LEGACY VILLAS

LIBERTY LAKE, WASHINGTON

PROJECT INFORMATION

Site Address:

TBD COUNTRY VISTA DRIVE

Code Compliance

2012 International Building Code (IBC)
2012 International Energy Conservation Code (IECC)
2012 International Fire Code (IFC)
2012 International Mechanical Code (IMC)
2012 International Plumbing Code (IPC)
2012 International Fuel Gas Code (IFGC)
2009 ICC/ANSI 117.1

Parcel Number:

55156.9202

Height and Number of Stories:

ACTUAL : 33'6" HIGH; 2 STORIES
ALLOWABLE HEIGHT: 40' HIGH: 3 STORIES

Type of Construction:

V–B SPRINKLERED NFPA 13R

Occupancy Classification:

MULTI–FAMILY RESIDENTIAL

ZONING ______ M–2
BUILDING USE ______ (MULTI–FAMILY) R–2 OCCUPANCY
SITE AREA ______ (15.92 ACRES) ______ 693,766 S.F.

DRAWING INDEX

	CONST. SET DATE	SUBMITTAL DATE	REVISION DATE	REVISION DATE
ARCHITECTURAL		6/20/2016		
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ARCHITECTURAL ABBREVIATIONS

&	And	D.F.	Drinking Fountain	FURR.	Furring	N.	North	SECT.	Section
L	Angle	DET.	Detail	FUT.	Future	N.I.C.	Not In Contract	SH.	Shelf
@	At	DIA.	Diameter	GA.	Gauge	NO.or#	Number	SHR.	Shower
℄	Centerline	DIM.	Dimension	GALV.	Galvanized	NOM.	Nominal	SHT.	Sheet
⌀	Diameter or Round	DISP.	Dispenser	G.B.	Grab Bar	N.T.S.	Not To Scale	SHW	Single Hung Window
⊥	Perpendicular	DN.	Down	GL.	Glass			SIM.	Similar
#	Pound or Number	D.O.	Door Opening	GND.	Ground	O.A.	Overall	S.N.D.	Sanitary Napkin Dispenser
(E)	Existing	DR.	Door	GR.	Grade	OBS.	Obscure	S.N.R.	Sanitary Napkin Receptacle
		DWR.	Drawer	GYP.	Gypsum	O.C.	On Center	SPEC.	Specification
ACOUS.	Acoustical	DS.	Downspout			O.D.	Outside Diameter (Dim.)	SQ.	Square
A.D.	Area Drain	D.S.P.	Dry Standpipe	H.B.	Hose Bibb	OFF.	Office	SST.	Stainless Steel
ADJ.	Adjustable	DWG.	Drawing	H.C.	Hollow Core	OPNG.	Opening	S.S.K.	Service Sink
AGGR.	Aggregate			HDWD.	Hardwood	OPP.	Opposite	STA.	Station
AL.	Aluminum	E.	East	HDWE.	Hardware			STD.	Standard
APPROX.	Approximate	EA.	Each	H.M.	Hollow Metal	PRCST.	Pre-cast	STL.	Steel
ARCH.	Architectural	E.J.	Expansion Joint	HORIZ.	Horizontal	PL.	Plate	STOR.	Storage
ASB.	Asbestos	EL.	Elevation	HR.	Hour	P. LAM.	Plastic Laminate	STRL.	Structural
ASPH.	Asphalt	ELEC.	Electrical	HGT.	Height	PLAS.	Plaster	SUSP.	Suspended
		ELEV.	Elevator			PLYWD.	Plywood	SYM.	Symmetrical
BD.	Board	EMER.	Emergency	I.D.	Inside Diameter	PR.	Pair		
BITUM.	Bituminous	ENCL.	Enclosure	INSUL.	Insulation	PT.	Point	TRD.	Tread
BLDG.	Building	E.P.	Electrical Panelboard	INT.	Interior	P.T.D.	Paper Towel Dispenser	T.B.	Towel Bar
BLK.	Block	EQ.	Equal			P.T.D/R	Combination Paper Towel	T.C.	Top of Curb
BLKG.	Blocking	EQPT.	Equipment				Dispenser & Receptacle	TEL.	Telephone
BM.	Beam	E.W.C.	Electric Water Cooler	JAN.	Janitor	PTN.	Partition	TER.	Terrazzo
BOT.	Bottom	EXST.	Existing	JT.	Joint	P.T.R.	Paper Towel Receptacle	T.& G.	Tongue and Groove
		EXPO.	Exposed					THK.	Thick
CAB.	Cabinet	EXP.	Expansion	KIT.	Kitchen	Q.T.	Quarry Tile	T.P.	Top of Pavement
C.B.	Catch Basin	EXT.	Exterior					T.P.D.	Toilet Paper Dispenser
CEM.	Cement			LAB.	Laboratory	R.	Riser	T.V.	Television
CER.	Ceramic	F.A.	Fire Alarm	LAM.	Laminate	RAD.	Radius	T.W.	Top of Wall
C.I.	Cast Iron	F.B.	Flat Bar	LAV.	Lavatory	R.D.	Roof Drain	TYP.	Typical
CLG.	Ceiling	F.D.	Floor Drain	LKR.	Locker	REF.	Reference	UNF.	Unfinished
CLKG.	Calking	FDN.	Foundation	LT.	Light	REFR.	Refrigerator	U.O.N.	Unless Otherwise Noted
CLO.	Closet	F.E.	Fire Extinguisher			RGTR.	Register	UR.	Urinal
CLR.	Clear	F.E.C.	Fire Extinguisher Cab.	MAX.	Maximum	REINF.	Reinforced		
COL.	Column	F.H.C.	Fire Hose Cabinet	M.C.	Medicine Cabinet	REQ.	Required	VERT.	Vertical
CONC.	Concrete	FIN.	Finish	MECH.	Mechanical	RESIL.	Resilient	VEST.	Vestibule
CONN.	Connection	FL.	Floor	MEMB.	Membrane	RM.	Room		
CONSTR.	Construction	FLASH.	Flashing	MET.	Metal	R.O.	Rough Opening	W.	West
CONT.	Continuous	FLUOR.	Fluorescent	MFR.	Manufacturer	RWD.	Redwood	W/	With
CORR.	Corridor	F.O.C.	Face of Concrete	MH.	Manhole	R.W.L.	Rain Water Leader	W.C.	Water Closet
CTSK.	Countersunk	F.O.F.	Face of Finish	MIN.	Minimum			WD.	Wood
CNTR.	Counter	F.O.S.	Face of Studs	MIR.	Mirror	S.	South	WDW	Window
CTR.	Center	FPRF.	Fireproof	MISC.	Miscellaneous	S.C.	Solid Core	W/O	Without
		F.S.	Full Size	M.O.	Masonry Opening	S.C.D.	Seat Cover Dispenser	WP.	Waterproof
DBL.	Double	FT.	Foot or Feet	MTD.	Mounted	SCHED.	Schedule	WSCT.	Wainscot
DEPT.	Department	FTG.	Footing	MUL.	Mullion	S.D.	Soap Dispenser	WT.	Weight

SYMBOLS

- AA / 4 — BUILDING SECTION / SHT. ON WHICH SECTION OCCURS
- A / 3 — WALL SECTION / SHT. ON WHICH SECTION OCCURS
- 1 / 5 — TYPICAL DETAIL / SHT. ON WHICH DETAIL OCCURS
- 2 / A5 — INTERIOR ELEVATION(S) SHT. ON WHICH ELEV. OCCURS ARROW INDICATE(S) DIRECTION SEEN FROM
- A, 1 — COLUMN LINE ORIENT POINT OF HEXAGONS TO COLUMN LINE. LETTERS IN ONE DIRECTION NUMBERS IN THE OTHER
- A — WINDOW TYPE
- 2.1 — FINISH COLOR
- X / 4 — EQUIPMENT TYPE X=X-RAY, F=FOOD SERVICE, 4=EQUIPMENT GROUP
- 42.0 — GRID LINES FOR SURVEYORS GRID MODULE GRID, ETC.
- MATCH LINE SHADED PORTION IS THE SIDE CONSIDERED
- 1 / 2 — DOOR SYMBOL DOOR MARK HARDWARE GROUP
- 3 — REVISION
- F — PARTITION WALL TYPE
- 98'–6" — TOP OF FOOTING
- 8 — FLAG NOTE
- WORK POINT, CONTROL POINT OR DATUM POINT
- OFFICE / 102 / 1A1 / 9–6 — ROOM IDENTIFICATION TYPE 1: ROOM NAME, ROOM NO., ROOM MATERIAL CODES (1ST NO.–FLOOR/BASE, 2ND NO.–WALLS/WAINSCOT, 3RD NO.–CEILING), CEILING HEIGHT OTHER THAN TYPICAL
- OFFICE / 102 — ROOM IDENTIFICATION TYPE 2: ROOM NAME, ROOM NUMBER
- EXISTING CONTOURS
- NEW CONTOURS
- S — SEWER LINE
- W — WATER LINE
- G — GAS LINE
- ℄ — CENTERLINE OF RIGHT–OF–WAY
- PROPERTY LINE
- O.P. — OVERHEAD POWER
- MH — MANHOLE
- CATCH BASIN
- FH — FIRE HYDRANT
- PP — POWER POLE
- x — FENCE
- T.W. 10.0 — TOP OF WALL
- T.C. 16.0 — TOP OF CURB
- T.P. 16.4 — TOP OF PAVEMENT
- 72.0 / 64.0 — NEW FINISH GRADE (45°) EXISTING GRADE (HORZ.)
- X 33.1 — SPOT ELEVATION

CONSULTANTS

ARCHITECTURAL
WYATT ARCHITECTS
AND ASSOCIATES P.S.
PO BOX 141713
SPOKANE VALLEY, WASHINGTON 99214
PHONE:(509)928-1860
CONTACT: LEE SCHWARTZENBURG

STRUCTURAL/ LANDSCAPE
WHIPPLE CONSULTING ENGINEERS
2528 N SULLIVAN ROAD
SPOKANE VALLEY, WA 99216
PHONE:(509)893-2617
CONTACT: TODD WHIPPLE

CIVIL
LAAKE CITY ENGINEERING
3909 N. Schreiber Way
Cocur d'Alene, Idaho 83815
PHONE:(208) 676-0230
CONTACT: DREW DITTMAN

MECHANICAL
KARTCHNER ENGINEERING
6814 E Jackson Ridge Ln,
GREENACRES, WASHINGTON 99016
PHONE:(509)922-0383
CONTACT: MARK KARTCHNER

OWNER/DEVELOPER
LEGACY VILLAS LLC
11808 E MANSFILED
SPOKANE VALLEY, WA 99016
PHONE:(208)640-0148
CONTACT: GREG GERVAIS

REVISIONS

PROPOSED 24 UNIT BUILDING FOR:
LEGACY VILLAS
COUNRTY VISTA ROAD, LIBERTY LAKE, WA

WYATT ARCHITECTS AND ASSOCIATES
JAMES A. McARTHUR, A.I.A.
4205 South Crestline
Spokane, WA 99203
Phone: 509-327-7943 / Fax: 509-327-7999
jallanmcarthur•gmail.com
Project Manager:
Lee J. Schwatrzenburg
PO Box 141713
Spokane Valley, WA 99214
Phone: 509-928-1860
lee•wyattarchitects.com

SHEET TITLE: TITLE SHEET
DRAWN BY: LJS
PROJECT: 15:26
DATE: 6/20/2016
SHEET NO. A0.1

CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS BEFORE ORDERING MATERIALS OR BEGINNING WORK. REPORT ALL INCONSISTENCIES TO ARCHITECT PRIOR TO PROCEEDING WITH WORK. TYP.

ARCHITECTURAL GENERAL NOTES:

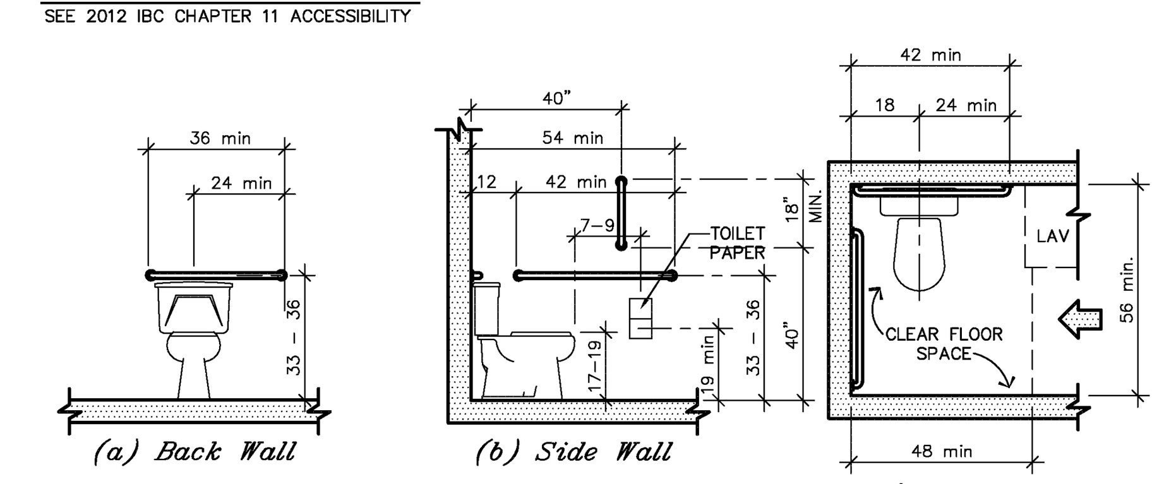
1. THE APPLICABLE BUILDING CODE IS THE 2012 INTERNATIONAL BUILDING CODE (2012 IBC). FOLLOWING ALL APPLICABLE CODES IS REQUIRED.
2. DO NOT SCALE DRAWINGS.
3. FIGURED DIMENSIONS TAKE PRECEDENCE OVER SCALED DRAWINGS. WHERE DISCREPANCIES OCCUR, THEY SHALL BE REPORTED TO ARCHITECT FOR RESOLUTION.
4. DETAILED DRAWINGS AND LARGER SCALE DRAWINGS TAKE PRECEDENCE OVER SMALLER SCALE DRAWINGS.
5. CONCRETE DIMENSIONS ARE GIVEN TO FACE OF CONCRETE AND TO THE FACE OF ROUGH OPENINGS.
6. PARTITION DIMENSIONS ARE GIVEN TO THE FACE OF STUD UNLESS OTHERWISE NOTED.
7. DOOR OPENING LOCATIONS ARE DIMENSIONED TO ROUGH OPENING OR CENTERLINE OF OPENING.
8. WHERE NO MATERIAL NOTES OCCUR, THE GRAPHIC MATERIAL INDICATION SHALL INDICATE MATERIAL TYPES AND ITEMS. SEE MATERIALS & SYMBOLS LIST ON THIS SHEET.
9. PROVIDE LANDINGS AND FLOOR LEVELS AT DOORS THAT COMPLY WITH THE 2012 IBC SECTION 1008.1.4, 1008.1.5 AND 1008.1.6
10. ALL NEW CONSTRUCTION TO COMPLY WITH ICC/ANSI A117.1 – 2009.
11. ALL MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.
12. EACH SUBCONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS FOR ACCURACY PRIOR TO COMMENCING WITH THE WORK. ANY DISCREPANCY SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.
13. PENETRATIONS THROUGH RATED ASSEMBLIES SHALL BE FIRESTOPPED IN ACCORDANCE WITH 2012 IBC SECTION 712 AND 716.
14. THE DRAWINGS INDICATE LOCATION, DIMENSIONS, REFERENCE, AND TYPICAL DETAILS OF CONSTRUCTION. THE DRAWINGS DO NOT INDICATE EVERY CONDITION – WORK NOT PARTICULARLY DETAILED SHALL BE OF CONSTRUCTION SIMILAR TO PARTS THAT ARE DETAILED.
15. FIRE–RESISTIVE FLOOR–CEILING OR ROOF CEILING CONSTRUCTION SYSTEMS SHALL HAVE FIRE–RESISTANCE RATINGS SET FORTH IN 2006 IBC. PENETRATIONS IN FLOORS AND CEILINGS REQUIRING PROTECTED OPENINGS SHALL BE FIRE–STOPPED WITH ASSEMBLIES TESTED IN ACCORDANCE WITH ASTM E814.
16. THE INTERIOR NON–BEARING WALLS SHOULD BE SHOWN TO ALLOW ROOF TRUSS DEFLECTION WITHOUT LOADING THE WALL, SUCH AS USE OF SIMPSON STC CLIP OR EQUIVALENT.
17. PROVIDE FIRE EXTINGUISHER CABINETS AND FIRE EXTINGUISHERS AS REQUIRED BY THE 2012 INTERNATIONAL FIRE CODE. IF NEEDED
18. WOOD MEMBERS IN CONTACT WITH CONCRETE SHALL BE PRESSURE TREATED.
19. FIRE STOPPING SHALL BE PROVIDED IN THE FOLLOWING LOCATIONS:
    –IN CONCEALED SPACES OF STUD WALLS AND PARTITIONS, INCLUDING FURRED SPACES, AT THE CEILING AND FLOOR LEVELS AND AT 10 FOOT INTERVALS ALONG THE LENGTH OF THE WALL.
    –AT ALL INTERCONNECTIONS BETWEEN CONCEALED VERTICAL AND HORIZONTAL SPACES AS OCCUR AT SOFFITS, DROP CEILINGS AND COVE CEILINGS.
    –IN OPENINGS AROUND VENTS, PIPES, DUCTS, CHIMNEYS, FIREPLACES AND SIMILAR OPENINGS WHICH AFFORD A PASSAGE FOR FIRE AT CEILING AND FLOOR LEVELS, WITH NON–COMBUSTABLE MATERIALS.
20. AN ATTIC ACCESS OPENING NOT LESS THAN 20 INCHES BY 30 INCHES SHALL BE PROVIDED IN THE CEILING OF EACH SEPARATE DWELLING UNIT ON THE TOP FLOOR OF BUILDINGS WITH COMBUSTIBLE CEILING OR ROOF CONSTRUCTION. LOCATE TO PROVIDE 30" MIN. CLEAR HEADROOM IN THE ATTIC AT OR ABOVE THE ACCESS OPENING.
21. WHEN FIRE–RATED WALLS AND PARTITIONS REQUIRE PROTECTED OPENINGS, THE FOLLOWING PENETRATIONS INTO OR THROUGH SUCH CONSTRUCTION ARE PERMITTED:
    –COPPER OR FERROUS PIPES OR CONDUITS MAY PENETRATE THE WALLS OR PARTITION, PROVIDED FIRE STOPPING IS PROVIDED.
    –OPENINGS FOR STEEL ELECTRICAL OUTLET BOXES NOT EXCEEDING 16 SQUARE INCHES IN AREA, PROVIDED THE AREA OF SUCH OPENINGS DOES NOT AGGREGATE MORE THAN 100 SQUARE INCHES FOR ANY 100 SQUARE FOOT OF WALL OR PARTITION AREA. OUTLET BOXES ON OPPOSITE SIDES OF WALLS OR PARTITIONS SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF 24 INCHES.
22. ALL INSULATION MATERIALS INCLUDING FACING, SUCH AS VAPOR BARRIER OR BREATHER PAPERS INSTALLED WITHIN FLOOR–CEILING ASSEMBLIES, ROOF–CEILING ASSEMBLIES, WALLS, CRAWL SPACES OR ATTICS SHALL HAVE A FLAME SPREAD RATING NOT TO EXCEED 25 AND A SMOKE DENSITY NOT TO EXCEED 450.
23. FIELD VERIFY DIMENSIONS AND SIZE OF ALL FIXTURES/APPLIANCES PRIOR TO ORDERING, ERECTION AND INSTALLATION.
24. CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS BEFORE ORDERING MATERIALS AND BEGINNING WORK. REPORT ALL INCONSISTENCIES TO ARCHITECT PRIOR TO PROCEEDING WITH CONSTRUCTION.

GENERAL NOTES

1. CONTRACTOR TO VERIFY ALL DIMENSIONS IN THE FIELD AND SHALL NOTIFY THE ARCHITECT OF ANY DISCREPANCIES. ALL WORK REQUIRING MEASURING SHALL BE DONE ACCORDING TO FIGURES ON DRAWINGS AND NOT SCALED FROM DRAWINGS. THE ARCHITECT WILL FURNISH ANY MISSING DIMENSIONS UPON REQUEST.
2. ALL WORK SHALL CONFORM TO PREVAILING CODES, ORDINANCES, AND REQUIREMENTS.
3. CONTRACTOR IS RESPONSIBLE TO OBTAIN ALL PERMITS AND INSPECTIONS REQUIRED FOR CONSTRUCTION, AND SHALL PAY ALL APPLICABLE FEES.
4. DIMENSIONS:
   A. DIMENSIONS ON DRAWINGS ARE TO FACE OF STUDS OR CENTER LINE OF COLUMNS TYPICALLY, UNLESS OTHERWISE NOTED.
   B. EXTERIOR DIMENSIONS ARE TO FACE OF STUDS.
   C. DOOR AND CASED OPENINGS WITHOUT LOCATION DIMENSIONS OR DETAILS ARE TO BE CENTERED BETWEEN ADJACENT WALLS. DOORS ADJACENT TO ONE WALL, BUT NOT DIMENSIONED, SHALL BE LOCATED WITH DOOR OPENING 3" FROM FACE OF ADJACENT WALL.
   D. VERIFY ALL DIMENSIONS AND CONDITIONS AND NOTIFY ARCHITECT OF ALL DISCREPANCIES PRIOR TO PROCEEDING WITH WORK.
5. CODES: ALL WORK SHALL CONFORM TO APPLICABLE BUILDING CODES, ORDINANCES AND LAWS HAVING JURISDICTION AT PROJECT SITE. NOTIFY ARCHITECT OF ALL CONFLICTS.
   ENEGY REQUIREMENTS SHALL COMPLY WITH THE 2012 WASHINGTON STATE ENERGY CODE PER TABLE R402.1.1.
6. DO NOT SCALE DRAWINGS: USE DIMENSIONS SHOWN ON DRAWINGS AND ACTUAL FIELD MEASUREMENTS. NOTIFY ARCHITECT OF DISCREPANCIES FOUND.
7. COORDINATION:
   A. REVIEW AND COORDINATE REQUIREMENTS OF THE DRAWINGS BEFORE BEGINNING INSTALLATION OF WORK. REPORT DISCREPANCIES DISCOVERED IN WRITING TO THE ARCHITECT. WORK INSTALLED AND FOUND IN CONFLICT WITH THE REQUIREMENTS INDICATED ON DRAWINGS SHALL BE CORRECTED BY THE CONTRACTOR.
   B. VERIFY THAT UTILITY REQUIREMENTS CHARACTERISTICS OF OPERATING EQUIPMENT ARE COMPATIBLE WITH BUILDING UTILITIES. COORDINATE WORK OF VARIOUS CONSTRUCTION TRADES HAVING INTERDEPENDENT RESPONSIBILITIES FOR INSTALLING, CONNECTING TO, AND PLACING IN SERVICE OF SUCH EQUIPMENT.
   C. COORDINATE SPACE REQUIREMENTS AND INSTALLATION OF MECHANICAL AND ELECTRICAL WORK INDICATED ON DRAWINGS. VERIFY LOCATION AND REQUIRED OPENING SIZES FOR MECHANICAL EQUIPMENT, LOCATION AND SIZES OF EQUIPMENT FOR PADS AND BASES, AND REQUIREMENT AND LOCATION OF POWER AND WATER OR DRAIN INSTALLATION WITH EQUIPMENT MANUFACTURERS BEFORE PROCEEDING WITH THE WORK.
   D. COMPLY WITH INSTALLATION REQUIREMENTS OF MANUFACTURER'S INSTRUCTIONS AND APPROVED SHOP DRAWINGS.
   E. THE CONTRACTOR SHALL PROVIDE RADON MITIGATION IN ALL APARTMENT BUILDINGS.

WATER CLOSETS

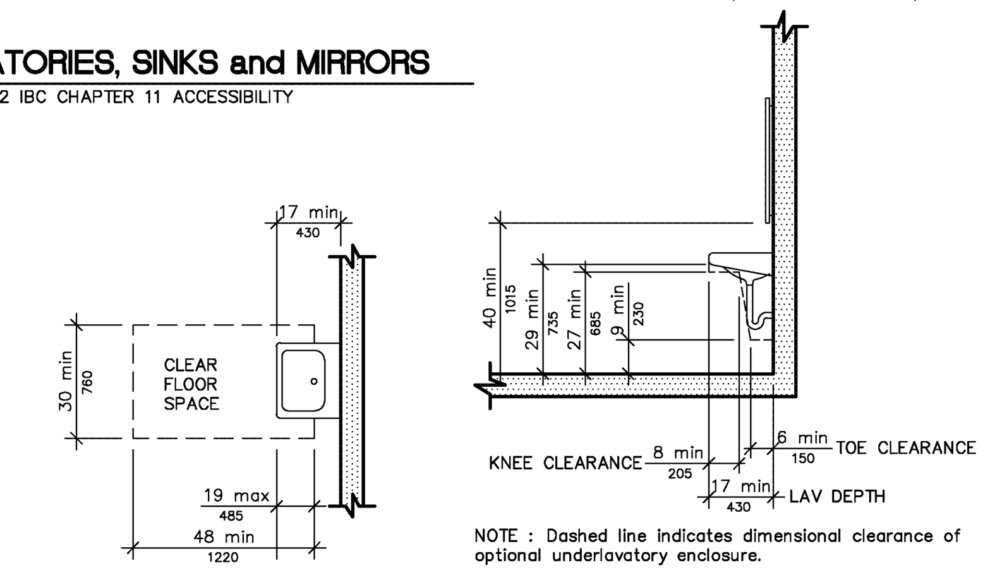
SEE 2012 IBC CHAPTER 11 ACCESSIBILITY



(a) Back Wall (b) Side Wall

LAVATORIES, SINKS and MIRRORS

SEE 2012 IBC CHAPTER 11 ACCESSIBILITY



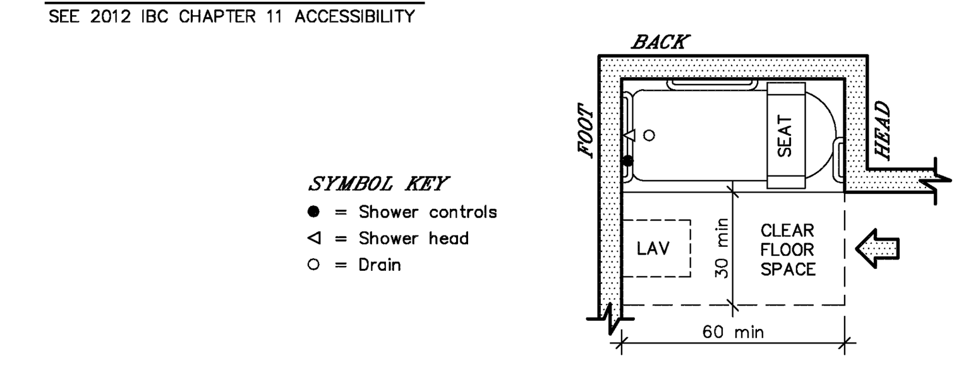
NOTE : Dashed line indicates dimensional clearance of optional underlavatory enclosure.

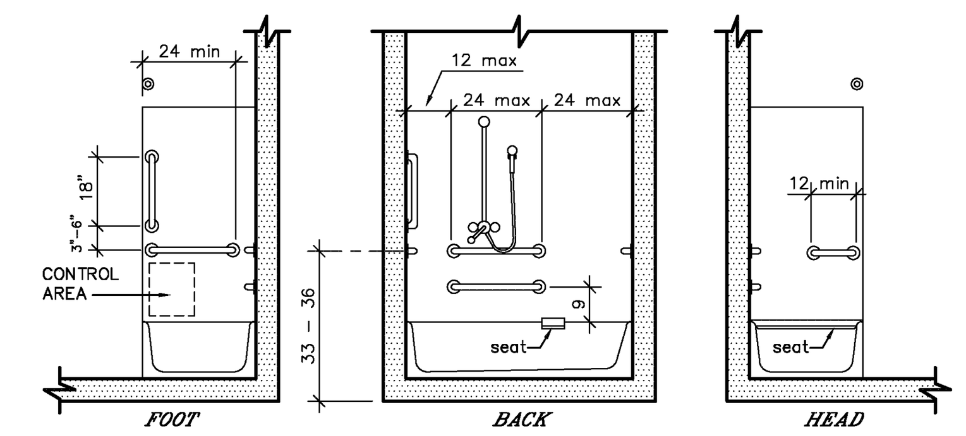
Clear Floor Space at Lavatories Lavatory Clearances

BATHTUBS

SEE 2012 IBC CHAPTER 11 ACCESSIBILITY

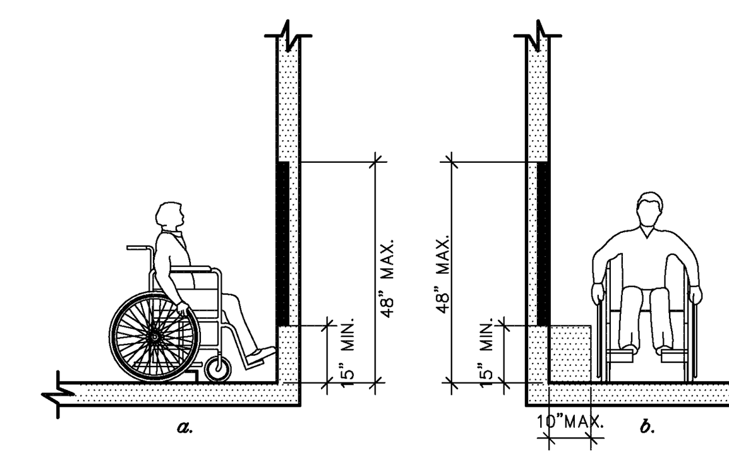
PROVIDE BLOCKING FOR GRAB BARS AT ALL WATER CLOSETS AND TUB/SHOWERS IN ALL GROUND FLOOR UNITS.





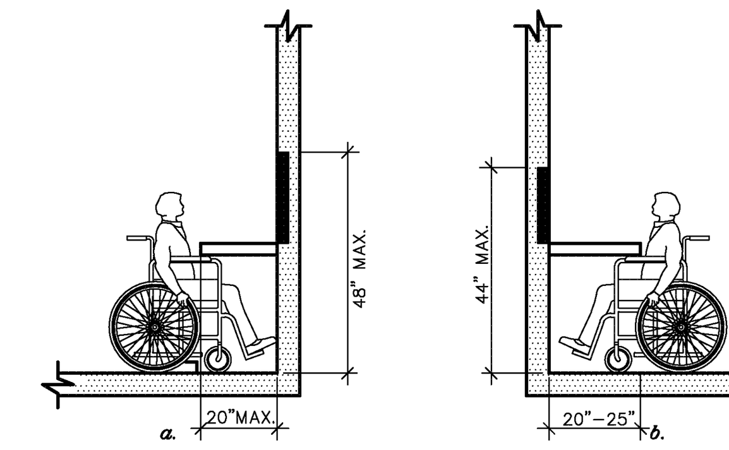
UNOBSTRUCTED REACH

SEE ANSI A117.1–2009, SECTION 308



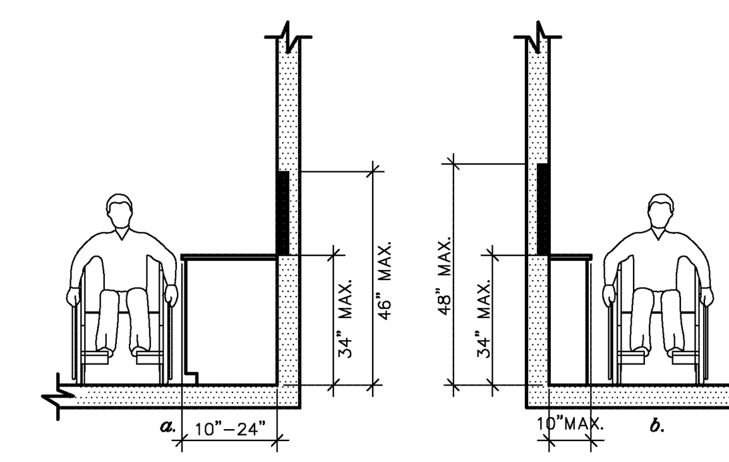
OBSTRUCTED HIGH FORWARD REACH

SEE ANSI A117.1–2009, SECTION 308



OBSTRUCTED HIGH SIDE REACH

SEE ANSI A117.1–2009, SECTION 308

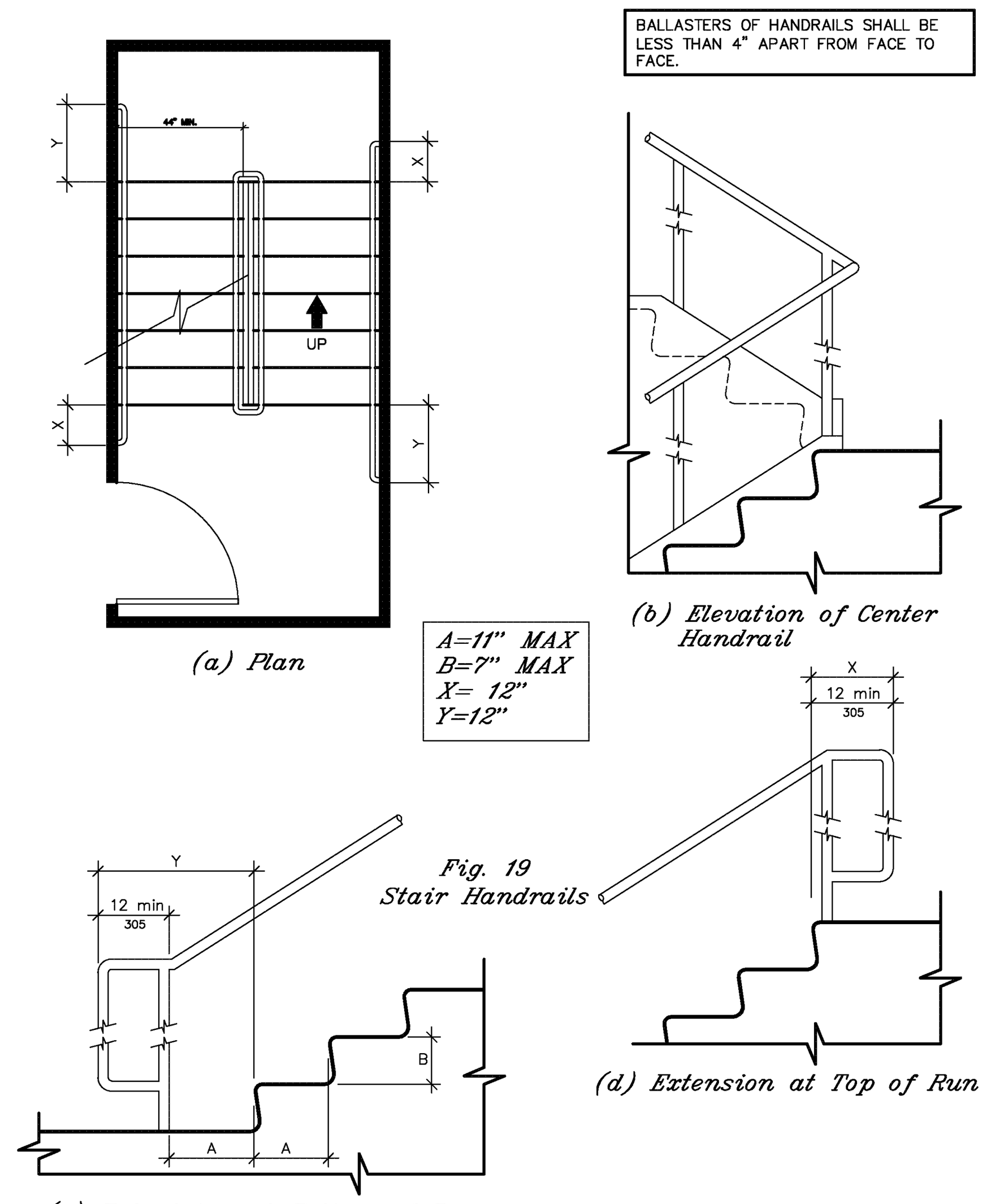


NOTE: (TYPICAL IN ALL TYPE 'A' ACCESSIBLE UNITS) REQUIRE 34" COUNTER HEIGHTS, FROM TOP OF SINK RIM TO FINISH FLOOR. 30" OF COUNTER SHALL BE DEDICATED TO WORKING SURFACES WITH KNEE SPACE IN THE KITCHEN.

STAIR

SEE 2012 IBC CHAPTER 11 ACCESSIBILITY

BALLASTERS OF HANDRAILS SHALL BE LESS THAN 4" APART FROM FACE TO FACE.



A=11" MAX
B=7" MAX
X= 12"
Y=12"

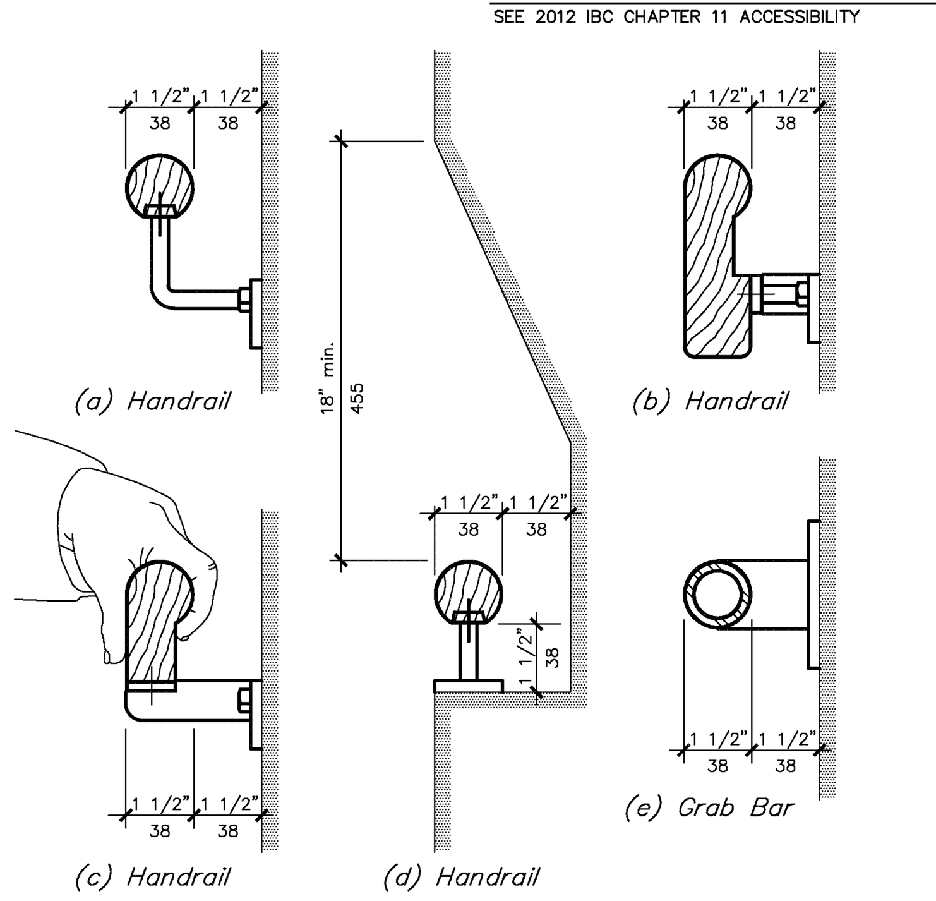
(a) Plan (b) Elevation of Center Handrail

Fig. 19 Stair Handrails

(c) Extentsion at Bottom of Run (d) Extension at Top of Run

GRAB BARS and HANDRAILS

SEE 2012 IBC CHAPTER 11 ACCESSIBILITY



(a) Handrail (b) Handrail (c) Handrail (d) Handrail (e) Grab Bar

GENERAL ACCESSIBILITY NOTES

-ALL BUILDINGS SHALL COMPLY WITH INTERNATIONAL BUILDING CODE 2012 AND ANISI 117.1-2009.

-PROVIDE THE REQUIRED 5% OF TYPE 'A' ACCESSIBLE UNITS OF THE TOTAL UNITS ON SITE. ALL OTHER GROUND FLOOR UNITS SHALL BE TYPE 'B'.

-PROVIDE A MANUAL FIRE ALARM PER IBC SECTION 907.2.9.

-RAMPS 0 TO 5% (1:20) DON'T REQUIRE HANDRAILS. BUT HANDRAILS ARE REQUIRED 5% TO 8.33%. NO SLOPE SHALL EXCEED 8.33% IF ACCESSIBLE ROUTE.

-EDGE PROTECTION SHALL BE PROVIDED ON EASH SIDE OF RAMP RUNS AND AT EACH SIDE OF LANDINGS. ANSI A117.1-2009, 405.9

-THE RISE PER ANY RAMP RUN SHALL BE 30" MAX. ANSI A117.1-2009, 405.6

-CLEAR WIDTH OF A RAMP RUN SHALL BE 36" WHERE HANDRAILS ARE PROVIDED ON THE SAM E RUN THE CLEAR WIDTH IS BETWEEN HANDRAILS. ANSI A117.1-2009, 405.5

-HALLWAYS SHALL BE A MINIMUM OF 36" IN WIDTH.

-RAMP HANDRAILS SHALL BE 34" - 38" VERTICALLY ABOVE THE RAMP. ANSI A117.1-2009, 505.4

-RAMP HANDRAILS SHALL EXTEND 12" HORIZONTALLY (MIN) BEYOND THE TOP AND BOTTOM OF RAMP RUNS. ANSI A117.1-2009, 505.10.1

-RAMPS SHALL HAVE LANDINGS AT TOP AND BOTTOM OF EACH RAMP RUN WITH A CLEAR WIDTH AT LEAST AS WIDE AS THE WIDEST RAMP TO THE LANDING AND SHALL HAVE A CLEAR LENGHT OF 60".

-GUARDRAILS OR OTHER BARRIERS SHALL BE PROVIDED WHERE OBJECTS PROTRUSION IS BEYOND THE LIMITS ALLOWED WHERE THE VERTICAL CLEARANCE IS LESS THAN 80" ABOVE THE FLOOR. THE LEADING EDGE OF SUCH GUARDRAIL OR BARRIER SHALL BE 27" MAX. ABOVE FINISH FLOOR. ANSI 307

-PROVIDE GUARDRAILS AT 42" HIGH AT EXTERIOR DECKS/BALCONIES. ANSI A117.1-2009

-GUARDRAILS SHALL HAVE BALUSTERS SUCH THAT A 4" DIAMETER SPHERE CANNOT PASS THROUGH. IBC SECTION 1013.3

-OBJECT WITH LEADING EDGES LESS THAN 27" AND NOT MORE THAN 80" ABOVE THE FLOOR SHALL PROTRUDE 4" MAX. HORIZONTALLY INTO THE CIRCULATION PATH. ANSI. 307.

-OBJECTS HAVE A 4" MAX. PROJECTION FROM WALL WITH A MAX. OF 24" WIDE AND GREATER THAN 27" ABOVE FINISH FLOOR, EXCEPTED WING WALL THAT GOES DOWN TO FLOOR.

-SIGNAGE PER IBC SHALL BE INSTALL AND FIELD VERIFIED AS TO THE LOCATION, TYPE, SIZE AND VERBIAGE.

-STAIR SIGNAGE:
PROVIDE TACTILE STAIR LEVEL IDENTIFICATION SIGNAGE PER ANSI A117.1 SECTION 703.3.
PROVIDE SIGNAGE INSIDE STAIR AT EXTERIOR DOOR STATING 'EXIT' PER ANSI SECTION 504.9.

-OPERABLE WINDOWS SHALL HAVE ACCESSIBLE CONTROLS AT A MAX. HEIGHT OF 48" ABOVE FINISH FLOOR.

-AN EGRESS WINDOW IS REQUIRED IN ALL BEDROOMS. AT LEAST 5.7 SQ. FT. IN SIZE

-ASSURE ALL DOORS HAVE ACCESSIBLE HARDWARE, SUCH AS LEVER STYLE.

-ALL DOORS NEED TO BE 32" CLEAR (36" RECOMMEND), EXCEPT DOORS THAT LEAD INTO AREAS WITH LESS THAN 24" IN DEPTH.

-DOORWAYS SHALL HAVE A CLEAR OPENING WIDTH OF 32" MIN.
MEASURED BETWEEN THE DOOR AND STOP, WITH THE DOOR OPEN 90 DEGREES.

-THRESHOLDS AT DOORWAYS SHALL BE ½" MAX. IN HEIGHT.

-ALL TYPE 'A' ACCESSIBLE AND TYPE 'B' ACCESSIBLE BATHROOMS REQUIRE GRAB BAR REINFORCEMENTS AT BATH TUBS, SHOWERS AND WATER CLOSETS.

-SIGN INDICATING ACCESSIBLE PARKING SHOULD BE LOCATED AT ALL ACCESSIBLE PARKING STALLS.

-IF WIDTH LESS THAN 48" THEN THE SLOPE OF THE FLARED SIDES OF THE CURB RAMP MUST NOT EXCEED 1:12.

-ACCESSIBLE PARKING SPACES MUST BE AT LEAST 96" WIDE AND HAVE AN ADJACENT ACCESS AISLE THAT IS 60" WIDE. VAN ACCESSIBLE 132" WIDE.

-2% OF PARKING SPACES SERVING DWELLING UNITS SHALL BE MADE ACCESSIBLE AND BE LOCATED ON AN ACCESSIBLE ROUTE. A MINIMUM OF ONE ACCESSIBLE PARKING SPACE REQUIRED AT SALES/ RENTAL OFFICE. FOR EVERY SIX OR FRACTION OF SIX ACCESSIBLE PARKING SPACES ONE VAN ACCESSIBLE SPACE IS REQUIRED. IBC 1106

-INSTALL BLOCKING FOR GRAB BARS AT TOILET AND BATHING FIXTURES IN ALL GROUND FLOOR UNITS.

- INSTALL ALL TOILETS 18" FROM DRYWALL FACE OF SIDE WALL IN ALL GROUND FLOOR UNITS.

-TYPE 'B' ACCESSIBLE DWELLING UNITS: (ANSI 117.1 SECTION 1004)

-EITHER ONE 'OPTION 'B' ACCESSIBLE' BATHROOM OR
ALL NEED TO BE 'OPTION 'A' ACCESSIBLE' FHA 7.36 & 7.37.

-MIRRORS ABOVE THE LAVATORIES SHALL HAVE THE BOTTOM EDGE OF THE REFLECTING SURFACE 40" MAX. ABOVE THE FLOOR.

-THE TOP OF THE WATER CLOSET SEAT SHALL BE BETWEEN 15" AND 19" ABOVE FINISH FLOOR.

-WATER CLOSETS SHOULD BE CENTERED ON 36". 18" FROM WALL.

-U-SHAPED KITCHEN SHALL HAVE 60" MIN. BETWEEN OPPOSING COUNTER TOPS AND APPLIANCES. ALTERNATE SHAPED KITCHENS SHALL HAVE A CLEAR SPACE OF 40" BETWEEN OPPOSING COUNTER TOPS AND APPLIANCES. SECTION 1004.12

-A CLEAR FLOOR SPACE, POSITIONED FOR PARALLEL OR FORWARD AND CENTERED, SHALL BE PROVIDED AT EACH KITCHEN APPLIANCE AND FIXTURE. SECTION 1004.12.2

-ACCESSIBLE ROUTES REQUIRE ROUTES TO ANY AND ALL PUBLIC AND COMMON AREAS (ALL FACILITIES, ELEMENTS OUTSIDE, MAILBOXES, SITE FURNISHINGS, OUTSIDE STORAGE AREAS, REFUSE DISPOSAL AREAS, PLAYFIELDS, AMPHITHEATERS, PICNIC SITES, SWIMMING POOLS, SUN DECKS, TENNIS COURTS, CLUBHOUSES, PLAYGROUND, GAZEBOS, PARKING AREA, SIDEWALKS, ALL OR PARTS OF NATURE TRAILS AND JOGGING PATHS.

-36" MINIMUM FOR ACCESSIBLE ROUTE.

-30" X 48" CLEAR FLOOR SPACE CENTERED ON WASHER AND DRYER.

-ALL ENTRY DOORS SHALL REQUIRE 18" CLEAR ON PULL SIDE OF DOOR AND 12" CLEAR ON THE PUSH SIDE OF THE DOOR. ANSI 404

-5% OF THE UNITS IN THE COMPLEX ARE REQUIRED TO BE TYPE 'A' UNITS ON GROUND FLOOR. ALL OTHER GROUND FLOOR UNITS ARE TYPE 'B'.

TYPE 'A' ACCESSIBLE DWELING UNITS (ANSI 117.1 SECTION 1003)

-ALL DOORS SHALL HAVE 18" CLEAR ON PULL SIDE OF DOOR. AND 12 CLEAR ON THE PUSH SIDE OF THE DOOR IF CLOSER IS INSTALLED. ANSI 404

-A CLEAR FLOOR SPACE COMPLYING WITH SECTION 305 SHALL BE PROVIDED AT ALL APPLIANCES AND FIXTURES.

-ALL TYPE 'A UNITS REQUIRE 34" COUNTER HEIGHTS, FROM TOP OF SINK RIM TO FINISH FLOOR.

-WHERE THERE ARE NO OBSTRUCTIONS TO INTERFERE WITH THE REACH OF A PERSON, CONTROLS AND OUTLETS SHALL BE MOUNTED IN A RANGE OF 15" FROM FINISH FLOOR TO 48" ABOVE FINIS FLOOR IN ACCORDANCE WITH ANSI 117.1, SECTION 308.

-30" OF COUNTER SHALL BE DEDICATED TO WORKING SURFACES.

-WORK SURFACE HEIGHT SHALL BE BASED ON THE TOP OF THE SINK RIM AT A MAX. HEIGHT OF 34" ABOVE FINISH FLOOR. A KNEE SPACE OF 30" IN LENGTH SHALL BE PROVIDED IN AT LEAST ONE SECTION OF THE KITCHEN COUNTER TOP.

-REMOVABLE CABINETS MAY BE INSTALLED UNDER THE KITCHEN SINK PROVIDED THEY CAN BE REMOVED WITH OUT REMOVING THE SINK AND THE WALL BEHIND AND FLOOR ARE FINISHED.

-RANGE HOOD CONTROLS SHALL BE MOUNTED A MAX OF 46" AFF.

REVISIONS

PROPOSED 24 UNIT BUILDING FOR:

LEGACY VILLAS

COUNRTY VISTA ROAD, LIBERTY LAKE, WA

WYATT ARCHITECTS AND ASSOCIATES

JAMES A. McARTHUR, A.I.A.
4205 South Crestline
Spokane, WA 99203
Phone: 509-327-7943 / Fax: 509-327-7999
jallanmcarthur@gmail.com

Project Manager:
Lee J. Schwatrzenburg
PO Box 141713
Spokane Valley, WA 99214
Phone: 509-928-1860
lee@wyattarchitects.com

SHEET TITLE:	NOTES
DRAWN BY:	LJS
PROJECT:	15:26
DATE:	6/20/2016
SHEET NO.	A0.2

BUILDING CODE SUMMARY WORKSHEET - BUILDING 'H, I' & 'L' - 3 STORY MULTI-FAMILY

PROJECT NAME: RIVERSIDE AVENUE APARTMENTS

BUILDING CODE EDITION 2012 IBC

SECTION 1 - BUILDING USE OR OCCUPANCY

Identify all use and occupancy classification group (s) in the Building (i.e. B, M, R-2, A-3, ect.):	U	R-2	A-3		
Residential Building -Multi-Family		X			
Attached Garage	X				

List all occupancy seperation fire barrier ratings required (i.e.B to S-2 = 2hr), IBC 508	
Include both horizontal and vertical seperations	U to R-2 = 1 Hr
And	
Provide mixed use ratio calculations per 508	N/A
Or	
Building is constructed per IBC 508.3.2 for Non-Seperated Uses or IBC 509 Special Provisions	N/A

Lists all incidental use areas (per IBC Table 508.2), floor area, and separation to be provided

Room or Area	Floor Area (sq.ft.)	Fire Seperation
N/A	N/A	N/A

List all accessory use areas not defined as Incidental Use, and fire barrier requirements (per IBC 508.3.1)

Room or Area	Floor Area (sq.ft.)	% floor area on story	Fire Seperation
Sprinkler Riser room (Residential Bldgs)	64.00	0.40%	N/A

SECTION 2 - BUILDING CONSTRUCTION

List Construction Type(s) used in the design (IA, IIB, VA, ect.):	VB, NFPA 13R Sprinklers

Building Height		
Type V-B (Residential Building xxxxxxxxxxxxxxx) Building Height (per IBC Table 503)	ALLOWED 40'	PROPOSED 36.7
Number of Stories (per IBC Table 503)	3	3
Are Automatic Sprinklers used for Height Modifications? (per IBC Section 504)	NO	NO
Is there a basement?	NO	NO
Is an Automatic Sprinkler System Used in Place of 1 Hour Construction? (per IBC Table 601, Footnote e.) or other fire resistive construction per IBC 601 footnote c.?	NO	NO

Fire Resist. of Ext Walls Based on Fire Sep Distance (per IBC Tables 602 & 705.8

Building 'H, I' & 'L'		Fire Separation Dist.			
List Wall Locations (i.e. North, South, ect.)		Provided	Range	Rating	Opening Protection (705.8)
North	Open Space	30'	10'<x<30'	0	Not Required
East	Open Space	15'	10'<x<30' (VB)	0	No Limit
South	Open Space	30'	10'<x<30'	0	Not Required
West	Open Space	15'	10'<x<30'	0	No Limit

Fire Resistance Rating Requirements (per IBC Table 601)	Rating Required	Rating Provided	Assembly #
Structural Frame	0 hr	0 hr	See Sheets A3.8 & A3.9
Bearing Walls - Exterior	0 hr	0 hr	
Bearing Walls - Interior	0 hr	0 hr	
Walls Seperating Dwelling Units	1 hr	1 hr	GA FILE# WP 3370
Area Seperation Wall	2 hr	2 hr	GA FILE# WP 4135
Nonbearing Walls & Partitions- Interior	0 hr	0 hr	
Floors Seperating Dwelling Units	1 hr	1 hr	GA FILE# FC 5109
Floor Construction	0 hr	0 hr	
Roof Construction	0 hr	0 hr	

SECTION 3 - BUILDING AREA LIMITATIONS: "ALLOWABLE"

If there are multiple construction types, or if a fire wall divides the building, provide a separation analysis for each area. Repeat as necessary.

Area Limitations for Each Proposed IBC Use or Occupancy Group	North Half		South Half
Occupancy	Occupancy 1	Occupancy 2	Occupancy 1
IBC Use / Occupancy Group	R-2	U	R-2
Table 503 Area Limitation (per IBC Table503) <At>	2 Stories @ 7000 sq.ft. +1 story per IBC 504.2 Sprinkler Inc.	1 Story @ 5500 sq.ft.	2 Stories @ 7000 sq.ft. +1 story per IBC 504.2 Sprinkler Inc.
Frontage Area Increase Multiplier (per IBC 506.2) <If>	[F/P-0.25]W/30		
Automatic Sprinkler System Area Increase Multiplier (per IBC 506.3) <Is> (not allowed for IBC 903.3.1.2 NFPA 13R sprinklers)	0%		
Total ALLOWANCE Floor Area (Equation5-1 / IBC 506.1) <Aa>	At+ [At x If] + [At x Is]		
Total ALLOWANCE Building Area	3 x Aa		
Does the Building Quality for Unlimited Area (per IBC 507)	NO		

SECTION 3A - BUILDING AREAS "PROPOSED"

If there are multiple construction types, or if a fire wall divides the building, provide a separation analysis for each area. Repeat as necessary.

Area Limitations for Each Proposed IBC Use or Occupancy Group or Building Portion	Occupancy 1			
IBC Use / Occupancy Group	R-2			
Table 503 Area Limitation (per IBC Table503) <At>	7000			
Frontage Area Increase Multiplier (per IBC 506.2) <If>	N/A			
Building Perimeter w/ 20' open space <F>				
	500			
Perimeter of building <P>				
	500			
Width of open space <W>	N/A	30.0 =(69')30 + (181')30 + (96')30 +(181')30 /500		
Automatic Sprinkler System Area Increase Multiplier (per IBC 506.3) <Is> (not allowed for IBC 903.3.1.2 NFPA 13R sprinklers)	0			
Total ALLOWABLE Floor Area (Equation 5-1 / IBC 506.1) <Aa>	12,250			
Total ALLOWANCE Building Area	3 x Aa =			
	36,753			
Max. PROPOSED Floor Area	10,681			
Total PROPOSED Building Area	10,681 + 9,223 + 9,223 = 29,127			

SECTION 4 - OCCUPANT LOAD BUILDING EXITING

If there are multiple construction types, or if a fire wall divides the building, provide a separation analysis for each area. Repeat as necessary.

	Level 1	Level 2	Level 3				
Floor Area (sf)	9,712	9,712	9,712	(L1 w/o Decks/Stor.)			
Occupant Load Factor (per Table 1004.1.1)	200	200	200				
Total Occupant Load Per Floor (1004.4)	48	48	48				

Number of Exits and Exit Widths From Each Level

	Number of Exits per 1015.1		Egress Components		Exit Width per 1005.1 w/ sprinklers			
					Stair Width (in.)(0.3)		Breezeway (in.)(0.2)	
	Req'd.	Prov.	Stairs	Breezeway	Req'd.	Prov.	Req'd.	Prov.
Level 1	4	8	0	4	0	0	13.6	48
Level 2	4	8	8	0	20.4	42	0	0
Level 3	4	8	8	0	20.4	42	0	0

Section 1009.1 - Stairways serving an occupant load less than 50 shall have clear width of not less than 36 in.

Are Areas of Refuge Required	NO

ALLOWABLE FLOOR AREA:

TYPE V-B. – SPRINKLED (NFPA 13R)

$I_f = [500/500 - 0.25]\ 30/30 = .75$

$A_t = 7{,}000$

$A_a = 7{,}000 + [7{,}000 \times .75] + [7{,}000 \times 0] = 12{,}250$

$A_a = 7{,}000 + [5{,}250] + [0] = 12{,}250$ ALLOWABLE/ FLOOR

REVISIONS

PROPOSED 24 UNIT BUILDING FOR:

LEGACY VILLAS

COUNTRY VISTA ROAD, LIBERTY LAKE, WA

WYATT ARCHITECTS AND ASSOCIATES

JAMES A. McARTHUR, A.I.A.

Project Manager: Les Schwaltzenburg
Lic. Building Designer
Spokane Valley, WA 99224
Phone 509-928-9600
lesschwaltzarchitects.com

4205 South Cowley Drive
Spokane, WA 99203
Phone 509-327-7340 / Fax 509-327-7999
jallenmcarthur@gmail.com

SHEET TITLE: CODE SHEET

DRAWN BY: LJS

PROJECT: 15:01

DATE: 6/21/2016

SHEET NO. A0.3

PROJECT INFORMATION

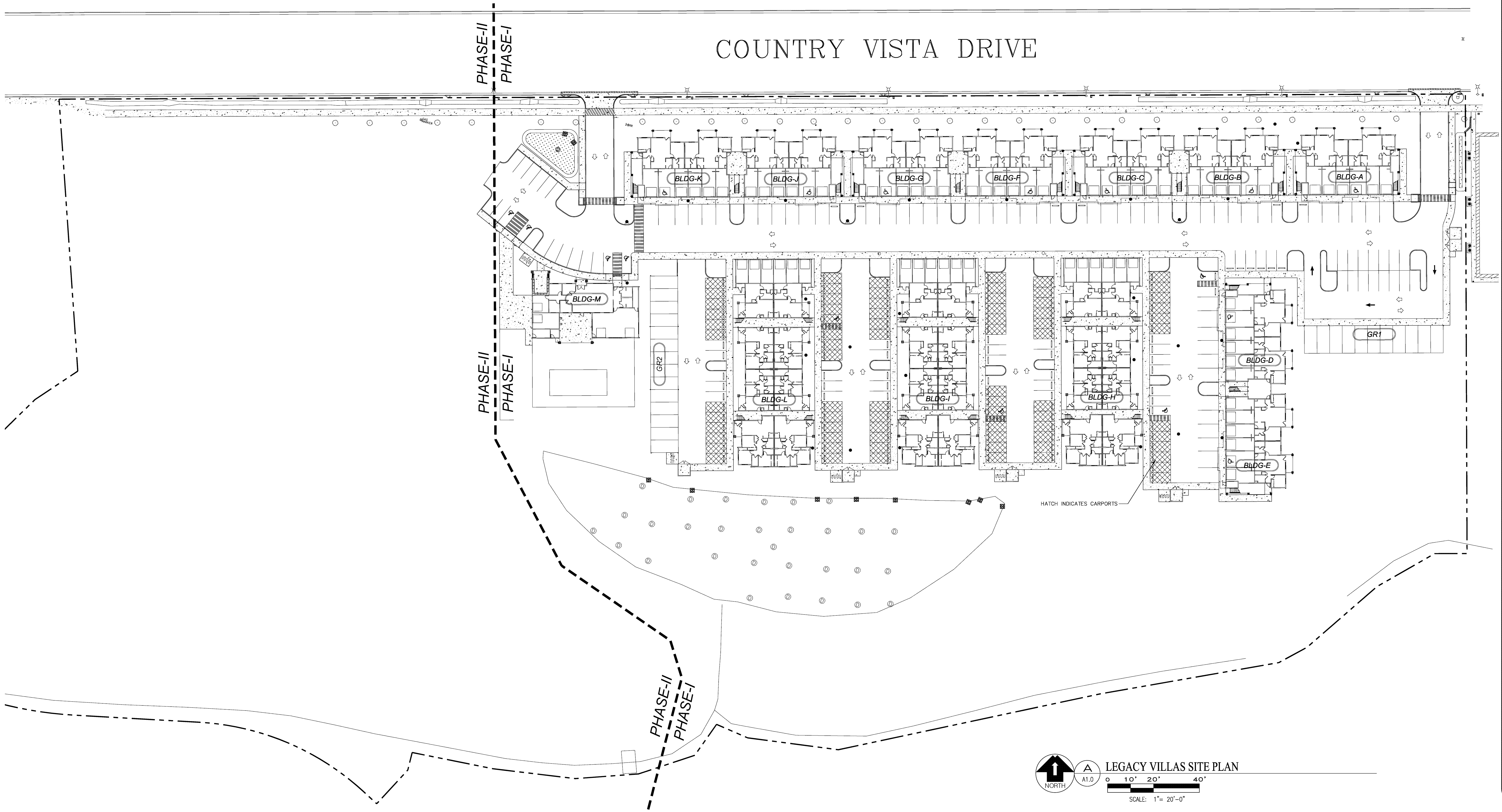
Name of Project: LEGACY VILLAS APARTMENTS - PHASE I
Date: 6/15/2016
Street Address: (TBD) COUNTRY VISTA DRIVE - LIBERTY LAKE, WA
Parcel Numbers: 55156.9202 & 55161.9203

	(name)	(address)	(phone)
OWNER:	Legacy Villas LLC	PO Box 949 Hayden, ID 83835	208/765-5059
CONTRACTOR:	Copper Basin	PO Box 949 Hayden, ID 83835	208/765-5059
Contact Person:	Jeremy Hopson	PO Box 949 Hayden, ID 83835	208/765-5059

Project is: APARTMENT COMPLEX

Existing lot/building use: Vacant
Proposed Use: RESIDENTIAL
Occupancy Group: R-2
Construction Type Required: V-B
Auto Fire-extinguishing System: NFPA 13R
Actual Construction Type: V-B

Allowable Height: 40'
Allowable Area: 7,000 S.F.
Actual Building Height and no. of stories: 33'6" feet, TWO stories;
Ground floor area and occupant load: Area: 3,980sf - 20 occupants -Per 6-Plex,
Total new floor area: 8,146sf Per 6-Plex ; Total existing floor area: N/A ;
New construction Valuation: $970,000 6-PLEX ;
ZONING:
Hazard Area? (Airport, Slide, Flood): N/A
Any Previous Environmental Declarations on this site: N/A
Use Zone of lot: M-2
Use Zone of adjacent lots: North: M-2 , South: M-2 , East: M-2 , West: M-2
Setbacks & Yards: North: 25' , South: 10' ; East: 5' ; West: 10'



A
A1.0
NORTH
LEGACY VILLAS SITE PLAN
0 10' 20' 40'
SCALE: 1"= 20'-0"

REVISIONS

PROPOSED 24 UNIT BUILDING FOR:
LEGACY VILLAS
COUNRTY VISTA ROAD, LIBERTY LAKE, WA

WYATT ARCHITECTS AND ASSOCIATES
JAMES A. McARTHUR, A.I.A.
4205 South Crestline
Spokane, WA 99203
Phone: 509-327-7943 / Fax: 509-327-7999
jallanmcarthur@gmail.com
Project Manager:
Lee J. Schwatrzenburg
PO Box 141713
Spokane Valley, WA 99214
Phone: 509-928-1860
lee@wyattarchitects.com

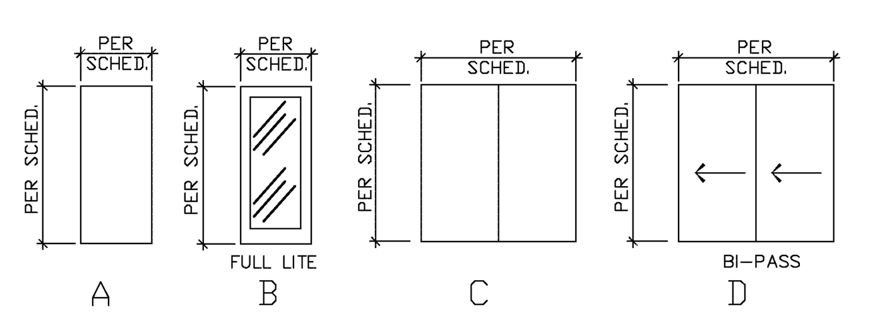
SHEET TITLE: SITE PLAN
DRAWN BY: LJS
PROJECT: 15:26
DATE: 6/20/2016
SHEET NO. A1.0

DOOR SCHEDULE

SEE DOOR LEGEND

DOOR MARK	1. DOOR SIZE AND LOCATION		2. TYPE	3. THICKNESS	4. CONSTRUCTION	5. FACING/FINISH	6. GLASS	7. RATING	8. FRAME TYPE	9. FRAME FINISH	REMARKS
1	ENTRY	3'-0" X 6'-8"	A	1-3/4	ISD	MP	--	20	WD	WP	AUTO CLOSER AND SMOKE SEAL
2	PATIO/DECK	3'-0" X 6'-8"	B	1-3/4	ISD	MP	IT	--	WD	WP	INSULATED GLASS IN DOOR 10" ABOVE THRESHOLD
3	EXT. STOR.	3'-0" X 6'-8"	A	1-3/4	ISD	MP	--	--	WD	WP	
4	BATH	3'-0" X 6'-8"	A	1-1/8	HC	FF	--	--	WD	WP	
5	BED. RM.	3'-0" X 6'-8"	A	1-1/8	HC	FF	--	--	WD	WP	
6	BED. CLST.	3'-0" X 6'-8"	A	1-1/8	HC	FF	--	--	WD	WP	--
7	BED. CLST.	4'-0" X 6'-8"	D	1-1/8	HC	FF	--	--	WD	WP	PAIR OF 2'0" BI-PASS
8	BED. CLST.	5'-0" X 6'-8"	D	1-1/8	HC	FF	--	--	WD	WP	PAIR OF 2'6" BI-PASS
9	BED. CLST.	6'-0" X 6'-8"	D	1-1/8	HC	FF	--	--	WD	WP	PAIR OF 3'0" BI-PASS
10	CLOSET	1'-6" X 6'-8"	A	1-1/8	HC	FF	--	--	WD	WP	
11	CLOSET	2'-0" X 6'-8"	A	1-1/8	HC	FF	--	--	WD	WP	--
12	CLO/PANTRY	3'-0" X 6'-8"	A	1-1/8	HC	FF	--	--	WD	WP	--
13	LAUNDRY	3'-0" X 6'-8"	A	1-1/8	HC	FF	--	--	WD	WP	
14	FAU	2'-0" X 6'-8"	A	1-1/8	HC	FF	--	--	WD	WP	
15	BED. CLST.	5'-0" X 6'-8"	C	1-1/8	HC	FF	--	--	WD	WP	PAIR OF 2'6"
16	RISER RM	3'-0" X 6'-8"	A	1-3/4	ISD	MP	--	--	WD	WP	

DOOR TYPES



DOOR LEGEND

2. TYPE:
SEE BELOW

4. CONSTRUCTION:
ISD = INSULATED STEEL DOOR
HC = HOLLOW CORE WOOD
SC = SOLID CORE WOOD
VN = VINYL

5./9. FACING/FINISH:
MP = METAL PAINTED
WS = WOOD STAINED
FF = FACTORY FINISH

6. GLASS TYPE:
IT = INSULATED TEMPERED PLATE
FR = FIRE RATED (20 MIN.)

8. DOOR FRAME:
VN = VINYL
WD = WOOD
AL = ALUMINUM
HM = HOLLOW METAL

NOTE: ALL EXTERIOR DOORS TO BE INSULATED WITH A U-VALUE OF .20 OR LESS.

DOOR NOTES:

1. ALL EXIT DOORS ARE TO BE OPERABLE FROM THE INSIDE WITHOUT THE USE OF A KEY OR SPECIAL KNOWLEDGE.
2. LATCHING AND LOCKING DOORS THAT ARE HAND ACTIVATED AND IN A PATH OF TRAVEL SHALL BE OPERABLE WITH A SINGLE EFFORT BY LEVER TYPE HARDWARE , PANIC BARS, PUSH-PULL ACTIVATING BARS OR OTHER HARDWARE THAT PROVIDES PASSAGE WITHOUT GRASPING THE HARDWARE.
3. MAXIMUM EFFORT TO OPERATE DOORS MUST NOT EXCEED 8.5 POUNDS FOR EXTERIOR DOORS AND 5 POUNDS FOR INTERIOR DOORS. WHEN FIRE DOORS ARE REQUIRED, THE MAXIMUM EFFORT TO OPERATE THE DOOR MAY BE INCREASED UP TO 15 POUNDS.
4. ALL EXTERIOR DOOR SHALL BE INSULATED AND WEATHER STRIPPED.
5. DOOR THRESHOLD SHALL BE A MAX HEIGHT OF 1/2".

WINDOW SCHEDULE

WINDOW MARK	ROUGH OPENING WIDTH X HEIGHT	FRESH-AIR VENT	GLASS TYPE	FRAME	SILL HEIGHT (A.F.F.)	REMARKS
A	5'-0" x 5'-0"	--	IN	VN	1'-8"±	SLIDER-EGRESS
B	4'-0" x 5'-0"	-	IN	VN	1'-8"±	SLIDER
C	2'-0" x 5'-0"	-	IN	VN	4'-8"±	FIXED
D	6'-0" x 5'-0"	--	IN	VN	1'-8"±	SLIDER-EGRESS

WINDOW LEGEND

GLASS TYPE:
IT = INSULATED TEMPERED
IN = 1" INSULATED
FR = FIRE RATED
PG = PLATE GLASS

FRAME MATERIAL:
MW = MANUFACTURED WOOD
CW = CUSTOM WOOD
VN = VINYL
AL = ALUMINUM
ST = STEEL
HM = HOLLOW METAL

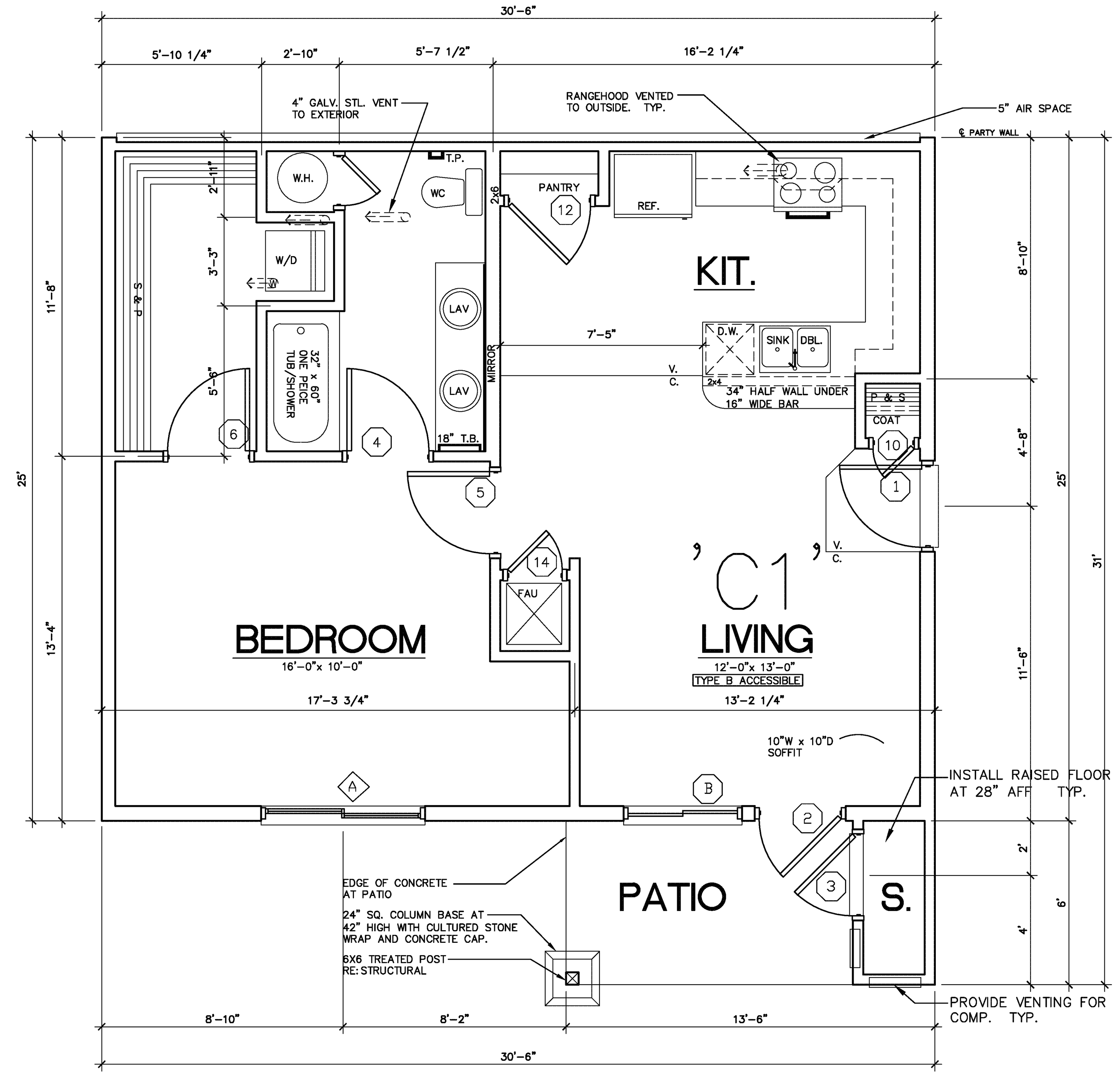
GLAZING IN FIXED OR OPERABLE PANELS WITHIN 24 INCHES OF EITHER VERTICAL SIDE OF THE DOOR SHALL BE SAFETY GLASS.

FIELD VERIFY ALL ROUGH OPENINGS OF WINDOWS AND DOORS PRIOR TO PURCHASE.

ALL GROUND FLOOR WINDOW LATCHES 48" A.F.F MAX.

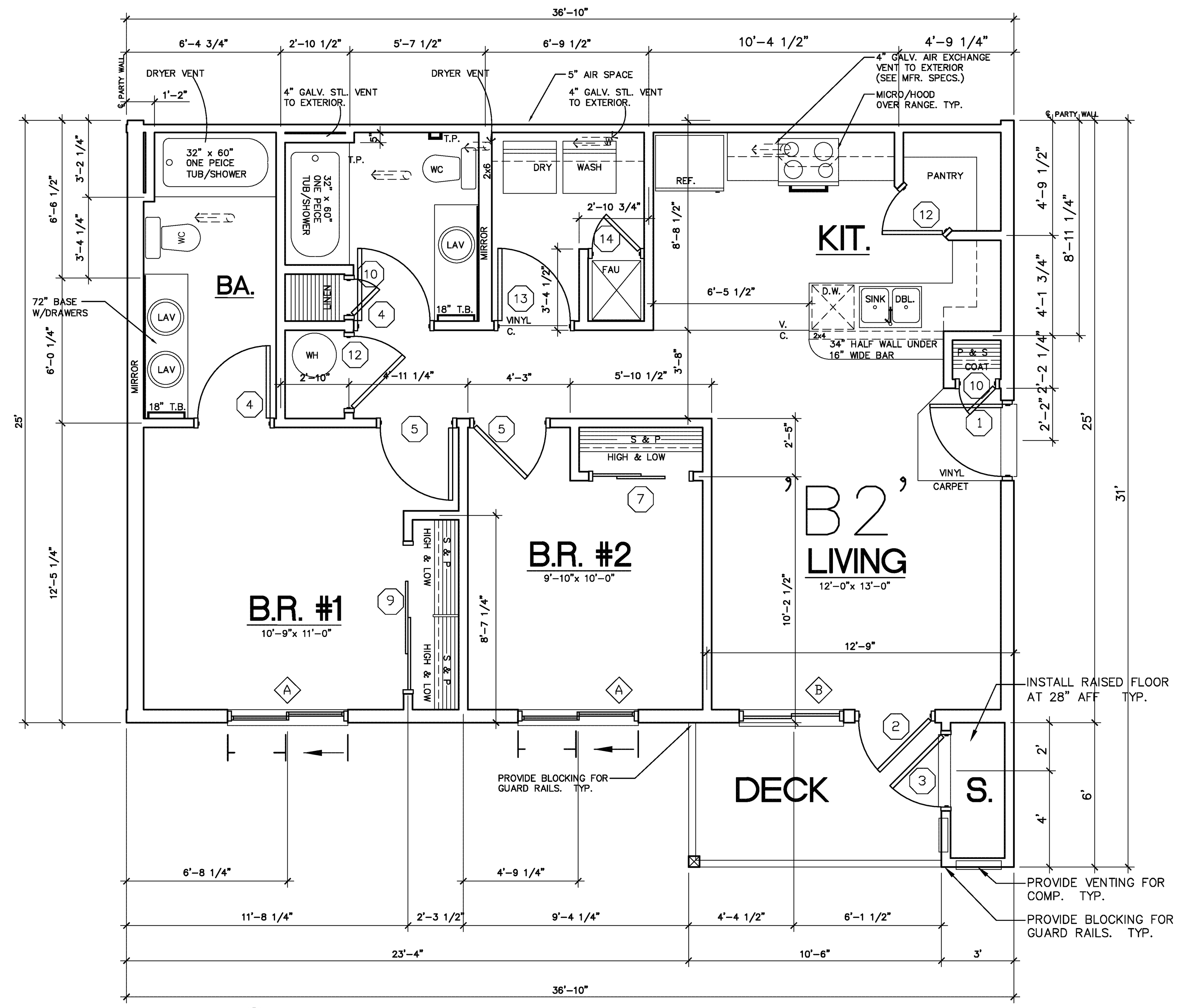
ALL EXTERIOR GLAZING SHALL INCLUDE LOW-E AND ARGON GAS.

EXTERIOR VINYL OPERABLE WINDOWS: U-.30 MAX.
EXTERIOR VINYL FIXED WINDOWS: U-.27 MAX.



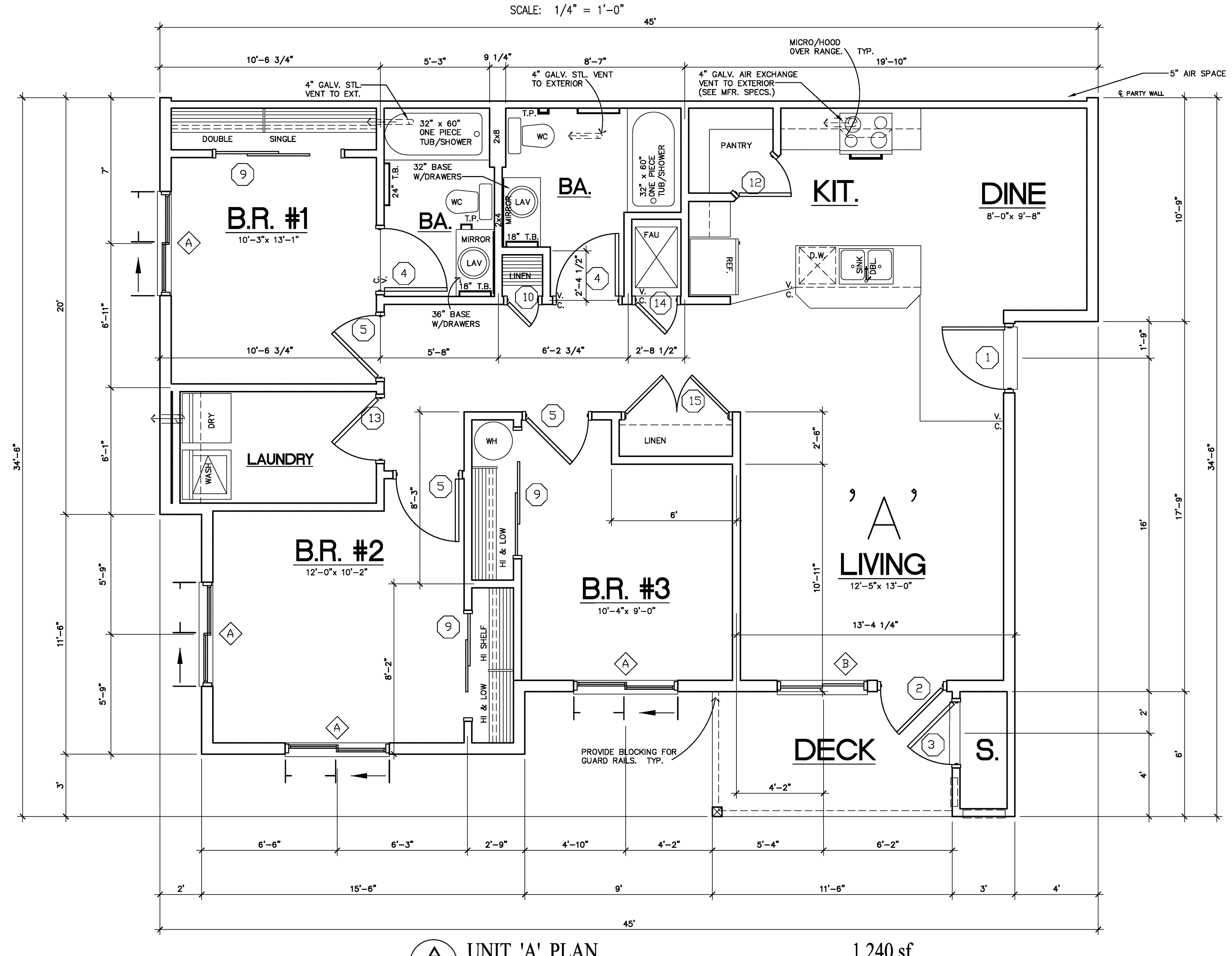
C A2.0 UNIT 'C' PLAN 762 sf

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



B A2.0 UNIT 'B' PLAN 920 sf

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



A A2.0 UNIT 'A' PLAN 1,240 sf

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

REVISIONS

PROPOSED 24 UNIT BUILDING FOR:

LEGACY VILLAS

COUNRTY VISTA ROAD, LIBERTY LAKE, WA

WYATT ARCHITECTS AND ASSOCIATES
Project Manager:
Lee J. Schwatrzenburg
PO Box 141713
Spokane Valley, WA 99214
Phone: 509-928-1860
lee@wyattarchitects.com

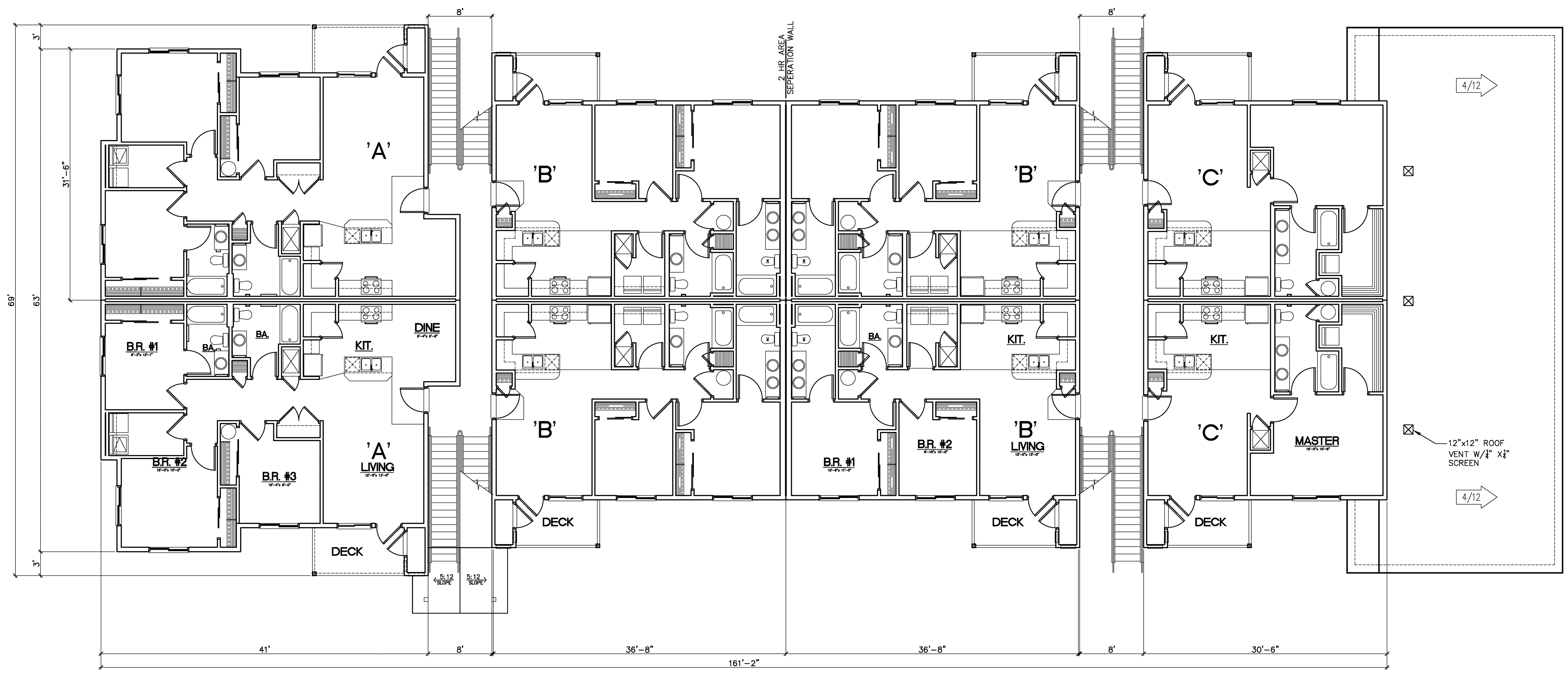
SHEET TITLE: BUILDING PLAN

DRAWN BY: LJS

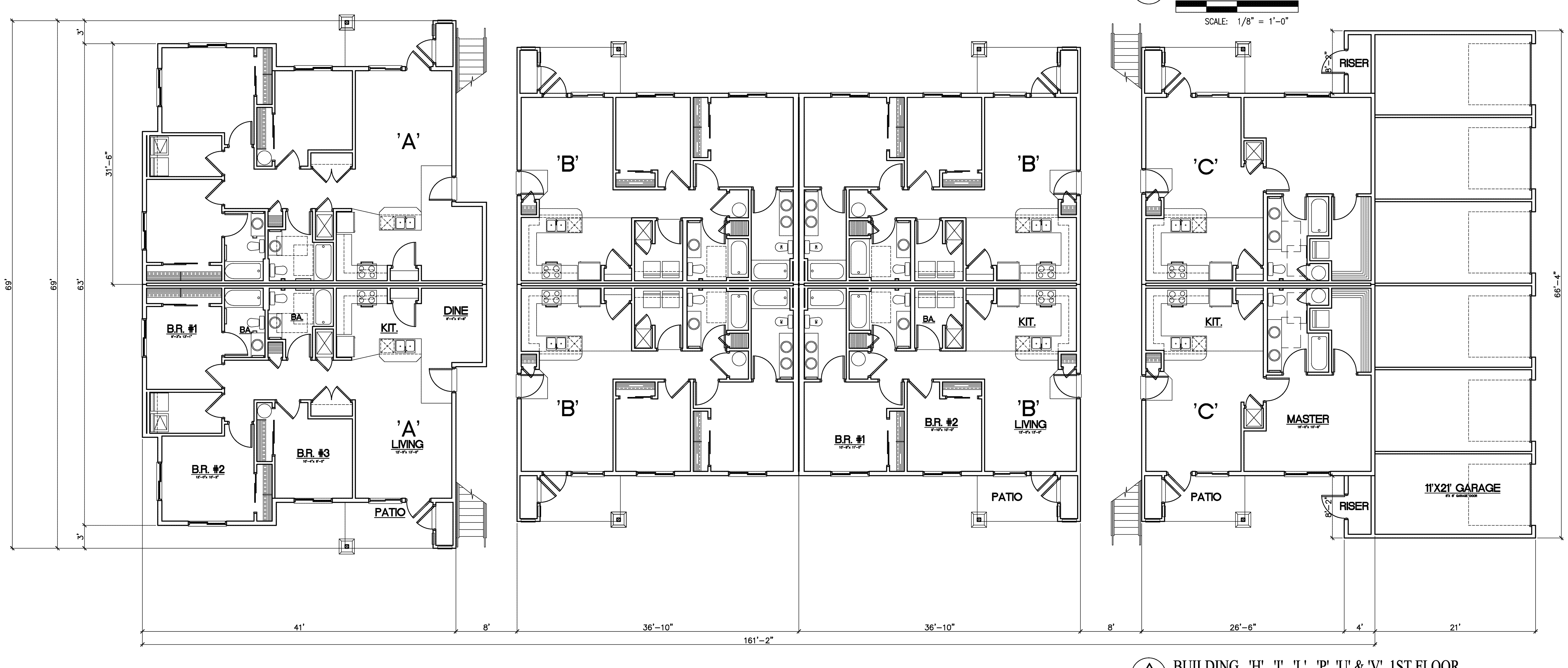
PROJECT: 15:26

DATE: 6/21/2016

SHEET NO. A2.0



B BUILDING 'H', 'I', 'L', 'P', 'U' & 'V' 2ND FLOOR
A3.0
0 4' 8' 16'
SCALE: 1/8" = 1'-0"



A BUILDING 'H', 'I', 'L', 'P', 'U' & 'V' 1ST FLOOR
A3.0
0 4' 8' 16'
SCALE: 1/8" = 1'-0"

REVISIONS

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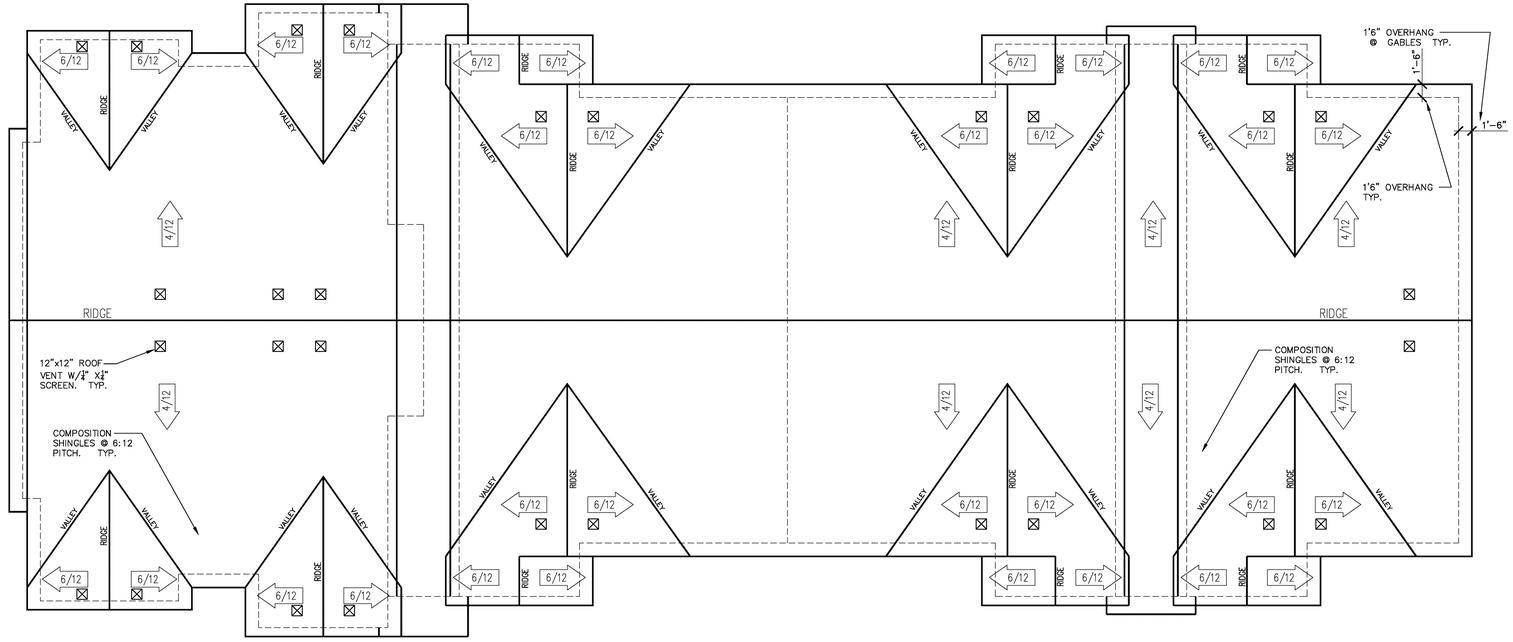
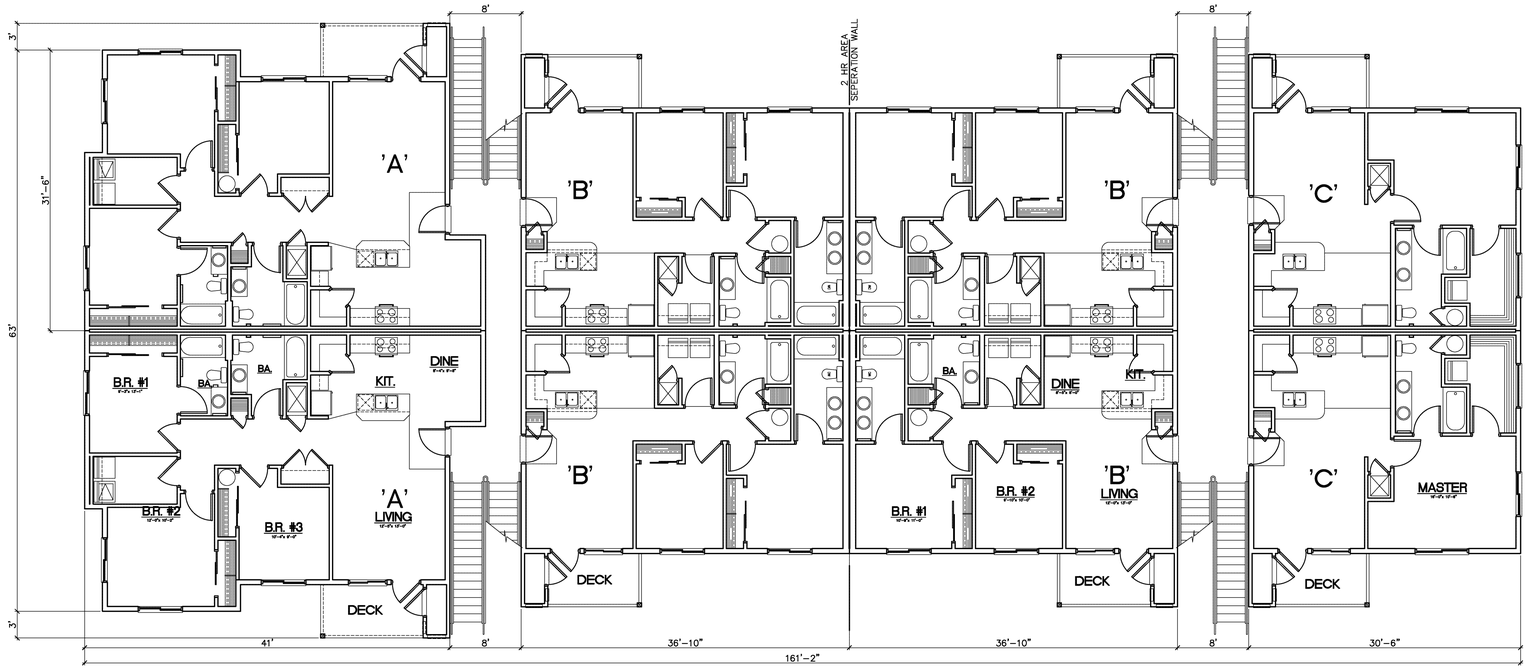
SHEET NO.
A3.0



B A3.1 BUILDING 'H', 'I', 'L', 'P', 'U' & 'V' ROOF PLAN

0 4' 8' 16'

SCALE: 1/8" = 1'-0"



A A3.1 BUILDING 'H', 'I', 'L', 'P' 'U' & 'V' 3RD FLOOR

0 4' 8' 16'

SCALE: 1/8" = 1'-0"

REVISIONS

PROPOSED 24 UNIT BUILDING FOR:

LEGACY VILLAS

COUNRTY VISTA ROAD, LIBERTY LAKE, WA

WYATT ARCHITECTS AND ASSOCIATES

Project Manager:
Lee J. Schwaltzenburg
LEED Accredited
Spokane Valley, WA 99224
Phone 509-928-9600
lee@wyattarchitects.com

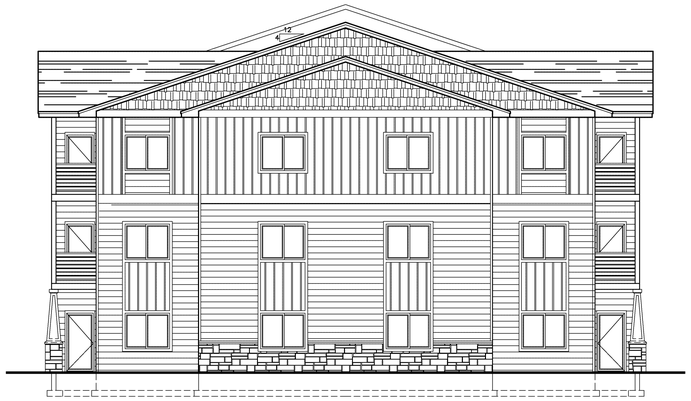
SHEET TITLE: BUILDING PLAN

DRAWN BY: LJS

PROJECT: 15:26

DATE: 6/21/2016

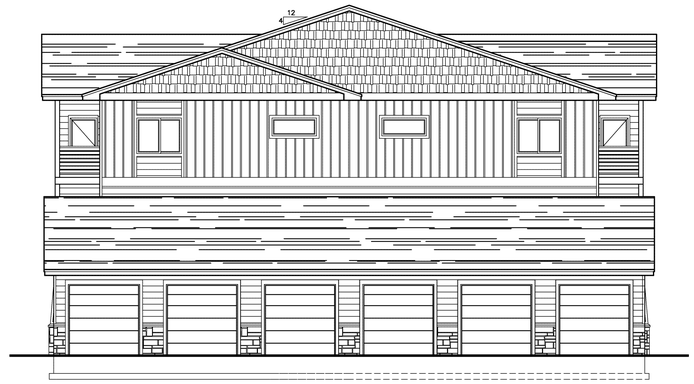
SHEET NO. A3.1



C A4.0 BUILDING 'H', 'I' , 'L' , 'P', 'U' & 'V' SOUTH ELEVATION

0 4' 8' 16'

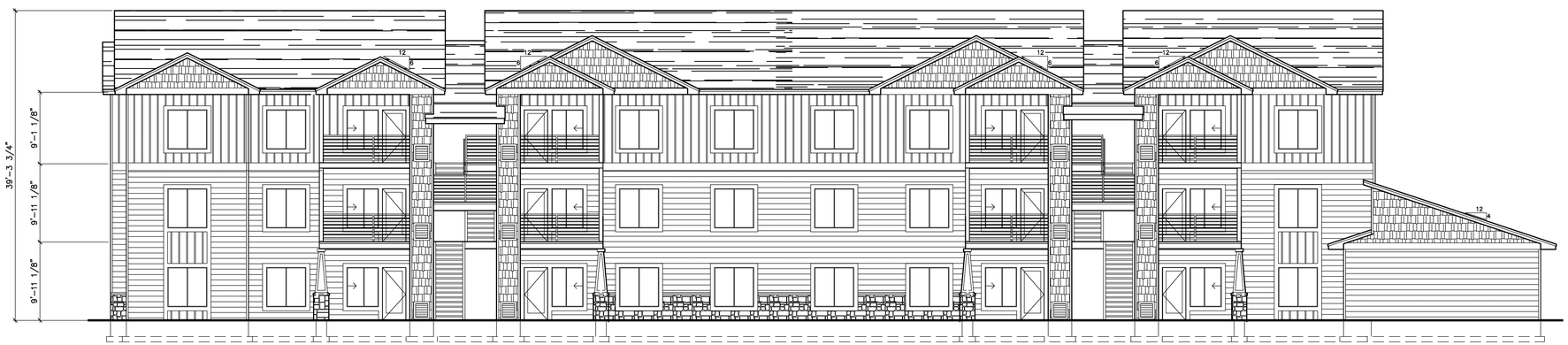
SCALE: 1/8" = 1'-0"



B A4.0 BUILDING 'H', 'I' , 'L', 'P', 'U' & 'V' NORTH ELEVATION

0 4' 8' 16'

SCALE: 1/8" = 1'-0"



A A4.0 BUILDING 'H', 'I' , 'L', 'P', 'U', & 'V' EAST ELEVATION

0 4' 8' 16'

SCALE: 1/8" = 1'-0"

REVISIONS

PROPOSED 24 UNIT BUILDING FOR:

LEGACY VILLAS

COUNRTY VISTA ROAD, LIBERTY LAKE, WA

WYATT ARCHITECTS AND ASSOCIATES

Project Manager:
Lee J. Schwaltzenburg
LEED AP BD+C
Spokane Valley, WA 99224
Phone 509-928-9600
lee@wyatt-architects.com

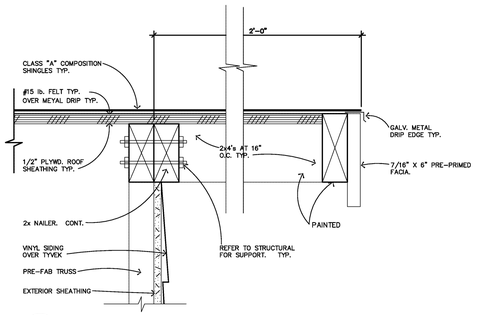
SHEET TITLE: BUILDING ELEVATIONS

DRAWN BY: LJS

PROJECT: 15:26

DATE: 6/21/2016

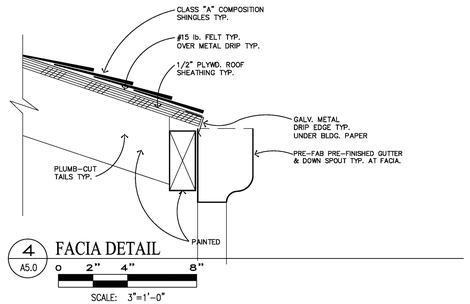
SHEET NO. A4.0



5 A5.0 GABLE END DETAIL

0 2" 4" 8"

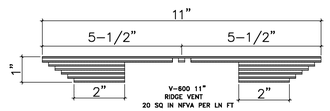
SCALE: 3"=1'-0"

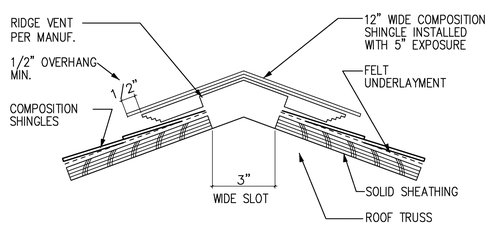


4 A5.0 FACIA DETAIL

0 2" 4" 8"

SCALE: 3"=1'-0"

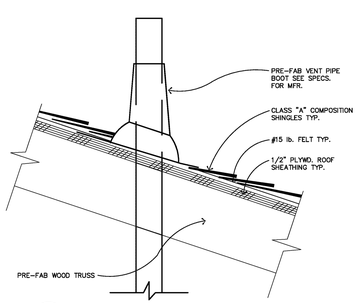




3 A5.0 RIDGE VENT DETAIL

0 2" 4" 8"

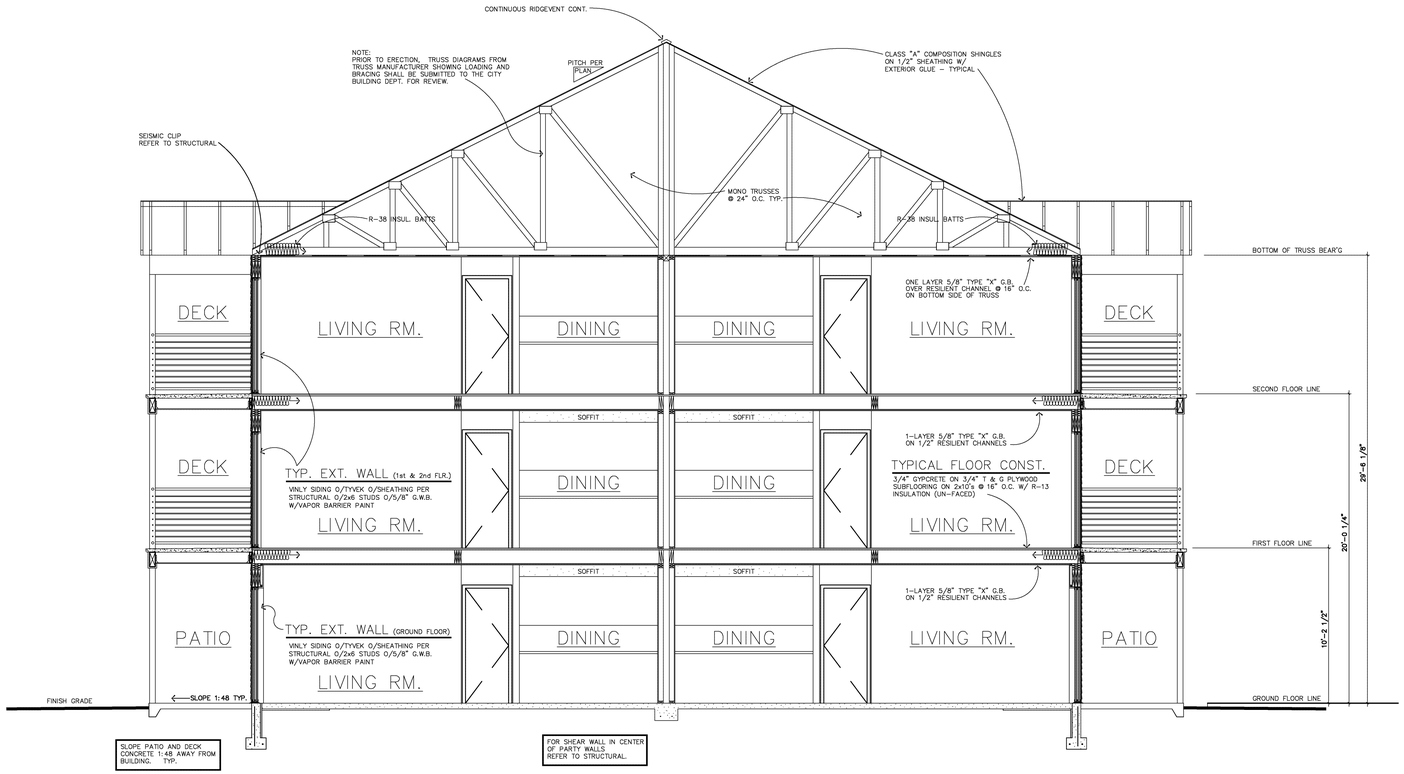
SCALE: 3"=1'-0"



2 A5.0 STACK VENT DETAIL

0 2" 4" 8"

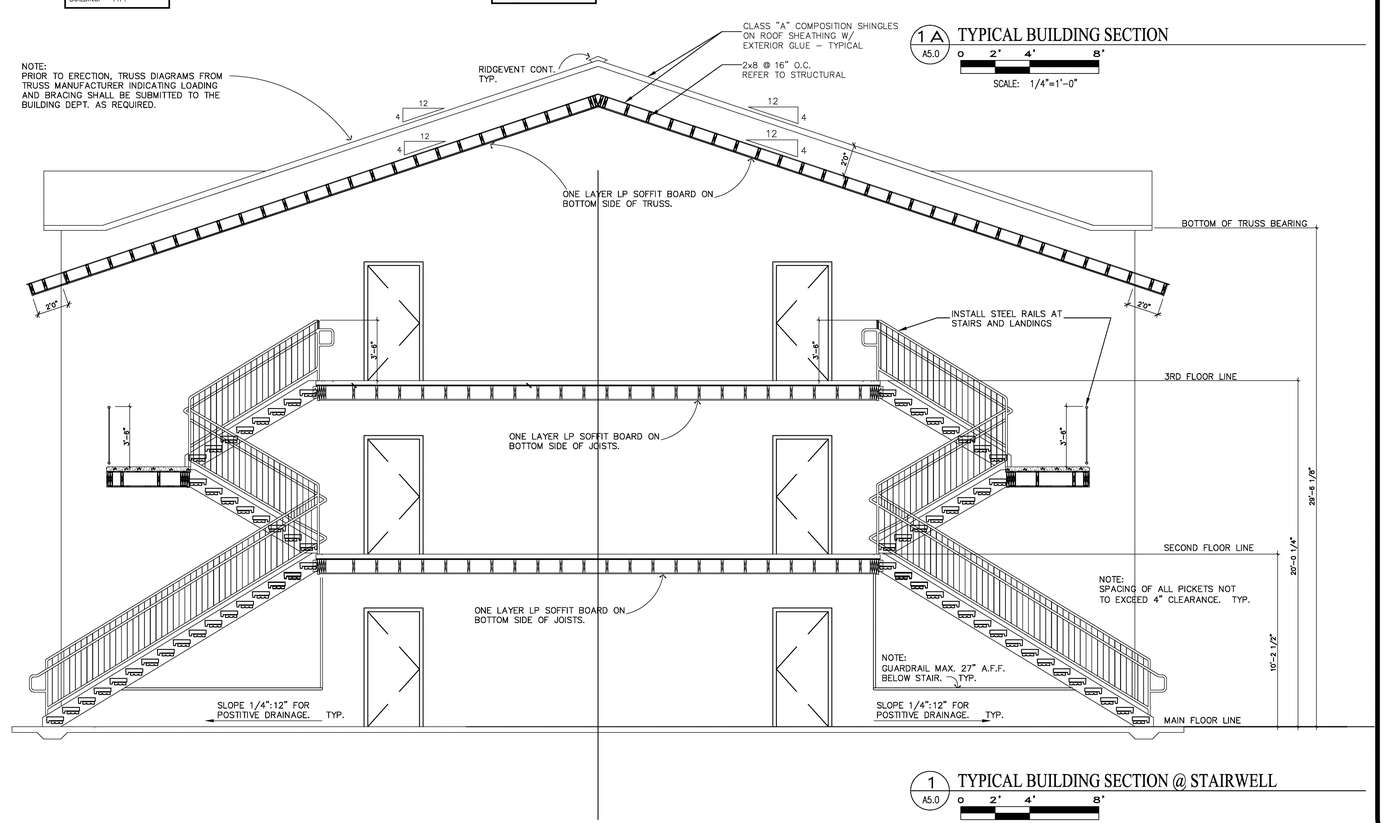
SCALE: 3"=1'-0"



1A A5.0 TYPICAL BUILDING SECTION

0 2' 4' 8'

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



1 A5.0 TYPICAL BUILDING SECTION @ STAIRWELL

0 2' 4' 8'

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

CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS BEFORE ORDERING MATERIALS OR BEGINNING WORK. REPORT ALL INCONSISTENCIES TO ARCHITECT PRIOR TO PROCEEDING WITH WORK. TYP.

REVISIONS

PROPOSED 24 UNIT BUILDING FOR:

LEGACY VILLAS

COUNTRY VISTA ROAD, LIBERTY LAKE, WA

WYATT ARCHITECTS AND ASSOCIATES

Project Manager:
Lee J. Schwartzenburg
E. 1803 Mission Ave.
Spokane Valley, WA 99214
Phone 509-928-9500
leeschwartz@wyattarchitects.com

SHEET TITLE: BUILDING SECTIONS

DRAWN BY: LJS

PROJECT: 15:26

DATE: 6/21/2016

SHEET NO. A5.0

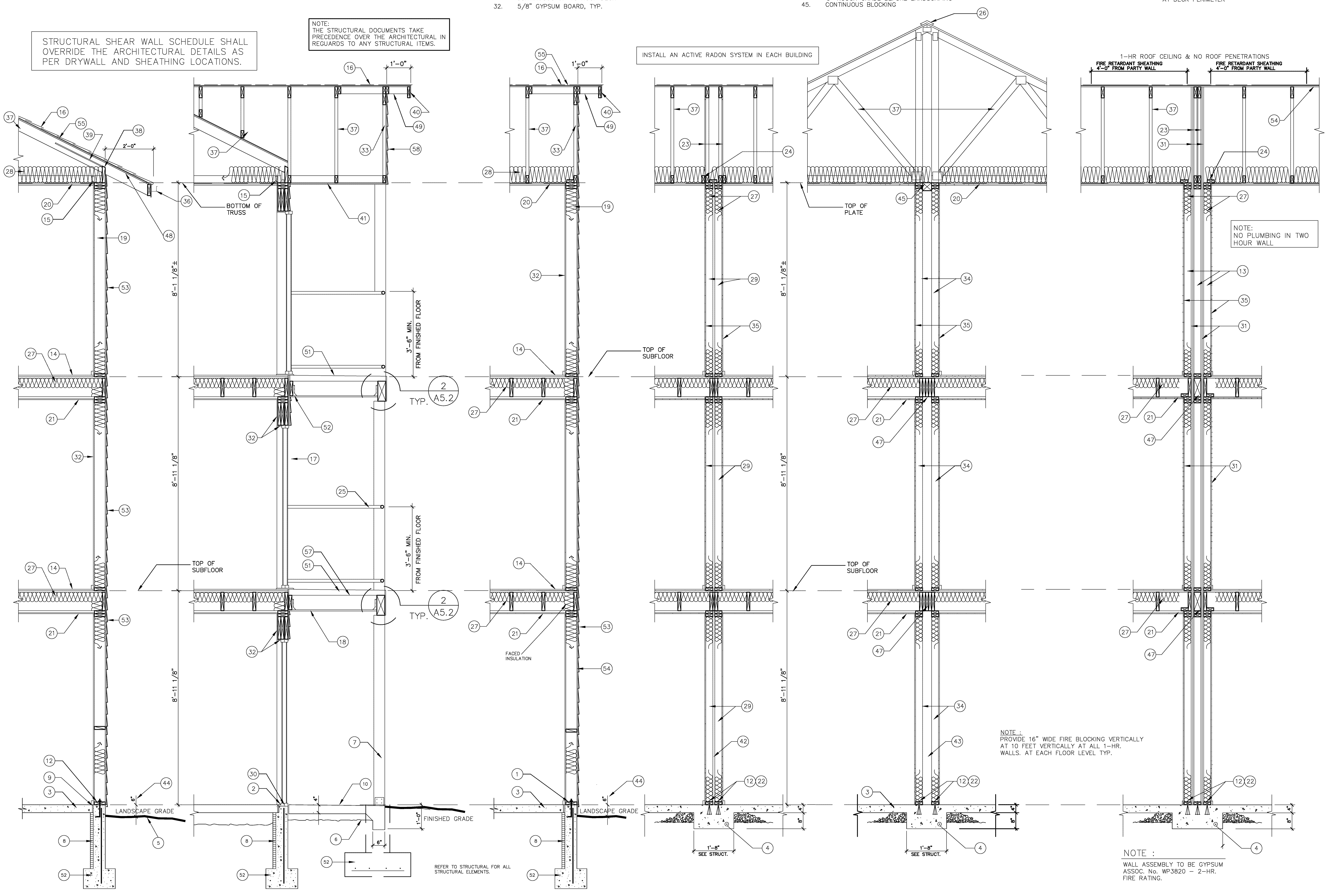
KEY NOTES :

1. 2X6 TREATED PLATE W/ 5/8" DIA. X 10" A.B. @ 48" O.C.
2. 1/2" MAX. THRESHOLD HEIGHT – ALL GROUND FLOOR UNITS
3. 4" CONCRETE SLAB
4. (2) #4 BARS, CONTINUOUS. (RE: STRUCTURAL)
5. FINISH GRADE, SLOPE AWAY FROM BUILDING.
6. COMPACT EARTH TO 95%.
7. 6"X 6" POST – RE: STRUCTURAL
8. R–10 RIGID PERIMETER INSULATION, TO 24" BELOW SLAB
9. 1/2" R–3 EXTRUDED POLYSTYRENE THERMAL BREAK. TYP.
10. 4" CONCRETE SLAB ON COMPACTED SUBGRADE. SLOPE SLAB 1/8" PER FOOT AWAY FROM BUILDING.
11. NOT USED.
12. 2x PRESSURE TREATED SILL (W/ FIBERGLASS SILL).
13. 2X4 STUDS AT 16" O.C.
14. 3/4" GYPCRETE FLOOR TOPPING ON 3/4" T & G O.S.B. ON 2x10 JOISTS @ 16" O.C.
15. H2.5A SEISMIC CLIPS EACH TRUSS EACH END
16. ASPHALT SHINGLES OVER 15# FELT (USE 30# FELT AT ALL EAVES) ON 1/2" O.S.B. SHEATHING.
17. INSULATED PATIO DOOR (LOW–E & ARGON GAS)
18. 5/8" EXTERIOR GYPSUM BOARD AT BOTTOM OF DECK JOISTS, PAINTED
19. R–21 FACED BATT INSULATION W/ VAPOR BARRIER PAINT
20. 5/8" TYPE "X" GYPSUM BOARD OVER RESILIENT CHANNEL @ 12" O.C. ON BOTTOM CHORD OF ROOF TRUSS.
21. 5/8" TYPE "X" GYPSUM BOARD ON RESILIENT FURRING CHANNELS ON JOIST
22. SHOT PINS @ 48" O.C. (RE: STRUCTURAL)
23. 5/8" TYPE "X" GYPSUM BOARD ON SIDE OF STRUCTURAL GABLE TRUSS WITH VERTICALS @ 16" O.C. PROVIDED BY TRUSS SUPPLIER
24. CONTINUOUS 2x4 NAILER.
25. POWDER COATED GUARD RAIL W/ 42" MIN. HEIGHT A.F.F.
26. TYPICAL RIDGE VENT
27. 3–1/2" BATT INSULATION
28. BLOWN INSULATION (R–38).
29. 2x4 STUDS (2 ROWS) @ 16" O.C. (STAGGER STUDS) W/ 1" AIR SPACE BETWEEN ROWS. (@ PARTY WALL).
30. 3/4" BLOCKOUT IN TOP OF FOUNDATION WALL AT DOORS
31. (2) LAYERS 5/8" TYPE X GYPSUM BOARD CONTINUOUS UP TO ROOF DECK
32. 5/8" GYPSUM BOARD, TYP.
33. GABLE END TRUSS
34. 2x4 STUDS (2 ROWS) @ 16" O.C. (STAGGER STUDS) W/ 5" AIR SPACE BETWEEN ROWS. (@ PARTY WALL).
35. 5/8" TYPE "X" GYPSUM BOARD
36. RAIN GUTTERS TYPICAL AT FRONT AND BACK OF ALL BUILDINGS OVER 2x6 FIR/LARCH. TYP.
37. MANUFACTURED TRUSSES @ 24" O.C. W/ "SIMPSON" H1 TRUSS ANCHOR AT EACH END. CONTRACTOR TO PROVIDE AND INSTALL TRUSS BLOCKING AND BRACING PER TRUSS MANUFACTURERS DESIGN. 14" ENERGY HEEL MINIMUM. TYP. ALL TRUSSES.
38. SOLID BLOCKING BETWEEN ALL TRUSSES – HOLD DOWN 1–1/2" TO ALLOW FOR VENTILATION, W/INSULATION BAFFLE.
39. INSULATION BAFFLE AT "FRIEZE" VENTS, ALLOW 2" CLEAR ABOVE INSULATION FOR VENTILATION. TYP.
40. 7/16" x 6 LP FASCIA PRE–PRIMED AT GABLE END ONLY
41. VENTED SOFFIT MATERIAL. TYP.
42. 1" AIR SPACE
43. 5" AIR SPACE
44. 6" LANDSCAPE GRADE CLEARANCE FROM WOOD 9" ROUGH GRADE BEFORE LANDSCAPING
45. CONTINUOUS BLOCKING
46. CONTINUE 5/8" GYP. BD. TO ROOF DECK ON BACK SIDE OF TRUSS MEMBER.
47. SOLID BLOCKING AT ALL FLOORS, TYPICAL ALL BUILDINGS.
48. PAINTED
49. OPEN SOFFIT– PAINTED. IF CLOSED SOFFIT USE VENTED SOFFIT MATERIAL.
50. 2x4 STUDS.
51. 3–3/4" LIGHT WEIGHT CONCRETE TAPER TO 3"
52. REFER TO STRUCTURAL FOR FOOTING, FOUNDATION AND REINFORCING. TYP.
53. FIBER CEMENT SIDING OVER BUILDING WRAP PER MANUF. SPECS. TYP.
54. 1/2" OSB SHEATHING, NAIL PER STRUCTURAL.
55. SOLID FULLY ADHERED ICE–SHIELD LAYER TO 24" INSIDE INTERIOR WALL FACE OF EXTERIOR WALLS, TYPICAL ALL BUILDINGS.
56. 10" FIBER CEMENT BELLY BAND
57. 60 MIL FULLY ADHERED MEMBRANE 12" UP SHEATHING AT DECK PERIMETER

STRUCTURAL SHEAR WALL SCHEDULE SHALL OVERRIDE THE ARCHITECTURAL DETAILS AS PER DRYWALL AND SHEATHING LOCATIONS.

NOTE:
THE STRUCTURAL DOCUMENTS TAKE PRECEDENCE OVER THE ARCHITECTURAL IN REGUARDS TO ANY STRUCTURAL ITEMS.

INSTALL AN ACTIVE RADON SYSTEM IN EACH BUILDING



1 WALL SECTION 1/2" = 1'–0"

2 WALL SECTION 1/2" = 1'–0"

3 WALL SECTION 1/2" = 1'–0"

4 WALL SECTION 1-HR 1/2" = 1'–0"

5 WALL SECTION 1/2" = 1'–0"

6 WALL SECTION 2-HR BUILDING 'E' & 'F' 1/2" = 1'–0"

CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS BEFORE ORDERING MATERIALS OR BEGINNING WORK. REPORT ALL INCONSISTENCIES TO ARCHITECT PRIOR TO PROCEEDING WITH WORK. TYP.

REVISIONS

PROPOSED 24 UNIT BUILDING FOR:
LEGACY VILLAS
COUNRTY VISTA ROAD, LIBERTY LAKE, WA

WYATT ARCHITECTS AND ASSOCIATES
Project Manager: Lee J. Schwartzenburg
PO Box 141713
Spokane Valley, WA 99214
Phone 509-928-9850
lee@wyattarchitects.com

SHEET TITLE: WALL SECTIONS
DRAWN BY: LJS
PROJECT: 15:26
DATE: 6/21/2016
SHEET NO. A5.1

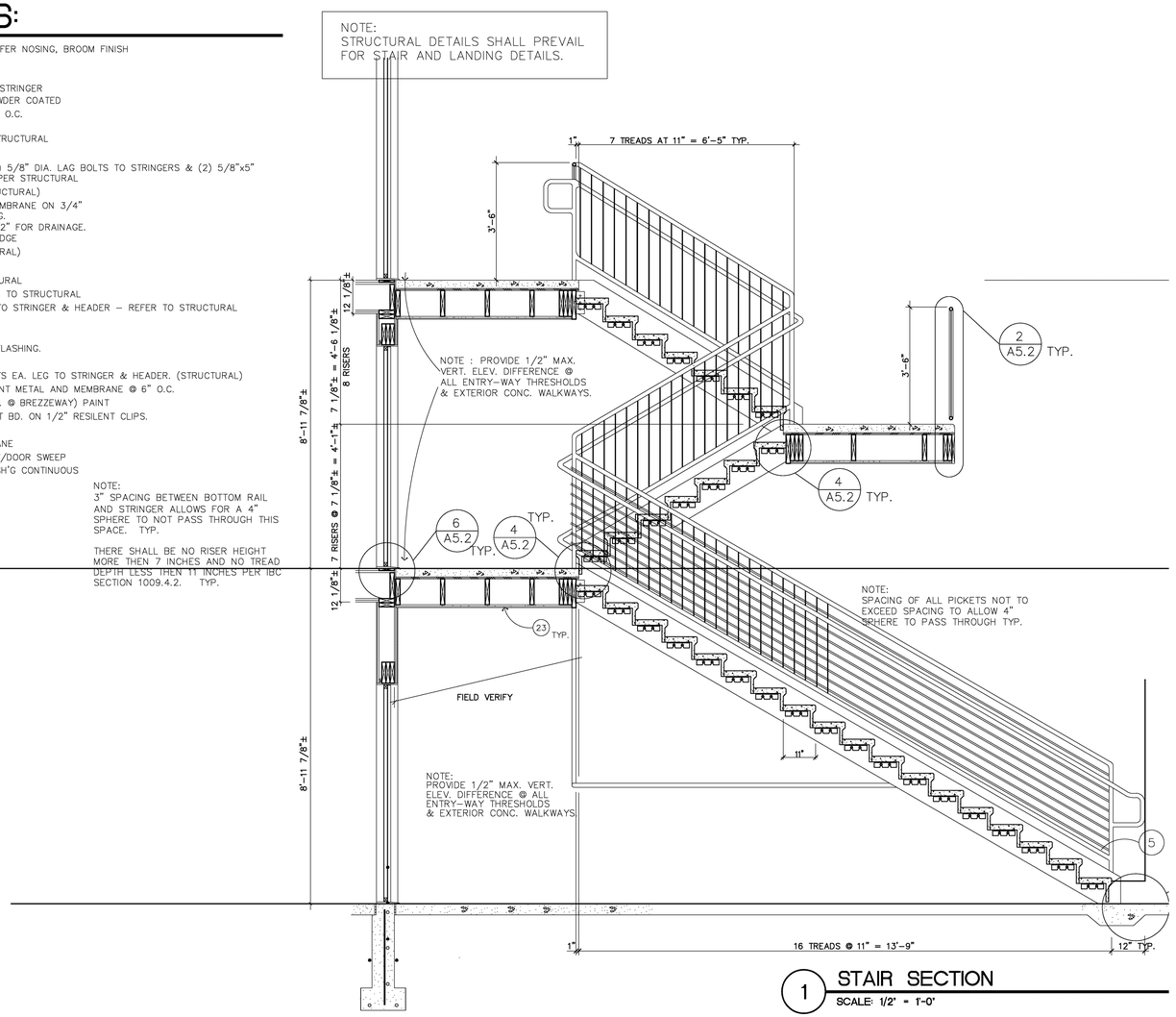
KEY NOTES:

1. PRECAST STAIR TREAD, CHAMFER NOSING, BROOM FINISH
2. STAIR STRINGER
3. ANGLE TREAD CLIP, BOLT TO STRINGER
4. 1–1/2" METAL PIPE RAIL, POWDER COATED
5. 1/2" SQ. STEEL TUBES AT 4" O.C. POWDER COATED
6. 1–1/2" METAL ANGLE. RE: STRUCTURAL
7. REFER TO STRUCTURAL
8. 3x3x3/6x0'–6" ANGLE W/ (2) 5/8" DIA. LAG BOLTS TO STRINGERS & (2) 5/8"x5" EXPANSION BOLTS AT SLAB. PER STRUCTURAL
9. DECK JOISTS (REFER TO STRUCTURAL)
10. 3" CONCRETE ON 6O MIL MEMBRANE ON 3/4" EXTERIOIR GRADE T & G SHTG. SLOPE CONCRETE 3" TO 2 1/2" FOR DRAINAGE.
11. METAL FLASHING WITH DRIP EDGE
12. LEDGER (REFER TO STRUCTURAL)
13. PRE–PRIMED RIM BOARD
14. HEADER – REFER TO STRUCTURAL
15. (3) 2x10 HEADERS –– REFER TO STRUCTURAL
16. 6" ANGLE BOLTED EA. LEG TO STRINGER & HEADER – REFER TO STRUCTURAL
17. 8" VINYL SIDING
18. N/A
19. 24 GAGE PRE–FINISHED "Z" FLASHING.
20. THRESHOLD SET IN SEALANT.
21. 3" ANGLE W/ 5/8" DIA. BOLTS EA. LEG TO STRINGER & HEADER. (STRUCTURAL)
22. 1/8" WASHER – BETWEEN BENT METAL AND MEMBRANE @ 6" O.C.
23. PRE–PRIMED SOFFIT BD. (TYP. @ BREZZEWAY) PAINT
24. 1 LAYER 5/8" GYPSUM SOFFIT BD. ON 1/2" RESILENT CLIPS.
25. 1 LAYER 1/2" GYP. BD.
26. 6O MIL. WATERPROOF MEMBRANE
27. ADJUSTABLE DOOR BOTTOM W/DOOR SWEEP
28. 1 1/2"x 1 1/2" CORNER FLASH'G CONTINUOUS
29. MAX. 1/2" BEVEL, TYP.

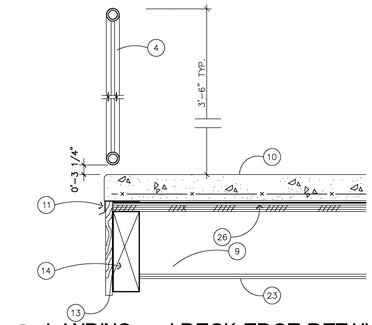
NOTE:
3" SPACING BETWEEN BOTTOM RAIL AND STRINGER ALLOWS FOR A 4" SPHERE TO NOT PASS THROUGH THIS SPACE. TYP.

THERE SHALL BE NO RISER HEIGHT MORE THEN 7 INCHES AND NO TREAD DEPTH LESS THEN 11 INCHES PER IBC SECTION 1009.4.2. TYP.

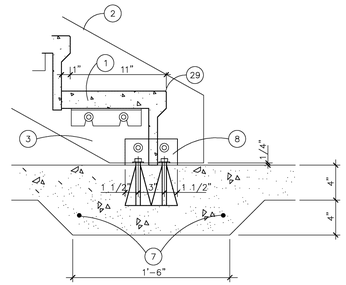
NOTE:
STRUCTURAL DETAILS SHALL PREVAIL FOR STAIR AND LANDING DETAILS.



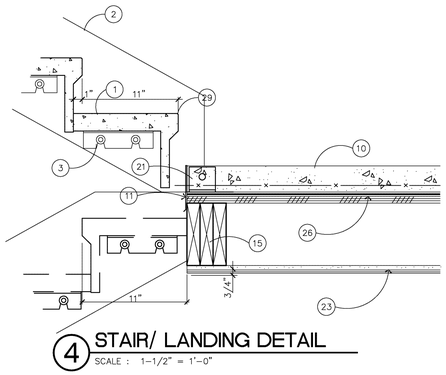
1 STAIR SECTION
SCALE: 1/2" = 1'-0"



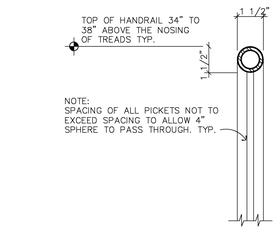
2 LANDING and DECK EDGE DETAIL
SCALE : 1–1/2" = 1'–0"



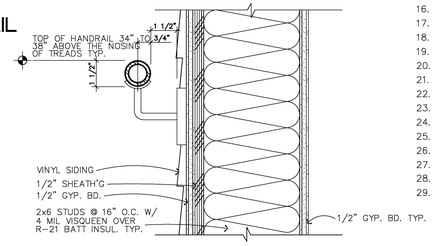
3 STAIR DETAIL
SCALE : 1–1/2" = 1'–0"



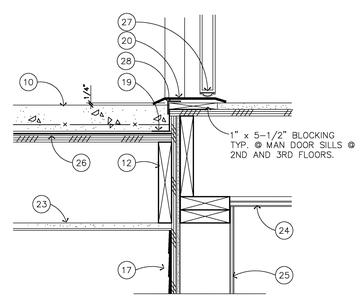
4 STAIR/ LANDING DETAIL
SCALE : 1–1/2" = 1'–0"



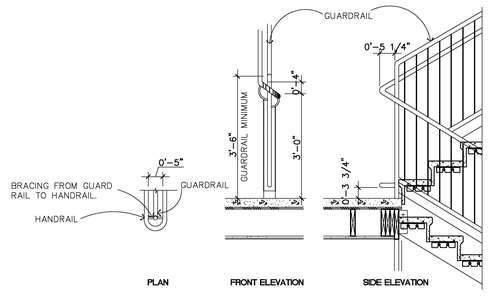
11 GUARDRAIL @ STAIR
SCALE : 3" = 1'–0"



10 METAL HANDRAIL @ VINYL SIDING
SCALE : 3" = 1'–0"



6 LANDING DETAIL
SCALE : 1–1/2" = 1'–0"



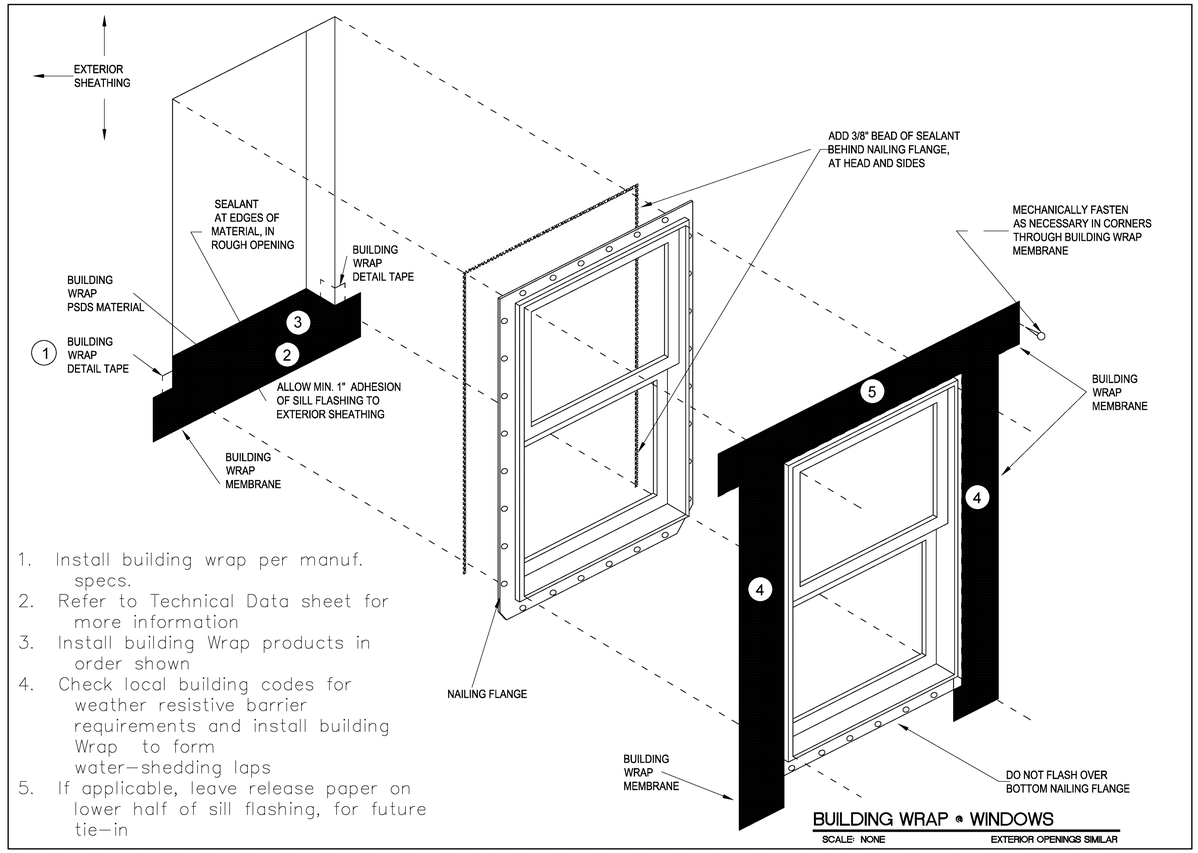
RAIL ELEVATION 5
SCALE: 1/2" = 1'-0"

REVISIONS

PROPOSED 24 UNIT BUILDING FOR:
LEGACY VILLAS
COUNTRY VISTA ROAD, LIBERTY LAKE, WA

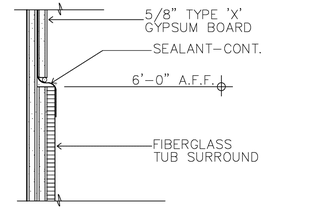
WYATT ARCHITECTS AND ASSOCIATES
Project Manager:
Lee Schaffenburg
PO Box 141713
Spokane WA 99214
Phone 509 928 1900
lee@wyattarchitects.com

SHEET TITLE:	STAIR DETAILS
DRAWN BY:	LJS
PROJECT:	15:26
DATE:	6/21/2016
SHEET NO.	A5.2



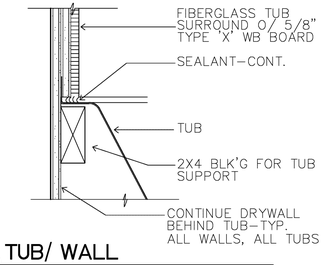
BUILDING WRAP @ WINDOWS

SCALE: NONE EXTERIOR OPENINGS SIMILAR



C TUB /SHOWER SURROUND

SCALE : 3" = 1'-0"



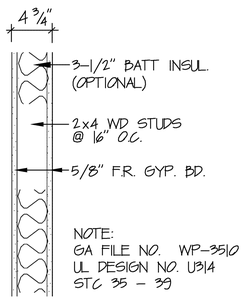
B TUB/ WALL

SCALE : 3" = 1'-0"

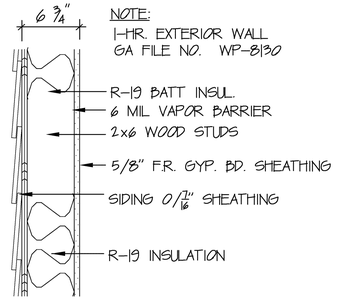
WALL TYPES

NOTE: COORDINATE ALL WALL CONSTRUCTION W/ STRUCTURAL SHEAR WALL SHEATHING SCHEDULE.

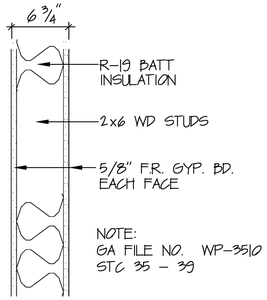
NOTE: ALL GYPSUM BOARD AND SOUND BOARD EDGES SHALL BE ON A SUPPORT.



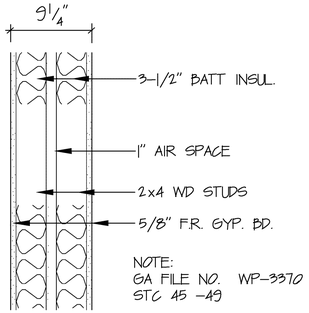
W-01 INTERIOR WALL



W-02 EXTERIOR WALL



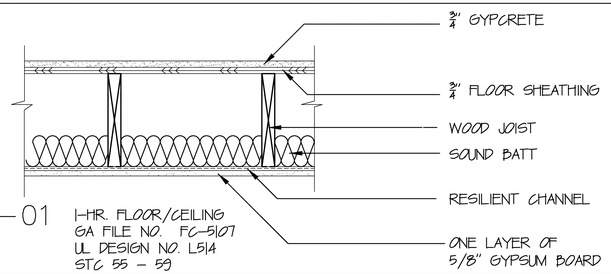
W-03 1-HR CORRIDOR WALL



W-04 1-HR. PARTY WALL

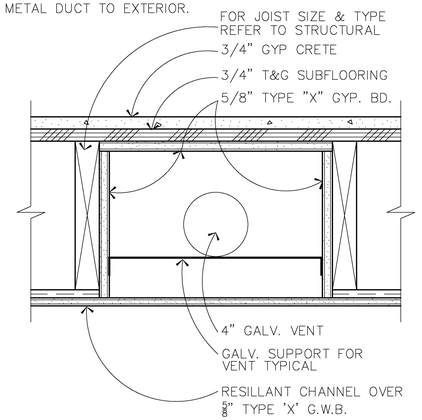
NOTE: TUB & SURROUND SHALL BE INSTALLED FOLLOWING THE GYP. BD.— GYP. BD. SHALL BE CONTINUOUS FROM CEILING TO FLOOR. TYP.

FLOOR TYPES



FC-01 1-HR. FLOOR/CEILING
GA FILE NO. FC-5107
UL DESIGN NO. L514
STC 55 - 59

TO ELIMINATE GYPSUM BORAD BETWEEN JOISTS, BOX IN FAN ON ALL SIDES WITH GYPSUM BOARD. CUT A HOLE IN GYPSUM BOARD TO ALLOW FOR A 26 GAGE METAL DUCT TO EXTERIOR.



A TYPICAL PENETRATION @ 1-HR FLOOR

SCALE : 3" = 1'-0"

REVISIONS

PROPOSED 24 UNIT BUILDING FOR:

LEGACY VILLAS

COUNRTY VISTA ROAD, LIBERTY LAKE, WA

WYATT ARCHITECTS AND ASSOCIATES

Project Manager:
Lee Schwarzenburg
North 905 Wall
Spokane Valley, WA 99214
Phone 509-928-9560
leeroywatt@comcast.com

SHEET TITLE: DETAILS

DRAWN BY: LJS

PROJECT: 15:26

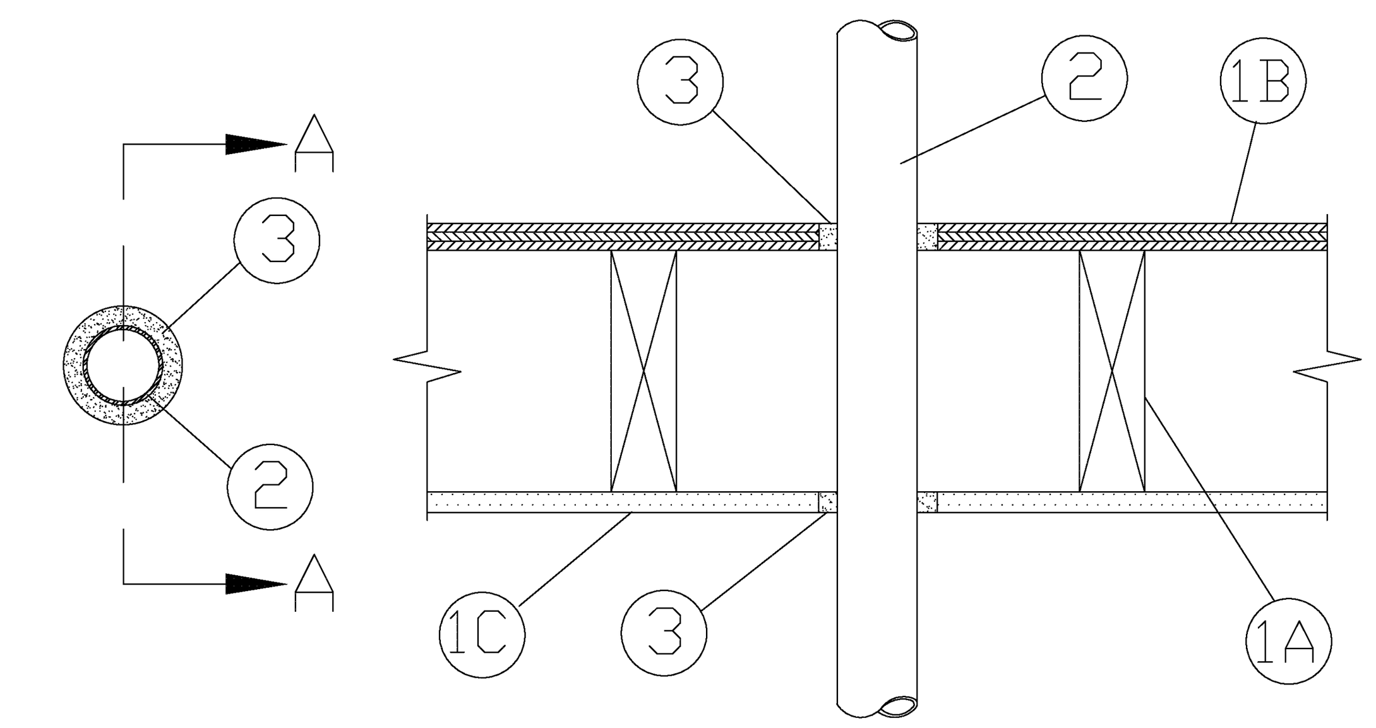
DATE: 6/21/2016

SHEET NO. A5.3

PENETRATION NOTES:
IBC 714.3.2 Membrane penetrations.
Membrane penetrations shall comply with Section 714.3.1. Where walls or partitions are required to have a fire–resistance rating, recessed fixtures shall be installed such that the required fire–resistance will not be reduced.

Exceptions:
1. Membrane penetrations of maximum 2–hour fire–resistance–rated walls and partitions by steel electrical boxes that do not exceed 16 square inches (0.0 103 m2) in area, provided the aggregate area of the openings through the membrane does not exceed 100 square inches (0.0645 m2) in any 100 square feet (9.29 m2) of wall area. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm). Such boxes on opposite sides of the wall or partition shall be separated by one of the following:
1.1. By a horizontal distance of not less than 24 inches (610 mm) where the wall or partition is constructed with individual noncommunicating stud cavities;
1.2. By a horizontal distance of not less than the depth of the wall cavity where the wall cavity is filled with cellulose loose–fill, rockwool or slag mineral wool insulation;
1.3. By solid fireblocking in accordance with Section 718.2.1;
1.4. By protecting both outlet boxes with listed putty pads; or
1.5. By other listed materials and methods.
2. Membrane penetrations by listed electrical boxes of any material, provided such boxes have been tested for use in fire–resistance–rated assemblies and are installed in accordance with the instructions included in the listing. The annular space between the wall membrane and the box shall not exceed 1/8 inch (3.1 mm) unless listed otherwise. Such boxes on opposite sides of the wall or partition shall be separated by one of the following:
2.1. By the horizontal distance specified in the listing of the electrical boxes;
2.2. By solid fireblocking in accordance with Section 718.2.1;
2.3. By protecting both boxes with listed putty pads; or
2.4. By other listed materials and methods.

System No. F-C-2039
May 18, 2005
F Rating - 1 Hr
T Ratings - 0 & 1 Hr (See Item 2)



SECTION A-A

1. Floor Assembly – The 1 hr fire rated wood truss or combination wood and steel truss Floor–Ceiling assembly shall be constructed of the materials and in the manner described in the individual L500 Series Design in the UL Fire Resistance Directory, as summarized below:

A. Joists – Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and ends firestopped.
B. Flooring System – Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor–Ceiling Design. Diameter of opening shall be 5/8 in. (16 mm) larger than the outside diam of nonmetallic pipe or conduit (Item 2).
C. Gypsum Board* – Nom a 4 ft (122 cm) wide by 5/8 in. (16 mm) thick, screw–attached to furring channels. Diameter of opening shall be 5/8 in. (16 mm) larger than the outside diam of nonmetallic pipe or conduit (Item 2).

1.1 Chase Wall (Optional, not shown) – The through penetrants (Item 2) may be routed through a 1 hr fire–rated single, double or staggered wood stud/gypsum wallboard chase wall constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. Studs – Nom 2 in. by 6 in. (51 mm by 152 mm) or double nom 2 in. by 4 in. (51 mm by 102 mm) lumber studs.
B. Sole Plate – Nom 2 in. by 6 in. (51 mm by 152 mm) or parallel 2 in. by 4 in. (51 mm by 102 mm) lumber plates, tightly butted.
C. Top Plate – The double top plate shall consist of two nom 2 in. by 6 in. (51 mm by 152 mm) or two sets of parallel 2 in. by 4 in. (51 mm by 102 mm) lumber plates, tightly butted. Diameter of opening shall be 5/8 in. (16 mm) larger than outside diam of nonmetallic pipe or conduit.
D. Gypsum Board* – Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.

2. Through Penetrants – One nonmetallic pipe, tubing or conduit to be installed concentrically or eccentrically within the firestop system. Annular space between pipe, tubing or conduit and edge of opening to be min 0 in. (point contact) and max 5/8 in. (0 mm to max 16 mm). Pipe, tubing or conduit to be rigidly supported on both sides of floor–ceiling assembly. The following types and sizes of nonmetallic pipes, tubing or conduit may be used:

A. Polyvinyl Chloride (PVC) Pipe – Nom 1–1/2 in. (38 mm) diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
B. Rigid Nonmetallic Conduit++ – Nom 1–1/2 in. (38 mm) diam (or smaller) Schedule 40 solid core PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA No. 70).
C. Chlorinated Polyvinyl Chloride (CPVC) Pipe – Nom 1–1/2 in. (38 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
D. Cellular Core Polyvinyl Chloride (ccPVC) Pipe – Nom 1–1/2 in. (38 mm) diam (or smaller) Schedule 40 cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
E. Acrylonitrile Butadiene Styrene (ABS) Pipe – Nom 1–1/2 in. (38 mm) diam (or smaller) Schedule 40 solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
F. Cellular Core Acrylonitrile Butadiene Styrene (ccABS) Pipe – Nom 1–1/2 in. (38 mm) diam (or smaller) Schedule 40 cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
G. Crosslink Polythylene (PGX) Tube – Nom 1 in. (25 mm) diam (or smaller) SDR 9 PEX tube for use in closed (process or supply) piping system.
H. Electrical Nonmetallic (ENT) Tubing+ – Nom 1–1/4 in. (32 mm) diam (or smaller) corrugated wall electrical nonmetallic tubing constructed of polyvinyl chloride. ENT to be installed as a complete system with all terminations in junction boxes, outlet boxes or other approved enclosures as specified in the National Electrical Code.

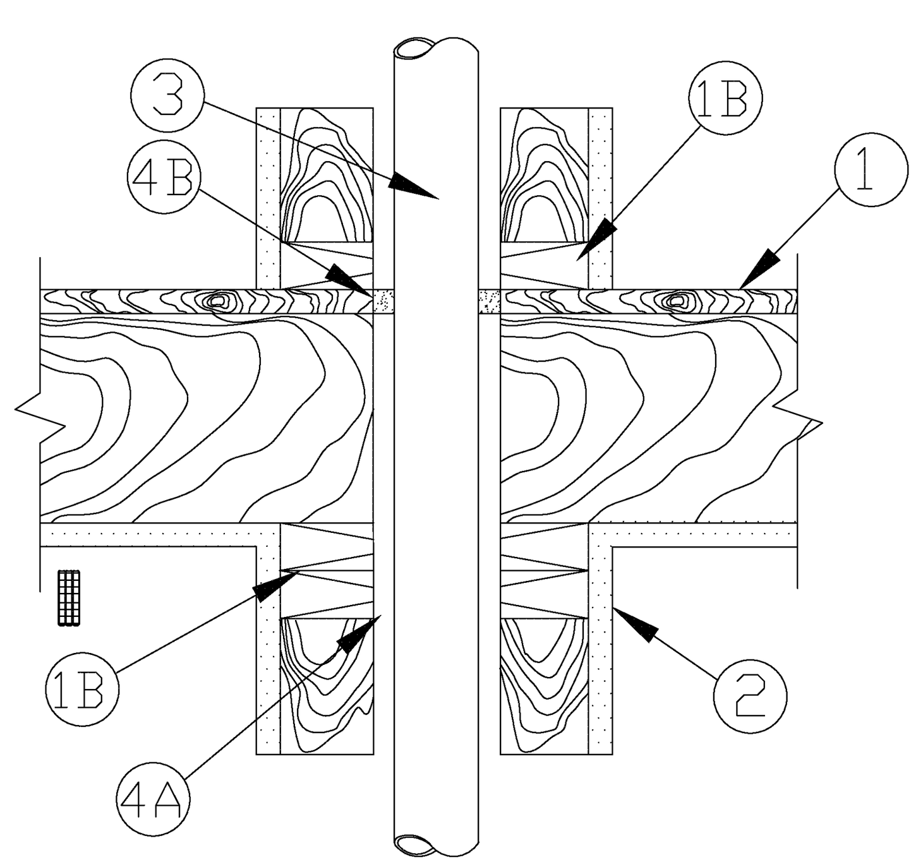
The hourly T Rating is 1 Hr when pipes/conduits A, B, C , G or H are used.
The hourly T Rating is 0 Hr when pipes D, E or F are used.

3. Fill,Void or Cavity Materials* - Caulk, Sealant or Putty – Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with top surface of floor or sole plate. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of ceiling or top plate. An additional min 1/4 in. (6 mm) crown of fill material applied to perimeter of penetrant at its egress from the top of flooring and underside of ceiling or from top of sole plate and underside of top plate.

3M COMPANY – CP 25WB+, IC 15WB+ caulk, FB–3000 WT sealant or MP+ Stix putty
(Note: CP 25WB+ not suitable for use with CPVC pipes.)

*Bearing the UL Classification Marking
++Bearing the UL Listing Mark

System No. F-C-2116
May 20, 2005
F Rating - 1 Hr
T Rating - 3/4 Hr



1. Floor Assembly – The 1 hr fire rated wood truss or combination wood and steel truss Floor–Ceiling assembly shall be constructed of the materials and in the manner described in the individual L500 Series Design in the UL Fire Resistance Directory, as summarized below:

A. Flooring System – Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor–Ceiling Design. Diam of opening shall be 1 in. (25 mm) larger than the nom diam of through penetrant (Item 3).
B. Joists – Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and ends firestopped.
C. **Gypsum Board*** – Nom 4 ft (122 cm) wide by 5/8 in. (16 mm) thick as specified in the individual Floor–Ceiling Design. Wallboard nailed to wood joists.

2. Chase Wall – The through penetrant (Item No. 3) shall be routed through a 1 hr fire rated single, double or staggered wood studs/gypsum wallboard chase wall constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. Studs – Nom 2 by 6 in. (51 mm by 152 mm) or double nom 2 by 4 in. (51 mm by 102 mm) lumber studs.
B. Sole Plate – Nom 2 by 6 in. (51 mm by 152 mm) or parallel 2 by 4 in. (51 mm by 102 mm) lumber plates, tightly butted. Diam of opening shall be 1 in. (25 mm) larger than the nom diam of through penetrant (Item 3).
C. Top Plate – The double top plate shall consist of two nom 2 by 6 in. (51 mm by 152 mm) or two sets of parallel 2 by 4 in. (51 mm by 102 mm) lumber plates, tightly butted. Diam of opening shall be 1 in. (25 mm) larger than the nom diam of through penetrant (Item 3).
D. Gypsum Board* – Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.

3. Through Penetrants – One nonmetallic pipe or conduit to be centered within the firestop system. Pipe or conduit to be rigidly supported on both sides of floor–ceiling assembly. The following types and sizes of nonmetallic pipes may be used:

A. Polyvinyl Chloride (PVC) Pipe – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid core or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
B. Chlorinated Polyvinyl Chloride (CPVC) Pipe – Nom 3 in. (76 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
C. Acrylonitrile Butadiene Styrene (ABS) Pipe – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid core or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
D. Rigid Nonmetallic Conduit++ – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA No. 70).

4. Firestop System – The details of the firestop system shall be as follows:

A. Fill,Void or Cavity Materials* - Wrap Strip – Nom 1/4 in. (6 mm) thick intumescent elastomeric material faced on one side with aluminum foil, supplied in 2 in. (51 mm) wide strips. One layer of wrap strip tightly wrapped around penetrant (foil side exposed) and held in place with foil tape. Wrap strip recessed into opening such that bottom edge of wrap strip is flush with bottom of lower top plate.

3M COMPANY – FS–195+

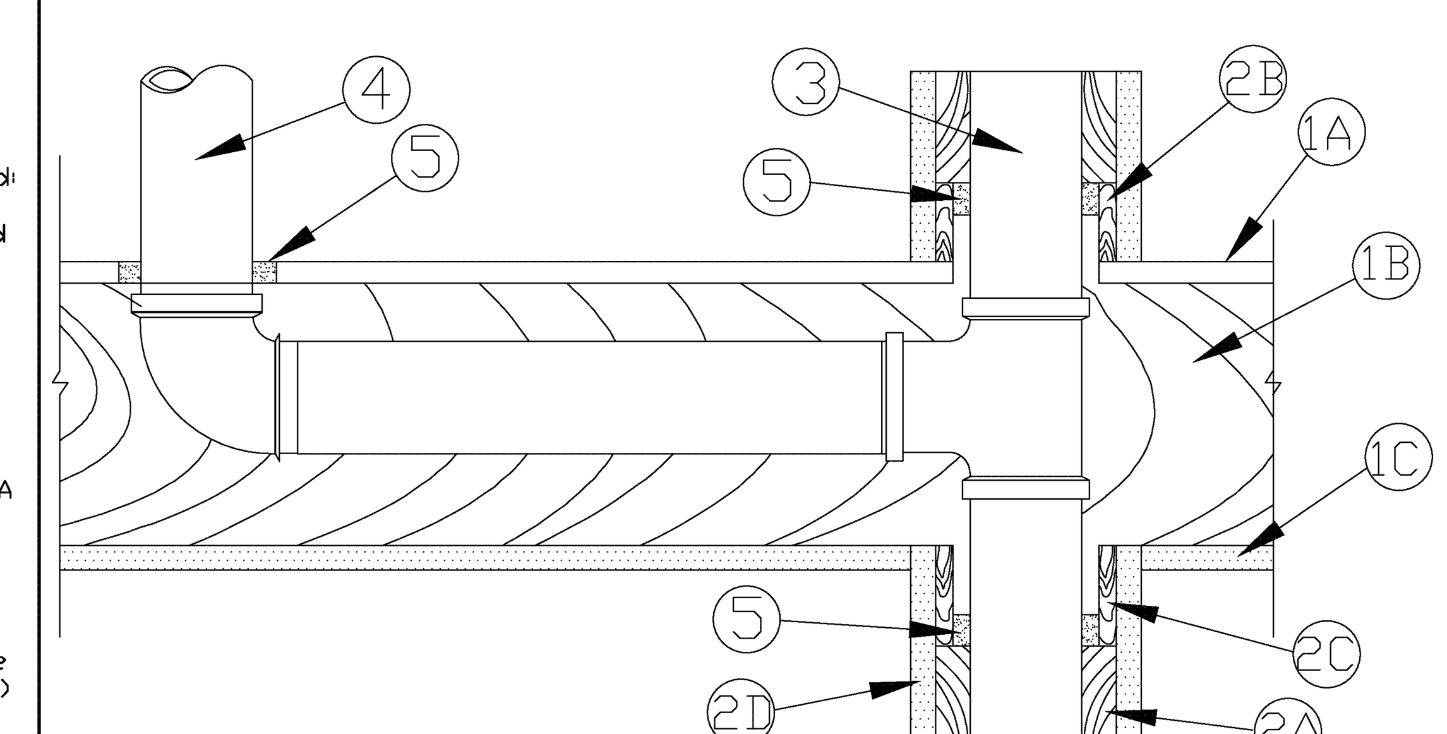
B. Fill,Void or Cavity Materials* - Caulk or Sealant – Min 1/2 in. (13 mm) thickness of caulk applied within the annulus, flush with top surface of floor or top surface of sole plate.

3M COMPANY – CP 25WB+ caulk or FB–3000 WT sealant
(Note: CP 25WB+ not suitable for use with CPVC pipes.)

C. Foil Tape – Min of one wrap of nom 4 in. (102 mm) wide, 3 mil thick aluminum tape wrapped around penetrant flush with bottom of lower top plate and proceeding downward.

++Bearing the UL Listing Mark
*Bearing the UL Classification Marking

System No. F-C-2134
May 20, 2005
F Rating - 1 Hr
T Rating - 3/4 Hr



1. Floor Assembly – The 1 hr fire rated wood truss or combination wood and steel truss Floor–Ceiling assembly shall be constructed of the materials and in the manner described in the individual L500 Series Design in the UL Fire Resistance Directory, as summarized below:

A. Flooring System – Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture* as specified in the individual Floor–Ceiling Design. Diam of opening shall be equal to or max 1 in. larger than the outside diam of nonmetallic pipe (Items 3 and 4).
B. Joists – Nom 10 in. deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and ends firestopped.
C. Gypsum Board* – Nom 4 ft wide by 5/8 in. (16 mm) thick, attached as described in the individual Floor–Ceiling Design.

2. Chase Wall – The through penetrant (Item No. 3) shall be routed through a 1 hr fire–rated single, double or staggered wood studs/gypsum wallboard chase wall constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. Studs – Nom 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
B. Sole Plate – Nom 2 (51 mm) by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted.
C. Top Plate – The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening shall be equal to or max 1 in. (25 mm) larger than the outside diam of nonmetallic pipe or conduit (Item 3).
D. Gypsum Board* – Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.

3. Through Penetrant – One nonmetallic pipe to be installed within the firestop system. Pipe to be rigidly supported on both sides of floor–ceiling assembly. The annular space between pipe and periphery of opening shall be min 0 in. (point contact) to max 1/2 in. (0 to max 13 mm).Pipe may be installed with continuous point contact. The following types and sizes of nonmetallic pipes may be used:

A. Polyvinyl Chloride (PVC) Pipe – Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
B. Cellular Core Polyvinyl Chloride (ccPVC) Pipe – Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
C. Acrylonitrile Butadiene Styrene (ABS) Pipe – Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
D. Cellular Core Acrylonitrile Butadiene Styrene (ccABS) Pipe – Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

4. Branch Piping – (Optional) One nonmetallic pipe to be connected to through penetrant (Item 3) and installed within opening in subfloor or wallboard plate. The annular space between pipe and periphery of opening shall be min 0 in. (point contact) to max 1/2 in. (0 to max 13 mm) Pipe may be installed with continuous point contact . The following types and sizes of nonmetallic pipes may be used:

A. Polyvinyl Chloride (PVC) Pipe – Nom 3 in. diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
B. Cellular Core Polyvinyl Chloride (ccPVC) Pipe – Nom 3 in. diam (or smaller) Schedule 40 cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
C. Acrylonitrile Butadiene Styrene (ABS) Pipe – Nom 3 in. diam (or smaller) Schedule 40 solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
D. Cellular Core Acrylonitrile Butadiene Styrene (ccABS) Pipe – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

5. Fill,Void or Cavity Materials* - Caulk or Sealant – Min 3/4 in. (19 mm) thickness of caulk applied within annular space around perimeter of through penetrant (Item 3), flush with top surface of floor or sole plate and flush with bottom surface of top plate. Min 3/4 in. thickness of caulk applied within annular space around perimeter of branch piping (Item 4), flush with top surface of floor. Min 1/2 in. diam bead applied at the pipe/floor interface and the pipe/wallboard or plate interface.

3M COMPANY – CP 25WB+ caulk, IC 15WB+ caulk, FD–150+ sealant or FB–3000 WT sealant

*Bearing the UL Classification Mark

REVISIONS

PROPOSED 24 UNIT BUILDING FOR:
LEGACY VILLAS
COUNRTY VISTA ROAD, LIBERTY LAKE, WA

WYATT ARCHITECTS AND ASSOCIATES
Project Manager:
Lee J. Schwatrzenburg
PO Box 141713
Spokane Valley, WA 99214
Phone: 509-928-1860
lee•wyattarchitects.com

SHEET TITLE:
DETAILS
DRAWN BY:
LJS
PROJECT:
15:26
DATE:
6/21/2016
SHEET NO.
A5.4

GENERAL REQUIREMENTS

Structural drawings shall be used in conjunction with Architectural, Mechanical, Plumbing, and Electrical drawings for bidding and construction purposes. Contractor shall verify all dimensions and conditions for compatibility before proceeding. Any discrepancies shall be brought to the attention of the Architect and the Engineer of Record.

The structural notes are intended to compliment the project specifications. Specific notes and details in the drawings shall govern over the general structural notes and typical details.

All work shall be done in accordance with OSHA requirements. Potential conflicts between these documents and OSHA requirements shall be brought to the attention of the structural engineer prior to proceeding with the work.

Contractor to refer to Architectural, Civil, Mechanical, Plumbing and Electrical drawings for locations and sizes of pipes, vents, ducts and other openings not shown on this plan. Sizes and locations of mechanical and other equipment that differs from those shown on the contract drawings shall be reported to the architect/engineer.

Contractor to refer to Architectural and Civil Engineering drawing to coordinate finished grade elevations, finished floor elevations and any slab depressions, slopes or other finishing requirements.

Contractor shall be responsible for erection stability and temporary shoring as required until the completion of the structure. The Structural Engineer is responsible for the strength and stability of the primary structure in its completed form.

Contractor initiated changes shall be in writing to the Architect/Engineer of Record for approval prior to fabrication and/or construction.

Drawings indicate general and typical details of construction and may not reflect all details of the work. Where conditions are not specifically indicated but are of a similar character to details shown, similar details of construction shall be used, subject to the review and approval of the architect and structural engineer.

BASIS OF DESIGN

GOVERNING CODE: International Building Code, 2012 Edition

WIND DESIGN: Basic Wind Speed 110 MPH, Exposure C, Building Category II (lw = 1.0)

SEISMIC DESIGN:
Seismic Importance Factor, Ie = 1.0
Seismic Use Group = II
Site Class = C
Spectral Response Coefficient (Short Period) SDS = 0.274 g
Spectral Response Coefficient (1-Second Period) SD1 = 0.129g
Seismic Design Category B
Response Modification Factor: R = 6.5 (Light framed wood shear walls)
Seismic response coefficients(s), Cs = 0.0422 (Allowable Stress Design)

DESIGN LIVE LOADS:

Roof (Snow)	40 PSF
Roof (Construction Live)	20 PSF (Not concurrent with Snow)
Floor (Residential)	40 PSF
Floor (Corridor/Stairway)	100 PSF

DESIGN DEAD LOADS:

Roof	15 PSF
Floor (Residential)	25 PSF (Includes 1" Gpycrete topping)
Floor (Corridor/Stairway)	50 PSF (Includes 3" Concrete topping)

FOUNDATIONS:

DESIGN SOIL VALUES: 3000 PSF
FROST PROTECTION: 24 Inch Minimum

GEOTECHNICAL REPORT:
Recommendations contained in "Geotechnical Evaluation, Proposed Apartments Parcel NO. 55156.9189 Liberty Lake, WA" by Inland Pacific Engineering Company, Project #15-189 Dated October 29, 2015 was used for this design. Contractor shall review the Geotechnical Report and shall follow the recommendations specified therein regarding subgrade preparation and water mitigation.

GEOTECHNICAL INSPECTION:
The Geotechnical Engineer shall inspect all prepared soil bearing surfaces prior to placement of concrete and reinforcing steel and provide a letter to the owner stating the soils are adequate to support the design soil values. Contractor to follow the geotechnical engineer's recommendations for Steep Slope Best Management Practices where applicable.

CAST-IN-PLACE CONCRETE

All concrete shall be stone aggregate concrete having a unit weight of approximately 150 pcf. Concrete submittals shall conform to IBC Section 1905. Contractor shall submit concrete mix design and testing reports for review by the engineer prior to placement of any concrete. Mixing and Placing of all concrete shall be in accordance with ACI 301, ACI 318 and the IBC.

MIX DESIGN REQUIREMENTS

	Specified 28-Day Compressive Strength	Maximum Aggregate Size	Max. W/C Ratio	Air Content (%)
Foundations	3000 psi**	1 Inch	--	--
Foundation Stem Walls	3000 psi**	3/4 Inch	--	5.0
Interior SOG	2500 psi	3/4 Inch	0.60	--
Exterior SOG	3000 psi**	3/4 Inch	0.50	6.0

** Concrete Designed for 2500 psi. No Special Inspection Required.

W/C Ratio: Water-cementitious material ratios shall be based on the total weight of cementitious materials. Ratios not shown in the table above are controlled by strength requirements.

Cementitious Content: The use of fly ash, other pozzolans, silica fume, or slag shall conform to ACI standards. The amount of fly ash shall be a maximum of 20% of the total cementitious content unless reviewed and approved otherwise.

Air Content: Conform to ACI Standards. Horizontal exterior surfaces in contact with the soil require entrained air in accordance to ACI Table 4.2.2.4 for Severe Exposure. Tolerance is ±1.5%. Air content shall be measured at point of placement.

Slump: Conform to ACI Standards. Slump shall be determined at point of placement, a maximum of 4" unless approved otherwise.

CONCRETE REINFORCEMENT

All reinforcement shall conform to ASTM A-615 Grade 60 and made from new billets. Reinforcement to be welded shall conform to ASTM A-706 Grade 60 and be used only on the approval of the engineer of record. Welded Wire Fabric (WWF) shall be in accordance to ASTM A-185. Wire Mesh shall lap at least one grid at ends and edges.

Detail reinforcing steel in accordance with the most current edition of "ACI Manual of Standard Practice of Detailing Reinforced Concrete Structures."

Lap continuous reinforcement as indicated in the structural details for this project. Mechanical splices may be used when approved by the engineer of record.

Anchor bolts, dowels and other embedded items to be securely tied in place prior on the placement of concrete.

The following minimum cover shall be provided for reinforcement unless noted otherwise on drawings:

Concrete cast against and permanently exposed to earth	
All Reinforcement	3" Earth Face
Concrete exposed to earth or weather (cast in formwork)	
#3, #4 and #5 Bars	1-1/2"
#6 - #18 Bars	2"
Concrete not exposed to weather or in contact with ground	
Slabs, Walls and Joists #11 or smaller	3/4"
Beams and Columns	1-1/2"

Field Bending shall conform to ACI 301 "Field Bending or Straightening". Bar sizes #3 to #5 may be field bent cold once. Other sizes will require review of the method through the engineer of record. Do not twist bars.

STRUCTURAL STEEL

Design, fabrication and erection of structural steel shall conform to the specifications and standards of the American Institute of Steel Construction (AISC), as contained in the latest edition of "AISC Manual of Steel Construction".

All structural steel shall be erected plumb and true to line. Temporary bracing shall be installed and shall be left in place until other means are provided to adequately brace the structure.

STRUCTURAL STEEL GRADES

Wide Flange and WT Sections	ASTM A992, 50 ksi
Square or Rectangular HSS	ASTM A500, Grade B, 46 ksi
Plates, Angles, Channels	ASTM A36
High Strength Bolts	ASTM A325
Nuts	ASTM A536
Washers (Flat/Beveled)	ASTM F436
Anchor Bolts/Rods	ASTM F1554, Grade 36
Mild Threaded Rods	ASTM A36

Except as otherwise noted, all bolts shall be high strength bolts.

All connections not shown shall conform to the AISC Manual of Steel Construction and shall be submitted on shop drawings for review by the engineer of record prior to fabrication.

All fabrication shall be performed by a licensed fabricator. The fabricator shall maintain detailed fabrication and erection quality control procedures per IBC Section 1704.2 that provides a basis for inspection control and workmanship and insures the work is performed in accordance with Code of Standard Practice, the AISC Specification, and the Contact Documents. Fabricators certified by the AISC Quality Certification Program with an Sbd level of certification are deemed to comply with this provision.

WELDING

Welding shall conform to AWS D1.1 "Code for Welding in Building Construction" and the AISC "Specifications for the Design, Fabrication and Erection of Structural Steel Buildings".

All welders shall have evidence of passing the AWS Standard Qualification Tests and be certified for the work they are performing.

Welding of Structural Steel shall be performed per AWS D1.1 using E70XX electrodes unless noted otherwise.

Field welds have been indicated where they are expected to occur. The contractor shall determine the actual field welding necessary to complete the project.

WOOD

Materials:

Dimensional Lumber and Timbers (Solid Sawn):
- Visually graded lumber shall be Douglas Fir-Larch #2 or better.
- Visually graded timbers shall be Douglas Fir-Larch #1 or better.
- Finger-jointed studs are acceptable only at interior walls.
- The moisture content of all lumber shall be 19% or less at the time of construction.

Structural Glued Laminated Timbers (GLB):
- Structural Glulam timbers shall be manufactured and graded as required in ASTM D3737 and ANSI A190.1 and be stamped with an AITC quality mark or APA-EWS trademark.
- Glulam beams shall be Douglas Fir Combination 24F-V4 1.8E for simple span beams and 24F-V8 1.8E for continuous spans and cantilevers. Other glulam combinations with equivalent design properties may be used with written approval from the engineer of record.
- Stair stringers shall be Alaskan Cedar Combination 20F-V12 1.5E.
- Glulam columns shall be Douglas Fir Combination 2 1.8E.
- Glulam members shall be Framing or Industrial appearance.
- Camber: All stock glulam beams shall be cambered with a 3500' radius unless noted otherwise on plan. Stock beams with zero camber are acceptable where available.

Wood Structural Panel Sheathing:
- Wood structural panels shall conform to the requirements for its type in US Dept. of Commerce PS1 or PS2. The panels must be identified by the trademarks of the approving testing and inspection agency.
- Wood sheathing includes all veneer plywood and oriented strand board and shall be APA rated Exposure 1, unless noted otherwise.
- Wood sheathing shall have the following minimum thicknesses and span ratings, unless noted otherwise:

Wall	15/32" (32/16)	Plywood
Wall	7/16" (24/16)	Oriented Strand Board
Roof	7/16" (32/16)	Oriented Strand Board
Roof	19/32" (40/20)	
Floor	23/32" (48/24)	Tongue and Groove

- Install roof and floor panels with long dimension across two or more supports, unless noted otherwise. End joints shall occur at supports.
- Nails or other approved fasteners attaching sheathing to structure shall be driven with the head or crown flush with the surface of the sheathing. Do not overdrive fasteners.

Nails:
- All nails shall conform to the tolerances specified in ASTM F1667.
- All nails shall be common nails with the following specifications. Alternate nails may be used upon approval of the engineer of record:
-

Nail	Shank Diameter	Min. Penetration
6d	0.113"	1-1/4"
8d	0.131"	1-1/2"
10d	0.148"	1-5/8"
12d	0.148"	1-5/8"
16d	0.162"	1-3/4"

- Refer to the "Fastening Schedule" included with this plan set for general framing and carpentry connections.
- All connections in contact with pressure treated or fire treated wood shall be hot-dipped galvanized or stainless steel.

Bolts/Lag Screws:
- Anchor Bolts shall be Grade 36 conforming to ASTM F1554. All anchor bolts shall have a washer between the sill plate and nut.
- Connection Bolts shall be ASTM A307 Grade A/C
- Bolt holes shall be oversized no greater than 1/16" larger than the specified bolt diameter. Holes between main and side members shall be accurately aligned such the bolt is not forcibly driven.
- Provide a minimum standard cut washer or metal plate between the wood and bolt head and wood and nut.
- All connections in contact with pressure treated or fire treated wood shall be hot-dipped galvanized or stainless steel.

Connection Hardware:
- All connection hardware shall be supplied by Simpson Strong-Tie, Inc. Install hardware per the manufacturer's guidelines. Connection hardware of equal design properties by other manufacturers may be used with written approval from the engineer of record. All connections in contact with pressure treated or fire treated wood shall be hot-dipped galvanized or stainless steel.

Pre-Fabricated Wood Trusses:
- Pre-Fabricated metal plate wood trusses shall be designed by a Professional Engineer registered in the same state as the project location. Design, handling, erection and permanent bracing shall be in accordance to ANSI/TPI-1. All steel gusset plate connectors shall be galvanized and ICBO certified.
- Roof Truss Design Criteria

Top Chord Dead Load:	7.0 psf
Bottom Chord Dead Load:	8.0 psf
Top Chord Live Load (Snow):	**See Design Live Loads
Top Chord Live Load (Const):	20.0 psf (Non-concurrent with Snow)

** Loads caused by drifting, unbalanced or sliding snow are not accounted for in the uniform loads above.

- Designs shall include a top chord over-framing load of 8.0 psf at all overbuild locations. The structural, architectural and mechanical plans may show additional loading information. Loads shown on these other sheets shall be incorporate into the design and engineering of the trusses. Additional trusses may be required.
- The truss manufacturer shall verify all truss dimensions.
- The truss manufacturer shall design and supply all truss-to-truss connections.
- Truss deflection shall be limited to L/240 for total load and L/360 for live load.
- Shop Drawings: Complete calculations and shop drawings indicating all member forces, stresses, reactions, lumber grades, dimensions, truss-to-truss connections, pressed steel plates, shall be submitted to the engineer of record and local building official for review and approval prior to fabrication.
- The requirements for truss stability and erection shall comply with the Truss Plate Institute entitled "Commentary and Recommendations for Handling and Erecting Wood Trusses." The contractor shall have copies of these publications on site and be familiar with their contents. The contractor is responsible for temporary bracing and support of trusses during construction.

ABBREVIATIONS

∠	ANGLE	GA	GAGE	PSI	POUNDS PER SQUARE INCH
AB	ANCHOR BOLT	GALV	GALVANIZED	PSL	PARALLEL STRAND LUMBER
ADDL	ADDITIONAL	GL	GLUE LAMINATED BEAM	P-T	POST-TENSIONED
ALT	ALTERNATE	GWB	GYPSUM WALL BOARD	PT	PRESSURE TREATED
ARCH	ARCHITECTURAL	HDR	HEADER	R	RADIUS
B	BOTTOM	HF	HEM-FIR	RD	ROOF DRAIN
B/	BOTTOM OF	HGR	HANGER	REF	REFERENCE
BLDG	BUILDING	HD	HOLD-DOWN	REINF	REINFORCING
BLKG	BLOCKING	HORIZ	HORIZONTAL	REQD	REQUIRED
BP	BASE PLATE	HSS	HOLLOW STRUCTURAL SECTION	SCHED	SCHEDULE
BRG	BEARING	IBC	INTERNATIONAL BUILDING CODE	SHTHG	SHEATHING
BTWN	BETWEEN	ID	INSIDE DIAMETER	SIM	SIMILAR
℄	CENTERLINE	IE	INVERT ELEVATION	SOG	SLAB ON GRADE
C	CAMBER	IF	INSIDE FACE	SPEC	SPECIFICATION
CIP	CAST IN PLACE	INT	INTERIOR	SQ	SQUARE
CJ	CONSTRUCTION OR CONTROL JOINT	k	KIPS	SR	STUDRAIL
CJP	COMPLETE JOINT PENETRATION	KSF	KIPS PER SQUARE FOOT	STAGG	STAGGERED
CLR	CLEAR	LF	LINEAL FEET	STD	STANDARD
CMU	CONCRETE MASONRY UNIT	LL	LIVE LOAD	STIFF	STIFFENER
COL	COLUMN	LLH	LONG LEG HORIZONTAL	STL	STEEL
CONC	CONCRETE	LLV	LONG LEG VERTICAL	SWWJ	SOLID WEB WOOD JOIST (I-JOIST)
CONN	CONNECTION	LP	LOW POINT	SYM	SYMMETRICAL
CONST	CONSTRUCTION	LONGIT	LONGITUDINAL	T	TOP
CONT	CONTINUOUS	LSL	LAMINATED STRAND LUMBER	T/	TOP OF
CSINK	COUNTERSINK	LVL	LAMINATED VENEER LUMBER	T&B	TOP AND BOTTOM
CTRD	CENTERED	MAS	MASONRY	TC AX LD	TOP CHORD AXIAL LOAD
ø	DIAMETER	MAX	MAXIMUM	TCX	TOP CHORD EXTENSION
DB	DROP BEAM	MECH	MECHANICAL	TDS	TIE DOWN SYSTEM
DBA	DEFORMED BAR ANCHOR	MEZZ	MEZZANINE	T&G	TONGUE AND GROOVE
DBL	DOUBLE	MFR	MANUFACTURER	THKND	THICKENED
DF	DOUG-FIR LARCH	MIN	MINIMUM	THRD	THREADED
DIAG	DIAGONAL	MISC	MISCELLANEOUS	THRU	THROUGH
DIST	DISTRIBUTED	NIC	NOT IN CONTRACT	TRANSV	TRANSVERSE
DL	DEAD LOAD	NTS	NOT TO SCALE	TYP	TYPICAL
DN	DOWN	OC	ON CENTER	UNO	UNLESS NOTED OTHERWISE
DP	DEEP/DEPTH	OD	OUTSIDE DIAMETER	VERT	VERTICAL
DWG	DRAWING	OF	OUTSIDE FACE	W	WIDE
(E)	EXISTING	OPNG	OPENING	w/	WITH
EA	EACH	OPP	OPPOSITE	w/o	WITHOUT
EF	EACH FACE	OSB	ORIENTATED STRAND BOARD	WHS	WELDED HEADED STUD
ELEV	ELEVATION	OWSJ	OPEN WEB STEEL JOIST	WP	WORKING POINT
ELEC	ELECTRICAL	OWWJ	OPEN WEB WOOD JOIST	WWF	WELDED WIRE FABRIC
EMBED	EMBEDMENT	ℙ	PLATE	±	PLUS OR MINUS
EQ	EQUAL	PAF	POWDER ACTUATED FASTENER		
EQUIP	EQUIPMENT	PC	PRECAST		
EW	EACH WAY	PERP	PERPENDICULAR		
EXP	EXPANSION	PLWD	PLYWOOD		
EXT	EXTERIOR	PP	PARTIAL PENETRATION		
FD	FLOOR DRAIN	PREFAB	PREFABRICATED		
FDN	FOUNDATION	PSF	POUNDS PER SQUARE FOOT		
FIN	FINISH				
FLR	FLOOR				
FTG	FOOTING				
F/	FACE OF				

SYMBOL LEGEND

MARK	DESCRIPTION	MARK	DESCRIPTION
F2.0	FOOTING CALLOUT (SEE SPREAD FOOTING SCHEDULE)		INDICATES WIDE FLANGE COLUMN
P6	SHEAR WALL CALLOUT (SEE TO SHEAR WALL SCHEDULE)		INDICATES HSS OR TS COLUMN
1	REVISION TRIANGLE		DENOTES WOOD POST OR BUNDLED STUDS
(4)2X	COLUMN IDENTIFICATION		DENOTES CONCRETE OR PRECAST COLUMN
T/?=0'-0" (NOTE)	ELEVATION AT POINT OF INDICATION (IE: T/SLAB, T/FTG, T/...)		DENOTES WOOD OR STEEL STUD WALL
?	INDICATES STEP		DENOTES MASONRY OR CMU WALL
#/SX.X	DETAILS OR SECTION CUT		DENOTES PRECAST OR TILT-UP CONCRETE WALL
? S?.?	DETAILS OR SECTION CUT IN PLAN VIEW		DENOTES WOOD STUD SHEAR WALL
? S?.?	ELEVATION CALLOUT		DENOTES BEARING WALL BELOW
	SPAN INDICATOR		DENOTES NON-BEARING WALL BELOW
	DENOTES DIRECTION OF DECK OR SHEATHING SPAN		DENOTES EXISTING WALL

CRAIG A. PENFIELD
STATE OF WASHINGTON
42811
REGISTERED
PROFESSIONAL ENGINEER
06/21/16

REV	DATE	BY	REVISIONS

WCE
WHIPPLE CONSULTING ENGINEERS
2528 NORTH SULLIVAN ROAD
SPOKANE VALLEY, WA 99216
PH: 509-893-2617 FAX: 509-926-0227

CIVIL
X STRUCTURAL
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LEGACY VILLAS
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STRUCTURAL GENERAL NOTES

S1.1

STATEMENT OF SPECIAL INSPECTIONS

1. OWNER SHALL EMPLOY ONE OR MORE SPECIAL INSPECTORS TO PROVIDE INSPECTIONS DURING CONSTRUCTION. THE SPECIAL INSPECTOR SHALL DEMONSTRATE COMPETENCE, TO THE SATISFACTION OF THE BUILDING OFFICIAL, FOR INSPECTION OF THE PARTICULAR TYPE OF CONSTRUCTION OR OPERATION REQUIRING SPECIAL INSPECTION.
2. ALL INSPECTIONS SHALL BE PERFORMED BY INDEPENDENT SPECIAL INSPECTORS. JOB SITE VISITS BY THE STRUCTURAL ENGINEER OF RECORD OR BUILDING OFFICIAL DO NOT CONSTITUTE AND ARE NOT A SUBSTITUTE FOR INSPECTIONS BY A SPECIAL INSPECTOR.
3. ALL INSPECTION REPORTS SHALL BE SUBMITTED TO THE BUILDING OFFICIAL AND STRUCTURAL ENGINEER OF RECORD. THE FINAL REPORTS BY THE SPECIAL INSPECTOR(S) MUST CERTIFY THE ENTIRE STRUCTURAL SYSTEM COMPLIES WITH THE APPROVED PLANS AND SPECIFICATIONS.
4. IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO SEE THESE INSPECTIONS ARE PERFORMED.
5. WORK REQUIRING SPECIAL INSPECTION SHALL BE INSPECTED BY THE SPECIAL INSPECTOR WHO IS PRESENT IN THE AREA WHERE THE WORK IS BEING PERFORMED AND AT THE COMPLETION OF WORK. CONTINUOUS INSPECTION CONSISTS OF FULL-TIME INSPECTION; PERIODIC INSPECTION CONSISTS OF PART-TIME OR INTERMITTENT INSPECTION.
6. THE FOLLOWING SPECIAL INSPECTIONS ARE IN ADDITION TO INSPECTION BY THE BUILDING OFFICIAL. THIS LIST NOT INTENDED TO BE ALL-INCLUSIVE.

STRUCTURAL OBSERVATIONS

VISUAL STRUCTURAL OBSERVATIONS WILL BE PERFORMED AT THE DISCRETION OF THE OWNER, ARCHITECT, STRUCTURAL ENGINEER OF RECORD, AND AS REQUIRED BY THE BUILDING OFFICIAL IN ACCORDANCE WITH THE BUILDING CODE. VISUAL OBSERVATIONS SHALL NOT BE CONSIDERED AS A SUBSTITUTE FOR SPECIAL INSPECTION REQUIREMENTS.

1. IF STRUCTURAL OBSERVATIONS ARE TO BE PROVIDED, IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO NOTIFY THE STRUCTURAL ENGINEER OF RECORD AS TO WHEN EACH MAJOR PHASE OF CONSTRUCTION, AS NOTED BELOW, IS READY FOR OBSERVATION A MINIMUM OF (3) WORKING DAYS IN ADVANCE.

- FOUNDATION REBAR AND ANCHORS – PRIOR TO POURING CONCRETE
- STRUCTURAL FRAMING – AFTER ERECTION AND PRIOR TO CLOSING IN
- RAISED FLOOR SLABS AND REBAR – PRIOR TO POURING CONCRETE
- ROOF NAILING – PRIOR TO INSTALLING ROOFING AND CRICKETS
- COMPLETION OF THE STRUCTURAL SYSTEM

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT NAILING, REINFORCEMENT, WELDS, CONNECTIONS, ETC. ARE VISIBLE FOR OBSERVATION WHEN THE STRUCTURAL ENGINEER OF RECORD IS ON SITE AND FOR ANY SCHEDULING DELAYS DUE TO NONCOMPLIANT ITEMS FOUND DURING THE OBSERVATION.

3. AT THE CONCLUSION OF THE WORK INCLUDED IN THE PERMIT, THE STRUCTURAL OBSERVER SHALL SUBMIT TO THE BUILDING OFFICIAL A WRITTEN STATEMENT ABOUT ANY SITE VISITS THAT HAVE BEEN MADE AND IDENTIFY ANY REPORTED DEFICIENCIES THAT, TO THE BEST OF THE STRUCTURAL OBSERVER'S KNOWLEDGE, HAVE NOT BEEN RESOLVED.

SCHEDULE OF SPECIAL INSPECTION

SPECIAL INSPECTION TYPE	CONT, PERIODIC, SUBMITTAL, NONE	NOTES/REMARKS
FABRICATION AND IMPLEMENTAION PROCEDURES – STRUCTURAL STEEL (IBC 1704.2.5.1)		
Fabrication Procedures: Review of fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by an approved special inspection agency. --OR-- AISC Certification	N/A	
At the completion of fabrication, the approved fabricator shall submit a certificate of compliance to the building code official stating the work was performed in accordance with the approved construction documents.	N/A	
FABRICATION AND IMPLEMENTAION PROCEDURES – WOOD TRUSSES (IBC 1704.2.5.1)		
Fabrication Procedures: Review of fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by an approved special inspection agency. --OR-- TPI Inspection Program: Fabricator shall participate in the TPI Quality Assurance Inspection Program, and maintain a copy of the Quality Assurance Procedures Manual, QAP-90. Submit copy of certificate. All trusses shall bear the TPI Registered Mark.	SUBMITTAL	
At the completion of fabrication, the approved fabricator shall submit a certificate of compliance to the building code official stating the work was performed in accordance with the approved construction documents.	SUBMITTAL	
SOILS (IBC 1705.6)		
Excavation	PERIODIC	Verify excavations are extended to proper depth and have reached proper material.
Subgrade	PERIODIC	Prior to placement of compacted fill, observe subgrade to verify site has been properly prepared.
Soil Bearing Capacity	PERIODIC	Verify materials below shallow foundations are adequate to achieve the design bearing capacity.
Fill	PERIODIC	Verify use of proper materials, densities, and lift thicknesses during placement and compaction of fill.
CONCRETE (IBC 1705.3)		Special inspection not required for Concrete work on this project per exemptions of IBC 1705.3
Reinforcing Placement	**	Verify prior to placing concrete that reinforcing is of specified type, grade and size; that it is free of oil, dirt, rust; that it is located and spaced properly; that hooks, bends, ties, stirrups, and supplemental reinforcing are placed correctly; that lap lengths, stagger and offsets are provided; and that all mechanical connections are installed per the manufacturer's instructions and/or evaluation report.
Anchor Bolts	**	Verify size, spacing and embedment meets the requirements of this construction document.
Hold-Down Anchor Bolt Placement	**	Verify specified cast-in-place anchor, location and embedment meets the requirements of this construction document.
Formwork	**	Verify that forms are placed plumb and conform to the shapes, lines, and dimensions of the members as required by the approved construction documents.
Use of Required Mix Design	**	Verify that all mixes used comply with the approved construction documents; ACI 318: Ch 4, 5.2-5.4 and IBC 1904.2, 1910.2 & 1910.3
Concrete Sampling for Strength Tests, Slump, Air Content and Temperature	**	Submit reports as defined in Concrete Section of the Structural General Notes
Concrete Placement	**	
Inspection and Maintenance of specified curing techniques and temperatures.	**	
Adhesive Anchors	CONT	All post-installed adhesive anchors/dowels shall be specially inspected as required by the approved ICC-ES Report.
Titen HD	PERIODIC	Simpson TIten HD Anchors shall be specially inspected as required by the approved ICC-ES Report.
STRUCTURAL STEEL (IBC 1704.3.3)		
High Strength Bolting	N/A	Verify that all joints use proper fastener components, connected elements are fabricated properly, the bolted joint is drawn into firm contact and that nuts cannot be removed without use of a wrench.
FIELD WELDING (IBC 1705.2.2.1)		
Single Pass Fillet Welds 5/16" or Less	N/A	Pre-welding inspections are to be performed to ensure that proper materials (i.e. structural steel, weld filler material, etc.), welding procedures, and welding personnel qualifications are appropriate. A visual inspection of all welds must be provided with periodic inspections made of work in progress.
Embedded Plates		
WOOD FRAME (IBC 1705.5, 1705.10.1 & 1705.11.2)		
Shear Wall and Diaphragm Nailing	PERIODIC	If fastener spacing is < 4" on center: Verify proper nailing, bolting, anchoring and other fastening of shear walls and diaphragms has occurred.
Shear Wall and Diaphragm Connectors and Hold-Downs/Straps	PERIODIC	Verify proper nailing, bolting, anchoring and other fastening of hold-downs, floor-to-floor straps, drag connection and all other shear wall and diaphragm connector has occurred as required by the approved ICC-ES Report.
Wood Trusses > 60-feet	CONT	Verify that temporary and permanent truss bracing is installed in accordance with approved truss package.

CRAIG A. PENFIELD
STATE OF WASHINGTON
42811
REGISTERED
PROFESSIONAL ENGINEER
06/21/16

REV	DATE	BY	REVISIONS

WCE
WHIPPLE CONSULTING ENGINEERS
2528 NORTH SULLIVAN ROAD
SPOKANE VALLEY, WA 99216
PH: 509-893-2617 FAX: 509-926-0227

CIVIL
X STRUCTURAL
SURVEYING
TRAFFIC
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OTHER

LEGACY VILLAS
24 UNIT
LIBERTY LAKE, WA

DRAWN: JDK
REVIEWED: CAP
SCALE: PER PLAN
PROJ #: 16-1624
DATE: 06/21/16

STRUCTURAL GENERAL NOTES

S1.2

TABLE 2304.9.1
FASTENING SCHEDULE

CONNECTION	FASTENING[a,m]	LOCATION
1. Joist to sill or girder	3–8d common (2½" x 0.131") 3–3" x 0.131" nails 3–3" x 14 gage staples	toenail
2. Bridging to joist	2–8d common (2½" x 0.131") 2–3" x 0.131" nails 2–3" x 14 gage staples	toenail each end
3. 1" x 6" subfloor to each joist	2–8d common (2½" x 0.131")	face nail
4. Wider than 1" x 6" subfloor to each joist	3–8d common (2½" x 0.131")	face nail
5. 2" subfloor to joist or girder	2–16d common (3½" x 0.162")	blind and face nail
6. Sole plate to joist or blocking Sole plate to joist or blocking at braced wall panel	16d (3½" x 0.135") at 16" o.c. 3" x 0.131" nails at 8" o.c. 3" 14 gage staples at 12" o.c. 3–16d (3½" x 0.135") at 16" o.c. 4–3" x 0.131" nails at 16" o.c. 4–3" 14 gage staples at 16" o.c.	typical face nail braced wall panels
7. Top plate to stud	2–16d common (3½" x 0.162") 3–3" x 0.131" nails 3–3" 14 gage staples	end nail
8. Stud to sole plate	4–8d common (2½" x 0.131") 4–3" x 0.131" nails 3–3" 14 gage staples 2–16d common (3½" x 0.162") 3–3" x 0.131" nails 3–3" 14 gage staples	toenail end nail
9. Double studs	16d (3½" x 0.135") at 24" o.c. 3" x 0.131" nails at 8" o.c. 3" 14 gage staples at 8" o.c.	face nail
10. Double top plates Double top plates	16d (3½" x 0.135") at 16" o.c. 3" x 0.131" nails at 12" o.c. 3" 14 gage staples at 12" o.c. 8–16d common (3½" x 0.162") 12–3" x 0.131" nails 12–3" 14 gage staples	typical face nail lap splice
11. Blocking between joists or rafters to top plate	3–8d common (2½" x 0.131") 3–3" x 0.131" nails 3–3" 14 gage staples	toenail
12. Rim joist to top plate	8d (2½" x 0.131") at 6" o.c. 3" x 0.131" nails at 6" o.c. 3" 14 gage staples at 6" o.c.	toenail
13. Top plates, laps and intersections	2–16d common (3½" x 0.162") 3–3" x 0.131" nails 3–3" 14 gage staples	face nail
14. Continuous header, two pieces	16d common (3½" x 0.162")	16" o.c. along edge
15. Ceiling joists to plate	3–8d common (2½" x 0.131") 5–3" x 0.131" nails 5–3" 14 gage staples	toenail
16. Continuous header to stud	4–8d common (2½" x 0.131")	toenail
17. Ceiling joists, laps over partitions (see Section 2308.10.4.1, Table 2308.10.4.1)	3–16d common (3½" x 0.162") minimum, Table 2308.10.4.1 4–3" x 0.131" nails 4–3" 14 gage staples	face nail
18. Ceiling joists to parallel rafters (see Section 2308.10.4.1, Table 2308.10.4.1)	3–16d common (3½" x 0.162") minimum, Table 2308.10.4.1 4–3" x 0.131" nails 4–3" 14 gage staples	face nail
19. Rafter to plate (see Section 2308.10.1, Table 2308.10.1)	3–8d common (2½" x 0.131") 3–3" x 0.131" nails 3–3" 14 gage staples	toenail
20. 1" diagnol brace to each stud and plate	2–8d common (2½" x 0.131") 2–3" x 0.131" nails 3–3" 14 gage staples	face nail
21. 1" x 8" sheathing to each bearing	3–8d common (2½" x 0.131")	face nail
22. Wider 1" x 8" sheathing to each bearing	3–8d common (2½" x 0.131")	face nail
23. Built-up corner studs	16d common (3½ x 0.162") 3" x 0.131" nails 3" 14 gage staples	24" o.c. 16" o.c. 16" o.c.
24. Built-up girder and beams	20d common (4" x 0.192") 32" o.c. 3" x 0.131" nails at 24" o.c. 3" 14 gage staples at 24" o.c. 2–20d common (4" x 0.192") 3–3" x 0.131" nails 3–3" 14 gage staples	face nail at top and bottom staggered on opposite sides face nail at ends and at each splice
25. 2" planks	16d common (3½" x 0.162")	at each bearing
26. Collar tie to rafter	3–10d common (3" x 0.148") 4–3" x 0.131" nails 4–3" 14 gage staples	face nail
27. Jack rafter to hip	3–10d common (3" x 0.148") 4–3" x 0.131" nails 4–3" 14 gage staples 2–16d common (3½" x 0.162") 3–3" x 0.131" nails 3–3" 14 gage staples	toenail face nail
28. roof rafter to 2–by ridge beam	2–16d common (3½" x 0.162") 3–3" x 0.131" nails 3–3" 14 gage staples 2–16d common (3½" x 0.162") 3–3" x 0.131" nails 3–3" 14 gage staples	toenail face nail
29. Joist to band joist	3–16d common (3½" x 0.162") 4–3" x 0.131" nails 4–3" 14 gage staples	face nail
30. Ledger strip	3–16d common (3½" x 0.162") 4–3" x 0.131" nails 4–3" 14 gage staples	face nail at each joist

TABLE 2304.9.1 CONTINUED
FASTENING SCHEDULE

CONNECTION	FASTENING[a,m]	LOCATION
31. Wood structure panels and particleboard[b] Subfloor, roof, and wall sheathing (to framing) Single floor (combination subfloor–underlayment to framing)	½" and less 19/32" to ¾" ⅞" 1⅛" to 1 ¼" ¾" and less ⅞" 1⅛" to 1¼"	6d[c-1] 2⅜" x 0.113" nail[n] 1¾" 16 gage[o] 8d[d] or 6d[e] 2⅜" x 0.113" nail[p] 2" 16 gage[p] 8d[c] 10d[d] or 8d[e] 6d[e] 8d[d] 10d[d] or 8d[e]	
32. Panel siding (to framing)	½" and less ⅝"	6d[f] 8d[f]	
33. Fiberboard sheathing[g]	½" 25/32"	No. 11 gage roofing nail[h] 6d common nail (2" x 0.113")[i] No. 16 gage staple No. 11 gage roofing nail[h] 8d common nail (2½" x 0.131)[i] No. 16 gage staple	
34. Interior paneling	¼" ⅜"	4d[j] 6d[k]	

For SI: 1 inch=25.4 mm

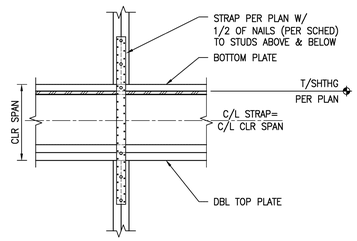
a. Common or box nails are permitted to be used except where otherwise stated.
b. Nails spaces at 6 inches in center at edges, 12 inches at intermediate supports except 6 inches at supports where spans are 48 inches or more. for nailing of wood structural panel and particleboard diaphragms and shear walls, refer to section 2305. Nails for wall sheathing are permitted to be common, box or casing.
c. Common or deformed shank (6d – 2" x 0.113"; 8d – 2½" x 0.131"; 10d – 3" x 0.148").
d. Common (6d – 2" x 0.113"; 8d – 2½" x 0.131"; 10d – 3" x 0.148").
e. Deformed shank (6d – 2" x 0.113"; 8d – 2½" x 0.131"; 10d – 3" x 0.148").
f. Corrosion–resistant siding (6d – 1⅞" x 0.106"; 8d – 2⅜" x 0.128) or casing (6d – 2" x 0.099"; 8d – 2½" x 0.113") nail
g. Fasteners spaced 3 inches on center at exterior edges and 6 inches on center at intermediate supports, when used as structural sheathing. Spacing shall be 6 inches on center on edges and 12 inches on center at intermediate supports for nonstructural applications.
h. Corrosion–resistant roofing nails with ⅜ø–inch–diameter head and 1½–inch length got ½–inch sheathing and 1¾–inch length for 25/32–inch sheathing
i. Corrosion–resistant staples with normal ⅜ø–inch crown or 1–inch crown and ¾–inch length for ½–inch 25/32–inch sheathing. Panel supports at 16 inches (20 inches if strength axis in the long direction of the panel, unless otherwise marked).
j. Casing (1⅜" x 0.080") or finish (1⅝" x 0.072") nails spaced 6 inches on panel edges, 12 inches at intermediate supports.
k. Panel supports at 24 inches. Casing or finish nails spaces 6 inches on panel edges, 12 inches at intermediate supports.
l. For roof sheathing applications, 3d nails (2⅜" x 0.113") are the minimum required for wood structural panels.
m. Staples shall have a minimum crown width of ⅜ø inch.
n. For roof sheathing applications, fasteners spaced 4 inches on center at edges, 8 inches at intermediate supports.
o. Fasteners spaced 4 inches on center at edges, 8 inches at intermediate supports for subfloor and wall sheathing and 3 inches on center at edges, 6 inches at intermediate supports for roof sheathing.
p. Fasteners spaced 4 inches on center at edges, 8 inches at intermediate supports.

TENSION STRAP SCHEDULE (DF–L)

STRAP	MIN END STUDS	FASTENERS	CAPACITY (LB)	ADDITIONAL INFO:
CS16	2x	(22) 0.131"ø NAILS	1,705	CUT LENGTH = 26" + CLEAR SPAN
MST37	(2)2x	(20) 0.162"ø NAILS	2,170	
MST48	(2)2x	(32) 0.162"ø NAILS	3,695	
MST60	(2)2x	(46) 0.162"ø NAILS	4,830	

NOTES:

1. SOME STRAP TYPES NOTED MAY NOT BE USED ON THIS PROJECT.
2. PROVIDE PANEL EDGE NAILING PER SHEAR WALL SCHEDULE AT TENSION STRAP STUDS/POST.
3. CAPACITIES INCLUDE 1.33 STRESS INCREASE.
4. MINIMUM NAIL LENGTHS SHALL BE 2½" FOR 0.131"ø, 3" FOR 0.148"ø AND 3½" FOR 0.162"ø UNO.
5. TOTAL NAILS SPECIFIED, USE HALF THE NAILS AT THE STUDS ABOVE AND BELOW LEVEL BEING CONNECTED. REFERENCE SIMPSON CATALOG FOR DEFINITION OF CLEAR SPAN AND NAIL LOCATIONS.
6. FOR STRAP LENGTHS AND ADDITIONAL INSTALLATION INFORMATION CONSULT CURRENT SIMPSON CATALOG.



6 TENSION STRAP SCHEDULE AND TYPICAL STRAP CONNECTION AT FLOOR FRAMING

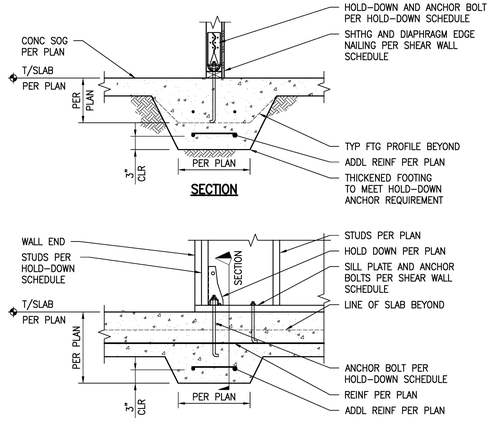
SCALE: 3/4" = 1'–0"

HOLDOWN SCHEDULE (DF–L)

HOLD DOWN	MIN END STUDS	FASTENERS	CAPACITY (LB)	ANCHORAGE TO CONCRETE			
				CAST–IN–PLACE	MECHANICAL	ADHESIVE	
HDU2	(2)2x	(6) SDS ¼"x2½"	3,075	SB ⅝x24	TITEN HD ⅝x8		
HDU4	(2)2x	(10) SDS ¼"x2½"	4,565	SB ⅝x24	N/A		
HDU5	(2)2x	(14) SDS ¼"x2½"	5,645	SB ⅝x24	N/A		
HDU8	(3)2x	(20) SDS ¼"x2½"	7,870	SB ⅞x24	N/A		

NOTES:

1. SOME HOLD–DOWN TYPES NOTED MAY NOT BE USED ON THIS PROJECT.
2. PROVIDE PANEL EDGE NAILING PER SHEAR WALL SCHEDULE AT HOLD–DOWN STUDS/POST.
3. CAPACITIES INCLUDE 1.33 STRESS INCREASE.
4. BASED ON MINIMUM f'c = 2500 PSI CONCRETE.
5. STEM WALLS SHALL BE 6" WIDE MINIMUM FOR ⅝"ø ANCHOR BOLTS AND 8" WIDE MINIMUM FOR ⅞"ø AND LARGER ANCHOR BOLTS.
6. CAST–IN–PLACE (CIP) TYPE ANCHOR BOLTS AT HOLD–DOWNS SHALL HAVE A HEX HEAD WITH A STANDARD CUT WASHER OR A STANDARD HOOK (MINIMUM 3x BOLT DIAMETER).
7. CONTACT ENGINEER FOR POST INSTALLED HOLD–DOWN OPTIONS.
8. THREADED ROD WITH SIMPSON SET OR HILTI HY–200 ADHESIVE.
9. FOR ⅝"ø ANCHOR BOLT, USE STANDARD CUT WASHER BETWEEN SEAT OF ANCHOR AND NUT.
10. TITEN HD SHALL BE USED AT INTERIOR WALLS WHERE HDU2 ARE REQUIRED. SB⅝x24 SHALL ONLY BE USED AT EXTERIOR WALLS



10 HOLD-DOWN SCHEDULE AND TYPICAL HOLD-DOWN ANCHOR AT THICKENED SLAB FOOTING

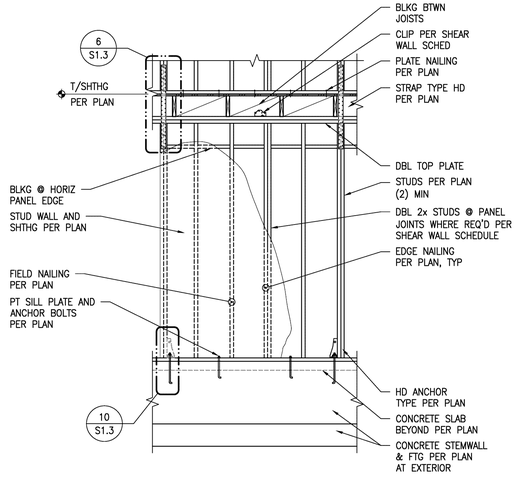
SCALE: 3/4" = 1'–0"

SHEAR WALL SCHEDULE (DF–L)

TAG	SHEATHING AND FASTENING				MINIMUM FRAMING MEMBERS					SHEAR TRANSFER CONNECTIONS			CAPACITY
	GWB & APA RATED PLYWOOD/OSB SHEATHING THICKNESS	PANEL EDGE FASTENING	PANEL FIELD FASTENING	FASTENER SIZE (13)	BOTTOM PLATE	PT SILL PLATE	ABUTTING PANEL EDGE	PANEL EDGE BLKG	MAX STUD SPACING	SILL PLATE CONNECTION TO FOUNDATION	BOTTOM PLATE TO RIM/BLKG	RIM/BLKG CONNECTION TO TOP PLATE	
G4	½" GWB ONE FACE	4" OC	12" OC	#6x1½" TYPE 'W'	2x	2x	2x	2x	16" OC	½"ø @ 72" OC	0.148"ø x 3¼" @ 8" OC	A35 @ 32" OC	165 PLF
P6	15/32" ONE SIDE	6" OC	12" OC	0.131"ø	2x	2x	2x	2x	24" OC	⅝"ø @ 48" OC	0.148"ø x 3¼" @ 8" OC	A35 @ 32" OC	260 PLF
P4	15/32" ONE SIDE	4" OC	12" OC	0.131"ø	2x	2x	(2)2x	(2)2x	24" OC	⅝"ø @ 48" OC	0.148"ø x 3¼" @ 6" OC	A35 @ 16" OC	380 PLF
P3	15/32" ONE SIDE	3" OC	12" OC	0.131"ø	2x	2x	(2)2x	(2)2x	24" OC	⅝"ø @ 32" OC	0.148"ø x 3¼" @ 4" OC	A35 @ 16" OC	490 PLF
2P4	15/32" BOTH SIDE	4" OC	12" OC	0.131"ø	2x	3x	(2)2x	(2)2x	16" OC	⅝"ø @ 16" OC	0.148"ø x 3¼" @ 6" OC (2) ROWS STAGGERED	A35 @ 8" OC	760 PLF
2P3	15/32" BOTH SIDE	3" OC	12" OC	0.131"ø	2x	3x	(2)2x	(2)2x	16" OC	⅝"ø @ 16" OC	0.148"ø x 3¼" @ 4" OC (2) ROWS STAGGERED	A35 @ 8" OC	980 PLF

NOTES:

1. SCHEDULE ASSUMES DOUGLAS–FIR FRAMING AND IS IN CONFORMANCE WITH THE 2012 IBC. GYPSUM WALLBOARD (GWB) SHEAR WALLS SHALL NOT BE USED IN SEISMIC DESIGN CATEGORIES E OR F. ALL PANEL EDGES SHALL BE BLOCKED.
2. REFERENCE THE TYPICAL SHEAR WALL ELEVATION FOR ADDITIONAL INFORMATION.
3. INSTALL PANELS EITHER HORIZONTALLY OR VERTICALLY. 7/16" APA–RATED SHEATHING (OSB) MAY BE USED IN PLACE OF 15/32" SHEATHING PROVIDED THAT ALL STUDS ARE SPACED AT 16" OC.
4. WHERE SHEATHING IS APPLIED TO BOTH SIDES OF WALL, PANEL EDGE JOINTS ON 2X FRAMING SHALL BE STAGGERED SO THAT JOINTS ON OPPOSITE SIDES ARE NOT LOCATED ON THE SAME STUD.
5. PROVIDE SHEAR WALL SHEATHING AND NAILING FOR THE ENTIRE LENGTH OF THE WALLS INDICATED ON THE PLANS. ENDS OF FULL HEIGHT WALLS ARE DESIGNATED BY WINDOWS, OR DOORWAYS OR AS DESIGNATED ON THE PLANS. FOR HOLD–DOWN REQUIREMENTS, REFERENCE PLANS. WALLS DESIGNATED AS PERFORATED SHEAR WALLS REQUIRE SHEATHING ABOVE AND BELOW ALL OPENINGS.
6. SHEATHING EDGE NAILING IS REQUIRED AT ALL HOLD–DOWN POSTS. EDGE NAILING MAY ALSO BE REQUIRED TO EACH STUD USED IN BUILT–UP HOLD–DOWN POSTS. FOR ADDITIONAL INFORMATION, REFERENCE THE HOLD–DOWN DETAILS.
7. INTERMEDIATE FRAMING TO BE 2x MINIMUM MEMBERS. DOUBLE 2x STUDS SHALL BE CONNECTED TOGETHER NAILING THE STUDS TOGETHER WITH NAILS OF THE SAME SIZE AND SPACING AS THE BOTTOM PLATE TO RIM/BLKG CONNECTION.
8. FRAMING CLIPS TO BE MANUFACTURED BY SIMPSON STRONG–TIE. SHEAR VALUES BASED ON 0.131"ø x 1½" NAILS USED TO ATTACH FRAMING CLIPS DIRECTLY TO FRAMING, USE 0.131"ø x 2½" NAILS WHERE INSTALLED OVER SHEATHING.
9. WHERE BOTTOM PLATE ATTACHMENT SPECIFIES (2) ROWS OF NAILS, PROVIDE DOUBLE JOIST, RIM JOIST OR EQUAL BELOW. STAGGER NAILS IN ROWS 1½" APART MINIMUM.
10. PRESSURE TREATED MATERIAL CAN CAUSE EXCESSIVE CORROSION IN THE FASTENERS. PROVIDE HOT–DIPPED GALVANIZED (ELECTRO–PLATING IS NOT ACCEPTABLE) NAILS, CONNECTOR PLATES (FRAMING ANGLES, ETC.) AND FOR ALL CONNECTORS IN CONTACT WITH PRESSURE TREATED FRAMING MEMBERS. FOR ADDITIONAL INFORMATION, REFERENCE STRUCTURAL NOTES.
11. SIMPSON TITEN HD ANCHOR BOLTS (MIN 8" LENGTH) CAN BE USED AS A 1–TO–1 (SIZE AND SPACING) REPLACEMENT FOR CAST–IN–PLACE ANCHOR BOLTS. CONTACT THE STRUCTURAL ENGINEER OF RECORD FOR OTHER ADHESIVE OR EXPANSION BOLT ALTERNATIVES TO CAST–IN–PLACE ANCHOR BOLTS. SPECIAL INSPECTION MAY BE REQUIRED.
12. NAIL STUDS TO 3x SILL PLATES WITH EITHER (2) 0.148"ø x 4" END NAILS OR (4) 0.131"ø x 2½" TOENAILS.
13. MINIMUM NAIL LENGTHS SHALL BE 2½" FOR 0.131"ø, 3" FOR 0.148"ø AND 3½" FOR 0.162"ø UNO.



12 TYPICAL SHEAR WALL ELEVATION

SCALE: 3/8" = 1'–0"

CRAIG A. PENFIELD
STATE OF WASHINGTON
42811
REGISTERED
PROFESSIONAL ENGINEER
06/21/16

REVISIONS

REV	DATE	BY

WCE
WHIPPLE CONSULTING ENGINEERS
2525 NORTH SULLIVAN ROAD
SPOKANE VALLEY, WA 99216
PH: 509-892-2617 FAX: 509-926-0227

CIVIL | X STRUCTURAL | SURVEYING | TRAFFIC | PLANNING | LANDSCAPE | OTHER

LEGACY VILLAS
24 UNIT

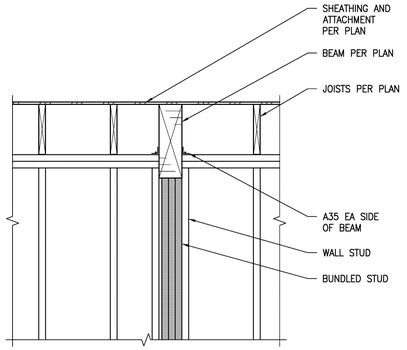
LIBERTY LAKE, WA

DRAWN: JDK
REVIEWED: CAP
SCALE: PER PLAN
PROJ #: 16-1624
DATE: 06/21/16

SHEARWALLS, HOLD-DOWNS, AND NAILING SCHEDULE

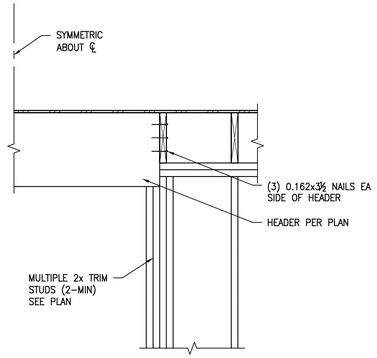
S1.3

P:\WCE_WORK\2016 WCE PROJECTS\2016-1624 Wyatt Koch - Copper Basin Liberty Lake Apts\DWG\STRUCTURAL\DRAWINGS\24 UNIT\2016-1624 S1.1 General Notes and Typical Details.dwg, 6/21/2016 11:20:19 AM, jarvik, DWG To PDF.pc3



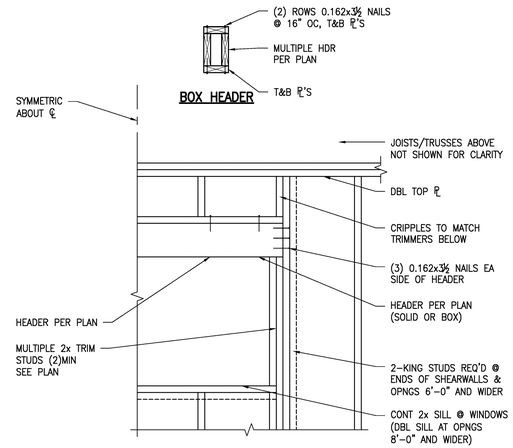
1 TYPICAL FLUSH BEAM FRAMING PARALLEL TO JOISTS

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



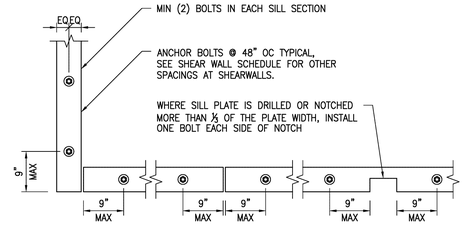
2 TYPICAL FLUSH BEAM FRAMING

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



3 TYPICAL HEADER FRAMING @ STRUCTURAL WALL

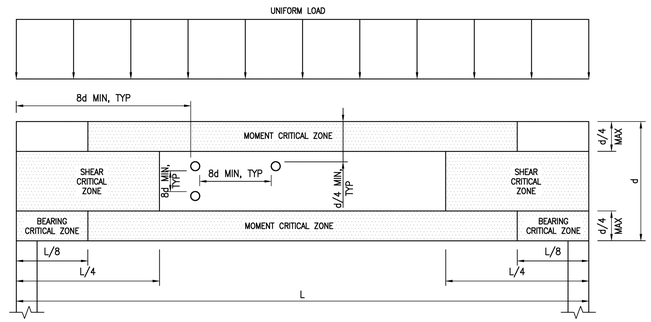
SCALE: 3/4" = 1'-0"



4 TYPICAL SILL PLATE BOLTING

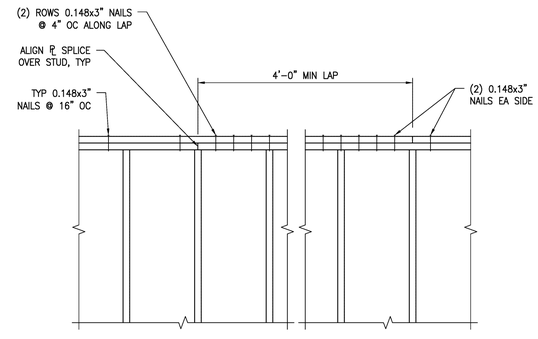
SCALE: 3/4" = 1'-0"

NOTES:
1. PRESCRIPTIVE GUIDELINES FOR ALLOWABLE HOLES ARE FOR SIMPLY SUPPORTED SINGLE SPAN BEAMS CARRYING UNIFORM GRAVITY (VERTICAL) LOADS PERPENDICULAR TO THE WIDE FACES OF THE LAMINATIONS.
2. DRILLING HOLES IN MULTI-SPAN BEAMS OR BEAMS WITH CONCENTRATED LOADS MUST BE APPROVED BY THE ENGINEER OF RECORD.
3. WHEN PRESCRIPTIVE GUIDELINES ARE NOT MET, ALL DRILLED HOLES MUST BE APPROVED BY THE ENGINEER OF RECORD.
4. DRILLED HOLES ARE NOT ALLOWED IN CRITICAL ZONES AS INDICATED ON DETAIL ABOVE WITHOUT APPROVAL OF THE ENGINEER OF RECORD.
5. VERTICAL HOLES IN BEAM MUST BE APPROVED BY THE ENGINEER OF RECORD.
6. NOTCHES IN BEAM MUST BE APPROVED BY THE ENGINEER OF RECORD.
7. MAXIMUM NUMBER OF HOLES SHALL NOT EXCEED (1) HOLES PER EACH 5'-0" LENGTH OF BEAM.
8. D=MAX HOLE DIAMETER (IN.). MAXIMUM HOLE ø SHALL BE 1¾" OR A HOLE DIAMETER EQUAL TO 1/10 BEAM DEPTH, WHICHEVER IS SMALLER.



5 PENETRATIONS IN GLU-LAM BEAMS

SCALE: N.T.S.



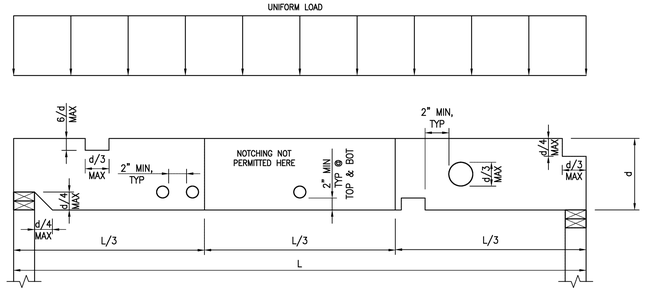
7 TYPICAL SPLICE OF DOUBLE TOP PLATE

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

BEARING WALLS AND SHEAR WALLS		
STUD SIZE	**MAX. DRILLED HOLE SIZE**	**MAXIMUM NOTCH DEPTH**
2x4	1" ø	⅞"
2x6	2" ø	1⅜"
2x8	3" ø	1⅞"

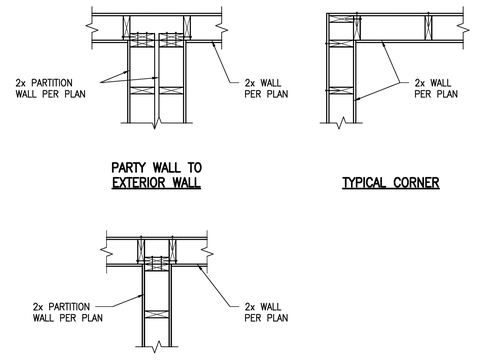
TOP & BOT. PLATES (SHEAR WALLS ONLY)			
PLATE SIZE	**MAX. DRILLED HOLE SIZE**	**MIN. EDGE DISTANCE**	**MAXIMUM NOTCH**
2x4	1" ø	1"	NOT ALLOWED
2x6	2" ø	1½"	NOT ALLOWED
2x8	3" ø	2"	NOT ALLOWED

NOTES:
1. PRESCRIPTIVE GUIDELINES FOR ALLOWABLE HOLES ARE FOR SIMPLY SUPPORTED SINGLE SPAN BEAMS, JOISTS AND RAFTERS CARRYING UNIFORM GRAVITY (VERTICAL) LOADS PERPENDICULAR TO THE SHORT DIMENSION OF MEMBERS.
2. DRILLING HOLES IN MULTI-SPAN MEMBERS OR MEMBERS WITH CONCENTRATED LOADS MUST BE APPROVED BY THE ENGINEER OF RECORD.
3. WHEN PRESCRIPTIVE GUIDELINES ARE NOT MET, ALL DRILLED HOLES MUST BE APPROVED BY THE ENGINEER OF RECORD.
4. VERTICAL HOLES IN MEMBERS MUST BE APPROVED BY THE ENGINEER OF RECORD.
5. d= ACTUAL DEPTH OF MEMBER (NOT NOMINAL)
6. TO OBTAIN THE d/4 DEPTH OF NOTCH LOCATED IN THE TOP RIGHT CORNER OF THE DIAGRAM, THE NOTCH MUST BE CONTAINED WITHIN A DISTANCE FROM THE FACE OF SUPPORT NOT GREATER THAN THE DEPTH, d, OF THE MEMBER. THE WIDTH OF THE NOTCH MUST NOT BE GREATER THAN d/3.
7. MAXIMUM NUMBER OF HOLES SHALL NOT EXCEED (2) HOLES PER EACH 5'-0" LENGTH OF BEAM. ONLY (2) HOLES ARE ALLOWED IN THE MIDDLE 1/3 OF THE MEMBER.



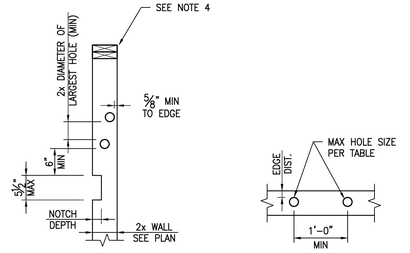
9 NOTCHING AND BORING GUIDE FOR SOLID SAWN BEAMS, JOISTS AND RAFTERS

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



11 TYPICAL WALL INTERSECTION FRAMING

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



NOTES:
1. DO NOT BORE HOLES OR NOTCH STUDS MORE THAN INDICATED IN ABOVE TABLES AND SKETCH.
2. VERIFY ALL PLUMBING WALL LOCATIONS W/ ARCH'L DRAWINGS.
3. DO NOT OVERCUT NOTCHES.
4. PLACE AN ADDITIONAL STUD AT JOIST BEARING LOCATION ADJACENT TO HOLE IN TOP PLATE.
5. HOLES & NOTCHES SHALL NOT BE LOCATED WITHIN THE SAME CROSS SECTION OF STUD.
6. CONTACT ENGINEER OF RECORD FOR HOLES OR NOTCHES THAT DO NOT MEET THE REQUIREMENT ABOVE.

12 NOTCHING & BORING GUIDELINES @ PLUMBING WALL

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

CRAIG A. PENFIELD — STATE OF WASHINGTON — 42811 — REGISTERED PROFESSIONAL ENGINEER
06/21/16

REVISIONS

REV	DATE	BY

WCE
WHIPPLE CONSULTING ENGINEERS
2528 NORTH SULLIVAN ROAD
SPOKANE VALLEY, WA 99216
PH: 509-893-2617 FAX: 509-926-0227

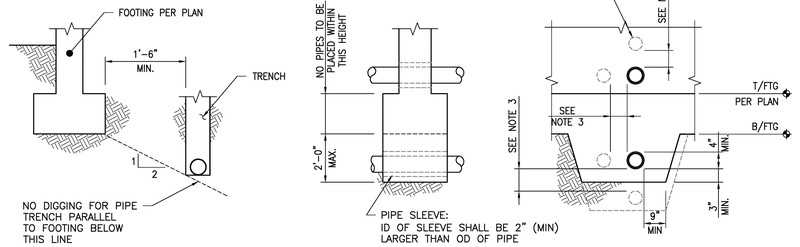
CIVIL	X STRUCTURAL	SURVEYING	TRAFFIC	PLANNING	LANDSCAPE	OTHER

LEGACY VILLAS
24 UNIT
LIBERTY LAKE, WA

DRAWN:	JDK
REVIEWED:	CAP
SCALE:	PER PLAN
PROJ #:	16-1624
DATE:	06/21/16

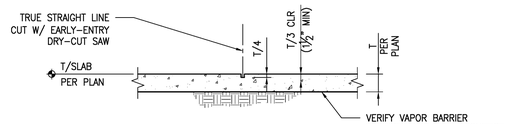
STRUCTURAL TYPICAL DETAILS

S1.4

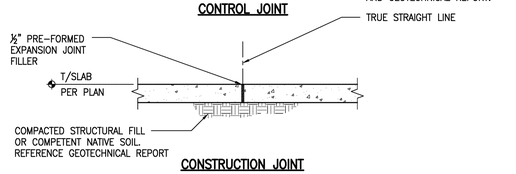


NOTES:
1. SEE NOTES ON FOUNDATION PLAN FOR ADDITIONAL REINFORCEMENT.
2. PIPE & CONDUIT MUST RUN PERP. THRU WALL.
3. VERT. & HORZ. CLEAR SPACE BETWEEN ADJACENT PIPE SLEEVES SHALL NOT BE LESS THAN THE DIAMETER OF THE LARGER SLEEVE.

1 TYPICAL PIPE OR CONDUIT PENETRATIONS AT FOUNDATION
SCALE: N.T.S.



CONTROL JOINT



CONSTRUCTION JOINT

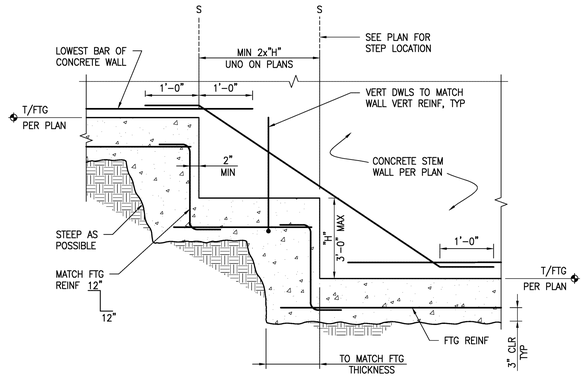
NOTES:
1. CONSTRUCTION/CONTROL JOINT LOCATIONS AT CONTRACTORS DISCRETION UNLESS NOTED OTHERWISE ON PLANS. MAXIMUM ENCLOSED SQUARE FOOTAGE AREA TO BE 144 SQUARE FEET, WITH MAXIMUM PANEL ASPECT RATIO OF 1.3 TO 1.0.
2. USE "EARLY ENTRY DRY-CUT SAW" AS SOON AS POSSIBLE WITHOUT CAUSING RAVELING OF CONCRETE EDGES. SAWCUT ALONG SHORT DIRECTION OF POUR FIRST

3 TYPICAL CONCRETE SLAB JOINT
SCALE: N.T.S.

BAR SIZE	f'c = 3000psi					
	DEVELOPMENT LENGTH			LAP SPLICE		
	TENSION		COMPRESSION	TENSION		COMPRESSION
	TOP BARS	OTHER BARS	ALL BARS	TOP BARS	OTHER BARS	ALL BARS
#3	22	17	9	28	22	12
#4	29	22	11	37	29	15
#5	36	28	14	47	36	19
#6	43	33	17	56	43	23
#7	63	48	20	81	63	27
#8	72	55	22	93	72	30

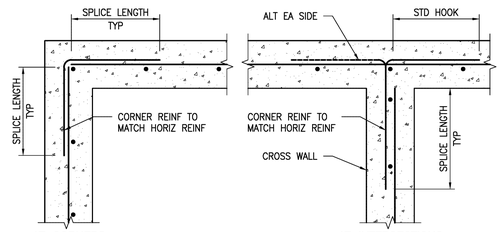
NOTES:
1. VALUES FOR UNCOATED REINFORCING AND NORMAL WEIGHT CONCRETE WITH CLEAR SPACING > db, CLEAR COVER > db AND MINIMUM STIRRUPS OR TIES THROUGHOUT Ld OR CLEAR SPACING > 2db AND CLEAR COVER > db.
2. DEVELOP ALL REINFORCING IN STRUCTURAL SLABS WITH MINIMUM DEVELOPMENT LENGTH Ld.
3. TOP BAR = HORIZONTAL BAR WITH MORE THAN 12" OF FRESH CONCRETE BELOW OR AS NOTED ON DOCUMENTS AS "TOP BAR".
4. UNLESS NOTED OTHERWISE, ALL LAPS SHALL BE MINIMUM CLASS B OR CLASS B (TOP BARS).
5. ALL TABULATED VALUES ARE IN INCHES.

4 TYPICAL LAP SPLICE AND DEVELOPMENT LENGTH SCHEDULE
SCALE: N.T.S.



5 NOT USED
SCALE: ¾" = 1'-0"

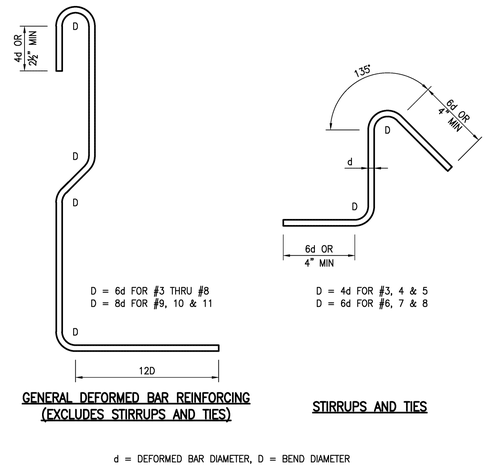
6 TYPICAL STEPPED FOOTING AT CONCRETE WALL
SCALE: ¾" = 1'-0"



AT CORNERS **AT INTERSECTIONS**

NOTES:
1. FOR SPLICE LENGTHS, REFERENCE LAP SPLICE AND DEVELOPMENT LENGTH SCHEDULE.
2. FOR WALL REINFORCING, REFERENCE PLAN.
3. AT FOOTING AND STEM WALLS, CORNER REINFORCING TO MATCH FOOTING AND STEM WALL HORIZONTAL REINFORCING.

7 TYPICAL CORNER REINF AT CONCRETE WALLS
SCALE: N.T.S.



GENERAL DEFORMED BAR REINFORCING (EXCLUDES STIRRUPS AND TIES)

STIRRUPS AND TIES

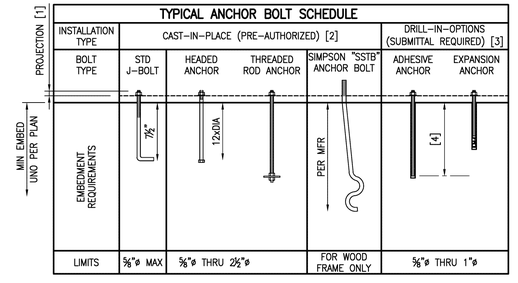
d = DEFORMED BAR DIAMETER, D = BEND DIAMETER

8 TYPICAL REBAR BENDING SCHEDULE
SCALE: N.T.S.

9 NOT USED
SCALE: ¾" = 1'-0"

10 NOT USED
SCALE: ¾" = 1'-0"

11 NOT USED
SCALE: ¾" = 1'-0"



NOTES:
1. CONTRACTOR SHALL DETERMINE THE REQUIRED THREAD PROJECTION SUITABLE FOR THE THICKNESS OF THE MATERIAL BEING FASTENED PLUS GROUT ALLOWANCE, IF ANY, AND CONSTRUCTION TOLERANCES, UNO.
2. CONTRACTOR MAY SELECT APPROPRIATE CAST-IN-PLACE ANCHOR BOLT OPTION WITHOUT SUBMITTAL.
3. DRILL-IN OPTIONS ARE NOT APPROPRIATE AT ALL CONDITIONS. IF DRILL-IN METHOD IS PREFERRED, SUBMIT MANUFACTURER'S INFORMATION, ALLOWABLE LOAD VS. EMBEDMENT DATA AND LOCATIONS WHERE SUBSTITUTIONS ARE REQUESTED. ENGINEER WILL DETERMINE IF SUBSTITUTION IS APPROPRIATE FOR LOCATION AND LOADING.
4. EMBEDMENT OF DRILL-IN ANCHORS SHALL BE PER ENGINEER'S SUBMITTAL REVIEW COMMENTS. EMBEDMENT SHALL BE (9) NINE TIMES THE NOMINAL ANCHOR DIAMETER, UNO.
5. AT PRESSURE TREATED SILLS, PROVIDE HOT DIPPED GALVANIZED OR STAINLESS STEEL ANCHORS.

12 TYPICAL ANCHOR BOLT SCHEDULE
SCALE: N.T.S.

CRAIG A. PENFIELD
STATE OF WASHINGTON
42811
REGISTERED PROFESSIONAL ENGINEER
06/21/16

WHIPPLE CONSULTING ENGINEERS
2528 NORTH SULLIVAN ROAD
SPOKANE VALLEY, WA 99216
PH: 509-893-2617 FAX: 509-926-0227

REV	DATE	BY	REVISIONS

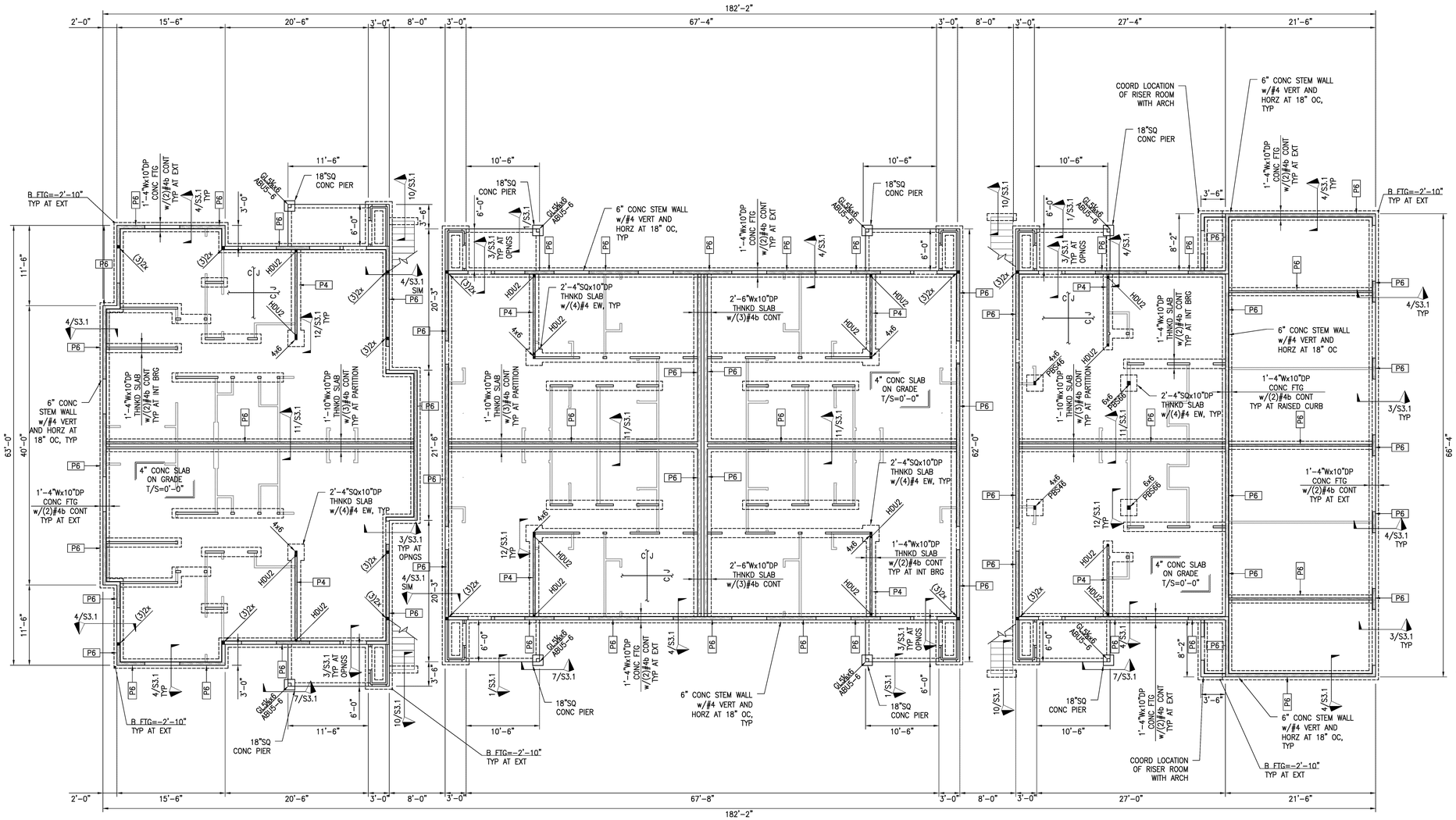
CIVIL | X STRUCTURAL | SURVEYING | TRAFFIC | PLANNING | LANDSCAPE | OTHER

LEGACY VILLAS
24 UNIT
LIBERTY LAKE, WA

DRAWN:	JDK
REVIEWED:	CAP
SCALE:	PER PLAN
PROJ #:	16-1624
DATE:	06/21/16

STRUCTURAL TYPICAL DETAILS

S1.5



24 UNIT - FOUNDATION AND MAIN FLOOR FRAMING PLAN

SCALE: 1/8" = 1'-0"

FOUNDATION PLAN NOTES:

1. REFERENCE S1.1 AND S1.2 FOR STRUCTURAL GENERAL NOTES AND OTHER STRUCTURAL DESIGN CRITERIA NOT SHOWN ON THIS SHEET. REFERENCE S1.3, S1.4 AND S1.5 FOR TYPICAL CONSTRUCTION DETAILS.
2. VERIFY ALL NEW AND EXISTING DIMENSIONS WITH THE ARCHITECTURAL DRAWINGS. ALL DOOR OPENINGS IN FOUNDATION WALLS, DRAINS AND SLOPES, BLOCKOUTS FOR PLUMBING, SPRINKLERS AND HVAC SHALL BE LOCATED AND COORDINATED BY THE CONTRACTOR PRIOR TO POURING CONCRETE.
3. ALL FOOTINGS AND SLABS TO BEAR ON COMPETENT NATIVE SOIL AND/OR STRUCTURAL FILL PER GEOTECHNICAL REPORT. PROVIDE FREE-DRAINING GRANULAR FILL UNDER SLABS PER GEOTECHNICAL REPORT AND/OR ARCHITECTURAL PLANS.
4. TOP OF SLAB ELEVATION ASSUMED TO BE 0'-0". COORDINATE FINISHED FLOOR ELEVATION WITH ARCHITECT/CIVIL ENGINEER.
5. BOTTOM OF ALL EXT FOOTINGS SHALL BEAR A MINIMUM OF 2'-0" BELOW LOWEST ADJACENT FINISHED GRADE. BOTTOM OF FOOTING (B FTG) IS ASSUMED TO BE -2'-10" BELOW TOP OF SLAB. COORDINATE B FTG ELEVATION WITH ARCHITECT/CIVIL ENGINEER WHERE BUILDING STEPS OCCUR.
6. CJ INDICATES CONTROL JOINT. FOR INFORMATION, REFERENCE S1.5.
7. MOISTURE PROOF ALL CONCRETE STEM WALLS PER ARCHITECT.
8. SILL PLATE TO BE 2x PRESSURE TREATED, UNO. SILL PLATE ANCHOR BOLTS AT STEM WALLS SHALL BE ½"ø x10" W/ MIN 7" EMBED SPACED 6'-0" OC UNO. ANCHOR BOLTS AT INTERIOR BEARING AND SHEAR WALLS AT THICKENED SLABS SHALL BE SIMPSON TITEN HD ½"ø x6" SPACED MAX 4'-0" OC OR PER SHEAR WALL SCHEDULE S1.3. STAGGER SPACING AT PARTITION WALLS.

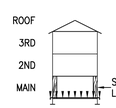
SHEAR WALL FRAMING NOTES:

1. REFERENCE S1.1 AND S1.2 FOR STRUCTURAL GENERAL NOTES AND OTHER STRUCTURAL DESIGN CRITERIA NOT SHOWN ON THIS SHEET. REFERENCE S1.3, S1.4 AND S1.5 FOR TYPICAL CONSTRUCTION DETAILS.
2. ALL DIMENSIONS AND ELEVATIONS SHALL BE COORDINATED WITH THE ARCHITECTS DRAWINGS PRIOR TO CONSTRUCTION. REFERENCE MECHANICAL, PLUMBING, ELECTRICAL AND SPRINKLER DRAWINGS FOR ALL DUCTS, CHASES AND PIPES.
3. SHEAR WALLS, POSTS AND BUNDLED STUDS SHOWN ON THIS PLAN ARE BETWEEN THE FRAMING PLANS ABOVE AND BELOW. REFERENCE THE FRAMING PLAN BELOW FOR BEARING WALL AND BEAM AND JOIST FRAMING REQUIREMENTS.
4. FOR SHEAR WALL AND NAILING REQUIREMENTS, REFERENCE SHEAR WALL SCHEDULE, S1.3. FOR TYPICAL SHEAR WALL ELEVATION, REFERENCE S1.3. ALL EXTERIOR WALLS TO BE SHEATHED WITH APA RATED PLYWOOD/OSB AND NAILED 0.131"ø x3" NAILS AT 6" OC EDGE, 12" OC FIELD.
5. HD INDICATES HOLD-DOWN. REFERENCE HOLD-DOWN SCHEDULE, S1.3. HOLD-DOWNS REQUIRED AT LOCATIONS SHOWN, NOT ALL SHEAR WALLS REQUIRE HOLD-DOWNS. REFERENCE S1.3 FOR TYPICAL HOLD-DOWN ELEVATIONS.

STUD WALL SCHEDULE

EXTERIOR:	2X6 @ 16" OC
CORRIDOR:	2X6 @ 16" OC
UNIT INTERIOR BEARING:	2X4 @ 16" OC
NON-UNIT INTERIOR BEARING:	2X6 @ 16" OC
INTERIOR NON-BEARING:	2X4 @ 16" OC
DOUBLE PARTITION:	2X4 @ 16" OC (EA SIDE)
SINGLE PARTITION:	2X6 @ 16" OC

FOR STUD GRADE REFER TO STRUCTURAL GENERAL NOTES S1.1 AND S1.2. REFER TO ARCHITECTURAL PLANS FOR DIMENSIONS OF PLUMBING WALLS (MIN 2X6 @ 16" OC)



TYPICAL DETAILS

1/S1.5	TYPICAL PIPE OR CONDUIT PENETRATIONS AT FOUNDATION
3/S1.5	TYPICAL CONCRETE SLAB JOINT
4/S1.5	TYPICAL LAP, SPLICE AND DEVELOPMENT LENGTH SCHEDULE
6/S1.5	TYPICAL STEPPED FOOTING AT CONCRETE WALL
7/S1.5	TYPICAL CORNER REINFORCEMENT AT CONCRETE WALLS
8/S1.5	TYPICAL REBAR BENDING SCHEDULE
12/S1.5	TYPICAL ANCHOR BOLT SCHEDULE

CRAIG A. PENFIELD
STATE OF WASHINGTON
42811
REGISTERED
PROFESSIONAL ENGINEER
06/21/16

WCE
WHIPPLE CONSULTING ENGINEERS
2528 NORTH SULLIVAN ROAD
SPOKANE VALLEY, WA 99216
PH: 509-892-2617 FAX: 509-926-0227

REV	DATE	BY	REVISIONS

CIVIL	STRUCTURAL	SURVEYING	TRAFFIC	PLANNING	LANDSCAPE	OTHER
	X					

LEGACY VILLAS
24 UNIT
LIBERTY LAKE, WA

DRAWN:	JDK
REVIEWED:	CAP
SCALE:	PER PLAN
PROJ #:	16-1624
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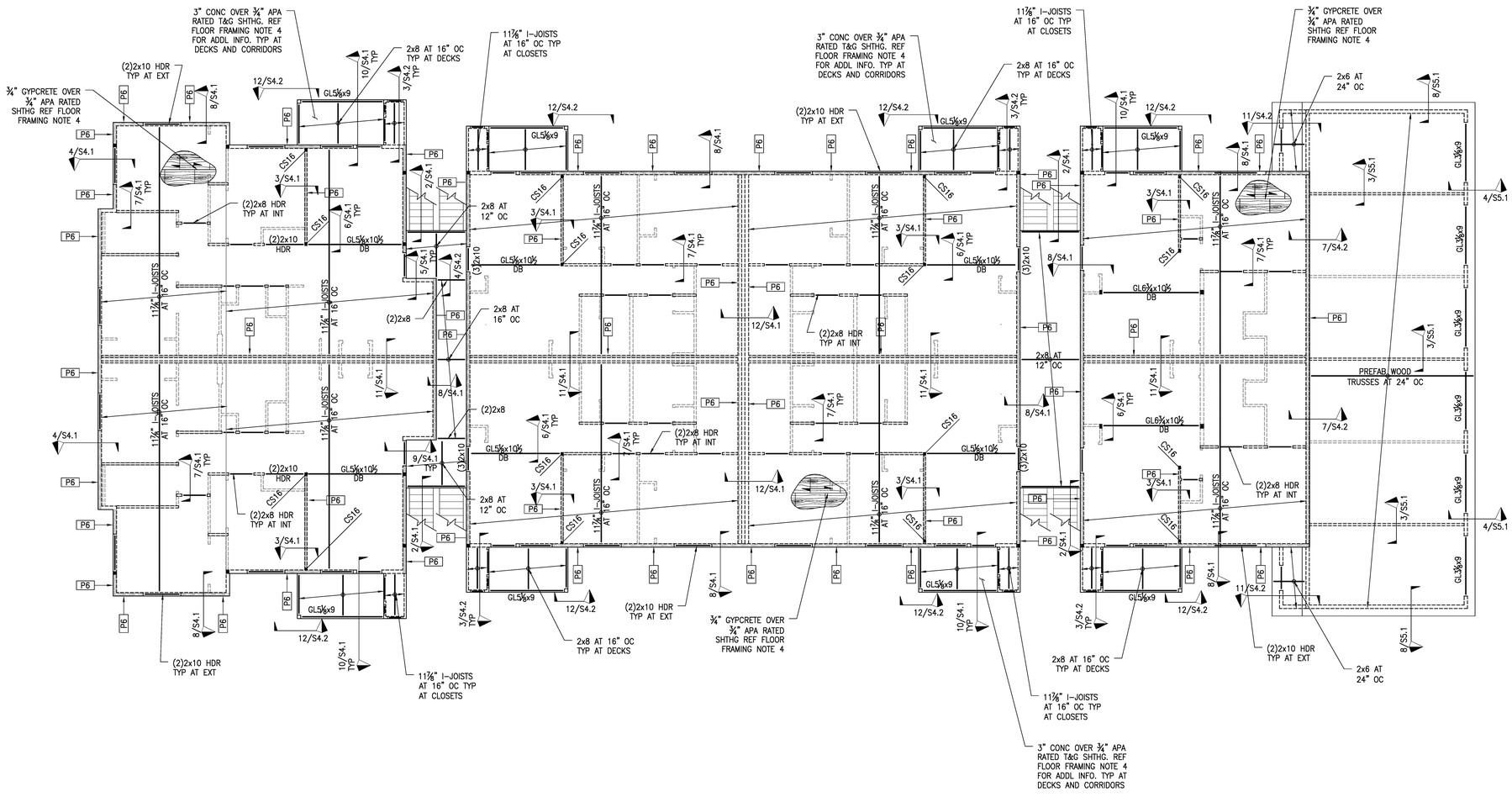
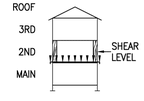
BUILDING B - FOUNDATION AND MAIN FLOOR FRAMING PLAN

S2.1.1



24 UNIT - SECOND FLOOR FRAMING AND SHEAR PLAN

SCALE: 1/8" = 1'-0"



FLOOR FRAMING NOTES:

1. REFERENCE S1.1 AND S1.2 FOR STRUCTURAL GENERAL NOTES AND OTHER STRUCTURAL DESIGN CRITERIA NOT SHOWN ON THIS SHEET. REFERENCE S1.3, S1.4 AND S1.5 FOR TYPICAL CONSTRUCTION DETAILS.
2. ALL DIMENSIONS AND ELEVATIONS SHALL BE COORDINATED WITH THE ARCHITECTS DRAWINGS PRIOR TO CONSTRUCTION. REFERENCE MECHANICAL, PLUMBING, ELECTRICAL AND SPRINKLER DRAWINGS FOR ALL DUCTS, CHASES AND PIPES.
3. REFERENCE THE FOUNDATION PLAN BELOW FOR BEARING AND SHEAR WALLS, POSTS AND BUNDLED STUDS, AND CONNECTION HARDWARE.
4. APA RATED T&G FLOOR SHEATHING THICKNESS PER PLAN. REFERENCE THE STRUCTURAL GENERAL NOTES FOR SHEATHING REQUIREMENTS AND SPAN RATINGS. SHEATHING SHALL BE GLUED & NAILED TO FRAMING WITH 0.131"ø x 3" NAILS AT 6"OC AT PANEL EDGES AND @ 12"OC FIELD, UNO.
5. JOIST AND BEAM HANGERS SHALL BE PER DETAIL OR SPECIFICALLY CALLED OUT ON PLAN WHERE REQUIRED.
6. PROVIDE FULL HEIGHT SOLID BLOCKING OR SINGLE JOISTS UNDER ALL SHEAR WALLS AND BEARING WALLS. AT SHEAR WALLS PARALLEL TO FRAMING, ALIGN (1) JOIST OVER SHEAR WALL (ADDITIONAL JOISTS MAY BE REQUIRED). REFERENCE SHEAR WALL PLAN ABOVE FOR SHEAR WALL LOCATIONS.
7. BEAMS ARE BELOW JOISTS (DROPPED BEAMS) UNO ON DETAILS OR ON PLANS. FOR BEAM SUPPORTS REFERENCE THE STUD AND SHEAR WALL PLAN BELOW.
8. BUNDLED STUDS AND TRIMMERS TO BE CONTINUOUS TO THE FOUNDATION OR SUPPORTING BEAM BELOW.

SHEAR WALL FRAMING NOTES:

1. REFERENCE S1.1 AND S1.2 FOR STRUCTURAL GENERAL NOTES AND OTHER STRUCTURAL DESIGN CRITERIA NOT SHOWN ON THIS SHEET. REFERENCE S1.3, S1.4 AND S1.5 FOR TYPICAL CONSTRUCTION DETAILS.
2. ALL DIMENSIONS AND ELEVATIONS SHALL BE COORDINATED WITH THE ARCHITECTS DRAWINGS PRIOR TO CONSTRUCTION. REFERENCE MECHANICAL, PLUMBING, ELECTRICAL AND SPRINKLER DRAWINGS FOR ALL DUCTS, CHASES AND PIPES.
3. SHEAR WALLS, POSTS AND BUNDLED STUDS SHOWN ON THIS PLAN ARE BETWEEN THE FRAMING PLANS ABOVE AND BELOW. REFERENCE THE FRAMING PLAN BELOW FOR BEARING WALL AND BEAM AND JOIST FRAMING REQUIREMENTS.
4. FOR SHEAR WALL AND NAILING REQUIREMENTS, REFERENCE SHEAR WALL SCHEDULE, S1.3. FOR TYPICAL SHEAR WALL ELEVATION, REFERENCE S1.3. ALL EXTERIOR WALLS TO BE SHEATHED WITH APA RATED PLYWOOD/OSB AND NAILED 0.131"ø x 3" NAILS AT 6" OC EDGE, 12" OC FIELD.
5. HS INDICATES HOLD-DOWN. REFERENCE HOLD-DOWN SCHEDULE, S1.3. HOLD-DOWNS REQUIRED AT LOCATIONS SHOWN, NOT ALL SHEAR WALLS REQUIRE HOLD-DOWNS. REFERENCE S1.3 FOR TYPICAL HOLD-DOWN ELEVATIONS.

STUD WALL SCHEDULE

EXTERIOR:	2X6 @ 16" OC
CORRIDOR:	2X6 @ 16" OC
UNIT INTERIOR BEARING:	2X4 @ 16" OC
NON-UNIT INTERIOR BEARING:	2X6 @ 16" OC
INTERIOR NON-BEARING:	2X4 @ 16" OC
DOUBLE PARTITION:	2X4 @ 16" OC (EA SIDE)
SINGLE PARTITION:	2X6 @ 16" OC

FOR STUD GRADE REFER TO STRUCTURAL GENERAL NOTES S1.1 AND S1.2. REFER TO ARCHITECTURAL PLANS FOR DIMENSIONS OF PLUMBING WALLS (MIN 2X6 @ 16" OC)

CRAIG A. PENFIELD — STATE OF WASHINGTON — 42811 — REGISTERED PROFESSIONAL ENGINEER
06/21/16

REVISIONS | REV | DATE | BY

WCE
WHIPPLE CONSULTING ENGINEERS
2528 NORTH SULLIVAN ROAD
SPOKANE VALLEY, WA 99216
PH: 509-893-2617 FAX: 509-926-0227

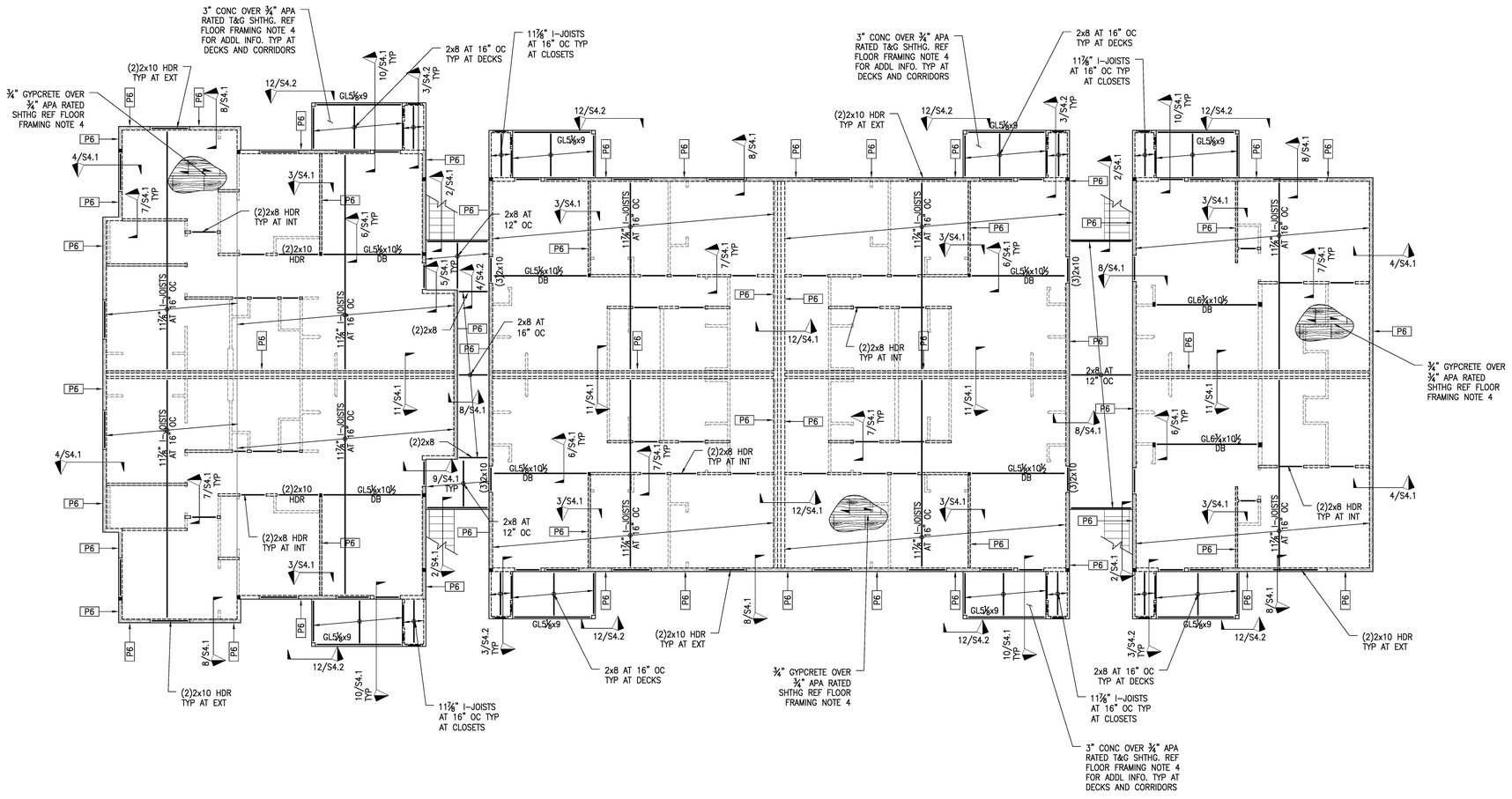
CIVIL | X STRUCTURAL | SURVEYING | TRAFFIC | PLANNING | LANDSCAPE | OTHER

LEGACY VILLAS
24 UNIT
LIBERTY LAKE, WA

DRAWN:	JDK
REVIEWED:	CAP
SCALE:	PER PLAN
PROJ #:	16-1624
DATE:	06/21/16

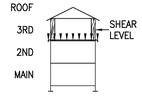
BUILDING B - SECOND FLOOR FRAMING AND SHEAR PLAN

S2.1.2



24 UNIT - THIRD FLOOR FRAMING AND SHEAR PLAN

SCALE: ⅛" = 1'-0"



FLOOR FRAMING NOTES:

1. REFERENCE S1.1 AND S1.2 FOR STRUCTURAL GENERAL NOTES AND OTHER STRUCTURAL DESIGN CRITERIA NOT SHOWN ON THIS SHEET. REFERENCE S1.3, S1.4 AND S1.5 FOR TYPICAL CONSTRUCTION DETAILS.
2. ALL DIMENSIONS AND ELEVATIONS SHALL BE COORDINATED WITH THE ARCHITECTS DRAWINGS PRIOR TO CONSTRUCTION. REFERENCE MECHANICAL, PLUMBING, ELECTRICAL AND SPRINKLER DRAWINGS FOR ALL DUCTS, CHASES AND PIPES.
3. REFERENCE THE FOUNDATION PLAN BELOW FOR BEARING AND SHEAR WALLS, POSTS AND BUNDLED STUDS, AND CONNECTION HARDWARE.
4. APA RATED T&G FLOOR SHEATHING THICKNESS PER PLAN. REFERENCE THE STRUCTURAL GENERAL NOTES FOR SHEATHING REQUIREMENTS AND SPAN RATINGS. SHEATHING SHALL BE GLUED & NAILED TO FRAMING WITH 0.131"ø x 3" NAILS AT 6"OC AT PANEL EDGES AND @ 12"OC FIELD, UNO.
5. JOIST AND BEAM HANGERS SHALL BE PER DETAIL OR SPECIFICALLY CALLED OUT ON PLAN WHERE REQUIRED.
6. PROVIDE FULL HEIGHT SOLID BLOCKING OR SINGLE JOISTS UNDER ALL SHEAR WALLS AND BEARING WALLS. AT SHEAR WALLS PARALLEL TO FRAMING, ALIGN (1) JOIST OVER SHEAR WALL (ADDITIONAL JOISTS MAY BE REQUIRED). REFERENCE SHEAR WALL PLAN ABOVE FOR SHEAR WALL LOCATIONS.
7. BEAMS ARE BELOW JOISTS (DROPPED BEAMS) UNO ON DETAILS OR ON PLANS. FOR BEAM SUPPORTS REFERENCE THE STUD AND SHEAR WALL PLAN BELOW.
8. BUNDLED STUDS AND TRIMMERS TO BE CONTINUOUS TO THE FOUNDATION OR SUPPORTING BEAM BELOW.

SHEAR WALL FRAMING NOTES:

1. REFERENCE S1.1 AND S1.2 FOR STRUCTURAL GENERAL NOTES AND OTHER STRUCTURAL DESIGN CRITERIA NOT SHOWN ON THIS SHEET. REFERENCE S1.3, S1.4 AND S1.5 FOR TYPICAL CONSTRUCTION DETAILS.
2. ALL DIMENSIONS AND ELEVATIONS SHALL BE COORDINATED WITH THE ARCHITECTS DRAWINGS PRIOR TO CONSTRUCTION. REFERENCE MECHANICAL, PLUMBING, ELECTRICAL AND SPRINKLER DRAWINGS FOR ALL DUCTS, CHASES AND PIPES.
3. SHEAR WALLS, POSTS AND BUNDLED STUDS SHOWN ON THIS PLAN ARE BETWEEN THE FRAMING PLANS ABOVE AND BELOW. REFERENCE THE FRAMING PLAN BELOW FOR BEARING WALL AND BEAM AND JOIST FRAMING REQUIREMENTS.
4. FOR SHEAR WALL AND NAILING REQUIREMENTS, REFERENCE SHEAR WALL SCHEDULE, S1.3. FOR TYPICAL SHEAR WALL ELEVATION, REFERENCE S1.3. ALL EXTERIOR WALLS TO BE SHEATHED WITH APA RATED PLYWOOD/OSB AND NAILED 0.131"ø x 3" NAILS AT 6" OC EDGE, 12" OC FIELD.
5. HD INDICATES HOLD-DOWN. REFERENCE HOLD-DOWN SCHEDULE, S1.3. HOLD-DOWNS REQUIRED AT LOCATIONS SHOWN, NOT ALL SHEAR WALLS REQUIRE HOLD-DOWNS. REFERENCE S1.3 FOR TYPICAL HOLD-DOWN ELEVATIONS.

STUD WALL SCHEDULE

EXTERIOR:	2X6 @ 16" OC
CORRIDOR:	2X6 @ 16" OC
UNIT INTERIOR BEARING:	2X4 @ 16" OC
NON-UNIT INTERIOR BEARING:	2X6 @ 16" OC
INTERIOR NON-BEARING:	2X4 @ 16" OC
DOUBLE PARTITION:	2X4 @ 16" OC (EA SIDE)
SINGLE PARTITION:	2X6 @ 16" OC

FOR STUD GRADE REFER TO STRUCTURAL GENERAL NOTES S1.1 AND S1.2. REFER TO ARCHITECTURAL PLANS FOR DIMENSIONS OF PLUMBING WALLS (MIN 2X6 @ 16" OC)

CRAIG A. PENFIELD
STATE OF WASHINGTON
42811
REGISTERED PROFESSIONAL ENGINEER
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WCE
WHIPPLE CONSULTING ENGINEERS
2528 NORTH SULLIVAN ROAD
SPOKANE VALLEY, WA 99216
PH: 509-893-2617 FAX: 509-926-0227

CIVIL	STRUCTURAL	SURVEYING	TRAFFIC	PLANNING	LANDSCAPE	OTHER
	X					

LEGACY VILLAS
24 UNIT
LIBERTY LAKE, WA

DRAWN:	JDK
REVIEWED:	CAP
SCALE:	PER PLAN
PROJ #:	16-1624
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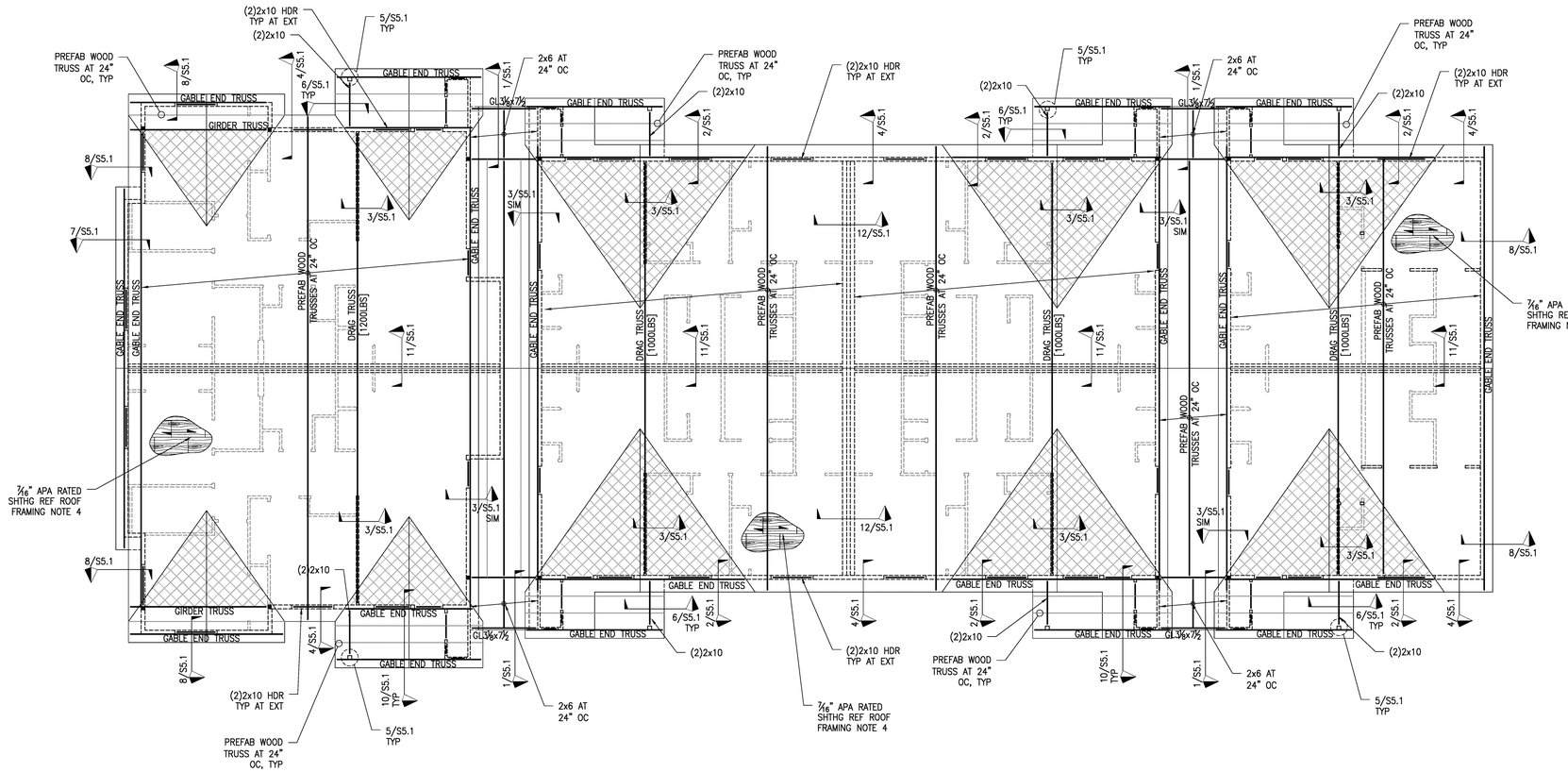
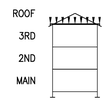
BUILDING B - THIRD FLOOR FRAMING AND SHEAR PLAN

S2.1.3



24 UNIT - ROOF FRAMING PLAN

SCALE: 1/8" = 1'-0"



ROOF FRAMING NOTES:

1. REFERENCE S1.1 AND S1.2 FOR STRUCTURAL GENERAL NOTES AND OTHER STRUCTURAL DESIGN CRITERIA NOT SHOWN ON THIS SHEET. REFERENCE S1.3, S1.4 AND S1.5 FOR TYPICAL CONSTRUCTION DETAILS.
2. ALL DIMENSIONS AND ELEVATIONS SHALL BE COORDINATED WITH THE ARCHITECTS DRAWINGS PRIOR TO CONSTRUCTION. REFERENCE MECHANICAL, PLUMBING, ELECTRICAL AND SPRINKLER DRAWINGS FOR ALL DUCTS, CHASES AND PIPES.
3. REFERENCE THE FRAMING PLAN BELOW FOR BEARING AND SHEAR WALLS, POSTS AND BUNDLED STUDS, AND CONNECTION HARDWARE.
4. APA RATED ROOF SHEATHING THICKNESS PER PLAN. REFERENCE THE STRUCTURAL GENERAL NOTES FOR SHEATHING REQUIREMENTS AND SPAN RATINGS. SHEATHING TO BE NAILED TO ROOF FRAMING WITH 0.131"ø x 3" NAILS @ 6"OC AT PANEL EDGES AND @ 12"OC FIELD, UNO.
5. THE DESIGN AND ENGINEERING OF ROOF TRUSSES AND SPACING ARE PER THE TRUSS MANUFACTURER. REFERENCE THE STRUCTURAL GENERAL NOTES FOR DESIGN LOADS AND SUBMITTAL REQUIREMENTS. ROOF TRUSSES SHOWN ARE A SUGGESTED LAYOUT.
6. CROSS-HATCHED REGION SHOWS APPROXIMATE AREAS OF OVER-FRAMING. TRUSSES SUPPORTING OVER-FRAMING SHALL BE DESIGNED TO CARRY LOADS FROM THE OVER-FRAMING IN ADDITION TO THE DESIGN LOADS SPECIFIED IN THE STRUCTURAL GENERAL NOTES. THE OVER-FRAMING DESIGN IS THE RESPONSIBILITY OF THE TRUSS MANUFACTURER.
7. ALL GIRDER TRUSSES SHALL BE SUPPORTED BY A MINIMUM OF THREE STUDS OR BEAR DIRECTLY ON SUPPORTING BEAM. TRUSS MANUFACTURER SHALL SUBMIT GIRDER TRUSSES REACTIONS TO THE ENGINEER OF RECORD. ALL MULTIPLE STUDS SUPPORTING HIP MASTER AND GIRDER TRUSSES TO CONTINUE TO FOUNDATION.
8. PROVIDE SIMPSON H2.5T HURRICANE TIES AT ALL ROOF TRUSSES TYPICAL. TRUSS HANGERS SHALL BE SUPPLIED AND DESIGNED BY THE TRUSS SUPPLIER.

CRAIG A. PENFIELD
STATE OF WASHINGTON
42811
REGISTERED PROFESSIONAL ENGINEER
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WCE
WHIPPLE CONSULTING ENGINEERS
2528 NORTH SULLIVAN ROAD
SPOKANE VALLEY, WA 99216
PH: 509-892-2617 FAX: 509-926-0227

CIVIL	STRUCTURAL	SURVEYING	TRAFFIC	PLANNING	LANDSCAPE	OTHER
	X					

LEGACY VILLAS
24 UNIT

LIBERTY LAKE, WA

DRAWN:	JDK
REVIEWED:	CAP
SCALE:	PER PLAN
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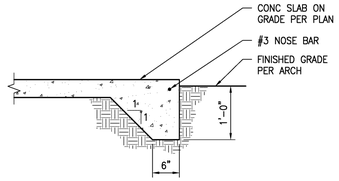
DATE:	06/21/16

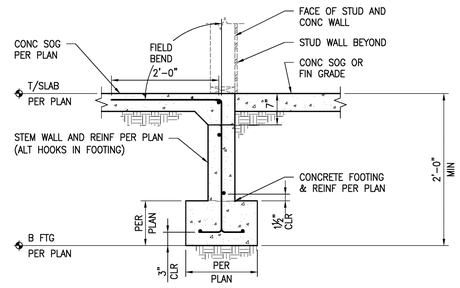
BUILDING B - ROOF FRAMING PLAN

S2.1.4



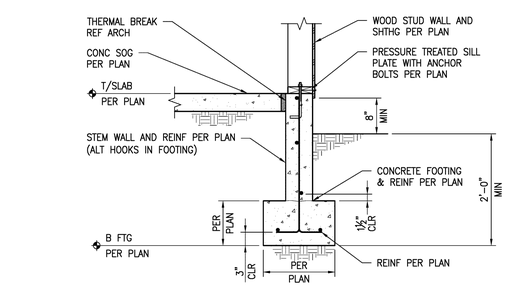
1 NOT USED
SCALE: 3/4" = 1'-0"

2 SLAB EDGE AT PATIO
SCALE: 3/4" = 1'-0"



NOTE:
COORDINATE ALIGNMENT OF SHTHG & STEM WALL.

3 SLAB OVER-POUR AT OPENINGS
SCALE: 3/4" = 1'-0"

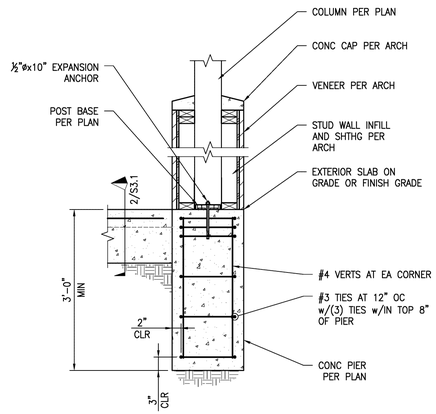


NOTES:
1. COORDINATE ALIGNMENT OF SHTHG & STEM WALL.
2. EXTERIOR SLAB ON GRADE AT SIM.

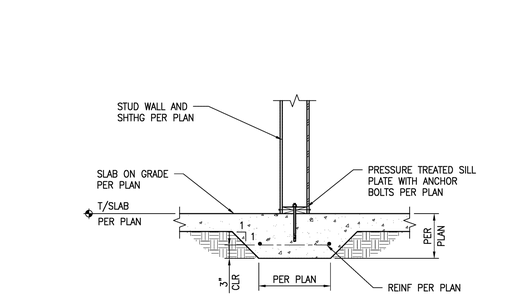
4 WOOD STUD WALL AT EXTERIOR FOOTING
SCALE: 3/4" = 1'-0"

5 NOT USED
SCALE: 3/4" = 1'-0"

6 NOT USED
SCALE: 3/4" = 1'-0"



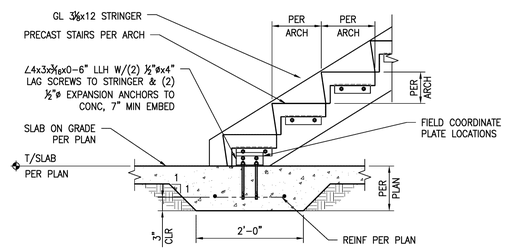
7 DECK POST AND FOOTING
SCALE: 3/4" = 1'-0"



NOTE:
COLD JOINT BETWEEN FOOTING AND SLAB NOT PERMITTED

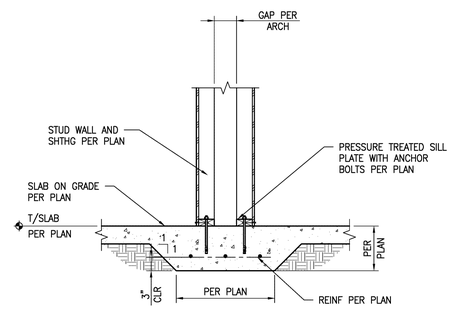
8 THICKENED SLAB AT INTERIOR STRUCTURAL WALL
SCALE: 3/4" = 1'-0"

9 NOT USED
SCALE: 3/4" = 1'-0"



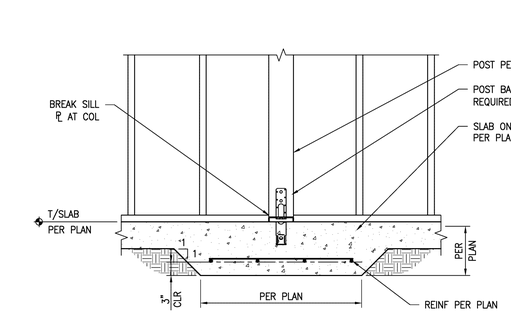
NOTE:
COLD JOINT BETWEEN FOOTING AND SLAB NOT PERMITTED

10 THICKENED SLAB SUPPORT AT STAIRS
SCALE: 3/4" = 1'-0"



NOTES:
1. COLD JOINT BETWEEN FOOTING AND SLAB NOT PERMITTED
2. ALTERNATIVE AB: USE TITEN HD W/ SAME SIZE AND SPACING

11 THICKENED SLAB AT INTERIOR PARTITION WALL
SCALE: 3/4" = 1'-0"



NOTE:
COLD JOINT BETWEEN FOOTING AND SLAB NOT PERMITTED

12 THICKENED SLAB FOOTING AT WOOD POST
SCALE: 3/4" = 1'-0"

CRAIG A. PENFIELD — STATE OF WASHINGTON — 42811 — REGISTERED PROFESSIONAL ENGINEER
06/21/16

REV	DATE	BY	REVISIONS

WCE
WHIPPLE CONSULTING ENGINEERS
2528 NORTH SULLIVAN ROAD
SPOKANE VALLEY, WA 99216
PH: 509-892-2617 FAX: 509-926-0227

CIVIL	X STRUCTURAL	SURVEYING	TRAFFIC	PLANNING	LANDSCAPE	OTHER	

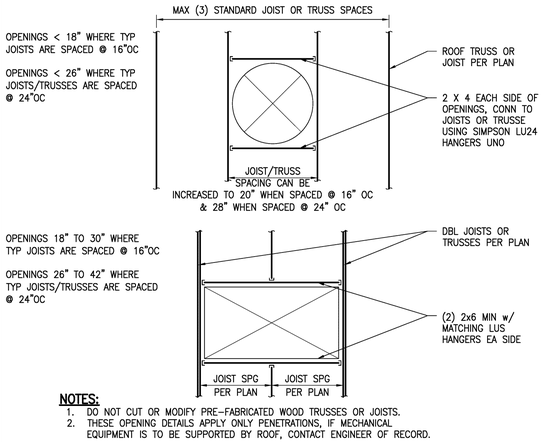
LEGACY VILLAS
24 UNIT

LIBERTY LAKE, WA

DRAWN:	JDK
REVIEWED:	CAP
SCALE:	PER PLAN
PROJ #:	16-1624
DATE:	06/21/16

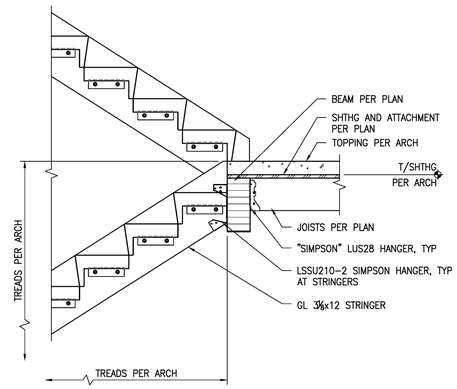
FOUNDATION DETAILS

S3.1

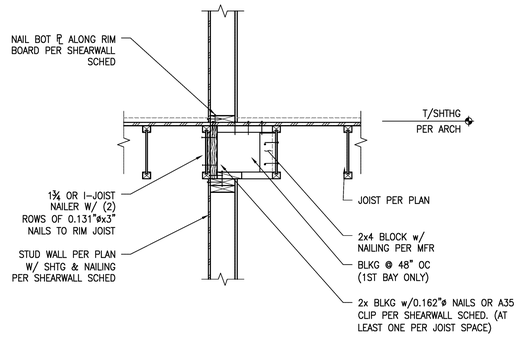


NOTES:
1. DO NOT CUT OR MODIFY PRE-FABRICATED WOOD TRUSSES OR JOISTS.
2. THESE OPENING DETAILS APPLY ONLY PENETRATIONS, IF MECHANICAL EQUIPMENT IS TO BE SUPPORTED BY ROOF, CONTACT ENGINEER OF RECORD.

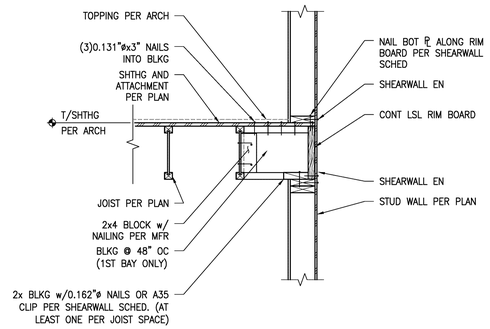
1 TYPICAL FRAMING AT FLOOR/ROOF OPENINGS
SCALE: 3/4" = 1'-0"



2 TYPICAL INTERIOR PRECAST STAIRWAY ELEVATION
SCALE: 3/4" = 1'-0"



3 PARALLEL JOISTS AT INTERIOR SHEAR WALL
SCALE: 3/4" = 1'-0"



4 PARALLEL JOISTS AT EXTERIOR STUD WALL
SCALE: 3/4" = 1'-0"

5 FLOOR FRAMING AT CORRIDORS
SCALE: 3/4" = 1'-0"

6 JOIST OVER DROPPED BEAM
SCALE: 3/4" = 1'-0"

7 PERP JOISTS OVER INTERIOR BEARING WALL
SCALE: 3/4" = 1'-0"

8 PERPENDICULAR JOISTS AT AT EXTERIOR STUD WALL
SCALE: 3/4" = 1'-0"

9 FLOOR FRAMING AT CORRIDORS
SCALE: 3/4" = 1'-0"

10 PERP JOISTS AT DECKS
SCALE: 3/4" = 1'-0"

NOTE:
CONTRACTOR TO COORDINATE INSPECTION REQUIREMENTS.

11 PERP JOISTS AT PARTITION WALL
SCALE: 3/4" = 1'-0"

12 PARALLEL JOISTS AT 2-HOUR FIRE WALL
SCALE: 3/4" = 1'-0"

CRAIG A. PENFIELD
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2528 NORTH SULLIVAN ROAD
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PH: 509-893-2617 FAX: 509-926-0227

CIVIL	STRUCTURAL	SURVEYING	TRAFFIC	PLANNING	LANDSCAPE	OTHER
	X					

LEGACY VILLAS
24 UNIT

LIBERTY LAKE, WA

DRAWN:	JDK
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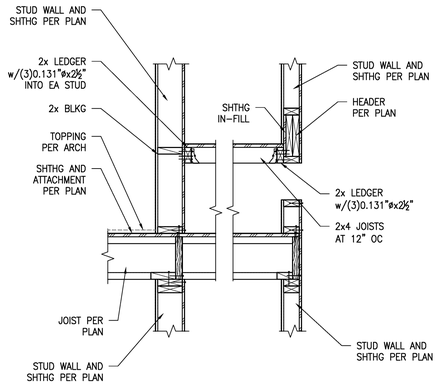
SCALE:	PER PLAN
PROJ #:	16-1624
DATE:	06/21/16

FLOOR FRAMING DETAILS

S4.1

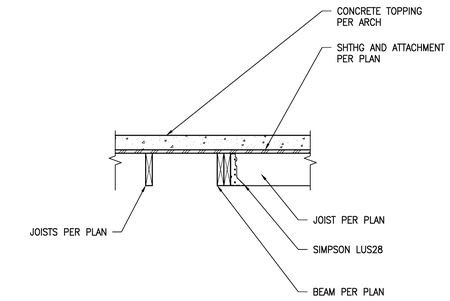
1 NOT USED
SCALE: 3/4" = 1'-0"

2 NOT USED
SCALE: 3/4" = 1'-0"



NOTE:
REFERENCE 4/S4.1 FOR BALANCE OF INFORMATION

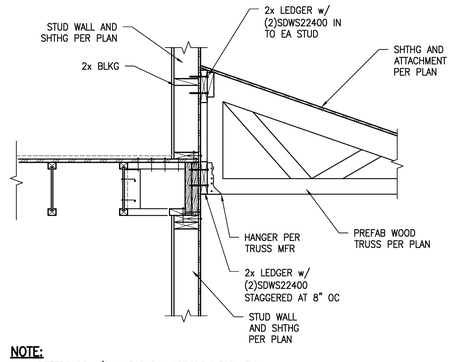
3 FLOOR FRAMING AT EXTERIOR CLOSETS
SCALE: 3/4" = 1'-0"



4 CORRIDORS JOISTS TO FLUSH BEAM
SCALE: 3/4" = 1'-0"

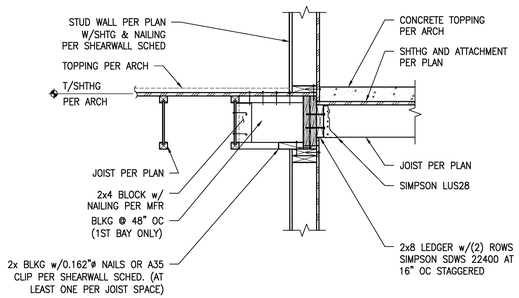
5 NOT USED
SCALE: 3/4" = 1'-0"

6 NOT USED
SCALE: 3/4" = 1'-0"



NOTE:
REFERENCE 4/S4.1 FOR BALANCE OF INFORMATION

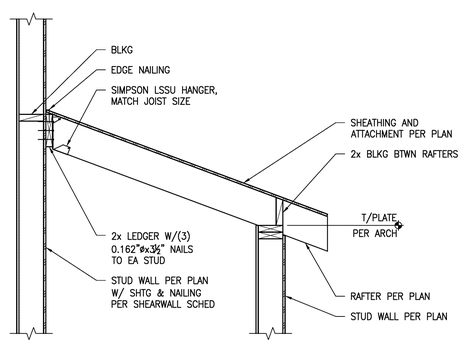
7 GARAGE ROOF TO WALL
SCALE: 3/4" = 1'-0"



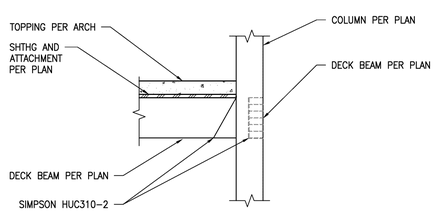
8 FLOOR FRAMING AT CORRIDORS
SCALE: 3/4" = 1'-0"

9 NOT USED
SCALE: 3/4" = 1'-0"

10 NOT USED
SCALE: 3/4" = 1'-0"



11 FRAMING AT FIRE RISER ROOM
SCALE: 3/4" = 1'-0"



NOTE:
COORDINATE COLUMN WRAPPING WITH ARCHITECT

12 WOOD BEAM CONNECTION TO WOOD POST
SCALE: 3/4" = 1'-0"

CRAIG A. PENFIELD
STATE OF WASHINGTON
42811
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2528 NORTH SULLIVAN ROAD
SPOKANE VALLEY, WA. 99216
PH: 509-892-2617 FAX: 509-926-0227

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	X					

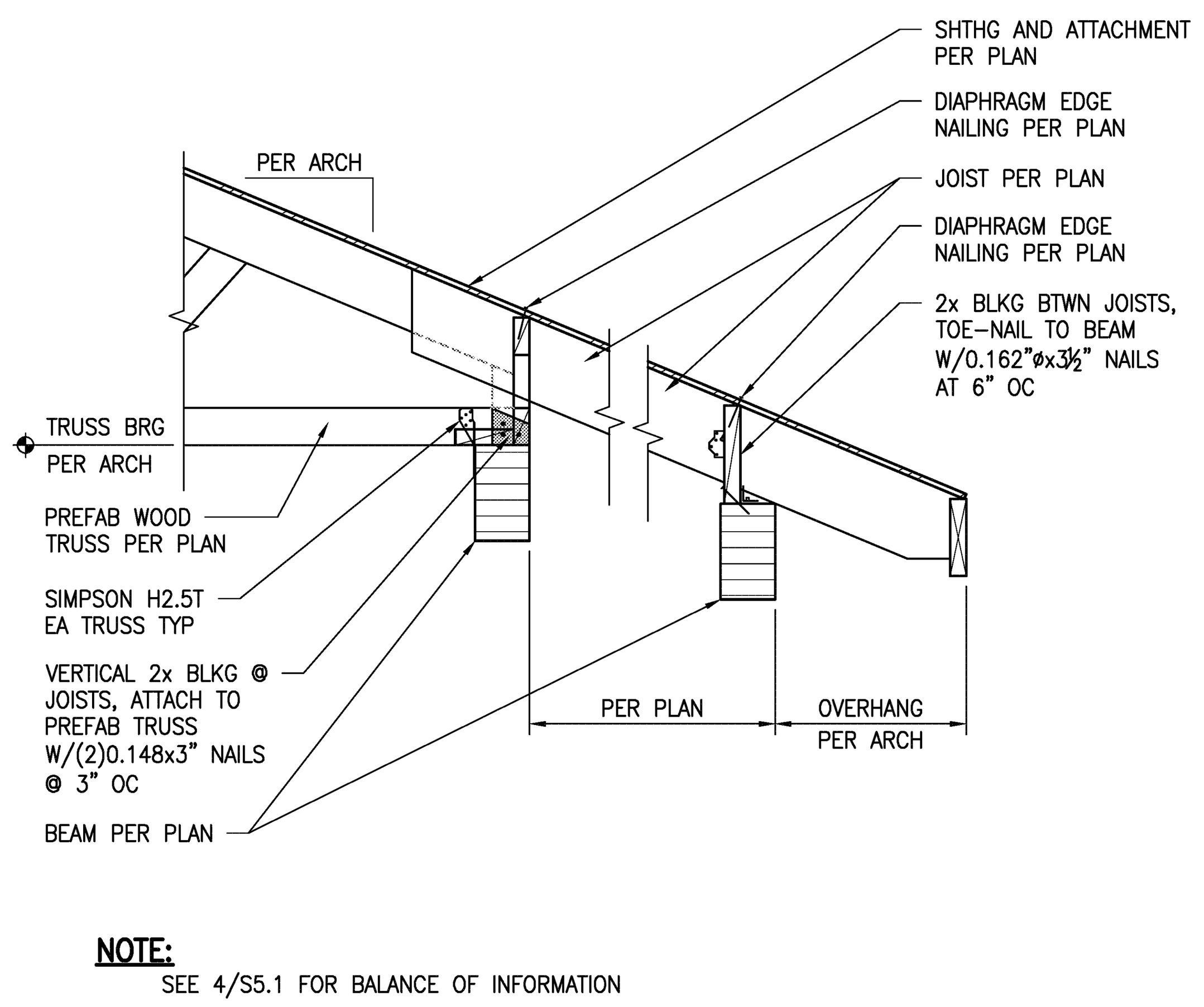
LEGACY VILLAS
24 UNIT

LIBERTY LAKE, WA

DRAWN:	JDK
REVIEWED:	CAP
SCALE:	PER PLAN
PROJ #:	16-1624
DATE:	06/21/16

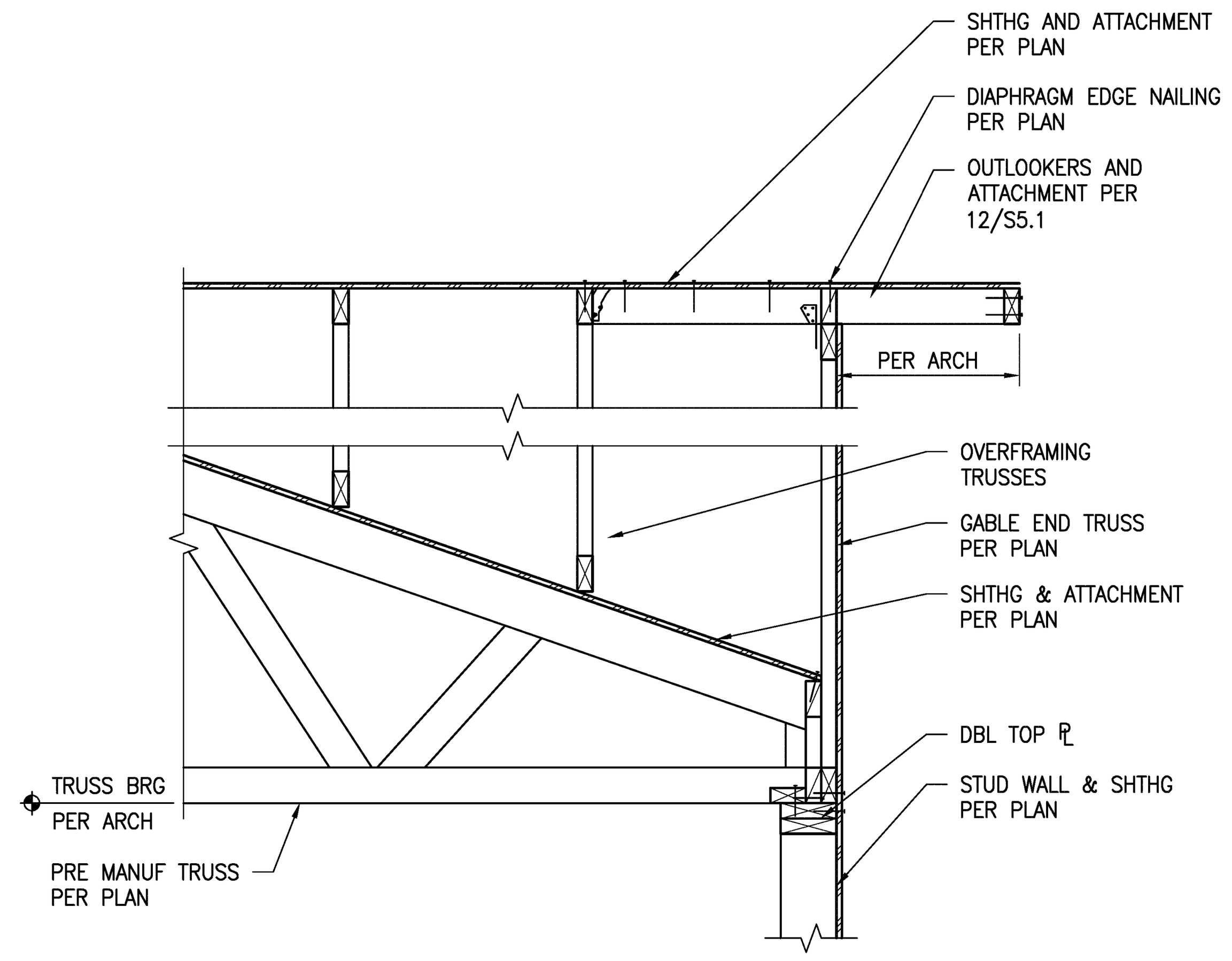
FLOOR FRAMING DETAILS

S4.2



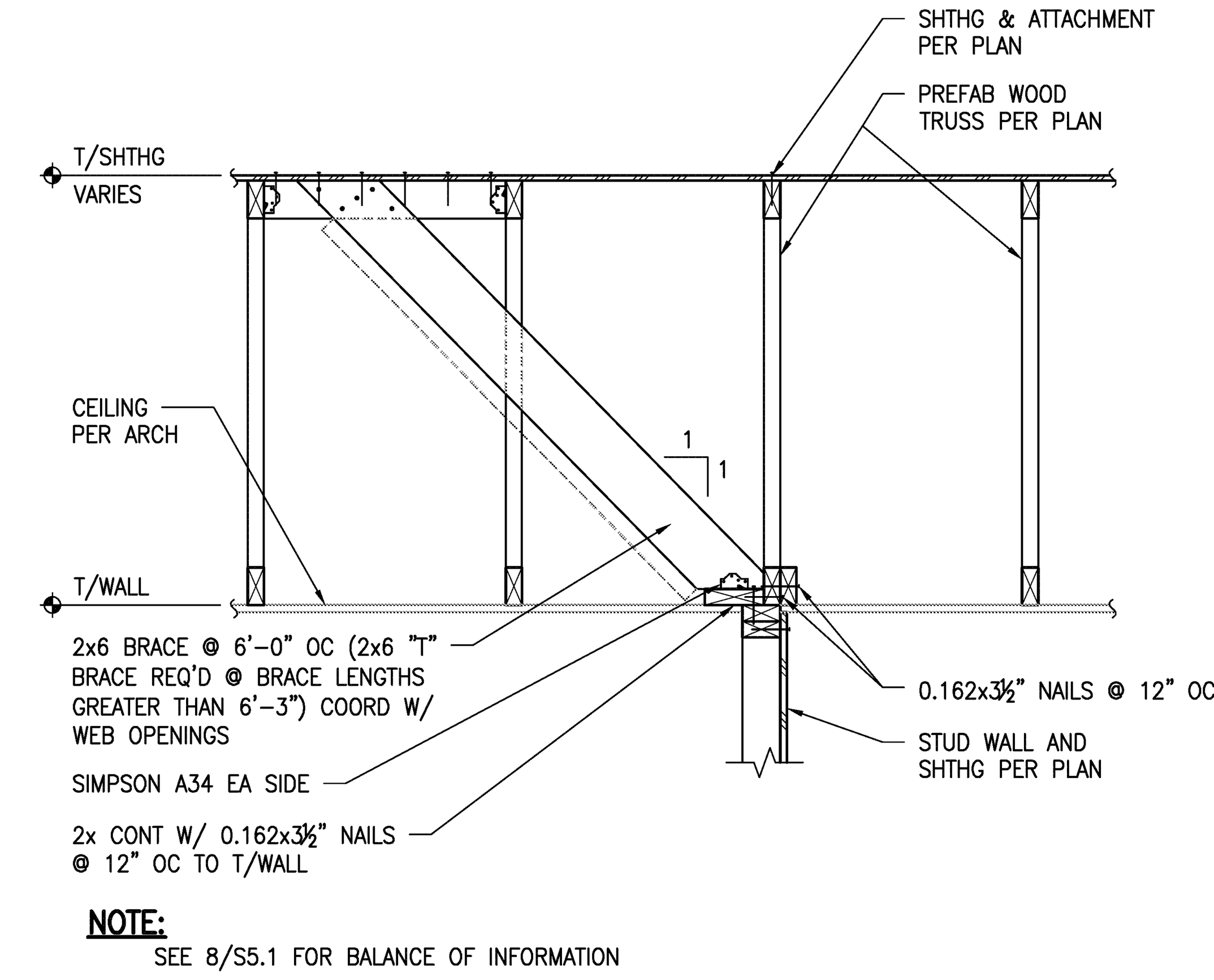
1 TRUSS TO BEAM TO RAFTERS

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



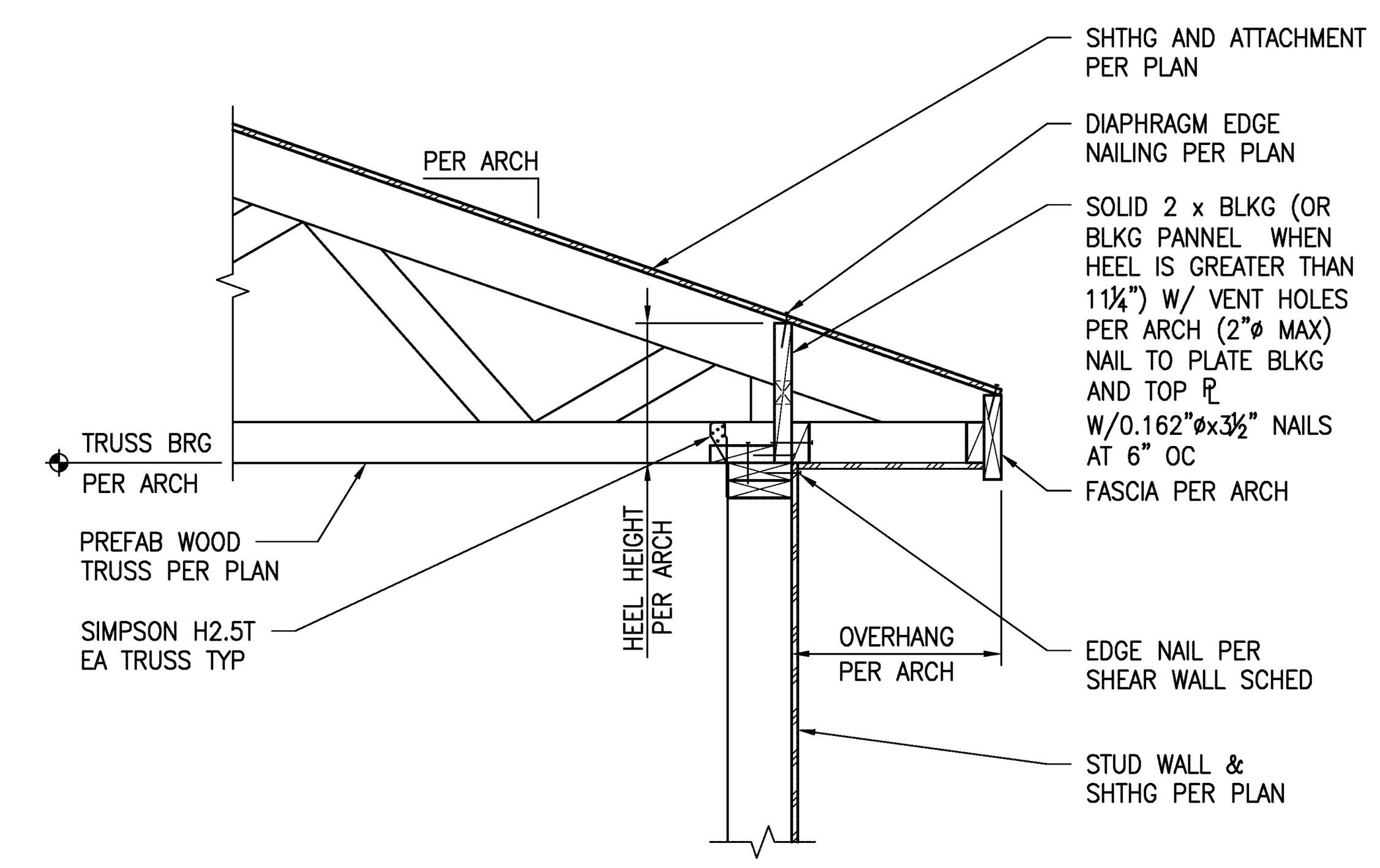
2 PERP TRUSS WITH OVERFRAMING TO EXTERIOR WALL

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



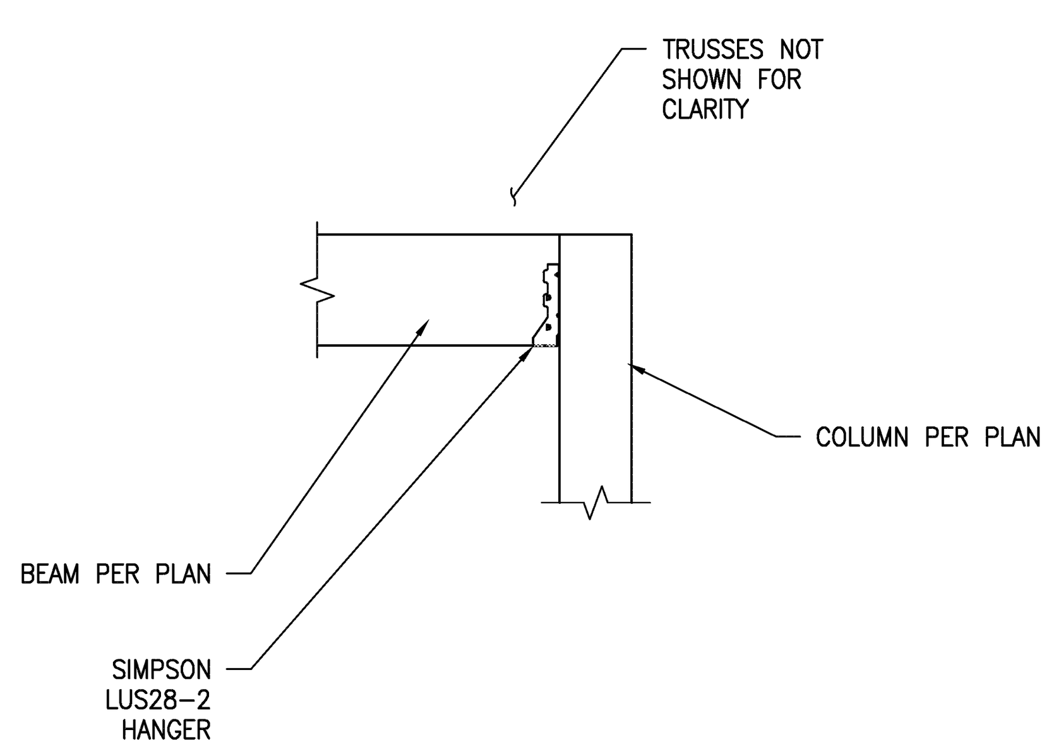
3 PARALLEL TRUSS TO INTERIOR SHEAR WALL

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



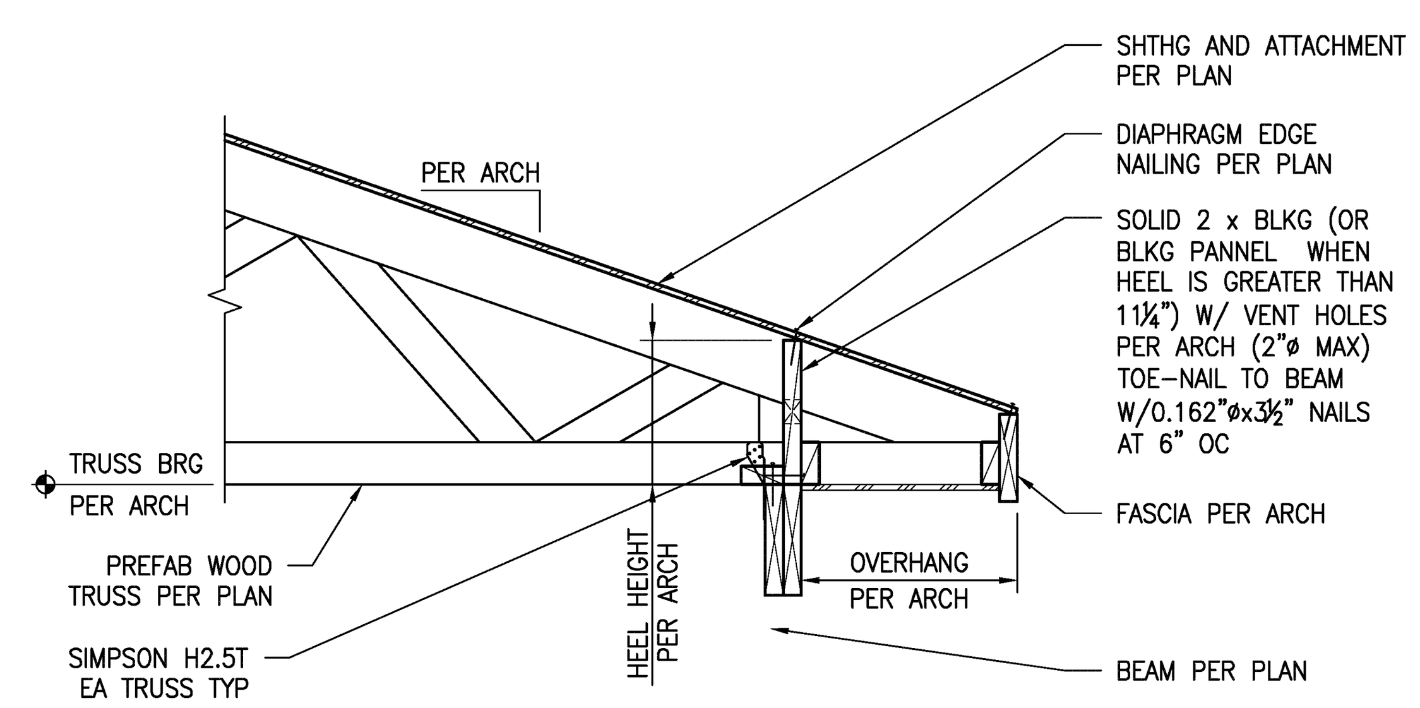
4 PERPENDICULAR TRUSSES TO EXTERIOR WALL

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



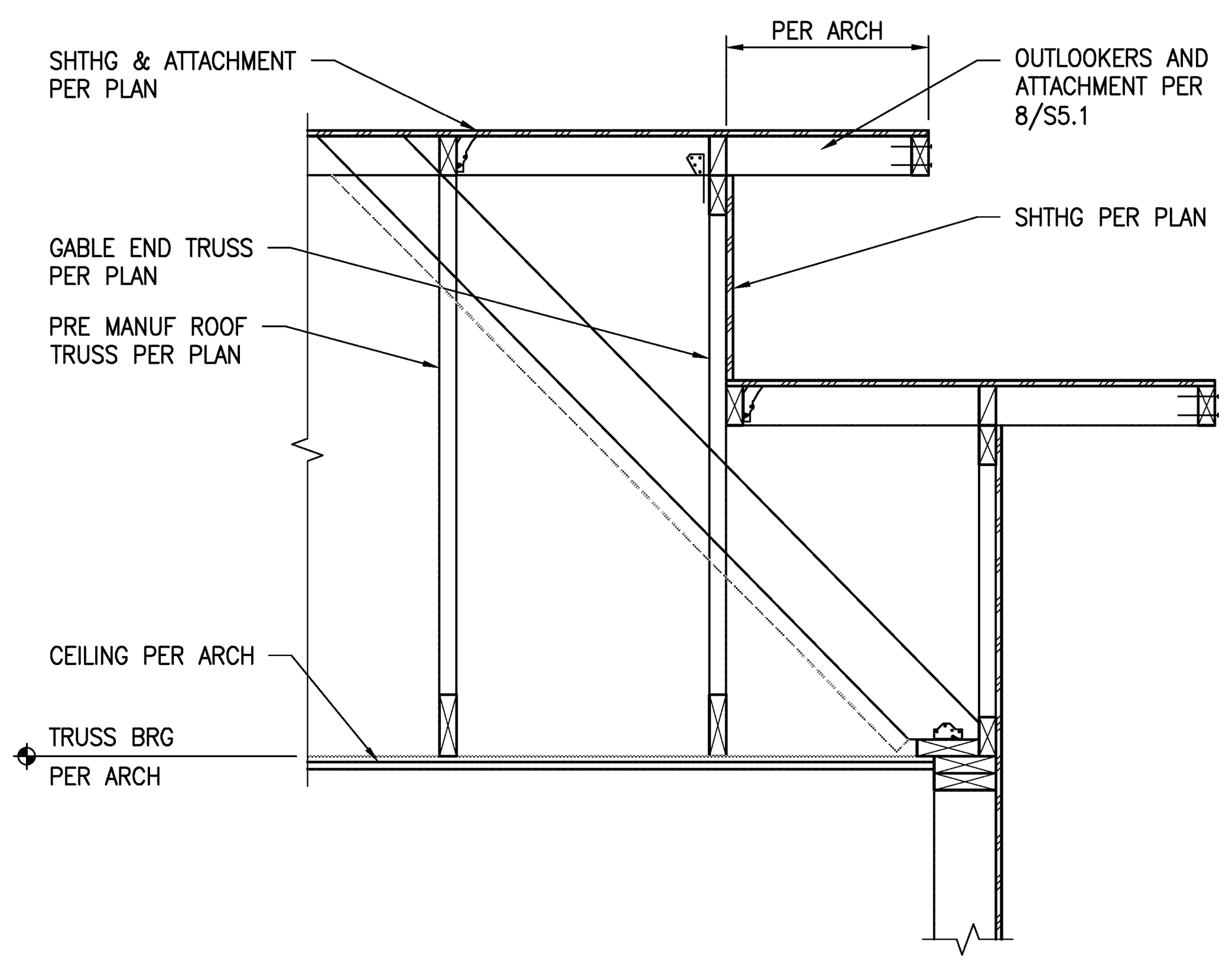
5 BEAM TO COLUMN AT ROOF

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



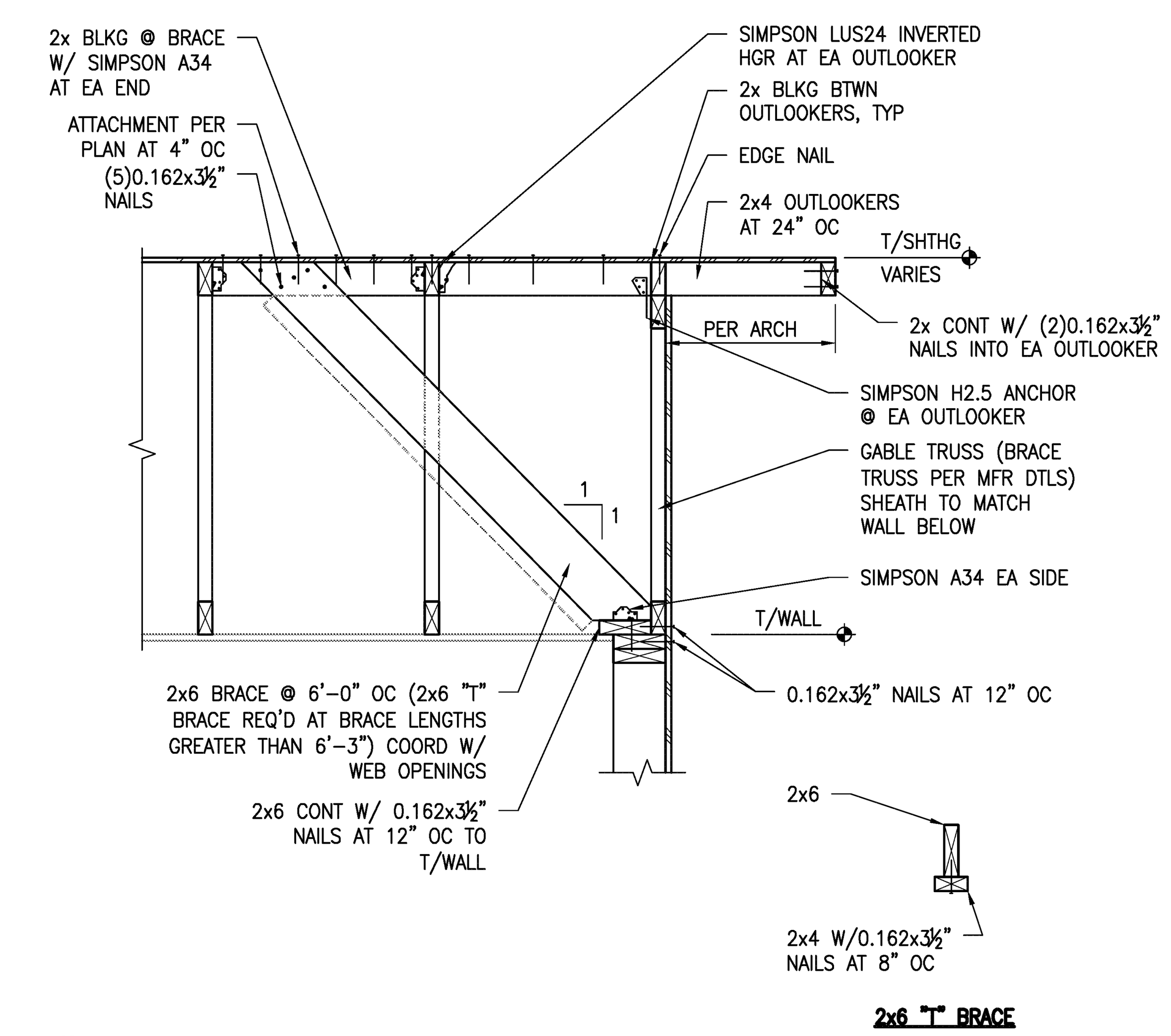
6 PERP TRUSS TO BEAM

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



7 HIGH/LOW GABLE END TRUSS

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

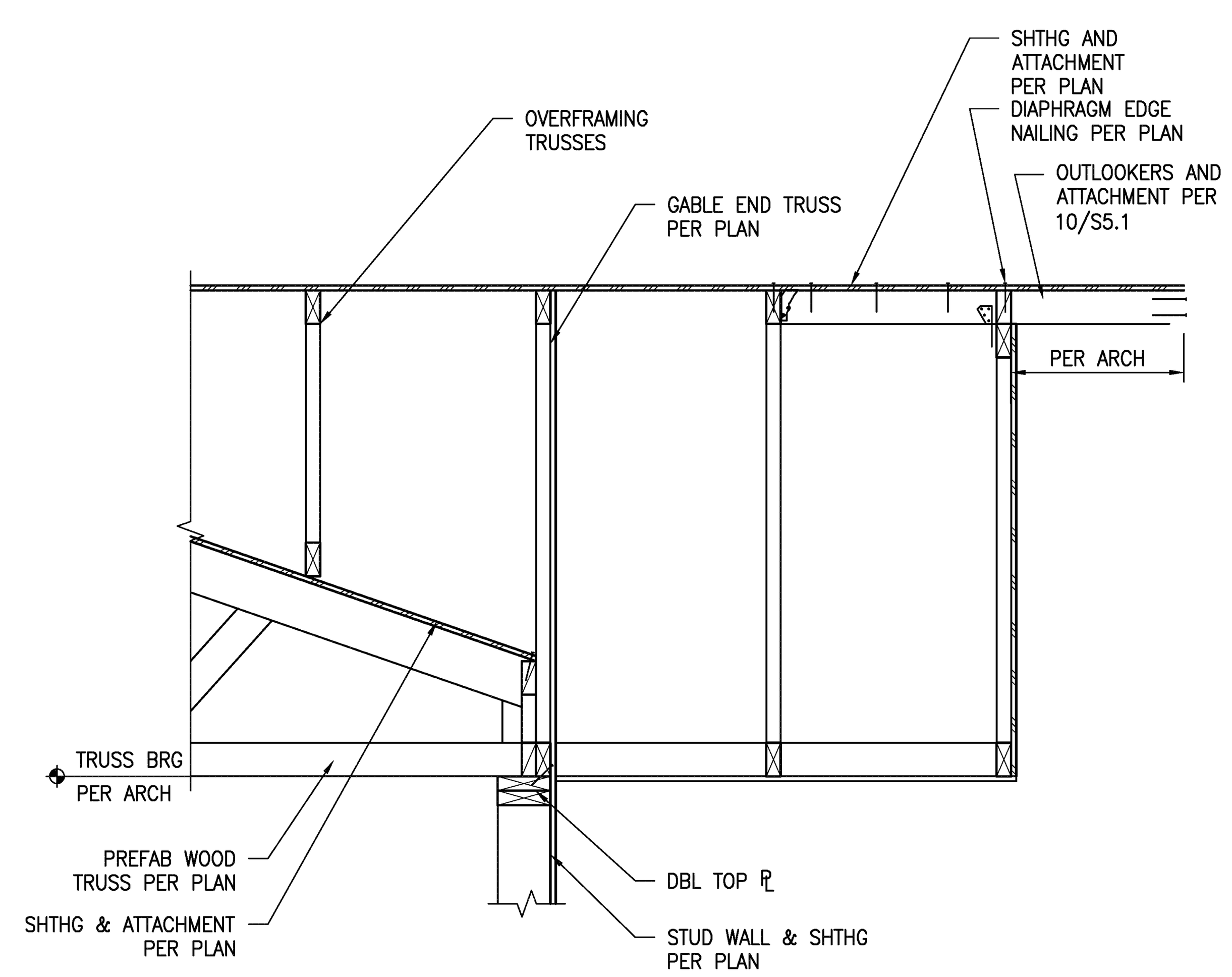


8 GABLE END TRUSS TO EXTERIOR WALL

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

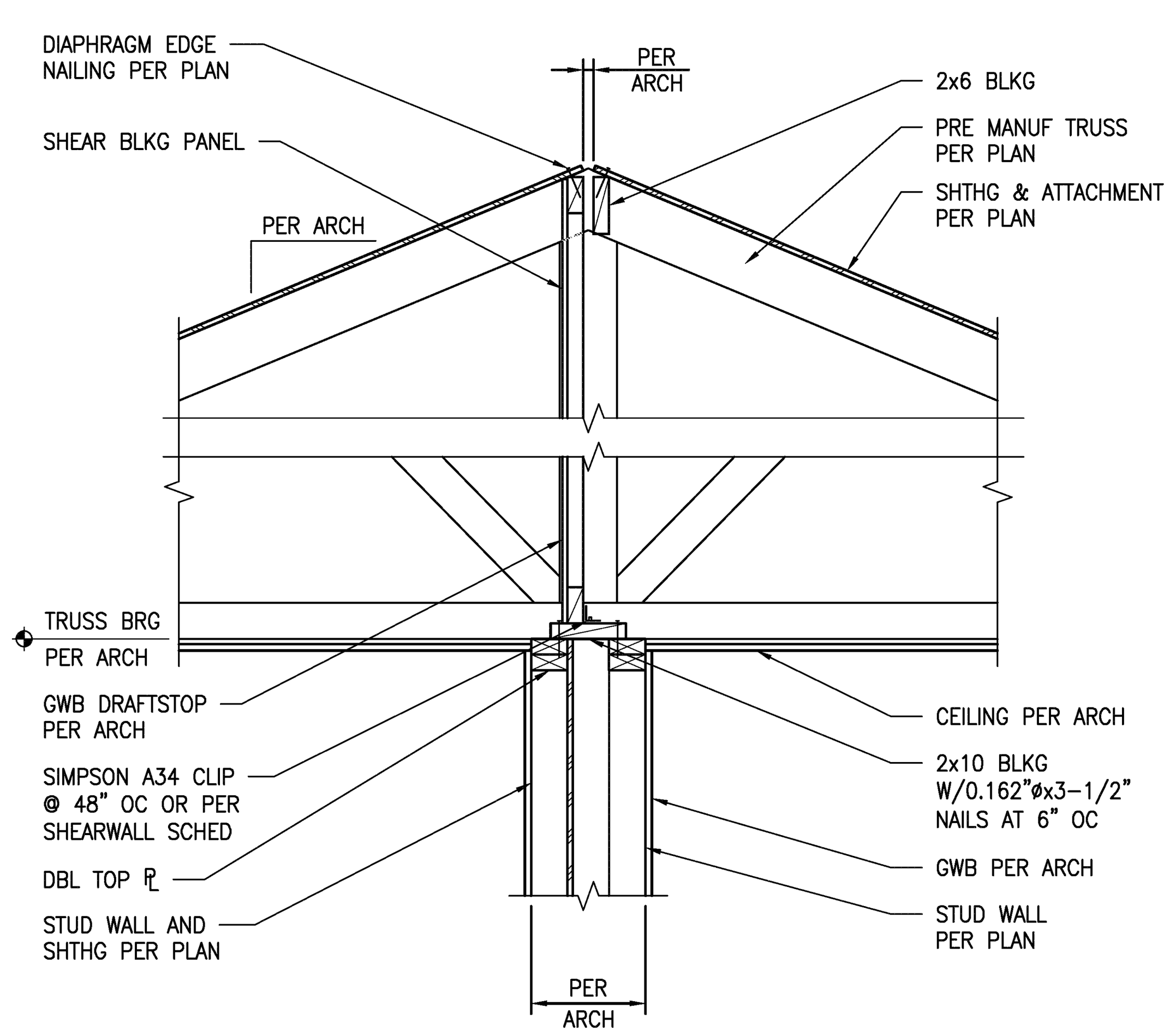
9 NOT USED

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



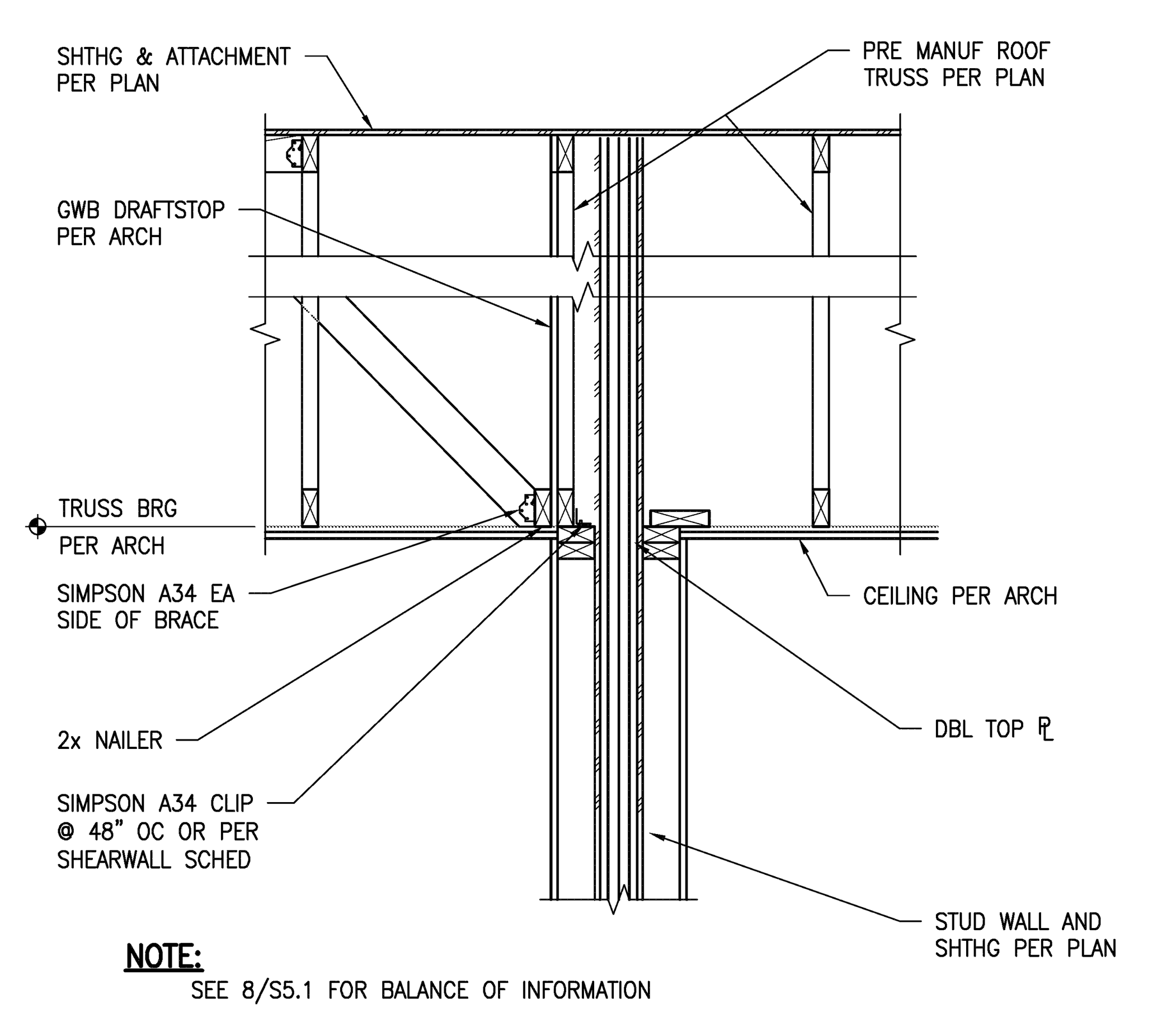
10 ROOF AT PATIO

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



11 PERP TRUSS TO DOUBLE PARTITION WALL

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



12 PARALLEL TRUSS TO DOUBLE PARTITION WALL

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

CRAIG A. PENFIELD
STATE OF WASHINGTON
42811
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PROFESSIONAL ENGINEER
06/21/16

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2528 NORTH SULLIVAN ROAD
SPOKANE VALLEY, WA 99216
PH: 509-893-2617 FAX: 509-926-0227

CIVIL | X STRUCTURAL | SURVEYING | TRAFFIC | PLANNING | LANDSCAPE | OTHER

LEGACY VILLAS
24 UNIT
LIBERTY LAKE, WA

DRAWN:	JDK
REVIEWED:	CAP
SCALE:	PER PLAN
PROJ #:	16-1624
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ROOF FRAMING DETAILS

S5.1

Structural Calculations

Legacy Villas – 24 Unit Structure

Liberty Lake, WA

June 21 , 2016

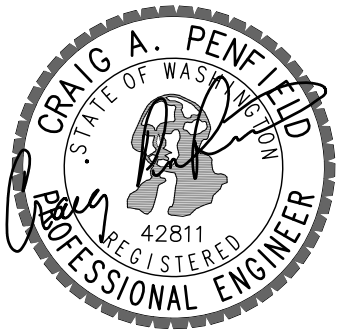
WCE No. 16-1624

Whipple Consulting Engineers, Inc.

Structural Calculations

Legacy Villas
24-Unit Structure
Liberty Lake, WA

Prepared for:
Wyatt Architects
P.O. Box 141713
Spokane Valley, WA 99214



6/21/16

June 21, 2016
WCE Job #2016-1624

2528 N. Sullivan Road, Spokane Valley, WA 99216 ▲ PO Box 1566, Veradale, WA 99037
Phone 509-893-2617 • Fax 509-926-0227
Civil, Structural, Traffic, Survey, Landscape Architecture and Entitlements

Whipple Consulting Engineers
2528 North Sullivan, Spokane Valley, WA 99216
509-893-2617 www.whipplece.com

GRAVITY LOADS

ROOF DEAD LOADS	WEIGHT (PSF)
Roofing	3
Sheathing/Metal Deck	1.0
Insulation	1.5
Trusses/Framing	3.0
Ceiling	1.0
MEP	3.0
Miscellaneous	2.5
Total Roof Dead Load	15.0

ROOF LIVE LOADS	WEIGHT (PSF)
Roof Live Construction	20
Snow Loads	40

WALL DEAD LOAD	
2x6	10

FLOOR DEAD LOADS	
Floor	25.0
Corridor/Decks	50

FLOOR LIVE LOADS	
Floor	40
Corridor/Decks	100

LATERAL LOADS

Wind

Wind Speed	110	MPH
Exposure	C	
Importance Category	II	

Seismic

Seismic Importance Factor	1.0		
Seismic Use Group	II		
Site Class	C		
Spectral Response Coeff (S_{DS})	0.274	g	
Spectral Response Coeff (S_{D1})	0.129	g	
Seismic Design Category	B		
Response Modification Factor (R)	6.5		Light Framed Wood Shear Walls
Seismic Response Coeff (C_S)	0.0422		

LATERAL ANALYSIS

Seismic Dead Loads

Roof: $P_f > 30$ psf ∴ Use 20% Roof snow + Self weight = $40(0.2)+15 = 23$ psf
Floors: Self wt = 25 psf

Segment "A"

Roof, W = (43'x65')(23psf) = 64 k
3rd Flr., W = (41'x62')(25psf) = 65 k
2nd Flr., W = " " = 65 k

Segment "B" (Center)

Roof, W = (76'x50')(23psf) = 91 k
3rd Flr., W = (74'x50')(25psf) = 93 k
2nd Flr., W = " " = 93 k

Segment "C" w/ Garage

Roof, W = (36'x52')(23psf) = 43 k
3rd Flr., W = (34'x52')(25psf) = 44 k
2nd Flr., W = (34'x52')25psf + (22'x66')23psf = 78 k

Seismic Base Shear

Per attached Enercalc run
Segment "A" = 8.2 k
Segment "B" = 11.7 k
Segment "C" = 7.0 k

∴ V = 26.9 k

WCE Whipple Consulting Engineers, Inc. 2528 N. Sullivan Rd. • Spokane Valley, WA 99216 Phone 509-893-2617 • Fax 509-926-0227	Traffic ☐ Planning ☐ Survey ☐ Structural ☐ Landscape ☐ Civil ☐	NAME OF PROJECT Lecam Villas - 24 Unit Bldg		SHEET NUMBER OF
		COMPUTED BY DGR	CHECKED BY	JOB NUMBER DATE

ASCE Seismic Base Shear

24 Unit bldg - Segment "A"

Risk Category

Calculations per ASCE 7-10

Risk Category of Building or Other Structure : "II" : All Buildings and other structures except those listed as Category I, III, and IV — *ASCE 7-10, Page 2, Table 1.5-1*

Seismic Importance Factor = 1 — *ASCE 7-10, Page 5, Table 1.5-2*

USER DEFINED Ground Motion

ASCE 7-10 11.4.1

Max. Ground Motions, 5% Damping :

S_S = 0.3430 g, 0.2 sec response

S_1 = 0.1150 g, 1.0 sec response

Site Class, Site Coeff. and Design Category

Site Classification "C" : Shear Wave Velocity 1,200 to 2,500 ft/sec = C — *ASCE 7-10 Table 20.3-1*

Site Coefficients Fa & Fv — *ASCE 7-10 Table 11.4-1 & 11.4-2*

(using straight-line interpolation from table values)

Fa = 1.20

Fv = 1.69

Maximum Considered Earthquake Acceleration

$S_{MS} = Fa * Ss$ = 0.412 — *ASCE 7-10 Eq. 11.4-1*

$S_{M1} = Fv * S1$ = 0.194 — *ASCE 7-10 Eq. 11.4-2*

Design Spectral Acceleration

$S_{DS} = S_{MS} * 2/3$ = 0.274 — *ASCE 7-10 Eq. 11.4-3*

$S_{D1} = S_{M1} * 2/3$ = 0.129 — *ASCE 7-10 Eq. 11.4-4*

Seismic Design Category = B — *ASCE 7-10 Table 11.6-1 & -2*

Resisting System

ASCE 7-10 Table 12.2-1

Basic Seismic Force Resisting System . . . **Bearing Wall Systems**
Light-framed walls sheathed w/wood structural panels rated for shear resistance or steel sheets.

Response Modification Coefficient " R " = 6.50

System Overstrength Factor " Wo " = 3.00

Deflection Amplification Factor " Cd " = 4.00

NOTE! See ASCE 7-10 for all applicable footnotes.

Building height Limits :

Category "A & B" Limit:	No Limit
Category "C" Limit:	No Limit
Category "D" Limit:	Limit = 65
Category "E" Limit:	Limit = 65
Category "F" Limit:	Limit = 65

Lateral Force Procedure

ASCE 7-10 Section 12.8.2

Equivalent Lateral Force Procedure

The "Equivalent Lateral Force Procedure" is being used according to the provisions of ASCE 7-10 12.8

Determine Building Period

Use ASCE 12.8-7

Structure Type for Building Period Calculation : All Other Structural Systems

" Ct " value = 0.020 " hn " : Height from base to highest level = 27.0 ft

" x " value = 0.75

" Ta " Approximate fundemental period using Eq. 12.8-7 : Ta = Ct * (hn ^ x) = 0.237 sec

"TL" : Long-period transition period per ASCE 7-10 Maps 22-12 -> 22-16 4.000 sec

Building Period " Ta " Calculated from Approximate Method selected = 0.237 sec

" Cs " Response Coefficient

ASCE 7-10 Section 12.8.1.1

S_{DS}: Short Period Design Spectral Response	=	0.274	From Eq. 12.8-2, Preliminary Cs	=	0.042
" R " : Response Modification Factor	=	6.50	From Eq. 12.8-3 & 12.8-4 , Cs need not exceed	=	0.084
" I " : Seismic Importance Factor	=	1	From Eq. 12.8-5 & 12.8-6, Cs not be less than	=	0.012
			Cs : Seismic Response Coefficient =	=	**0.0422**

Seismic Base Shear

ASCE 7-10 Section 12.8.1

Cs = 0.0422 from 12.8.1.1

W (see Sum Wi below) = 194.00 k

Seismic Base Shear V = Cs * W = 8.19 k

ASCE Seismic Base Shear

Vertical Distribution of Seismic Forces

ASCE 7-10 Section 12.8.3

" k " : hx exponent based on Ta = 1.00

Table of building Weights by Floor Level...

Level #	Wi : Weight	Hi : Height	(Wi * Hi) ^k	Cvx	Fx=Cvx * V	Sum Story Shear	Sum Story Moment
3	64.00	27.00	1,728.00	0.4961	4.06	4.06	0.00
2	65.00	18.00	1,170.00	0.3359	2.75	6.81	36.57
1	65.00	9.00	585.00	0.1680	1.38	8.19	97.90
Sum Wi =	194.00 k		Sum Wi * Hi =	3,483.00 k-ft		Total Base Shear =	8.19 k
						Base Moment =	171.6 k-ft

Diaphragm Forces : Seismic Design Category "B" to "F"

ASCE 7-10 12.10.1.1

Level #	Wi	Fi	Sum Fi	Sum Wi	Fpx : Calcd	Fpx : Min	Fpx : Max	Fpx	Dsgn. Force
3	64.00	4.06	4.06	64.00	4.06	3.51	7.02	4.06	4.06
2	65.00	2.75	6.81	129.00	3.43	3.57	7.13	3.57	3.57
1	65.00	1.38	8.19	194.00	2.74	3.57	7.13	3.57	3.57

Wpx ..... Weight at level of diaphragm and other structure elements attached to it.
Fi ..... Design Lateral Force applied at the level.
Sum Fi ..... Sum of "Lat. Force" of current level plus all levels above
MIN Req'd Force @ Level ..... $0.20 * S_{DS}^{*} I * Wpx$
MAX Req'd Force @ Level ..... $0.40 * S_{DS}^{*} I * Wpx$
Fpx : Design Force @ Level ..... Wpx * SUM(x->n) Fi / SUM(x->n) wi, x = Current level, n = Top Level

ASCE Seismic Base Shear

24 Unit Bldg, Segment "B" (center units)

Risk Category

Calculations per ASCE 7-10

Risk Category of Building or Other Structure : "II" : All Buildings and other structures except those listed as Category I, III, and IV — *ASCE 7-10, Page 2, Table 1.5-1*

Seismic Importance Factor = 1 — *ASCE 7-10, Page 5, Table 1.5-2*

USER DEFINED Ground Motion

ASCE 7-10 11.4.1

Max. Ground Motions, 5% Damping :

S_S = 0.3430 g, 0.2 sec response

S_1 = 0.1150 g, 1.0 sec response

Site Class, Site Coeff. and Design Category

Site Classification "C" : Shear Wave Velocity 1,200 to 2,500 ft/sec		=	C	*ASCE 7-10 Table 20.3-1*
Site Coefficients Fa & Fv	Fa	=	1.20	*ASCE 7-10 Table 11.4-1 & 11.4-2*
(using straight-line interpolation from table values)	Fv	=	1.69	
Maximum Considered Earthquake Acceleration	S_{MS} = Fa * Ss	=	0.412	*ASCE 7-10 Eq. 11.4-1*
	S_{M1} = Fv * S1	=	0.194	*ASCE 7-10 Eq. 11.4-2*
Design Spectral Acceleration	$S_{DS} = S_{MS} * 2/3$	=	0.274	*ASCE 7-10 Eq. 11.4-3*
	$S_{D1} = S_{M1} * 2/3$	=	0.129	*ASCE 7-10 Eq. 11.4-4*
Seismic Design Category		=	B	*ASCE 7-10 Table 11.6-1 & -2*

Resisting System

ASCE 7-10 Table 12.2-1

Basic Seismic Force Resisting System . . . **Bearing Wall Systems**
Light-framed walls sheathed w/wood structural panels rated for shear resistance or steel sheets.

Response Modification Coefficient " R "	=	6.50
System Overstrength Factor " Wo "	=	3.00
Deflection Amplification Factor " Cd "	=	4.00

NOTE! See ASCE 7-10 for all applicable footnotes.

Building height Limits :

Category "A & B" Limit:	No Limit
Category "C" Limit:	No Limit
Category "D" Limit:	Limit = 65
Category "E" Limit:	Limit = 65
Category "F" Limit:	Limit = 65

Lateral Force Procedure

ASCE 7-10 Section 12.8.2

Equivalent Lateral Force Procedure

The "Equivalent Lateral Force Procedure" is being used according to the provisions of ASCE 7-10 12.8

Determine Building Period

Use ASCE 12.8-7

Structure Type for Building Period Calculation : All Other Structural Systems

" Ct " value = 0.020 " hn " : Height from base to highest level = 27.0 ft

" x " value = 0.75

" Ta " Approximate fundemental period using Eq. 12.8-7 : Ta = Ct * (hn ^ x) = 0.237 sec

"TL" : Long-period transition period per ASCE 7-10 Maps 22-12 -> 22-16 16.000 sec

Building Period " Ta " Calculated from Approximate Method selected = 0.237 sec

" Cs " Response Coefficient

ASCE 7-10 Section 12.8.1.1

S_{DS}: Short Period Design Spectral Response	=	0.274	From Eq. 12.8-2, Preliminary Cs	=	0.042
" R " : Response Modification Factor	=	6.50	From Eq. 12.8-3 & 12.8-4 , Cs need not exceed	=	0.084
" I " : Seismic Importance Factor	=	1	From Eq. 12.8-5 & 12.8-6, Cs not be less than	=	0.012
			Cs : Seismic Response Coefficient =	=	**0.0422**

Seismic Base Shear

ASCE 7-10 Section 12.8.1

Cs = 0.0422 from 12.8.1.1

W (see Sum Wi below) = 277.00 k

Seismic Base Shear V = Cs * W = 11.69 k

ASCE Seismic Base Shear

Vertical Distribution of Seismic Forces

ASCE 7-10 Section 12.8.3

" k " : hx exponent based on Ta = 1.00

Table of building Weights by Floor Level...

Level #	Wi : Weight	Hi : Height	(Wi * Hi) ^k	Cvx	Fx=Cvx * V	Sum Story Shear	Sum Story Moment
3	91.00	27.00	2,457.00	0.4946	5.78	5.78	0.00
2	93.00	18.00	1,674.00	0.3370	3.94	9.72	52.05
1	93.00	9.00	837.00	0.1685	1.97	11.69	139.56

Sum Wi = 277.00 k Sum Wi * Hi = 4,968.00 k-ft Total Base Shear = 11.69 k Base Moment = 244.8 k-ft

Diaphragm Forces : Seismic Design Category "B" to "F"

ASCE 7-10 12.10.1.1

Level #	Wi	Fi	Sum Fi	Sum Wi	Fpx : Calcd	Fpx : Min	Fpx : Max	Fpx	Dsgn. Force
3	91.00	5.78	5.78	91.00	5.78	4.99	9.99	5.78	5.78
2	93.00	3.94	9.72	184.00	4.91	5.10	10.21	5.10	5.10
1	93.00	1.97	11.69	277.00	3.93	5.10	10.21	5.10	5.10

Wpx ..... Weight at level of diaphragm and other structure elements attached to it.
Fi ..... Design Lateral Force applied at the level.
Sum Fi ..... Sum of "Lat. Force" current level plus all levels above
MIN Req'd Force @ Level ..... $0.20 * S_{DS}^{*} I * Wpx$
MAX Req'd Force @ Level ..... $0.40 * S_{DS}^{*} I * Wpx$
Fpx : Design Force @ Level ..... Wpx * SUM(x->n) Fi / SUM(x->n) wi, x = Current level, n = Top Level

24 Unit Bldg., Segment "C" (with garage)

Risk Category

Calculations per ASCE 7-10

Risk Category of Building or Other Structure : "II" : All Buildings and other structures except those listed as Category I, III, and IV — *ASCE 7-10, Page 2, Table 1.5-1*

Seismic Importance Factor = 1 — *ASCE 7-10, Page 5, Table 1.5-2*

USER DEFINED Ground Motion

ASCE 7-10 11.4.1

Max. Ground Motions, 5% Damping :

S_S = 0.3430 g, 0.2 sec response
S_1 = 0.1150 g, 1.0 sec response

Site Class, Site Coeff. and Design Category

Site Classification "C" : Shear Wave Velocity 1,200 to 2,500 ft/sec		=	C	*ASCE 7-10 Table 20.3-1*
Site Coefficients Fa & Fv	Fa	=	1.20	*ASCE 7-10 Table 11.4-1 & 11.4-2*
(using straight-line interpolation from table values)	Fv	=	1.69	
Maximum Considered Earthquake Acceleration	S_{MS} = Fa * Ss	=	0.412	*ASCE 7-10 Eq. 11.4-1*
	S_{M1} = Fv * S1	=	0.194	*ASCE 7-10 Eq. 11.4-2*
Design Spectral Acceleration	S_{DS} = S_{MS} * 2/3	=	0.274	*ASCE 7-10 Eq. 11.4-3*
	S_{D1} = S_{M1} * 2/3	=	0.129	*ASCE 7-10 Eq. 11.4-4*
Seismic Design Category		=	B	*ASCE 7-10 Table 11.6-1 & -2*

Resisting System

ASCE 7-10 Table 12.2-1

Basic Seismic Force Resisting System . . . **Bearing Wall Systems**
Light-framed walls sheathed w/wood structural panels rated for shear resistance or steel sheets.

Response Modification Coefficient " R "	=	6.50
System Overstrength Factor " Wo "	=	3.00
Deflection Amplification Factor " Cd "	=	4.00

NOTE! See ASCE 7-10 for all applicable footnotes.

Building height Limits :

Category "A & B" Limit:	No Limit
Category "C" Limit:	No Limit
Category "D" Limit:	Limit = 65
Category "E" Limit:	Limit = 65
Category "F" Limit:	Limit = 65

Lateral Force Procedure

ASCE 7-10 Section 12.8.2

Equivalent Lateral Force Procedure

The "Equivalent Lateral Force Procedure" is being used according to the provisions of ASCE 7-10 12.8

Determine Building Period

Use ASCE 12.8-7

Structure Type for Building Period Calculation : All Other Structural Systems

" Ct " value = 0.020 " hn " : Height from base to highest level = 27.0 ft

" x " value = 0.75

" Ta " Approximate fundemental period using Eq. 12.8-7 : Ta = Ct * (hn ^ x) = 0.237 sec

"TL" : Long-period transition period per ASCE 7-10 Maps 22-12 -> 22-16 16.000 sec

Building Period " Ta " Calculated from Approximate Method selected = 0.237 sec

" Cs " Response Coefficient

ASCE 7-10 Section 12.8.1.1

S_{DS}: Short Period Design Spectral Response	=	0.274	From Eq. 12.8-2, Preliminary Cs	=	0.042
" R " : Response Modification Factor	=	6.50	From Eq. 12.8-3 & 12.8-4 , Cs need not exceed	=	0.084
" I " : Seismic Importance Factor	=	1	From Eq. 12.8-5 & 12.8-6, Cs not be less than	=	0.012
			Cs : Seismic Response Coefficient =	=	**0.0422**

Seismic Base Shear

ASCE 7-10 Section 12.8.1

Cs = 0.0422 from 12.8.1.1

W (see Sum Wi below) = 165.00 k

Seismic Base Shear V = Cs * W = 6.97 k

ASCE Seismic Base Shear

Vertical Distribution of Seismic Forces

ASCE 7-10 Section 12.8.3

" k " : hx exponent based on Ta = 1.00

Table of building Weights by Floor Level...

Level #	Wi : Weight	Hi : Height	(Wi * Hi) ^k	Cvx	Fx=Cvx * V	Sum Story Shear	Sum Story Moment
3	43.00	27.00	1,161.00	0.4373	3.05	3.05	0.00
2	44.00	18.00	792.00	0.2983	2.08	5.12	27.41
1	78.00	9.00	702.00	0.2644	1.84	6.97	73.53
Sum Wi =	165.00 k	Sum Wi * Hi =	2,655.00 k-ft		Total Base Shear =	6.97 k	
						Base Moment =	136.2 k-ft

Diaphragm Forces : Seismic Design Category "B" to "F"

ASCE 7-10 12.10.1.1

Level #	Wi	Fi	Sum Fi	Sum Wi	Fpx : Calcd	Fpx : Min	Fpx : Max	Fpx	Dsgn. Force
3	43.00	3.05	3.05	43.00	3.05	2.36	4.72	3.05	3.05
2	44.00	2.08	5.12	87.00	2.59	2.41	4.83	2.59	2.59
1	78.00	1.84	6.97	165.00	3.29	4.28	8.56	4.28	4.28

Wpx ..... Weight at level of diaphragm and other structure elements attached to it.
Fi ..... Design Lateral Force applied at the level.
Sum Fi ..... Sum of "Lat. Force" of current level plus all levels above
MIN Req'd Force @ Level ..... $0.20 * S_{DS}^{*} I * Wpx$
MAX Req'd Force @ Level ..... $0.40 * S_{DS}^{*} I * Wpx$
Fpx : Design Force @ Level ..... Wpx * SUM(x->n) Fi / SUM(x->n) wi, x = Current level, n = Top Level

Wind V = 110 mph, Exp. "C", Zone (risk) II, Encl. Cat. = Enclosed
Code: 2012 IBC, ASCE 7-10

Wind Pressures per ASCE 7-10, Fig. 28.6-1 (See attached Enercalc run)
A = 38.1 psf, B = 10.0 psf, C = 25.4 psf, D = 8.0 psf, dist. a = 6.3'

Shear Loads / Level

Average Bldg. Dim's:
Ht.: 2nd Flr = 10', 3rd Floor = 20', Eave = 30', Peak = 40'
Width, W = 63'
Length, L = 162'

Wind into Sidewall

V/Flr. = Wall Trib. Ht. [2a(A) + (L-2a)C] / L
2nd Flr., V = 10' [2(6.3')(38.1psf) + ((162' - 2(6.3'))(25.4psf))] / 162' = 264 plf
3rd Flr., V = " " " " = 264 plf

V eave = [Wall trib. Ht. [2a(A) + (L-2a)(C)] + Roof trib. Ht. [2a(B) + (L-2a)(D)]] / L
Eave, V = 5' [12.6'(38.1) + (162' - 12.6')(25.4)] + 10' [12.6'(10) + (162' - 12.6')(8)] / 162 = 214 plf

Wind into Endwall

V/Flr. = Wall trib. ht. [a(A) + (W-a)(C)] / W
2nd Flr., V = 10' [6.3'(38.1psf) + (63' - 6.3')(25.4psf)] / 63' = 267 plf
3rd Flr., V = " " " = 267 plf

V eave = [Wall trib ht. [a(A) + (W-a)(C)] + Roof trib. ht. [a(A) + (W-a)(C)]] / W
Eave, V = [5' [6.3'(38.1) + (63' - 6.3')25.4] + 10' [6.3'(38.1) + (63' - 6.3')(25.4)]] / 63' = 400 plf

Total Wind Base Shear

Wind into Sidewall

V = Σ Floor Levels + Eave = (2(264 plf) + 214 plf) 162' = 120^k
Wind governs over Seismic

Wind into Endwall

V = Σ Floor Levels + Eave = (2(267 plf) + 400 plf) 63' = 59^k
Wind governs over Seismic

WCE Whipple Consulting Engineers, Inc.
2528 N. Sullivan Rd. • Spokane Valley, WA 99216
Phone 509-893-2617 • Fax 509-926-0227

Traffic ☐ Planning ☐ Survey ☐ Structural ☐ Landscape ☐ Civil ☐

NAME OF PROJECT			SHEET NUMBER
Legacy Villas - 24 Unit Structure			OF
COMPUTED BY	CHECKED BY	JOB NUMBER	DATE
DGR		16-1624	

ASCE 7-10 Wind Forces Chpt 28, Pt2 & Chpt 30, Pt2

Description : 24 Unit Building (three story)

Analytical Values

Calculations per ASCE 7-10

V : Basic Wind Speed per Sect 26.5-1 A, B or C	110.0 mph	
Roof Rise:Run Ratio	4:12	
Occupancy per Table 1.5-1	II	All Buildings and other structures except those listed as Category I, III, and IV
Exposure Category per 26.7	Exposure C	
MRH : Mean Roof Height	33.330 ft	*"Lambda" is interpolated between height tablular values.*
Lambda : per Figure 28.6-1, Page 305	1.43	
Effective Wind Area of Component & Cladding	10.0 ft^2	
Roof pitch for cladding pressure	0 to 7 degrees	
User specified minimum design pressure	8.0 psf	
Topographic Factor Kzt per 26.8	1.00	
LHD : Least Horizontal Dimension	63.0 ft	
a = max (0.04 * LHD, 3, min(0.10 * LHD, 0.4*MRH))	6.30 ft	max (0.04 * LHD, 3, min(0.10 * LHD, 0.4*MRH))

Design Wind Pressures

Minimum Additional Load Case per 28.4.4 = 16 PSF on entire vertical plane

Horizontal Pressures . . .

Zone: A =	38.13 psf	Zone: C =	25.37 psf
Zone: B =	-10.03 psf	Zone: D =	-8.00 psf

Vertical Pressures . . .

Zone: E =	-33.11 psf	Zone: G =	-22.93 psf
Zone: F =	-22.93 psf	Zone: H =	-17.49 psf

Overhangs . . .

Zone: Eoh =	-46.30 psf	Zone: Goh =	-36.26 psf

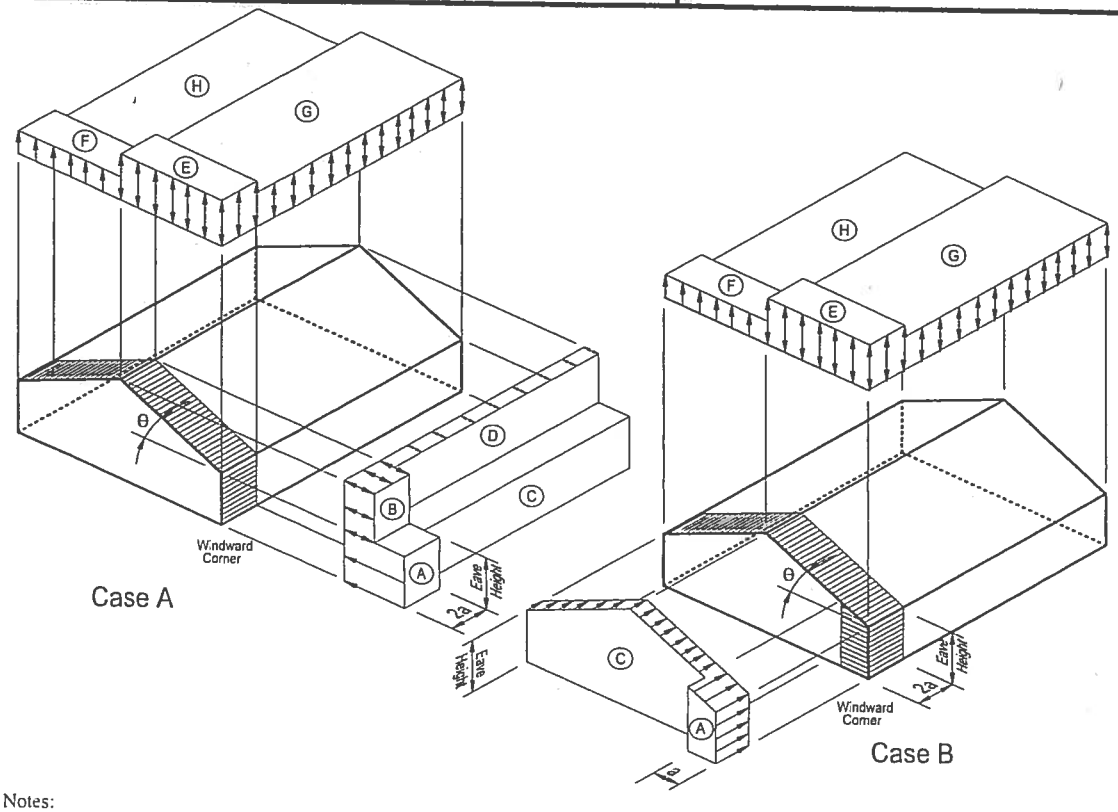
Component & Cladding Design Wind Pressures

*Design Wind Pressure = Lambda * Kzt * Ps30 per Eq 30.5-1*

Roof Zone 1 :	Positive :	12.756 psf
	Negative :	-31.246 psf
Roof Zone 2 :	Positive :	12.756 psf
	Negative :	-52.315 psf
Roof Zone 3 :	Positive :	12.756 psf
	Negative :	-78.832 psf
Wall Zone 4 :	Positive :	31.246 psf
	Negative :	-33.826 psf
Wall Zone 5 :	Positive :	31.246 psf
	Negative :	-41.709 psf
Roof Overhang Zone 2:		-49.162 psf
Roof Overhang Zone 3:		-80.981 psf

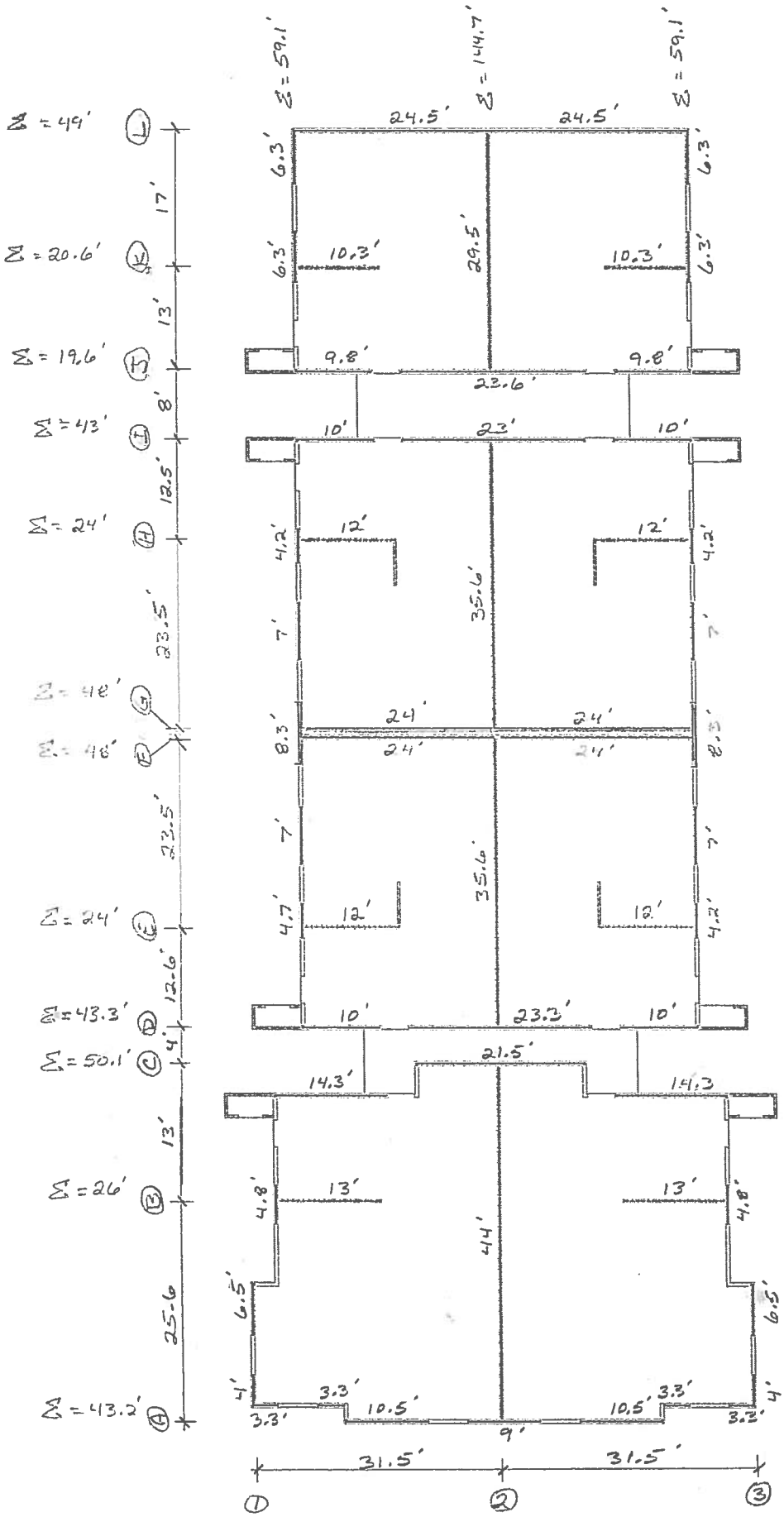
Minimum Additional Load Case per 28.4.4 = 16 PSF on entire vertical plane

Main Wind Force Resisting System – Method 2		h ≤ 60 ft.
Figure 28.6-1	Design Wind Pressures	Walls & Roofs
Enclosed Buildings		



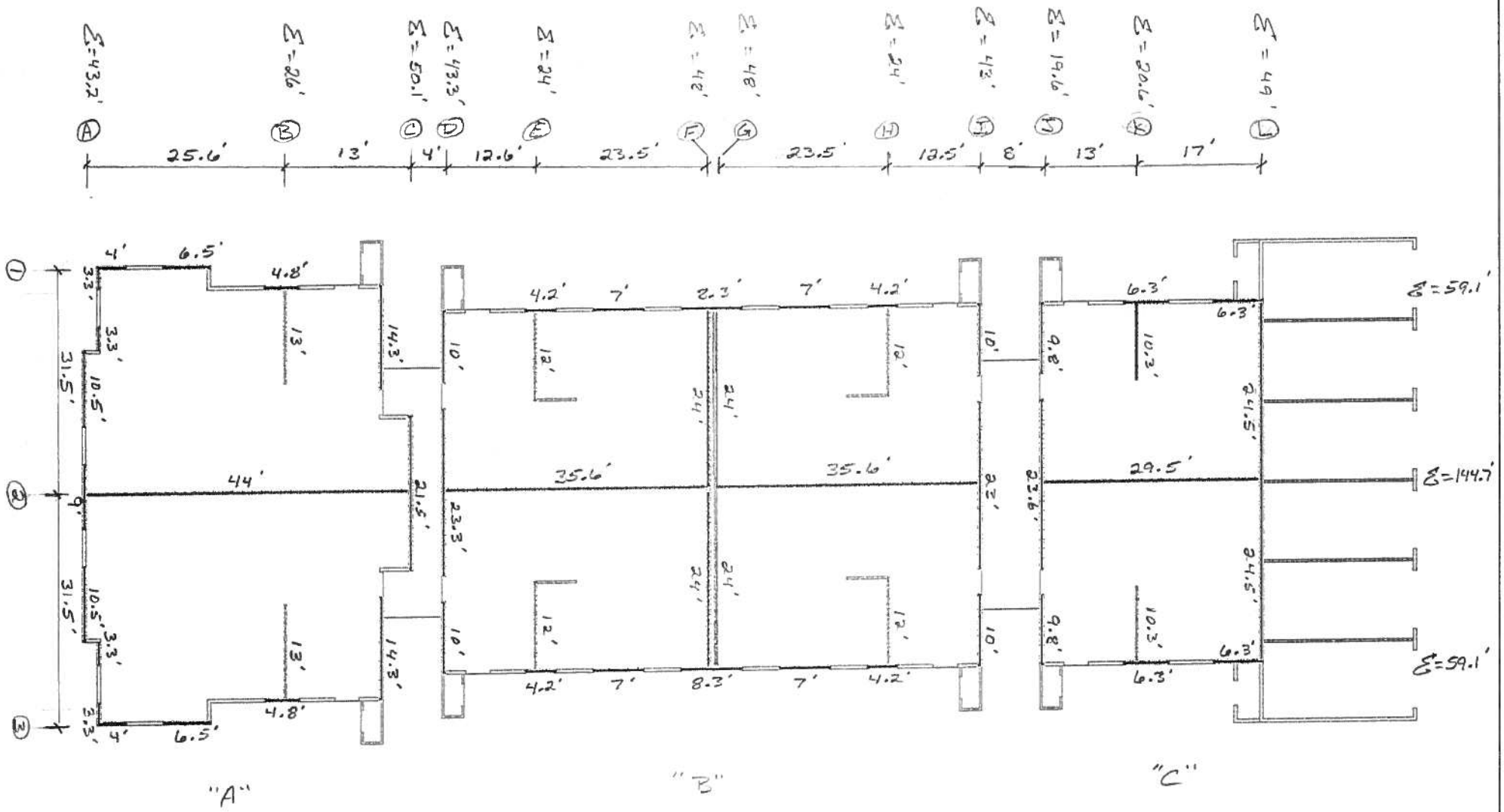
Notes:

1. Pressures shown are applied to the horizontal and vertical projections, for exposure B, at h=30 ft (9.1m). Adjust to other exposures and heights with adjustment factor λ.
2. The load patterns shown shall be applied to each corner of the building in turn as the reference corner. (See Figure 28.4-1)
3. For Case B use $\theta = 0°$.
4. Load cases 1 and 2 must be checked for $25° < \theta \leq 45°$. Load case 2 at 25° is provided only for interpolation between 25° and 30°.
5. Plus and minus signs signify pressures acting toward and away from the projected surfaces, respectively.
6. For roof slopes other than those shown, linear interpolation is permitted.
7. The total horizontal load shall not be less than that determined by assuming $p_S = 0$ in zones B & D.
8. Where zone E or G falls on a roof overhang on the windward side of the building, use E_{OH} and G_{OH} for the pressure on the horizontal projection of the overhang. Overhangs on the leeward and side edges shall have the basic zone pressure applied.
9. Notation:
   - *a:* 10 percent of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).
   - *h:* Mean roof height, in feet (meters), except that eave height shall be used for roof angles <10°.
   - *θ:* Angle of plane of roof from horizontal, in degrees.



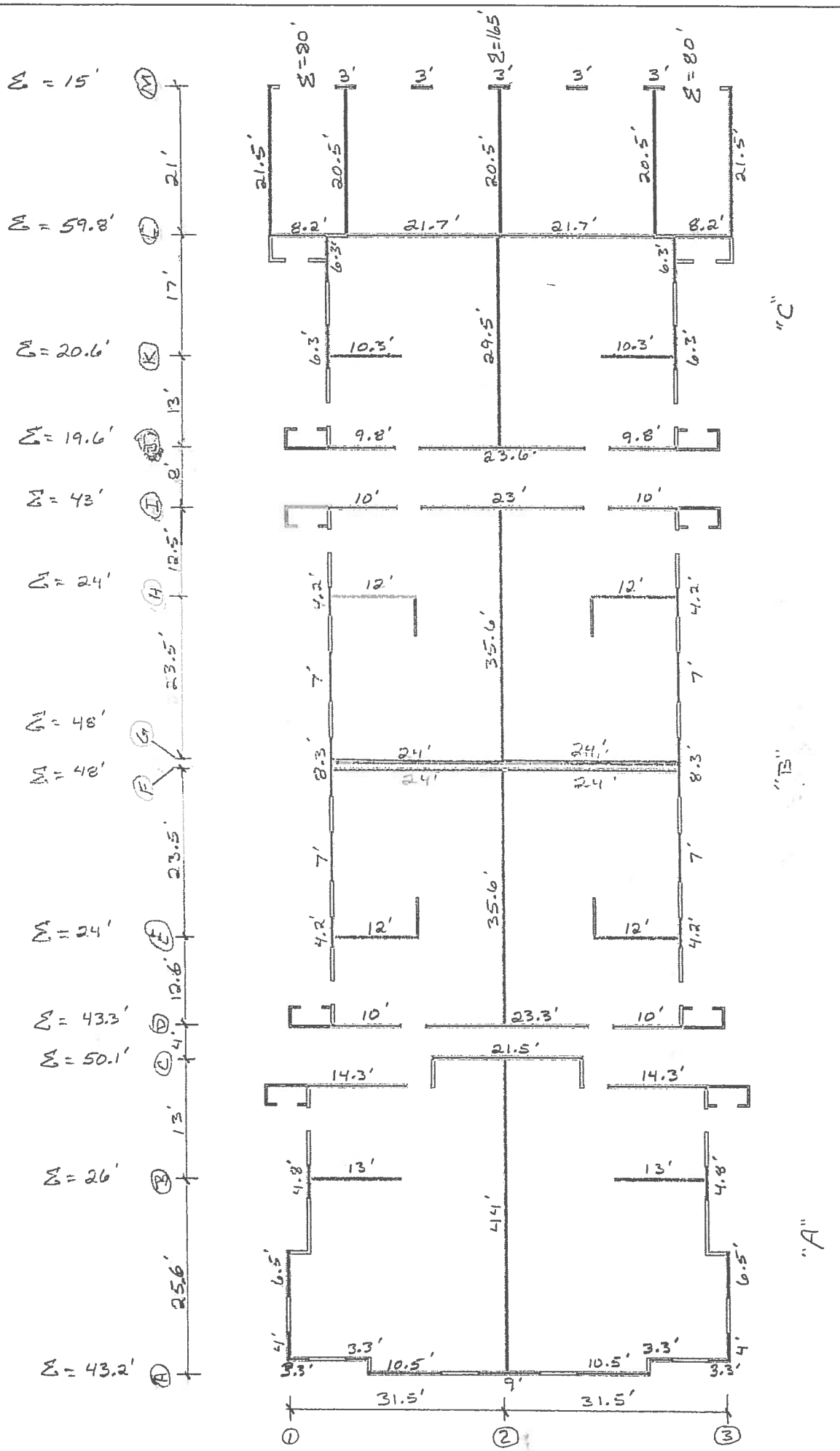
Shear Lines

Third Floor



Shear Lines

Second Floor



Shear Lines

Main Floor

Whipple Consulting Engineers
2528 N Sullivan Rd, Spokane Valley, WA

Date: 05/06/16
Page:
By: DGR

Project: Legacy Villas
Project No: 16-1624
Subject: LATERAL ANALYSIS - 24-Unit, Three Story Bldg.

Shear Wall Calculations (Wind Into Sidewall)
Wind Controls

TOP OF 3rd FLOOR WALLS

Wall	Load (plf)	Trib Width (ft)	Load (k)	Load From Above (k)	Total Load for Design (k)	Total Wall Length (ft)	(0.6)*Unit Shear (plf)	Wall Type	Wall Capacity
Line A	214.0	12.8	2.74	0.00	2.74	43.2	38	P6	260
Line B	214.0	19.3	4.13	0.00	4.13	26	95	P6	260
Line C	214.0	8.5	1.82	0.00	1.82	50.1	22	P6	260
Line D	214.0	8.3	1.78	0.00	1.78	43.3	25	P6	260
Line E	214.0	18.1	3.87	0.00	3.87	24	97	P6	260
Line F	214.0	12.0	2.57	0.00	2.57	48	32	P6	260
Line G	214.0	12.0	2.57	0.00	2.57	48	32	P6	260
Line H	214.0	18.0	3.85	0.00	3.85	24	96	P6	260
Line I	214.0	10.3	2.19	0.00	2.19	43	31	P6	260
Line J	214.0	10.5	2.25	0.00	2.25	19.6	69	P6	260
Line K	214.0	15.0	3.21	0.00	3.21	20.6	93	P6	260
Line L	214.0	8.5	1.82	0.00	1.82	49	22	P6	260

TOP OF 2nd FLOOR WALLS

Wall	Load (plf)	Trib Width (ft)	Load (k)	Load From Above (k)	Total Load for Design (k)	Total Wall Length (ft)	(0.6)*Unit Shear (plf)	Wall Type	Wall Capacity
Line A	264.0	12.8	3.38	2.74	6.12	43.2	85	P6	260
Line B	264.0	19.3	5.10	4.13	9.23	26	213	P6	260
Line C	264.0	8.5	2.24	1.82	4.06	50.1	49	P6	260
Line D	264.0	8.3	2.19	1.78	3.97	43.3	55	P6	260
Line E	264.0	18.1	4.78	3.87	8.65	24	216	P6	260
Line F	264.0	12.0	3.17	2.57	5.74	48	72	P6	260
Line G	264.0	12.0	3.17	2.57	5.74	48	72	P6	260
Line H	264.0	18.0	4.75	3.85	8.60	24	215	P6	260
Line I	264.0	10.3	2.71	2.19	4.90	43	68	P6	260
Line J	264.0	10.5	2.77	2.25	5.02	19.6	154	P6	260
Line K	264.0	15.0	3.96	3.21	7.17	20.6	209	P6	260
Line L	264.0	8.5	2.24	1.82	4.06	49	50	P6	260

TOP OF 1st FLOOR WALLS

Wall	Load (plf)	Trib Width (ft)	Load (k)	Load From Above (k)	Total Load for Design (k)	Total Wall Length (ft)	(0.6)*Unit Shear (plf)	Wall Type	Wall Capacity
Line A	264.0	12.8	3.38	6.12	9.50	43.2	132	P6	260
Line B	264.0	19.3	5.10	9.23	14.32	26	330	P4	380
Line C	264.0	8.5	2.24	4.06	6.31	50.1	76	P6	260
Line D	264.0	8.3	2.19	3.97	6.16	43.3	85	P6	260
Line E	264.0	18.1	4.78	8.65	13.43	24	336	P4	380
Line F	264.0	12.0	3.17	5.74	8.90	48	111	P6	260
Line G	264.0	12.0	3.17	5.74	8.90	48	111	P6	260
Line H	264.0	18.0	4.75	8.60	13.36	24	334	P4	380
Line I	264.0	10.3	2.71	4.90	7.61	43	106	P6	260
Line J	264.0	10.5	2.77	5.02	7.79	19.6	239	P6	260
Line K	264.0	15.0	3.96	7.17	11.13	20.6	324	P4	380
Line L	264.0	19.0	5.02	4.06	9.08	59.8	91	P6	260
Line M	264.0	10.5	2.77	0.00	2.77	15	111	P6	260

Whipple Consulting Engineers
2528 N Sullivan Rd, Spokane Valley, WA

Project: Legacy Villas
Subject: LATERAL ANALYSIS - 24-Unit, Three Story Bldg.

Project No: 16-1624

Date: 05/06/16
Page:
By: DGR

Shear Wall Calculations (Wind Into End Wall)
Wind Controls

TOP OF 3rd FLOOR WALLS

Wall	Load (plf)	Trib Width (ft)	Load (k)	Load From Above (k)	Total Load for Design (k)	Total Wall Length (ft)	(0.6)*Unit Shear (plf)	Wall Type	Wall Capacity
Line 1	400	15.75	6.30	0.00	6.30	59.1	64	P6	260
Line 2	400	31.5	12.60	0.00	12.60	144.7	52	P6	260
Line 3	400	15.75	6.30	0.00	6.30	59.1	64	P6	260
					25.20				

TOP OF 2nd FLOOR WALLS

Wall	Load (plf)	Trib Width (ft)	Load (k)	Load From Above (k)	Total Load for Design (k)	Total Wall Length (ft)	(0.6)*Unit Shear (plf)	Wall Type	Wall Capacity
Line 1	267	15.75	4.21	6.30	10.51	59.1	107	P6	260
Line 2	267	31.5	8.41	12.60	21.01	144.7	87	P6	260
Line 3	267	15.75	4.21	6.30	10.51	59.1	107	P6	260
					42.02				

TOP OF 1st FLOOR WALLS

Wall	Load (plf)	Trib Width (ft)	Load (k)	Load From Above (k)	Total Load for Design (k)	Total Wall Length (ft)	(0.6)*Unit Shear (plf)	Wall Type	Wall Capacity
Line 1	267	15.75	4.21	10.51	14.71	80	110	P6	260
Line 2	267	31.5	8.41	21.01	29.42	144.7	122	P6	260
Line 3	267	15.75	4.21	10.51	14.71	80	110	P6	260
					58.84				

Shear Wall Holdowns (Wind Into Sidewall)

3RD FLOOR (HD ACROSS 3RD FLOOR FRAMING)

Wall	Unit Shear	Wall Length	Wall Height	Dead Load 0.6D (plf)	PDL 0.6*D (lb)	Overturning Moment	Holdown Force	Anchor Type	Anchor Capacity
Line A	38	9	9	81		-0.20	-22	None	
Line B	95	13	9	72	0	5.07	390	None	
Line C	22	14.3	9	72		-4.56	-319	None	
Line D	25	10	9	72	0	-1.38	-138	None	
Line E	97	12	9	72	0	5.27	440	None	
Line F	32	24	9	63	0	-11.21	-467	None	
Line G	32	24	9	63	0	-11.21	-467	None	
Line H	96	12	9	72	0	5.22	435	None	
Line I	31	10	9	72	0	-0.85	-85	None	
Line J	69	9.8	9	72	0	2.61	266	None	
Line K	93	10.3	9	72	0	4.85	471	None	
Line L	22	49	9	81	0	-87.42	-1784	None	

2ND FLOOR (HD ACROSS 2ND FLOOR FRAMING)

Wall	Unit Shear	Wall Length	Wall Height	Dead Load 0.6D (plf)	PDL 0.6*D (lb)	Overturning Moment	Holdown Force	Anchor Type	Anchor Capacity
Line A	85	9	9	150		0.81	90	None	
Line B	213	13	9	156	0	11.73	1292	CS16	1705
Line C	49	14.3	9	261		-20.42	-1428	None	
Line D	55	10	9	261	0	-8.10	-810	None	
Line E	216	12	9	156	0	12.13	1450	CS16	1705
Line F	72	24	9	132	0	-22.53	-939	None	
Line G	72	24	9	132	0	-22.53	-939	None	
Line H	215	12	9	156	0	12.00	1435	CS16	1705
Line I	68	10	9	261	0	-6.90	-690	None	
Line J	154	9.8	9	261	0	1.02	370	None	
Line K	209	10.3	9	156	0	11.08	1547	CS16	1705
Line L	50	49	9	150	0	-158.13	-3227	None	

1ST FLOOR (HD AT FOUNDATION)

Wall	Unit Shear	Wall Length	Wall Height	Dead Load 0.6D (plf)	PDL 0.6*D (lb)	Overturning Moment	Holdown Force	Anchor Type	Anchor Capacity
Line A	132	9	9	219		1.82	292	None	
Line B	330	13	9	280	0	15.01	2446	HDU2	3075
Line C	76	14.3	9	450		-36.29	-2538	None	
Line D	85	10	9	450	0	-14.82	-1482	None	
Line E	336	12	9	280	0	16.10	2792	HDU2	3075
Line F	111	24	9	201	0	-33.85	-1410	None	
Line G	111	24	9	201	0	-33.85	-1410	None	
Line H	334	12	9	280	0	15.90	2760	HDU2	3075
Line I	106	10	9	450	0	-12.95	-1295	None	
Line J	239	9.8	9	450	0	-0.57	312	None	
Line K	324	10.3	9	280	0	15.20	3022	HDU2	3075
Line L	91	49	9	309	0	-330.78	-6751	None	
Line M	111	3	9	162	432	0.97	323	None	

Shear Wall Holdowns (Wind Into Endwall)

3RD FLOOR (HD ACROSS 3RD FLOOR FRAMING)

Wall	Unit Shear	Wall Length	Wall Height	Dead Load 0.6D (plf)	PDL 0.6*D (lb)	Overturning Moment	Holdown Force	Anchor Type	Anchor Capacity
Line 1	64	4	9	212	0	0.61	152	None	
Line 2	52	29.5	9	338	0	-133.20	-4515	None	
Line 3	64	4	9	212	0	0.61	152	None	

2ND FLOOR (HD ACROSS 2ND FLOOR FRAMING)

Wall	Unit Shear	Wall Length	Wall Height	Dead Load 0.6D (plf)	PDL 0.6*D (lb)	Overturning Moment	Holdown Force	Anchor Type	Anchor Capacity
Line 1	107	4	9	386	0	0.75	188	None	
Line 2	87	29.5	9	632	0	-251.87	-8538	None	
Line 3	107	4	9	386	0	0.75	188	None	

1ST FLOOR (HD AT FOUNDATION)

Wall	Unit Shear	Wall Length	Wall Height	Dead Load 0.6D (plf)	PDL 0.6*D (lb)	Overturning Moment	Holdown Force	Anchor Type	Anchor Capacity
Line 1	110	4	9	560	0	-0.51	-127	None	
Line 2	122	29.5	9	926	0	-370.54	-12561	None	
Line 3	110	4	9	560	0	-0.51	-127	None	

Whipple Consulting Engineers

2528 N Sullivan Rd, Spokane Valley, WA

Project: Legacy Villas **Project No:** 16-1624 **Date:** 05/10/16

Subject: Drag Truss Calculations - 24 Unit Bldg, Shearline B **By:** DGR

b(length of line)= 57

v (plf)= 214 v_R= 72 R(lbs)= 4130

L(trib)= 19.3

v_w= 159

	L_1=	L_2=	L_3=	L_4=	L_5=	
	13	31	13			
Plot of Unit Shears	72	72	72	0	0	plf
	159		159	0	0	plf
Net Unit Shears		72				plf
	-86		-86	0	0	plf
Collector Forces		1123.12	0.00	0.00	0.00	lbs
	-1123					lbs

Max Drag req= 1123 lbs

Service Load

Whipple Consulting Engineers

2528 N Sullivan Rd, Spokane Valley, WA

Project: Legacy Villas **Project No:** 16-1624 **Date:** 05/10/16

Subject: Drag Truss Calculations - 24 Unit, Shearlines E and H **By:** JDK

b(length of line)= 50

v (plf)= 214 v_R= 77 R(lbs)= 3863

L(trib)= 18.05

v_w= 161

	L_1=	L_2=	L_3=	L_4=	L_5=
	12	26	12	0	0
Plot of Unit Shears	77	77	77	0	0 plf
	161		161	0	0 plf
Net Unit Shears		77			plf
	-84		-84	0	0 plf
Collector Forces		1004.30	0.00	0.00	0.00 lbs
	-1004				lbs

Max Drag req= 1004 lbs

Service Load

Whipple Consulting Engineers

2528 N Sullivan Rd, Spokane Valley, WA

Project: Legacy Villas **Project No:** 16-1624 **Date:** 05/10/16

Subject: Drag Truss Calculations - 24 Unit Bldg, Shearline K **By:** DGR

b(length of line)= 50

v (plf)= 214 v_R= 64 R(lbs)= 3210

L(trib)= 15

v_w= 156

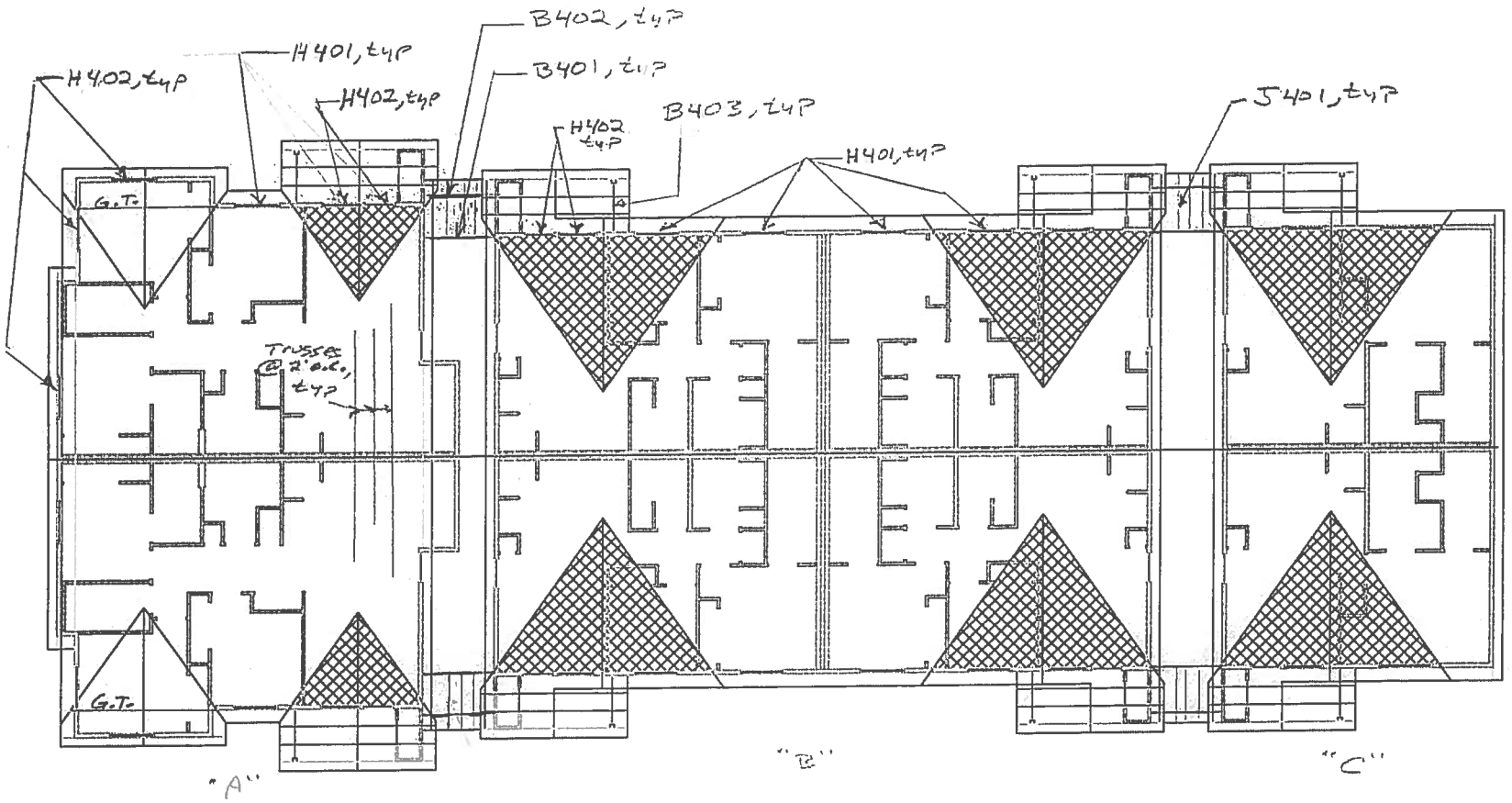
	L_1=	L_2=	L_3=	L_4=	L_5=	
	10.3	29.4	10.3	0	0	
Plot of Unit Shears	64	64	64	0	0	plf
	156		156	0	0	plf
Net Unit Shears		64				plf
	-92		-92	0	0	plf
Collector Forces		943.74	0.00	0.00	0.00	lbs
	-944					lbs

Max Drag req= 944 lbs

Service Load

BEAMS AND HEADERS

Roof Beams + Headers



Beams

B401 : GL 5 1/8 x 12
B402 : GL 3 1/8 x 7 1/2
B403 : (2) 2x10

Headers

H401 : (3) 2x10
H402 : (2) 2x10

Joists

J401 : 2x6 @ 24" o.c.

Whipple Consulting Engineers
2528 N Sullivan Rd
Spokane Valley, WA 99216

Project Title:
Engineer:
Project Descr:

Project ID:

Multiple Simple Beam

Description : Roof Beams and Headers

Wood Beam Design : B403: Truss support beam at deck

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **2-2x10, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending

Wood Species :	Douglas Fir - Larch				Wood Grade : No.2				
Fb - Tension	900.0 psi	Fc - Prll	1,350.0 psi	Fv	180.0 psi	Ebend- xx	1,600.0 ksi	Density	31.20 pcf
Fb - Compr	900.0 psi	Fc - Perp	625.0 psi	Ft	575.0 psi	Eminbend - xx	580.0 ksi		

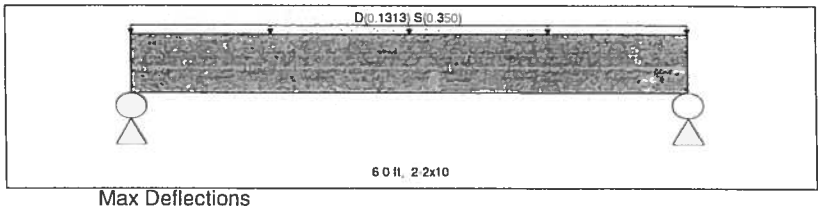
Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.0150, S = 0.040 k/ft, Trib= 8.750 ft

Design Summary

Max fb/Fb Ratio = **0.540 : 1**
fb : Actual : 615.04 psi at 3.000 ft in Span # 1
Fb : Allowable : 1,138.50 psi
Load Comb : +D+S+H

Max fv/FvRatio = **0.285 : 1**
fv : Actual : 59.00 psi at 5.240 ft in Span # 1
Fv : Allowable : 207.00 psi
Load Comb : +D+S+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.41			1.05			
Right Support	0.41			1.05			

Max Deflections

Downward L+Lr+S	0.032 in	Downward Total	0.045 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	2221 >360	Total Defl Ratio	1595 >240

Wood Beam Design : B401: Breezeway truss support beam

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **5.125x12, GLB, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending

Wood Species :	DF/DF				Wood Grade : 24F - V4				
Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.20 pcf
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi		

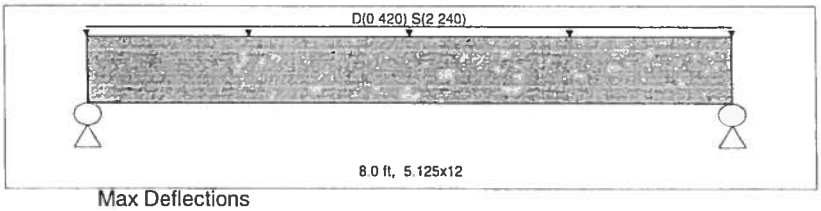
Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.0150, S = 0.080 k/ft, Trib= 28.0 ft

Design Summary

Max fb/Fb Ratio = **0.756 : 1**
fb : Actual : 2,086.50 psi at 4.000 ft in Span # 1
Fb : Allowable : 2,760.00 psi
Load Comb : +D+S+H

Max fv/FvRatio = **0.645 : 1**
fv : Actual : 196.48 psi at 0.000 ft in Span # 1
Fv : Allowable : 304.75 psi
Load Comb : +D+S+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.73			8.96			
Right Support	1.73			8.96			

Max Deflections

Downward L+Lr+S	0.156 in	Downward Total	0.186 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	614 >360	Total Defl Ratio	514 >240

Wood Beam Design : B402: Breezeway joist support beam

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **3.125x7.5, GLB, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending

Wood Species :	DF/DF				Wood Grade : 24F - V4				
Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.20 pcf
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi		

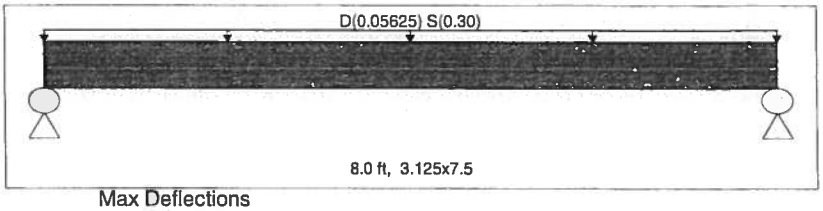
Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.0150, S = 0.080 k/ft, Trib= 3.750 ft

Design Summary

Max fb/Fb Ratio = **0.429 : 1**
fb : Actual : 1,184.00 psi at 4.000 ft in Span # 1
Fb : Allowable : 2,760.00 psi
Load Comb : +D+S+H

Max fv/FvRatio = **0.257 : 1**
fv : Actual : 78.32 psi at 0.000 ft in Span # 1
Fv : Allowable : 304.75 psi
Load Comb : +D+S+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.25			1.20			
Right Support	0.25			1.20			

Max Deflections

Downward L+Lr+S	0.141 in	Downward Total	0.169 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	683 >360	Total Defl Ratio	567 >240

Whipple Consulting Engineers
2528 N Sullivan Rd
Spokane Valley, WA 99216

Project Title:
Engineer:
Project Descr:

Project ID:

Multiple Simple Beam

File = P:\WCE_WORK\242IDK-9\2MHZA9~D\DBJGBY~H\SEV10W~K\C7A4YC~F\1CFED0~A.EC6
ENERCALC, INC. 1983-2016, Build:6.16.5.11, Ver:6.16.5.11
Lic. # : KW-06009199
Licensee : Whipple Consulting Engineers

Wood Beam Design : J401: Breezeway Joist

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **2x6, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending

Wood Species :	Douglas Fir - Larch					Wood Grade :	No.2		
Fb - Tension	900.0 psi	Fc - Prll	1,350.0 psi	Fv	180.0 psi	Ebend- xx	1,600.0 ksi	Density	31.20 pcf
Fb - Compr	900.0 psi	Fc - Perp	625.0 psi	Ft	575.0 psi	Eminbend - xx	580.0 ksi		

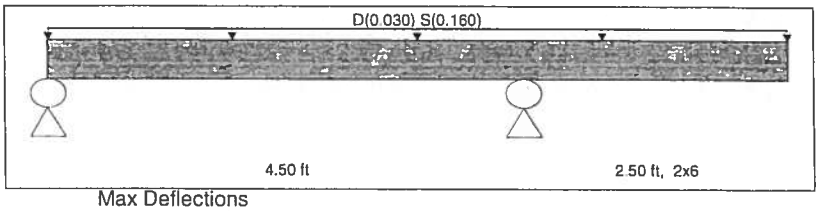
Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.0150, S = 0.080 k/ft, Trib= 2.0 ft

Design Summary

Max fb/Fb Ratio = **0.707 : 1**
fb : Actual : 951.01 psi at 4.500 ft in Span # 1
Fb : Allowable : 1,345.50 psi
Load Comb : +D+S+H

Max fv/FvRatio = **0.420 : 1**
fv : Actual : 86.98 psi at 4.050 ft in Span # 1
Fv : Allowable : 207.00 psi
Load Comb : +D+S+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.05			0.25			
Right Support	0.17			0.87			

Max Deflections

Downward L+Lr+S	0.059 in	Downward Total	0.071 in
Upward L+Lr+S	-0.001 in	Upward Total	-0.001 in
Live Load Defl Ratio	1018 >360	Total Defl Ratio	848 >240

Wood Beam Design : H401: Header at Sidewall

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **2-2x10, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending

Wood Species :	Douglas Fir - Larch					Wood Grade :	No.2		
Fb - Tension	900 psi	Fc - Prll	1350 psi	Fv	180 psi	Ebend- xx	1600 ksi	Density	31.2 pcf
Fb - Compr	900 psi	Fc - Perp	625 psi	Ft	575 psi	Eminbend - xx	580 ksi		

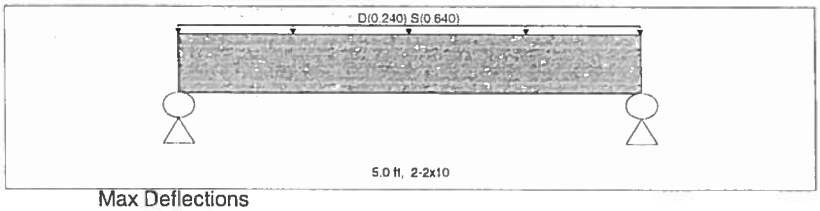
Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.0150, S = 0.040 k/ft, Trib= 16.0 ft

Design Summary

Max fb/Fb Ratio = **0.682 : 1**
fb : Actual : 776.64 psi at 2.500 ft in Span # 1
Fb : Allowable : 1,138.50 psi
Load Comb : +D+S+H

Max fv/FvRatio = **0.401 : 1**
fv : Actual : 83.01 psi at 4.233 ft in Span # 1
Fv : Allowable : 207.00 psi
Load Comb : +D+S+H

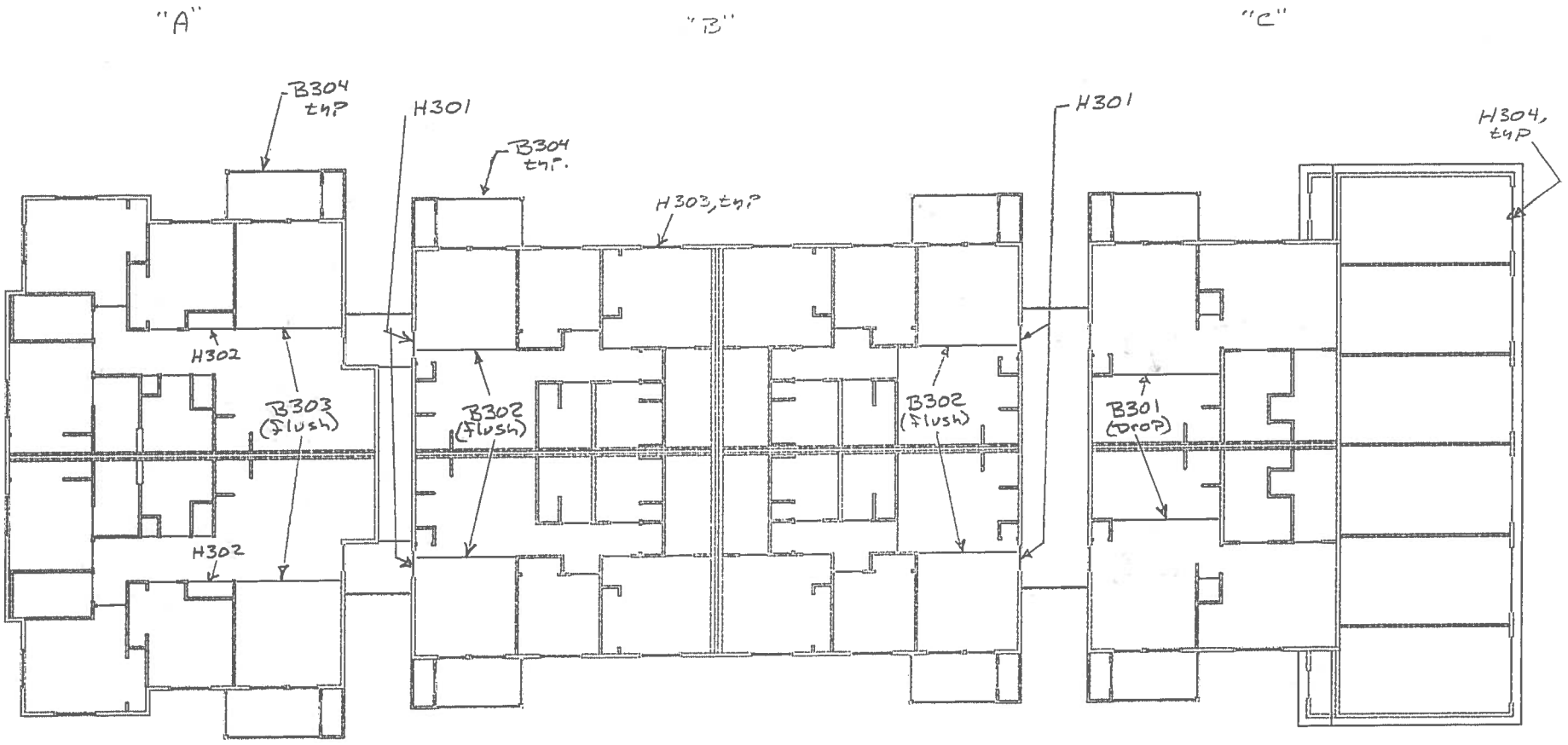


Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.62			1.60			
Right Support	0.62			1.60			

Max Deflections

Downward L+Lr+S	0.029 in	Downward Total	0.040 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	2099 >360	Total Defl Ratio	1516 >240

Second and Third Floor Beams & Headers



Beams

B301 : GL 6¾ x 10.5
B302 : GL 5⅛ x 10.5
B303 : GL 5⅛ x 10.5
B304 : GL 3⅛ x 9

Headers

H301 : GL 5⅛ x 9
H302 : (2) 2x10
H303 : (2) 2x10
H304 : GL 3⅛ x 10.5

Whipple Consulting Engineers
2528 N Sullivan Rd
Spokane Valley, WA 99216

Project Title:
Engineer:
Project Descr:
Project ID:

Multiple Simple Beam

Description : Floor Beams and Headers

Wood Beam Design : B301: Unit C Living Room Beam w/Cont. joists above

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **6.75x10.5, GLB, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending
Wood Species : DF/DF — Wood Grade : 24F - V4

Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.20 pcf
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi		

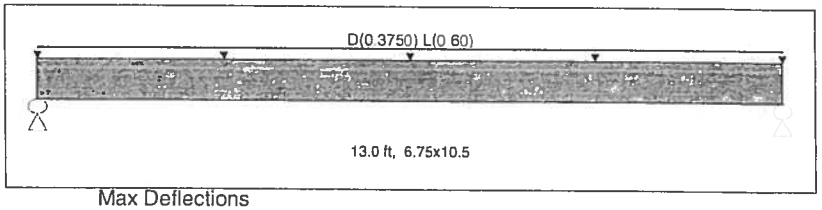
Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.0250, L = 0.040 k/ft, Trib= 15.0 ft

Design Summary

Max fb/Fb Ratio = **0.843 : 1**
fb : Actual : 2,024.13 psi at 6.500 ft in Span # 1
Fb : Allowable : 2,400.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.446 : 1**
fv : Actual : 118.07 psi at 12.133 ft in Span # 1
Fv : Allowable : 265.00 psi
Load Comb : +D+L+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	2.54	3.90					
Right Support	2.54	3.90					

Max Deflections

Downward L+Lr+S	0.331 in	Downward Total	0.546 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	471 >360	Total Defl Ratio	285 >240

Wood Beam Design : H301: Unit B Door Header w/Living Rm Bm Point Load

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **3-2x10, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending
Wood Species : Douglas Fir - Larch — Wood Grade : No.2

Fb - Tension	900 psi	Fc - Prll	1350 psi	Fv	180 psi	Ebend- xx	1600 ksi	Density	31.2 pcf
Fb - Compr	900 psi	Fc - Perp	625 psi	Ft	575 psi	Eminbend - xx	580 ksi		

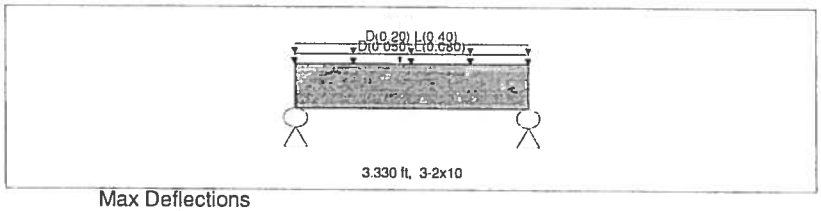
Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.0250, L = 0.040 k/ft, Trib= 2.0 ft
Unif Load: D = 0.050, L = 0.10 k/ft, Trib= 4.0 ft
Point: D = 2.0, L = 3.0 k @ 1.50 ft

Design Summary

Max fb/Fb Ratio = **0.969 : 1**
fb : Actual : 959.60 psi at 1.499 ft in Span # 1
Fb : Allowable : 990.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.683 : 1**
fv : Actual : 122.96 psi at 0.000 ft in Span # 1
Fv : Allowable : 180.00 psi
Load Comb : +D+L+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.53	2.45					
Right Support	1.33	2.15					

Max Deflections

Downward L+Lr+S	0.011 in	Downward Total	0.018 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	3586 >360	Total Defl Ratio	2194 >240

Wood Beam Design : B302: Unit B Living Room Beam

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **5.125x10.5, GLB, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending
Wood Species : DF/DF — Wood Grade : 24F - V4

Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.20 pcf
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi		

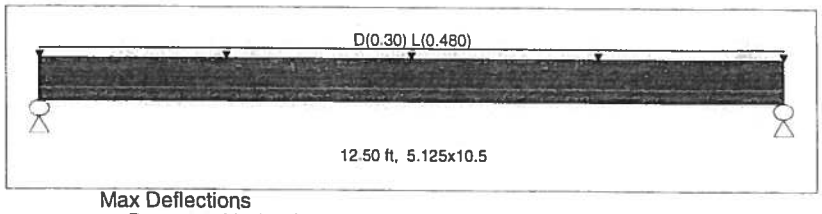
Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.0250, L = 0.040 k/ft, Trib= 12.0 ft

Design Summary

Max fb/Fb Ratio = **0.821 : 1**
fb : Actual : 1,970.28 psi at 6.250 ft in Span # 1
Fb : Allowable : 2,400.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.451 : 1**
fv : Actual : 119.53 psi at 11.667 ft in Span # 1
Fv : Allowable : 265.00 psi
Load Comb : +D+L+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.95	3.00					
Right Support	1.95	3.00					

Max Deflections

Downward L+Lr+S	0.298 in	Downward Total	0.491 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	503 >360	Total Defl Ratio	305 >240

Whipple Consulting Engineers
2528 N Sullivan Rd
Spokane Valley, WA 99216

Project Title:
Engineer:
Project Descr:
Project ID:

Multiple Simple Beam

Wood Beam Design : B303: Unit A Living Room Beam

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **5.125x10.5, GLB, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending

Wood Species : DF/DF
Wood Grade : 24F - V4

Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.20 pcf
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi		

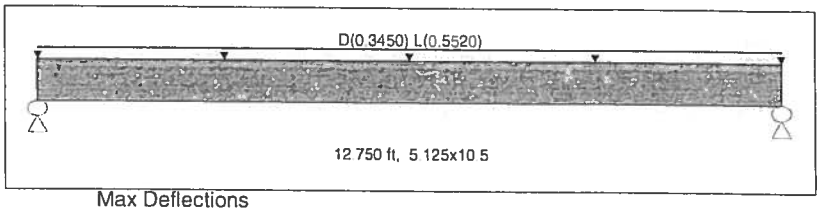
Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.0250, L = 0.040 k/ft, Trib= 13.80 ft

Design Summary

Max fb/Fb Ratio = **0.980 : 1**
fb : Actual : 2,352.84 psi at 6.375 ft in Span # 1
Fb : Allowable : 2,400.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.528 : 1**
fv : Actual : 139.94 psi at 11.900 ft in Span # 1
Fv : Allowable : 265.00 psi
Load Comb : +D+L+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	2.27	3.52					
Right Support	2.27	3.52					

Max Deflections

Downward L+Lr+S	0.371 in	Downward Total	0.610 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	412 >360	Total Defl Ratio	250 >240

Wood Beam Design : B304: Deck Joist Support Beam

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **5.125x9, GLB, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending

Wood Species : DF/DF
Wood Grade : 24F - V4

Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.20 pcf
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi		

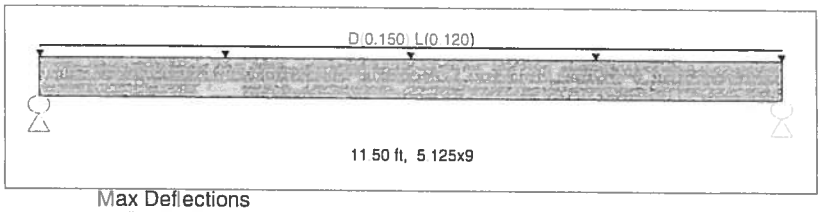
Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.050, L = 0.040 k/ft, Trib= 3.0 ft

Design Summary

Max fb/Fb Ratio = **0.335 : 1**
fb : Actual : 802.80 psi at 5.750 ft in Span # 1
Fb : Allowable : 2,400.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.173 : 1**
fv : Actual : 45.72 psi at 0.000 ft in Span # 1
Fv : Allowable : 265.00 psi
Load Comb : +D+L+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.92	0.69					
Right Support	0.92	0.69					

Max Deflections

Downward L+Lr+S	0.085 in	Downward Total	0.198 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	1629 >360	Total Defl Ratio	698 >240

Wood Beam Design : H302: Interior header in Unit A

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **2-2x10, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending

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

Fb - Tension	900.0 psi	Fc - Prll	1,350.0 psi	Fv	180.0 psi	Ebend- xx	1,600.0 ksi	Density	31.20 pcf
Fb - Compr	900.0 psi	Fc - Perp	625.0 psi	Ft	575.0 psi	Eminbend - xx	580.0 ksi		

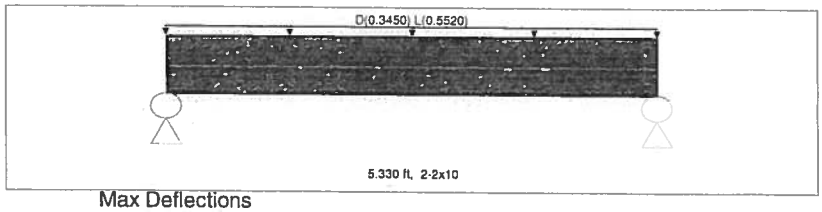
Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.0250, L = 0.040 k/ft, Trib= 13.80 ft

Design Summary

Max fb/Fb Ratio = **0.909 : 1**
fb : Actual : 899.47 psi at 2.665 ft in Span # 1
Fb : Allowable : 990.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.516 : 1**
fv : Actual : 92.79 psi at 4.566 ft in Span # 1
Fv : Allowable : 180.00 psi
Load Comb : +D+L+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.94	1.47					
Right Support	0.94	1.47					

Max Deflections

Downward L+Lr+S	0.032 in	Downward Total	0.052 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	2009 >360	Total Defl Ratio	1228 >240

Multiple Simple Beam

File = P:\WCE_WORK\242IDK~9\2MHZA9~D\DBJGBY~H\SEV10W~K\C7A4YC~F\1CFED0~A.EC6
ENERCALC, INC. 1983-2016, Build:6.16.3.4, Ver:6.16.3.4

Lic. # : KW-06009199
Licensee : Whipple Consulting Engineers

Description : Garage Door Header

Wood Beam Design : H304: Garage Door Header

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **3.125x9, GLB, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending

Wood Species : DF/DF Wood Grade : 24F - V4

Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.20 pcf
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi		

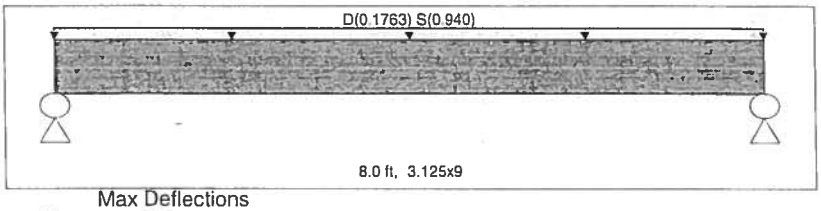
Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.0150, S = 0.080 k/ft, Trib= 11.750 ft

Design Summary

Max fb/Fb Ratio = **0.925** : 1
fb : Actual : 2,553.96 psi at 4.000 ft in Span # 1
Fb : Allowable : 2,760.00 psi
Load Comb : +D+S+H

Max fv/FvRatio = **0.639** : 1
fv : Actual : 194.74 psi at 0.000 ft in Span # 1
Fv : Allowable : 304.75 psi
Load Comb : +D+S+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.73			3.76			
Right Support	0.73			3.76			

Max Deflections

Downward L+Lr+S	0.255 in	Downward Total	0.304 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	376 >360	Total Defl Ratio	315 >240

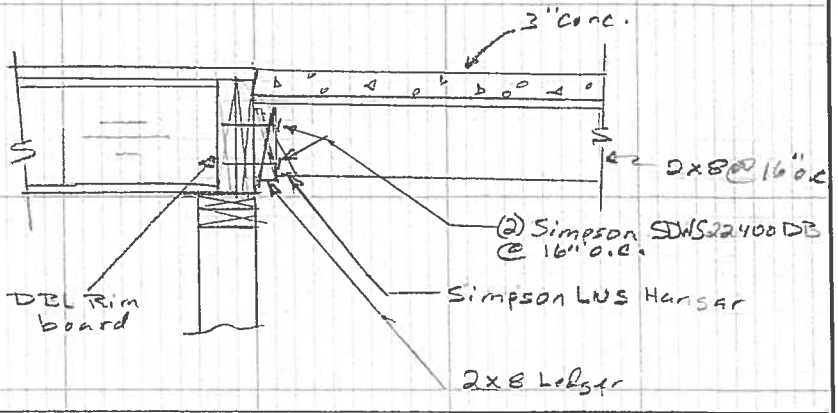
Deck Ledger Attachment

Shear Load, V = (D+L) trib
V = (50psf + 40psf) 6'/2
V = 270 plf

USE (2) Simpson SDWS22400DB @ 16" o.c.

V_{cap} = 405/ea

$V_{cap/ft} = \frac{2(405)}{1.33'} = 609$ plf

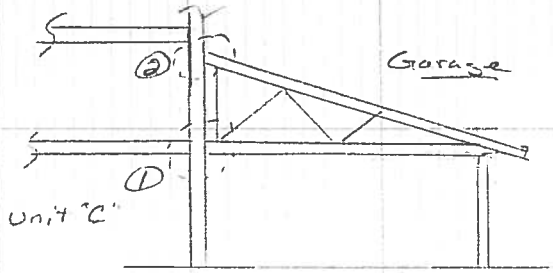


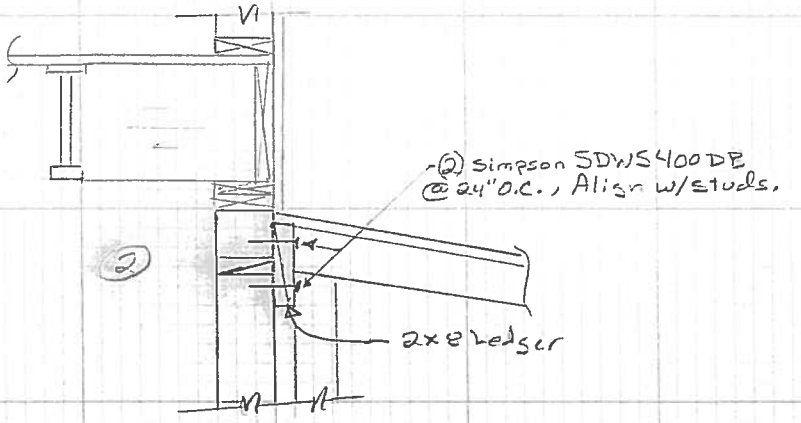
Garage Ledger Attachment

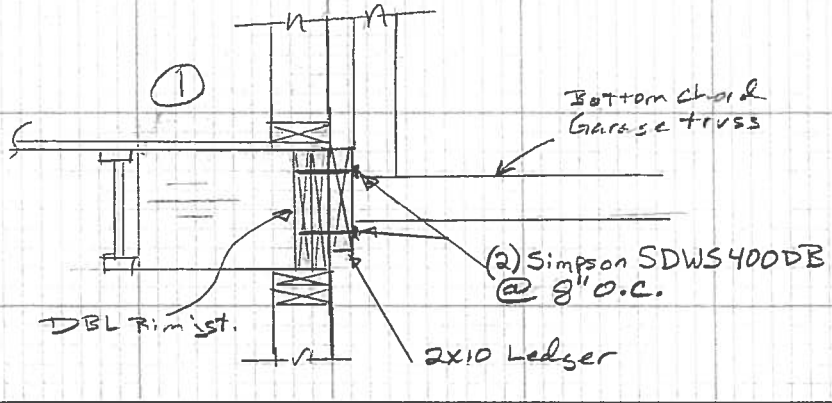
Shear Load, V = (D+S) trib
V = (15 + 80) 22'/2 (incl. drift)
V = 1045 plf

Bottom Chord Truss Ledger:
USE (2) Simpson SDWS22400DB @ 8" o.c.

$V_{cap} = \frac{2(410\#)}{0.67'} = 1209$ plf





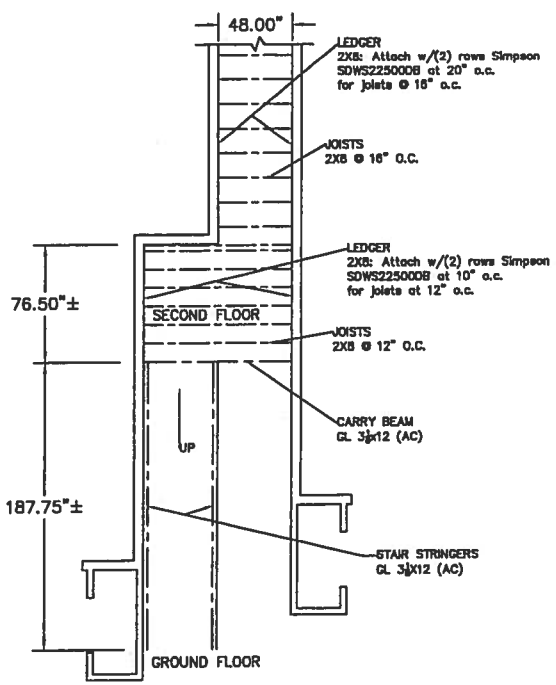


WCE Whipple Consulting Engineers, Inc. 2528 N. Sullivan Rd. • Spokane Valley, WA 99216 Phone 509-893-2617 • Fax 509-926-0227	Traffic ☐ Planning ☐ Survey ☐ Structural ☐ Landscape ☐ Civil ☐	NAME OF PROJECT Avery Estates 24-unit		SHEET NUMBER OF
	COMPUTED BY DGR	CHECKED BY	JOB NUMBER	DATE

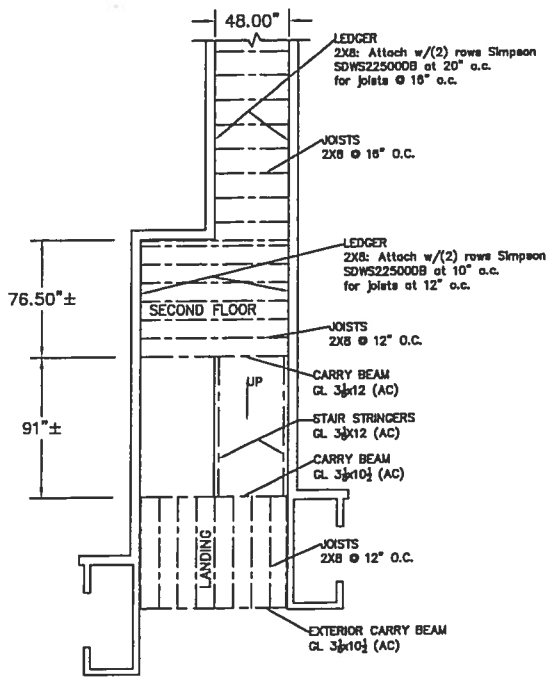
EXTERIOR:

BREEZEWAY, STAIR BMS., DECK JOISTS

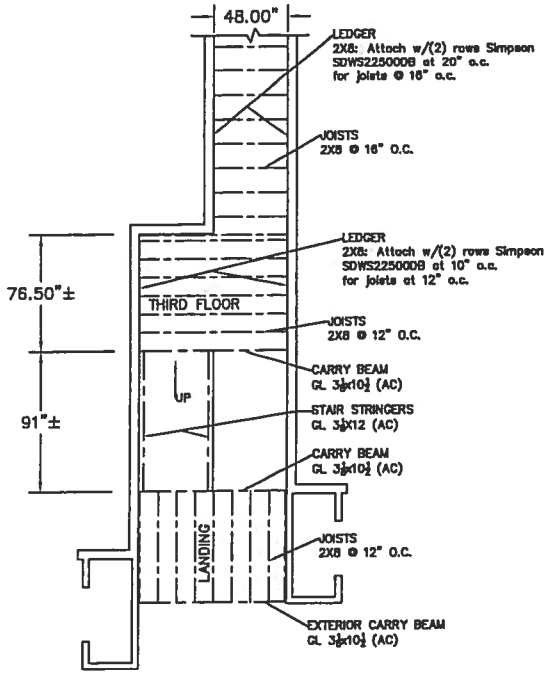
LEGACY VILLAS
24–UNIT
BREEZEWAY STAIR AND FLOOR FRAMING



GROUND–TO–SECOND FLOOR



SECOND FLOOR–TO–LANDING



LANDING–TO–THIRD FLOOR

Whipple Consulting Engineers
2528 N Sullivan Rd
Spokane Valley, WA 99216

Project Title:
Engineer:
Project Descr:

Project ID:

Multiple Simple Beam

File = P:\WCE_WORK\242IDK-9\2MHZA9-D\DBJGBY-H\SEV10W-K\C7A4YC-F\1CFED0-A.EC6
ENERCALC, INC. 1983-2016, Build:6.16.5.11, Ver:6.16.5.11

Lic. # : KW-06009199

Licensee : Whipple Consulting Engineers

Description : Breezeway Joists, Stair Stringers and Carry Beams

Wood Beam Design : 8' Joists

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **2x8, Sawn, Fully Unbraced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending

Wood Species :	Douglas Fir - Larch				Wood Grade : No.2				
Fb - Tension	900.0 psi	Fc - Prll	1,350.0 psi	Fv	180.0 psi	Ebend- xx	1,600.0 ksi	Density	31.20 pcf
Fb - Compr	900.0 psi	Fc - Perp	625.0 psi	Ft	575.0 psi	Eminbend - xx	580.0 ksi		

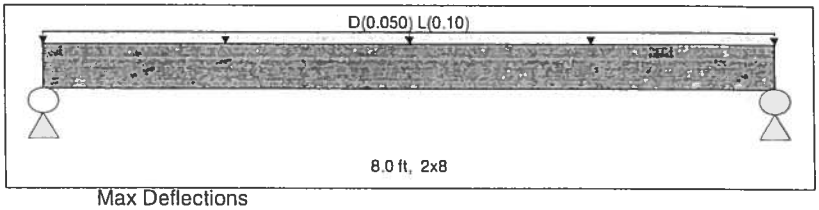
Applied Loads

Unif Load: D = 0.050, L = 0.10 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.931 : 1**
fb : Actual : 1,095.84 psi at 4.000 ft in Span # 1
Fb : Allowable : 1,177.38 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.392 : 1**
fv : Actual : 70.62 psi at 0.000 ft in Span # 1
Fv : Allowable : 180.00 psi
Load Comb : +D+L+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.20	0.40					
Right Support	0.20	0.40					

Max Deflections

Downward L+Lr+S	0.122 in	Downward Total	0.182 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	789 >360	Total Defl Ratio	526 >240

Wood Beam Design : 4' Joists

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **2x8, Sawn, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending

Wood Species :	Douglas Fir - Larch				Wood Grade : No.2				
Fb - Tension	900.0 psi	Fc - Prll	1,350.0 psi	Fv	180.0 psi	Ebend- xx	1,600.0 ksi	Density	31.20 pcf
Fb - Compr	900.0 psi	Fc - Perp	625.0 psi	Ft	575.0 psi	Eminbend - xx	580.0 ksi		

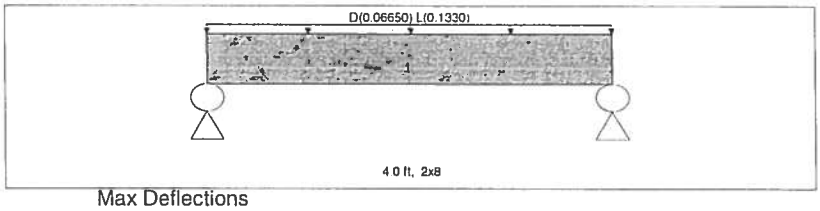
Applied Loads

Unif Load: D = 0.050, L = 0.10 k/ft, Trib= 1.330 ft

Design Summary

Max fb/Fb Ratio = **0.293 : 1**
fb : Actual : 364.37 psi at 2.000 ft in Span # 1
Fb : Allowable : 1,242.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.214 : 1**
fv : Actual : 38.52 psi at 0.000 ft in Span # 1
Fv : Allowable : 180.00 psi
Load Comb : +D+L+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.13	0.27					
Right Support	0.13	0.27					

Max Deflections

Downward L+Lr+S	0.010 in	Downward Total	0.015 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	4750 >360	Total Defl Ratio	3166 >240

Wood Beam Design : Stair Stringers: Ground Level-to-Second Floor

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **3.125x12, GLB, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending

Wood Species :	AC/AC				Wood Grade : 20F - V12				
Fb - Tension	2,000.0 psi	Fc - Prll	1,500.0 psi	Fv	265.0 psi	Ebend- xx	1,500.0 ksi	Density	28.70 pcf
Fb - Compr	1,400.0 psi	Fc - Perp	560.0 psi	Ft	925.0 psi	Eminbend - xx	790.0 ksi		

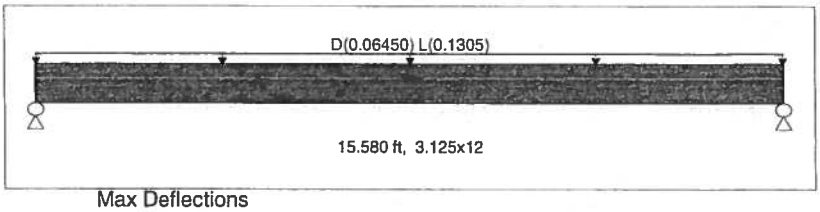
Applied Loads

Unif Load: D = 0.0430, L = 0.0870 k/ft, Trib= 1.50 ft

Design Summary

Max fb/Fb Ratio = **0.473 : 1**
fb : Actual : 946.67 psi at 7.790 ft in Span # 1
Fb : Allowable : 2,000.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.200 : 1**
fv : Actual : 53.07 psi at 0.000 ft in Span # 1
Fv : Allowable : 265.00 psi
Load Comb : +D+L+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.50	1.02					
Right Support	0.50	1.02					

Max Deflections

Downward L+Lr+S	0.258 in	Downward Total	0.385 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	725 >600	Total Defl Ratio	485 >480

Whipple Consulting Engineers
2528 N Sullivan Rd
Spokane Valley, WA 99216

Project Title:
Engineer:
Project Descr:
Project ID:

Multiple Simple Beam

Wood Beam Design : Stair Stringer Carry Beam: Second Floor

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **3.125x12, GLB, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending

Wood Species :	AC/AC				Wood Grade : 20F - V12				
Fb - Tension	2,000.0 psi	Fc - Prll	1,500.0 psi	Fv	265.0 psi	Ebend- xx	1,500.0 ksi	Density	28.70 pcf
Fb - Compr	1,400.0 psi	Fc - Perp	560.0 psi	Ft	925.0 psi	Eminbend - xx	790.0 ksi		

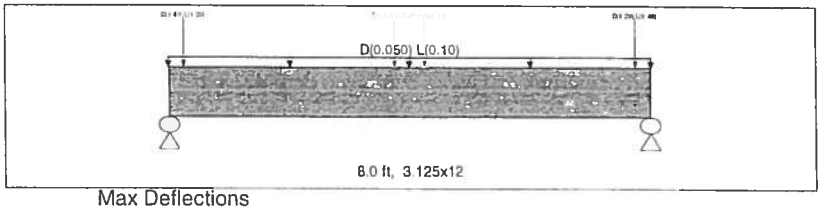
Applied Loads

Unif Load: D = 0.050, L = 0.10 k/ft, Trib= 1.0 ft
Point: D = 0.60, L = 1.20 k @ 0.250 ft
Point: D = 0.60, L = 1.20 k @ 3.750 ft
Point: D = 0.20, L = 0.40 k @ 4.250 ft
Point: D = 0.20, L = 0.40 k @ 7.750 ft

Design Summary

Max fb/Fb Ratio = **0.491 : 1**
fb : Actual : 982.35 psi at 3.760 ft in Span # 1
Fb : Allowable : 2,000.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.249 : 1**
fv : Actual : 66.08 psi at 0.000 ft in Span # 1
Fv : Allowable : 265.00 psi
Load Comb : +D+L+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.20	2.40					
Right Support	0.80	1.60					

Max Deflections

Downward L+Lr+S	0.062 in	Downward Total	0.092 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	1560 >360	Total Defl Ratio	1040 >360

Wood Beam Design : Stair Stringer Carry Beam: Landing and Third Floor

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **3.125x10.5, GLB, Fully Braced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending

Wood Species :	AC/AC				Wood Grade : 20F - V12				
Fb - Tension	2,000.0 psi	Fc - Prll	1,500.0 psi	Fv	265.0 psi	Ebend- xx	1,500.0 ksi	Density	28.70 pcf
Fb - Compr	1,400.0 psi	Fc - Perp	560.0 psi	Ft	925.0 psi	Eminbend - xx	790.0 ksi		

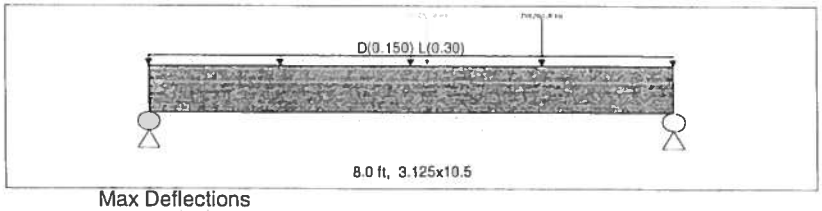
Applied Loads

Unif Load: D = 0.050, L = 0.10 k/ft, Trib= 3.0 ft
Point: D = 0.20, L = 0.40 k @ 4.250 ft
Point: D = 0.20, L = 0.40 k @ 6.0 ft

Design Summary

Max fb/Fb Ratio = **0.566 : 1**
fb : Actual : 1,131.74 psi at 4.240 ft in Span # 1
Fb : Allowable : 2,000.00 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.377 : 1**
fv : Actual : 99.87 psi at 7.147 ft in Span # 1
Fv : Allowable : 265.00 psi
Load Comb : +D+L+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.74	1.49					
Right Support	0.86	1.71					

Max Deflections

Downward L+Lr+S	0.089 in	Downward Total	0.134 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	1077 >360	Total Defl Ratio	718 >360

Whipple Consulting Engineers
2528 N Sullivan Rd
Spokane Valley, WA 99216

Project Title:
Engineer:
Project Descr:

Project ID:

Multiple Simple Beam

Description : Deck Joists

Wood Beam Design : Deck Joists

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

BEAM Size : **2x8, Sawn, Fully Unbraced**
Using Allowable Stress Design with IBC 2012 Load Combinations, Major Axis Bending

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

Fb - Tension	900 psi	Fc - Prll	1350 psi	Fv	180 psi	Ebend- xx	1600 ksi	Density	31.2 pcf
Fb - Compr	900 psi	Fc - Perp	625 psi	Ft	575 psi	Eminbend - xx	580 ksi		

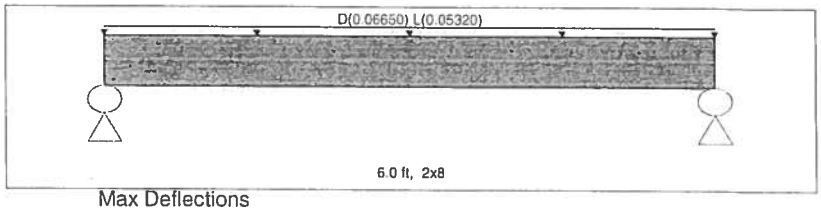
Applied Loads

Unif Load: D = 0.050, L = 0.040 k/ft, Trib= 1.330 ft

Design Summary

Max fb/Fb Ratio = **0.468 : 1**
fb : Actual : 491.89 psi at 3.000 ft in Span # 1
Fb : Allowable : 1,051.62 psi
Load Comb : +D+L+H

Max fv/FvRatio = **0.220 : 1**
fv : Actual : 39.62 psi at 5.400 ft in Span # 1
Fv : Allowable : 180.00 psi
Load Comb : +D+L+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.20	0.16					
Right Support	0.20	0.16					

Max Deflections

Downward L+Lr+S	0.020 in	Downward Total	0.046 in
Upward L+Lr+S	0.000 in	Upward Total	0.000 in
Live Load Defl Ratio	3518 >360	Total Defl Ratio	1563 >240

COLUMNS

Exterior Column – Deck + Roof Support

Loads:

2nd + 3rd Floors

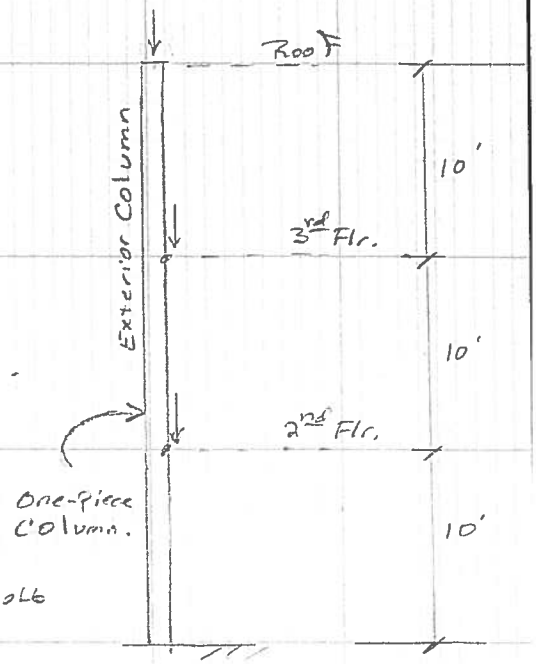
DL = trib x self wt. = $(6'/2)(10'/2)(50psf)$ = 750 Lb

LL = " x Live = $15ft^2(40psf)$ = 600 Lb

Roof

DL = trib x self wt. = $(6'/2+1')(14'/2+1.5')(15psf)$ = 510 Lb

SL = " x Snow = $(34ft^2)\,40psf$ = 1360 Lb



See attached Enercalc run:

USE: GL 5 1/8 x 6, Cont. for full ht.

Locate 6" dim. parallel to outside face of deck.

Connections:

Base: Simpson ABW5-6

Floors: Floor member: GL 3 1/2 x 9, DL = 819 Lbs, L = 630 Lb

USE: Simpson HUC210-2

Cap. = 2085 Lb

Roof: By truss mfg.

WCE Whipple Consulting Engineers, Inc. 2528 N. Sullivan Rd. • Spokane Valley, WA 99216 Phone 509-893-2617 • Fax 509-926-0227	Traffic ☐ Planning ☐ Survey ☐ Structural ☐ Landscape ☐ Civil ☐	NAME OF PROJECT Legacy Villas - 24-Plex			SHEET NUMBER OF
		COMPUTED BY DGR	CHECKED BY	JOB NUMBER 16-1624	DATE

Wood Column

Description : Exterior Deck Column: Full Height

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2012

General Information

Analysis Method : Allowable Stress Design
End Fixities : Top & Bottom Pinned
Overall Column Height : 30.0 ft
(Used for non-slender calculations)

Wood Species : GluLam Column, Species: DF
Wood Grade : 1.6 L2, >= 4 Laminations

Fb - Tension	1,800.0 psi	Fv	230.0 psi
Fb - Compr	1,700.0 psi	Ft	1,250.0 psi
Fc - Prll	1,950.0 psi	Density	pcf
Fc - Perp	560.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	850.0	850.0	

Wood Section Name : **5.125x6**
Wood Grading/Manuf. : Western
Wood Member Type : GLB

Exact Width	**5.125** in	Allow Stress Modification Factors	
Exact Depth	**6.0** in	Cf or Cv for Bending	1.0
Area	30.750 in^2	Cf or Cv for Compression	1.0
Ix	92.250 in^4	Cf or Cv for Tension	1.0
Iy	67.306 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Factor	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0 *NDS 15.3.2*
		Use Cr : Repetitive ?	No *(non-glb only)*

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Lu for X-X Axis buckling : 10 ft, 20 ft, K = 1.0
Y-Y (depth) axis : Unbraced Length for X-X Axis buckling = 10 ft, K = 1.0

Applied Loads

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

Column self weight included : 0.0 lbs * Dead Load Factor
AXIAL LOADS . . .
Second Floor: Axial Load at 10.0 ft, Yecc = 3.0 in, D = 0.750, L = 0.60 k
Third Floor: Axial Load at 20.0 ft, Yecc = 3.0 in, D = 0.750, L = 0.60 k
Roof: Axial Load at 30.0 ft, D = 0.510, S = 1.360 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.1139 : 1**
Load Combination : +D+0.750L+0.750S+H
Governing NDS Forumla : Comp + Mxx, NDS Eq. 3.9-4
Location of max.above base : 9.866 ft
At maximum location values are . . .
Applied Axial : 3.930 k
Applied Mx : 0.1973 k-ft
Applied My : 0.0 k-ft
Fc : Allowable : 1,122.27 psi

PASS Maximum Shear Stress Ratio = **0.003181 : 1**
Load Combination : +D+L+H
Location of max.above base : 30.0 ft
Applied Design Shear : 1.098 psi
Allowable Shear : 230.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.02250 k	Bottom along Y-Y	0.02250 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y : 0.03170 in at 7.248 ft above base
for load combination : +D+L+H

Along X-X : 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	1.000	0.576	0.05825	PASS	9.866 ft	0.001767	PASS	30.0 ft
+D+L+H	1.000	0.576	0.09302	PASS	9.866 ft	0.003181	PASS	30.0 ft
+D+Lr+H	1.000	0.576	0.05825	PASS	9.866 ft	0.001767	PASS	30.0 ft
+D+S+H	1.000	0.576	0.09766	PASS	9.866 ft	0.001767	PASS	30.0 ft
+D+0.750Lr+0.750L+H	1.000	0.576	0.08433	PASS	9.866 ft	0.002828	PASS	30.0 ft
+D+0.750L+0.750S+H	1.000	0.576	0.1139	PASS	9.866 ft	0.002828	PASS	30.0 ft
+D+0.60W+H	1.000	0.576	0.05825	PASS	9.866 ft	0.001767	PASS	30.0 ft
+D+0.70E+H	1.000	0.576	0.05825	PASS	9.866 ft	0.001767	PASS	30.0 ft
+D+0.750Lr+0.750L+0.450W+H	1.000	0.576	0.08433	PASS	9.866 ft	0.002828	PASS	30.0 ft

Wood Column

Description : Exterior Deck Column: Full Height

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location
+D+0.750L+0.750S+0.450W+H	1.000	0.576	0.1139	PASS	9.866 ft	0.002828	PASS	30.0 ft
+D+0.750L+0.750S+0.5250E+H	1.000	0.576	0.1139	PASS	9.866 ft	0.002828	PASS	30.0 ft
+0.60D+0.60W+0.60H	1.000	0.576	0.03495	PASS	9.866 ft	0.001060	PASS	30.0 ft
+0.60D+0.70E+0.60H	1.000	0.576	0.03495	PASS	9.866 ft	0.001060	PASS	30.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base
+D+H	k		0.013	-0.013 k	2.010 k
+D+L+H	k		0.023	-0.023 k	3.210 k
+D+Lr+H	k		0.013	-0.013 k	2.010 k
+D+S+H	k		0.013	-0.013 k	3.370 k
+D+0.750Lr+0.750L+H	k		0.020	-0.020 k	2.910 k
+D+0.750L+0.750S+H	k		0.020	-0.020 k	3.930 k
+D+0.60W+H	k		0.013	-0.013 k	2.010 k
+D+0.70E+H	k		0.013	-0.013 k	2.010 k
+D+0.750Lr+0.750L+0.450W+H	k		0.020	-0.020 k	2.910 k
+D+0.750L+0.750S+0.450W+H	k		0.020	-0.020 k	3.930 k
+D+0.750L+0.750S+0.5250E+H	k		0.020	-0.020 k	3.930 k
+0.60D+0.60W+0.60H	k		0.008	-0.008 k	1.206 k
+0.60D+0.70E+0.60H	k		0.008	-0.008 k	1.206 k
D Only	k		0.013	-0.013 k	2.010 k
Lr Only	k			k	k
L Only	k		0.010	-0.010 k	1.200 k
S Only	k			k	1.360 k
W Only	k			k	k
E Only	k			k	k
H Only	k			k	k

Maximum Deflections for Load Combinations

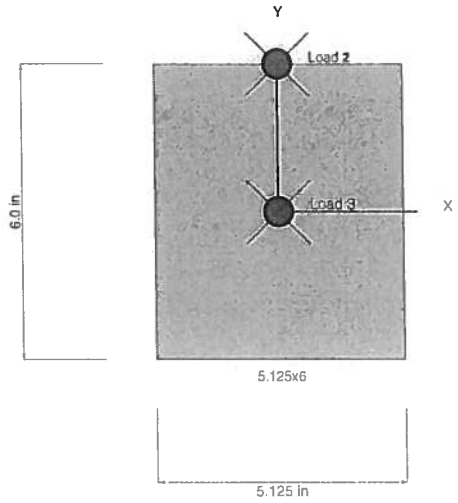
Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
+D+H	0.0000 in	0.000 ft	0.018 in	7.248 ft
+D+L+H	0.0000 in	0.000 ft	0.032 in	7.248 ft
+D+Lr+H	0.0000 in	0.000 ft	0.018 in	7.248 ft
+D+S+H	0.0000 in	0.000 ft	0.018 in	7.248 ft
+D+0.750Lr+0.750L+H	0.0000 in	0.000 ft	0.028 in	7.248 ft
+D+0.750L+0.750S+H	0.0000 in	0.000 ft	0.028 in	7.248 ft
+D+0.60W+H	0.0000 in	0.000 ft	0.018 in	7.248 ft
+D+0.70E+H	0.0000 in	0.000 ft	0.018 in	7.248 ft
+D+0.750Lr+0.750L+0.450W+H	0.0000 in	0.000 ft	0.028 in	7.248 ft
+D+0.750L+0.750S+0.450W+H	0.0000 in	0.000 ft	0.028 in	7.248 ft
+D+0.750L+0.750S+0.5250E+H	0.0000 in	0.000 ft	0.028 in	7.248 ft
+0.60D+0.60W+0.60H	0.0000 in	0.000 ft	0.011 in	7.248 ft
+0.60D+0.70E+0.60H	0.0000 in	0.000 ft	0.011 in	7.248 ft
D Only	0.0000 in	0.000 ft	0.018 in	7.248 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
L Only	0.0000 in	0.000 ft	0.014 in	7.248 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
W Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
E Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
H Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

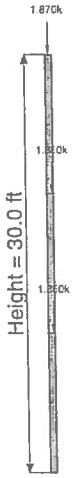
Wood Column

Lic. # : KW-06009199
Licensee : Whipple Consulting Engineers

Description : Exterior Deck Column: Full Height

Sketches





Loads are total entered value. Arrows do not reflect absolute direction.

Wood Column

Description : Bundled Studs: Roof Girder Truss Support

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2012

General Information

Analysis Method :	Allowable Stress Design		
End Fixities	Top & Bottom Pinned		
Overall Column Height	10.0 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir - Larch		
Wood Grade	No.2		
Fb - Tension	900 psi	Fv	180 psi
Fb - Compr	900 psi	Ft	575 psi
Fc - Prll	1350 psi	Density	31.2 pcf
Fc - Perp	625 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1600	1600	1600 ksi
Minimum	580	580	

Wood Section Name	**3-2x6**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**4.50** in	Allow Stress Modification Factors	
Exact Depth	**5.50** in	Cf or Cv for Bending	1.30
Area	24.750 in^2	Cf or Cv for Compression	1.10
Ix	62.391 in^4	Cf or Cv for Tension	1.30
Iy	41.766 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Factor	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0 *NDS 15.3.2*
		Use Cr : Repetitive ?	No *(non-glb only)*

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Unbraced Length for X-X Axis buckling = 10 ft, K = 1.0
Y-Y (depth) axis : Fully braced against buckling along Y-Y Axis

Applied Loads

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

Column self weight included : 53.625 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 10.0 ft, D = 1.60, S = 4.40 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.4132 : 1**

Load Combination	+D+S+H
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are . . .	
Applied Axial	6.054 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	591.96 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D+0.70E+0.60H
Location of max.above base	10.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	180.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a
Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	1.000	0.399	0.1129	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+L+H	1.000	0.399	0.1129	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+Lr+H	1.000	0.399	0.1129	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+S+H	1.000	0.399	0.4132	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750Lr+0.750L+H	1.000	0.399	0.1129	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S+H	1.000	0.399	0.3381	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.60W+H	1.000	0.399	0.1129	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.70E+H	1.000	0.399	0.1129	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750Lr+0.750L+0.450W+H	1.000	0.399	0.1129	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S+0.450W+H	1.000	0.399	0.3381	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S+0.5250E+H	1.000	0.399	0.3381	PASS	0.0 ft	0.0	PASS	10.0 ft
+0.60D+0.60W+0.60H	1.000	0.399	0.06772	PASS	0.0 ft	0.0	PASS	10.0 ft

Wood Column

Lic. # : KW-06009199 — **Licensee : Whipple Consulting Engineers**

Description : Bundled Studs: Roof Girder Truss Support

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+0.60D+0.70E+0.60H	1.000	0.399	0.06772	PASS	0.0 ft	0.0	PASS	10.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base
+D+H		k		k	1.654 k
+D+L+H		k		k	1.654 k
+D+Lr+H		k		k	1.654 k
+D+S+H		k		k	6.054 k
+D+0.750Lr+0.750L+H		k		k	1.654 k
+D+0.750L+0.750S+H		k		k	4.954 k
+D+0.60W+H		k		k	1.654 k
+D+0.70E+H		k		k	1.654 k
+D+0.750Lr+0.750L+0.450W+H		k		k	1.654 k
+D+0.750L+0.750S+0.450W+H		k		k	4.954 k
+D+0.750L+0.750S+0.5250E+H		k		k	4.954 k
+0.60D+0.60W+0.60H		k		k	0.992 k
+0.60D+0.70E+0.60H		k		k	0.992 k
D Only		k		k	1.654 k
Lr Only		k		k	k
L Only		k		k	k
S Only		k		k	4.400 k
W Only		k		k	k
E Only		k		k	k
H Only		k		k	k

Maximum Deflections for Load Combinations

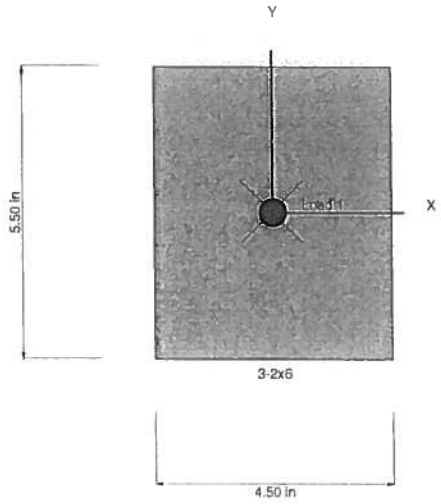
Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
+D+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.60W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.70E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L+0.450W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+0.450W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+0.5250E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+0.60W+0.60H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+0.70E+0.60H	0.0000 in	0.000 ft	0.000 in	0.000 ft
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
L Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
W Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
E Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
H Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Wood Column

Lic. # : KW-06009199
Licensee : Whipple Consulting Engineers

Description : Bundled Studs: Roof Girder Truss Support

Sketches



Loads are total entered value. Arrows do not reflect absolute direction.

Wood Column

Lic. # : KW-06009199
Licensee : Whipple Consulting Engineers

Description : Bundled Studs: Breezeway Truss Beam (B401) Support

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2012

General Information

Analysis Method : Allowable Stress Design
End Fixities : Top & Bottom Pinned
Overall Column Height : 10.0 ft
(Used for non-slender calculations)

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

Fb - Tension	900 psi	Fv	180 psi
Fb - Compr	900 psi	Ft	575 psi
Fc - Prll	1350 psi	Density	31.2 pcf
Fc - Perp	625 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1600	1600	1600 ksi
Minimum	580	580	

Wood Section Name : **3-2x6**
Wood Grading/Manuf. : Graded Lumber
Wood Member Type : Sawn

Exact Width	**4.50** in
Exact Depth	**5.50** in
Area	24.750 in^2
Ix	62.391 in^4
Iy	41.766 in^4

Allow Stress Modification Factors

Cf or Cv for Bending	1.30
Cf or Cv for Compression	1.10
Cf or Cv for Tension	1.30
Cm : Wet Use Factor	1.0
Ct : Temperature Factor	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0 *NDS 15.3.2*
Use Cr : Repetitive ?	No *(non-glb only)*

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Unbraced Length for X-X Axis buckling = 10 ft, K = 1.0
Y-Y (depth) axis : Fully braced against buckling along Y-Y Axis

Applied Loads

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

Column self weight included : 53.625 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 10.0 ft, D = 1.730, S = 8.960 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.7333 : 1**

Load Combination	+D+S+H
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are . . .	
Applied Axial	10.744 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	591.96 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D+0.70E+0.60H
Location of max.above base	10.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	180.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	1.000	0.399	0.1217	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+L+H	1.000	0.399	0.1217	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+Lr+H	1.000	0.399	0.1217	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+S+H	1.000	0.399	0.7333	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750Lr+0.750L+H	1.000	0.399	0.1217	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S+H	1.000	0.399	0.5804	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.60W+H	1.000	0.399	0.1217	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.70E+H	1.000	0.399	0.1217	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750Lr+0.750L+0.450W+H	1.000	0.399	0.1217	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S+0.450W+H	1.000	0.399	0.5804	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S+0.5250E+H	1.000	0.399	0.5804	PASS	0.0 ft	0.0	PASS	10.0 ft
+0.60D+0.60W+0.60H	1.000	0.399	0.07304	PASS	0.0 ft	0.0	PASS	10.0 ft

Wood Column

Lic. # : KW-06009199 — **Licensee : Whipple Consulting Engineers**

Description : Bundled Studs: Breezeway Truss Beam (B401) Support

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+0.60D+0.70E+0.60H	1.000	0.399	0.07304	PASS	0.0 ft	0.0	PASS	10.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base
+D+H		k		k	1.784 k
+D+L+H		k		k	1.784 k
+D+Lr+H		k		k	1.784 k
+D+S+H		k		k	10.744 k
+D+0.750Lr+0.750L+H		k		k	1.784 k
+D+0.750L+0.750S+H		k		k	8.504 k
+D+0.60W+H		k		k	1.784 k
+D+0.70E+H		k		k	1.784 k
+D+0.750Lr+0.750L+0.450W+H		k		k	1.784 k
+D+0.750L+0.750S+0.450W+H		k		k	8.504 k
+D+0.750L+0.750S+0.5250E+H		k		k	8.504 k
+0.60D+0.60W+0.60H		k		k	1.070 k
+0.60D+0.70E+0.60H		k		k	1.070 k
D Only		k		k	1.784 k
Lr Only		k		k	k
L Only		k		k	k
S Only		k		k	8.960 k
W Only		k		k	k
E Only		k		k	k
H Only		k		k	k

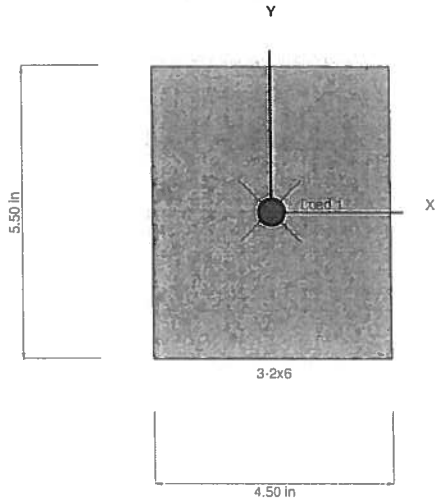
Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
+D+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.60W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.70E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L+0.450W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+0.450W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+0.5250E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+0.60W+0.60H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+0.70E+0.60H	0.0000 in	0.000 ft	0.000 in	0.000 ft
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
L Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
W Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
E Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
H Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Wood Column

Description : Bundled Studs: Breezeway Truss Beam (B401) Support

Sketches



Loads are total entered value. Arrows do not reflect absolute direction.

Whipple Consulting Engineers
2528 N Sullivan Rd
Spokane Valley, WA 99216

Project Title:
Engineer:
Project Descr:
Project ID:

Wood Column

Lic. # : KW-06009199 — **Licensee : Whipple Consulting Engineers**

Description : Bundled Studs: Living Rm Bm (B301) Support, Bottom Flr. [2x4 wall]

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2012

General Information

Analysis Method : Allowable Stress Design
End Fixities : Top & Bottom Pinned
Overall Column Height : 8.625 ft
(Used for non-slender calculations)

Wood Species : Douglas Fir - Larch
Wood Grade : No.1

Fb - Tension	1200 psi	Fv	170 psi
Fb - Compr	1200 psi	Ft	825 psi
Fc - Prll	1000 psi	Density	31.2 pcf
Fc - Perp	625 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1600	1600	1600 ksi
Minimum	580	580	

Wood Section Name : 4x6
Wood Grading/Manuf. : Graded Lumber
Wood Member Type : Sawn

Exact Width	3.50 in
Exact Depth	5.50 in
Area	19.250 in^2
Ix	48.526 in^4
Iy	19.651 in^4

Allow Stress Modification Factors

Cf or Cv for Bending	1.30
Cf or Cv for Compression	1.10
Cf or Cv for Tension	1.30
Cm : Wet Use Factor	1.0
Ct : Temperature Factor	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0 *NDS 15.3.2*
Use Cr : Repetitive ?	No

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Fully braced against buckling along X-X Axis
Y-Y (depth) axis : Unbraced Length for X-X Axis buckling = 8.625 ft, K = 1.0

Applied Loads

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

Column self weight included : 35.973 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 8.625 ft, D = 2.540, L = 3.90 k
Axial Load at 8.625 ft, D = 2.540, L = 3.90 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.8070 : 1**

Load Combination	+D+L+H
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are . . .	
Applied Axial	12.916 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	831.45 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D+0.70E+0.60H
Location of max.above base	8.625 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	0.900	0.785	0.3418	PASS	0.0 ft	0.0	PASS	8.625 ft
+D+L+H	1.000	0.756	0.8070	PASS	0.0 ft	0.0	PASS	8.625 ft
+D+Lr+H	1.250	0.684	0.2827	PASS	0.0 ft	0.0	PASS	8.625 ft
+D+S+H	1.150	0.712	0.2950	PASS	0.0 ft	0.0	PASS	8.625 ft
+D+0.750Lr+0.750L+H	1.250	0.684	0.6060	PASS	0.0 ft	0.0	PASS	8.625 ft
+D+0.750L+0.750S+H	1.150	0.712	0.6324	PASS	0.0 ft	0.0	PASS	8.625 ft
+D+0.60W+H	1.600	0.593	0.2548	PASS	0.0 ft	0.0	PASS	8.625 ft
+D+0.70E+H	1.600	0.593	0.2548	PASS	0.0 ft	0.0	PASS	8.625 ft
+D+0.750Lr+0.750L+0.450W+H	1.600	0.593	0.5462	PASS	0.0 ft	0.0	PASS	8.625 ft
+D+0.750L+0.750S+0.450W+H	1.600	0.593	0.5462	PASS	0.0 ft	0.0	PASS	8.625 ft
+D+0.750L+0.750S+0.5250E+H	1.600	0.593	0.5462	PASS	0.0 ft	0.0	PASS	8.625 ft

Whipple Consulting Engineers
2528 N Sullivan Rd
Spokane Valley, WA 99216

Project Title:
Engineer:
Project Descr:

Project ID:

Wood Column

Lic. # : KW-06009199

Licensee : Whipple Consulting Engineers

Description : Bundled Studs: Living Rm Bm (B301) Support, Bottom Flr. [2x4 wall]

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location
+0.60D+0.60W+0.60H	1.600	0.593	0.1529	PASS	0.0 ft	0.0	PASS	8.625 ft
+0.60D+0.70E+0.60H	1.600	0.593	0.1529	PASS	0.0 ft	0.0	PASS	8.625 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base
+D+H		k		k	5.116 k
+D+L+H		k		k	12.916 k
+D+Lr+H		k		k	5.116 k
+D+S+H		k		k	5.116 k
+D+0.750Lr+0.750L+H		k		k	10.966 k
+D+0.750L+0.750S+H		k		k	10.966 k
+D+0.60W+H		k		k	5.116 k
+D+0.70E+H		k		k	5.116 k
+D+0.750Lr+0.750L+0.450W+H		k		k	10.966 k
+D+0.750L+0.750S+0.450W+H		k		k	10.966 k
+D+0.750L+0.750S+0.5250E+H		k		k	10.966 k
+0.60D+0.60W+0.60H		k		k	3.070 k
+0.60D+0.70E+0.60H		k		k	3.070 k
D Only		k		k	5.116 k
Lr Only		k		k	k
L Only		k		k	7.800 k
S Only		k		k	k
W Only		k		k	k
E Only		k		k	k
H Only		k		k	k

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
+D+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.60W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.70E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L+0.450W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+0.450W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+0.5250E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+0.60W+0.60H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+0.70E+0.60H	0.0000 in	0.000 ft	0.000 in	0.000 ft
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
L Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
W Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
E Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
H Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Whipple Consulting Engineers
2528 N Sullivan Rd
Spokane Valley, WA 99216

Project Title:
Engineer:
Project Descr:

Project ID:

Wood Column

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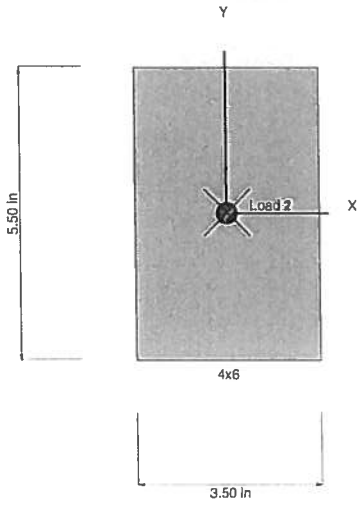
ENERCALC, INC. 1983-2016, Build:6.16.5.11, Ver:6.16.5.11

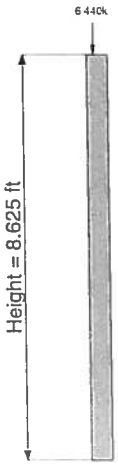
Lic. # : KW-06009199

Licensee : Whipple Consulting Engineers

Description : Bundled Studs: Living Rm Bm (B301) Support, Bottom Flr. [2x4 wall]

Sketches





Loads are total entered value. Arrows do not reflect absolute direction.

Wood Column

Lic. # : KW-06009199 — Licensee : Whipple Consulting Engineers

Description : Bundled Studs: Living Rm Bm (B302, B303) Support, Bottom Flr.

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2012

General Information

Analysis Method : Allowable Stress Design
End Fixities : Top & Bottom Pinned
Overall Column Height : 10.0 ft
(Used for non-slender calculations)
Wood Species : Douglas Fir - Larch
Wood Grade : No.2

Fb - Tension	900.0 psi	Fv	180.0 psi
Fb - Compr	900.0 psi	Ft	575.0 psi
Fc - Prll	1,350.0 psi	Density	31.20 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Wood Section Name : **3-2x6**
Wood Grading/Manuf. : Graded Lumber
Wood Member Type : Sawn

Exact Width	**4.50** in	Allow Stress Modification Factors	
Exact Depth	**5.50** in	Cf or Cv for Bending	1.30
Area	24.750 in^2	Cf or Cv for Compression	1.10
Ix	62.391 in^4	Cf or Cv for Tension	1.30
Iy	41.766 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Factor	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0 *NDS 15.3.2*
		Use Cr : Repetitive ?	No *(non-glb only)*

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Unbraced Length for X-X Axis buckling = 10 ft, K = 1.0
Y-Y (depth) axis : Unbraced Length for X-X Axis buckling = 10.0 ft, K = 1.0

Applied Loads

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

Column self weight included : 53.625 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 10.0 ft, D = 5.080, L = 7.80 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.8828 : 1**

Load Combination	+D+L+H
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are . . .	
Applied Axial	12.934 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	591.96 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D+0.70E+0.60H
Location of max.above base	10.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	288.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a
Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	0.900	0.435	0.3570	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+L+H	1.000	0.399	0.8828	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+Lr+H	1.250	0.329	0.3397	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+S+H	1.150	0.354	0.3433	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750Lr+0.750L+H	1.250	0.329	0.7268	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S+H	1.150	0.354	0.7344	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.60W+H	1.600	0.263	0.3315	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.70E+H	1.600	0.263	0.3315	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750Lr+0.750L+0.450W+H	1.600	0.263	0.7093	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S+0.450W+H	1.600	0.263	0.7093	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S+0.5250E+H	1.600	0.263	0.7093	PASS	0.0 ft	0.0	PASS	10.0 ft
+0.60D+0.60W+0.60H	1.600	0.263	0.1989	PASS	0.0 ft	0.0	PASS	10.0 ft

Description : Bundled Studs: Living Rm Bm (B302, B303) Support, Bottom Flr.

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
+0.60D+0.70E+0.60H	1.600	0.263	0.1989	PASS	0.0 ft	0.0	PASS	10.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base
+D+H		k		k	5.134 k
+D+L+H		k		k	12.934 k
+D+Lr+H		k		k	5.134 k
+D+S+H		k		k	5.134 k
+D+0.750Lr+0.750L+H		k		k	10.984 k
+D+0.750L+0.750S+H		k		k	10.984 k
+D+0.60W+H		k		k	5.134 k
+D+0.70E+H		k		k	5.134 k
+D+0.750Lr+0.750L+0.450W+H		k		k	10.984 k
+D+0.750L+0.750S+0.450W+H		k		k	10.984 k
+D+0.750L+0.750S+0.5250E+H		k		k	10.984 k
+0.60D+0.60W+0.60H		k		k	3.080 k
+0.60D+0.70E+0.60H		k		k	3.080 k
D Only		k		k	5.134 k
Lr Only		k		k	k
L Only		k		k	7.800 k
S Only		k		k	k
W Only		k		k	k
E Only		k		k	k
H Only		k		k	k

Maximum Deflections for Load Combinations

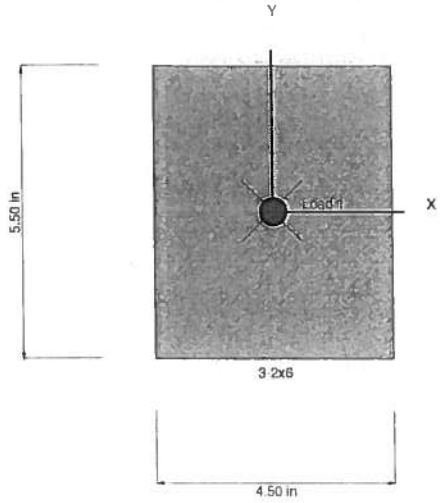
Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
+D+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.60W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.70E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L+0.450W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+0.450W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+0.5250E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+0.60W+0.60H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+0.70E+0.60H	0.0000 in	0.000 ft	0.000 in	0.000 ft
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
L Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
W Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
E Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
H Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Wood Column

Lic. # : KW-06009199
Licensee : Whipple Consulting Engineers

Description : Bundled Studs: Living Rm Bm (B302, B303) Support, Bottom Flr.

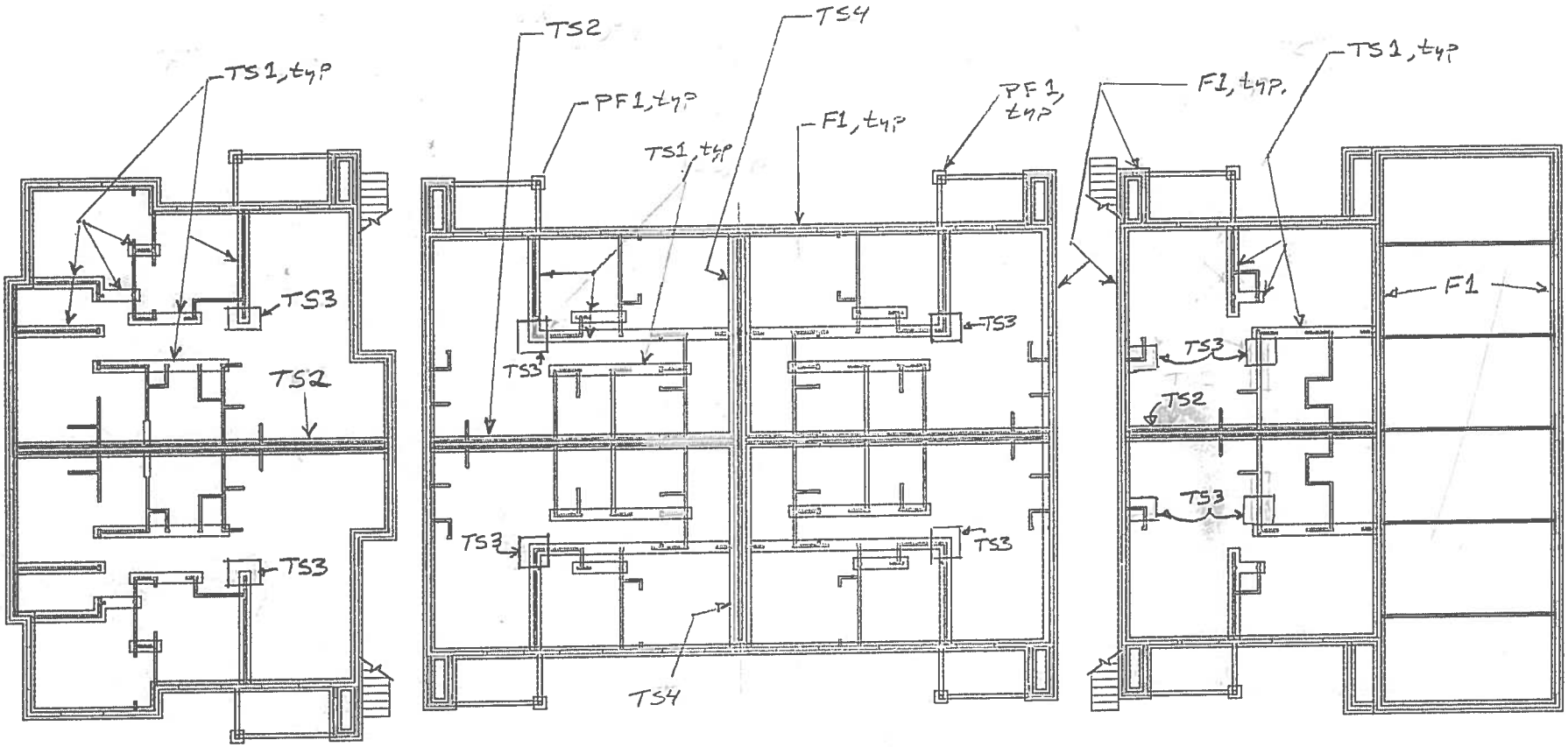
Sketches



Loads are total entered value. Arrows do not reflect absolute direction.

FOOTINGS

Footings



Cont. Footings

F1 : 1'-4"W x 10" DP w/(2)#4 bars, Cont.

Thickened Slabs

TS1: 1'-4"W x 10" DP w/(2)#4 bars, Cont.
TS2: 1'-10"W x 10" DP w/(3)#4 bars, Cont.
TS3: 2'-4" Sq. x 10" DP w/(4)#4 bars e.w.
TS4: 2'-6" x 10" DP w/(2)#4 bars, cont.

Pier Footings

PF1: 18" Sq. Reinf.: see detail

Wall Footing

Lic. # : KW-06009199
Licensee : Whipple Consulting Engineers,

Description : Perimeter Wall Footing, F1

Code References

Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2012

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
AutoCalc Footing Weight as DL	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Reference Depth below Surface	=	2.0 ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

Increases based on footing Width

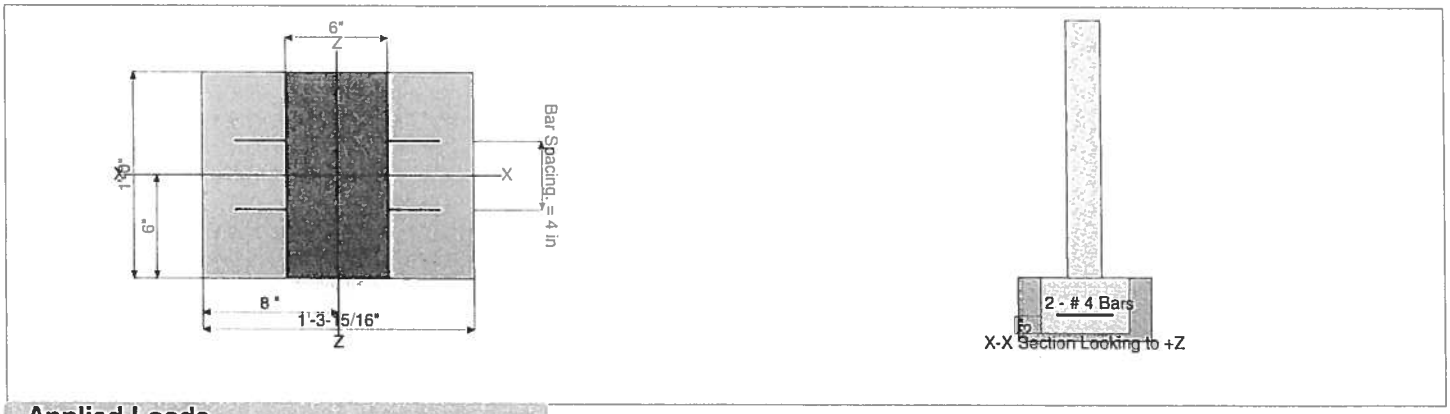
Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft

Adjusted Allowable Bearing Pressure = 3.0 ksf

Dimensions

Footing Width	=	1.330 ft	Footing Thickness	=	10.0 in	Bars along X-X Axis	
Wall Thickness	=	6.0 in	Rebar Centerline to Edge of Concrete...			# of Bars in 12" Width	= 2
Wall center offset from center of footing	=	0 in	at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 4

Reinforcing



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	0.8590		0.520	0.620				k
OB : Overburden	=								ksf
V-x	=								k
M-zz	=								k-ft
Vx applied	=	in above top of footing							

Wall Footing

Description : Perimeter Wall Footing, F1

DESIGN SUMMARY

Design OK

	Factor of Safety	Item	Applied	Capacity	Governing Load Combination
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift

	Utilization Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.4699	Soil Bearing	1.410 ksf	3.0 ksf	+D+0.750L+0.750S+0.5
PASS	0.01363	Z Flexure (+X)	0.1602 k-ft	11.753 k-ft	+1.20D+0.50L+1.60S+1
PASS	0.005054	Z Flexure (-X)	0.05940 k-ft	11.753 k-ft	+0.90D+E+0.90H
PASS	n/a	1-way Shear (+X)	0.0 psi	75.0 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Actual Soil Bearing Stress -X	Actual Soil Bearing Stress +X	Actual / Allowable Ratio
. +D+H	3.0 ksf	0.0 in	0.7667 ksf	0.7667 ksf	0.256
. +D+L+H	3.0 ksf	0.0 in	1.158 ksf	1.158 ksf	0.386
. +D+Lr+H	3.0 ksf	0.0 in	0.7667 ksf	0.7667 ksf	0.256
. +D+S+H	3.0 ksf	0.0 in	1.233 ksf	1.233 ksf	0.411
. +D+0.750Lr+0.750L+H	3.0 ksf	0.0 in	1.060 ksf	1.060 ksf	0.353
. +D+0.750L+0.750S+H	3.0 ksf	0.0 in	1.410 ksf	1.410 ksf	0.470
. +D+0.60W+H	3.0 ksf	0.0 in	0.7667 ksf	0.7667 ksf	0.256
. +D+0.70E+H	3.0 ksf	0.0 in	0.7667 ksf	0.7667 ksf	0.256
. +D+0.750Lr+0.750L+0.450W+H	3.0 ksf	0.0 in	1.060 ksf	1.060 ksf	0.353
. +D+0.750L+0.750S+0.450W+H	3.0 ksf	0.0 in	1.410 ksf	1.410 ksf	0.470
. +D+0.750L+0.750S+0.5250E+H	3.0 ksf	0.0 in	1.410 ksf	1.410 ksf	0.470
. +0.60D+0.60W+0.60H	3.0 ksf	0.0 in	0.460 ksf	0.460 ksf	0.153
. +0.60D+0.70E+0.60H	3.0 ksf	0.0 in	0.460 ksf	0.460 ksf	0.153

Overturning Stability

Units : k-ft

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status

Footing Has NO Overturning

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding SafetyRatio	Status

Footing Has NO Sliding

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
. +1.40D+1.60H	0.0924	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.40D+1.60H	0.0924	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50Lr+1.60L+1.60H	0.1331	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50Lr+1.60L+1.60H	0.1331	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60L+0.50S+1.60H	0.1531	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60L+0.50S+1.60H	0.1531	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60Lr+0.50L+1.60H	0.09603	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60Lr+0.50L+1.60H	0.09603	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60Lr+0.50W+1.60H	0.0792	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60Lr+0.50W+1.60H	0.0792	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50L+1.60S+1.60H	0.1602	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50L+1.60S+1.60H	0.1602	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60S+0.50W+1.60H	0.1434	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60S+0.50W+1.60H	0.1434	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50Lr+0.50L+W+1.60H	0.09603	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50Lr+0.50L+W+1.60H	0.09603	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50L+0.50S+W+1.60H	0.1161	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50L+0.50S+W+1.60H	0.1161	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK

Description : Perimeter Wall Footing, F1

. +1.20D+0.50L+0.70S+E+1.60H	0.1241	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50L+0.70S+E+1.60H	0.1241	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK

Wall Footing

Lic. # : KW-06009199
Licensee : Whipple Consulting Engineers

Description : Perimeter Wall Footing, F1

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
. +0.90D+W+0.90H	0.0594	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +0.90D+W+0.90H	0.0594	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +0.90D+E+0.90H	0.0594	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +0.90D+E+0.90H	0.0594	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK

One Way Shear

Units : k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50Lr+1.60L+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60L+0.50S+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60Lr+0.50L+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60Lr+0.50W+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50L+1.60S+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60S+0.50W+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50Lr+0.50L+W+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50L+0.50S+W+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50L+0.70S+E+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+0.90D+W+0.90H	0 psi	0 psi	0 psi	75 psi	0	OK
+0.90D+E+0.90H	0 psi	0 psi	0 psi	75 psi	0	OK

Wall Footing

Lic. # : KW-06009199
Licensee : Whipple Consulting Engineers

Description : Typical Bearing Wall Thk. Slab, TS1

Code References

Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2012

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
AutoCalc Footing Weight as DL	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Reference Depth below Surface	=	0.830 ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

Increases based on footing Width

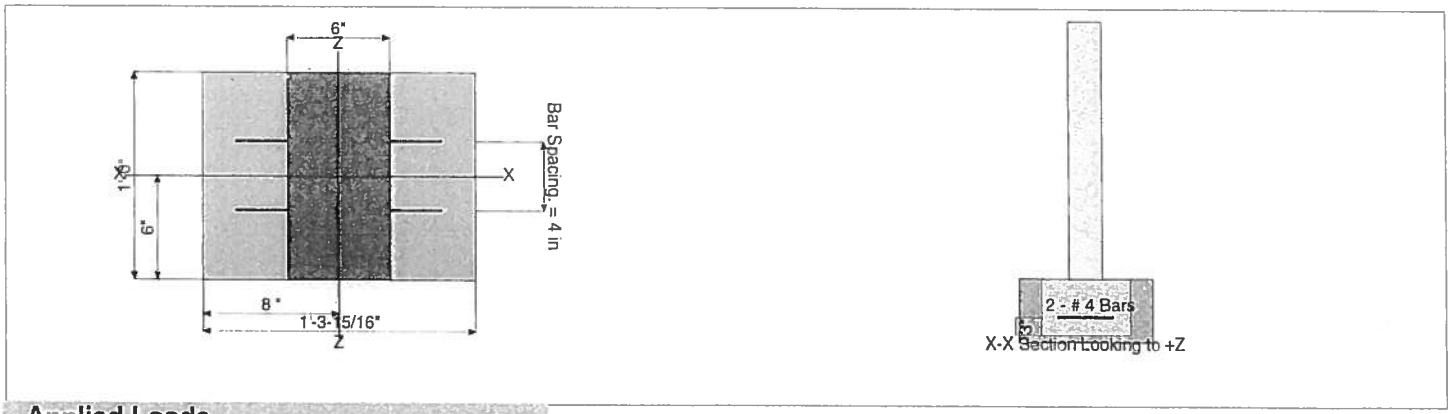
Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft

Adjusted Allowable Bearing Pressure = 3.0 ksf

Dimensions

Footing Width	=	1.330 ft	Footing Thickness	=	10.0 in	Bars along X-X Axis	
Wall Thickness	=	6.0 in	Rebar Centerline to Edge of Concrete...			# of Bars in 12" Width	= 2
Wall center offset from center of footing	=	0 in	at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 4

Reinforcing



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	1.050		1.20					k
OB : Overburden	=								ksf
V-x	=								k
M-zz	=								k-ft
Vx applied	=		in above top of footing						

Wall Footing

Description : Typical Bearing Wall Thk. Slab, TS1

DESIGN SUMMARY

Design OK

	Factor of Safety	Item	Applied	Capacity	Governing Load Combination
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift

	Utilization Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.6042	Soil Bearing	1.813 ksf	3.0 ksf	+D+L+H
PASS	0.01858	Z Flexure (+X)	0.2183 k-ft	11.753 k-ft	+1.20D+0.50Lr+1.60L+
PASS	0.006001	Z Flexure (-X)	0.07053 k-ft	11.753 k-ft	+0.90D+E+0.90H
PASS	n/a	1-way Shear (+X)	0.0 psi	75.0 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Actual Soil Bearing Stress -X	Actual Soil Bearing Stress +X	Actual / Allowable Ratio
. +D+H	3.0 ksf	0.0 in	0.9103 ksf	0.9103 ksf	0.303
. +D+L+H	3.0 ksf	0.0 in	1.813 ksf	1.813 ksf	0.604
. +D+Lr+H	3.0 ksf	0.0 in	0.9103 ksf	0.9103 ksf	0.303
. +D+S+H	3.0 ksf	0.0 in	0.9103 ksf	0.9103 ksf	0.303
. +D+0.750Lr+0.750L+H	3.0 ksf	0.0 in	1.587 ksf	1.587 ksf	0.529
. +D+0.750L+0.750S+H	3.0 ksf	0.0 in	1.587 ksf	1.587 ksf	0.529
. +D+0.60W+H	3.0 ksf	0.0 in	0.9103 ksf	0.9103 ksf	0.303
. +D+0.70E+H	3.0 ksf	0.0 in	0.9103 ksf	0.9103 ksf	0.303
. +D+0.750Lr+0.750L+0.450W+H	3.0 ksf	0.0 in	1.587 ksf	1.587 ksf	0.529
. +D+0.750L+0.750S+0.450W+H	3.0 ksf	0.0 in	1.587 ksf	1.587 ksf	0.529
. +D+0.750L+0.750S+0.5250E+H	3.0 ksf	0.0 in	1.587 ksf	1.587 ksf	0.529
. +0.60D+0.60W+0.60H	3.0 ksf	0.0 in	0.5462 ksf	0.5462 ksf	0.182
. +0.60D+0.70E+0.60H	3.0 ksf	0.0 in	0.5462 ksf	0.5462 ksf	0.182

Overturning Stability

Units : k-ft

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding SafetyRatio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
. +1.40D+1.60H	0.1097	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.40D+1.60H	0.1097	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50Lr+1.60L+1.60H	0.2183	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50Lr+1.60L+1.60H	0.2183	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60L+0.50S+1.60H	0.2183	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60L+0.50S+1.60H	0.2183	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60Lr+0.50L+1.60H	0.1329	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60Lr+0.50L+1.60H	0.1329	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60Lr+0.50W+1.60H	0.09404	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60Lr+0.50W+1.60H	0.09404	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50L+1.60S+1.60H	0.1329	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50L+1.60S+1.60H	0.1329	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60S+0.50W+1.60H	0.09404	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+1.60S+0.50W+1.60H	0.09404	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50Lr+0.50L+W+1.60H	0.1329	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50Lr+0.50L+W+1.60H	0.1329	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50L+0.50S+W+1.60H	0.1329	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50L+0.50S+W+1.60H	0.1329	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK

Description : Typical Bearing Wall Thk. Slab, TS1

. +1.20D+0.50L+0.70S+E+1.60H	0.1329	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +1.20D+0.50L+0.70S+E+1.60H	0.1329	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK

Wall Footing

Lic. # : KW-06009199
Licensee : Whipple Consulting Engineers

Description : Typical Bearing Wall Thk. Slab, TS1

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
. +0.90D+W+0.90H	0.07053	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +0.90D+W+0.90H	0.07053	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +0.90D+E+0.90H	0.07053	-X	Bottom	0.216	Min Temp %	0.4	11.753	OK
. +0.90D+E+0.90H	0.07053	+X	Bottom	0.216	Min Temp %	0.4	11.753	OK

One Way Shear

Units : k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50Lr+1.60L+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60L+0.50S+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60Lr+0.50L+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60Lr+0.50W+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50L+1.60S+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60S+0.50W+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50Lr+0.50L+W+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50L+0.50S+W+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50L+0.70S+E+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+0.90D+W+0.90H	0 psi	0 psi	0 psi	75 psi	0	OK
+0.90D+E+0.90H	0 psi	0 psi	0 psi	75 psi	0	OK

Wall Footing

Lic. # : KW-06009199
Licensee : Whipple Consulting Engineers

Description : Thickened Slab under Ridge, TS2

Code References

Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2012

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
AutoCalc Footing Weight as DL	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Reference Depth below Surface	=	0.830 ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

Increases based on footing Width

Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft

Adjusted Allowable Bearing Pressure = 3.0 ksf

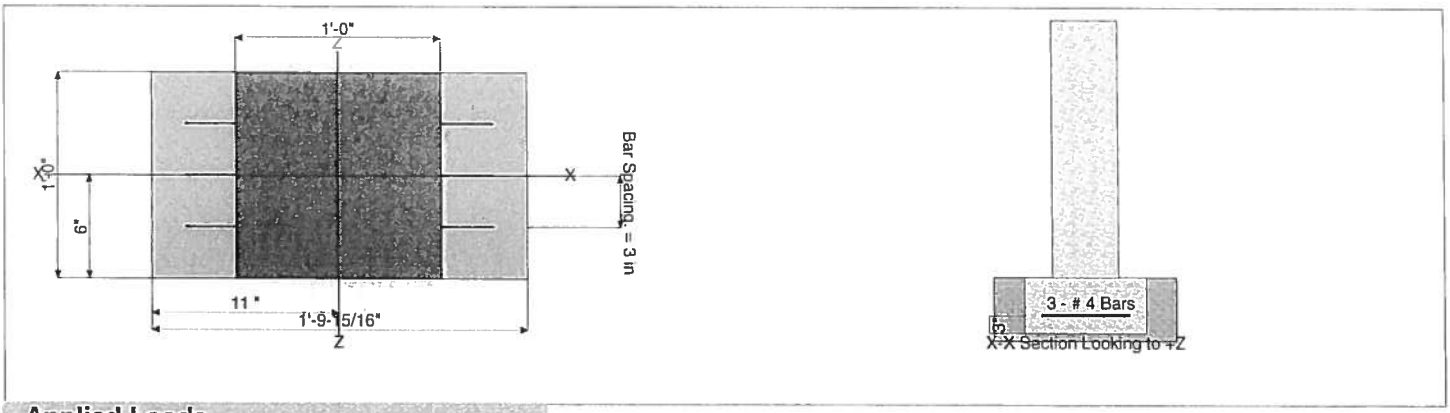
Dimensions

Footing Width	=	1.830 ft
Wall Thickness	=	12.0 in
Wall center offset from center of footing	=	0 in

Footing Thickness = 10.0 in
Rebar Centerline to Edge of Concrete... at Bottom of footing = 3.0 in

Reinforcing

Bars along X-X Axis
# of Bars in 12" Width = 3
Reinforcing Bar Size = # 4



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	1.758		1.180	1.120				k
OB : Overburden	=								ksf
V-x	=								k
M-zz	=								k-ft

Vx applied = in above top of footing

Wall Footing

File = P:\WCE\WORK\242iDK~9\2MHZA9~D\DBJGBY~H\SEV10W~K\C7A4YC~F\1CFED0~A.EC6
ENERCALC, INC. 1983-2016, Build:6.16.3.4, Ver:6.16.3.4

Lic. # : KW-06009199 — Licensee : Whipple Consulting Engineers

Description : Thickened Slab under Ridge, TS2

DESIGN SUMMARY — Design OK

	Factor of Safety	Item	Applied	Capacity	Governing Load Combination
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift

	Utilization Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.6747	Soil Bearing	2.024 ksf	3.0 ksf	+D+0.750L+0.750S+0.5
PASS	0.01336	Z Flexure (+X)	0.2269 k-ft	16.994 k-ft	+1.20D+1.60L+0.50S+1
PASS	0.004932	Z Flexure (-X)	0.08382 k-ft	16.994 k-ft	+0.90D+E+0.90H
PASS	n/a	1-way Shear (+X)	0.0 psi	75.0 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Actual Soil Bearing Stress -X	Actual Soil Bearing Stress +X	Actual / Allowable Ratio
. +D+H	3.0 ksf	0.0 in	1.081 ksf	1.081 ksf	0.361
. +D+L+H	3.0 ksf	0.0 in	1.726 ksf	1.726 ksf	0.575
. +D+Lr+H	3.0 ksf	0.0 in	1.081 ksf	1.081 ksf	0.361
. +D+S+H	3.0 ksf	0.0 in	1.694 ksf	1.694 ksf	0.565
. +D+0.750Lr+0.750L+H	3.0 ksf	0.0 in	1.565 ksf	1.565 ksf	0.522
. +D+0.750L+0.750S+H	3.0 ksf	0.0 in	2.024 ksf	2.024 ksf	0.675
. +D+0.60W+H	3.0 ksf	0.0 in	1.081 ksf	1.081 ksf	0.361
. +D+0.70E+H	3.0 ksf	0.0 in	1.081 ksf	1.081 ksf	0.361
. +D+0.750Lr+0.750L+0.450W+H	3.0 ksf	0.0 in	1.565 ksf	1.565 ksf	0.522
. +D+0.750L+0.750S+0.450W+H	3.0 ksf	0.0 in	2.024 ksf	2.024 ksf	0.675
. +D+0.750L+0.750S+0.5250E+H	3.0 ksf	0.0 in	2.024 ksf	2.024 ksf	0.675
. +0.60D+0.60W+0.60H	3.0 ksf	0.0 in	0.6489 ksf	0.6489 ksf	0.216
. +0.60D+0.70E+0.60H	3.0 ksf	0.0 in	0.6489 ksf	0.6489 ksf	0.216

Overturning Stability

Units : k-ft

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding SafetyRatio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
. +1.40D+1.60H	0.1304	-X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.40D+1.60H	0.1304	+X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+0.50Lr+1.60L+1.60H	0.2006	-X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+0.50Lr+1.60L+1.60H	0.2006	+X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+1.60L+0.50S+1.60H	0.2269	-X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+1.60L+0.50S+1.60H	0.2269	+X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+1.60Lr+0.50L+1.60H	0.1395	-X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+1.60Lr+0.50L+1.60H	0.1395	+X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+1.60Lr+0.50W+1.60H	0.1118	-X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+1.60Lr+0.50W+1.60H	0.1118	+X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+0.50L+1.60S+1.60H	0.2238	-X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+0.50L+1.60S+1.60H	0.2238	+X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+1.60S+0.50W+1.60H	0.1961	-X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+1.60S+0.50W+1.60H	0.1961	+X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+0.50Lr+0.50L+W+1.60H	0.1395	-X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+0.50Lr+0.50L+W+1.60H	0.1395	+X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+0.50L+0.50S+W+1.60H	0.1659	-X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+0.50L+0.50S+W+1.60H	0.1659	+X	Bottom	0.216	Min Temp %	0.6	16.994	OK

Description : Thickened Slab under Ridge, TS2

. +1.20D+0.50L+0.70S+E+1.60H	0.1764	-X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +1.20D+0.50L+0.70S+E+1.60H	0.1764	+X	Bottom	0.216	Min Temp %	0.6	16.994	OK

Wall Footing

Description : Thickened Slab under Ridge, TS2

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
. +0.90D+W+0.90H	0.08382	-X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +0.90D+W+0.90H	0.08382	+X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +0.90D+E+0.90H	0.08382	-X	Bottom	0.216	Min Temp %	0.6	16.994	OK
. +0.90D+E+0.90H	0.08382	+X	Bottom	0.216	Min Temp %	0.6	16.994	OK

One Way Shear

Units : k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50Lr+1.60L+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60L+0.50S+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60Lr+0.50L+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60Lr+0.50W+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50L+1.60S+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60S+0.50W+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50Lr+0.50L+W+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50L+0.50S+W+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50L+0.70S+E+1.60H	0 psi	0 psi	0 psi	75 psi	0	OK
+0.90D+W+0.90H	0 psi	0 psi	0 psi	75 psi	0	OK
+0.90D+E+0.90H	0 psi	0 psi	0 psi	75 psi	0	OK

General Footing

Description : Thk. Slab under Bundled Studs, TS3

Code References

Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2012

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	0.830 ft
Allow press. increase per foot of depth	=	0.0 ksf
when footing base is below	=	0.0 ft

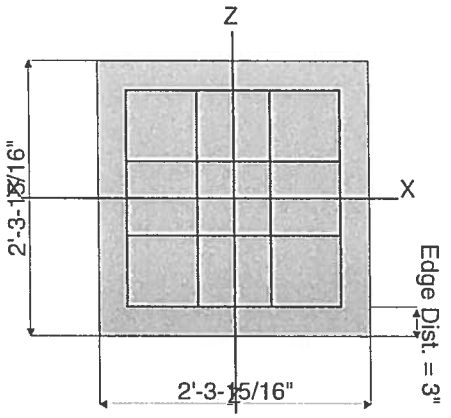
Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	0.0 ksf
when max. length or width is greater than	=	0.0 ft

Dimensions

Width parallel to X-X Axis	=	2.330 ft
Length parallel to Z-Z Axis	=	2.330 ft
Footing Thickness	=	10.0 in

Pedestal dimensions...		
px : parallel to X-X Axis	=	0.0 in
pz : parallel to Z-Z Axis	=	0.0 in
Height	=	0.0 in
Rebar Centerline to Edge of Concrete...		
at Bottom of footing	=	3.0 in

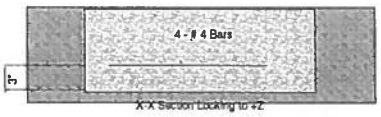


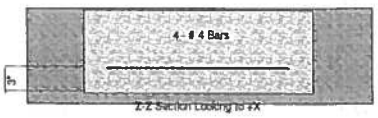
Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		4.0
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		4
Reinforcing Bar Size	=	#	4

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H
P : Column Load	=	5.080	0.0	7.80	0.0	0.0	0.0	0.0 k
OB : Overburden	=	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ksf
M-xx	=	0.0	0.0	0.0	0.0	0.0	0.0	0.0 k-ft
M-zz	=	0.0	0.0	0.0	0.0	0.0	0.0	0.0 k-ft
V-x	=	0.0	0.0	0.0	0.0	0.0	0.0	0.0 k
V-z	=	0.0	0.0	0.0	0.0	0.0	0.0	0.0 k

General Footing

Description : Thk. Slab under Bundled Studs, TS3

DESIGN SUMMARY

Design OK

Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS 0.8310	Soil Bearing	2.493 ksf	3.0 ksf	+D+L+H about Z-Z axis
PASS n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS 2,881.54	Uplift	-0.001991 k	5.736 k	+D+H
PASS 0.2278	Z Flexure (+X)	2.322 k-ft	10.191 k-ft	+1.20D+0.50Lr+1.60L+1.60H
PASS 0.2278	Z Flexure (-X)	2.322 k-ft	10.191 k-ft	+1.20D+0.50Lr+1.60L+1.60H
PASS 0.2278	X Flexure (+Z)	2.322 k-ft	10.191 k-ft	+1.20D+0.50Lr+1.60L+1.60H
PASS 0.2278	X Flexure (-Z)	2.322 k-ft	10.191 k-ft	+1.20D+0.50Lr+1.60L+1.60H
PASS 0.3164	1-way Shear (+X)	23.728 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS 0.3164	1-way Shear (-X)	23.728 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS 0.3164	1-way Shear (+Z)	23.728 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS 0.3164	1-way Shear (-Z)	23.728 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS 0.5869	2-way Punching	88.036 psi	150.0 psi	+1.20D+0.50Lr+1.60L+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, +D+H	3.0	n/a	0.0	1.056	1.056	n/a	n/a	0.352
X-X, +D+L+H	3.0	n/a	0.0	2.493	2.493	n/a	n/a	0.831
X-X, +D+Lr+H	3.0	n/a	0.0	1.056	1.056	n/a	n/a	0.352
X-X, +D+S+H	3.0	n/a	0.0	1.056	1.056	n/a	n/a	0.352
X-X, +D+0.750Lr+0.750L+H	3.0	n/a	0.0	2.134	2.134	n/a	n/a	0.711
X-X, +D+0.750L+0.750S+H	3.0	n/a	0.0	2.134	2.134	n/a	n/a	0.711
X-X, +D+0.60W+H	3.0	n/a	0.0	1.056	1.056	n/a	n/a	0.352
X-X, +D+0.70E+H	3.0	n/a	0.0	1.056	1.056	n/a	n/a	0.352
X-X, +D+0.750Lr+0.750L+0.450W+H	3.0	n/a	0.0	2.134	2.134	n/a	n/a	0.711
X-X, +D+0.750L+0.750S+0.450W+H	3.0	n/a	0.0	2.134	2.134	n/a	n/a	0.711
X-X, +D+0.750L+0.750S+0.5250E+H	3.0	n/a	0.0	2.134	2.134	n/a	n/a	0.711
X-X, +0.60D+0.60W+0.60H	3.0	n/a	0.0	0.6337	0.6337	n/a	n/a	0.211
X-X, +0.60D+0.70E+0.60H	3.0	n/a	0.0	0.6337	0.6337	n/a	n/a	0.211
Z-Z, +D+H	3.0	0.0	n/a	n/a	n/a	1.056	1.056	0.352
Z-Z, +D+L+H	3.0	0.0	n/a	n/a	n/a	2.493	2.493	0.831
Z-Z, +D+Lr+H	3.0	0.0	n/a	n/a	n/a	1.056	1.056	0.352
Z-Z, +D+S+H	3.0	0.0	n/a	n/a	n/a	1.056	1.056	0.352
Z-Z, +D+0.750Lr+0.750L+H	3.0	0.0	n/a	n/a	n/a	2.134	2.134	0.711
Z-Z, +D+0.750L+0.750S+H	3.0	0.0	n/a	n/a	n/a	2.134	2.134	0.711
Z-Z, +D+0.60W+H	3.0	0.0	n/a	n/a	n/a	1.056	1.056	0.352
Z-Z, +D+0.70E+H	3.0	0.0	n/a	n/a	n/a	1.056	1.056	0.352
Z-Z, +D+0.750Lr+0.750L+0.450W+H	3.0	0.0	n/a	n/a	n/a	2.134	2.134	0.711
Z-Z, +D+0.750L+0.750S+0.450W+H	3.0	0.0	n/a	n/a	n/a	2.134	2.134	0.711
Z-Z, +D+0.750L+0.750S+0.5250E+H	3.0	0.0	n/a	n/a	n/a	2.134	2.134	0.711
Z-Z, +0.60D+0.60W+0.60H	3.0	0.0	n/a	n/a	n/a	0.6337	0.6337	0.211
Z-Z, +0.60D+0.70E+0.60H	3.0	0.0	n/a	n/a	n/a	0.6337	0.6337	0.211

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Description : Thk. Slab under Bundled Studs, TS3

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	0.8890	+Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK

General Footing

Description : Thk. Slab under Bundled Studs, TS3

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	0.8890	-Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	2.322	+Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	2.322	-Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+1.60L+0.50S+1.60H	2.322	+Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+1.60L+0.50S+1.60H	2.322	-Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+1.60Lr+0.50L+1.60H	1.250	+Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+1.60Lr+0.50L+1.60H	1.250	-Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	0.7620	+Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	0.7620	-Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+0.50L+1.60S+1.60H	1.250	+Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+0.50L+1.60S+1.60H	1.250	-Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.7620	+Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.7620	-Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+0.50Lr+0.50L+W+1.60H	1.250	+Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+0.50Lr+0.50L+W+1.60H	1.250	-Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+0.50L+0.50S+W+1.60H	1.250	+Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+0.50L+0.50S+W+1.60H	1.250	-Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+0.50L+0.70S+E+1.60H	1.250	+Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +1.20D+0.50L+0.70S+E+1.60H	1.250	-Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +0.90D+W+0.90H	0.5715	+Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +0.90D+W+0.90H	0.5715	-Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +0.90D+E+0.90H	0.5715	+Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
X-X, +0.90D+E+0.90H	0.5715	-Z	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.40D+1.60H	0.8890	-X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.40D+1.60H	0.8890	+X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	2.322	-X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	2.322	+X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	2.322	-X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	2.322	+X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+1.60Lr+0.50L+1.60H	1.250	-X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+1.60Lr+0.50L+1.60H	1.250	+X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	0.7620	-X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	0.7620	+X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+0.50L+1.60S+1.60H	1.250	-X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+0.50L+1.60S+1.60H	1.250	+X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.7620	-X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.7620	+X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+0.50Lr+0.50L+W+1.60H	1.250	-X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+0.50Lr+0.50L+W+1.60H	1.250	+X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+0.50L+0.50S+W+1.60H	1.250	-X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+0.50L+0.50S+W+1.60H	1.250	+X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+0.50L+0.70S+E+1.60H	1.250	-X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +1.20D+0.50L+0.70S+E+1.60H	1.250	+X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +0.90D+W+0.90H	0.5715	-X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +0.90D+W+0.90H	0.5715	+X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +0.90D+E+0.90H	0.5715	-X	Bottom	0.216	Min Temp %	0.3433	10.191	OK
Z-Z, +0.90D+E+0.90H	0.5715	+X	Bottom	0.216	Min Temp %	0.3433	10.191	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	9.084 psi	9.084 psi	9.084 psi	9.084 psi	9.084 psi	75 psi	0.1211	OK
+1.20D+0.50Lr+1.60L+1.60H	23.728 psi	23.728 psi	23.728 psi	23.728 psi	23.728 psi	75 psi	0.3164	OK
+1.20D+1.60L+0.50S+1.60H	23.728 psi	23.728 psi	23.728 psi	23.728 psi	23.728 psi	75 psi	0.3164	OK
+1.20D+1.60Lr+0.50L+1.60H	12.768 psi	12.768 psi	12.768 psi	12.768 psi	12.768 psi	75 psi	0.1702	OK
+1.20D+1.60Lr+0.50W+1.60H	7.787 psi	7.787 psi	7.787 psi	7.787 psi	7.787 psi	75 psi	0.1038	OK
+1.20D+0.50L+1.60S+1.60H	12.768 psi	12.768 psi	12.768 psi	12.768 psi	12.768 psi	75 psi	0.1702	OK
+1.20D+1.60S+0.50W+1.60H	7.787 psi	7.787 psi	7.787 psi	7.787 psi	7.787 psi	75 psi	0.1038	OK
+1.20D+0.50Lr+0.50L+W+1.60H	12.768 psi	12.768 psi	12.768 psi	12.768 psi	12.768 psi	75 psi	0.1702	OK
+1.20D+0.50L+0.50S+W+1.60H	12.768 psi	12.768 psi	12.768 psi	12.768 psi	12.768 psi	75 psi	0.1702	OK
+1.20D+0.50L+0.70S+E+1.60H	12.768 psi	12.768 psi	12.768 psi	12.768 psi	12.768 psi	75 psi	0.1702	OK
+0.90D+W+0.90H	5.84 psi	5.84 psi	5.84 psi	5.84 psi	5.84 psi	75 psi	0.07787	OK
+0.90D+E+0.90H	5.84 psi	5.84 psi	5.84 psi	5.84 psi	5.84 psi	75 psi	0.07787	OK

Description : Thk. Slab under Bundled Studs, TS3

Punching Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	33.705 psi	150 psi	0.2247	OK
+1.20D+0.50Lr+1.60L+1.60H	88.036 psi	150 psi	0.5869	OK
+1.20D+1.60L+0.50S+1.60H	88.036 psi	150 psi	0.5869	OK
+1.20D+1.60Lr+0.50L+1.60H	47.373 psi	150 psi	0.3158	OK
+1.20D+1.60Lr+0.50W+1.60H	28.89 psi	150 psi	0.1926	OK
+1.20D+0.50L+1.60S+1.60H	47.373 psi	150 psi	0.3158	OK
+1.20D+1.60S+0.50W+1.60H	28.89 psi	150 psi	0.1926	OK
+1.20D+0.50Lr+0.50L+W+1.60H	47.373 psi	150 psi	0.3158	OK
+1.20D+0.50L+0.50S+W+1.60H	47.373 psi	150 psi	0.3158	OK
+1.20D+0.50L+0.70S+E+1.60H	47.373 psi	150 psi	0.3158	OK
+0.90D+W+0.90H	21.668 psi	150 psi	0.1445	OK
+0.90D+E+0.90H	21.668 psi	150 psi	0.1445	OK

Wall Footing

Description : Thickened Slab at Common (double) Wall, TS4

Code References

Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2012

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
AutoCalc Footing Weight as DL	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Reference Depth below Surface	=	0.8330 ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

Increases based on footing Width

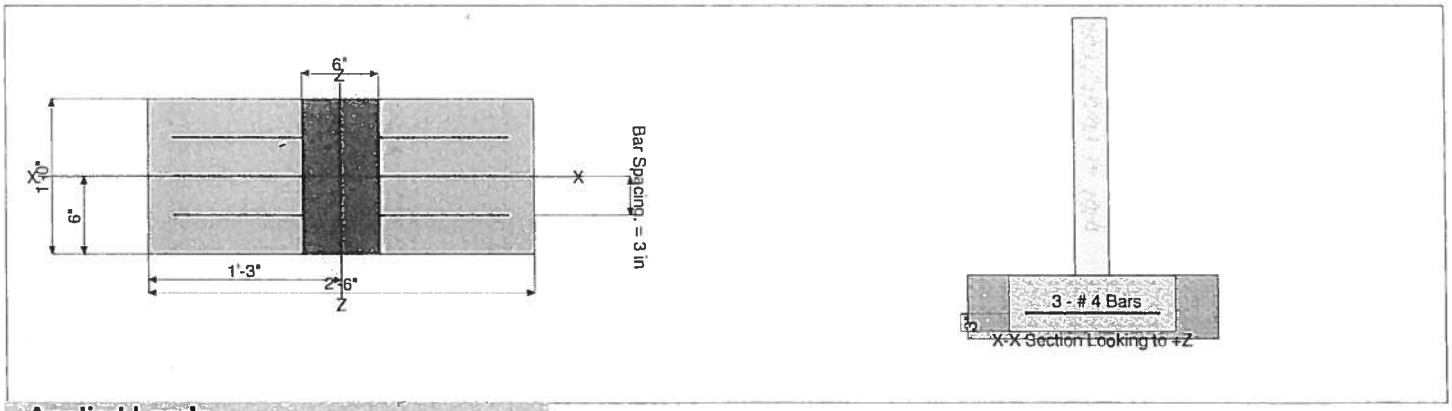
Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft

Adjusted Allowable Bearing Pressure = 3.0 ksf

Dimensions

Footing Width	=	2.50 ft	Footing Thickness	=	10.0 in	Bars along X-X Axis		
Wall Thickness	=	6.0 in	Rebar Centerline to Edge of Concrete...			# of Bars in 12" Width	=	3
Wall center offset from center of footing	=	0 in	at Bottom of footing	=	3.0 in	Reinforcing Bar Size	=	# 4

Reinforcing



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	0.730		0.160	0.080				k
OB : Overburden	=								ksf
V-x	=								k
M-zz	=								k-ft

Vx applied = in above top of footing

Wall Footing

Description : Thickened Slab at Common (double) Wall, TS4

DESIGN SUMMARY

Design OK

	Factor of Safety	Item	Applied	Capacity	Governing Load Combination
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift

	Utilization Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.1616	Soil Bearing	0.4848 ksf	3.0 ksf	+D+0.750L+0.750S+0.5
PASS	0.01773	Z Flexure (+X)	0.3069 k-ft	17.312 k-ft	+1.20D+1.60L+0.50S+1
PASS	0.01073	Z Flexure (-X)	0.1858 k-ft	17.312 k-ft	+0.90D+E+0.90H
PASS	0.03558	1-way Shear (+X)	2.923 psi	82.158 psi	+1.20D+1.60L+0.50S+1
PASS	0.03854	1-way Shear (-X)	3.166 psi	82.158 psi	+1.20D+1.60L+0.50S+1

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Actual Soil Bearing Stress -X	Actual Soil Bearing Stress +X	Actual / Allowable Ratio
. +D+H	3.0 ksf	0.0 in	0.4128 ksf	0.4128 ksf	0.138
. +D+L+H	3.0 ksf	0.0 in	0.4768 ksf	0.4768 ksf	0.159
. +D+Lr+H	3.0 ksf	0.0 in	0.4128 ksf	0.4128 ksf	0.138
. +D+S+H	3.0 ksf	0.0 in	0.4448 ksf	0.4448 ksf	0.148
. +D+0.750Lr+0.750L+H	3.0 ksf	0.0 in	0.4608 ksf	0.4608 ksf	0.154
. +D+0.750L+0.750S+H	3.0 ksf	0.0 in	0.4848 ksf	0.4848 ksf	0.162
. +D+0.60W+H	3.0 ksf	0.0 in	0.4128 ksf	0.4128 ksf	0.138
. +D+0.70E+H	3.0 ksf	0.0 in	0.4128 ksf	0.4128 ksf	0.138
. +D+0.750Lr+0.750L+0.450W+H	3.0 ksf	0.0 in	0.4608 ksf	0.4608 ksf	0.154
. +D+0.750L+0.750S+0.450W+H	3.0 ksf	0.0 in	0.4848 ksf	0.4848 ksf	0.162
. +D+0.750L+0.750S+0.5250E+H	3.0 ksf	0.0 in	0.4848 ksf	0.4848 ksf	0.162
. +0.60D+0.60W+0.60H	3.0 ksf	0.0 in	0.2477 ksf	0.2477 ksf	0.083
. +0.60D+0.70E+0.60H	3.0 ksf	0.0 in	0.2477 ksf	0.2477 ksf	0.083

Overturning Stability

Units : k-ft

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status

Footing Has NO Overturning

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding SafetyRatio	Status

Footing Has NO Sliding

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
. +1.40D+1.60H	0.289	-X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.40D+1.60H	0.289	+X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+0.50Lr+1.60L+1.60H	0.2989	-X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+0.50Lr+1.60L+1.60H	0.2989	+X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+1.60L+0.50S+1.60H	0.3069	-X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+1.60L+0.50S+1.60H	0.3069	+X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+1.60Lr+0.50L+1.60H	0.2637	-X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+1.60Lr+0.50L+1.60H	0.2637	+X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+1.60Lr+0.50W+1.60H	0.2477	-X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+1.60Lr+0.50W+1.60H	0.2477	+X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+0.50L+1.60S+1.60H	0.2893	-X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+0.50L+1.60S+1.60H	0.2893	+X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+1.60S+0.50W+1.60H	0.2733	-X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+1.60S+0.50W+1.60H	0.2733	+X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+0.50Lr+0.50L+W+1.60H	0.2637	-X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+0.50Lr+0.50L+W+1.60H	0.2637	+X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+0.50L+0.50S+W+1.60H	0.2717	-X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+0.50L+0.50S+W+1.60H	0.2717	+X	Bottom	0.216	Min Temp %	0.6	17.312	OK

Description : Thickened Slab at Common (double) Wall, TS4

. +1.20D+0.50L+0.70S+E+1.60H	0.2749	-X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +1.20D+0.50L+0.70S+E+1.60H	0.2749	+X	Bottom	0.216	Min Temp %	0.6	17.312	OK

Wall Footing

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Description : Thickened Slab at Common (double) Wall, TS4

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
. +0.90D+W+0.90H	0.1858	-X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +0.90D+W+0.90H	0.1858	+X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +0.90D+E+0.90H	0.1858	-X	Bottom	0.216	Min Temp %	0.6	17.312	OK
. +0.90D+E+0.90H	0.1858	+X	Bottom	0.216	Min Temp %	0.6	17.312	OK

One Way Shear

Units : k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	2.982 psi	2.752 psi	2.982 psi	82.158 psi	0.03629	OK
+1.20D+0.50Lr+1.60L+1.60H	3.084 psi	2.847 psi	3.084 psi	82.158 psi	0.03754	OK
+1.20D+1.60L+0.50S+1.60H	3.166 psi	2.923 psi	3.166 psi	82.158 psi	0.03854	OK
+1.20D+1.60Lr+0.50L+1.60H	2.721 psi	2.511 psi	2.721 psi	82.158 psi	0.03312	OK
+1.20D+1.60Lr+0.50W+1.60H	2.556 psi	2.359 psi	2.556 psi	82.158 psi	0.03111	OK
+1.20D+0.50L+1.60S+1.60H	2.985 psi	2.755 psi	2.985 psi	82.158 psi	0.03633	OK
+1.20D+1.60S+0.50W+1.60H	2.82 psi	2.603 psi	2.82 psi	82.158 psi	0.03432	OK
+1.20D+0.50Lr+0.50L+W+1.60H	2.721 psi	2.511 psi	2.721 psi	82.158 psi	0.03312	OK
+1.20D+0.50L+0.50S+W+1.60H	2.803 psi	2.588 psi	2.803 psi	82.158 psi	0.03412	OK
+1.20D+0.50L+0.70S+E+1.60H	2.836 psi	2.618 psi	2.836 psi	82.158 psi	0.03452	OK
+0.90D+W+0.90H	1.917 psi	1.769 psi	1.917 psi	82.158 psi	0.02333	OK
+0.90D+E+0.90H	1.917 psi	1.769 psi	1.917 psi	82.158 psi	0.02333	OK

General Footing

Description : Deck Column Footing, PF1

Code References

Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : IBC 2012

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	3.0 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

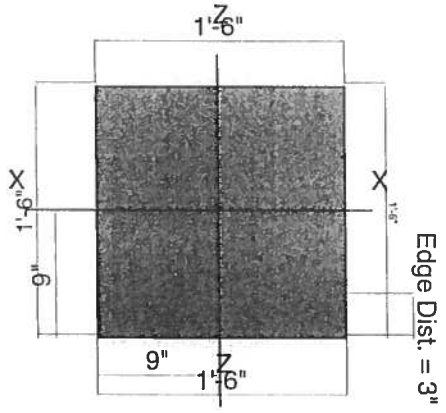
Width parallel to X-X Axis	=	1.50 ft
Length parallel to Z-Z Axis	=	1.50 ft
Footing Thickness	=	6.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	18.0 in
pz : parallel to Z-Z Axis	=	18.0 in
Height	=	30.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in

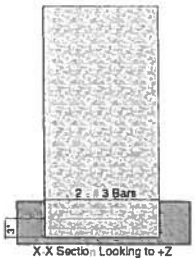


Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		2.0
Reinforcing Bar Size	=	#	3
Bars parallel to Z-Z Axis			
Number of Bars	=		2.0
Reinforcing Bar Size	=	#	3

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	2.010		1.20	1.360				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

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ENERGALC, INC. 1983-2016, Build:6.16.3.4, Ver:6.16.3.4

Lic. # : KW-06009199 — **Licensee : Whipple Consulting Engineers**

Description : Deck Column Footing, PF1

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.7273	Soil Bearing	2.182 ksf	3.0 ksf	+D+0.750L+0.750S+0.5250E+H about Z-Z
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.0	Z Flexure (+X)	0.0 k-ft	0.0 k-ft	No Moment
PASS	0.0	Z Flexure (-X)	0.0 k-ft	0.0 k-ft	No Moment
PASS	0.0	X Flexure (+Z)	0.0 k-ft	0.0 k-ft	No Moment
PASS	0.0	X Flexure (-Z)	0.0 k-ft	0.0 k-ft	No Moment
PASS	n/a	1-way Shear (+X)	0.0 psi	75.0 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a
PASS	n/a	1-way Shear (+Z)	0.0 psi	75.0 psi	n/a
PASS	n/a	1-way Shear (-Z)	0.0 psi	75.0 psi	n/a
PASS	n/a	2-way Punching	21.668 psi	75.0 psi	+1.40D+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location: Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X. +D+H	3.0	n/a	0.0	1.328	1.328	n/a	n/a	0.443
X-X. +D+L+H	3.0	n/a	0.0	1.862	1.862	n/a	n/a	0.621
X-X. +D+Lr+H	3.0	n/a	0.0	1.328	1.328	n/a	n/a	0.443
X-X. +D+S+H	3.0	n/a	0.0	1.933	1.933	n/a	n/a	0.644
X-X. +D+0.750Lr+0.750L+H	3.0	n/a	0.0	1.728	1.728	n/a	n/a	0.576
X-X. +D+0.750L+0.750S+H	3.0	n/a	0.0	2.182	2.182	n/a	n/a	0.727
X-X. +D+0.60W+H	3.0	n/a	0.0	1.328	1.328	n/a	n/a	0.443
X-X. +D+0.70E+H	3.0	n/a	0.0	1.328	1.328	n/a	n/a	0.443
X-X. +D+0.750Lr+0.750L+0.450W+H	3.0	n/a	0.0	1.728	1.728	n/a	n/a	0.576
X-X. +D+0.750L+0.750S+0.450W+H	3.0	n/a	0.0	2.182	2.182	n/a	n/a	0.727
X-X. +D+0.750L+0.750S+0.5250E+H	3.0	n/a	0.0	2.182	2.182	n/a	n/a	0.727
X-X. +0.60D+0.60W+0.60H	3.0	n/a	0.0	0.7970	0.7970	n/a	n/a	0.266
X-X. +0.60D+0.70E+0.60H	3.0	n/a	0.0	0.7970	0.7970	n/a	n/a	0.266
Z-Z. +D+H	3.0	0.0	n/a	n/a	n/a	1.328	1.328	0.443
Z-Z. +D+L+H	3.0	0.0	n/a	n/a	n/a	1.862	1.862	0.621
Z-Z. +D+Lr+H	3.0	0.0	n/a	n/a	n/a	1.328	1.328	0.443
Z-Z. +D+S+H	3.0	0.0	n/a	n/a	n/a	1.933	1.933	0.644
Z-Z. +D+0.750Lr+0.750L+H	3.0	0.0	n/a	n/a	n/a	1.728	1.728	0.576
Z-Z. +D+0.750L+0.750S+H	3.0	0.0	n/a	n/a	n/a	2.182	2.182	0.727
Z-Z. +D+0.60W+H	3.0	0.0	n/a	n/a	n/a	1.328	1.328	0.443
Z-Z. +D+0.70E+H	3.0	0.0	n/a	n/a	n/a	1.328	1.328	0.443
Z-Z. +D+0.750Lr+0.750L+0.450W+H	3.0	0.0	n/a	n/a	n/a	1.728	1.728	0.576
Z-Z. +D+0.750L+0.750S+0.450W+H	3.0	0.0	n/a	n/a	n/a	2.182	2.182	0.727
Z-Z. +D+0.750L+0.750S+0.5250E+H	3.0	0.0	n/a	n/a	n/a	2.182	2.182	0.727
Z-Z. +0.60D+0.60W+0.60H	3.0	0.0	n/a	n/a	n/a	0.7970	0.7970	0.266
Z-Z. +0.60D+0.70E+0.60H	3.0	0.0	n/a	n/a	n/a	0.7970	0.7970	0.266

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X. +1.40D+1.60H	0.0	+Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.40D+1.60H	0.0	-Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+0.50Lr+1.60L+1.60H	0.0	+Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+0.50Lr+1.60L+1.60H	0.0	-Z	Top	0.1296	Min Temp %	0.1467	1.866	OK

Description : Deck Column Footing, PF1

X-X, +1.20D+1.60L+0.50S+1.60H	0.0	+Z	Top	0.1296	Min Temp %	0.1467	1.866	OK

General Footing

Description : Deck Column Footing, PF1

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X. +1.20D+1.60L+0.50S+1.60H	0.0	-Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+1.60Lr+0.50L+1.60H	0.0	+Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+1.60Lr+0.50L+1.60H	0.0	-Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+1.60Lr+0.50W+1.60H	0.0	+Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+1.60Lr+0.50W+1.60H	0.0	-Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+0.50L+1.60S+1.60H	0.0	+Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+0.50L+1.60S+1.60H	0.0	-Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+1.60S+0.50W+1.60H	0.0	+Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+1.60S+0.50W+1.60H	0.0	-Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+0.50Lr+0.50L+W+1.60H	0.0	+Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+0.50Lr+0.50L+W+1.60H	0.0	-Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+0.50L+0.50S+W+1.60H	0.0	+Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+0.50L+0.50S+W+1.60H	0.0	-Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+0.50L+0.70S+E+1.60H	0.0	+Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +1.20D+0.50L+0.70S+E+1.60H	0.0	-Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +0.90D+W+0.90H	0.0	+Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +0.90D+W+0.90H	0.0	-Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +0.90D+E+0.90H	0.0	+Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
X-X. +0.90D+E+0.90H	0.0	-Z	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.40D+1.60H	0.0	-X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.40D+1.60H	0.0	+X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+0.50Lr+1.60L+1.60H	0.0	-X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+0.50Lr+1.60L+1.60H	0.0	+X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+1.60L+0.50S+1.60H	0.0	-X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+1.60L+0.50S+1.60H	0.0	+X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+1.60Lr+0.50L+1.60H	0.0	-X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+1.60Lr+0.50L+1.60H	0.0	+X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+1.60Lr+0.50W+1.60H	0.0	-X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+1.60Lr+0.50W+1.60H	0.0	+X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+0.50L+1.60S+1.60H	0.0	-X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+0.50L+1.60S+1.60H	0.0	+X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+1.60S+0.50W+1.60H	0.0	-X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+1.60S+0.50W+1.60H	0.0	+X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+0.50Lr+0.50L+W+1.60H	0.0	-X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+0.50Lr+0.50L+W+1.60H	0.0	+X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+0.50L+0.50S+W+1.60H	0.0	-X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+0.50L+0.50S+W+1.60H	0.0	+X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+0.50L+0.70S+E+1.60H	0.0	-X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +1.20D+0.50L+0.70S+E+1.60H	0.0	+X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +0.90D+W+0.90H	0.0	-X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +0.90D+W+0.90H	0.0	+X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +0.90D+E+0.90H	0.0	-X	Top	0.1296	Min Temp %	0.1467	1.866	OK
Z-Z. +0.90D+E+0.90H	0.0	+X	Top	0.1296	Min Temp %	0.1467	1.866	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	0 psi	0 psi	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50Lr+1.60L+1.60H	0 psi	0 psi	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60L+0.50S+1.60H	0 psi	0 psi	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60Lr+0.50L+1.60H	0 psi	0 psi	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60Lr+0.50W+1.60H	0 psi	0 psi	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50L+1.60S+1.60H	0 psi	0 psi	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+1.60S+0.50W+1.60H	0 psi	0 psi	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50Lr+0.50L+W+1.60H	0 psi	0 psi	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50L+0.50S+W+1.60H	0 psi	0 psi	0 psi	0 psi	0 psi	75 psi	0	OK
+1.20D+0.50L+0.70S+E+1.60H	0 psi	0 psi	0 psi	0 psi	0 psi	75 psi	0	OK
+0.90D+W+0.90H	0 psi	0 psi	0 psi	0 psi	0 psi	75 psi	0	OK
+0.90D+E+0.90H	0 psi	0 psi	0 psi	0 psi	0 psi	75 psi	0	OK

Punching Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	21.668 psi	128.571 psi	0.1685	OK
+1.20D+0.50Lr+1.60L+1.60H	21.668 psi	128.571 psi	0.1685	OK

Description : Deck Column Footing, PF1

Punching Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.20D+1.60L+0.50S+1.60H	21.668 psi	128.571 psi	0.1685	OK
+1.20D+1.60Lr+0.50L+1.60H	21.668 psi	128.571 psi	0.1685	OK
+1.20D+1.60Lr+0.50W+1.60H	21.668 psi	128.571 psi	0.1685	OK
+1.20D+0.50L+1.60S+1.60H	21.668 psi	128.571 psi	0.1685	OK
+1.20D+1.60S+0.50W+1.60H	21.668 psi	128.571 psi	0.1685	OK
+1.20D+0.50Lr+0.50L+W+1.60H	21.668 psi	128.571 psi	0.1685	OK
+1.20D+0.50L+0.50S+W+1.60H	21.668 psi	128.571 psi	0.1685	OK
+1.20D+0.50L+0.70S+E+1.60H	21.668 psi	128.571 psi	0.1685	OK
+0.90D+W+0.90H	21.668 psi	128.571 psi	0.1685	OK
+0.90D+E+0.90H	21.668 psi	128.571 psi	0.1685	OK

TAS Technical Assistance Services

Garden Court Building, 222 W. Mission Avenue. Suite 234, Spokane, WA 99201 (509) 325-4476 FAX (509) 325-4587

06/21/16

Liberty Lake Planning and Community Development
22710 E. Country Vista Blvd.
Liberty Lake, WA

Project: 24 unit Multifamily Residence

Total Area: 23052 sq.ft.

Address: Legacy Villas 24 unit Apartment
Buildings H, I & L
Country Vista Road
Liberty Lake, WA

Contact/ Phone: Lee Schwartzenburg, Wyatt Architects and Associates/ 928-1860

Glazing Percentage: 10.1%

Permit Center:

It is my opinion that plans submitted to TAS for the above project, **in conjunction with the compliance requirements noted below**, show compliance with the requirements of the 2012 Washington State Residential Energy Code (multifamily 3 stories or less). Compliance requirements not shown on the plans are noted below.

PROJECT COMPLIES with SECTION R402.1.4 TOTAL UA ALTERNATIVE with Target U-factors from TABLE R402.1.3 and WSU UA Alternative Worksheet for R-2 Occupancy, Washington State Residential Energy Code.

R402.1.4 Total UA Alternative. If the total building thermal envelope UA (sum of U-factors times assembly area) is less than or equal to the total UA resulting from using the U-factors in Table R402.1.3 (multiplied by the same assembly area as the proposed building), the building shall be considered in compliance with Table R402.2.2.

ALLOWABLE HEAT LOSS (Btu/h/deg.F)

Glazing (10.1%): 2334 sq.ft. @ U .30	= 700.0
Doors: 504 sq.ft. @ U .30	= 151.2
Ceiling: 7684 sq.ft. R49 @ U .026	= 199.8
Walls: 15619 sq.ft. R21 INT @ U .056	= 874.5
Slab: 625.7 l.f. R10 24" vertical or horizontal with thermal break @ .54 F-value	= 337.9
TOTAL UA ALLOWABLE	= 2263.4

PROPOSED HEAT LOSS (Btu/h/deg.F)

Glazing (10.1%): 1830.0 sq.ft.vinyl operable w/low-E + Argon @ U .30	= 549.0
504 sq.ft. insulated full light door w/low-E glazing @ U .28	= 141.1
Doors: 504 sq.ft. insulated @ U .16	= 80.6
Ceiling: 7684 sq.ft. R38 4:12 standard truss/ @ U .031	= 238.2
Walls: 15619 sq.ft. R21 INT horiz. siding @ U .054	= 843.4
Slab: 601.7 l.f. R10 vert/ 1 /2" extruded polystyrene thermal break slab to fdn @ .62 F-value	= 373.1
24 l.f. R10 vert/ no TB slab to fdn. (door blockouts) @ .70 F-factor	= 16.8

TOTAL PROPOSED HEAT LOSS = 2242.2

2242.2 Btu/h < 2263.4 Btu/h -- **Project complies w/ Table R402.1.1**

1. ENVELOPE

a. sec. R303.1.1 **Building thermal envelope insulation.** Insulation installers shall provide a certification listing the type, manufacturer and R-values of insulation installed in each element of the building thermal envelope.

b. sec. R303.1.1.1 **Blown roof/ceiling insulation.** The thickness of blown-in roof/ceiling insulation (fiberglass or cellulose) shall be written in inches on markers that are installed at least one for every 300 sq.ft. throughout the attic space. The markers shall be affixed to the trusses or joists and marked with the minimum initial installed thickness.

c. sec. R303.1.2 **Insulation mark installation.** Insulating materials shall be installed such that the manufacturer's R-value mark is readily observable upon inspection.

d. sec. R402.4 **Air leakage.** The building thermal envelope shall be constructed to limit air leakage. See attached Table R402.4.1.1for air barrier and insulation installation as applicable to the method of construction.

e. sec. R402.4.1.2 **Testing.** The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding 5 air changes per hour. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals). A written report of the results of the test shall be signed by the party conducting the test and provided to the code official.

f. sec. R402.4.3 **Air Leakage of fenestration.** Windows, skylights and sliding glass doors shall have an air infiltration rate of no more than 0.3 cfm per sq.ft. and swinging doors no more than 0.5 cfm per sq.ft. when tested according to NFRC 400 or AAMA/WDMA/CSA101/ I.S.2/A440 by an accredited, independent laboratory and listed and labeled by the manufacturer.

g. sec. 402.4.4 **Recessed lighting** (if used). Recessed luminaries installed in the building thermal envelope shall be type IC-rated and certified under ASTM E283 as having an air leakage rate not more than 2.0 cfm when tested at a 1.57 psf pressure differential.

2. MECHANICAL

a. sec. R403.1 **Controls.** At least one thermostat shall be provided for each separate heating and cooling system.

b. sec. R403.1.1 **programmable thermostat.** A programmable thermostat is not required unless the primary heating system is a forced air furnace.

c. sec. R403.4.2 **Hot water pipe insulation.** Insulation for hot water pipe shall have a minimum thermal resistance value of R-3.

d. sec. R403.4.3 **Electric water heater insulation.** All electric water heaters in unheated spaces or on concrete floors shall be placed on an incompressible, insulated surface with a minimum thermal resistance of R-10.

NOTE: The Washington State Residential Energy Code for residential buildings 3 stories or less **does not have specific efficiency requirements for HVAC systems in dwelling units unless the systems serve multiple dwelling units.**

The Residential Energy Code also does not have specific water heater efficiency requirements.

e. sec. R403.5 **Mechanical ventilation.** The building shall be provided with ventilation that meets the requirements of the International Residential Code or International Mechanical Code, as applicable, or with other means of ventilation. Outdoor intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

f. sec. R403.5.1 **Mechanical ventilation system fan efficacy.** Range hoods and in-line fans with no minimum or maximum cfm rate and bathroom & utility fans with a minimum 90 cfm airflow rate shall have a minimum efficacy of 2.8 cfm/watt. Bathroom and utility fans with a minimum 10 cfm to less than 90 cfm maximum flow rate shall have a minimum efficacy of 1.4 cfm/watt.

Exception: Where mechanical ventilation fans are integral to tested and listed HVAC equipment, they shall be powered by an electronically commutated motor.

g. sec. R403.6 **Equipment sizing.** Heating and cooling equipment shall be sized in accordance with ACCA Manual S based on building loads calculated in accordance with Manual J or other approved heating and cooling calculation methodologies.

3. LIGHTING

NOTE: Lighting **must be 75% high efficacy lamps* in fixtures** - there is no wattage restriction. A high efficacy lamp is a compact fluorescent, T-8 or smaller diameter linear fluorescent lamp, or lamps with a minimum efficacy of:

1. 60 lumens per watt for lamps over 40 watts;
2. 50 lumens per watt for lamps over 15 watts to 49 watts; and
3. 40 lumens per watt for lamps 15 watts or less

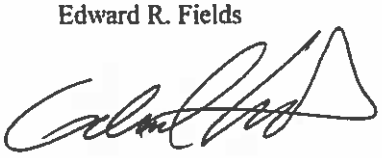
* Total lamp count, not fixture count.

Exterior Lighting: Luminaires providing outdoor lighting and permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy luminaries.

EXCEPTION: Permanently installed outdoor luminaries that are not high efficacy fixtures shall be allowed provided they are controlled by a motion sensor(s) with integral photo control photo sensor.

The Washington State Residential Energy Code does not have an Exterior Target Lighting Wattage Allowance for buildings or site.

Edward R. Fields



Technical Assistance Services
!CC Certification #1139685-78

TABLE R402.4.1.1
AIR BARRIER AND INSULATION INSTALLATION

COMPONENT	CRITERIA[a]
Air barrier and thermal barrier	A continuous air barrier shall be installed in the building envelope. Exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed. Air-permeable insulation shall not be used as a sealing material.
Cavity insulation installation	All cavities in the thermal envelope shall be filled with insulation. The density of the insulation shall be at the manufacturers' product recommendation and said density shall be maintained for all volume of each cavity. Batt type insulation will show no voids or gaps and maintain an even density for the entire cavity. Batt insulation shall be installed in the recommended cavity depth. Where an obstruction in the cavity due to services, blocking, bracing or other obstruction exists, the batt product will be cut to fit the remaining depth of the cavity. Where the batt is cut around obstructions, loose fill insulation shall be placed to fill any surface or concealed voids, and at the manufacturers' specified density. Where faced batt is used, the installation tabs must be stapled to the face of the stud. There shall be no compression to the batt at the edges of the cavity due to inset stapling installation tabs. Insulation that upon installation readily conforms to available space shall be installed filling the entire cavity and within the manufacturers' density recommendation.
Ceiling/attic	The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier sealed. Access openings, drop down stair or knee wall doors to unconditioned attic spaces shall be sealed. Batt insulation installed in attic roof assemblies may be compressed at exterior wall lines to allow for required attic ventilation.
Walls	Corners and headers shall be insulated and the junction of the foundation and sill plate shall be sealed. The junction of the top plate and top of exterior walls shall be sealed. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier. Knee walls shall be sealed.
Windows, skylights and doors	The space between window/door jambs and framing and skylights and framing shall be sealed.
Rim joists	Rim joists shall be insulated and include the air barrier.
Floors (including above-garage and cantilevered floors)	Insulation shall be installed to maintain permanent contact with underside of subfloor decking. The air barrier shall be installed at any exposed edge of insulation.
Crawl space walls	Where provided in lieu of floor insulation, insulation shall be permanently attached to the crawlspace walls. Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping joints taped.
Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts opening to exterior or unconditioned space shall be sealed.
Narrow cavities	Batts in narrow cavities shall be cut to fit and installed to the correct density without any voids or gaps or compression. Narrow cavities shall be filled by insulation that on installation readily conforms to the available cavity space.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be air tight, IC rated, and sealed to the drywall.
Plumbing and wiring	Batt insulation shall be cut neatly to fit around wiring and plumbing in exterior walls. There shall be no voids or gaps or compression where cut to fit. Insulation that on installation readily conforms to available space shall extend behind piping and wiring.
Shower/tub on exterior wall	Exterior walls adjacent to showers and tubs shall be insulated and the air barrier installed separating them from the showers and tubs.
Electrical/phone box on exterior walls	The air barrier shall be installed behind electrical or communication boxes or air sealed boxes shall be installed.
HVAC register boots	HVAC register boots that penetrate building thermal envelope shall be sealed to the subfloor or drywall.
Fireplace	An air barrier shall be installed on fireplace walls. Fireplaces shall have gasketed doors.

a. In addition, inspection of log walls shall be in accordance with the provisions of ICC-400.