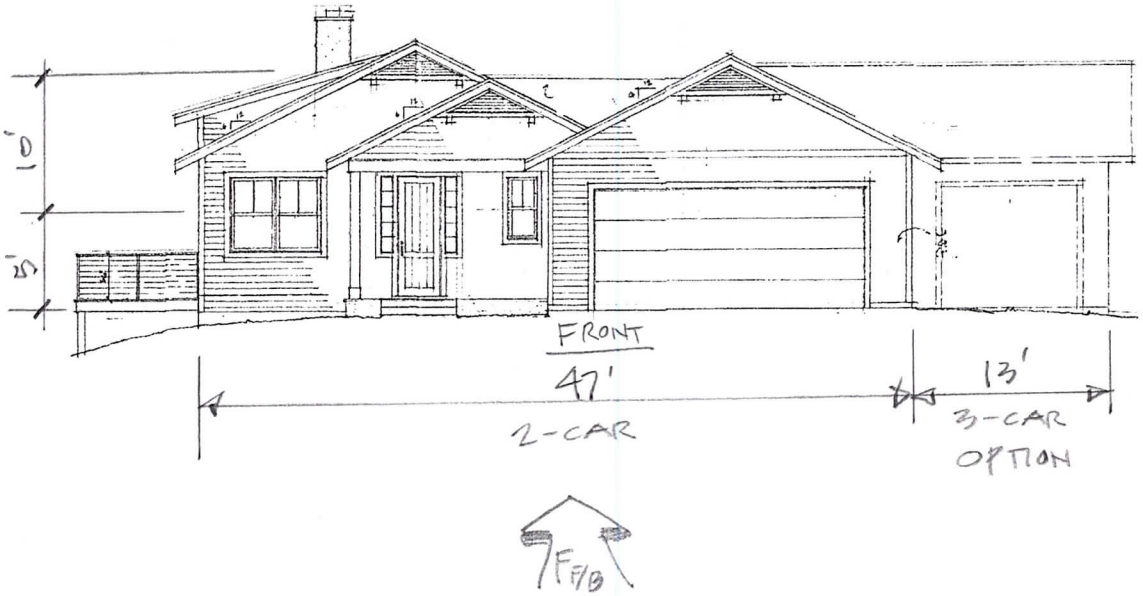
Terry A. Nettles, P.E.
Consulting Engineer
7777 92nd Street NW Gig Harbor, WA 98332
VOICE & FAX (253) 858-7777

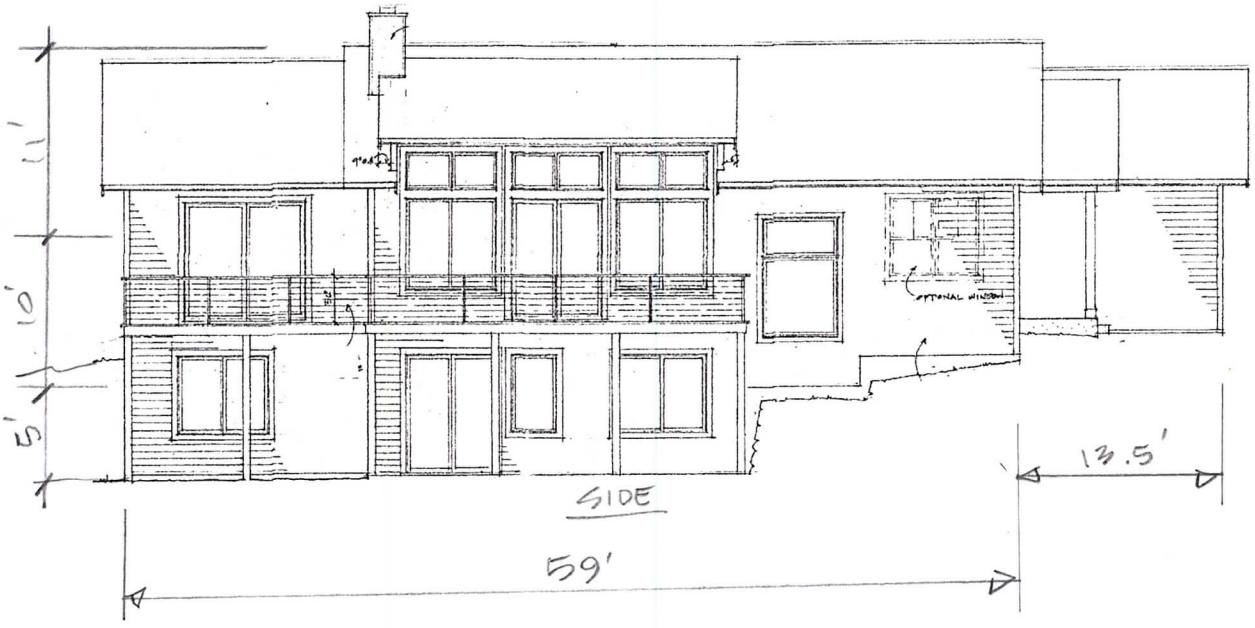
Project DISNEY ASSOCS. PLAN 2322
Subject
Sheet 1 of 20
Job No. 39125
Date 12/3/19

Reviewed for code compliance
with IRC 2015
Kitsap County Building Department
GShapiro@co.kitsap.wa.us
04/14/2020

BASIC PERMIT PACKAGE
REVIEWED FOR CODE COMPLIANCE
WITH IRC 2015
KITSAP COUNTY BUILDING DEPARTMENT



F F/B



F S/S

CHANGES
MUST Be Approved Prior
To Performing Work

Established Basic Permit #
19-05700

Permit Number: 20-00762

A Residence by Disney Associates
Bjorn & Poulsen - Plan 2322
Lateral Forces Analysis
Exposure B

Lateral Forces Analysis in accordance with the IBC 2015, chapter 16

This lateral forces analysis is being performed for a site with 30 psf ground snow loads, 85 mph wind speeds (K_{zt} = 1.0), with an Exposure B terrain condition. Seismic analysis shall use a site class D soil with site coefficient F_s for a site spectral response of S_s = 1.5 Seismic Category Use Group I, Importance factor 1.0

Wind Alternate All Heights Method per IBC Section 1609.6.3, Exposure B, 110 mph wind (ultimate)

$$P_{net} = q_s K_z C_{net} [I k_{zt}]$$

q_s = 18.5 psf K_{z25} = 0.90
C_{net} = 0.73 used for all (roofs and walls)
k_{zt} = 1.0 I = 1.0
for h ≤ 30' P_{net} = 12.3 psf

F f/b_1 = 47'(10')12.3psf = 5781 lb
F s/s_1 = 73'(11')12.3psf = 9877 lb
F f/b_0 = 26'(5')12.3psf + 0.5(Ff/b2) = 4490 lb to rear portion
F s/s_0 = [59'(10')12.3psf + 0.6(Fs/s2)] = 13183 lb to dalite portion

GRAVITY LOADS	DL (psf)	LL (psf)	TOTAL (psf)
roof (composition)	15	25	40 psf
floors (living)	12	40	52 psf
floors (sleeping)	10	30	40 psf
exterior decks framed	10	60	70 psf
walls (9-ft height)	90	----	90 plf

SEISMIC FORCES

This building is 3-stories or less of plywood shearwall bracing
The seismic base shear V = C_sW
where C_s = [S_{DS} / R/I_e)] W
and from ASCE 7 Table 12.2-1, Section A 15, Light Wood Frame, R = 6.5
Seismic Category D2, use S_s = 1.5
and from ASCE 7, Table 11.4-1 for site class D, F_a = 1.1
so S_{MS} = $F_a S_s$ = 1.1(1.5) = 1.65
then S_{DS} = $^2/_3$ S_{MS} = 1.1
R = 6.5 for plywood sheathed framed walls
For working stress analysis, use 0.7E for seismic
W = dead load weight of building
so Veq = [(1.1)/6.5] W(.7) = 0.1185 W for framed wall portions

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Lateral Forces Analysis
Exposure B

Where W is the gross weight of the part of the structure above the base of the shear resisting element. Therefore the floor weight does not add to the wall shears of the floor being calculated but only to the mass contributing to shears of the next story's bracing walls below it when it is calculated.

Dead Load + Live Load (floors) + Seismic (snow is not included when < 30psf) the net areas that can be loaded.

Calculate the maximum gross weight of the building using the sum of the net areas that can be loaded.

A roof	Wr	2562	15 psf	=	38430 lb
A floor 1	Wf1	1602	10 psf	=	16020 lb
A floor 0	Wf0	720	slab at grade	=	0 lb
L walls 1	Ww1	322	90 plf	=	28980 lb
L walls 0	Ww0	123	90 plf	=	11070 lb

Veq 1 = 0.1185(Wr + Ww1) = 7988 lb
Veq 0 = 0.1185 (Wf1 + Ww0) + 0.45Veq1 = 6805 lb to rear portion

SUMMARY OF CONTROLLING SHEARS

FLOOR 1
Maximum F f/b = 7988 **Seismic controls**
Maximum F s/s = 9877 **Wind controls**
FLOOR 0
Maximum F f/b = 6805 **Seismic controls**
Maximum F s/s = 13183 **Wind controls**

For Maximum Base Shears
Veq = 0.1185(Wf1) + Veq0 = 7988 lb
Vwind = 46'(5')12.3psf + Fs/s_0 = **16012 lb CONTROLS**

Anchor Bolt Requirements (Cumulative)
Total foundation base length = 324 ft
By using the allowable compressive stress of the bolt face against the wood with 4/3 stress increase for short term loads, and assuming a Hem-fir species material with Fc = 500 psi, the 4/3(500) = 667 psi, then for
$^1/_2$" dia. bolts in 1$^1/_2$" mudsills, gives a 500 lb/bolt capacity, and for
$^5/_8$" dia. bolts in 1$^1/_2$" mudsills, gives a 625 lb/bolt capacity

Vbase = 16012 lb, so minimum number of bolts req'd = V/500 = 32
or = V/625 = 26
324/32 = 10 ft o.c. for $^1/_2$" bolts
324/26 = 13 ft o.c. for $^1/_2$" bolts

Use at least $^1/_2$" Φ @ maximum 6' o.c. with 3"x 3"x $^1/_4$" plate washers
(See Shear wall schedule for local wall conditions requiring closer spacing.)

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7777 92nd Street NW Gig Harbor, WA 98332
VOICE & FAX (253) 858-7777

Project DISNEY ASSOC
PLAN 2322
Subject LATERAL FORCES

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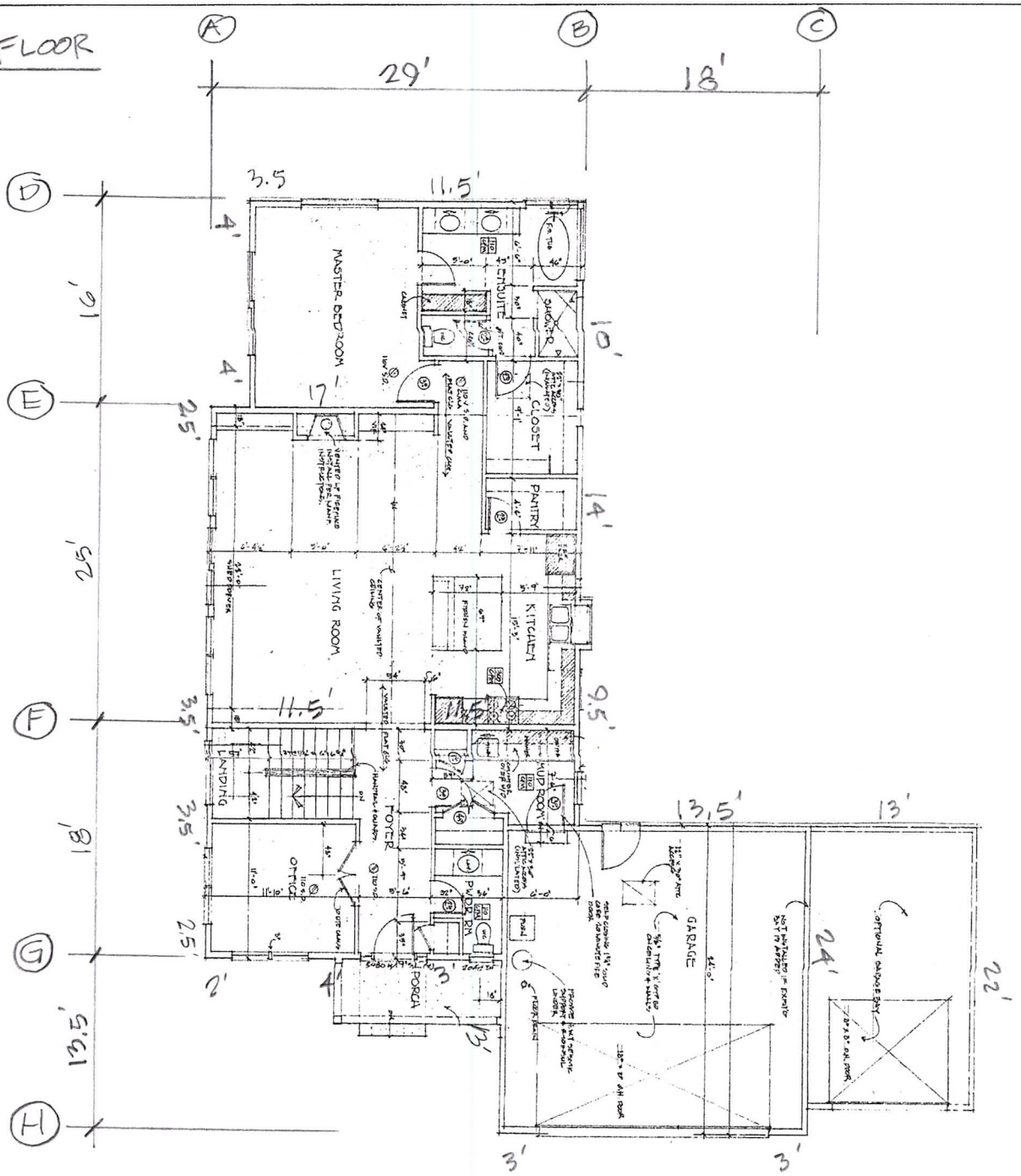
Job No. 39125
Date 12/3/19

MAIN FLOOR



$F_{F/B1} = 7988^{\#}$ $F_{A} = \left(\frac{14}{47}\right)F = 2380^{\#}$ $F_{B} = \frac{1}{2}F = 3994^{\#}$ $F_{C} = \left(\frac{9}{47}\right)F = 1615$

BRACING WALLS

$f_{v\,A} = \frac{2380^{\#}}{2(4+2.5'+3.5')} = 111$ plf

$f_{v\,B} = \frac{3994^{\#}}{(10'+14'+7.5'+13')} = 86$ plf

$\frac{1615^{\#}}{24'} = 67$ plf

7/16" OSB w/ 8d @ 6" o.c.

Terry A. Nettles, P.E.
Consulting Engineer
7777 92nd Street NW Gig Harbor, WA 98332
VOICE & FAX (253) 858-7777

Project DISNEY ASSOC
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BRACING WALLS

$F_{S/S\,1} = 9877^{\#}$

$F_{(D)} = \left(\frac{8}{72.5'}\right) 9877 = 1090^{\#}$

$F_{(E)} = \left(\frac{20.5}{72.5}\right) 9877 = 2795^{\#}$

$F_{(F)} = \left(\frac{21.5}{72.5}\right) 9877 = 2930^{\#}$

$F_{(G)} = \left(\frac{15.75'}{72.5'}\right) 9877 = 2145^{\#}$

$F_{(H)} = \left(\frac{6.75}{72.5}\right) 9877 = 920^{\#}$

8d/6 $f_{v(D)} = \frac{1090^{\#}}{(3.5' + 11.5')} = 73$ plf → 7/16" OSB w/8d @ 6" o.c.

8d/6 $f_{v(E)} = \frac{2795^{\#}}{17'} = 165$ plf → DO

5d/7 $f_{v(F)} = \frac{2930^{\#}}{2(11.5')} = 127$ plf → ½" GWB 2-sides w/5d @ 7" o.c.

8d/6 $f_{v(G)} = \frac{2145^{\#}}{(2' + 4' + 3')} = 238$ plf → 7/16" OSB w/8d @ 6" o.c.

PFH $f_{v(H)} = \frac{920^{\#}}{2(3')} = 153$ plf → 7/16" OSB w/8d @ 6" o.c. w/STHD14

CONSTRUCT PER FIG. 2308.6.5.2 - PFH

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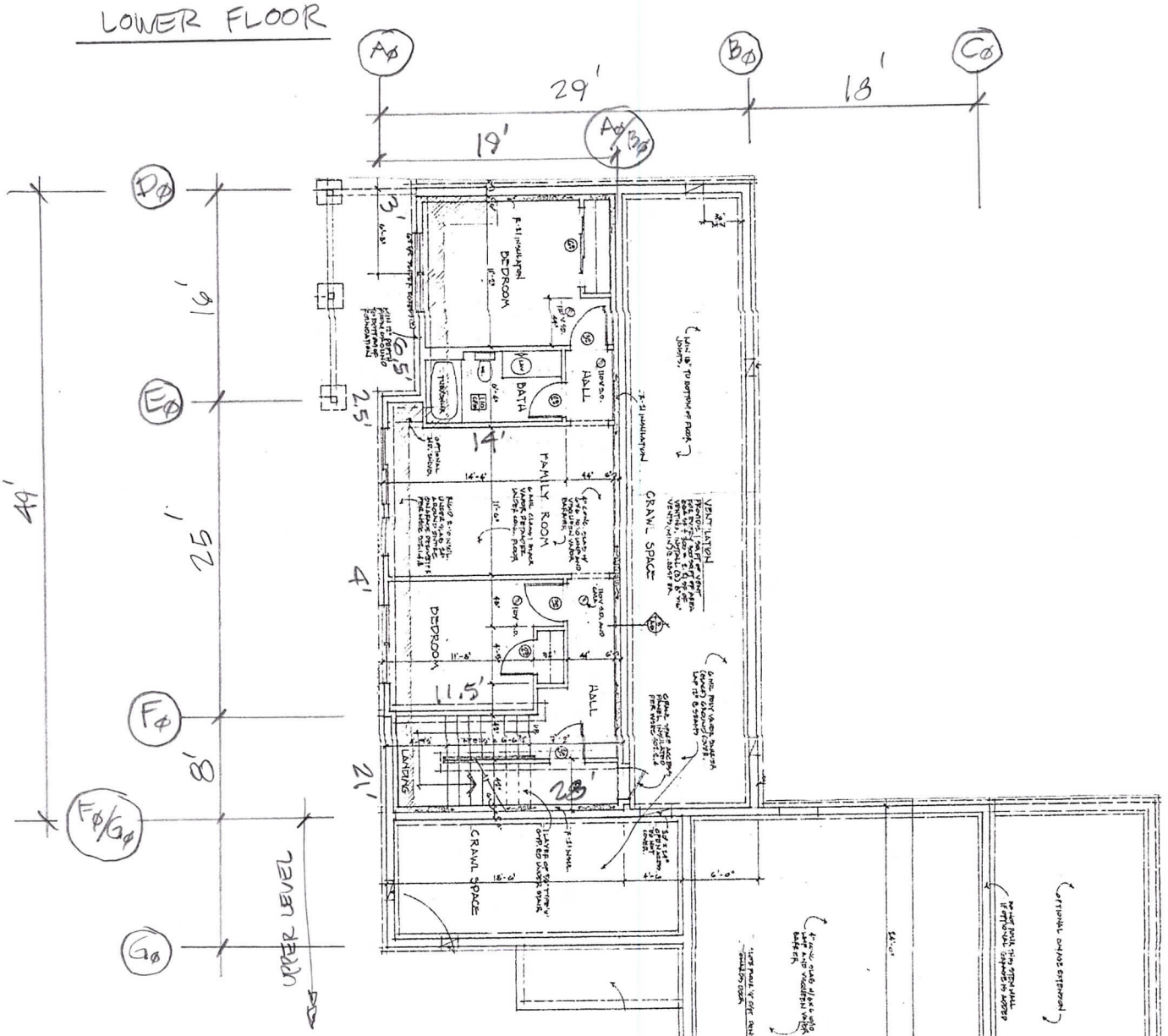
7777 92nd Street NW Gig Harbor, WA 98332
VOICE & FAX (253) 858-7777

Project DISNEY ASSOCS
PLAN 2322
Subject LATERAL FORCES

Sheet 6 of 20
Job No. 2A125
Date 12/3/19

LOWER FLOOR



$F_{F/B\,\phi} = 6805^{\#}/2 = 3400^{\#}$ to Aϕ & Aϕ/Bϕ

8d/6

$f_{v\,A\phi} = \dfrac{3400^{\#}}{(3' + 2.5' + 4' + 21')} = 113$ plf

$f_{v\,B\phi} = \dfrac{3400^{\#}}{49'} = 70$ plf

7/16" OSB w/ 8d @ 6" o.c.

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7777 92nd Street NW Gig Harbor, WA 98332
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Project DISNEY ASSOCS PLAN 2322
Subject
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$F_{5/8\phi} = 13185^{\#}$

$F_{D\phi} = \left(\frac{8}{49}\right) 13185^{\#} = 2152^{\#}$

$F_{E\phi} = \left(\frac{20.5}{49}\right) F = 5516^{\#}$

$F_{F\phi} = \left(\frac{16.5}{49}\right) F = 4440^{\#}$

$F_{F\phi/G\phi} = \left(\frac{4}{49}\right) F = 1077^{\#}$

8d/6 $f_{v\,D\phi} = \frac{2152^{\#}}{29'} = 74$ plf → 7/16" OSB w/8d @ 6" o.c. → CONCRETE FDN.

8d/4 $f_{v\,E\phi} = \frac{5516^{\#}}{14'} = 394$ plf → 7/16" OSB 1-side w/8d @ 4" o.c.

8d/4 $f_{v\,F\phi} = \frac{4440^{\#}}{11.5'} = 386$ plf → DO

8d/6 $f_{v\,F\phi/G\phi} = \frac{1077^{\#}}{28'} = 39$ plf → 7/16" OSB if framed concrete fdn wall

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Consulting Engineer
7777 92nd Street NW Gig Harbor, WA 98332
VOICE & FAX (253) 858-7777

Project DISNEY ASSOC
PLAN 2322
Subject ROOF FRAMING

Sheet 8 of 20
Job No. 39125
Date 12/3/19

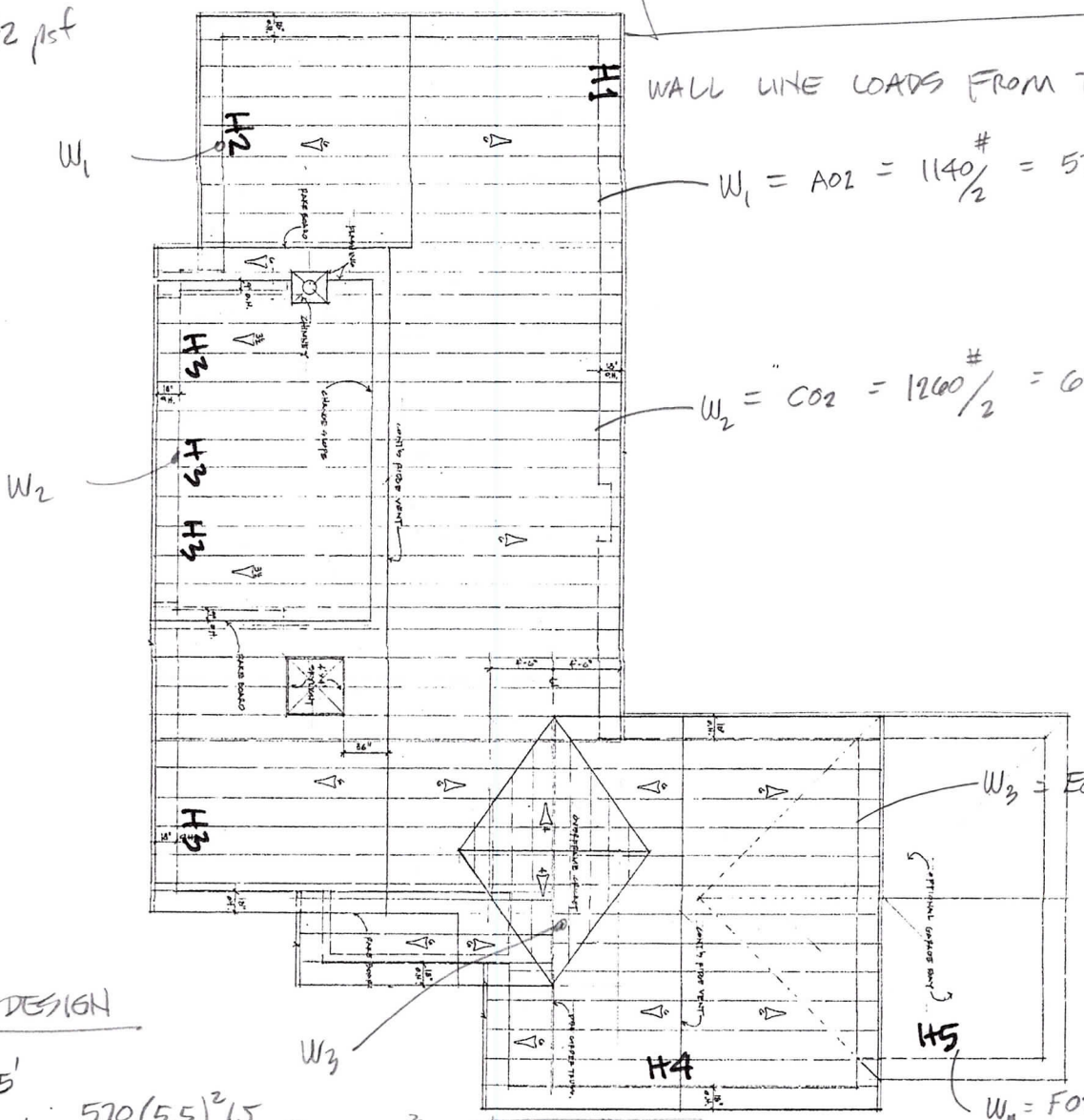
ROOF LOADS

$W_{DL} = 17$ psf
$W_{LL} = 25$ psf (snow reduced C_b)

$W_{TOT} = 42$ psf

ALL ROOF IS MFGR TRUSSES ENGINEERED BY VENDOR

WALL LINE LOADS FROM TRUSS MFGR



$W_1 = A02 = 1140^{\#}/_2 = 570$ plf

$W_2 = C02 = 12600^{\#}/_2 = 6300$ plf

$W_3 = E02 = 960^{\#}/_2 = 480$ plf

$W_4 = F02 = 980^{\#} = 490$ plf

HEADER DESIGN

H1, L = 5.5'

$S_{reqd} = \frac{570(5.5)^2 1.5}{1138 psi} = 22.7 in^3$ → 4x8 #2DF

H2, L = 8'

$S_{reqd} = \frac{570(8')^2 1.5}{963 psi} = 56.8 in^3$ → 4x12 #2 DF

H3, L = 6'

$S_{reqd} = \frac{6300 plf (6')^2 1.5}{1138 psi} = 29.9 in^3$ → 4x8 #2DF

H4, L = 18'

$S_{reqd} = \frac{490 plf (18')^2 1.5}{875 psi} = 105.5 in^3$ → 6x12 #2DF

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Consulting Engineer
7777 92nd Street NW Gig Harbor, WA 98332
VOICE & FAX (253) 858-7777

Project DISNEY ASSOC
PLAN 2322
Subject FLOOR FRAMING

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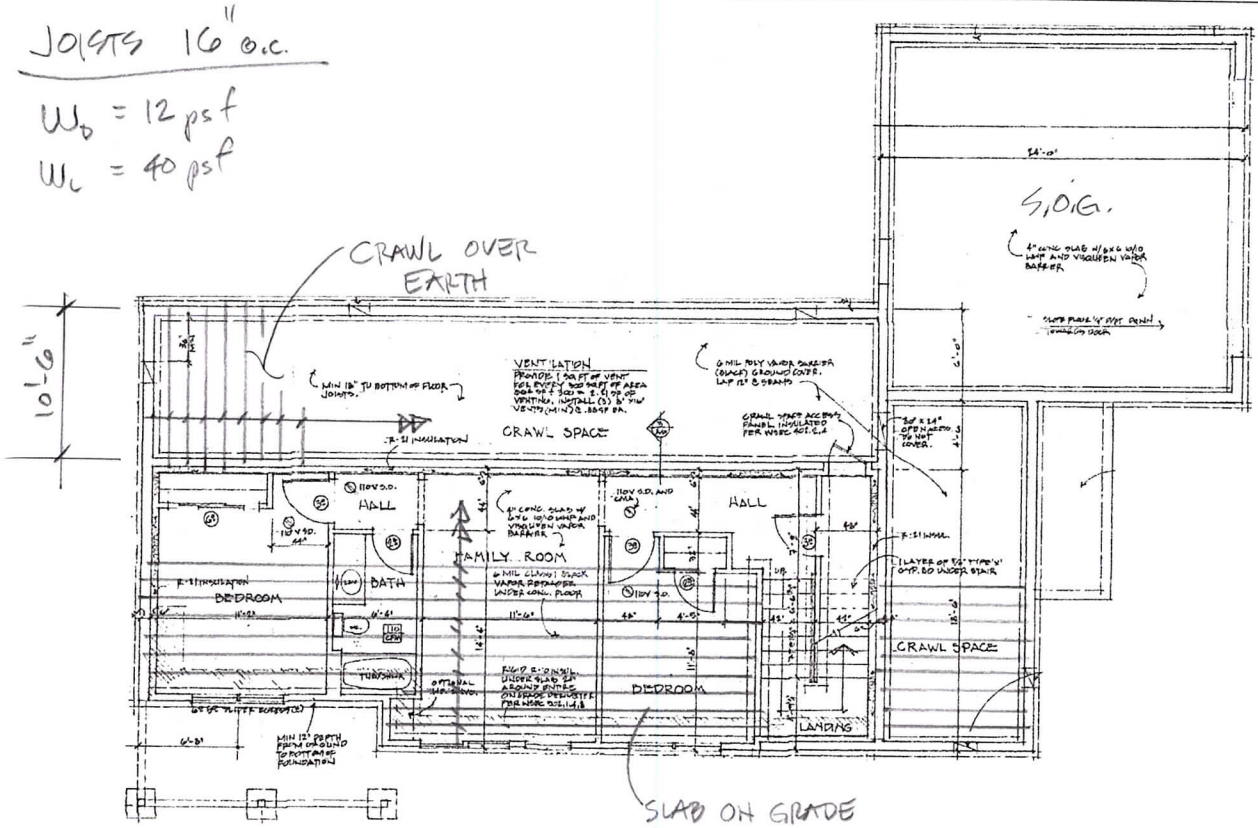
Date 12/3/19

JOISTS 16" o.c.

$W_D = 12$ psf
$W_L = 40$ psf



MAX SPAN 14'-0"

2 x 10 # 2HF @ 16" o.c. $f_b = \frac{\frac{4}{3}(52\text{ psf})(14')^2 1.5}{21.39\text{ in}^3} = 953\text{ psi} < F'_b = 1075\text{ psi}$ ✓

USING 9½" I-Joists $M_{req} = \frac{70(14')^2}{8} = 1715\text{ lb-ft} < M_{ba} = 2500$ TJI-110

BEARING WALLS

$W_b = \left(\frac{18'}{2}\right)52\text{psf} + 70\text{plf} = 5600\text{ plf}$
$W_c = \left(\frac{18}{2}\right)$ DO $= 5600\text{ plf}$
$W_d = \left(\frac{22'}{2}\right)52 + 70 = 6062\text{ plf}$
$W_e = \left(\frac{10'}{2}\right)52 + 70 = 350\text{ plf}$

Use 12" wide x 12" thick ea slab w/ (2) #4

MAX $f_c = 6065$ psf ✓

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Consulting Engineer
7777 92nd Street NW Gig Harbor, WA 98332
VOICE & FAX (253) 858-7777

Project DISNEY ASSOCS. PLAN 2322
Subject FOUNDATION DESIGN

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Job No. 39125
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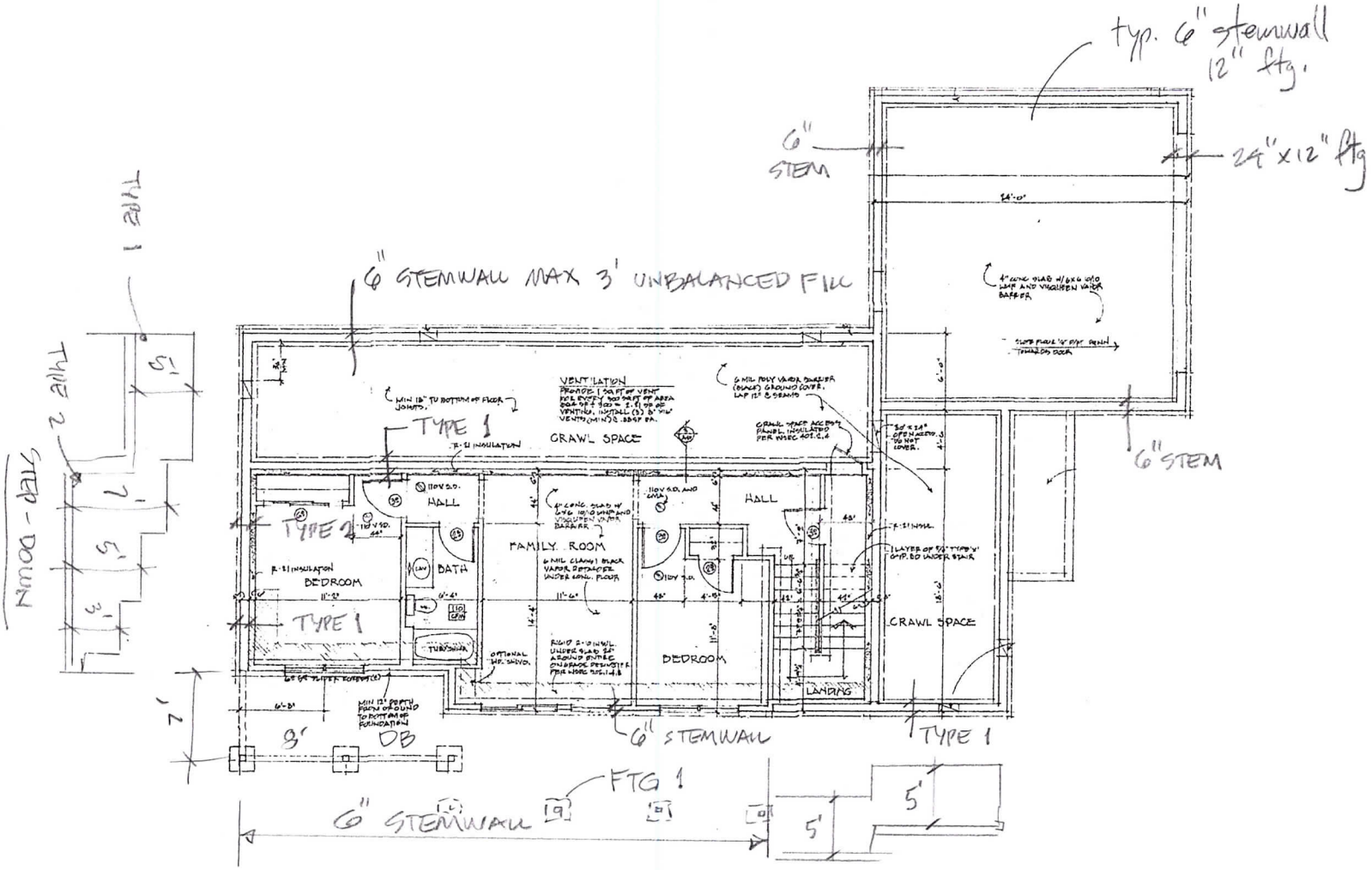

6" STEMWALL GRID (B) FTG LOADS

$\left(\frac{32'}{2}\right)$ 42 psf (roof) + 70 plf (wall) + $\left(\frac{12'}{2}\right)$ 50 psf (floor) = 1075 plf

footing width $b = \frac{1075\ plf}{1500\ psf} = 8"$ → USE MIN. 12" ftg

FTG 1 DECK PIERS

$P = 8'\left(\frac{7'}{2}\right)70\ psf = 1960^{\#}$ → $A = \frac{1960^{\#}}{1500\ psf} = 1.3\ sf$

USE 2' dia x 12" Ad

DB - DECK BEAM L = 8'

$w = \left(\frac{8'}{2}\right)70 = 280\ plf$

$\frac{280(8')^2 1.5}{675\ psi} = 39.8\ in^3$ → 6x8 2HF, P.T.

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Terry A. Nettles, P.E., S.E.
Consulting Engineer
7777 92nd St. NW
Gig Harbor, WA 98332
(253) 858-7777

Project Name/Number : disney plan
Title :
Dsgnr: TANettles
Description....
5-ft cantliever foundation wall TYPE 1

Date: 30 NOV 2019

P 11/20

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Cantilevered Retaining Wall

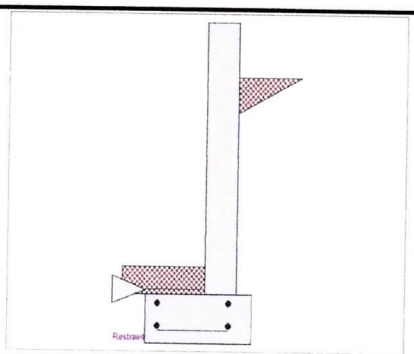
Code: IBC 2015,ACI 318-14,ACI 530-13

Criteria

Retained Height	=	4.00 ft
Wall height above soil	=	1.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	275.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	0.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	300.0 lbs
Axial Live Load	=	500.0 lbs
Axial Load Eccentricity	=	0.0 in

Design Summary

Wall Stability Ratios

Overturning	=	2.77 OK

Slab Resists All Sliding !

Total Bearing Load	=	1,943 lbs
...resultant ecc.	=	3.17 in
Soil Pressure @ Toe	=	1,329 psf OK
Soil Pressure @ Heel	=	231 psf OK
Allowable	=	1,500 psf

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	1,861 psf
ACI Factored @ Heel	=	324 psf
Footing Shear @ Toe	=	9.7 psi OK
Footing Shear @ Heel	=	2.1 psi OK
Allowable	=	75.0 psi

Sliding Calcs

Lateral Sliding Force	=	423.0 lbs

Vertical component of active lateral soil pressure IS considered in the calculation of soil bearing pressures.

Load Factors

Building Code	IBC 2015,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom
Design Height Above Ftg	ft =	Stem OK 0.00
Wall Material Above "Ht"	=	Concrete
Design Method	=	LRFD LRFD
Thickness	=	8.00
Rebar Size	=	# 4
Rebar Spacing	=	15.00
Rebar Placed at	=	6 in
Design Data		
fb/FB + fa/Fa	=	**0.142**
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	448.0
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	597.3
Moment.....Allowable	=	4,184.1
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	6.2
Shear.....Allowable	psi =	75.0
Anet (Masonry)	in2 =	
Rebar Depth 'd'	in =	6.00
Masonry Data		
f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Wall Weight	psf =	100.0
Short Term Factor	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	Medium Weight
Masonry Design Method	=	ASD
Concrete Data		
f'c	psi =	2,500.0
Fy	psi =	60,000.0

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Consulting Engineer
7777 92nd St. NW
Gig Harbor, WA 98332
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Project Name/Number : disney plan
Title :
Dsgnr: TANettles
Description....
5-ft cantliever foundation wall TYPE 1

P 12/20

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Cantilevered Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing
As (based on applied moment) :	0.0234 in2/ft	
(4/3) * As :	0.0312 in2/ft	Min Stem T&S Reinf Area 0.960 in2
200bd/fy : 200(12)(6)/60000 :	0.24 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft
0.0016bh : 0.0016(12)(8) :	0.1536 in2/ft	Horizontal Reinforcing Options :
	==========	One layer of : Two layers of :
Required Area :	0.1536 in2/ft	#4@ 12.50 in #4@ 25.00 in
Provided Area :	0.16 in2/ft	#5@ 19.38 in #5@ 38.75 in
Maximum Area :	0.8128 in2/ft	#6@ 27.50 in #6@ 55.00 in

Footing Data

Toe Width	=	1.25 ft
Heel Width	=	1.00
Total Footing Width	=	2.25
Footing Thickness	=	11.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,861	324 psf
Mu' : Upward	=	14,781	0 ft-#
Mu' : Downward	=	2,166	39 ft-#
Mu: Design	=	673	39 ft-#
Actual 1-Way Shear	=	9.69	2.14 psi
Allow 1-Way Shear	=	75.00	40.00 psi

Toe Reinforcing = # 4 @ 15.00 in
Heel Reinforcing = None Spec'd
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 10.09 in, #5@ 15.65 in, #6@ 22.21 in, #7@ 30.29 in, #8@ 39.89 in, #9@ 5
Heel: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: No key defined

Min footing T&S reinf Area 0.53 in2
Min footing T&S reinf Area per foot 0.24 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 10.10 in	#4@ 20.20 in
#5@ 15.66 in	#5@ 31.31 in
#6@ 22.22 in	#6@ 44.44 in

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7777 92nd St. NW
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(253) 858-7777

Project Name/Number : disney plan
Title :
Dsgnr: TANettles
Description....
5-ft cantliever foundation wall TYPE 1

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Cantilevered Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		423.0	1.64	693.3	Soil Over HL (ab. water tbl)	146.7	2.08	305.6
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		2.08	305.6
Hydrostatic Force					Watre Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=	800.0	1.58	475.0
Added Lateral Load	=				* Axial Live Load on Stem	=	500.0	1.58	791.7
Load @ Stem Above Soil	=				Soil Over Toe	=		0.63	
	=				Surcharge Over Toe	=			
					Stem Weight(s)	=	500.0	1.58	791.7
					Earth @ Stem Transitions	=			
					Footing Weight	=	309.4	1.13	348.0
					Key Weight	=			
					Vert. Component	=			
Total	=	423.0	**O.T.M.** =	693.3	**Total** =		1,256.0 lbs	**R.M.**=	1,920.3

Resisting/Overturning Ratio = **2.77**
Vertical Loads used for Soil Pressure = 1,942.8 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.082	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Established Basic Permit #
19-05700

Permit Number: 20-00762

Terry A. Nettles, P.E., S.E.
Consulting Engineer
7777 92nd St. NW
Gig Harbor, WA 98332
(253) 858-7777

Project Name/Number : 7-ft cant
Title :
Dsgnr: TANettlees
Description....
7-ft cantilever foundation wall TYPE 2

This Wall in File: c:\users\graew\documents\current project files\disney\plan 2322\foundation walls\

Cantilevered Retaining Wall

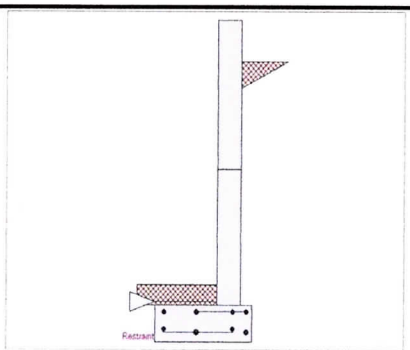
Code: IBC 2015,ACI 318-14,ACI 530-13

Criteria

Retained Height	=	6.00 ft
Wall height above soil	=	1.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	275.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	0.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	300.0 lbs
Axial Live Load	=	500.0 lbs
Axial Load Eccentricity	=	0.0 in

Design Summary

Wall Stability Ratios

Overturning	=	1.64 OK
Slab Resists All Sliding !		
Total Bearing Load	=	2,468 lbs
...resultant ecc.	=	2.37 in
Soil Pressure @ Toe	=	1,092 psf OK
Soil Pressure @ Heel	=	434 psf OK
Allowable	=	1,500 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	1,528 psf
ACI Factored @ Heel	=	608 psf
Footing Shear @ Toe	=	13.6 psi OK
Footing Shear @ Heel	=	1.0 psi OK
Allowable	=	75.0 psi

Sliding Calcs

Lateral Sliding Force	=	837.2 lbs

Vertical component of active lateral soil pressure IS considered in the calculation of soil bearing pressures.

Load Factors

Building Code	IBC 2015,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		2nd Stem OK	Bottom Stem OK
Design Height Above Ftg	ft =	3.33	0.00
Wall Material Above "Ht"	=	Concrete	Concrete
Design Method	=	LRFD	LRFD
Thickness	=	8.00	8.00
Rebar Size	=	# 4	# 4
Rebar Spacing	=	14.00	14.00
Rebar Placed at	=	5.5 in	5.5 in
Design Data			
fb/FB + fa/Fa	=	**0.042**	**0.492**
Total Force @ Section			
Service Level	lbs =		
Strength Level	lbs =	199.6	1,008.0
Moment....Actual			
Service Level	ft-# =		
Strength Level	ft-# =	177.7	2,016.0
Moment.....Allowable	ft-# =	4,086.8	4,086.8
Shear.....Actual			
Service Level	psi =		
Strength Level	psi =	3.0	15.3
Shear.....Allowable	psi =	75.0	75.0
Anet (Masonry)	in2 =		
Rebar Depth 'd'	in =	5.50	5.50
Masonry Data			
f'm	psi =		
Fs	psi =		
Solid Grouting	=		
Modular Ratio 'n'	=		
Wall Weight	psf =	100.0	100.0
Short Term Factor	=		
Equiv. Solid Thick.	=		
Masonry Block Type	=	Medium Weight	
Masonry Design Method	=	ASD	
Concrete Data			
f'c	psi =	2,500.0	2,500.0
Fy	psi =	60,000.0	60,000.0

Established Basic Permit #

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Consulting Engineer
7777 92nd St. NW
Gig Harbor, WA 98332
(253) 858-7777

Project Name/Number : 7-ft cant
Title :
Dsgnr: TANettlees
Description....
7-ft cantilever foundation wall TYPE 2

This Wall in File: c:\users\graew\documents\current project files\disney\plan 2322\foundation walls\

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Cantilevered Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Concrete Stem Rebar Area Details

2nd Stem	Vertical Reinforcing	Horizontal Reinforcing
As (based on applied moment) :	0.0076 in2/ft	
(4/3) * As :	0.0102 in2/ft	Min Stem T&S Reinf Area 0.705 in2
200bd/fy : 200(12)(5.5)/60000 :	0.22 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft
0.0016bh : 0.0016(12)(8) :	0.1536 in2/ft	Horizontal Reinforcing Options :
	==========	One layer of : Two layers of :
Required Area :	0.1536 in2/ft	#4@ 12.50 in #4@ 25.00 in
Provided Area :	0.1714 in2/ft	#5@ 19.38 in #5@ 38.75 in
Maximum Area :	0.7451 in2/ft	#6@ 27.50 in #6@ 55.00 in

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing
As (based on applied moment) :	0.0865 in2/ft	
(4/3) * As :	0.1153 in2/ft	Min Stem T&S Reinf Area 0.639 in2
200bd/fy : 200(12)(5.5)/60000 :	0.22 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft
0.0016bh : 0.0016(12)(8) :	0.1536 in2/ft	Horizontal Reinforcing Options :
	==========	One layer of : Two layers of :
Required Area :	0.1536 in2/ft	#4@ 12.50 in #4@ 25.00 in
Provided Area :	0.1714 in2/ft	#5@ 19.38 in #5@ 38.75 in
Maximum Area :	0.7451 in2/ft	#6@ 27.50 in #6@ 55.00 in

Footing Data

Toe Width	=	1.75 ft
Heel Width	=	1.00
Total Footing Width	=	2.75
Footing Thickness	=	11.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0016
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,528	608 psf
Mu' : Upward	=	24,497	36 ft-#
Mu' : Downward	=	4,245	53 ft-#
Mu: Design	=	1,282	17 ft-#
Actual 1-Way Shear	=	13.59	0.96 psi
Allow 1-Way Shear	=	75.00	75.00 psi

Toe Reinforcing = # 4 @ 11.36 in
Heel Reinforcing = # 4 @ 11.35 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 11.35 in, #5@ 17.60 in, #6@ 24.99 in, #7@ 34.08 in, #8@ 44.88 in, #9@ 5
Heel: #4@ 11.35 in, #5@ 17.60 in, #6@ 24.99 in, #7@ 34.08 in, #8@ 44.88 in, #9@ 5
Key: No key defined

Min footing T&S reinf Area 0.58 in2
Min footing T&S reinf Area per foot 0.21 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 11.36 in	#4@ 22.73 in
#5@ 17.61 in	#5@ 35.23 in
#6@ 25.00 in	#6@ 50.00 in

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Project Name/Number : 7-ft cant
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7-ft cantilever foundation wall TYPE 2

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Cantilevered Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#	.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	837.2	2.31	1,930.2			
HL Act Pres (be water tbl)						
Hydrostatic Force						
Buoyant Force =						
Surcharge over Heel =						
Surcharge Over Toe =						
Adjacent Footing Load =						
Added Lateral Load =						
Load @ Stem Above Soil =						
=						
Soil Over HL (ab. water tbl)				220.0	2.58	568.3
Soil Over HL (bel. water tbl)					2.58	568.3
Watre Table						
Sloped Soil Over Heel =						
Surcharge Over Heel =						
Adjacent Footing Load =						
Axial Dead Load on Stem =				800.0	2.08	625.0
* Axial Live Load on Stem =				500.0	2.08	1,041.7
Soil Over Toe =					0.88	
Surcharge Over Toe =						
Stem Weight(s) =				700.0	2.08	1,458.3
Earth @ Stem Transitions =						
Footing Weight =				378.1	1.38	519.9
Key Weight =						
Vert. Component =						
Total =	837.2	**O.T.M.** =	1,930.2	**Total** = 1,598.1 lbs	**R.M.**=	3,171.6

Resisting/Overturning Ratio = **1.64**
Vertical Loads used for Soil Pressure = 2,467.7 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.077	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

USE THIS WALL/FTG FOR TYPE 1 & TYPE 2 (ALL STEP-DOWNS)

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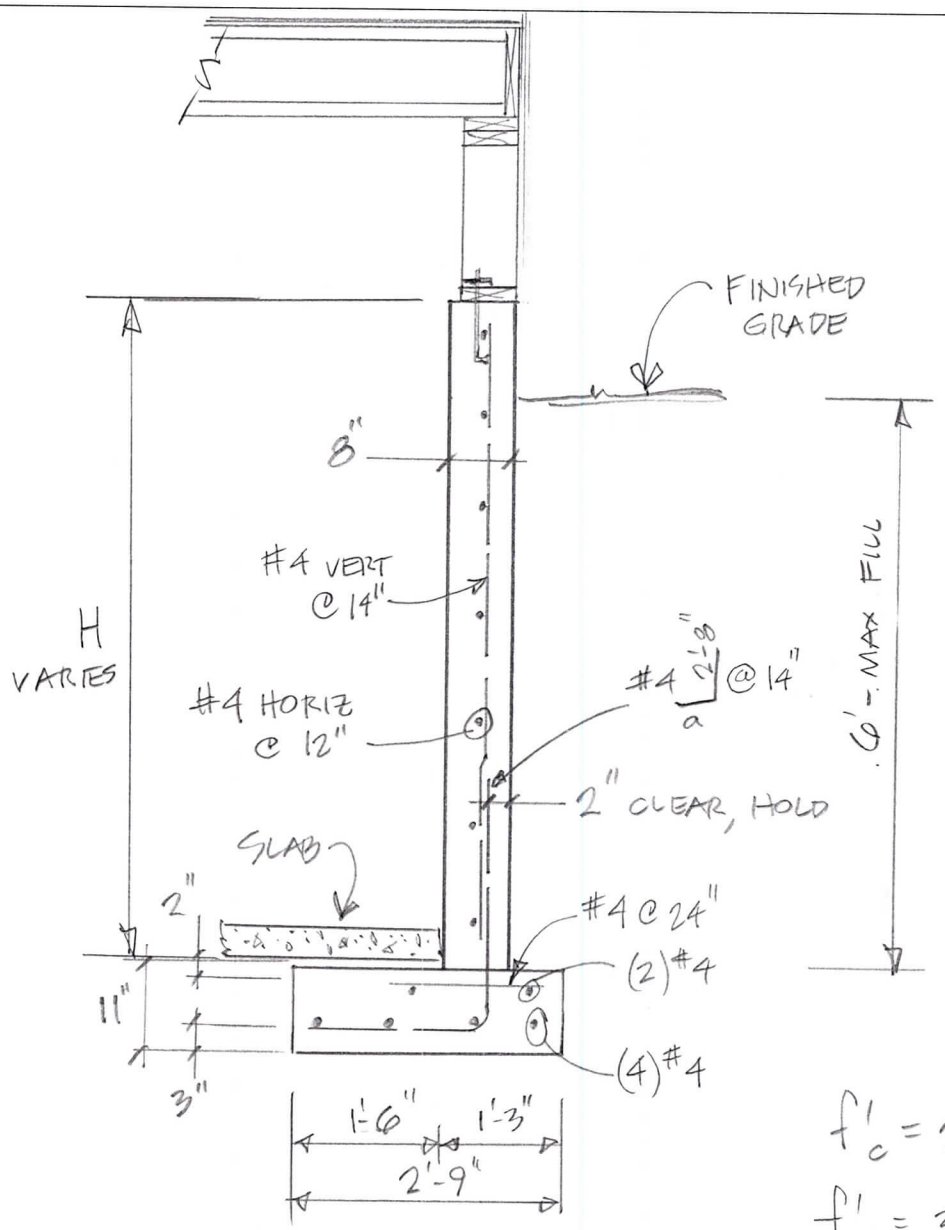
Terry A. Nettles, P.E.
Consulting Engineer
7777 92nd Street NW Gig Harbor, WA 98332
VOICE & FAX (253) 858-7777

Project DISNEY ASSOCS
PLAN 2322
Subject SIDE WALL FOUNDATION

Sheet 17 of 20
Job No. 39125
Date 12/3/19



$f'_c = 2500$ psi FOOTING

$f'_c = 3000$ psi WALL

$f_y = 60,000$ psi

SECTION

PARTIAL HEIGHT RETAINING WALL

Established Basic Permit #
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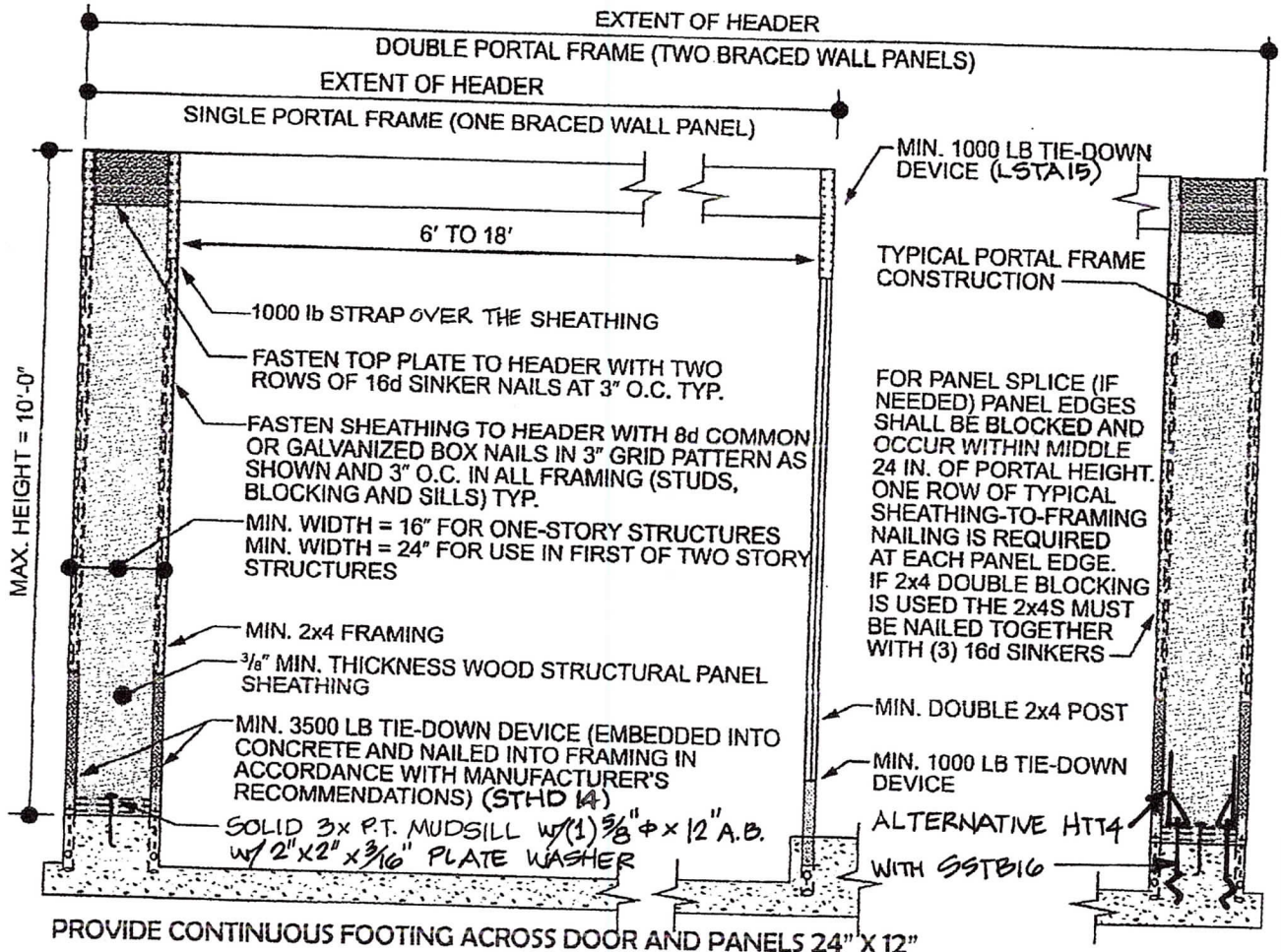
Permit Number: 20-00762

Terry A. Nettles, P.E.
Consulting Engineer
7777 92nd Street NW Gig Harbor, WA 98332
VOICE & FAX (253) 858-7777

Project DISNEY PLAN 2322 Sheet 18 of 20
Job No. 39125
Subject PFH BRACE-WALL Date



PROVIDE CONTINUOUS FOOTING ACROSS DOOR AND PANELS 24" X 12" WITH (2) #4 BARS TOP & BOTTOM (ANY SPLICE LAPS MIN. 15"). PLACE (2) #4L BARS IN EACH STEMWALL AT THE SHEAR PANEL

FIGURE 2308.6.5.2
PORTAL FRAME WITH HOLD-DOWNS (PFH)

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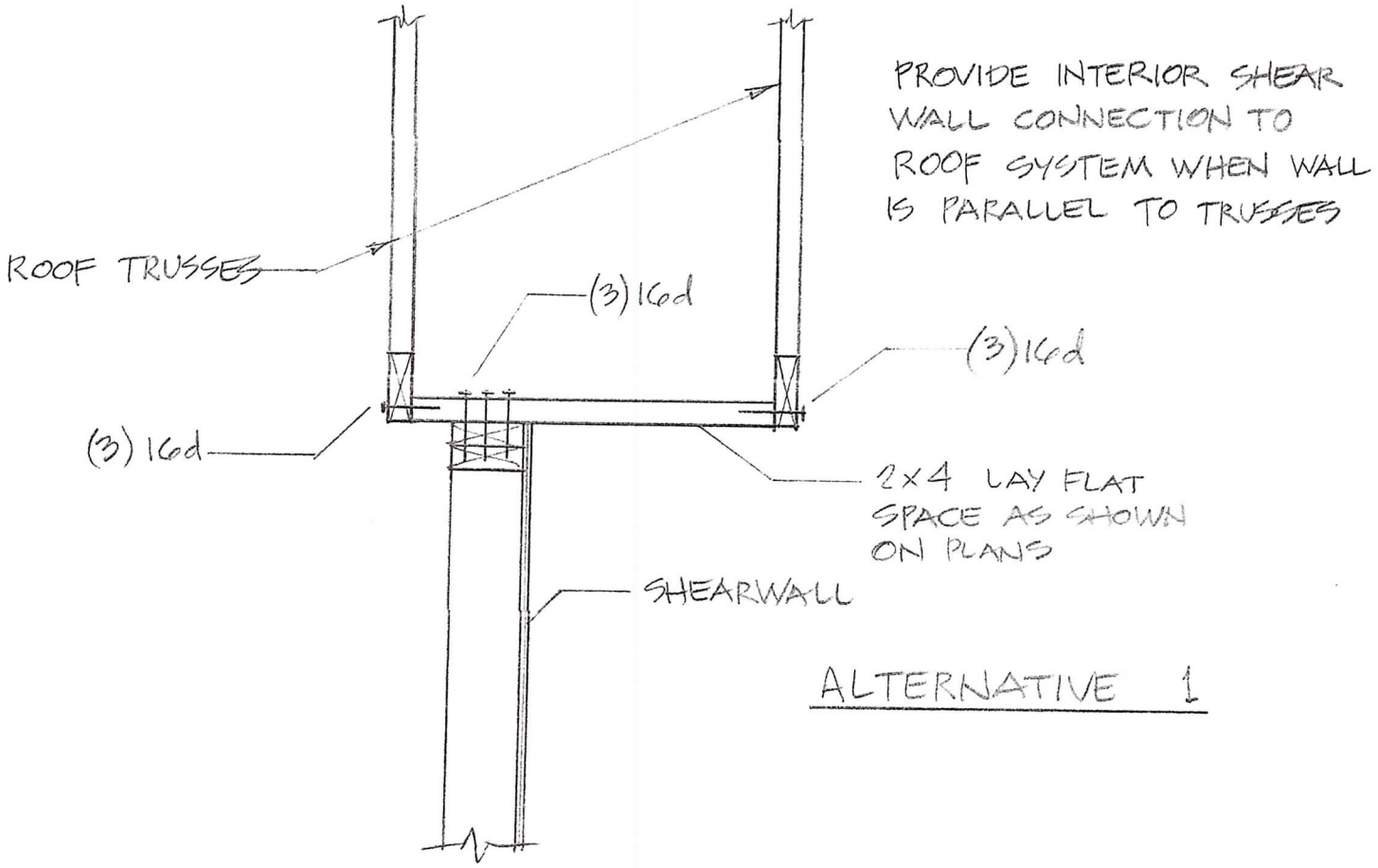
Terry A. Nettles, P.E.
Consulting Engineer
7777 92nd Street NW Gig Harbor, WA 98332
VOICE & FAX (253) 858-7777

Project DISNEY PLAN 2322 Sheet 19 of 20
Job No.
Subject LADDER BLOCK DETAIL Date



LADDER BLOCK DETAIL

Established Basic Permit #
19-05700

Permit Number: 20-00762

P20/20

SHEATHING REQUIREMENTS FOR THE DISNEY PLAN 2322 RESIDENCE

Structural sheathing is required to provide adequate lateral bracing of the building system and as diaphragms of the roof and floor structures to transfer loads to lateral bracing elements and is specified by the following notes:

For exterior walls and roofs use a minimum thickness $^{7}/_{16}$" APA rated sheathing panel for all exterior faces. For all wall panels, there shall be one row of nails at each plate and at least one row into each rim joist. Spacing of these nails in these rows shall be consistent with the panel designation nailings as defined below and indicated on the drawings. At the foundation line there shall be a row of nails continuous at 4" o.c. minimum. Sole plate nailing of all wood panel sheathed walls is specified below.

Roof sheathing shall be laid with face grain perpendicular to the rafters and all panels alternated by $^{1}/_{2}$ panel length. Roof nailing should be done with 8d galvanized nails spaced at 6" o.c. at all panel edges and at 12" o.c. through the field. Floor panels shall be a minimum $^{23}/_{32}$" APA Sturd-I-Floor, tongue and groove edged, rated panels likewise alternated by $^{1}/_{2}$ of a panel length in layout and glued and nailed with 10d galvanized or ring shanked nails at 6" o.c all edges, 12" in the field. Edges of roof and floor diaphragms shall be nailed into solid blocking which fills the joist or rafter space in line with and directly above the bracing wall elements below. Trusses shall be connected to the top plates with Simpson type H1 hurricane clips, OR SDWC 15600 screws, OR 6" TimberLOK screws at maximum 24" o.c. unless indicated otherwise on the plans.

Nailing and sheathing requirements are specified on the drawings with the fastening indicated by spacing on the edges and along interior lines (through the field) in inches by the following symbols.

for 8d/6 Use a $^{7}/_{16}$"minimum thickness APA rated sheathing panel on one side with 8d common or galvanized box nails @ 6" o.c. edges and 12" through the field. Nail sole plates into solid material (blocking or joists) with 16d @ 12" o.c. Blocking is required at all unsupported edges of the sheathing. Provide ½" diameter x10-inch anchor bolts at 6-ft o.c. maximum.

for 8d/4 Use a $^{7}/_{16}$" minimum thickness APA rated sheathing panel on one side with 8d common or galvanized box nails @ 4" o.c. edges and 8" through the field. Nail sole plates into solid material (blocking or joists) with 16d @ 6" o.c. Blocking is required at all unsupported edges of the sheathing. Provide ½" diameter x10-inch anchor bolts at 4-ft o.c. maximum.

for 5d/7 Sheath wall both sides with $^{1}/_{2}$" gypsum wallboard and nail edges supported by studs and plates with 5d cooler nails spaced at 7 inches on center. Nail sole plate to solid blocking or joists in the floor below using 16d nails spaced at 12-inches on center.

for PFH construct these panels as Portal Frame Holdown Panels adjacent to garage door opening in accordance with the details and specifications provided in the 2015 Edition of the International Building Code Figure 2308.6.5.2 with continuous length 4" x 12" header minimum or as shown on the drawings, full strapping, holdowns, and all special foundations

All foundations shall be cast on undisturbed competent subgrade materials as inspected and approved by the Engineer. Any fill if required to support foundations shall be a fully compacted select pit-run structural fill. Materials for the foundations shall use a vendor pre-approved mix design able to achieve an f'_c = 2500 psi at 28 days for footings and f'_c = 3000 psi for exposed walls and slabs. All reinforcements shall meet ASTM A-615, Grade 60, f_y = 60,000 psi. All site bends shall satisfy ACI minimum bend radius criteria. No bars are allowed to be bent more than one time. Placement of reinforcements within the forms shall be chaired and properly braced and tied.