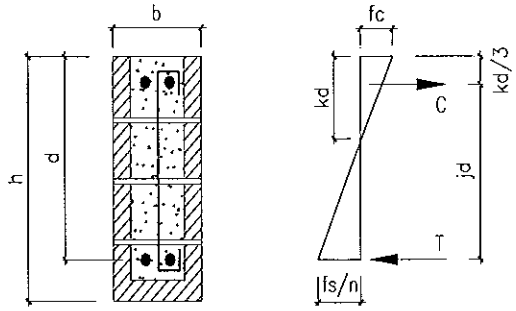
V = 978 lbs

Use [8" × 8" Lintel w/ (1) #4 Bar]

PROJECT :	OIT Softball Dugouts	PAGE :	
CLIENT :	OIT	DESIGN BY :	LAJ
JOB NO. :	KF213-3094 DATE : 6/26/13	REVIEW BY :	

Masonry Beam Design Based on ACI 530-05

INPUT DATA & DESIGN SUMMARY



SPECIAL INSPECTION (0=NO, 1=YES)			1	Yes
TYPE OF MASONRY (1=CMU, 2=BRICK)			1	CMU
MASONRY STRENGTH	f_m'	=	1.5	ksi
REBAR YIELD STRESS	f_y	=	60	ksi
ALLOWABLE INCREASING ? (IBC/CBC 1605.3.2)			Yes	
SERVICE SHEAR LOAD	V	=	0.978	k
SERVICE MOMENT LOAD	M	=	1.467	ft-k
WIDTH	b	=	8	in
EFFECTIVE DEPTH	d	=	8	in
CLEAR SPAN	Lc	=	6	ft
LOAD TYPE (1=SEISMIC, 0=WIND, 5=GRAVITY)			5	Gravity Only

VERTICAL REINF. 0 # 4 @ 32 in o.c.

TENSION REINFORCEMENT 1 # 4

[THE BEAM DESIGN IS ADEQUATE.]

ANALYSIS

ALLOWABLE STRESS FACTOR	SF	=	1.333		
ALLOWABLE REINF. STRESS	(1.33 or 1.0) F_s	=	32	ksi	
ALLOWABLE MASONRY STRESS	F_b=(SF)(0.33f_m')	=	0.66	ksi	
MASONRY ELASTICITY MODULUS	E_m	=	1350	ksi, (Sec. 1.8.2.2.1)	
STEEL ELASTICITY MODULUS	E_s	=	29000	ksi	
EFFECTIVE WIDTH	b_w	=	7.63	in	[Satisfactory, Lc < 32 bw]
MODULAR RATIO	n	=	21.48		
TENSION REINFORCEMENT RATIO	ρ	=	0.003		

THE NEUTRAL AXIS DEPTH FACTOR IS

$$k=\sqrt{2\rho n+(\rho n)^2}-\rho n = 0.311$$

THE LEVER-ARM FACTOR IS

$$j=1-\frac{k}{3} = 0.896$$

THE TENSILE STRESS IN REINFORCEMENT DUE TO FLEXURE IS

$$f_s=\frac{M}{A_s jd} = 12.28 \text{ ksi} < F_s$$ [SATISFACTORY]

THE COMPRESSIVE STRESS IN THE EXTREME FIBER DUE TO FLEXURE IS

$$f_b=\frac{2M}{jkb_w d^2} = 0.26 \text{ ksi} < F_b$$ [SATISFACTORY]

THE SHEAR STRESS IN MASONRY IS

$$f_v=\frac{V}{b_w d} = 16 \text{ psi}$$

(Sec. 2.3.5.2.1)

$< F_v=(SF)MIN(\sqrt{f'_m}\ ,\ 50)=$ 51.64 psi [SATISFACTORY]

$< F_v=(SF)MIN(3\sqrt{f'_m}\ ,\ 150)=$ 154.92 psi [SATISFACTORY]

CHECK THE MINIMUM AREA OF SHEAR REINFORCEMENT REQUIRED :

$\frac{V}{F_s d}=$ 0.05 in^2 / ft > $\frac{A_v}{s}=$ 0.00 in^2 / ft (No shear reinf. Reqd)

FIRST FLOOR/FOUNDATION ANALYSIS & DESIGN:

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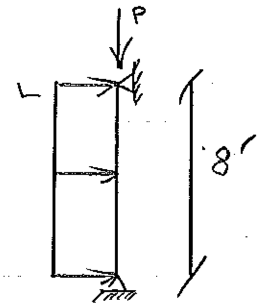
PROJECT NO. KF213-3094 SHEET 2001 OF
PROJECT NAME OIT Softball Dugouts DESIGNED BY Luke DATE 6/24/2013
SUBJECT Floor/Foundation CHECKED BY DATE

Masonry Bearing Wall:

P:
$DL_{roof} = 10psf$
$SL_{roof} = 32psf$

Trib. width = $\frac{10.7'}{2}$(roof) + 1'(overhang)
= 5.4'

$W_D = 10psf \times 5.4' = 54plf$
$W_S = 32psf \times 5.4' = 173plf$



L:

WL = 26.4 psf

Use [8" CMU wall w/ #4 32" o.c.]

Continuous Footing:

$DL_{roof} = 10psf$
$SL = 32psf$

DL(masonry) = 81 psf

$W_{D-roof} = 10 psf \times 7.4' = 74 plf$

$W_S = 32psf \times 7.4' = 237 plf$

$W_{D-masonry} = 81 psf \times 7.4' = 600 plf$

Use [12"w × 12"D Footing w/ (3) #4 Bars]

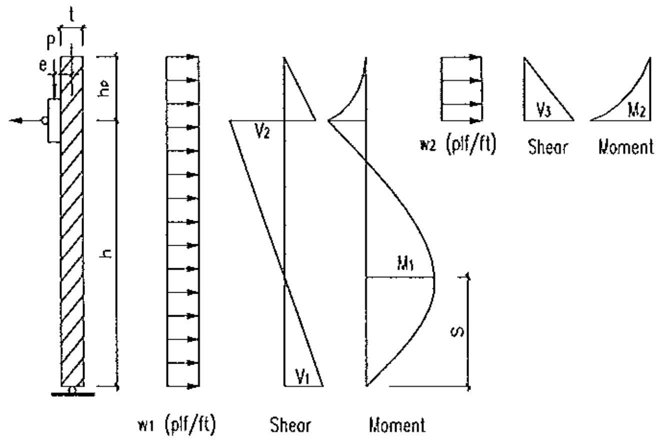
PROJECT : OIT Softball Dugouts PAGE :
CLIENT : OIT DESIGN BY : LAJ
JOB NO. : KF213-3094 DATE : 6/24/2013 REVIEW BY :

Allowable Stress Design of Masonry Bearing Wall Based on ACI 530-05 / IBC 06

INPUT DATA & DESIGN SUMMARY

SPECIAL INSPECTION (0=NO, 1=YES)			1	Yes
TYPE OF MASONRY (1=CMU, 2=BRICK)			1	CMU
MASONRY STRENGTH	f_m'	=	1.5	ksi
REBAR YIELD STRESS	f_y	=	60	ksi
ALLOWABLE INCREASING ? (IBC/CBC 1605.3.2)			Yes	
SERVICE GRAVITY LOAD	P	=	4.842	lbs / ft
SERVICE LATERAL LOAD	w_1	=	26.4	plf / ft
SERVICE PARAPET LOAD	w_2	=	66.4	plf / ft
THICKNESS OF WALL	t	=	8	in
PARAPET HEIGHT	h_p	=	0	ft
WALL HEIGHT	h	=	8	ft
ECCENTRICITY	e	=	0	in

WALL VERT. REINF. (A_{sv}) 1 # 4 @ 32 in o.c. (at middle)



[THE WALL DESIGN IS ADEQUATE.]

ANALYSIS

REINF. AREA AT EACH SIDE	A_s	=	0.08	in^2
EFFECTIVE DEPTH (ACI, 1.13.3.5)	d	=	3.82	in
WIDTH OF SECTION	b_w	=	12.00	in
EFFECTIVE THICKNESS	t_e	=	7.63	in
MASONRY ELASTICITY MODULUS	E_m	=	1350	ksi
STEEL ELASTICITY MODULUS	E_s	=	29000	ksi

MODULAR RATIO	n	=	21.48
REINFORCEMENT RATIO	ρ	=	0.0016
ALLOWABLE STRESS FACTOR	SF	=	1.333

THE NEUTRAL AXIS DEPTH FACTOR IS

$$k = \sqrt{2\rho n + (\rho n)^2} - \rho n = 0.23243$$

THE ALLOWABLE STRESS DUE TO FLEXURE IS

$$F_b = (SF)(0.33 f'_m) = 660 \text{ psi}$$

THE ALLOWABLE REINF. STRESS DUE TO FLEXURE IS

$$F_S = (1.33 \ \ or \ \ 1.0)(24000 \ \ or \ \ 20000) = 32000 \text{ psi}$$

THE DISTANCE FROM BOTTOM TO M_1 IS

$$S = h + h_p - \left[\frac{(h+h_p)^2}{2h} - \frac{Pe}{h w_1}\right] = 4.0 \text{ ft}$$

THE GOVERNING MOMENTS AND AXIAL FORCES ARE

$$M_1 = \frac{1.05}{2 w_1 h^2}\left[Pe + \frac{w_1}{2}\left(h^2 - h_p^2\right)\right]^2 = 222 \text{ ft-lbs/ft}$$

$$P_1 = P + (wall \ \ weight) = 352 \text{ lbs / ft}$$

$$M_2 = \frac{w_2 h_p^2}{2} = 0 \text{ ft-lbs/ft}$$

$$P_2 = P + (wall \ \ weight) = 5 \text{ lbs / ft}$$

THE GOVERNING SHEAR FORCES ARE

$$V_1 = (h + h_p) w_1 - \frac{(h+h_p)^2 w_1}{2h} + \frac{Pe}{h} = 106 \text{ lbs / ft}$$

$$V_2 = h w_1 - V_1 = 106 \text{ lbs / ft}$$

$$V_3 = h_p w_2 = 0 \text{ lbs / ft}$$

THE GOVERNING SHEAR STRESS IN MASONRY IS

$$f_v = \frac{MAX(V_1 \ , \ V_2 \ , \ V_3)}{t_e b_w} = 1.15 \text{ psi}$$

DETERMINE THE REGION FOR FLEXURE AND AXIAL LOAD (MDG Tab 12.2.1, Fig 12.2-12 & 13, page 12-25).

$$\frac{M}{Pd} \le \frac{t_e}{6d}$$

1. Wall is in compression and not cracked.

$$\frac{M}{Pd} \le \left(\frac{t_e}{2d} - \frac{1}{3}\right)$$

2. Wall is cracked but steel is in compression.

$$\frac{M}{Pd} > \left(\frac{t_e}{2d} - \frac{1}{3}\right)$$

3. Wall is cracked and steel is in tension.

REGION 3 APPLICABLE FOR (M1, P1)

REGION 1 APPLICABLE FOR (M2, P2)

(cont'd)

CHECK REGION 1 CAPACITY

$$M_m = \frac{b_w t_e^2}{6} F_b - P\frac{t_e}{6} = \begin{cases} 6367 \text{ ft-lbs / ft} > M_1 & \text{[Not applicable]} \\ 6403 \text{ ft-lbs / ft} > M_2 & \text{[Satisfactory]} \end{cases}$$

CHECK REGION 2 CAPACITY

$$M_m = P\frac{t_e}{2} - \frac{2P^2}{3b_w F_b} = \begin{cases} 111 \text{ ft-lbs / ft} < M1 & \text{[Not applicable]} \\ 2 \text{ ft-lbs / ft} > M2 & \text{[Not applicable]} \end{cases}$$

CHECK REGION 3 CAPACITY (The moment maybe limited by either the masonry compression or steel tension, MDG page 12-25).

$$M_m = MIN\left[\frac{1}{2}b_w kd F_b\left(d - \frac{kd}{3}\right) - P\left(d - \frac{t_e}{2}\right) \;,\; A_s F_s\left(d - \frac{kd}{3}\right) + P\left(\frac{t_e}{2} - \frac{kd}{3}\right)\right]$$

$$= \begin{cases} 807 \text{ ft-lbs / ft} > M_1 & \text{[Satisfactory]} \\ 705 \text{ ft-lbs / ft} > M_2 & \text{[Not applicable]} \end{cases}$$

THE ALLOWABLE SHEAR STRESS IS GIVEN BY

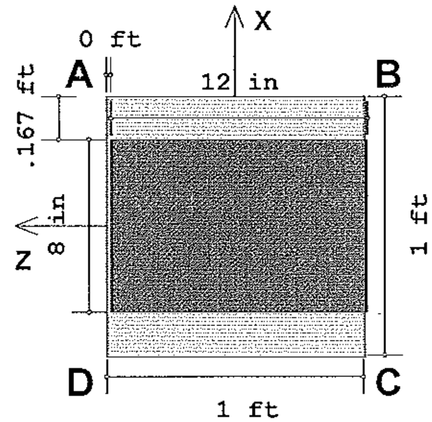
$$F_v = (SF)\, MIN\left(\sqrt{f'_m} \;,\; 50\right) = 51.64 \text{ psi} > f_v \quad \text{[Satisfactory]}$$

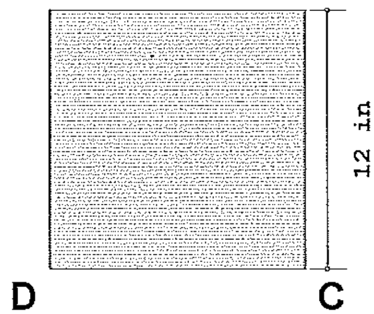
Technical References:

1. "Masonry Designers' Guide, Third Edition" (MDG-3), The Masonry Society, 2001.

2004

Sketch





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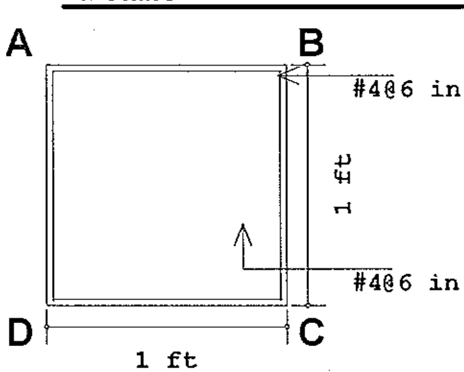
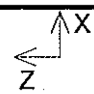
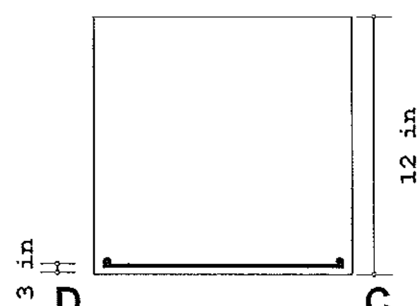






Footing Elevation

X Dir. Steel: .39 in^2 (2,#4)

Z Dir. Steel: .39 in^2 (2 #4)

Bottom Rebar Plan

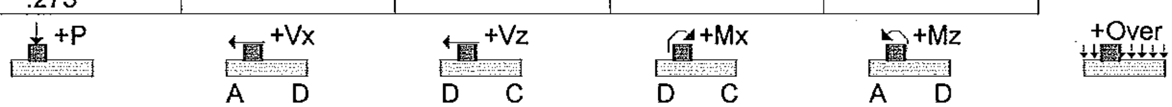
Geometry, Materials and Criteria

Length	:1 ft	eX	:0 in	Gross Allow. Bearing	:1500 psf (gross)	Steel fy	:60 ksi
Width	:1 ft	eZ	:0 in	Concrete Weight	:150 pcf	Minimum Steel	:.0018
Thickness	:12 in	pX	:8 in	Concrete f'c	:3 ksi	Maximum Steel	:.0075
Height	:0 in	pZ	:12 in	Design Code	:ACI 318-05		

Footing Top Bar Cover	:3 in	Overturning Safety Factor	:1.5	Phi for Flexure	:0.9
Footing Bottom Bar Cover	:3 in	Coefficient of Friction	:0.3	Phi for Shear	:0.75
Pedestal Longitudinal Bar Cover	:1e-8 in	Passive Resistance of Soil	:0 k	Phi for Bearing	:0.65

Loads

	P (k)	Vx (k)	Vz (k)	Mx (k-ft)	Mz (k-ft)	Overburden (psf)
DL	.674					100
SL	.273					



Soil Bearing

Description	Categories and Factors	Gross Allow.(psf)	Max Bearing (psf)	Max/Allowable Ratio
ASCE 2.4.1-1	1DL	1500	924 (A)	.616
ASCE 2.4.1-2	1DL+1LL	1500	924 (A)	.616
ASCE 2.4.1-3a	1DL+1WL	1500	924 (A)	.616
ASCE 2.4.1-3b	1DL+.7EL	1500	924 (A)	.616
ASCE 2.4.1-3c	1DL+.75LL+.75WL	1500	924 (A)	.616
ASCE 2.4.1-3d	1DL+.75LL+.7EL	1500	924 (A)	.616
ASCE 2.4.1-4	.6DL+1WL	1500	554.4 (A)	.37
ASCE 2.4.1-5	.6DL+.7EL	1500	554.4 (A)	.37

1DL
QA: 924 psf
QB: 924 psf
QC: 924 psf
QD: 924 psf
NAZ: -1 in
NAX: -1 in

1DL+1LL
QA: 924 psf
QB: 924 psf
QC: 924 psf
QD: 924 psf
NAZ: -1 in
NAX: -1 in

1DL+1WL
QA: 924 psf
QB: 924 psf
QC: 924 psf
QD: 924 psf
NAZ: -1 in
NAX: -1 in

1DL+.7EL
QA: 924 psf
QB: 924 psf
QC: 924 psf
QD: 924 psf
NAZ: -1 in
NAX: -1 in

1DL+.75LL+.75WL
QA: 924 psf
QB: 924 psf
QC: 924 psf
QD: 924 psf
NAZ: -1 in
NAX: -1 in

1DL+.75LL+.7EL
QA: 924 psf
QB: 924 psf
QC: 924 psf
QD: 924 psf
NAZ: -1 in
NAX: -1 in

.6DL+1WL
QA: 554.4 psf
QB: 554.4 psf
QC: 554.4 psf
QD: 554.4 psf
NAZ: -1 in
NAX: -1 in

.6DL+.7EL
QA: 554.4 psf
QB: 554.4 psf
QC: 554.4 psf
QD: 554.4 psf
NAZ: -1 in
NAX: -1 in

Footing Flexure Design (Bottom Bars)

Description	Categories and Factors	Mu-XX (k-ft)	Z Dir As (in^2)	Mu-ZZ (k-ft)	X Dir As (in^2)
ACI-99 9-1	1.4DL+1.7LL	1.1795e-7	0	.013	.000332852
ACI-99 9-2	1.05DL+1.275LL+1.275WL	8.84625e-8	0	.01	.000249637
ACI-99 9-3	.9DL+1.3WL	7.5825e-8	0	.008	.000213973
IBC 16-5	1.2DL+1LL+1EL	1.011e-7	0	.011	.0002853
IBC 16-6	.9DL+1EL	7.5825e-8	0	.008	.000213973

Footing Shear Check

Two Way (Punching) Vc: NA One Way (X Dir. Cut) Vc 11.502 k One Way (Z Dir. Cut) Vc: 11.502 k

		Punching		X Dir. Cut		Z Dir. Cut	
Description	Categories and Factors	Vu(k)	Vu/∅Vc	Vu(k)	Vu/∅Vc	Vu(k)	Vu/∅Vc
ACI-99 9-1	1.4DL+1.7LL	NA	NA	.0004718	0	.0004718	0
ACI-99 9-2	1.05DL+1.275LL+1.275WL	NA	NA	.00035385	0	.00035385	0
ACI-99 9-3	.9DL+1.3WL	NA	NA	.0003033	0	.0003033	0
IBC 16-5	1.2DL+1LL+1EL	NA	NA	.0004044	0	.0004044	0
IBC 16-6	.9DL+1EL	NA	NA	.0003033	0	.0003033	0

Concrete Bearing Check (Vertical Loads Only)

Bearing Bc : 244.8 k

Description	Categories and Factors	Bearing Bu (k)	Bearing Bu/∅Bc
ACI-99 9-1	1.4DL+1.7LL	1.294	.008
ACI-99 9-2	1.05DL+1.275LL+1.275WL	.97	.006
ACI-99 9-3	.9DL+1.3WL	.832	.005
IBC 16-5	1.2DL+1LL+1EL	1.109	.007
IBC 16-6	.9DL+1EL	.832	.005

Overturning Check (Service)

Description	Categories and Factors	Mo-XX (k-ft)	Ms-XX (k-ft)	Mo-ZZ (k-ft)	Ms-ZZ (k-ft)	OSF-XX	OSF-ZZ
ASCE 2.4.1-1	1DL	0	.462	0	.462	NA	NA
ASCE 2.4.1-2	1DL+1LL	0	.462	0	.462	NA	NA
ASCE 2.4.1-3a	1DL+1WL	0	.462	0	.462	NA	NA
ASCE 2.4.1-3b	1DL+.7EL	0	.462	0	.462	NA	NA
ASCE 2.4.1-3c	1DL+.75LL+.75WL	0	.462	0	.462	NA	NA
ASCE 2.4.1-3d	1DL+.75LL+.7EL	0	.462	0	.462	NA	NA
ASCE 2.4.1-4	.6DL+1WL	0	.277	0	.277	NA	NA
ASCE 2.4.1-5	.6DL+.7EL	0	.277	0	.277	NA	NA

Mo-XX: Governing Overturning Moment about AD or BC
Ms-XX: Governing Stablizing Moment about AD or BC
OSF-XX: Ratio of Ms-XX to Mo-XX

Sliding Check (Service)

Description	Categories and Factors	Va-XX (k)	Vr-XX (k)	Va-ZZ (k)	Vr-ZZ (k)	SR-XX	SR-ZZ
ASCE 2.4.1-1	1DL	0	.257	0	.257	NA	NA
ASCE 2.4.1-2	1DL+1LL	0	.257	0	.257	NA	NA
ASCE 2.4.1-3a	1DL+1WL	0	.257	0	.257	NA	NA
ASCE 2.4.1-3b	1DL+.7EL	0	.257	0	.257	NA	NA
ASCE 2.4.1-3c	1DL+.75LL+.75WL	0	.257	0	.257	NA	NA
ASCE 2.4.1-3d	1DL+.75LL+.7EL	0	.257	0	.257	NA	NA
ASCE 2.4.1-4	.6DL+1WL	0	.154	0	.154	NA	NA
ASCE 2.4.1-5	.6DL+.7EL	0	.154	0	.154	NA	NA

Va-XX: Applied Lateral Force to Cause Sliding Along XX Axis
Vr-XX: Resisting Lateral Force Against Sliding Along XX Axis
SR-XX: Ratio of Vr-XX to Va-XX

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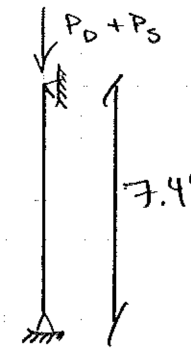
PROJECT NO. KF213-3094 SHEET 2007 OF

PROJECT NAME OIT Softball Dugouts DESIGNED BY Luke DATE 6/26/2013

SUBJECT Floor / Foundation CHECKED BY DATE



Post Design:

$DL_{roof} = 10\,psf$
$SL = 32\,psf$

Trib. width $= \frac{10.7'}{2}$ (roof) + 1' (overhang)

$= 6.4'$

Trib. Length = 8.5' (spacing between posts)

$P_D = 10\,psf \times 6.4' \times 8.5'$

$= 544\ lbs$

$P_S = 32\,psf \times 6.4' \times 8.5'$

$= 1{,}741\ lbs$

Use [HSS 2.5 × 0.25 → 2.5" ϕ Pipe w/ ½" thickness]

Foundation Design:

$P_{Dead} = 544\ lbs$

$P_{snow} = 1{,}741\ lbs$

Use [1'-0" W × 2'-0" L × 1'-0" deep w/ #4 bars @ 6" O.C.]

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/f...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1

Hot Rolled Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
1	Post	Post	7.4												Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Post	PIPE_2.5	Column	Pipe	A500 Gr.42	Typical	1.61	1.45	1.45	2.89

Basic Load Cases

	BLC Description	Category	X Gravi...	Y Gravi...	Z Gravity	Joint	Point	Distrib...	Area(M...	Surfac...
1	Dead	DL		-1			1			
2	Snow	SL					1			

Load Combinations

	Description	Solve	PDelta	SRSS	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
1	IBC 16-8	Yes			DL	1														
2	IBC 16-9	Yes			DL	1	LL	1	LLS	1										
3	IBC 16-10 (a)	Yes			DL	1														
4	IBC 16-10 (b)	Yes			DL	1	SL	1	SLN	1										
5	IBC 16-11 (b)	Yes			DL	1	LL	.75	LLS	.75	SL	.75	SLN	.75						

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*ft^...
No Data to Print ...			

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(de...	Section/Shape	Type	Design List	Material	Design Rules
1	Post	BASE	TOP			Post	Column	Pipe	A500 Gr.42	Typical

Envelope Member Section Forces

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	Post	1	max	.02	4	0	1	0	1	0	1	0	1	0	1
2			min	.02	1	0	1	0	1	0	1	0	1	0	1
3		2	max	0	1	0	1	0	1	0	1	0	1	0	1
4			min	0	1	0	1	0	1	0	1	0	1	0	1
5		3	max	-.02	4	0	1	0	1	0	1	0	1	0	1
6			min	-.02	1	0	1	0	1	0	1	0	1	0	1

Envelope Member Section Deflections

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
1	Post	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
2			min	0	1	0	1	0	1	0	1	NC	1	NC	1
3		2	max	0	1	0	1	0	1	0	1	NC	1	NC	1
4			min	0	1	0	1	0	1	0	1	NC	1	NC	1
5		3	max	0	1	0	1	0	1	0	1	NC	1	NC	1
6			min	0	1	0	1	0	1	0	1	NC	1	NC	1

Envelope Joint Reactions

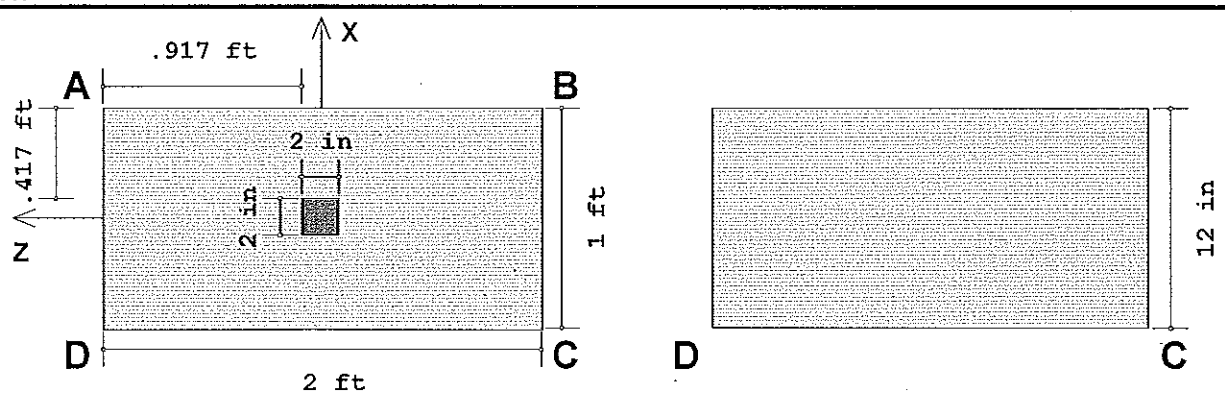
	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BASE	max	0	1	.02	4	NC	NC	NC	NC	NC	NC	0	1
2		min	0	1	.02	1	NC	NC	NC	NC	NC	NC	0	1
3	TOP	max	0	1	2.305	4	NC	NC	NC	NC	NC	NC	0	1
4		min	0	1	.564	1	NC	NC	NC	NC	NC	NC	0	1
5	Totals:	max	0	1	2.326	4	0	1						
6		min	0	1	.585	1	0	1						

Envelope AISC ASD Steel Code Checks

	Member	Shape	Code Check	Loc...	LC	Shea...	Loc...	...	L...	Fa [k...	Ft [ksi]	Fb y-...	Fb z-...	...	C...	C...	ASD ...
1	Post	PIPE_2.5	.001	0	4	.000	0		1	14.982	25.2	27.72	27.72	1..	.6	.6	H1-1

Company : Precision Structural Engineering, Inc. June 27, 2013
Designer : LAJ
Job Number : KF213-3094 **Post Footing Design** Checked By:_____

Sketch



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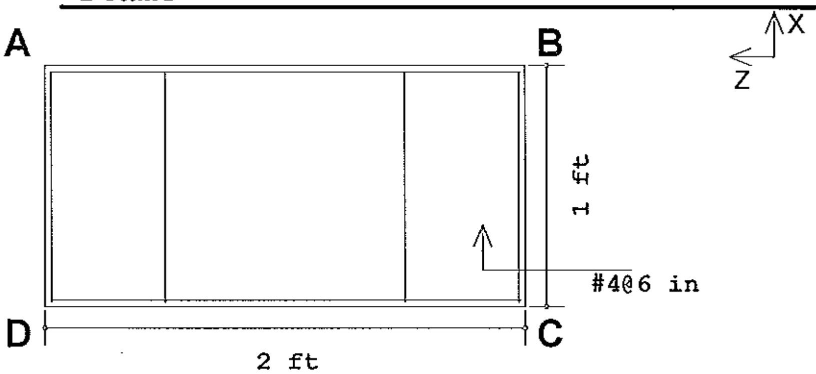
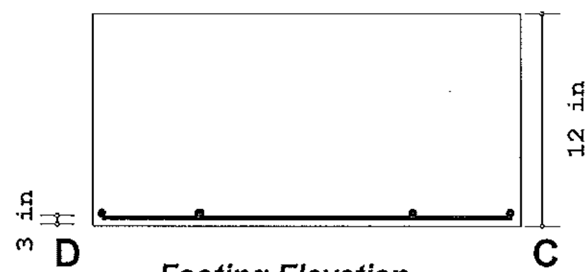




Footing Elevation

Controlling X direction steel requires the following placement:

Region 1 (starts at A):	6 in	Steel: .2 in^2(1 #4 @NA)
Region 2 (middle):	**12 in**	Steel: **.39 in^2(2 #4 @12 in)**
Region 3 (ends at B):	6 in	Steel: .2 in^2(1 #4 @NA)

Bottom Rebar Plan

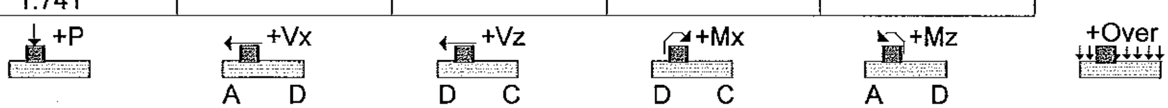
Geometry, Materials and Criteria

Length	:2 ft	eX	:0 in	Gross Allow. Bearing	:1500 psf (gross)	Steel fy	:60 ksi
Width	:1 ft	eZ	:0 in	Concrete Weight	:150 pcf	Minimum Steel	:.0018
Thickness	:12 in	pX	:2 in	Concrete f'c	:3 ksi	Maximum Steel	:.0075
Height	:0 in	pZ	:2 in	Design Code	:ACI 318-05		

Footing Top Bar Cover	:3 in	Overturning Safety Factor	:1.5	Phi for Flexure	:0.9
Footing Bottom Bar Cover	:3 in	Coefficient of Friction	:0.3	Phi for Shear	:0.75
Pedestal Longitudinal Bar Cover	:.5 in	Passive Resistance of Soil	:0 k	Phi for Bearing	:0.65

Loads

	P (k)	Vx (k)	Vz (k)	Mx (k-ft)	Mz (k-ft)	Overburden (psf)
DL	.544					100
LL	1.741					



Soil Bearing

Description	Categories and Factors	Gross Allow.(psf)	Max Bearing (psf)	Max/Allowable Ratio
ASCE 2.4.1-1	1DL	1500	522 (A)	.348
ASCE 2.4.1-2	1DL+1LL	1500	1392.5 (A)	.928
ASCE 2.4.1-3a	1DL+1WL	1500	522 (A)	.348
ASCE 2.4.1-3b	1DL+.7EL	1500	522 (A)	.348
ASCE 2.4.1-3c	1DL+.75LL+.75WL	1500	1174.87 (A)	.783
ASCE 2.4.1-3d	1DL+.75LL+.7EL	1500	1174.87 (A)	.783
ASCE 2.4.1-4	.6DL+1WL	1500	313.2 (A)	.209
ASCE 2.4.1-5	.6DL+.7EL	1500	313.2 (A)	.209

1DL
QA: 522 psf
QB: 522 psf
QC: 522 psf
QD: 522 psf
NAZ: -1 in
NAX: -1 in

1DL+1LL
QA: 1392.5 psf
QB: 1392.5 psf
QC: 1392.5 psf
QD: 1392.5 psf
NAZ: -1 in
NAX: -1 in

1DL+1WL
QA: 522 psf
QB: 522 psf
QC: 522 psf
QD: 522 psf
NAZ: -1 in
NAX: -1 in

1DL+.7EL
QA: 522 psf
QB: 522 psf
QC: 522 psf
QD: 522 psf
NAZ: -1 in
NAX: -1 in

1DL+.75LL+.75WL
QA: 1174.87 psf
QB: 1174.87 psf
QC: 1174.87 psf
QD: 1174.87 psf
NAZ: -1 in
NAX: -1 in

1DL+.75LL+.7EL
QA: 1174.87 psf
QB: 1174.87 psf
QC: 1174.87 psf
QD: 1174.87 psf
NAZ: -1 in
NAX: -1 in

.6DL+1WL
QA: 313.2 psf
QB: 313.2 psf
QC: 313.2 psf
QD: 313.2 psf
NAZ: -1 in
NAX: -1 in

.6DL+.7EL
QA: 313.2 psf
QB: 313.2 psf
QC: 313.2 psf
QD: 313.2 psf
NAZ: -1 in
NAX: -1 in

Footing Flexure Design (Bottom Bars)

Description	Categories and Factors	Mu-XX (k-ft)	Z Dir As (in^2)	Mu-ZZ (k-ft)	X Dir As (in^2)
ACI-99 9-1	1.4DL+1.7LL	.782	.02	.323	.008
ACI-99 9-2	1.05DL+1.275LL+1.275WL	.586	.015	.242	.006
ACI-99 9-3	.9DL+1.3WL	.103	.003	.043	.001
IBC 16-5	1.2DL+1LL+1EL	.503	.013	.208	.005
IBC 16-6	.9DL+1EL	.103	.003	.043	.001

Footing Shear Check

Two Way (Punching) Vc: NA One Way (X Dir. Cut) Vc 11.502 k One Way (Z Dir. Cut) Vc: 23.004 k

		Punching		X Dir. Cut		Z Dir. Cut	
Description	Categories and Factors	Vu(k)	Vu/⌀Vc	Vu(k)	Vu/⌀Vc	Vu(k)	Vu/⌀Vc
ACI-99 9-1	1.4DL+1.7LL	NA	NA	.349	.04	.002	0
ACI-99 9-2	1.05DL+1.275LL+1.275WL	NA	NA	.262	.03	.001	0
ACI-99 9-3	.9DL+1.3WL	NA	NA	.046	.005	.0002448	0
IBC 16-5	1.2DL+1LL+1EL	NA	NA	.224	.026	.001	0
IBC 16-6	.9DL+1EL	NA	NA	.046	.005	.0002448	0

Concrete Bearing Check (Vertical Loads Only)

Bearing Bc : 20.4 k

Description	Categories and Factors	Bearing Bu (k)	Bearing Bu/⌀Bc
ACI-99 9-1	1.4DL+1.7LL	4.421	.333
ACI-99 9-2	1.05DL+1.275LL+1.275WL	3.316	.25
ACI-99 9-3	.9DL+1.3WL	.94	.071
IBC 16-5	1.2DL+1LL+1EL	2.994	.226
IBC 16-6	.9DL+1EL	.94	.071

Overturning Check (Service)

Description	Categories and Factors	Mo-XX (k-ft)	Ms-XX (k-ft)	Mo-ZZ (k-ft)	Ms-ZZ (k-ft)	OSF-XX	OSF-ZZ
ASCE 2.4.1-1	1DL	0	1.044	0	.522	NA	NA
ASCE 2.4.1-2	1DL+1LL	0	2.785	0	1.392	NA	NA
ASCE 2.4.1-3a	1DL+1WL	0	1.044	0	.522	NA	NA
ASCE 2.4.1-3b	1DL+.7EL	0	1.044	0	.522	NA	NA
ASCE 2.4.1-3c	1DL+.75LL+.75WL	0	2.35	0	1.175	NA	NA
ASCE 2.4.1-3d	1DL+.75LL+.7EL	0	2.35	0	1.175	NA	NA
ASCE 2.4.1-4	.6DL+1WL	0	.626	0	.313	NA	NA
ASCE 2.4.1-5	.6DL+.7EL	0	.626	0	.313	NA	NA

Mo-XX: Governing Overturning Moment about AD or BC
Ms-XX: Governing Stablizing Moment about AD or BC
OSF-XX: Ratio of Ms-XX to Mo-XX

Sliding Check (Service)

Description	Categories and Factors	Va-XX (k)	Vr-XX (k)	Va-ZZ (k)	Vr-ZZ (k)	SR-XX	SR-ZZ
ASCE 2.4.1-1	1DL	0	.312	0	.312	NA	NA
ASCE 2.4.1-2	1DL+1LL	0	.835	0	.835	NA	NA
ASCE 2.4.1-3a	1DL+1WL	0	.312	0	.312	NA	NA
ASCE 2.4.1-3b	1DL+.7EL	0	.312	0	.312	NA	NA
ASCE 2.4.1-3c	1DL+.75LL+.75WL	0	.704	0	.704	NA	NA
ASCE 2.4.1-3d	1DL+.75LL+.7EL	0	.704	0	.704	NA	NA
ASCE 2.4.1-4	.6DL+1WL	0	.187	0	.187	NA	NA
ASCE 2.4.1-5	.6DL+.7EL	0	.187	0	.187	NA	NA

Va-XX: Applied Lateral Force to Cause Sliding Along XX Axis
Vr-XX: Resisting Lateral Force Against Sliding Along XX Axis
SR-XX: Ratio of Vr-XX to Va-XX

LATERAL ANALYSIS & DESIGN:

Pages 3,000 - 3,999

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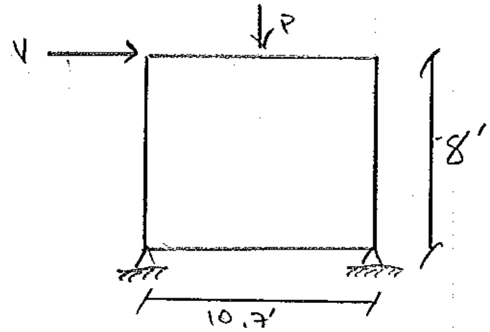
PROJECT NO. KF213-3094 SHEET 3000 OF ______

PROJECT NAME OIT Softball Dugouts DESIGNED BY Luke DATE 6/25/2013

SUBJECT Lateral CHECKED BY ______ DATE ______

Shear walls:



Trib. width = $\frac{36'}{2}$ (longest wall)
= 18'

V:

WL:

WL = 18.42 psf

$h/2 = \frac{7.4'}{2} = 3.7'$

V = WL × Trib width × $h/2$

= 18.42 psf × 18' × 3.7'

= 1,227 lbs

EL:

V = $\frac{4,751 \text{ lbs}}{2 \text{ walls}}$ =

= 2,376 lbs

P:

DL = 10 psf
SL = 32 psf

Trib. width = $\frac{10.7'}{2}$ (roof) + 1' (overhang)

= 6.4'

DL = 10 psf × 6.4' = 64 plf

SL = 32 psf × 6.4' = 205 plf

Trib. Length = $\frac{36'}{2}$ (longest wall)

= 18'

P_{Dead} = 64 plf × 18'

= 1,152 lbs

P_{snow} = 205 plf × 18'

= 3,690 lbs

$P_{TOT} = P_D + P_S$ = 1,152 lbs + 3,690 lbs

= 4,842 lbs

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PROJECT NO. KF213-3094 SHEET 3001 OF

PROJECT NAME OIT Softball Dugouts DESIGNED BY Luke DATE 6/25/2013

SUBJECT Lateral CHECKED BY DATE

Vertical Reinforcement @ each end:

Use [(1) #4, 4" from end]

Wall Horizontal Reinforcement:

Use [#4 spaced 32" o.c.]

Wall Vertical Reinforcement:

Use [8" CMU wall w/ #4 @ 32" o.c.]

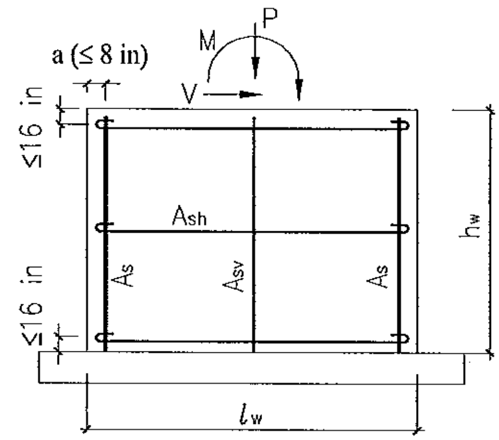
3002

PROJECT : OIT Softball Dugouts
CLIENT : OIT
JOB NO. : KF213-3094   DATE : 6/25/2013
PAGE :
DESIGN BY : LAJ
REVIEW BY :

Masonry Shear Wall Design Based on IBC 2006 / ACI 530-05

INPUT DATA & DESIGN SUMMARY

SPECIAL INSPECTION (0=NO, 1=YES)			1	Yes
TYPE OF MASONRY (1=CMU, 2=BRICK)			1	CMU
MASONRY STRENGTH	f_m'	=	1.5	ksi
REBAR YIELD STRESS	f_y	=	60	ksi
ALLOWABLE INCREASING ? (IBC/CBC 1605.3.2)			YES	
SEISMIC PERFORMANCE CATEGORY (C,D,E, 0=WIND, 5=GRAVITY)			D	Seismic D
SERVICE AXIAL LOAD	P	=	4.842	k
SERVICE SHEAR LOAD	V	=	2.376	k
SERVICE MOMENT LOAD	M	=	0	ft-k
THICKNESS OF WALL	t	=	8	in
LENGTH OF WALL	l_w	=	10.7	ft
EFFECTIVE HEIGHT of WALL	h_w	=	8	ft



VERT. REINF. AT EACH END (A_s) 1 # 4 => DIST. FR BAR'S CENT. TO END a = 4 in
WALL HORIZ. REINF. (A_{sh}) 1 # 4 @ 32 in o.c.
WALL VERT. REINF. (A_{sv}) 1 # 4 @ 32 in o.c.

[THE WALL DESIGN IS ADEQUATE.]

ANALYSIS

REINF. AREA AT EACH END	A_s	=	0.20	in^2
GROSS WALL AREA	A_g	=	1027	in^2
EFFECTIVE LENGTH OF WALL	d	=	124	in
EFFECTIVE THICKNESS OF WALL	b_w	=	7.63	in
MASONRY ELASTICITY MODULUS	E_m	=	1350	ksi
STEEL ELASTICITY MODULUS	E_s	=	29000	ksi

MODULAR RATIO	n	=	21.48	
REINFORCEMENT RATIO	ρ	=	0.0002	
ALLOWABLE STRESS FACTOR	SF	=	1.333	
REQD MIN. HORIZ. REINF.	$A_{sh,min}$	=	0.075	in^2/ft
	$S_{sh,max}$	=	32	in
REQD MIN. VERT. REINF.	$A_{sv,min}$	=	0.075	in^2/ft
	$S_{sv,max}$	=	32	in

THE ALLOWABLE STRESS DUE TO FLEXURE IS

$$F_b = (SF)(0.33 f'_m) = \quad 0.660 \text{ ksi}$$

THE ALLOWABLE REINF. STRESS DUE TO FLEXURE IS

$$F_S = (1.33 \;\; or \;\; 1.0)(24 \;\; or \;\; 20) = \quad 32.00 \text{ ksi}$$

THE TOTAL AXIAL FORCE ACTING AT BOTTOM IS

$$P_T = P + (wall \;\; weight) = \quad 12.5 \text{ kips}$$

THE TOTAL MOMENT ACTING AT BOTTOM IS

$$M_T = M + V h_w = \quad 19.01 \text{ ft-kips}$$

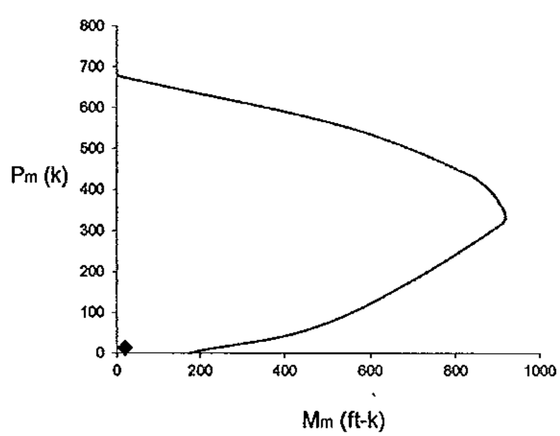
THE NEUTRAL AXIS DEPTH FACTOR IS

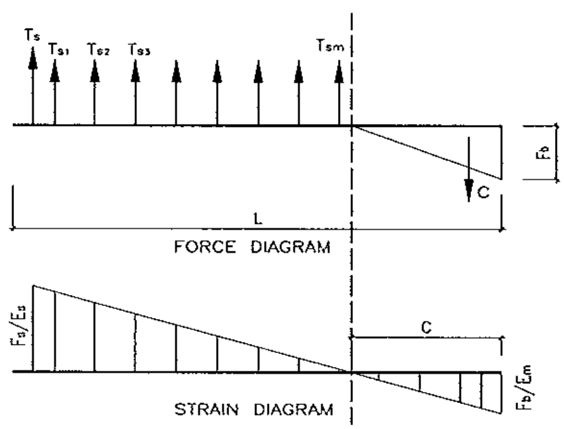
$$k = \sqrt{2\rho n + (\rho n)^2} - \rho n \quad = \quad 0.09$$

THE SHEAR STRESS IN MASONRY IS

$$f_v = \frac{V}{b_w l_w} \quad = \quad 2 \text{ psi}$$

CHECK FLEXURAL & AXIAL CAPACITY





THE CODE SEC. 2.3.2.2.1 PERMITS COMPRESSION FORCES TO BE RESISTED BY COMPRESSION REINFORCEMENT ONLY IF THE LATERAL SUPPORT REQUIREMENTS OF CODE SEC. 2.1.6.5 ARE MET. SINCE IT IS VIRTUALLY IMPOSSIBLE TO MEET THESE PROVISIONS IN WALLS, THE CONTRIBUTION OF REINFORCING STEEL TO COMPRESSIVE FORCE MUST BE NEGLECTED.

THE MAXIMUM DESIGN AXIAL LOAD STRENGTH IS $P_m = t\,L_w\,SF\,(f_m'/3)$ = 677.952 kips. THE DESIGN MOMENT CAPACITY AT MAXIMUM AXIAL LOAD STRENGTH IS 0 ft-kips.
THE DESIGN AXIAL AND MOMENT CAPACITIES AT THE WALL CRACKED BUT STEEL STRESS ZERO ARE 438 kips AND 830 ft-kips.

FOR THE BALANCED STRAIN CONDITION UNDER COMBINED FLEXURE AND AXIAL LOAD, THE MAXIMUM STRAIN IN THE MASONRY AND IN THE TENSION REINFORCEMENT MUST SIMULTANEOUSLY REACH THE VALUES AS $\varepsilon_m = F_b / E_m$ and $\varepsilon_s = F_s / E_s$. THE DESIGN AXIAL AND MOMENT CAPACITIES AT THE BALANCED STRAIN CONDITION ARE 319 kips AND 911 ft-kips.

SUMMARY OF LOAD VERSUS MOMENT CAPACITIES ARE SHOWN IN THE TABLE BELOW, AND THEY ARE PLOTTED ON THE INTERACTION DIAGRAM ABOVE.

		P_m (kips)	M_m (ft-kips)
AT AXIAL LOAD ONLY	=	678	0
AT LARGE AXIAL LOAD	=	558	528
AT 0 % TENSION	=	438	830
AT 25 % TENSION	=	401	878
AT 50 % TENSION	=	369	902
AT BALANCED STRAIN CONDITION	=	319	911
AT SMALL AXIAL LOAD	=	80	514
AT FLEXURE ONLY	=	0	174

THE DESIGN FORCES P & M ARE ALSO PLOTTED ON THE INTERACTION DIAGRAM. FROM THE INTERACTION DIAGRAM, THE ALLOWABLE MOMENT AT AN AXIAL LOAD P IS

M_m = 216 ft-kips. > M [Satisfactory]

CHECK SHEAR CAPACITY

THE ALLOWABLE SHEAR STRESS IS GIVEN BY

$$F_{v,\,without\ reinf.} = \begin{cases} (SF)\,MIN\left[\frac{1}{3}\left(4-\frac{M_T}{Vd}\right)\sqrt{f_m'}\ ,\ \left(80-\frac{45M_T}{Vd}\right)\right]\ ,\ for\ \frac{M_T}{Vd}<1.0 \\ (SF)\,MIN(\sqrt{f_m'}\ ,\ 35)\ ,\ for\ \frac{M_T}{Vd}\geq 1.0 \end{cases}$$

= 55.57 psi > 1.5 f_v [Satisfactory]
(factor 1.5 from IBC 2106.5.1)

$$F_{v,\,max} = \begin{cases} (SF)\,MIN\left[\frac{1}{2}\left(4-\frac{M_T}{Vd}\right)\sqrt{f_m'}\ ,\ \left(120-\frac{45M_T}{Vd}\right)\right]\ ,\ for\ \frac{M_T}{Vd}<1.0 \\ (SF)\,MIN(1.5\sqrt{f_m'}\ ,\ 75)\ ,\ for\ \frac{M_T}{Vd}\geq 1.0 \end{cases}$$

= 83.35 psi > f_v [Satisfactory]

CHECK THE MINIMUM AREA OF SHEAR REINFORCEMENT REQUIRED :

$1.5\ \frac{V}{F_s d} =$ 0.01 in^2 / ft < $\frac{A_v}{s} =$ 0.08 in^2 / ft (No shear reinf. reqd.)

(cont'd)

CHECK MAXIMUM REINFORCEMENT PERCENTAGE (IBC 06, 2107.8) :

$\frac{M}{Vd} =$ 0.0 < 1.0 , *and*

$P =$ 4.842 kips < $0.05 f_m' A_n =$ 77.04 kips

$$\rho_{max} = \frac{n f'_m}{2 f_y \left(n + \frac{f_y}{f'_m} \right)} = 0.0044 > \rho = 0.0002$$

[Satisfactory]

Technical References:

1. "Masonry Designers' Guide, Third Edition" (MDG-3), The Masonry Society, 2001.
2. Alan Williams: "Structural Engineering Reference Manual", Professional Publications, Inc, 2001.

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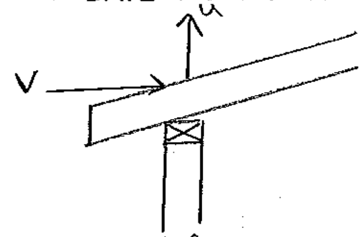
PROJECT NO. KF213-3094 SHEET 3005 OF

PROJECT NAME OIT Softball Dugouts DESIGNED BY Luke DATE 6/28/2013

SUBJECT Lateral CHECKED BY DATE



Wall To roof Anchorage:

V = 196 plf → p. 3007 (Lateral force for one-story wall)

Average uplift = (23.7 psf + 20.51 psf + 17.67 psf) / 3 ← MECAWind for windward roof

= 20.7 psf

Trib. Width = (10.7 ft (roof) + 2 ft (1' Each way)) / 2

= 6.4'

u = 20.7 psf × 6.4'

= 133 plf

Rafter to Beam:

V = 196 plf × 2' (spacing of rafters)

= 392 lbs

u = 133 plf × 2' (spacing of rafters)

= 266 lbs

Use [Simpson A35 & H4 rafter tie]

Beam to wall:

V = 196 plf
u = 133 plf

2x check:

$Z_\perp$ = 530 lbs → NDS 2005 p. 85
C_d = 1.6

$Z'_\perp$ = 530 lbs (1.6)

$Z'_\perp$ = 848 lbs

(calculations cont'd on p. 3006)

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$V = 196\,plf \times (32'' \times \frac{1'}{12''})$

$V = 523\,lbs$

$Z'_{\perp} \geq V$ ✓

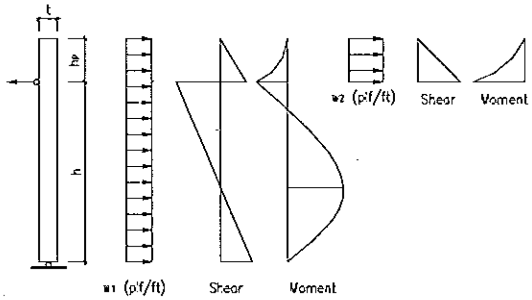
Use [2X P.T. Plate w/ 5/8" A.B. @ 32" O.C.]

3007

PROJECT :	OIT Softball Dugouts		PAGE :
CLIENT :	OIT		DESIGN BY : LAJ
JOB NO. :	KF213-3094	DATE : 6/24/2013	REVIEW BY :

Lateral Force for One-Story Wall Based on IBC 2006

INPUT DATA



WALL THICKNESS	t	=	8	in
PARAPET HEIGHT	h_p	=	0	ft
WALL HEIGHT	h	=	7.4	ft
TOTAL WALL DENSITY	ρ	=	125	pcf
SEISMIC PARAMETER	S_{DS}	=	0.674	(ASCE 7-05 Sec 11.4.4
SEISMIC DESIGN CATEGOR	SDC	=	D	
DIAPHRAGM FLEXIBLE ? (0=no, 1=yes)			1	Yes
SEISMIC IMPORTANCE FACTOR	I	=	1	(ASCE 7-05 Tab 11.5-1
WIND IMPORTANCE FACTOR	I	=	1	(ASCE 7-05 Tab 6-1)
BASIC WIND SPEED	V	=	95	mph
EXPOSURE CATEGORY (B, C, D)		=	C	
TOPOGRAPHIC FACTOR	K_{zt}	=	1	Flat, (ASCE 6.5.7.2)

DESIGN SUMMARY

Out-of-plane force for wall design w_1 = 26.4 psf (Wind governs)
Out-of-plane force for parapet design w_2 = 66.4 psf (Wind governs)
Out-of-plane force for anchorage design F_{anch} = 196 plf (Horizontal direction)
(The governing seismic forces have been reduced by 0.7 for ASD)

WIND ANALYSIS

Out-of-plane wind force for wall design (ASCE 7-05, Eq.6-22)

$$w_{1,wind} = q_h\left[(GC_P)-(GC_{Pi})\right] = \left(0.00256K_hK_{Zt}K_dV^2I\right)\left[(GC_P)-(GC_{Pi})\right] \quad = \quad 26.4 \text{ psf}$$

Where: K_h = 0.85 , K_d = 0.85 , GC_p = -1.40 , GC_{pi} = 0.18
(mean roof h = 7.4 ft, changeable) (ASCE Tab. 6-4) (corner ? Yes , TA = 9.867 ft²) (ASCE Fig. 6-5)
(ASCE Tab. 6-3) (ASCE Fig. 6-11A)

Out-of-plane wind force for parapet design (ASCE 7-05, Eq.6-24)

$$w_{2,wind} = q_p\left[(GC_P)-(GC_{Pi})\right] = \left(0.00256K_hK_{Zt}K_dV^2I_w\right)\left[(GC_P)-(GC_{Pi})\right] \quad = \quad 66.4 \text{ psf, (ASCE7-02,6.5.12.4.4)}$$

Where: K_p = 0.85 , K_d = 0.85 , GC_p = -1.40 , GC_p = -2.80 GC_{pi} = 0.18
(ASCE Tab. 6-3) (ASCE Tab. 6-4) = 1.00 (roof, ASCE Fig. 6-11B) (roof, ASCE Fig. 6-5)
(TA = 0 ft²)
(wall, ASCE Fig. 6-11A)

Out-of-plane wind force for anchorage design

$$F_{anch,wind} = \frac{h}{2}w_{1,wind} + h_p\left(1+\frac{h_p}{2h}\right)w_{2,wind} \quad = \quad 98 \text{ plf (Horizontal)}$$

SEISMIC ANALYSIS

Out-of-plane seismic force for wall design (ASCE 7-05, Sec.12.11.1)

$$w_{1,seismic} = MAX\left(0.4IS_{DS}W_p \ ,0.1W_p\right) \quad = \quad 0.27\ W_p = \quad 22.5 \text{ psf}$$

Where: W_p = 83.3 psf , I = 1.0
(IBC Tab 1604.5 & ASCE Tab 11.5-1)

Out-of-plane seismic force for parapet design (ASCE 7-05, Sec. 13.3.1)

$$w_{2,seismic} = MAX\left[0.3S_{DS}I_pW_p \ , \ MIN\left(\frac{1.2a_pS_{DS}I_pW_p}{R_p} \ , \ 1.6S_{DS}I_pW_p\right)\right] \quad = \quad 0.81\ W_p = \quad 67.4 \text{ psf}$$

Where: a_p = 2.5 , I_p = 1.0 , R_p = 2.5
(ASCE Tab. 13.5-1) (ASCE Sec. 13.1.3) (ASCE Tab. 13.5-1)

Out-of-plane seismic force for anchorage design

For masonry or concrete under seismic design category A & B, both flexible & rigid diaphragm (ASCE 7-05 Sec. 12.11.2)

$$F_{anch,seismic} = MAX\left[0.4S_{DS}IW_p\frac{(h+h_p)^2}{2h} \ , \ 0.1W_p\frac{(h+h_p)^2}{2h} \ , \ 400S_{DS}I \ , \ F_{min}\right] =$$

3.36 W_p =
280 plf (Horizontal)
(Not applicable)

Where: F_{min} = 280 plf
(ASCE Sec. 12.11.2)

For seismic design category C and above, flexible diaphragm (ASCE 7-05 Sec. 12.11.2.1)

$$F_{anch,seismic} = MAX\left[0.8S_{DS}IW_p\frac{(h+h_p)^2}{2h} \ , \ 0.1W_p\frac{(h+h_p)^2}{2h} \ , \ 400S_{DS}I \ , \ F_{min}\right] =$$

3.36 W_p =
280 plf (Horizontal)
(Applicable)

For seismic design category C and above, rigid diaphragm (ASCE 7-05 Sec. 12.11.2 & Sec. 13.3.1)

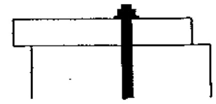
$$F_{anch,seismic} = MAX\left\{MAX\left[0.3S_{DS}I_p \ , \ MIN\left(\frac{1.2a_pS_{DS}I_p}{R_p} \ , \ 1.6S_{DS}I_p\right)\right]W_p\frac{(h+h_p)^2}{2h} \ , \ 400S_{DS}I \ , \ F_{min}\right\}$$

= 3.36 W_p = 280 plf (Horizontal) (Not applicable)

Where: a_p = 1.0 R_p = 1.5
(ASCE Tab. 13.5-1) (1.5, ASCE 13.4.2 or 2.5, ASCE Tab 13.5-1)

3008

Table 11E BOLTS: Reference Lateral Design Values (Z) for Single Shear (two member) Connections[1,2,3,4]



for sawn lumber or SCL to concrete

Embedment Depth in Concrete t_m in.	Side Member t_s in.	Bolt Diameter D in.	G=0.67 Red Oak $Z_{\parallel}$ lbs.	G=0.67 Red Oak $Z_{\perp}$ lbs.	G=0.55 Mixed Maple Southern Pine $Z_{\parallel}$ lbs.	G=0.55 Mixed Maple Southern Pine $Z_{\perp}$ lbs.	G=0.50 Douglas Fir-Larch $Z_{\parallel}$ lbs.	G=0.50 Douglas Fir-Larch $Z_{\perp}$ lbs.	G=0.49 Douglas Fir-Larch(N) $Z_{\parallel}$ lbs.	G=0.49 Douglas Fir-Larch(N) $Z_{\perp}$ lbs.	G=0.46 Douglas Fir(S) Hem-Fir(N) $Z_{\parallel}$ lbs.	G=0.46 Douglas Fir(S) Hem-Fir(N) $Z_{\perp}$ lbs.
6.0 and greater	1-1/2	1/2	770	480	680	410	650	380	640	380	620	360
		5/8	1070	660	970	580	930	530	920	520	890	470
		3/4	1450	890	1330	660	1270	590	1260	560	1230	520
		7/8	1890	960	1750	720	1690	630	1680	600	1640	550
		1	2410	1020	2250	770	2100	680	2060	650	1930	600
	1-3/4	1/2	830	510	740	430	700	400	690	390	670	370
		5/8	1160	680	1030	600	980	550	970	550	940	530
		3/4	1530	900	1390	770	1330	680	1310	660	1270	600
		7/8	1970	1120	1800	840	1730	740	1720	700	1680	640
		1	2480	1190	2290	890	2210	790	2200	750	2150	700
	2-1/2	1/2	830	590	790	520	770	470	760	460	750	440
		5/8	1290	800	1230	670	1180	610	1170	610	1120	570
		3/4	1840	1000	1630	850	1540	800	1520	780	1460	750
		7/8	2290	1240	2050	1080	1940	1020	1920	1000	1860	920
		1	2800	1520	2530	1280	2410	1130	2390	1080	2310	1000
	3-1/2	1/2	830	590	790	540	770	510	760	500	750	490
		5/8	1290	880	1230	810	1200	730	1190	720	1170	670
		3/4	1860	1190	1770	980	1720	900	1720	880	1680	830
		7/8	2540	1410	2410	1190	2320	1100	2290	1070	2200	1020
		1	3310	1670	2970	1420	2800	1330	2770	1300	2660	1260

Embedment Depth in Concrete t_m in.	Side Member t_s in.	Bolt Diameter D in.	G=0.43 Hem-Fir $Z_{\parallel}$ lbs.	G=0.43 Hem-Fir $Z_{\perp}$ lbs.	G=0.42 Spruce-Pine-Fir $Z_{\parallel}$ lbs.	G=0.42 Spruce-Pine-Fir $Z_{\perp}$ lbs.	G=0.37 Redwood (open grain) $Z_{\parallel}$ lbs.	G=0.37 Redwood (open grain) $Z_{\perp}$ lbs.	G=0.36 Eastern Softwoods Spruce-Pine-Fir(S) Western Cedars Western Woods $Z_{\parallel}$ lbs.	G=0.36 Eastern Softwoods Spruce-Pine-Fir(S) Western Cedars Western Woods $Z_{\perp}$ lbs.	G=0.35 Northern Species $Z_{\parallel}$ lbs.	G=0.35 Northern Species $Z_{\perp}$ lbs.
6.0 and greater	1-1/2	1/2	590	340	590	340	550	310	540	290	530	290
		5/8	860	420	850	410	810	350	800	330	780	320
		3/4	1200	460	1190	450	1130	370	1120	360	1100	350
		7/8	1580	500	1540	490	1360	410	1330	390	1280	370
		1	1800	540	1760	530	1560	440	1520	420	1460	410
	1-3/4	1/2	640	360	630	350	580	320	580	310	560	310
		5/8	910	490	900	480	840	400	830	380	810	370
		3/4	1230	540	1220	530	1160	430	1140	420	1120	410
		7/8	1630	580	1610	570	1540	470	1520	460	1490	430
		1	2090	630	2060	610	1820	510	1770	490	1710	470
	2-1/2	1/2	730	410	730	400	700	360	690	340	680	340
		5/8	1070	540	1060	530	980	480	960	470	940	460
		3/4	1400	710	1380	700	1290	620	1270	600	1240	580
		7/8	1790	830	1770	810	1660	680	1640	660	1600	610
		1	2230	900	2210	880	2080	730	2060	700	2030	680
	3-1/2	1/2	730	470	730	470	700	430	690	410	690	400
		5/8	1140	620	1140	610	1090	550	1080	530	1070	520
		3/4	1650	780	1640	770	1540	680	1510	670	1470	660
		7/8	2100	960	2070	950	1910	870	1880	850	1840	820
		1	2550	1190	2520	1180	2340	1020	2310	980	2260	950

1. Tabulated lateral design values (Z) for bolted connections shall be multiplied by all applicable adjustment factors (see Table 10.3.1).
2. Tabulated lateral design values (Z) are for "full diameter" bolts (see Appendix L) with bending yield strength (F_{yb}) of 45,000 psi.
3. Tabulated lateral design values (Z) are based on dowel bearing strength (F_e) of 7,500 psi for concrete with minimum f_c' = 2,500 psi.
4. Six inch anchor embedment assumed.

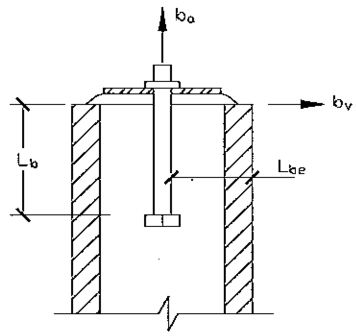
3009

PROJECT : OIT Softball Dugouts PAGE :
CLIENT : OIT DESIGN BY : LAJ
JOB NO. : KF213-3094 DATE : 6/25/2013 REVIEW BY :

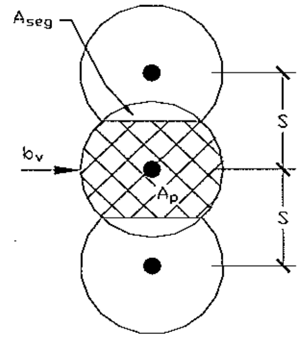
Fastener Anchorage in Tension & Perpendicular Shear Based on ACI 530 / IBC 06 & CBC 07

INPUT DATA & DESIGN SUMMARY

MASONRY STRENGTH	f_m'	=	1.5	ksi
FASTENER YIELD STRESS	f_y	=	48	ksi
SERVICE TENSION LOAD	b_a	=	0.133	kips / ft
SERVICE SHEAR LOAD	b_v	=	0.196	kips / ft
WALL THICKNESS	b	=	8	in
FASTENER DIAMETER	ϕ	=	5/8	in
EFFECTIVE EMBEDMENT	L_b	=	12	in
FASTENER SPACING	S	=	32	in
ALLOWABLE INCREASING ? (IBC/CBC 1605.3.2)			yes	



SECTION



PLAN

[THE ANCHORAGE DESIGN IS ADEQUATE.]

ANALYSIS

CHECK MIN. EMBEDMENT (ACI 530 2.1.4.2.1)

$L_{b,min}$ = MIN[4ϕ , 2] = 2.00 in < L_b [SATISFACTORY]

CHECK TENSION CAPACITY (ACI 530 2.1.4.2.2)

B_a = MIN[$0.5A_p(f_m')^{0.5}$, $0.2A_bf_y$] = 0.75 kips / fasteners

> $k\,S\,b_a$ [SATISFACTORY]

Where L_{be} = 3.50 in

L = MIN[L_b , L_{be}] = 3.50 in

$\theta = COS^{-1}(0.5S / L)$ = 0.00 rad

$A_{seg} = L^2 [\theta - 0.5\,SIN(2\theta)]$ = 0.00 in^2

$A_p = \pi L^2 - 2 A_{seg}$ = 38.54 in^2

$A_b = \pi \phi^2 / 4$ = 0.31 in^2

k = 3/4

CHECK SHEAR CAPACITY (ACI 530 2.1.4.2.3)

B_v = MIN[$(F)350(A_bf_m')^{1/4}$, $0.12A_bf_y$] = 0.62 kips / fasteners

> $k\,S\,b_v$ [SATISFACTORY]

Where $F = [MIN(L_{be}, 12\phi) - 1] / (12\phi - 1)$ = 0.385

CHECK COMBINED SHEAR AND TENSION CAPACITY (ACI 530 2.1.4.2.4)

$S\,b_a / B_a + S\,b_v / B_v$ = 1.31 < 1.33 [SATISFACTORY]

STRUCTURAL GENERAL NOTES – APPLICABLE TO ALL CONSTRUCTION UNLESS OTHERWISE NOTED ON THE PLANS

A. DESIGN SCOPE BY PRECISION STRUCTURAL ENGINEERING (PSE)

1. Design Shown on drawings by PSE is for the following items.
   a. Foundation and framing.
2. Design Shown on PSE drawings does not include: finishes, architectural items, windows, doors, moisture barriers, water proofing, mechanical units, plumbing, or electrical items.

B. GENERAL REQUIREMENT:

1. Furnish all labor, materials, and equipment necessary to complete the work shown or inferred by these drawings.
2. Where construction details are not shown or noted for any part of the work, such details shall be the same as for similar work shown on the drawings.
3. Notes and details on the drawings take precedence over the general notes and typical details in case of conflict.
4. Provide manufacturer's approved product evaluation reports (ICBO reports) and a list of all proposed substitutions to the Engineer for review and written approval before fabrication.
5. Pipes, ducts, sleeves, chases, etc. shall not be placed in slabs, beams, or walls unless specifically shown or noted nor shall any structural member be cut for pipe, ducts, etc., unless specifically shown. Obtain prior written approval for installation of any additional holes, ducts, etc.
6. Locate and protect underground or concealed conduit, plumbing or other utilities where new work is being performed.
7. The contract drawings and specifications represent the finished structure and do not indicate methods, procedures or sequence of construction. The contractor shall take necessary precautions to maintain and insure the integrity of the new and any existing structures during construction. The design stresses shall not be exceeded during construction based on the age of each element . Neither the owner nor Architect/Engineer will enforce safety measure regulations. Contractor shall design, construct and maintain all safety devices, including shoring and bracing for the new and any existing structures and shall be solely responsible for conforming to all local, state and federal safety and health standards, laws and regulations. Observation visits to the site by the engineer shall not include inspection of the above items.
8. Obtain prior written approval for any changes to the drawings.
9. The contractor shall review and compare the structural drawings with all other Construction Documents, such as Architectural, Mechanical and Electrical drawings, specifications, etc. Do not scale drawings. The contractor shall verify dimensions, elevations and all information. Report, in writing, any inconsistencies, errors, or omissions to the Architect/Engineer of record before proceeding with the work.
10. All existing constructions shown are schematic only. Contractor is responsible to verify actual conditions and allow for them in his bid. Notify the Architect/Engineer, in writing, in case of any discrepancy between actual conditions and what is shown on the structural drawings before proceeding with the work.
11. See Architectural, Mechanical, Electrical and other drawings for embedded items.
12. Camber shall be provided for all members with 30 feet or more of span. Check beam table and contact the Structural Engineer for the amount of camber.
13. Shop drawings:
    a) Shop drawings shall be submitted in the form of two copies.
    b) Prior to submittals, the general contractor shall review all submittals for conformance with the Construction Documents and shall stamp submittals as being "Reviewed for Conformance".
    c) Any detail on the shop drawing that deviates from the Construction Documents shall be marked with the note "This is a change"
    d) Shop drawing submittals processed by the Structural Engineer are not Change Orders.
    e) Shop drawings shall be submitted to the Architect/Engineer prior to fabrication and construction regarding all structural items including:
       –Concrete and masonry reinforcement, drawings shall conform to ACI 315 and ACI 318.
       –Structural steel, drawings to conform to AISC.
       –Glued–Laminated members, drawings to conform to AITC.
       –Prefabricated wood joists and trusses, drawings to conform to ICBO product evaluation report.
       –Wood trusses, drawings to conform to UBC.
    f) Shop drawings or calculations submitted for review that require re–submittal for re–review, as determined by the Structural Engineer, shall be billed hourly to the general contractor. Re–review will not proceed without written approval from the general contractor for additional engineering services.
14. Submit seismic anchorage calculations stamped by a licensed Professional Engineer for all equipment and components weighing more than 400 lb.
15. Submit structural drawings signed and sealed by a professional Engineer licensed in the State where the project is located for any structural member needed for this project that is not designed by P.S.E.
17. Any substitutions for structural members, hardware or details shall be reviewed by the Architect and Structural Engineer. Such review will be billed on a time and materials basis to the General Contractor with no guarantee that the substitution will be allowed.
18. All communication shall be in writing. No verbal communications, decisions, instructions or approvals shall be valid.

C. CODE AND LOADS:

1. All design, material, and construction work for this project shall conform to the 2010 Oregon Structural Speciality Code (OSSC) based on the 2009 International Building Code (IBC).
2. The 2009 International Building Code design parameters.

a. Floor Live Load = 40 psf.
b. Floor Dead Load = 15 psf.
c. Roof Live Load = n/a.
d. Roof dead load 10 psf.
e. Ground Snow Load, Pg = 45 psf.
f. Flat Roof snow load = 32 psf.
g. Snow Exposure Factor, Ce = 1.0
h. Snow Load Importance Factor, I = 1.0
i. Thermal Factor, Ct = 1.0
j. Basic Wind Speed (3 second gust) = 95 mph
k. Wind Importance Factor, Iw = 1.00
l. Wind Exposure = C
m. Internal Pressure Coefficient = 0.55
n. Components and Cladding studs = 21 psf
o. Seismic Importance Factor, Ie = 1.0
p. Ss = 0.881
q. S1 = 0.341
r. Site Class = D
s. Sms = 1.011
t. Sm1 = 0.586
u. Sds = 0.674
v. Sd1 = 0.391
w. Seismic Design Catagory = D
x. Basic Seismic Force Resisting System = Special Reinforced Masonry Shear Walls
y. Design Base Shear = 0.135 * W
z. Approximate Fundamental Period, T = 0.104
aa. Response Modification Factor, R = 5
bb. Analysis Procedure Used = Equivalent Lateral Force Procedure

D. INSPECTION:

1. All construction shall be inspected by the building officials according to the above Code.
2. It is recommended that the owner or the contractor hire Precision Structural Engineering or other Qualified Licenced inspectors to provide inspection during construction.

E. CONCRETE:

1. MINIMUM SPECIFIED COMPRESSIVE STRENGTH OF CONCRETE.

TYPE OR LOCATION OF CONCRETE	MINIMUM SPECIFIED COMPRESSIVE STRENGTH (F'c)
	SEVERE
BASEMENT WALLS, FOUNDATION AND OTHER CONCRETE NOT EXPOSED TO THE WEATHER.	2,500 PSI
BASEMENT SLAB AND INTERIOR SLABS ON GRADE, EXCEPT GARAGE FLOOR SLABS.	2,500 PSI
BASEMENT WALLS, FOUNDATION WALLS, EXTERIOR WALLS AND OTHER VERTICAL CONCRETE WORK EXPOSED TO WEATHER.	3,500 PSI
PORCHES CARPORT SLABS AND STEPS EXPOSED TO THE WEATHER, AND GARAGE FLOOR SLABS.	3,500 PSI

3. Basement wall, foundation wall, basement slab, slab on grade, all concrete work exposed to weather, and all exterior concrete shall contain the proper admixtures to obtain 5% to 7% Air Entrainment. All interior concrete work shall contain 2% to 4% Air Entrainment.
4. Reinforcing Steel:
   a) All reinforcing steel shall be ASTM A615 Grade 60.
   b) Vertical bars shall be doweled to supporting members with the same size and spacing of reinforcement shown in the drawing or general notes.
   c) Splices shall be 55 bar diameters or 36 inches whichever is greater UON.
5. When air temperature is above 80 degrees Fahrenheit, Hot Weather Concreting, ACI 305R shall apply. When the average air temperature is below 40 degree Fahrenheit, Cold Weather Concreting, ACI 306R shall apply.

F. FOUNDATION

1. PSE recommends that the owner/contractor order geotechnical investigation report. Due to the lack of specific geotechnical information for this site, foundation was designed on an assumed bearing capacity of 1500 PSF. PSE is not responsible for any future defects resulting from unreported condition mitigating the above assumption.
2. Soft soil or fill material shall be removed and replaced with competent granular engineering fill or lean concrete. The new fill shall be compacted in 8" layers to gain 98% of its maximum dry density according to ASTM D–698 standard proctor, and be capable of supporting the above bearing capacity.
3. Footing shall be stepped as required to maintain minimum required frost depth, below finished grade.
4. Use light weight equipment to compact the soil within 2 feet around foundation/basement wall.
5. Excavation shall be properly back filled Back fill for walls shall be pervious material. Do not place back fill behind walls before they have attained their design strength. Shore and protect walls from lateral loads until the supporting members are in place and have developed specified strength.
6. When the finished crawl space elevation is lower than the outside finished grade, or when it is required by the Geotechnical investigative report or building department, provide 4 inch diam. perforated drain pipe below the top of the footing. Encase the pipe in 18x18 inches free–drain crushed stone and fabric at the perimeter of the crushed stone.
7. Roof and area drainage shall be directed away from the foundation.

G. FROST DEPTH:

Klamath County: 24"

H. WOOD:

GENERAL:

1. All wood exposed to the weather or in contact with concrete or masonry shall be pressure treated or protected with a waterproof membrane. Newly exposed surfaces resulting from field cutting, boring or handling shall be field treated in accordance with AWPA M–4.
2. Maintain 1/2 inch air space at sides and at ends for beam pockets in concrete or masonry. Minimum bearing is 3 inches UON.
3. Wood framing members, sheathing and combustible materials shall not be placed closer than 2 inches to chimney walls. The gap shall be fire stopped using a minimum of 1 inch thick noncombustible materials, UON.
4. Reference specifications for more requirements.
5. It is required that the contractor keep a copy of the Simpson catalog and/or Simpson Installation Manual on site at all times, and shall be used with the installation process at all Simpson connections.

MATERIALS

STICK FRAMING:

1. All wood Stick Framing shall be Douglas Fir/Larch #2 (DF #2) or better unless otherwise noted on the drawings. Comply with PS 20, American softwood lumber standard and standard grading rules for western lumber. 19%maximum moisture content at time of placement.
2. All wood members shall be stamped showing wood grade and the grading agency.
3. All timbers to be FSC rated.
4. All materials to be low V.O.C. and non–urea formaldehyde.

GLUED–LAMINATED TIMBER:

1. Glued–Laminated timber shall be manufactured, inspected, and tested according to:
   a) American National Standard for Wood products–Structural Glued Laminated Timber, ANSI/AITC A190.1 –1992
   b) Standard Specification for Structural Glued–Laminated Timber of Softwood Species, AITC 117; Manufacturing.
   c) Design and Standard Specifications for Hardwood Glued–Laminated Timber, AITC 119.
   In case of conflict, the most stringent requirement shall apply.
2. Submit certificate by one of the above agencies to the Engineer and the Building Inspector prior to installation.
3. Glued–Laminated timber shall have wet–use adhesive, ASTM D2559. Lamination shall be 2 inches nominal. Appearance shall be Industrial, AITC 110.
4. Colorless end sealer shall be applied immediately to the ends of all members after fabrication and field trimming. Members shall be individually wrapped.
5. Pressure treatment shall be provided for all members exposed to weather and not protected by a roof or eave overhang.
6. All cuts, holes, etc. shall be re–coated as recommended by the manufacturer.
7. Glued–Laminated timber shall have the following minimum combination and strength:
   a) Beams with simple spans shall have combination 24F–V4 or better.
   b) Continuous beams shall have combination as shown on plans.

JOISTS/ RAFTERS:

1. Provide a copy of the manufacturer's approved ICBO product evaluation reports.
2. Wood joists shall be installed according to the manufacturer recommendations and as shown on drawings. Blocking, web stiffeners and bridging etc. shall be as required by the manufacturer's approved ICBO product evaluation reports.
3. All joists, ceiling joists and rafters shall have a minimum of 1–1/2 inches bearing at each end on wood or metal, and not less than 3 inches on masonry or concrete. Use approved joist hanger if bearing is not provided.
4. Install full depth solid blocking or cross bracing at intervals not exceeding 8 feet for all joists and rafters 2x12 inches and deeper.

STUDS:

1. Double full height studs shall be used at both ends of all walls shown on the structural drawings, UON.
2. Studs shall have full bearing on plates and sills.
3. Provide blocking at all ceiling levels.
4. Provide multiple studs under beams or trusses to match width of supported member, typical.

TOP PLATES AND/OR CHORDS:

1. Top plates or chords shall be continuous over headers UON.
2. Top plates shall be two pieces, same size as studs. Stagger splices 4'–0" minimum. Center splices over studs UON.

SHEATHING:

1. All wood structural panels shall be stamped with the appropriate grade trademark of the American Plywood Association (APA).
2. Block structural panel with 2X4 inch flat blocking where noted on roof or floor framing plans. Use ply clips at mid–span of unsupported panel edges.
3. Maintain 1/8" air space between structural panels in walls, floors and roofs at ends and at edges or as specified by the manufacturer.
4. Wood structural panels shall be manufactured using exterior glue and shall be not less than 4X8 feet except at boundaries.

I. WOOD CONNECTIONS:

1. It is required that the contractor keep the Simpson catalog and/or Simpson Installation Manual on site at all times to be used during the installation of all typical Simpson connections.
2. All exposed steel timber hardware, fasteners and connectors shall be galvanized.
3. Connector Hardware model numbers are those for the Simpson–Strong Tie Company. Size and number of nails, screws or bolts to be the maximum specified by the manufacturer UON.
4. Nails shall be common wire unless otherwise noted.
5. Machine nailing: The use of machine nailing is subject to continued satisfactory performance. Panel nails shall be driven so that the heads are flush with the surface of the panel and the minimum panel edge distance is 1/2 inch.
6. Bolts: maintain a distance not less then 7 bolt diameters from the end and 4 diameters from the edge of the member. Bore holes $\frac{1}{32}$ to $\frac{1}{16}$ inch larger than the bolt diameter. All nuts shall be tightened when installed and re–tightened at completion of work or before closing in. Thread projection shall be ½ inch minimum beyond the nut. Use 5/16 inch thick X 3" X 3" washers, typ.
7. Lag screw clearance and lead/pilot holes shall be bored in two stages as follows: The clearance hole for the shank shall have the same diameter as the shank, and the same depth of penetration as the length of unthreaded shank. The lead hole for the threaded portion shall have diameter equal to 70% of the shank diameter and a length equal to at least the length of the threaded portion.
8. Nailed/screwed or bolted hold–down anchors shall be installed per manufacturer's approved [ICC or ICBO] product evaluation report. Install hold–downs 3/4 inch minimum above the plate to allow for tightening anchor bolt. The hold–down shall be installed tight to the hold–down post without fillers or dapping. Do not bend hold–down anchors.
9. Connections shall be as detailed on the drawings. If not shown, minimum connections shall be as follows:
   a) Joist or rafter to sill or girder, toe nail........3–8d
   b) Bridging to joist, toenail each end........2–8d
   c) Sill plate to joist or blocking, typical, face nail [SN]........16d at 6" o.c.
   d) Double top plates:
      Lower plate to studs........3–16d
      Top plate to lower plate, face nail........16d @ 12" O.C.
      Top plate to lower plate at lap Splice [4'–0" minimum]........20–16d minimum UON on drawings.
      Top plate to lower plate at intersection........3–16d
   e) Stud to sill plate........4–8d toenails or 2–16d endnail.
   f) Double studs, face nail........16d at 12" o.c.
   g) Blocking between joists or rafters to top plate, toenail........3–8d
   h) Continuous header, two pieces........16d @ 16" o.c. along each edge.
   i) Ceiling joists to plate, toenail........3–8d
   j) Continuous header to stud, toenail........4–8d
   k) Ceiling joists, laps over partitions, face nail........3–16d
   l) Ceiling joists to parallel rafters, face nail........3–16d
   m) Built–up corner studs........16d @ 12" o.c.
   n) 5/8" gyp. Sheathing to studs, sill plates & top plates........8d @ 4" O.C. @ 3/8" from all panel edges and 8" O.C. @ intermediate supports.
   o) For stick framing construction structural sheathing could be fastened to structural members using 16 gauge wire staples two inches long. Staples shall have a minimum of 7⁄16" diameter crown width. For roof and floor, staple spacing shall be per plan. For shear wall, spacing should be per shear wall schedule.
   p) Staples for structural insulated panels, sips shall be per sips notes.
   q) NOTES: REF: To the above Building Code.

J. ABBREVIATIONS:

AB ANCHOR BOLT
ADDL ADDITIONAL
ALT ALTERNATE
APA AMERICAN PLYWOOD ASSOCIATION
ARCH ARCHITECTURAL
B BOTTOM
BLKG BLOCKING
BN BOUNDARY NAIL
BOF BOTTOM OF FOOTING
CBC CALIFORNIA BUILDING CODE
CJ CONSTRUCTION JOINT OR CONTROL JOINT
CL CENTER LINE
CLR CLEAR
CONN CONNECTION
CONT CONTINUOUS
DBL DOUBLE
DIM DIMENSION
DL DEAD LOAD
DO DITTO (REPEAT)
DWG DRAWING
DWL DOWEL
E EXISTING
EA EACH
EF EACH FACE
EL ELEVATION
EMBED EMBEDMENT
EN EDGE NAIL
EOR ENGINEER OF RECORD

EQ EQUAL
ES EACH SIDE
EW EACH WAY
FA FRAMING ANCHOR
FD FROST DEPTH
FEN FLOOR EDGE NAILING
FF FINISHED FLOOR
FN FIELD/INTERMEDIATE NAILING
FS FAR SIDE
FTG FOOTING
GALV GALVANIZED
GC GENERAL CONTRACTOR
GIR GEOTECHNICAL INVESTIGATION REPORT
GLB GLUED LAMINATED BEAM
GR GRADE
HDR HEADER
HGR HANGER
HORIZ HORIZONTAL
HSH HORIZONTALLY SLOTTED HOLES
ICBO INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS
ID INSIDE DIAMETER
INT INTERIOR
JT JOINT
LDGR LEDGER
LGST LIGHT GUAGE STEEL, COLD–FORMED STEEL

LL LIVE LOAD
MATL MATERIAL
MAX MAXIMUM
MB MACHINE BOLT
MFR MANUFACTURER
MIN. MINIMUM
MTL METAL
NO. NUMBER
NS NEAR SIDE
NTS NOT TO SCALE
OC ON CENTER
OD OUTSIDE DIAMETER
OFDSC OREGON ONE & TWO FAMILY DWELLING SPECIALTY CODE
OH OPPOSITE HAND
OSB ORIENTED STRAND BOARD
OSSC OREGON STRUCTURAL SPECIALTY CODE
OSV ON SITE VERIFY
OTOB OUT TO OUT OF BEARING
PERP PERPENDICULAR
PL PLATE
PLF POUND PER LINEAR FOOT
PSE PRECISION STRUCTURAL ENGINEERING
PT PRESSURE TREATED
PW PLATE WASHER
REF REFERENCE
REN ROOF EDGE NAILING
REINF REINFORCEMENT

RFT RAFTERS
SGN STRUCTURAL GENERAL NOTES
SEP SEPARATION
SIM SIMILAR
SN SHEAR NAIL
SNL SNOW LOAD
SPEC SPECIFICATION
STD STANDARD
STGR STAGGER
STIFF STIFFENERS
T TOP
TB TOP & BOTTOM
TD TYPICAL DETAILS
TG TONGUE & GROOVE
THK THICKNESS/THICK
TN TOENAIL
TOB TOP OF BEAM
TOF TOP OF FOOTING
TOW TOP OF WALL
TYP TYPICAL
UBC UNIFORM BUILDING CODE
UON UNLESS OTHERWISE NOTED
VERT VERTICAL
VSH VERTICAL SLOTTED HOLES
WD WOOD
WEN WALL EDGE NAILING
WWF WELDED WIRE FABRIC
W/ WITH
W/O WITHOUT

K. MASONRY:

1. All masonry materials and construction shall comply with the following sections of the building code for full allowable stresses:
   a) Section 2103 – Mortar and Grout
   b) Section 2104 – Construction
   c) Section 2105 – Quality Assurance
2. Concrete masonry units shall be moisture controlled type I, Grade N, ASTM C90 normal weight (over 125 pcf when dry) open end and have a minimum of 2200 PSI compressive strength.
3. Lay blocks in running bond. Use concave compressed joints and inverted bond beam for starting courses.
4. All concrete masonry shall have minimum design compressive strength (f'm) of 1500 PSI UON.
5. All mortar for masonry shall be type M, UBC 21–15. Two inch cubes shall test 1800 psi in 28 days.
6. Center footing and grade beams under masonry UON.
7. Keep masonry walls shored during construction until the roof deck/beams and slab–on–grade are in place to provide lateral stability.
8. All masonry shall be solid grouted.
9. Concrete grout shall be UBC STD 21–19, have a minimum 28–days compressive strength of 3000 PSI and a maximum aggregate size of 3/8 inch. Recommended slump is 9 inches.
10. Reinforcement requirements:
    a) Reinforcement shall be ASTM A–615 grade 60, typical.
    b) Anchor bolts ASTM A307 Headed Machine bolts.
    c) Center vertical bars in block cells, no splices UON. Dowel reinforcement to support members with same size and spacing of reinforcement as shown on the drawings or per general notes.
    d) Vertical cells to be filled shall have vertical alignment sufficient to maintain a clear, unobstructed and continuous vertical cell 3x4 inches for single width concrete block walls.
    e) Provide cleanout opening in bottom course at reinforcement (32 inches max.) when grout pour exceeds 4'–6" in height.
    f) Remove all overhanging mortar or obstructions and any debris from inside of cells.
    g) Support vertical reinforcing bars at top and bottom of wall and at intervals not exceeding 4'–0" in height.
    h) Lap splices shall be 55 bar diameters or 40 inches whichever is greater.
    i) Vertical reinforcement shall be located at corners of walls, at each jamb of opening, and on each side of control or expansion joints. Between these locations, vertical reinforcement shall be spaced as indicated on the drawings. Vertical bars shall extend the full floor height.
    j) Provide 2–#5 bars above and below any opening of 4 feet or less. Extend the steel 2'–6" beyond opening dimension. For wider opening, see drawing.
    k) Corner bars 4'–0" long, 2'–0" each leg, shall be used at wall corners and intersecting walls. Corner bars shall match the diameter and the spacing of horizontal wall reinforcement.
11. Use a mechanical vibrator to consolidate at the time of placing grout and then re–consolidate before plasticity is lost.
12. Horizontal construction joints shall be formed by stopping the grout pour 1–1/2 inches below the top of a mortar joint and a minimum of 1/2 inch below the top of bond beams.
13. Beams and lintels, unless otherwise shown on the drawing, shall bear on masonry at each end as follows:
    a) For 8 feet span or less, 6 inches bearing, 2 anchor bolts.
    b) For longer beams and lintels, use 1 inch bearing for each foot of length with 4 anchor bolts.
14. Masonry walls shall be anchored at or near their tops to the structural frame to resist horizontal force of 300 PLF or as detailed on drawings.
15. For Masonry veneer ties, joint reinforcement, header and lintels, refer to brick veneer details sheet.
16. Provide flashing and weep holes to divert water to the outside per architectural drawing and/or building code.
17. For above grade masonry pprovide vertical control joint in concrete masonry at 30'–0" horizontal. Vertical expansion joint in brick masonry at 25'–0"
    unless noted on the drawings. Locate one vertical control joint 5'–0" each side of all corners in concrete masonry and one expansion joint 5'–0" each side of all corners in brick masonry. Coordinate locations with the Architect/Engineer.
18. Adhered Veneer–cultured stone:
    a) Exterior application, including its backing shall provide a weather proof covering per code.
    b) Install weather resistant barrier such as building paper or equal for wood construction or breather type sealer for concrete and masonry constructions.
    c) Follow the manufacturer's installation recommendations. In case of conflict with the building code, the most stringent requirements shall apply.
    d) Adhered veneer may be applied by the following application method.
       A paste of neat Portland cement shall be brushed on the backing and the back of the veneer unit. Type S mortar then shall be applied to the backing and the veneer unit. Sufficient mortar shall be used to create a slight excess to be forced out the edges of the units. The units shall be tapped into place so as to completely fill the space between the units and the backing. The resulting thickness of mortar in back of the units shall not be less than 1/2 inch (13 mm) or more than 1–1/4 inches (32 mm).
    e) For wood construction:
       1) Studs shall be spaced no more than 16" O.C.
       2) Use pressure treated plywood of at least 1/2 inch thick unless otherwise noted on plans or shear wall schedule.
       3) Install metal lath and fasteners per manufacturer's recommendations and per Table 25–C of State of Oregon Structural Specialty Code, 1998 Edition. In case of conflict, the most stringent requirement shall apply.
       4) All fasteners, including nails, staples and screws, and metal lath shall be hot–dipped galvanized according to ASTM A–153.
    f) Provide isolation joint between adhearent veneer and any other building element that could move such as, slab–on–grade, side walk, stairs, soil, foundation etc.
19. Reference specifications for more requirements.

SHEET INDEX:

S1	GENERAL STRUCTURAL NOTES
S2	TYPICAL DETAILS
S3	FOUNDATION & ROOF FRAMING

Structural details for this project are for illustration only. They are not drawn to scale unless noted otherwise. Contractor must verify all dimensions before fabrication or construction. Do not scale drawings.

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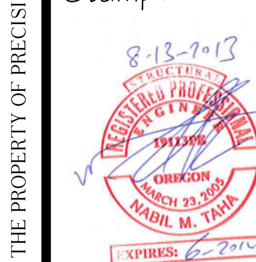


REVISIONS:

MARK:	DATE:	BY:

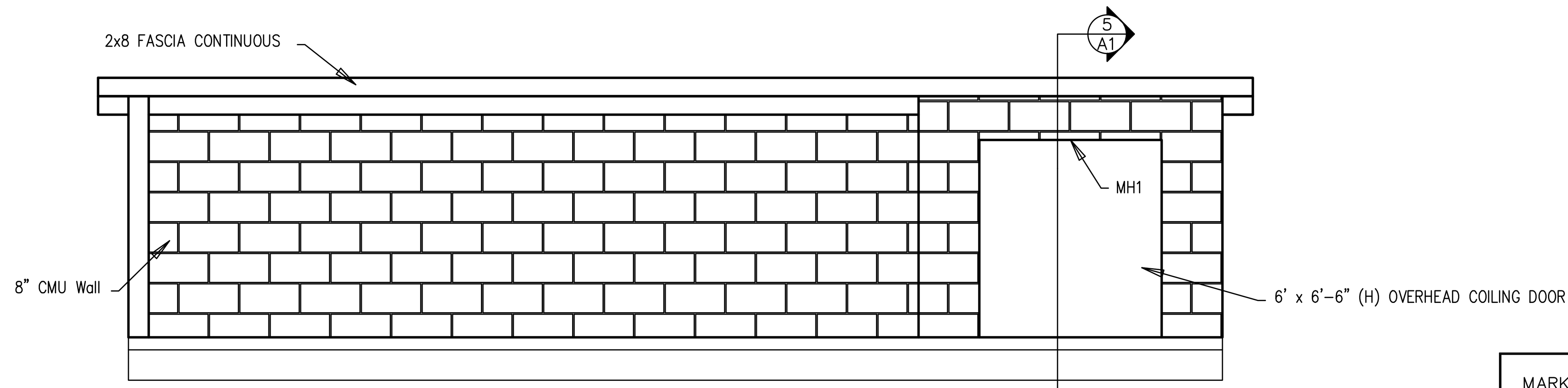
DRAWN BY: L.J.
DS. BY: R.H.
CHK BY: N.T.
DATE: 07-02-13

PROJECT #: KF213-3094

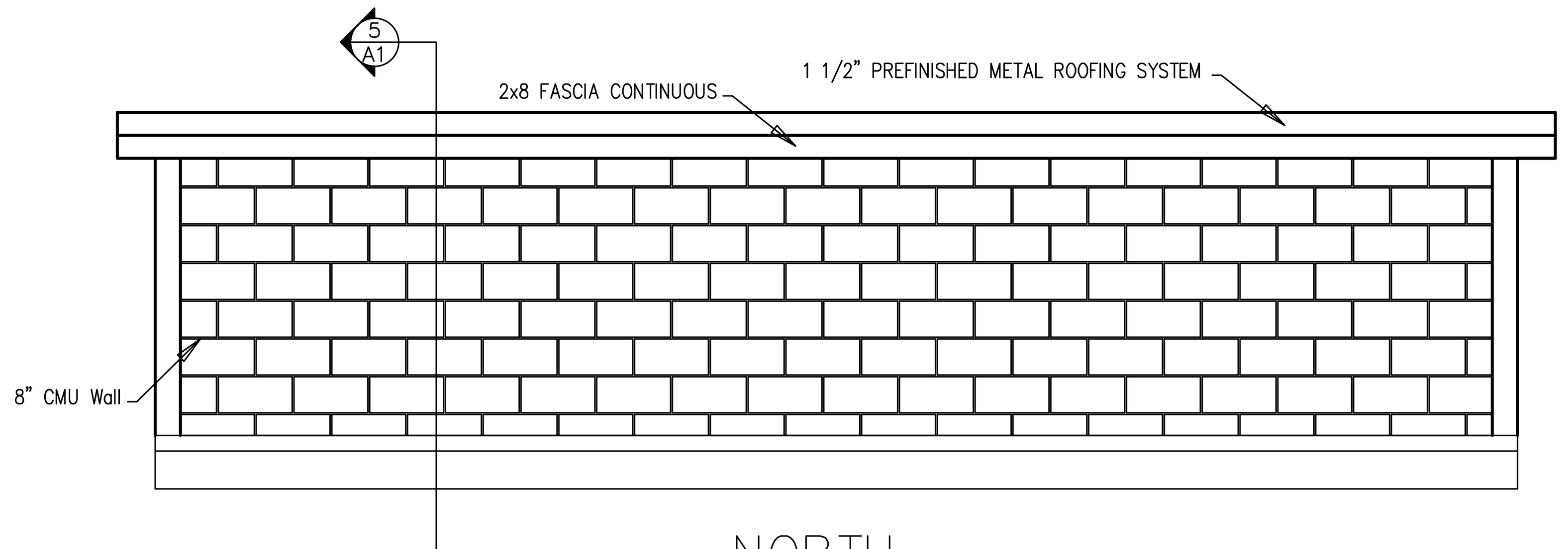
TITLE: GENERAL NOTES

PAGE NO: S1

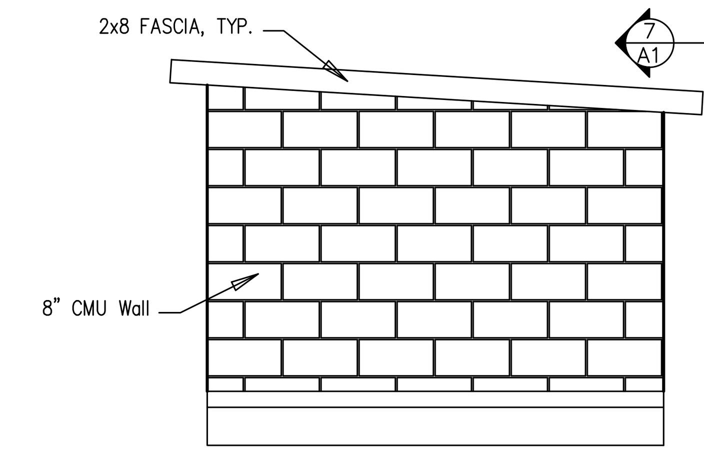
RALPH HALL, PRECISION STRUCTURAL ENGINEERING 4/30/2009 4:25 PM 24x36 Structural Set.dwg



1 SOUTH
Scale: 1/4" = 1'-0"



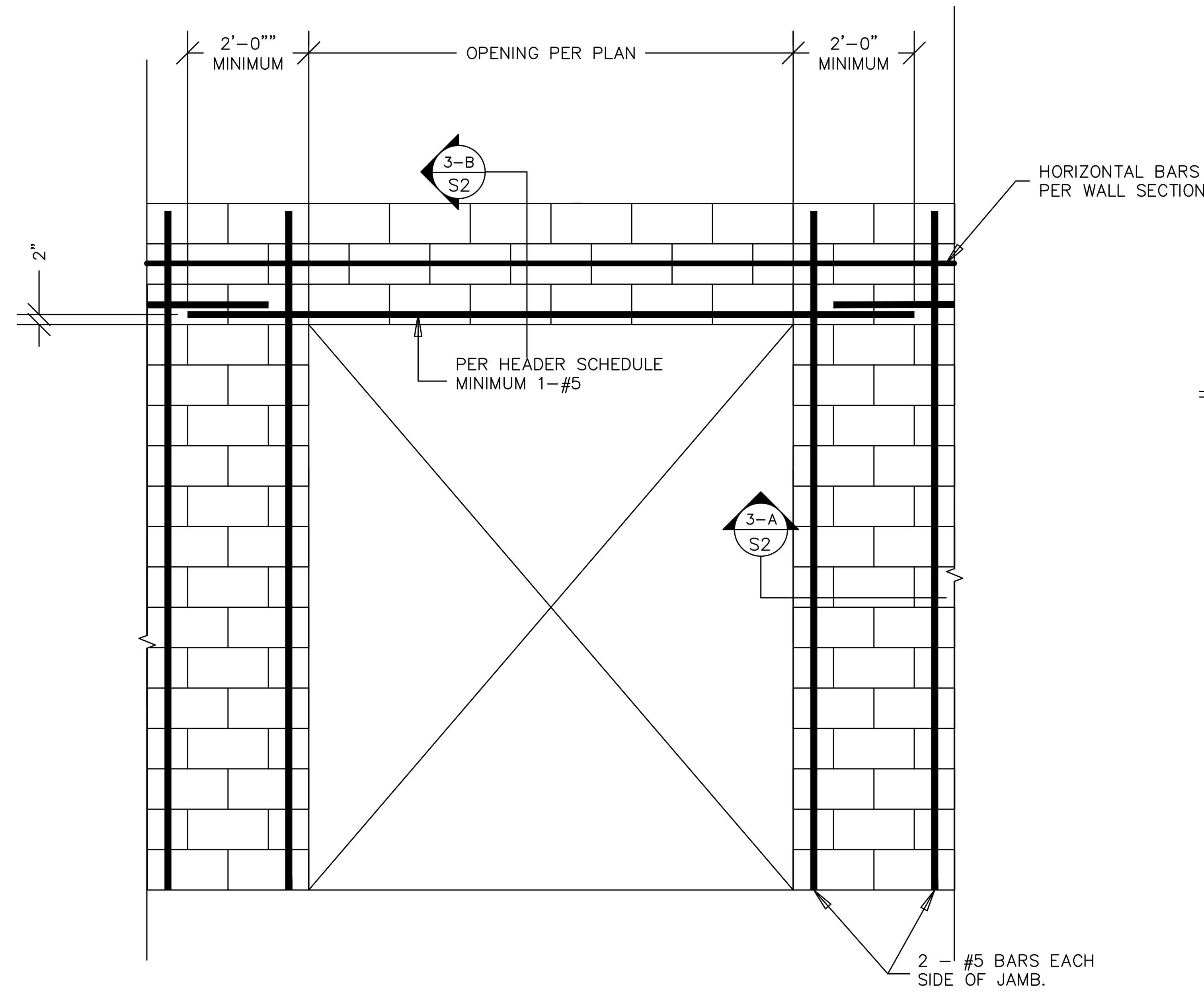
2 NORTH
Scale: 1/4" = 1'-0"



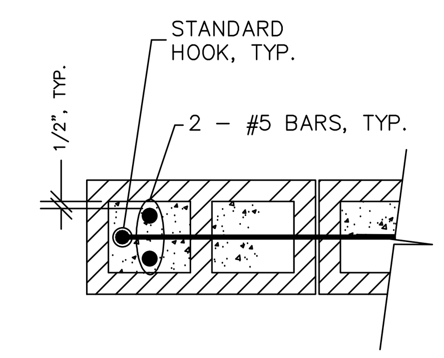
4 EAST
Scale: 1/4" = 1'-0"

MARK	SIZE	BOTTOM BARS	MIDDLE BARS	TOP BARS	STIRRUPS
MH1	8x8	—	1 – #4	—	—

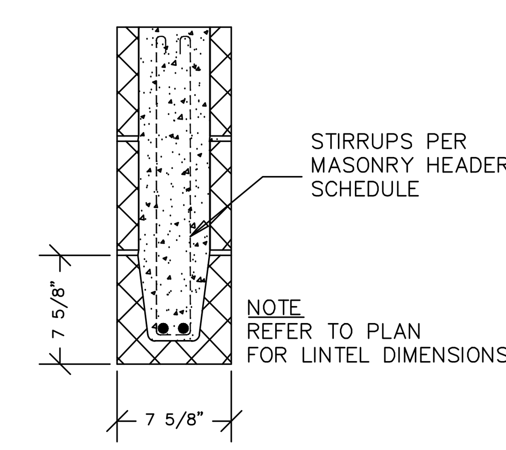
3D MASONRY HEADERS SCHEDULE
Scale: NOT TO SCALE



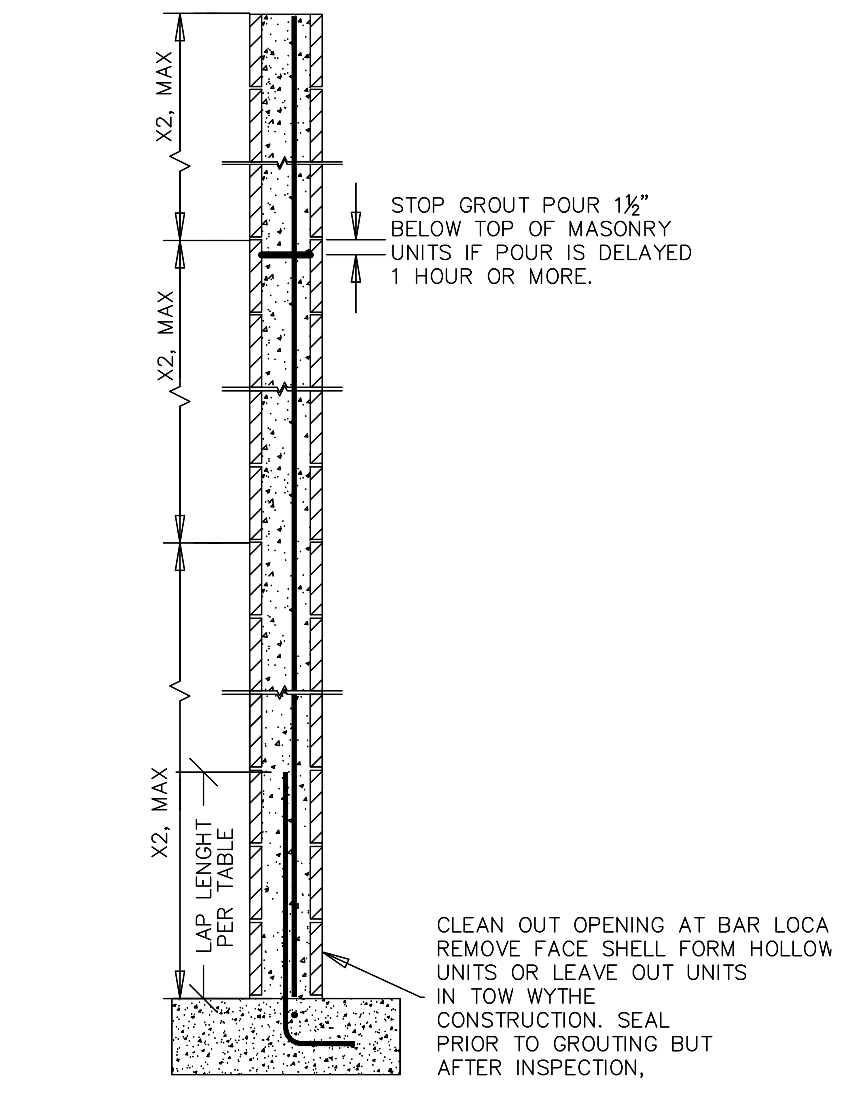
3 TYPICAL WALL OPENING REINFORCING DETAILS
Scale: NOT TO SCALE



3.A SECTION
SCALE: 3/4"=1'-0"

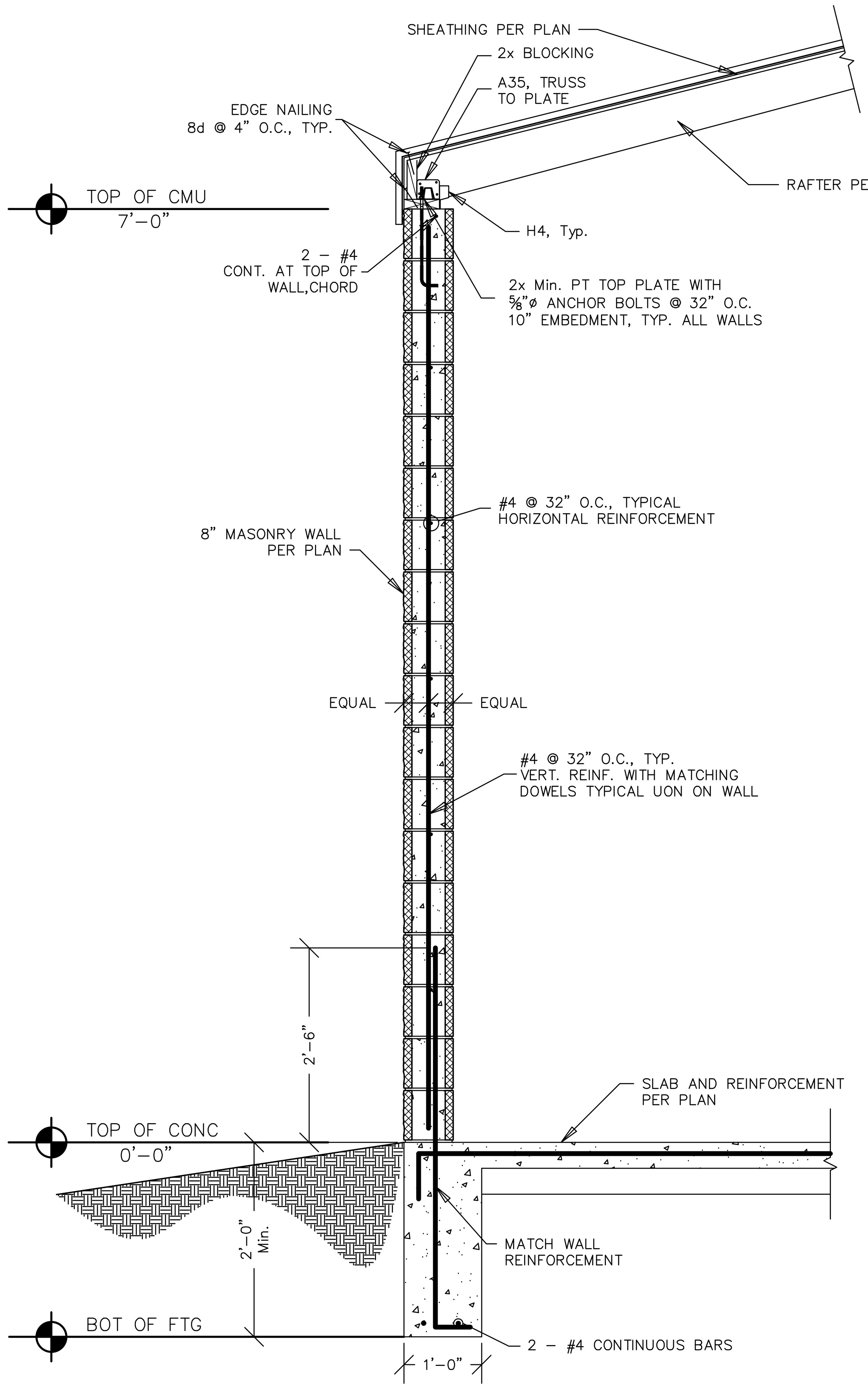


3.B SECTION
SCALE: 3/4"=1'-0"



FOR CALIFORNIA HOSPITALS AND SCHOOL PROJECTS
1–X2= 6'-0" FOR ALL CONSTRUCTION EXCELENT AS SHOWN ON 2 TO 4 BELOW:
2–REFER TO DIVISION OF THE STATE ARCHITECTS INTERPRETAION OF REGULATIONS, IR-21-2
3–CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENFORCEMENT AGENCY.
4–X2= 4'-0".

5 HIGH LIFT GROUTING
Scale: NOT TO SCALE



6 TYPICAL WALL SECTION
Scale: NOT TO SCALE

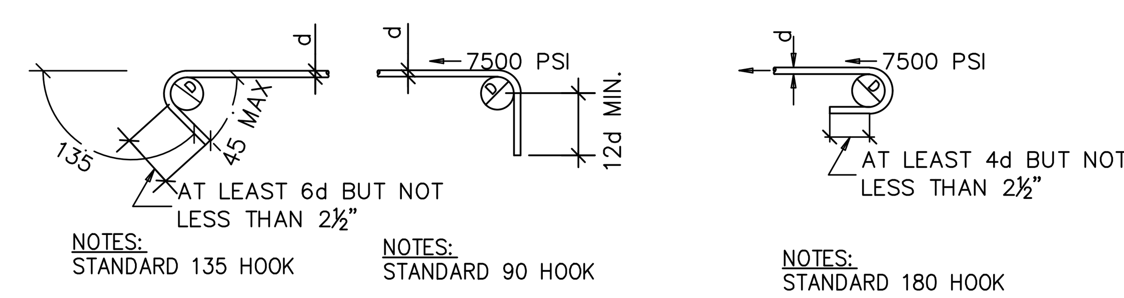
LENGTH OF LAP (INCHES)[1] GRADE 60 STEEL F_s = 24,000 PSI

BAR SIZE		LAPS FOR TENSION BARS	
NO.	DIA. D_b (INCHES)	48X1.3 =62 DIA.	LONG SPLICE 48X1.5[1] =72 DIA.
3	0.375	23	27
4	0.500	31	36
5	0.625	39	45
6	0.750	47	54
7	0.875	54	63
8	1.000	62	72
9	1.128	70	81
10	1.270	79	91
11	1.410	87	102

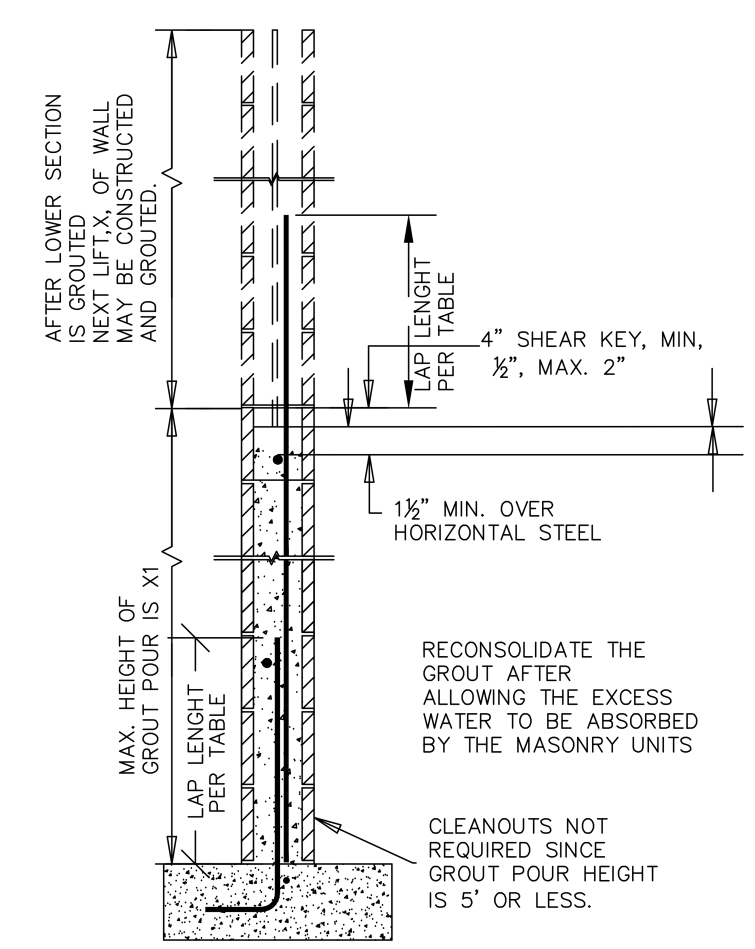
1. ONLY WHEN CALLED ON PLANS OR DETAILS AS "LONG SPLICE" WHER F_s >0.80F_s PER UBC SEC. 2107.2.12.

7 LAP SPLICES FOR REINFORCING STEEL
SCALE: NOT TO SCALE

BAR SIZE			D_i (INSIDE DIA) (INCHES)	D_o (OUTSIDE DIA) (INCHES)	REMARKS[2]
NO.	DIA. D_b (INCHES)	CROSS SECT. A_s (SQ. IN.)			
3	0.375	0.11	2 1/4	3	D= 6D_b FOR BARS OR=4d FOR *4 OR SMALLER STIRRUPS
4	0.500	0.20	3	4	
5	0.625	0.31	3 3/4	5	
6	0.750	0.44	4 1/2	6	
7	0.875	0.60	5 1/4	7	
8	1.000	0.79	6	8	



X REINFORCEMENT BENDS & LAPS
SCALE: 1/4" = 1'-0"



LIFT HEIGHT X
1– X1= 5'-0" FOR ALL CONSTRUCTION EXCEPT AS SHOWN ON 2 BELOW.
2– X1= 4'-0" FOR CALIFORNIA HOSPITALS AND SCHOOL PROJECTS AND FOR PROJECTS REGULATED BY CALIFORNIA DIVISION OF THE STATE ARCHITECTS.

8 LOW LIFT GROUTING
Scale: NOT TO SCALE

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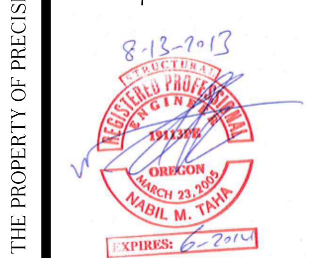


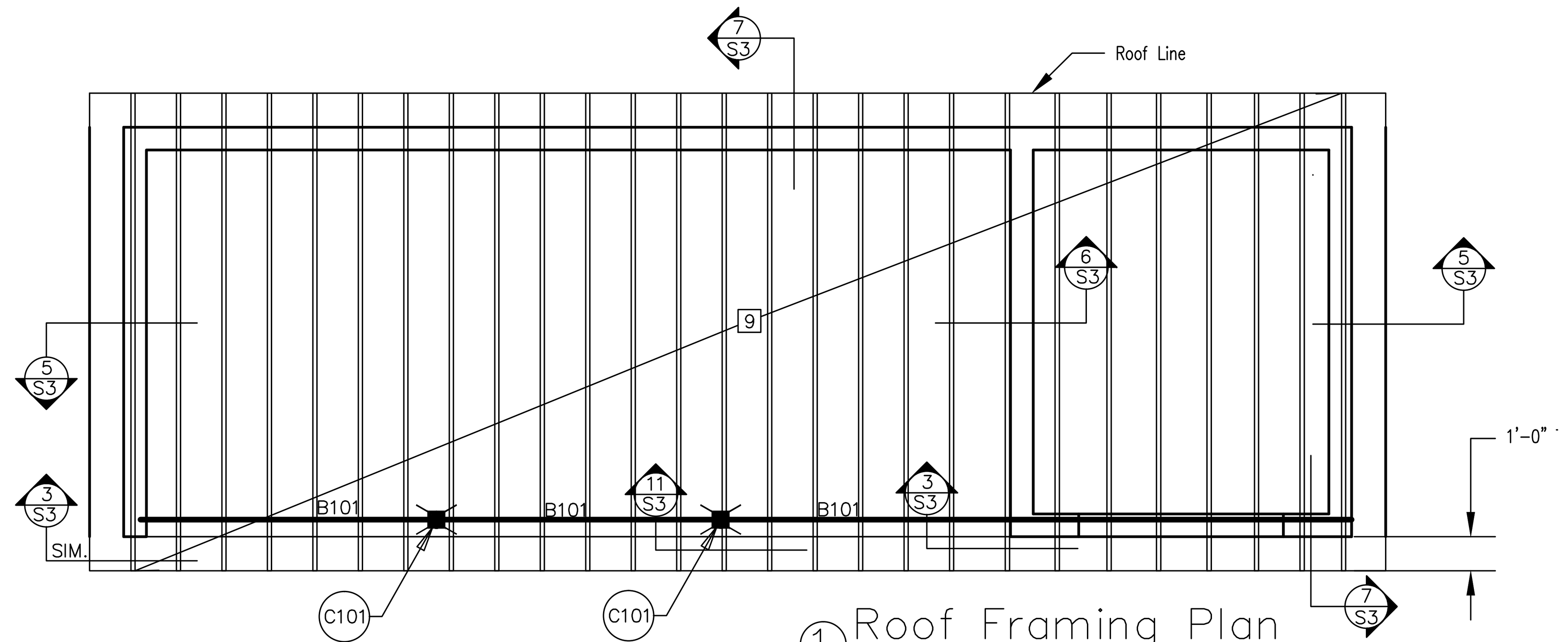
REVISIONS:		
MARK	DATE:	BY:

DRAWN BY: L.J.
DS. BY: R.H.
CHK BY: N.T.
DATE: 07-02-13

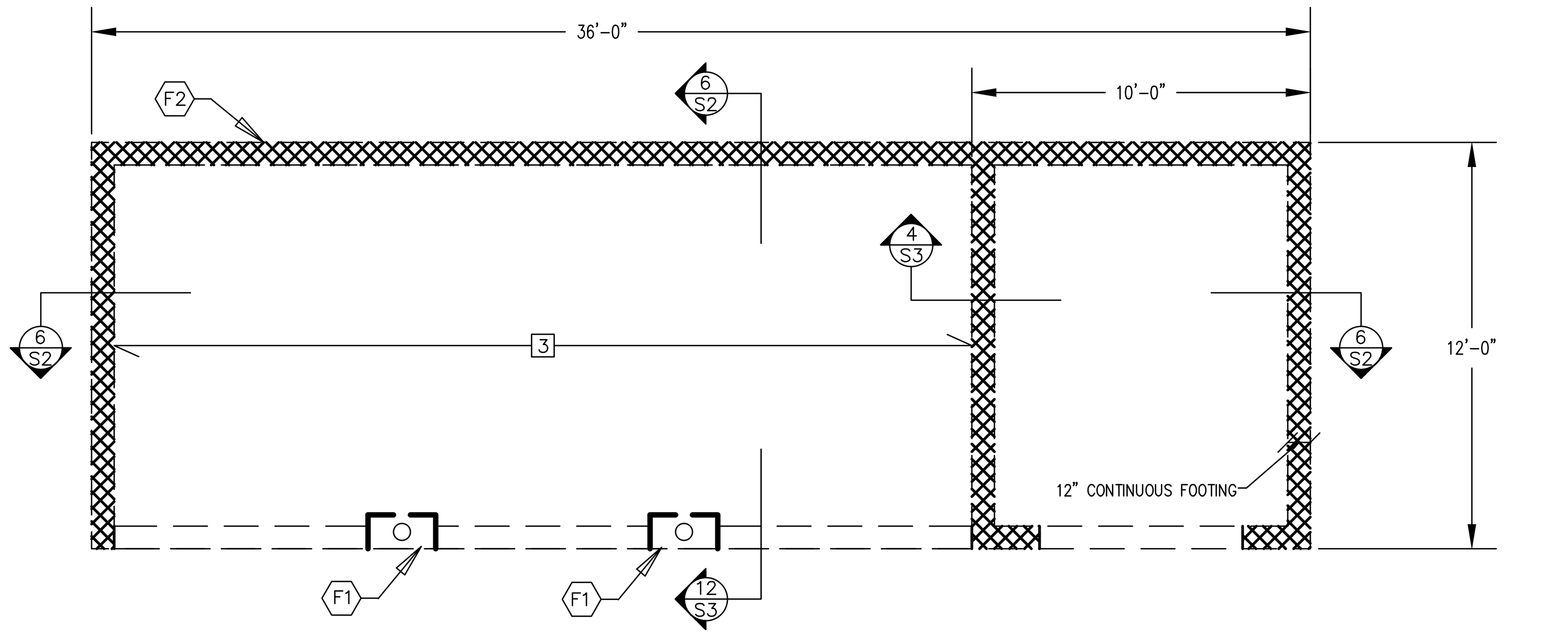
PROJECT #:
KF213-3094

TITLE:
Typical Details

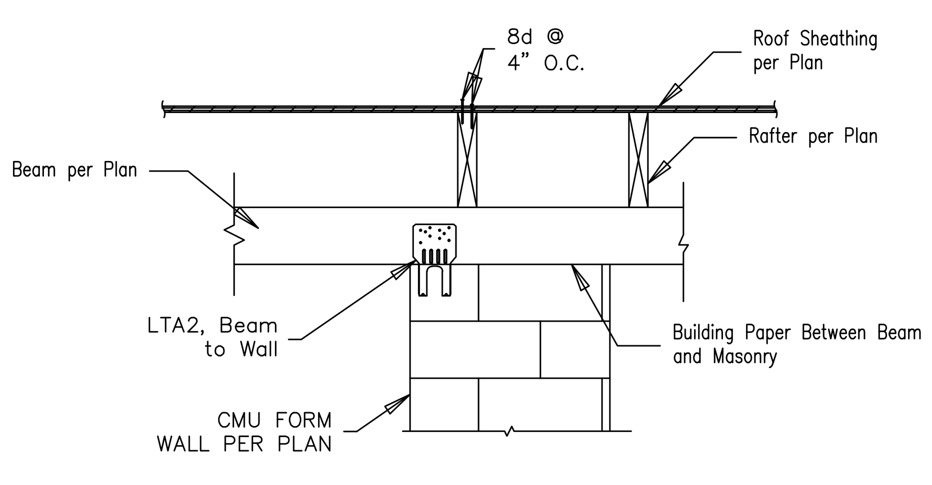
PAGE NO:
S2



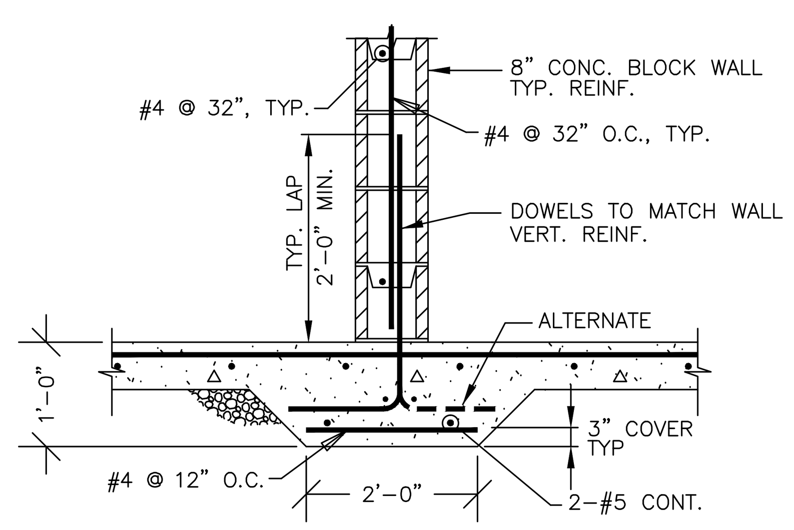
1 Roof Framing Plan
Scale: 1/4" = 1'-0"



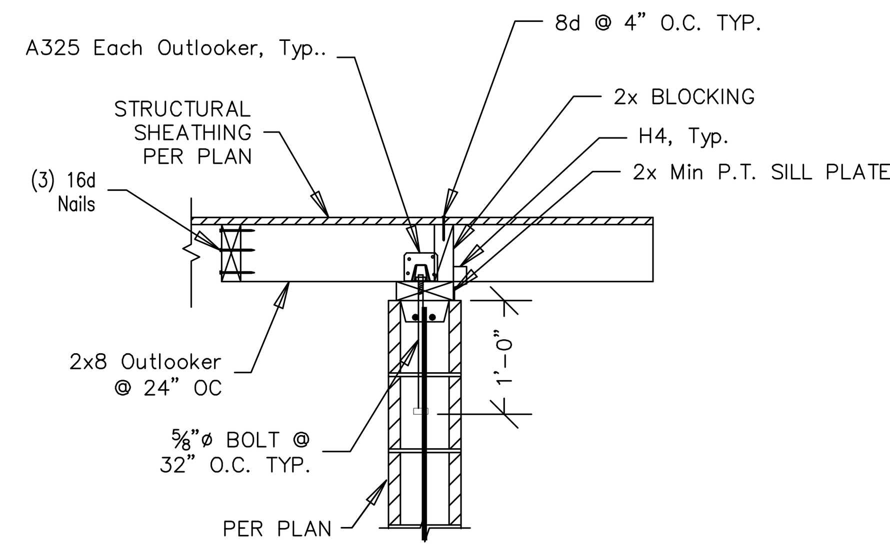
2 Foundation/First Floor Framing Plan
Scale: 1/4" = 1'-0"



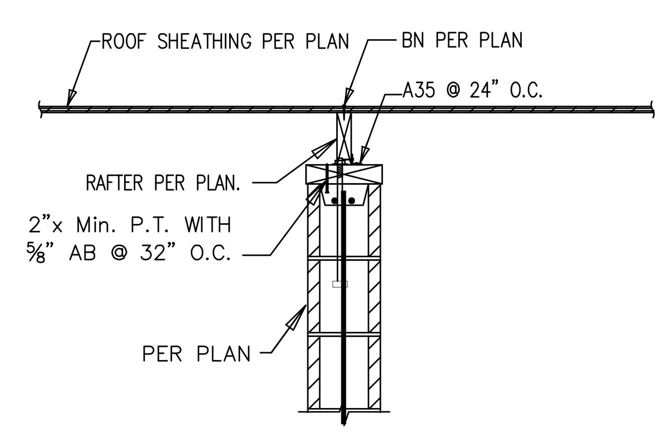
3 BEAM CONNECTION AT CMU WALL
Scale: NOT TO SCALE



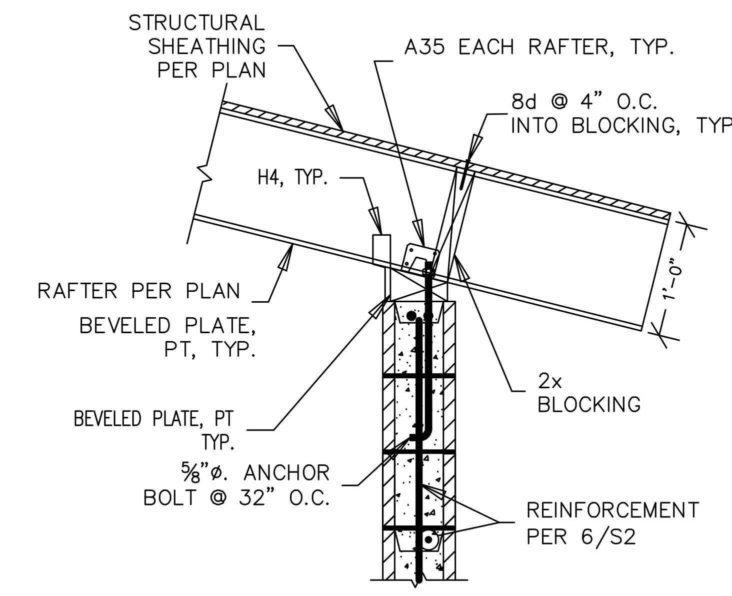
4 FOOTING FOR LOAD BEARING WALL
Scale: NOT TO SCALE



5 SECTION
Scale: NOT TO SCALE



6 SHEAR WALL DETAIL
Scale: NOT TO SCALE



7 WALL LATERAL SUPPORT
Scale: NOT TO SCALE

MARK	SIZE	TYPE	BASE CONNECTION	TOP CONNECTION	REMARKS
C101	2 ½" ø	Schedule 40 pipe	–	–	–

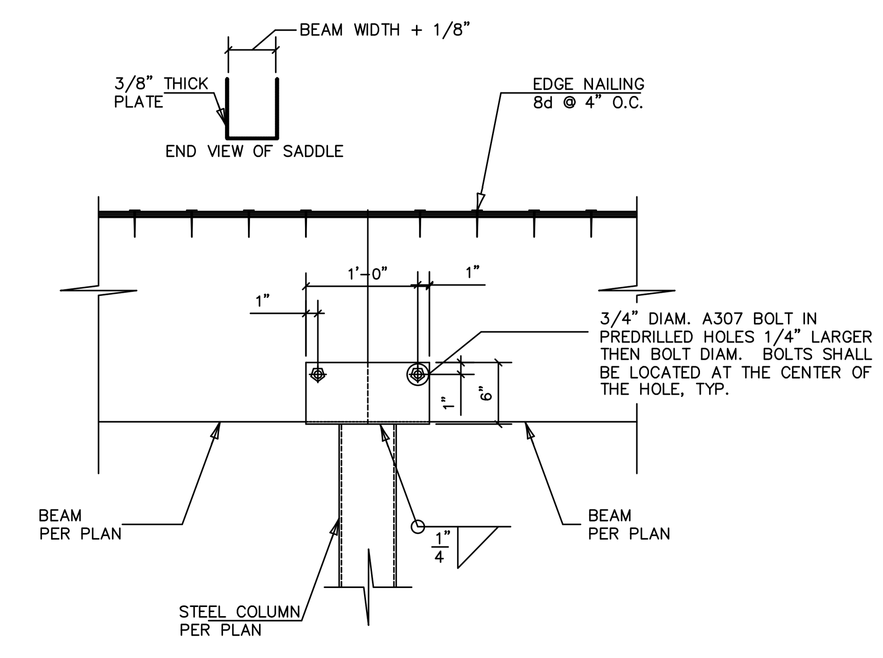
8 COLUMN SCHEDULE
N.T.S. COLUMN SUPPORTING THIS ROOF

MARK	WIDTH (INCHES)	DEPTH (INCHES)	COMBINATION	CAMBER (INCH)	REMARKS
B101	4	8	No. 2 DFL	–	–

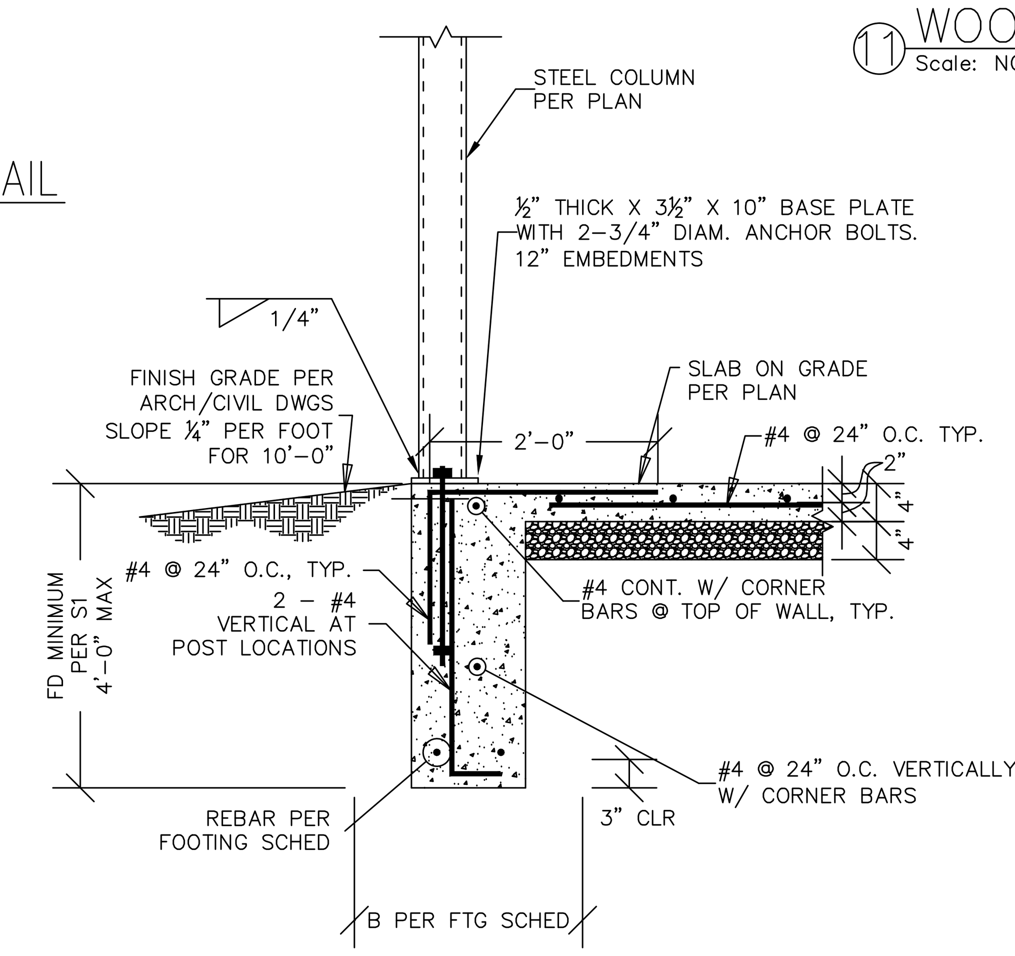
9 WOOD BEAM SCHEDULE
N.T.S.

MARK	DIMENSION LENGTH "A"	DIMENSION WIDTH "B"	DIMENSION DEPTH "D"	BOTTOM REINFORCEMENT LONGITUDINAL	BOTTOM REINFORCEMENT TRANSVERSE	DETAIL NO./ REMARKS
F1	2'-0"	1'-0"	1'-0"	(2) #4	(3) #4	–
F2	1'-0" CONTINUOUS			(2) #4	–	–

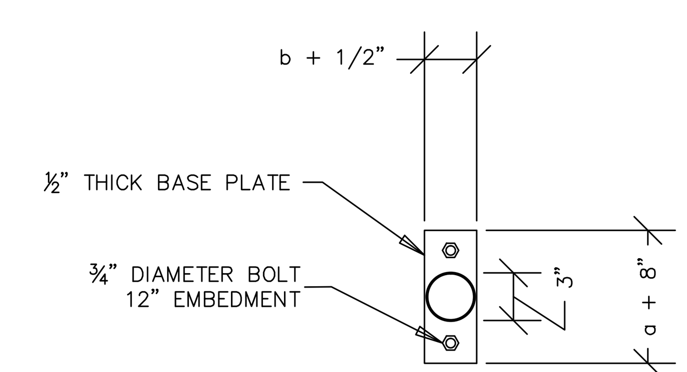
10 COLUMN FOOTING SCHEDULE
N.T.S.



11 TYPICAL STEEL POST TO WOOD BEAM CONNECTION DETAIL
Scale: NOT TO SCALE



12 STEEL POST AT BUILDING EDGE DETAILS
Scale: NOT TO SCALE



A- AT SIDE LOCATIONS

LEGEND:

- MASONRY WALL
- COLUMN SUPPORTING NEXT FLOOR/ROOF UP.
- n INDICATES SHEET NOTES.
- Fn INDICATES FOOTING MARK, REFER TO FOOTING SCHEDULE.
- Cn INDICATES COLUMN MARK, REFER TO COLUMN SCHEDULE.
- n NUMERICAL VALUE, 1, 2, 3 ETC.

SHEET NOTES:

1. REFER TO S1 FOR STRUCTURAL GENERAL NOTES AND TO OTHER SHEETS FOR DETAILS.
2. VERIFY ALL DIMENSIONS WITH THE ARCHITECTURAL DRAWINGS. DO NOT SCALE DRAWINGS.
3. 4" THICK CONCRETE SLAB-ON-GRADE OVER 4" OF FREE DRAINING 3/4" CRUSHED ROCK. CRUSHED ROCK SHALL CONTAIN NO FINES TO PROVIDE A CAPILLARY MOISTURE BREAK. REINFORCE SLAB WITH #4 BARS @ 24" O.C. BOTH WAYS AT SLAB MID-THICKNESS.
4. CENTER FOOTING UNDER WALLS AND POSTS UNLESS OTHERWISE NOTED ON PLANS AND/OR DETAILS.
5. IT IS RECOMMENDED THAT NATURALLY DURABLE OR PRESERVATIVE-TREATED WOOD SHALL BE USED FOR WOOD MEMBERS THAT ARE EXPOSED TO WEATHER WITHOUT PROTECTION FROM ROOF SUCH AS BALCONIES, DECKS OR PORCHES ETC.
6. ROOF DRAINAGE SHALL BE DIRECTED AWAY FROM FOUNDATION.
7. LAY FLOOR AND ROOF STRUCTURAL PANELS WITH THE LONG DIMENSION AT RIGHT ANGLE TO SUPPORTS AND CONTINUOUS OVER TWO OR MORE SPANS.
8. ROOF SHEATHING SHALL BE ⅝" THICK APA PLYWOOD OR ORIENTED STRAND BOARDS WITH 24"/16" SPAN RATING. USE 8d @ 4" O.C. (BN) AT EXTERIOR WALLS AND INTERIOR SHEAR WALLS. 8d @ 6" O.C. (REN) AT PANEL EDGES AND 8d @10" P.C. AT INTERMEDIATE SUPPORTS, UON. MINIMUM PENETRATION IS 1 ⅝" INTO FRAMING.
9. 2X8 DFL #2 @ 24" O.C.

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NABIL M. TAHA
EXPIRES

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TITLE: FOUNDATION & ROOF FRAMING

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