City of Ketchum
Planning & Building

OFFICIAL USE ONLY
File Number:
Date Received:
By:
Fee Paid:
Approved Date:
Denied Date:
By:

Conditional Use Permit Application

Submit completed application and payment to the Planning and Building Department, PO Box 2315, Ketchum, ID 83340 or hand deliver to Ketchum City Hall, 191 5th St. West, Ketchum. If you have questions, please contact the Planning and Building Department at (208) 726-7801. To view the Development Standards, visit the City website at: www.ketchumidaho.org and click on Municipal Code.

OWNER INFORMATION	
Project Name: Pratt Residence	
Name of Owner of Record: Bradley & Gail Pratt	
Physical Address: 406 Sage Road	
Property Legal Description: Warm Springs Village Subdivision, 4th Addition, Block 3, Lot 23	
Property Zoning District: General Residential Low-Density (GR-L)	
Contact Phone: (208) 727-1988	Contact Email: bsmith@alpineenterprisesinc.com

PROJECT INFORMATION	
Description of Proposed Conditional Use:	To allow for a new avalanche resistant single-family residential structure within the Avalanche Overlay District.
Description of Proposed and Existing Exterior Lighting:	See Architectural Plans. No exterior lighting is associated with the avalanche mitigation structure.

ADDITIONAL COMMENTS

See the attached Narrative & Engineering Statements.

ACCOMPANYING SUPPORTING INFORMATION REQUIRED

• Existing Site Plan • Proposed Site Plan • Landscape Plan • Grading and Drainage Plan • Exterior Lighting Plan and Specifications • Other plans and studies related to the social, economic, fiscal, environmental, traffic, and other effects of the proposed conditional use, as required by the Administrator

Applicant agrees to observe all City ordinances, laws and conditions imposed. Applicant agrees to defend, hold harmless and indemnify the City of Ketchum, city officials, agents and employees from and for any and all losses, claims, actions, judgments for damages, or injury to persons or property, and losses and expenses caused or incurred by Applicant, its servants, agents, employees, guests and business invitees and not caused by or arising out of the tortuous conduct of city or its officials, agents or employees. Applicant certifies that s/he has read and examined this application and that all information contained herein is true and correct.

Bruce S.

Representative's Signature

Bruce Smith, PLS 7048
Alpine Enterprises Inc.

31JAN23

Date

*Once your application has been received, we will review it and contact you with next steps. No further action is required at this time.

ALPINE ENTERPRISES INC.

Surveying, Mapping, Civil Engineering, GPS, GIS, and Natural Hazards Consulting

Bruce Smith, PLS
Alex Nelson, PE
Alpine Enterprises Inc.
P.O. Box 2037
Ketchum, ID 83340
(208) 727-1988
alexnelson@alpineenterprisesinc.com

January 20th, 2023

City of Ketchum
Planning & Building Department

RE: 406 Sage Road – Conditional Use Permit Application
Warm Springs Village Subdivision, 4th Addition, Block 3, Lot 23
Ketchum, ID 83340

Please find the attached Conditional Use Permit Application and plans for the proposed Pratt Residence located at 406 Sage Rd. in Ketchum, Idaho.

The owners wish to redevelop the existing parcel, Warm Springs Village Subdivision, 4th Addition, Block 3, Lot 23, into a new single-family residential dwelling. The Subject Property is located within the City of Ketchum's Avalanche Zoning District. As a result, any new development within this Zone must be designed to withstand the potential avalanche forces, to not deflect avalanche runout towards the property of others, and to not increase the danger to persons or property. The current residential structure was constructed in 1966, before avalanche design requirements were implemented, and consequently is not safe from avalanche danger.

We have worked with the Owners, the Designers at Farmer Payne Architects, and Structural Engineer at Maxwell SDS to make this an avalanche aware design from the inception. Numerous meetings with the Owners, Farmer Payne Architects, and Maxwell SDS have resulted in what we believe to be the best location, orientation, and design for the proposed residence. The goal was to keep the structure and its surrounding property as safe as possible while still maintaining the Owners vision for their property. An important aspect of the design was to be deflection neutral. The design also adds an element of safety to the existing down path residences. The proposed structure was oriented in a manner that will entrap the potential avalanche runout in order to not deflect avalanche runout towards the property of others. Any snow momentarily deflected by the structure will be immediately entrained by the rest of the slide as it passes by ensuring there will not be increased risks to neighboring properties. The structure was also located immediately adjacent to the minimum front yard setback in an attempt to reduce the potential avalanche forces associated with Red Hazard Zones. It should be remembered that persons and property inside an avalanche resistant structure will be safe from avalanche danger, but persons or property on the outside of a proposed structure could be at risk.

According to the structural plans by Maxwell SDS the height of the proposed avalanche protection wall would range between 22' and 26' above finish grade along the Westerly side of the building. The avalanche protection wall is an extension of the buildings foundation and was a component in the aesthetic design choices.

Conditional Use Permit Criteria:

A. *The characteristics of the conditional use will not be unreasonably incompatible with the types of uses permitted in the applicable zoning district.*
   - The surrounding neighborhood and adjacent properties have all been developed with similar avalanche protection structures. The neighboring properties that do not have similar avalanche mitigation structures were developed before it was a requirement.

B. *The conditional use will not materially endanger the health, safety, and welfare of the community.*
   - The proposed structure will not endanger the health, safety, and welfare of the community as far as any development within an Avalanche Hazard zone can be considered, but as long as the City allows development within Avalanche Hazard Zones, we feel that the owner has a vested right to responsibly develop this property. The existing structure on the subject property as well as numerous neighboring properties were developed before avalanche protection was a requirement. These structures have endangered the health, safety, and welfares of the community and have also created

the need for stricter codes and enforcement. The proposed development would replace an existing nonconforming structure, act as a mitigation structure for downslope properties, and would decrease the risks to the community.

C. The conditional use is such that pedestrian and vehicular traffic associated with the use will not be hazardous or conflict with existing and anticipated traffic in the neighborhood.

- The proposed development is within a platted subdivision that was recorded in 1961. The subject property was identified as being within an Avalanche Zone by the City of Ketchum in 1979. The vehicular and pedestrian traffic associated with this property would be consistent with every other lot and development within the subdivision.

D. The conditional use will be supported by adequate public facilities or services and will not adversely affect public services to the surrounding area, or conditions can be established to mitigate adverse impacts.

- The proposed development is within a platted subdivision that was recorded in 1961 and the property is currently serviced by City water and sewer.

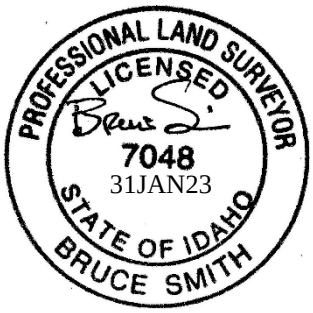
E. The conditional use is not in conflict with the policies of the comprehensive plan or the basic purposes of this chapter.

- The proposed development does not conflict with the policies of the City's Comprehensive Plan or the basic purpose of the Conditional Use requirements.

Should you need further information, please do not hesitate to contact me.

Sincerely,

Bruce Smith, PLS 7048, Idaho
Alex Nelson, PE 19275, Idaho



MAXWELL
STRUCTURAL DESIGN STUDIO

AVALANCHE ZONE MEMORANDUM February 13, 2023

TO: City of Ketchum – Planning and Zoning Department
480 East Avenue North
Ketchum, Idaho 83340
208-726-7802

FROM: Craig Maxwell P.E.

RE: Pratt Residence
406 Sage Road
Ketchum, Idaho

To whom it may concern,

This memorandum is to accompany the Conditional Use Permit and Design Review Application for the single-family residence that is to be built within Ketchum's Avalanche Overlay District at 406 Sage Road in Ketchum, Idaho. This memorandum certifies that the proposed construction as designed will withstand the avalanche forces as set forth in the 2023 Snow Avalanche Hazard Evaluation Block 3, Lot 23, Warm Springs Village Subdivision, 4th Add. located within Section 11 & 14, T. 4N., R.17E., B.M., City of Ketchum, Blaine County, Idaho by Alpine Enterprises Inc.

If there are any further questions, please contact me.

Sincerely,

Craig Maxwell

CRAIG@MAXWELLSDS.COM • 208 721 2171 • PO BOX 1911 • SUN VALLEY, IDAHO 83353

ALPINE ENTERPRISES INC.

Surveying, Mapping, Civil Engineering, GPS, GIS, and Natural Hazards Consulting

Alex Nelson, PE
Alpine Enterprises Inc.
P.O. Box 2037
Ketchum, ID 83340
(208) 727-1988
alexnelson@alpineenterprisesinc.com

May 17th, 2023

City of Ketchum
Planning & Building Department

RE: 406 Sage Road – Retaining Wall Engineering Statement
Warm Springs Village Subdivision, 4th Addition, Block 3, Lot 23
Ketchum, ID 83340

I have reviewed the Grading and Landscape Plans, dated May 17th 2023, for the proposed Pratt Residence located at 406 Sage Rd. in Ketchum, Idaho to determine if the planned boulder slope retainage would qualify as permanent structures or require engineering in pursuant to Ketchum Municipal Code 17.12.030. It is of my professional opinion that the proposed retainage is not structural or permanent under the current definitions and should be evaluated as landscape features.

Should you need further information, please do not hesitate to contact me.

Sincerely,

Alex Nelson, PE 19275, Idaho

SNOW AVALANCHE HAZARD EVALUATION
WARM SPRINGS VILLAGE SUBDIVISION, 4TH ADDITION
BLOCK 3, LOT 23
406 SAGE ROAD
LOCATED WITHIN SECTIONS 11 & 14, T. 4 N., R.17 E., B.M.,
CITY OF KETCHUM, BLAINE COUNTY, IDAHO

Prepared for
Bradley & Gail Pratt

Bruce Smith, PLS 7048
Alex Nelson, PE 19275
Alpine Enterprises Inc.
P.O. Box 2037
Ketchum, Idaho 83340

This report will attempt to delineate the potential avalanche danger at the study site by correlating key data, both quantitatively and intuitively, to show runout distances and destructive power within the limits of the avalanche hazard forecasting art. The avalanche hazard areas in this study are considered by Alpine Enterprises, Inc., the City of Ketchum, the owners and their planners to be reasonable for regulatory purposes. However, neither Alpine Enterprises, Inc., the City of Ketchum, nor the owners or their planners represents, warrants or implies that areas outside of the designated avalanche zones are safe and free from avalanches or avalanche danger. The effects of natural and artificial hazards other than snow are not discussed in this report.

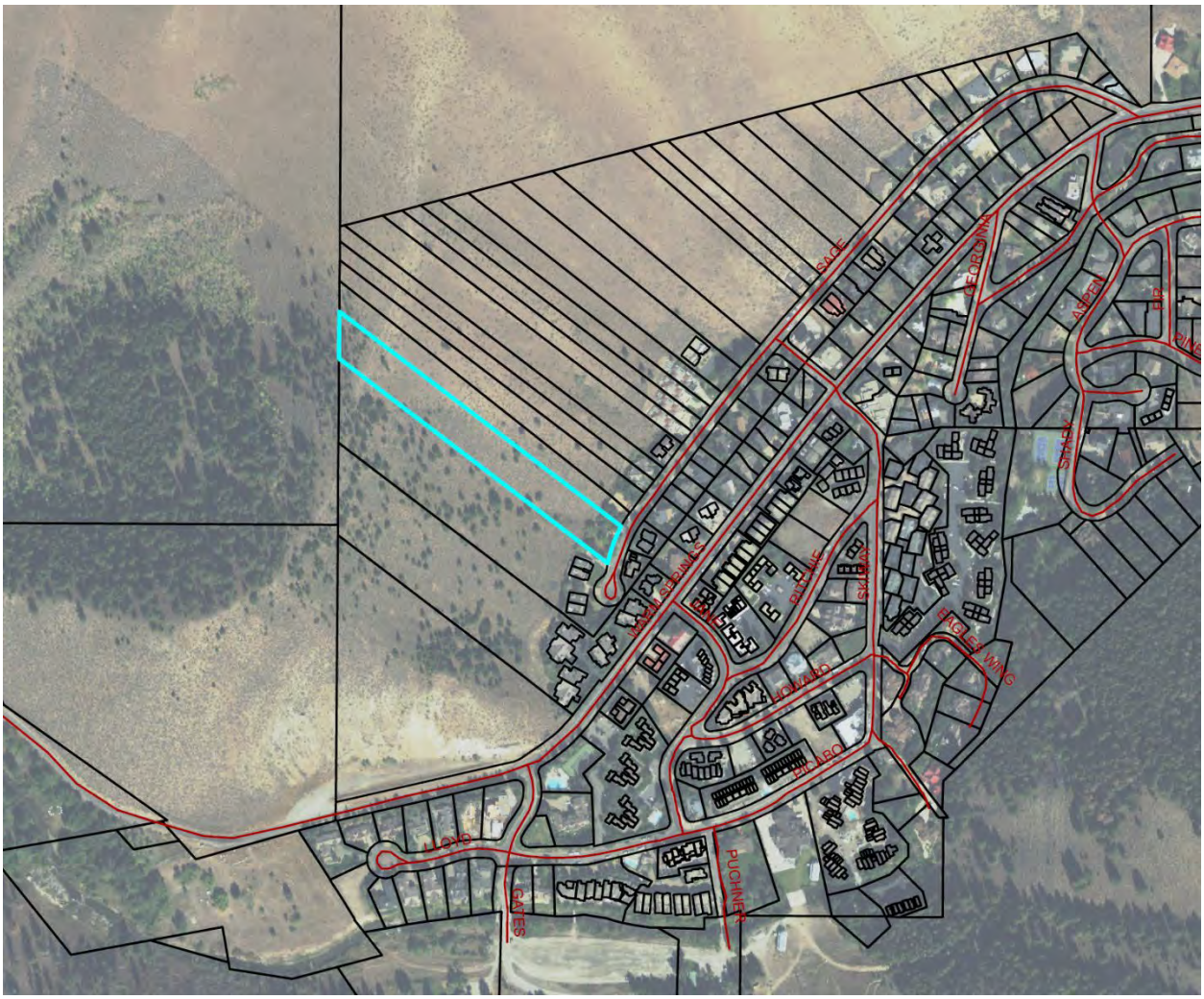


Figure 1 - Vicinity Map (Image Not to Scale)

The purpose of this study is to discuss the potential Snow Avalanche Hazard for the proposed residence at Warm Springs Village Subdivision 4th Addition, Block 3, Lot 23, located at 406 Sage Road, City of Ketchum, Idaho. This discussion applies only to these Lots and should not be used for other areas. The subject property is located within portions of Sections 11and 14, Township 4 North, Range 17 East, Boise Meridian, Blaine County, Idaho. The geographic position is roughly 43°41'11.7" North Latitude, and 114°24'15.6" West Longitude. Elevations range from approximately 5920 feet on the valley floor, to about 6410 feet on top of a ridge that may affect the general area. Downtown Ketchum, Idaho, lies approximately 2.5 miles Southeasterly of the study site. Topographic maps used in the calculations come from a Site Plan produced by Alpine Enterprises Inc. using site specific data, Blaine County GIS LiDAR, and Parcel Data.

Field inspections and avalanche observations of the general area have taken place from circa 1980 through 2022, and field inspections of the site took place in May of 2022.

AVALANCHE CHARACTERISTICS

The following discussion is to help the reader better understand conditions that may lead to an avalanche event. The difference between grade in percent and inclination in degrees should be noted. Percent grade is calculated by the vertical rise divided by the horizontal distance. Inclination in degrees is calculated by taking the arctangent of the grade in percent. A four to one slope = 25% = 14°. Avalanches are generally divided into three areas: a starting zone, a track, and a runout zone. In general, an open slope with an inclination over 27° that receives large amounts of snow can be considered a potential starting zone. Once the snow is set in motion, a slope angle of 17° is all that is required to keep the snow moving through the track, although 22° to 35° is a more typical track angle. The runout zone is where the slide starts losing momentum and the debris finally comes to rest. Runouts may begin when the slope angle flattens to 10° and some will continue across flats and even uphill.

Avalanches may be put into two general types: loose snow, and slabs. These two may be further subdivided into wet and dry. Loose snow slides occur when individual snow grains, due to a lack of cohesiveness, reach their angle of repose and slide down the hill in a generally harmless repositioning, known as a sluff. Wet snow sluffs, although slow moving, may present a hazard due to the sheer mass involved. This type of slide usually occurs in the springtime when factors such as high temperatures, warm winds, rain, and solar radiation create a melt-water saturated snowpack which slides on the ground. Slushflows have been documented on slopes as shallow as 3°, but these are rare occurrences and can generally be disregarded for land planning purposes. On slopes steeper than 50°, loose snow sluffs occur almost continually during storms, thus preventing accumulations that could become hazardous.

Slab avalanches occur involving entire layers in the snowpack and have the potential to become extremely dangerous. The most common type of slab avalanche occurs when large amounts of wind deposited snow accumulate on a slope into a cohesive slab, sitting on top of a weaker layer. With an appropriate trigger, this slab layer will fracture into blocks of snow and begin moving rapidly down the hill, picking up momentum and entraining more snow as it propagates. The slide moves on a bed surface, which may be a deeper layer of snow or the ground. Structural instability in the snowpack occurs due to many factors, some of which are: heavy amounts of snowfall, extreme air temperature changes, a temperature gradient through the layers that forms weak crystals, rainfall, or an ice crust layer.

AVALANCHE ZONING

The City of Ketchum uses roughly the same zoning plan that was developed in Switzerland over 60 years ago. The main difference in the two systems is the "return period" factor. Avalanches have been documented for centuries in Europe, while Blaine County still lacks actual records of occurrences. The best available evidence is talking to long time area residents, old newspaper

articles, and terrain analysis with personal observations and records.

This report will use the three color (or three zone) system. The three zones are defined as follows:

RED (High Hazard) Zone. This area includes terrain where avalanches are expected to have (a) an impact pressure of 30 kPa (600 Lb/Ft^2) or greater with a return period up to 300 years, and/or (b) a return period of 30 years or less regardless of impact pressure. Buildings, roads, and winter parking are generally not allowed in the Red Zone (except in the Cities of Ketchum and Sun Valley).

BLUE (Low Hazard) Zone. This area is the transition zone between high hazard and no hazard zones. Avalanches are expected with impact pressures of less than 30 kPa (600 Lb/Ft^2) and return periods between 30 and 300 years.

WHITE (No Hazard) Zone. This area includes terrain with very infrequent small slides and the potential for less than 3 kPa (60 Lb/Ft^2) from the air blast of a Very Large Avalanche.

The avalanche path modeled in this study that could affect the site and the proposed structure lies within the Red and Blue Hazard Zones, and its size classification is Small.

Please refer to Ketchum Municipal Code, Chapter 17.92 Avalanche Zone District (A) for further Conditions and Restrictions, as it is subject to change.

It is generally regarded that it is not economically feasible to build wood frame structures capable of withstanding pressures greater than 10 kPa (200 Lb/Ft^2), so reinforced concrete structures may be the most logical direct protection alternative. In some cases, avalanche mitigation structures such as catching dams or deflecting berms may be more suitable. Any structure that encourages gatherings of people such as schools, churches, and hotels, should not be allowed.

HISTORY

The Sun Valley and Blaine County areas have seen man's activities since the late 1800's, but a detailed history of avalanche activity has not been kept. Personal observations, videos, photos, old newspaper articles and interviews with long time area residents recall that avalanches have occurred regularly in the Warm Springs area. In my brief 40 years living in Ketchum, I have observed numerous avalanches in this area, but none, so far, at the subject property.

A former Blaine County Planning and Zoning Administrator recalled stories of a storm in the early 1930's when "it snowed 2 feet, and then rained hard on the new snow, and nearly everything slid." A similar report from the early 1900's reports the same conditions.

The circa 1978, Avalanche Study, conducted by Arthur I. Mears, that was used as the basis for Ketchum's Avalanche Overlay District shows the subject property to be in a Red Zone. Whereas the circa 1977 Avalanche Study, conducted by Norman A. Wilson, shows the subject property outside of avalanche hazard areas. These maps were produced before most of the development occurred in the area and were before Avalanche Dynamics Software and LiDAR mapping were available.

Figure 2 - This photo shows a January 2004 event at the intersection of Sage Road and Skiway Drive and is similar to what could be expected at the site.

Figure 3 - This photo shows a January 2008 event on Sage Road and is similar to what could be expected at the site.

Figure 4 - This photo shows a January 2004 event on Sage Road and is similar to what could be expected at the site.

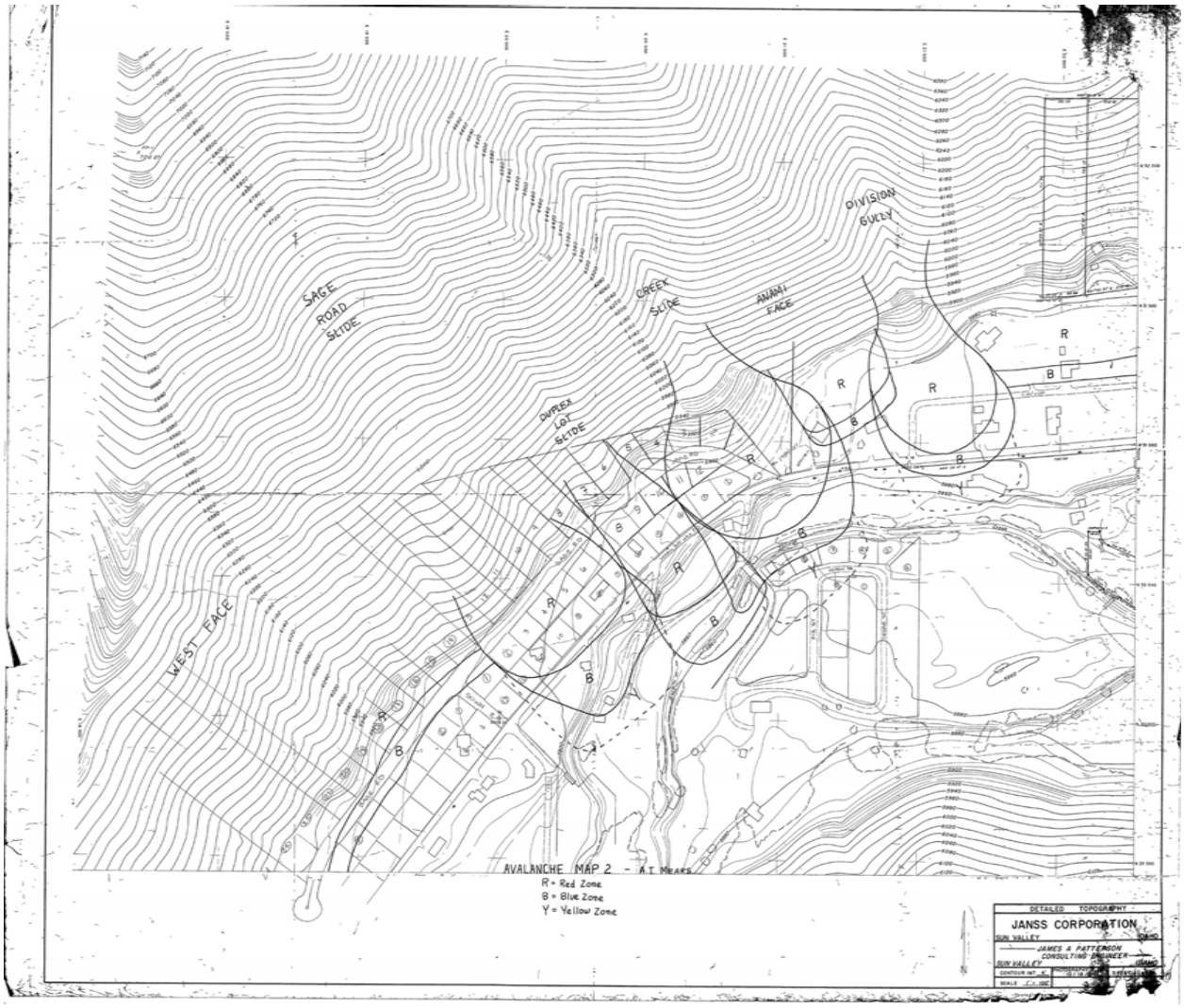


Figure 5 - Mears Avalanche Map 2 – Circa 1978

SITE ANALYSIS

The best method for determining avalanche runout distance (which is of primary importance to man and his activities) is a long (300 year) history of past events at the site. If this is not available, the next step is to look for damage to trees and other vegetation along the track and runout zone. This particular site does not lend itself to dendrochronology, due to minimal vegetation consisting of mostly grasses and sagebrush with a few small, scattered Fir and Aspen.

The next step is terrain analysis and applying statistical methods developed by mapping hundreds of avalanches around the world and comparing these figures to a local data set to determine runout distance. These results are compared with accepted avalanche dynamics modeling software, RAMMS: AVALANCHE (Rapid Mass Movement Simulation), developed by the Swiss Federal Institute for Snow and Avalanche Research to calculate approximate flow depths, velocities, pressures, and potential impact forces that may be expected. Both the Statistical and Dynamic Models are used in this report with the RAMMS model taking precedence as it shows velocities, pressures, and flow depths along the path and the lateral extents.

Blaine County is typically under the influence of Intermountain climatic factors, which usually result in a comparatively shallow snowpack, and cold temperatures; perfect conditions for creating the usual and expected temperature gradient layers (T.G., Kinetic, Facets or "sugar snow") resulting in a weak snowpack structure. This fact, coupled with occasional large Pacific storm events, and the necessary terrain characteristics, result in the occasional avalanches that are observed.

Figure 6 - Looking Uphill from Proposed Building Site.

The slope above the site is a combination of a broad unconfined face and a channelized path. Both lie at a typical slope angle of around 32 degrees that steepens up to 38 degrees as it nears the toe of the slope. The projected avalanche path is short and steep with a slight channel above the subject property that will direct larger avalanche events into the proposed building area. The slope does not lend itself to deep snow wind loading as typical on the Westerly side of many of the channelized paths in the Warm Springs area, but the steep nature of the immediate terrain creates the potential for avalanche danger.

LAND PLANNING RECOMMENDATIONS

Please refer to the attached 1" = 40', 1" = 10', and Avalanche Forces "A Snow Avalanche Hazard Study Showing Lot 23, Blk 3, Warm Springs Village Subdivision, 4th Addition" maps by Alpine Enterprises Inc. for the following discussion.

The Red Zone shown will affect only the most northwestern corner of the proposed avalanche protection wall, while the remainder of the proposed structures and driveways lie in the Blue Zone that stops within Sage Road. To ensure the building will remain deflection neutral, the northwestern portion of the structure was designed in such a way that the potential avalanche runout will become entrapped behind the structure. This creates the possibility for the potential avalanche impact pressures to exceed what would commonly be found in Blue Hazard Areas and as a result the projected impact pressures were increased to be within the Red Hazard Area classification.

We have worked with the Owners, the Designers at Farmer Payne Architects, and Structural Engineer at Maxwell SDS to make this an avalanche aware design from the inception. Numerous meetings with the Owners, Farmer Payne Architects, and Maxwell SDS have resulted in what we believe to be the best location, orientation, and design for the proposed residence. The goal was to keep the structure and its surrounding property as safe as possible while still maintaining the Owners vision for their property. An important aspect of the design was to be deflection neutral and act as a mitigation structure to add an element of safety to the existing down path residences. The proposed structure was oriented in a manner that will entrap the potential avalanche runout in order to not deflect avalanche runout towards the property of others. Any snow momentarily deflected by the structure will be immediately entrained by the rest of the slide as it passes by ensuring there will not be increased risks to neighboring properties. The structure was also located immediately adjacent to the minimum front yard setback in an attempt to reduce the potential avalanche forces associated with Red Hazard Zones. It should be remembered that persons and property inside an avalanche resistant structure will be safe from avalanche danger, but persons or property on the outside of a proposed structure could be at risk.

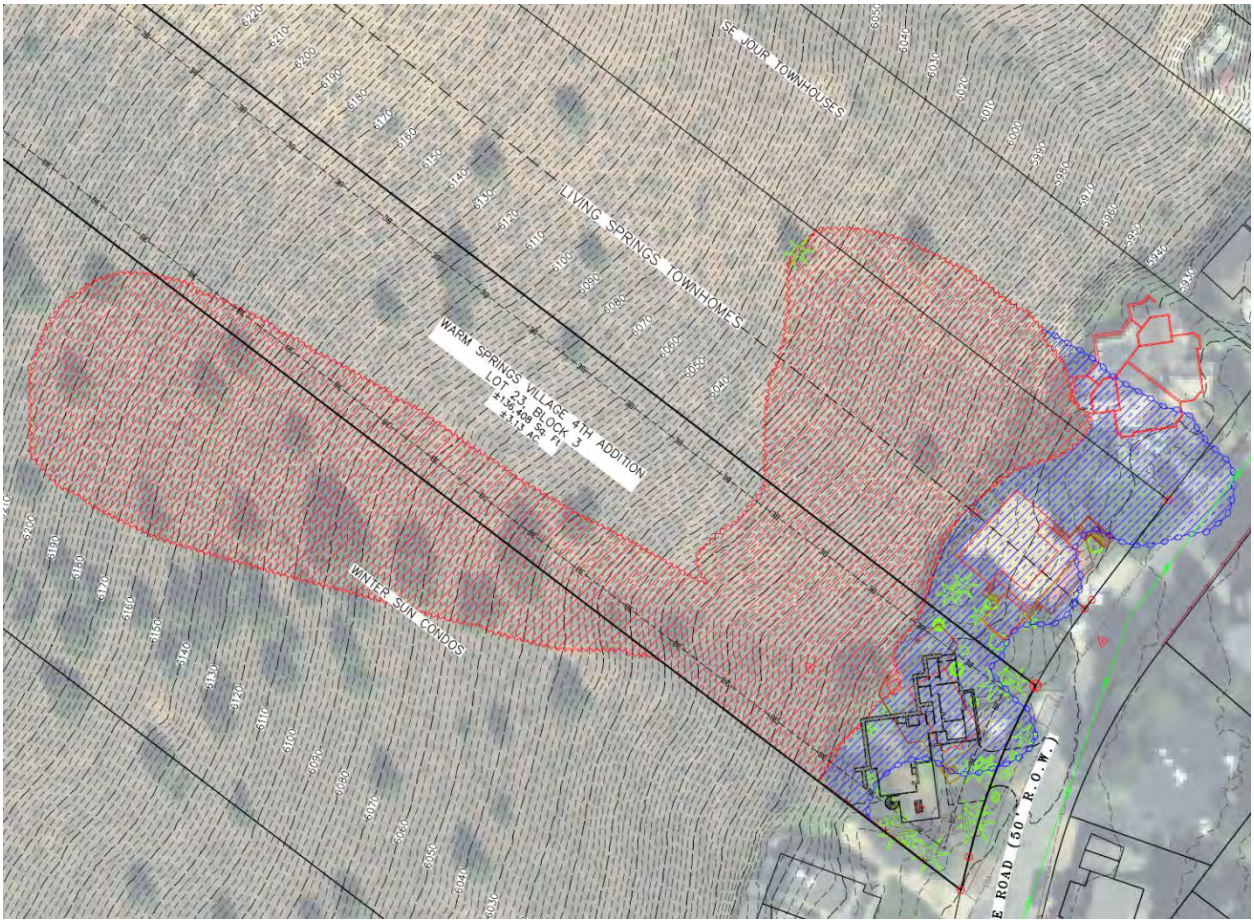


Figure 7 – A 2022 Avalanche Hazard Map showing the subject property, 406 Sage Rd.

This report should be considered site specific in that avalanche forces and return periods at this site should not be applied to other sites.

The Sawtooth Avalanche Center maintains a daily avalanche hazard forecast during winter months on the internet at SawtoothAvalanche.com that should be referred to frequently, and official warnings should be heeded during periods of high hazard. A daily subscription via email is also available.

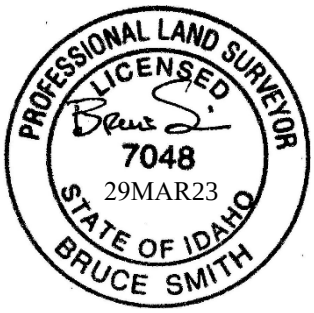
As Pete Schaerer suggests in *The Handbook of Snow*: "the technical work required to identify dangerous zones can be carried out with reasonable accuracy using the procedures outlined above. Determination of acceptable risk and the enforcement of building restrictions are political and legal matters."

In conclusion, it is recommended that structures in this area be carefully positioned, oriented, and designed; and that the residents of this area possess at least a basic knowledge of conditions that may lead to an avalanche event, and use this knowledge to protect themselves, family, visitors, structures, the public, and property. As long as the City allows development in the High Hazard Zones, we do feel that the owners have a vested right to responsibly develop this property. Dwelling in this area may be considered an acceptable risk for those who are aware of the hazard, have a basic understanding of conditions that could result in an avalanche event, and are willing to accept the occasional risk. The Developer, Owner, and the City should be aware of, and willing to accept, all possible legal, moral, financial, political, ethical, and safety consequences that may result from structures being located within High Avalanche Hazard Zones.

Respectfully submitted,

Bruce Smith, PLS 7048, Idaho

Alex Nelson, PE 19275, Idaho



Alpine Enterprises, Inc.

Ketchum, Idaho

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KETCHUM COMMUNITY LIBRARY

Regional History Department

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2015**. The Technical Avalanche Protection Handbook,** Ernst & Sohn

NGI CALCULATIONS

Client/Site	Sage Mountainside Townhomes		
Date	11/8/2022		
		Horizontal	
Input Parameters (yellow):		**Distance**	**Elevation**
Avalanche Path Profile		**(X) (ft)**	**(Y) (ft)**
Top of starting zone (X_1, Y_1)		**0**	6220
10° point (X_β, Y_β)		522	5940
θ, slope angle (°) top 100 m (vert.)			29.50
Calculated Parameters (green and red):			
β, ave. slope < to 10° point			28.209
H, vert. distance (0,0 to end parabola (ft)			85.344

X_r (ft)	dX (ft)	dX + 1SD (ft)	
590	68	107	**Equation 2**
594	72	115	**Equation 3**
861	139	190	**Equation 3B**
566	44	112	**Equation 5**
723	201	257	**Equation 7**
Mean	**105**	**156**	**All Equations**
Mean	**113**	**167**	**All Equations except Eq. 3**

Figure 8 - NGI Calculation Sheet

RAMMS ::AVALANCHE DATA

Avalanche simulations were run for twelve different circumstances. Path “R7_T300_SHORT” represents the 300-Year Event that is considered to be an accurate representation of the potential design event. Existing vegetation and structures were ignored due to uncertainties in future site conditions.

Figure 9 - Release Area, R7, 2D

Figure 10 - Release Area, R7, 3D

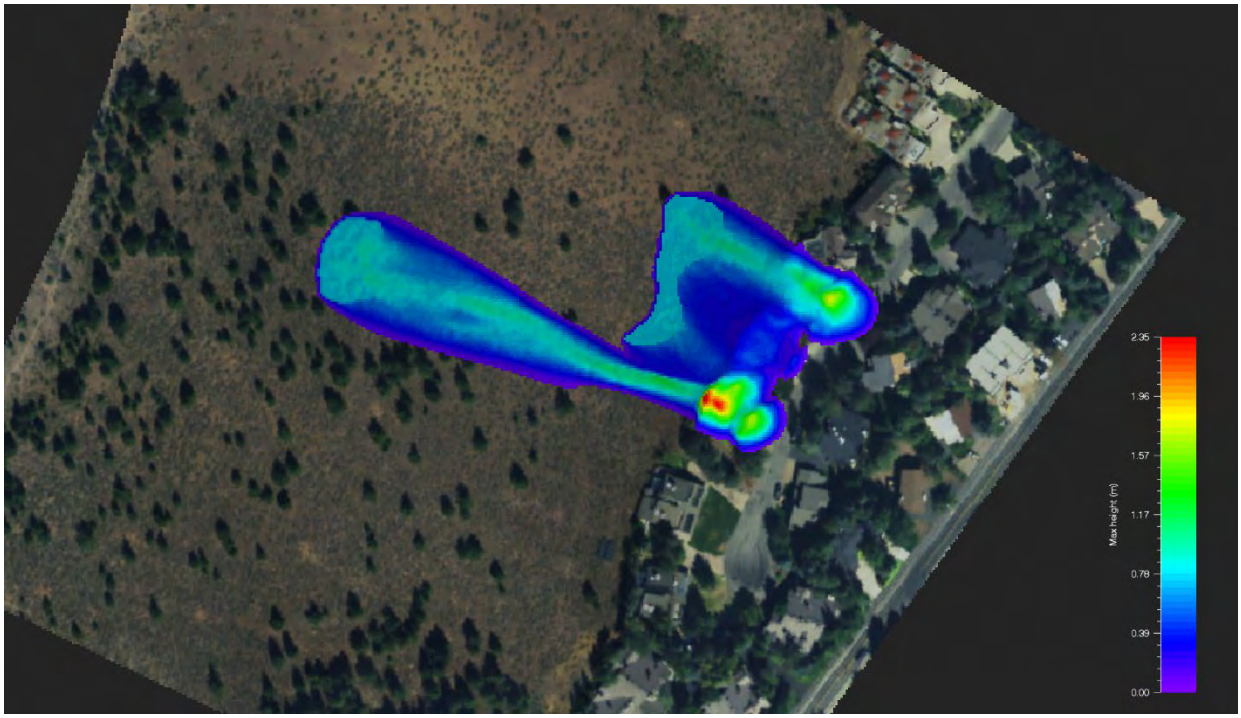


Figure 11 - Path_R7_T300_SHORT - Maximum Flow Height, 2D

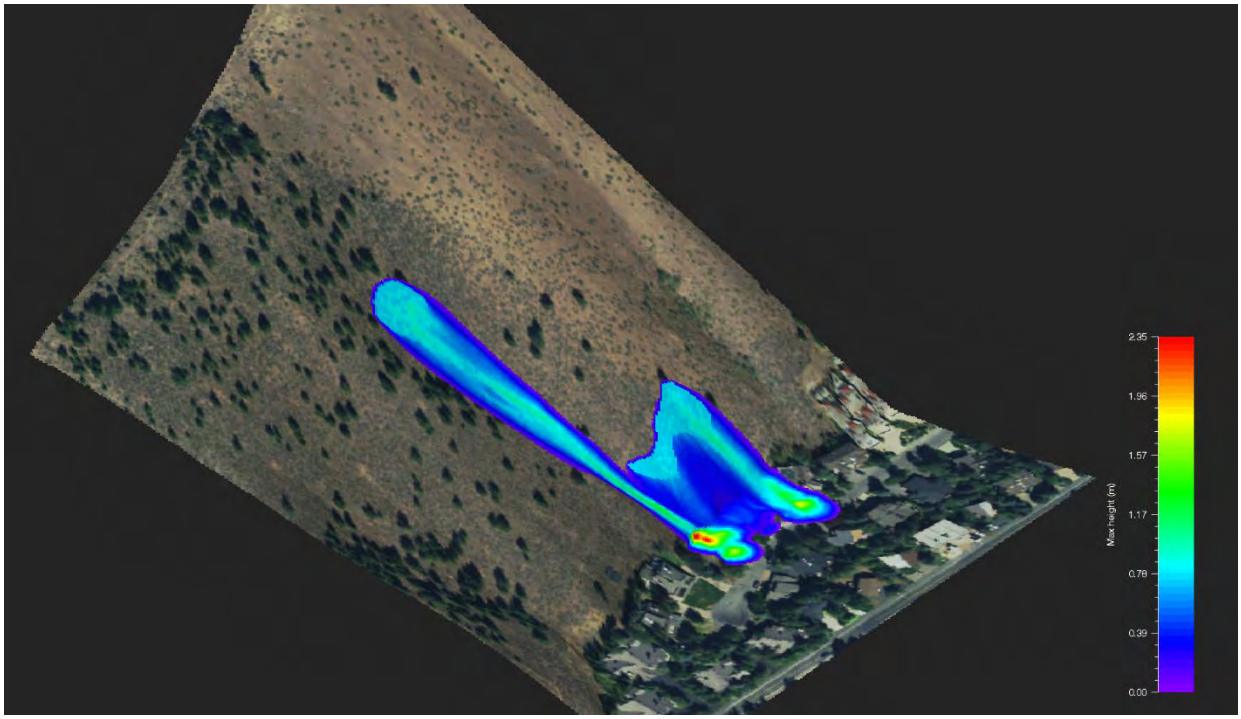


Figure 12 - Path_R7_T300_SHORT - Maximum Flow Height, 3D

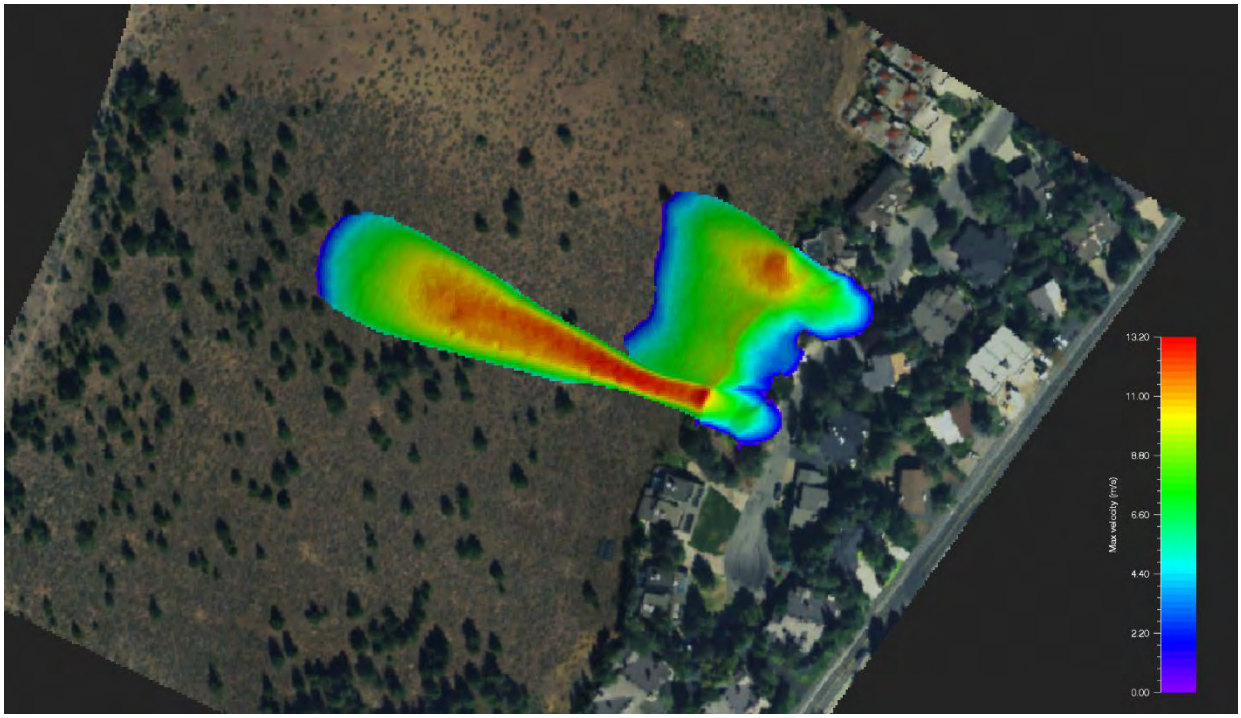


Figure 13 - Path_R7_T300_SHORT - Maximum Velocity, 2D

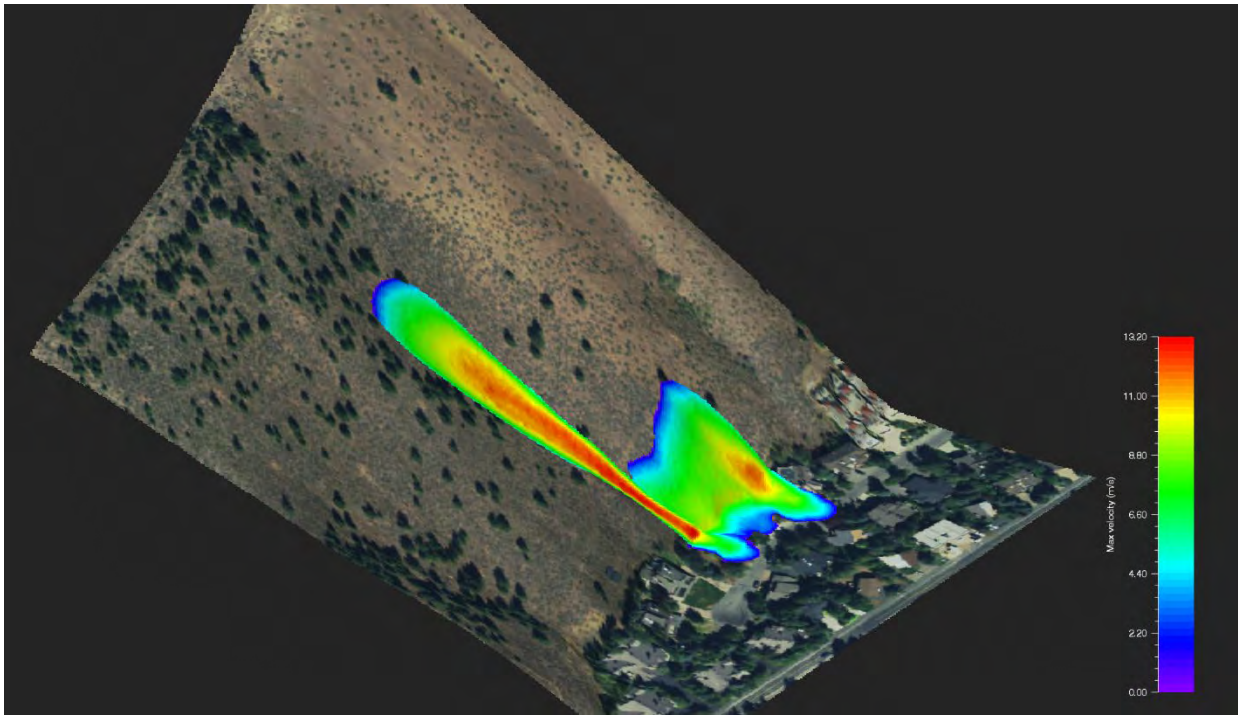


Figure 14 - Path_R7_T300_SHORT *- Maximum Velocity, 3D*

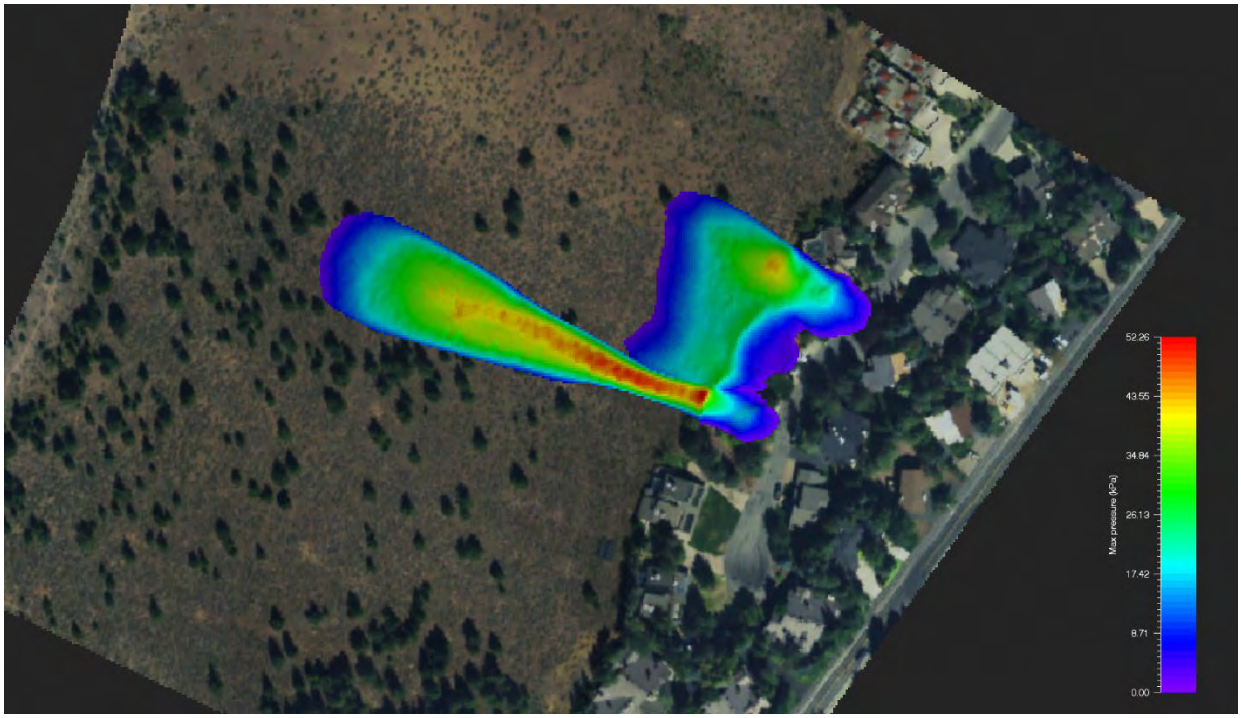


Figure 15 - Path_R7_T300_SHORT - Maximum Pressure, 2D

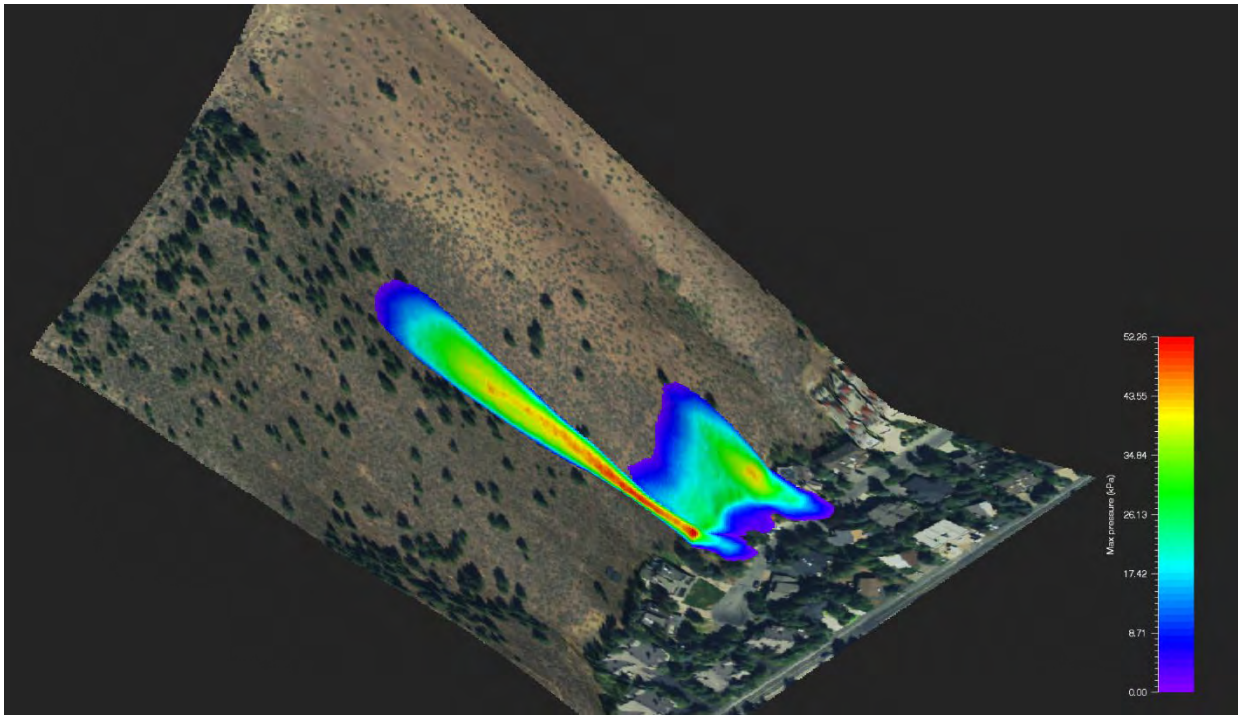


Figure 16 - Path_R7_T300_SHORT - Maximum Pressure, 3D

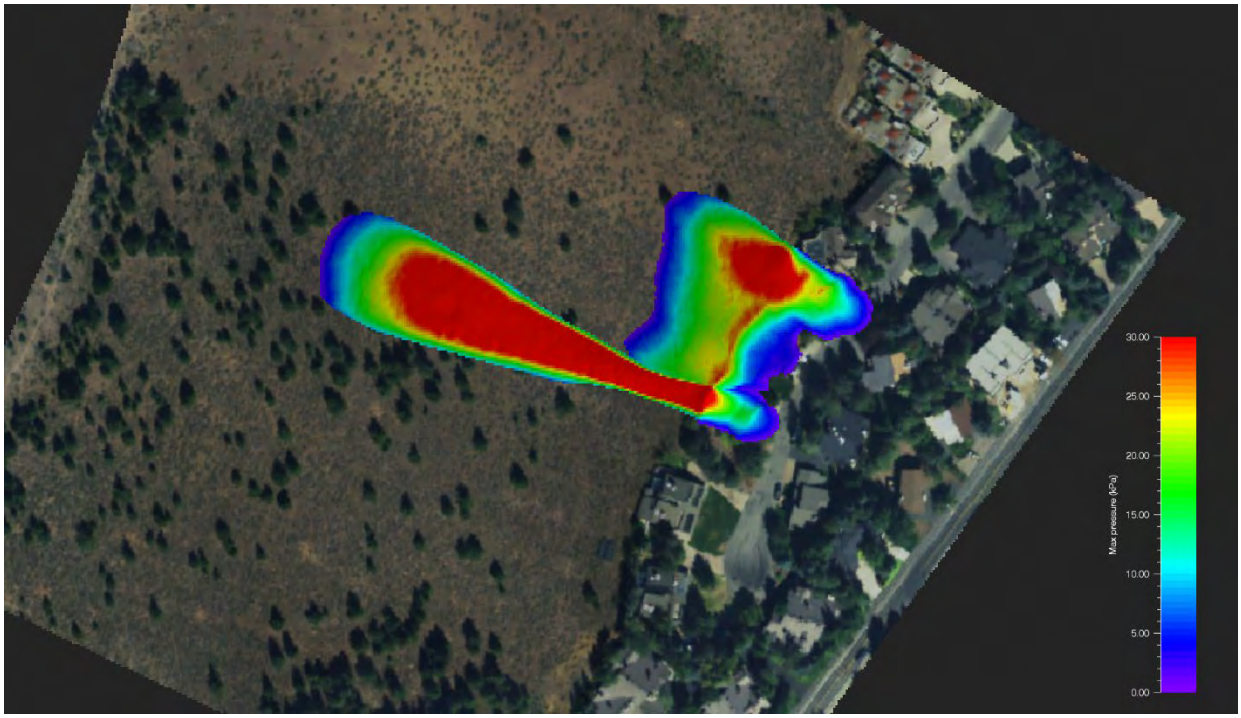


Figure 17 - Path_R7_T300_SHORT - Maximum Pressure – Red Zone, 2D

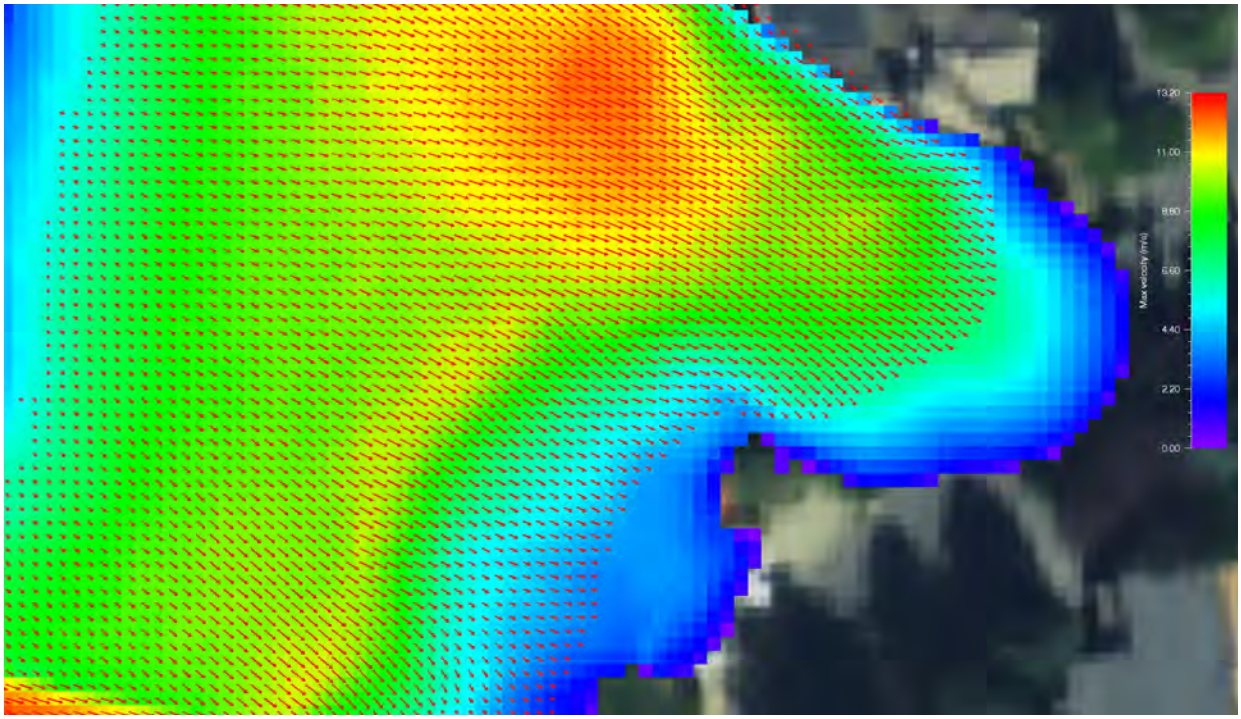


Figure 18 - Path_R7_T300_SHORT – Velocity Vectors – Time Step 21 Sec, 2D

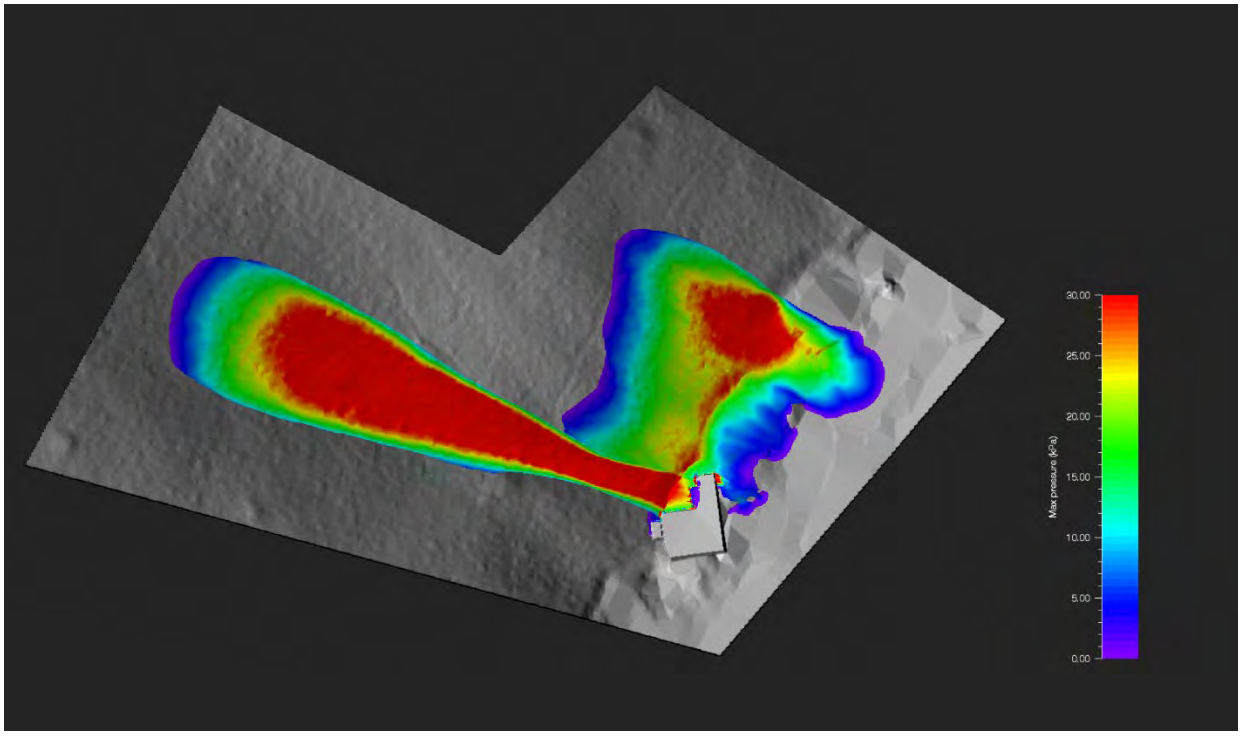


Figure 19 - Path_R7_T300_SHORT – Proposed Structure Included - Maximum Pressure – Red Zone, 2D

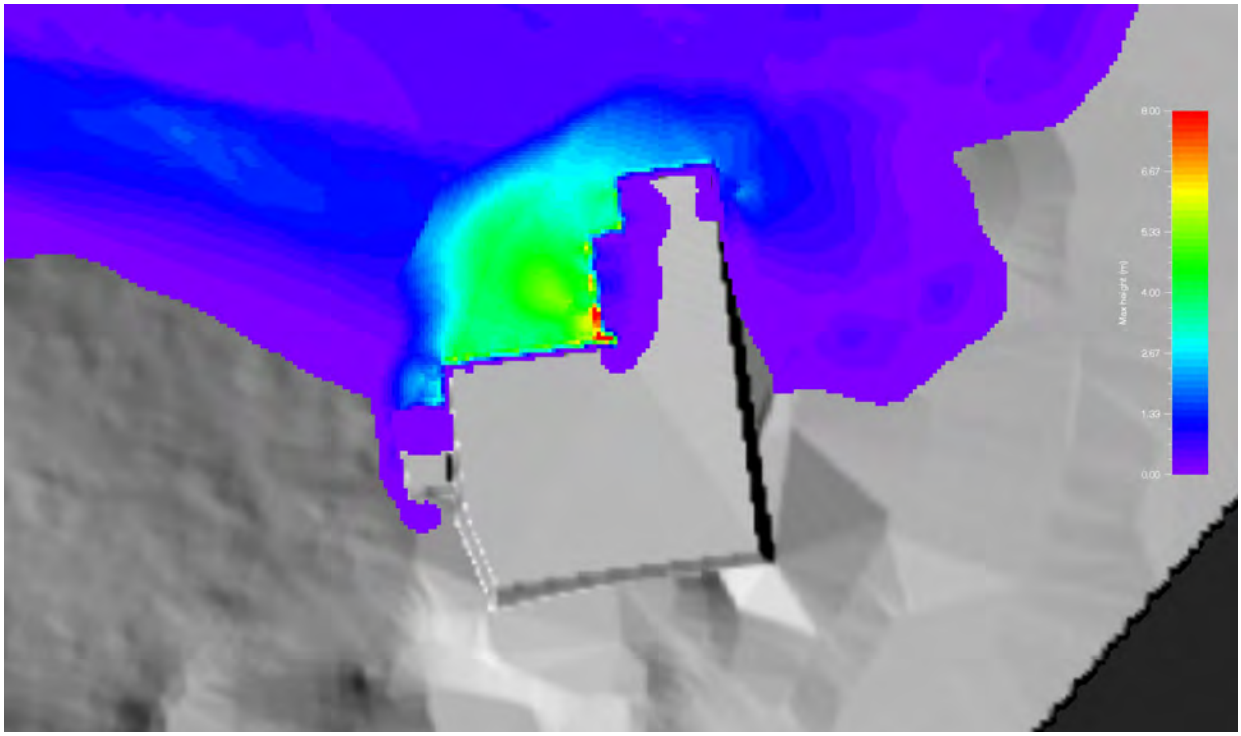


Figure 20 - Path_R7_T300_SHORT – Proposed Structure Included, Maximum Flow Height, 2D

PATH : R5-S300 LOG FILE

****
RAMMS::AVALANCHE RAMMS OUTPUT LOGFILE

Output filename: U:\LD3\214_L22B3WSV4\RAMMS_2022\214_LS_AVY2022\R7_T300_SHORT.out.gz

Simulation stopped due to LOW FLUX!

Simulation stopped after 32.0000s
Calculation time (min.): 1.15

Simulation resolution (m): 1.00

SIMULATION RESULTS

Number of cells: 135121
Number of nodes: 136119

Calculated Release Volume (m3): 597.818

Overall MAX velocity (m/s): 13.1985
Overall MAX flowheight (m): 2.34986
Overall MAX pressure (kPa): 52.2603

****
RAMMS::AVALANCHE 1.7.20 INPUT LOGFILE

Date: Fri May 20 15:05:21 2022
Input filename: U:\LD3\214_L22B3WSV4\RAMMS_2022\214_LS_AVY2022\R7_T300_SHORT.av2

Project: 214_LS_AVY2022
Details:
214 Living Springs Townhomes
Avalanche 2022
1m Grid

DEM / REGION INFORMATION:
DEM file: U:\LD3\214_L22B3WSV4\RAMMS_2022\214_LS_AVY2022\214_LS_AVY2022.xyz
DEM resolution (m): 1.00
(imported from: U:\LD3\214_L22B3WSV4\RAMMS_2022\214_LivingSprings_Grid_1M_ACCII.asc)

Nr of nodes: 599676
Nr of cells: 598125

Project region extent:
E - W: 467762.45 / 466937.45
S - N: 224076.43 / 224801.43

CALCULATION DOMAIN:
U:\LD3\214_L22B3WSV4\RAMMS_2022\214_LS_AVY2022\D2.dom

GENERAL SIMULATION PARAMETERS:
Simulation time (s): 300.000
Dump interval (s): 0.50
Stopping criteria (momentum threshold) (%): 5
Constant density (kg/m3): 300

NUMERICS:
Numerical scheme: SecondOrder
H Cutoff (m): 0.000001
Curvature effects are ON!

RELEASE:
Depth: 0.75 m Vol: 597.8 m3 Delay: 0.00 s Name: R7_1.shp
Depth: 0.75 m Vol: 792.1 m3 Delay: 13.00 s Name: R7_2.shp
Estimated release volume: 1389.89 m3

FRICTION MUXI:
Altitude_limit_1: 1500 m a.s.l
Altitude_limit_2: 1000 m a.s.l
Format of following parameters: [< 1000] - [1000 - 1500] - [> 1500]

Open slope parameters:
Mu: 0.300 - 0.290 - 0.320
Xi: 1250 - 1400 - 1200
Channelled parameters:
Mu: 0.340 - 0.330 - 0.360
Xi: 1050 - 1180 - 1000
Gully parameters:
Mu: 0.440 - 0.430 - 0.360
Xi: 900 - 1000 - 800
Flat parameters:
Mu: 0.280 - 0.270 - 0.260
Xi: 1500 - 1600 - 1750
Forest parameters:
Mu (delta): 0.020 - 0.020 - 0.020
Xi: 400 - 400 - 400

RETURN PERIOD (y): 300
VOLUME category: Tiny

COHESION:
No COHESION specified.

MAP / ORTHOPHOTO INFO:
Map file: U:\LD3\214_L22B3WSV4\RAMMS_2022\AerialImagery\NAIP2021.tif
OrthoPhoto file: U:\LD3\214_L22B3WSV4\RAMMS_2022\AerialImagery\NAIP2021.tif

LEGEND

- Subject Boundary
- Adjoiners Boundary
- Existing Edge of Asphalt Roadway
- Building Setback (See Note 5)
- 10' Major Contour Line (Blaine County LiDAR)
- 2' Minor Contour Line (Blaine County LiDAR)
- Existing Structure
- Existing Deck
- Existing Concrete/Driveway
- Red Avalanche Hazard Zone (Alpine 2022)
- Blue Avalanche Hazard Zone (Alpine 2022)
- Proposed Structure
- Proposed Driveway
- Proposed Landscaping
- Found 1/2" Rebar
- Found Aluminum Cap
- Set 1/2" Rebar, PLS 7048
- Existing Conifer Tree
- Existing Deciduous Tree

NOTES

1) Basis of Bearings is Idaho State Plane Coordinate System, NAD83, Central Zone, at Grid in US Survey Feet. Vertical Datum is NAVD1988.
2) Boundary Information is from the Plats of Warm Springs Village Subdivision, Fourth Addition, Instrument Number 115701; Winter Sun Condominium, Instrument Number 210802; Living Springs Townhomes, Instrument Number 456235; Records of Blaine County, Idaho.
3) Refer to the Plat Notes, Conditions, Covenants, & Restrictions on the Original Plat.
4) Utility Locations shown are based on visual surface evidence and a DIGLINE INC. locate. Utility locations should be verified by DIGLINE INC. before any excavation.
5) Current Zoning appears to be General Residential Low Density, (GR-L). Please refer to City of Ketchum Zoning Ordinances for more information about this Zone. Front Setbacks are are as shown, Side Setbacks are the greater of 1' for every 3' in building height or 5'. Rear Setbacks are the greater of 1' for every 3' in building height or 15'.
6) Subject Property lies withing the City of Ketchum's Avalanche Zone District and Mountain Overlay Zoning District as defined in Zoning Code Title 15. Persons dwelling in this area should become familiar with these portions of the Ordinance and dwell here at their own risk.
7) Subject property lies within the Blaine County Elk Winter Range Zone.
8) Not all trees and vegetation are shown. Some locations are approximate.
9) Avalanche Zoning is from a 2022 RAMMS Study conducted by Alpine Enterprises Inc. This study is site specific; it should not be applied to adjacent lands.
10) Aerial Imagery, if shown, is from NAIP 2021.

NORTH

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

A SNOW AVALANCHE HAZARD STUDY SHOWING LOT 23, BLOCK 3, WARM SPRINGS VILLAGE SUBD., 4TH ADD.

WITHIN S11 & S14, T.4N., R.17E., B.M., CITY OF KETCHUM, BLAINE COUNTY, IDAHO

PREPARED FOR BRADLEY AND GAIL PRATT

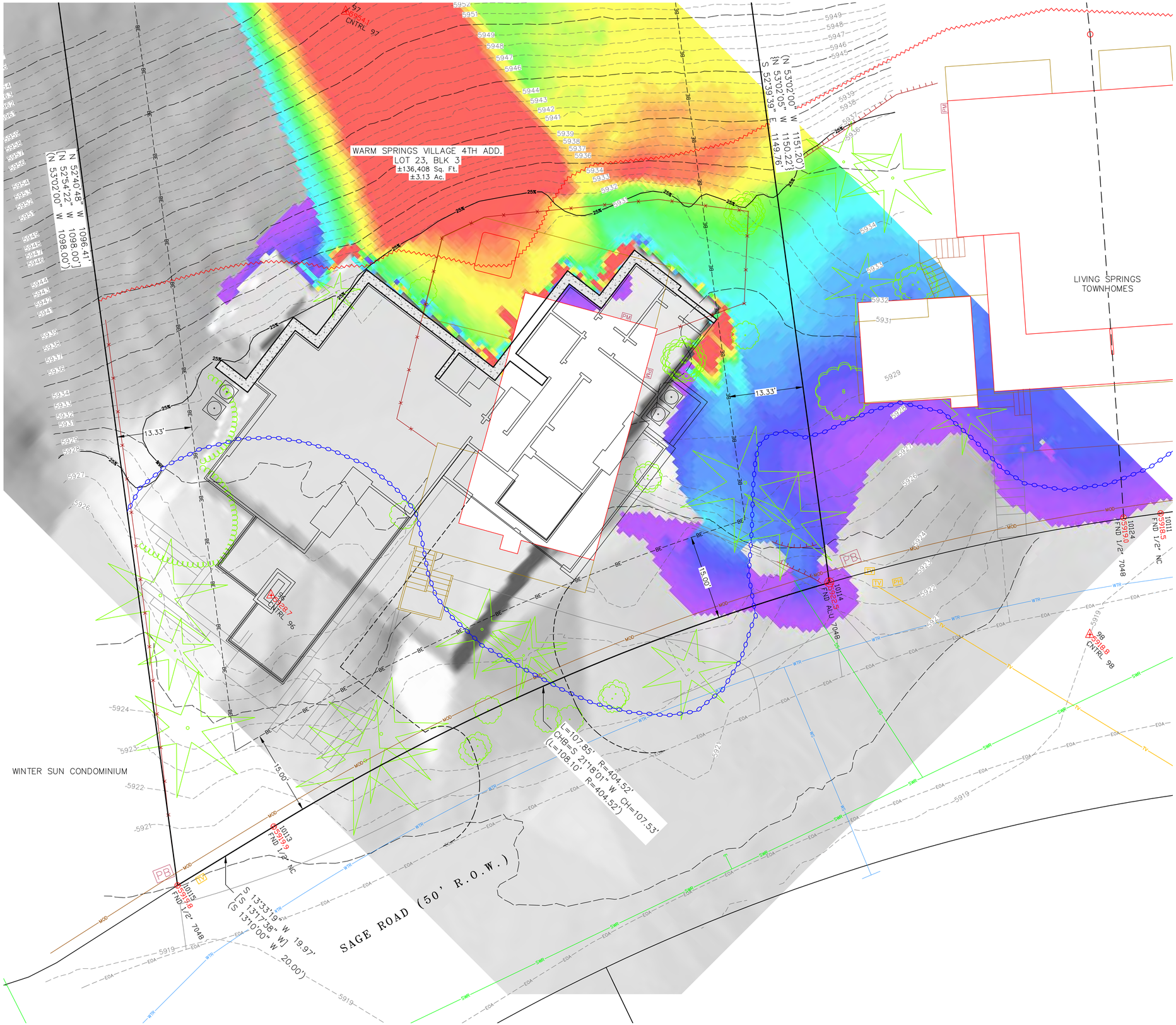
PROJECT PATH AND PRINT DATE U:\LD3\214_L22B3WSV4\dwg\CS_214_Pratt_WSV4th_Blk3Lt23_Avy2022.dwg 3/29/23 4:38:29 PM MST

REVISIONS	NO	DATE	BY

PROFESSIONAL LAND SURVEYOR — LICENSED — 7048 — 23MAR23 — STATE OF IDAHO — BRUCE SMITH

Alpine Enterprises Inc.
Surveying, Mapping, Civil Engineering,
and Natural Hazards Consulting
660 Bell Dr., Unit 1
P.O. Box 2037, Ketchum, ID 83340 USA
(208) 727-1988 727-1987 fax
email: barnthe@alpineenterprisesinc.com

SHEET 1 OF 4



LEGEND

- Subject Boundary
- Adjoiners Boundary
- Existing Edge of Asphalt Roadway
- Building Setback (See Note 5)
- Mountain Overlay District (City of Ketchum)
- 25% Slope Line (Alpine 2022)
- Existing 5' Major Contour Line (Alpine 2022)
- Existing 1' Minor Contour Line (Alpine 2022)
- Existing Structure
- Existing Deck
- Existing Concrete/Driveway
- Existing Retaining Wall
- Existing Overhead Power
- Existing Water Main
- Existing Water Service
- Existing Sewer Main
- Existing Sewer Service
- Existing CA/TV
- Existing Gas Main
- Red Avalanche Hazard Zone (Alpine 2022)
- Blue Avalanche Hazard Zone (Alpine 2022)
- Proposed Structure
- Proposed Driveway
- Proposed Landscaping
- Found 1/2" Rebar
- Found Aluminum Cap
- Set 1/2" Rebar, PLS 7048
- Existing Power Pole
- Existing Sewer Manhole
- Existing Water Meter
- Existing Water Valve
- Existing Well
- Existing Phone Box
- Existing CA/TV Box
- Existing Power Box
- Proposed Power Meter
- Existing Conifer Tree
- Existing Deciduous Tree

NOTES

1) Basis of Bearings is Idaho State Plane Coordinate System, NAD83, Central Zone, at Grid in US Survey Feet. Vertical Datum is NAVD1988.
2) Boundary information is from the Plats of Warm Springs Village Subdivision, Fourth Addition, Instrument Number 115701; Winter Sun Condominium, Instrument Number 210802; Living Springs Townhomes, Instrument Number 456235; Records of Blaine County, Idaho.
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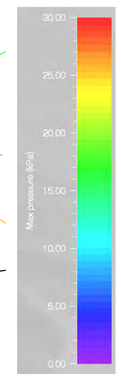
6) Subject Property lies withing the City of Ketchum's Avalanche Zone District and Mountain Overlay Zoning District as defined in Zoning Code Title 15. Persons dwelling in this area should become familiar with these portions of the Ordinance and dwell here at their own risk.
7) Subject property lies within the Blaine County Elk Winter Range Zone.
8) Not all trees and vegetation are shown. Some locations are approximate.
9) Avalanche Zoning is from a 2022 RAMMS Study conducted by Alpine Enterprises Inc. This study is site specific; it should not be applied to adjacent lands.



NORTH

GRAPHIC SCALE

8 0 4 8 16 32

(IN FEET)
1 inch = 8 ft.

A SNOW AVALANCHE HAZARD STUDY SHOWING LOT 23, BLOCK 3, WARM SPRINGS VILLAGE SUBD., 4TH ADD. WITHIN S11 & S14, T.4N., R.17E., B.M., CITY OF KETCHUM, BLAINE COUNTY, IDAHO

PREPARED FOR BRADLEY AND GAIL PRATT

Alpine Enterprises Inc.
Surveying, Mapping, Civil Engineering,
and Natural Hazards Consulting
660 Bell Dr., Unit 1
P.O. Box 2037, Ketchum, ID 83340 USA
(208) 727-1988 727-1987 fax
email: bsmith@alpineenterprisesinc.com

PROFESSIONAL LAND SURVEYOR — LICENSED — 7048 — 29MAR23 — STATE OF IDAHO — BRUCE SMITH

NO	REVISIONS	DATE	BY

PROJECT PATH AND PRINT DATE: U:\LD3\214_L22B3WSV4\dwg\CS_214_Pratt_WSV4th_Blk3Lt23_Avy2022.dwg 3/29/23 4:38:29 PM MST

SHEET 2 OF 4

AVALANCHE IMPACT PRESSURES

P_n = NORMAL PRESSURE
P_s = SHEAR STRESS
P_v = UPLIFT PRESSURE
$P_n = \frac{1}{2} P_s = \frac{1}{2} P_v$

AVALANCHE FLOW DIRECTION

PLAN VIEW
SCALE: 1"=10'

NORTH ELEVATION
SCALE: 1"=10'

GRAPHIC SCALE
(IN FEET)
1 inch = 10 ft.

WEST WALLS
AVALANCHE PRESSURES
SCALE: 1"=10'

NORTH WALLS
AVALANCHE PRESSURES
SCALE: 1"=10'

A SNOW AVALANCHE HAZARD STUDY SHOWING
LOT 23, BLOCK 3, WARM SPRINGS VILLAGE SUBD., 4TH ADD.
WITHIN S11 & S14, T.4N., R.17E., B.M., CITY OF KETCHUM, BLAINE COUNTY, IDAHO
PREPARED FOR BRADLEY AND GAIL PRATT

Alpine Enterprises Inc.
Surveying, Mapping, Civil Engineering,
and Natural Hazards Consulting
660 Bell Dr., Unit 1
Ketchum, ID 83340 USA
P.O. Box 2037, Ketchum, ID 83340
(208) 727-1988 727-1987 fax
email: esmith@alpineenterprisesinc.com

PROFESSIONAL ENGINEER
19275
29MAR23
STATE OF IDAHO
ALEX NELSON

NO	REVISIONS	DATE	BY

PROJECT PATH AND PRINT DATE U:\LD3\214_L22B3WSV4\dwg\CS_214_Pratt_WSV4th_Blk3Lt23_Avy2022.dwg 3/29/23 4:38:29 PM MST

SHEET 3 OF 4

AVALANCHE IMPACT PRESSURES

P_n = NORMAL PRESSURE
P_s = SHEAR STRESS
P_v = UPLIFT PRESSURE
$P_n = \frac{1}{2} P_s = \frac{1}{2} P_v$

METRIC

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)
Point	**Point Name**	**Velocity (V) (m/s)**	**Deflection Angle (θ) (°)**	**Depth Previous Snow and Avalanche Deposits (H_d) (m)**	**Design Avalanche Flow Depth (H_a) (m)**	**Design Avalanche Climbing Height on Deflecting Surface (H_r) (m)**	**Full Impact Height (m)**	**Total Climbing Height (H) (m) = $H_a + H_d + H_r$**	**Pressure (P_n) (kPa)**	**Normal Pressure (P_n) (kPa)**	**Shear Forces (Ps) (kPa) = (0.5)*(P_n)**	**Uplift Forces (Pv) (kPa) = (0.5)*(P_n)**	**Notes**
A	WEST WALL	3.2	64.0	1.00	1.15	0.41	2.15	2.56	3.0	2.42	1.21	1.21	Forces increase linearly along West Wall from A to B.
B	WEST WALL	6.5	64.0	1.00	0.80	1.72	1.80	3.52	12.5	10.10	5.05	5.05	Forces increase linearly along West Wall from A to B.
C	WEST WALL	6.5	64.0	1.00	0.40	1.72	1.40	3.12	12.5	10.10	5.05	5.05	Climb Heights decrease along West Wall from B to C.
D	WEST WALL	7.5	64.0	1.00	0.60	2.33	1.60	3.93	17.0	13.73	6.87	6.87	Forces act along West Wall D.
D	NORTH WALL	7.5	40.0	1.00	0.55	1.19	1.55	2.74	17.0	7.02	3.51	3.51	Forces increase linearly along North Wall from D to E.
E	NORTH WALL	7.3	90.0	1.00	0.60	2.72	1.60	4.32	16.0	16.00	8.00	8.00	Flow is confined.
E	WEST WALL	7.3	90.0	1.00	0.60	2.72	1.60	4.32	16.0	16.00	8.00	8.00	Flow is confined.
F	WEST WALL	9.1	64.0	1.00	0.65	3.43	1.65	5.08	25.0	20.20	10.10	10.10	Forces increase linearly along West Wall from E to F.
F	NORTH WALL	9.1	34.0	1.00	0.65	1.33	1.65	2.98	25.0	7.82	3.91	3.91	Forces increase linearly along North Wall from F to G.
G	NORTH WALL	8.9	90.0	1.00	0.75	4.08	1.75	5.83	24.0	24.00	12.00	12.00	Flow is confined.
G	WEST WALL	8.9	90.0	1.00	0.75	4.08	1.75	5.83	24.0	24.00	12.00	12.00	Flow is confined.
G	WEST WALL	8.9	90.0	1.00	0.75	4.08	1.75	5.83	24.0	24.00	12.00	12.00	Flow is confined.
H	WEST WALL	10.6	55.0	1.00	0.85	3.88	1.85	5.73	34.0	22.81	11.41	11.41	Forces decrease linearly along West Wall from G to H.
H	NORTH WALL	10.6	40.0	1.00	0.85	2.39	1.85	4.24	34.0	14.05	7.02	7.02	Forces decrease linearly along North Wall from H to J.
J	NORTH WALL	9.3	40.0	1.00	1.40	1.83	2.40	4.23	26.0	10.74	5.37	5.37	Forces increase linearly along North Wall from J to K.
K	NORTH WALL	10.5	90.0	1.00	2.25	5.61	3.25	8.86	33.0	33.00	16.50	16.50	Flow is confined.
K	WEST WALL	10.5	90.0	1.00	2.25	5.61	3.25	8.86	33.0	33.00	16.50	16.50	Flow is confined.
L	WEST WALL	10.8	90.0	1.00	2.25	5.95	3.25	9.20	35.0	35.00	17.50	17.50	Forces increase linearly along West Wall from K to L.
M	WEST WALL	10.6	90.0	1.00	1.40	5.78	2.40	8.18	34.0	34.00	17.00	17.00	Forces decrease linearly along West Wall from L to M.
M	NORTH WALL	7.5	52.0	1.00	1.40	1.79	2.40	4.19	17.0	10.56	5.28	5.28	Forces increase linearly along North Wall from M to N.
N	NORTH WALL	10.0	90.0	1.00	1.80	5.10	2.80	7.90	30.0	30.00	15.00	15.00	Flow is confined.
N	WEST WALL	10.0	90.0	1.00	1.80	5.10	2.80	7.90	30.0	30.00	15.00	15.00	Flow is confined.
P	WEST WALL	10.0	68.0	1.00	1.15	4.38	2.15	6.53	30.0	25.79	12.90	12.90	Forces decrease linearly along West Wall from N to P.
P	NORTH WALL	6.3	52.0	1.00	1.15	1.27	2.15	3.42	12.0	7.45	3.73	3.73	Forces decrease linearly along North Wall from P to Q.
Q	NORTH WALL	5.8	52.0	1.00	0.85	1.05	1.85	2.90	10.0	6.21	3.10	3.10	Force is constant along North Wall from Q to R.
R	NORTH WALL	5.8	52.0	1.00	0.75	1.05	1.75	2.80	10.0	6.21	3.10	3.10	Force is constant along North Wall from Q to R.

Note: Structures should be designed to withstand full Normal Pressures (kPa) (Column (k)) at Full Impact Height (m) (Column (h)) and decrease linearly to 0 kPa at Total Climbing Height (m) (Column (i)). Flow Density (ρ) = 300kg/m3 (Assumed for safety) Full Impact Height was assumed at 1.0m. Proposed building location is in Flow Channel and above Deposition Zone. Actual Full Impact Height will vary with avalanche size and runout distance.

IMPERIAL

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)
Point	**Point Name**	**Velocity (V) (mph)**	**Deflection Angle (θ) (°)**	**Depth Previous Snow and Avalanche Deposits (H_d) (ft)**	**Design Avalanche Flow Depth (H_a) (ft)**	**Design Avalanche Climbing Height on Deflecting Surface (H_r) (ft)**	**Full Impact Height (ft)**	**Total Climbing Height (H) (ft) = $H_a + H_d + H_r$**	**Pressure (P_n) (psf)**	**Normal Pressure (P_n) (psf)**	**Shear Forces (Ps) (psf) = (0.5)*(P_n)**	**Uplift Forces (Pv) (psf) = (0.5)*(P_n)**	**Notes**
A	WEST WALL	7.1	64.0	3.28	3.77	1.4	7.1	8.4	62.7	50.6	25.3	25.3	Forces increase linearly along West Wall from A to B.
B	WEST WALL	14.4	64.0	3.28	2.62	5.6	5.9	11.5	261.1	210.9	105.4	105.4	Forces increase linearly along West Wall from A to B.
C	WEST WALL	14.4	64.0	3.28	1.31	5.6	4.6	10.2	261.1	210.9	105.4	105.4	Climb Heights decrease along West Wall from B to C.
D	WEST WALL	16.8	64.0	3.28	1.97	7.7	5.2	12.9	355.1	286.8	143.4	143.4	Forces act along West Wall D.
D	NORTH WALL	16.8	40.0	3.28	1.80	3.9	5.1	9.0	355.1	146.7	73.3	73.3	Forces increase linearly along North Wall from D to E.
E	NORTH WALL	16.3	90.0	3.28	1.97	8.9	5.2	14.2	334.2	334.2	167.1	167.1	Flow is confined.
E	WEST WALL	16.3	90.0	3.28	1.97	8.9	5.2	14.2	334.2	334.2	167.1	167.1	Flow is confined.
F	WEST WALL	20.4	64.0	3.28	2.13	11.3	5.4	16.7	522.1	421.8	210.9	210.9	Forces increase linearly along West Wall from E to F.
F	NORTH WALL	20.4	34.0	3.28	2.13	4.4	5.4	9.8	522.1	163.3	81.6	81.6	Forces increase linearly along North Wall from F to G.
G	NORTH WALL	20.0	90.0	3.28	2.46	13.4	5.7	19.1	501.2	501.2	250.6	250.6	Flow is confined.
G	WEST WALL	20.0	90.0	3.28	2.46	13.4	5.7	19.1	501.2	501.2	250.6	250.6	Flow is confined.
G	WEST WALL	20.0	90.0	3.28	2.46	13.4	5.7	19.1	501.2	501.2	250.6	250.6	Flow is confined.
H	WEST WALL	23.8	55.0	3.28	2.79	12.7	6.1	18.8	710.1	476.5	238.2	238.2	Forces decrease linearly along West Wall from G to H.
H	NORTH WALL	23.8	40.0	3.28	2.79	7.8	6.1	13.9	710.1	293.4	146.7	146.7	Forces decrease linearly along North Wall from H to J.
J	NORTH WALL	20.8	40.0	3.28	4.59	6.0	7.9	13.9	543.0	224.4	112.2	112.2	Forces increase linearly along North Wall from J to K.
K	NORTH WALL	23.5	90.0	3.28	7.38	18.4	10.7	29.1	689.2	689.2	344.6	344.6	Flow is confined.
K	WEST WALL	23.5	90.0	3.28	7.38	18.4	10.7	29.1	689.2	689.2	344.6	344.6	Flow is confined.
L	WEST WALL	24.2	90.0	3.28	7.38	19.5	10.7	30.2	731.0	731.0	365.5	365.5	Forces increase linearly along West Wall from K to L.
M	WEST WALL	23.8	90.0	3.28	4.59	19.0	7.9	26.8	710.1	710.1	355.1	355.1	Forces decrease linearly along West Wall from L to M.
M	NORTH WALL	16.8	52.0	3.28	4.59	5.9	7.9	13.8	355.1	220.5	110.2	110.2	Forces increase linearly along North Wall from M to N.
N	NORTH WALL	22.4	90.0	3.28	5.91	16.7	9.2	25.9	626.6	626.6	313.3	313.3	Flow is confined.
N	WEST WALL	22.4	90.0	3.28	5.91	16.7	9.2	25.9	626.6	626.6	313.3	313.3	Flow is confined.
P	WEST WALL	22.4	68.0	3.28	3.77	14.4	7.1	21.4	626.6	538.6	269.3	269.3	Forces decrease linearly along West Wall from N to P.
P	NORTH WALL	14.1	52.0	3.28	3.77	4.2	7.1	11.2	250.6	155.6	77.8	77.8	Forces decrease linearly along North Wall from P to Q.
Q	NORTH WALL	12.9	52.0	3.28	2.79	3.5	6.1	9.5	208.9	129.7	64.8	64.8	Force is constant along North Wall from Q to R.
R	NORTH WALL	12.9	52.0	3.28	2.46	3.5	5.7	9.2	208.9	129.7	64.8	64.8	Force is constant along North Wall from Q to R.

Note: Structures should be designed to withstand full Normal Pressures (psf) (Column (k)) at Full Impact Height (ft) (Column (h)) and decrease linearly to 0 psf at Total Climbing Height (ft) (Column (i)). Flow Density (ρ) = 300kg/m3 (Assumed for safety) Full Impact Height was assumed at 3.3ft. Proposed building location is in Flow Channel and above Deposition Zone. Actual Full Impact Height will vary with avalanche size and runout distance.

A SNOW AVALANCHE HAZARD STUDY SHOWING
LOT 23, BLOCK 3, WARM SPRINGS VILLAGE SUBD., 4TH ADD.
WITHIN S11 & S14, T.4N., R.17E., B.M., CITY OF KETCHUM, BLAINE COUNTY, IDAHO
PREPARED FOR BRADLEY AND GAIL PRATT

Alpine Enterprises Inc.
Surveying, Mapping, Civil Engineering,
and Natural Hazards Consulting
660 Bell Dr., Unit 1 Ketchum, ID 83340 USA
P.O. Box 2037, Ketchum, ID 83340 USA
(208) 727-1988 727-1987 fax
email: bsmith@alpineenterprisesinc.com

PROFESSIONAL ENGINEER LICENSED 9275 29MAR23 STATE OF IDAHO ALEX NELSON

REVISIONS	NO	DATE	BY

PROJECT PATH AND PRINT DATE: U:\LD3\214_L22B3WSV4\dwg\CS_214_Pratt_WSV4th_Blk3Lt23_Avy2022.dwg 3/29/23 4:38:29 PM MST

SHEET 4 OF 4

MAXWELL
STRUCTURAL DESIGN STUDIO

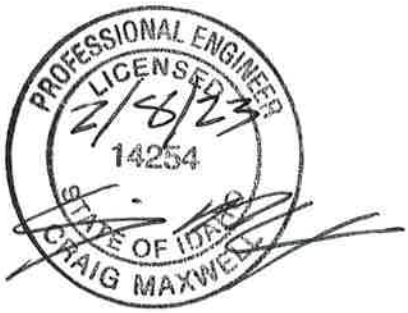
STRUCTURAL CALCULATIONS **February 08, 2023**

Pratt Residence

406 Sage Rd, Ketchum, Idaho

Structural Design Calculations

Structural Engineer:
Craig Maxwell P.E. #14254
Maxwell Structural Design Studio
105 Lewis Street, Suite 205
Ketchum, Idaho. 83340



MAXWELL
STRUCTURAL DESIGN STUDIO

Calculations Table of Contents

MAXWELL
STRUCTURAL DESIGN STUDIO

DESIGN CRITERIA

BUILDING CODE
Design, construction, and inspection shall conform to the International Building Code, (IBC), 2018 Edition and International Residential Code, 2018 Edition and all Local Codes that may be applicable.

Material test standards referenced shall be the edition referenced in the 2018 IBC.

RISK CATEGORY OF BUILDING: II

DESIGN LOAD CRITERIA
At all times, the General Contractor and Owner shall keep the loads on the structure within the limits of the design load criteria.

The General Contractor is responsible to provide all bracing and shoring as required to support the loads that may be imposed on the structure during construction until all structural elements are complete.

DESIGN ROOF LOADS

Live Load (Snow)	100 PSF (Balanced Snow Load)
Dead Load	20 PSF
Wood Load Duration Factor	1.15
Importance Factor Snow (Is)	1.0

Drift and Un-Balanced Loads per ASCE/SEI 7-16

Ground Snow Load	120 PSF
Exposure Factor (Ce)	1.0
Temperature Factor (Ct)	1.1

DESIGN FLOOR LOADS

Live Load	40 PSF
Dead Load	20 PSF

DESIGN DECK LOADS

Live Load	40 PSF
Dead Load	35 PSF

WIND LOAD DATA

Wind Speed (3 sec. gust)	103 MPH
Importance Factor (Iw)	1.0
Building Category	I
Exposure Category	B
Internal Pressure Coefficient	+/- 0.18

SEISMIC LOAD DATA

Project Coordinates	(43.69, -114.4)
Importance Factor (Is)	1.0
Ss	0.631
S1	0.194
Sds	0.545
Sd1	0.287
Site Class	D
Seismic Design Category	D

Basic Seismic Force Resisting System - Light Frame Walls with Wood Structural Panels
Response Modification Coefficient (R) = 6.5
Equivalent Force Analysis Procedure
E = 1.0

Vbase (unmodified)	0.094*W
Seismic Weights (W)	Dead Loads + 35% Balanced Snow Load

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

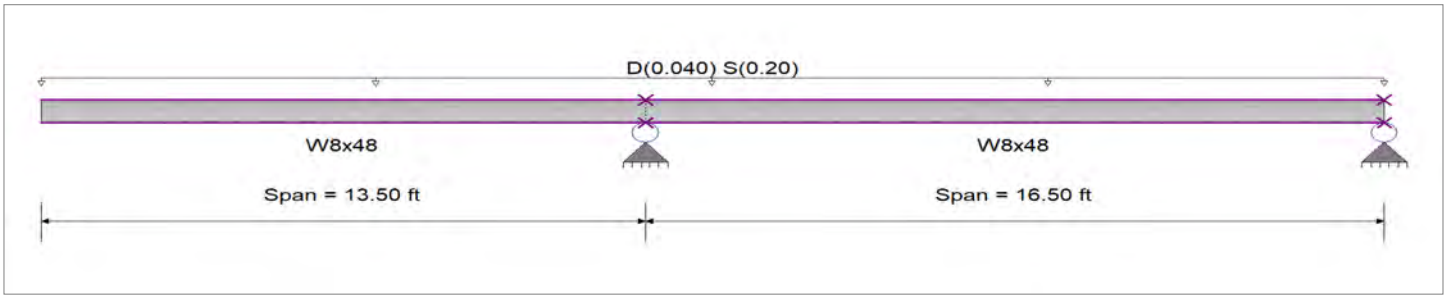
DESCRIPTION: B4-1 Cantilevered Steel Roof Joist

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 ksf, Tributary Width = 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.215 : 1	Maximum Shear Stress Ratio =	0.058 : 1
Section used for this span	W8x48	Section used for this span	W8x48
Ma : Applied	26.244 k-ft	Va : Applied	3.967 k
Mn / Omega : Allowable	122.255 k-ft	Vn/Omega : Allowable	68.0 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	13.500 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.544 in	Ratio =	595	>=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.046 in	Ratio =	4,344	>=360	Span: 2 : S Only
Max Downward Total Deflection	0.784 in	Ratio =	413	>=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.066 in	Ratio =	3017	>=180	Span: 2 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 13.50 ft	1	0.066	0.018		-8.02	8.02	204.17	122.26	1.00	1.00	1.21	102.00 68.00
Dsgn. L = 16.50 ft	2	0.066	0.018	0.33	-8.02	8.02	204.17	122.26	1.00	1.00	1.21	102.00 68.00
+D+S												
Dsgn. L = 13.50 ft	1	0.215	0.058		-26.24	26.24	204.17	122.26	1.00	1.00	3.97	102.00 68.00
Dsgn. L = 16.50 ft	2	0.215	0.058	1.07	-26.24	26.24	204.17	122.26	1.00	1.00	3.97	102.00 68.00
+D+0.750S												
Dsgn. L = 13.50 ft	1	0.177	0.048		-21.69	21.69	204.17	122.26	1.00	1.00	3.28	102.00 68.00
Dsgn. L = 16.50 ft	2	0.177	0.048	0.89	-21.69	21.69	204.17	122.26	1.00	1.00	3.28	102.00 68.00
+0.60D												
Dsgn. L = 13.50 ft	1	0.039	0.011		-4.81	4.81	204.17	122.26	1.00	1.00	0.73	102.00 68.00
Dsgn. L = 16.50 ft	2	0.039	0.011	0.20	-4.81	4.81	204.17	122.26	1.00	1.00	0.73	102.00 68.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.7836	0.000		0.0000	0.000
	2	0.0000	0.000	+D+S	-0.0656	5.346

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		7.854	0.785

Steel Beam

DESCRIPTION: B4-1 Cantilevered Steel Roof Joist

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from Load Combinations		7.854	0.785
Max Upward from Load Cases		5.455	0.545
D Only		2.400	0.240
+D+S		7.854	0.785
+D+0.750S		6.491	0.649
+0.60D		1.440	0.144
S Only		5.455	0.545

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

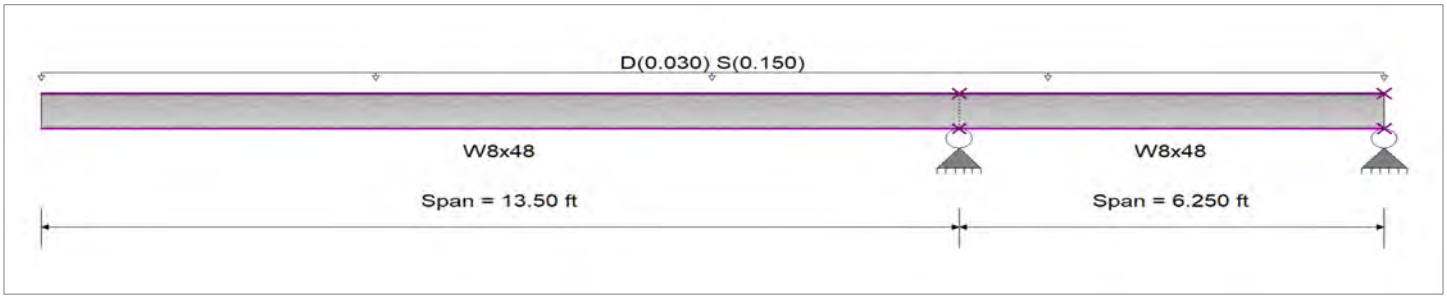
DESCRIPTION: B4-2

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 ksf, Tributary Width = 1.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.170 : 1	Maximum Shear Stress Ratio =	0.059 : 1
Section used for this span	W8x48	Section used for this span	W8x48
Ma : Applied	20.776 k-ft	Va : Applied	4.037 k
Mn / Omega : Allowable	122.255 k-ft	Vn/Omega : Allowable	68.0 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	13.500 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.320 in	Ratio =	1,012	>=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.010 in	Ratio =	7,305	>=360	Span: 2 : S Only
Max Downward Total Deflection	0.486 in	Ratio =	666	>=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.016 in	Ratio =	4806	>=180	Span: 2 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 13.50 ft	1	0.058	0.020		-7.11	7.11	204.17	122.26	1.00	1.00	1.38	102.00 68.00
Dsgn. L = 6.25 ft	2	0.058	0.020		-7.11	7.11	204.17	122.26	1.00	1.00	1.38	102.00 68.00
+D+S												
Dsgn. L = 13.50 ft	1	0.170	0.059		-20.78	20.78	204.17	122.26	1.00	1.00	4.04	102.00 68.00
Dsgn. L = 6.25 ft	2	0.170	0.059		-20.78	20.78	204.17	122.26	1.00	1.00	4.04	102.00 68.00
+D+0.750S												
Dsgn. L = 13.50 ft	1	0.142	0.050		-17.36	17.36	204.17	122.26	1.00	1.00	3.37	102.00 68.00
Dsgn. L = 6.25 ft	2	0.142	0.050		-17.36	17.36	204.17	122.26	1.00	1.00	3.37	102.00 68.00
+0.60D												
Dsgn. L = 13.50 ft	1	0.035	0.012		-4.26	4.26	204.17	122.26	1.00	1.00	0.83	102.00 68.00
Dsgn. L = 6.25 ft	2	0.035	0.012		-4.26	4.26	204.17	122.26	1.00	1.00	0.83	102.00 68.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.4865	0.000		0.0000	0.000
	2	0.0000	0.000	+D+S	-0.0156	2.600

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		7.115	

Steel Beam

DESCRIPTION: B4-2

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from Load Combinations		7.115	
Max Upward from Load Cases		4.681	
Max Downward from all Load Conditions (Resis			-2.612
Max Downward from Load Combinations (Resi			-2.612
Max Downward from Load Cases (Resisting Up			-1.718
D Only		2.434	-0.893
+D+S		7.115	-2.612
+D+0.750S		5.944	-2.182
+0.60D		1.460	-0.536
S Only		4.681	-1.718

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

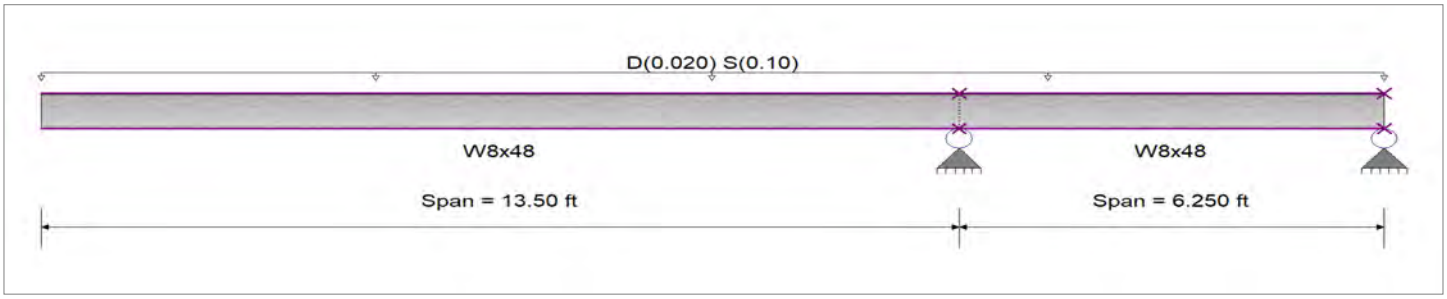
DESCRIPTION: B4-3

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.125 : 1	Maximum Shear Stress Ratio =	0.044 : 1
Section used for this span	W8x48	Section used for this span	W8x48
Ma : Applied	15.309 k-ft	Va : Applied	2.974 k
Mn / Omega : Allowable	122.255 k-ft	Vn/Omega : Allowable	68.0 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	13.500 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.213 in	Ratio =	1,518	>=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.007 in	Ratio =	10,957	>=360	Span: 2 : S Only
Max Downward Total Deflection	0.358 in	Ratio =	904	>=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.011 in	Ratio =	6523	>=180	Span: 2 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 13.50 ft	1	0.051	0.018		-6.20	6.20	204.17	122.26	1.00	1.00	1.20	102.00 68.00
Dsgn. L = 6.25 ft	2	0.051	0.018		-6.20	6.20	204.17	122.26	1.00	1.00	1.20	102.00 68.00
+D+S												
Dsgn. L = 13.50 ft	1	0.125	0.044		-15.31	15.31	204.17	122.26	1.00	1.00	2.97	102.00 68.00
Dsgn. L = 6.25 ft	2	0.125	0.044		-15.31	15.31	204.17	122.26	1.00	1.00	2.97	102.00 68.00
+D+0.750S												
Dsgn. L = 13.50 ft	1	0.107	0.037		-13.03	13.03	204.17	122.26	1.00	1.00	2.53	102.00 68.00
Dsgn. L = 6.25 ft	2	0.107	0.037		-13.03	13.03	204.17	122.26	1.00	1.00	2.53	102.00 68.00
+0.60D												
Dsgn. L = 13.50 ft	1	0.030	0.011		-3.72	3.72	204.17	122.26	1.00	1.00	0.72	102.00 68.00
Dsgn. L = 6.25 ft	2	0.030	0.011		-3.72	3.72	204.17	122.26	1.00	1.00	0.72	102.00 68.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.3584	0.000		0.0000	0.000
	2	0.0000	0.000	+D+S	-0.0115	2.600

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		5.242	

Steel Beam

DESCRIPTION: B4-3

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from Load Combinations		5.242	
Max Upward from Load Cases		3.121	
Max Downward from all Load Conditions (Resis			-1.924
Max Downward from Load Combinations (Resi			-1.924
Max Downward from Load Cases (Resisting Up			-1.146
D Only		2.122	-0.779
+D+S		5.242	-1.924
+D+0.750S		4.462	-1.638
+0.60D		1.273	-0.467
S Only		3.121	-1.146

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-4

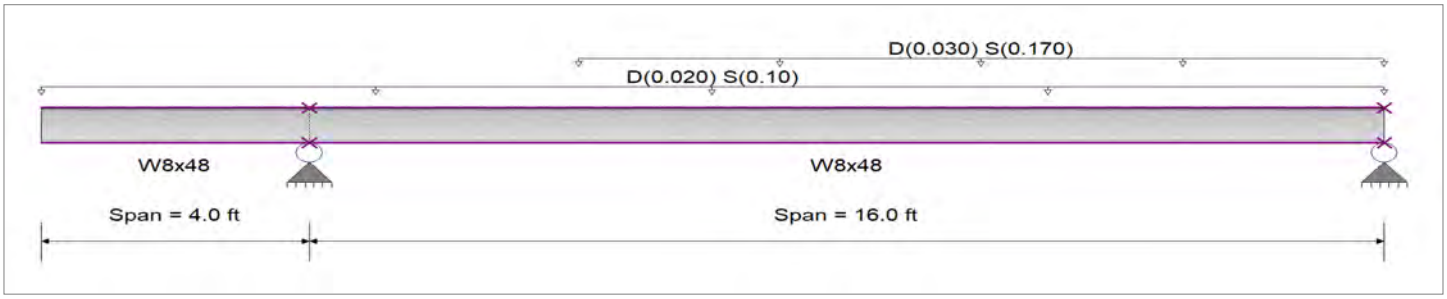
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 k/ft

Partial Length Uniform Load : D = 0.030, S = 0.170 k/ft, Extent = 8.0 -->> 20.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.074** : 1	Maximum Shear Stress Ratio =	**0.035** : 1
Section used for this span	**W8x48**	Section used for this span	**W8x48**
Ma : Applied	9.000 k-ft	Va : Applied	2.40 k
Mn / Omega : Allowable	122.255 k-ft	Vn/Omega : Allowable	68.0 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	16.000 ft
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 2

Maximum Deflection

Max Downward Transient Deflection	0.064 in	Ratio =	2,994	>=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.046 in	Ratio =	2,090	>=360	Span: 2 : S Only
Max Downward Total Deflection	0.076 in	Ratio =	2526	>=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.054 in	Ratio =	1765	>=180	Span: 2 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 4.00 ft	1	0.001	0.004		-0.16	0.16	204.17	122.26	1.00	1.00	0.31	102.00 68.00
Dsgn. L = 16.00 ft	2	0.012	0.006	1.41	-0.16	1.41	204.17	122.26	1.00	1.00	0.38	102.00 68.00
+D+S												
Dsgn. L = 4.00 ft	1	0.008	0.028		-0.96	0.96	204.17	122.26	1.00	1.00	1.92	102.00 68.00
Dsgn. L = 16.00 ft	2	0.074	0.035	9.00	-0.96	9.00	204.17	122.26	1.00	1.00	2.40	102.00 68.00
+D+0.750S												
Dsgn. L = 4.00 ft	1	0.006	0.022		-0.76	0.76	204.17	122.26	1.00	1.00	1.52	102.00 68.00
Dsgn. L = 16.00 ft	2	0.058	0.028	7.10	-0.76	7.10	204.17	122.26	1.00	1.00	1.89	102.00 68.00
+0.60D												
Dsgn. L = 4.00 ft	1	0.001	0.003		-0.10	0.10	204.17	122.26	1.00	1.00	0.18	102.00 68.00
Dsgn. L = 16.00 ft	2	0.007	0.003	0.84	-0.10	0.84	204.17	122.26	1.00	1.00	0.23	102.00 68.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S	-0.0544	0.000
+D+S	2	0.0760	8.192		0.0000	0.000

Steel Beam

DESCRIPTION: B4-4

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		2.400	2.400
Max Upward from Load Combinations		2.400	2.400
Max Upward from Load Cases		2.015	2.025
D Only		0.385	0.375
+D+S		2.400	2.400
+D+0.750S		1.896	1.894
+0.60D		0.231	0.225
S Only		2.015	2.025

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

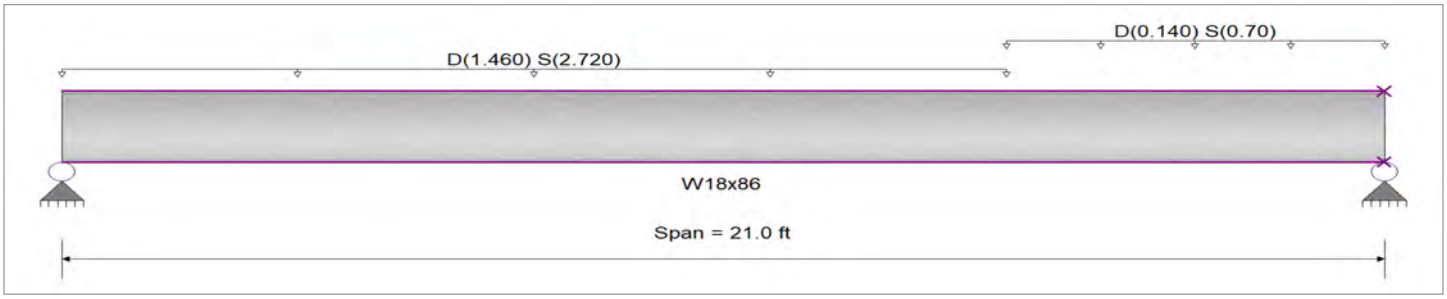
DESCRIPTION: B4-5

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Partial Length Uniform Load : D = 1.460, S = 2.720 k/ft, Extent = 0.0 -->> 15.0 ft

Partial Length Uniform Load : D = 0.140, S = 0.70 k/ft, Extent = 15.0 -->> 21.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.434 : 1	Maximum Shear Stress Ratio =	0.232 : 1
Section used for this span	W18x86	Section used for this span	W18x86
Ma : Applied	201.342 k-ft	Va : Applied	41.027 k
Mn / Omega : Allowable	464.072 k-ft	Vn/Omega : Allowable	176.640 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.232 in	Ratio =	1,083	>=360
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360
Max Downward Total Deflection	0.353 in	Ratio =	714	>=180
Max Upward Total Deflection	0.000 in	Ratio =	0	<180

Span: 1 : S Only
Span: 1 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 21.00 ft	1	0.149	0.080	69.04		69.04	775.00	464.07	1.00	1.00	14.20	264.96 176.64
+D+S												
Dsgn. L = 21.00 ft	1	0.434	0.232	201.34		201.34	775.00	464.07	1.00	1.00	41.03	264.96 176.64
+D+0.750S												
Dsgn. L = 21.00 ft	1	0.363	0.194	168.26		168.26	775.00	464.07	1.00	1.00	34.32	264.96 176.64
+0.60D												
Dsgn. L = 21.00 ft	1	0.089	0.048	41.42		41.42	775.00	464.07	1.00	1.00	8.52	264.96 176.64

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.3531	10.320		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Upward from all Load Conditions	41.027	26.713	2.025
Max Upward from Load Combinations	41.027	26.713	2.025
Max Upward from Load Cases	26.829	18.171	2.025
Max Downward from all Load Conditions (Resis			2.025

Steel Beam

DESCRIPTION: B4-5

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Downward from Load Combinations (Resi			2.025
Max Downward from Load Cases (Resisting Up			2.025
D Only	14.199	8.541	2.025
+D+S	41.027	26.713	2.025
+D+0.750S	34.320	22.170	2.025
+0.60D	8.519	5.125	2.025
S Only	26.829	18.171	2.025

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

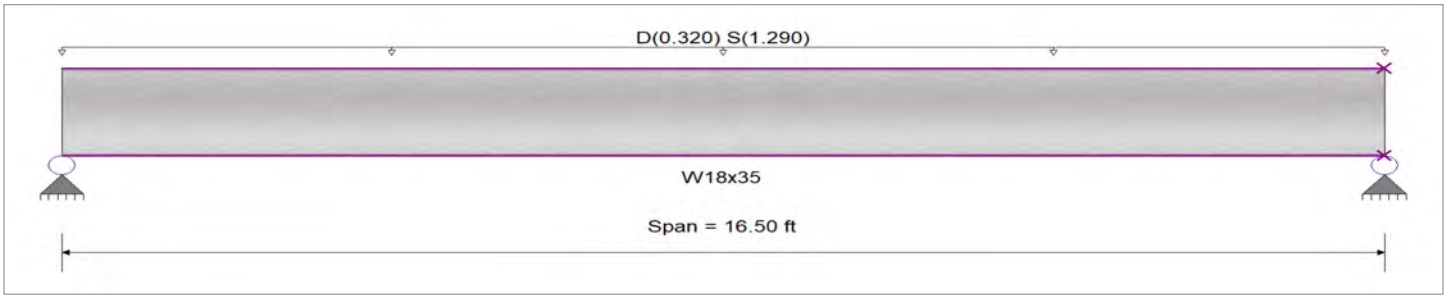
DESCRIPTION: B4-6

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.320, S = 1.290 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.337 : 1	Maximum Shear Stress Ratio =	0.128 : 1
Section used for this span	W18x35	Section used for this span	W18x35
Ma : Applied	55.983 k-ft	Va : Applied	13.572 k
Mn / Omega : Allowable	165.918 k-ft	Vn/Omega : Allowable	106.20 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.146 in	Ratio =	1,355	>=360	
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360	Span: 1 : S Only
Max Downward Total Deflection	0.186 in	Ratio =	1063	>=180	Span: 1 : +D+S
Max Upward Total Deflection	0.000 in	Ratio =	0	<180	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 16.50 ft	1	0.073	0.028	12.08		12.08	277.08	165.92	1.00	1.00	2.93	159.30	106.20
+D+S													
Dsgn. L = 16.50 ft	1	0.337	0.128	55.98		55.98	277.08	165.92	1.00	1.00	13.57	159.30	106.20
+D+0.750S													
Dsgn. L = 16.50 ft	1	0.271	0.103	45.01		45.01	277.08	165.92	1.00	1.00	10.91	159.30	106.20
+0.60D													
Dsgn. L = 16.50 ft	1	0.044	0.017	7.25		7.25	277.08	165.92	1.00	1.00	1.76	159.30	106.20

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.1863	8.297		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Upward from all Load Conditions	13.572	13.572	2.025
Max Upward from Load Combinations	13.572	13.572	2.025
Max Upward from Load Cases	10.643	10.643	2.025
Max Downward from all Load Conditions (Resis			2.025
Max Downward from Load Combinations (Resi			2.025
Max Downward from Load Cases (Resisting Up			2.025

Steel Beam

DESCRIPTION: B4-6

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
D Only	2.929	2.929	2.025
+D+S	13.572	13.572	2.025
+D+0.750S	10.911	10.911	2.025
+0.60D	1.758	1.758	2.025
S Only	10.643	10.643	2.025

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-7

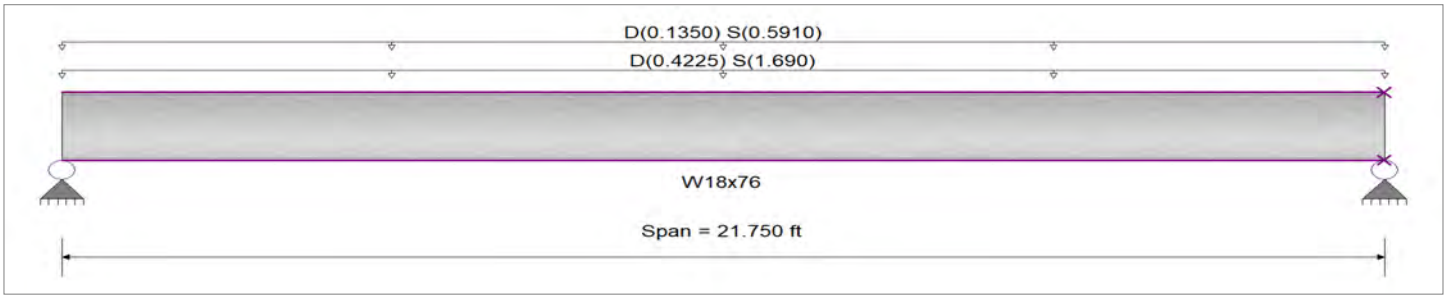
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.0250, S = 0.10 ksf, Tributary Width = 16.90 ft

Uniform Load on ALL spans : D = 0.1350, S = 0.5910 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.424 : 1	Maximum Shear Stress Ratio =	0.205 : 1
Section used for this span	W18x76	Section used for this span	W18x76
Ma : Applied	172.337 k-ft	Va : Applied	31.694 k
Mn / Omega : Allowable	406.687 k-ft	Vn/Omega : Allowable	154.70 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.299 in	Ratio =	872	>=360	
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360	Span: 1 : S Only
Max Downward Total Deflection	0.382 in	Ratio =	683	>=180	Span: 1 : +D+S
Max Upward Total Deflection	0.000 in	Ratio =	0	<180	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 21.75 ft	1	0.092	0.045	37.46		37.46	679.17	406.69	1.00	1.00	6.89	232.05 154.70
+D+S												
Dsgn. L = 21.75 ft	1	0.424	0.205	172.34		172.34	679.17	406.69	1.00	1.00	31.69	232.05 154.70
+D+0.750S												
Dsgn. L = 21.75 ft	1	0.341	0.165	138.62		138.62	679.17	406.69	1.00	1.00	25.49	232.05 154.70
+0.60D												
Dsgn. L = 21.75 ft	1	0.055	0.027	22.47		22.47	679.17	406.69	1.00	1.00	4.13	232.05 154.70

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.3822	10.937		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Upward from all Load Conditions	31.694	31.694	2.025
Max Upward from Load Combinations	31.694	31.694	2.025
Max Upward from Load Cases	24.806	24.806	2.025
Max Downward from all Load Conditions (Resis			2.025

Steel Beam

DESCRIPTION: B4-7

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Downward from Load Combinations (Resi			2.025
Max Downward from Load Cases (Resisting Up			2.025
D Only	6.888	6.888	2.025
+D+S	31.694	31.694	2.025
+D+0.750S	25.493	25.493	2.025
+0.60D	4.133	4.133	2.025
S Only	24.806	24.806	2.025

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-8

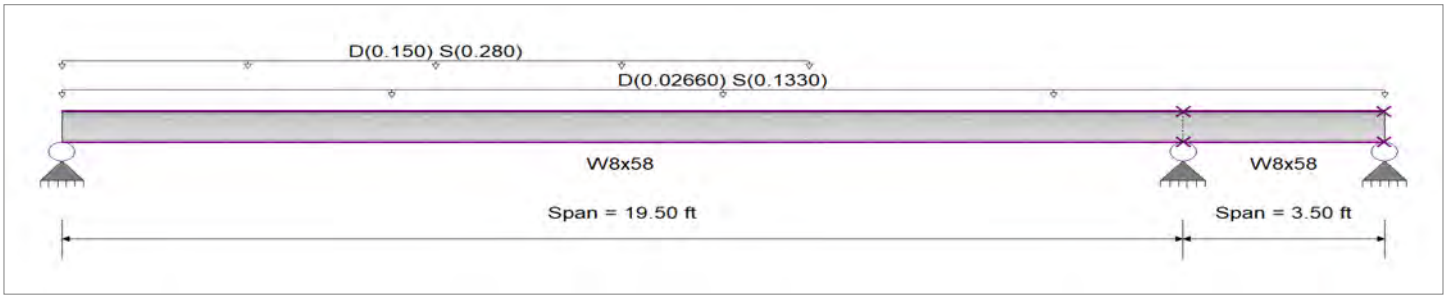
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 ksf, Tributary Width = 1.330 ft

Partial Length Uniform Load : D = 0.150, S = 0.280 k/ft, Extent = 0.0 -->> 13.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.124 : 1	Maximum Shear Stress Ratio =	0.062 : 1
Section used for this span	W8x58	Section used for this span	W8x58
Ma : Applied	18.449 k-ft	Va : Applied	5.550 k
Mn / Omega : Allowable	149.202 k-ft	Vn/Omega : Allowable	89.250 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	19.500 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.091 in	Ratio =	2,584	>=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.003 in	Ratio =	15,724	>=360	Span: 2 : S Only
Max Downward Total Deflection	0.128 in	Ratio =	1828	>=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.004 in	Ratio =	11204	>=180	Span: 2 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 19.50 ft	1	0.035	0.017	4.71	-5.26	5.26	249.17	149.20	1.00	1.00	1.55	133.88 89.25
Dsgn. L = 3.50 ft	2	0.035	0.017		-5.26	5.26	249.17	149.20	1.00	1.00	1.55	133.88 89.25
+D+S												
Dsgn. L = 19.50 ft	1	0.124	0.062	15.95	-18.45	18.45	249.17	149.20	1.00	1.00	5.55	133.88 89.25
Dsgn. L = 3.50 ft	2	0.124	0.062		-18.45	18.45	249.17	149.20	1.00	1.00	5.55	133.88 89.25
+D+0.750S												
Dsgn. L = 19.50 ft	1	0.102	0.051	13.14	-15.15	15.15	249.17	149.20	1.00	1.00	4.55	133.88 89.25
Dsgn. L = 3.50 ft	2	0.102	0.051		-15.15	15.15	249.17	149.20	1.00	1.00	4.55	133.88 89.25
+0.60D												
Dsgn. L = 19.50 ft	1	0.021	0.010	2.83	-3.15	3.15	249.17	149.20	1.00	1.00	0.93	133.88 89.25
Dsgn. L = 3.50 ft	2	0.021	0.010		-3.15	3.15	249.17	149.20	1.00	1.00	0.93	133.88 89.25

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.1280	8.424		0.0000	0.000
	2	0.0000	8.424	+D+S	-0.0037	1.484

Steel Beam

DESCRIPTION: B4-8

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	4.337	9.916	
Max Upward from Load Combinations	4.337	9.916	
Max Upward from Load Cases	3.047	7.188	
Max Downward from all Load Conditions (Resis			-4.992
Max Downward from Load Combinations (Resi			-4.992
Max Downward from Load Cases (Resisting Up			-3.536
D Only	1.290	2.728	-1.456
+D+S	4.337	9.916	-4.992
+D+0.750S	3.575	8.119	-4.108
+0.60D	0.774	1.637	-0.873
S Only	3.047	7.188	-3.536

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-9 - Grid K Strucutral Fascia

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

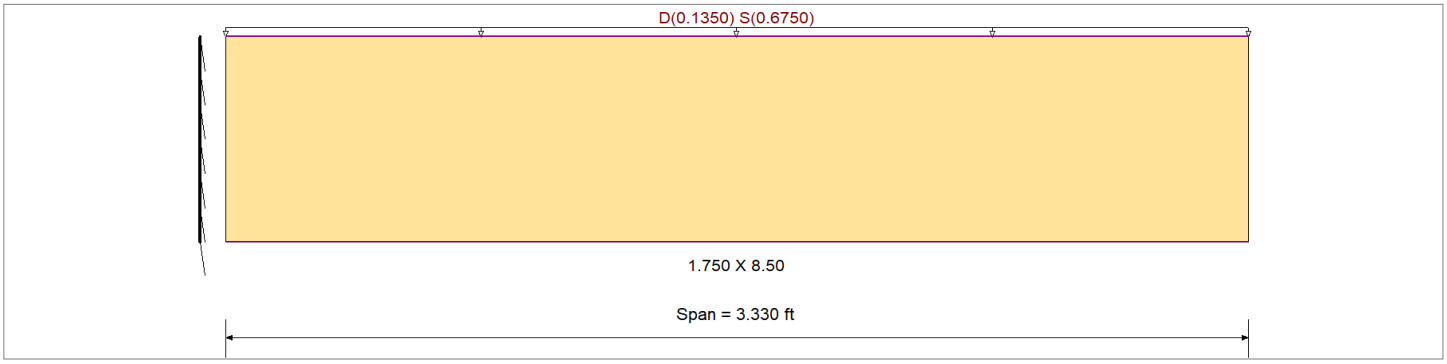
Wood Species : Boise Cascade
Wood Grade : Versa Lam 2800

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,800.0 psi
Fb -	2,800.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 ksf, Tributary Width = 6.750 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.751 : 1	Maximum Shear Stress Ratio	=	0.654 : 1
Section used for this span		1.750 X 8.50	Section used for this span		1.750 X 8.50
fb: Actual	=	2,557.41 psi	fv: Actual	=	214.42 psi
F'b	=	3,405.43 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	0.000 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.100 in	Ratio =	800 >=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.120 in	Ratio =	666 >=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 3.330 ft	1	0.160	0.139	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.75	426.2	2,665.1	0.35	35.7	256.5
+D+S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 3.330 ft	1	0.751	0.654	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	4.49	2,557.4	3,405.4	2.13	214.4	327.8
+D+0.750S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 3.330 ft	1	0.595	0.518	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	3.56	2,024.6	3,405.4	1.68	169.7	327.8
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 3.330 ft	1	0.054	0.047	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.45	255.7	4,738.0	0.21	21.4	456.0

Wood Beam

DESCRIPTION: B4-9 - Grid K Strucutral Fascia

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.1198	3.330		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	2.697	
Max Upward from Load Combinations	2.697	
Max Upward from Load Cases	2.248	
D Only	0.450	
+D+S	2.697	
+D+0.750S	2.135	
+0.60D	0.270	
S Only	2.248	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-10

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

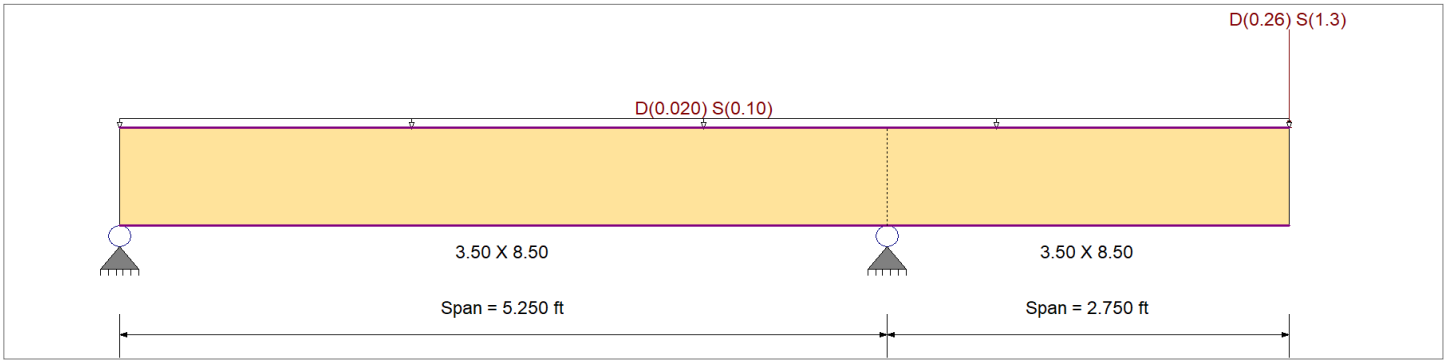
Wood Species : Boise Cascade
Wood Grade : Versa Lam 3100

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3,100.0 psi
Fb -	3,100.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 k/ft
Load for Span Number 2
Point Load : D = 0.260, S = 1.30 k @ 2.750 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.361 : 1	Maximum Shear Stress Ratio	=	0.280 : 1
Section used for this span		3.50 X 8.50	Section used for this span		3.50 X 8.50
fb: Actual	=	1,359.96 psi	fv: Actual	=	91.91 psi
F'b	=	3,770.30 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	5.250 ft	Location of maximum on span	=	5.250 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.130 in	Ratio =	504 >=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.029 in	Ratio =	2149 >=360	Span: 1 : S Only
Max Downward Total Deflection	0.157 in	Ratio =	420 >=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.035 in	Ratio =	1797 >=180	Span: 1 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 5.250 ft	1	0.079	0.063	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.82	234.4	2,950.7	0.32	16.1	256.5
Length = 2.750 ft	2	0.079	0.063	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.82	234.4	2,950.7	0.32	16.1	256.5
+D+S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.250 ft	1	0.361	0.280	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	4.78	1,360.0	3,770.3	1.82	91.9	327.8
Length = 2.750 ft	2	0.361	0.280	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	4.78	1,360.0	3,770.3	1.82	91.9	327.8
+D+0.750S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.250 ft	1	0.286	0.223	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	3.79	1,078.6	3,770.3	1.45	72.9	327.8

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-10

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
Length = 2.750 ft	**2**	0.286	0.223	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	3.79	1,078.6	3,770.3	1.45	72.9	327.8
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.250 ft	**1**	0.027	0.021	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.49	140.6	5,245.6	0.19	9.6	456.0
Length = 2.750 ft	**2**	0.027	0.021	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.49	140.6	5,245.6	0.19	9.6	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S	-0.0350	3.109
+D+S	2	0.1570	2.750		0.0000	3.109

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		3.161	
Max Upward from Load Combinations		3.161	
Max Upward from Load Cases		2.590	
Max Downward from all Load Conditio	-0.572		
Max Downward from Load Combinations	-0.572		
Max Downward from Load Cases (Resis	-0.490		
D Only	-0.082	0.571	
+D+S	-0.572	3.161	
+D+0.750S	-0.450	2.514	
+0.60D	-0.049	0.342	
S Only	-0.490	2.590	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: N/S Ladder Framing West Side

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

Wood Species : Boise Cascade
Wood Grade : Versa Lam 2800

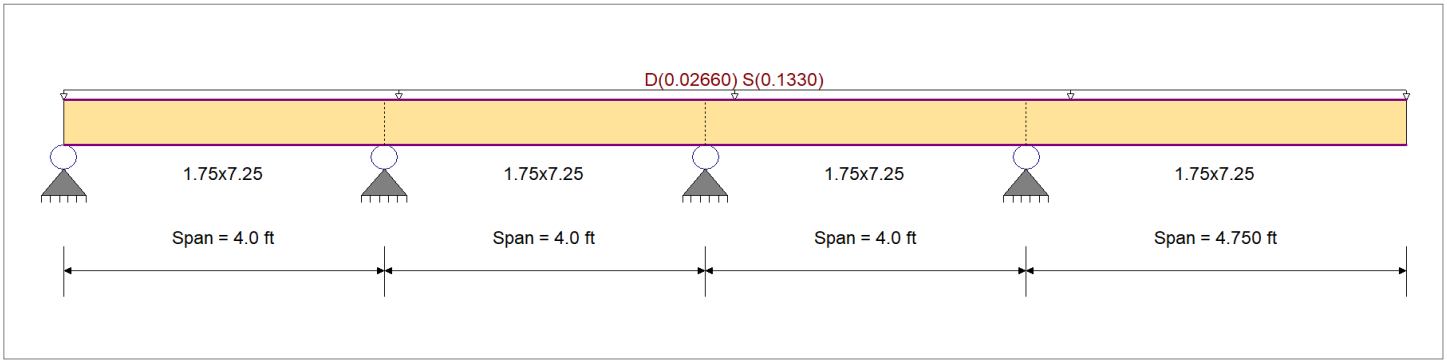
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2800 psi
Fb -	2800 psi
Fc - Prll	3000 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	2100 psi

E : Modulus of Elasticity

Ebend- xx	2000 ksi
Eminbend - xx	2530120482 ksi
Density	41.76 pcf

Repetitive Member Stress Increase



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 ksf, Tributary Width = 1.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.398 : 1	Maximum Shear Stress Ratio	=	0.266 : 1
Section used for this span		1.75x7.25	Section used for this span		1.75x7.25
fb: Actual	=	1,409.32 psi	fv: Actual	=	87.09 psi
F'b	=	3,541.65 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	4.000 ft	Location of maximum on span	=	3.443 ft
Span # where maximum occurs	=	Span # 3	Span # where maximum occurs	=	Span # 3

Maximum Deflection

Max Downward Transient Deflection	0.243 in	Ratio =	468 >=360	Span: 4 : S Only
Max Upward Transient Deflection	-0.015 in	Ratio =	3205 >=360	Span: 3 : S Only
Max Downward Total Deflection	0.291 in	Ratio =	390 >=180	Span: 4 : +D+S
Max Upward Total Deflection	-0.018 in	Ratio =	2671 >=180	Span: 3 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 4.0 ft	1	0.018	0.029	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.04	0.06	49.0	2,771.7	0.06	7.5	256.5
Length = 4.0 ft	2	0.018	0.029	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.04	0.06	49.0	2,771.7	0.06	7.5	256.5
Length = 4.0 ft	3	0.085	0.057	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.04	0.30	234.9	2,771.7	0.12	14.5	256.5
Length = 4.750 ft	4	0.085	0.057	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.04	0.30	234.9	2,771.7	0.11	14.5	256.5
+D+S					1.00	1.00	1.00	1.058	1.00	1.00	1.04			0.0	0.00	0.0	0.0
Length = 4.0 ft	1	0.083	0.137	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.04	0.38	293.8	3,541.6	0.38	45.0	327.8
Length = 4.0 ft	2	0.083	0.137	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.04	0.38	293.8	3,541.6	0.38	45.0	327.8
Length = 4.0 ft	3	0.398	0.266	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.04	1.80	1,409.3	3,541.6	0.74	87.1	327.8

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: N/S Ladder Framing West Side

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 4.750 ft	**4**	0.398	0.266	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.04	1.80	1,409.3	3,541.6	0.66	87.1	327.8
+D+0.750S					1.00	1.00	1.00	1.058	1.00	1.00	1.04			0.0	0.00	0.0	0.0
Length = 4.0 ft	**1**	0.066	0.109	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.04	0.30	232.6	3,541.6	0.30	35.6	327.8
Length = 4.0 ft	**2**	0.066	0.109	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.04	0.30	232.6	3,541.6	0.30	35.6	327.8
Length = 4.0 ft	**3**	0.315	0.210	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.04	1.43	1,115.7	3,541.6	0.58	68.9	327.8
Length = 4.750 ft	**4**	0.315	0.210	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.04	1.43	1,115.7	3,541.6	0.52	68.9	327.8
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.04			0.0	0.00	0.0	0.0
Length = 4.0 ft	**1**	0.006	0.010	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.04	0.04	29.4	4,927.5	0.04	4.5	456.0
Length = 4.0 ft	**2**	0.006	0.010	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.04	0.04	29.4	4,927.5	0.04	4.5	456.0
Length = 4.0 ft	**3**	0.029	0.019	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.04	0.18	140.9	4,927.5	0.07	8.7	456.0
Length = 4.750 ft	**4**	0.029	0.019	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.04	0.18	140.9	4,927.5	0.07	8.7	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0027	1.620	+D+S	-0.0001	3.797
+D+S	2	0.0063	2.380		0.0000	3.797
	3	0.0000	2.380	+D+S	-0.0180	2.582
+D+S	4	0.2913	4.750		0.0000	2.582

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4	Support 5
Max Upward from all Load Conditions	0.225	0.882		1.584	
Max Upward from Load Combinations	0.225	0.882		1.584	
Max Upward from Load Cases	0.188	0.735		1.320	
Max Downward from all Load Conditio			-0.018		
Max Downward from Load Combinations			-0.018		
Max Downward from Load Cases (Resis			-0.015		
D Only	0.038	0.147	-0.003	0.264	
+D+S	0.225	0.882	-0.018	1.584	
+D+0.750S	0.178	0.698	-0.014	1.254	
+0.60D	0.023	0.088	-0.002	0.158	
S Only	0.188	0.735	-0.015	1.320	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: NW Corner 8 1/2 LVL framing

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

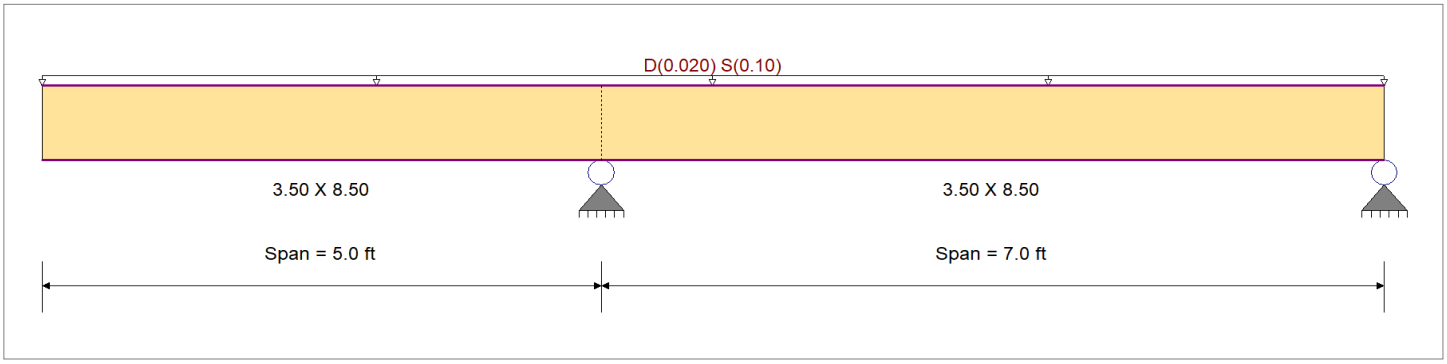
Wood Species : Boise Cascade
Wood Grade : Versa Lam 2800

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,800.0 psi
Fb -	2,800.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.129 : 1	Maximum Shear Stress Ratio	=	0.085 : 1
Section used for this span		3.50 X 8.50	Section used for this span		3.50 X 8.50
fb: Actual	=	427.09 psi	fv: Actual	=	27.72 psi
F'b	=	3,304.68 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	5.000 ft	Location of maximum on span	=	5.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.074 in	Ratio =	1628 >=360	Span: 1 : S Only
Max Upward Transient Deflection	-0.006 in	Ratio =	15119 >=360	Span: 2 : S Only
Max Downward Total Deflection	0.088 in	Ratio =	1356 >=180	Span: 1 : +D+S
Max Upward Total Deflection	-0.007 in	Ratio =	12599 >=180	Span: 2 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.028	0.018	0.90	1.00	1.00	1.00	1.026	1.00	1.00	1.00	0.25	71.2	2,586.3	0.09	4.6	256.5
Length = 7.0 ft	2	0.028	0.018	0.90	1.00	1.00	1.00	1.026	1.00	1.00	1.00	0.25	71.2	2,586.3	0.09	4.6	256.5
+D+S					1.00	1.00	1.00	1.026	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.129	0.085	1.15	1.00	1.00	1.00	1.026	1.00	1.00	1.00	1.50	427.1	3,304.7	0.55	27.7	327.8
Length = 7.0 ft	2	0.129	0.085	1.15	1.00	1.00	1.00	1.026	1.00	1.00	1.00	1.50	427.1	3,304.7	0.55	27.7	327.8
+D+0.750S					1.00	1.00	1.00	1.026	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.102	0.067	1.15	1.00	1.00	1.00	1.026	1.00	1.00	1.00	1.19	338.1	3,304.7	0.44	21.9	327.8
Length = 7.0 ft	2	0.102	0.067	1.15	1.00	1.00	1.00	1.026	1.00	1.00	1.00	1.19	338.1	3,304.7	0.44	21.9	327.8

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: NW Corner 8 1/2 LVL framing

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+0.60D					1.00	1.00	1.00	1.026	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	**1**	0.009	0.006	1.60	1.00	1.00	1.00	1.026	1.00	1.00	1.00	0.15	42.7	4,597.8	0.05	2.8	456.0
Length = 7.0 ft	**2**	0.009	0.006	1.60	1.00	1.00	1.00	1.026	1.00	1.00	1.00	0.15	42.7	4,597.8	0.05	2.8	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0884	0.000		0.0000	0.000
	2	0.0000	0.000	+D+S	-0.0067	1.799

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		1.234	0.206
Max Upward from Load Combinations		1.234	0.206
Max Upward from Load Cases		1.029	0.171
D Only		0.206	0.034
+D+S		1.234	0.206
+D+0.750S		0.977	0.163
+0.60D		0.123	0.021
S Only		1.029	0.171

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: 2x8 LVL Ladder Framing West Side

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

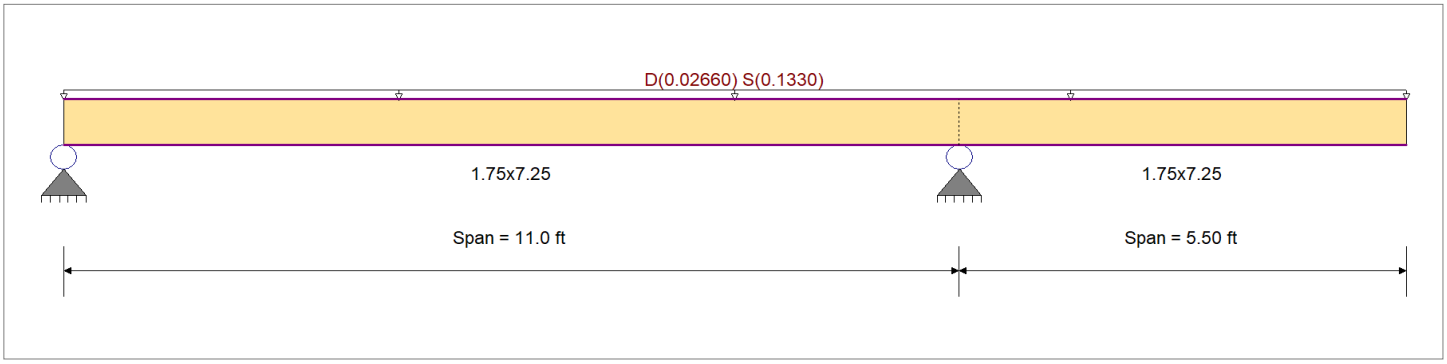
Wood Species : Boise Cascade
Wood Grade : Versa Lam 2800

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,800.0 psi
Fb -	2,800.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 ksf, Tributary Width = 1.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.568 : 1	Maximum Shear Stress Ratio	=	0.372 : 1
Section used for this span		1.75x7.25	Section used for this span		1.75x7.25
fb: Actual	=	1,933.06 psi	fv: Actual	=	122.04 psi
F'b	=	3,405.43 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	11.000 ft	Location of maximum on span	=	10.447 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.236 in	Ratio =	560	>=360	Span: 2 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.289 in	Ratio =	456	>=180	Span: 2 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.135	0.088	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.46	358.5	2,665.1	0.19	22.6	256.5
Length = 5.50 ft	2	0.135	0.088	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.46	358.5	2,665.1	0.15	22.6	256.5
+D+S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.568	0.372	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	2.47	1,933.1	3,405.4	1.03	122.0	327.8
Length = 5.50 ft	2	0.568	0.372	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	2.47	1,933.1	3,405.4	0.80	122.0	327.8
+D+0.750S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.452	0.297	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.97	1,539.4	3,405.4	0.82	97.2	327.8
Length = 5.50 ft	2	0.452	0.297	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.97	1,539.4	3,405.4	0.64	97.2	327.8

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: 2x8 LVL Ladder Framing West Side

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.0 ft	**1**	0.045	0.030	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.27	215.1	4,738.0	0.11	13.6	456.0
Length = 5.50 ft	**2**	0.045	0.030	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.27	215.1	4,738.0	0.09	13.6	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.2035	4.670		0.0000	0.000
+D+S	2	0.2893	5.500		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	0.674	2.021	
Max Upward from Load Combinations	0.674	2.021	
Max Upward from Load Cases	0.549	1.646	
D Only	0.125	0.375	
+D+S	0.674	2.021	
+D+0.750S	0.536	1.609	
+0.60D	0.075	0.225	
S Only	0.549	1.646	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

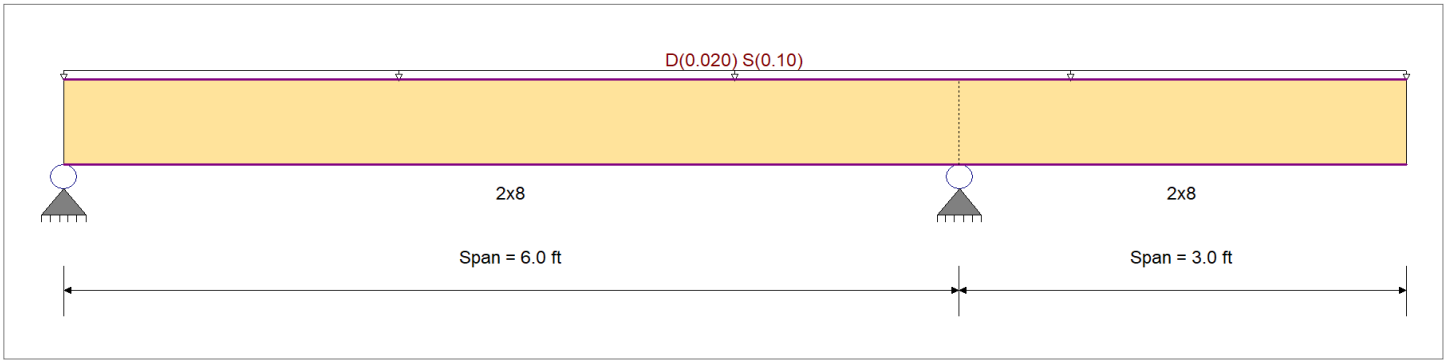
DESCRIPTION: 2x8 LVL Ladder Framing East Side

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	900.0 psi	*E : Modulus of Elasticity*	
Load Combination :	IBC 2021	Fb -	900.0 psi	Ebend- xx	1,600.0 ksi
		Fc - Prll	1,350.0 psi	Eminbend - xx	580.0 ksi
Wood Species :	Douglas Fir-Larch	Fc - Perp	625.0 psi		
Wood Grade :	No.2	Fv	180.0 psi		
		Ft	575.0 psi	Density	31.210 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.405 : 1	Maximum Shear Stress Ratio	=	0.257 : 1
Section used for this span		2x8	Section used for this span		2x8
fb: Actual	=	502.81 psi	fv: Actual	=	53.11 psi
F'b	=	1,242.00 psi	F'v	=	207.00 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	6.000 ft	Location of maximum on span	=	5.397 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.023 in	Ratio =	3148 >=360	Span: 2 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.028 in	Ratio =	2572 >=180	Span: 2 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 6.0 ft	1	0.095	0.060	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.10	91.9	972.0	0.07	9.7	162.0
Length = 3.0 ft	2	0.095	0.060	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.10	91.9	972.0	0.05	9.7	162.0
+D+S					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	1	0.405	0.257	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.55	502.8	1,242.0	0.39	53.1	207.0
Length = 3.0 ft	2	0.405	0.257	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.55	502.8	1,242.0	0.29	53.1	207.0
+D+0.750S					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	1	0.322	0.204	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.44	400.1	1,242.0	0.31	42.3	207.0
Length = 3.0 ft	2	0.322	0.204	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.44	400.1	1,242.0	0.23	42.3	207.0

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: 2x8 LVL Ladder Framing East Side

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+0.60D					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	**1**	0.032	0.020	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.06	55.1	1,728.0	0.04	5.8	288.0
Length = 3.0 ft	**2**	0.032	0.020	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.06	55.1	1,728.0	0.03	5.8	288.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0197	2.547		0.0000	0.000
+D+S	2	0.0280	3.000		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	0.275	0.826	
Max Upward from Load Combinations	0.275	0.826	
Max Upward from Load Cases	0.225	0.675	
D Only	0.050	0.151	
+D+S	0.275	0.826	
+D+0.750S	0.219	0.657	
+0.60D	0.030	0.091	
S Only	0.225	0.675	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: 2x8 LVL Ladder Framing NW/SW Corners

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

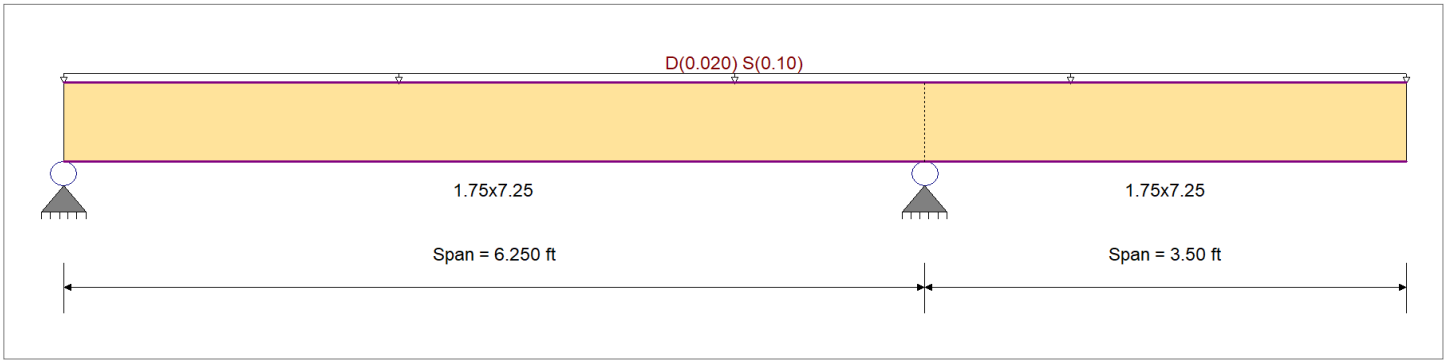
Wood Species : Boise Cascade
Wood Grade : Versa Lam 2800

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,800.0 psi
Fb -	2,800.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.174 : 1	Maximum Shear Stress Ratio	=	0.157 : 1
Section used for this span		1.75x7.25	Section used for this span		1.75x7.25
fb: Actual	=	592.96 psi	fv: Actual	=	51.34 psi
F'b	=	3,405.43 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	6.250 ft	Location of maximum on span	=	5.656 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.043 in	Ratio =	1946	>=360	Span: 2 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.053 in	Ratio =	1574	>=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.001 in	Ratio =	71754	>=180	Span: 1 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 6.250 ft	1	0.043	0.038	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.15	113.5	2,665.1	0.08	9.8	256.5
Length = 3.50 ft	2	0.043	0.038	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.15	113.5	2,665.1	0.07	9.8	256.5
+D+S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.250 ft	1	0.174	0.157	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.76	593.0	3,405.4	0.43	51.3	327.8
Length = 3.50 ft	2	0.174	0.157	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.76	593.0	3,405.4	0.36	51.3	327.8
+D+0.750S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.250 ft	1	0.139	0.125	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.60	473.1	3,405.4	0.35	41.0	327.8
Length = 3.50 ft	2	0.139	0.125	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.60	473.1	3,405.4	0.29	41.0	327.8

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: 2x8 LVL Ladder Framing NW/SW Corners

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.250 ft	**1**	0.014	0.013	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.09	68.1	4,738.0	0.05	5.9	456.0
Length = 3.50 ft	**2**	0.014	0.013	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.09	68.1	4,738.0	0.04	5.9	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0108	2.374	+D+S	-0.0010	5.761
+D+S	2	0.0533	3.500		0.0000	5.761

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	0.265	0.941	
Max Upward from Load Combinations	0.265	0.941	
Max Upward from Load Cases	0.215	0.761	
D Only	0.051	0.180	
+D+S	0.265	0.941	
+D+0.750S	0.212	0.750	
+0.60D	0.030	0.108	
S Only	0.215	0.761	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Nothwest Corner Long Span 2x8

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

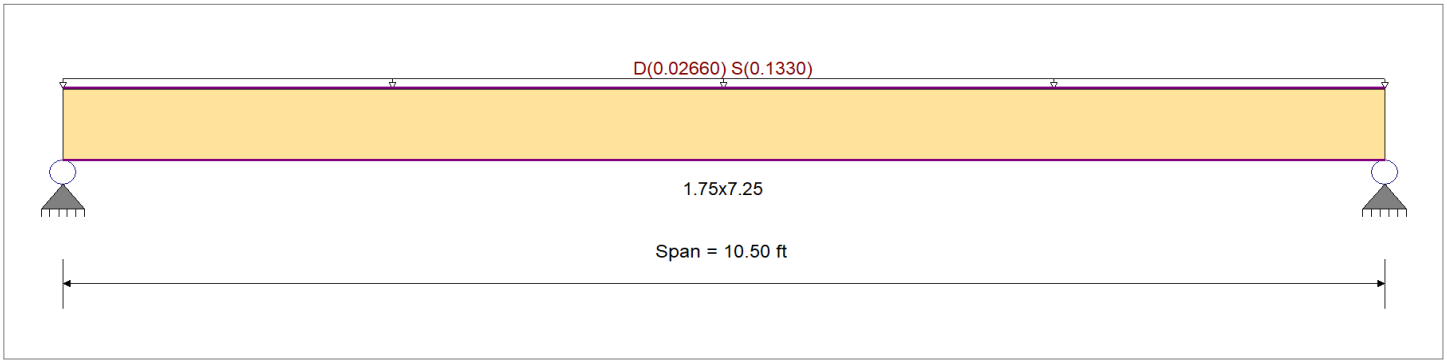
Wood Species : Boise Cascade
Wood Grade : Versa Lam 2800

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,800.0 psi
Fb -	2,800.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 ksf, Tributary Width = 1.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.506 : 1	Maximum Shear Stress Ratio	=	0.269 : 1
Section used for this span		1.75x7.25	Section used for this span		1.75x7.25
fb: Actual	=	1,721.63 psi	fv: Actual	=	88.22 psi
F'b	=	3,405.43 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	5.250 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.329 in	Ratio =	382	>=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.395 in	Ratio =	318	>=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 10.50 ft	1	0.108	0.057	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.37	286.9	2,665.1	0.12	14.7	256.5
+D+S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 10.50 ft	1	0.506	0.269	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	2.20	1,721.6	3,405.4	0.75	88.2	327.8
+D+0.750S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 10.50 ft	1	0.400	0.213	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.74	1,363.0	3,405.4	0.59	69.8	327.8
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 10.50 ft	1	0.036	0.019	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.22	172.2	4,738.0	0.07	8.8	456.0

Wood Beam

DESCRIPTION: Nothwest Corner Long Span 2x8

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.3950	5.288		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.838	0.838
Max Upward from Load Combinations	0.838	0.838
Max Upward from Load Cases	0.698	0.698
D Only	0.140	0.140
+D+S	0.838	0.838
+D+0.750S	0.663	0.663
+0.60D	0.084	0.084
S Only	0.698	0.698

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

LIC# : KW-06016764, Build:20.22.12.28 Maxwell Structural Design Studio PLLC (c) ENERCALC INC 1983-2022

DESCRIPTION: B4-20

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

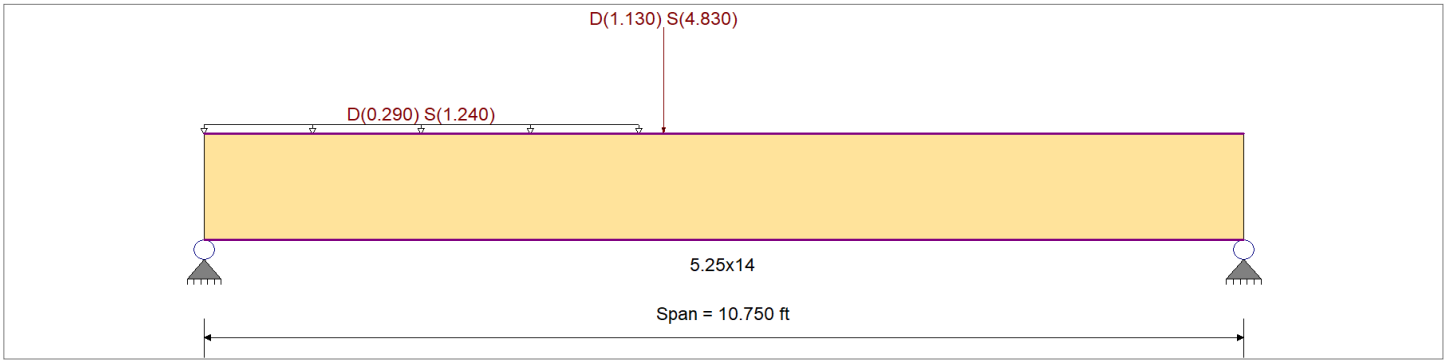
Wood Species : Boise Cascade
Wood Grade : Versa Lam 3100

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3,100.0 psi
Fb -	3,100.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Partial Length Uniform Load : D = 0.290, S = 1.240 k/ft, Extent = 0.0 -->> 4.50 ft
Point Load : D = 1.130, S = 4.830 k, Starting at : 4.750 ft and placed every 0.0 ft thereafter

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.494 : 1	Maximum Shear Stress Ratio	=	0.443 : 1
Section used for this span		5.25x14	Section used for this span		5.25x14
fb: Actual	=	1,731.48 psi	fv: Actual	=	145.31 psi
F'b	=	3,504.46 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	4.747 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.147 in	Ratio =	874 >=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.185 in	Ratio =	698 >=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 10.750 ft	1	0.126	0.113	0.90	1.00	1.00	1.00	0.983	1.00	1.00	1.00	4.94	345.5	2,742.6	1.42	29.0	256.5
+D+S					1.00	1.00	1.00	0.983	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 10.750 ft	1	0.494	0.443	1.15	1.00	1.00	1.00	0.983	1.00	1.00	1.00	24.75	1,731.5	3,504.5	7.12	145.3	327.8
+D+0.750S					1.00	1.00	1.00	0.983	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 10.750 ft	1	0.395	0.355	1.15	1.00	1.00	1.00	0.983	1.00	1.00	1.00	19.79	1,385.0	3,504.5	5.70	116.2	327.8
+0.60D					1.00	1.00	1.00	0.983	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 10.750 ft	1	0.043	0.038	1.60	1.00	1.00	1.00	0.983	1.00	1.00	1.00	2.96	207.3	4,875.8	0.85	17.4	456.0

Wood Beam

DESCRIPTION: B4-20

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.1846	5.061		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	8.885	4.189
Max Upward from Load Combinations	8.885	4.189
Max Upward from Load Cases	7.108	3.302
D Only	1.777	0.887
+D+S	8.885	4.189
+D+0.750S	7.108	3.364
+0.60D	1.066	0.532
S Only	7.108	3.302

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-21

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

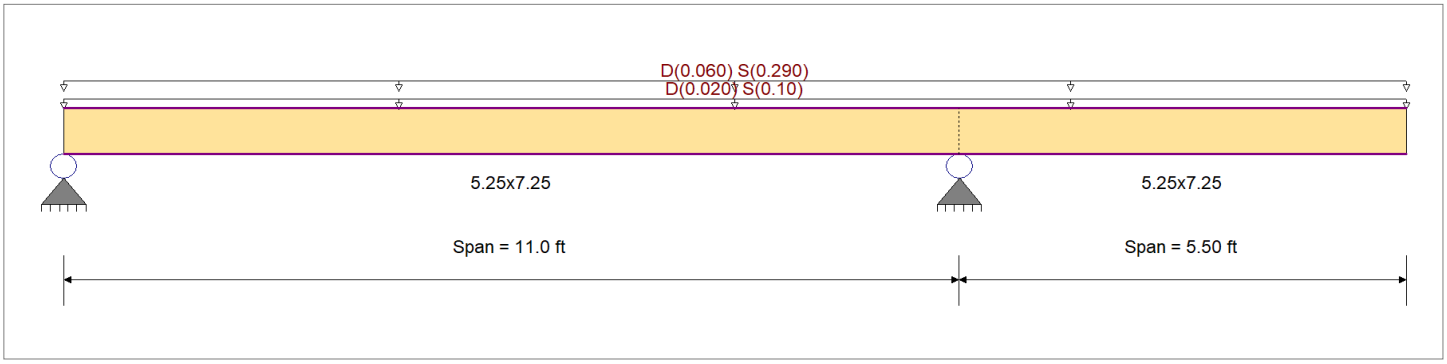
Wood Species : Boise Cascade
Wood Grade : Versa Lam 2800

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,800.0 psi
Fb -	2,800.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 k/ft
Uniform Load on ALL spans : D = 0.060, S = 0.290 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.557 : 1	Maximum Shear Stress Ratio	=	0.366 : 1
Section used for this span		5.25x7.25	Section used for this span		5.25x7.25
fb: Actual	=	1,898.33 psi	fv: Actual	=	119.85 psi
F'b	=	3,405.43 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	11.000 ft	Location of maximum on span	=	10.447 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.230 in	Ratio =	572 >=360	Span: 2 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.284 in	Ratio =	464 >=180	Span: 2 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.135	0.088	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.38	359.3	2,665.1	0.58	22.7	256.5
Length = 5.50 ft	2	0.135	0.088	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.38	359.3	2,665.1	0.45	22.7	256.5
+D+S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.557	0.366	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	7.28	1,898.3	3,405.4	3.04	119.8	327.8
Length = 5.50 ft	2	0.557	0.366	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	7.28	1,898.3	3,405.4	2.36	119.8	327.8
+D+0.750S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.444	0.292	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	5.80	1,513.6	3,405.4	2.42	95.6	327.8
Length = 5.50 ft	2	0.444	0.292	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	5.80	1,513.6	3,405.4	1.89	95.6	327.8

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-21

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.0 ft	**1**	0.045	0.030	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.83	215.6	4,738.0	0.35	13.6	456.0
Length = 5.50 ft	**2**	0.045	0.030	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.83	215.6	4,738.0	0.27	13.6	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.1998	4.670		0.0000	0.000
+D+S	2	0.2841	5.500		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	1.984	5.953	
Max Upward from Load Combinations	1.984	5.953	
Max Upward from Load Cases	1.609	4.826	
D Only	0.376	1.127	
+D+S	1.984	5.953	
+D+0.750S	1.582	4.746	
+0.60D	0.225	0.676	
S Only	1.609	4.826	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

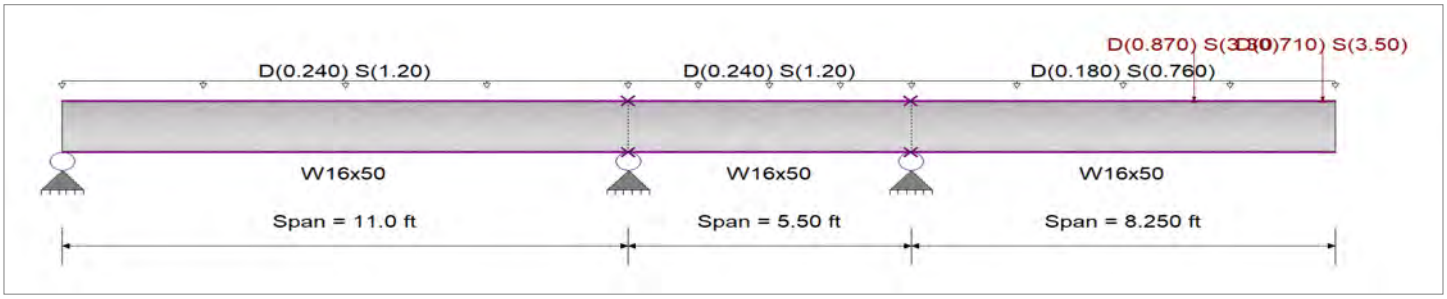
DESCRIPTION: B4-22

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Load for Span Number 1
Uniform Load : D = 0.020, S = 0.10 ksf, Tributary Width = 12.0 ft

Load for Span Number 2
Uniform Load : D = 0.020, S = 0.10 ksf, Tributary Width = 12.0 ft

Load for Span Number 3
Uniform Load : D = 0.180, S = 0.760 k/ft, Tributary Width = 1.0 ft

Point Load : D = 0.870, S = 3.30 k @ 5.50 ft

Point Load : D = 0.710, S = 3.50 k @ 8.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.393** : 1	Maximum Shear Stress Ratio =	**0.163** : 1
Section used for this span	**W16x50**	Section used for this span	**W16x50**
Ma : Applied	90.307 k-ft	Va : Applied	20.180 k
Mn / Omega : Allowable	229.541 k-ft	Vn/Omega : Allowable	123.880 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	5.500 ft
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 2

Maximum Deflection

Max Downward Transient Deflection	0.218 in	Ratio =	907	>=360	Span: 3 : S Only
Max Upward Transient Deflection	-0.012 in	Ratio =	5,623	>=360	Span: 3 : S Only
Max Downward Total Deflection	0.273 in	Ratio =	726	>=180	Span: 3 : +D+S
Max Upward Total Deflection	-0.015 in	Ratio =	4488	>=180	Span: 3 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 11.00 ft	1	0.019	0.020	4.27	-0.24	4.27	383.33	229.54	1.00	1.00	2.48	185.82 123.88
Dsgn. L = 5.50 ft	2	0.080	0.033	-0.00	-18.29	18.29	383.33	229.54	1.00	1.00	4.08	185.82 123.88
Dsgn. L = 8.25 ft	3	0.080	0.028		-18.29	18.29	383.33	229.54	1.00	1.00	3.48	185.82 123.88
+D+S												
Dsgn. L = 11.00 ft	1	0.094	0.097	21.62	-1.85	21.62	383.33	229.54	1.00	1.00	11.99	185.82 123.88
Dsgn. L = 5.50 ft	2	0.393	0.163	-0.00	-90.31	90.31	383.33	229.54	1.00	1.00	20.18	185.82 123.88
Dsgn. L = 8.25 ft	3	0.393	0.134		-90.31	90.31	383.33	229.54	1.00	1.00	16.55	185.82 123.88
+D+0.750S												

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-22

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega	
Dsgn. L = 11.00 ft	1	0.075	0.078	17.28	-1.45	17.28	383.33	229.54	1.00	1.00	9.61	185.82	123.88
Dsgn. L = 5.50 ft	2	0.315	0.130	-0.00	-72.30	72.30	383.33	229.54	1.00	1.00	16.16	185.82	123.88
Dsgn. L = 8.25 ft	3	0.315	0.107		-72.30	72.30	383.33	229.54	1.00	1.00	13.28	185.82	123.88
+0.60D													
Dsgn. L = 11.00 ft	1	0.011	0.012	2.56	-0.14	2.56	383.33	229.54	1.00	1.00	1.49	185.82	123.88
Dsgn. L = 5.50 ft	2	0.048	0.020	-0.00	-10.98	10.98	383.33	229.54	1.00	1.00	2.45	185.82	123.88
Dsgn. L = 8.25 ft	3	0.048	0.017		-10.98	10.98	383.33	229.54	1.00	1.00	2.09	185.82	123.88

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0247	5.500		0.0000	0.000
	2	0.0000	5.500	+D+S	-0.0147	3.227
+D+S	3	0.2728	8.250		0.0000	3.227

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Max Upward from all Load Conditions	8.027		36.728	
Max Upward from Load Combinations	8.027		36.728	
Max Upward from Load Cases	6.454		29.171	
Max Downward from all Load Conditions (Resis		-3.622		
Max Downward from Load Combinations (Resis		-3.622		
Max Downward from Load Cases (Resisting Up		-2.754		
D Only	1.573	-0.867	7.558	
+D+S	8.027	-3.622	36.728	
+D+0.750S	6.413	-2.933	29.436	
+0.60D	0.944	-0.520	4.535	
S Only	6.454	-2.754	29.171	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-23

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

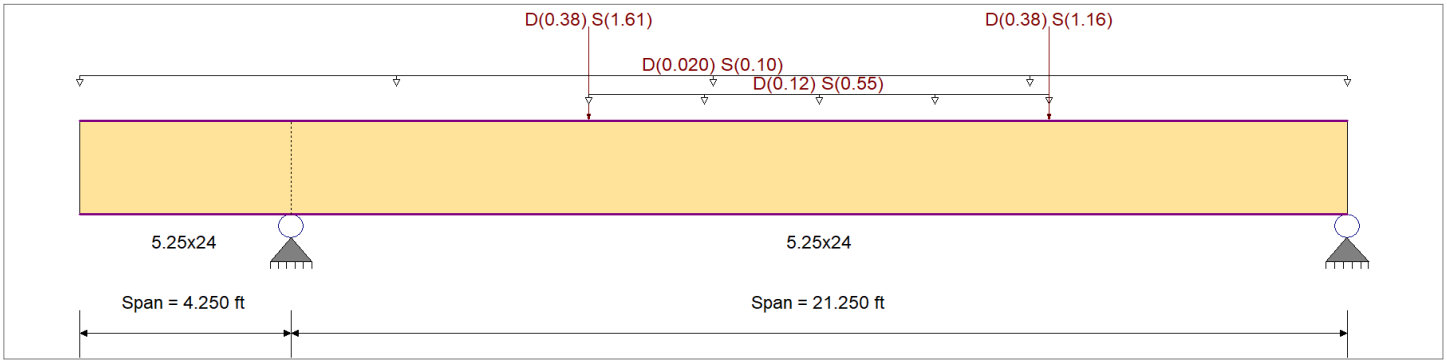
Wood Species : Boise Cascade
Wood Grade : Versa Lam 3100

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3,100.0 psi
Fb -	3,100.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 k/ft
Load for Span Number 2
Point Load : D = 0.380, S = 1.610 k @ 6.0 ft
Uniform Load : D = 0.120, S = 0.550 k/ft, Extent = 6.0 -->> 15.250 ft, Tributary Width = 1.0 ft
Point Load : D = 0.380, S = 1.160 k @ 15.250 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.307 : 1	Maximum Shear Stress Ratio	=	0.220 : 1
Section used for this span		5.25x24	Section used for this span		5.25x24
fb: Actual	=	1,013.88 psi	fv: Actual	=	72.14 psi
F'b	=	3,300.74 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	10.566 ft	Location of maximum on span	=	4.250 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.229 in	Ratio =	1112 >=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.141 in	Ratio =	724 >=360	Span: 1 : S Only
Max Downward Total Deflection	0.282 in	Ratio =	904 >=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.173 in	Ratio =	588 >=180	Span: 1 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 4.250 ft	1	0.002	0.052	0.90	1.00	1.00	1.00	0.926	1.00	1.00	1.00	0.18	4.3	2,583.2	1.12	13.3	256.5
Length = 21.250 ft	2	0.073	0.052	0.90	1.00	1.00	1.00	0.926	1.00	1.00	1.00	7.93	188.9	2,583.2	1.12	13.3	256.5
+D+S					1.00	1.00	1.00	0.926	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 4.250 ft	1	0.008	0.220	1.15	1.00	1.00	1.00	0.926	1.00	1.00	1.00	1.08	25.8	3,300.7	6.06	72.1	327.8
Length = 21.250 ft	2	0.307	0.220	1.15	1.00	1.00	1.00	0.926	1.00	1.00	1.00	42.58	1,013.9	3,300.7	6.06	72.1	327.8

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-23

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.750S					1.00	1.00	1.00	0.926	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 4.250 ft	**1**	0.006	0.175	1.15	1.00	1.00	1.00	0.926	1.00	1.00	1.00	0.86	20.4	3,300.7	4.82	57.4	327.8
Length = 21.250 ft	**2**	0.245	0.175	1.15	1.00	1.00	1.00	0.926	1.00	1.00	1.00	33.92	807.6	3,300.7	4.82	57.4	327.8
+0.60D					1.00	1.00	1.00	0.926	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 4.250 ft	**1**	0.001	0.018	1.60	1.00	1.00	1.00	0.926	1.00	1.00	1.00	0.11	2.6	4,592.3	0.67	8.0	456.0
Length = 21.250 ft	**2**	0.025	0.018	1.60	1.00	1.00	1.00	0.926	1.00	1.00	1.00	4.76	113.3	4,592.3	0.67	8.0	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S	-0.1732	0.000
+D+S	2	0.2819	10.684		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		6.798	5.990
Max Upward from Load Combinations		6.798	5.990
Max Upward from Load Cases		5.557	4.851
D Only		1.241	1.139
+D+S		6.798	5.990
+D+0.750S		5.409	4.777
+0.60D		0.745	0.683
S Only		5.557	4.851

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-24

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

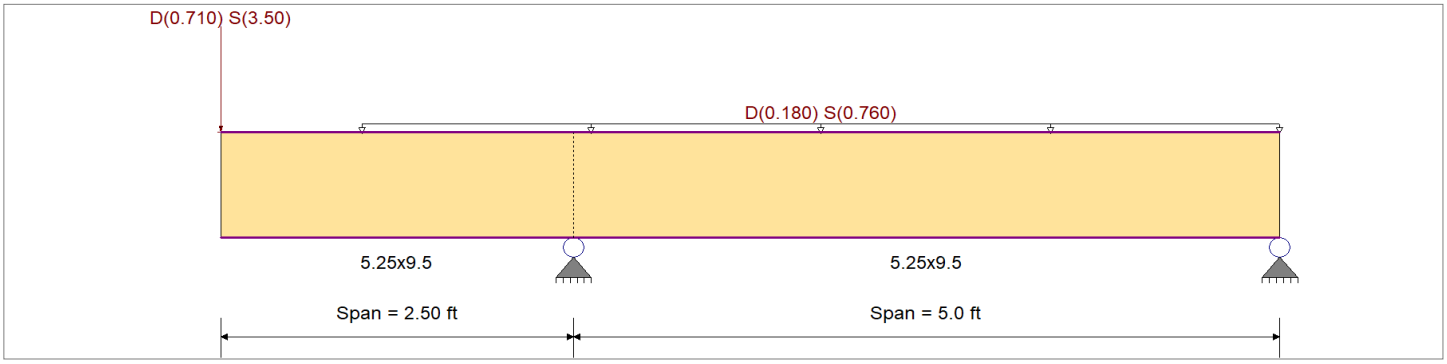
Wood Species : Boise Cascade
Wood Grade : Versa Lam 3100

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3,100.0 psi
Fb -	3,100.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Partial Length Uniform Load : D = 0.180, S = 0.760 k/ft, Extent = 1.0 -->> 7.50 ft
Point Load : D = 0.710, S = 3.50 k, Starting at : 0.0 ft and placed every 0.0 ft thereafter

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.481 : 1	Maximum Shear Stress Ratio	=	0.448 : 1
Section used for this span		5.25x9.5	Section used for this span		5.25x9.5
fb: Actual	=	1,760.06 psi	fv: Actual	=	146.91 psi
F'b	=	3,658.75 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	2.500 ft	Location of maximum on span	=	1.718 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.114 in	Ratio =	526 >=360	Span: 1 : S Only
Max Upward Transient Deflection	-0.022 in	Ratio =	2689 >=360	Span: 2 : S Only
Max Downward Total Deflection	0.136 in	Ratio =	440 >=180	Span: 1 : +D+S
Max Upward Total Deflection	-0.026 in	Ratio =	2264 >=180	Span: 2 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 2.50 ft	1	0.105	0.098	0.90	1.00	1.00	1.00	1.026	1.00	1.00	1.00	1.98	300.5	2,863.4	0.84	25.2	256.5
Length = 5.0 ft	2	0.105	0.098	0.90	1.00	1.00	1.00	1.026	1.00	1.00	1.00	1.98	300.5	2,863.4	0.70	25.2	256.5
+D+S					1.00	1.00	1.00	1.026	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.50 ft	1	0.481	0.448	1.15	1.00	1.00	1.00	1.026	1.00	1.00	1.00	11.58	1,760.1	3,658.7	4.88	146.9	327.8
Length = 5.0 ft	2	0.481	0.448	1.15	1.00	1.00	1.00	1.026	1.00	1.00	1.00	11.58	1,760.1	3,658.7	3.93	146.9	327.8
+D+0.750S					1.00	1.00	1.00	1.026	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.50 ft	1	0.381	0.355	1.15	1.00	1.00	1.00	1.026	1.00	1.00	1.00	9.18	1,395.2	3,658.7	3.87	116.5	327.8
Length = 5.0 ft	2	0.381	0.355	1.15	1.00	1.00	1.00	1.026	1.00	1.00	1.00	9.18	1,395.2	3,658.7	3.12	116.5	327.8

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-24

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+0.60D					1.00	1.00	1.00	1.026	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.50 ft	**1**	0.035	0.033	1.60	1.00	1.00	1.00	1.026	1.00	1.00	1.00	1.19	180.3	5,090.4	0.50	15.1	456.0
Length = 5.0 ft	**2**	0.035	0.033	1.60	1.00	1.00	1.00	1.026	1.00	1.00	1.00	1.19	180.3	5,090.4	0.42	15.1	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.1363	0.000		0.0000	0.000
	2	0.0000	0.000	+D+S	-0.0265	1.872

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		10.287	0.054
Max Upward from Load Combinations		10.287	0.039
Max Upward from Load Cases		8.461	0.054
Max Downward from all Load Conditio			-0.021
Max Downward from Load Cases (Resis			-0.021
D Only		1.826	0.054
+D+S		10.287	0.033
+D+0.750S		8.171	0.039
+0.60D		1.095	0.033
S Only		8.461	-0.021

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-25

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

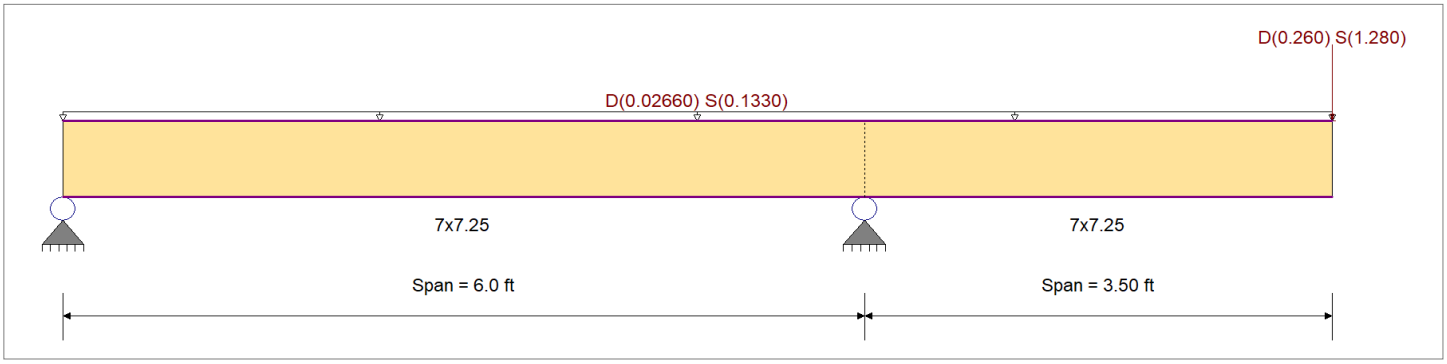
Wood Species : Boise Cascade
Wood Grade : Versa Lam 3100

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3,100.0 psi
Fb -	3,100.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 ksf, Tributary Width = 1.330 ft
Point Load : D = 0.260, S = 1.280 k, Starting at : 9.50 ft and placed every 0.0 ft thereafter

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.330 : 1	Maximum Shear Stress Ratio	=	0.181 : 1
Section used for this span		7x7.25	Section used for this span		7x7.25
fb: Actual	=	1,246.04 psi	fv: Actual	=	59.26 psi
F'b	=	3,770.30 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	6.000 ft	Location of maximum on span	=	6.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.208 in	Ratio =	402	>=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.039 in	Ratio =	1828	>=360	Span: 1 : S Only
Max Downward Total Deflection	0.250 in	Ratio =	334	>=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.047 in	Ratio =	1519	>=180	Span: 1 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 6.0 ft	1	0.071	0.039	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.07	210.0	2,950.7	0.34	10.0	256.5
Length = 3.50 ft	2	0.071	0.039	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.07	210.0	2,950.7	0.34	10.0	256.5
+D+S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	1	0.330	0.181	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	6.37	1,246.0	3,770.3	2.00	59.3	327.8
Length = 3.50 ft	2	0.330	0.181	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	6.37	1,246.0	3,770.3	2.00	59.3	327.8
+D+0.750S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	1	0.262	0.143	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	5.04	987.0	3,770.3	1.59	46.9	327.8
Length = 3.50 ft	2	0.262	0.143	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	5.04	987.0	3,770.3	1.59	46.9	327.8

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-25

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	**1**	0.024	0.013	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.64	126.0	5,245.6	0.20	6.0	456.0
Length = 3.50 ft	**2**	0.024	0.013	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.64	126.0	5,245.6	0.20	6.0	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S	-0.0474	3.587
+D+S	2	0.2505	3.500		0.0000	3.587

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		3.639	
Max Upward from Load Combinations		3.639	
Max Upward from Load Cases		3.027	
Max Downward from all Load Conditio	-0.582		
Max Downward from Load Combinations	-0.582		
Max Downward from Load Cases (Resis	-0.483		
D Only	-0.099	0.612	
+D+S	-0.582	3.639	
+D+0.750S	-0.462	2.882	
+0.60D	-0.059	0.367	
S Only	-0.483	3.027	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-26

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

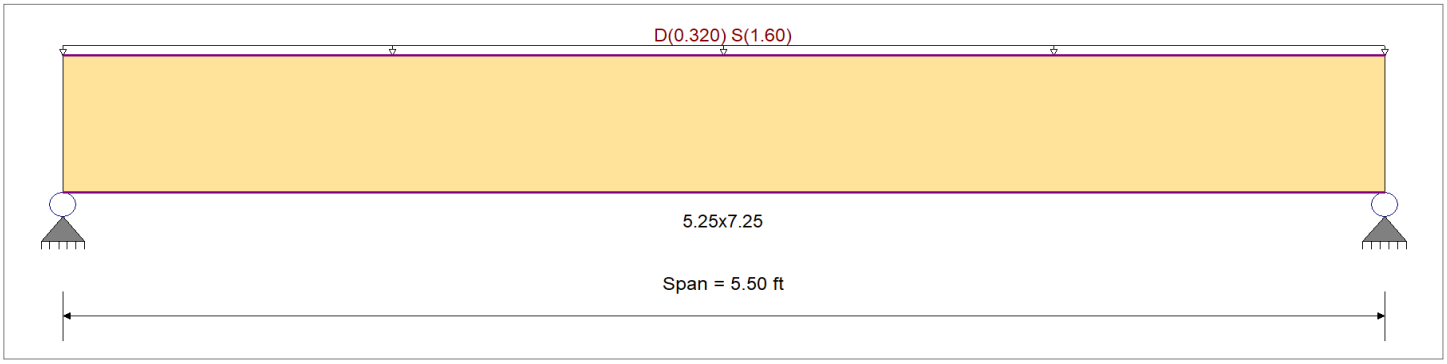
Wood Species : Boise Cascade
Wood Grade : Versa Lam 3100

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3100 psi
Fb -	3100 psi
Fc - Prll	3000 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	2100 psi

E : Modulus of Elasticity

Ebend- xx	2000 ksi
Eminbend - xx	2530120482 ksi
Density	41.76 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.320, S = 1.60 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.502 : 1	Maximum Shear Stress Ratio	=	0.496 : 1
Section used for this span		5.25x7.25	Section used for this span		5.25x7.25
fb: Actual	=	1,894.23 psi	fv: Actual	=	162.51 psi
F'b	=	3,770.30 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	2.750 ft	Location of maximum on span	=	4.898 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.099 in	Ratio =	664 >=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.119 in	Ratio =	553 >=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 5.50 ft	1	0.107	0.106	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.21	315.7	2,950.7	0.69	27.1	256.5
+D+S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.50 ft	1	0.502	0.496	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	7.26	1,894.2	3,770.3	4.12	162.5	327.8
+D+0.750S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.50 ft	1	0.398	0.393	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	5.75	1,499.6	3,770.3	3.26	128.7	327.8
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.50 ft	1	0.036	0.036	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.73	189.4	5,245.6	0.41	16.3	456.0

Wood Beam

DESCRIPTION: B4-26

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.1192	2.770		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	5.280	5.280
Max Upward from Load Combinations	5.280	5.280
Max Upward from Load Cases	4.400	4.400
D Only	0.880	0.880
+D+S	5.280	5.280
+D+0.750S	4.180	4.180
+0.60D	0.528	0.528
S Only	4.400	4.400

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-27

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

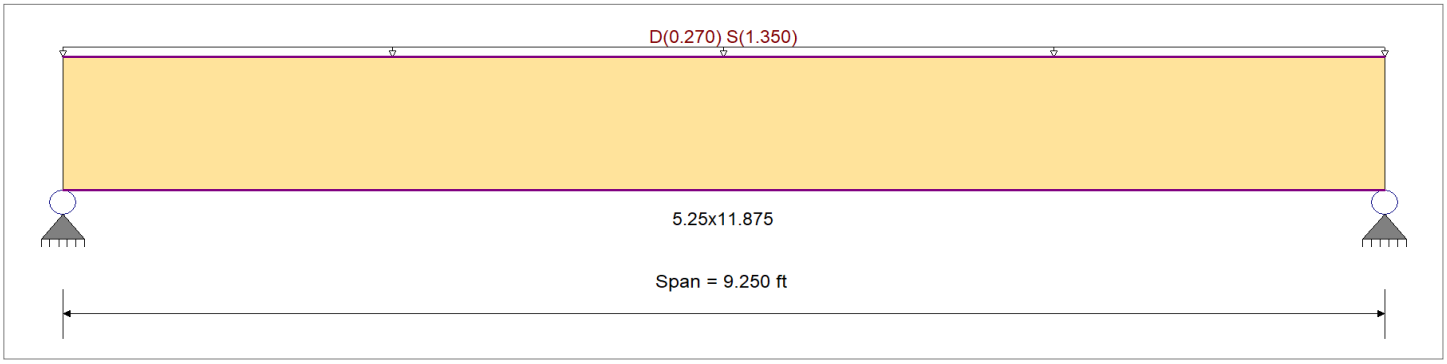
Wood Species : Boise Cascade
Wood Grade : Versa Lam 3100

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3100 psi
Fb -	3100 psi
Fc - Prll	3000 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	2100 psi

E : Modulus of Elasticity

Ebend- xx	2000 ksi
Eminbend - xx	2530120482 ksi
Density	41.76 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.270, S = 1.350 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.472 : 1	Maximum Shear Stress Ratio	=	0.434 : 1
Section used for this span		5.25x11.875	Section used for this span		5.25x11.875
fb: Actual	=	1,685.06 psi	fv: Actual	=	142.11 psi
F'b	=	3,569.15 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	4.625 ft	Location of maximum on span	=	8.271 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.153 in	Ratio =	727 >=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.183 in	Ratio =	605 >=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 9.250 ft	1	0.101	0.092	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.89	280.8	2,793.2	0.98	23.7	256.5
+D+S					1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.250 ft	1	0.472	0.434	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	17.33	1,685.1	3,569.2	5.91	142.1	327.8
+D+0.750S					1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.250 ft	1	0.374	0.343	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	13.72	1,334.0	3,569.2	4.68	112.5	327.8
+0.60D					1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.250 ft	1	0.034	0.031	1.60	1.00	1.00	1.00	1.001	1.00	1.00	1.00	1.73	168.5	4,965.8	0.59	14.2	456.0

Wood Beam

DESCRIPTION: B4-27

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.1832	4.659		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	7.493	7.493
Max Upward from Load Combinations	7.493	7.493
Max Upward from Load Cases	6.244	6.244
D Only	1.249	1.249
+D+S	7.493	7.493
+D+0.750S	5.932	5.932
+0.60D	0.749	0.749
S Only	6.244	6.244

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-28

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

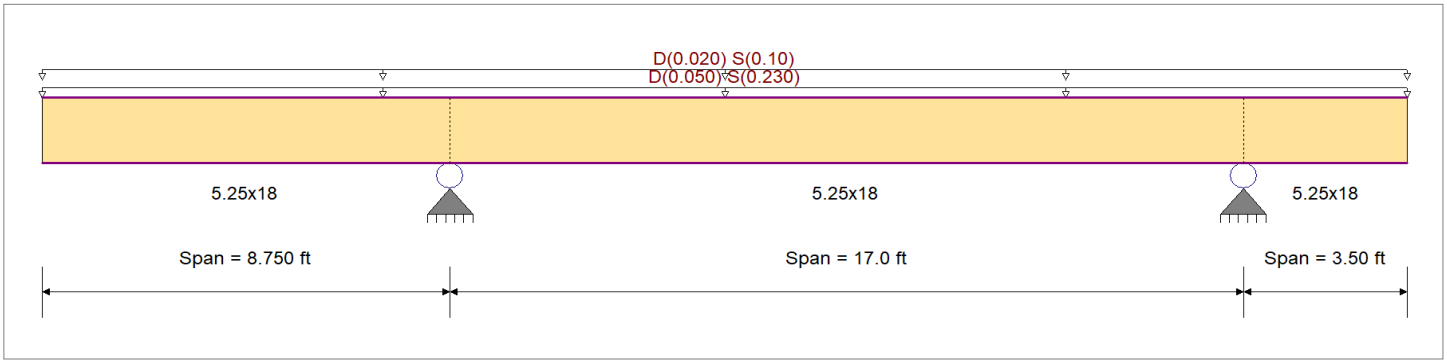
Wood Species : Boise Cascade
Wood Grade : Versa Lam 3100

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3100 psi
Fb -	3100 psi
Fc - Prll	3000 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	2100 psi

E : Modulus of Elasticity

Ebend- xx	2000 ksi
Eminbend - xx	2530120482 ksi
Density	41.76 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.050, S = 0.230 k/ft
Uniform Load on ALL spans : D = 0.020, S = 0.10 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.190 : 1	Maximum Shear Stress Ratio	=	0.174 : 1
Section used for this span		5.25x18	Section used for this span		5.25x18
fb: Actual	=	648.15 psi	fv: Actual	=	56.91 psi
F'b	=	3,407.95 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	8.750 ft	Location of maximum on span	=	8.750 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.111 in	Ratio =	1886 >=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.022 in	Ratio =	3820 >=360	Span: 3 : S Only
Max Downward Total Deflection	0.135 in	Ratio =	1556 >=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.027 in	Ratio =	3152 >=180	Span: 3 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 8.750 ft	1	0.043	0.039	0.90	1.00	1.00	1.00	0.956	1.00	1.00	1.00	2.68	113.4	2,667.1	0.63	10.0	256.5
Length = 17.0 ft	2	0.043	0.039	0.90	1.00	1.00	1.00	0.956	1.00	1.00	1.00	2.68	113.4	2,667.1	0.63	10.0	256.5
Length = 3.50 ft	3	0.007	0.039	0.90	1.00	1.00	1.00	0.956	1.00	1.00	1.00	0.43	18.1	2,667.1	0.14	10.0	256.5
+D+S					1.00	1.00	1.00	0.956	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 8.750 ft	1	0.190	0.174	1.15	1.00	1.00	1.00	0.956	1.00	1.00	1.00	15.31	648.1	3,408.0	3.59	56.9	327.8
Length = 17.0 ft	2	0.190	0.174	1.15	1.00	1.00	1.00	0.956	1.00	1.00	1.00	15.31	648.1	3,408.0	3.59	56.9	327.8
Length = 3.50 ft	3	0.030	0.174	1.15	1.00	1.00	1.00	0.956	1.00	1.00	1.00	2.45	103.7	3,408.0	0.80	56.9	327.8
+D+0.750S					1.00	1.00	1.00	0.956	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-28

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 8.750 ft	**1**	0.151	0.138	1.15	1.00	1.00	1.00	0.956	1.00	1.00	1.00	12.15	514.5	3,408.0	2.85	45.2	327.8
Length = 17.0 ft	**2**	0.151	0.138	1.15	1.00	1.00	1.00	0.956	1.00	1.00	1.00	12.15	514.5	3,408.0	2.85	45.2	327.8
Length = 3.50 ft	**3**	0.024	0.138	1.15	1.00	1.00	1.00	0.956	1.00	1.00	1.00	1.94	82.3	3,408.0	0.63	45.2	327.8
+0.60D					1.00	1.00	1.00	0.956	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 8.750 ft	**1**	0.014	0.013	1.60	1.00	1.00	1.00	0.956	1.00	1.00	1.00	1.61	68.1	4,741.5	0.38	6.0	456.0
Length = 17.0 ft	**2**	0.014	0.013	1.60	1.00	1.00	1.00	0.956	1.00	1.00	1.00	1.61	68.1	4,741.5	0.38	6.0	456.0
Length = 3.50 ft	**3**	0.002	0.013	1.60	1.00	1.00	1.00	0.956	1.00	1.00	1.00	0.26	10.9	4,741.5	0.08	6.0	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.1348	0.000		0.0000	0.000
+D+S	2	0.0408	10.143	+D+S	-0.0020	1.000
	3	0.0000	10.143	+D+S	-0.0266	3.500

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Max Upward from all Load Conditions		7.657	4.043	
Max Upward from Load Combinations		7.657	4.043	
Max Upward from Load Cases		6.317	3.336	
D Only		1.340	0.708	
+D+S		7.657	4.043	
+D+0.750S		6.077	3.209	
+0.60D		0.804	0.425	
S Only		6.317	3.336	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-29

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

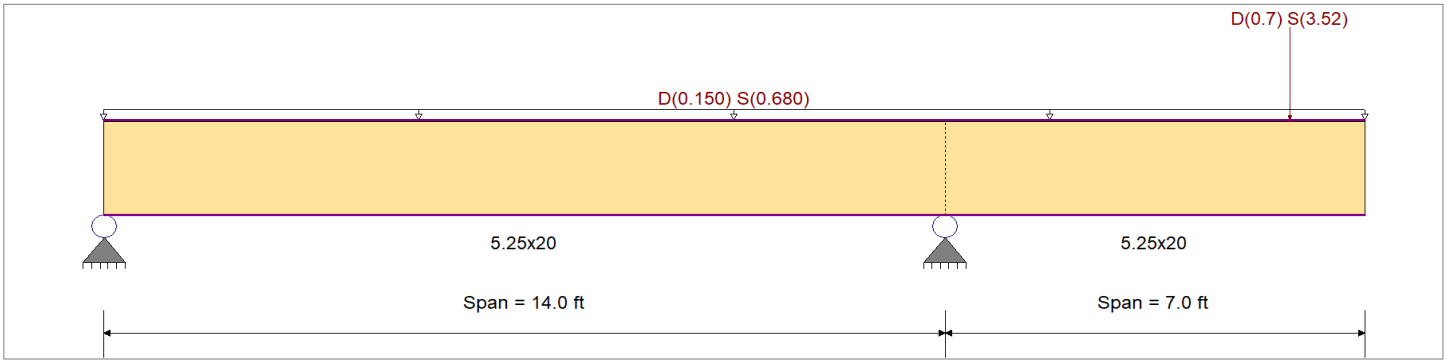
Wood Species : Boise Cascade
Wood Grade : Versa Lam 3100

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3,100.0 psi
Fb -	3,100.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.150, S = 0.680 k/ft
Load for Span Number 2
Point Load : D = 0.70, S = 3.520 k @ 5.750 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.454 : 1	Maximum Shear Stress Ratio	=	0.378 : 1
Section used for this span		5.25x20	Section used for this span		5.25x20
fb: Actual	=	1,529.14 psi	fv: Actual	=	123.81 psi
F'b	=	3,368.29 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	14.000 ft	Location of maximum on span	=	14.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.286 in	Ratio =	586 >=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.038 in	Ratio =	4401 >=360	Span: 1 : S Only
Max Downward Total Deflection	0.344 in	Ratio =	488 >=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.045 in	Ratio =	3704 >=180	Span: 1 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 14.0 ft	1	0.100	0.084	0.90	1.00	1.00	1.00	0.945	1.00	1.00	1.00	7.70	264.0	2,636.1	1.50	21.5	256.5
Length = 7.0 ft	2	0.100	0.084	0.90	1.00	1.00	1.00	0.945	1.00	1.00	1.00	7.70	264.0	2,636.1	1.50	21.5	256.5
+D+S					1.00	1.00	1.00	0.945	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 14.0 ft	1	0.454	0.378	1.15	1.00	1.00	1.00	0.945	1.00	1.00	1.00	44.60	1,529.1	3,368.3	8.67	123.8	327.8
Length = 7.0 ft	2	0.454	0.378	1.15	1.00	1.00	1.00	0.945	1.00	1.00	1.00	44.60	1,529.1	3,368.3	8.67	123.8	327.8
+D+0.750S					1.00	1.00	1.00	0.945	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 14.0 ft	1	0.360	0.300	1.15	1.00	1.00	1.00	0.945	1.00	1.00	1.00	35.38	1,212.9	3,368.3	6.88	98.2	327.8

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-29

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
Length = 7.0 ft	**2**	0.360	0.300	1.15	1.00	1.00	1.00	0.945	1.00	1.00	1.00	35.38	1,212.9	3,368.3	6.88	98.2	327.8
+0.60D					1.00	1.00	1.00	0.945	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 14.0 ft	**1**	0.034	0.028	1.60	1.00	1.00	1.00	0.945	1.00	1.00	1.00	4.62	158.4	4,686.3	0.90	12.9	456.0
Length = 7.0 ft	**2**	0.034	0.028	1.60	1.00	1.00	1.00	0.945	1.00	1.00	1.00	4.62	158.4	4,686.3	0.90	12.9	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S	-0.0454	10.168
+D+S	2	0.3441	7.000		0.0000	10.168

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	2.624	19.026	
Max Upward from Load Combinations	2.624	19.026	
Max Upward from Load Cases	2.124	15.676	
D Only	0.500	3.350	
+D+S	2.624	19.026	
+D+0.750S	2.093	15.107	
+0.60D	0.300	2.010	
S Only	2.124	15.676	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-30

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

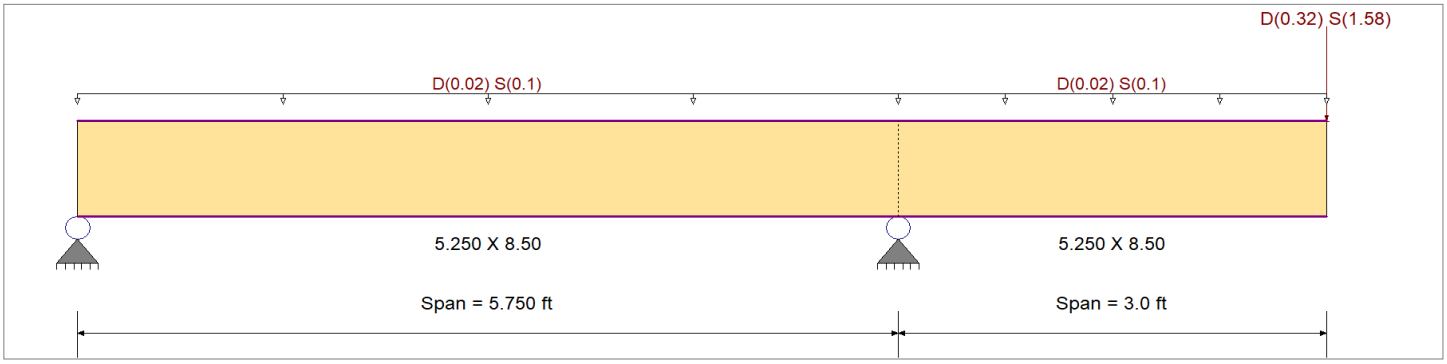
Wood Species : Boise Cascade
Wood Grade : Versa Lam 3100

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3,100.0 psi
Fb -	3,100.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Load for Span Number 1
Uniform Load : D = 0.020, S = 0.10 , Tributary Width = 1.0 ft
Load for Span Number 2
Point Load : D = 0.320, S = 1.580 k @ 3.0 ft
Uniform Load : D = 0.020, S = 0.10 ksf, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.314 : 1	Maximum Shear Stress Ratio	=	0.223 : 1
Section used for this span		5.250 X 8.50	Section used for this span		5.250 X 8.50
fb: Actual	=	1,184.46 psi	fv: Actual	=	73.13 psi
F'b	=	3,770.30 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	5.750 ft	Location of maximum on span	=	5.750 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.137 in	Ratio =	524 >=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.031 in	Ratio =	2212 >=360	Span: 1 : S Only
Max Downward Total Deflection	0.165 in	Ratio =	436 >=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.038 in	Ratio =	1839 >=180	Span: 1 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 5.750 ft	1	0.068	0.048	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.05	199.3	2,950.7	0.37	12.3	256.5
Length = 3.0 ft	2	0.068	0.048	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.05	199.3	2,950.7	0.37	12.3	256.5
+D+S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.750 ft	1	0.314	0.223	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	6.24	1,184.5	3,770.3	2.18	73.1	327.8
Length = 3.0 ft	2	0.314	0.223	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	6.24	1,184.5	3,770.3	2.18	73.1	327.8
+D+0.750S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-30

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
Length = 5.750 ft	**1**	0.249	0.177	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	4.94	938.2	3,770.3	1.72	57.9	327.8
Length = 3.0 ft	**2**	0.249	0.177	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	4.94	938.2	3,770.3	1.72	57.9	327.8
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.750 ft	**1**	0.023	0.016	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.63	119.6	5,245.6	0.22	7.4	456.0
Length = 3.0 ft	**2**	0.023	0.016	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.63	119.6	5,245.6	0.22	7.4	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S	-0.0375	3.405
+D+S	2	0.1649	3.000		0.0000	3.405

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		3.690	
Max Upward from Load Combinations		3.690	
Max Upward from Load Cases		3.070	
Max Downward from all Load Conditio	-0.740		
Max Downward from Load Combinations	-0.740		
Max Downward from Load Cases (Resis	-0.615		
D Only	-0.125	0.620	
+D+S	-0.740	3.690	
+D+0.750S	-0.586	2.923	
+0.60D	-0.075	0.372	
S Only	-0.615	3.070	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-31

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

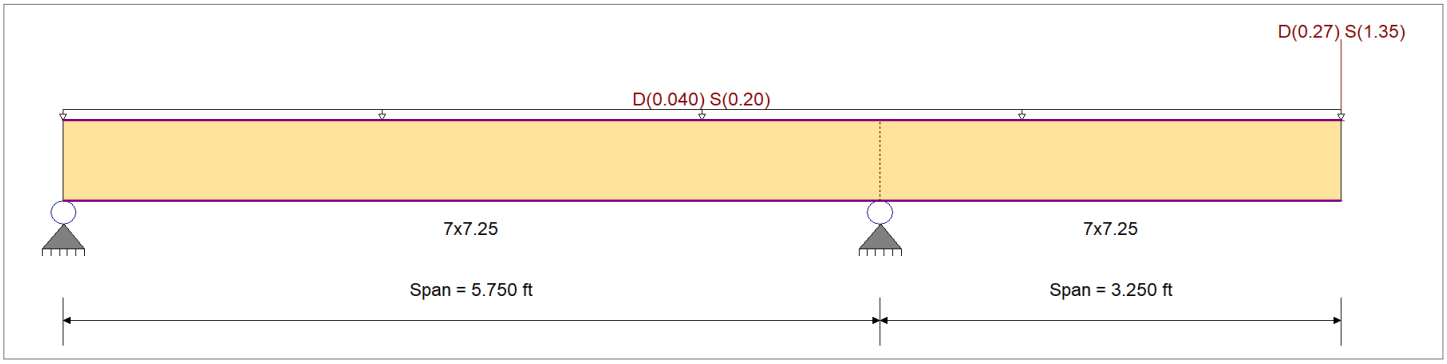
Wood Species : Boise Cascade
Wood Grade : Versa Lam 2800

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2800 psi
Fb -	2800 psi
Fc - Prll	3000 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	2100 psi

E : Modulus of Elasticity

Ebend- xx	2000 ksi
Eminbend - xx	2530120482 ksi
Density	41.76 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 ksf, Tributary Width = 2.0 ft
Load for Span Number 2
Point Load : D = 0.270, S = 1.350 k @ 3.250 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.375 : 1	Maximum Shear Stress Ratio	=	0.203 : 1
Section used for this span		7x7.25	Section used for this span		7x7.25
fb: Actual	=	1,278.31 psi	fv: Actual	=	66.69 psi
F'b	=	3,405.43 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	5.750 ft	Location of maximum on span	=	5.750 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.182 in	Ratio =	426 >=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.034 in	Ratio =	2002 >=360	Span: 1 : S Only
Max Downward Total Deflection	0.219 in	Ratio =	356 >=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.041 in	Ratio =	1668 >=180	Span: 1 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 5.750 ft	1	0.080	0.043	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.09	213.1	2,665.1	0.38	11.1	256.5
Length = 3.250 ft	2	0.080	0.043	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.09	213.1	2,665.1	0.38	11.1	256.5
+D+S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.750 ft	1	0.375	0.203	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	6.53	1,278.3	3,405.4	2.26	66.7	327.8
Length = 3.250 ft	2	0.375	0.203	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	6.53	1,278.3	3,405.4	2.26	66.7	327.8
+D+0.750S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.750 ft	1	0.297	0.161	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	5.17	1,012.0	3,405.4	1.79	52.8	327.8

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B4-31

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
Length = 3.250 ft	**2**	0.297	0.161	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	5.17	1,012.0	3,405.4	1.79	52.8	327.8
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.750 ft	**1**	0.027	0.015	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.65	127.8	4,738.0	0.23	6.7	456.0
Length = 3.250 ft	**2**	0.027	0.015	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.65	127.8	4,738.0	0.23	6.7	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S	-0.0414	3.501
+D+S	2	0.2189	3.250		0.0000	3.501

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		4.226	
Max Upward from Load Combinations		4.226	
Max Upward from Load Cases		3.522	
Max Downward from all Load Conditio	-0.446		
Max Downward from Load Combinations	-0.446		
Max Downward from Load Cases (Resis	-0.372		
D Only	-0.074	0.704	
+D+S	-0.446	4.226	
+D+0.750S	-0.353	3.346	
+0.60D	-0.045	0.423	
S Only	-0.372	3.522	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Southwest Corner Strucutral Fascia

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

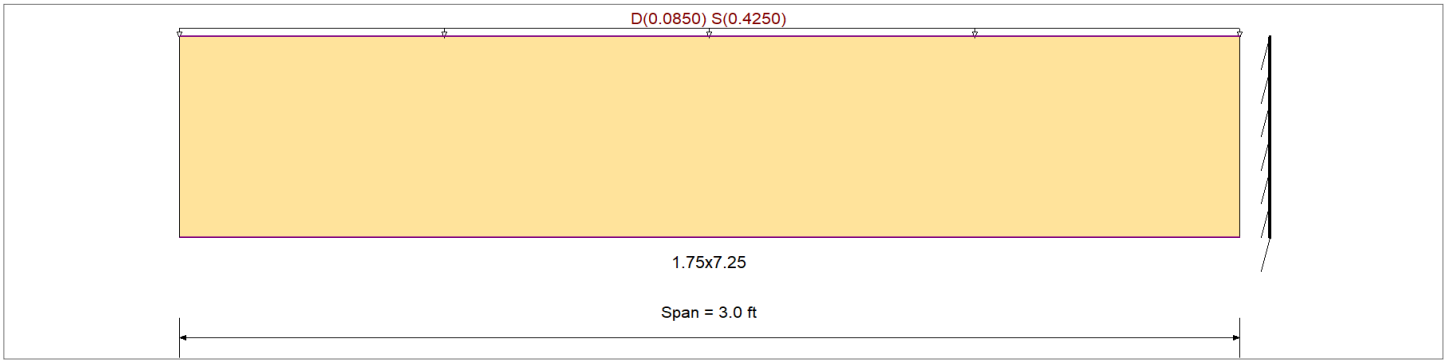
Wood Species : Boise Cascade
Wood Grade : Versa Lam 2800

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,800.0 psi
Fb -	2,800.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 ksf, Tributary Width = 4.250 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.528 : 1	Maximum Shear Stress Ratio	=	0.441 : 1
Section used for this span		1.75x7.25	Section used for this span		1.75x7.25
fb: Actual	=	1,796.39 psi	fv: Actual	=	144.58 psi
F'b	=	3,405.43 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	3.000 ft	Location of maximum on span	=	2.398 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.067 in	Ratio =	1072 >=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.080 in	Ratio =	894 >=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 3.0 ft	1	0.112	0.094	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.38	299.4	2,665.1	0.20	24.1	256.5
+D+S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 3.0 ft	1	0.528	0.441	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	2.29	1,796.4	3,405.4	1.22	144.6	327.8
+D+0.750S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 3.0 ft	1	0.418	0.349	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.82	1,422.1	3,405.4	0.97	114.5	327.8
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 3.0 ft	1	0.038	0.032	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.23	179.6	4,738.0	0.12	14.5	456.0

Wood Beam

DESCRIPTION: Southwest Corner Strucutral Fascia

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0805	0.000		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions		1.530
Max Upward from Load Combinations		1.530
Max Upward from Load Cases		1.275
D Only		0.255
+D+S		1.530
+D+0.750S		1.211
+0.60D		0.153
S Only		1.275

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Northeast Corner

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

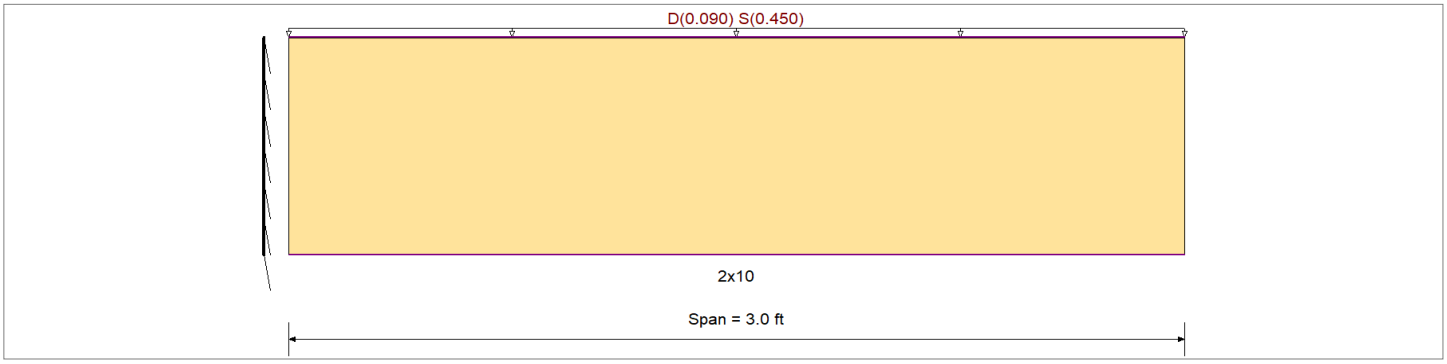
Wood Species : Boise Cascade
Wood Grade : Versa Lam 2800

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2800 psi
Fb -	2800 psi
Fc - Prll	3000 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	2100 psi

E : Modulus of Elasticity

Ebend- xx	2000 ksi
Eminbend - xx	1530120482 ksi
Density	41.76 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 ksf, Tributary Width = 4.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.423 : 1	Maximum Shear Stress Ratio	=	0.398 : 1
Section used for this span		2x10	Section used for this span		2x10
fb: Actual	=	1,363.21 psi	fv: Actual	=	130.39 psi
F'b	=	3,220.00 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	0.000 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.040 in	Ratio =	1812 >=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.048 in	Ratio =	1510 >=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 3.0 ft	1	0.090	0.085	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.41	227.2	2,520.0	0.20	21.7	256.5
+D+S					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 3.0 ft	1	0.423	0.398	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.43	1,363.2	3,220.0	1.21	130.4	327.8
+D+0.750S					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 3.0 ft	1	0.335	0.315	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.92	1,079.2	3,220.0	0.95	103.2	327.8
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 3.0 ft	1	0.030	0.029	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.24	136.3	4,480.0	0.12	13.0	456.0

Wood Beam

DESCRIPTION: Northeast Corner

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0476	3.000		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.620	
Max Upward from Load Combinations	1.620	
Max Upward from Load Cases	1.350	
D Only	0.270	
+D+S	1.620	
+D+0.750S	1.283	
+0.60D	0.162	
S Only	1.350	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

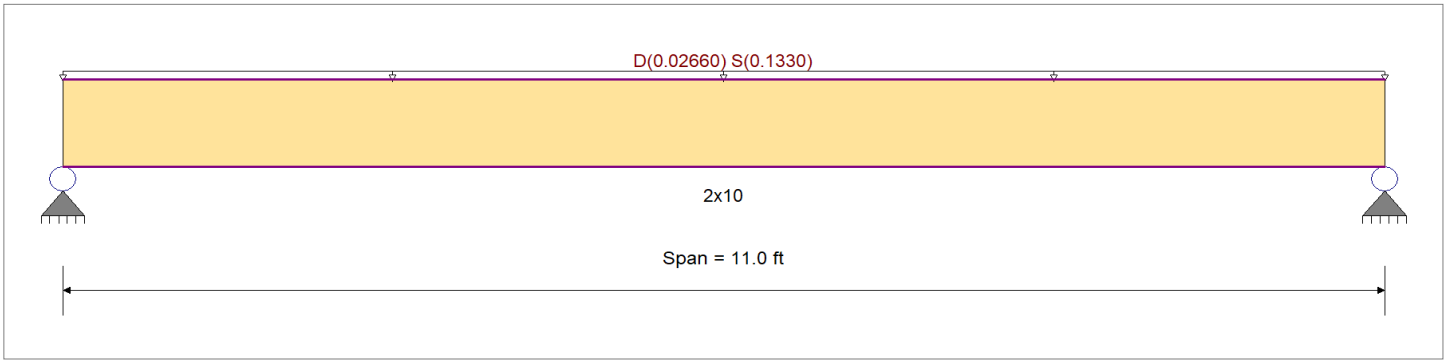
DESCRIPTION: 14" BCI @ 16"o.c.

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	2800 psi	*E : Modulus of Elasticity*	
Load Combination :	IBC 2021	Fb -	2800 psi	Ebend- xx	2000 ksi
		Fc - Prll	3000 psi	Eminbend - xx	2530120482 ksi
Wood Species :	Boise Cascade	Fc - Perp	750 psi		
Wood Grade :	Versa Lam 2800	Fv	285 psi		
		Ft	2100 psi	Density	41.76 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 ksf, Tributary Width = 1.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.421 : 1	Maximum Shear Stress Ratio	=	0.249 : 1
Section used for this span		2x10	Section used for this span		2x10
fb: Actual	=	1,354.21 psi	fv: Actual	=	81.74 psi
F'b	=	3,220.00 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	5.500 ft	Location of maximum on span	=	10.237 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.223 in	Ratio =	592 >=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.267 in	Ratio =	493 >=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.090	0.053	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.40	225.7	2,520.0	0.13	13.6	256.5
+D+S					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.421	0.249	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.41	1,354.2	3,220.0	0.76	81.7	327.8
+D+0.750S					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.333	0.197	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.91	1,072.1	3,220.0	0.60	64.7	327.8
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.0 ft	1	0.030	0.018	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.24	135.4	4,480.0	0.08	8.2	456.0

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: 14" BCI @ 16"o.c.

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.2673	5.540		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.878	0.878
Max Upward from Load Combinations	0.878	0.878
Max Upward from Load Cases	0.732	0.732
D Only	0.146	0.146
+D+S	0.878	0.878
+D+0.750S	0.695	0.695
+0.60D	0.088	0.088
S Only	0.732	0.732

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B3-1

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

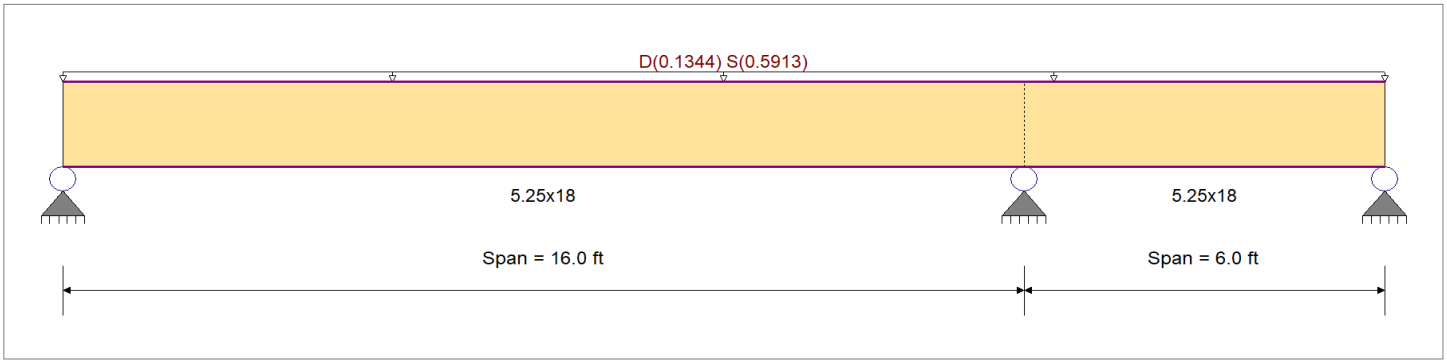
Wood Species : Boise Cascade
Wood Grade : Versa Lam 3100

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3,100.0 psi
Fb -	3,100.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.0250, S = 0.110 ksf, Tributary Width = 5.375 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.229 : 1	Maximum Shear Stress Ratio	=	0.295 : 1
Section used for this span		5.25x18	Section used for this span		5.25x18
fb: Actual	=	780.92 psi	fv: Actual	=	96.83 psi
F'b	=	3,407.95 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	16.000 ft	Location of maximum on span	=	14.570 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.095 in	Ratio =	2028 >=360	Span: 1 : S Only
Max Upward Transient Deflection	-0.008 in	Ratio =	8755 >=360	Span: 2 : S Only
Max Downward Total Deflection	0.121 in	Ratio =	1592 >=180	Span: 1 : +D+S
Max Upward Total Deflection	-0.010 in	Ratio =	6874 >=180	Span: 2 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.063	0.081	0.90	1.00	1.00	1.00	0.956	1.00	1.00	1.00	3.96	167.8	2,667.1	1.31	20.8	256.5
Length = 6.0 ft	2	0.063	0.081	0.90	1.00	1.00	1.00	0.956	1.00	1.00	1.00	3.96	167.8	2,667.1	0.91	20.8	256.5
+D+S					1.00	1.00	1.00	0.956	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.229	0.295	1.15	1.00	1.00	1.00	0.956	1.00	1.00	1.00	18.45	780.9	3,408.0	6.10	96.8	327.8
Length = 6.0 ft	2	0.229	0.295	1.15	1.00	1.00	1.00	0.956	1.00	1.00	1.00	18.45	780.9	3,408.0	4.22	96.8	327.8
+D+0.750S					1.00	1.00	1.00	0.956	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.184	0.237	1.15	1.00	1.00	1.00	0.956	1.00	1.00	1.00	14.83	627.6	3,408.0	4.90	77.8	327.8
Length = 6.0 ft	2	0.184	0.237	1.15	1.00	1.00	1.00	0.956	1.00	1.00	1.00	14.83	627.6	3,408.0	3.39	77.8	327.8

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B3-1

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+0.60D					1.00	1.00	1.00	0.956	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	**1**	0.021	0.027	1.60	1.00	1.00	1.00	0.956	1.00	1.00	1.00	2.38	100.7	4,741.5	0.79	12.5	456.0
Length = 6.0 ft	**2**	0.021	0.027	1.60	1.00	1.00	1.00	0.956	1.00	1.00	1.00	2.38	100.7	4,741.5	0.54	12.5	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.1205	7.240		0.0000	0.000
	2	0.0000	7.240	+D+S	-0.0105	2.346

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	4.871	12.511	
Max Upward from Load Combinations	4.871	12.511	
Max Upward from Load Cases	3.825	9.823	
Max Downward from all Load Conditio			-0.816
Max Downward from Load Combinations			-0.816
Max Downward from Load Cases (Resis			-0.641
D Only	1.047	2.688	-0.175
+D+S	4.871	12.511	-0.816
+D+0.750S	3.915	10.055	-0.656
+0.60D	0.628	1.613	-0.105
S Only	3.825	9.823	-0.641

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B3-2

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

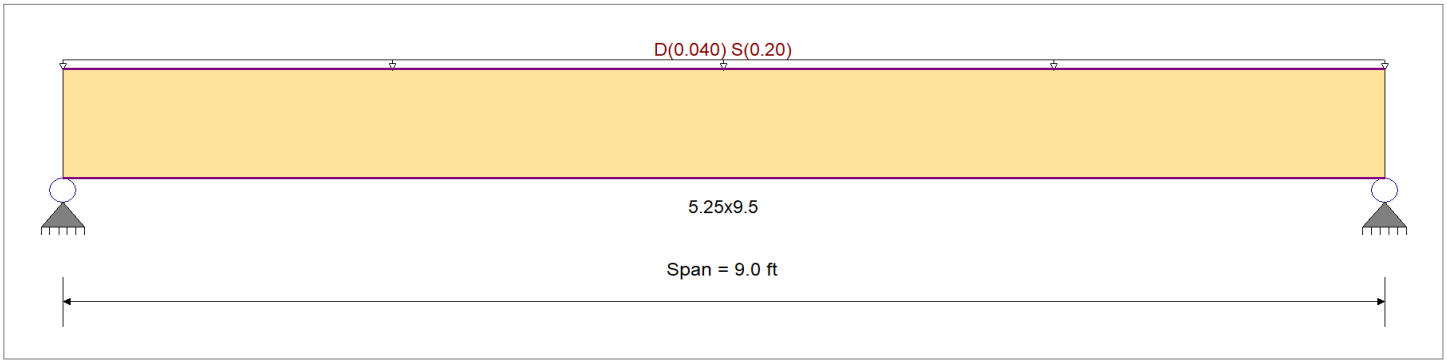
Wood Species : Boise Cascade
Wood Grade : Versa Lam 3100

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3100 psi
Fb -	3100 psi
Fc - Prll	3000 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	2100 psi

E : Modulus of Elasticity

Ebend- xx	2000 ksi
Eminbend - xx	1230120482 ksi
Density	41.76 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, S = 0.10 ksf, Tributary Width = 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.101 : 1	Maximum Shear Stress Ratio	=	0.082 : 1
Section used for this span		5.25x9.5	Section used for this span		5.25x9.5
fb: Actual	=	369.26 psi	fv: Actual	=	26.79 psi
F'b	=	3,658.75 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	4.500 ft	Location of maximum on span	=	8.212 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.040 in	Ratio =	2728 >=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.048 in	Ratio =	2273 >=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 9.0 ft	1	0.021	0.017	0.90	1.00	1.00	1.00	1.026	1.00	1.00	1.00	0.41	61.5	2,863.4	0.15	4.5	256.5
+D+S					1.00	1.00	1.00	1.026	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.0 ft	1	0.101	0.082	1.15	1.00	1.00	1.00	1.026	1.00	1.00	1.00	2.43	369.3	3,658.7	0.89	26.8	327.8
+D+0.750S					1.00	1.00	1.00	1.026	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.0 ft	1	0.080	0.065	1.15	1.00	1.00	1.00	1.026	1.00	1.00	1.00	1.92	292.3	3,658.7	0.71	21.2	327.8
+0.60D					1.00	1.00	1.00	1.026	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.0 ft	1	0.007	0.006	1.60	1.00	1.00	1.00	1.026	1.00	1.00	1.00	0.24	36.9	5,090.4	0.09	2.7	456.0

Wood Beam

DESCRIPTION: B3-2

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0475	4.533		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.080	1.080
Max Upward from Load Combinations	1.080	1.080
Max Upward from Load Cases	0.900	0.900
D Only	0.180	0.180
+D+S	1.080	1.080
+D+0.750S	0.855	0.855
+0.60D	0.108	0.108
S Only	0.900	0.900

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B3-3

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

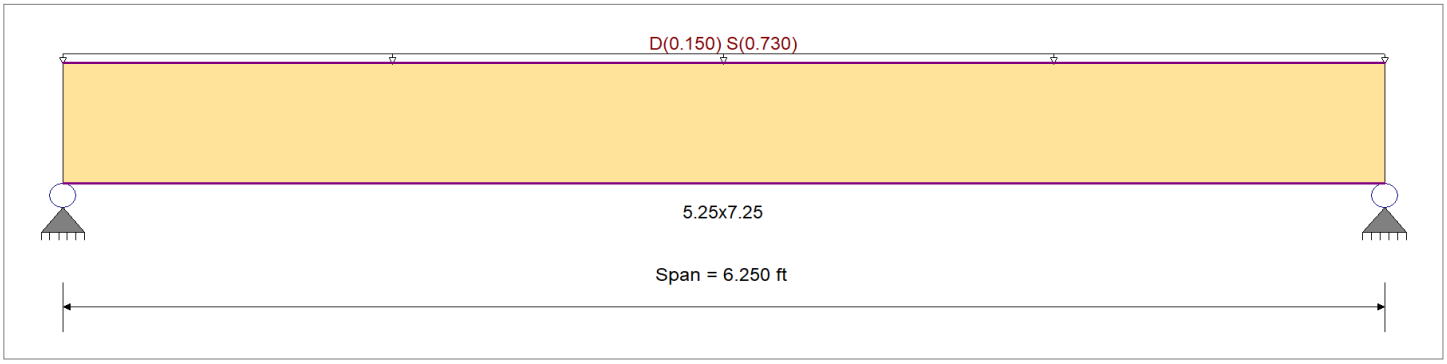
Wood Species : Boise Cascade
Wood Grade : Versa Lam 3100

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3100 psi
Fb -	3100 psi
Fc - Prll	3000 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	2100 psi

E : Modulus of Elasticity

Ebend- xx	2000 ksi
Eminbend - xx	2530120482 ksi
Density	41.76 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.150, S = 0.730 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.297 : 1	Maximum Shear Stress Ratio	=	0.268 : 1
Section used for this span		5.25x7.25	Section used for this span		5.25x7.25
fb: Actual	=	1,121.11 psi	fv: Actual	=	87.81 psi
F'b	=	3,770.30 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	3.125 ft	Location of maximum on span	=	5.657 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.076 in	Ratio =	992 >=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.091 in	Ratio =	822 >=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 6.250 ft	1	0.065	0.058	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.73	191.1	2,950.7	0.38	15.0	256.5
+D+S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.250 ft	1	0.297	0.268	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	4.30	1,121.1	3,770.3	2.23	87.8	327.8
+D+0.750S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.250 ft	1	0.236	0.212	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	3.41	888.6	3,770.3	1.77	69.6	327.8
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.250 ft	1	0.022	0.020	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.44	114.7	5,245.6	0.23	9.0	456.0

Wood Beam

DESCRIPTION: B3-3

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0911	3.148		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	2.750	2.750
Max Upward from Load Combinations	2.750	2.750
Max Upward from Load Cases	2.281	2.281
D Only	0.469	0.469
+D+S	2.750	2.750
+D+0.750S	2.180	2.180
+0.60D	0.281	0.281
S Only	2.281	2.281

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B3-4

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

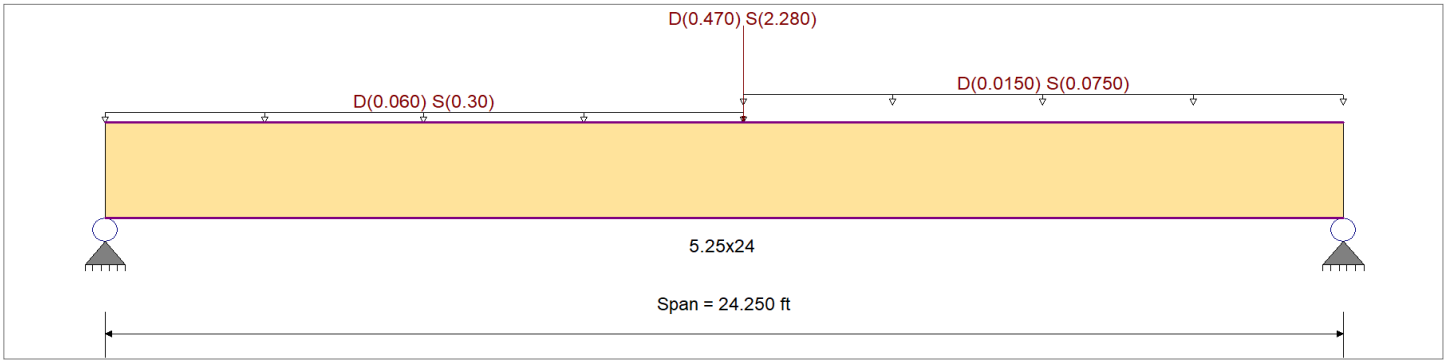
Wood Species : Douglas Fir-Larch (North)
Wood Grade : No. 1/No. 2

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,000.0 psi
Fb -	1,000.0 psi
Fc - Prll	1,000.0 psi
Fc - Perp	1,000.0 psi
Fv	65.0 psi
Ft	65.0 psi

E : Modulus of Elasticity

Ebend- xx	1,300.0 ksi
Eminbend - xx	1,300.0 ksi
Density	34.0 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Partial Length Uniform Load : D = 0.020, S = 0.10 ksf, Extent = 0.0 -->> 12.50 ft, Tributary Width = 3.0 ft
Partial Length Uniform Load : D = 0.020, S = 0.10 ksf, Extent = 12.50 -->> 24.250 ft, Tributary Width = 0.750 ft
Point Load : D = 0.470, S = 2.280 k, Starting at : 12.50 ft and placed every 0.0 ft thereafter

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.749 : 1	Maximum Shear Stress Ratio	=	0.673 : 1
Section used for this span		5.25x24	Section used for this span		5.25x24
fb: Actual	=	797.07 psi	fv: Actual	=	50.33 psi
F'b	=	1,064.76 psi	F'v	=	74.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	12.479 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.342 in	Ratio =	851 >=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.411 in	Ratio =	707 >=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 24.250 ft	1	0.161	0.145	0.90	1.00	1.00	1.00	0.926	1.00	1.00	1.00	5.65	134.5	833.3	0.71	8.5	58.5
+D+S					1.00	1.00	1.00	0.926	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 24.250 ft	1	0.749	0.673	1.15	1.00	1.00	1.00	0.926	1.00	1.00	1.00	33.48	797.1	1,064.8	4.23	50.3	74.8
+D+0.750S					1.00	1.00	1.00	0.926	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 24.250 ft	1	0.593	0.533	1.15	1.00	1.00	1.00	0.926	1.00	1.00	1.00	26.52	631.4	1,064.8	3.35	39.9	74.8
+0.60D					1.00	1.00	1.00	0.926	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 24.250 ft	1	0.054	0.049	1.60	1.00	1.00	1.00	0.926	1.00	1.00	1.00	3.39	80.7	1,481.4	0.43	5.1	104.0

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B3-4

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.4112	11.948		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	4.929	3.379
Max Upward from Load Combinations	4.929	3.379
Max Upward from Load Cases	4.102	2.810
D Only	0.827	0.569
+D+S	4.929	3.379
+D+0.750S	3.903	2.676
+0.60D	0.496	0.341
S Only	4.102	2.810

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wall Footing

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: WP1 Footing - Max Footing Loads

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2021

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	=	4.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	400.0 pcf
Soil/Concrete Friction Coeff.	=	0.60

Increases based on footing Depth

Reference Depth below Surface	=	12.0 ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

Increases based on footing Width

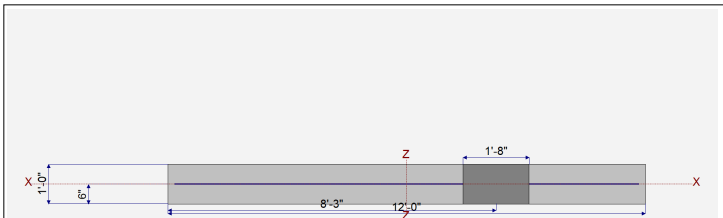
Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft

Adjusted Allowable Bearing Pressure = 0.0 ksf

Dimensions

Footing Width	=	12.0 ft	Footing Thickness	=	18.0 in	Bars along X-X Axis	
Wall Thickness	=	20.0 in	Rebar Centerline to Edge of Concrete...			Bar spacing	= 12.00
Wall center offset from center of footing	=	27 in	at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 6

Reinforcing



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	13.0			2.60				k
OB : Overburden	=								ksf
V-x	=			3.0					k
M-zz	=			5.50					k-ft
Vx applied	=		in above top of footing						

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wall Footing

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: WP1 Footing - Max Footing Loads

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	0.0	Soil Bearing	0.0 ksf	0.0 ksf	0.0
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	n/a	1-way Shear (+X)	0.0 psi	0.0 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

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 in2	Gvrn. As in2	Actual As in2	Phi*Mn k-ft	Status

One Way Shear

Units : k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wall Footing

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: WP2 Footing - Max Footing Loads

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2021

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	=	4.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	400.0 pcf
Soil/Concrete Friction Coeff.	=	0.60

Increases based on footing Depth

Reference Depth below Surface	=	12.0 ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

Increases based on footing Width

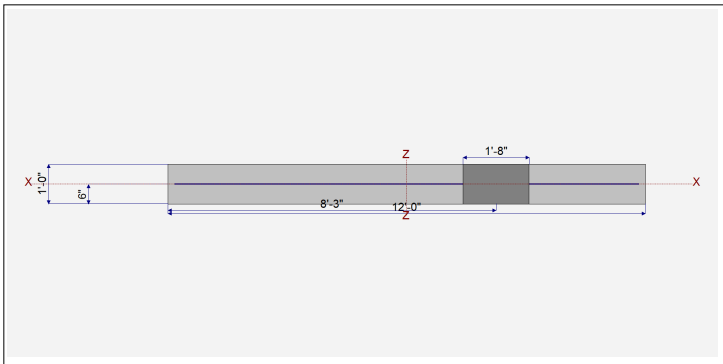
Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft

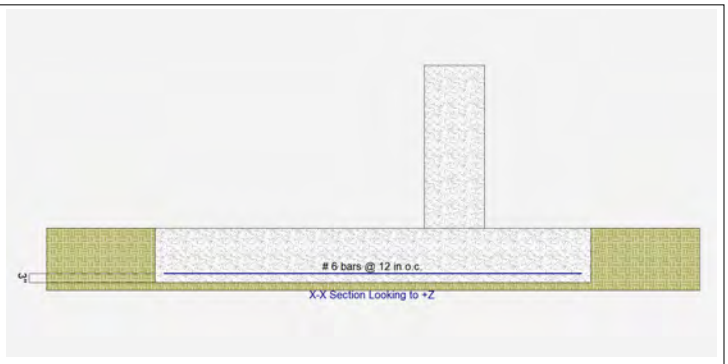
Adjusted Allowable Bearing Pressure = 0.0 ksf

Dimensions

Footing Width	=	12.0 ft	Footing Thickness	=	18.0 in	Bars along X-X Axis	
Wall Thickness	=	20.0 in	Rebar Centerline to Edge of Concrete...			Bar spacing	= 12.00
Wall center offset from center of footing	=	27 in	at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 6

Reinforcing





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	16.20			2.850				k
OB : Overburden	=								ksf
V-x	=			3.10					k
M-zz	=			2.20					k-ft
Vx applied	=		in above top of footing						

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wall Footing

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: WP2 Footing - Max Footing Loads

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	0.0	Soil Bearing	0.0 ksf	0.0 ksf	0.0
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	n/a	1-way Shear (+X)	0.0 psi	0.0 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

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 in2	Gvrn. As in2	Actual As in2	Phi*Mn k-ft	Status

One Way Shear

Units : k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wall Footing

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: WP3 Footing - Max Footing Loads

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2021

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	=	4.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	400.0 pcf
Soil/Concrete Friction Coeff.	=	0.60

Increases based on footing Depth

Reference Depth below Surface	=	12.0 ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

Increases based on footing Width

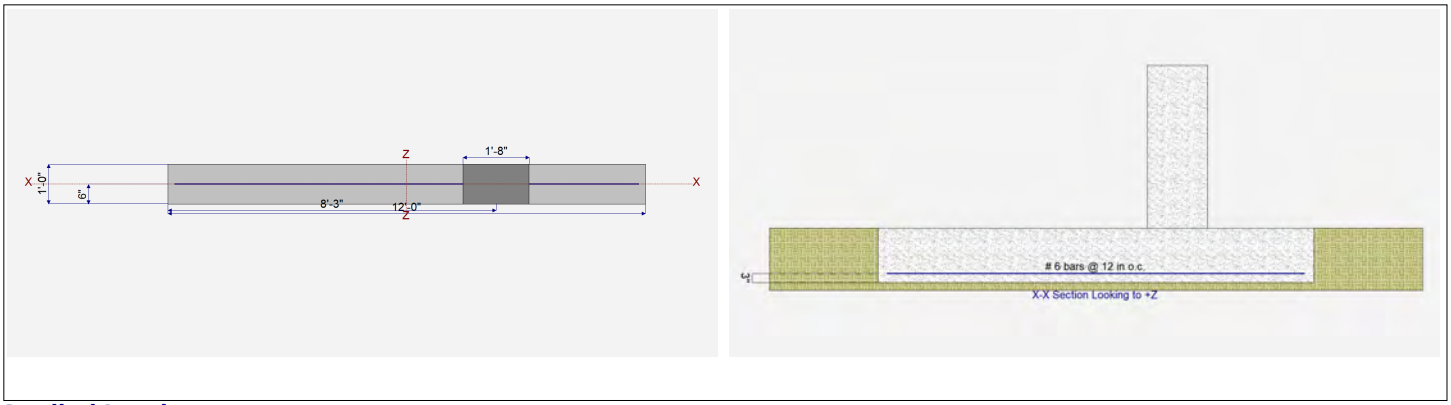
Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft

Adjusted Allowable Bearing Pressure = 0.0 ksf

Dimensions

Footing Width	=	12.0 ft	Footing Thickness	=	18.0 in	Bars along X-X Axis	
Wall Thickness	=	20.0 in	Rebar Centerline to Edge of Concrete...			Bar spacing	= 12.00
Wall center offset from center of footing	=	27 in	at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 6

Reinforcing



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	10.470			1.50				k
OB : Overburden	=								ksf
V-x	=			4.50					k
M-zz	=			14.0					k-ft
Vx applied	=		in above top of footing						

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wall Footing

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: WP3 Footing - Max Footing Loads

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	0.0	Soil Bearing	0.0 ksf	0.0 ksf	0.0
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	n/a	1-way Shear (+X)	0.0 psi	0.0 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

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 in2	Gvrn. As in2	Actual As in2	Phi*Mn k-ft	Status

One Way Shear

Units : k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wall Footing

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: WP4 Footing - Max Footing Loads

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2021

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	=	4.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	400.0 pcf
Soil/Concrete Friction Coeff.	=	0.60

Increases based on footing Depth

Reference Depth below Surface	=	12.0 ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

Increases based on footing Width

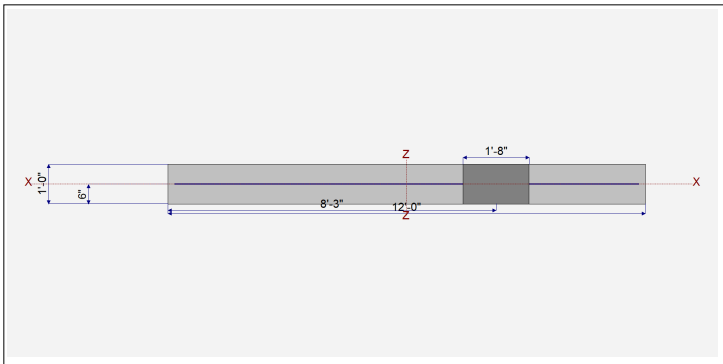
Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft

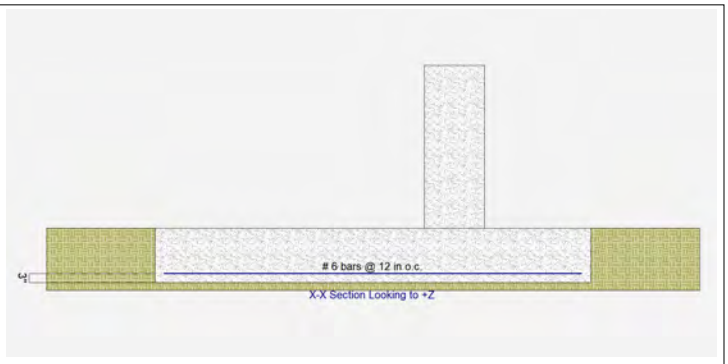
Adjusted Allowable Bearing Pressure = 0.0 ksf

Dimensions

Footing Width	=	12.0 ft	Footing Thickness	=	18.0 in	Bars along X-X Axis	
Wall Thickness	=	20.0 in	Rebar Centerline to Edge of Concrete...			Bar spacing	= 12.00
Wall center offset from center of footing	=	27 in	at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 6

Reinforcing





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	9.760			1.240				k
OB : Overburden	=								ksf
V-x	=			4.50					k
M-zz	=			14.30					k-ft
Vx applied	=	in above top of footing							

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wall Footing

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: WP4 Footing - Max Footing Loads

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	0.0	Soil Bearing	0.0 ksf	0.0 ksf	0.0
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	n/a	1-way Shear (+X)	0.0 psi	0.0 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

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 in2	Gvrn. As in2	Actual As in2	Phi*Mn k-ft	Status

One Way Shear

Units : k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wall Footing

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: WP7 Footing - Max Footing Loads

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2021

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	=	2.0 : 1
Min. Sliding Safety Factor	=	1.50 : 1
AutoCalc Footing Weight as DL :		Yes

Soil Design Values

Allowable Soil Bearing	=	4.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	400.0 pcf
Soil/Concrete Friction Coeff.	=	0.60

Increases based on footing Depth

Reference Depth below Surface	=	4.0 ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

Increases based on footing Width

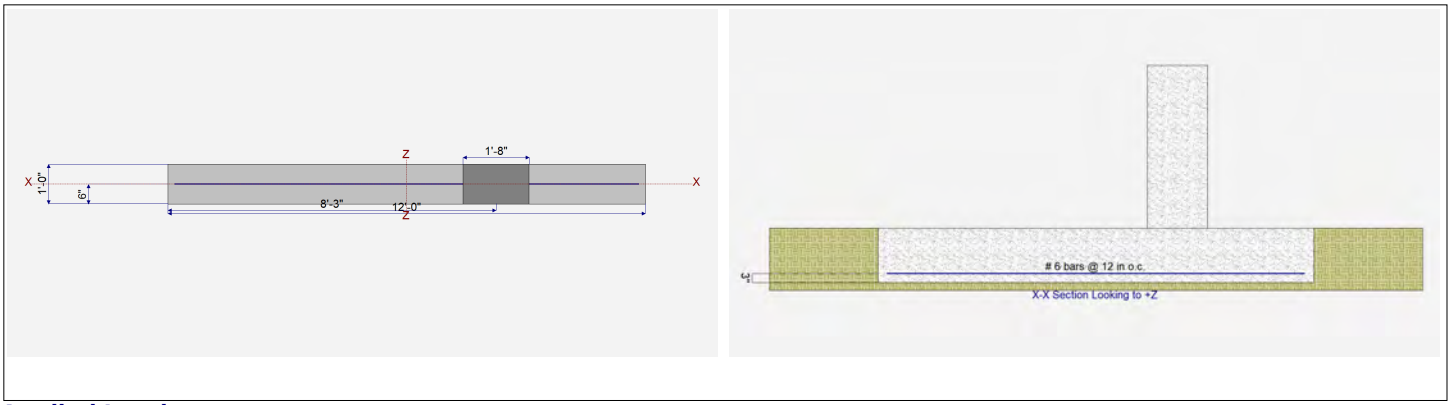
Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft

Adjusted Allowable Bearing Pressure = 0.0 ksf

Dimensions

Footing Width	=	12.0 ft	Footing Thickness	=	18.0 in	Bars along X-X Axis	
Wall Thickness	=	20.0 in	Rebar Centerline to Edge of Concrete...			Bar spacing	= 12.00
Wall center offset from center of footing	=	27 in	at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 6

Reinforcing



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	5.60			1.20				k
OB : Overburden	=								ksf
V-x	=			2.60					k
M-zz	=			13.80					k-ft
Vx applied	=	in above top of footing							

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wall Footing

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: WP7 Footing - Max Footing Loads

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	0.0	Soil Bearing	0.0 ksf	0.0 ksf	0.0
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	n/a	1-way Shear (+X)	0.0 psi	0.0 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

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 in2	Gvrn. As in2	Actual As in2	Phi*Mn k-ft	Status

One Way Shear

Units : k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid A-6 Avalanche Wall

Code Reference

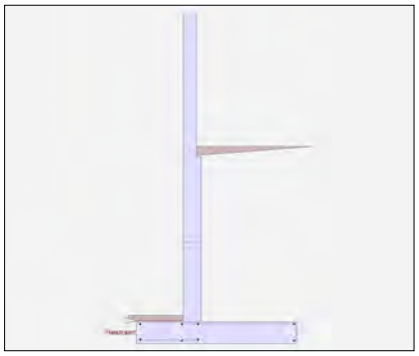
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	13.25 ft
Wall height above soil	=	10.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	400.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

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

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Live Load (L) (Service Level)
Wind on Exposed Stem (Strength Level)	=	130.0 psf

Adjacent Footing Load

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

Axial Load Applied to Stem

Axial Dead Load	=	40.0 lbs
Axial Live Load	=	200.0 lbs
Axial Load Eccentricity	=	0.0 in

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid A-6 Avalanche Wall

Design Summary

Wall Stability Ratios

Overturning	=	2.58	OK
Slab Resists All Sliding !			
Global Stability	=	2.31	
Total Bearing Load	=	15,393 lbs	
...resultant ecc.	=	18.00 in	
Eccentricity within middle third			
Soil Pressure @ Toe	=	2,820 psf	OK
Soil Pressure @ Heel	=	183 psf	OK
Allowable	=	4,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	3,949 psf	
ACI Factored @ Heel	=	256 psf	
Footing Shear @ Toe	=	26.8 psi	OK
Footing Shear @ Heel	=	20.2 psi	OK
Allowable	=	82.2 psi	

Sliding Calcs

Lateral Sliding Force	=	4,673.9 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

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

Stem Construction

		3rd	2nd	Bottom		
		Stem OK	Stem OK	Stem OK		
Design Height Above Ftg	ft =	12.50	6.00	0.00		
Wall Material Above "Ht"	=	Concrete	Concrete	Concrete		
Design Method	=	SD	SD	SD	SD	SD
Thickness	=	10.00	14.00	14.00		
Rebar Size	=	# 5	# 6	# 9		
Rebar Spacing	=	8.00	8.00	8.00		
Rebar Placed at	=	Edge	Edge	Edge		
Design Data						
fb/FB + fa/Fa	=	**0.739**	**0.890**	**0.887**		
Total Force @ Section						
Service Level	lbs =					
Strength Level	lbs =	2,095.8	3,551.8	6,995.8		
Moment....Actual						
Service Level	ft-# =					
Strength Level	ft-# =	11,963.9	29,036.7	59,671.2		
Moment.....Allowable	ft-# =	16,175.5	32,598.7	67,246.9		
Shear.....Actual						
Service Level	psi =					
Strength Level	psi =	21.3	25.5	51.0		
Shear.....Allowable	psi =	82.2	82.2	82.2		
Anet (Masonry)	in2 =					
Wall Weight	psf =	125.0	175.0	175.0		
Rebar Depth 'd'	in =	8.19	11.63	11.44		

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	3,000.0	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0	60,000.0

Cantilevered Retaining Wall

DESCRIPTION: Grid A-6 Avalanche Wall

Concrete Stem Rebar Area Details

3rd Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.3379 in2/ft		
(4/3) * As :	0.4505 in2/ft	Min Stem T&S Reinf Area 2.580 in2	
200bd/fy : 200(12)(8.1875)/60000 :	0.3275 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.3379 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.465 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	1.331 in2/ft	#6@ 22.00 in	#6@ 44.00 in

2nd Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.5707 in2/ft		
(4/3) * As :	0.7609 in2/ft	Min Stem T&S Reinf Area 2.184 in2	
200bd/fy : 200(12)(11.625)/60000 :	0.465 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.336 in2/ft	
0.0018bh : 0.0018(12)(14) :	0.3024 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.5707 in2/ft	#4@ 7.14 in	#4@ 14.29 in
Provided Area :	0.66 in2/ft	#5@ 11.07 in	#5@ 22.14 in
Maximum Area :	1.8898 in2/ft	#6@ 15.71 in	#6@ 31.43 in

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	1.1926 in2/ft		
(4/3) * As :	1.5901 in2/ft	Min Stem T&S Reinf Area 2.016 in2	
200bd/fy : 200(12)(11.4375)/60000 :	0.4575 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.336 in2/ft	
0.0018bh : 0.0018(12)(14) :	0.3024 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	1.1926 in2/ft	#4@ 7.14 in	#4@ 14.29 in
Provided Area :	1.5 in2/ft	#5@ 11.07 in	#5@ 22.14 in
Maximum Area :	1.8593 in2/ft	#6@ 15.71 in	#6@ 31.43 in

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid A-6 Avalanche Wall

Footing Data

Toe Width	=	3.00 ft
Heel Width	=	7.25
Total Footing Width	=	10.25
Footing Thickness	=	20.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	3,949	256 psf	
Mu' : Upward	=	16,148	18,257 ft-#	
Mu' : Downward	=	1,647	37,914 ft-#	
Mu: Design	=	14,501 OK	19,657 ft-#	OK
phiMn	=	101,027	45,831 ft-#	
Actual 1-Way Shear	=	26.82	20.19 psi	
Allow 1-Way Shear	=	82.16	82.16 psi	
Toe Reinforcing	=	# 9 @ 8.00 in		
Heel Reinforcing	=	# 7 @ 12.00 in		
Key Reinforcing	=	None Spec'd		
Footing Torsion, Tu	=	0.00 ft-lbs		
Footing Allow. Torsion, phi Tu	=	0.00 ft-lbs		

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

Other Acceptable Sizes & Spacings

Toe: #4@ 5.55 in, #5@ 8.61 in, #6@ 12.22 in, #7@ 16.66 in, #8@ 21.94 in, #9@ 27.77 in, #10@ 35.27 in

Heel: #4@ 5.55 in, #5@ 8.61 in, #6@ 12.22 in, #7@ 16.66 in, #8@ 21.94 in, #9@ 27.77 in, #10@ 35.27 in

Key: No key defined

Min footing T&S reinf Area 4.43 in2
Min footing T&S reinf Area per foot 0.43 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 5.56 in	#4@ 11.11 in
#5@ 8.61 in	#5@ 17.22 in
#6@ 12.22 in	#6@ 24.44 in

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid A-6 Avalanche Wall

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		3,893.9	4.97	19,361.2	Soil Over HL (ab. water tbl)	8,866.5	7.21	63,912.4
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		7.21	63,912.4
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=	40.0	3.58	143.3
Added Lateral Load	=				* Axial Live Load on Stem	=	200.0	3.58	716.7
Load @ Stem Above Soil	=	780.0	19.92	15,535.0	Soil Over Toe	=	165.0	1.50	247.5
	=				Surcharge Over Toe	=			
					Stem Weight(s)	=	3,531.3	3.52	12,429.7
					Earth @ Stem Transitions	=	27.5	4.00	110.0
					Footing Weight	=	2,562.5	5.13	13,132.8
					Key Weight	=			
					Vert. Component	=			
Total	=	4,673.9	**O.T.M.** =	34,896.2	**Total =**	15,192.7 lbs	**R.M.=**		89,975.7

Resisting/Overturning Ratio = **2.58**

Vertical Loads used for Soil Pressure = 15,392.7 lbs

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

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

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

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.178	in

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

Cantilevered Retaining Wall

DESCRIPTION: Grid A-6 Avalanche Wall

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 3rd
Stem Design Height: 12.50 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	21.36 in
Development length for #5 bar specified in this stem design segment =	16.43 in

---

Stem Design Segment: 2nd
Stem Design Height: 6.00 ft above top of footing

Lap Splice length for #6 bar specified in this stem design segment (25.4.2.3a) =	25.63 in
Development length for #6 bar specified in this stem design segment =	19.72 in

---

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

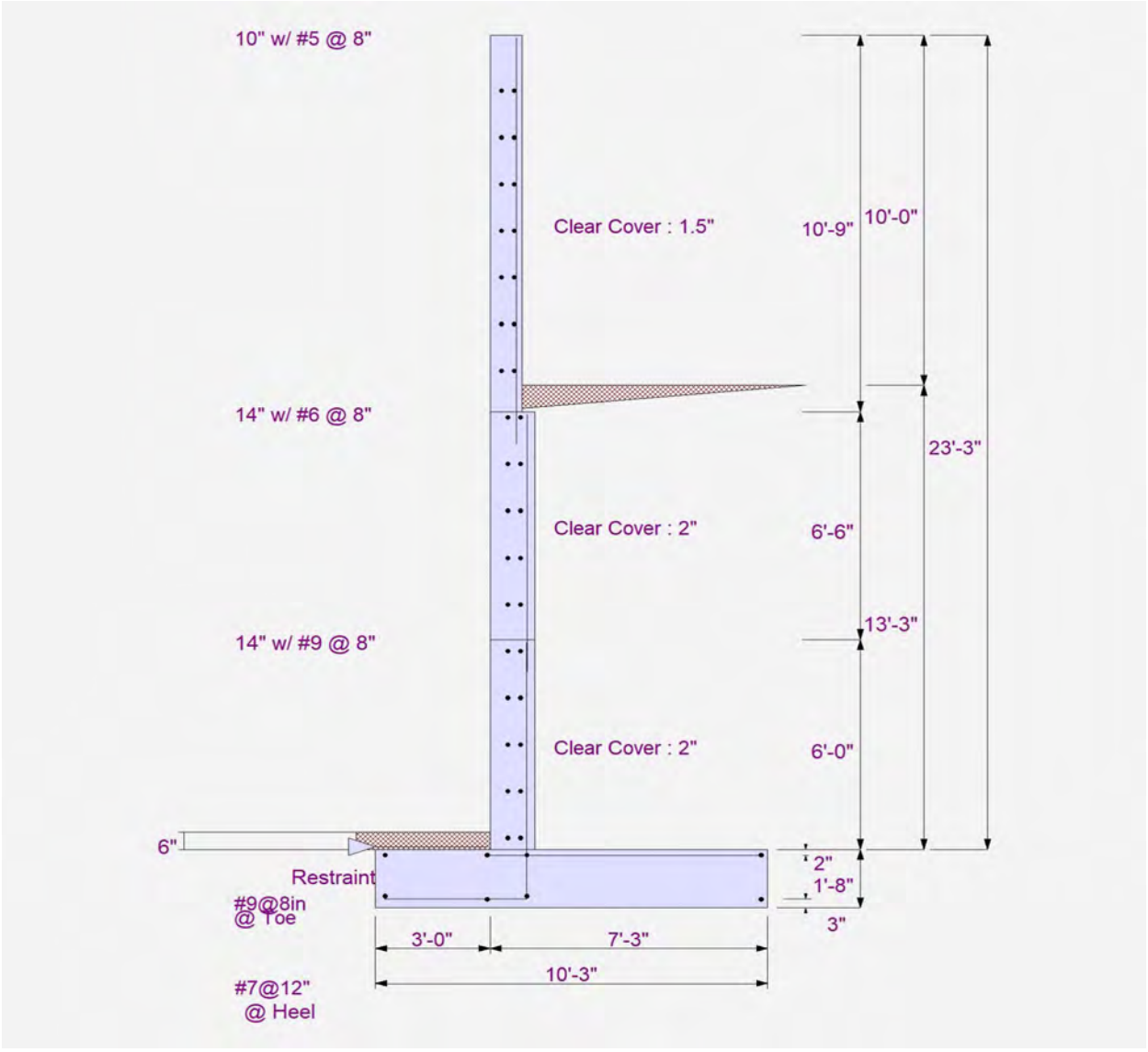
Lap Splice length for #9 bar specified in this stem design segment (25.4.2.3a) =	48.06 in
Development length for #9 bar specified in this stem design segment =	36.97 in
Hooked embedment length into footing for #9 bar specified in this stem design segment =	13.72 in
As Provided =	1.5000 in2/ft
As Required =	1.1926 in2/ft

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

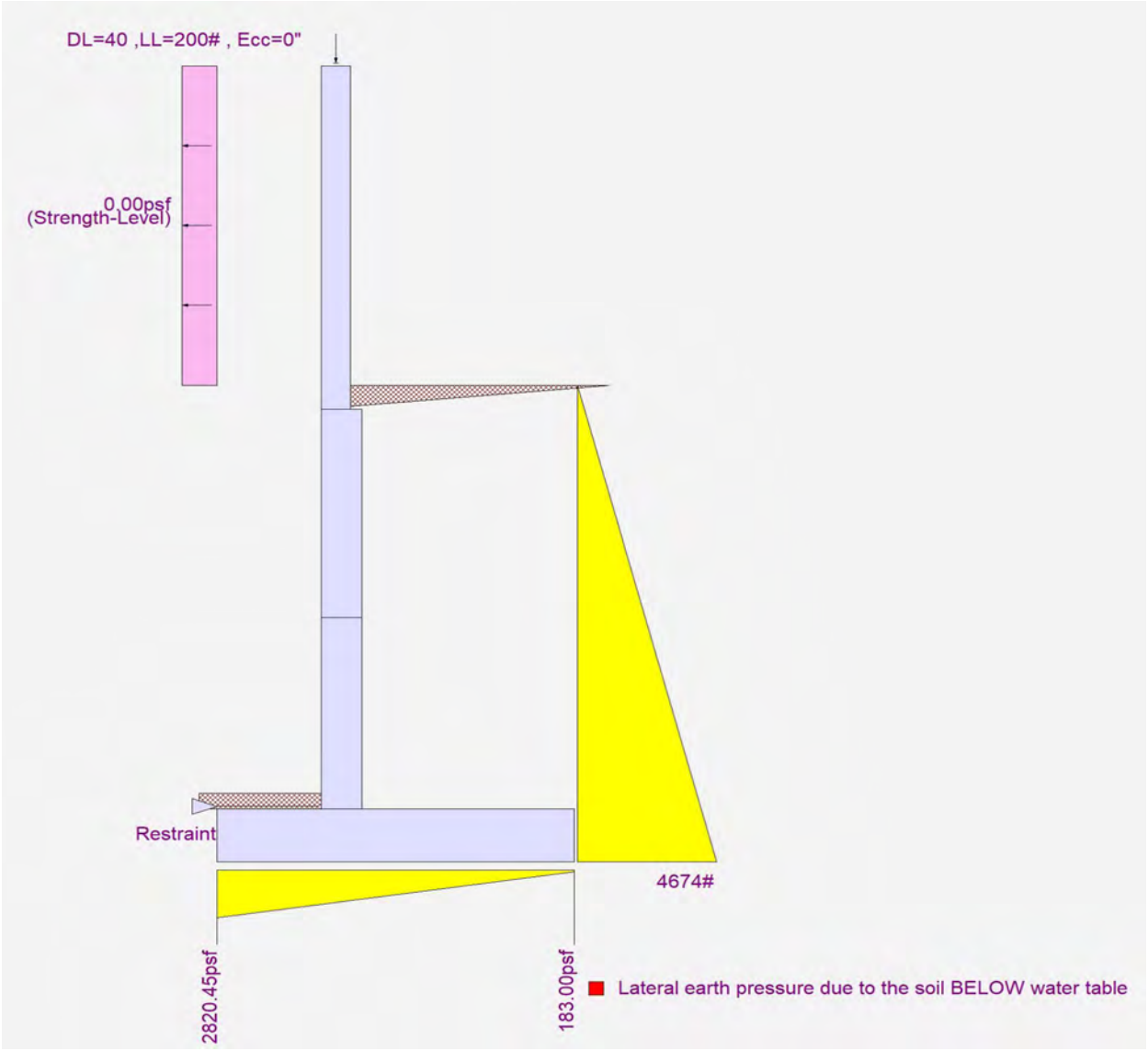
Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid A-6 Avalanche Wall



Cantilevered Retaining Wall

DESCRIPTION: Grid A-6 Avalanche Wall



Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Short Span Deck Joist

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

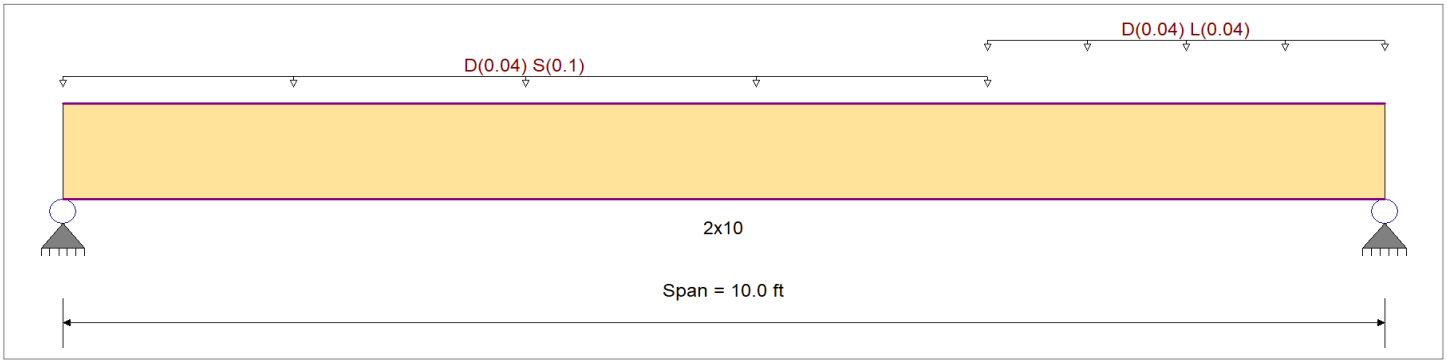
Wood Species : Douglas Fir-Larch (North)
Wood Grade : No. 1/No. 2

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	1,000.0 psi
Fb -	1,000.0 psi
Fc - Prll	1,000.0 psi
Fc - Perp	1,000.0 psi
Fv	65.0 psi
Ft	65.0 psi

E : Modulus of Elasticity

Ebend- xx	1,300.0 ksi
Eminbend - xx	1,300.0 ksi
Density	34.0 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Load for Span Number 1
Uniform Load : D = 0.040, S = 0.10 k/ft, Extent = 0.0 -->> 7.0 ft, Tributary Width = 1.0 ft
Uniform Load : D = 0.040, L = 0.040 k/ft, Extent = 7.0 -->> 10.0 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.680 : 1	Maximum Shear Stress Ratio	=	0.792 : 1
Section used for this span		2x10	Section used for this span		2x10
fb: Actual	=	859.57 psi	fv: Actual	=	59.21 psi
F'b	=	1,265.00 psi	F'v	=	74.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	4.672 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.140 in	Ratio =	854 >=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.211 in	Ratio =	569 >=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 10.0 ft	1	0.283	0.313	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	0.50	280.5	990.0	0.17	18.3	58.5
+D+L					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 10.0 ft	1	0.303	0.400	1.00	1.00	1.00	1.00	1.100	1.00	1.00	1.00	0.59	333.3	1,100.0	0.24	26.0	65.0
+D+S					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 10.0 ft	1	0.680	0.792	1.15	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.53	859.6	1,265.0	0.55	59.2	74.8
+D+0.750L					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 10.0 ft	1	0.232	0.297	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	0.57	319.6	1,375.0	0.22	24.1	81.3
+D+0.750L+0.750S					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Short Span Deck Joist

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
Length = 10.0 ft	**1**	0.593	0.675	1.15	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.34	750.6	1,265.0	0.47	50.4	74.8
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 10.0 ft	**1**	0.096	0.106	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	0.30	168.3	1,760.0	0.10	11.0	104.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.2108	4.927		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.655	0.460
Max Upward from Load Combinations	0.655	0.460
Max Upward from Load Cases	0.455	0.245
D Only	0.200	0.200
+D+L	0.218	0.302
+D+S	0.655	0.445
+D+0.750L	0.214	0.277
+D+0.750L+0.750S	0.555	0.460
+0.60D	0.120	0.120
L Only	0.018	0.102
S Only	0.455	0.245

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

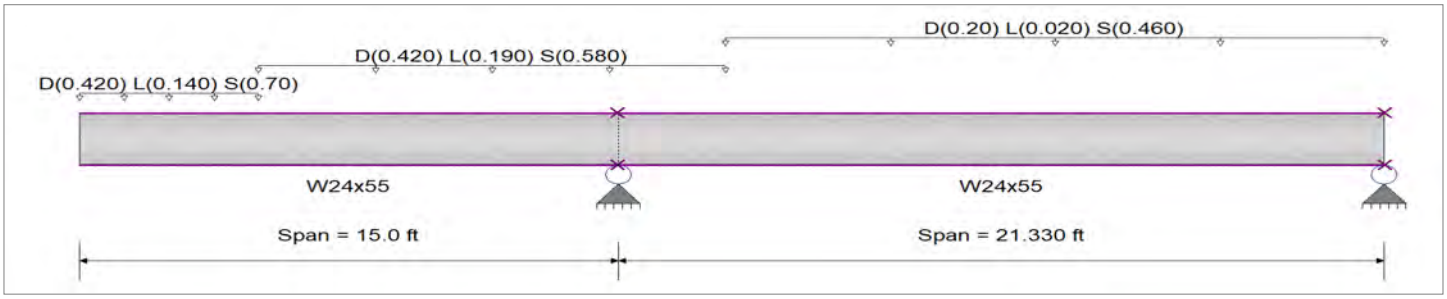
DESCRIPTION: B2-1

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...

Partial Length Uniform Load : D = 0.420, L = 0.140, S = 0.70 k/ft, Extent = 0.0 -->> 5.0 ft

Partial Length Uniform Load : D = 0.420, L = 0.190, S = 0.580 k/ft, Extent = 5.0 -->> 18.0 ft

Partial Length Uniform Load : D = 0.20, L = 0.020, S = 0.460 k/ft, Extent = 18.0 -->> 36.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.359 : 1	Maximum Shear Stress Ratio =	0.093 : 1
Section used for this span	W24x55	Section used for this span	W24x55
Ma : Applied	120.000 k-ft	Va : Applied	15.60 k
Mn / Omega : Allowable	334.331 k-ft	Vn/Omega : Allowable	167.461 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	15.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.402 in	Ratio =	895	>=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.043 in	Ratio =	6,009	>=360	Span: 2 : S Only
Max Downward Total Deflection	0.685 in	Ratio =	526	>=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.084 in	Ratio =	3037	>=180	Span: 2 : +D+0.750L+0.750S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 15.00 ft	1	0.141	0.038		-47.25	47.25	558.33	334.33	1.00	1.00	6.30	279.66	167.46
Dsgn. L = 21.33 ft	2	0.141	0.030		-47.25	47.25	558.33	334.33	1.00	1.00	4.96	279.66	167.46
+D+L													
Dsgn. L = 15.00 ft	1	0.196	0.053		-65.50	65.50	558.33	334.33	1.00	1.00	8.90	279.66	167.46
Dsgn. L = 21.33 ft	2	0.196	0.039		-65.50	65.50	558.33	334.33	1.00	1.00	6.50	279.66	167.46
+D+S													
Dsgn. L = 15.00 ft	1	0.359	0.093		-120.00	120.00	558.33	334.33	1.00	1.00	15.60	279.66	167.46
Dsgn. L = 21.33 ft	2	0.359	0.081	1.67	-120.00	120.00	558.33	334.33	1.00	1.00	13.61	279.66	167.46
+D+0.750L													
Dsgn. L = 15.00 ft	1	0.182	0.049		-60.94	60.94	558.33	334.33	1.00	1.00	8.25	279.66	167.46
Dsgn. L = 21.33 ft	2	0.182	0.037		-60.94	60.94	558.33	334.33	1.00	1.00	6.12	279.66	167.46
+D+0.750L+0.750S													
Dsgn. L = 15.00 ft	1	0.345	0.091		-115.50	115.50	558.33	334.33	1.00	1.00	15.23	279.66	167.46
Dsgn. L = 21.33 ft	2	0.345	0.075	0.38	-115.50	115.50	558.33	334.33	1.00	1.00	12.61	279.66	167.46
+0.60D													

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-1

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
Dsgn. L = 15.00 ft	1	0.085	0.023		-28.35	28.35	558.33	334.33	1.00	1.00	3.78	279.66	167.46
Dsgn. L = 21.33 ft	2	0.085	0.018		-28.35	28.35	558.33	334.33	1.00	1.00	2.98	279.66	167.46

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.6846	0.000		0.0000	0.000
	2	0.0000	0.000	+D+0.750L+0.750S	-0.0843	7.679

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		29.213	1.521	-0.758
Max Upward from Load Combinations		29.213	1.485	-0.758
Max Upward from Load Cases		17.951	1.521	-0.758
Max Downward from all Load Conditions (Resis			-0.642	-0.758
Max Downward from Load Combinations (Resis			-0.642	-0.758
Max Downward from Load Cases (Resisting Up			-0.606	-0.758
D Only		11.262	-0.036	-0.758
+D+L		15.405	-0.642	-0.758
+D+S		29.213	1.485	-0.758
+D+0.750L		14.369	-0.491	-0.758
+D+0.750L+0.750S		27.833	0.650	-0.758
+0.60D		6.757	-0.021	-0.758
L Only		4.143	-0.606	-0.758
S Only		17.951	1.521	-0.758

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-2

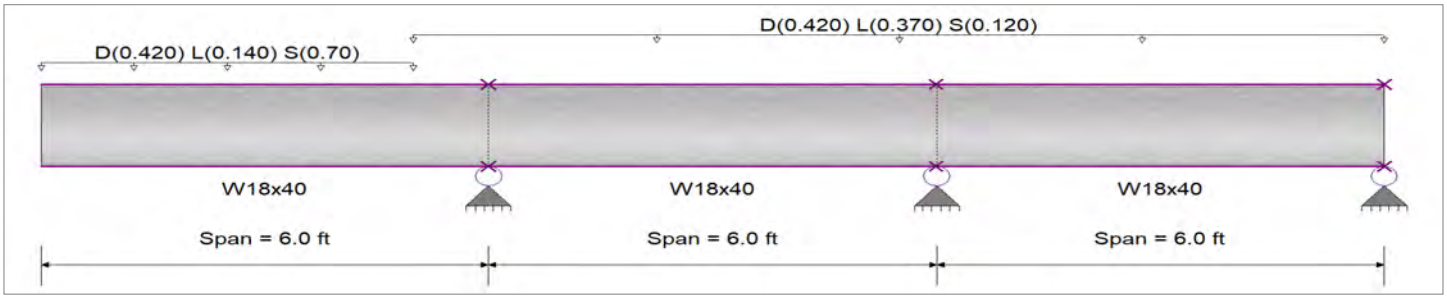
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Partial Length Uniform Load : D = 0.420, L = 0.140, S = 0.70 k/ft, Extent = 0.0 -->> 5.0 ft

Partial Length Uniform Load : D = 0.420, L = 0.370, S = 0.120 k/ft, Extent = 5.0 -->> 18.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.102 : 1	Maximum Shear Stress Ratio =	0.054 : 1
Section used for this span	W18x40	Section used for this span	W18x40
Ma : Applied	19.870 k-ft	Va : Applied	6.140 k
Mn / Omega : Allowable	195.609 k-ft	Vn/Omega : Allowable	112.770 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	6.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.023 in	Ratio =	6,179	>=360	Span: 3 : S Only
Max Upward Transient Deflection	-0.002 in	Ratio =	33,959	>=360	Span: 3 : S Only
Max Downward Total Deflection	0.037 in	Ratio =	3936	>=180	Span: 3 : +D+S
Max Upward Total Deflection	-0.003 in	Ratio =	22605	>=180	Span: 3 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 6.00 ft	1	0.039	0.022		-7.56	7.56	326.67	195.61	1.00	1.00	2.52	169.16 112.77
Dsgn. L = 6.00 ft	2	0.039	0.022	-0.00	-7.56	7.56	326.67	195.61	1.00	1.00	2.52	169.16 112.77
Dsgn. L = 6.00 ft	3	0.010	0.011	1.89	-0.00	1.89	326.67	195.61	1.00	1.00	1.26	169.16 112.77
+D+L												
Dsgn. L = 6.00 ft	1	0.052	0.035		-10.20	10.20	326.67	195.61	1.00	1.00	3.90	169.16 112.77
Dsgn. L = 6.00 ft	2	0.052	0.035	-0.00	-10.20	10.20	326.67	195.61	1.00	1.00	3.90	169.16 112.77
Dsgn. L = 6.00 ft	3	0.016	0.023	3.07	-1.01	3.07	326.67	195.61	1.00	1.00	2.54	169.16 112.77
+D+S												
Dsgn. L = 6.00 ft	1	0.102	0.054		-19.87	19.87	326.67	195.61	1.00	1.00	6.14	169.16 112.77
Dsgn. L = 6.00 ft	2	0.102	0.047	2.54	-19.87	19.87	326.67	195.61	1.00	1.00	5.35	169.16 112.77
Dsgn. L = 6.00 ft	3	0.020	0.018	3.86		3.86	326.67	195.61	1.00	1.00	2.04	169.16 112.77
+D+0.750L												
Dsgn. L = 6.00 ft	1	0.049	0.032		-9.54	9.54	326.67	195.61	1.00	1.00	3.56	169.16 112.77
Dsgn. L = 6.00 ft	2	0.049	0.032	-0.00	-9.54	9.54	326.67	195.61	1.00	1.00	3.56	169.16 112.77
Dsgn. L = 6.00 ft	3	0.014	0.020	2.77	-0.75	2.77	326.67	195.61	1.00	1.00	2.22	169.16 112.77
+D+0.750L+0.750S												
Dsgn. L = 6.00 ft	1	0.096	0.054		-18.77	18.77	326.67	195.61	1.00	1.00	6.04	169.16 112.77
Dsgn. L = 6.00 ft	2	0.096	0.050	1.15	-18.77	18.77	326.67	195.61	1.00	1.00	5.68	169.16 112.77

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-2

Maximum Forces & Stresses for Load Combinations

Load Combination			Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length		Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	VnxVnx/Omega	
Dsgn. L =	6.00 ft	3	0.021	0.023	4.14		4.14	326.67	195.61	1.00	1.00	2.55	169.16	112.77
+0.60D														
Dsgn. L =	6.00 ft	1	0.023	0.013		-4.54	4.54	326.67	195.61	1.00	1.00	1.51	169.16	112.77
Dsgn. L =	6.00 ft	2	0.023	0.013	-0.00	-4.54	4.54	326.67	195.61	1.00	1.00	1.51	169.16	112.77
Dsgn. L =	6.00 ft	3	0.006	0.007	1.13	-0.00	1.13	326.67	195.61	1.00	1.00	0.76	169.16	112.77

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0366	0.000		0.0000	0.000
	2	0.0000	0.000	+D+S	-0.0032	2.280
+D+0.750L+0.750S	3	0.0016	2.960		0.0000	2.280

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Max Upward from all Load Conditions		11.720	3.376	2.554
Max Upward from Load Combinations		11.720	3.376	2.554
Max Upward from Load Cases		6.455	2.116	1.260
Max Downward from all Load Conditions (Resis			-2.177	
Max Downward from Load Combinations (Resi			-0.917	
Max Downward from Load Cases (Resisting Up			-2.177	
D Only		5.040	1.260	1.260
+D+L		7.491	3.376	2.202
+D+S		11.495	-0.917	2.043
+D+0.750L		6.879	2.847	1.967
+D+0.750L+0.750S		11.720	1.214	2.554
+0.60D		3.024	0.756	0.756
L Only		2.451	2.116	0.942
S Only		6.455	-2.177	0.783

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-3

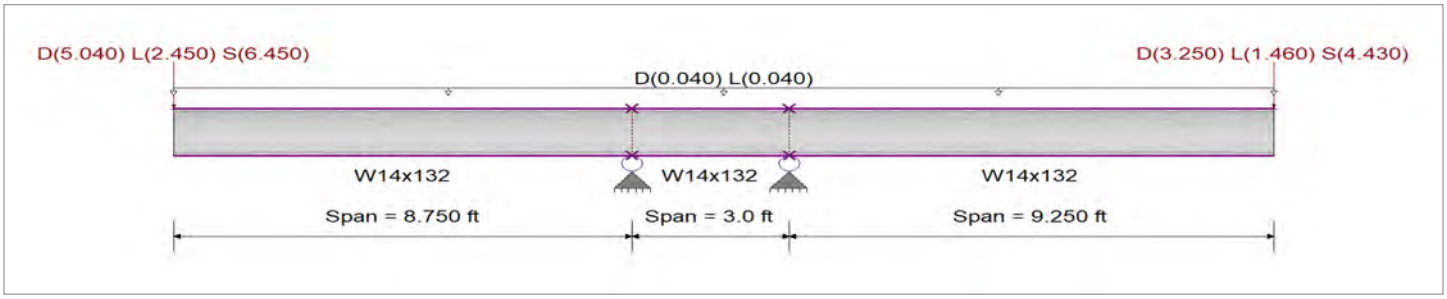
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.040, L = 0.040 k/ft

Load(s) for Span Number 1
Point Load : D = 5.040, L = 2.450, S = 6.450 k @ 0.0 ft

Load(s) for Span Number 3
Point Load : D = 3.250, L = 1.460, S = 4.430 k @ 9.250 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.189 : 1	Maximum Shear Stress Ratio =	0.071 : 1
Section used for this span	W14x132	Section used for this span	W14x132
Ma : Applied	110.242 k-ft	Va : Applied	13.483 k
Mn / Omega : Allowable	583.832 k-ft	Vn/Omega : Allowable	189.630 k
Load Combination	+D+0.750L+0.750S	Load Combination	+D+0.750L+0.750S
		Location of maximum on span	8.750 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.083 in	Ratio =	2,542	>=360	Span: 3 : S Only
Max Upward Transient Deflection	-0.002 in	Ratio =	16,624	>=360	Span: 3 : S Only
Max Downward Total Deflection	0.159 in	Ratio =	1319	>=180	Span: 3 : +D+0.750L+0.750S
Max Upward Total Deflection	-0.004 in	Ratio =	8549	>=180	Span: 3 : +D+0.750L+0.750S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 8.75 ft	1	0.087	0.035		-50.69	50.69	975.00	583.83	1.00	1.00	6.55	284.45	189.63
Dsgn. L = 3.00 ft	2	0.087	0.026	-0.00	-50.69	50.69	975.00	583.83	1.00	1.00	4.84	284.45	189.63
Dsgn. L = 9.25 ft	3	0.064	0.026		-37.42	37.42	975.00	583.83	1.00	1.00	4.84	284.45	189.63
+D+L												
Dsgn. L = 8.75 ft	1	0.126	0.049		-73.66	73.66	975.00	583.83	1.00	1.00	9.35	284.45	189.63
Dsgn. L = 3.00 ft	2	0.126	0.039	-0.00	-73.66	73.66	975.00	583.83	1.00	1.00	7.32	284.45	189.63
Dsgn. L = 9.25 ft	3	0.090	0.035		-52.64	52.64	975.00	583.83	1.00	1.00	6.67	284.45	189.63
+D+S												
Dsgn. L = 8.75 ft	1	0.183	0.069		-107.12	107.12	975.00	583.83	1.00	1.00	13.00	284.45	189.63
Dsgn. L = 3.00 ft	2	0.183	0.052	-0.00	-107.12	107.12	975.00	583.83	1.00	1.00	9.83	284.45	189.63
Dsgn. L = 9.25 ft	3	0.134	0.049		-78.40	78.40	975.00	583.83	1.00	1.00	9.27	284.45	189.63
+D+0.750L												
Dsgn. L = 8.75 ft	1	0.116	0.046		-67.91	67.91	975.00	583.83	1.00	1.00	8.65	284.45	189.63

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-3

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega	
Dsgn. L = 3.00 ft	2	0.116	0.035	-0.00	-67.91	67.91	975.00	583.83	1.00	1.00	6.66	284.45	189.63
Dsgn. L = 9.25 ft	3	0.084	0.033		-48.84	48.84	975.00	583.83	1.00	1.00	6.21	284.45	189.63
+D+0.750L+0.750S													
Dsgn. L = 8.75 ft	1	0.189	0.071		-110.24	110.24	975.00	583.83	1.00	1.00	13.48	284.45	189.63
Dsgn. L = 3.00 ft	2	0.189	0.056	-0.00	-110.24	110.24	975.00	583.83	1.00	1.00	10.53	284.45	189.63
Dsgn. L = 9.25 ft	3	0.136	0.050		-79.57	79.57	975.00	583.83	1.00	1.00	9.54	284.45	189.63
+0.60D													
Dsgn. L = 8.75 ft	1	0.052	0.021		-30.41	30.41	975.00	583.83	1.00	1.00	3.93	284.45	189.63
Dsgn. L = 3.00 ft	2	0.052	0.015	-0.00	-30.41	30.41	975.00	583.83	1.00	1.00	2.91	284.45	189.63
Dsgn. L = 9.25 ft	3	0.038	0.015		-22.45	22.45	975.00	583.83	1.00	1.00	2.91	284.45	189.63

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S	1	0.1592	0.000		0.0000	0.000
	2	0.0000	0.000	+D+0.750L+0.750S	-0.0042	1.460
+D+0.750L+0.750S	3	0.1340	9.250		0.0000	1.460

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Max Upward from all Load Conditions		24.010	0.679	
Max Upward from Load Combinations		24.010	0.407	
Max Upward from Load Cases		11.603	0.679	
Max Downward from all Load Conditions (Resis			-0.723	
Max Downward from Load Combinations (Resi			-0.384	
Max Downward from Load Cases (Resisting Up			-0.723	
D Only		11.225	0.679	
+D+L		16.669	-0.015	
+D+S		22.828	-0.045	
+D+0.750L		15.308	0.158	
+D+0.750L+0.750S		24.010	-0.384	
+0.60D		6.735	0.407	
L Only		5.444	-0.694	
S Only		11.603	-0.723	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-4

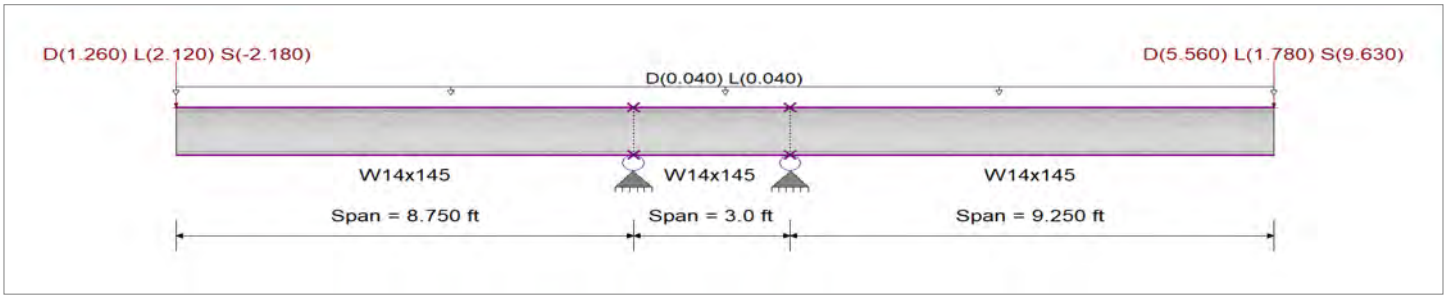
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.040, L = 0.040 k/ft

Load(s) for Span Number 1
Point Load : D = 1.260, L = 2.120, S = -2.180 k @ 0.0 ft

Load(s) for Span Number 3
Point Load : D = 5.560, L = 1.780, S = 9.630 k @ 9.250 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.219 : 1	Maximum Shear Stress Ratio =	0.247 : 1
Section used for this span	W14x145	Section used for this span	W14x145
Ma : Applied	142.219 k-ft	Va : Applied	49.639 k
Mn / Omega : Allowable	648.703 k-ft	Vn/Omega : Allowable	201.280 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	3.000 ft
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 2

Maximum Deflection

Max Downward Transient Deflection	0.114 in	Ratio =	1,952	>=360	Span: 3 : S Only
Max Upward Transient Deflection	-0.010 in	Ratio =	21,245	>=360	Span: 3 : S Only
Max Downward Total Deflection	0.185 in	Ratio =	1200	>=180	Span: 3 : +D+S
Max Upward Total Deflection	-0.003 in	Ratio =	12177	>=180	Span: 3 : +D+0.750L+0.750S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 8.75 ft	1	0.019	0.067		-12.56	12.56	1,083.33	648.70	1.00	1.00	13.47	301.92 201.28
Dsgn. L = 3.00 ft	2	0.082	0.068	-0.00	-53.14	53.14	1,083.33	648.70	1.00	1.00	13.59	301.92 201.28
Dsgn. L = 9.25 ft	3	0.082	0.029		-53.14	53.14	1,083.33	648.70	1.00	1.00	5.93	301.92 201.28
+D+L												
Dsgn. L = 8.75 ft	1	0.050	0.063		-32.64	32.64	1,083.33	648.70	1.00	1.00	12.77	301.92 201.28
Dsgn. L = 3.00 ft	2	0.110	0.065	-0.00	-71.32	71.32	1,083.33	648.70	1.00	1.00	13.01	301.92 201.28
Dsgn. L = 9.25 ft	3	0.110	0.040		-71.32	71.32	1,083.33	648.70	1.00	1.00	8.08	301.92 201.28
+D+S												
Dsgn. L = 8.75 ft	1	0.010	0.246	6.52		6.52	1,083.33	648.70	1.00	1.00	49.52	301.92 201.28
Dsgn. L = 3.00 ft	2	0.219	0.247	6.52	-142.22	142.22	1,083.33	648.70	1.00	1.00	49.64	301.92 201.28
Dsgn. L = 9.25 ft	3	0.219	0.077		-142.22	142.22	1,083.33	648.70	1.00	1.00	15.56	301.92 201.28
+D+0.750L												
Dsgn. L = 8.75 ft	1	0.043	0.064		-27.62	27.62	1,083.33	648.70	1.00	1.00	12.95	301.92 201.28

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-4

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega	
Dsgn. L = 3.00 ft	2	0.103	0.065	-0.00	-66.77	66.77	1,083.33	648.70	1.00	1.00	13.16	301.92	201.28
Dsgn. L = 9.25 ft	3	0.103	0.037		-66.77	66.77	1,083.33	648.70	1.00	1.00	7.54	301.92	201.28
+D+0.750L+0.750S													
Dsgn. L = 8.75 ft	1	0.021	0.199		-13.31	13.31	1,083.33	648.70	1.00	1.00	39.99	301.92	201.28
Dsgn. L = 3.00 ft	2	0.206	0.200	-0.00	-133.58	133.58	1,083.33	648.70	1.00	1.00	40.20	301.92	201.28
Dsgn. L = 9.25 ft	3	0.206	0.073		-133.58	133.58	1,083.33	648.70	1.00	1.00	14.77	301.92	201.28
+0.60D													
Dsgn. L = 8.75 ft	1	0.012	0.040		-7.53	7.53	1,083.33	648.70	1.00	1.00	8.08	301.92	201.28
Dsgn. L = 3.00 ft	2	0.049	0.041	-0.00	-31.88	31.88	1,083.33	648.70	1.00	1.00	8.15	301.92	201.28
Dsgn. L = 9.25 ft	3	0.049	0.018		-31.88	31.88	1,083.33	648.70	1.00	1.00	3.56	301.92	201.28

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0493	0.000	S Only	-0.0006	8.750
	2	0.0000	0.000	+D+0.750L+0.750S	-0.0030	1.700
+D+S	3	0.1850	9.250		0.0000	1.700

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Max Upward from all Load Conditions		3.165	65.199	
Max Upward from Load Combinations			65.199	
Max Upward from Load Cases		3.165	45.681	
Max Downward from all Load Conditions (Resis		-50.089		
Max Downward from Load Combinations (Resi		-50.089		
Max Downward from Load Cases (Resisting Up		-38.231		
D Only		-11.858	19.518	
+D+L		-8.693	21.093	
+D+S		-50.089	65.199	
+D+0.750L		-9.485	20.700	
+D+0.750L+0.750S		-38.158	54.960	
+0.60D		-7.115	11.711	
L Only		3.165	1.575	
S Only		-38.231	45.681	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-5

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

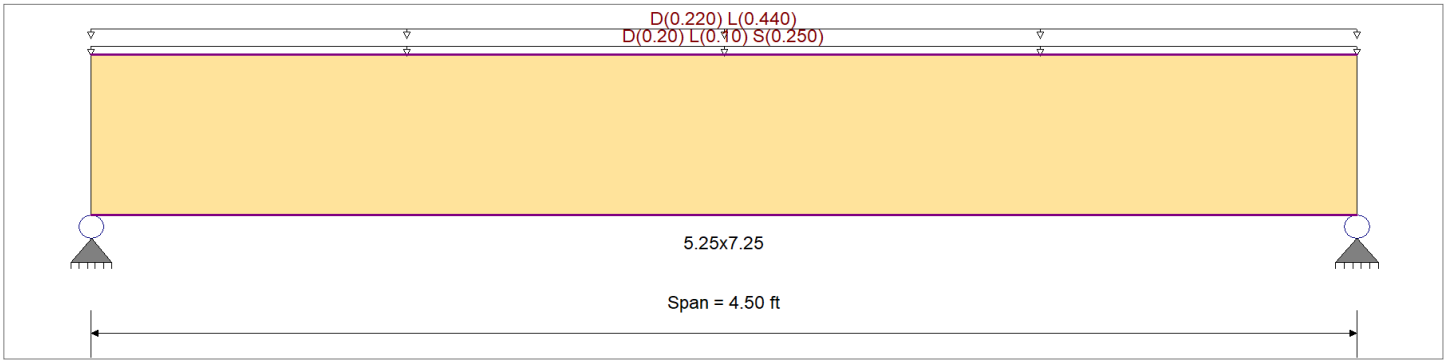
Wood Species : Boise Cascade
Wood Grade : Versa Lam 2800

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2800 psi
Fb -	2800 psi
Fc - Prll	3000 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	2100 psi

E : Modulus of Elasticity

Ebend- xx	2000 ksi
Eminbend - xx	2530120482 ksi
Density	41.76 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.20, L = 0.10, S = 0.250 k/ft
Uniform Load on ALL spans : D = 0.220, L = 0.440 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.214 : 1	Maximum Shear Stress Ratio	=	0.220 : 1
Section used for this span		5.25x7.25	Section used for this span		5.25x7.25
fb: Actual	=	634.02 psi	fv: Actual	=	62.76 psi
F'b	=	2,961.24 psi	F'v	=	285.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	2.250 ft	Location of maximum on span	=	3.909 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.015 in	Ratio =	3593 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.028 in	Ratio =	1916 >=180	Span: 1 : +D+0.750L+0.750S
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 4.50 ft	1	0.104	0.107	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.06	277.4	2,665.1	0.70	27.5	256.5
+D+L					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 4.50 ft	1	0.214	0.220	1.00	1.00	1.00	1.00	1.058	1.00	1.00	1.00	2.43	634.0	2,961.2	1.59	62.8	285.0
+D+S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 4.50 ft	1	0.130	0.134	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.70	442.5	3,405.4	1.11	43.8	327.8
+D+0.750L					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 4.50 ft	1	0.147	0.151	1.25	1.00	1.00	1.00	1.058	1.00	1.00	1.00	2.09	544.9	3,701.6	1.37	53.9	356.3
+D+0.750L+0.750S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-5

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
Length = 4.50 ft	**1**	0.196	0.202	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	2.56	668.7	3,405.4	1.68	66.2	327.8
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 4.50 ft	**1**	0.035	0.036	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.64	166.4	4,738.0	0.42	16.5	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S	1	0.0282	2.266		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	2.278	2.278
Max Upward from Load Combinations	2.278	2.278
Max Upward from Load Cases	1.215	1.215
D Only	0.945	0.945
+D+L	2.160	2.160
+D+S	1.508	1.508
+D+0.750L	1.856	1.856
+D+0.750L+0.750S	2.278	2.278
+0.60D	0.567	0.567
L Only	1.215	1.215
S Only	0.563	0.563

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-6

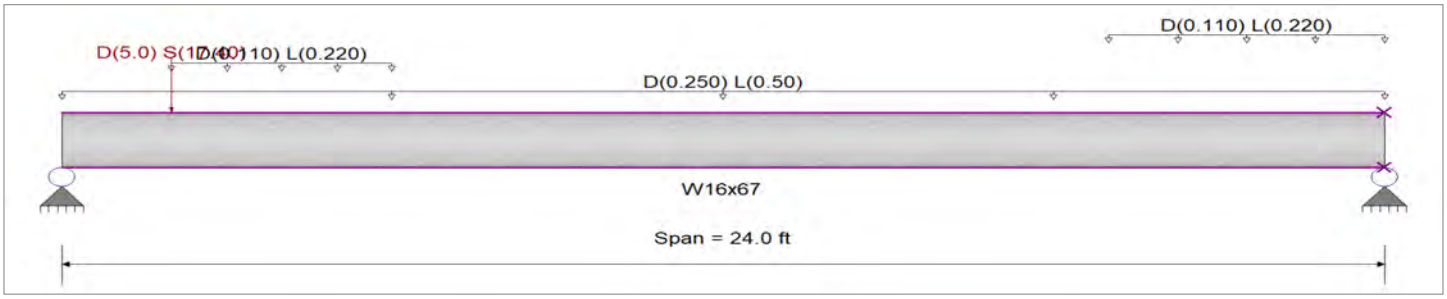
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.020, L = 0.040 ksf, Tributary Width = 12.50 ft, (Top Side Floor Framing)

Uniform Load : D = 0.020, L = 0.040 ksf, Extent = 2.0 -->> 6.0 ft, Tributary Width = 5.50 ft, (Right Side Lower Framing)

Uniform Load : D = 0.020, L = 0.040 ksf, Extent = 19.0 -->> 24.0 ft, Tributary Width = 5.50 ft, (Right Side Lower Framing)

Point Load : D = 5.0, S = 17.40 k @ 2.0 ft, (Post FA)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.227 : 1	Maximum Shear Stress Ratio =	0.201 : 1
Section used for this span	W16x67	Section used for this span	W16x67
Ma : Applied	73.520 k-ft	Va : Applied	25.910 k
Mn / Omega : Allowable	324.351 k-ft	Vn/Omega : Allowable	128.770 k
Load Combination	+D+0.750L+0.750S	Load Combination	+D+0.750L+0.750S
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.149 in	Ratio =	1,930	>=360	
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360	Span: 1 : L Only
Max Downward Total Deflection	0.286 in	Ratio =	1007	>=180	Span: 1 : +D+0.750L+0.750S
Max Upward Total Deflection	0.000 in	Ratio =	0	<180	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 24.00 ft	1	0.092	0.068	29.69		29.69	541.67	324.35	1.00	1.00	8.81	193.16 128.77
+D+L												
Dsgn. L = 24.00 ft	1	0.212	0.122	68.66		68.66	541.67	324.35	1.00	1.00	15.66	193.16 128.77
+D+S												
Dsgn. L = 24.00 ft	1	0.162	0.192	52.39		52.39	541.67	324.35	1.00	1.00	24.76	193.16 128.77
+D+0.750L												
Dsgn. L = 24.00 ft	1	0.182	0.108	58.90		58.90	541.67	324.35	1.00	1.00	13.95	193.16 128.77
+D+0.750L+0.750S												
Dsgn. L = 24.00 ft	1	0.227	0.201	73.52		73.52	541.67	324.35	1.00	1.00	25.91	193.16 128.77
+0.60D												
Dsgn. L = 24.00 ft	1	0.055	0.041	17.81		17.81	541.67	324.35	1.00	1.00	5.29	193.16 128.77

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-6

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S	1	0.2861	11.520		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Upward from all Load Conditions	25.910	11.919	45.681
Max Upward from Load Combinations	25.910	11.919	45.681
Max Upward from Load Cases	15.950	7.132	45.681
Max Downward from all Load Conditions (Resis			45.681
Max Downward from Load Combinations (Resi			45.681
Max Downward from Load Cases (Resisting Up			45.681
D Only	8.812	4.787	45.681
+D+L	15.660	11.919	45.681
+D+S	24.762	6.237	45.681
+D+0.750L	13.948	10.136	45.681
+D+0.750L+0.750S	25.910	11.224	45.681
+0.60D	5.287	2.872	45.681
L Only	6.848	7.132	45.681
S Only	15.950	1.450	45.681

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

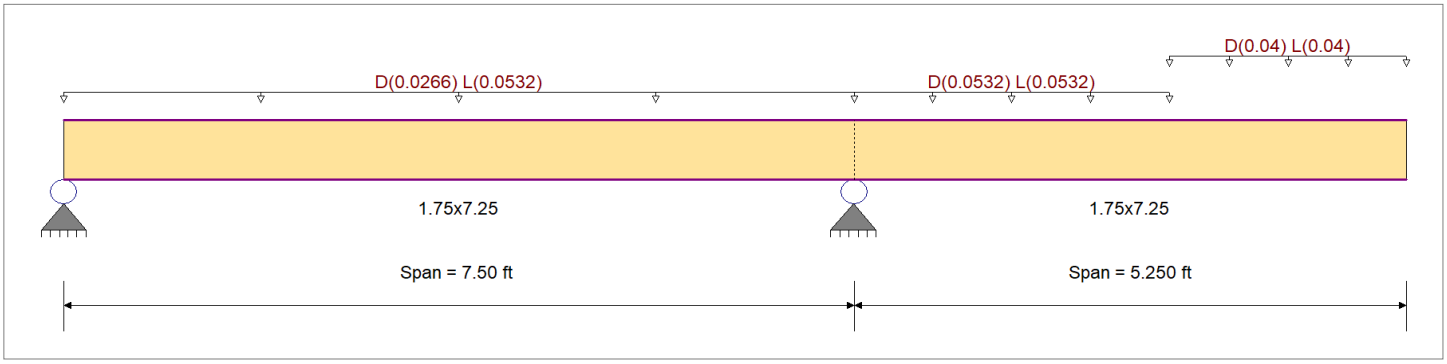
DESCRIPTION: Cantilevered Deck Joist

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	2,800.0 psi	*E : Modulus of Elasticity*	
Load Combination :	IBC 2021	Fb -	2,800.0 psi	Ebend- xx	2,000.0 ksi
		Fc - Prll	3,000.0 psi	Eminbend - xx	1,036.83 ksi
Wood Species :	Boise Cascade	Fc - Perp	750.0 psi		
Wood Grade :	Versa Lam 2800	Fv	285.0 psi		
		Ft	2,100.0 psi	Density	41.760 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight NOT internally calculated and added
Load for Span Number 1
Uniform Load : D = 0.020, L = 0.040 ksf, Tributary Width = 1.330 ft
Load for Span Number 2
Uniform Load : D = 0.040, L = 0.040 ksf, Extent = 0.0 -->> 3.0 ft, Tributary Width = 1.330 ft
Uniform Load : D = 0.040, L = 0.040 k/ft, Extent = 3.0 -->> 5.250 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.323 : 1	Maximum Shear Stress Ratio	=	0.181 : 1
Section used for this span		1.75x7.25	Section used for this span		1.75x7.25
fb: Actual	=	955.96 psi	fv: Actual	=	51.64 psi
F'b	=	2,961.24 psi	F'v	=	285.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	7.500 ft	Location of maximum on span	=	7.500 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.111 in	Ratio =	1132 >=360	Span: 2 : L Only
Max Upward Transient Deflection	-0.005 in	Ratio =	16724 >=360	Span: 1 : L Only
Max Downward Total Deflection	0.261 in	Ratio =	482 >=180	Span: 2 : +D+L
Max Upward Total Deflection	-0.022 in	Ratio =	4063 >=180	Span: 1 : +D+L

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 7.50 ft	1	0.179	0.101	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.61	478.0	2,665.1	0.22	25.8	256.5
Length = 5.250 ft	2	0.179	0.101	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.61	478.0	2,665.1	0.22	25.8	256.5
+D+L					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 7.50 ft	1	0.323	0.181	1.00	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.22	956.0	2,961.2	0.44	51.6	285.0
Length = 5.250 ft	2	0.323	0.181	1.00	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.22	956.0	2,961.2	0.44	51.6	285.0
+D+0.750L					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Cantilevered Deck Joist

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 7.50 ft	**1**	0.226	0.127	1.25	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.07	836.5	3,701.6	0.38	45.2	356.3
Length = 5.250 ft	**2**	0.226	0.127	1.25	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.07	836.5	3,701.6	0.38	45.2	356.3
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 7.50 ft	**1**	0.061	0.034	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.37	286.8	4,738.0	0.13	15.5	456.0
Length = 5.250 ft	**2**	0.061	0.034	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.37	286.8	4,738.0	0.13	15.5	456.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+L	-0.0221	5.447
+D+L	2	0.2607	5.250		0.0000	5.447

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	0.136	0.961	
Max Upward from Load Combinations	0.136	0.961	
Max Upward from Load Cases	0.118	0.531	
D Only	0.018	0.431	
+D+L	0.136	0.961	
+D+0.750L	0.107	0.829	
+0.60D	0.011	0.258	
L Only	0.118	0.531	

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-20

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

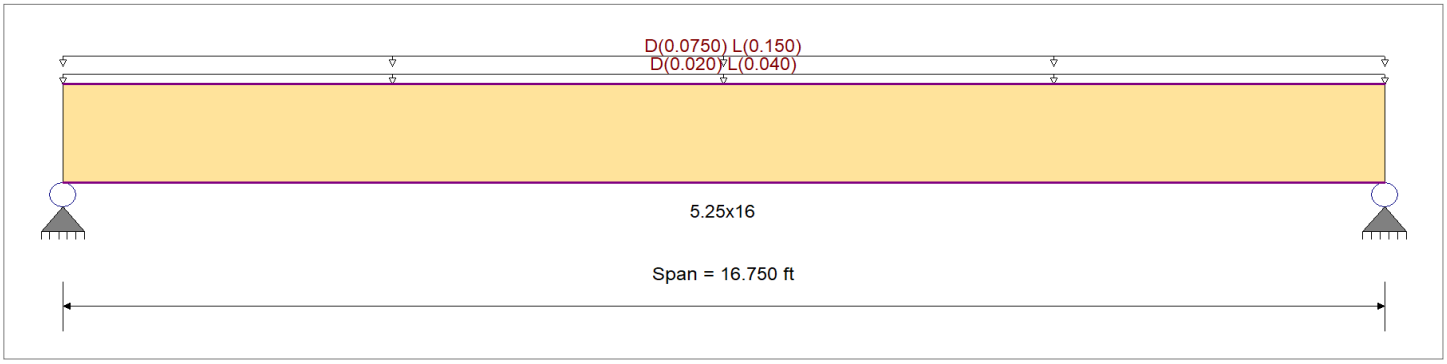
Wood Species : Boise Cascade
Wood Grade : Versa Lam 3100

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	3,100.0 psi
Fb -	3,100.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, L = 0.040 k/ft
Partial Length Uniform Load : D = 0.0750, L = 0.150 k/ft, Extent = 0.0 -->> 16.750 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.194 : 1	Maximum Shear Stress Ratio	=	0.137 : 1
Section used for this span		5.25x16	Section used for this span		5.25x16
fb: Actual	=	581.22 psi	fv: Actual	=	39.17 psi
F'b	=	3,002.48 psi	F'v	=	285.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	8.375 ft	Location of maximum on span	=	15.466 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.094 in	Ratio =	2128 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.154 in	Ratio =	1307 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 16.750 ft	1	0.083	0.059	0.90	1.00	1.00	1.00	0.969	1.00	1.00	1.00	4.19	224.2	2,702.2	0.85	15.1	256.5
+D+L					1.00	1.00	1.00	0.969	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.750 ft	1	0.194	0.137	1.00	1.00	1.00	1.00	0.969	1.00	1.00	1.00	10.85	581.2	3,002.5	2.19	39.2	285.0
+D+0.750L					1.00	1.00	1.00	0.969	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.750 ft	1	0.131	0.093	1.25	1.00	1.00	1.00	0.969	1.00	1.00	1.00	9.18	492.0	3,753.1	1.86	33.2	356.3
+0.60D					1.00	1.00	1.00	0.969	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.750 ft	1	0.028	0.020	1.60	1.00	1.00	1.00	0.969	1.00	1.00	1.00	2.51	134.5	4,804.0	0.51	9.1	456.0

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-20

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.1538	8.436		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	2.591	2.591
Max Upward from Load Combinations	2.591	2.591
Max Upward from Load Cases	1.591	1.591
D Only	1.000	1.000
+D+L	2.591	2.591
+D+0.750L	2.193	2.193
+0.60D	0.600	0.600
L Only	1.591	1.591

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-21

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

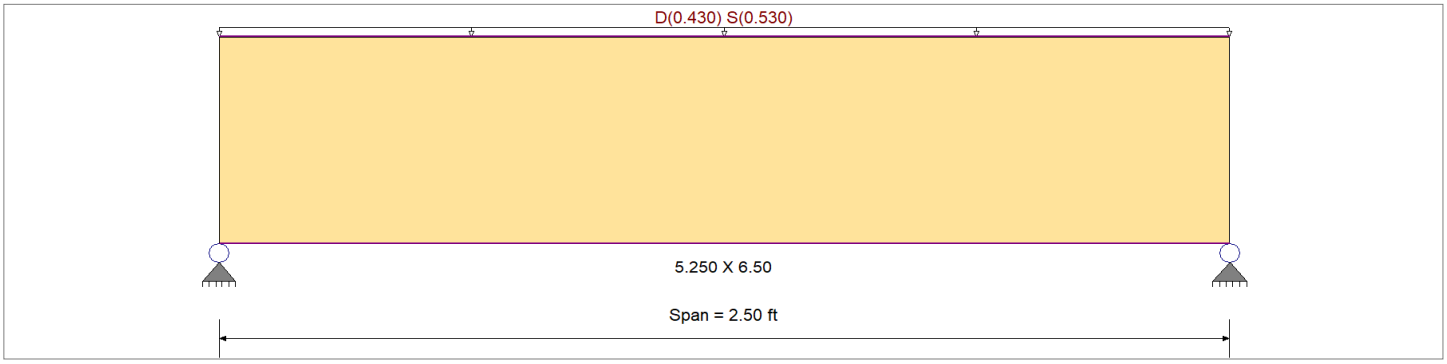
Wood Species : Boise Cascade
Wood Grade : Versa Lam 2800

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,800.0 psi
Fb -	2,800.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.430, S = 0.530 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.071 : 1	Maximum Shear Stress Ratio	=	0.092 : 1
Section used for this span		5.250 X 6.50	Section used for this span		5.250 X 6.50
fb: Actual	=	243.45 psi	fv: Actual	=	30.03 psi
F'b	=	3,405.43 psi	F'v	=	327.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	1.250 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.002 in	Ratio =	15385	>=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.004 in	Ratio =	8494	>=180	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 2.50 ft	1	0.041	0.052	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.34	109.0	2,665.1	0.31	13.5	256.5
+D+S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.50 ft	1	0.071	0.092	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.75	243.4	3,405.4	0.68	30.0	327.8
+D+0.750S					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.50 ft	1	0.062	0.079	1.15	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.65	209.8	3,405.4	0.59	25.9	327.8
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 2.50 ft	1	0.014	0.018	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.20	65.4	4,738.0	0.18	8.1	456.0

Wood Beam

DESCRIPTION: B2-21

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0035	1.259		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.200	1.200
Max Upward from Load Combinations	1.200	1.200
Max Upward from Load Cases	0.663	0.663
D Only	0.538	0.538
+D+S	1.200	1.200
+D+0.750S	1.034	1.034
+0.60D	0.323	0.323
S Only	0.663	0.663

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-22

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

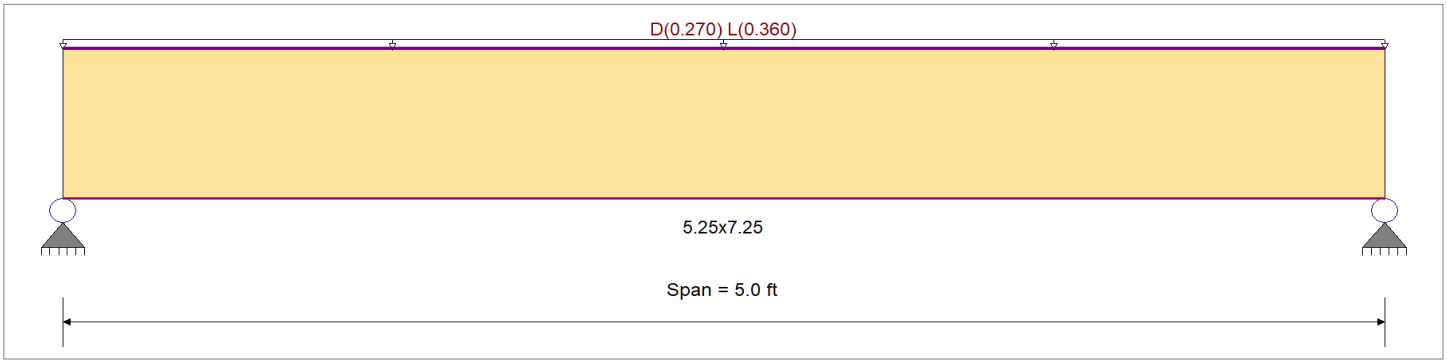
Wood Species : Boise Cascade
Wood Grade : Versa Lam 2800

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,800.0 psi
Fb -	2,800.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.030, L = 0.040 ksf, Tributary Width = 9.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.173 : 1	Maximum Shear Stress Ratio	=	0.165 : 1
Section used for this span		5.25x7.25	Section used for this span		5.25x7.25
fb: Actual	=	513.67 psi	fv: Actual	=	47.12 psi
F'b	=	2,961.24 psi	F'v	=	285.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	2.500 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.015 in	Ratio =	3928 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.027 in	Ratio =	2245 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.083	0.079	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.84	220.1	2,665.1	0.51	20.2	256.5
+D+L					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.173	0.165	1.00	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.97	513.7	2,961.2	1.20	47.1	285.0
+D+0.750L					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.119	0.113	1.25	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.69	440.3	3,701.6	1.02	40.4	356.3
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.028	0.027	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	0.51	132.1	4,738.0	0.31	12.1	456.0

Wood Beam

DESCRIPTION: B2-22

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0267	2.518		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.575	1.575
Max Upward from Load Combinations	1.575	1.575
Max Upward from Load Cases	0.900	0.900
D Only	0.675	0.675
+D+L	1.575	1.575
+D+0.750L	1.350	1.350
+0.60D	0.405	0.405
L Only	0.900	0.900

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-23

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

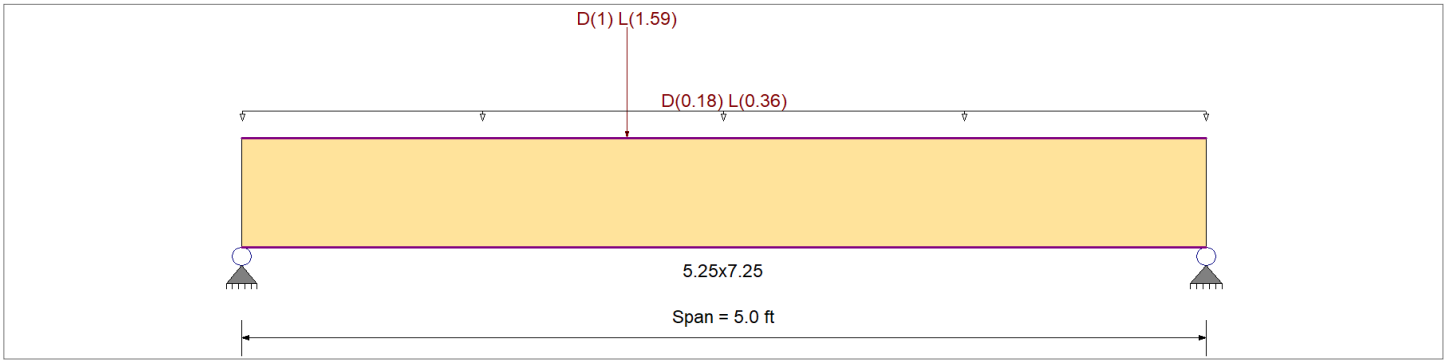
Wood Species : Boise Cascade
Wood Grade : Versa Lam 2800

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2,800.0 psi
Fb -	2,800.0 psi
Fc - Prll	3,000.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	2,100.0 psi

E : Modulus of Elasticity

Ebend- xx	2,000.0 ksi
Eminbend - xx	1,036.83 ksi
Density	41.760 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Point Load : D = 1.0, L = 1.590 k @ 2.0 ft
Uniform Load : D = 0.020, L = 0.040 ksf, Tributary Width = 9.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.416 : 1	Maximum Shear Stress Ratio	=	0.357 : 1
Section used for this span		5.25x7.25	Section used for this span		5.25x7.25
fb: Actual	=	1,232.14 psi	fv: Actual	=	101.63 psi
F'b	=	2,961.24 psi	F'v	=	285.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	2.007 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.036 in	Ratio =	1680 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.056 in	Ratio =	1067 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.170	0.145	0.90	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.74	453.4	2,665.1	0.94	37.1	256.5
+D+L					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.416	0.357	1.00	1.00	1.00	1.00	1.058	1.00	1.00	1.00	4.72	1,232.1	2,961.2	2.58	101.6	285.0
+D+0.750L					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.280	0.240	1.25	1.00	1.00	1.00	1.058	1.00	1.00	1.00	3.98	1,037.5	3,701.6	2.17	85.5	356.3
+0.60D					1.00	1.00	1.00	1.058	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.057	0.049	1.60	1.00	1.00	1.00	1.058	1.00	1.00	1.00	1.04	272.0	4,738.0	0.56	22.3	456.0

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Wood Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B2-23

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0562	2.427		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	2.904	2.386
Max Upward from Load Combinations	2.904	2.386
Max Upward from Load Cases	1.854	1.536
D Only	1.050	0.850
+D+L	2.904	2.386
+D+0.750L	2.441	2.002
+0.60D	0.630	0.510
L Only	1.854	1.536

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

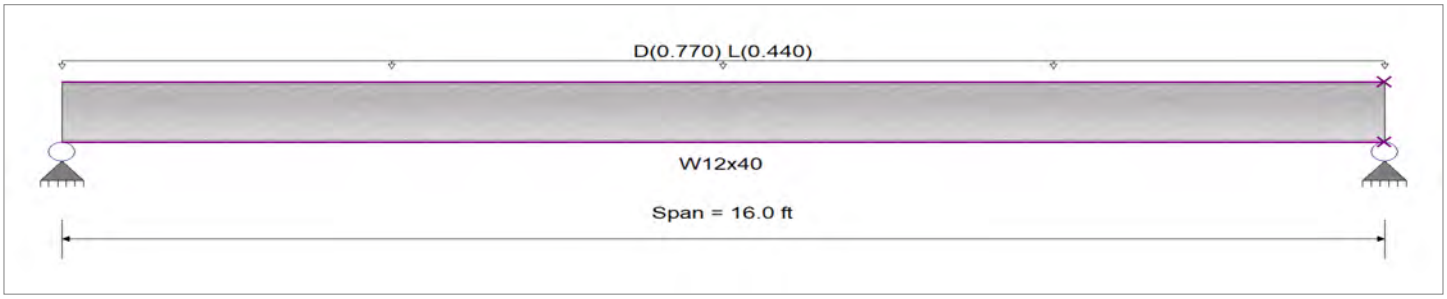
DESCRIPTION: B1-1

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.070, L = 0.040 ksf, Tributary Width = 11.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.272 : 1	Maximum Shear Stress Ratio =	0.138 : 1
Section used for this span	W12x40	Section used for this span	W12x40
Ma : Applied	38.720 k-ft	Va : Applied	9.680 k
Mn / Omega : Allowable	142.216 k-ft	Vn/Omega : Allowable	70.210 k
Load Combination	+D+L	Load Combination	+D+L
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.073 in	Ratio =	2,622	>=360	
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360	Span: 1 : L Only
Max Downward Total Deflection	0.201 in	Ratio =	954	>=180	Span: 1 : +D+L
Max Upward Total Deflection	0.000 in	Ratio =	0	<180	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 16.00 ft	1	0.173	0.088	24.64		24.64	237.50	142.22	1.00	1.00	6.16	105.32 70.21
+D+L												
Dsgn. L = 16.00 ft	1	0.272	0.138	38.72		38.72	237.50	142.22	1.00	1.00	9.68	105.32 70.21
+D+0.750L												
Dsgn. L = 16.00 ft	1	0.248	0.125	35.20		35.20	237.50	142.22	1.00	1.00	8.80	105.32 70.21
+0.60D												
Dsgn. L = 16.00 ft	1	0.104	0.053	14.78		14.78	237.50	142.22	1.00	1.00	3.70	105.32 70.21

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.2013	8.046		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Upward from all Load Conditions	9.680	9.680	29.171
Max Upward from Load Combinations	9.680	9.680	29.171
Max Upward from Load Cases	6.160	6.160	29.171
Max Downward from all Load Conditions (Resis			29.171
Max Downward from Load Combinations (Resi			29.171
Max Downward from Load Cases (Resisting Up			29.171

Steel Beam

DESCRIPTION: B1-1

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
D Only	6.160	6.160	29.171
+D+L	9.680	9.680	29.171
+D+0.750L	8.800	8.800	29.171
+0.60D	3.696	3.696	29.171
L Only	3.520	3.520	29.171

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

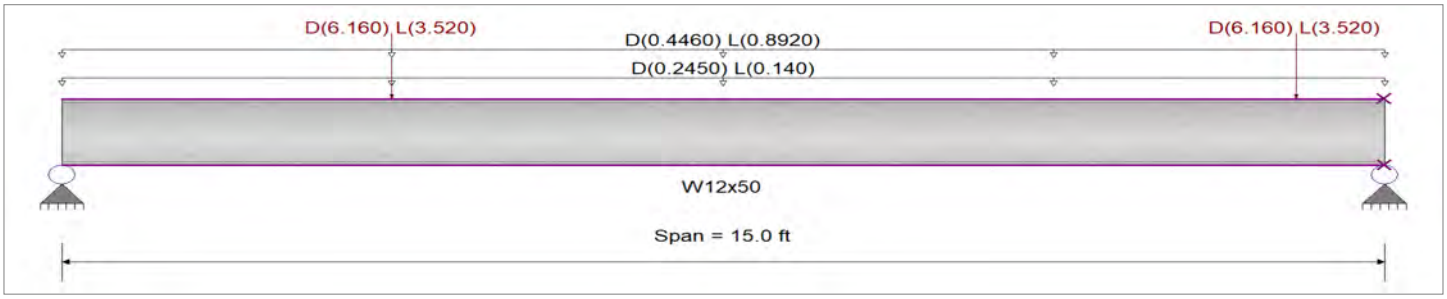
DESCRIPTION: B1-2

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.070, L = 0.040 ksf, Tributary Width = 3.50 ft, (PAN DECK)

Point Load : D = 6.160, L = 3.520 k @ 3.750 ft

Point Load : D = 6.160, L = 3.520 k @ 14.0 ft

Uniform Load : D = 0.4460, L = 0.8920 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.403 : 1	Maximum Shear Stress Ratio =	0.270 : 1
Section used for this span	W12x50	Section used for this span	W12x50
Ma : Applied	72.363 k-ft	Va : Applied	24.377 k
Mn / Omega : Allowable	179.391 k-ft	Vn/Omega : Allowable	90.280 k
Load Combination	+D+L	Load Combination	+D+L
		Location of maximum on span	15.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.138 in	Ratio =	1,306	>=360	
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360	Span: 1 : L Only
Max Downward Total Deflection	0.266 in	Ratio =	676	>=180	Span: 1 : +D+L
Max Upward Total Deflection	0.000 in	Ratio =	0	<180	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 15.00 ft	1	0.195	0.138	34.99		34.99	299.58	179.39	1.00	1.00	12.47	135.42 90.28
+D+L												
Dsgn. L = 15.00 ft	1	0.403	0.270	72.36		72.36	299.58	179.39	1.00	1.00	24.38	135.42 90.28
+D+0.750L												
Dsgn. L = 15.00 ft	1	0.351	0.237	62.99		62.99	299.58	179.39	1.00	1.00	21.40	135.42 90.28
+0.60D												
Dsgn. L = 15.00 ft	1	0.117	0.083	20.99		20.99	299.58	179.39	1.00	1.00	7.48	135.42 90.28

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.2664	7.371		0.0000	0.000

Steel Beam

DESCRIPTION: B1-2

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Upward from all Load Conditions	20.828	24.377	29.171
Max Upward from Load Combinations	20.828	24.377	29.171
Max Upward from Load Cases	10.615	12.472	29.171
Max Downward from all Load Conditions (Resis			29.171
Max Downward from Load Combinations (Resi			29.171
Max Downward from Load Cases (Resisting Up			29.171
D Only	10.213	12.472	29.171
+D+L	20.828	24.377	29.171
+D+0.750L	18.174	21.401	29.171
+0.60D	6.128	7.483	29.171
L Only	10.615	11.905	29.171

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

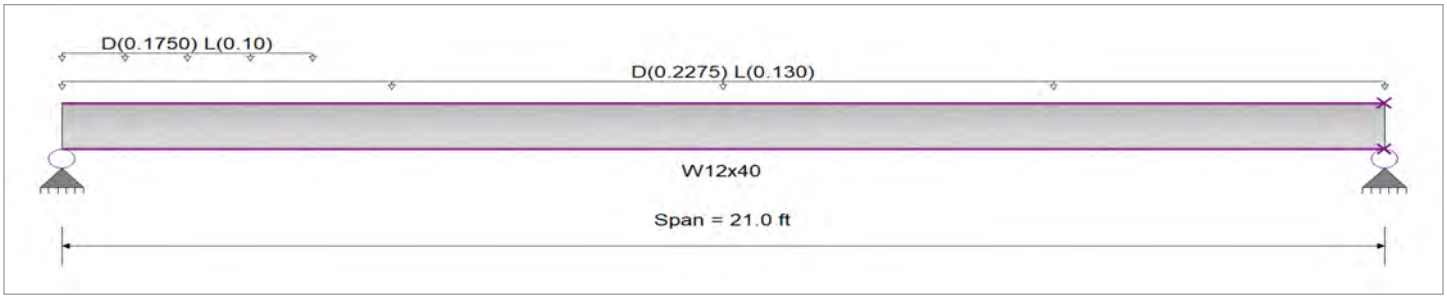
DESCRIPTION: B1-3

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.070, L = 0.040 ksf, Tributary Width = 3.250 ft

Partial Length Uniform Load : D = 0.070, L = 0.040 ksf, Extent = 0.0 -->> 4.0 ft, Tributary Width = 2.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.146 : 1	Maximum Shear Stress Ratio =	0.068 : 1
Section used for this span	W12x40	Section used for this span	W12x40
Ma : Applied	20.823 k-ft	Va : Applied	4.749 k
Mn / Omega : Allowable	142.216 k-ft	Vn/Omega : Allowable	70.210 k
Load Combination	+D+L	Load Combination	+D+L
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.068 in	Ratio =	3,684	>=360	
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360	Span: 1 : L Only
Max Downward Total Deflection	0.188 in	Ratio =	1340	>=180	Span: 1 : +D+L
Max Upward Total Deflection	0.000 in	Ratio =	0	<180	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega	
D Only													
Dsgn. L = 21.00 ft	1	0.093	0.043	13.25		13.25	237.50	142.22	1.00	1.00	3.02	105.32	70.21
+D+L													
Dsgn. L = 21.00 ft	1	0.146	0.068	20.82		20.82	237.50	142.22	1.00	1.00	4.75	105.32	70.21
+D+0.750L													
Dsgn. L = 21.00 ft	1	0.133	0.061	18.93		18.93	237.50	142.22	1.00	1.00	4.32	105.32	70.21
+0.60D													
Dsgn. L = 21.00 ft	1	0.056	0.026	7.95		7.95	237.50	142.22	1.00	1.00	1.81	105.32	70.21

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.1881	10.440		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Upward from all Load Conditions	4.749	3.859	29.171
Max Upward from Load Combinations	4.749	3.859	29.171
Max Upward from Load Cases	3.022	2.455	29.171
Max Downward from all Load Conditions (Resis			29.171

Steel Beam

DESCRIPTION: B1-3

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Downward from Load Combinations (Resi			29.171
Max Downward from Load Cases (Resisting Up			29.171
D Only	3.022	2.455	29.171
+D+L	4.749	3.859	29.171
+D+0.750L	4.317	3.508	29.171
+0.60D	1.813	1.473	29.171
L Only	1.727	1.403	29.171

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

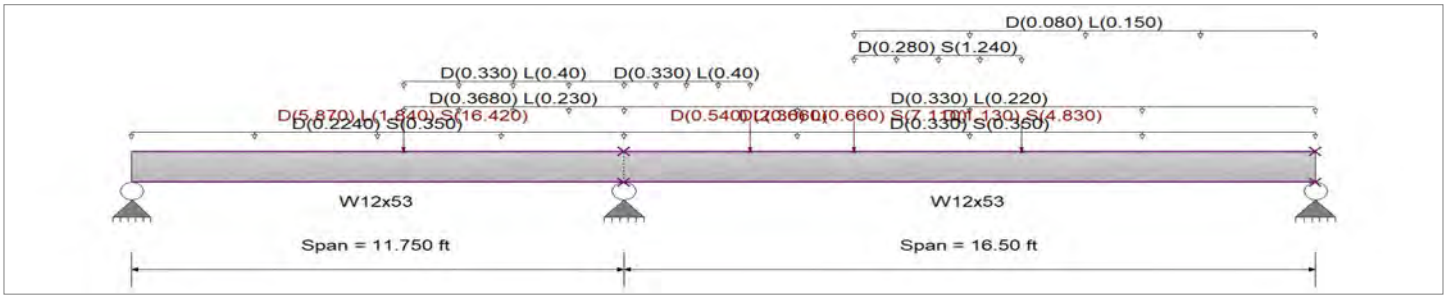
DESCRIPTION: B1-4

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Load for Span Number 1
Uniform Load : D = 0.0640, S = 0.10 ksf, Tributary Width = 3.50 ft, (Green Roof Pan Deck)

Uniform Load : D = 0.0640, L = 0.040 ksf, Extent = 6.50 -->> 11.750 ft, Tributary Width = 5.750 ft, (Interior Pan Deck)

Uniform Load : D = 0.330, L = 0.40 k/ft, Extent = 6.50 -->> 11.750 ft, Tributary Width = 1.0 ft, (Wall Above)

Point Load : D = 5.870, L = 1.840, S = 16.420 k @ 6.50 ft, (B1-5 Point Load)

Load for Span Number 2
Uniform Load : D = 0.330, S = 0.350 k/ft, Tributary Width = 1.0 ft, (Green Roof Pan Deck)

Uniform Load : D = 0.330, L = 0.220 k/ft, Tributary Width = 1.0 ft, (Interior Pan Deck)

Uniform Load : D = 0.330, L = 0.40 k/ft, Extent = 0.0 -->> 3.0 ft, Tributary Width = 1.0 ft, (Wall Above)

Point Load : D = 0.540, L = 0.660 k @ 3.0 ft, (Post FA 1)

Point Load : D = 2.30, L = 0.660, S = 7.110 k @ 5.50 ft, (Post FA 2)

Uniform Load : D = 0.280, S = 1.240 k/ft, Extent = 5.50 -->> 9.50 ft, Tributary Width = 1.0 ft, (Wall FA2)

Point Load : D = 1.130, S = 4.830 k @ 9.50 ft

Uniform Load : D = 0.080, L = 0.150 k/ft, Extent = 5.50 -->> 16.50 ft, Tributary Width = 1.0 ft, (Wall Above)

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B1-4

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.459 : 1	Maximum Shear Stress Ratio =	0.335 : 1
Section used for this span	W12x53	Section used for this span	W12x53
Ma : Applied	89.251 k-ft	Va : Applied	27.939 k
Mn / Omega : Allowable	194.361 k-ft	Vn/Omega : Allowable	83.490 k
Load Combination	+D+S	Load Combination	+D+0.750L+0.750S
		Location of maximum on span	11.750 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.122 in	Ratio =	1,625	>=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.003 in	Ratio =	52,001	>=360	Span: 2 : S Only
Max Downward Total Deflection	0.206 in	Ratio =	960	>=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.007 in	Ratio =	20292	>=180	Span: 2 : +D+0.750L+0.750S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega	
D Only													
Dsgn. L = 11.75 ft	1	0.178	0.147	7.94	-34.63	34.63	324.58	194.36	1.00	1.00	12.24	125.24	83.49
Dsgn. L = 16.50 ft	2	0.178	0.147	25.97	-34.63	34.63	324.58	194.36	1.00	1.00	12.24	125.24	83.49
+D+L													
Dsgn. L = 11.75 ft	1	0.246	0.209	10.75	-47.87	47.87	324.58	194.36	1.00	1.00	17.48	125.24	83.49
Dsgn. L = 16.50 ft	2	0.246	0.209	34.83	-47.87	47.87	324.58	194.36	1.00	1.00	17.48	125.24	83.49
+D+S													
Dsgn. L = 11.75 ft	1	0.459	0.335	31.35	-89.25	89.25	324.58	194.36	1.00	1.00	27.93	125.24	83.49
Dsgn. L = 16.50 ft	2	0.459	0.335	66.25	-89.25	89.25	324.58	194.36	1.00	1.00	27.93	125.24	83.49
+D+0.750L													
Dsgn. L = 11.75 ft	1	0.229	0.194	10.05	-44.56	44.56	324.58	194.36	1.00	1.00	16.17	125.24	83.49
Dsgn. L = 16.50 ft	2	0.229	0.194	32.61	-44.56	44.56	324.58	194.36	1.00	1.00	16.17	125.24	83.49
+D+0.750L+0.750S													
Dsgn. L = 11.75 ft	1	0.440	0.335	27.60	-85.53	85.53	324.58	194.36	1.00	1.00	27.94	125.24	83.49
Dsgn. L = 16.50 ft	2	0.440	0.335	62.83	-85.53	85.53	324.58	194.36	1.00	1.00	27.94	125.24	83.49
+0.60D													
Dsgn. L = 11.75 ft	1	0.107	0.088	4.76	-20.78	20.78	324.58	194.36	1.00	1.00	7.34	125.24	83.49
Dsgn. L = 16.50 ft	2	0.107	0.088	15.58	-20.78	20.78	324.58	194.36	1.00	1.00	7.34	125.24	83.49

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0302	4.841	+D+0.750L+0.750S	-0.0069	10.528
+D+S	2	0.2063	8.976		0.0000	10.528

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	6.866	54.390	13.644
Max Upward from Load Combinations	6.866	54.390	13.644
Max Upward from Load Cases	4.744	31.481	6.982
D Only	2.122	22.908	6.486
+D+L	2.556	32.861	9.047
+D+S	6.866	54.390	13.468
+D+0.750L	2.448	30.373	8.407
+D+0.750L+0.750S	6.006	53.984	13.644
+0.60D	1.273	13.745	3.891
L Only	0.434	9.952	2.561
S Only	4.744	31.481	6.982

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B1-5

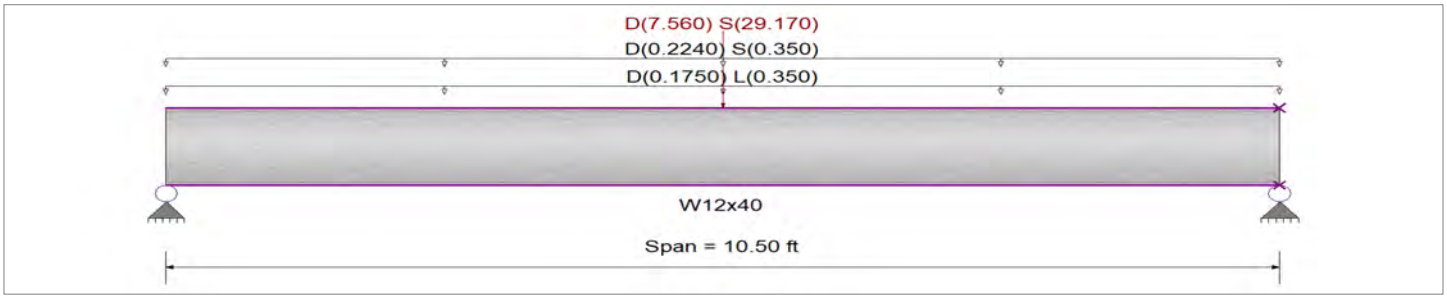
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.020, L = 0.040 ksf, Tributary Width = 8.750 ft, (Floor Above)

Point Load : D = 7.560, S = 29.170 k @ 5.250 ft, (C1)

Uniform Load : D = 0.0640, S = 0.10 ksf, Tributary Width = 3.50 ft, (Pan Deck)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.751 : 1	Maximum Shear Stress Ratio =	0.318 : 1
Section used for this span	W12x40	Section used for this span	W12x40
Ma : Applied	106.738 k-ft	Va : Applied	22.297 k
Mn / Omega : Allowable	142.216 k-ft	Vn/Omega : Allowable	70.210 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.148 in	Ratio =	851	>=360	
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360	Span: 1 : S Only
Max Downward Total Deflection	0.196 in	Ratio =	644	>=180	Span: 1 : +D+S
Max Upward Total Deflection	0.000 in	Ratio =	0	<180	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 10.50 ft	1	0.178	0.084	25.34		25.34	237.50	142.22	1.00	1.00	5.87	105.32	70.21
+D+L													
Dsgn. L = 10.50 ft	1	0.212	0.110	30.17		30.17	237.50	142.22	1.00	1.00	7.71	105.32	70.21
+D+S													
Dsgn. L = 10.50 ft	1	0.751	0.318	106.74		106.74	237.50	142.22	1.00	1.00	22.30	105.32	70.21
+D+0.750L													
Dsgn. L = 10.50 ft	1	0.204	0.103	28.96		28.96	237.50	142.22	1.00	1.00	7.25	105.32	70.21
+D+0.750L+0.750S													
Dsgn. L = 10.50 ft	1	0.633	0.279	90.01		90.01	237.50	142.22	1.00	1.00	19.57	105.32	70.21
+0.60D													
Dsgn. L = 10.50 ft	1	0.107	0.050	15.21		15.21	237.50	142.22	1.00	1.00	3.52	105.32	70.21

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.1958	5.280		0.0000	0.000

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B1-5

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Upward from all Load Conditions	22.297	22.297	6.982
Max Upward from Load Combinations	22.297	22.297	6.982
Max Upward from Load Cases	16.423	16.423	6.982
Max Downward from all Load Conditions (Resis			6.982
Max Downward from Load Combinations (Resi			6.982
Max Downward from Load Cases (Resisting Up			6.982
D Only	5.875	5.875	6.982
+D+L	7.712	7.712	6.982
+D+S	22.297	22.297	6.982
+D+0.750L	7.253	7.253	6.982
+D+0.750L+0.750S	19.570	19.570	6.982
+0.60D	3.525	3.525	6.982
L Only	1.838	1.838	6.982
S Only	16.423	16.423	6.982

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

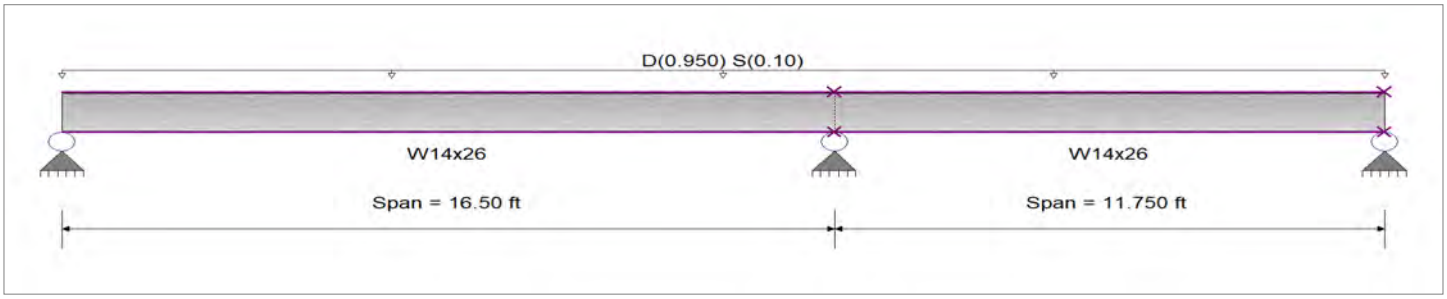
DESCRIPTION: B1-6

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.950, S = 0.10 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.283 : 1	Maximum Shear Stress Ratio =	0.146 : 1
Section used for this span	W14x26	Section used for this span	W14x26
Ma : Applied	28.407 k-ft	Va : Applied	10.384 k
Mn / Omega : Allowable	100.299 k-ft	Vn/Omega : Allowable	70.890 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	16.500 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.013 in	Ratio =	15,754	>=360	Span: 2 : S Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360	Span: 2 : S Only
Max Downward Total Deflection	0.132 in	Ratio =	1500	>=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.009 in	Ratio =	16337	>=180	Span: 2 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 16.50 ft	1	0.256	0.133	20.76	-25.70	25.70	167.50	100.30	1.00	1.00	9.40	106.34	70.89
Dsgn. L = 11.75 ft	2	0.256	0.110	6.06	-25.70	25.70	167.50	100.30	1.00	1.00	7.77	106.34	70.89
+D+S												
Dsgn. L = 16.50 ft	1	0.283	0.146	22.94	-28.41	28.41	167.50	100.30	1.00	1.00	10.38	106.34	70.89
Dsgn. L = 11.75 ft	2	0.283	0.121	6.70	-28.41	28.41	167.50	100.30	1.00	1.00	8.59	106.34	70.89
+D+0.750S												
Dsgn. L = 16.50 ft	1	0.276	0.143	22.39	-27.73	27.73	167.50	100.30	1.00	1.00	10.14	106.34	70.89
Dsgn. L = 11.75 ft	2	0.276	0.118	6.54	-27.73	27.73	167.50	100.30	1.00	1.00	8.38	106.34	70.89
+0.60D												
Dsgn. L = 16.50 ft	1	0.154	0.080	12.45	-15.42	15.42	167.50	100.30	1.00	1.00	5.64	106.34	70.89
Dsgn. L = 11.75 ft	2	0.154	0.066	3.64	-15.42	15.42	167.50	100.30	1.00	1.00	4.66	106.34	70.89

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.1320	7.392		0.0000	0.000
+D+S	2	0.0079	8.272	+D+S	-0.0086	1.974

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	6.941	18.971	3.751

Steel Beam

DESCRIPTION: B1-6

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from Load Combinations	6.941	18.971	3.751
Max Upward from Load Cases	6.280	17.164	3.394
D Only	6.280	17.164	3.394
+D+S	6.941	18.971	3.751
+D+0.750S	6.776	18.519	3.662
+0.60D	3.768	10.298	2.036
S Only	0.661	1.807	0.357

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

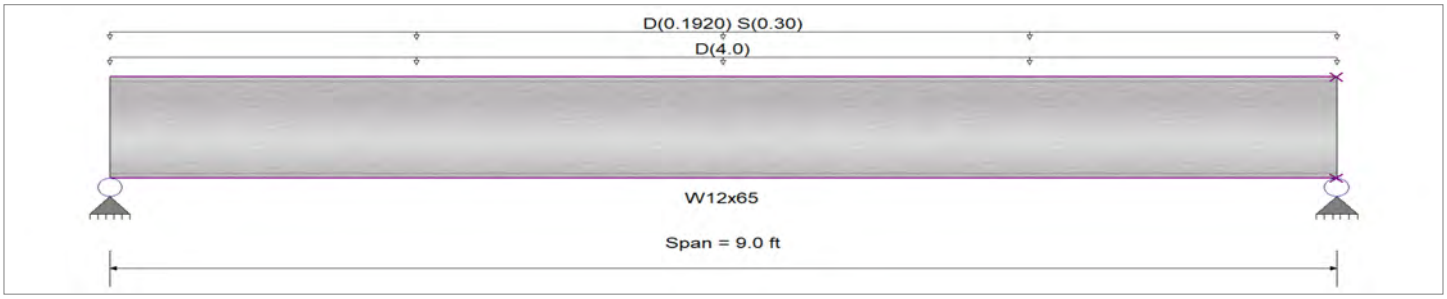
DESCRIPTION: B1-7

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight NOT internally calculated and added
Uniform Load : D = 4.0 k/ft, Tributary Width = 1.0 ft, (CMU + Stone Weight)

Uniform Load : D = 0.0640, S = 0.10 ksf, Tributary Width = 3.0 ft, (Pan Deck Weight)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.192 : 1	Maximum Shear Stress Ratio =	0.214 : 1
Section used for this span	W12x65	Section used for this span	W12x65
Ma : Applied	45.482 k-ft	Va : Applied	20.214 k
Mn / Omega : Allowable	237.004 k-ft	Vn/Omega : Allowable	94.380 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.003 in	Ratio =	37,522	>=360	
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360	Span: 1 : S Only
Max Downward Total Deflection	0.043 in	Ratio =	2506	>=180	Span: 1 : +D+S
Max Upward Total Deflection	0.000 in	Ratio =	0	<180	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 9.00 ft	1	0.179	0.200	42.44		42.44	395.80	237.00	1.00	1.00	18.86	141.57 94.38
+D+S												
Dsgn. L = 9.00 ft	1	0.192	0.214	45.48		45.48	395.80	237.00	1.00	1.00	20.21	141.57 94.38
+D+0.750S												
Dsgn. L = 9.00 ft	1	0.189	0.211	44.72		44.72	395.80	237.00	1.00	1.00	19.88	141.57 94.38
+0.60D												
Dsgn. L = 9.00 ft	1	0.107	0.120	25.47		25.47	395.80	237.00	1.00	1.00	11.32	141.57 94.38

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0431	4.526		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Upward from all Load Conditions	20.214	20.214	0.357
Max Upward from Load Combinations	20.214	20.214	0.357
Max Upward from Load Cases	18.864	18.864	0.357
Max Downward from all Load Conditions (Resis			0.357
Max Downward from Load Combinations (Resi			0.357

Steel Beam

DESCRIPTION: B1-7

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Downward from Load Cases (Resisting Up			0.357
D Only	18.864	18.864	0.357
+D+S	20.214	20.214	0.357
+D+0.750S	19.877	19.877	0.357
+0.60D	11.318	11.318	0.357
S Only	1.350	1.350	0.357

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B1-8

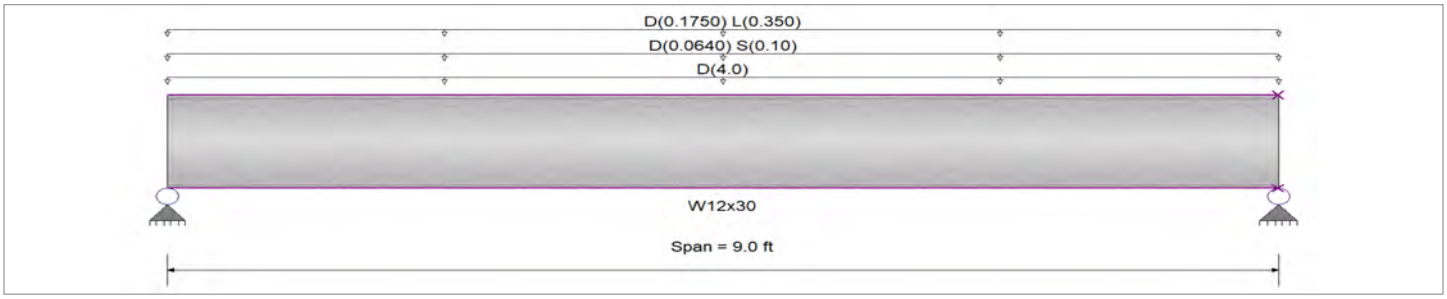
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight NOT internally calculated and added
Uniform Load : D = 4.0 k/ft, Tributary Width = 1.0 ft, (CMU + Stone Weight)

Uniform Load : D = 0.0640, S = 0.10 ksf, Tributary Width = 1.0 ft, (Pan Deck Weight)

Uniform Load : D = 0.020, L = 0.040 ksf, Tributary Width = 8.750 ft, (Floor Above)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.432 : 1	Maximum Shear Stress Ratio =	0.323 : 1
Section used for this span	W12x30	Section used for this span	W12x30
Ma : Applied	46.464 k-ft	Va : Applied	20.651 k
Mn / Omega : Allowable	107.535 k-ft	Vn/Omega : Allowable	63.960 k
Load Combination	+D+L	Load Combination	+D+L
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.008 in	Ratio =	14,361	>=360	
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360	Span: 1 : L Only
Max Downward Total Deflection	0.099 in	Ratio =	1095	>=180	Span: 1 : +D+L
Max Upward Total Deflection	0.000 in	Ratio =	0	<180	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 9.00 ft	1	0.399	0.298	42.92		42.92	179.58	107.53	1.00	1.00	19.08	95.94	63.96
+D+L													
Dsgn. L = 9.00 ft	1	0.432	0.323	46.46		46.46	179.58	107.53	1.00	1.00	20.65	95.94	63.96
+D+S													
Dsgn. L = 9.00 ft	1	0.409	0.305	43.93		43.93	179.58	107.53	1.00	1.00	19.53	95.94	63.96
+D+0.750L													
Dsgn. L = 9.00 ft	1	0.424	0.317	45.58		45.58	179.58	107.53	1.00	1.00	20.26	95.94	63.96
+D+0.750L+0.750S													
Dsgn. L = 9.00 ft	1	0.431	0.322	46.34		46.34	179.58	107.53	1.00	1.00	20.59	95.94	63.96
+0.60D													
Dsgn. L = 9.00 ft	1	0.239	0.179	25.75		25.75	179.58	107.53	1.00	1.00	11.45	95.94	63.96

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0986	4.526		0.0000	0.000

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B1-8

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Upward from all Load Conditions	20.651	20.651	0.357
Max Upward from Load Combinations	20.651	20.651	0.357
Max Upward from Load Cases	19.076	19.076	0.357
Max Downward from all Load Conditions (Resis			0.357
Max Downward from Load Combinations (Resi			0.357
Max Downward from Load Cases (Resisting Up			0.357
D Only	19.076	19.076	0.357
+D+L	20.651	20.651	0.357
+D+S	19.526	19.526	0.357
+D+0.750L	20.257	20.257	0.357
+D+0.750L+0.750S	20.594	20.594	0.357
+0.60D	11.445	11.445	0.357
L Only	1.575	1.575	0.357
S Only	0.450	0.450	0.357

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B1-9

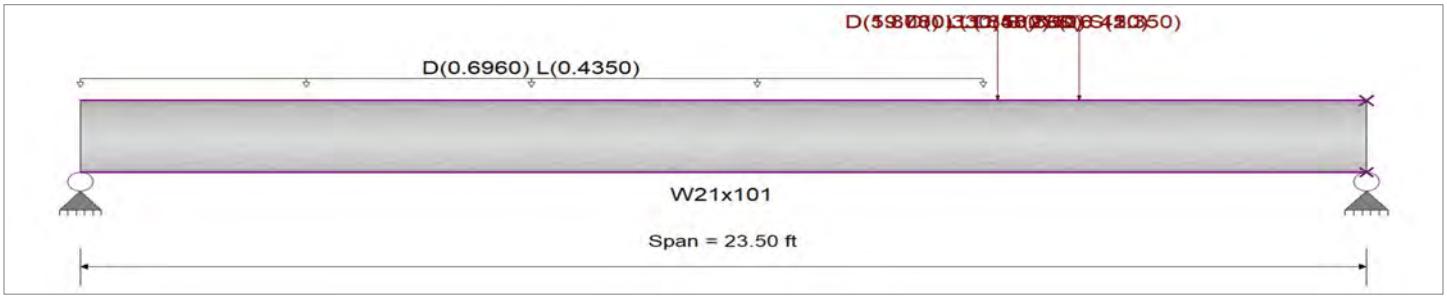
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
Load for Span Number 1
Uniform Load : D = 0.0640, L = 0.040 ksf, Extent = 0.0 -->> 16.50 ft, Tributary Width = 10.875 ft, (Pan Deck)

Point Load : D = 0.330, S = 2.10 k @ 16.750 ft, (C1)

Point Load : D = 5.870, L = 1.840, S = 16.420 k @ 16.750 ft, (B1-5)

Point Load : D = 19.080, L = 1.580, S = 0.450 k @ 16.750 ft, (B1-8)

Point Load : D = 18.860, S = 1.350 k @ 18.250 ft, (B1-8)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.510 : 1	Maximum Shear Stress Ratio =	0.245 : 1
Section used for this span	W21x101	Section used for this span	W21x101
Ma : Applied	322.168 k-ft	Va : Applied	52.534 k
Mn / Omega : Allowable	631.238 k-ft	Vn/Omega : Allowable	214.0 k
Load Combination	+D+0.750L+0.750S	Load Combination	+D+0.750L+0.750S
		Location of maximum on span	23.500 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.104 in	Ratio =	2,704	>=360	
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360	Span: 1 : S Only
Max Downward Total Deflection	0.392 in	Ratio =	720	>=180	Span: 1 : +D+0.750L+0.750S
Max Upward Total Deflection	0.000 in	Ratio =	0	<180	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 23.50 ft	1	0.356	0.177	224.93		224.93	1,054.17	631.24	1.00	1.00	37.89	321.00 214.00
+D+L												
Dsgn. L = 23.50 ft	1	0.409	0.200	258.44		258.44	1,054.17	631.24	1.00	1.00	42.85	321.00 214.00
+D+S												
Dsgn. L = 23.50 ft	1	0.509	0.245	321.07		321.07	1,054.17	631.24	1.00	1.00	52.46	321.00 214.00
+D+0.750L												
Dsgn. L = 23.50 ft	1	0.396	0.194	250.06		250.06	1,054.17	631.24	1.00	1.00	41.61	321.00 214.00
+D+0.750L+0.750S												
Dsgn. L = 23.50 ft	1	0.510	0.245	322.17		322.17	1,054.17	631.24	1.00	1.00	52.53	321.00 214.00
+0.60D												

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B1-9

Maximum Forces & Stresses for Load Combinations

Load Combination			Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length		Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Dsgn. L =	23.50 ft	1	0.214	0.106	134.96		134.96	1,054.17	631.24	1.00	1.00	22.73	321.00	214.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S	1	0.3919	12.690		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Upward from all Load Conditions	28.662	52.534	0.357
Max Upward from Load Combinations	28.662	52.534	0.357
Max Upward from Load Cases	20.119	37.889	0.357
Max Downward from all Load Conditions (Resis			0.357
Max Downward from Load Combinations (Resi			0.357
Max Downward from Load Cases (Resisting Up			0.357
D Only	20.119	37.889	0.357
+D+L	25.759	42.846	0.357
+D+S	25.869	52.458	0.357
+D+0.750L	24.349	41.607	0.357
+D+0.750L+0.750S	28.662	52.534	0.357
+0.60D	12.071	22.733	0.357
L Only	5.640	4.957	0.357
S Only	5.750	14.570	0.357

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

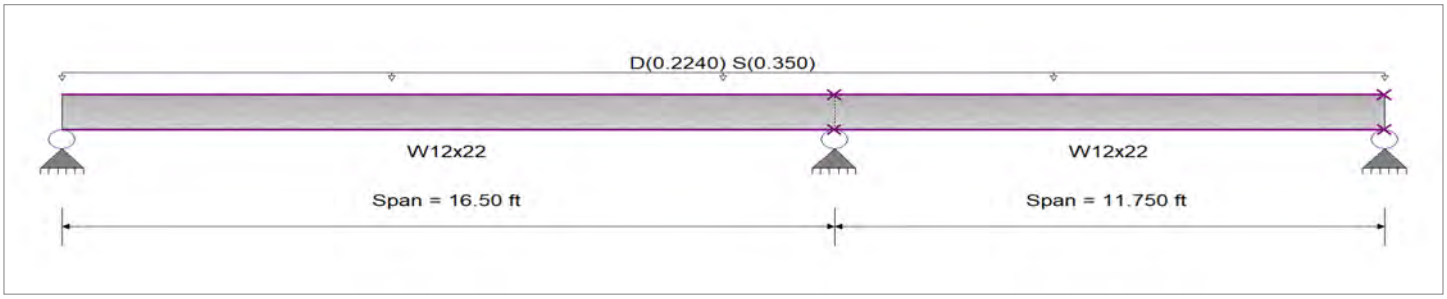
DESCRIPTION: B1-10

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.0640, S = 0.10 ksf, Tributary Width = 3.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.221 : 1	Maximum Shear Stress Ratio =	0.092 : 1
Section used for this span	W12x22	Section used for this span	W12x22
Ma : Applied	16.126 k-ft	Va : Applied	5.895 k
Mn / Omega : Allowable	73.104 k-ft	Vn/Omega : Allowable	63.960 k
Load Combination	+D+S	Load Combination	+D+S
		Location of maximum on span	16.500 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.069 in	Ratio =	2,866	>=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.005 in	Ratio =	31,207	>=360	Span: 2 : S Only
Max Downward Total Deflection	0.118 in	Ratio =	1683	>=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.008 in	Ratio =	18325	>=180	Span: 2 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 16.50 ft	1	0.091	0.038	5.38	-6.66	6.66	122.08	73.10	1.00	1.00	2.43	95.94 63.96
Dsgn. L = 11.75 ft	2	0.091	0.031	1.57	-6.66	6.66	122.08	73.10	1.00	1.00	2.01	95.94 63.96
+D+S												
Dsgn. L = 16.50 ft	1	0.221	0.092	13.02	-16.13	16.13	122.08	73.10	1.00	1.00	5.89	95.94 63.96
Dsgn. L = 11.75 ft	2	0.221	0.076	3.80	-16.13	16.13	122.08	73.10	1.00	1.00	4.87	95.94 63.96
+D+0.750S												
Dsgn. L = 16.50 ft	1	0.188	0.079	11.11	-13.76	13.76	122.08	73.10	1.00	1.00	5.03	95.94 63.96
Dsgn. L = 11.75 ft	2	0.188	0.065	3.25	-13.76	13.76	122.08	73.10	1.00	1.00	4.16	95.94 63.96
+0.60D												
Dsgn. L = 16.50 ft	1	0.055	0.023	3.23	-3.99	3.99	122.08	73.10	1.00	1.00	1.46	95.94 63.96
Dsgn. L = 11.75 ft	2	0.055	0.019	0.94	-3.99	3.99	122.08	73.10	1.00	1.00	1.21	95.94 63.96

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.1177	7.392		0.0000	0.000
+D+S	2	0.0070	8.272	+D+S	-0.0077	1.974

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	3.940	10.769	2.129

Steel Beam

DESCRIPTION: B1-10

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from Load Combinations	3.940	10.769	2.129
Max Upward from Load Cases	2.314	6.324	1.250
D Only	1.627	4.446	0.879
+D+S	3.940	10.769	2.129
+D+0.750S	3.362	9.188	1.817
+0.60D	0.976	2.667	0.527
S Only	2.314	6.324	1.250

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

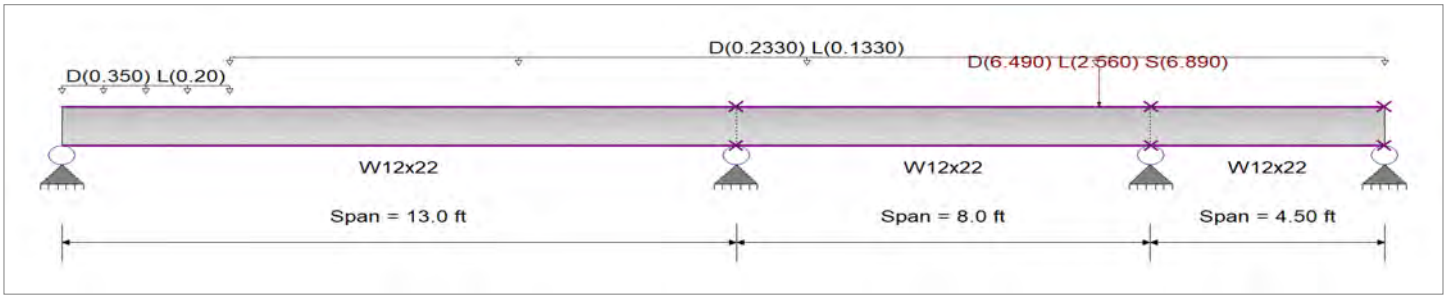
DESCRIPTION: B1-11

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Partial Length Uniform Load : D = 0.350, L = 0.20 k/ft, Extent = 0.0 -->> 3.250 ft

Partial Length Uniform Load : D = 0.2330, L = 0.1330 k/ft, Extent = 3.250 -->> 25.50 ft

Point Load : D = 6.490, L = 2.560, S = 6.890 k, Starting at : 20.0 ft and placed every 0.0 ft thereafter

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.096 : 1	Maximum Shear Stress Ratio =	0.207 : 1
Section used for this span	W12x22	Section used for this span	W12x22
Ma : Applied	6.991 k-ft	Va : Applied	13.222 k
Mn / Omega : Allowable	73.104 k-ft	Vn/Omega : Allowable	63.960 k
Load Combination	+D+L	Load Combination	+D+0.750L+0.750S
		Location of maximum on span	8.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 2

Maximum Deflection

Max Downward Transient Deflection	0.011 in	Ratio =	14,636	>=360	Span: 3 : S Only
Max Upward Transient Deflection	-0.002 in	Ratio =	31,352	>=360	Span: 3 : L Only
Max Downward Total Deflection	0.029 in	Ratio =	5453	>=180	Span: 3 : +D+L
Max Upward Total Deflection	-0.003 in	Ratio =	18258	>=180	Span: 3 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 13.00 ft	1	0.062	0.030	3.31	-4.52	4.52	122.08	73.10	1.00	1.00	1.91	95.94	63.96
Dsgn. L = 8.00 ft	2	0.062	0.101	2.98	-4.52	4.52	122.08	73.10	1.00	1.00	6.47	95.94	63.96
Dsgn. L = 4.50 ft	3	0.046	0.020		-3.37	3.37	122.08	73.10	1.00	1.00	1.27	95.94	63.96
+D+L													
Dsgn. L = 13.00 ft	1	0.096	0.047	5.23	-6.99	6.99	122.08	73.10	1.00	1.00	2.99	95.94	63.96
Dsgn. L = 8.00 ft	2	0.096	0.142	4.19	-6.99	6.99	122.08	73.10	1.00	1.00	9.10	95.94	63.96
Dsgn. L = 4.50 ft	3	0.065	0.029		-4.72	4.72	122.08	73.10	1.00	1.00	1.87	95.94	63.96
+D+S													
Dsgn. L = 13.00 ft	1	0.071	0.038	3.07	-5.16	5.16	122.08	73.10	1.00	1.00	2.40	95.94	63.96
Dsgn. L = 8.00 ft	2	0.093	0.201	5.94	-6.78	6.78	122.08	73.10	1.00	1.00	12.84	95.94	63.96
Dsgn. L = 4.50 ft	3	0.093	0.032		-6.78	6.78	122.08	73.10	1.00	1.00	2.03	95.94	63.96
+D+0.750L													
Dsgn. L = 13.00 ft	1	0.087	0.043	4.75	-6.37	6.37	122.08	73.10	1.00	1.00	2.72	95.94	63.96
Dsgn. L = 8.00 ft	2	0.087	0.132	3.89	-6.37	6.37	122.08	73.10	1.00	1.00	8.44	95.94	63.96
Dsgn. L = 4.50 ft	3	0.060	0.027		-4.38	4.38	122.08	73.10	1.00	1.00	1.72	95.94	63.96

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Steel Beam

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: B1-11

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega	
+D+0.750L+0.750S													
Dsgn. L = 13.00 ft	1	0.094	0.047	4.58	-6.85	6.85	122.08	73.10	1.00	1.00	3.02	95.94	63.96
Dsgn. L = 8.00 ft	2	0.095	0.207	6.10	-6.94	6.94	122.08	73.10	1.00	1.00	13.22	95.94	63.96
Dsgn. L = 4.50 ft	3	0.095	0.036		-6.94	6.94	122.08	73.10	1.00	1.00	2.29	95.94	63.96
+0.60D													
Dsgn. L = 13.00 ft	1	0.037	0.018	1.98	-2.71	2.71	122.08	73.10	1.00	1.00	1.15	95.94	63.96
Dsgn. L = 8.00 ft	2	0.037	0.061	1.79	-2.71	2.71	122.08	73.10	1.00	1.00	3.88	95.94	63.96
Dsgn. L = 4.50 ft	3	0.028	0.012		-2.02	2.02	122.08	73.10	1.00	1.00	0.76	95.94	63.96

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0286	5.720		0.0000	0.000
+D+S	2	0.0073	5.120	+D+L	-0.0009	0.747
	3	0.0000	5.120	+D+S	-0.0030	1.860

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Max Upward from all Load Conditions	2.365	5.870	15.514	
Max Upward from Load Combinations	2.365	5.870	15.514	
Max Upward from Load Cases	1.500	3.797	7.739	
Max Downward from all Load Conditions (Resis	-0.049			-0.982
Max Downward from Load Combinations (Resis				-0.982
Max Downward from Load Cases (Resisting Up	-0.049			-0.758
D Only	1.500	3.797	7.739	-0.224
+D+L	2.365	5.870	10.972	-0.226
+D+S	1.450	4.361	14.872	-0.982
+D+0.750L	2.148	5.352	10.164	-0.225
+D+0.750L+0.750S	2.111	5.775	15.514	-0.794
+0.60D	0.900	2.278	4.644	-0.134
L Only	0.865	2.074	3.233	-0.002
S Only	-0.049	0.564	7.133	-0.758

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining/Green Roof

Code Reference

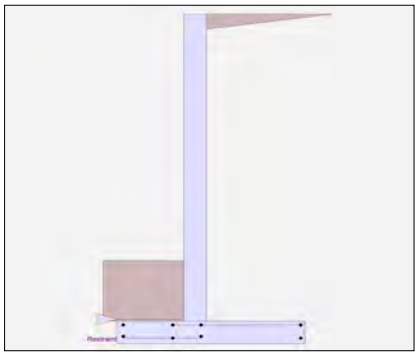
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	13.50 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	32.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

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

Lateral Load Applied to Stem

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

Adjacent Footing Load

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

Axial Load Applied to Stem

Axial Dead Load	=	280.0 lbs
Axial Live Load	=	350.0 lbs
Axial Load Eccentricity	=	0.0 in

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining/Green Roof

Design Summary

Wall Stability Ratios

Overturning	=	2.16	OK
Slab Resists All Sliding !			
Global Stability	=	1.84	

Total Bearing Load	=	9,546 lbs	
...resultant ecc.	=	14.72 in	
Eccentricity outside middle third			
Soil Pressure @ Toe	=	2,799 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	4,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	3,919 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	48.4 psi	OK
Footing Shear @ Heel	=	32.5 psi	OK
Allowable	=	106.1 psi	

Sliding Calcs

Lateral Sliding Force	=	3,679.4 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

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

Stem Construction

		Bottom				
		Ratio > 1.0				
Design Height Above Ftg	ft =	0.00				
Wall Material Above "Ht"	=	Concrete				
Design Method	=	SD	SD	SD	SD	SD
Thickness	=	10.00				
Rebar Size	=	# 6				
Rebar Spacing	=	12.00				
Rebar Placed at	=	Edge				

Design Data

fb/FB + fa/Fa	=	**1.574**
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	5,103.0
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	22,963.5
Moment.....Allowable	=	14,583.5
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	55.8
Shear.....Allowable	psi =	106.1
Anet (Masonry)	in2 =	
Wall Weight	psf =	125.0
Rebar Depth 'd'	in =	7.63

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	5,000.0
Fy	psi =	60,000.0

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining/Green Roof

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.6967 in2/ft		
(4/3) * As :	0.9289 in2/ft	Min Stem T&S Reinf Area 3.240 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(7.625)/6000	0.3235 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.6967 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.44 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	1.9444 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Footing Data

Toe Width	=	2.50 ft
Heel Width	=	4.50
Total Footing Width	=	7.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 5,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe		Heel	
Factored Pressure	=	3,919		0	psf
Mu' : Upward	=	10,751		4,059	ft-#
Mu' : Downward	=	1,663		13,189	ft-#
Mu: Design	=	9,089	OK	9,130	ft-# OK
phiMn	=	28,565		12,513	ft-#
Actual 1-Way Shear	=	48.39		32.47	psi
Allow 1-Way Shear	=	106.07		106.07	psi

Toe Reinforcing = # 8 @ 12.00 in
Heel Reinforcing = # 6 @ 17.95 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

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

Other Acceptable Sizes & Spacings

Toe: #4@ 7.30 in, #5@ 11.32 in, #6@ 16.07 in, #7@ 21.92 in, #8@ 28.86 in, #9@ 36.54 in, #10@ 46.40 in

Heel: #4@ 8.16 in, #5@ 12.65 in, #6@ 17.95 in, #7@ 24.48 in, #8@ 32.23 in, #9@ 40.81 in, #10@ 51.82 in

Key: No key defined

Min footing T&S reinf Area	1.81	in2
Min footing T&S reinf Area per foot	0.26	in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining/Green Roof

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		3,679.4	4.83	17,783.6	Soil Over HL (ab. water tbl)	5,445.0	5.17	28,132.5
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		5.17	28,132.5
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=	280.0	2.92	816.7
Added Lateral Load	=				* Axial Live Load on Stem	=	350.0	2.92	1,020.8
Load @ Stem Above Soil	=				Soil Over Toe	=	733.3	1.25	916.7
	=				Surcharge Over Toe	=			
					Stem Weight(s)	=	1,687.5	2.92	4,921.9
					Earth @ Stem Transitions	=			
					Footing Weight	=	1,050.0	3.50	3,675.0
					Key Weight	=			
					Vert. Component	=			
Total	=	3,679.4	**O.T.M.** =	17,783.6	**Total =**		9,195.8 lbs	**R.M.=**	38,462.7

Resisting/Overturning Ratio = **2.16**
Vertical Loads used for Soil Pressure = 9,545.8 lbs

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

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

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

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.150	in

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

Cantilevered Retaining Wall

DESCRIPTION: Garage Retaining/Green Roof

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

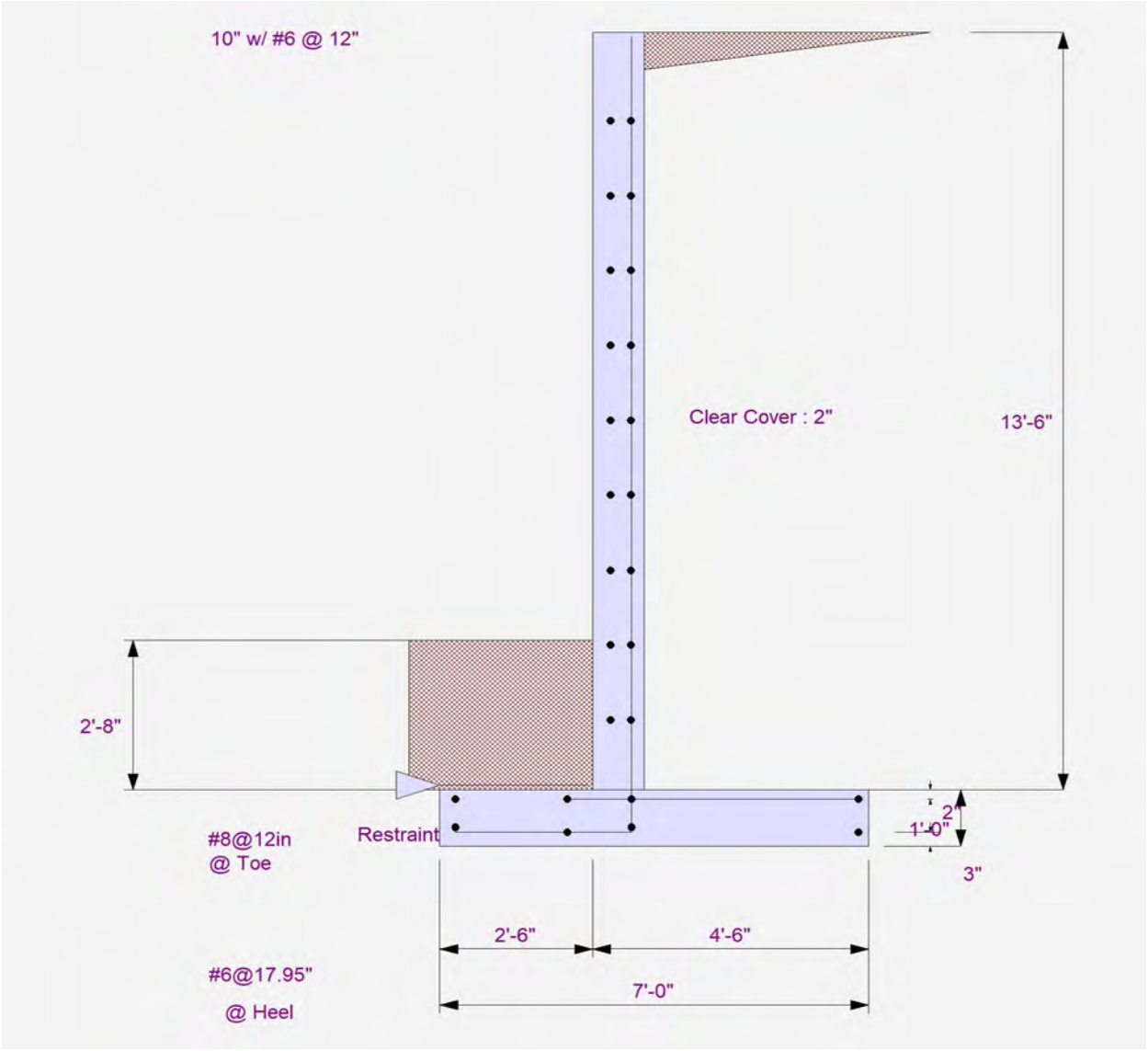
Lap Splice length for #6 bar specified in this stem design segment (25.4.2.3a) =	19.86 in
Development length for #6 bar specified in this stem design segment =	15.27 in
Hooked embedment length into footing for #6 bar specified in this stem design segment =	8.91 in
As Provided =	0.4400 in2/ft
As Required =	0.6967 in2/ft

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining/Green Roof



Cantilevered Retaining Wall

DESCRIPTION: Garage Retaining/Green Roof

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining Grid E

Code Reference

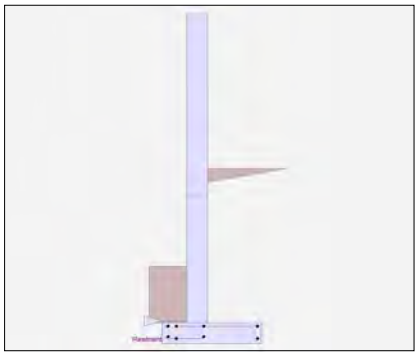
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	7.33 ft
Wall height above soil	=	7.33 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	32.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	400.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

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

Axial Load Applied to Stem

Axial Dead Load	=	0.3 lbs
Axial Live Load	=	0.4 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	16.0 psf

Adjacent Footing Load

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

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining Grid E

Design Summary

Wall Stability Ratios

Overturning	=	2.14	OK
Slab Resists All Sliding !			
Global Stability	=	1.46	

Total Bearing Load	=	4,473 lbs	
...resultant ecc.	=	11.06 in	
Eccentricity outside middle third			
Soil Pressure @ Toe	=	2,766 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	4,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	3,872 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	8.7 psi	OK
Footing Shear @ Heel	=	11.5 psi	OK
Allowable	=	82.2 psi	

Sliding Calcs

Lateral Sliding Force	=	1,284.7 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

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

Stem Construction

		2nd	Bottom			
		Stem OK	Stem OK			
Design Height Above Ftg	ft =	6.00	0.00			
Wall Material Above "Ht"	=	Concrete	Concrete			
Design Method	=	SD	SD	SD	SD	SD
Thickness	=	10.00	10.00			
Rebar Size	=	# 5	# 5			
Rebar Spacing	=	16.00	16.00			
Rebar Placed at	=	Edge	Edge			
Design Data						
fb/FB + fa/Fa	=	**0.115**	**0.689**			
Total Force @ Section						
Service Level	lbs =					
Strength Level	lbs =	237.2	1,692.1			
Moment....Actual						
Service Level	ft-# =					
Strength Level	ft-# =	959.3	5,739.0			
Moment.....Allowable	ft-# =	8,327.0	8,327.0			
Shear.....Actual						
Service Level	psi =					
Strength Level	psi =	2.4	17.2			
Shear.....Allowable	psi =	82.2	82.2			
Anet (Masonry)	in2 =					
Wall Weight	psf =	125.0	125.0			
Rebar Depth 'd'	in =	8.19	8.19			

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining Grid E

Concrete Stem Rebar Area Details

2nd Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0271 in2/ft		
(4/3) * As :	0.0361 in2/ft	Min Stem T&S Reinf Area 2.078 in2	
200bd/fy : 200(12)(8.1875)/60000 :	0.3275 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.216 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.2325 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	1.331 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.1621 in2/ft		
(4/3) * As :	0.2161 in2/ft	Min Stem T&S Reinf Area 1.440 in2	
200bd/fy : 200(12)(8.1875)/60000 :	0.3275 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.2161 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.2325 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	1.331 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Footing Data

Toe Width	=	1.00 ft
Heel Width	=	3.00
Total Footing Width	=	4.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	3,872	0	psf
Mu' : Upward	=	1,737	549	ft-#
Mu' : Downward	=	266	2,694	ft-#
Mu: Design	=	1,471 OK	2,145	ft-# OK
phiMn	=	27,464	24,231	ft-#
Actual 1-Way Shear	=	8.72	11.50	psi
Allow 1-Way Shear	=	82.16	82.16	psi

Toe Reinforcing = # 8 @ 12.00 in
Heel Reinforcing = # 7 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

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

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area 1.04 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining Grid E

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		1,214.3	2.78	3,371.7	Soil Over HL (ab. water tbl)	1,747.0	2.92	5,095.4
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		2.92	5,095.4
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=	0.3	1.42	0.4
Added Lateral Load	=				* Axial Live Load on Stem	=	0.4	1.42	0.5
Load @ Stem Above Soil	=	70.4	12.00	844.1	Soil Over Toe	=	293.3	0.50	146.7
	=				Surcharge Over Toe	=			
					Stem Weight(s)	=	1,832.5	1.42	2,596.0
					Earth @ Stem Transitions	=			
					Footing Weight	=	600.0	2.00	1,200.0
					Key Weight	=			
					Vert. Component	=			
Total	=	1,284.7	**O.T.M.** =	4,215.8	**Total =**		4,473.1 lbs	**R.M.=**	9,038.5

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

Resisting/Overturning Ratio = **2.14**

Vertical Loads used for Soil Pressure = 4,473.4 lbs

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

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

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.282	in

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

Cantilevered Retaining Wall

DESCRIPTION: Garage Retaining Grid E

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd
Stem Design Height: 6.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	21.36 in
Development length for #5 bar specified in this stem design segment =	16.43 in

---

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

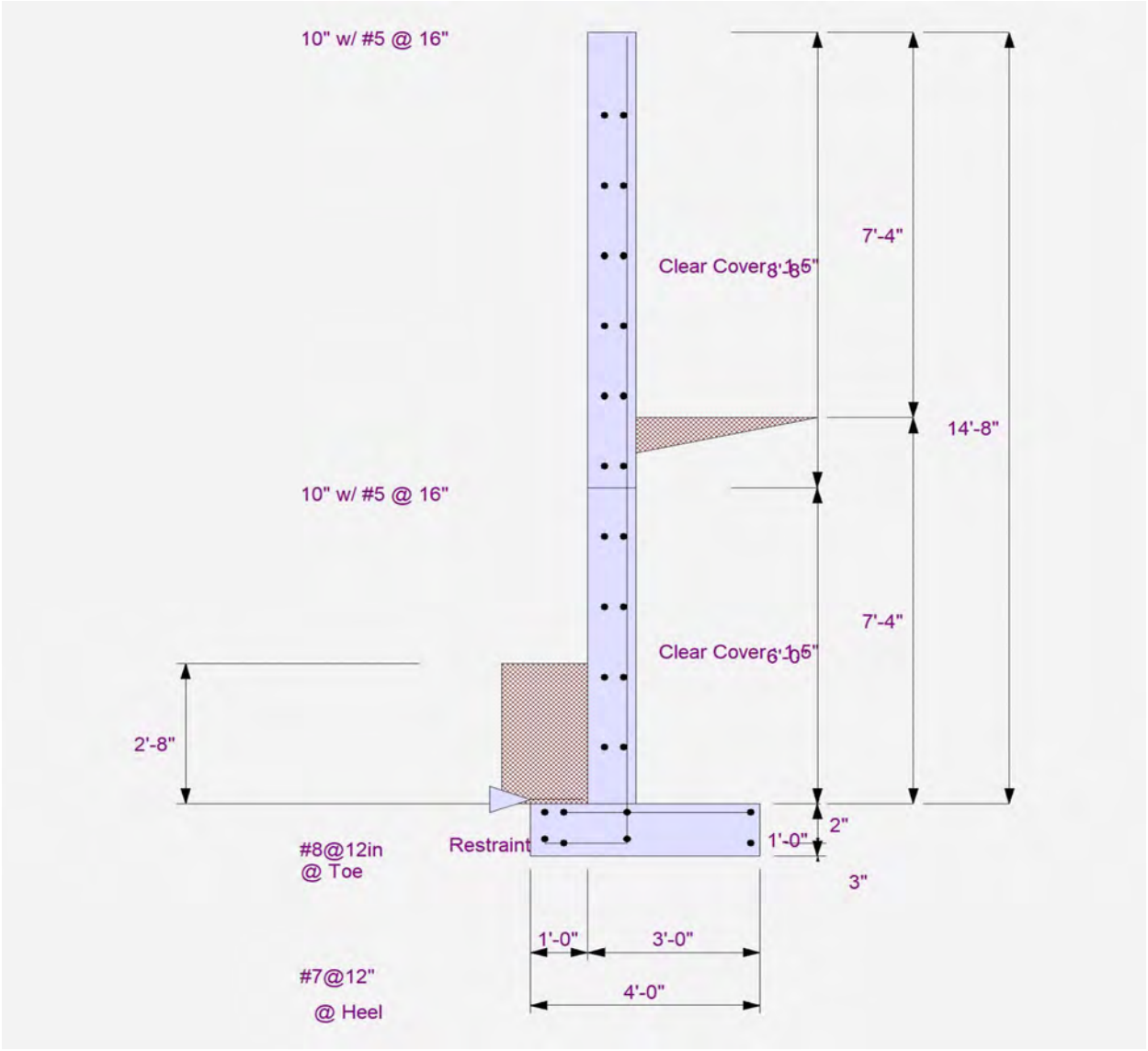
Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	21.36 in
Development length for #5 bar specified in this stem design segment =	16.43 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	8.91 in
As Provided =	0.2325 in2/ft
As Required =	0.2161 in2/ft

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

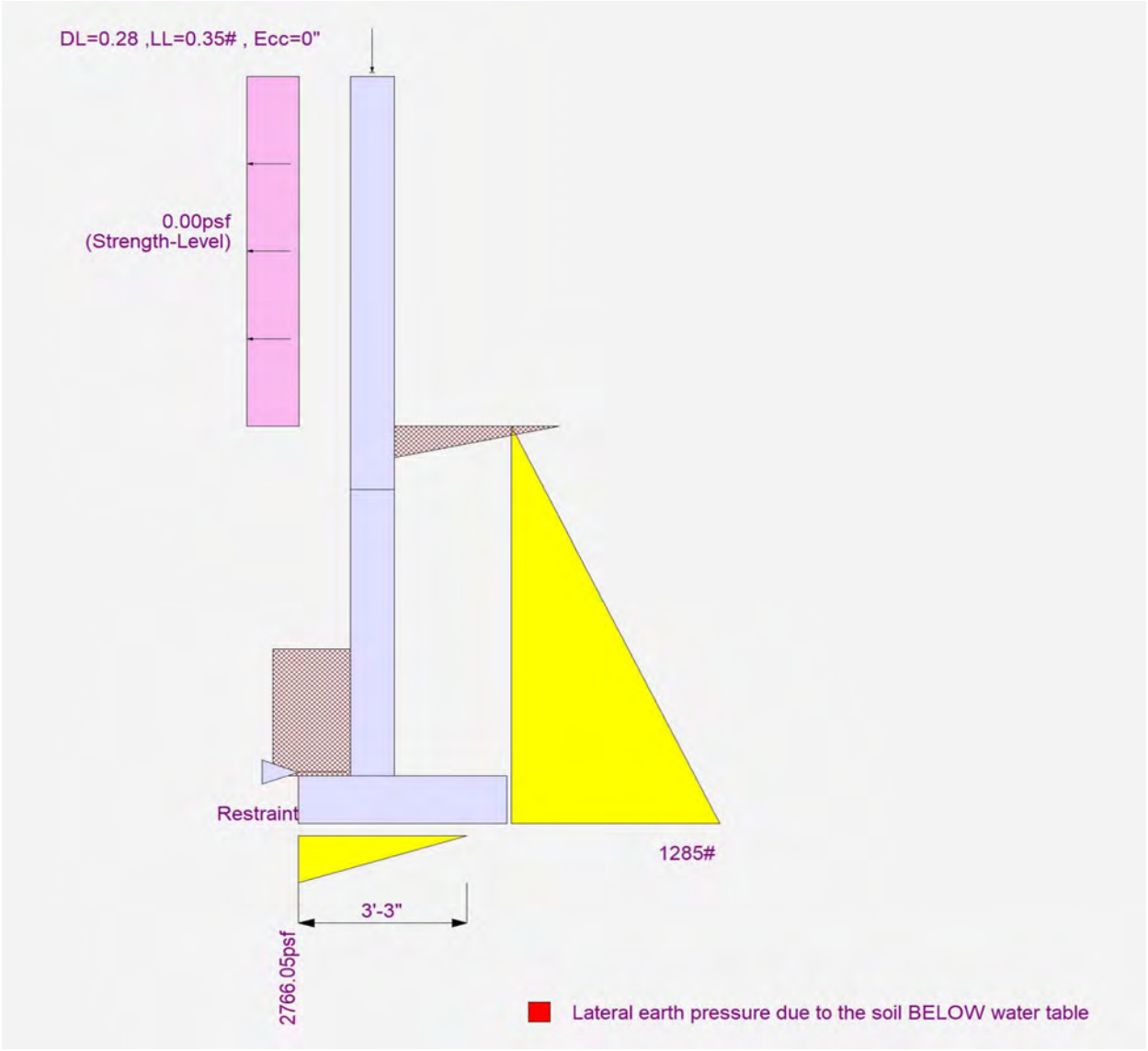
Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining Grid E



Cantilevered Retaining Wall

DESCRIPTION: Garage Retaining Grid E



Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining Grid B

Code Reference

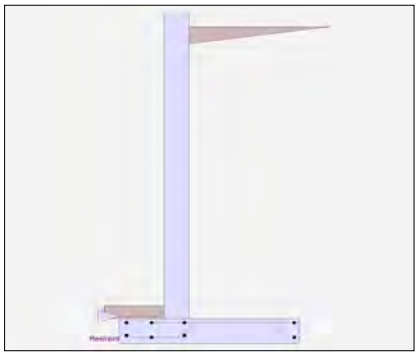
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	11.50 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	400.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

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

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	16.0 psf

Adjacent Footing Load

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

Axial Load Applied to Stem

Axial Dead Load	=	0.5 lbs
Axial Live Load	=	1.9 lbs
Axial Load Eccentricity	=	0.0 in

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining Grid B

Design Summary

Wall Stability Ratios

Overturning	=	2.18	OK
Slab Resists All Sliding !			
Global Stability	=	1.97	

Total Bearing Load	=	7,123	lbs
...resultant ecc.	=	13.23	in
Eccentricity outside middle third			
Soil Pressure @ Toe	=	2,503	psf OK
Soil Pressure @ Heel	=	0	psf OK
Allowable	=	4,000	psf
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	3,504	psf
ACI Factored @ Heel	=	0	psf
Footing Shear @ Toe	=	23.2	psi OK
Footing Shear @ Heel	=	24.2	psi OK
Allowable	=	82.2	psi

Sliding Calcs

Lateral Sliding Force	=	2,739.2	lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

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

Stem Construction

		2nd	Bottom			
		Stem OK	Stem OK			
Design Height Above Ftg	ft =	5.00	0.00			
Wall Material Above "Ht"	=	Concrete	Concrete			
Design Method	=	SD	SD	SD	SD	SD
Thickness	=	10.00	10.00			
Rebar Size	=	# 5	# 5			
Rebar Spacing	=	16.00	8.00			
Rebar Placed at	=	Edge	Edge			
Design Data						
fb/FB + fa/Fa	=	**0.318**	**0.886**			
Total Force @ Section						
Service Level	lbs =					
Strength Level	lbs =	1,195.8	3,715.8			
Moment....Actual						
Service Level	ft-# =					
Strength Level	ft-# =	2,649.6	14,345.2			
Moment.....Allowable	ft-# =	8,327.0	16,175.5			
Shear.....Actual						
Service Level	psi =					
Strength Level	psi =	12.2	37.8			
Shear.....Allowable	psi =	82.2	82.2			
Anet (Masonry)	in2 =					
Wall Weight	psf =	125.0	125.0			
Rebar Depth 'd'	in =	8.19	8.19			

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining Grid B

Concrete Stem Rebar Area Details

2nd Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0748 in2/ft		
(4/3) * As :	0.0998 in2/ft	Min Stem T&S Reinf Area 1.680 in2	
200bd/fy : 200(12)(8.1875)/60000 :	0.3275 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.216 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.2325 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	1.331 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.4051 in2/ft		
(4/3) * As :	0.5402 in2/ft	Min Stem T&S Reinf Area 1.200 in2	
200bd/fy : 200(12)(8.1875)/60000 :	0.3275 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.4051 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.465 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	1.331 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Footing Data

Toe Width	=	1.50 ft
Heel Width	=	4.50
Total Footing Width	=	6.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	3,504	0	psf
Mu' : Upward	=	3,596	3,886	ft-#
Mu' : Downward	=	277	11,414	ft-#
Mu: Design	=	3,319 OK	7,529	ft-# OK
phiMn	=	17,225	24,231	ft-#
Actual 1-Way Shear	=	23.23	24.16	psi
Allow 1-Way Shear	=	82.16	82.16	psi

Toe Reinforcing = # 5 @ 8.00 in
Heel Reinforcing = # 7 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

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

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area 1.56 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining Grid B

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		2,734.4	4.17	11,393.2	Soil Over HL (ab. water tbl)	4,638.3	4.17	19,326.4
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		4.17	19,326.4
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=	0.5	1.92	1.0
Added Lateral Load	=				* Axial Live Load on Stem	=	1.9	1.92	3.6
Load @ Stem Above Soil	=	4.8	12.75	61.2	Soil Over Toe	=	82.5	0.75	61.9
	=				Surcharge Over Toe	=			
					Stem Weight(s)	=	1,500.0	1.92	2,875.0
					Earth @ Stem Transitions	=			
					Footing Weight	=	900.0	3.00	2,700.0
					Key Weight	=			
					Vert. Component	=			
Total	=	2,739.2	**O.T.M.** =	11,454.4	**Total =**		7,121.3 lbs	**R.M.=**	24,964.2

Resisting/Overturning Ratio = **2.18**
Vertical Loads used for Soil Pressure = 7,123.2 lbs

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

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

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

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.139	in

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

Cantilevered Retaining Wall

DESCRIPTION: Garage Retaining Grid B

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd
Stem Design Height: 5.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	21.36 in
Development length for #5 bar specified in this stem design segment =	16.43 in

---

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

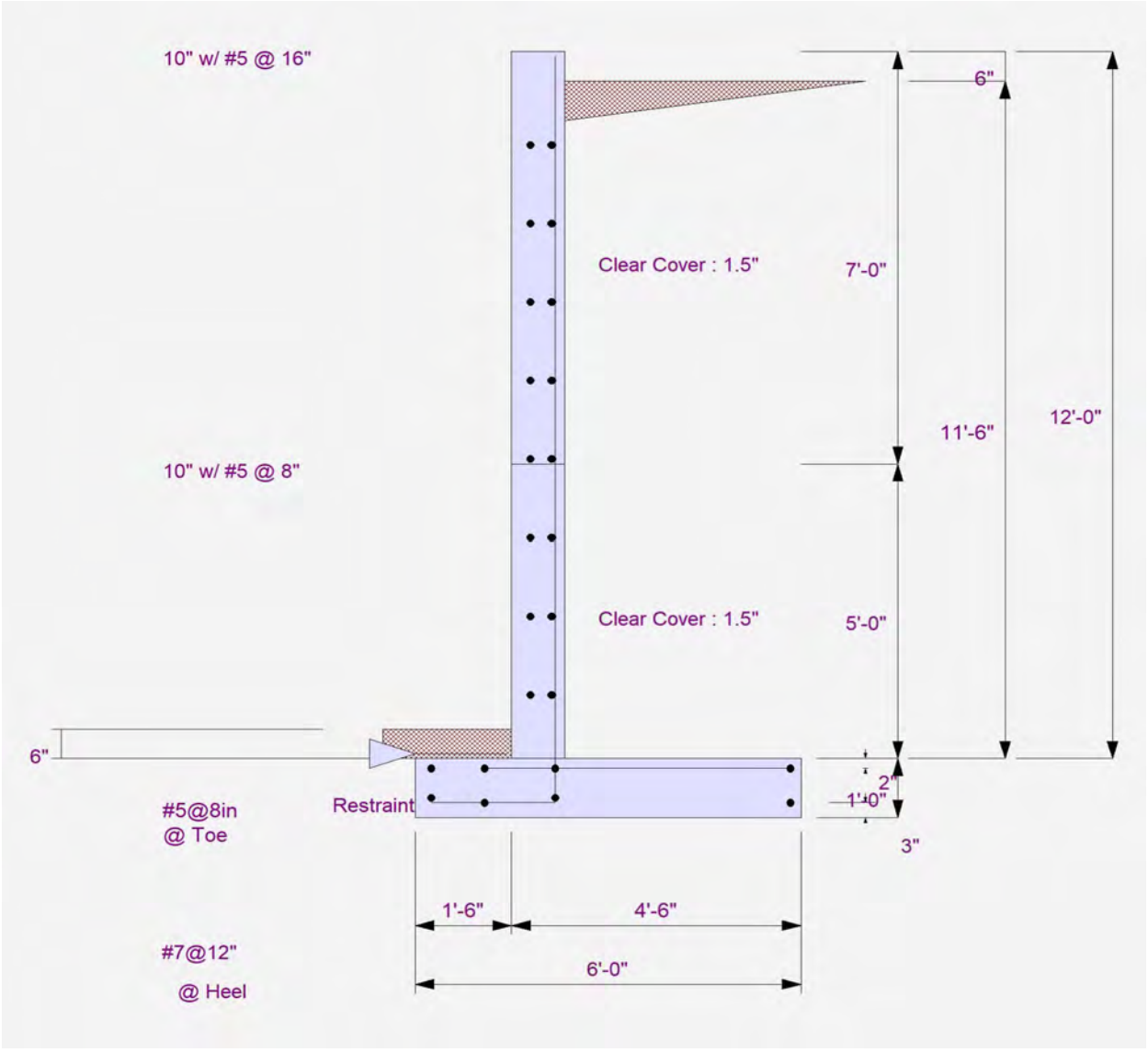
Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	21.36 in
Development length for #5 bar specified in this stem design segment =	16.43 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	8.35 in
As Provided =	0.4650 in2/ft
As Required =	0.4051 in2/ft

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining Grid B

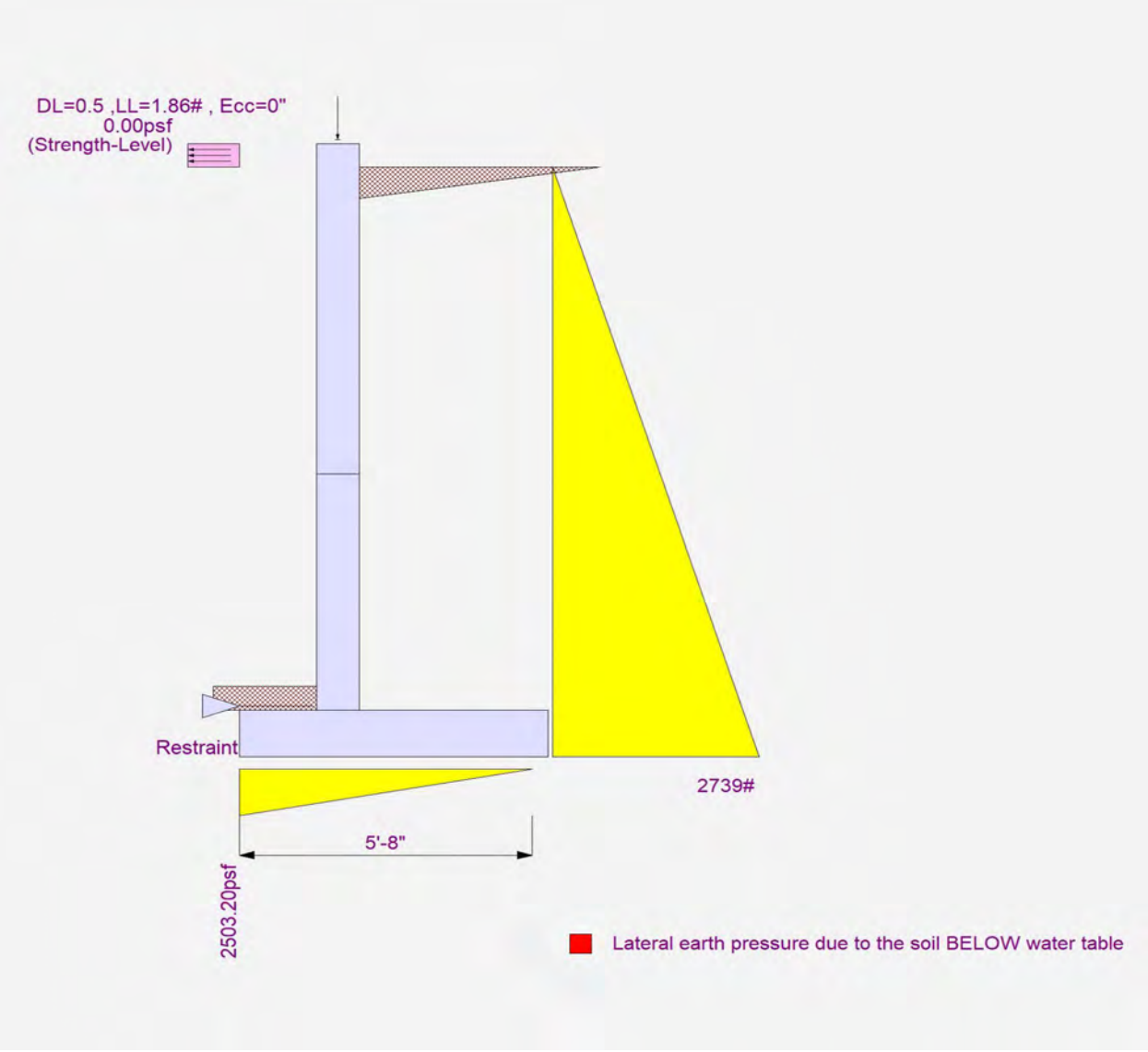


Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Garage Retaining Grid B



Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid 5 Entry Stairs Retaining Wall

Code Reference

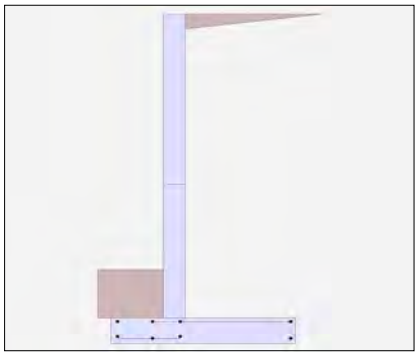
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	13.67 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	26.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	400.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

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

Axial Load Applied to Stem

Axial Dead Load	=	75.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

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

Adjacent Footing Load

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

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid 5 Entry Stairs Retaining Wall

Design Summary

Wall Stability Ratios

Overturning	=	2.09	OK
Sliding	=	1.54	OK
Global Stability	=	2.16	

Total Bearing Load	=	9,751 lbs	
...resultant ecc.	=	16.37 in	
Eccentricity outside middle third			
Soil Pressure @ Toe	=	3,043 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	4,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	4,261 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	29.4 psi	OK
Footing Shear @ Heel	=	30.0 psi	OK
Allowable	=	82.2 psi	

Sliding Calcs

Lateral Sliding Force	=	3,852.2 lbs	
less 100% Passive Force	-	2,022.2 lbs	
less 100% Friction Force	-	3,900.3 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

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

Stem Construction

		2nd	Bottom			
		Stem OK	Stem OK			
Design Height Above Ftg	ft =	6.00	0.00			
Wall Material Above "Ht"	=	Concrete	Concrete			
Design Method	=	SD	SD	SD	SD	SD
Thickness	=	10.00	10.00			
Rebar Size	=	# 6	# 7			
Rebar Spacing	=	16.00	8.00			
Rebar Placed at	=	Edge	Edge			
Design Data						
fb/FB + fa/Fa	=	**0.388**	**0.881**			
Total Force @ Section						
Service Level	lbs =					
Strength Level	lbs =	1,647.2	5,232.3			
Moment....Actual						
Service Level	ft-# =					
Strength Level	ft-# =	4,211.4	23,842.0			
Moment.....Allowable	ft-# =	10,841.2	27,043.9			
Shear.....Actual						
Service Level	psi =					
Strength Level	psi =	18.0	57.7			
Shear.....Allowable	psi =	82.2	82.2			
Anet (Masonry)	in2 =					
Wall Weight	psf =	125.0	125.0			
Rebar Depth 'd'	in =	7.63	7.56			

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid 5 Entry Stairs Retaining Wall

Concrete Stem Rebar Area Details

2nd Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.1281 in2/ft		
(4/3) * As :	0.1708 in2/ft	Min Stem T&S Reinf Area 1.841 in2	
200bd/fy : 200(12)(7.625)/60000 :	0.305 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.216 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.33 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	1.2395 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.7314 in2/ft		
(4/3) * As :	0.9752 in2/ft	Min Stem T&S Reinf Area 1.440 in2	
200bd/fy : 200(12)(7.5625)/60000 :	0.3025 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.7314 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.9 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	1.2294 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Footing Data

Toe Width	=	2.00 ft
Heel Width	=	5.00
Total Footing Width	=	7.00
Footing Thickness	=	14.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	4,261	0	psf
Mu' : Upward	=	7,635	5,062	ft-#
Mu' : Downward	=	992	17,486	ft-#
Mu: Design	=	6,643 OK	12,424 ft-#	OK
phiMn	=	26,931	29,631	ft-#
Actual 1-Way Shear	=	29.42	30.04	psi
Allow 1-Way Shear	=	82.16	82.16	psi

Toe Reinforcing = # 7 @ 12.00 in
Heel Reinforcing = # 7 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

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

Other Acceptable Sizes & Spacings

Toe: #4@ 7.93 in, #5@ 12.30 in, #6@ 17.46 in, #7@ 23.80 in, #8@ 31.34 in, #9@ 39.68 in, #10@ 50.39 in

Heel: #4@ 7.28 in, #5@ 11.29 in, #6@ 16.03 in, #7@ 21.86 in, #8@ 28.79 in, #9@ 36.44 in, #10@ 46.29 in

Key: No key defined

Min footing T&S reinf Area 2.12 in2
Min footing T&S reinf Area per foot 0.30 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 7.94 in	#4@ 15.87 in
#5@ 12.30 in	#5@ 24.60 in
#6@ 17.46 in	#6@ 34.92 in

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid 5 Entry Stairs Retaining Wall

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		3,852.2	4.95	19,051.4	Soil Over HL (ab. water tbl)	6,265.4	4.92	30,805.0
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		4.92	30,805.0
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=	75.0	2.42	181.3
Added Lateral Load	=				* Axial Live Load on Stem	=			
Load @ Stem Above Soil	=				Soil Over Toe	=	476.7	1.00	476.7
	=				Surcharge Over Toe	=			
					Stem Weight(s)	=	1,708.8	2.42	4,129.5
					Earth @ Stem Transitions	=			
					Footing Weight	=	1,225.0	3.50	4,287.5
					Key Weight	=			
					Vert. Component	=			
Total	=	3,852.2	**O.T.M.** =	19,051.4	**Total =**		9,750.8 lbs	**R.M.=**	39,879.9

Resisting/Overturning Ratio = **2.09**

Vertical Loads used for Soil Pressure = 9,750.8 lbs

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

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

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

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.165	in

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

Cantilevered Retaining Wall

DESCRIPTION: Grid 5 Entry Stairs Retaining Wall

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd
Stem Design Height: 6.00 ft above top of footing

Lap Splice length for #6 bar specified in this stem design segment (25.4.2.3a) =	25.63 in
Development length for #6 bar specified in this stem design segment =	19.72 in

---

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

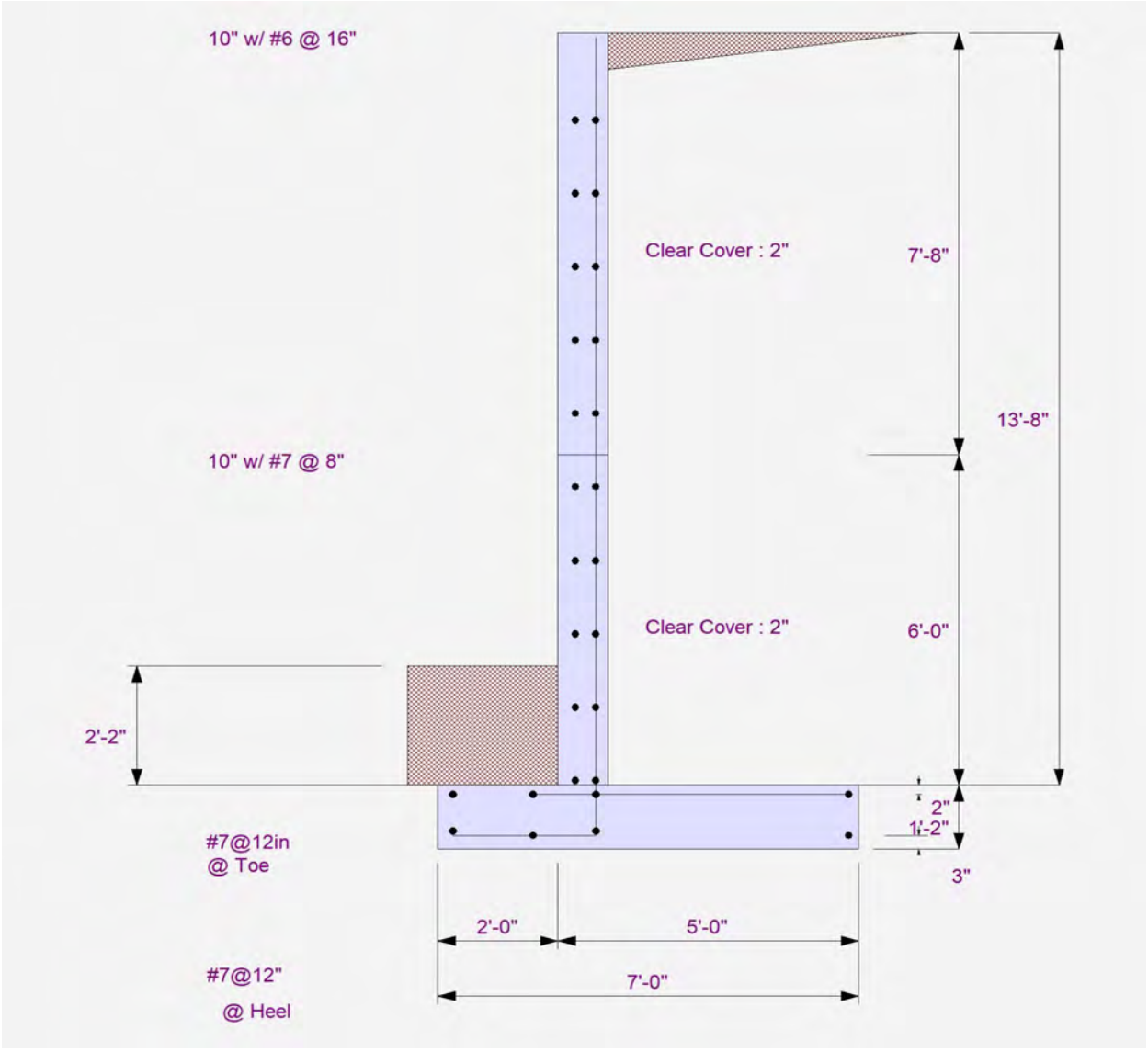
Lap Splice length for #7 bar specified in this stem design segment (25.4.2.3a) =	37.38 in
Development length for #7 bar specified in this stem design segment =	28.76 in
Hooked embedment length into footing for #7 bar specified in this stem design segment =	10.91 in
As Provided =	0.9000 in2/ft
As Required =	0.7314 in2/ft

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

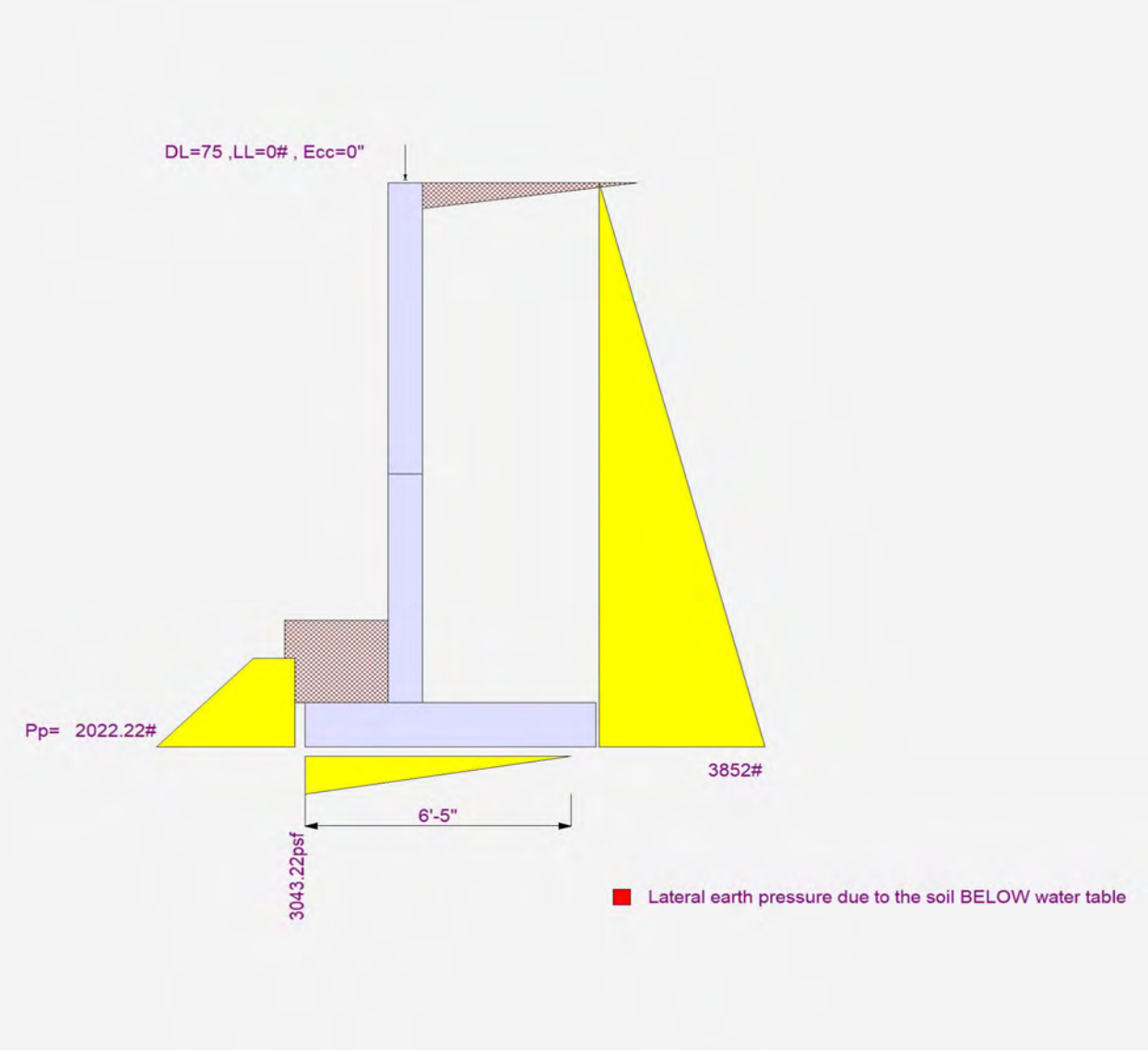
Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid 5 Entry Stairs Retaining Wall



Cantilevered Retaining Wall

DESCRIPTION: Grid 5 Entry Stairs Retaining Wall



Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid 3 Interior Retaining Wall

Code References

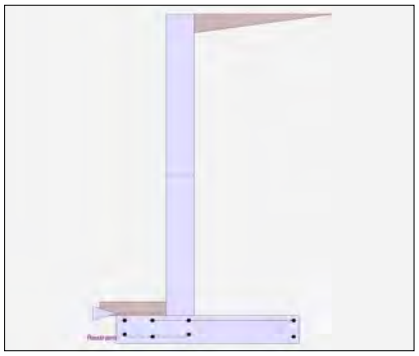
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	10.75 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	400.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

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

Lateral Load Applied to Stem

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

Adjacent Footing Load

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

Axial Load Applied to Stem

Axial Dead Load	=	210.0 lbs
Axial Live Load	=	120.0 lbs
Axial Load Eccentricity	=	0.0 in

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid 3 Interior Retaining Wall

Design Summary

Wall Stability Ratios

Overturning	=	2.11	OK
Slab Resists All Sliding !			
Global Stability	=	1.32	

Total Bearing Load	=	6,326 lbs	
...resultant ecc.	=	12.62 in	
Eccentricity outside middle third			
Soil Pressure @ Toe	=	2,483 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	4,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	3,477 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	22.8 psi	OK
Footing Shear @ Heel	=	21.6 psi	OK
Allowable	=	82.2 psi	

Sliding Calcs

Lateral Sliding Force	=	2,416.1 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

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

Stem Construction

		2nd	Bottom			
		Stem OK	Stem OK			
Design Height Above Ftg	ft =	5.00	0.00			
Wall Material Above "Ht"	=	Concrete	Concrete			
Design Method	=	SD	SD	SD	SD	SD
Thickness	=	10.00	10.00			
Rebar Size	=	# 5	# 5			
Rebar Spacing	=	16.00	8.00			
Rebar Placed at	=	Edge	Edge			
Design Data						
fb/FB + fa/Fa	=	**0.213**	**0.716**			
Total Force @ Section						
Service Level	lbs =					
Strength Level	lbs =	925.8	3,235.8			
Moment....Actual						
Service Level	ft-# =					
Strength Level	ft-# =	1,774.4	11,594.8			
Moment.....Allowable	ft-# =	8,327.0	16,175.5			
Shear.....Actual						
Service Level	psi =					
Strength Level	psi =	9.4	32.9			
Shear.....Allowable	psi =	82.2	82.2			
Anet (Masonry)	in2 =					
Wall Weight	psf =	125.0	125.0			
Rebar Depth 'd'	in =	8.19	8.19			

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid 3 Interior Retaining Wall

Concrete Stem Rebar Area Details

2nd Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0501 in2/ft		
(4/3) * As :	0.0668 in2/ft	Min Stem T&S Reinf Area 1.380 in2	
200bd/fy : 200(12)(8.1875)/60000 :	0.3275 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.216 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.2325 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	1.331 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.3274 in2/ft		
(4/3) * As :	0.4366 in2/ft	Min Stem T&S Reinf Area 1.200 in2	
200bd/fy : 200(12)(8.1875)/60000 :	0.3275 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.3275 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.465 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	1.331 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Footing Data

Toe Width	=	1.50 ft
Heel Width	=	4.00
Total Footing Width	=	5.50
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	3,477	0	psf
Mu' : Upward	=	3,528	2,394	ft-#
Mu' : Downward	=	277	8,017	ft-#
Mu: Design	=	3,251 OK	5,623	ft-# OK
phiMn	=	27,464	24,231	ft-#
Actual 1-Way Shear	=	22.81	21.60	psi
Allow 1-Way Shear	=	82.16	82.16	psi

Toe Reinforcing = # 8 @ 12.00 in
Heel Reinforcing = # 7 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

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

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area 1.43 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid 3 Interior Retaining Wall

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		2,416.1	3.92	9,463.0	Soil Over HL (ab. water tbl)	3,744.6	3.92	14,666.3
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		3.92	14,666.3
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=	210.0	1.92	402.5
Added Lateral Load	=				* Axial Live Load on Stem	=	120.0	1.92	230.0
Load @ Stem Above Soil	=				Soil Over Toe	=	82.5	0.75	61.9
	=				Surcharge Over Toe	=			
					Stem Weight(s)	=	1,343.8	1.92	2,575.5
					Earth @ Stem Transitions	=			
					Footing Weight	=	825.0	2.75	2,268.8
					Key Weight	=			
					Vert. Component	=			
Total	=	2,416.1	**O.T.M.** =	9,463.0	**Total =**		6,205.8 lbs	**R.M.=**	19,974.9

Resisting/Overturning Ratio = **2.11**

Vertical Loads used for Soil Pressure = 6,325.8 lbs

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

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

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

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.135	in

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

Cantilevered Retaining Wall

DESCRIPTION: Grid 3 Interior Retaining Wall

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd
Stem Design Height: 5.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	21.36 in
Development length for #5 bar specified in this stem design segment =	16.43 in

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Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

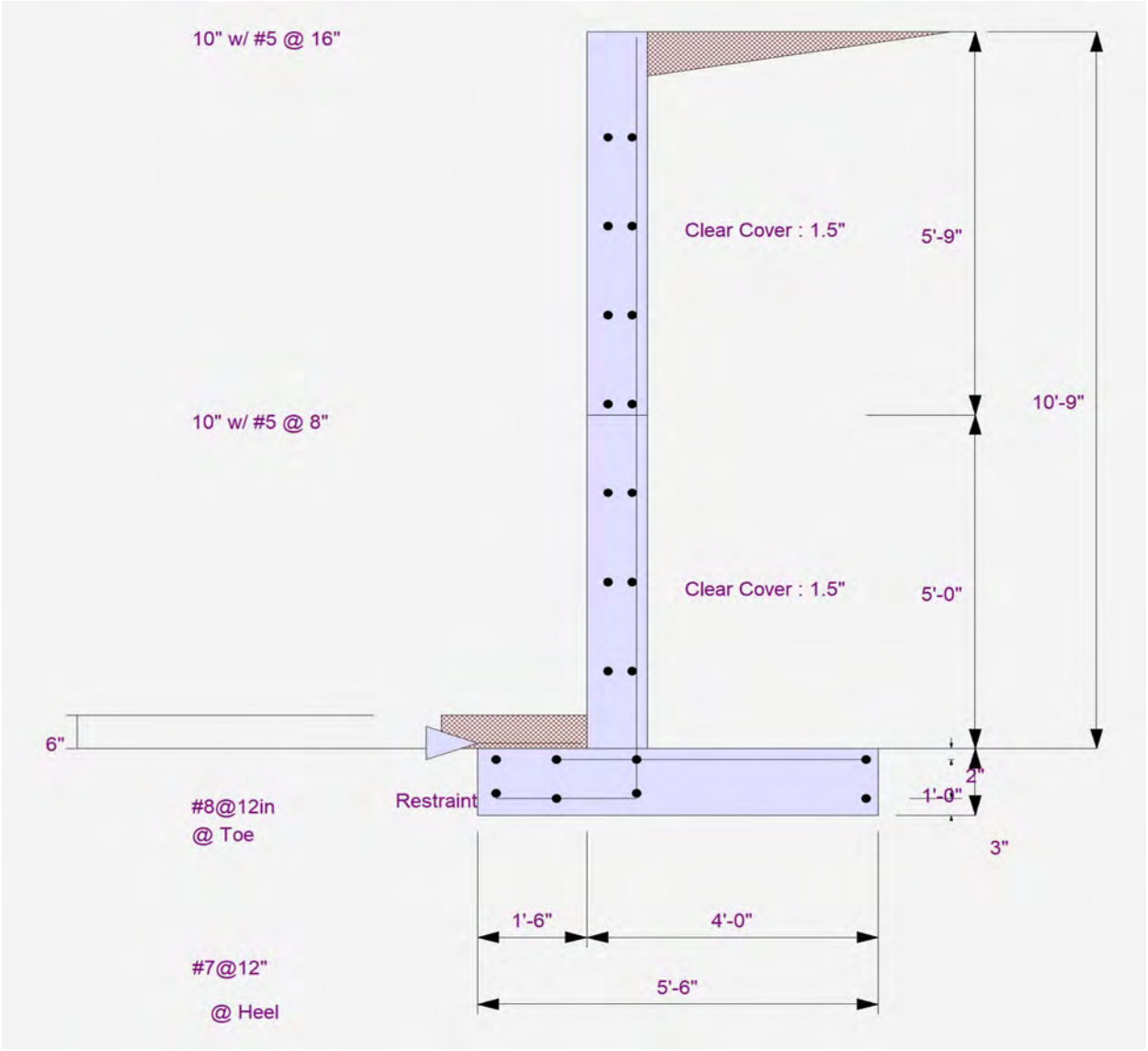
Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	21.36 in
Development length for #5 bar specified in this stem design segment =	16.43 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	6.75 in
As Provided =	0.4650 in2/ft
As Required =	0.3275 in2/ft

Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid 3 Interior Retaining Wall

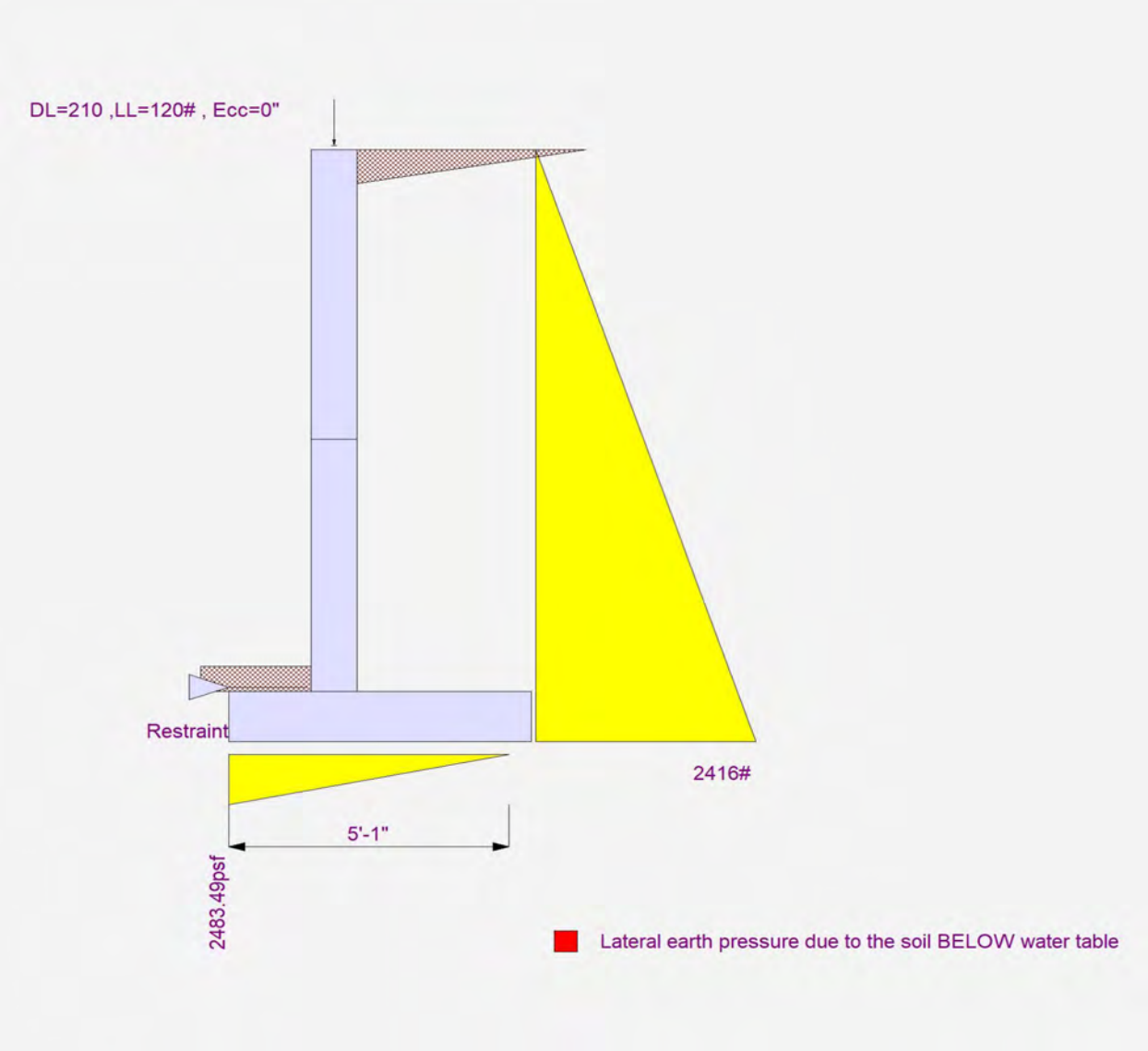


Project Title: Pratt Residence
Engineer: CM
Project ID: 22057
Project Descr:

Cantilevered Retaining Wall

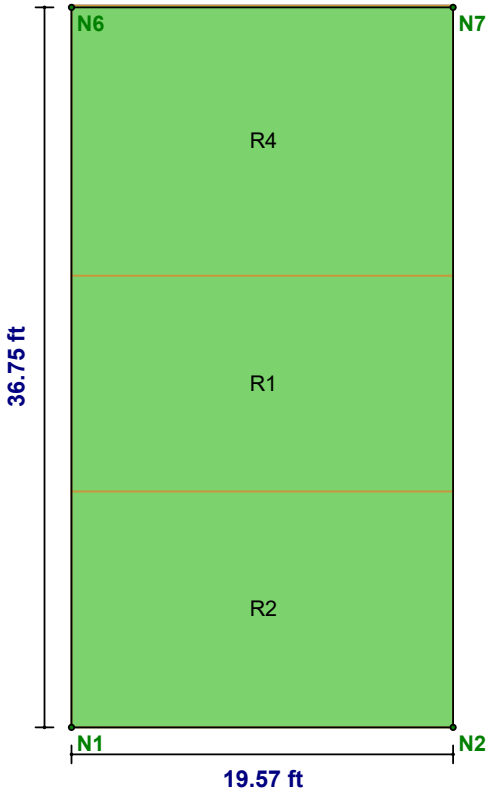
Project File: Pratt Residence Calculations.ec6

DESCRIPTION: Grid 3 Interior Retaining Wall



Detail Report: WP1

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	36.75	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	19.566	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R1	0.085	2	0.071	1	0.006	2	0.036	5	0.036	5	0.023	1
R2	0.159	5	0.073	5	0.005	5	0.139	6	0.286	6	0.019	1
R4	0.009	5	0.035	2	0.006	5	0.028	2	0.023	2	0.016	2

REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R1	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R2	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R4	#6@16in oc e.f.	#6@16in oc e.f.	N/A

Detail Report: WP1 (In-Plane, Region R1)

CRITERIA

Code:	ACI 318-19
Design Rule:	Avalanche
Seismic Rule:	SDR_Conc1
Loc of r/f:	Each Face
Outer Bars:	Vertical
Vert Bar Size:	#6
Horz Bar Size:	#6
Vert Bar Spac (in):	16
Horz Bar Spac (in):	16
Group Wall?:	No

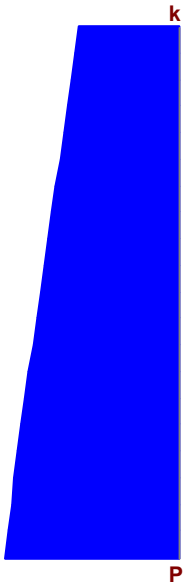
GEOMETRY

Total Height (ft):	11
Total Length (ft):	19.566
Thickness (in):	20
Int Cover (-z) (in):	1
Ext Cover (+z) (in):	1
Cover Open/Edge (in):	2
K:	1
Use Cracked?:	Yes
Icr Factor:	0.7

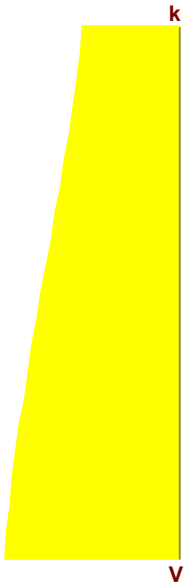
MATERIALS

Material Set:	Conc4000NW
Concrete f'c (ksi):	4
Concrete E (ksi):	3644
Concrete G (ksi):	1584
Conc Density (k/ft^3):	0.145
Lambda:	1
Conc Str Blk:	Rectangular
Vert Bar Fy (ksi):	60
Horz Bar Fy (ksi):	60
Steel E (ksi):	29000

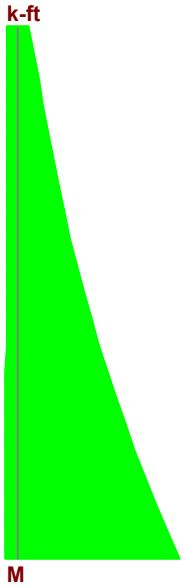
ENVELOPE DIAGRAMS



Min: 100.447 at 11 ft
Max: 175.231 at 0 ft



Min: -0.154 at 11 ft
Max: 88.35 at 0 ft



Min: -575.903 at 0 ft
Max: 38.576 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.085	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	-575.903	**Gov LC:**	2
Gov Pu (k):	0	**phi*Mn (k-ft):**	6740.605		

SHEAR DETAILS

UC Max:	0.071	**phi*Vn (k):**	1251.699	**Vs (k):**	777.959
Location (ft):	0	**Vnmax (k):**	2375.928	**Gov LC:**	1
Gov Vu (k):	88.35	**Vc (k):**	890.973		

DEFLECTION DETAILS

Delta max (in):	0.006	**Location (ft):**	36.75
Deflection Ratio:	H/10000	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.952	**rho min (H):**	0.002	**As min (V) (in^2):**	7.044
rho Provided (H):	0.003	**As Provided (V) (in^2):**	13.254	**rho min (V):**	0.002
As min (H) (in^2):	5.28	**rho Provided (V):**	0.003		

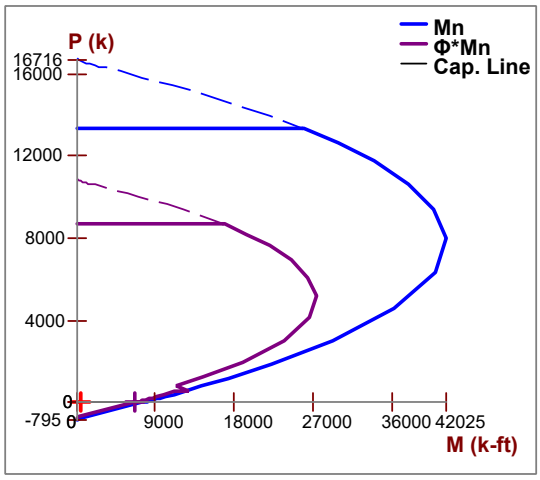
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	19.566	**Icracked (in^4):**	1.51e+7	**KL/r:**	1.948
A (in^2):	4695.84	**Cracked Mom, Mcr (k-ft):**	7263.657		
Igross (in^4):	2.157e+7	**r (in):**	56.708		

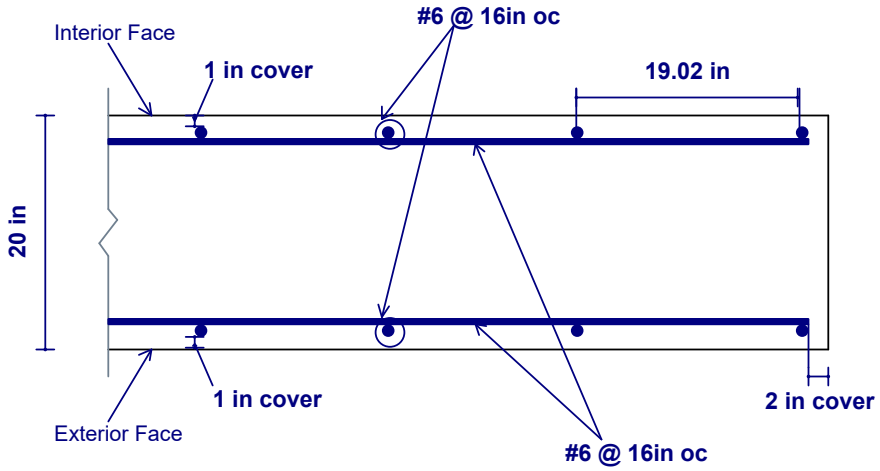
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



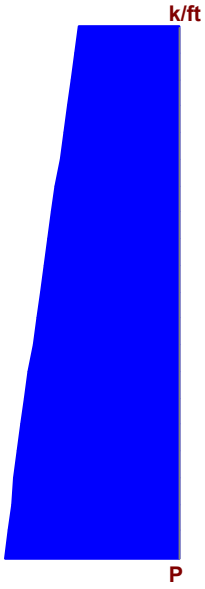
CROSS SECTION DETAILING



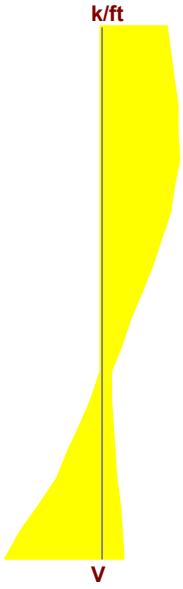
Detail Report: WP1 (Out-of-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	19.566	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

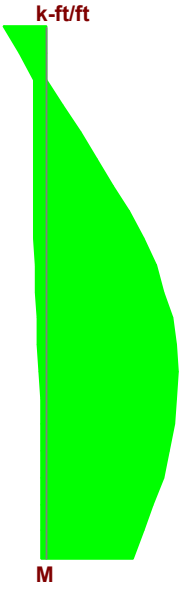
ENVELOPE DIAGRAMS



Min: 5.134 at 11 ft
Max: 8.956 at 0 ft



Min: -0.246 at 8.25 ft
Max: 0.306 at 0 ft



Min: -1.037 at 3.85 ft
Max: 0.322 at 11 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.036	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.322
Location (ft):	3.85	**Gov LC Int (-z):**	5	**phi*Mn Ext (+z) (k-ft/ft):**	28.701
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.011	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	11	**Gov LC Ext (+z):**	1
Gov Mu Int (-z) (k-ft/ft):	-1.037	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	28.701	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.036	**Gov Vu (k/ft):**	0.306	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	8.435	**Gov LC:**	5

DEFLECTION DETAILS

Delta max (in):	0.023	**Location (ft):**	36.75
Deflection Ratio:	H/5723	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	13.254	**As min (V) (in^2):**	7.044
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

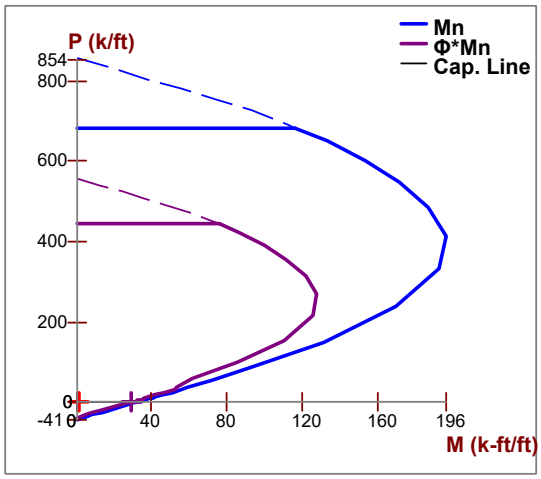
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	22.863
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	618.731		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

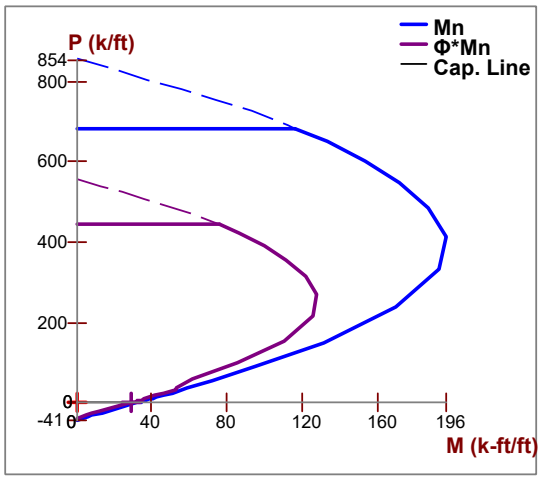
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

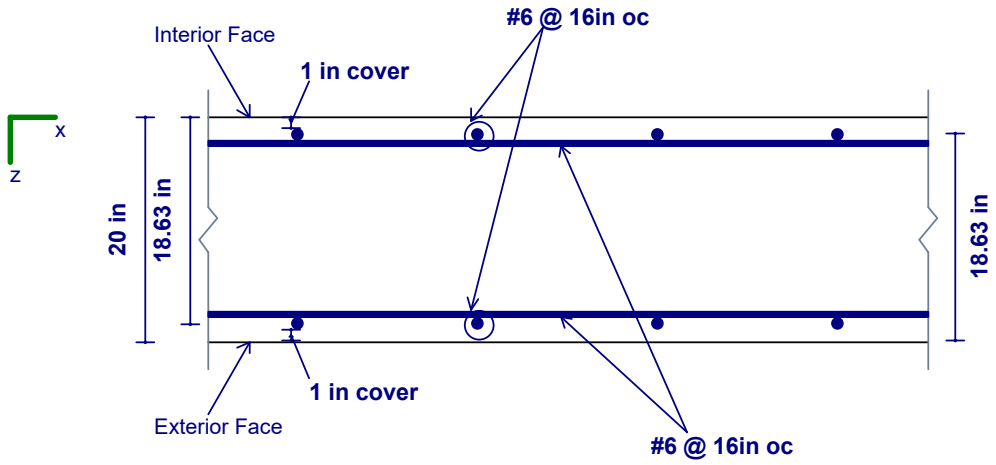
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



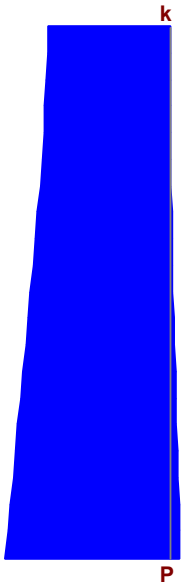
CROSS SECTION DETAILING



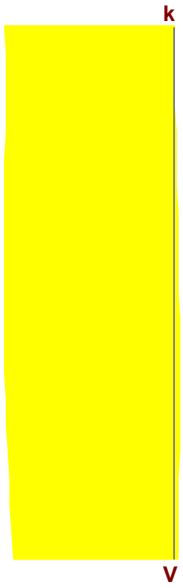
Detail Report: WP1 (In-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	19.566	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

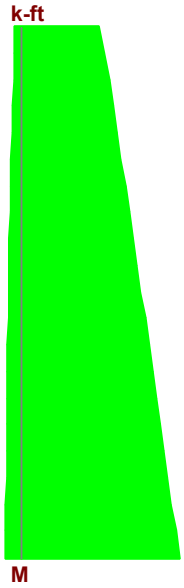
ENVELOPE DIAGRAMS



Min: -13.77 at 0 ft
Max: 234.686 at 0 ft



Min: -2.62 at 3.6 ft
Max: 91.252 at 6.6 ft



Min: -1071.748 at 0 ft
Max: 92.421 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.159	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	-1071.748	**Gov LC:**	5
Gov Pu (k):	0	**phi*Mn (k-ft):**	6740.605		

SHEAR DETAILS

UC Max:	0.073	**phi*Vn (k):**	1251.699	**Vs (k):**	777.959
Location (ft):	6.6	**Vnmax (k):**	2375.928	**Gov LC:**	5
Gov Vu (k):	91.252	**Vc (k):**	890.973		

DEFLECTION DETAILS

Delta max (in):	0.005	**Location (ft):**	36.75
Deflection Ratio:	H/10000	**Gov LC:**	5

REINFORCEMENT DETAILS

As Provided (H) (in^2):	9.719	**rho min (H):**	0.002	**As min (V) (in^2):**	7.044
rho Provided (H):	0.003	**As Provided (V) (in^2):**	13.254	**rho min (V):**	0.002
As min (H) (in^2):	5.76	**rho Provided (V):**	0.003		

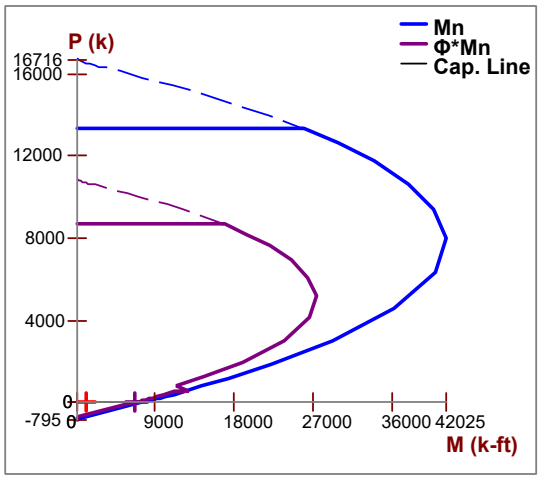
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	19.566	**Icracked (in^4):**	1.51e+7	**KL/r:**	2.125
A (in^2):	4695.84	**Cracked Mom, Mcr (k-ft):**	7263.657		
Igross (in^4):	2.157e+7	**r (in):**	56.708		

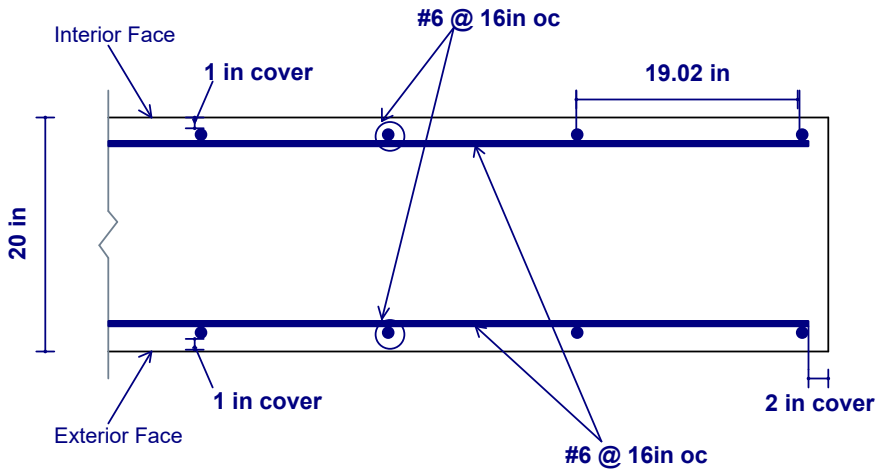
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



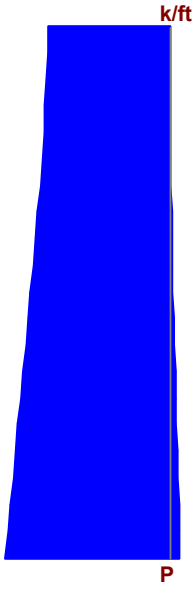
CROSS SECTION DETAILING



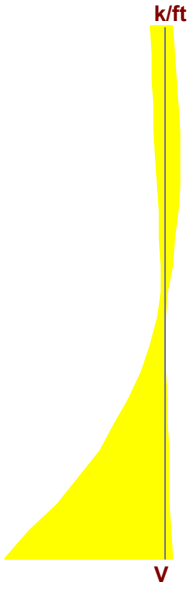
Detail Report: WP1 (Out-of-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	19.566	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

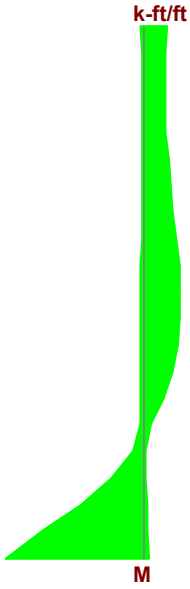
ENVELOPE DIAGRAMS



Min: -0.704 at 0 ft
Max: 11.995 at 0 ft



Min: -0.209 at 9 ft
Max: 2.302 at 0 ft



Min: -1.06 at 5.4 ft
Max: 3.98 at 0 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.037	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	3.98
Location (ft):	6	**Gov LC Int (-z):**	6	**phi*Mn Ext (+z) (k-ft/ft):**	28.701
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.139	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	0	**Gov LC Ext (+z):**	6
Gov Mu Int (-z) (k-ft/ft):	-1.06	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	28.701	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.286	**Gov Vu (k/ft):**	2.302	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	8.061	**Gov LC:**	6

DEFLECTION DETAILS

Delta max (in):	0.019	**Location (ft):**	36.75
Deflection Ratio:	H/7414	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	13.254	**As min (V) (in^2):**	7.044
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

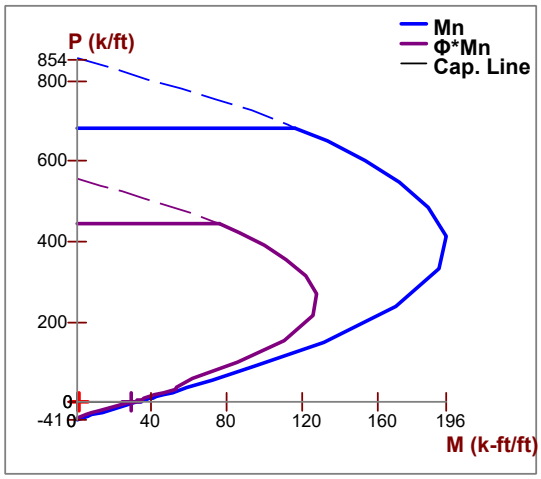
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	24.942
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	618.731		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

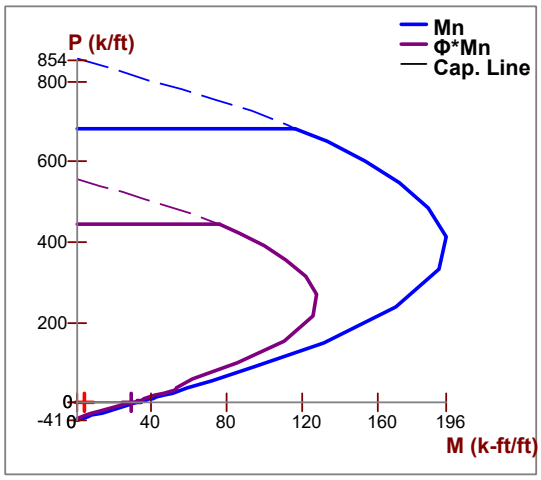
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

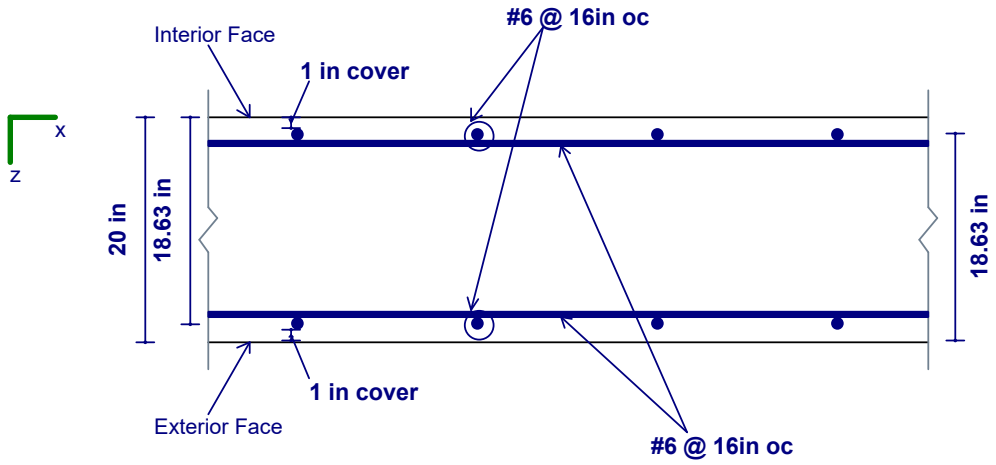
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



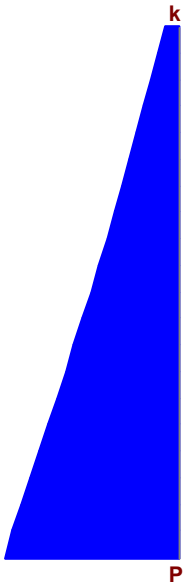
CROSS SECTION DETAILING



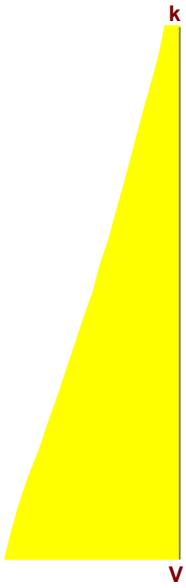
Detail Report: WP1 (In-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	13.75	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	19.566	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

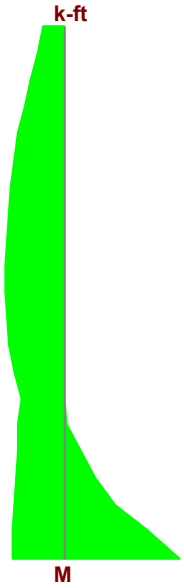
ENVELOPE DIAGRAMS



Min: 7.488 at 13.75 ft
Max: 97.61 at 0 ft



Min: -0.185 at 6.188 ft
Max: 44.42 at 0 ft



Min: -63.557 at 0 ft
Max: 31.725 at 7.563 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.009	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	-63.557	**Gov LC:**	5
Gov Pu (k):	0	**phi*Mn (k-ft):**	6740.605		

SHEAR DETAILS

UC Max:	0.035	**phi*Vn (k):**	1251.699	**Vs (k):**	777.959
Location (ft):	0	**Vnmax (k):**	2375.928	**Gov LC:**	2
Gov Vu (k):	44.42	**Vc (k):**	890.973		

DEFLECTION DETAILS

Delta max (in):	0.006	**Location (ft):**	36.75
Deflection Ratio:	H/10000	**Gov LC:**	5

REINFORCEMENT DETAILS

As Provided (H) (in^2):	9.719	**rho min (H):**	0.002	**As min (V) (in^2):**	7.044
rho Provided (H):	0.003	**As Provided (V) (in^2):**	13.254	**rho min (V):**	0.002
As min (H) (in^2):	6.6	**rho Provided (V):**	0.003		

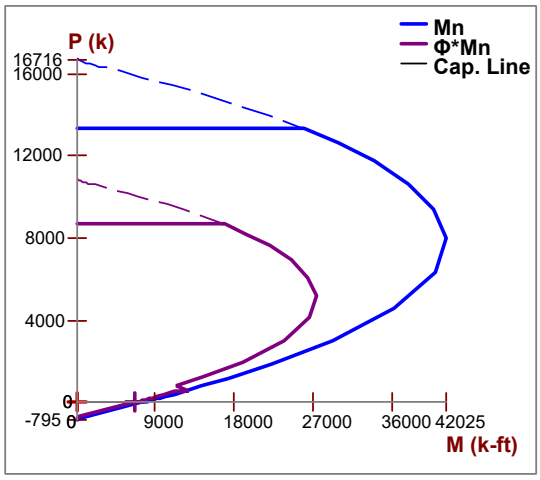
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	19.566	**Icracked (in^4):**	1.51e+7	**KL/r:**	2.434
A (in^2):	4695.84	**Cracked Mom, Mcr (k-ft):**	7263.657		
Igross (in^4):	2.157e+7	**r (in):**	56.708		

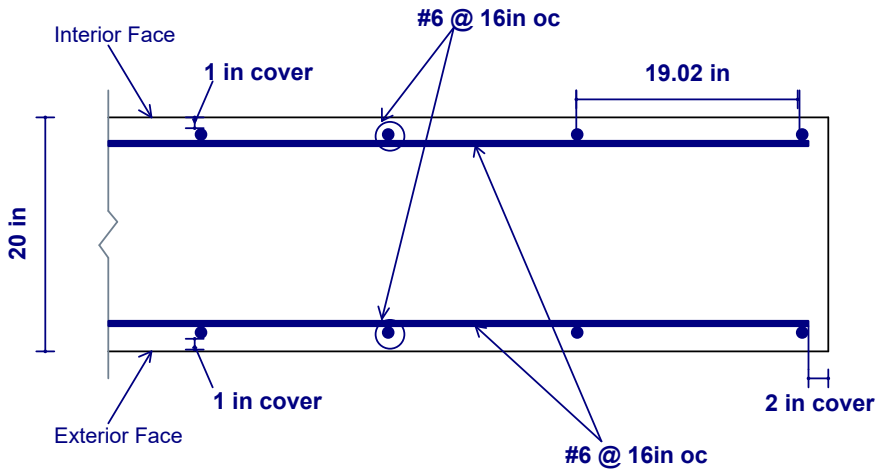
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



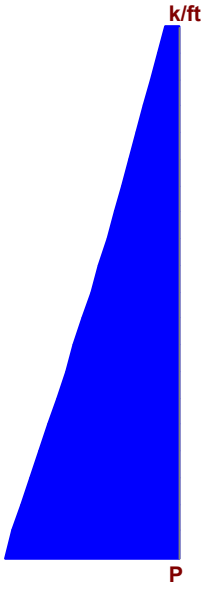
CROSS SECTION DETAILING



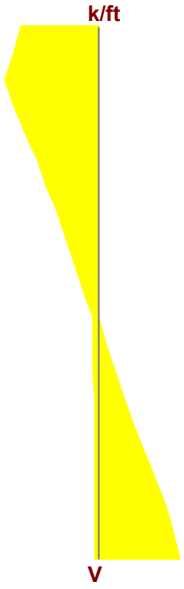
Detail Report: WP1 (Out-of-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	13.75	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	19.566	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

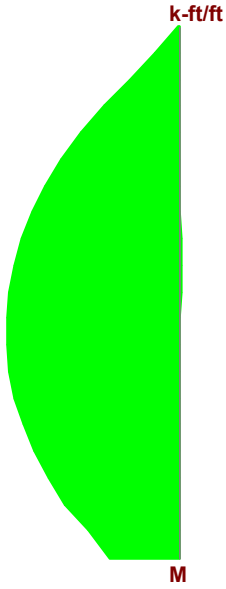
ENVELOPE DIAGRAMS



Min: 0.383 at 13.75 ft
Max: 4.989 at 0 ft



Min: -0.166 at 0 ft
Max: 0.185 at 12.375 ft



Min: -0.004 at 4.813 ft
Max: 0.806 at 5.5 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.806
Location (ft):	7.562	**Gov LC Int (-z):**	13	**phi*Mn Ext (+z) (k-ft/ft):**	28.701
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.028	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	6.188	**Gov LC Ext (+z):**	2
Gov Mu Int (-z) (k-ft/ft):	-0.004	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	28.701	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.023	**Gov Vu (k/ft):**	0.185	**phi*Vns (k/ft):**	0
Location (ft):	12.375	**phi*Vnc (k/ft):**	8.155	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.016	**Location (ft):**	36.75
Deflection Ratio:	H/10000	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	13.254	**As min (V) (in^2):**	7.044
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

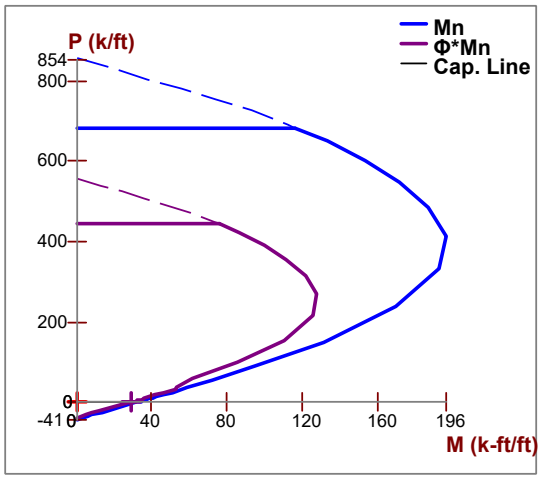
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	28.579
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	618.731		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

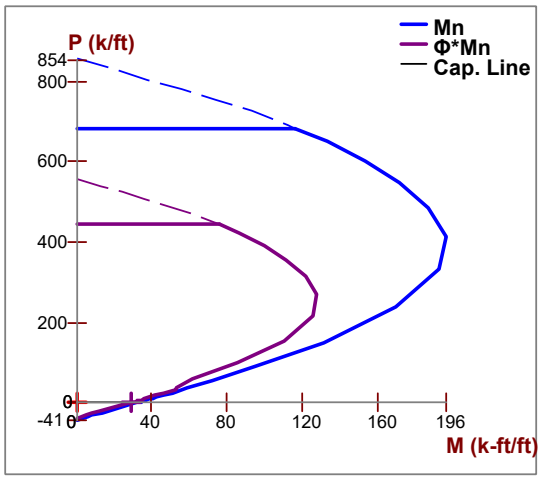
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

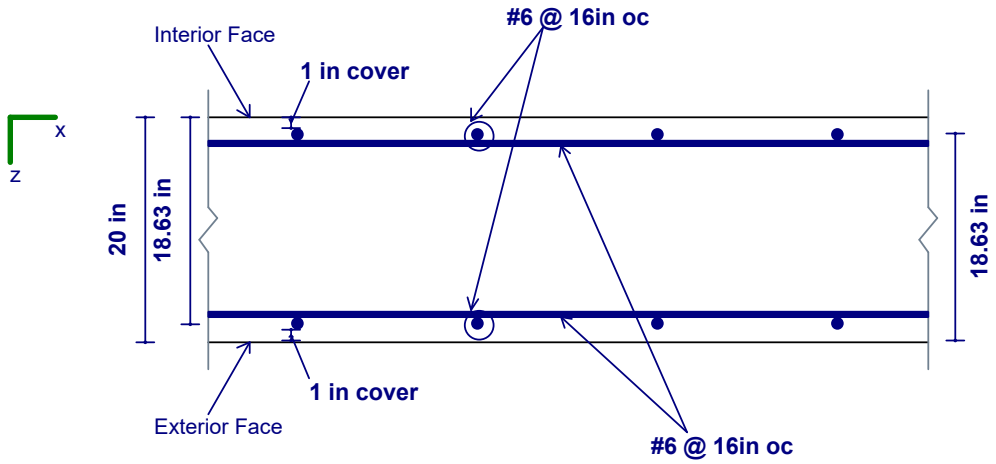
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram

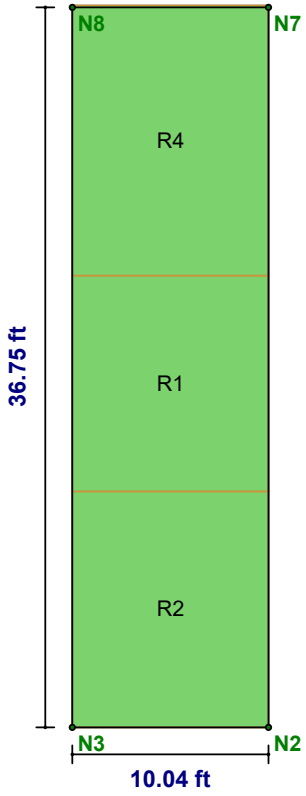


CROSS SECTION DETAILING



Detail Report: WP2

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	36.75	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	10.038	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R1	0.095	5	0.063	1	0.014	2	0.034	1	0.077	5	0.059	2
R2	0.143	5	0.054	1	0.009	2	0.074	1	0.275	2	0.079	2
R4	0.03	1	0.059	1	0.018	2	0.033	1	0.027	2	0.047	2

REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R1	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R2	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R4	#6@16in oc e.f.	#6@16in oc e.f.	N/A

Detail Report: WP2 (In-Plane, Region R1)

CRITERIA

Code:	ACI 318-19
Design Rule:	Avalanche
Seismic Rule:	SDR_Conc1
Loc of r/f:	Each Face
Outer Bars:	Vertical
Vert Bar Size:	#6
Horz Bar Size:	#6
Vert Bar Spac (in):	16
Horz Bar Spac (in):	16
Group Wall?:	No

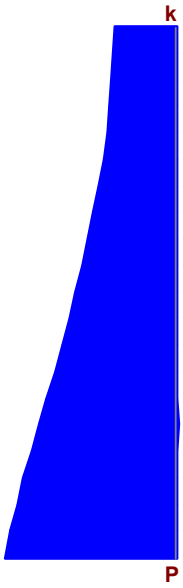
GEOMETRY

Total Height (ft):	11
Total Length (ft):	10.038
Thickness (in):	20
Int Cover (-z) (in):	1
Ext Cover (+z) (in):	1
Cover Open/Edge (in):	2
K:	1
Use Cracked?:	Yes
Icr Factor:	0.7

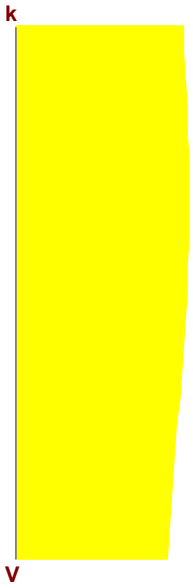
MATERIALS

Material Set:	Conc4000NW
Concrete f'c (ksi):	4
Concrete E (ksi):	3644
Concrete G (ksi):	1584
Conc Density (k/ft^3):	0.145
Lambda:	1
Conc Str Blk:	Rectangular
Vert Bar Fy (ksi):	60
Horz Bar Fy (ksi):	60
Steel E (ksi):	29000

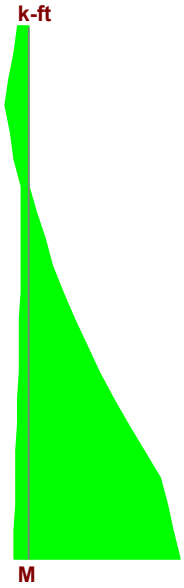
ENVELOPE DIAGRAMS



Min: -2.262 at 2.75 ft
Max: 142.191 at 0 ft



Min: -40.229 at 7.15 ft
Max: -35.34 at 0 ft



Min: -176.251 at 0 ft
Max: 24.74 at 9.35 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.095	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	-176.251	**Gov LC:**	5
Gov Pu (k):	0	**phi*Mn (k-ft):**	1848.779		

SHEAR DETAILS

UC Max:	0.063	**phi*Vn (k):**	642.163	**Vs (k):**	399.119
Location (ft):	7.15	**Vnmax (k):**	1218.929	**Gov LC:**	1
Gov Vu (k):	-40.229	**Vc (k):**	457.098		

DEFLECTION DETAILS

Delta max (in):	0.014	**Location (ft):**	36.75
Deflection Ratio:	H/9258	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.952	**rho min (H):**	0.002	**As min (V) (in^2):**	3.614
rho Provided (H):	0.003	**As Provided (V) (in^2):**	7.069	**rho min (V):**	0.002
As min (H) (in^2):	5.28	**rho Provided (V):**	0.003		

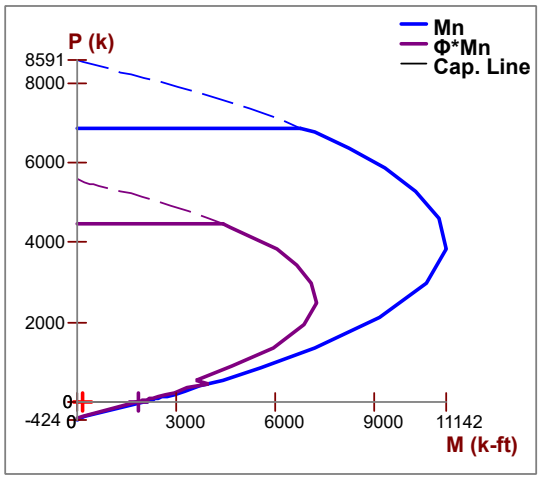
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	10.038	**Icracked (in^4):**	2.039e+6	**KL/r:**	3.796
A (in^2):	2409.12	**Cracked Mom, Mcr (k-ft):**	1911.814		
Igross (in^4):	2.913e+6	**r (in):**	29.093		

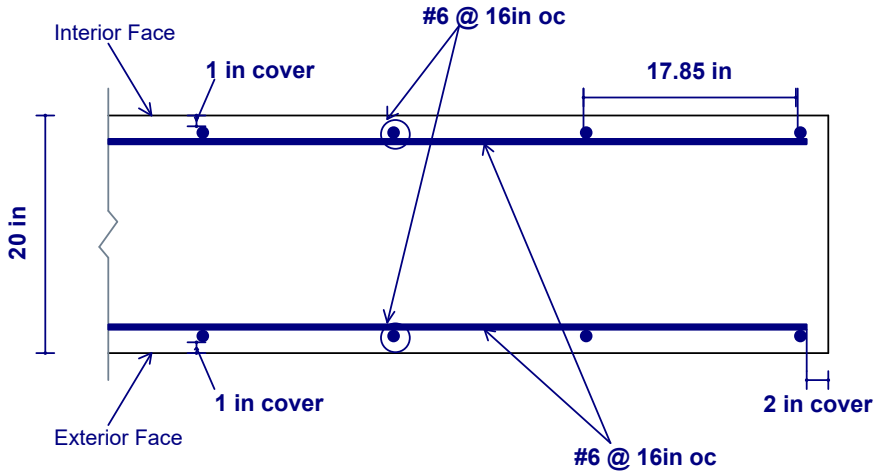
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



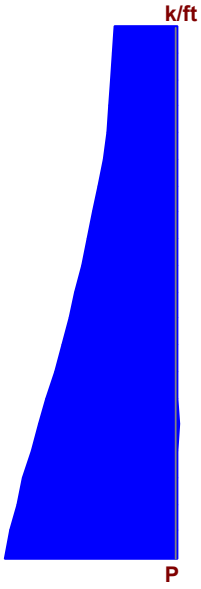
CROSS SECTION DETAILING



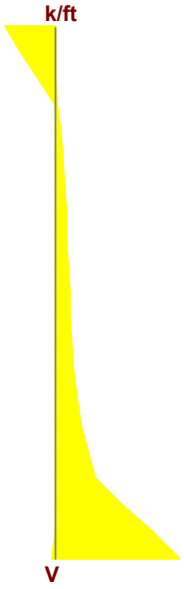
Detail Report: WP2 (Out-of-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	10.038	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

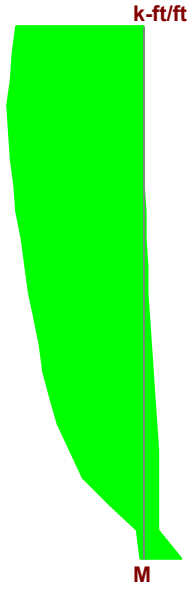
ENVELOPE DIAGRAMS



Min: -0.225 at 2.75 ft
Max: 14.165 at 0 ft



Min: -0.702 at 0 ft
Max: 0.273 at 11 ft



Min: -0.283 at 0 ft
Max: 1.013 at 9.35 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.032	**phi eff. Int (-z):**	0.65	**Gov Mu Ext (+z) (k-ft/ft):**	1.013
Location (ft):	0	**Gov LC Int (-z):**	1	**phi*Mn Ext (+z) (k-ft/ft):**	29.765
Gov Pu Int (-z) (k/ft):	14.165	**UC Max Ext (+z):**	0.034	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z) (k/ft):	445.045	**Location (ft):**	9.35	**Gov LC Ext (+z):**	1
Gov Mu Int (-z) (k-ft/ft):	-0.27	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	8.481	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.077	**Gov Vu (k/ft):**	-0.702	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	9.157	**Gov LC:**	5

DEFLECTION DETAILS

Delta max (in):	0.059	**Location (ft):**	36.75
Deflection Ratio:	H/2254	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	7.069	**As min (V) (in^2):**	3.614
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

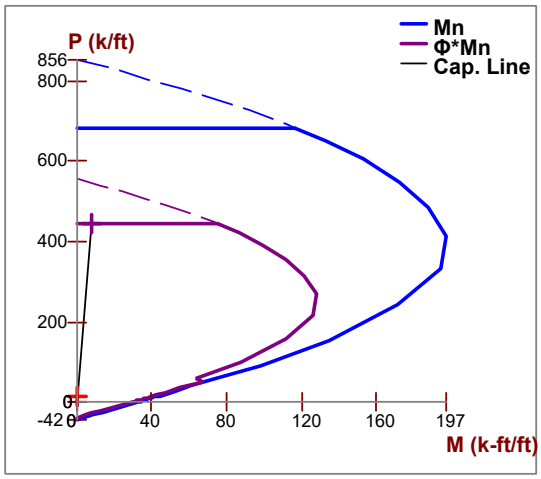
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	22.863
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	317.429		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

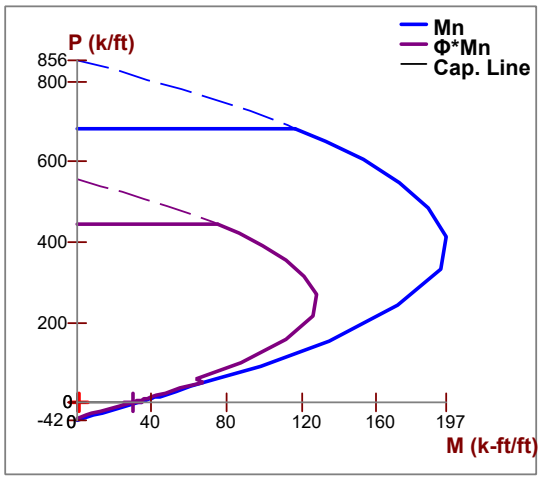
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

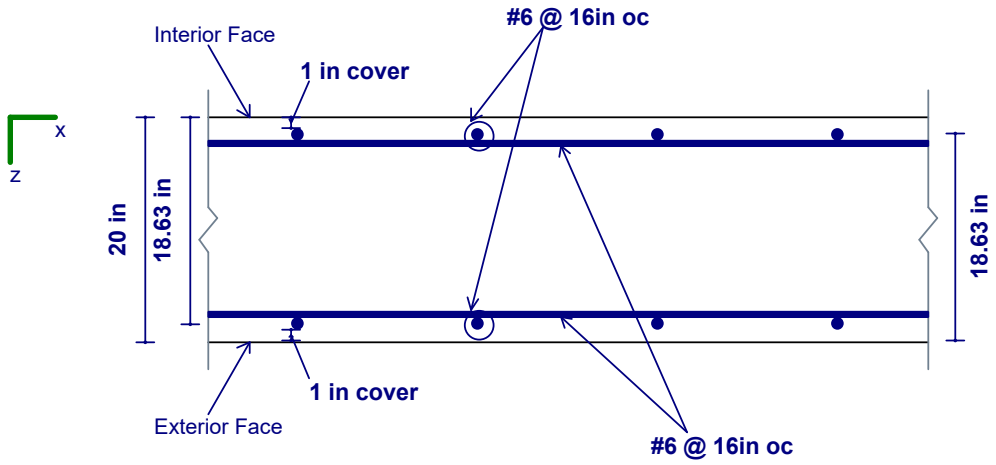
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



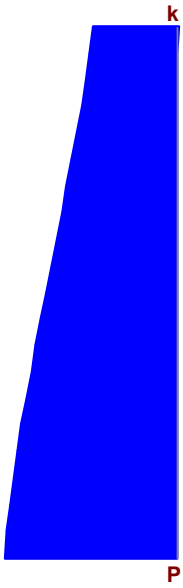
CROSS SECTION DETAILING



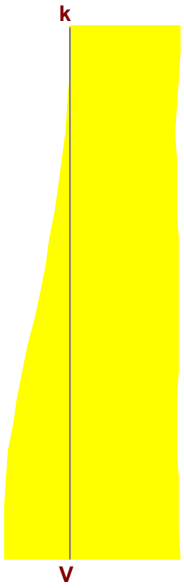
Detail Report: WP2 (In-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	10.038	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

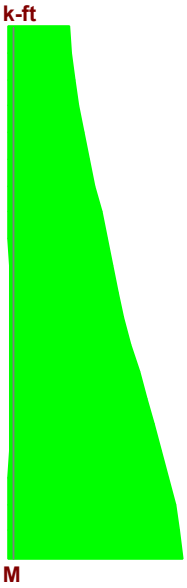
ENVELOPE DIAGRAMS



Min: -1.777 at 12 ft
Max: 317.976 at 0 ft



Min: -34.54 at 12 ft
Max: 19.771 at 0 ft



Min: -767.446 at 0 ft
Max: 17.701 at 9.6 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.143	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	11.4	**Gov Mu (k-ft):**	-263.961	**Gov LC:**	5
Gov Pu (k):	0	**phi*Mn (k-ft):**	1848.779		

SHEAR DETAILS

UC Max:	0.054	**phi*Vn (k):**	642.163	**Vs (k):**	399.119
Location (ft):	12	**Vnmax (k):**	1218.929	**Gov LC:**	1
Gov Vu (k):	-34.54	**Vc (k):**	457.098		

DEFLECTION DETAILS

Delta max (in):	0.009	**Location (ft):**	36.75
Deflection Ratio:	H/10000	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (H) (in^2):	9.719	**rho min (H):**	0.002	**As min (V) (in^2):**	3.614
rho Provided (H):	0.003	**As Provided (V) (in^2):**	7.069	**rho min (V):**	0.002
As min (H) (in^2):	5.76	**rho Provided (V):**	0.003		

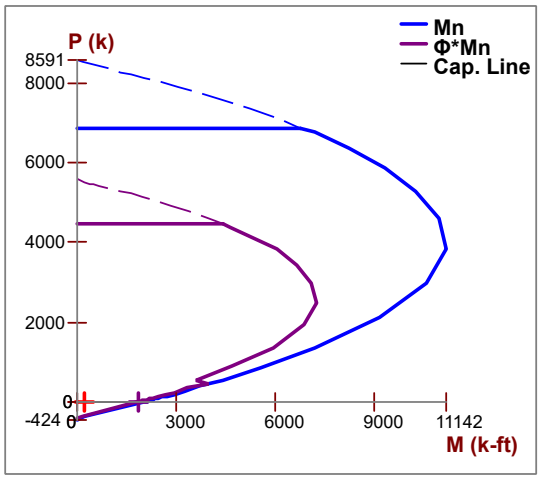
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	10.038	**Icracked (in^4):**	2.039e+6	**KL/r:**	4.141
A (in^2):	2409.12	**Cracked Mom, Mcr (k-ft):**	1911.814		
Igross (in^4):	2.913e+6	**r (in):**	29.093		

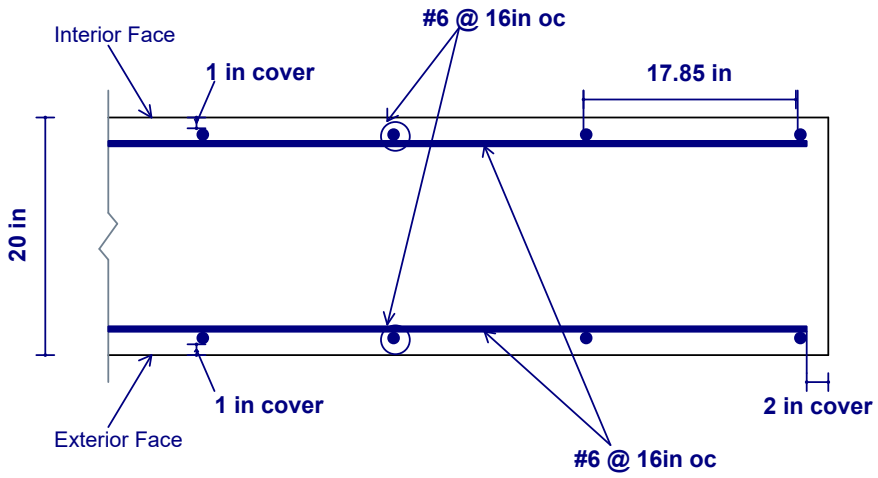
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



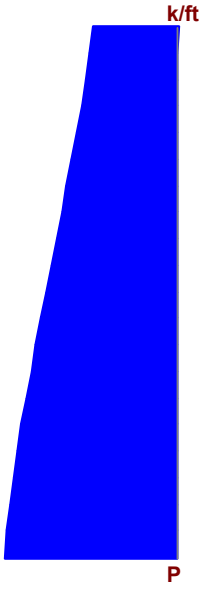
CROSS SECTION DETAILING



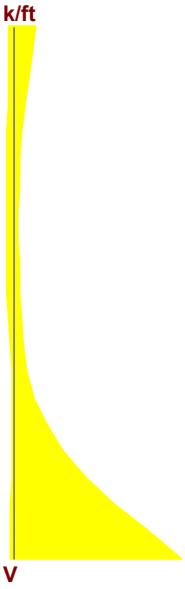
Detail Report: WP2 (Out-of-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	10.038	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

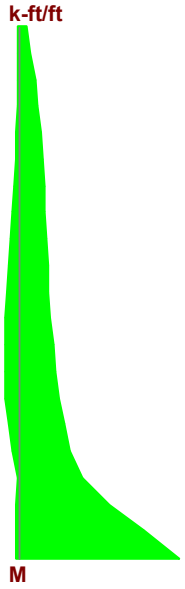
ENVELOPE DIAGRAMS



Min: -0.177 at 12 ft
Max: 31.677 at 0 ft



Min: -2.976 at 0 ft
Max: 0.101 at 7.2 ft



Min: -6.293 at 0 ft
Max: 0.497 at 4.2 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.074	**phi eff. Int (-z):**	0.65	**Gov Mu Ext (+z) (k-ft/ft):**	0
Location (ft):	0	**Gov LC Int (-z):**	1	**phi*Mn Ext (+z):**	NC
Gov Pu Int (-z) (k/ft):	31.677	**UC Max Ext (+z):**	0.071	**phi eff. Ext (+z):**	0.65
phi*Pn Int (-z) (k/ft):	428.292	**Location (ft):**	0	**Gov LC Ext (+z):**	1
Gov Mu Int (-z) (k-ft/ft):	-6.246	**Gov Pu Ext (+z) (k/ft):**	31.677		
phi*Mn Int (-z) (k-ft/ft):	84.443	**phi*Pn Ext (+z) (k/ft):**	445.045		

SHEAR DETAILS

UC Max:	0.275	**Gov Vu (k/ft):**	-2.976	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	10.827	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.079	**Location (ft):**	36.75
Deflection Ratio:	H/1815	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	7.069	**As min (V) (in^2):**	3.614
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

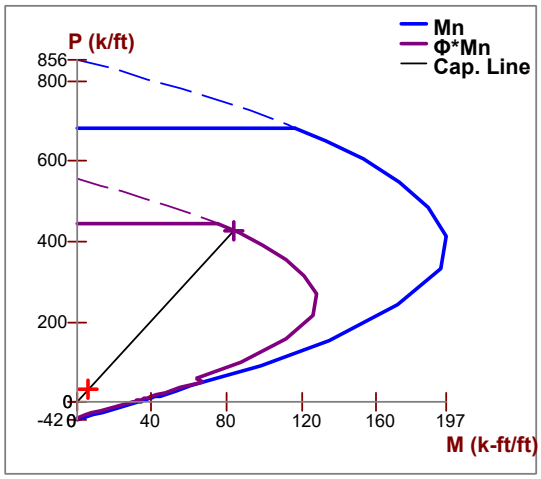
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	24.942
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	317.429		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

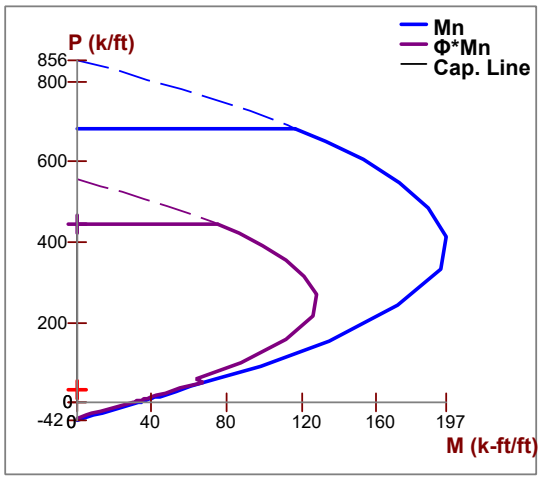
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

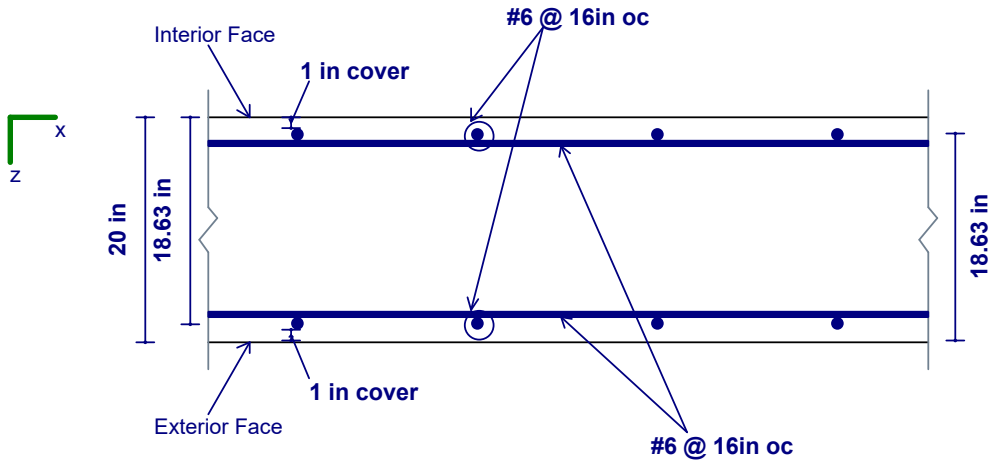
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



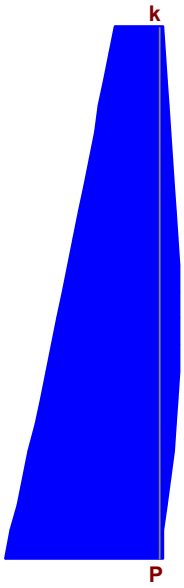
CROSS SECTION DETAILING



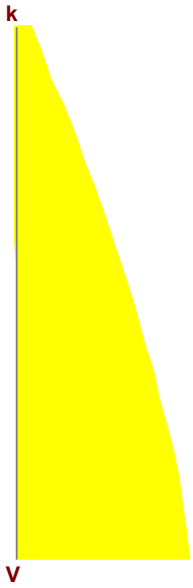
Detail Report: WP2 (In-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	13.75	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	10.038	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

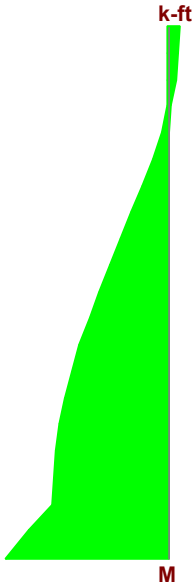
ENVELOPE DIAGRAMS



Min: -6.445 at 6.188 ft
Max: 49.18 at 0 ft



Min: -37.671 at 0 ft
Max: 0.088 at 12.375 ft



Min: -3.948 at 13.75 ft
Max: 55.196 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.03	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	55.196	**Gov LC:**	1
Gov Pu (k):	0	**phi*Mn (k-ft):**	1830.886		

SHEAR DETAILS

UC Max:	0.059	**phi*Vn (k):**	642.163	**Vs (k):**	399.119
Location (ft):	0	**Vnmax (k):**	1218.929	**Gov LC:**	1
Gov Vu (k):	-37.671	**Vc (k):**	457.098		

DEFLECTION DETAILS

Delta max (in):	0.018	**Location (ft):**	36.75
Deflection Ratio:	H/9136	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (H) (in^2):	9.719	**rho min (H):**	0.002	**As min (V) (in^2):**	3.614
rho Provided (H):	0.003	**As Provided (V) (in^2):**	7.069	**rho min (V):**	0.002
As min (H) (in^2):	6.6	**rho Provided (V):**	0.003		

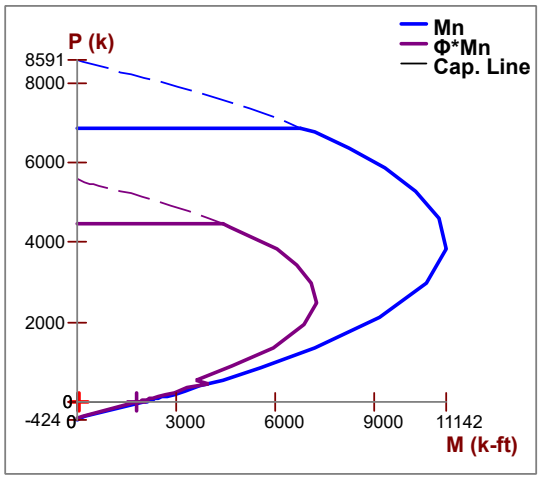
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	10.038	**Icracked (in^4):**	2.039e+6	**KL/r:**	4.745
A (in^2):	2409.12	**Cracked Mom, Mcr (k-ft):**	1911.814		
Igross (in^4):	2.913e+6	**r (in):**	29.093		

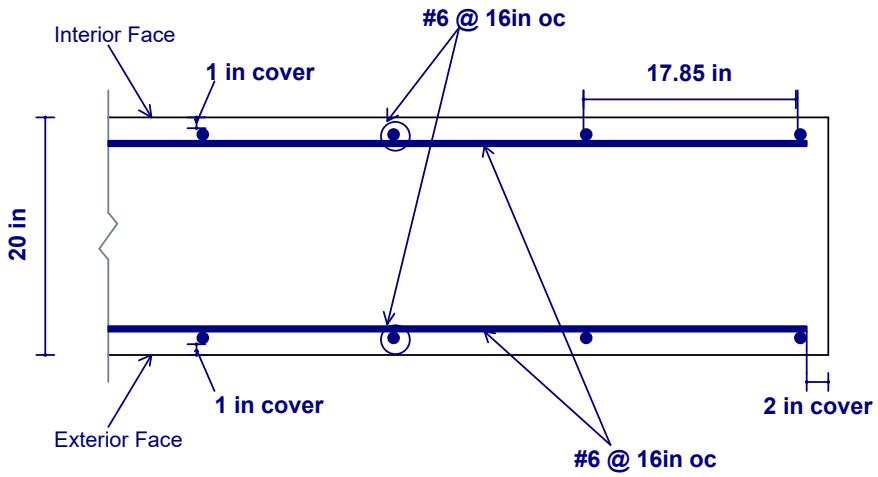
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



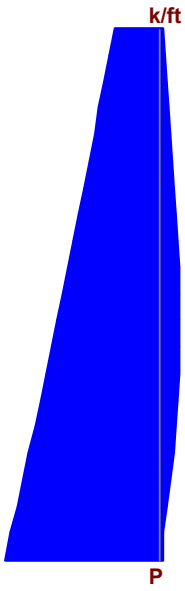
CROSS SECTION DETAILING



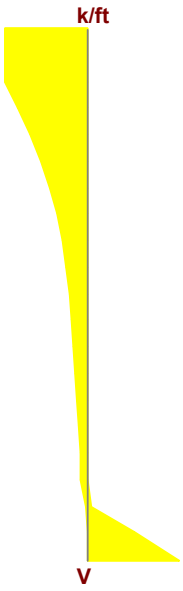
Detail Report: WP2 (Out-of-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	13.75	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	10.038	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

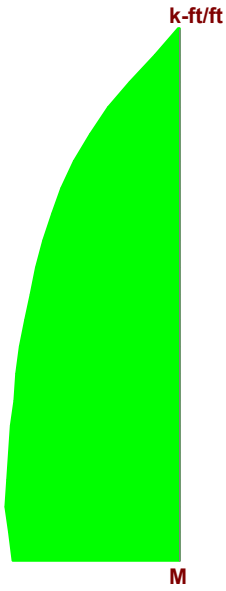
ENVELOPE DIAGRAMS



Min: -0.642 at 6.188 ft
Max: 4.899 at 0 ft



Min: -0.22 at 0 ft
Max: 0.198 at 12.375 ft



Min: 0 at 13.75 ft
Max: 0.983 at 1.375 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.983
Location (ft):	12.375	**Gov LC Int (-z):**	4	**phi*Mn Ext (+z) (k-ft/ft):**	29.765
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.033	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	1.375	**Gov LC Ext (+z):**	1
Gov Mu Int (-z) (k-ft/ft):	-0.0001396	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	29.765	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.027	**Gov Vu (k/ft):**	-0.22	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	8.251	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.047	**Location (ft):**	1.837
Deflection Ratio:	H/3545	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	7.069	**As min (V) (in^2):**	3.614
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

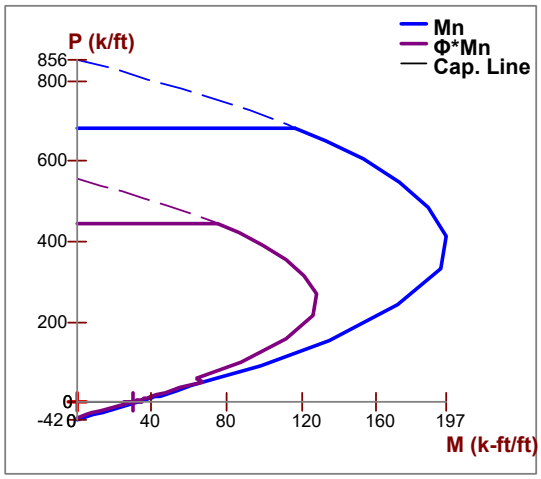
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	28.579
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	317.429		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

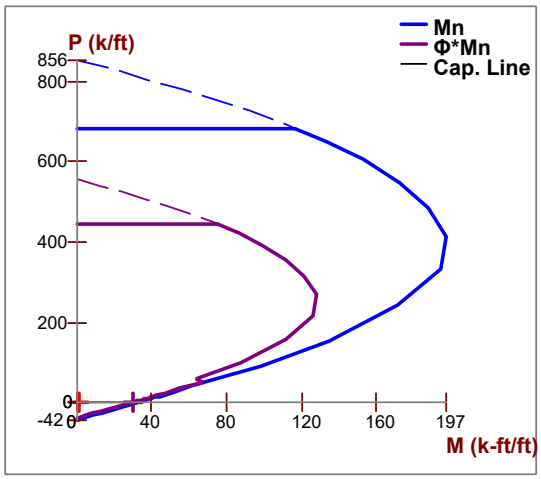
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

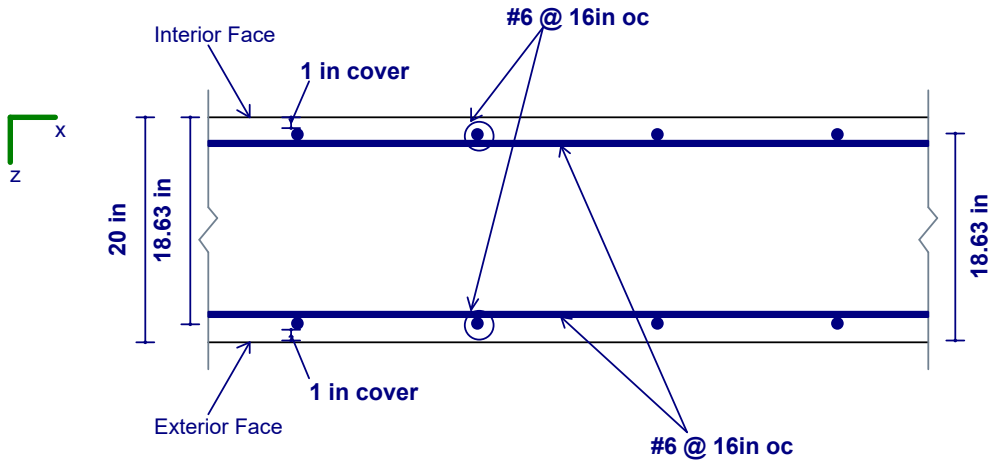
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram

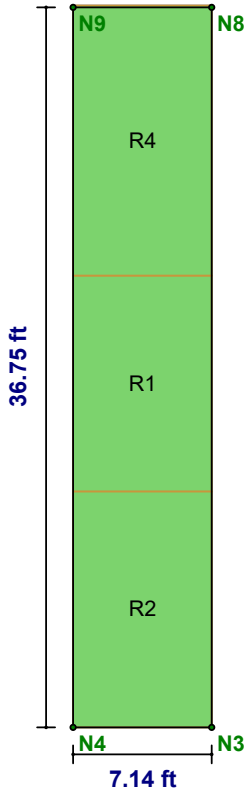


CROSS SECTION DETAILING



Detail Report: WP3

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	36.75	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	7.142	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R1	0.269	5	0.261	5	0.049	2	0.02	2	0.044	2	0.031	2
R2	0.729	1	0.365	2	0.037	2	0.219	5	0.112	2	0.041	2
R4	0.025	1	0.097	5	0.056	2	0.012	2	0.026	2	0.023	2

REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R1	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R2	#6@12in oc e.f.	#6@16in oc e.f.	N/A
R4	#6@16in oc e.f.	#6@16in oc e.f.	N/A

Detail Report: WP3 (In-Plane, Region R1)

CRITERIA

Code:	ACI 318-19
Design Rule:	Avalanche
Seismic Rule:	SDR_Conc1
Loc of r/f:	Each Face
Outer Bars:	Vertical
Vert Bar Size:	#6
Horz Bar Size:	#6
Vert Bar Spac (in):	16
Horz Bar Spac (in):	16
Group Wall?:	No

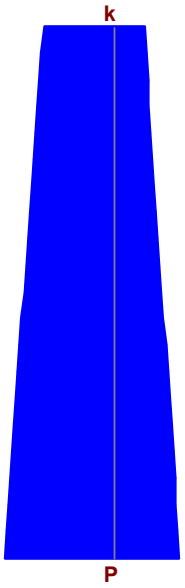
GEOMETRY

Total Height (ft):	11
Total Length (ft):	7.142
Thickness (in):	20
Int Cover (-z) (in):	1
Ext Cover (+z) (in):	1
Cover Open/Edge (in):	2
K:	1
Use Cracked?:	Yes
Icr Factor:	0.7

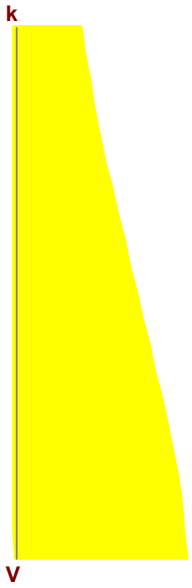
MATERIALS

Material Set:	Conc4000NW
Concrete f'c (ksi):	4
Concrete E (ksi):	3644
Concrete G (ksi):	1584
Conc Density (k/ft^3):	0.145
Lambda:	1
Conc Str Blk:	Rectangular
Vert Bar Fy (ksi):	60
Horz Bar Fy (ksi):	60
Steel E (ksi):	29000

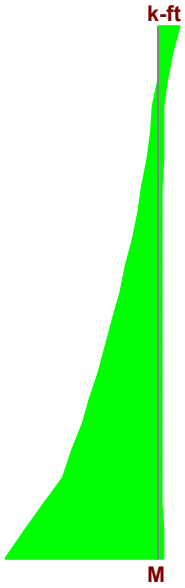
ENVELOPE DIAGRAMS



Min: -37.081 at 0 ft
Max: 62.083 at 0 ft



Min: -117.709 at 0 ft
Max: 1.151 at 3.85 ft



Min: -36.369 at 11 ft
Max: 261.164 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.269	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	261.164	**Gov LC:**	5
Gov Pu (k):	0	**phi*Mn (k-ft):**	971.459		

SHEAR DETAILS

UC Max:	0.261	**phi*Vn (k):**	450.411	**Vs (k):**	283.991
Location (ft):	0	**Vnmax (k):**	867.324	**Gov LC:**	5
Gov Vu (k):	-117.709	**Vc (k):**	316.557		

DEFLECTION DETAILS

Delta max (in):	0.049	**Location (ft):**	36.75
Deflection Ratio:	H/2688	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.952	**rho min (H):**	0.002	**As min (V) (in^2):**	2.571
rho Provided (H):	0.003	**As Provided (V) (in^2):**	5.301	**rho min (V):**	0.002
As min (H) (in^2):	5.28	**rho Provided (V):**	0.003		

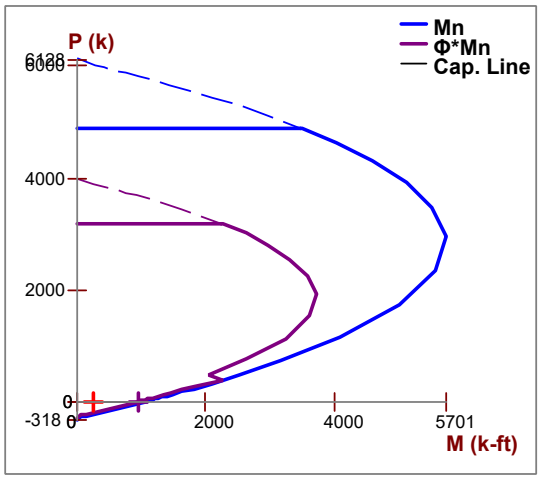
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	7.142	**Icracked (in^4):**	7.346e+5	**KL/r:**	5.335
A (in^2):	1714.2	**Cracked Mom, Mcr (k-ft):**	967.947		
Igross (in^4):	1.049e+6	**r (in):**	20.701		

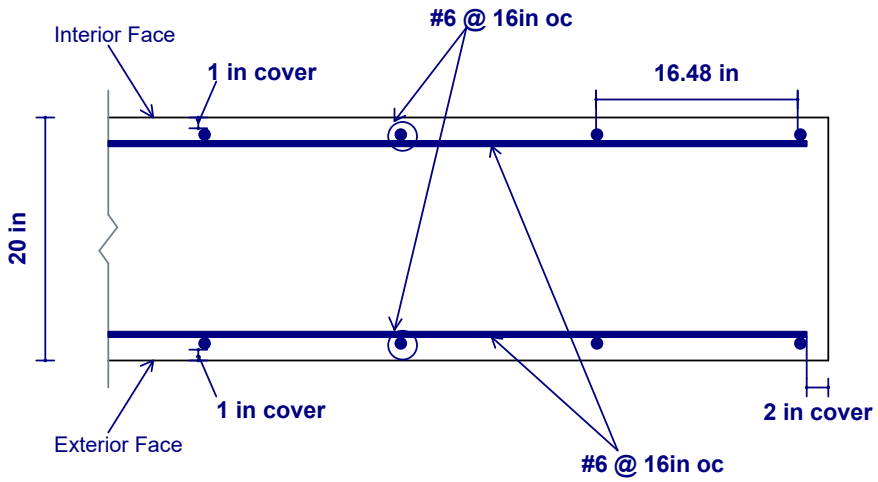
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



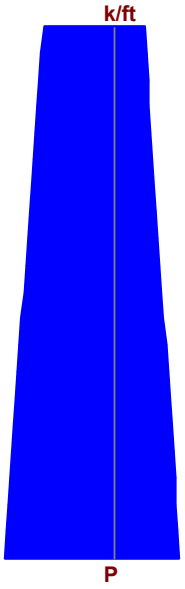
CROSS SECTION DETAILING



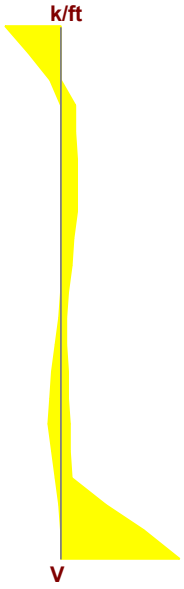
Detail Report: WP3 (Out-of-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	7.142	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

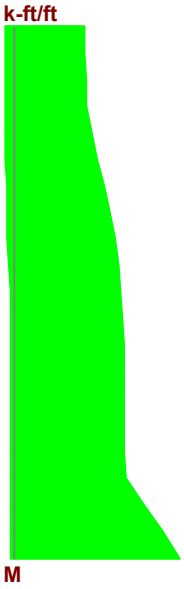
ENVELOPE DIAGRAMS



Min: -5.192 at 0 ft
Max: 8.692 at 0 ft



Min: -0.345 at 0 ft
Max: 0.155 at 11 ft



Min: -0.613 at 0 ft
Max: 0.026 at 9.9 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.02	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.026
Location (ft):	0	**Gov LC Int (-z):**	2	**phi*Mn Ext (+z) (k-ft/ft):**	31.274
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.001	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	11	**Gov LC Ext (+z):**	6
Gov Mu Int (-z) (k-ft/ft):	-0.613	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	31.274	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.044	**Gov Vu (k/ft):**	-0.345	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	7.791	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.031	**Location (ft):**	36.75
Deflection Ratio:	H/4312	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	5.301	**As min (V) (in^2):**	2.571
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

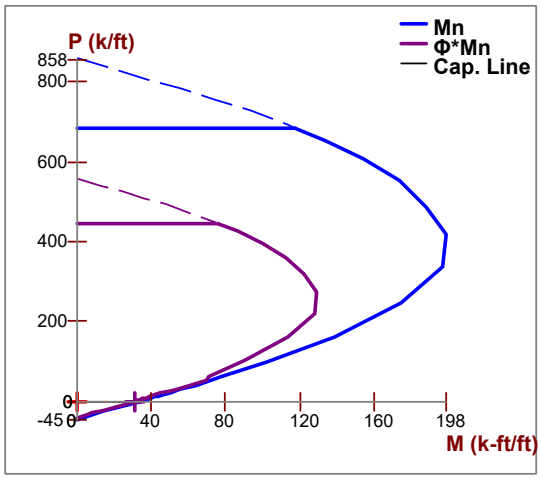
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	22.863
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	225.866		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

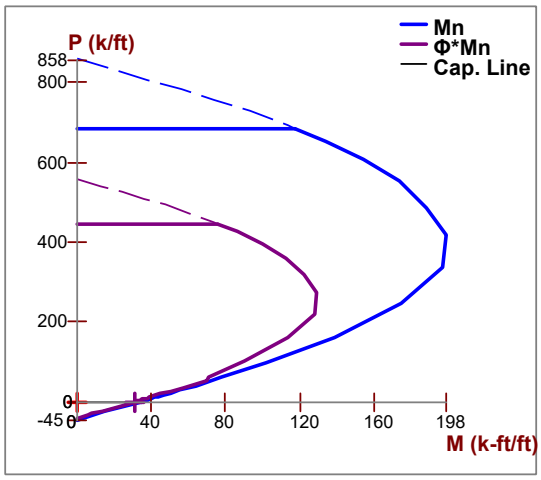
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

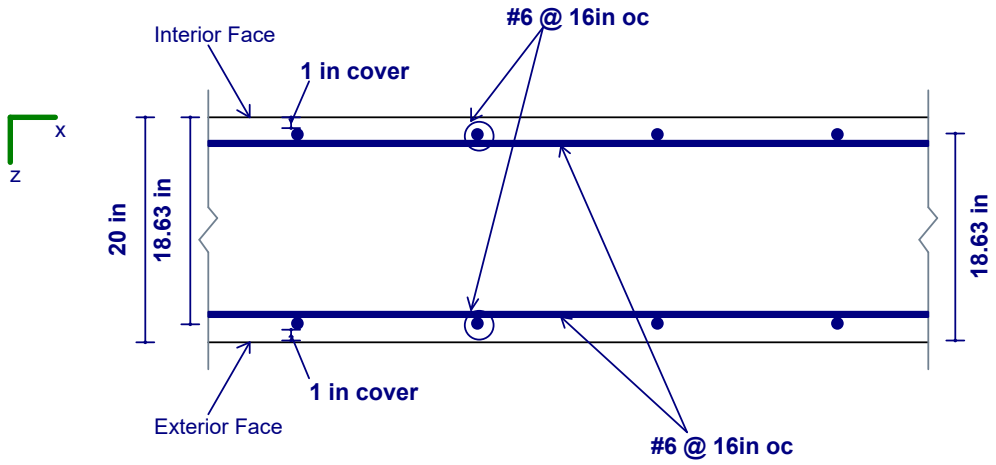
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



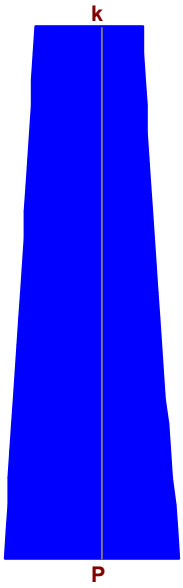
CROSS SECTION DETAILING



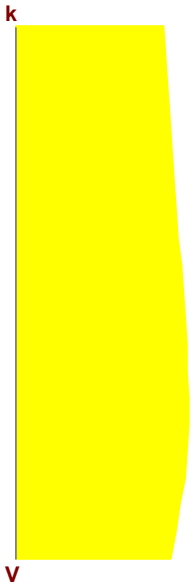
Detail Report: WP3 (In-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	7.142	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	12	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

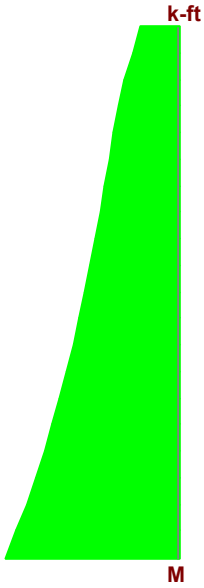
ENVELOPE DIAGRAMS



Min: -73.031 at 0 ft
Max: 91.198 at 0 ft



Min: -143.575 at 3.6 ft
Max: -122.414 at 12 ft



Min: -10.535 at 0 ft
Max: 828.625 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.729	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	820.984	**Gov LC:**	1
Gov Pu (k):	0	**phi*Mn (k-ft):**	1126.188		

SHEAR DETAILS

UC Max:	0.365	**phi*Vn (k):**	362.355	**Vs (k):**	283.991
Location (ft):	0.6	**Vnmax (k):**	867.324	**Gov LC:**	2
Gov Vu (k):	-132.171	**Vc (k):**	199.149		

DEFLECTION DETAILS

Delta max (in):	0.037	**Location (ft):**	36.75
Deflection Ratio:	H/3939	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (H) (in^2):	9.719	**rho min (H):**	0.002	**As min (V) (in^2):**	4.285
rho Provided (H):	0.003	**As Provided (V) (in^2):**	6.185	**rho min (V):**	0.002
As min (H) (in^2):	7.2	**rho Provided (V):**	0.004		

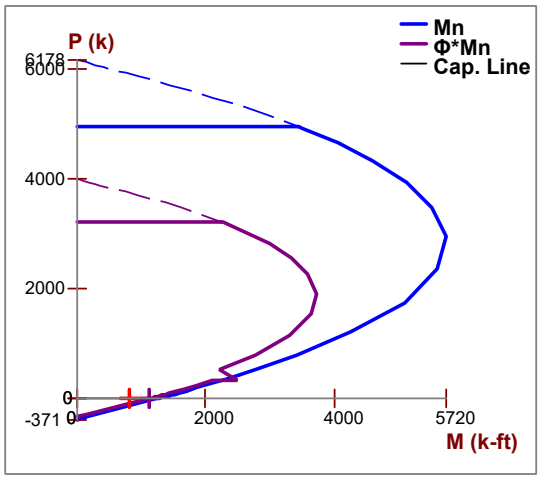
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	7.142	**Icracked (in^4):**	7.346e+5	**KL/r:**	5.82
A (in^2):	1714.2	**Cracked Mom, Mcr (k-ft):**	967.947		
Igross (in^4):	1.049e+6	**r (in):**	20.701		

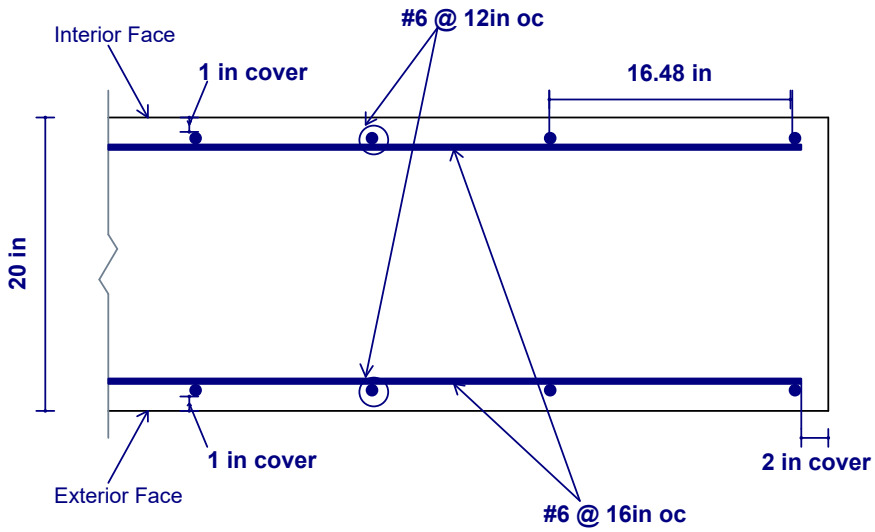
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



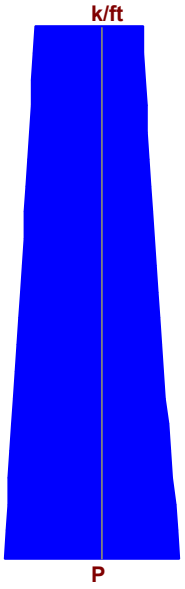
CROSS SECTION DETAILING



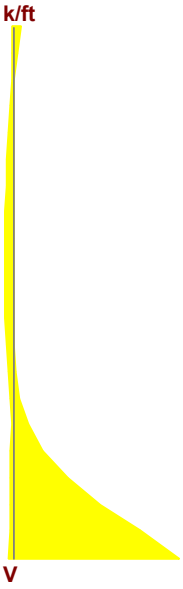
Detail Report: WP3 (Out-of-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	7.142	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	12	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

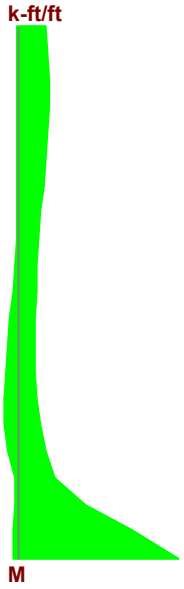
ENVELOPE DIAGRAMS



Min: -10.225 at 0 ft
Max: 12.768 at 0 ft



Min: -2.373 at 0 ft
Max: 0.108 at 6 ft



Min: -3.576 at 0 ft
Max: 0.28 at 3.6 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.219	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0
Location (ft):	0	**Gov LC Int (-z):**	5	**phi*Mn Ext (+z):**	NC
Gov Pu Int (-z) (k/ft):	-10.225	**UC Max Ext (+z):**	0.219	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z) (k/ft):	-46.761	**Location (ft):**	0	**Gov LC Ext (+z):**	5
Gov Mu Int (-z) (k-ft/ft):	-2.272	**Gov Pu Ext (+z) (k/ft):**	-10.225		
phi*Mn Int (-z) (k-ft/ft):	10.391	**phi*Pn Ext (+z) (k/ft):**	-46.761		

SHEAR DETAILS

UC Max:	0.112	**Gov Vu (k/ft):**	-2.373	**phi*Vns (k/ft):**	21.203
Location (ft):	0	**phi*Vnc (k/ft):**	7.673	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.041	**Location (ft):**	36.75
Deflection Ratio:	H/3535	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	6.185	**As min (V) (in^2):**	4.285
rho Provided (V):	0.004	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

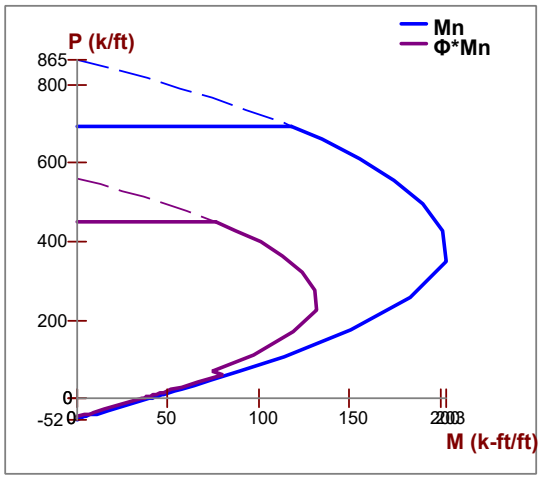
Total Width (in):	12	**Icracked (in^4):**	2800	**KL/r:**	24.942
A (in^2):	240	**Cracked Mom, Mcr (k-ft):**	225.866		
Igross (in^4):	8000	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

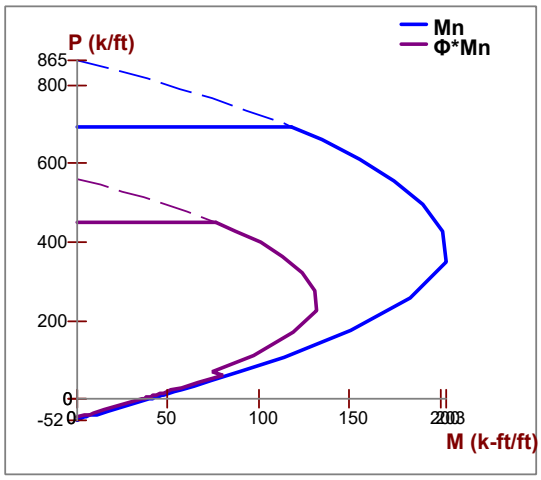
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

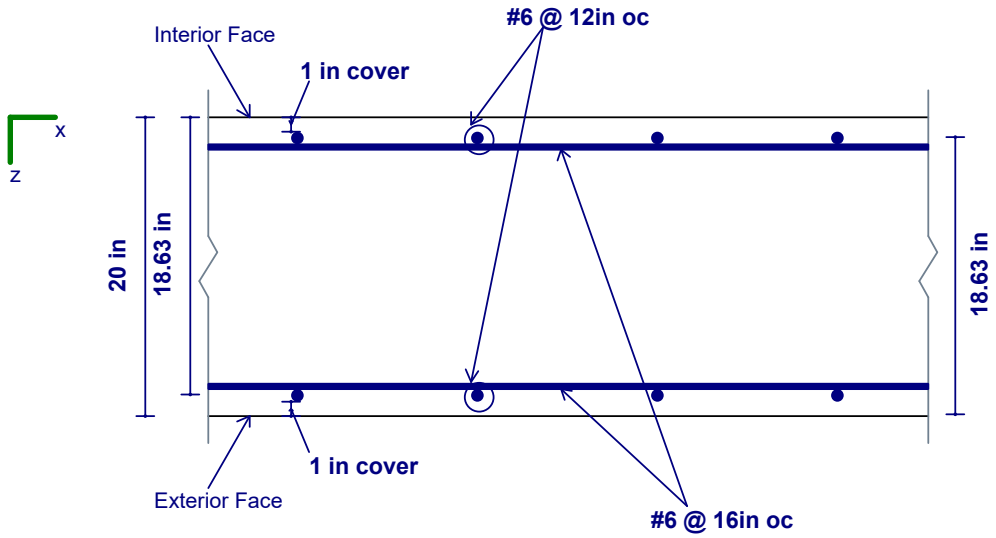
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



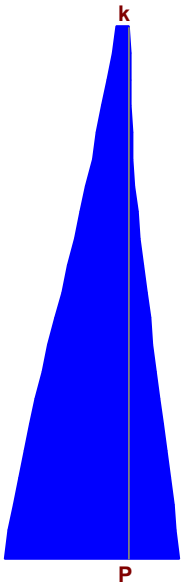
CROSS SECTION DETAILING



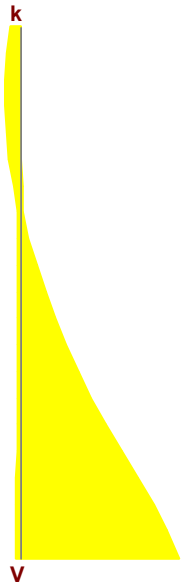
Detail Report: WP3 (In-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	13.75	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	7.142	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

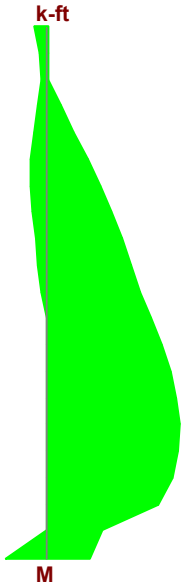
ENVELOPE DIAGRAMS



Min: -16.175 at 0 ft
Max: 39.611 at 0 ft



Min: -37.687 at 0 ft
Max: 3.481 at 11.688 ft



Min: -24.289 at 3.438 ft
Max: 7.202 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.025	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	3.438	**Gov Mu (k-ft):**	-24.289	**Gov LC:**	1
Gov Pu (k):	0	**phi*Mn (k-ft):**	983.387		

SHEAR DETAILS

UC Max:	0.097	**phi*Vn (k):**	387.798	**Vs (k):**	283.991
Location (ft):	0	**Vnmax (k):**	867.324	**Gov LC:**	5
Gov Vu (k):	-37.687	**Vc (k):**	233.073		

DEFLECTION DETAILS

Delta max (in):	0.056	**Location (ft):**	36.75
Deflection Ratio:	H/2947	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (H) (in^2):	9.719	**rho min (H):**	0.002	**As min (V) (in^2):**	2.571
rho Provided (H):	0.003	**As Provided (V) (in^2):**	5.301	**rho min (V):**	0.002
As min (H) (in^2):	6.6	**rho Provided (V):**	0.003		

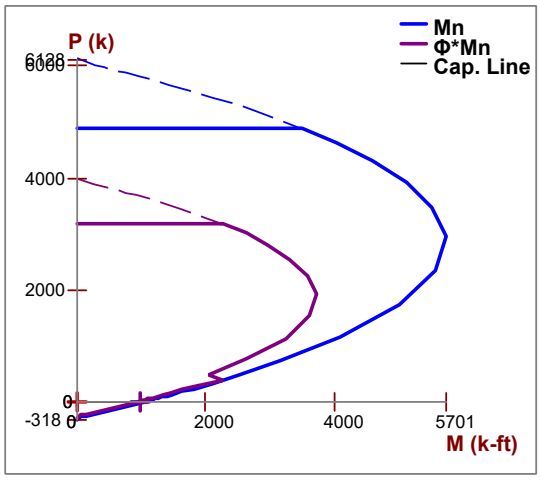
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	7.142	**Icracked (in^4):**	7.346e+5	**KL/r:**	6.669
A (in^2):	1714.2	**Cracked Mom, Mcr (k-ft):**	967.947		
Igross (in^4):	1.049e+6	**r (in):**	20.701		

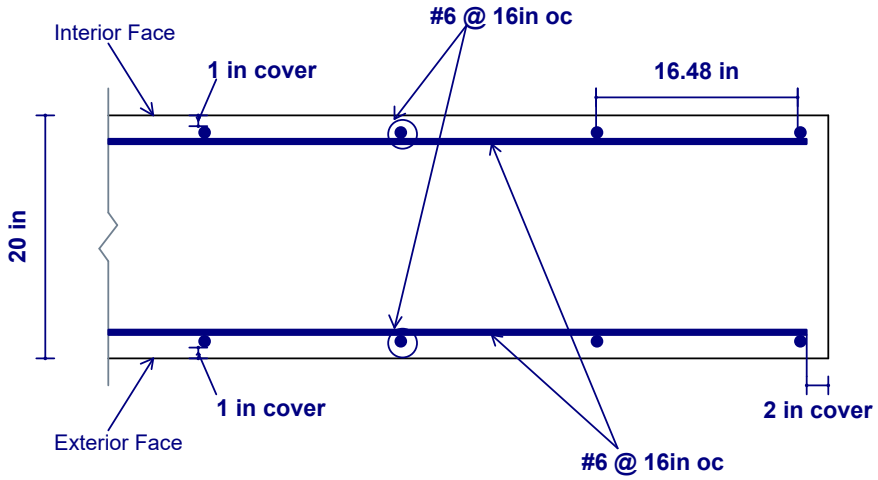
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



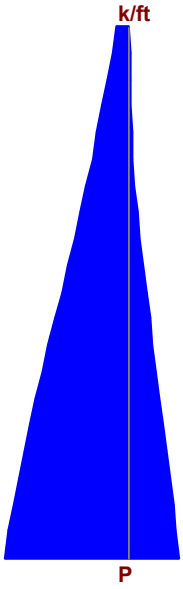
CROSS SECTION DETAILING



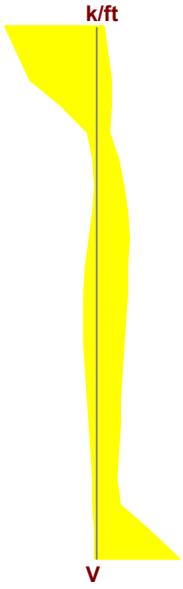
Detail Report: WP3 (Out-of-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	13.75	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	7.142	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

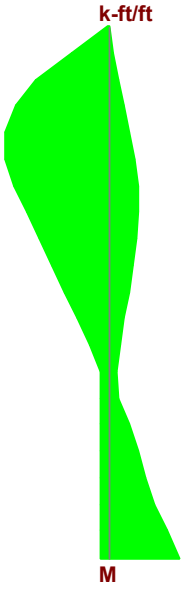
ENVELOPE DIAGRAMS



Min: -2.265 at 0 ft
Max: 5.546 at 0 ft



Min: -0.198 at 0 ft
Max: 0.219 at 13.75 ft



Min: -0.261 at 0 ft
Max: 0.383 at 10.313 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.008	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.384
Location (ft):	0	**Gov LC Int (-z):**	5	**phi*Mn Ext (+z) (k-ft/ft):**	31.274
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.012	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	10.313	**Gov LC Ext (+z):**	2
Gov Mu Int (-z) (k-ft/ft):	-0.261	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	31.274	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.026	**Gov Vu (k/ft):**	0.219	**phi*Vns (k/ft):**	0
Location (ft):	13.75	**phi*Vnc (k/ft):**	8.391	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.023	**Location (ft):**	1.837
Deflection Ratio:	H/7185	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	5.301	**As min (V) (in^2):**	2.571
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

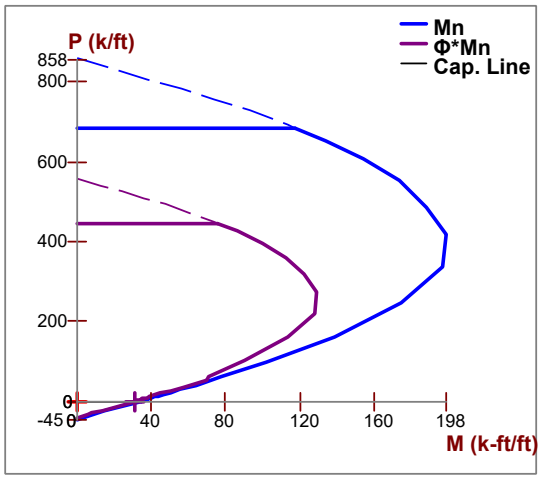
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	28.579
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	225.866		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

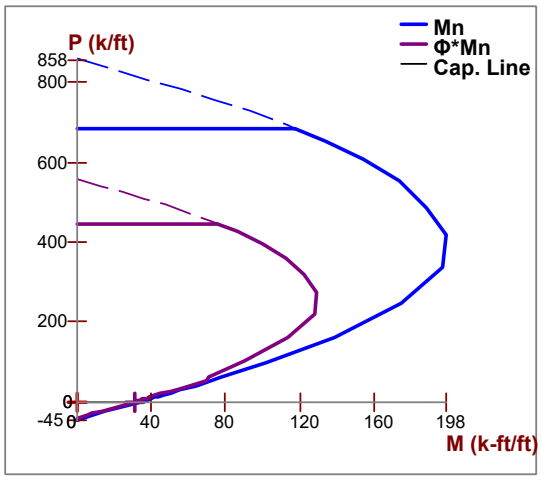
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

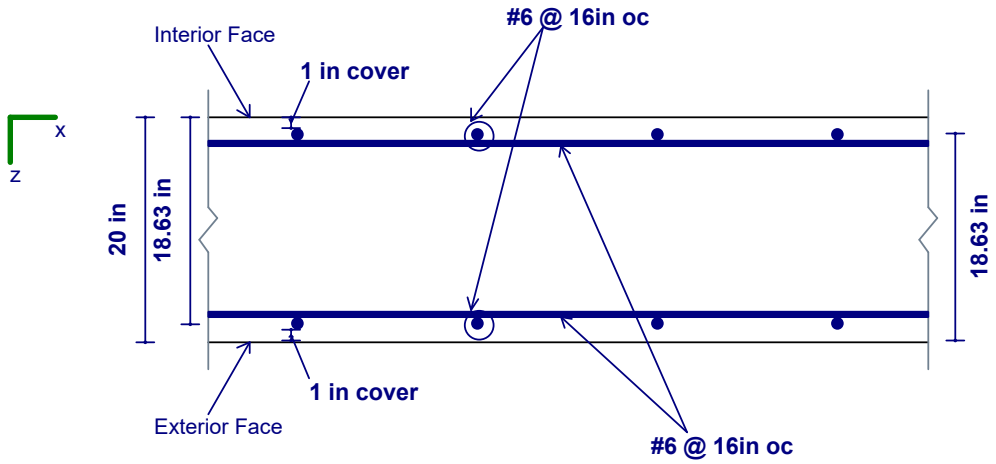
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram

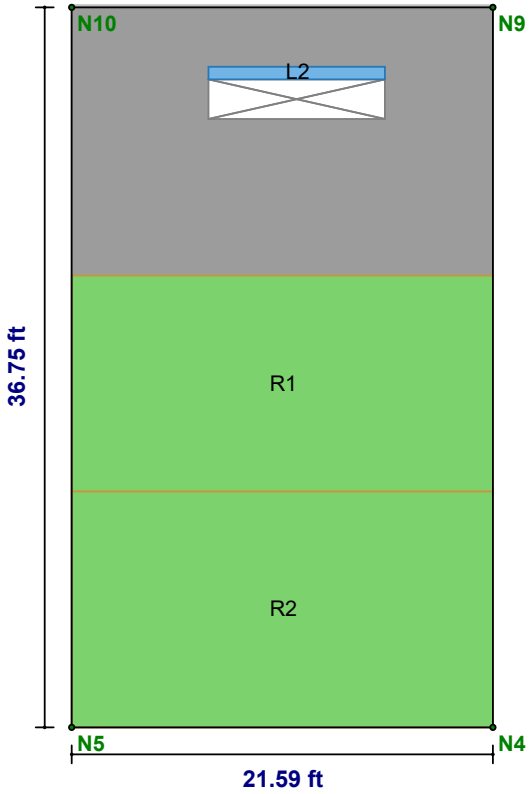


CROSS SECTION DETAILING



Detail Report: WP4

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	36.75	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	21.587	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R1	0.296	5	0.143	2	0.013	2	0.296	5	0.051	5	0.059	2
R2	0.607	2	0.173	2	0.011	2	0.607	2	0.222	2	0.078	2

REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R1	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R2	#6@14in oc e.f.	#6@16in oc e.f.	N/A

Detail Report: WP4 (In-Plane, Opening L2)

CRITERIA

Code:	ACI 318-19
Design Rule:	Avalanche
Seismic Rule:	SDR_Conc1
Loc of r/f:	Each Face
Outer Bars:	Vertical
Vert Bar Size:	#6
Horz Bar Size:	#6

GEOMETRY

Total Height (ft):	2
Total Length (ft):	9
Thickness (in):	20
Int Cover (-z) (in):	1
Ext Cover (+z) (in):	1
Cover Open/Edge (in):	2

MATERIALS

Material Set:	Conc4000NW
Concrete f'c (ksi):	4
Concrete E (ksi):	3644
Concrete G (ksi):	1584
Conc Density (k/ft^3):	0.145
Lambda:	1
Conc Str Blk:	Rectangular
Vert Bar Fy (ksi):	60
Horz Bar Fy (ksi):	60
Steel E (ksi):	29000

Note: Lintel analysis is considered only when opening has a region exactly above it.

Detail Report: WP4 (Out-of-Plane, Opening L2)

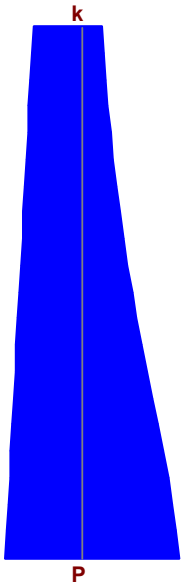
CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	2	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	9	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6			**Conc Str Blk:**	Rectangular
				Vert Bar Fy (ksi):	60
				Horz Bar Fy (ksi):	60
				Steel E (ksi):	29000

Note: Lintel analysis is considered only when opening has a region exactly above it.

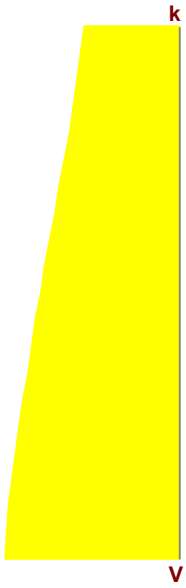
Detail Report: WP4 (In-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	21.587	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

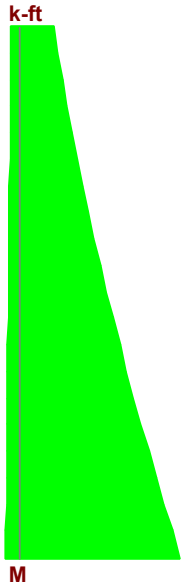
ENVELOPE DIAGRAMS



Min: -226.008 at 0 ft
Max: 173.181 at 0 ft



Min: 85.248 at 11 ft
Max: 156.561 at 0 ft



Min: -1671.681 at 0 ft
Max: 124.868 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.296	**phi*Pn (k):**	-763.407	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	-1663.246	**Gov LC:**	5
Gov Pu (k):	-226.008	**phi*Mn (k-ft):**	5618.087		

SHEAR DETAILS

UC Max:	0.143	**phi*Vn (k):**	1092.906	**Vs (k):**	858.316
Location (ft):	0	**Vnmax (k):**	2621.341	**Gov LC:**	2
Gov Vu (k):	155.975	**Vc (k):**	598.892		

DEFLECTION DETAILS

Delta max (in):	0.013	**Location (ft):**	36.75
Deflection Ratio:	H/9844	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.952	**rho min (H):**	0.002	**As min (V) (in^2):**	7.771
rho Provided (H):	0.003	**As Provided (V) (in^2):**	14.137	**rho min (V):**	0.001
As min (H) (in^2):	5.28	**rho Provided (V):**	0.003		

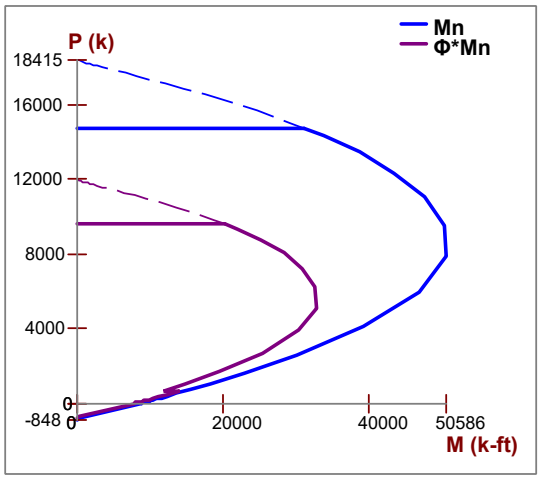
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	21.587	**Icracked (in^4):**	2.028e+7	**KL/r:**	1.765
A (in^2):	5180.88	**Cracked Mom, Mcr (k-ft):**	8841.701		
Igross (in^4):	2.897e+7	**r (in):**	62.565		

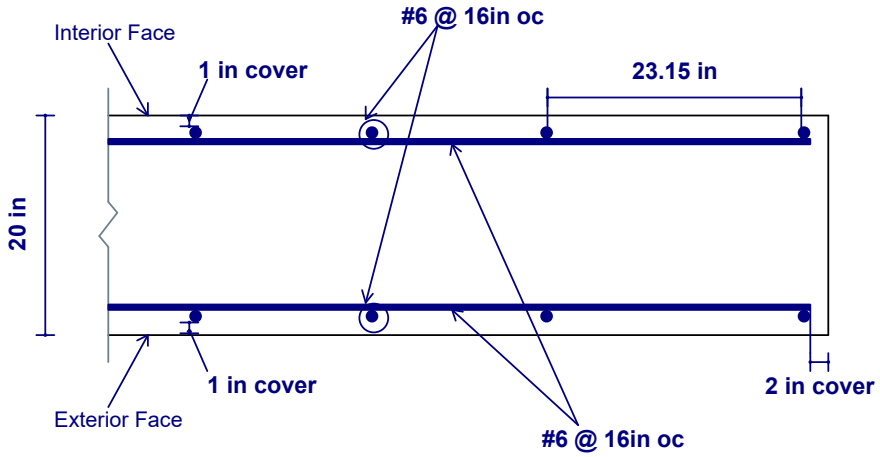
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



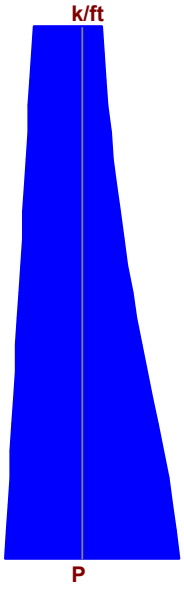
CROSS SECTION DETAILING



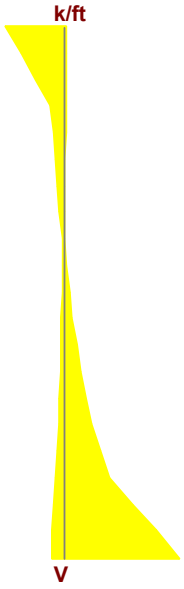
Detail Report: WP4 (Out-of-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	21.587	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

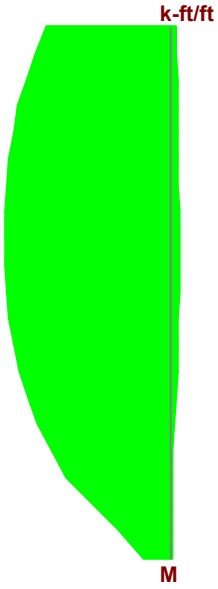
ENVELOPE DIAGRAMS



Min: -10.47 at 0 ft
Max: 8.022 at 0 ft



Min: -1.073 at 0 ft
Max: 0.528 at 11 ft



Min: -0.102 at 6.05 ft
Max: 1.986 at 6.05 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.296	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0
Location (ft):	0	**Gov LC Int (-z):**	5	**phi*Mn Ext (+z):**	NC
Gov Pu Int (-z) (k/ft):	-10.47	**UC Max Ext (+z):**	0.296	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z) (k/ft):	-35.364	**Location (ft):**	0	**Gov LC Ext (+z):**	5
Gov Mu Int (-z) (k-ft/ft):	0	**Gov Pu Ext (+z) (k/ft):**	-10.47		
phi*Mn Int (-z):	NC	**phi*Pn Ext (+z) (k/ft):**	-35.364		

SHEAR DETAILS

UC Max:	0.051	**Gov Vu (k/ft):**	-1.073	**phi*Vns (k/ft):**	21.203
Location (ft):	0	**phi*Vnc (k/ft):**	6.833	**Gov LC:**	5

DEFLECTION DETAILS

Delta max (in):	0.059	**Location (ft):**	36.75
Deflection Ratio:	H/2235	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	14.137	**As min (V) (in^2):**	7.771
rho Provided (V):	0.003	**rho min (V):**	0.001

WALL SEGMENT SECTION PROPERTIES

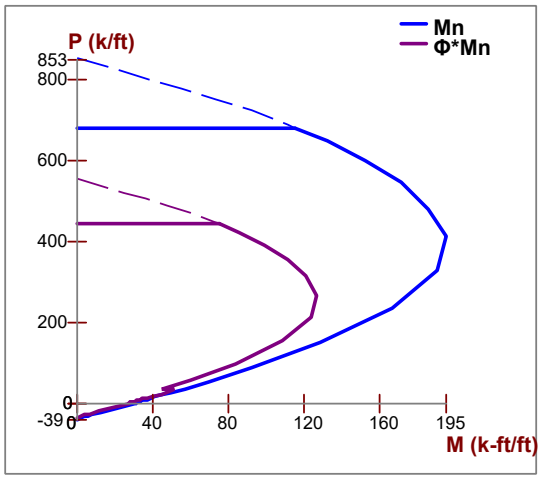
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	22.863
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	682.641		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

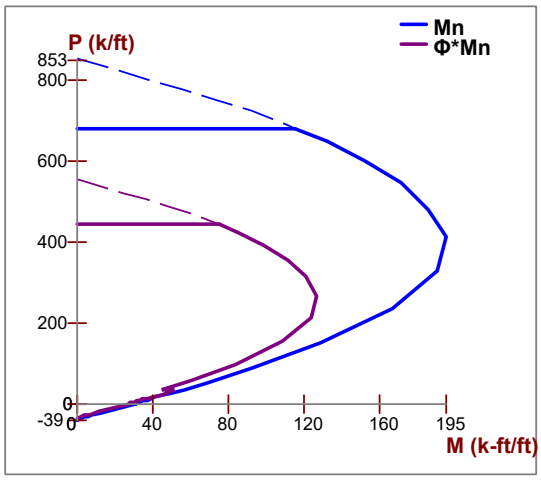
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

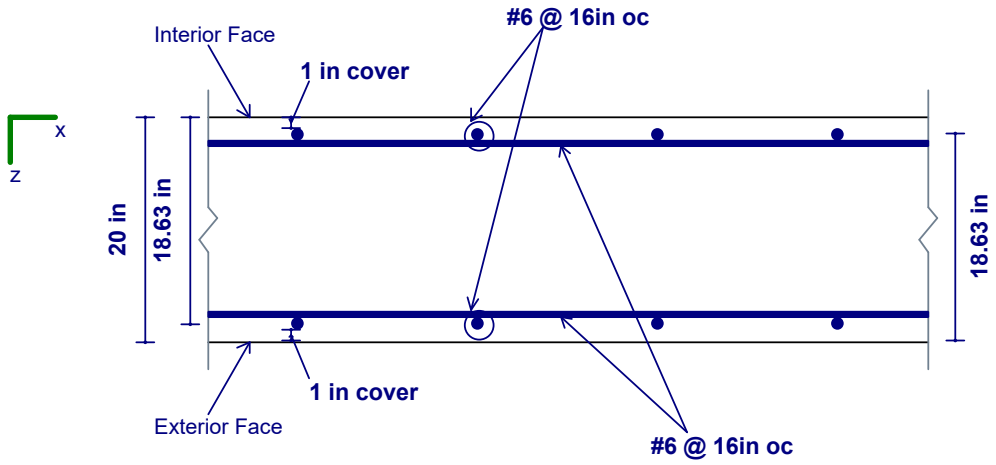
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



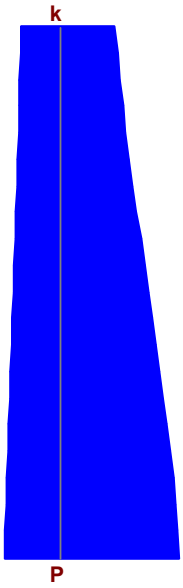
CROSS SECTION DETAILING



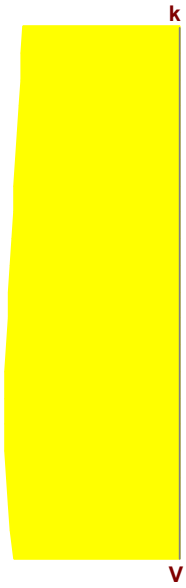
Detail Report: WP4 (In-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	21.587	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	14	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

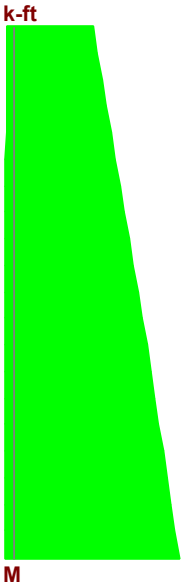
ENVELOPE DIAGRAMS



Min: -549.935 at 0 ft
Max: 251.135 at 0 ft



Min: 161.2 at 12 ft
Max: 180.242 at 3 ft



Min: -3501.091 at 0 ft
Max: 166.318 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.607	**phi*Pn (k):**	-906.546	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	-3501.091	**Gov LC:**	2
Gov Pu (k):	-549.935	**phi*Mn (k-ft):**	5771.405		

SHEAR DETAILS

UC Max:	0.173	**phi*Vn (k):**	1039.042	**Vs (k):**	858.316
Location (ft):	2.4	**Vnmax (k):**	2621.341	**Gov LC:**	2
Gov Vu (k):	179.264	**Vc (k):**	527.074		

DEFLECTION DETAILS

Delta max (in):	0.011	**Location (ft):**	36.75
Deflection Ratio:	H/10000	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (H) (in^2):	9.719	**rho min (H):**	0.002	**As min (V) (in^2):**	7.771
rho Provided (H):	0.003	**As Provided (V) (in^2):**	16.788	**rho min (V):**	0.001
As min (H) (in^2):	5.76	**rho Provided (V):**	0.003		

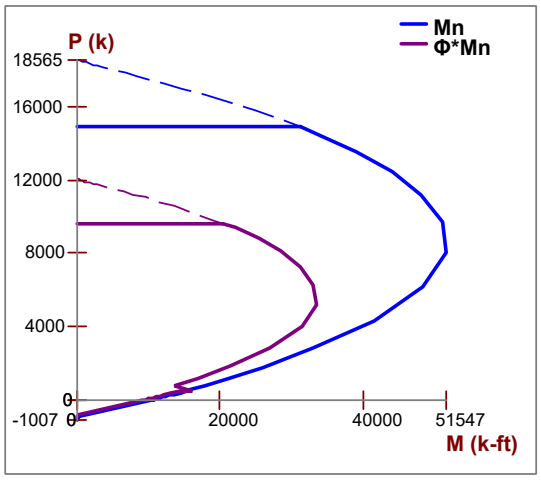
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	21.587	**Icracked (in^4):**	2.028e+7	**KL/r:**	1.926
A (in^2):	5180.88	**Cracked Mom, Mcr (k-ft):**	8841.701		
Igross (in^4):	2.897e+7	**r (in):**	62.565		

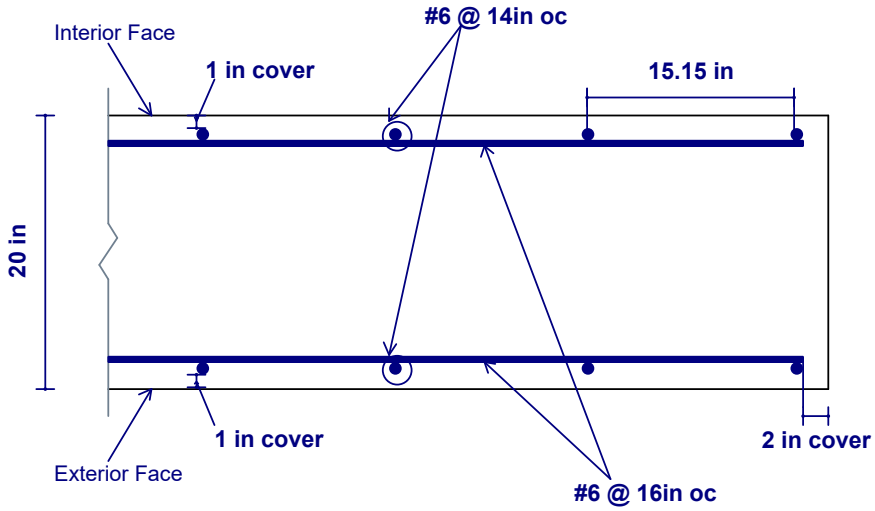
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



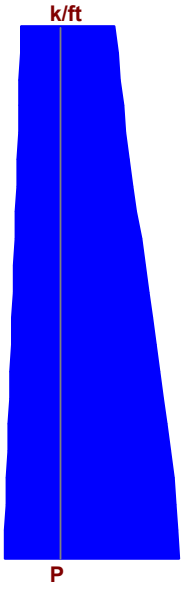
CROSS SECTION DETAILING



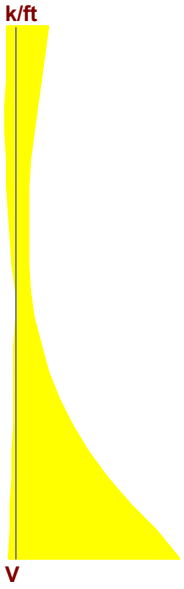
Detail Report: WP4 (Out-of-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	21.587	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	14	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

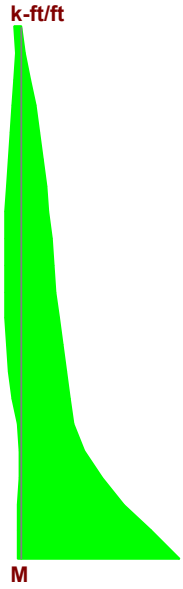
ENVELOPE DIAGRAMS



Min: -25.475 at 0 ft
Max: 11.634 at 0 ft



Min: -3.534 at 0 ft
Max: 0.176 at 9.6 ft



Min: -10.087 at 0 ft
Max: 0.974 at 6.6 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.607	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0
Location (ft):	0	**Gov LC Int (-z):**	2	**phi*Mn Ext (+z):**	NC
Gov Pu Int (-z) (k/ft):	-25.475	**UC Max Ext (+z):**	0.607	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z) (k/ft):	-41.995	**Location (ft):**	0	**Gov LC Ext (+z):**	2
Gov Mu Int (-z) (k-ft/ft):	-10.087	**Gov Pu Ext (+z) (k/ft):**	-25.475		
phi*Mn Int (-z) (k-ft/ft):	16.628	**phi*Pn Ext (+z) (k/ft):**	-41.995		

SHEAR DETAILS

UC Max:	0.222	**Gov Vu (k/ft):**	-3.534	**phi*Vns (k/ft):**	15.889
Location (ft):	0	**phi*Vnc (k/ft):**	5.561	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.078	**Location (ft):**	36.75
Deflection Ratio:	H/1839	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	16.788	**As min (V) (in^2):**	7.771
rho Provided (V):	0.003	**rho min (V):**	0.001

WALL SEGMENT SECTION PROPERTIES

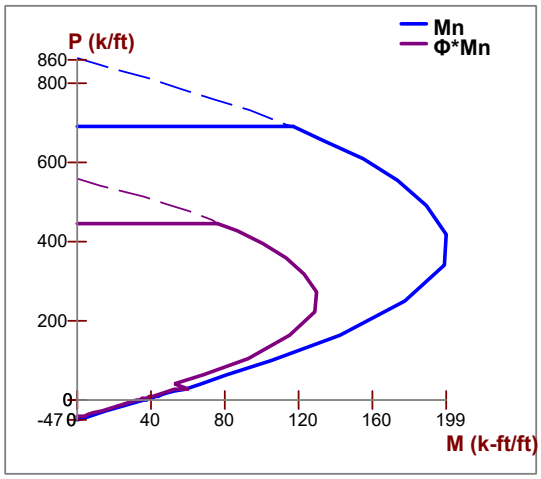
Total Width (in):	14	**Icracked (in^4):**	3266.667	**KL/r:**	24.942
A (in^2):	280	**Cracked Mom, Mcr (k-ft):**	682.641		
Igross (in^4):	9333.333	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

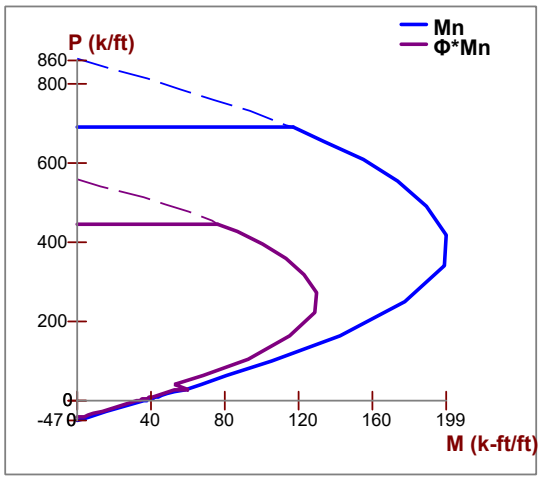
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

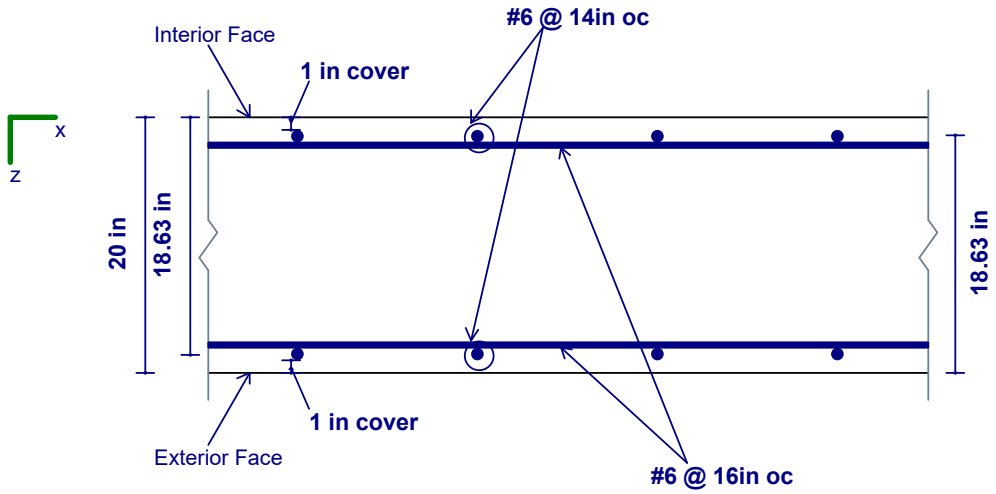
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram

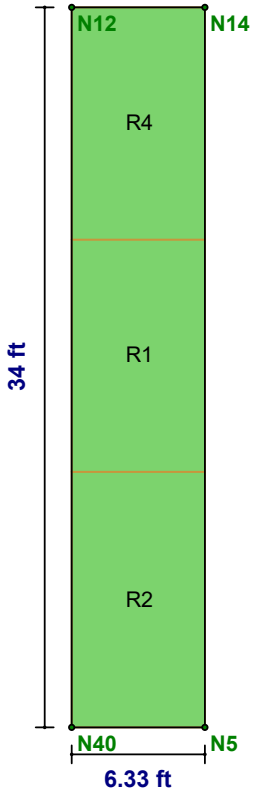


CROSS SECTION DETAILING



Detail Report: WP5

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	34	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	6.334	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R2	0.092	2	0.08	1	0.002	1	0.046	6	0.164	6	0.018	2
R1	0.031	1	0.039	1	0.005	1	0.031	1	0.04	5	0.011	2
R4	0.013	1	0.02	1	0.005	1	0.03	2	0.045	2	0.016	2

REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R2	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R1	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R4	#6@16in oc e.f.	#6@16in oc e.f.	N/A

Detail Report: WP5 (In-Plane, Region R2)

CRITERIA

Code:	ACI 318-19
Design Rule:	Avalanche
Seismic Rule:	SDR_Conc1
Loc of r/f:	Each Face
Outer Bars:	Vertical
Vert Bar Size:	#6
Horz Bar Size:	#6
Vert Bar Spac (in):	16
Horz Bar Spac (in):	16
Group Wall?:	No

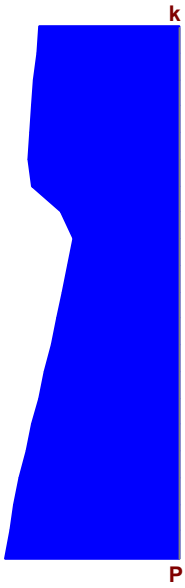
GEOMETRY

Total Height (ft):	12
Total Length (ft):	6.334
Thickness (in):	20
Int Cover (-z) (in):	1
Ext Cover (+z) (in):	1
Cover Open/Edge (in):	2
K:	1
Use Cracked?:	Yes
Icr Factor:	0.7

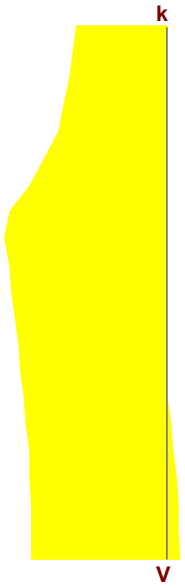
MATERIALS

Material Set:	Conc4000NW
Concrete f'c (ksi):	4
Concrete E (ksi):	3644
Concrete G (ksi):	1584
Conc Density (k/ft^3):	0.145
Lambda:	1
Conc Str Blk:	Rectangular
Vert Bar Fy (ksi):	60
Horz Bar Fy (ksi):	60
Steel E (ksi):	29000

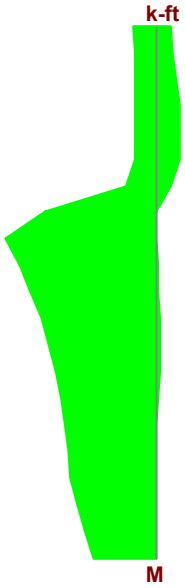
ENVELOPE DIAGRAMS



Min: 66.946 at 7.2 ft
Max: 110.78 at 0 ft



Min: -2.105 at 0 ft
Max: 27.795 at 7.2 ft



Min: -15.621 at 9 ft
Max: 96.97 at 7.2 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.092	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	7.2	**Gov Mu (k-ft):**	66.164	**Gov LC:**	2
Gov Pu (k):	0	**phi*Mn (k-ft):**	717.843		

SHEAR DETAILS

UC Max:	0.08	**phi*Vn (k):**	348.259	**Vs (k):**	251.825
Location (ft):	7.2	**Vnmax (k):**	769.086	**Gov LC:**	1
Gov Vu (k):	27.795	**Vc (k):**	212.52		

DEFLECTION DETAILS

Delta max (in):	0.002	**Location (ft):**	34
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	9.719	**rho min (H):**	0.002	**As min (V) (in^2):**	2.28
rho Provided (H):	0.003	**As Provided (V) (in^2):**	4.418	**rho min (V):**	0.002
As min (H) (in^2):	5.76	**rho Provided (V):**	0.003		

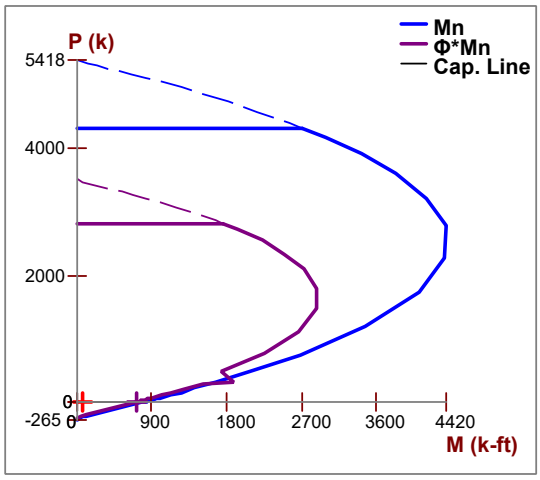
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	6.334	**Icracked (in^4):**	5.122e+5	**KL/r:**	6.563
A (in^2):	1520.04	**Cracked Mom, Mcr (k-ft):**	761.095		
Igross (in^4):	7.317e+5	**r (in):**	18.356		

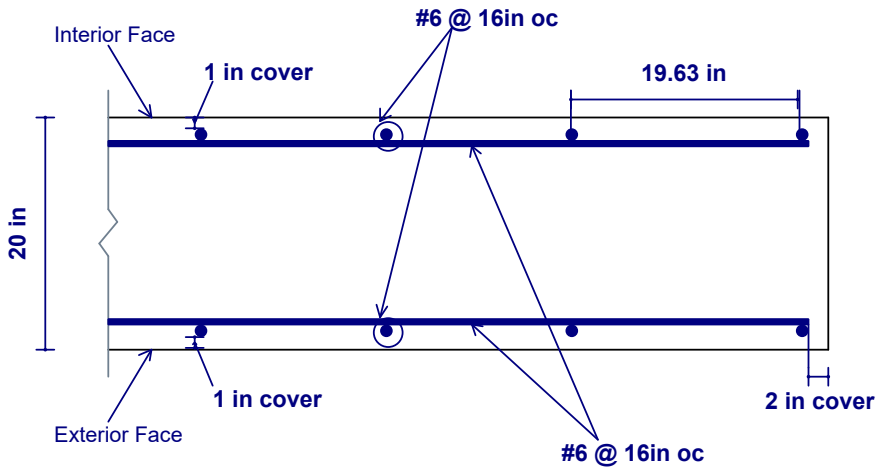
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



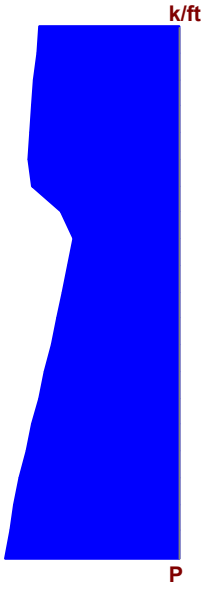
CROSS SECTION DETAILING



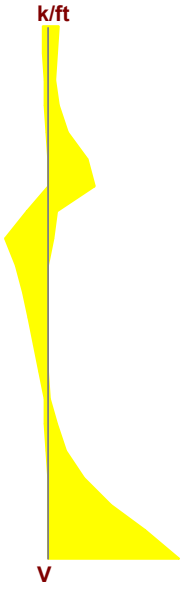
Detail Report: WP5 (Out-of-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	6.334	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

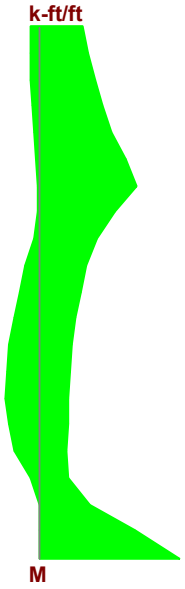
ENVELOPE DIAGRAMS



Min: 10.57 at 7.2 ft
Max: 17.491 at 0 ft



Min: -1.528 at 0 ft
Max: 0.492 at 7.2 ft



Min: -1.932 at 0 ft
Max: 0.434 at 3.6 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.046	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0
Location (ft):	0	**Gov LC Int (-z):**	6	**phi*Mn Ext (+z):**	NC
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.039	**phi eff. Ext (+z):**	0.65
phi*Pn Int (-z):	NC	**Location (ft):**	0	**Gov LC Ext (+z):**	1
Gov Mu Int (-z) (k-ft/ft):	-1.346	**Gov Pu Ext (+z) (k/ft):**	17.491		
phi*Mn Int (-z) (k-ft/ft):	29.501	**phi*Pn Ext (+z) (k/ft):**	444.85		

SHEAR DETAILS

UC Max:	0.164	**Gov Vu (k/ft):**	-1.351	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	8.254	**Gov LC:**	6

DEFLECTION DETAILS

Delta max (in):	0.018	**Location (ft):**	32.3
Deflection Ratio:	H/8012	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	4.418	**As min (V) (in^2):**	2.28
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

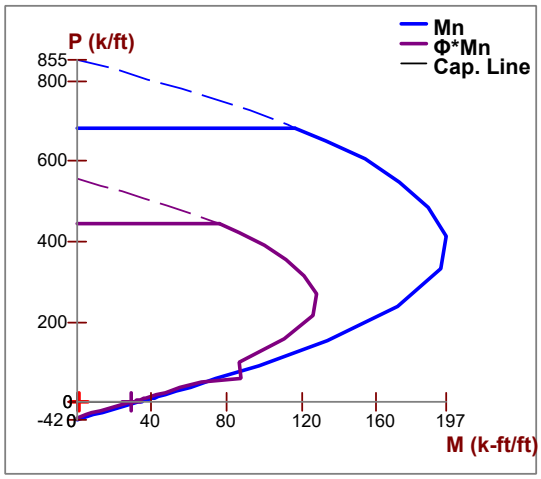
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	24.942
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	200.283		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

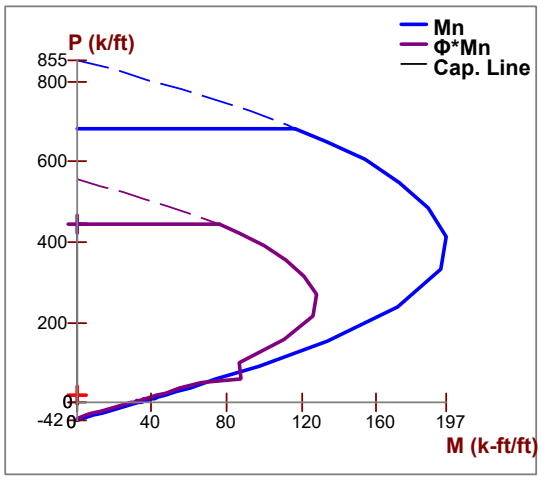
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

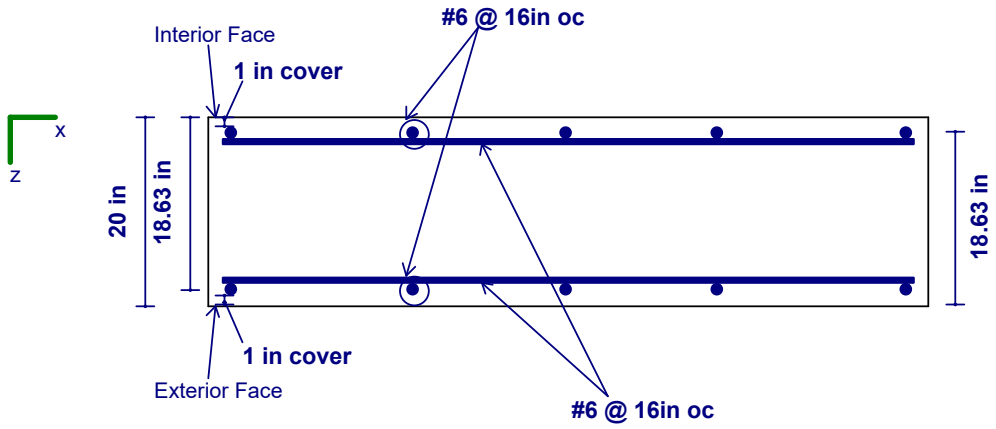
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



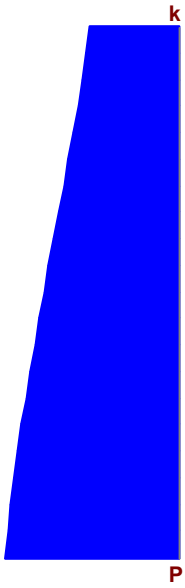
CROSS SECTION DETAILING



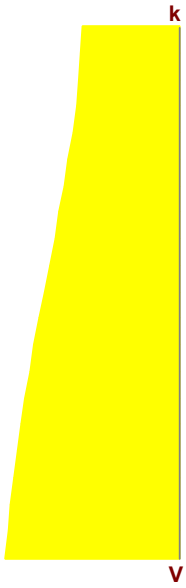
Detail Report: WP5 (In-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	6.334	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

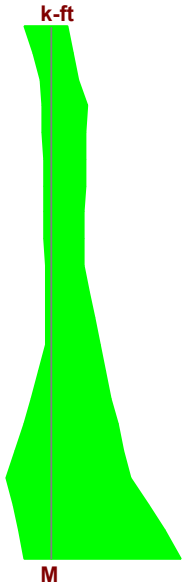
ENVELOPE DIAGRAMS



Min: 44.441 at 11 ft
Max: 87.681 at 0 ft



Min: 7.943 at 11 ft
Max: 14.328 at 0 ft



Min: -15.342 at 0 ft
Max: 5.03 at 1.65 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.031	**phi*Pn (k):**	2817.457	**phi eff.:**	0.65
Location (ft):	0	**Gov Mu (k-ft):**	-8.52	**Gov LC:**	1
Gov Pu (k):	87.681	**phi*Mn (k-ft):**	273.788		

SHEAR DETAILS

UC Max:	0.039	**phi*Vn (k):**	371.027	**Vs (k):**	251.825
Location (ft):	0	**Vnmax (k):**	769.086	**Gov LC:**	1
Gov Vu (k):	14.328	**Vc (k):**	242.878		

DEFLECTION DETAILS

Delta max (in):	0.005	**Location (ft):**	34
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.952	**rho min (H):**	0.002	**As min (V) (in^2):**	2.28
rho Provided (H):	0.003	**As Provided (V) (in^2):**	4.418	**rho min (V):**	0.002
As min (H) (in^2):	5.28	**rho Provided (V):**	0.003		

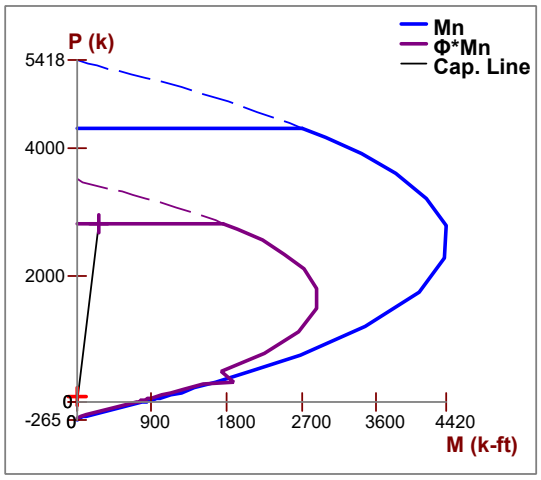
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	6.334	**Icracked (in^4):**	5.122e+5	**KL/r:**	6.016
A (in^2):	1520.04	**Cracked Mom, Mcr (k-ft):**	761.095		
Igross (in^4):	7.317e+5	**r (in):**	18.356		

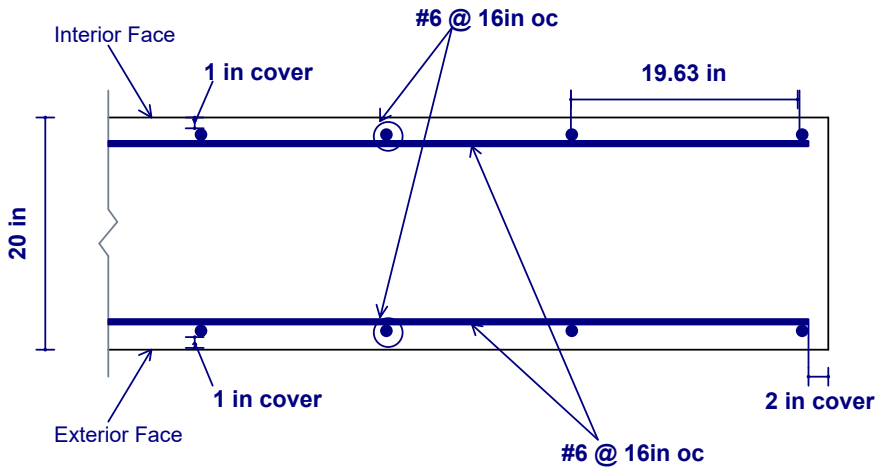
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



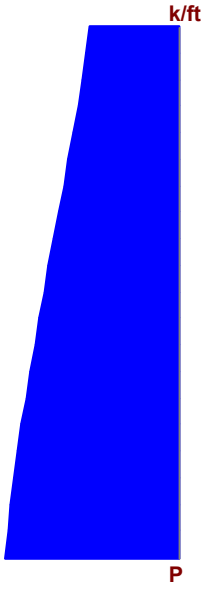
CROSS SECTION DETAILING



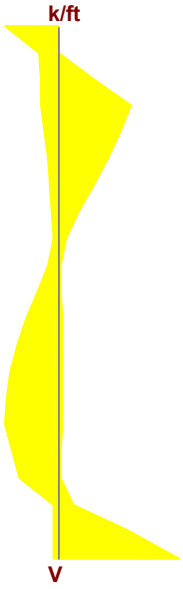
Detail Report: WP5 (Out-of-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	6.334	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

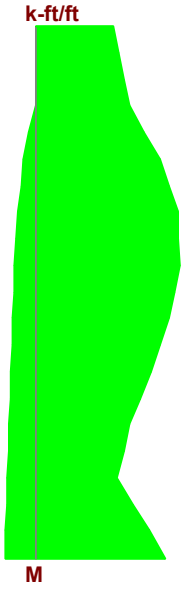
ENVELOPE DIAGRAMS



Min: 7.017 at 11 ft
Max: 13.844 at 0 ft



Min: -0.368 at 0 ft
Max: 0.163 at 11 ft



Min: -0.537 at 6.05 ft
Max: 0.107 at 0 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.031	**phi eff. Int (-z):**	0.65	**Gov Mu Ext (+z) (k-ft/ft):**	0
Location (ft):	0	**Gov LC Int (-z):**	1	**phi*Mn Ext (+z):**	NC
Gov Pu Int (-z) (k/ft):	13.844	**UC Max Ext (+z):**	0.031	**phi eff. Ext (+z):**	0.65
phi*Pn Int (-z) (k/ft):	444.85	**Location (ft):**	0	**Gov LC Ext (+z):**	1
Gov Mu Int (-z) (k-ft/ft):	-0.403	**Gov Pu Ext (+z) (k/ft):**	13.844		
phi*Mn Int (-z) (k-ft/ft):	12.951	**phi*Pn Ext (+z) (k/ft):**	444.85		

SHEAR DETAILS

UC Max:	0.04	**Gov Vu (k/ft):**	-0.368	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	9.144	**Gov LC:**	5

DEFLECTION DETAILS

Delta max (in):	0.011	**Location (ft):**	32.3
Deflection Ratio:	H/10000	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	4.418	**As min (V) (in^2):**	2.28
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

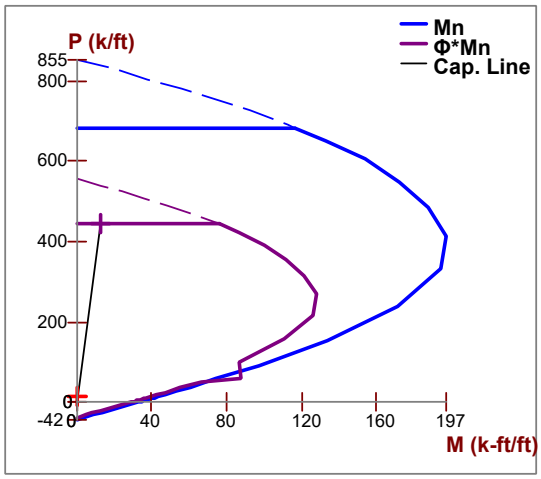
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	22.863
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	200.283		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

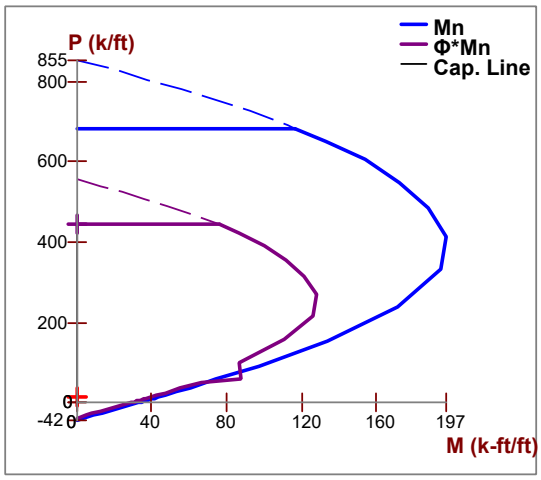
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

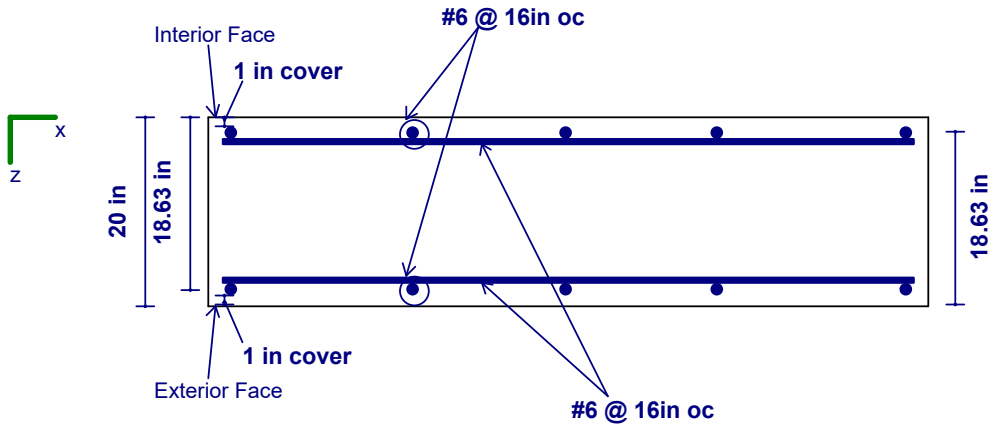
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



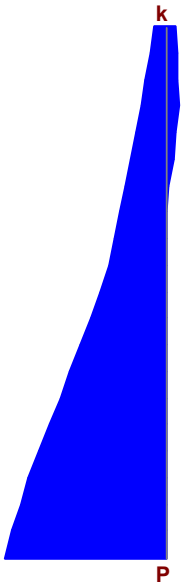
CROSS SECTION DETAILING



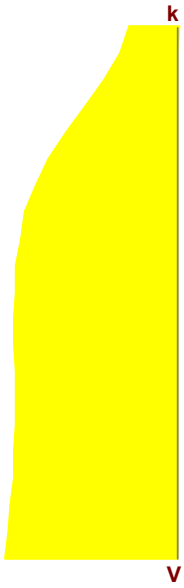
Detail Report: WP5 (In-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	6.334	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

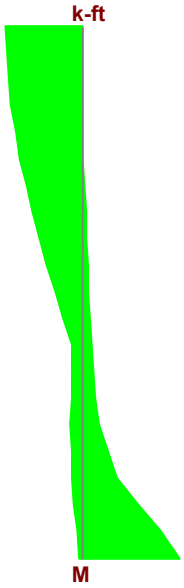
ENVELOPE DIAGRAMS



Min: -3.101 at 9.35 ft
Max: 41.433 at 0 ft



Min: -0.075 at 11 ft
Max: 7.453 at 0 ft



Min: -9.259 at 0 ft
Max: 7.069 at 11 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.013	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	-9.259	**Gov LC:**	1
Gov Pu (k):	0	**phi*Mn (k-ft):**	726.789		

SHEAR DETAILS

UC Max:	0.02	**phi*Vn (k):**	371.027	**Vs (k):**	251.825
Location (ft):	0	**Vnmax (k):**	769.086	**Gov LC:**	1
Gov Vu (k):	7.453	**Vc (k):**	242.878		

DEFLECTION DETAILS

Delta max (in):	0.005	**Location (ft):**	34
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.952	**rho min (H):**	0.002	**As min (V) (in^2):**	2.28
rho Provided (H):	0.003	**As Provided (V) (in^2):**	4.418	**rho min (V):**	0.002
As min (H) (in^2):	5.28	**rho Provided (V):**	0.003		

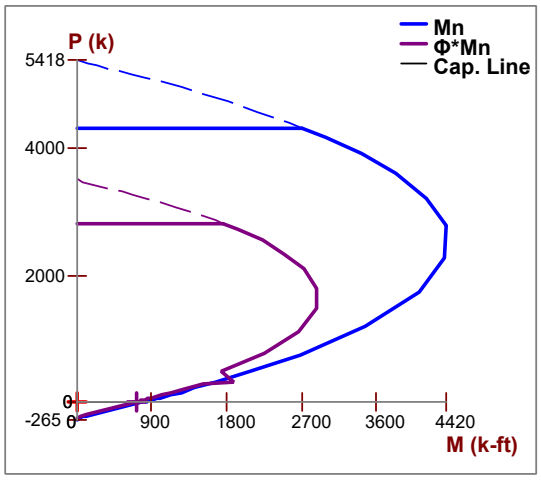
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	6.334	**Icracked (in^4):**	5.122e+5	**KL/r:**	6.016
A (in^2):	1520.04	**Cracked Mom, Mcr (k-ft):**	761.095		
Igross (in^4):	7.317e+5	**r (in):**	18.356		

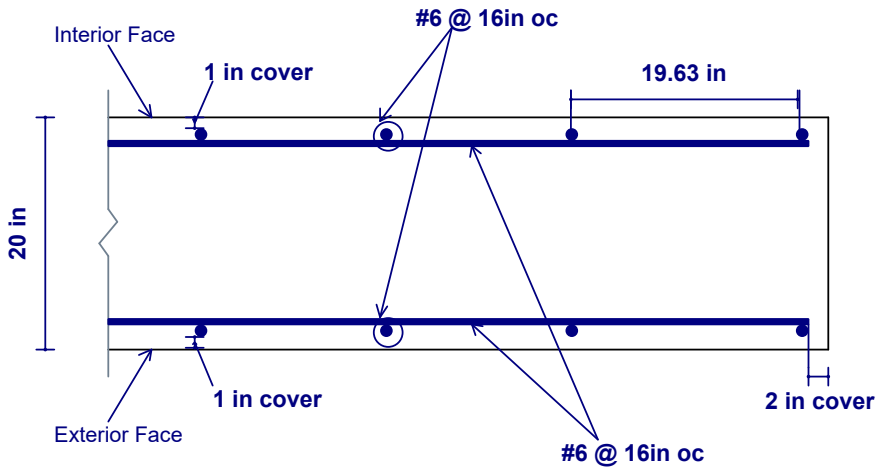
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



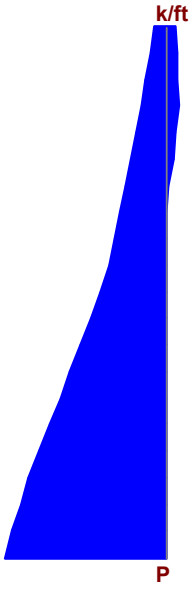
CROSS SECTION DETAILING



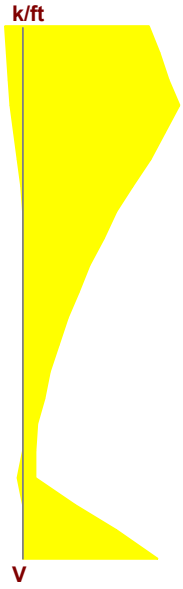
Detail Report: WP5 (Out-of-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	6.334	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

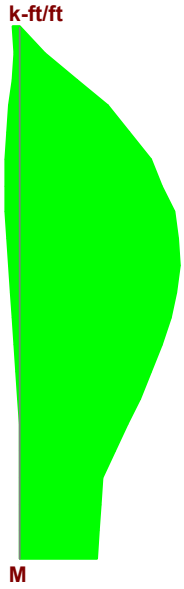
ENVELOPE DIAGRAMS



Min: -0.49 at 9.35 ft
Max: 6.542 at 0 ft



Min: -0.371 at 9.35 ft
Max: 0.04 at 11 ft



Min: -0.876 at 6.05 ft
Max: 0.068 at 8.25 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.03	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.068
Location (ft):	6.05	**Gov LC Int (-z):**	2	**phi*Mn Ext (+z) (k-ft/ft):**	29.501
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.002	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	8.25	**Gov LC Ext (+z):**	13
Gov Mu Int (-z) (k-ft/ft):	-0.876	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	29.501	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.045	**Gov Vu (k/ft):**	-0.371	**phi*Vns (k/ft):**	0
Location (ft):	9.35	**phi*Vnc (k/ft):**	8.166	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.016	**Location (ft):**	1.7
Deflection Ratio:	H/8230	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	4.418	**As min (V) (in^2):**	2.28
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

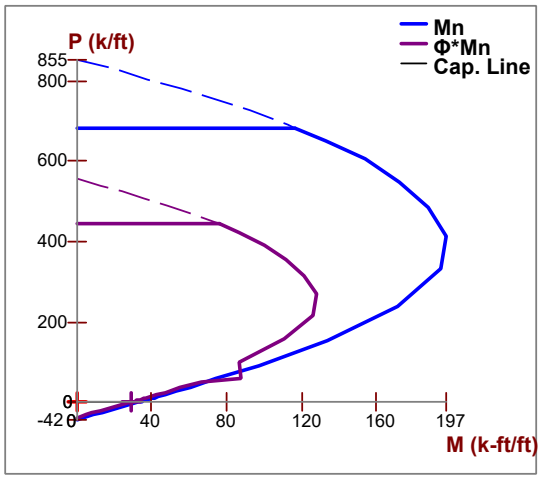
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	22.863
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	200.283		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

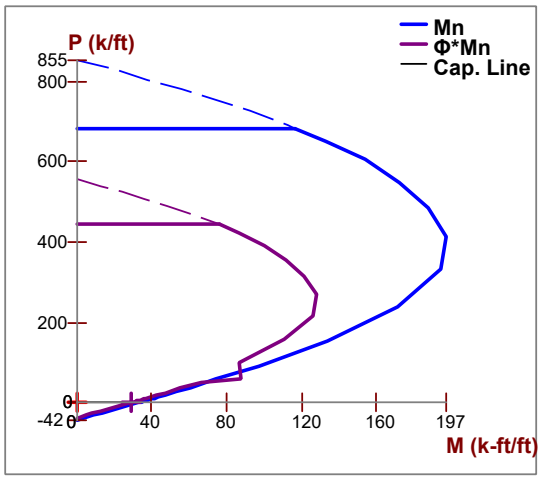
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

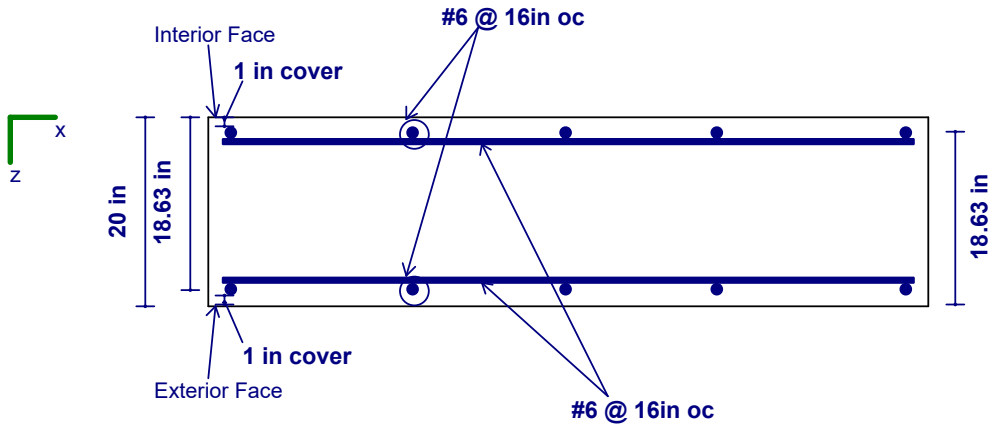
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram

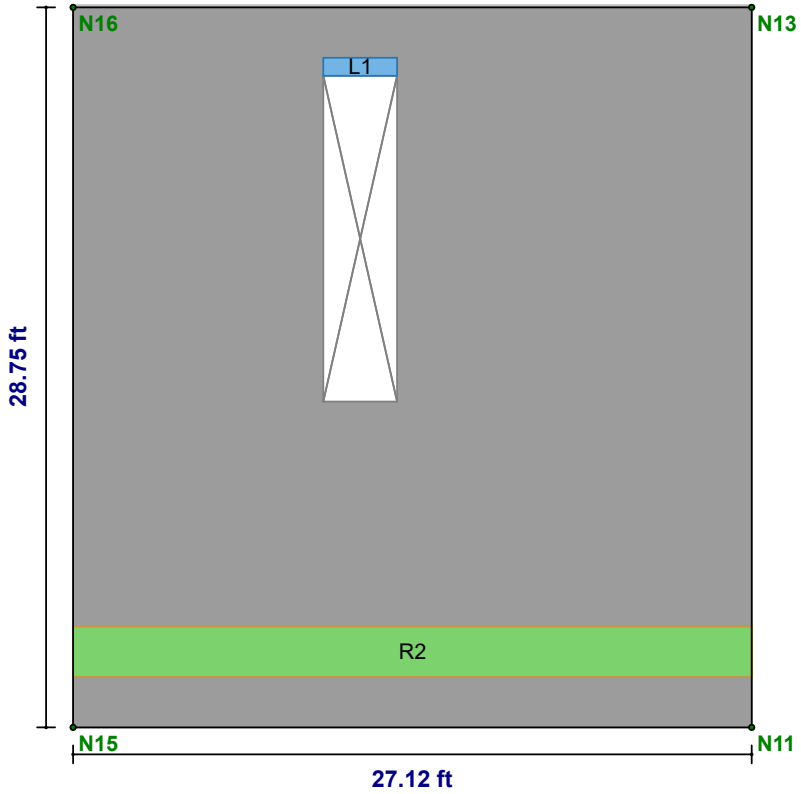


CROSS SECTION DETAILING



Detail Report: WP6

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	28.75	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	27.124	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R2	0.091	1	0.086	1	0.001	1	0.084	5	0.128	2	0.005	5

REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R2	#6@16in oc e.f.	#6@16in oc e.f.	N/A

Detail Report: WP6 (In-Plane, Opening L1)

CRITERIA

Code:	ACI 318-19
Design Rule:	Avalanche
Seismic Rule:	SDR_Conc1
Loc of r/f:	Each Face
Outer Bars:	Vertical
Vert Bar Size:	#6
Horz Bar Size:	#6

GEOMETRY

Total Height (ft):	13
Total Length (ft):	3
Thickness (in):	20
Int Cover (-z) (in):	1
Ext Cover (+z) (in):	1
Cover Open/Edge (in):	2

MATERIALS

Material Set:	Conc4000NW
Concrete f'c (ksi):	4
Concrete E (ksi):	3644
Concrete G (ksi):	1584
Conc Density (k/ft^3):	0.145
Lambda:	1
Conc Str Blk:	Rectangular
Vert Bar Fy (ksi):	60
Horz Bar Fy (ksi):	60
Steel E (ksi):	29000

Note: Lintel analysis is considered only when opening has a region exactly above it.

Detail Report: WP6 (Out-of-Plane, Opening L1)

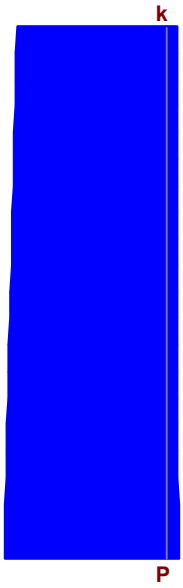
CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	13	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	3	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6			**Conc Str Blk:**	Rectangular
				Vert Bar Fy (ksi):	60
				Horz Bar Fy (ksi):	60
				Steel E (ksi):	29000

Note: Lintel analysis is considered only when opening has a region exactly above it.

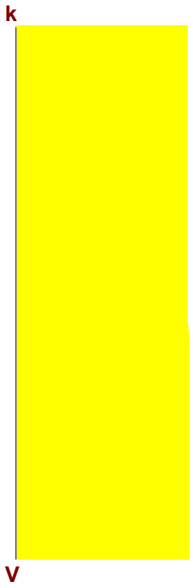
Detail Report: WP6 (In-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	2	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	27.124	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

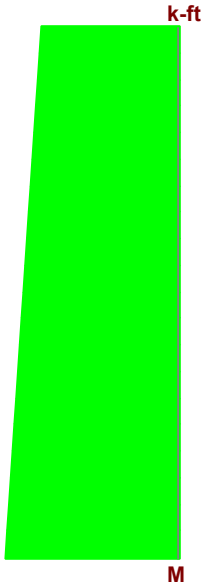
ENVELOPE DIAGRAMS



Min: -18.631 at 0 ft
Max: 252.996 at 0 ft



Min: -149.448 at 0 ft
Max: -147.666 at 2 ft



Min: -14.099 at 2 ft
Max: 1175.397 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.091	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	1175.397	**Gov LC:**	1
Gov Pu (k):	0	**phi*Mn (k-ft):**	12969.356		

SHEAR DETAILS

UC Max:	0.086	**phi*Vn (k):**	1735.209	**Vs (k):**	1078.471
Location (ft):	0	**Vnmax (k):**	3293.707	**Gov LC:**	1
Gov Vu (k):	-149.448	**Vc (k):**	1235.14		

DEFLECTION DETAILS

Delta max (in):	0.0007118	**Location (ft):**	28.75
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	3.534	**rho min (H):**	0.002	**As min (V) (in^2):**	9.765
rho Provided (H):	0.007	**As Provided (V) (in^2):**	18.555	**rho min (V):**	0.002
As min (H) (in^2):	0.96	**rho Provided (V):**	0.003		

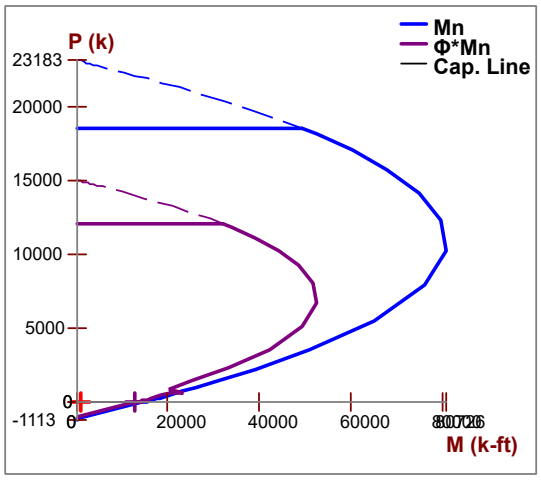
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	27.124	**Icracked (in^4):**	4.023e+7	**KL/r:**	0.255
A (in^2):	6509.76	**Cracked Mom, Mcr (k-ft):**	13959.142		
Igross (in^4):	5.747e+7	**r (in):**	78.613		

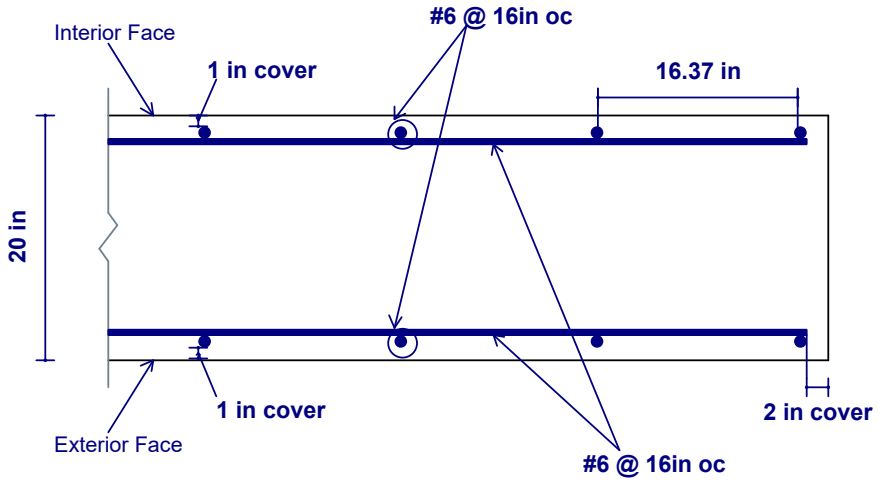
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



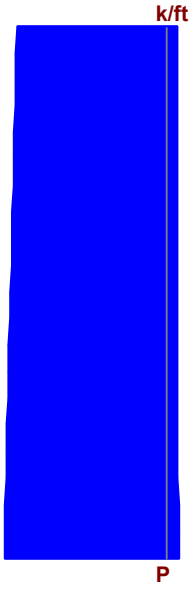
CROSS SECTION DETAILING



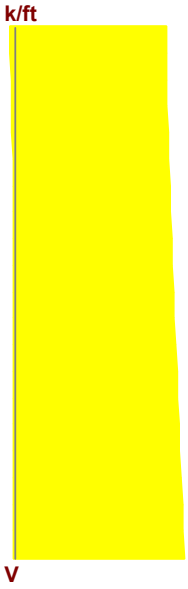
Detail Report: WP6 (Out-of-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	2	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	27.124	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

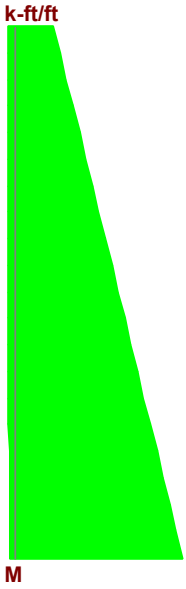
ENVELOPE DIAGRAMS



Min: -0.687 at 0 ft
Max: 9.327 at 0 ft



Min: -1.045 at 0 ft
Max: 0.026 at 2 ft



Min: -2.443 at 0 ft
Max: 0.08 at 2 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.084	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.08
Location (ft):	0	**Gov LC Int (-z):**	5	**phi*Mn Ext (+z) (k-ft/ft):**	28.967
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.003	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	2	**Gov LC Ext (+z):**	6
Gov Mu Int (-z) (k-ft/ft):	-2.443	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	28.967	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.128	**Gov Vu (k/ft):**	-1.039	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	8.094	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.005	**Location (ft):**	14.375
Deflection Ratio:	H/4728	**Gov LC:**	5

REINFORCEMENT DETAILS

As Provided (V) (in^2):	18.555	**As min (V) (in^2):**	9.765
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

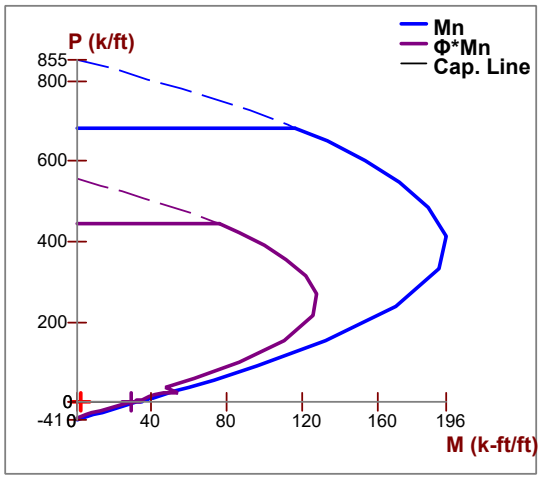
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	4.157
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	857.736		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

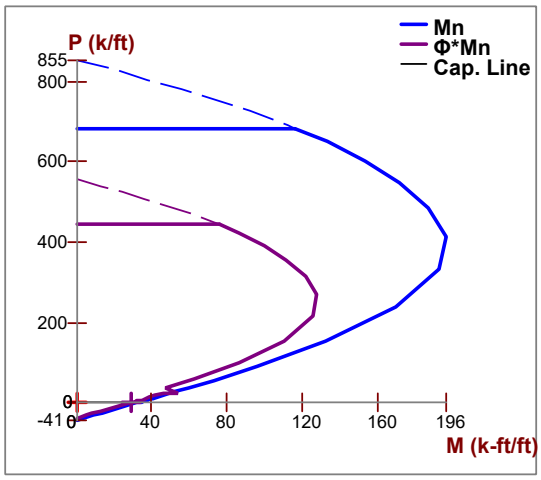
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

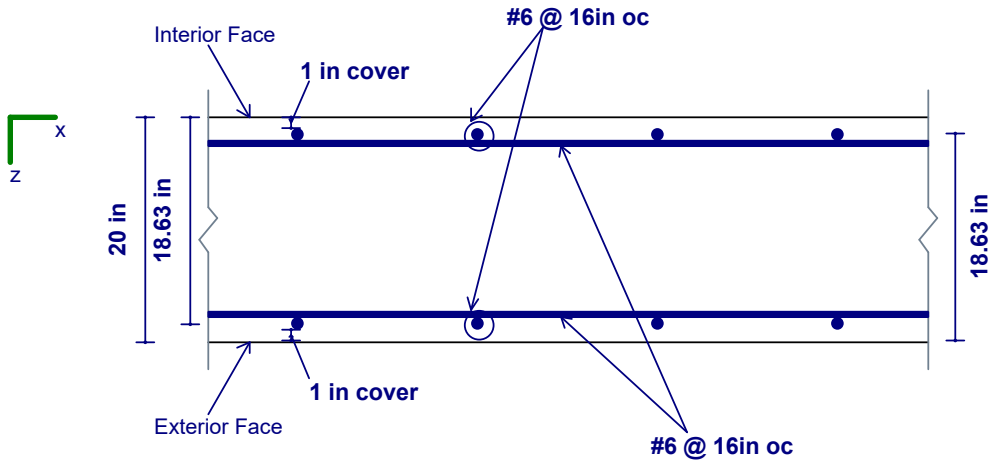
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram

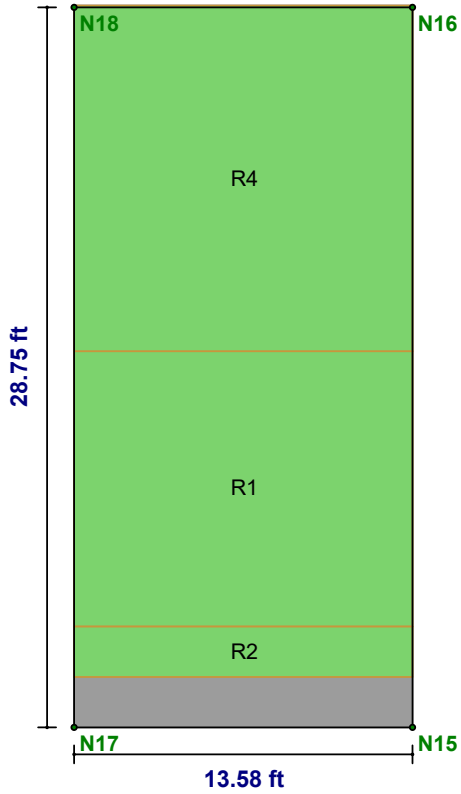


CROSS SECTION DETAILING



Detail Report: WP7

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	28.75	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	13.583	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R1	0.048	2	0.032	2	0.002	2	0.09	2	0.203	5	0.025	1
R2	0.061	2	0.033	2	0	2	0.172	5	0.214	2	0.03	1
R4	0.012	1	0.008	5	0.002	1	0.061	5	0.04	2	0.029	1

REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R1	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R2	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R4	#6@16in oc e.f.	#6@16in oc e.f.	N/A

Detail Report: WP7 (In-Plane, Region R1)

CRITERIA

Code:	ACI 318-19
Design Rule:	Avalanche
Seismic Rule:	SDR_Conc1
Loc of r/f:	Each Face
Outer Bars:	Vertical
Vert Bar Size:	#6
Horz Bar Size:	#6
Vert Bar Spac (in):	16
Horz Bar Spac (in):	16
Group Wall?:	No

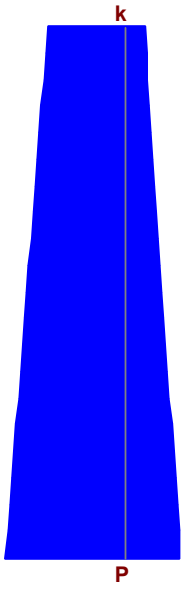
GEOMETRY

Total Height (ft):	11
Total Length (ft):	13.583
Thickness (in):	20
Int Cover (-z) (in):	1
Ext Cover (+z) (in):	1
Cover Open/Edge (in):	2
K:	1
Use Cracked?:	Yes
Icr Factor:	0.7

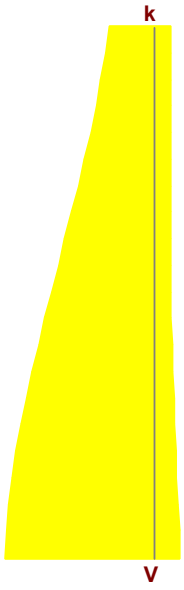
MATERIALS

Material Set:	Conc4000NW
Concrete f'c (ksi):	4
Concrete E (ksi):	3644
Concrete G (ksi):	1584
Conc Density (k/ft^3):	0.145
Lambda:	1
Conc Str Blk:	Rectangular
Vert Bar Fy (ksi):	60
Horz Bar Fy (ksi):	60
Steel E (ksi):	29000

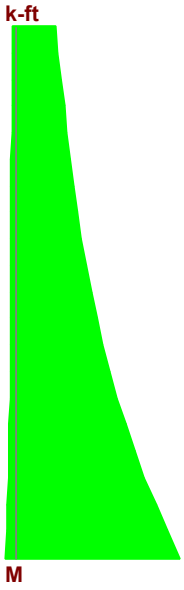
ENVELOPE DIAGRAMS



Min: -51.555 at 0 ft
Max: 110.805 at 0 ft



Min: -4.822 at 0 ft
Max: 28.083 at 0 ft



Min: -150.699 at 0 ft
Max: 8.116 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.048	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	-150.699	**Gov LC:**	2
Gov Pu (k):	0	**phi*Mn (k-ft):**	3134.293		

SHEAR DETAILS

UC Max:	0.032	**phi*Vn (k):**	868.948	**Vs (k):**	540.071
Location (ft):	0	**Vnmax (k):**	1649.404	**Gov LC:**	2
Gov Vu (k):	28.083	**Vc (k):**	618.526		

DEFLECTION DETAILS

Delta max (in):	0.002	**Location (ft):**	28.75
Deflection Ratio:	H/10000	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.952	**rho min (H):**	0.002	**As min (V) (in^2):**	4.89
rho Provided (H):	0.003	**As Provided (V) (in^2):**	8.836	**rho min (V):**	0.002
As min (H) (in^2):	5.28	**rho Provided (V):**	0.003		

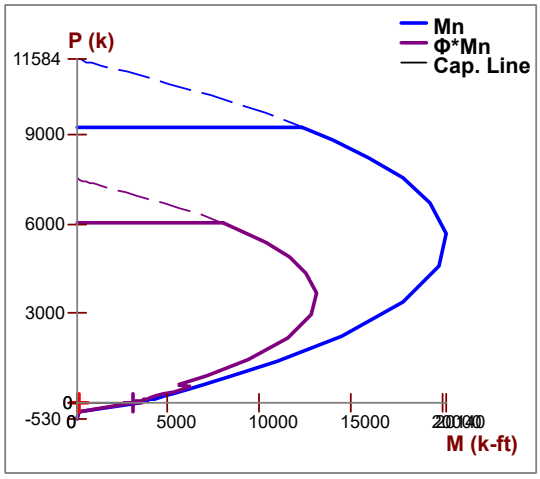
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	13.583	**Icracked (in^4):**	5.052e+6	**KL/r:**	2.805
A (in^2):	3259.92	**Cracked Mom, Mcr (k-ft):**	3500.601		
Igross (in^4):	7.217e+6	**r (in):**	39.367		

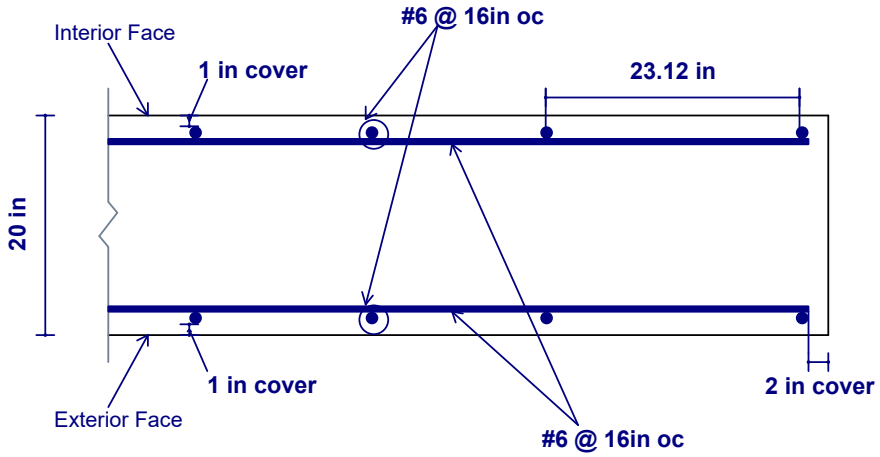
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



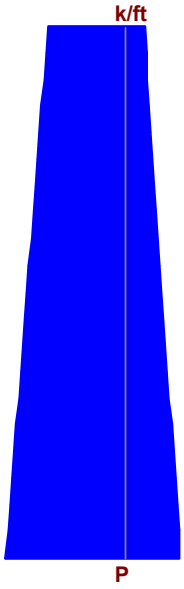
CROSS SECTION DETAILING



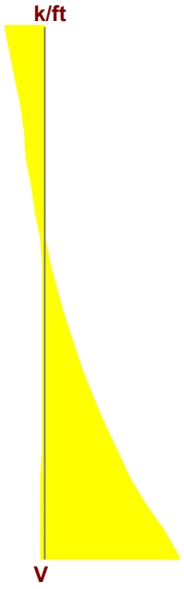
Detail Report: WP7 (Out-of-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	13.583	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

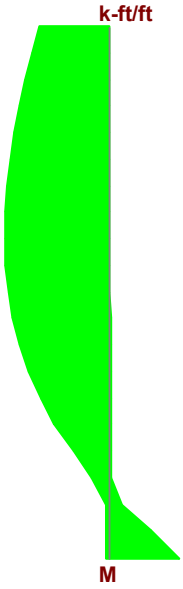
ENVELOPE DIAGRAMS



Min: -3.796 at 0 ft
Max: 8.158 at 0 ft



Min: -1.544 at 0 ft
Max: 0.429 at 11 ft



Min: -1.687 at 0 ft
Max: 2.483 at 6.6 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.061	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	2.483
Location (ft):	0	**Gov LC Int (-z):**	5	**phi*Mn Ext (+z) (k-ft/ft):**	27.633
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.09	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	7.15	**Gov LC Ext (+z):**	2
Gov Mu Int (-z) (k-ft/ft):	-1.687	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	27.633	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.203	**Gov Vu (k/ft):**	-1.544	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	7.598	**Gov LC:**	5

DEFLECTION DETAILS

Delta max (in):	0.025	**Location (ft):**	27.312
Deflection Ratio:	H/5199	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	8.836	**As min (V) (in^2):**	4.89
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

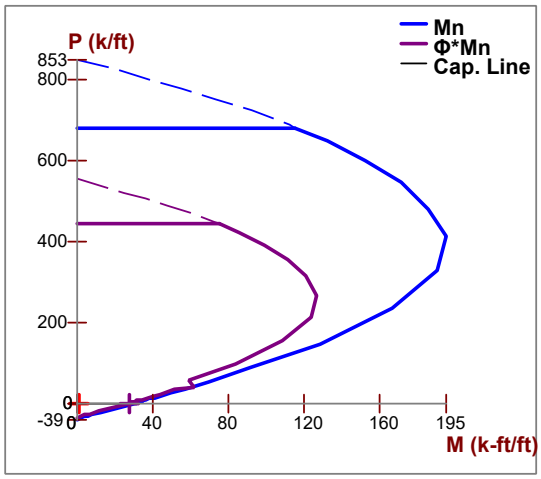
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	22.863
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	429.532		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

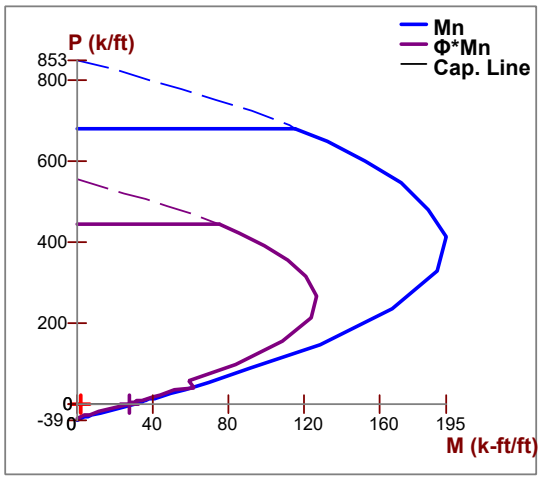
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

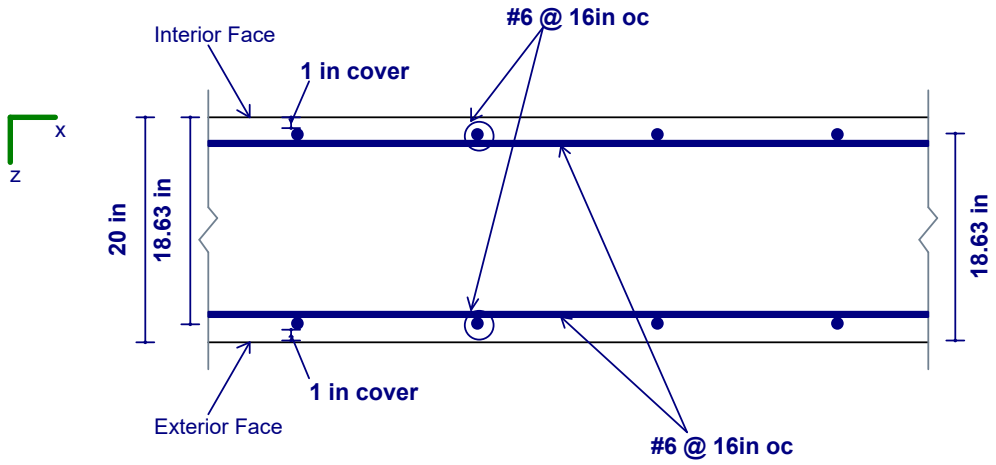
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



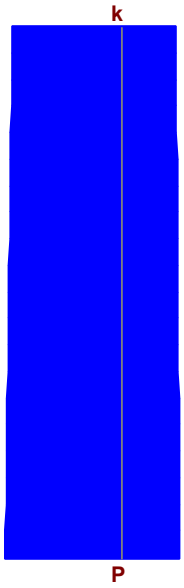
CROSS SECTION DETAILING



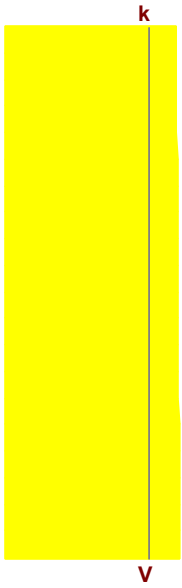
Detail Report: WP7 (In-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	2	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	13.583	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

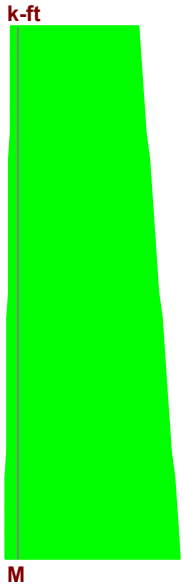
ENVELOPE DIAGRAMS



Min: -59.287 at 0 ft
Max: 117.973 at 0 ft



Min: -6.198 at 0 ft
Max: 28.65 at 2 ft



Min: -191.166 at 0 ft
Max: 12.698 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.061	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	-191.166	**Gov LC:**	2
Gov Pu (k):	0	**phi*Mn (k-ft):**	3134.293		

SHEAR DETAILS

UC Max:	0.033	**phi*Vn (k):**	868.948	**Vs (k):**	540.071
Location (ft):	2	**Vnmax (k):**	1649.404	**Gov LC:**	2
Gov Vu (k):	28.65	**Vc (k):**	618.526		

DEFLECTION DETAILS

Delta max (in):	0.0003459	**Location (ft):**	28.75
Deflection Ratio:	H/10000	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (H) (in^2):	3.534	**rho min (H):**	0.002	**As min (V) (in^2):**	4.89
rho Provided (H):	0.007	**As Provided (V) (in^2):**	8.836	**rho min (V):**	0.002
As min (H) (in^2):	0.96	**rho Provided (V):**	0.003		

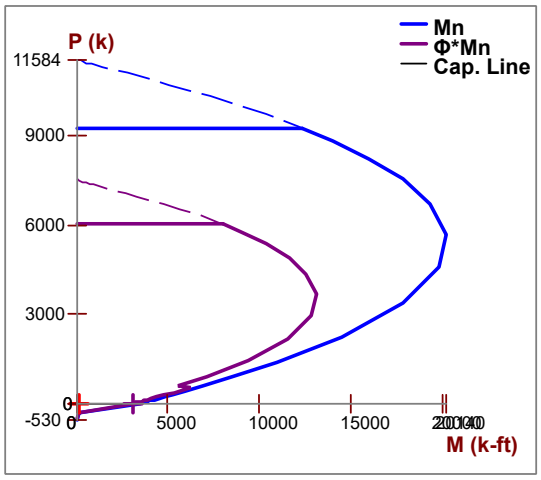
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	13.583	**Icracked (in^4):**	5.052e+6	**KL/r:**	0.51
A (in^2):	3259.92	**Cracked Mom, Mcr (k-ft):**	3500.601		
Igross (in^4):	7.217e+6	**r (in):**	39.367		

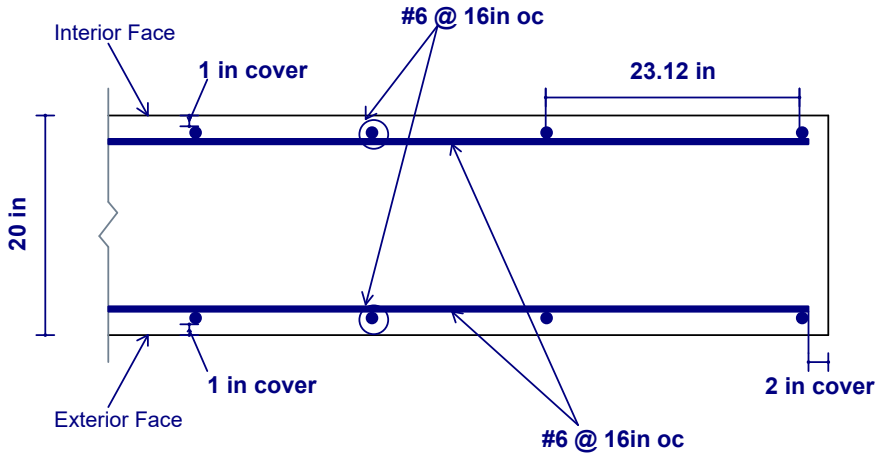
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



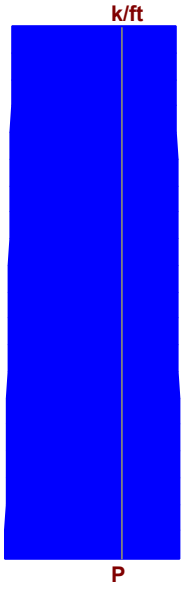
CROSS SECTION DETAILING



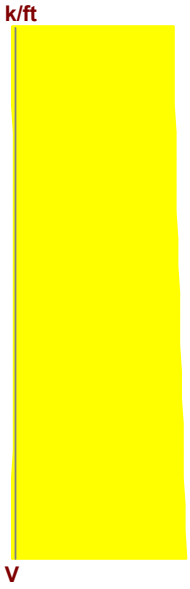
Detail Report: WP7 (Out-of-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	2	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	13.583	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

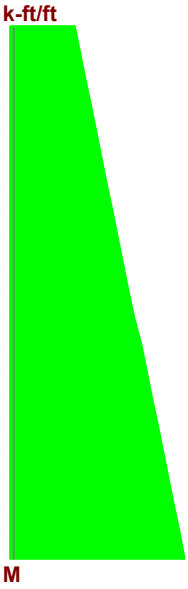
ENVELOPE DIAGRAMS



Min: -4.365 at 0 ft
Max: 8.685 at 0 ft



Min: -1.61 at 0 ft
Max: 0.025 at 2 ft



Min: -4.744 at 0 ft
Max: 0.059 at 2 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.172	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.059
Location (ft):	0	**Gov LC Int (-z):**	5	**phi*Mn Ext (+z) (k-ft/ft):**	27.633
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.002	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	2	**Gov LC Ext (+z):**	6
Gov Mu Int (-z) (k-ft/ft):	-4.744	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	27.633	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.214	**Gov Vu (k/ft):**	-1.61	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	7.526	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.03	**Location (ft):**	27.312
Deflection Ratio:	H/791	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	8.836	**As min (V) (in^2):**	4.89
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

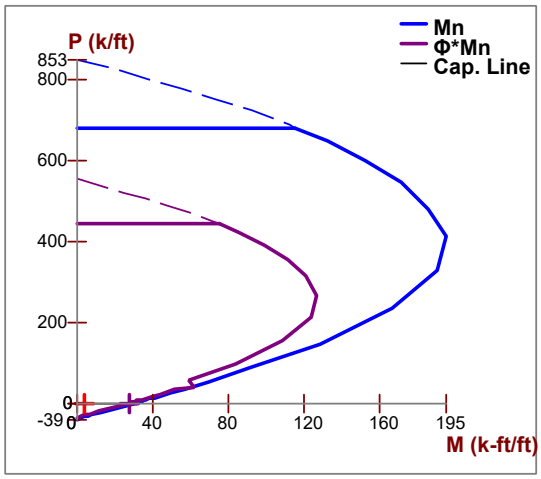
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	4.157
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	429.532		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

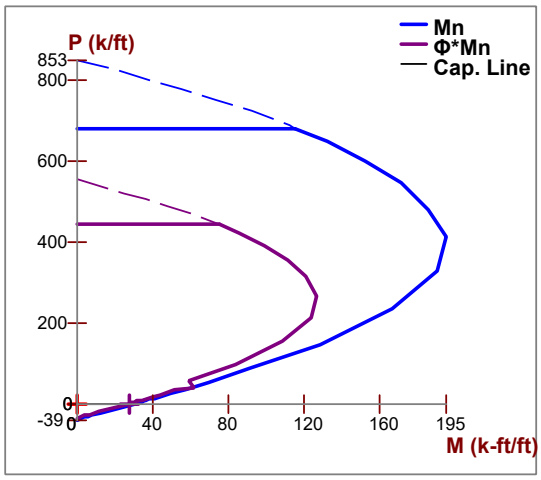
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

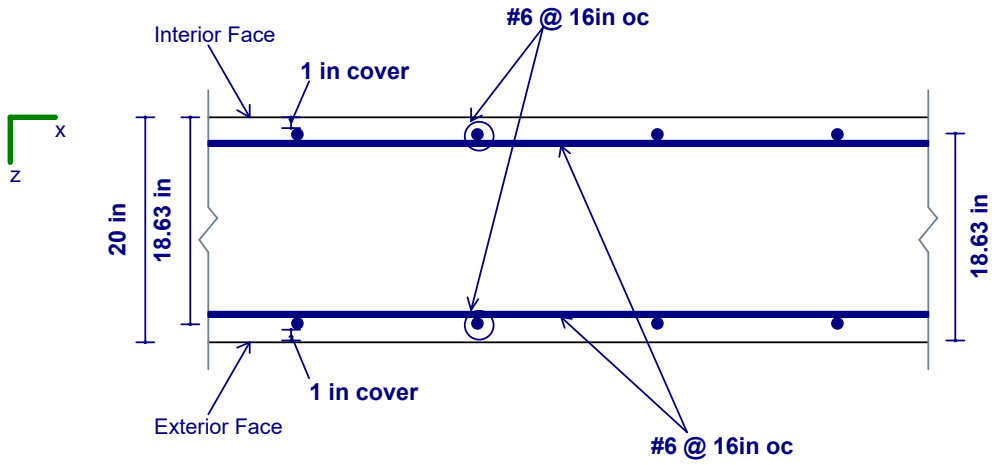
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



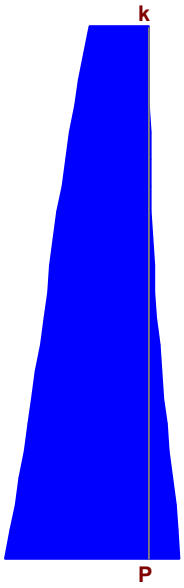
CROSS SECTION DETAILING



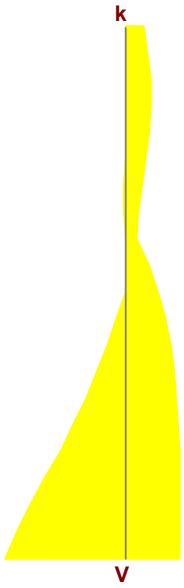
Detail Report: WP7 (In-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	13.75	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	13.583	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

ENVELOPE DIAGRAMS



Min: -15.882 at 0 ft
Max: 71.828 at 0 ft



Min: -3.021 at 0 ft
Max: 6.564 at 0 ft

Min: -37.282 at 0 ft
Max: 2.073 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.012	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	-37.282	**Gov LC:**	1
Gov Pu (k):	0	**phi*Mn (k-ft):**	3134.293		

SHEAR DETAILS

UC Max:	0.008	**phi*Vn (k):**	868.948	**Vs (k):**	540.071
Location (ft):	0	**Vnmax (k):**	1649.404	**Gov LC:**	5
Gov Vu (k):	6.564	**Vc (k):**	618.526		

DEFLECTION DETAILS

Delta max (in):	0.002	**Location (ft):**	28.75
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	9.719	**rho min (H):**	0.002	**As min (V) (in^2):**	4.89
rho Provided (H):	0.003	**As Provided (V) (in^2):**	8.836	**rho min (V):**	0.002
As min (H) (in^2):	6.6	**rho Provided (V):**	0.003		

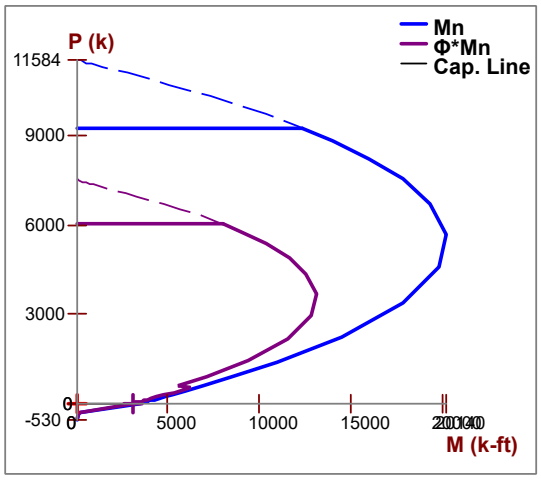
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	13.583	**Icracked (in^4):**	5.052e+6	**KL/r:**	3.507
A (in^2):	3259.92	**Cracked Mom, Mcr (k-ft):**	3500.601		
Igross (in^4):	7.217e+6	**r (in):**	39.367		

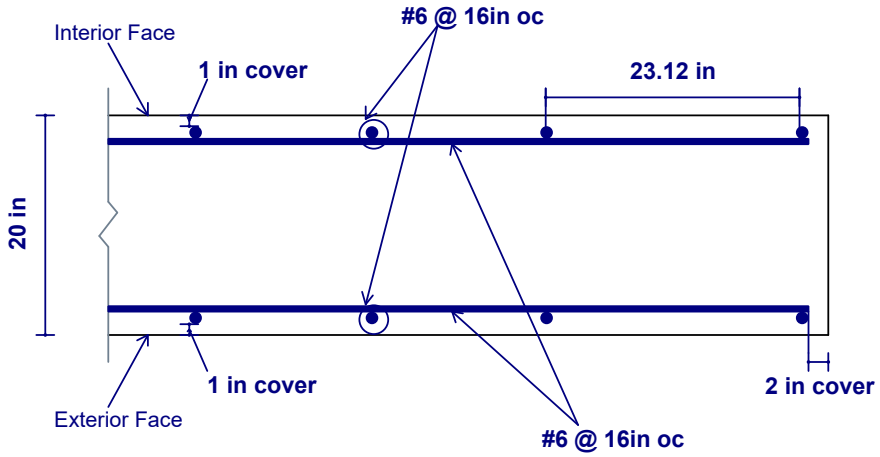
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



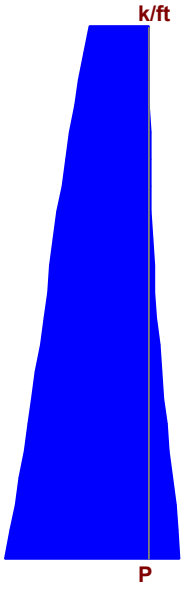
CROSS SECTION DETAILING



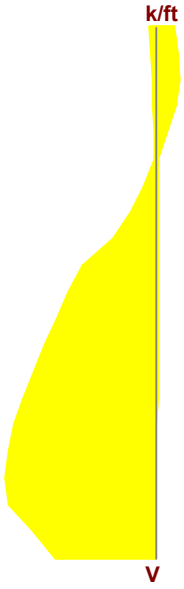
Detail Report: WP7 (Out-of-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	13.75	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	13.583	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

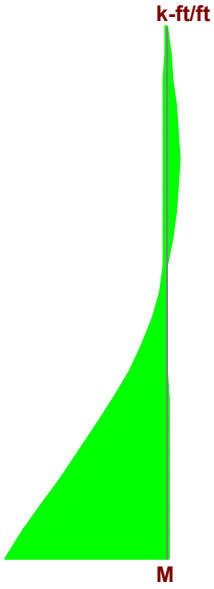
ENVELOPE DIAGRAMS



Min: -1.169 at 0 ft
Max: 5.288 at 0 ft



Min: -0.052 at 12.375 ft
Max: 0.321 at 2.063 ft



Min: -0.125 at 10.313 ft
Max: 1.695 at 0 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.005	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	1.695
Location (ft):	10.312	**Gov LC Int (-z):**	2	**phi*Mn Ext (+z) (k-ft/ft):**	27.633
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.061	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	0	**Gov LC Ext (+z):**	5
Gov Mu Int (-z) (k-ft/ft):	-0.125	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	27.633	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.04	**Gov Vu (k/ft):**	0.321	**phi*Vns (k/ft):**	0
Location (ft):	2.062	**phi*Vnc (k/ft):**	7.931	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.029	**Location (ft):**	1.438
Deflection Ratio:	H/5611	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	8.836	**As min (V) (in^2):**	4.89
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

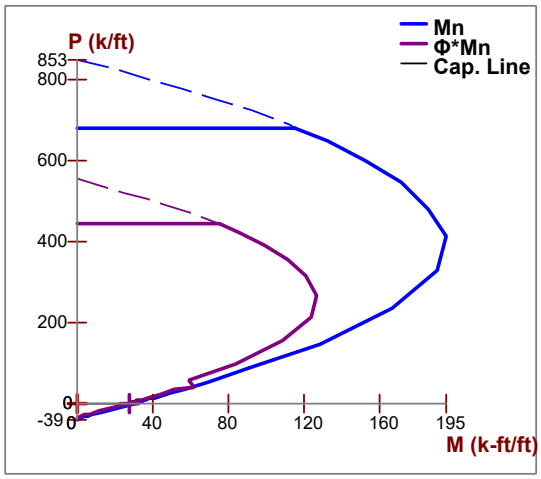
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	28.579
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	429.532		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

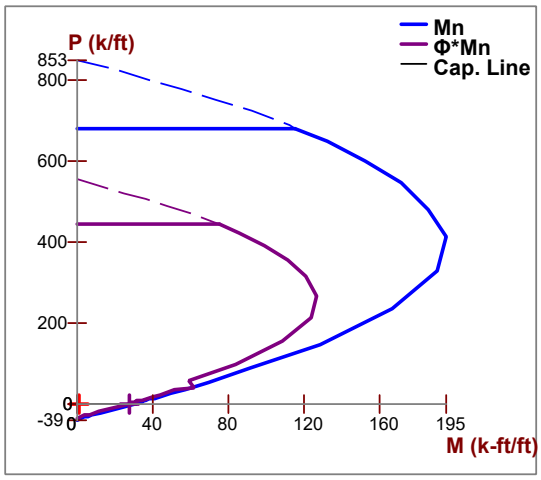
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

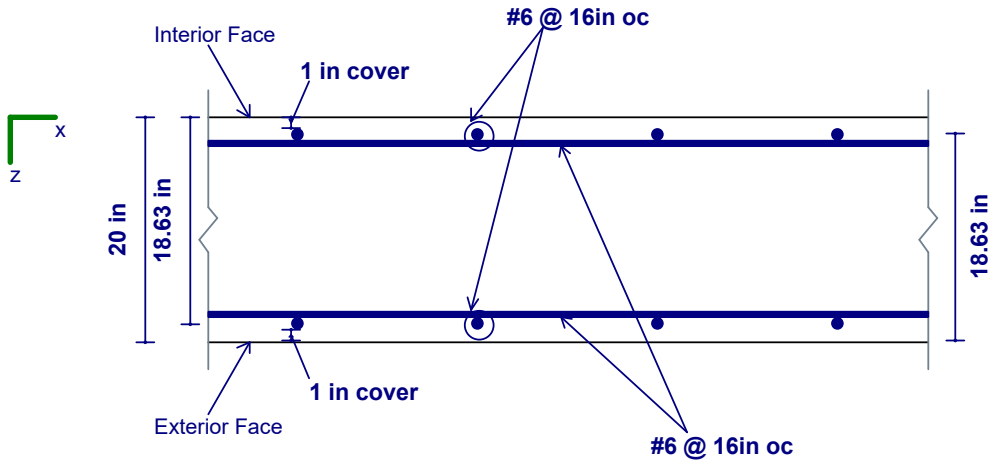
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram

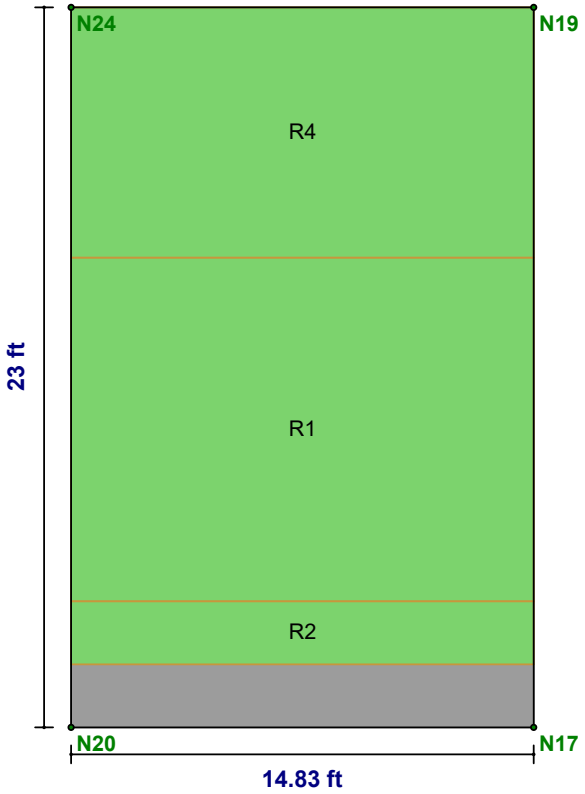


CROSS SECTION DETAILING



Detail Report: WP8

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	23	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	14.83	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R1	0.064	2	0.024	1	0.002	2	0.091	2	0.185	5	0.031	1
R2	0.081	2	0.026	1	0	1	0.188	5	0.197	2	0.037	1
R4	0.009	13	0.006	1	0.001	2	0.059	5	0.037	2	0.034	1

REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R1	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R2	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R4	#6@16in oc e.f.	#6@16in oc e.f.	N/A

Detail Report: WP8 (In-Plane, Region R1)

CRITERIA

Code:	ACI 318-19
Design Rule:	Avalanche
Seismic Rule:	SDR_Conc1
Loc of r/f:	Each Face
Outer Bars:	Vertical
Vert Bar Size:	#6
Horz Bar Size:	#6
Vert Bar Spac (in):	16
Horz Bar Spac (in):	16
Group Wall?:	No

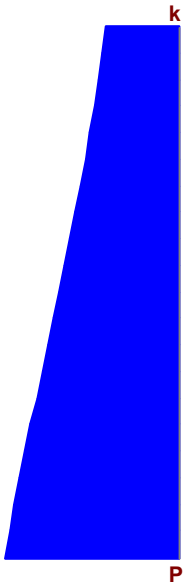
GEOMETRY

Total Height (ft):	11
Total Length (ft):	14.83
Thickness (in):	20
Int Cover (-z) (in):	1
Ext Cover (+z) (in):	1
Cover Open/Edge (in):	2
K:	1
Use Cracked?:	Yes
Icr Factor:	0.7

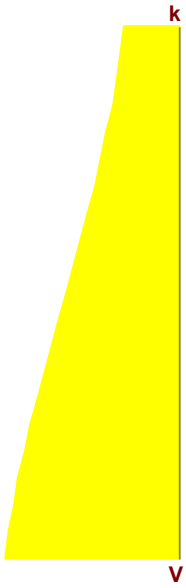
MATERIALS

Material Set:	Conc4000NW
Concrete f'c (ksi):	4
Concrete E (ksi):	3644
Concrete G (ksi):	1584
Conc Density (k/ft^3):	0.145
Lambda:	1
Conc Str Blk:	Rectangular
Vert Bar Fy (ksi):	60
Horz Bar Fy (ksi):	60
Steel E (ksi):	29000

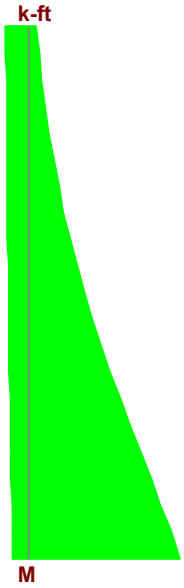
ENVELOPE DIAGRAMS



Min: 68.026 at 11 ft
Max: 162.94 at 0 ft



Min: 7.18 at 11 ft
Max: 22.781 at 0 ft



Min: -239.438 at 0 ft
Max: 33.748 at 11 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.064	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	-239.438	**Gov LC:**	2
Gov Pu (k):	0	**phi*Mn (k-ft):**	3760.981		

SHEAR DETAILS

UC Max:	0.024	**phi*Vn (k):**	948.722	**Vs (k):**	589.652
Location (ft):	0	**Vnmax (k):**	1800.829	**Gov LC:**	1
Gov Vu (k):	22.781	**Vc (k):**	675.311		

DEFLECTION DETAILS

Delta max (in):	0.002	**Location (ft):**	23
Deflection Ratio:	H/10000	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.952	**rho min (H):**	0.002	**As min (V) (in^2):**	5.339
rho Provided (H):	0.003	**As Provided (V) (in^2):**	9.719	**rho min (V):**	0.001
As min (H) (in^2):	5.28	**rho Provided (V):**	0.003		

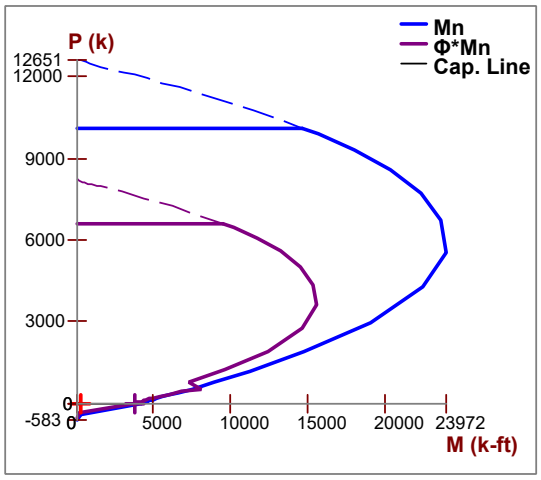
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	14.83	**Icracked (in^4):**	6.575e+6	**KL/r:**	2.569
A (in^2):	3559.2	**Cracked Mom, Mcr (k-ft):**	4172.857		
Igross (in^4):	9.393e+6	**r (in):**	42.981		

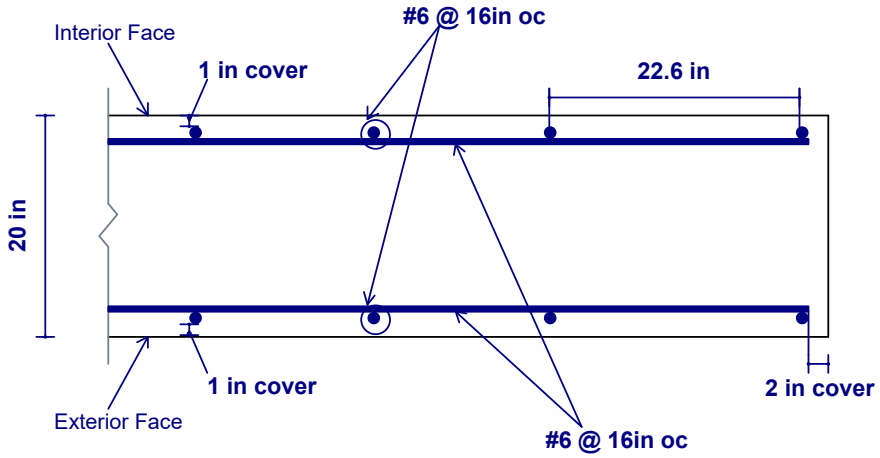
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



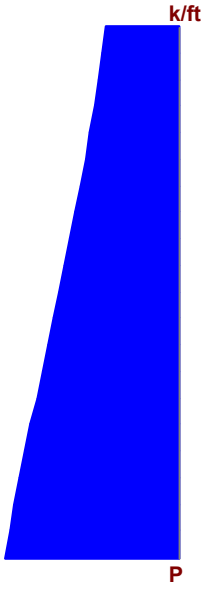
CROSS SECTION DETAILING



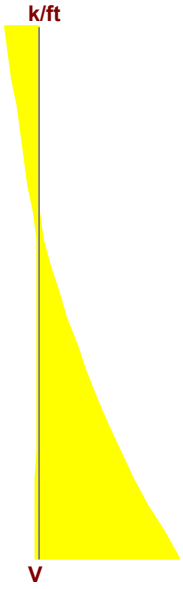
Detail Report: WP8 (Out-of-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	14.83	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

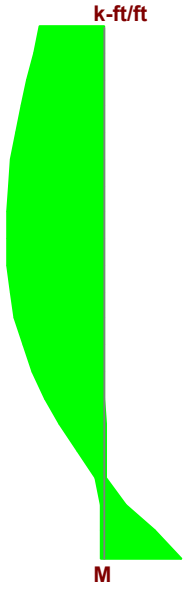
ENVELOPE DIAGRAMS



Min: 4.587 at 11 ft
Max: 10.987 at 0 ft



Min: -1.598 at 0 ft
Max: 0.381 at 11 ft



Min: -2.032 at 0 ft
Max: 2.543 at 7.15 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.073	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	2.543
Location (ft):	0	**Gov LC Int (-z):**	5	**phi*Mn Ext (+z) (k-ft/ft):**	27.827
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.091	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	7.15	**Gov LC Ext (+z):**	2
Gov Mu Int (-z) (k-ft/ft):	-2.032	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	27.827	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.185	**Gov Vu (k/ft):**	-1.598	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	8.628	**Gov LC:**	5

DEFLECTION DETAILS

Delta max (in):	0.031	**Location (ft):**	23
Deflection Ratio:	H/4232	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	9.719	**As min (V) (in^2):**	5.339
rho Provided (V):	0.003	**rho min (V):**	0.001

WALL SEGMENT SECTION PROPERTIES

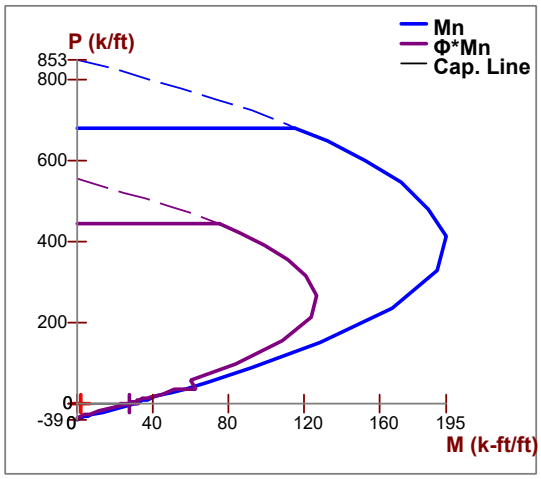
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	22.863
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	468.966		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

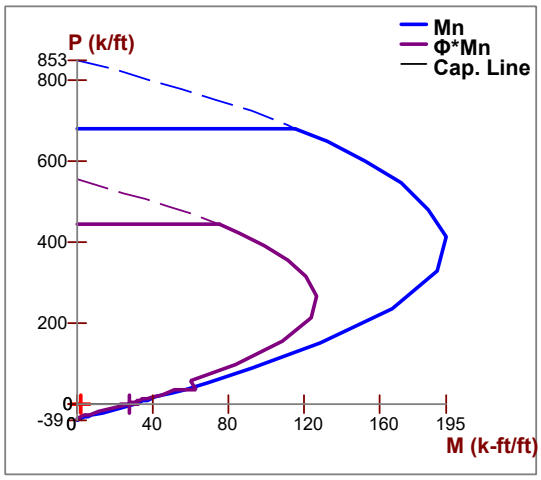
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

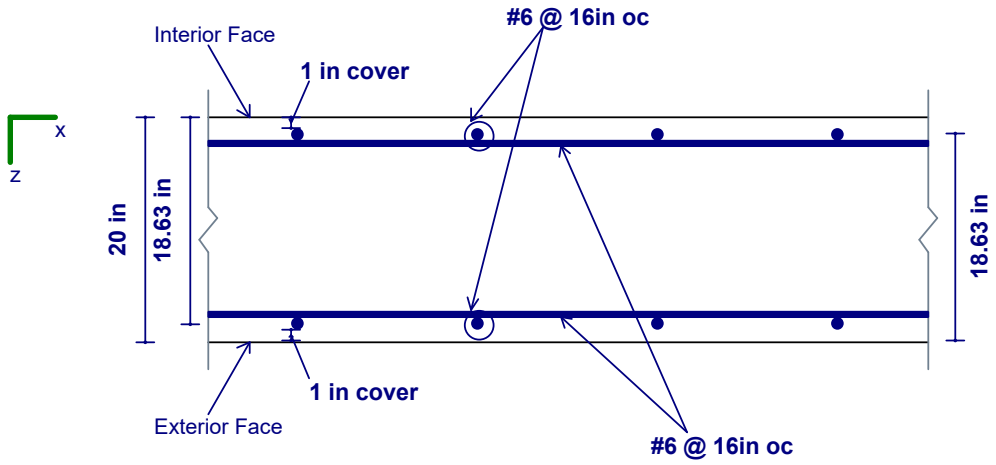
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



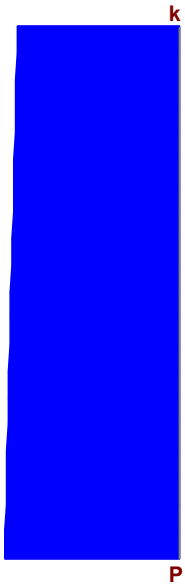
CROSS SECTION DETAILING



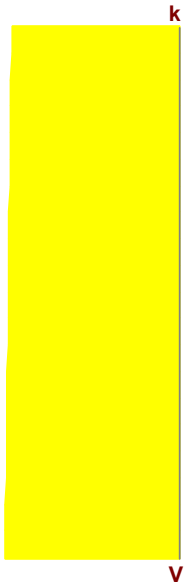
Detail Report: WP8 (In-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	2	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	14.83	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

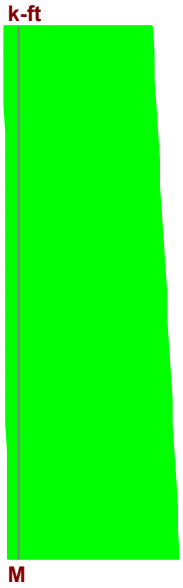
ENVELOPE DIAGRAMS



Min: 169.725 at 2 ft
Max: 182.92 at 0 ft



Min: 24.073 at 2 ft
Max: 25.077 at 0 ft



Min: -304.443 at 0 ft
Max: 23.197 at 2 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.081	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	-304.443	**Gov LC:**	2
Gov Pu (k):	0	**phi*Mn (k-ft):**	3760.981		

SHEAR DETAILS

UC Max:	0.026	**phi*Vn (k):**	948.722	**Vs (k):**	589.652
Location (ft):	0	**Vnmax (k):**	1800.829	**Gov LC:**	1
Gov Vu (k):	25.077	**Vc (k):**	675.311		

DEFLECTION DETAILS

Delta max (in):	0.0003339	**Location (ft):**	23
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	3.534	**rho min (H):**	0.002	**As min (V) (in^2):**	5.339
rho Provided (H):	0.007	**As Provided (V) (in^2):**	9.719	**rho min (V):**	0.001
As min (H) (in^2):	0.96	**rho Provided (V):**	0.003		

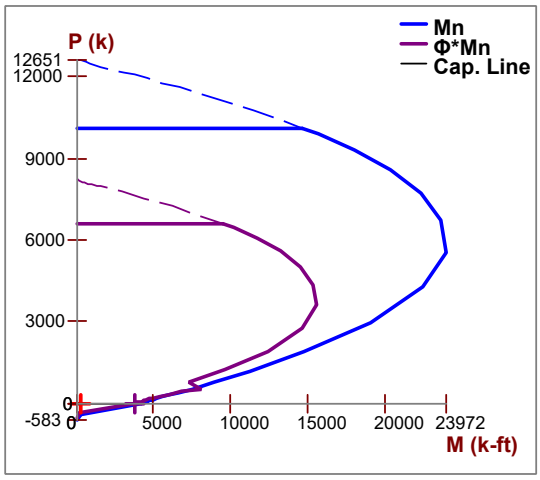
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	14.83	**Icracked (in^4):**	6.575e+6	**KL/r:**	0.467
A (in^2):	3559.2	**Cracked Mom, Mcr (k-ft):**	4172.857		
Igross (in^4):	9.393e+6	**r (in):**	42.981		

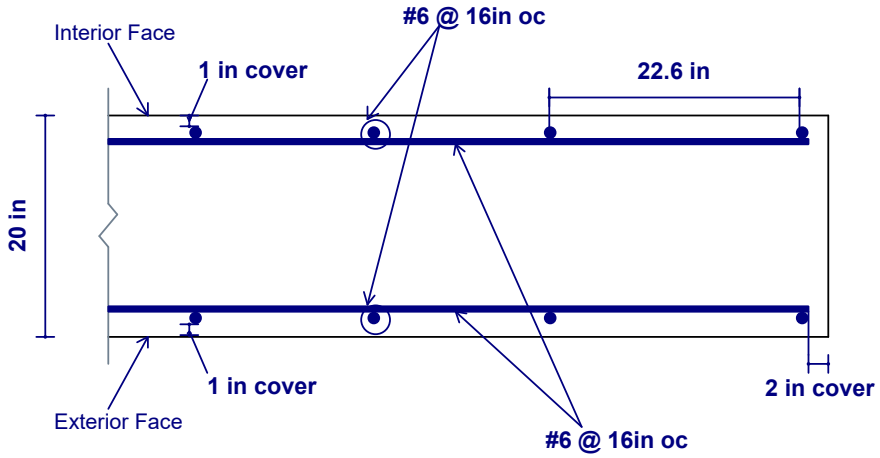
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



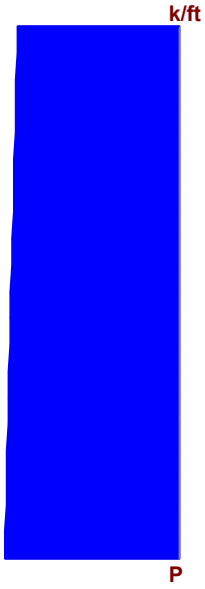
CROSS SECTION DETAILING



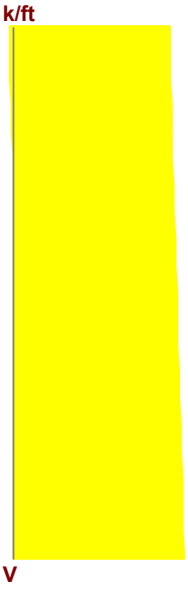
Detail Report: WP8 (Out-of-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	2	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	14.83	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

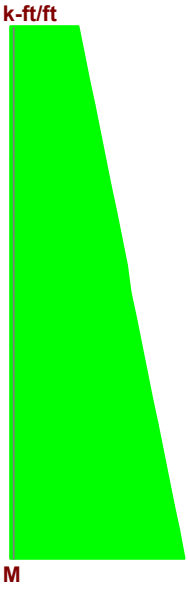
ENVELOPE DIAGRAMS



Min: 11.445 at 2 ft
Max: 12.334 at 0 ft



Min: -1.737 at 0 ft
Max: 0.02 at 2 ft



Min: -5.261 at 0 ft
Max: 0.064 at 2 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.188	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0
Location (ft):	0	**Gov LC Int (-z):**	5	**phi*Mn Ext (+z):**	NC
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.028	**phi eff. Ext (+z):**	0.65
phi*Pn Int (-z):	NC	**Location (ft):**	0	**Gov LC Ext (+z):**	1
Gov Mu Int (-z) (k-ft/ft):	-5.24	**Gov Pu Ext (+z) (k/ft):**	12.334		
phi*Mn Int (-z) (k-ft/ft):	27.827	**phi*Pn Ext (+z) (k/ft):**	443.609		

SHEAR DETAILS

UC Max:	0.197	**Gov Vu (k/ft):**	-1.722	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	8.736	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.037	**Location (ft):**	23
Deflection Ratio:	H/657	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	9.719	**As min (V) (in^2):**	5.339
rho Provided (V):	0.003	**rho min (V):**	0.001

WALL SEGMENT SECTION PROPERTIES

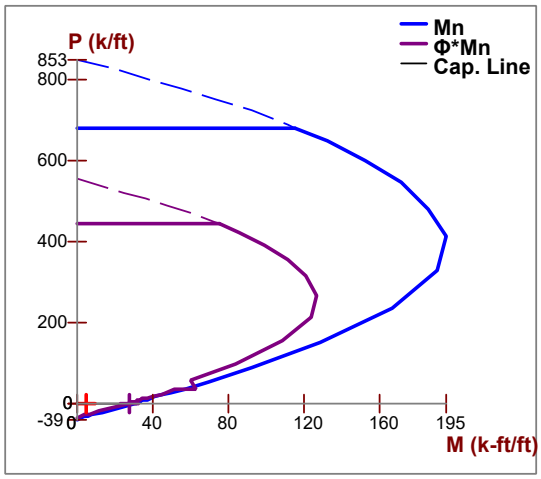
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	4.157
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	468.966		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

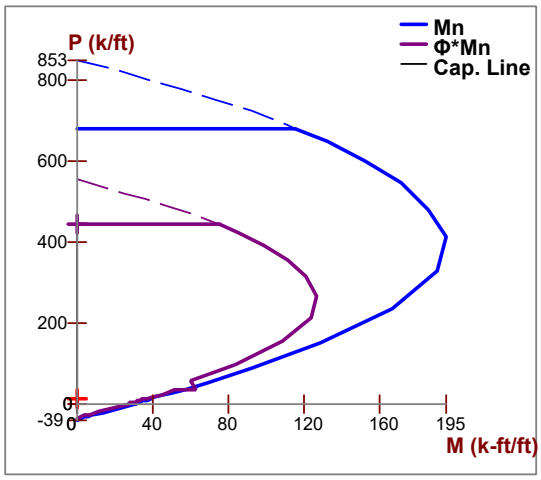
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

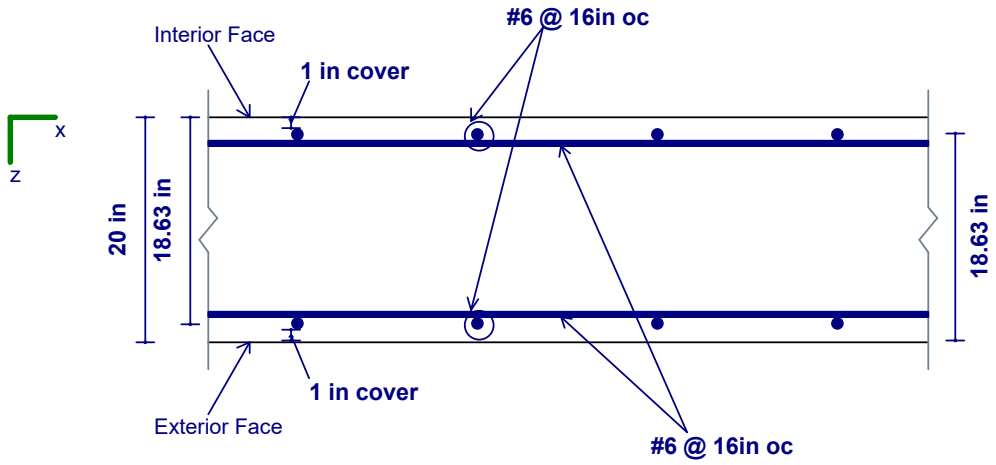
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



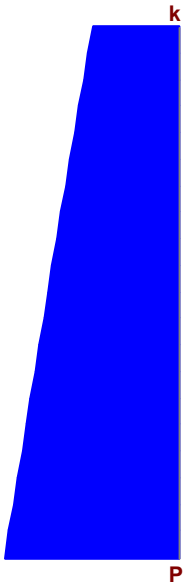
CROSS SECTION DETAILING



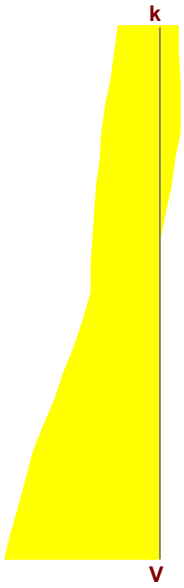
Detail Report: WP8 (In-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	8	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	14.83	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

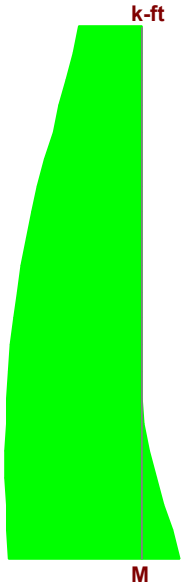
ENVELOPE DIAGRAMS



Min: 33.481 at 8 ft
Max: 67.865 at 0 ft



Min: -0.776 at 6.8 ft
Max: 5.971 at 0 ft



Min: -8.958 at 0 ft
Max: 32.101 at 1.6 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.009	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	1.6	**Gov Mu (k-ft):**	32.101	**Gov LC:**	13
Gov Pu (k):	0	**phi*Mn (k-ft):**	3734.142		

SHEAR DETAILS

UC Max:	0.006	**phi*Vn (k):**	948.722	**Vs (k):**	589.652
Location (ft):	0	**Vnmax (k):**	1800.829	**Gov LC:**	1
Gov Vu (k):	5.971	**Vc (k):**	675.311		

DEFLECTION DETAILS

Delta max (in):	0.001	**Location (ft):**	23
Deflection Ratio:	H/10000	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.069	**rho min (H):**	0.002	**As min (V) (in^2):**	5.339
rho Provided (H):	0.004	**As Provided (V) (in^2):**	9.719	**rho min (V):**	0.001
As min (H) (in^2):	3.84	**rho Provided (V):**	0.003		

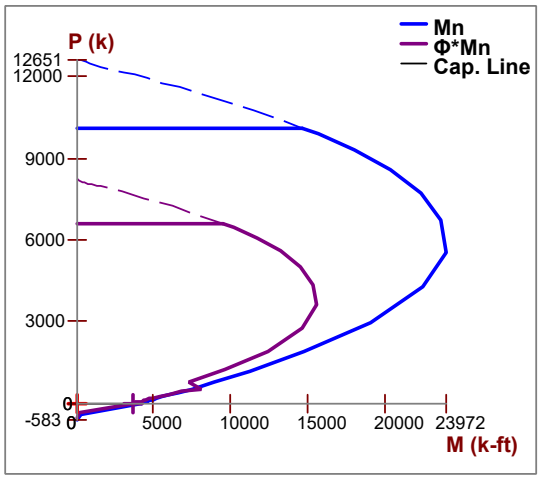
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	14.83	**Icracked (in^4):**	6.575e+6	**KL/r:**	1.869
A (in^2):	3559.2	**Cracked Mom, Mcr (k-ft):**	4172.857		
Igross (in^4):	9.393e+6	**r (in):**	42.981		

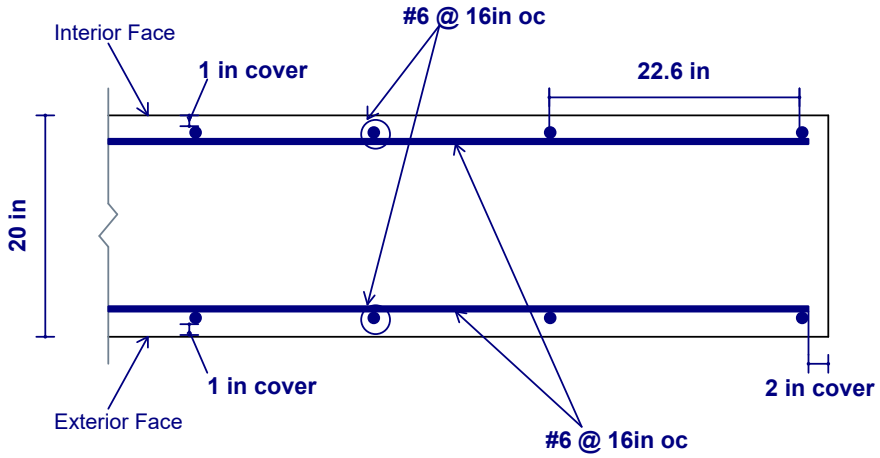
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



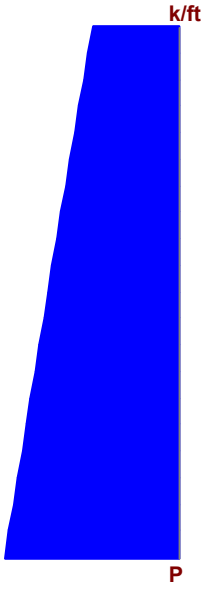
CROSS SECTION DETAILING



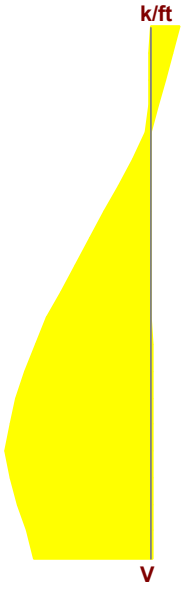
Detail Report: WP8 (Out-of-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	8	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	14.83	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

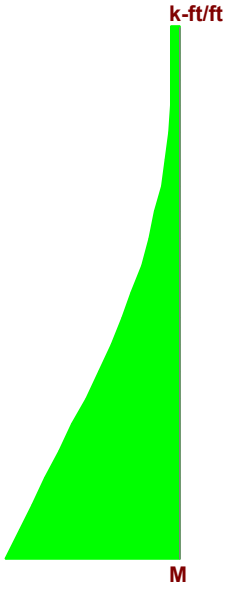
ENVELOPE DIAGRAMS



Min: 2.258 at 8 ft
Max: 4.576 at 0 ft



Min: -0.062 at 8 ft
Max: 0.3 at 1.6 ft



Min: -0.005 at 0 ft
Max: 1.637 at 0 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	1.637
Location (ft):	0	**Gov LC Int (-z):**	13	**phi*Mn Ext (+z) (k-ft/ft):**	27.827
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.059	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	0	**Gov LC Ext (+z):**	5
Gov Mu Int (-z) (k-ft/ft):	-0.005	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	27.827	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.037	**Gov Vu (k/ft):**	0.3	**phi*Vns (k/ft):**	0
Location (ft):	1.6	**phi*Vnc (k/ft):**	8.134	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.034	**Location (ft):**	1.15
Deflection Ratio:	H/2844	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	9.719	**As min (V) (in^2):**	5.339
rho Provided (V):	0.003	**rho min (V):**	0.001

WALL SEGMENT SECTION PROPERTIES

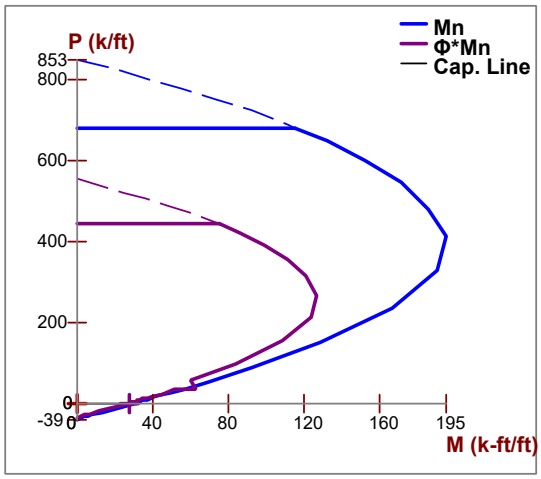
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	16.628
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	468.966		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

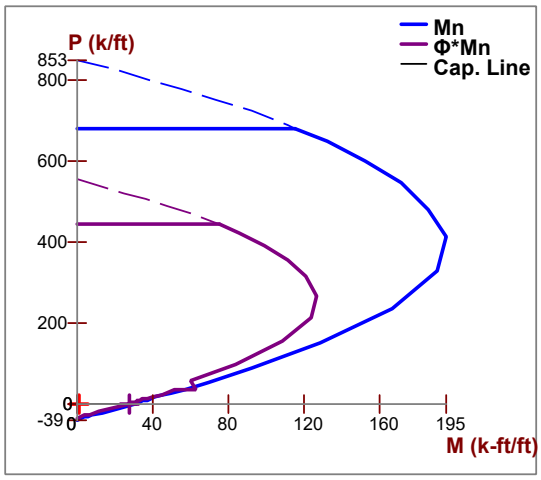
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

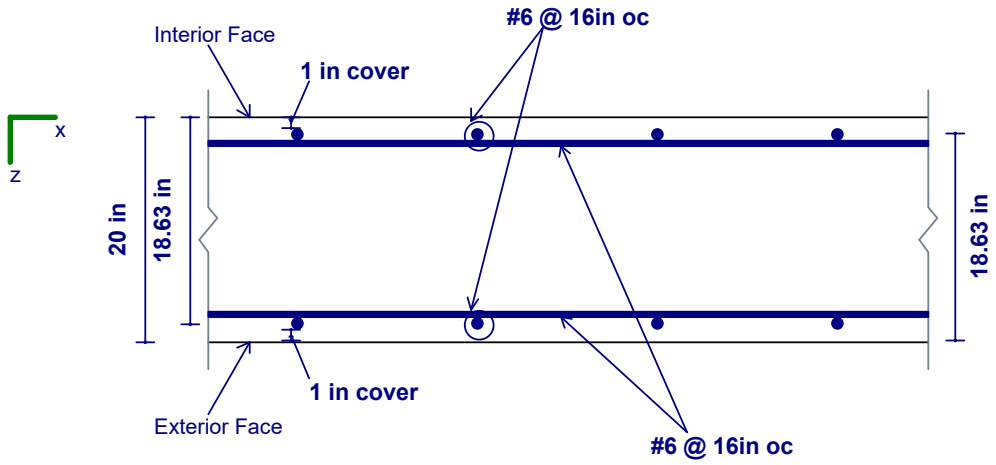
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram

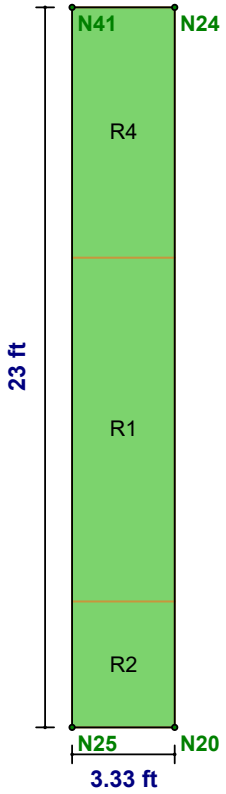


CROSS SECTION DETAILING



Detail Report: WP9

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	23	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	3.334	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R2	0.111	5	0.107	2	0.002	1	0.037	1	0.034	1	0.001	2
R1	0.115	2	0.131	2	0.011	1	0.024	1	0.019	1	0.001	2
R4	0.019	1	0.037	2	0.008	1	0.021	2	0.052	2	0.001	2

REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R2	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R1	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R4	#6@16in oc e.f.	#6@16in oc e.f.	N/A

Detail Report: WP9 (In-Plane, Region R2)

CRITERIA

Code:	ACI 318-19
Design Rule:	Avalanche
Seismic Rule:	SDR_Conc1
Loc of r/f:	Each Face
Outer Bars:	Vertical
Vert Bar Size:	#6
Horz Bar Size:	#6
Vert Bar Spac (in):	16
Horz Bar Spac (in):	16
Group Wall?:	No

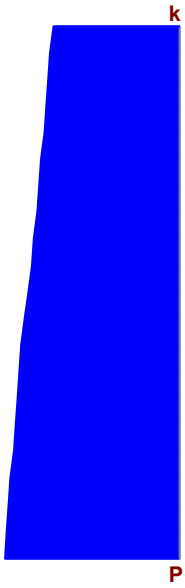
GEOMETRY

Total Height (ft):	4
Total Length (ft):	3.334
Thickness (in):	20
Int Cover (-z) (in):	1
Ext Cover (+z) (in):	1
Cover Open/Edge (in):	2
K:	1
Use Cracked?:	Yes
Icr Factor:	0.7

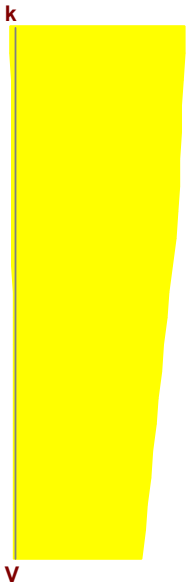
MATERIALS

Material Set:	Conc4000NW
Concrete f'c (ksi):	4
Concrete E (ksi):	3644
Concrete G (ksi):	1584
Conc Density (k/ft^3):	0.145
Lambda:	1
Conc Str Blk:	Rectangular
Vert Bar Fy (ksi):	60
Horz Bar Fy (ksi):	60
Steel E (ksi):	29000

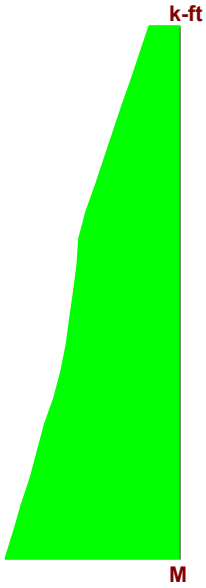
ENVELOPE DIAGRAMS



Min: 39.858 at 4 ft
Max: 55.242 at 0 ft



Min: -22.775 at 4 ft
Max: 0.398 at 4 ft



Min: -0.109 at 4 ft
Max: 35.724 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.111	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	1	**Gov Mu (k-ft):**	25.621	**Gov LC:**	5
Gov Pu (k):	0	**phi*Mn (k-ft):**	230.116		

SHEAR DETAILS

UC Max:	0.107	**phi*Vn (k):**	213.287	**Vs (k):**	132.562
Location (ft):	4	**Vnmax (k):**	404.852	**Gov LC:**	2
Gov Vu (k):	-22.775	**Vc (k):**	151.82		

DEFLECTION DETAILS

Delta max (in):	0.002	**Location (ft):**	23
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	4.418	**rho min (H):**	0.002	**As min (V) (in^2):**	1.2
rho Provided (H):	0.005	**As Provided (V) (in^2):**	2.651	**rho min (V):**	0.001
As min (H) (in^2):	1.92	**rho Provided (V):**	0.003		

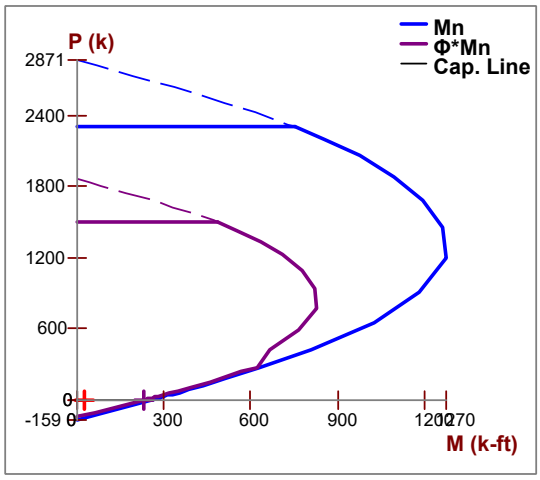
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	3.334	**Icracked (in^4):**	74711.476	**KL/r:**	4.156
A (in^2):	800.16	**Cracked Mom, Mcr (k-ft):**	210.903		
Igross (in^4):	1.067e+5	**r (in):**	9.663		

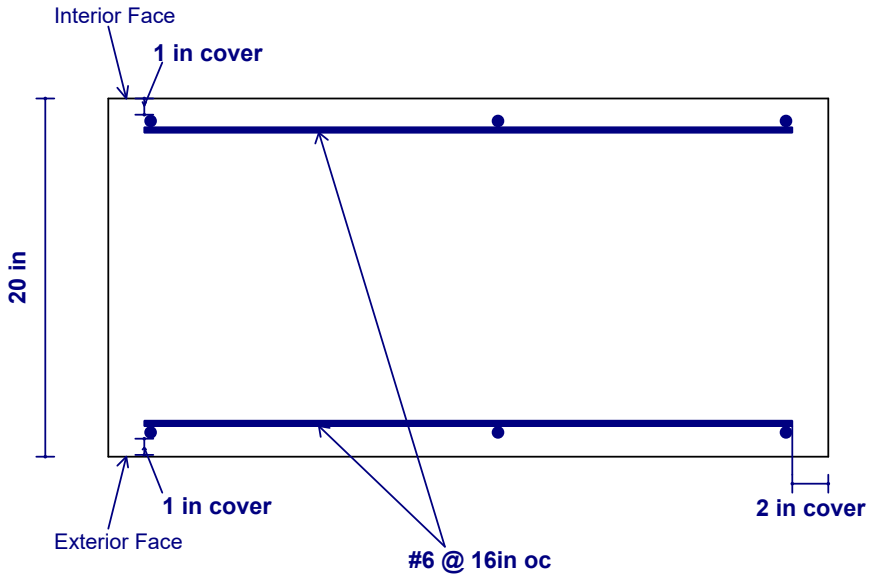
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



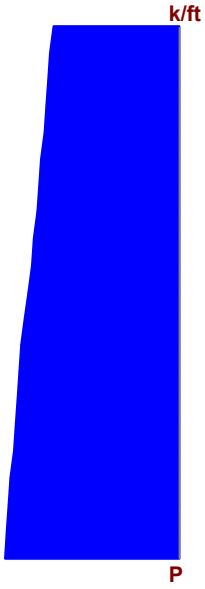
CROSS SECTION DETAILING



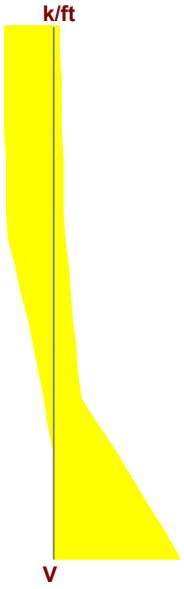
Detail Report: WP9 (Out-of-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	4	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	3.334	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

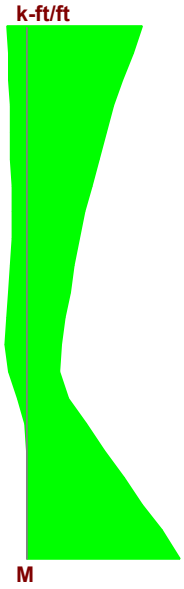
ENVELOPE DIAGRAMS



Min: 11.955 at 4 ft
Max: 16.569 at 0 ft



Min: -0.356 at 0 ft
Max: 0.131 at 4 ft



Min: -0.309 at 0 ft
Max: 0.039 at 1.6 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.037	**phi eff. Int (-z):**	0.65	**Gov Mu Ext (+z) (k-ft/ft):**	0
Location (ft):	0	**Gov LC Int (-z):**	1	**phi*Mn Ext (+z):**	NC
Gov Pu Int (-z) (k/ft):	16.569	**UC Max Ext (+z):**	0.037	**phi eff. Ext (+z):**	0.65
phi*Pn Int (-z) (k/ft):	447.72	**Location (ft):**	0	**Gov LC Ext (+z):**	1
Gov Mu Int (-z) (k-ft/ft):	-0.309	**Gov Pu Ext (+z) (k/ft):**	16.569		
phi*Mn Int (-z) (k-ft/ft):	8.345	**phi*Pn Ext (+z) (k/ft):**	447.72		

SHEAR DETAILS

UC Max:	0.034	**Gov Vu (k/ft):**	-0.356	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	10.518	**Gov LC:**	1

DEFLECTION DETAILS

Delta max (in):	0.001	**Location (ft):**	18.4
Deflection Ratio:	H/10000	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	2.651	**As min (V) (in^2):**	1.2
rho Provided (V):	0.003	**rho min (V):**	0.001

WALL SEGMENT SECTION PROPERTIES

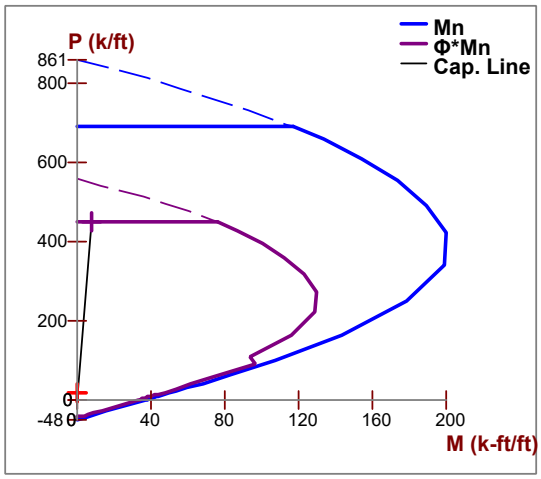
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	8.314
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	105.43		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

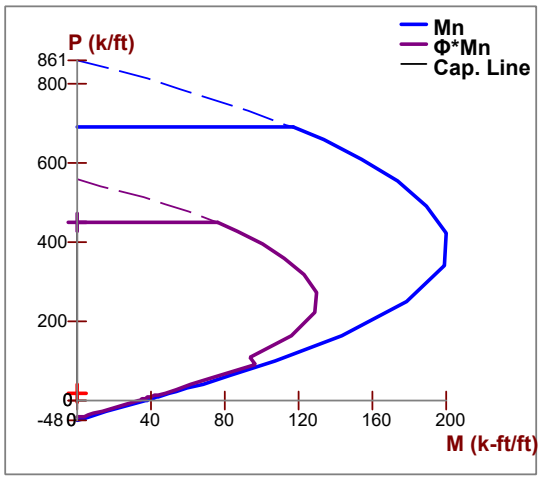
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

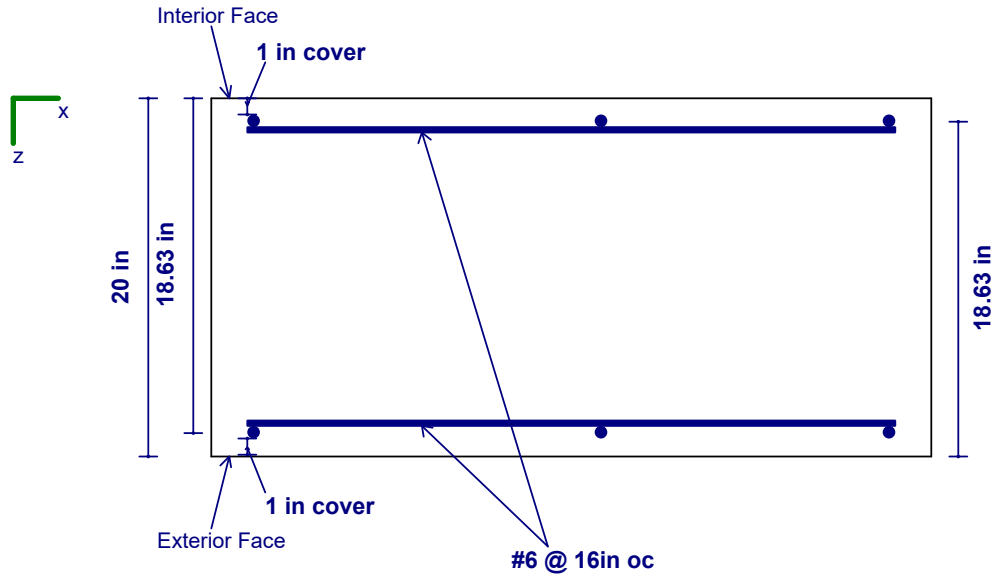
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



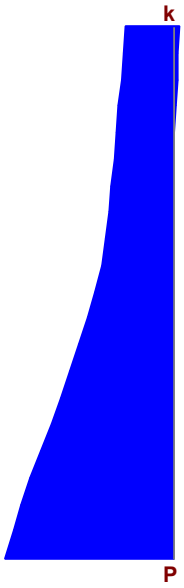
CROSS SECTION DETAILING



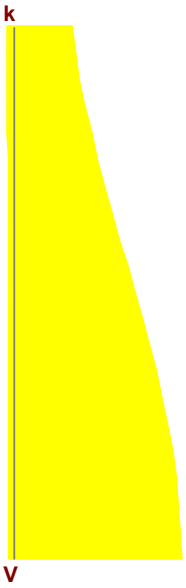
Detail Report: WP9 (In-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	3.334	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

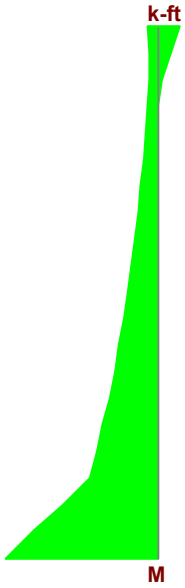
ENVELOPE DIAGRAMS



Min: -1.174 at 11 ft
Max: 35.598 at 0 ft



Min: -22.997 at 0 ft
Max: 0.738 at 11 ft



Min: -3.925 at 11 ft
Max: 26.972 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.115	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	26.392	**Gov LC:**	2
Gov Pu (k):	0	**phi*Mn (k-ft):**	230.116		

SHEAR DETAILS

UC Max:	0.131	**phi*Vn (k):**	175.332	**Vs (k):**	132.562
Location (ft):	0	**Vnmax (k):**	404.852	**Gov LC:**	2
Gov Vu (k):	-22.997	**Vc (k):**	101.213		

DEFLECTION DETAILS

Delta max (in):	0.011	**Location (ft):**	23
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.952	**rho min (H):**	0.002	**As min (V) (in^2):**	1.2
rho Provided (H):	0.003	**As Provided (V) (in^2):**	2.651	**rho min (V):**	0.001
As min (H) (in^2):	5.28	**rho Provided (V):**	0.003		

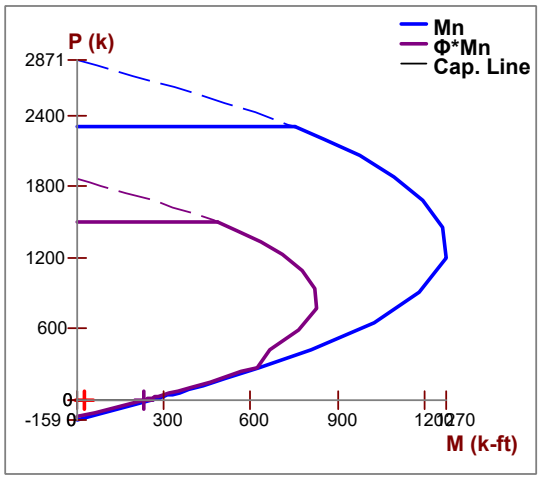
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	3.334	**Icracked (in^4):**	74711.476	**KL/r:**	11.429
A (in^2):	800.16	**Cracked Mom, Mcr (k-ft):**	210.903		
Igross (in^4):	1.067e+5	**r (in):**	9.663		

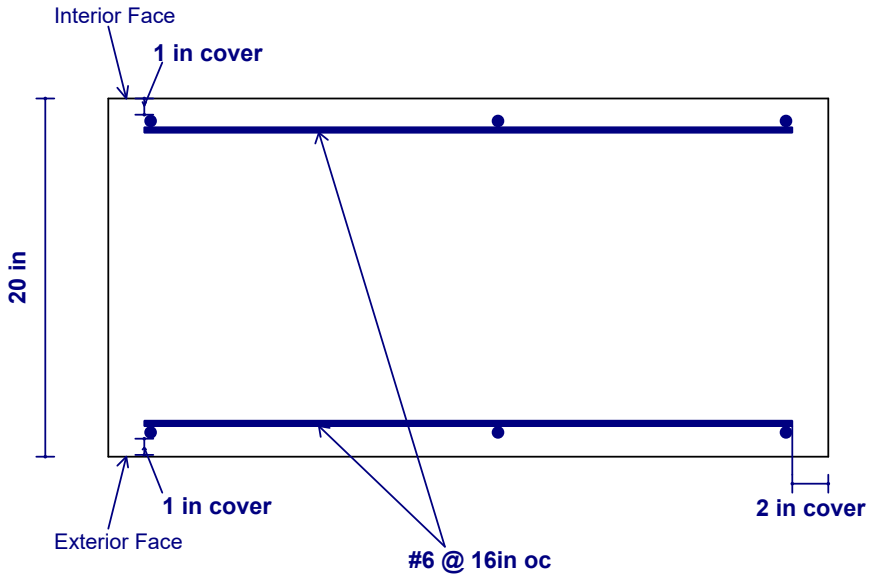
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



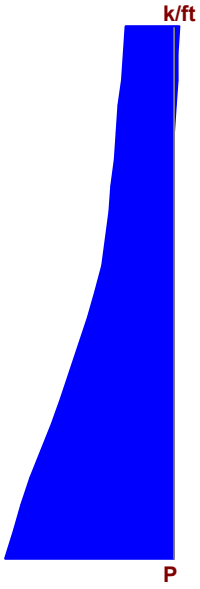
CROSS SECTION DETAILING



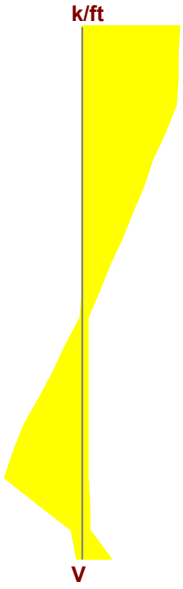
Detail Report: WP9 (Out-of-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	3.334	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

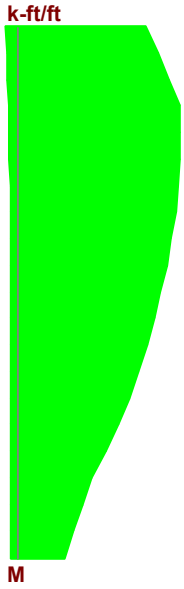
ENVELOPE DIAGRAMS



Min: -0.352 at 11 ft
Max: 10.677 at 0 ft



Min: -0.167 at 11 ft
Max: 0.13 at 1.65 ft



Min: -0.642 at 8.25 ft
Max: 0.04 at 11 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.024	**phi eff. Int (-z):**	0.65	**Gov Mu Ext (+z) (k-ft/ft):**	0
Location (ft):	0	**Gov LC Int (-z):**	1	**phi*Mn Ext (+z):**	NC
Gov Pu Int (-z) (k/ft):	10.677	**UC Max Ext (+z):**	0.024	**phi eff. Ext (+z):**	0.65
phi*Pn Int (-z) (k/ft):	447.72	**Location (ft):**	0	**Gov LC Ext (+z):**	1
Gov Mu Int (-z) (k-ft/ft):	0	**Gov Pu Ext (+z) (k/ft):**	10.677		
phi*Mn Int (-z):	NC	**phi*Pn Ext (+z) (k/ft):**	447.72		

SHEAR DETAILS

UC Max:	0.019	**Gov Vu (k/ft):**	-0.167	**phi*Vns (k/ft):**	0
Location (ft):	11	**phi*Vnc (k/ft):**	8.814	**Gov LC:**	1

DEFLECTION DETAILS

Delta max (in):	0.000973	**Location (ft):**	18.4
Deflection Ratio:	H/10000	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	2.651	**As min (V) (in^2):**	1.2
rho Provided (V):	0.003	**rho min (V):**	0.001

WALL SEGMENT SECTION PROPERTIES

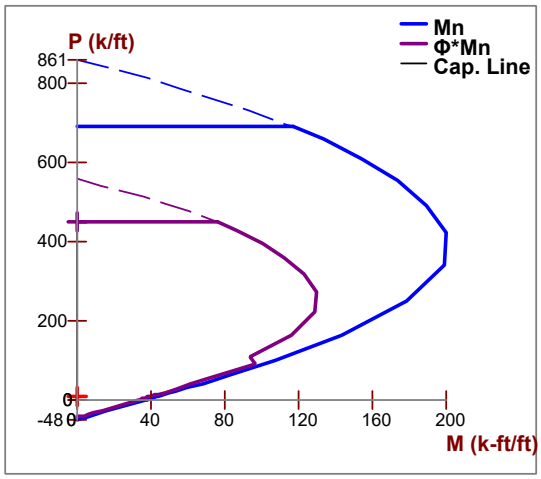
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	22.863
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	105.43		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

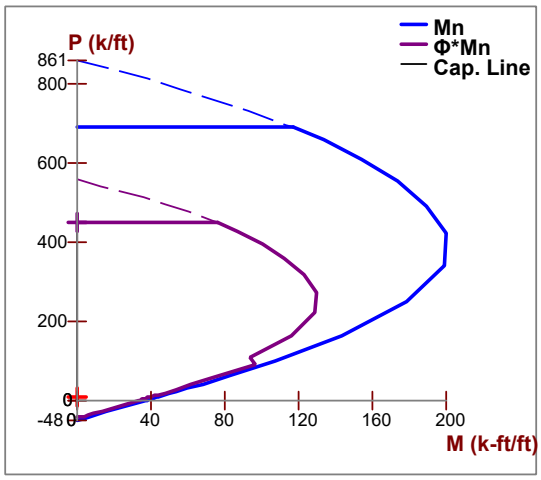
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

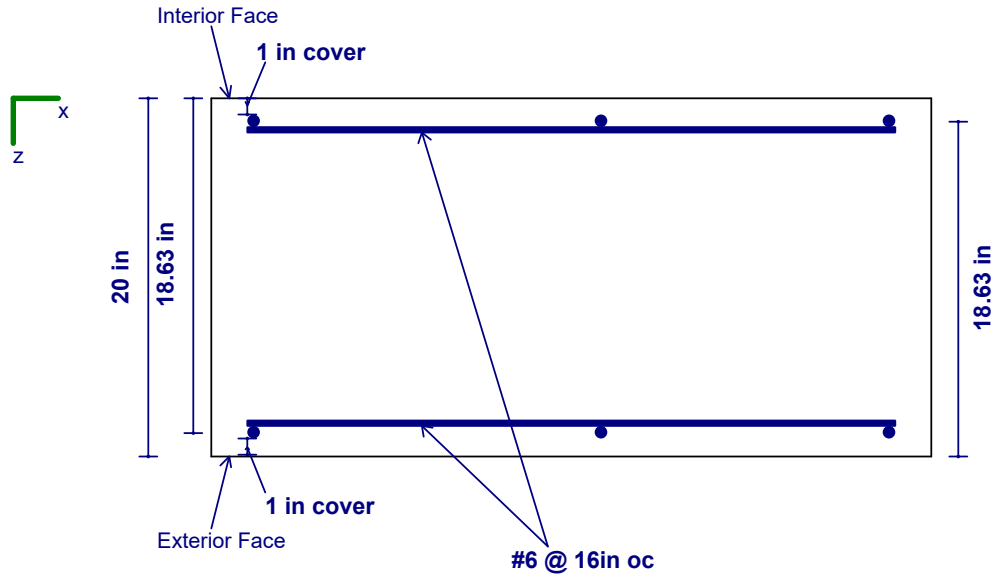
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



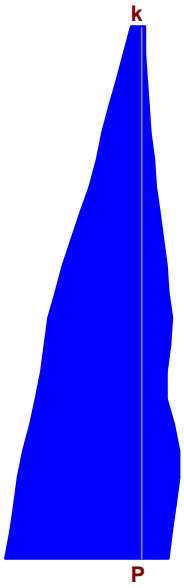
CROSS SECTION DETAILING



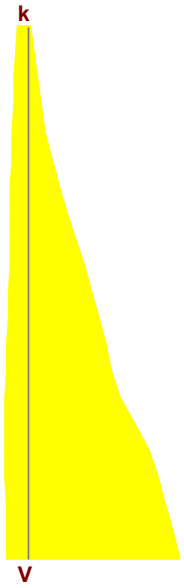
Detail Report: WP9 (In-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	8	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	3.334	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

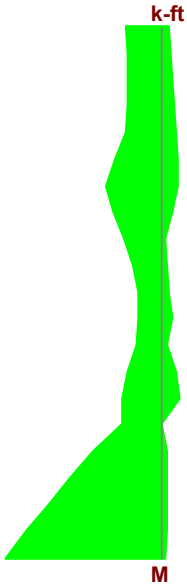
ENVELOPE DIAGRAMS



Min: -2.845 at 1.6 ft
Max: 9.933 at 0 ft



Min: -6.552 at 0 ft
Max: 0.93 at 1.6 ft



Min: -0.486 at 2.4 ft
Max: 4.345 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.019	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	4.345	**Gov LC:**	1
Gov Pu (k):	0	**phi*Mn (k-ft):**	230.116		

SHEAR DETAILS

UC Max:	0.037	**phi*Vn (k):**	175.332	**Vs (k):**	132.562
Location (ft):	0	**Vnmax (k):**	404.852	**Gov LC:**	2
Gov Vu (k):	-6.552	**Vc (k):**	101.213		

DEFLECTION DETAILS

Delta max (in):	0.008	**Location (ft):**	23
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.069	**rho min (H):**	0.002	**As min (V) (in^2):**	1.2
rho Provided (H):	0.004	**As Provided (V) (in^2):**	2.651	**rho min (V):**	0.001
As min (H) (in^2):	3.84	**rho Provided (V):**	0.003		

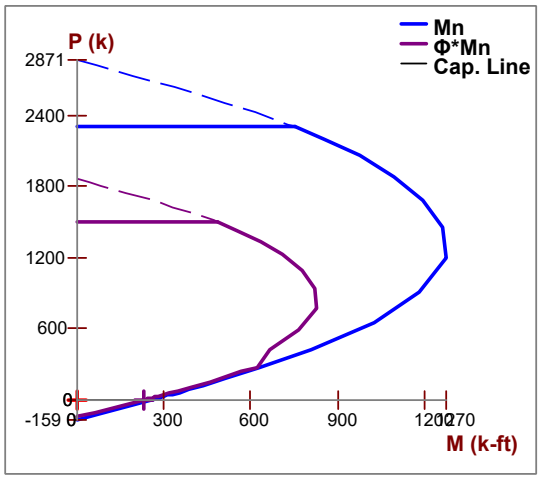
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	3.334	**Icracked (in^4):**	74711.476	**KL/r:**	8.312
A (in^2):	800.16	**Cracked Mom, Mcr (k-ft):**	210.903		
Igross (in^4):	1.067e+5	**r (in):**	9.663		

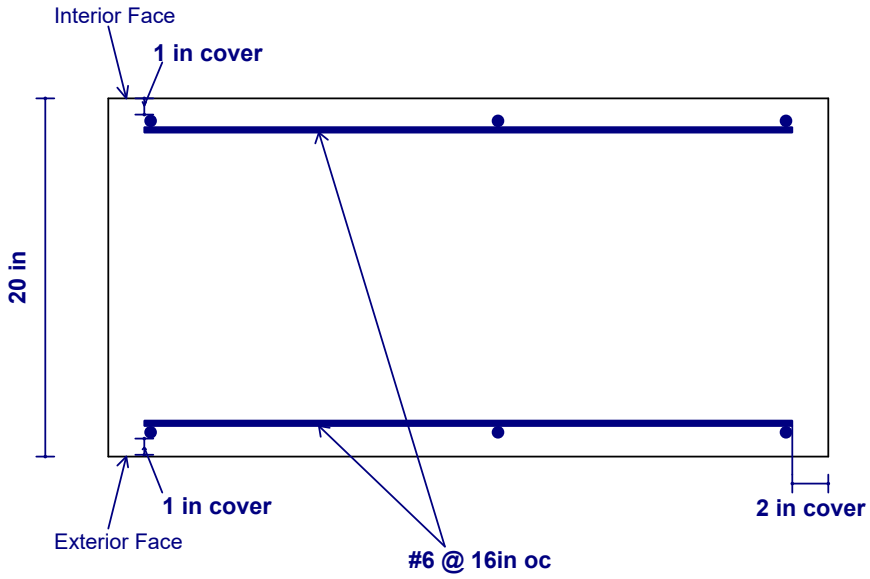
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



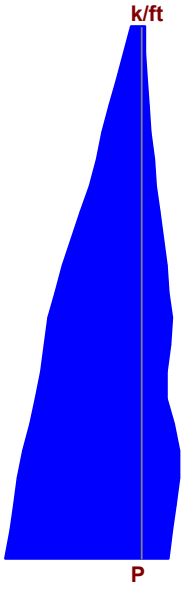
CROSS SECTION DETAILING



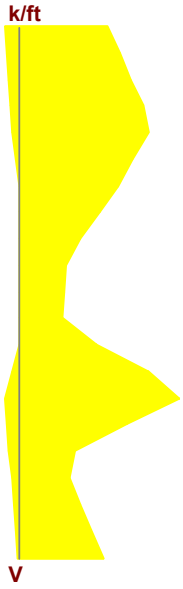
Detail Report: WP9 (Out-of-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	8	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	3.334	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

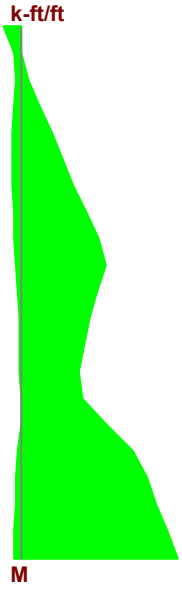
ENVELOPE DIAGRAMS



Min: -0.853 at 1.6 ft
Max: 2.979 at 0 ft



Min: -0.446 at 2.4 ft
Max: 0.036 at 2.4 ft



Min: -0.713 at 0 ft
Max: 0.074 at 8 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.021	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.074
Location (ft):	0	**Gov LC Int (-z):**	2	**phi*Mn Ext (+z) (k-ft/ft):**	33.364
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.002	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	8	**Gov LC Ext (+z):**	2
Gov Mu Int (-z) (k-ft/ft):	-0.713	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	33.364	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.052	**Gov Vu (k/ft):**	-0.446	**phi*Vns (k/ft):**	0
Location (ft):	2.4	**phi*Vnc (k/ft):**	8.526	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.001	**Location (ft):**	1.15
Deflection Ratio:	H/10000	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	2.651	**As min (V) (in^2):**	1.2
rho Provided (V):	0.003	**rho min (V):**	0.001

WALL SEGMENT SECTION PROPERTIES

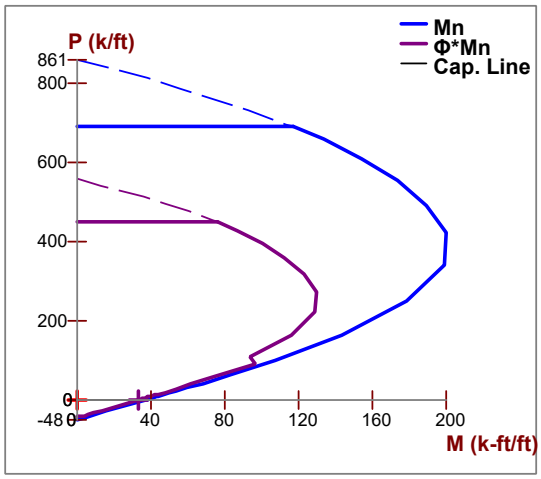
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	16.628
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	105.43		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

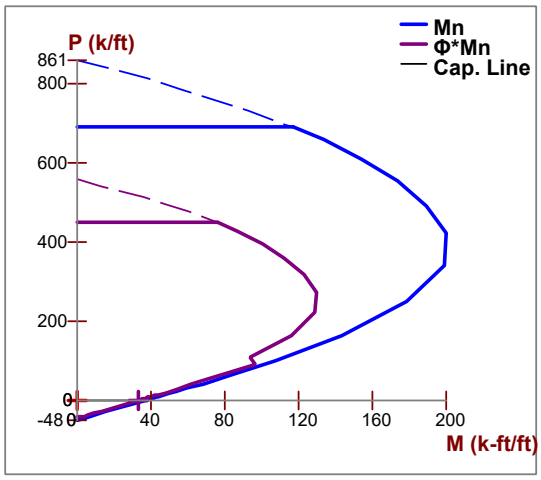
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

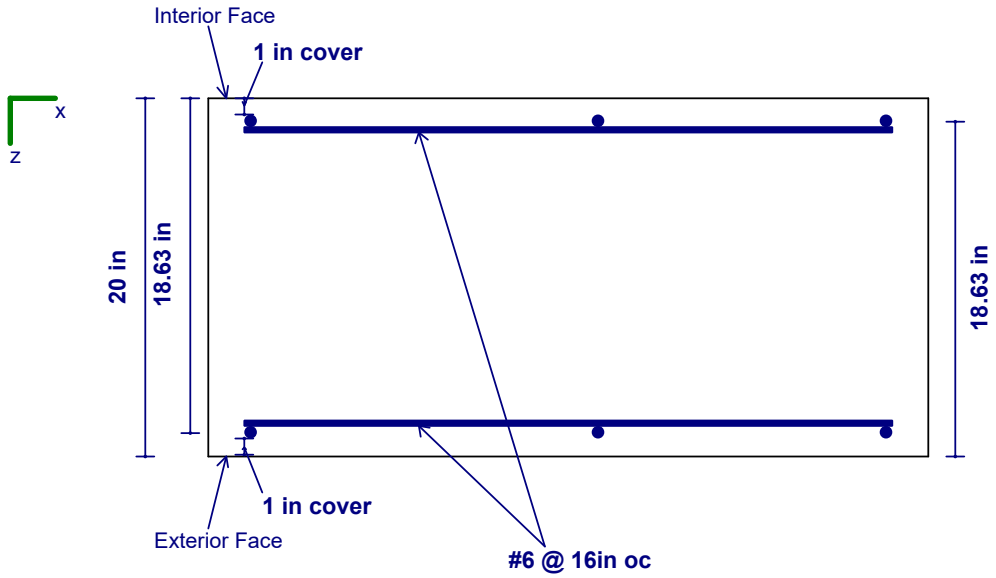
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram

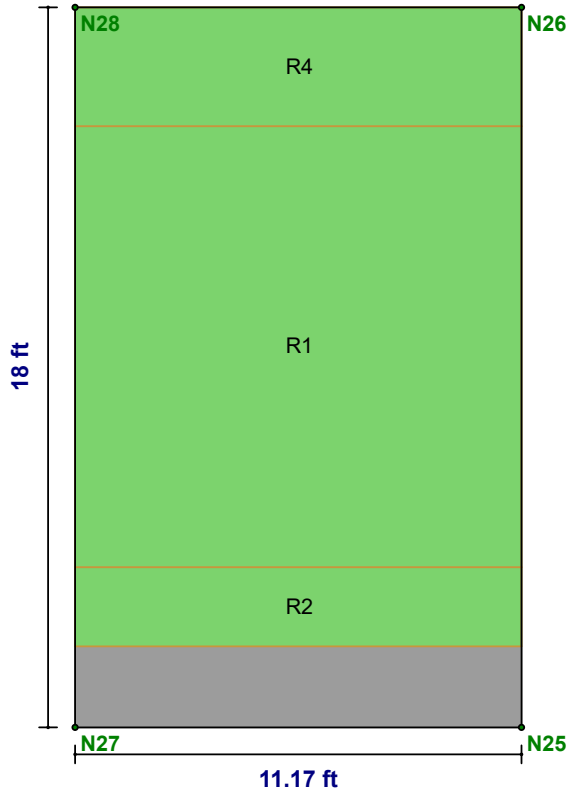


CROSS SECTION DETAILING



Detail Report: WP10

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	18	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	11.17	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R2	0.013	1	0.011	5	0	1	0.071	5	0.093	2	0.02	1
R1	0.012	1	0.013	5	0.001	1	0.027	5	0.082	5	0.017	1
R4	0.005	13	0.008	2	0	1	0.002	5	0.006	5	0.018	1

REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R2	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R1	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R4	#6@16in oc e.f.	#6@16in oc e.f.	N/A

Detail Report: WP10 (In-Plane, Region R2)

CRITERIA

Code:	ACI 318-19
Design Rule:	Avalanche
Seismic Rule:	SDR_Conc1
Loc of r/f:	Each Face
Outer Bars:	Vertical
Vert Bar Size:	#6
Horz Bar Size:	#6
Vert Bar Spac (in):	16
Horz Bar Spac (in):	16
Group Wall?:	No

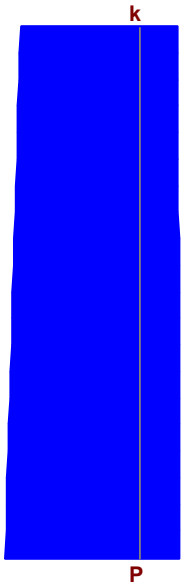
GEOMETRY

Total Height (ft):	2
Total Length (ft):	11.17
Thickness (in):	20
Int Cover (-z) (in):	1
Ext Cover (+z) (in):	1
Cover Open/Edge (in):	2
K:	1
Use Cracked?:	Yes
Icr Factor:	0.7

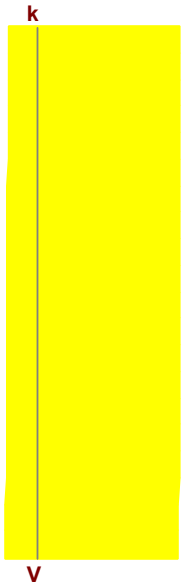
MATERIALS

Material Set:	Conc4000NW
Concrete f'c (ksi):	4
Concrete E (ksi):	3644
Concrete G (ksi):	1584
Conc Density (k/ft^3):	0.145
Lambda:	1
Conc Str Blk:	Rectangular
Vert Bar Fy (ksi):	60
Horz Bar Fy (ksi):	60
Steel E (ksi):	29000

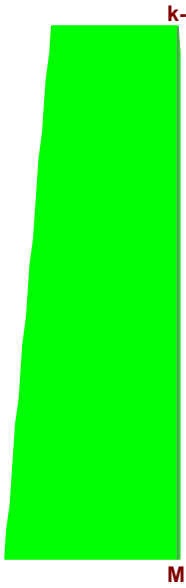
ENVELOPE DIAGRAMS



Min: -19.518 at 0 ft
Max: 65.276 at 0 ft



Min: -7.771 at 2 ft
Max: 1.642 at 0 ft



Min: -0.314 at 0 ft
Max: 30.609 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.013	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	30.609	**Gov LC:**	1
Gov Pu (k):	0	**phi*Mn (k-ft):**	2292.302		

SHEAR DETAILS

UC Max:	0.011	**phi*Vn (k):**	714.58	**Vs (k):**	444.128
Location (ft):	2	**Vnmax (k):**	1356.389	**Gov LC:**	5
Gov Vu (k):	-7.771	**Vc (k):**	508.646		

DEFLECTION DETAILS

Delta max (in):	8.16e-5	**Location (ft):**	18
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	3.534	**rho min (H):**	0.002	**As min (V) (in^2):**	4.021
rho Provided (H):	0.007	**As Provided (V) (in^2):**	7.952	**rho min (V):**	0.002
As min (H) (in^2):	0.96	**rho Provided (V):**	0.003		

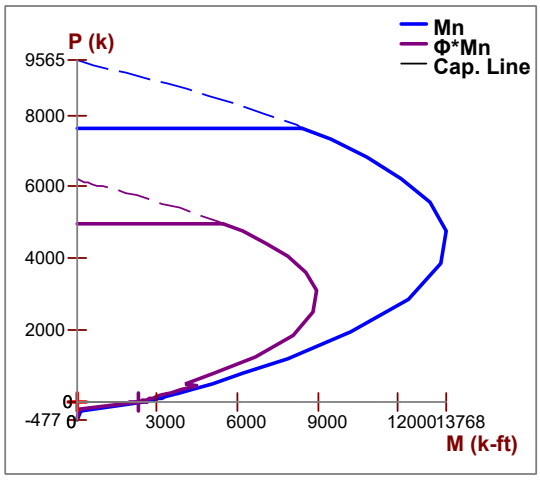
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	11.17	**Icracked (in^4):**	2.81e+6	**KL/r:**	0.62
A (in^2):	2680.8	**Cracked Mom, Mcr (k-ft):**	2367.323		
Igross (in^4):	4.014e+6	**r (in):**	32.374		

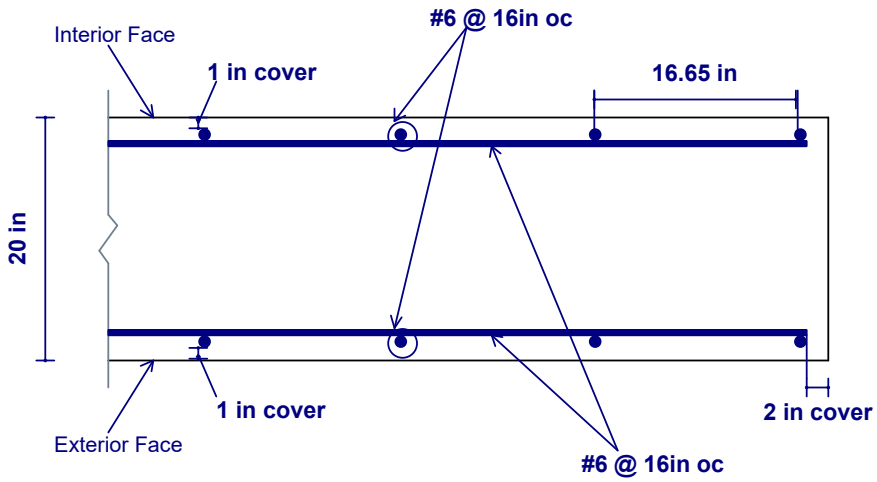
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



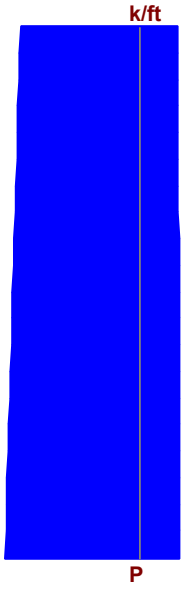
CROSS SECTION DETAILING



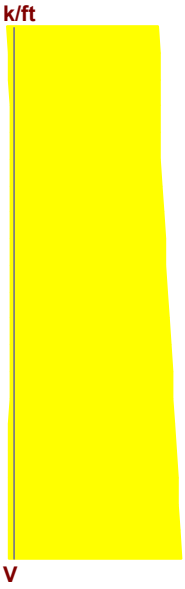
Detail Report: WP10 (Out-of-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	2	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	11.17	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

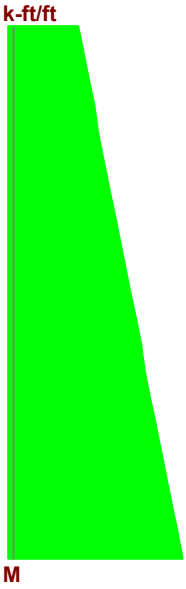
ENVELOPE DIAGRAMS



Min: -1.747 at 0 ft
Max: 5.844 at 0 ft



Min: -0.747 at 0 ft
Max: 0.024 at 2 ft



Min: -2.145 at 0 ft
Max: 0.057 at 2 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.071	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.057
Location (ft):	0	**Gov LC Int (-z):**	5	**phi*Mn Ext (+z) (k-ft/ft):**	30.072
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.002	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	2	**Gov LC Ext (+z):**	6
Gov Mu Int (-z) (k-ft/ft):	-2.145	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	30.072	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.093	**Gov Vu (k/ft):**	-0.747	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	8.076	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.02	**Location (ft):**	18
Deflection Ratio:	H/1202	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	7.952	**As min (V) (in^2):**	4.021
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

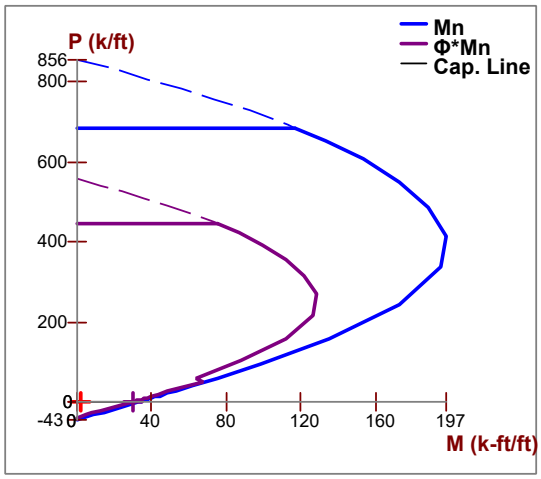
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	4.157
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	353.226		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

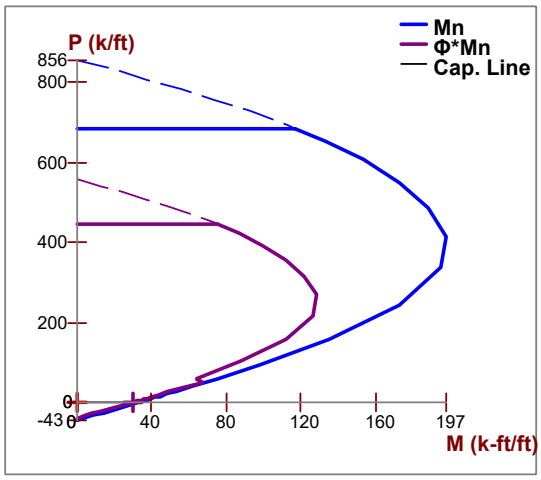
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

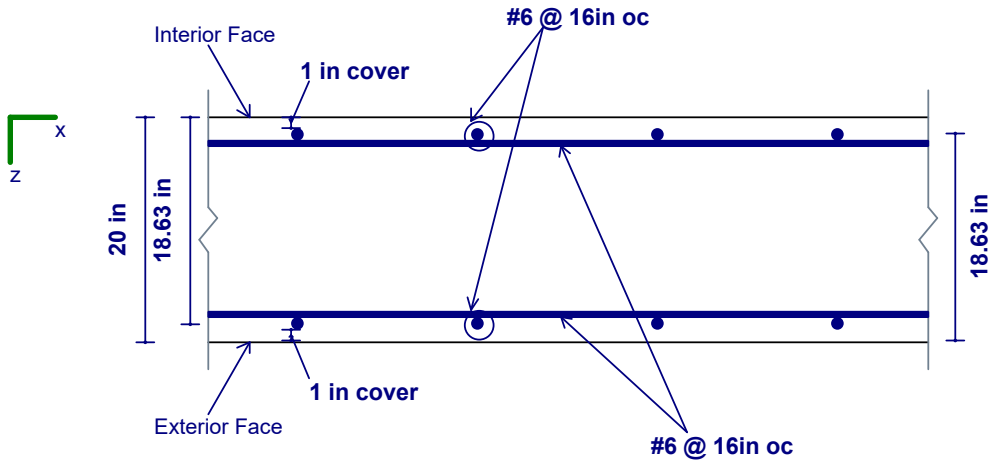
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



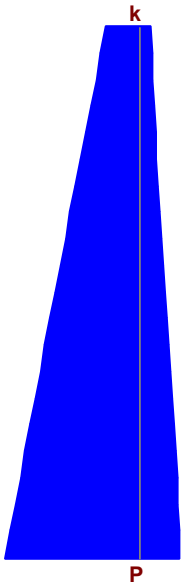
CROSS SECTION DETAILING



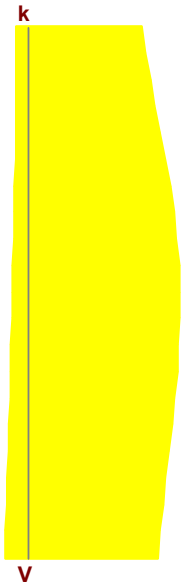
Detail Report: WP10 (In-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	11.17	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

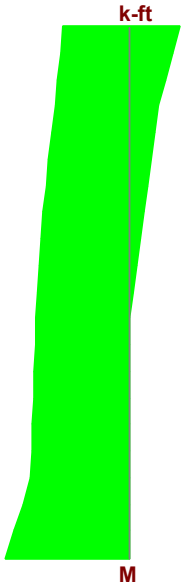
ENVELOPE DIAGRAMS



Min: -17.602 at 0 ft
Max: 57.631 at 0 ft



Min: -9.394 at 4.95 ft
Max: 1.33 at 0 ft



Min: -11.615 at 11 ft
Max: 27.554 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.012	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	27.554	**Gov LC:**	1
Gov Pu (k):	0	**phi*Mn (k-ft):**	2292.302		

SHEAR DETAILS

UC Max:	0.013	**phi*Vn (k):**	714.58	**Vs (k):**	444.128
Location (ft):	4.95	**Vnmax (k):**	1356.389	**Gov LC:**	5
Gov Vu (k):	-9.394	**Vc (k):**	508.646		

DEFLECTION DETAILS

Delta max (in):	0.0007767	**Location (ft):**	18
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.952	**rho min (H):**	0.002	**As min (V) (in^2):**	4.021
rho Provided (H):	0.003	**As Provided (V) (in^2):**	7.952	**rho min (V):**	0.002
As min (H) (in^2):	5.28	**rho Provided (V):**	0.003		

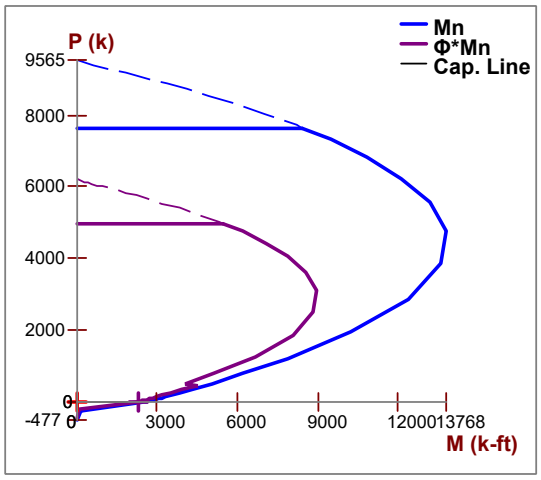
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	11.17	**Icracked (in^4):**	2.81e+6	**KL/r:**	3.411
A (in^2):	2680.8	**Cracked Mom, Mcr (k-ft):**	2367.323		
Igross (in^4):	4.014e+6	**r (in):**	32.374		

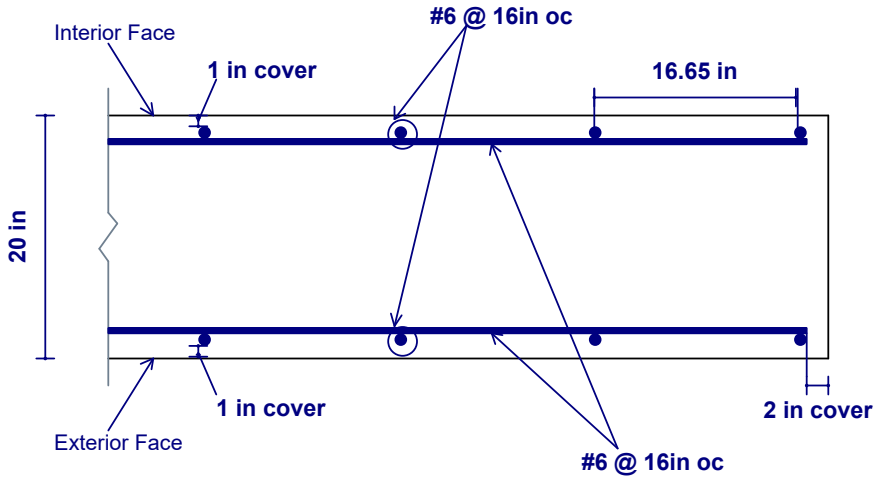
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



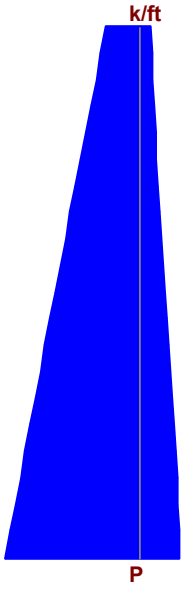
CROSS SECTION DETAILING



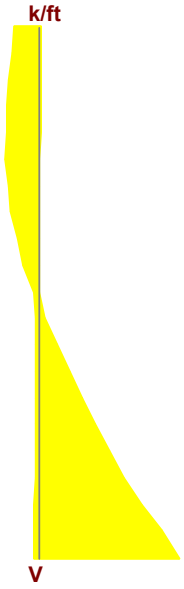
Detail Report: WP10 (Out-of-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	11.17	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

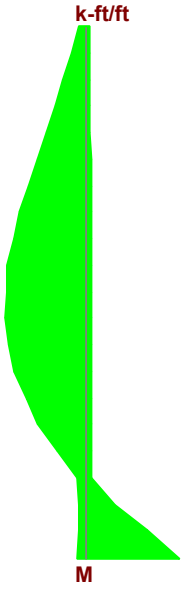
ENVELOPE DIAGRAMS



Min: -1.576 at 0 ft
Max: 5.159 at 0 ft



Min: -0.661 at 0 ft
Max: 0.148 at 8.25 ft



Min: -0.825 at 0 ft
Max: 0.709 at 4.95 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.027	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.709
Location (ft):	0	**Gov LC Int (-z):**	5	**phi*Mn Ext (+z) (k-ft/ft):**	30.072
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.024	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	4.95	**Gov LC Ext (+z):**	2
Gov Mu Int (-z) (k-ft/ft):	-0.825	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	30.072	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.082	**Gov Vu (k/ft):**	-0.661	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	8.096	**Gov LC:**	5

DEFLECTION DETAILS

Delta max (in):	0.017	**Location (ft):**	18
Deflection Ratio:	H/7632	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	7.952	**As min (V) (in^2):**	4.021
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

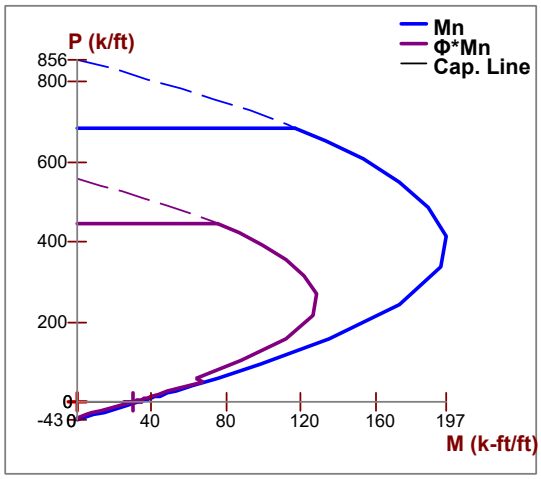
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	22.863
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	353.226		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

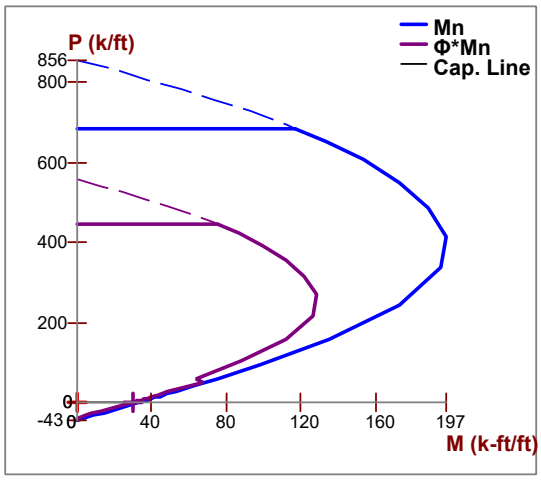
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

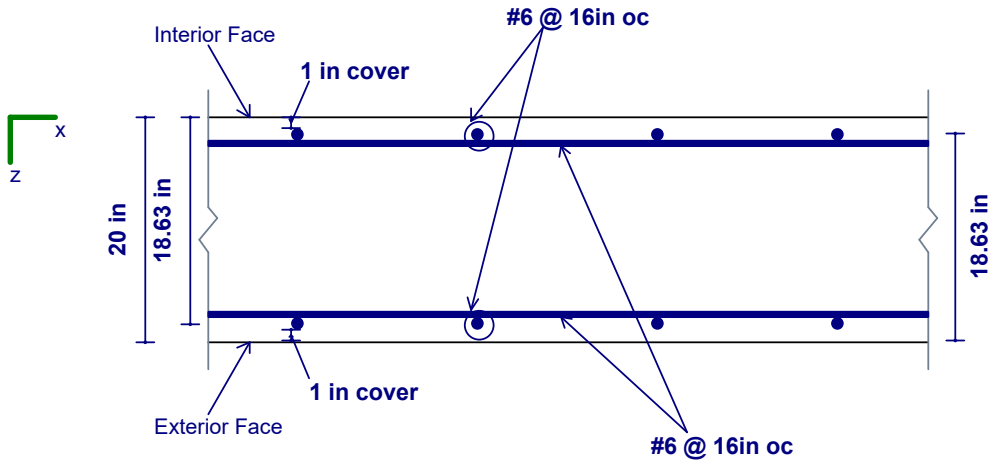
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



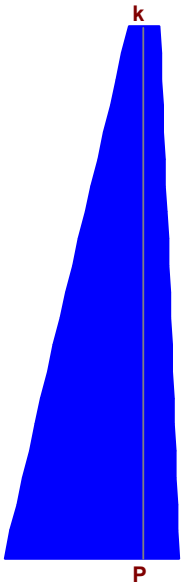
CROSS SECTION DETAILING



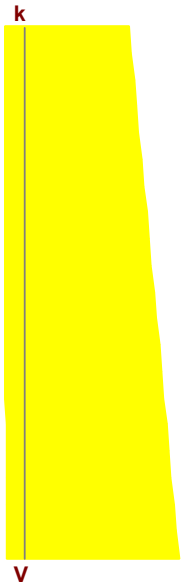
Detail Report: WP10 (In-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	3	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	11.17	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

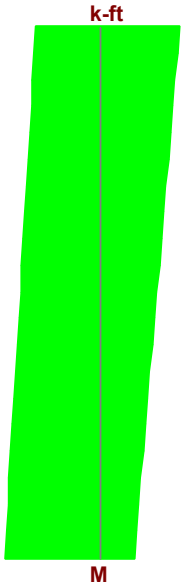
ENVELOPE DIAGRAMS



Min: -3.424 at 0 ft
Max: 13.371 at 0 ft



Min: -6.056 at 0 ft
Max: 0.73 at 3 ft



Min: -9.239 at 3 ft
Max: 10.968 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.005	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	10.968	**Gov LC:**	13
Gov Pu (k):	0	**phi*Mn (k-ft):**	2292.302		

SHEAR DETAILS

UC Max:	0.008	**phi*Vn (k):**	714.58	**Vs (k):**	444.128
Location (ft):	0	**Vnmax (k):**	1356.389	**Gov LC:**	2
Gov Vu (k):	-6.056	**Vc (k):**	508.646		

DEFLECTION DETAILS

Delta max (in):	0.0002886	**Location (ft):**	18
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	2.651	**rho min (H):**	0.002	**As min (V) (in^2):**	4.021
rho Provided (H):	0.004	**As Provided (V) (in^2):**	7.952	**rho min (V):**	0.002
As min (H) (in^2):	1.44	**rho Provided (V):**	0.003		

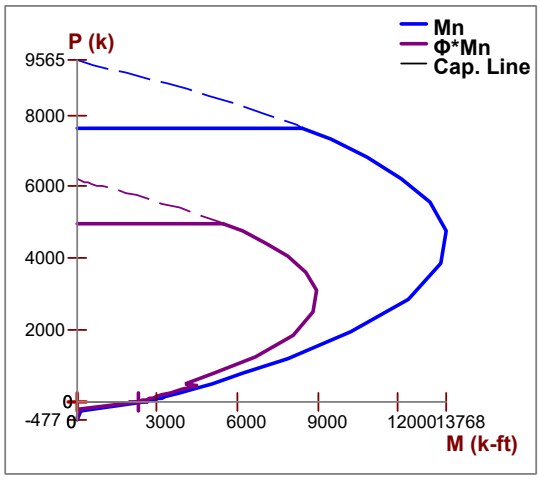
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	11.17	**Icracked (in^4):**	2.81e+6	**KL/r:**	0.93
A (in^2):	2680.8	**Cracked Mom, Mcr (k-ft):**	2367.323		
Igross (in^4):	4.014e+6	**r (in):**	32.374		

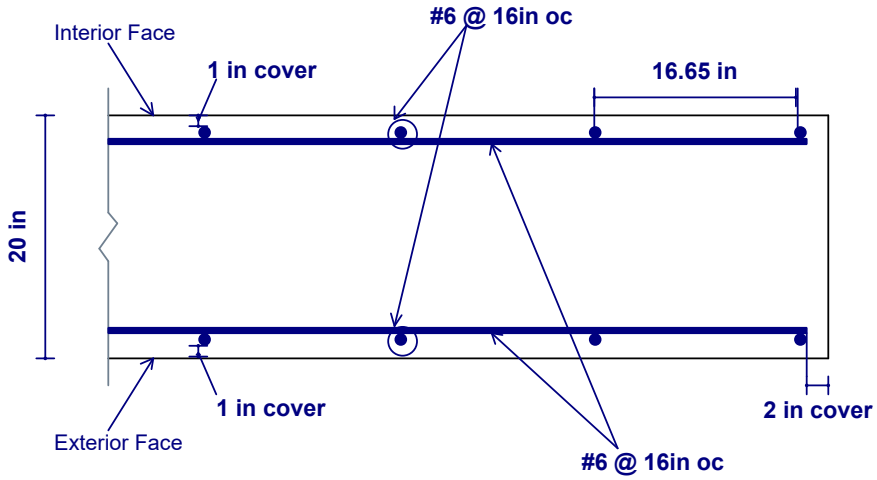
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



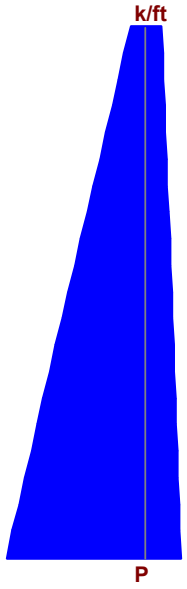
CROSS SECTION DETAILING



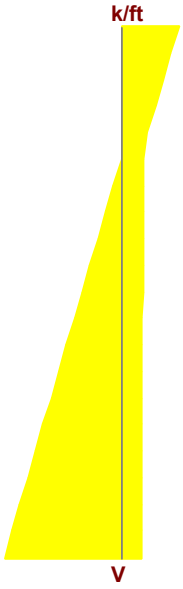
Detail Report: WP10 (Out-of-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	3	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	11.17	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

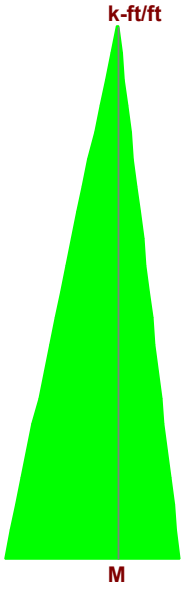
ENVELOPE DIAGRAMS



Min: -0.307 at 0 ft
Max: 1.197 at 0 ft



Min: -0.025 at 3 ft
Max: 0.051 at 0 ft



Min: -0.027 at 0 ft
Max: 0.05 at 0 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.001	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.05
Location (ft):	0	**Gov LC Int (-z):**	13	**phi*Mn Ext (+z) (k-ft/ft):**	30.072
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.002	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	0	**Gov LC Ext (+z):**	5
Gov Mu Int (-z) (k-ft/ft):	-0.027	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	30.072	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.006	**Gov Vu (k/ft):**	0.051	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	8.243	**Gov LC:**	5

DEFLECTION DETAILS

Delta max (in):	0.018	**Location (ft):**	0.9
Deflection Ratio:	H/1985	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	7.952	**As min (V) (in^2):**	4.021
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

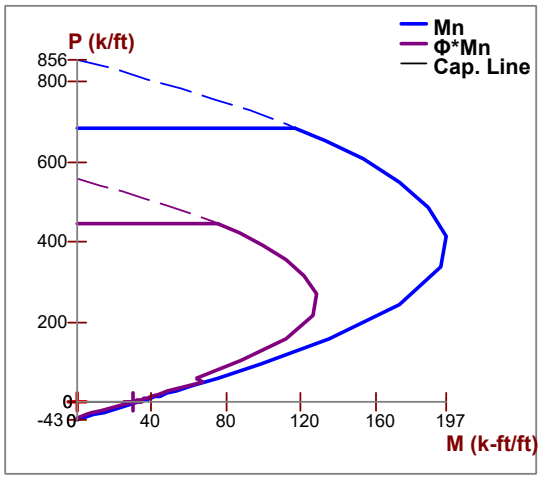
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	6.235
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	353.226		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

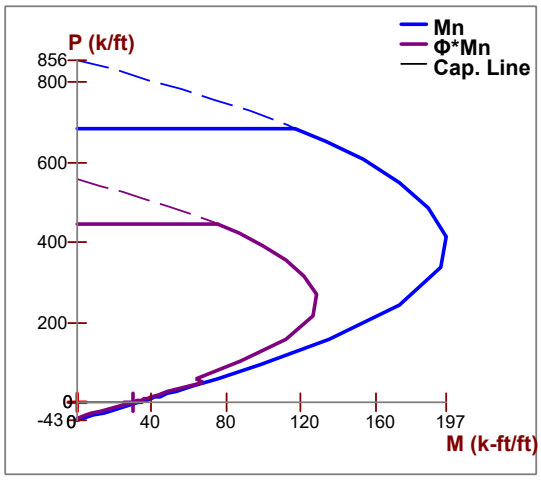
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

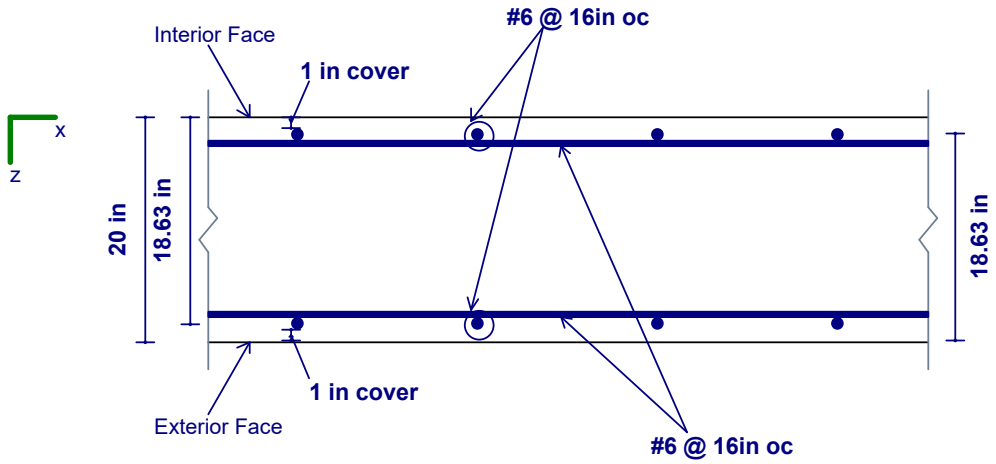
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram

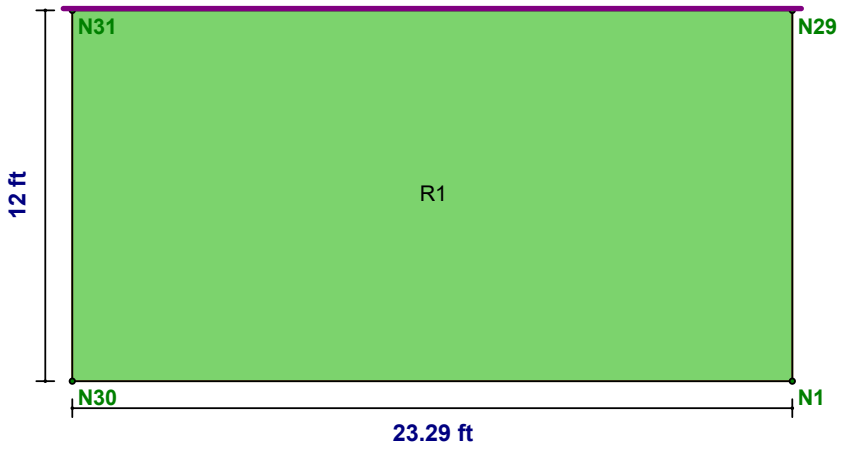


CROSS SECTION DETAILING



Detail Report: WP11

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	23.288	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	10	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R1	0.04	5	0.027	1	0.001	6	0.403	6	0.431	6	0.004	6

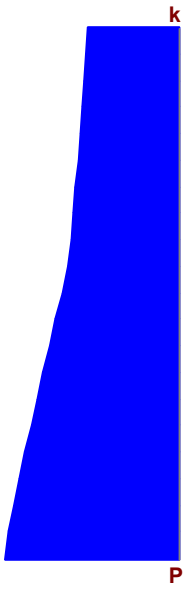
REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R1	#6@16in oc e.f.	#6@16in oc e.f.	N/A

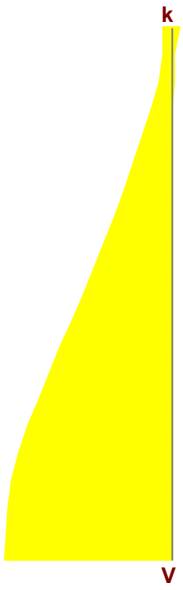
Detail Report: WP11 (In-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	23.288	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	10	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

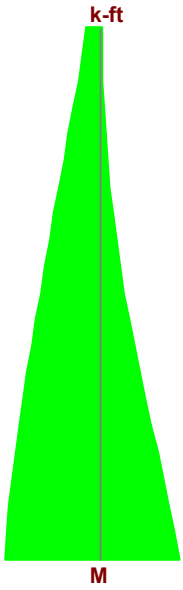
ENVELOPE DIAGRAMS



Min: 76.397 at 12 ft
Max: 147.226 at 0 ft



Min: -1.248 at 12 ft
Max: 29.02 at 0 ft



Min: -307.255 at 0 ft
Max: 366.649 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.04	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	366.649	**Gov LC:**	5
Gov Pu (k):	0	**phi*Mn (k-ft):**	9165.37		

SHEAR DETAILS

UC Max:	0.027	**phi*Vn (k):**	1060.461	**Vs (k):**	925.949
Location (ft):	0	**Vnmax (k):**	1413.948	**Gov LC:**	1
Gov Vu (k):	29.02	**Vc (k):**	530.23		

DEFLECTION DETAILS

Delta max (in):	0.001	**Location (ft):**	12
Deflection Ratio:	H/10000	**Gov LC:**	6

REINFORCEMENT DETAILS

As Provided (H) (in^2):	9.719	**rho min (H):**	0.002	**As min (V) (in^2):**	4.192
rho Provided (H):	0.007	**As Provided (V) (in^2):**	15.904	**rho min (V):**	0.002
As min (H) (in^2):	2.88	**rho Provided (V):**	0.006		

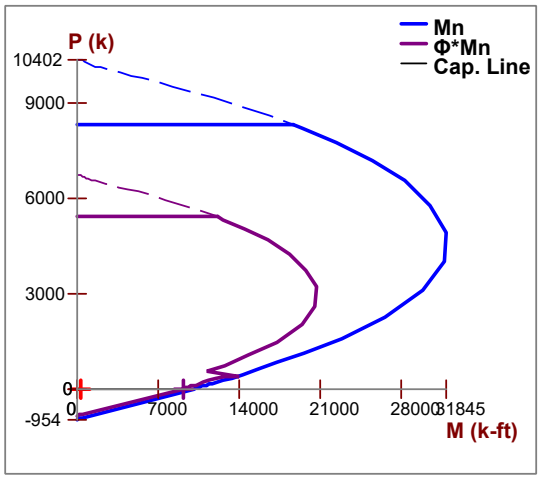
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	23.288	**Icracked (in^4):**	1.273e+7	**KL/r:**	1.785
A (in^2):	2794.56	**Cracked Mom, Mcr (k-ft):**	5145.003		
Igross (in^4):	1.819e+7	**r (in):**	67.495		

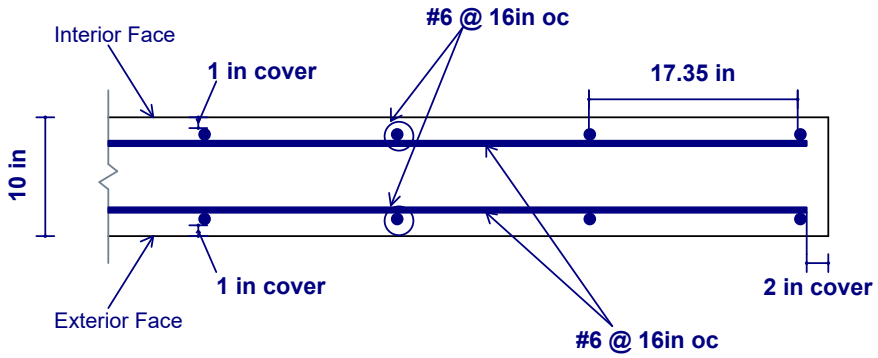
SLENDER BENDING SPAN RESULTS

KL/r in	Cm in	Lu in (ft)	Pc (k)	deltaNS	M act (k-ft)	M2 min (k-ft)	Mc in (k-ft)
1.785	0.648	12	0	N/A	0	0	N/A

IN-PLANE WALL INTERACTION DIAGRAM



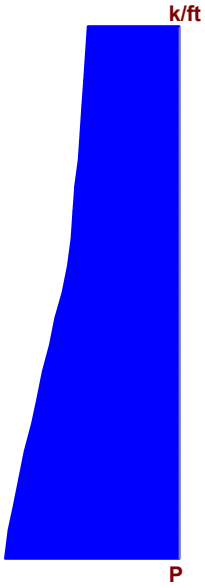
CROSS SECTION DETAILING



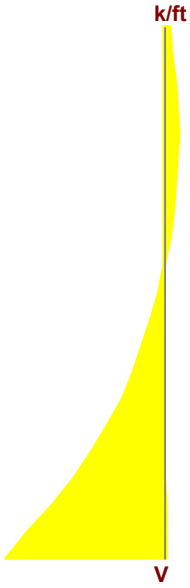
Detail Report: WP11 (Out-of-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	23.288	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	10	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

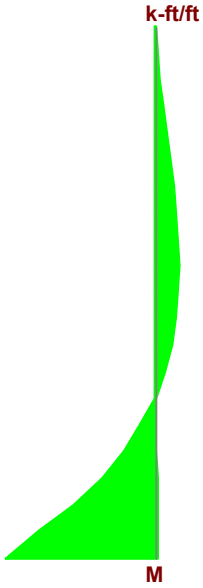
ENVELOPE DIAGRAMS



Min: 3.281 at 12 ft
Max: 6.322 at 0 ft



Min: -0.219 at 9.6 ft
Max: 2.576 at 0 ft



Min: -0.836 at 6.6 ft
Max: 5.465 at 0 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.062	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	5.465
Location (ft):	6.6	**Gov LC Int (-z):**	2	**phi*Mn Ext (+z) (k-ft/ft):**	13.556
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.403	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	0	**Gov LC Ext (+z):**	6
Gov Mu Int (-z) (k-ft/ft):	-0.836	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	13.556	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.431	**Gov Vu (k/ft):**	2.576	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	5.977	**Gov LC:**	6

DEFLECTION DETAILS

Delta max (in):	0.004	**Location (ft):**	12
Deflection Ratio:	H/10000	**Gov LC:**	6

REINFORCEMENT DETAILS

As Provided (V) (in^2):	15.904	**As min (V) (in^2):**	4.192
rho Provided (V):	0.006	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

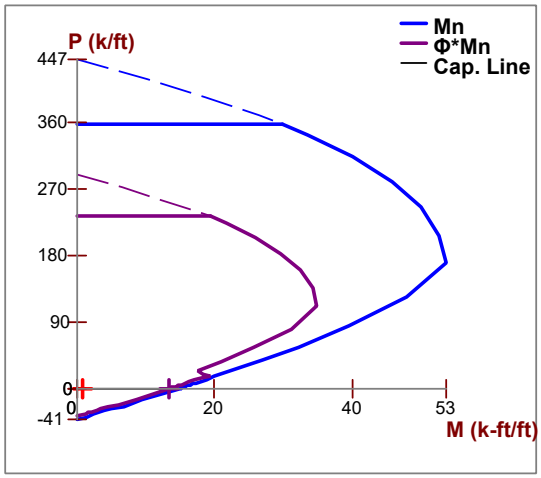
Total Width (in):	16	**Icracked (in^4):**	466.667	**KL/r:**	49.883
A (in^2):	160	**Cracked Mom, Mcr (k-ft):**	184.108		
Igross (in^4):	1333.333	**r (in):**	1.708		

SLENDER BENDING SPAN RESULTS

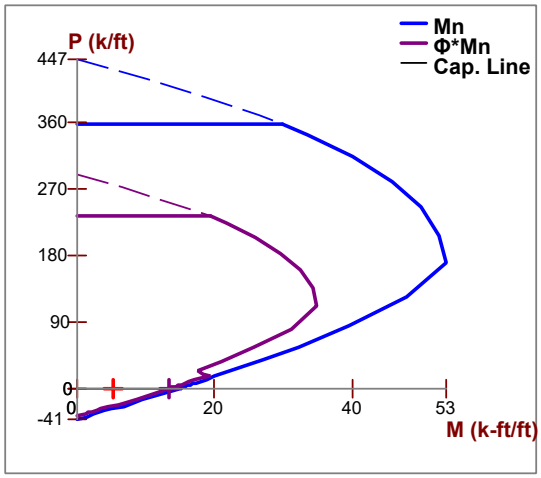
	KL/r out	Cm out	Lu out (ft)	Pc (k/ft)	deltaNS	M act (k-ft/ft)	M2 min (k-ft/ft)	Mc out (k-ft/ft)
Interior	49.883	0.6	12	433.604	1	0.836(6.6ft)	0.208	0.836(6.6ft)
Exterior				433.604	1	-5.465(0ft)	0.09	-5.465(0ft)

OUT-PLANE WALL INTERACTION DIAGRAM

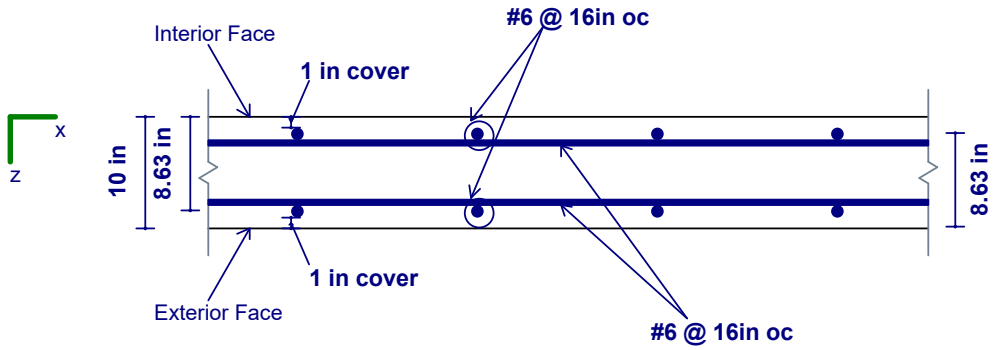
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram

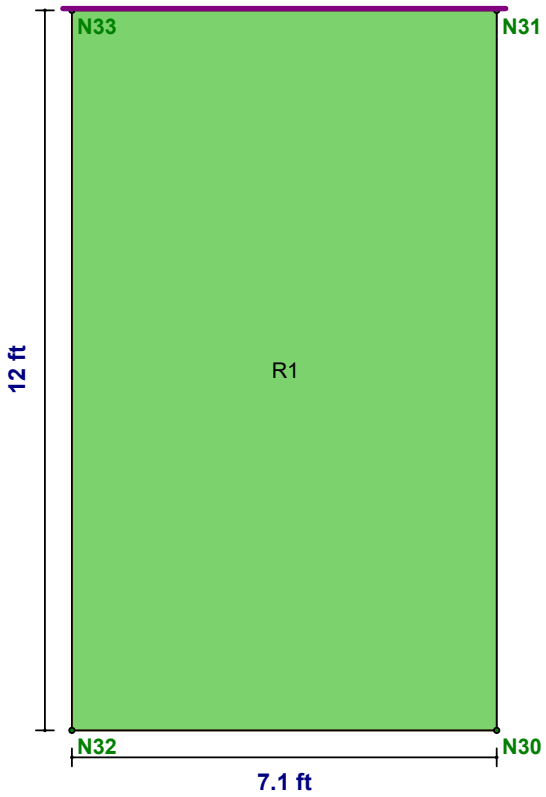


CROSS SECTION DETAILING



Detail Report: WP12

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	7.104	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	10	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R1	0.104	1	0.097	1	0.008	1	0.033	2	0.135	6	0.002	6

REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R1	#6@16in oc e.f.	#6@16in oc e.f.	N/A

Detail Report: WP12 (In-Plane, Region R1)

CRITERIA

Code:	ACI 318-19
Design Rule:	Avalanche
Seismic Rule:	SDR_Conc1
Loc of r/f:	Each Face
Outer Bars:	Vertical
Vert Bar Size:	#6
Horz Bar Size:	#6
Vert Bar Spac (in):	16
Horz Bar Spac (in):	16
Group Wall?:	No

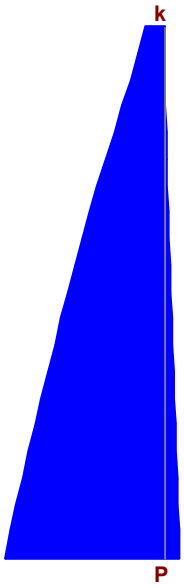
GEOMETRY

Total Height (ft):	12
Total Length (ft):	7.104
Thickness (in):	10
Int Cover (-z) (in):	1
Ext Cover (+z) (in):	1
Cover Open/Edge (in):	2
K:	1
Use Cracked?:	Yes
Icr Factor:	0.7

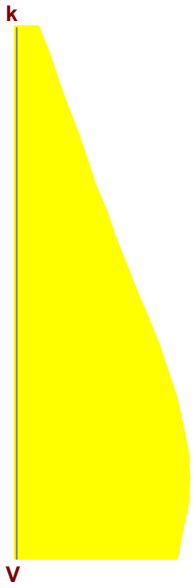
MATERIALS

Material Set:	Conc4000NW
Concrete f'c (ksi):	4
Concrete E (ksi):	3644
Concrete G (ksi):	1584
Conc Density (k/ft^3):	0.145
Lambda:	1
Conc Str Blk:	Rectangular
Vert Bar Fy (ksi):	60
Horz Bar Fy (ksi):	60
Steel E (ksi):	29000

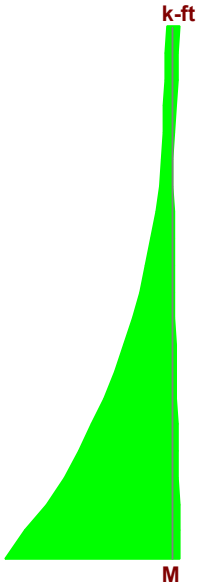
ENVELOPE DIAGRAMS



Min: -1.937 at 0 ft
Max: 21.268 at 0 ft



Min: -30.949 at 1.8 ft
Max: 0.062 at 0 ft



Min: -4.226 at 12 ft
Max: 97.799 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.104	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	97.799	**Gov LC:**	1
Gov Pu (k):	0	**phi*Mn (k-ft):**	942.496		

SHEAR DETAILS

UC Max:	0.097	**phi*Vn (k):**	317.855	**Vs (k):**	282.461
Location (ft):	1.8	**Vnmax (k):**	431.325	**Gov LC:**	1
Gov Vu (k):	-30.949	**Vc (k):**	141.346		

DEFLECTION DETAILS

Delta max (in):	0.008	**Location (ft):**	12
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	9.719	**rho min (H):**	0.002	**As min (V) (in^2):**	1.279
rho Provided (H):	0.007	**As Provided (V) (in^2):**	5.301	**rho min (V):**	0.002
As min (H) (in^2):	2.88	**rho Provided (V):**	0.006		

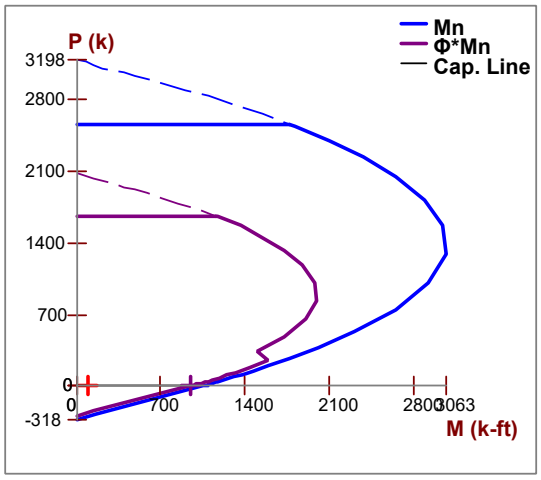
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	7.104	**Icracked (in^4):**	3.614e+5	**KL/r:**	5.852
A (in^2):	852.48	**Cracked Mom, Mcr (k-ft):**	478.77		
Igross (in^4):	5.163e+5	**r (in):**	20.589		

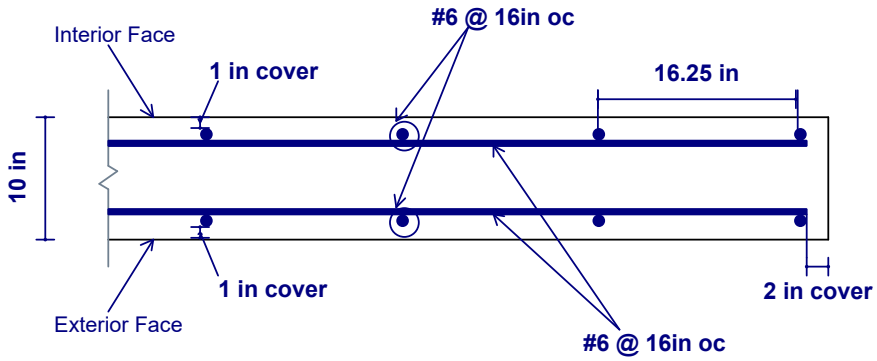
SLENDER BENDING SPAN RESULTS

KL/r in	Cm in	Lu in (ft)	Pc (k)	deltaNS	M act (k-ft)	M2 min (k-ft)	Mc in (k-ft)
5.852	0.588	12	0	N/A	0	0	N/A

IN-PLANE WALL INTERACTION DIAGRAM



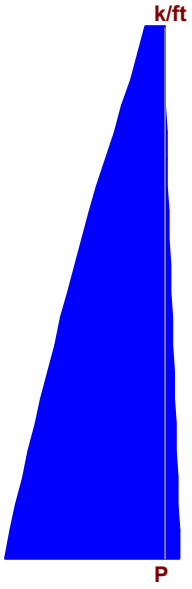
CROSS SECTION DETAILING



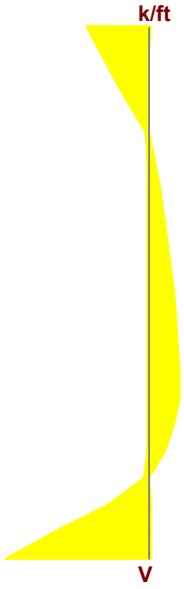
Detail Report: WP12 (Out-of-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	7.104	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	10	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

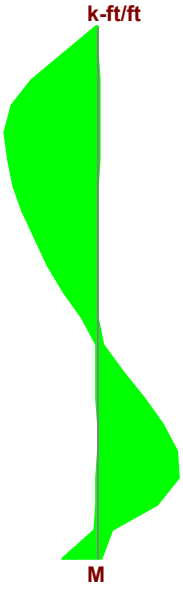
ENVELOPE DIAGRAMS



Min: -0.273 at 0 ft
Max: 2.994 at 0 ft



Min: -0.176 at 4.2 ft
Max: 0.815 at 0 ft



Min: -0.427 at 1.8 ft
Max: 0.48 at 9.6 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.029	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.48
Location (ft):	1.8	**Gov LC Int (-z):**	1	**phi*Mn Ext (+z) (k-ft/ft):**	14.642
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.033	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	9.6	**Gov LC Ext (+z):**	2
Gov Mu Int (-z) (k-ft/ft):	-0.427	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	14.642	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.135	**Gov Vu (k/ft):**	0.815	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	6.033	**Gov LC:**	6

DEFLECTION DETAILS

Delta max (in):	0.002	**Location (ft):**	12
Deflection Ratio:	H/10000	**Gov LC:**	6

REINFORCEMENT DETAILS

As Provided (V) (in^2):	5.301	**As min (V) (in^2):**	1.279
rho Provided (V):	0.006	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

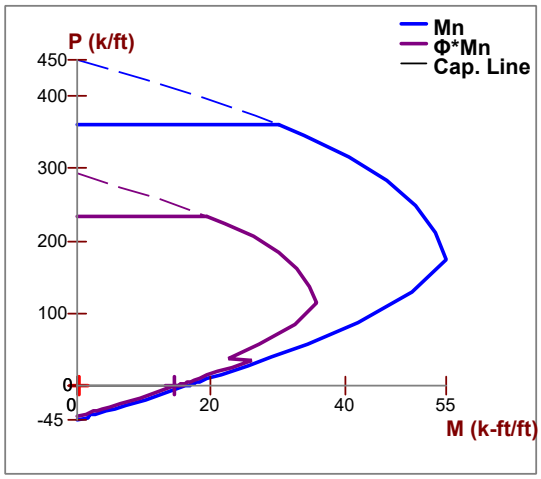
Total Width (in):	16	**Icracked (in^4):**	466.667	**KL/r:**	49.883
A (in^2):	160	**Cracked Mom, Mcr (k-ft):**	56.162		
Igross (in^4):	1333.333	**r (in):**	1.708		

SLENDER BENDING SPAN RESULTS

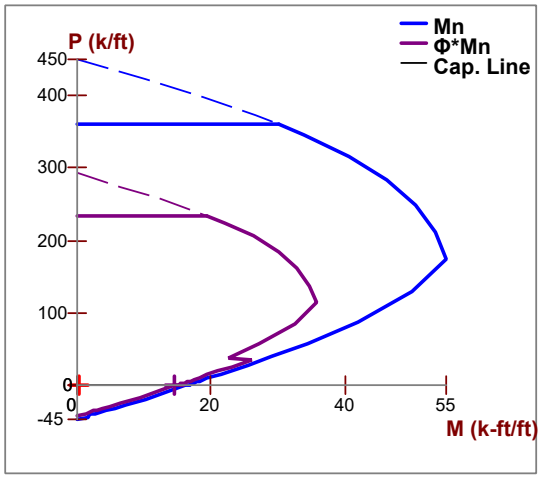
	KL/r out	Cm out	Lu out (ft)	Pc (k/ft)	deltaNS	M act (k-ft/ft)	M2 min (k-ft/ft)	Mc out (k-ft/ft)
Interior	49.883	0.6	12	433.604	1	0.427(1.8ft)	0.157	0.427(1.8ft)
Exterior				433.604	1	-0.48(9.6ft)	0.002	-0.48(9.6ft)

OUT-PLANE WALL INTERACTION DIAGRAM

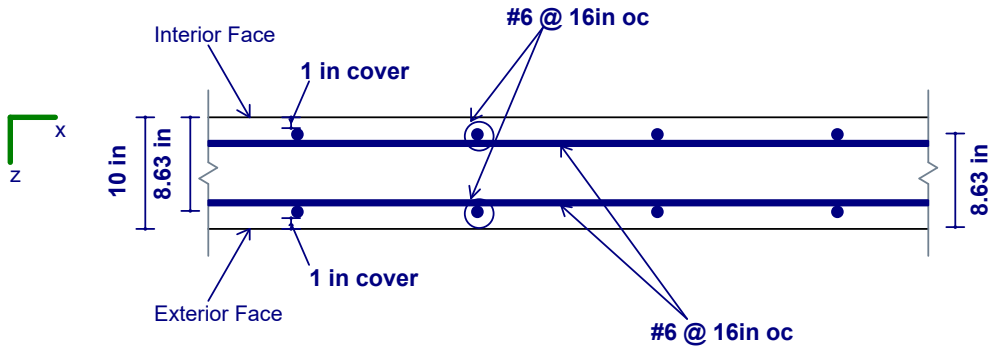
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram

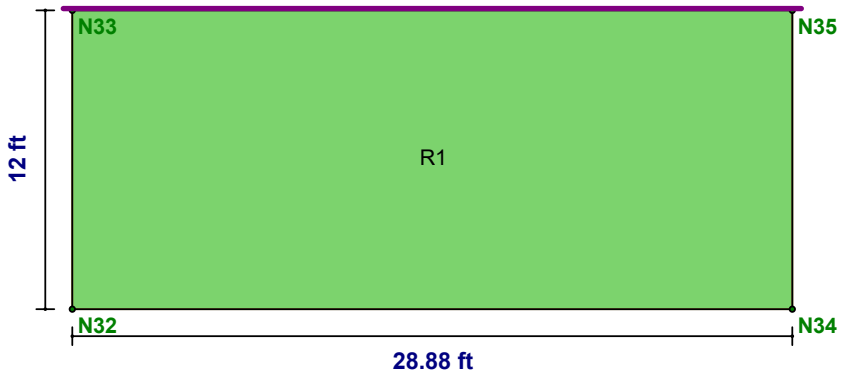


CROSS SECTION DETAILING



Detail Report: WP13

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	R5	**Total Length (ft):**	28.878	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	10	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#5	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R1	0.028	1	0.012	1	0.001	1	0.844	1	0.599	6	0.28	1

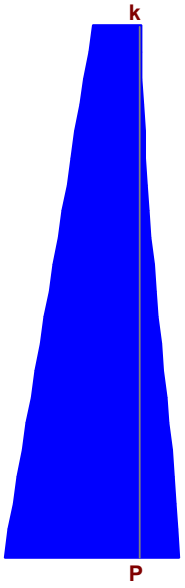
REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R1	#6@16in oc e.f.	#5@16in oc e.f.	N/A

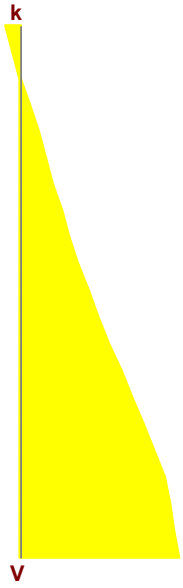
Detail Report: WP13 (In-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	R5	**Total Length (ft):**	28.878	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	10	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#5	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

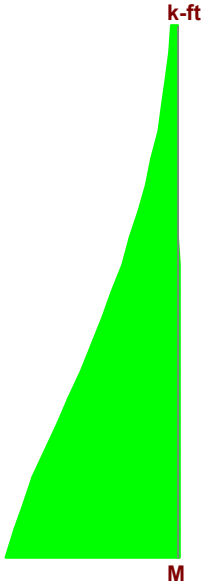
ENVELOPE DIAGRAMS



Min: -21.073 at 0 ft
Max: 71.863 at 0 ft



Min: -12.89 at 0 ft
Max: 1.246 at 12 ft



Min: -5.735 at 0 ft
Max: 393.14 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.028	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	393.14	**Gov LC:**	1
Gov Pu (k):	0	**phi*Mn (k-ft):**	13888.227		

SHEAR DETAILS

UC Max:	0.012	**phi*Vn (k):**	1091.156	**Vs (k):**	797.369
Location (ft):	0	**Vnmax (k):**	1753.349	**Gov LC:**	1
Gov Vu (k):	-12.89	**Vc (k):**	657.506		

DEFLECTION DETAILS

Delta max (in):	0.0009998	**Location (ft):**	12
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	6.75	**rho min (H):**	0.002	**As min (V) (in^2):**	5.198
rho Provided (H):	0.005	**As Provided (V) (in^2):**	19.439	**rho min (V):**	0.002
As min (H) (in^2):	2.88	**rho Provided (V):**	0.006		

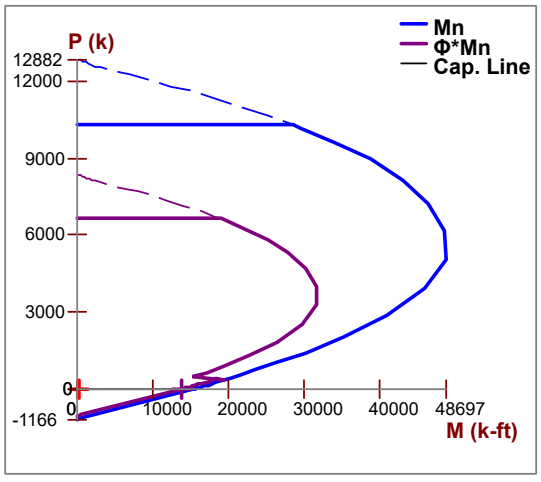
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	28.878	**Icracked (in^4):**	2.428e+7	**KL/r:**	1.439
A (in^2):	3465.36	**Cracked Mom, Mcr (k-ft):**	7911.439		
Igross (in^4):	3.468e+7	**r (in):**	83.696		

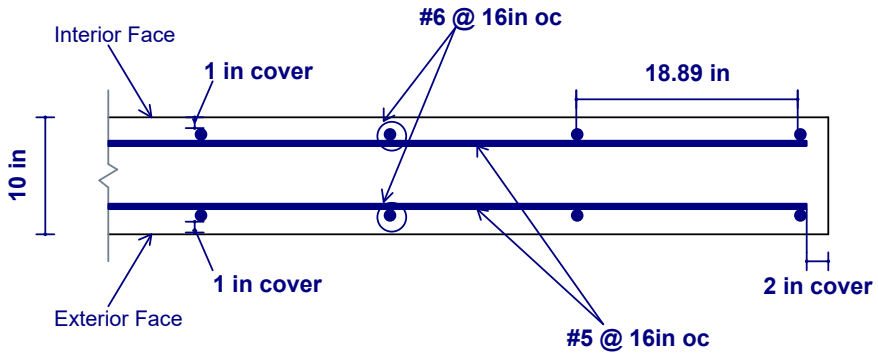
SLENDER BENDING SPAN RESULTS

KL/r in	Cm in	Lu in (ft)	Pc (k)	deltaNS	M act (k-ft)	M2 min (k-ft)	Mc in (k-ft)
1.439	0.612	12	0	N/A	0	0	N/A

IN-PLANE WALL INTERACTION DIAGRAM



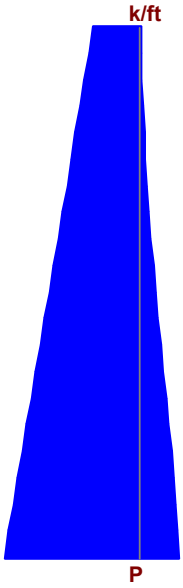
CROSS SECTION DETAILING



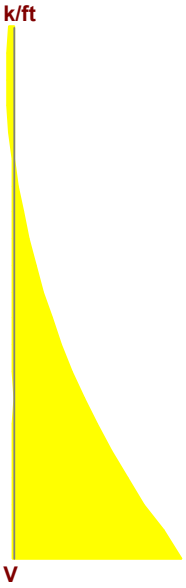
Detail Report: WP13 (Out-of-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	R5	**Total Length (ft):**	28.878	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	10	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#5	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

ENVELOPE DIAGRAMS



Min: -0.73 at 0 ft
Max: 2.488 at 0 ft



Min: -3.441 at 0 ft
Max: 0.109 at 10.8 ft

Min: -11.301 at 0 ft
Max: 0.239 at 9 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.844	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.239
Location (ft):	0	**Gov LC Int (-z):**	1	**phi*Mn Ext (+z) (k-ft/ft):**	13.387
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.018	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	9	**Gov LC Ext (+z):**	2
Gov Mu Int (-z) (k-ft/ft):	-11.301	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	13.387	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.599	**Gov Vu (k/ft):**	-3.441	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	5.74	**Gov LC:**	6

DEFLECTION DETAILS

Delta max (in):	0.28	**Location (ft):**	12
Deflection Ratio:	H/513	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	19.439	**As min (V) (in^2):**	5.198
rho Provided (V):	0.006	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

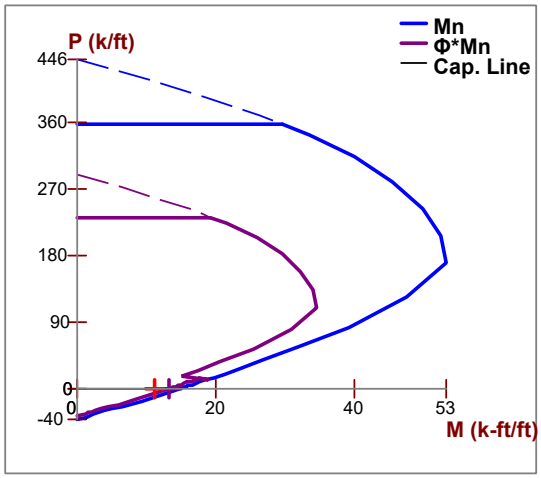
Total Width (in):	16	**Icracked (in^4):**	466.667	**KL/r:**	49.883
A (in^2):	160	**Cracked Mom, Mcr (k-ft):**	228.301		
Igross (in^4):	1333.333	**r (in):**	1.708		

SLENDER BENDING SPAN RESULTS

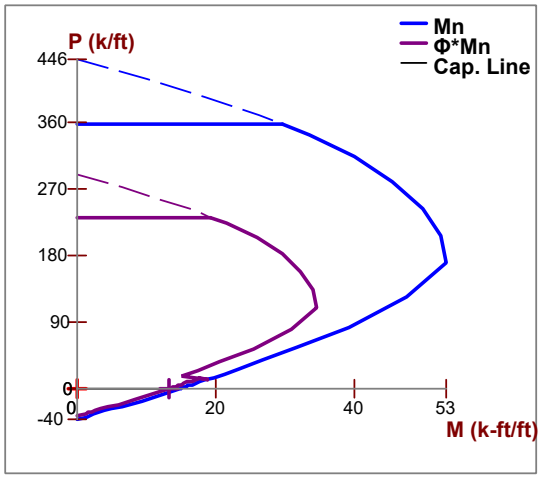
	KL/r out	Cm out	Lu out (ft)	Pc (k/ft)	deltaNS	M act (k-ft/ft)	M2 min (k-ft/ft)	Mc out (k-ft/ft)
Interior	49.883	0.6	12	433.604	1	11.301(0ft)	0.093	11.301(0ft)
Exterior				15.015	1	-0.008(9ft)	0.003	N/A(9ft)

OUT-PLANE WALL INTERACTION DIAGRAM

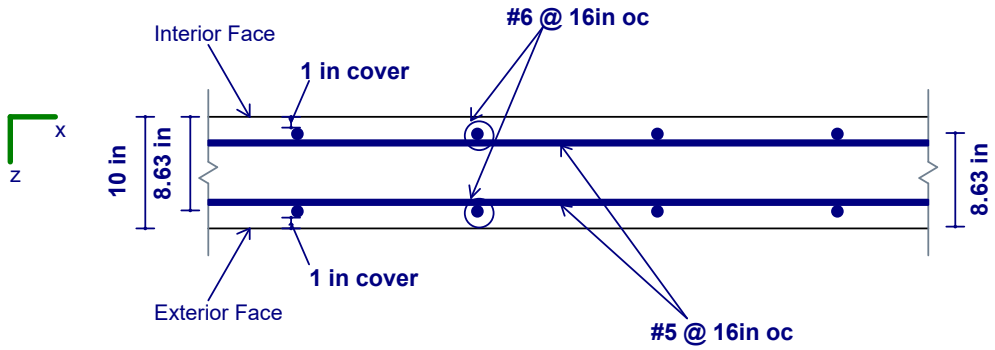
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram

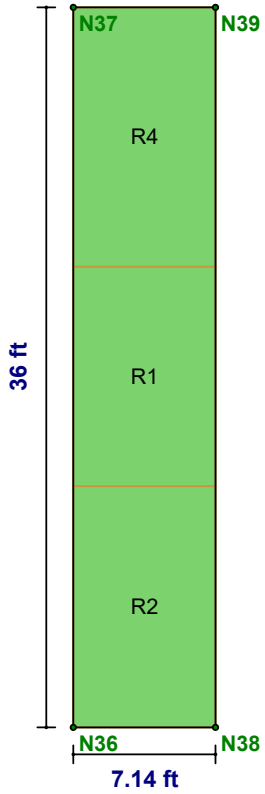


CROSS SECTION DETAILING



Detail Report: WP14

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	36	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	7.142	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R2	0.129	1	0.186	1	0.019	1	0.096	1	0.141	2	0.087	2
R1	0.042	1	0.138	5	0.022	1	0.042	1	0.015	5	0.056	5
R4	0.032	1	0.024	5	0.021	5	0.026	5	0.021	1	0.061	2

REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R2	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R1	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R4	#6@16in oc e.f.	#6@16in oc e.f.	N/A

Detail Report: WP14 (In-Plane, Region R2)

CRITERIA

Code:	ACI 318-19
Design Rule:	Avalanche
Seismic Rule:	SDR_Conc1
Loc of r/f:	Each Face
Outer Bars:	Vertical
Vert Bar Size:	#6
Horz Bar Size:	#6
Vert Bar Spac (in):	16
Horz Bar Spac (in):	16
Group Wall?:	No

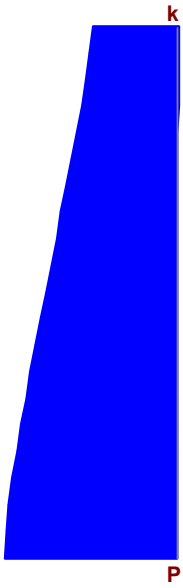
GEOMETRY

Total Height (ft):	12
Total Length (ft):	7.142
Thickness (in):	20
Int Cover (-z) (in):	1
Ext Cover (+z) (in):	1
Cover Open/Edge (in):	2
K:	1
Use Cracked?:	Yes
Icr Factor:	0.7

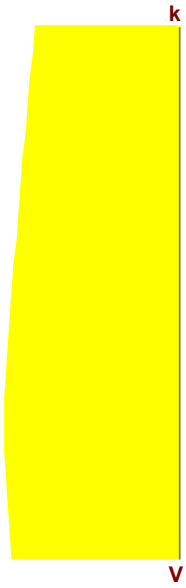
MATERIALS

Material Set:	Conc4000NW
Concrete f'c (ksi):	4
Concrete E (ksi):	3644
Concrete G (ksi):	1584
Conc Density (k/ft^3):	0.145
Lambda:	1
Conc Str Blk:	Rectangular
Vert Bar Fy (ksi):	60
Horz Bar Fy (ksi):	60
Steel E (ksi):	29000

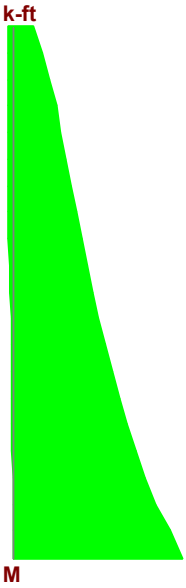
ENVELOPE DIAGRAMS



Min: -2.258 at 12 ft
Max: 304.472 at 0 ft



Min: -0.225 at 12 ft
Max: 79.339 at 3 ft



Min: -447.167 at 0 ft
Max: 10.904 at 9.6 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.129	**phi*Pn (k):**	2368.332	**phi eff.:**	0.65
Location (ft):	0	**Gov Mu (k-ft):**	-447.167	**Gov LC:**	1
Gov Pu (k):	304.472	**phi*Mn (k-ft):**	3478.287		

SHEAR DETAILS

UC Max:	0.186	**phi*Vn (k):**	427.643	**Vs (k):**	283.991
Location (ft):	3	**Vnmax (k):**	867.324	**Gov LC:**	1
Gov Vu (k):	79.339	**Vc (k):**	286.199		

DEFLECTION DETAILS

Delta max (in):	0.019	**Location (ft):**	36
Deflection Ratio:	H/7625	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	9.719	**rho min (H):**	0.002	**As min (V) (in^2):**	2.571
rho Provided (H):	0.003	**As Provided (V) (in^2):**	5.301	**rho min (V):**	0.002
As min (H) (in^2):	5.76	**rho Provided (V):**	0.003		

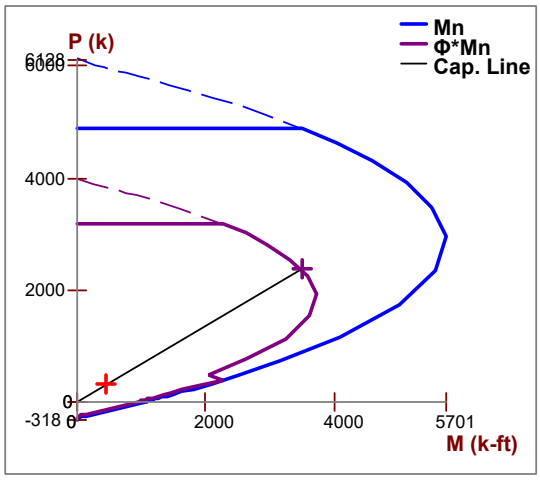
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	7.142	**Icracked (in^4):**	7.346e+5	**KL/r:**	5.82
A (in^2):	1714.2	**Cracked Mom, Mcr (k-ft):**	967.947		
Igross (in^4):	1.049e+6	**r (in):**	20.701		

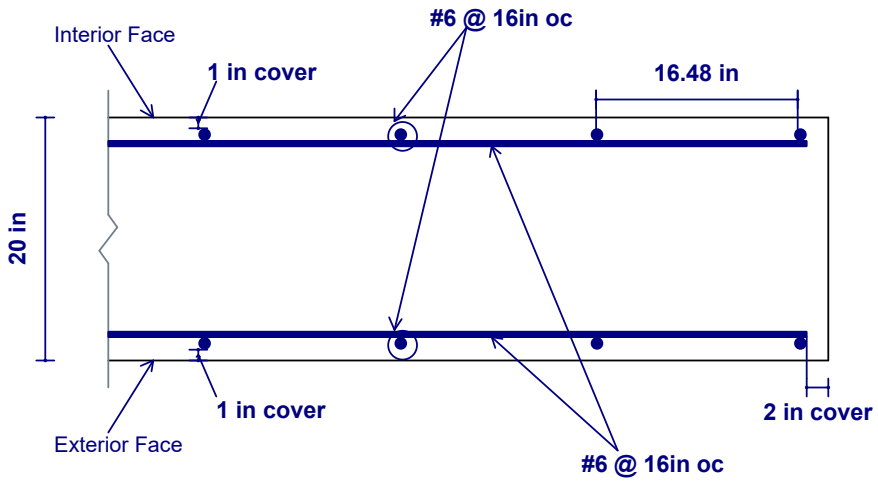
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



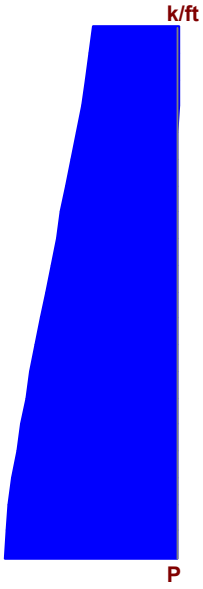
CROSS SECTION DETAILING



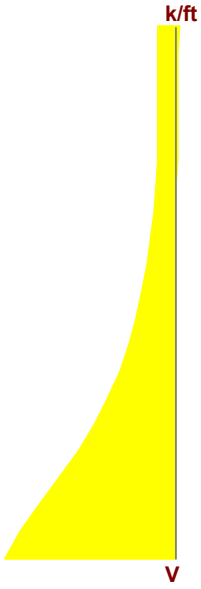
Detail Report: WP14 (Out-of-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	7.142	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

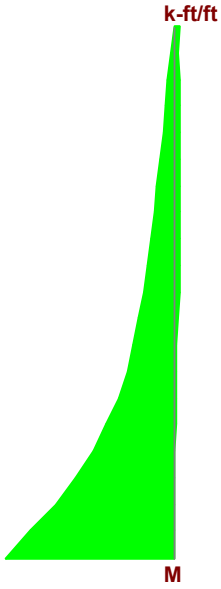
ENVELOPE DIAGRAMS



Min: -0.316 at 12 ft
Max: 42.628 at 0 ft



Min: -0.029 at 12 ft
Max: 1.791 at 0 ft



Min: -0.235 at 8.4 ft
Max: 6.617 at 0 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.096	**phi eff. Int (-z):**	0.65	**Gov Mu Ext (+z) (k-ft/ft):**	6.617
Location (ft):	0	**Gov LC Int (-z):**	1	**phi*Mn Ext (+z) (k-ft/ft):**	69.255
Gov Pu Int (-z) (k/ft):	42.628	**UC Max Ext (+z):**	0.096	**phi eff. Ext (+z):**	0.65
phi*Pn Int (-z) (k/ft):	446.166	**Location (ft):**	0	**Gov LC Ext (+z):**	1
Gov Mu Int (-z) (k-ft/ft):	0	**Gov Pu Ext (+z) (k/ft):**	42.628		
phi*Mn Int (-z):	NC	**phi*Pn Ext (+z) (k/ft):**	446.166		

SHEAR DETAILS

UC Max:	0.141	**Gov Vu (k/ft):**	1.746	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	12.359	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.087	**Location (ft):**	36
Deflection Ratio:	H/1664	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	5.301	**As min (V) (in^2):**	2.571
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

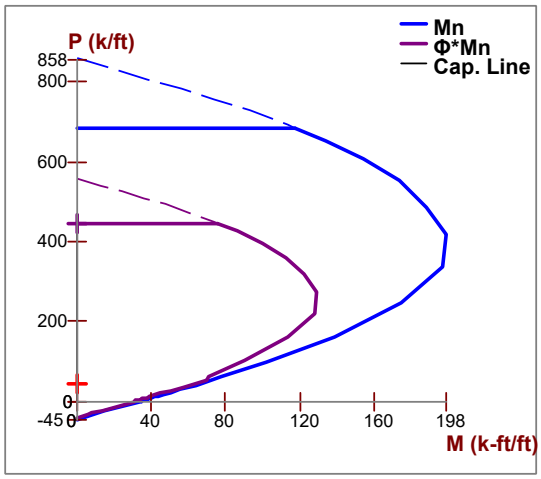
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	24.942
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	225.866		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

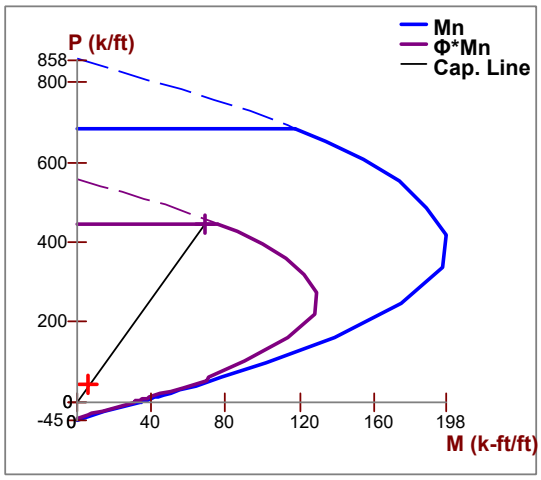
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

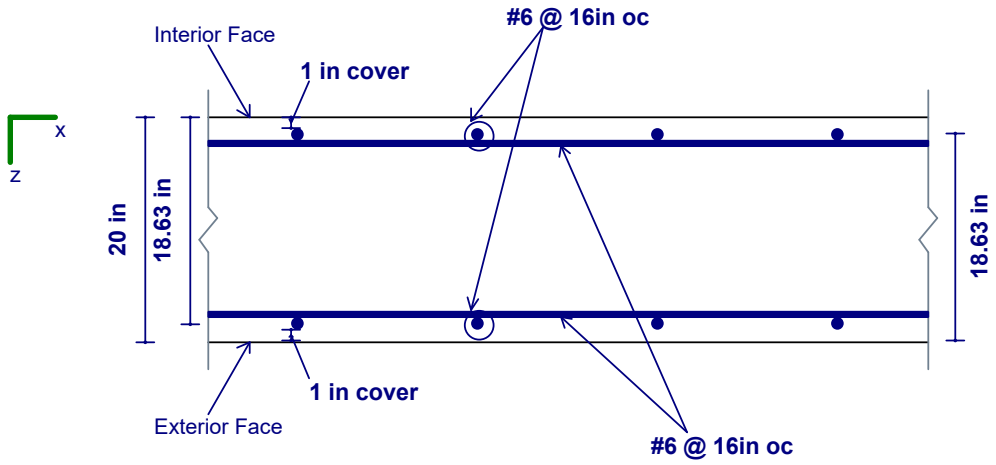
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



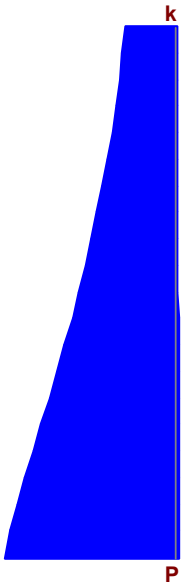
CROSS SECTION DETAILING



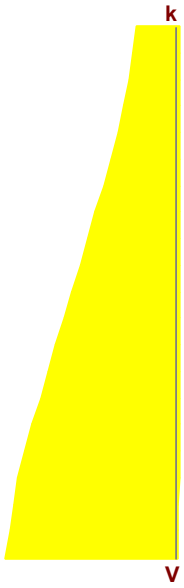
Detail Report: WP14 (In-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	7.142	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

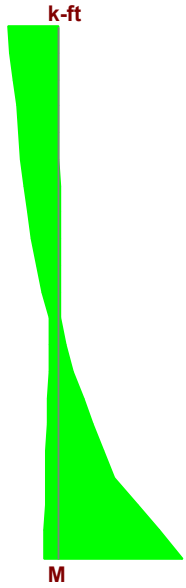
ENVELOPE DIAGRAMS



Min: -2.457 at 1.65 ft
Max: 133.51 at 0 ft



Min: -1.479 at 4.95 ft
Max: 62.326 at 0 ft



Min: -99.525 at 0 ft
Max: 39.761 at 11 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.042	**phi*Pn (k):**	3186.738	**phi eff.:**	0.65
Location (ft):	0	**Gov Mu (k-ft):**	-90.799	**Gov LC:**	1
Gov Pu (k):	133.51	**phi*Mn (k-ft):**	2167.275		

SHEAR DETAILS

UC Max:	0.138	**phi*Vn (k):**	450.411	**Vs (k):**	283.991
Location (ft):	0	**Vnmax (k):**	867.324	**Gov LC:**	5
Gov Vu (k):	62.326	**Vc (k):**	316.557		

DEFLECTION DETAILS

Delta max (in):	0.022	**Location (ft):**	36
Deflection Ratio:	H/6022	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.952	**rho min (H):**	0.002	**As min (V) (in^2):**	2.571
rho Provided (H):	0.003	**As Provided (V) (in^2):**	5.301	**rho min (V):**	0.002
As min (H) (in^2):	5.28	**rho Provided (V):**	0.003		

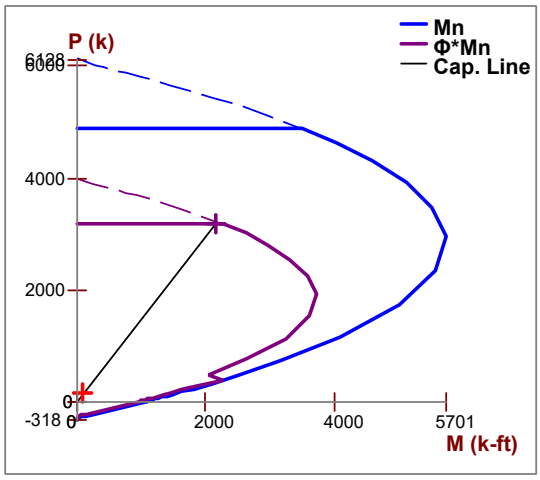
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	7.142	**Icracked (in^4):**	7.346e+5	**KL/r:**	5.335
A (in^2):	1714.2	**Cracked Mom, Mcr (k-ft):**	967.947		
Igross (in^4):	1.049e+6	**r (in):**	20.701		

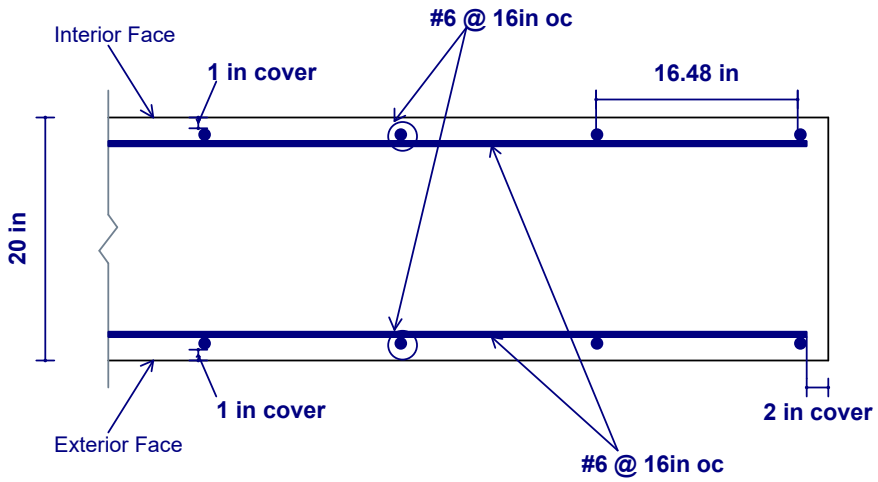
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



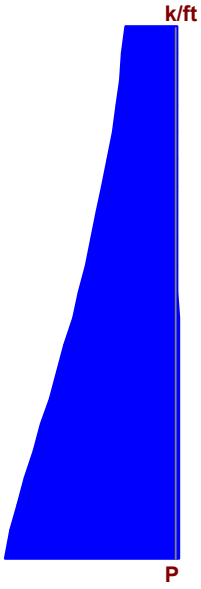
CROSS SECTION DETAILING



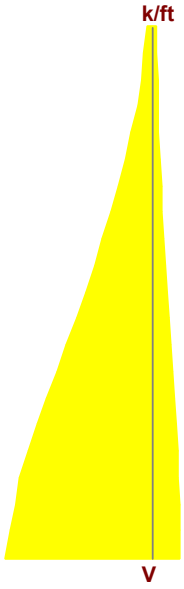
Detail Report: WP14 (Out-of-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	7.142	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

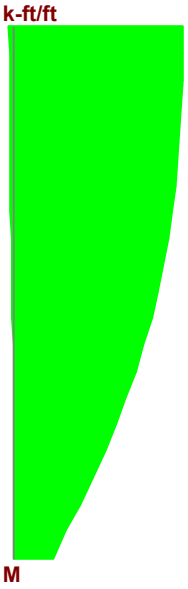
ENVELOPE DIAGRAMS



Min: -0.344 at 1.65 ft
Max: 18.692 at 0 ft



Min: -0.029 at 0 ft
Max: 0.153 at 0 ft



Min: -0.818 at 11 ft
Max: 0.013 at 11 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.042	**phi eff. Int (-z):**	0.65	**Gov Mu Ext (+z) (k-ft/ft):**	0
Location (ft):	0	**Gov LC Int (-z):**	1	**phi*Mn Ext (+z):**	NC
Gov Pu Int (-z) (k/ft):	18.692	**UC Max Ext (+z):**	0.042	**phi eff. Ext (+z):**	0.65
phi*Pn Int (-z) (k/ft):	446.166	**Location (ft):**	0	**Gov LC Ext (+z):**	1
Gov Mu Int (-z) (k-ft/ft):	0	**Gov Pu Ext (+z) (k/ft):**	18.692		
phi*Mn Int (-z):	NC	**phi*Pn Ext (+z) (k/ft):**	446.166		

SHEAR DETAILS

UC Max:	0.015	**Gov Vu (k/ft):**	0.153	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	9.933	**Gov LC:**	5

DEFLECTION DETAILS

Delta max (in):	0.056	**Location (ft):**	36
Deflection Ratio:	H/2373	**Gov LC:**	5

REINFORCEMENT DETAILS

As Provided (V) (in^2):	5.301	**As min (V) (in^2):**	2.571
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

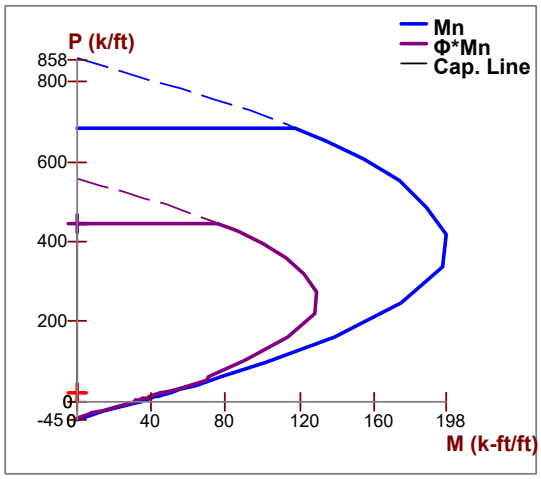
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	22.863
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	225.866		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

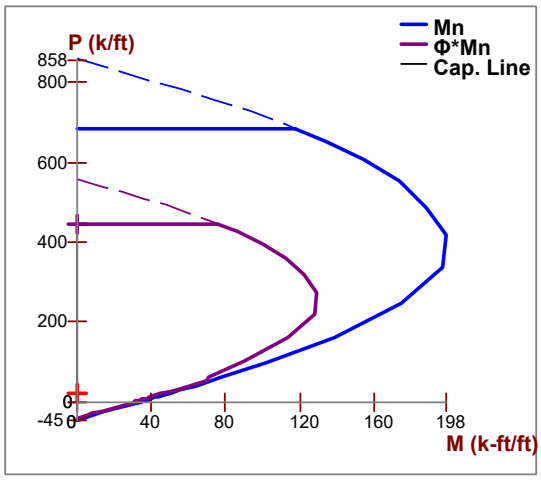
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

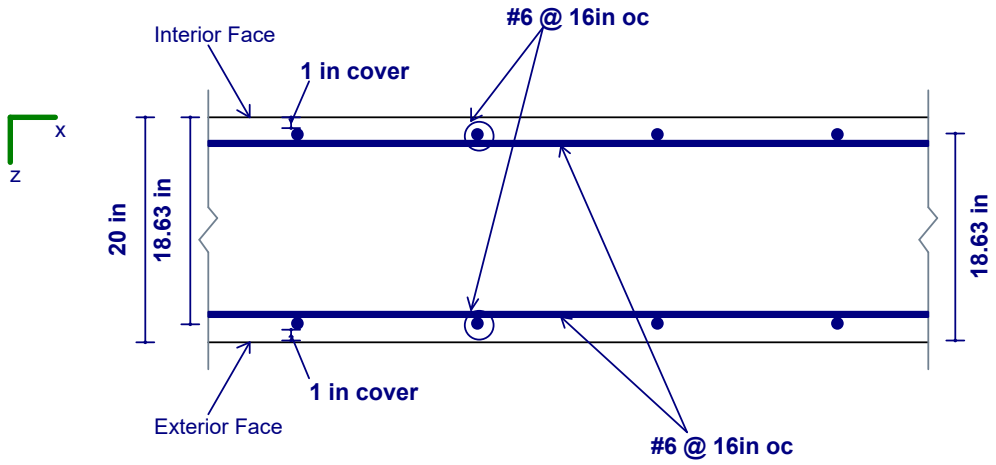
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



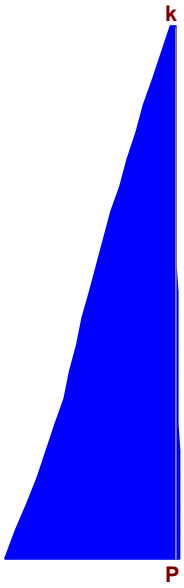
CROSS SECTION DETAILING



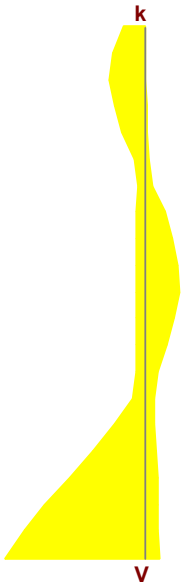
Detail Report: WP14 (In-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	13	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	7.142	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

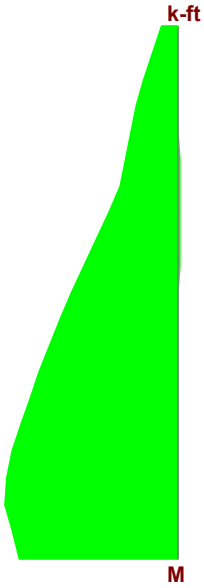
ENVELOPE DIAGRAMS



Min: -0.925 at 0 ft
Max: 35.149 at 0 ft



Min: -2.34 at 6.5 ft
Max: 9.683 at 0 ft



Min: -0.201 at 8.45 ft
Max: 31.455 at 1.3 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.032	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	1.3	**Gov Mu (k-ft):**	31.455	**Gov LC:**	1
Gov Pu (k):	0	**phi*Mn (k-ft):**	971.459		

SHEAR DETAILS

UC Max:	0.024	**phi*Vn (k):**	404.874	**Vs (k):**	283.991
Location (ft):	0	**Vnmax (k):**	867.324	**Gov LC:**	5
Gov Vu (k):	9.683	**Vc (k):**	255.841		

DEFLECTION DETAILS

Delta max (in):	0.021	**Location (ft):**	36
Deflection Ratio:	H/7336	**Gov LC:**	5

REINFORCEMENT DETAILS

As Provided (H) (in^2):	10.603	**rho min (H):**	0.002	**As min (V) (in^2):**	2.571
rho Provided (H):	0.003	**As Provided (V) (in^2):**	5.301	**rho min (V):**	0.002
As min (H) (in^2):	6.24	**rho Provided (V):**	0.003		

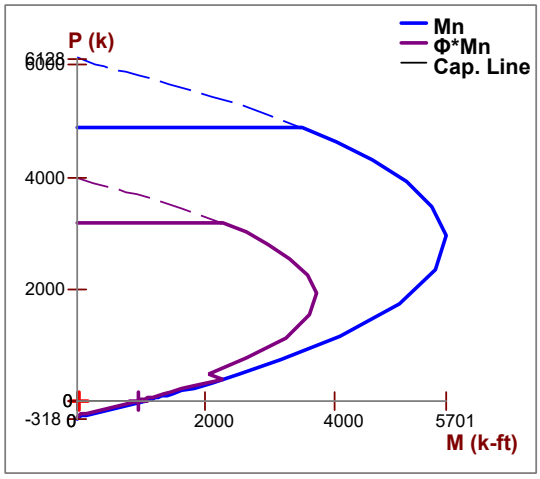
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	7.142	**Icracked (in^4):**	7.346e+5	**KL/r:**	6.305
A (in^2):	1714.2	**Cracked Mom, Mcr (k-ft):**	967.947		
Igross (in^4):	1.049e+6	**r (in):**	20.701		

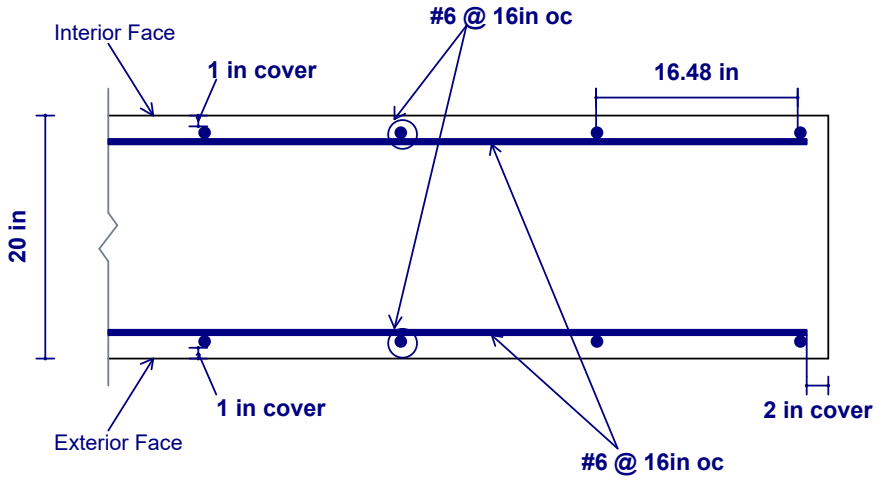
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



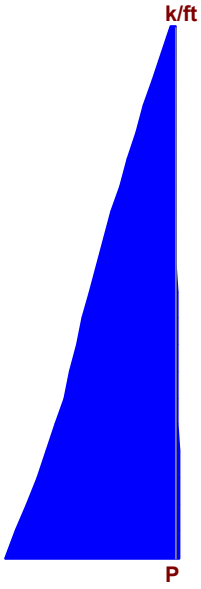
CROSS SECTION DETAILING



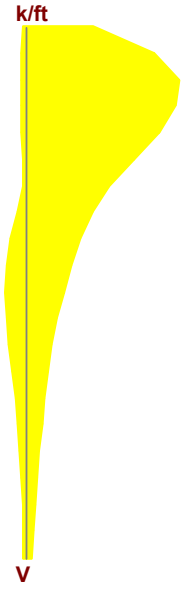
Detail Report: WP14 (Out-of-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	13	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	7.142	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

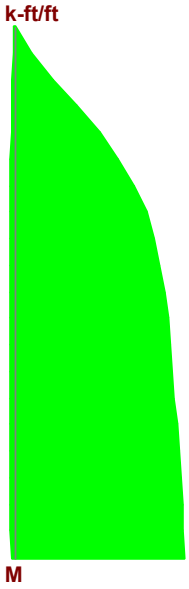
ENVELOPE DIAGRAMS



Min: -0.13 at 0 ft
Max: 4.921 at 0 ft



Min: -0.182 at 11.7 ft
Max: 0.024 at 6.5 ft



Min: -0.818 at 0 ft
Max: 0.018 at 4.55 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.026	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.019
Location (ft):	0	**Gov LC Int (-z):**	5	**phi*Mn Ext (+z) (k-ft/ft):**	31.274
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.001	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	4.55	**Gov LC Ext (+z):**	6
Gov Mu Int (-z) (k-ft/ft):	-0.818	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	31.274	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.021	**Gov Vu (k/ft):**	-0.182	**phi*Vns (k/ft):**	0
Location (ft):	11.7	**phi*Vnc (k/ft):**	8.463	**Gov LC:**	1

DEFLECTION DETAILS

Delta max (in):	0.061	**Location (ft):**	1.8
Deflection Ratio:	H/2550	**Gov LC:**	2

REINFORCEMENT DETAILS

As Provided (V) (in^2):	5.301	**As min (V) (in^2):**	2.571
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

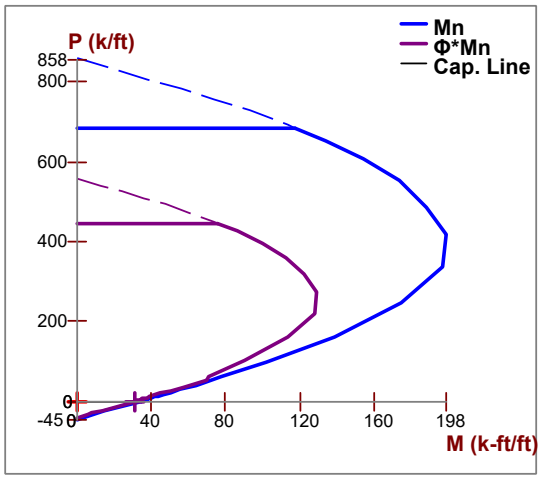
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	27.02
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	225.866		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

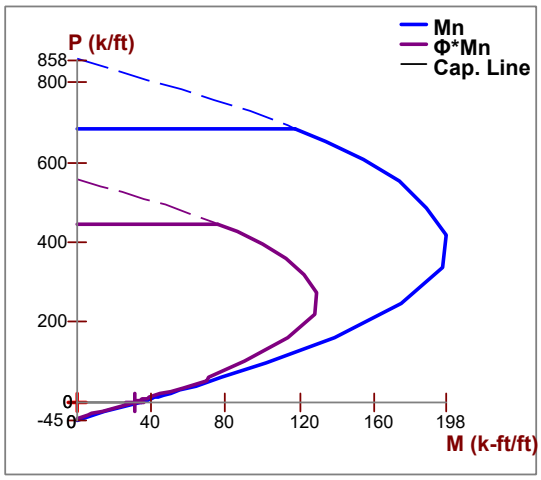
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

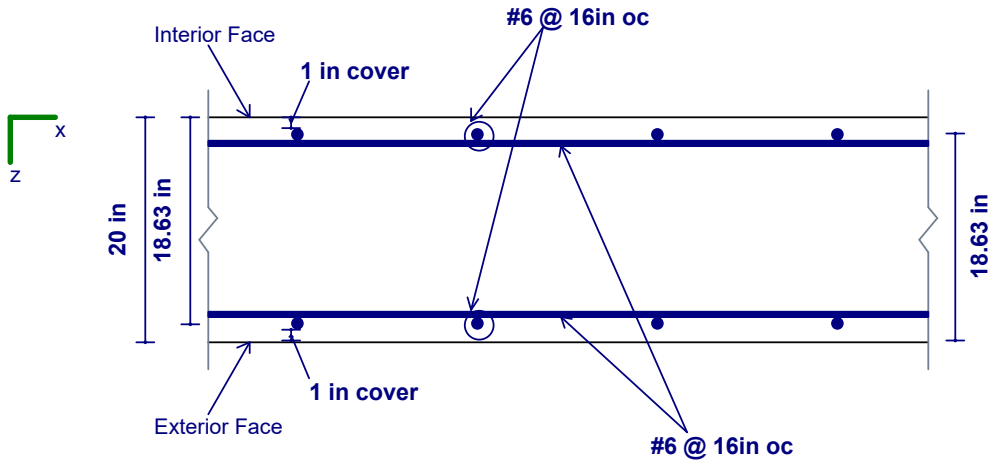
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram

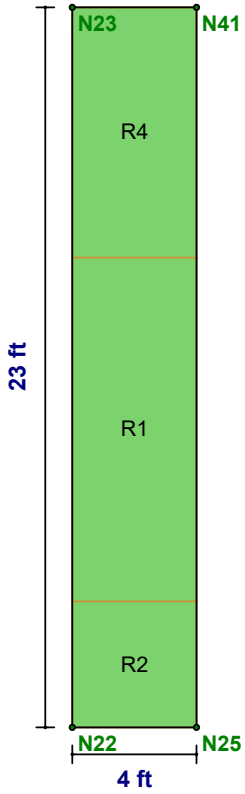


CROSS SECTION DETAILING



Detail Report: WP15

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	23	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	4	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R2	0.493	2	0.1	2	0.002	1	0.493	2	0.009	2	0.005	1
R1	0.308	2	0.092	2	0.011	1	0.308	2	0.01	2	0.005	1
R4	0.009	2	0.012	1	0.008	1	0.017	2	0.066	2	0.004	1

REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R2	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R1	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R4	#6@16in oc e.f.	#6@16in oc e.f.	N/A

Detail Report: WP15 (In-Plane, Region R2)

CRITERIA

Code:	ACI 318-19
Design Rule:	Avalanche
Seismic Rule:	SDR_Conc1
Loc of r/f:	Each Face
Outer Bars:	Vertical
Vert Bar Size:	#6
Horz Bar Size:	#6
Vert Bar Spac (in):	16
Horz Bar Spac (in):	16
Group Wall?:	No

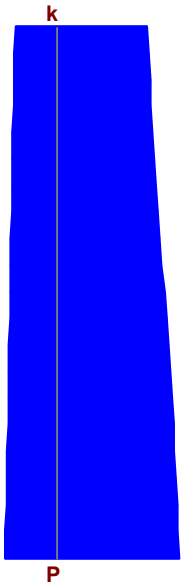
GEOMETRY

Total Height (ft):	4
Total Length (ft):	4
Thickness (in):	20
Int Cover (-z) (in):	1
Ext Cover (+z) (in):	1
Cover Open/Edge (in):	2
K:	1
Use Cracked?:	Yes
Icr Factor:	0.7

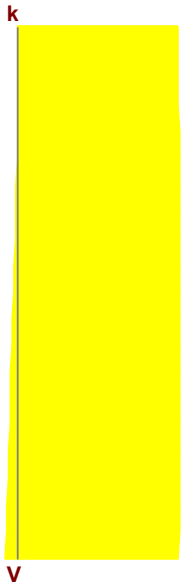
MATERIALS

Material Set:	Conc4000NW
Concrete f'c (ksi):	4
Concrete E (ksi):	3644
Concrete G (ksi):	1584
Conc Density (k/ft^3):	0.145
Lambda:	1
Conc Str Blk:	Rectangular
Vert Bar Fy (ksi):	60
Horz Bar Fy (ksi):	60
Steel E (ksi):	29000

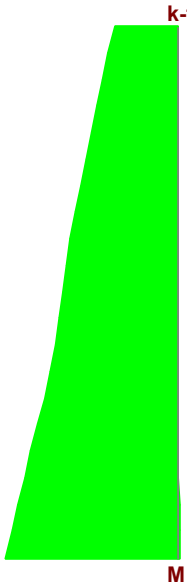
ENVELOPE DIAGRAMS



Min: -70.55 at 0 ft
Max: 28.806 at 0 ft



Min: -19.881 at 1.6 ft
Max: 1.235 at 0 ft



Min: -0.69 at 0 ft
Max: 62.18 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.493	**phi*Pn (k):**	-143.139	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	61.453	**Gov LC:**	2
Gov Pu (k):	-70.55	**phi*Mn (k-ft):**	124.683		

SHEAR DETAILS

UC Max:	0.1	**phi*Vn (k):**	197.956	**Vs (k):**	159.043
Location (ft):	1.4	**Vnmax (k):**	485.726	**Gov LC:**	2
Gov Vu (k):	-19.874	**Vc (k):**	104.898		

DEFLECTION DETAILS

Delta max (in):	0.002	**Location (ft):**	23
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	4.418	**rho min (H):**	0.002	**As min (V) (in^2):**	1.44
rho Provided (H):	0.005	**As Provided (V) (in^2):**	2.651	**rho min (V):**	0.002
As min (H) (in^2):	1.92	**rho Provided (V):**	0.003		

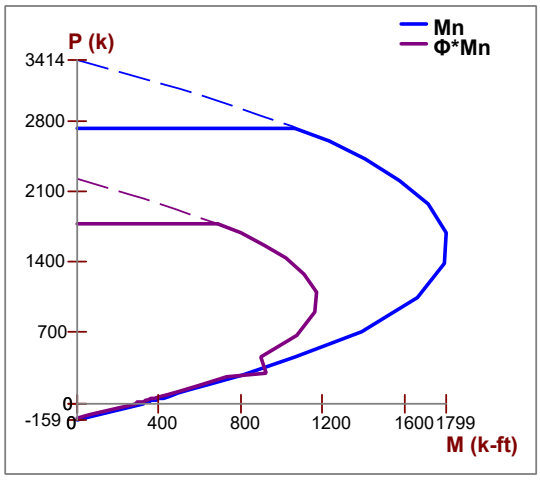
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	4	**Icracked (in^4):**	1.29e+5	**KL/r:**	3.464
A (in^2):	960	**Cracked Mom, Mcr (k-ft):**	303.579		
Igross (in^4):	1.843e+5	**r (in):**	11.593		

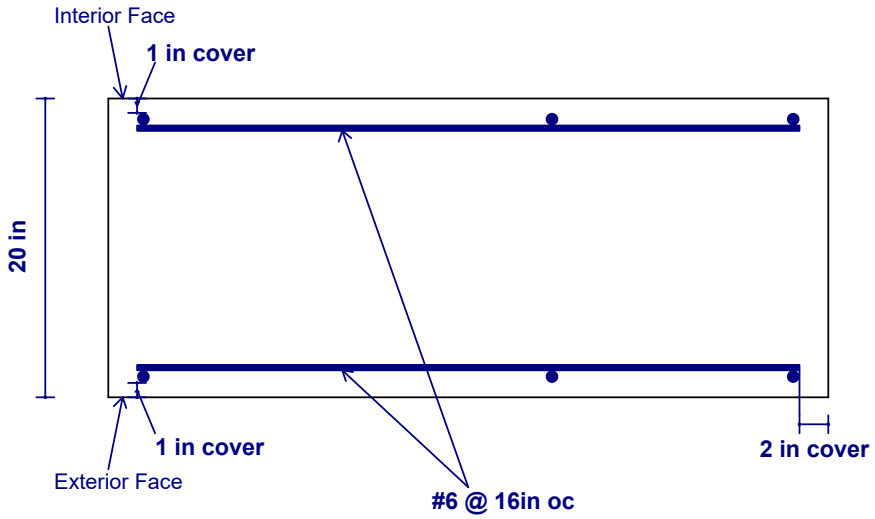
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



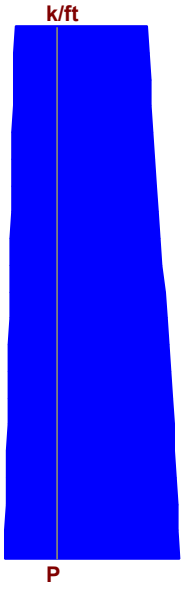
CROSS SECTION DETAILING



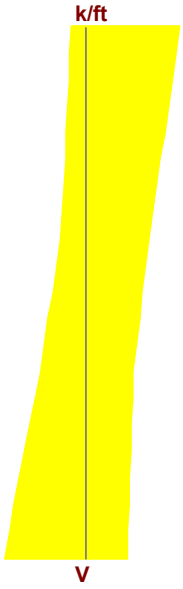
Detail Report: WP15 (Out-of-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	4	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	4	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

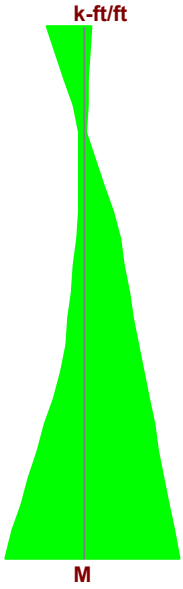
ENVELOPE DIAGRAMS



Min: -17.637 at 0 ft
Max: 7.201 at 0 ft



Min: -0.145 at 4 ft
Max: 0.124 at 0 ft



Min: -0.226 at 0 ft
Max: 0.186 at 0 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.493	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0
Location (ft):	0	**Gov LC Int (-z):**	2	**phi*Mn Ext (+z):**	NC
Gov Pu Int (-z) (k/ft):	-17.637	**UC Max Ext (+z):**	0.493	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z) (k/ft):	-35.785	**Location (ft):**	0	**Gov LC Ext (+z):**	2
Gov Mu Int (-z) (k-ft/ft):	0	**Gov Pu Ext (+z) (k/ft):**	-17.637		
phi*Mn Int (-z):	NC	**phi*Pn Ext (+z) (k/ft):**	-35.785		

SHEAR DETAILS

UC Max:	0.009	**Gov Vu (k/ft):**	-0.145	**phi*Vns (k/ft):**	16.592
Location (ft):	4	**phi*Vnc (k/ft):**	6.586	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.005	**Location (ft):**	23
Deflection Ratio:	H/9201	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	2.651	**As min (V) (in^2):**	1.44
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

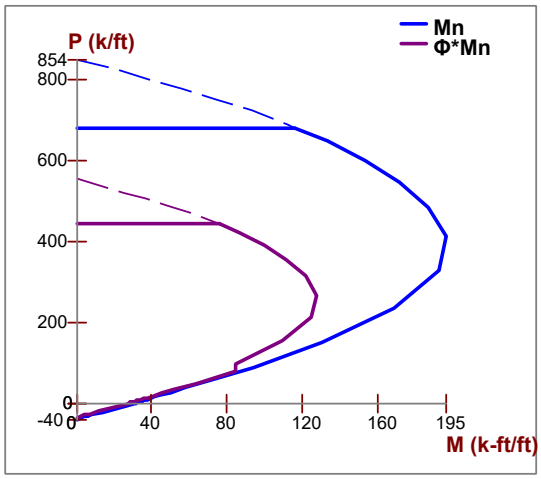
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	8.314
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	126.491		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

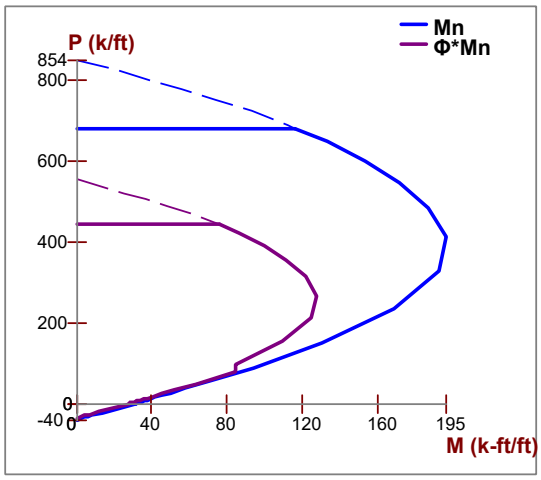
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

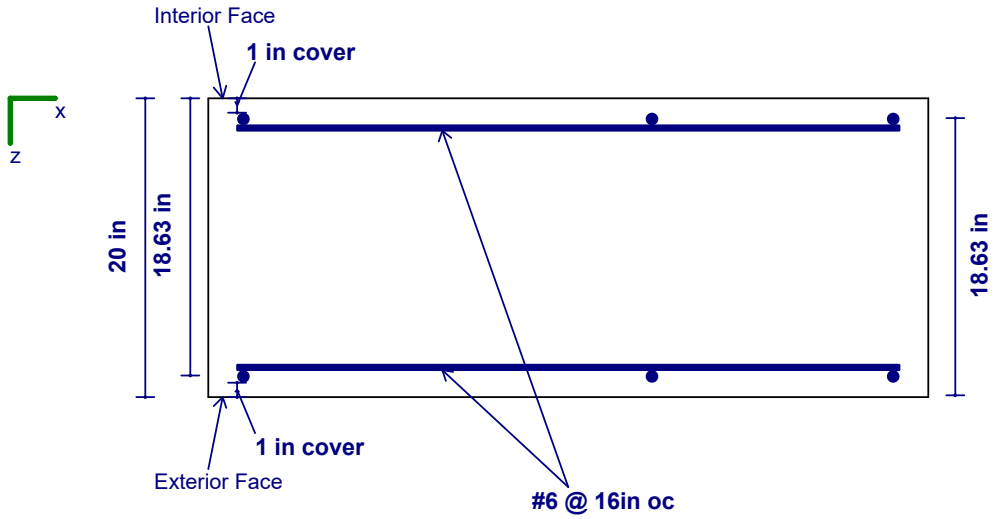
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



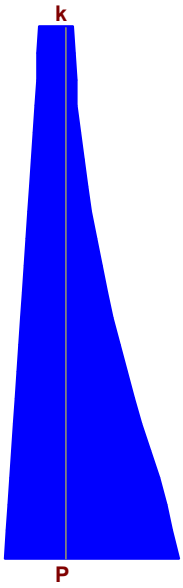
CROSS SECTION DETAILING



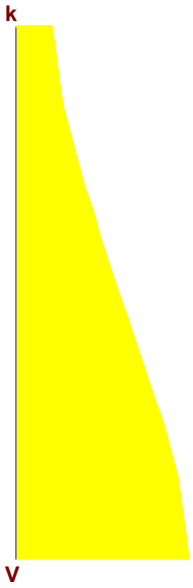
Detail Report: WP15 (In-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	4	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

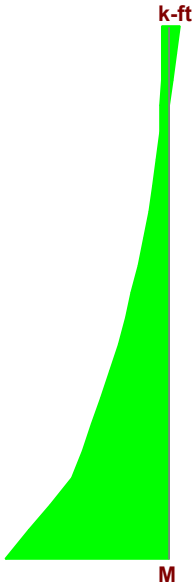
ENVELOPE DIAGRAMS



Min: -44.042 at 0 ft
Max: 23.323 at 0 ft



Min: -18.857 at 0 ft
Max: -3.843 at 11 ft



Min: -2.716 at 11 ft
Max: 37.527 at 0 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.308	**phi*Pn (k):**	-143.139	**phi eff.:**	0.9
Location (ft):	0	**Gov Mu (k-ft):**	35.709	**Gov LC:**	2
Gov Pu (k):	-44.042	**phi*Mn (k-ft):**	116.057		

SHEAR DETAILS

UC Max:	0.092	**phi*Vn (k):**	202	**Vs (k):**	159.043
Location (ft):	0	**Vnmax (k):**	485.726	**Gov LC:**	2
Gov Vu (k):	-18.602	**Vc (k):**	110.29		

DEFLECTION DETAILS

Delta max (in):	0.011	**Location (ft):**	23
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.952	**rho min (H):**	0.002	**As min (V) (in^2):**	1.44
rho Provided (H):	0.003	**As Provided (V) (in^2):**	2.651	**rho min (V):**	0.002
As min (H) (in^2):	5.28	**rho Provided (V):**	0.003		

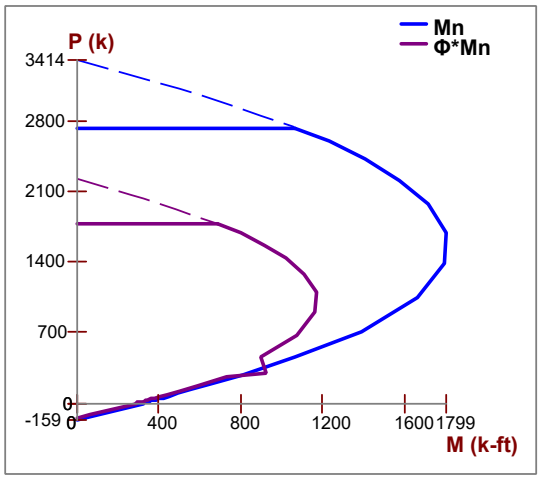
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	4	**Icracked (in^4):**	1.29e+5	**KL/r:**	9.526
A (in^2):	960	**Cracked Mom, Mcr (k-ft):**	303.579		
Igross (in^4):	1.843e+5	**r (in):**	11.593		

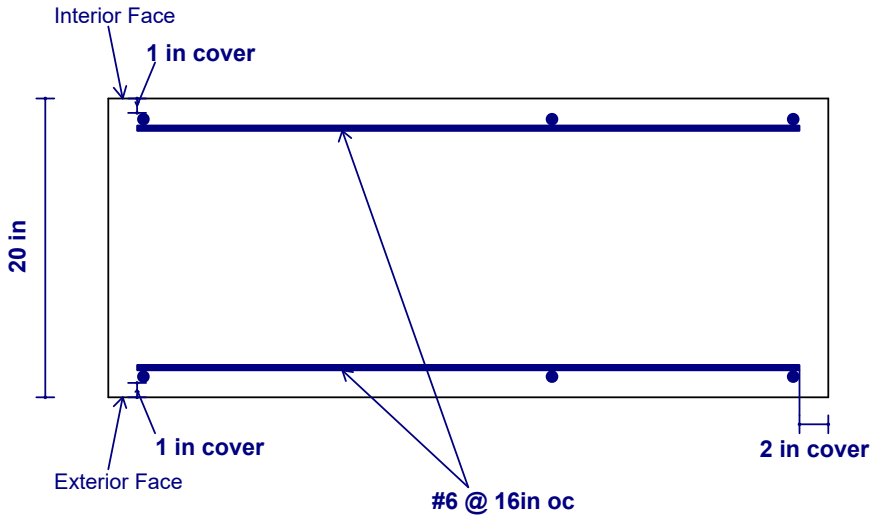
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



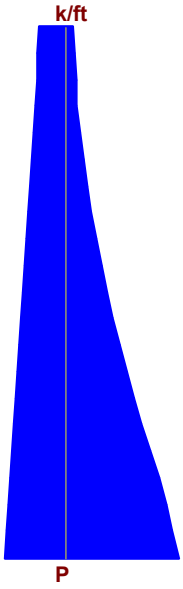
CROSS SECTION DETAILING



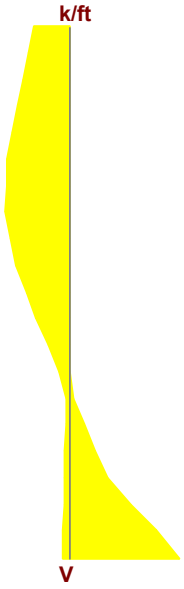
Detail Report: WP15 (Out-of-Plane, Region R1)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	4	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

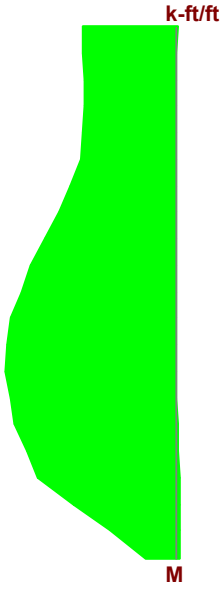
ENVELOPE DIAGRAMS



Min: -11.01 at 0 ft
Max: 5.831 at 0 ft



Min: -0.219 at 0 ft
Max: 0.124 at 7.15 ft



Min: -0.006 at 1.65 ft
Max: 0.28 at 3.85 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.308	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0
Location (ft):	0	**Gov LC Int (-z):**	2	**phi*Mn Ext (+z):**	NC
Gov Pu Int (-z) (k/ft):	-11.01	**UC Max Ext (+z):**	0.308	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z) (k/ft):	-35.785	**Location (ft):**	0	**Gov LC Ext (+z):**	2
Gov Mu Int (-z) (k-ft/ft):	0	**Gov Pu Ext (+z) (k/ft):**	-11.01		
phi*Mn Int (-z):	NC	**phi*Pn Ext (+z) (k/ft):**	-35.785		

SHEAR DETAILS

UC Max:	0.01	**Gov Vu (k/ft):**	-0.219	**phi*Vns (k/ft):**	21.203
Location (ft):	0	**phi*Vnc (k/ft):**	6.802	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.005	**Location (ft):**	23
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	2.651	**As min (V) (in^2):**	1.44
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

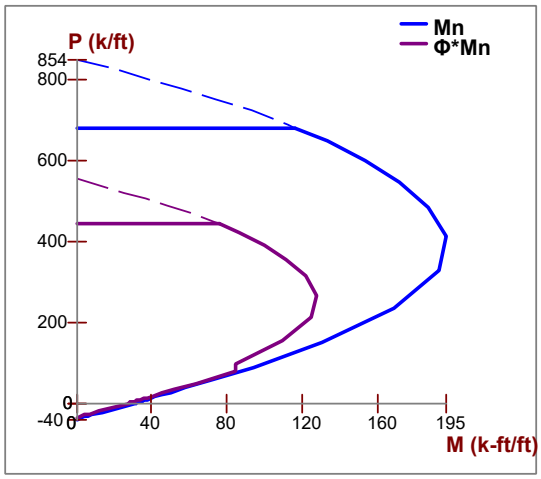
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	22.863
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	126.491		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

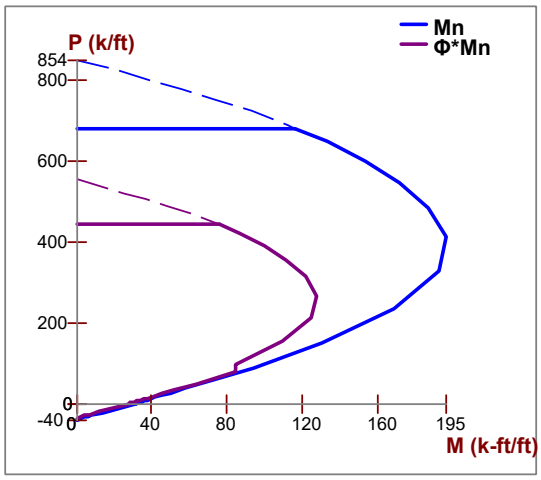
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

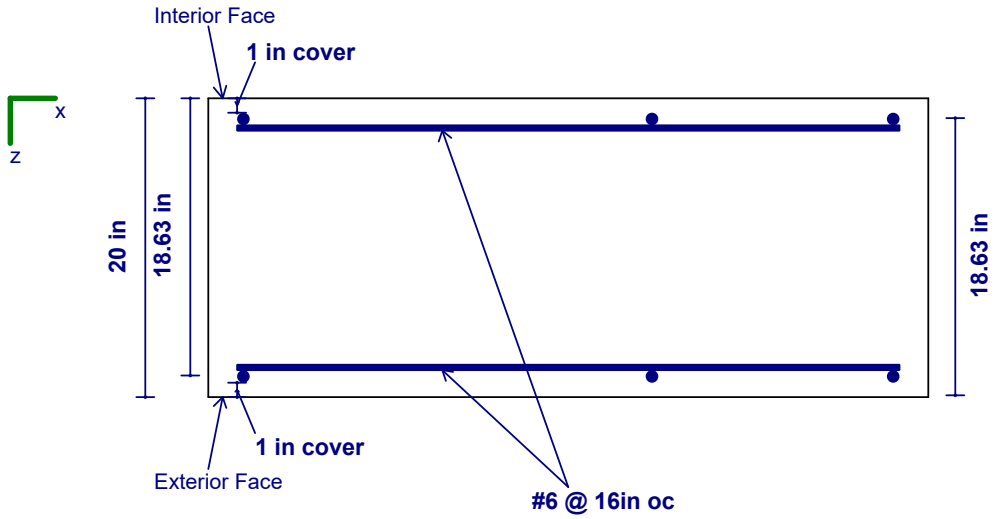
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



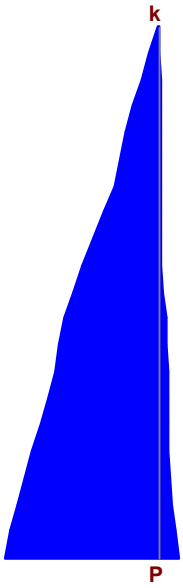
CROSS SECTION DETAILING



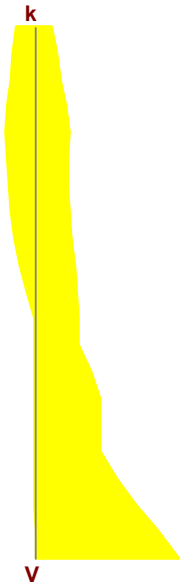
Detail Report: WP15 (In-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	8	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	4	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

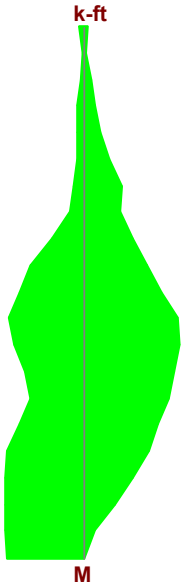
ENVELOPE DIAGRAMS



Min: -1.206 at 0 ft
Max: 9.764 at 0 ft



Min: -2.464 at 0 ft
Max: 0.492 at 6.4 ft



Min: -2.239 at 3.2 ft
Max: 1.852 at 1.2 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.009	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	3.2	**Gov Mu (k-ft):**	-2.239	**Gov LC:**	2
Gov Pu (k):	0	**phi*Mn (k-ft):**	248.939		

SHEAR DETAILS

UC Max:	0.012	**phi*Vn (k):**	210.356	**Vs (k):**	159.043
Location (ft):	0	**Vnmax (k):**	485.726	**Gov LC:**	1
Gov Vu (k):	-2.464	**Vc (k):**	121.431		

DEFLECTION DETAILS

Delta max (in):	0.008	**Location (ft):**	23
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.069	**rho min (H):**	0.002	**As min (V) (in^2):**	1.44
rho Provided (H):	0.004	**As Provided (V) (in^2):**	2.651	**rho min (V):**	0.002
As min (H) (in^2):	3.84	**rho Provided (V):**	0.003		

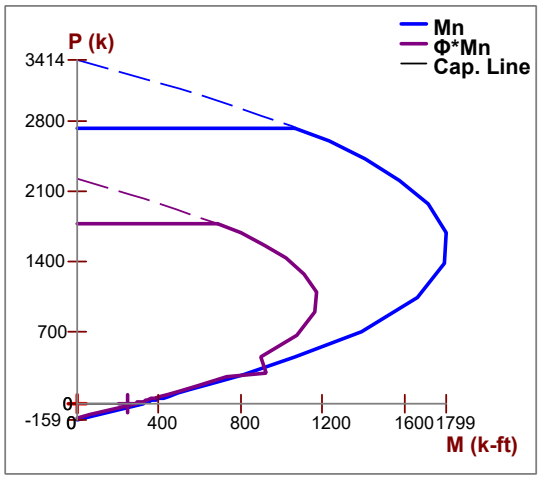
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	4	**Icracked (in^4):**	1.29e+5	**KL/r:**	6.928
A (in^2):	960	**Cracked Mom, Mcr (k-ft):**	303.579		
Igross (in^4):	1.843e+5	**r (in):**	11.593		

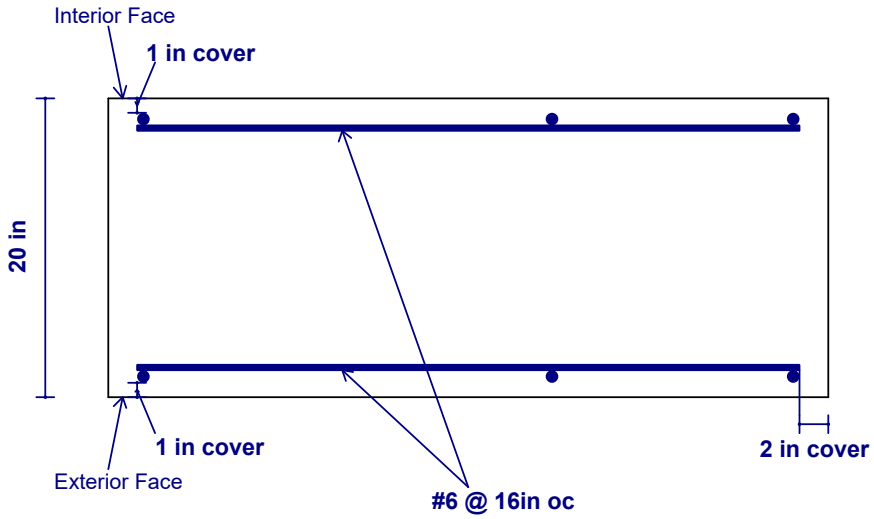
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



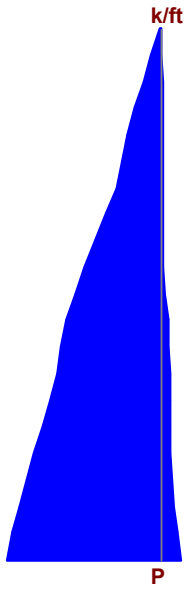
CROSS SECTION DETAILING



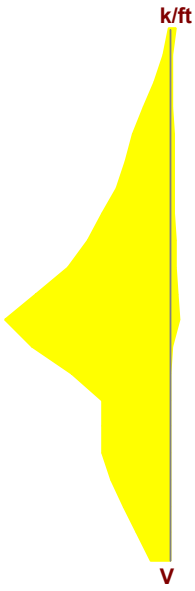
Detail Report: WP15 (Out-of-Plane, Region R4)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	8	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	4	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	20	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

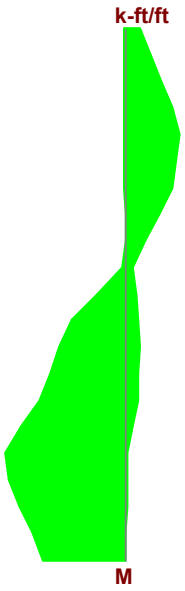
ENVELOPE DIAGRAMS



Min: -0.301 at 0 ft
Max: 2.441 at 0 ft



Min: -0.029 at 3.6 ft
Max: 0.529 at 3.6 ft



Min: -0.22 at 6.4 ft
Max: 0.488 at 1.6 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.008	**phi eff. Int (-z):**	0.9	**Gov Mu Ext (+z) (k-ft/ft):**	0.488
Location (ft):	6.4	**Gov LC Int (-z):**	1	**phi*Mn Ext (+z) (k-ft/ft):**	28.117
Gov Pu Int (-z) (k/ft):	0	**UC Max Ext (+z):**	0.017	**phi eff. Ext (+z):**	0.9
phi*Pn Int (-z):	NC	**Location (ft):**	1.6	**Gov LC Ext (+z):**	2
Gov Mu Int (-z) (k-ft/ft):	-0.22	**Gov Pu Ext (+z) (k/ft):**	0		
phi*Mn Int (-z) (k-ft/ft):	28.117	**phi*Pn Ext (+z):**	NC		

SHEAR DETAILS

UC Max:	0.066	**Gov Vu (k/ft):**	0.529	**phi*Vns (k/ft):**	0
Location (ft):	3.6	**phi*Vnc (k/ft):**	8.07	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.004	**Location (ft):**	23
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	2.651	**As min (V) (in^2):**	1.44
rho Provided (V):	0.003	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

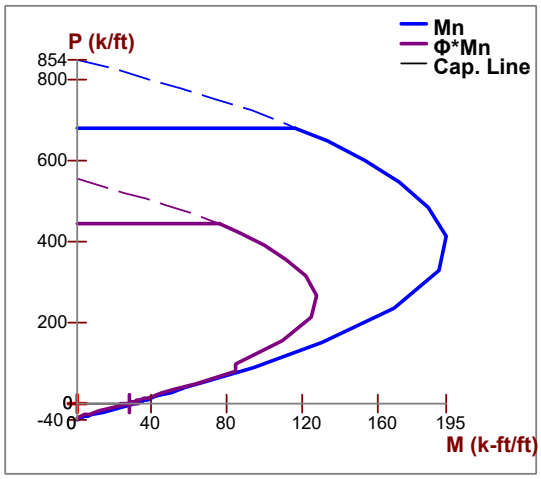
Total Width (in):	16	**Icracked (in^4):**	3733.333	**KL/r:**	16.628
A (in^2):	320	**Cracked Mom, Mcr (k-ft):**	126.491		
Igross (in^4):	10666.667	**r (in):**	3.416		

SLENDER BENDING SPAN RESULTS

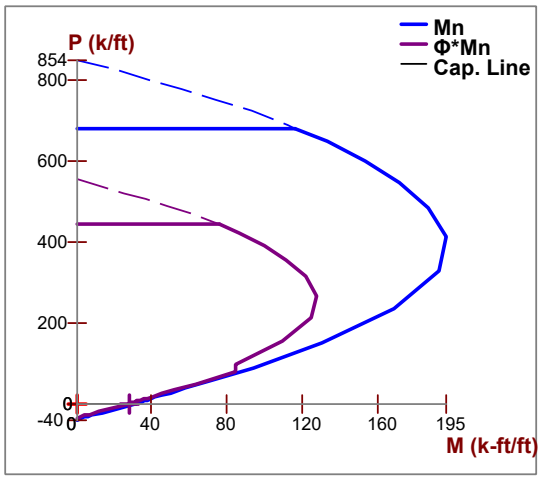
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

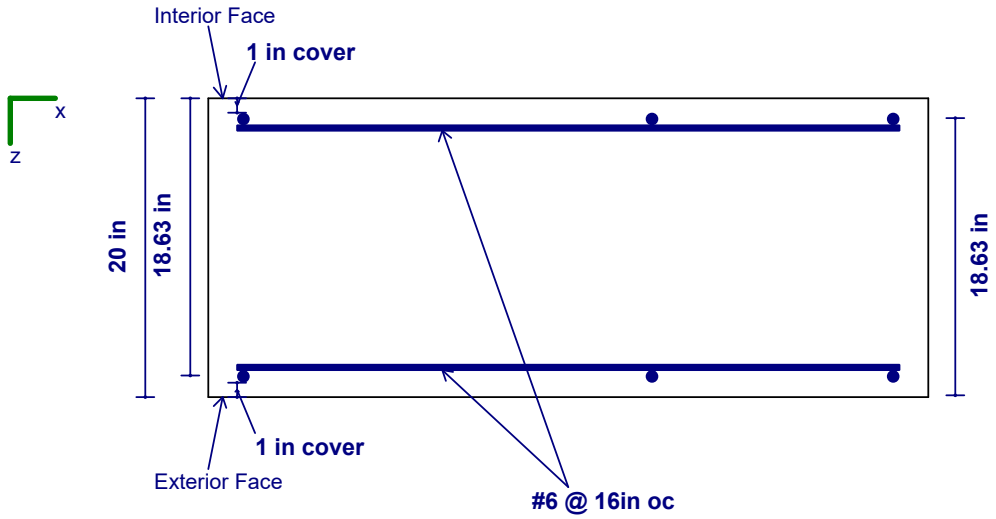
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram

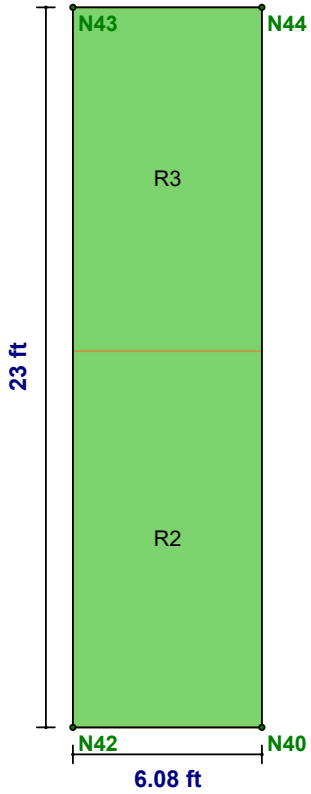


CROSS SECTION DETAILING



Detail Report: WP16

Concrete Wall



CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	23	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	6.083	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	10	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Transfer In?:	No	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Transfer Out?:	No	**In Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No	**Out Icr Factor:**	0.35	**Steel E (ksi):**	29000

REGION RESULTS

Region	UC Max In Plane	LC	UC Shear In Plane	LC	Delta Max In Plane (in)	LC	UC Max Out Plane	LC	UC Shear Out Plane	LC	Delta Max Out Plane (in)	LC
R2	0.039	1	0.069	2	0.004	1	0.036	1	0.023	1	0.007	1
R3	0.033	1	0.066	5	0.006	5	0.026	1	0.002	2	0.005	1

REINFORCEMENT RESULTS

Region	Vertical Reinforcement	Horizontal Reinforcement	Diagonal Reinforcement
R2	#6@16in oc e.f.	#6@16in oc e.f.	N/A
R3	#6@16in oc e.f.	#6@16in oc e.f.	N/A

Detail Report: WP16 (In-Plane, Region R2)

CRITERIA

Code:	ACI 318-19
Design Rule:	Avalanche
Seismic Rule:	SDR_Conc1
Loc of r/f:	Each Face
Outer Bars:	Vertical
Vert Bar Size:	#6
Horz Bar Size:	#6
Vert Bar Spac (in):	16
Horz Bar Spac (in):	16
Group Wall?:	No

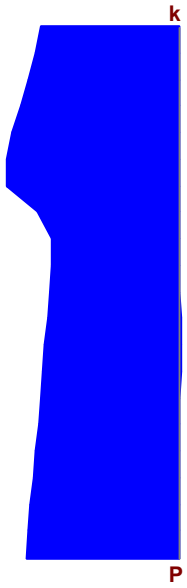
GEOMETRY

Total Height (ft):	12
Total Length (ft):	6.083
Thickness (in):	10
Int Cover (-z) (in):	1
Ext Cover (+z) (in):	1
Cover Open/Edge (in):	2
K:	1
Use Cracked?:	Yes
Icr Factor:	0.7

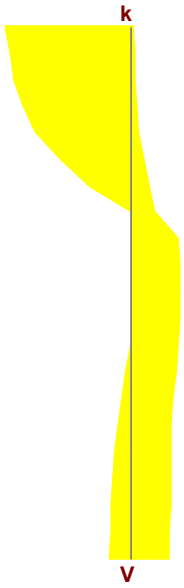
MATERIALS

Material Set:	Conc4000NW
Concrete f'c (ksi):	4
Concrete E (ksi):	3644
Concrete G (ksi):	1584
Conc Density (k/ft^3):	0.145
Lambda:	1
Conc Str Blk:	Rectangular
Vert Bar Fy (ksi):	60
Horz Bar Fy (ksi):	60
Steel E (ksi):	29000

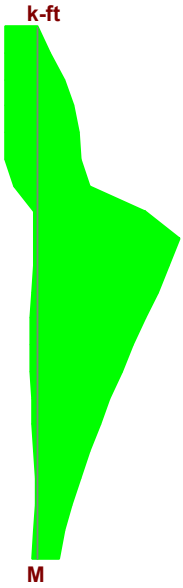
ENVELOPE DIAGRAMS



Min: -0.306 at 4.8 ft
Max: 51.267 at 8.4 ft



Min: -6.946 at 6 ft
Max: 17.375 at 12 ft



Min: -54.664 at 7.2 ft
Max: 11.937 at 10.2 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.039	**phi*Pn (k):**	957.257	**phi eff.:**	0.65
Location (ft):	7.2	**Gov Mu (k-ft):**	-54.664	**Gov LC:**	1
Gov Pu (k):	37.346	**phi*Mn (k-ft):**	1401.16		

SHEAR DETAILS

UC Max:	0.069	**phi*Vn (k):**	252.538	**Vs (k):**	241.865
Location (ft):	12	**Vnmax (k):**	369.334	**Gov LC:**	2
Gov Vu (k):	17.375	**Vc (k):**	94.853		

DEFLECTION DETAILS

Delta max (in):	0.004	**Location (ft):**	23
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (H) (in^2):	9.719	**rho min (H):**	0.002	**As min (V) (in^2):**	1.095
rho Provided (H):	0.007	**As Provided (V) (in^2):**	4.418	**rho min (V):**	0.002
As min (H) (in^2):	2.88	**rho Provided (V):**	0.006		

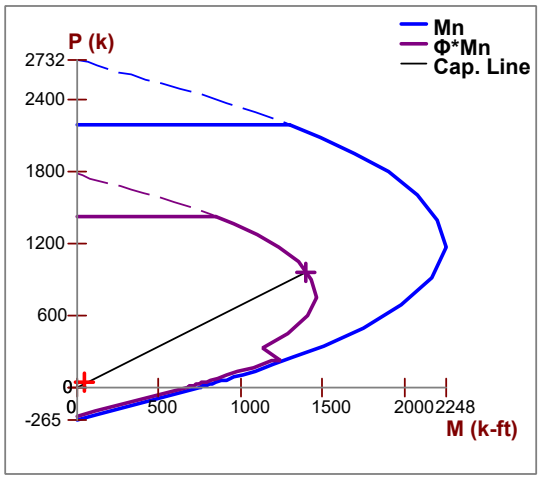
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	6.083	**Icracked (in^4):**	2.269e+5	**KL/r:**	6.834
A (in^2):	729.96	**Cracked Mom, Mcr (k-ft):**	351.04		
Igross (in^4):	3.241e+5	**r (in):**	17.63		

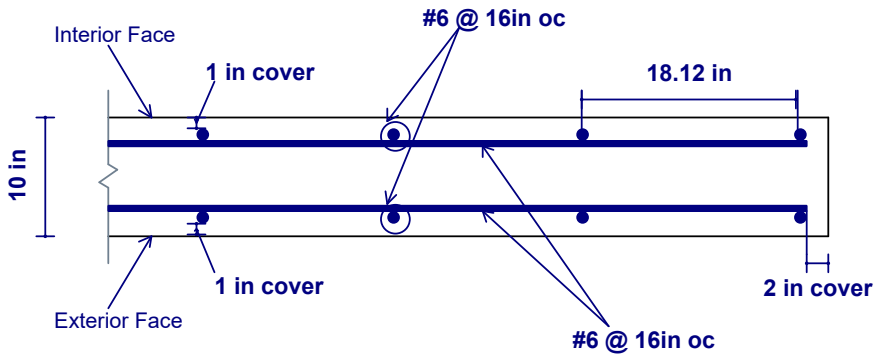
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



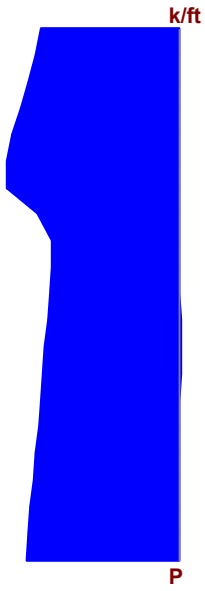
CROSS SECTION DETAILING



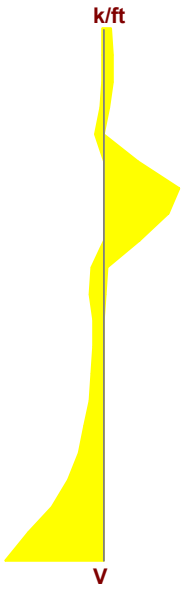
Detail Report: WP16 (Out-of-Plane, Region R2)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	12	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	6.083	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	10	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

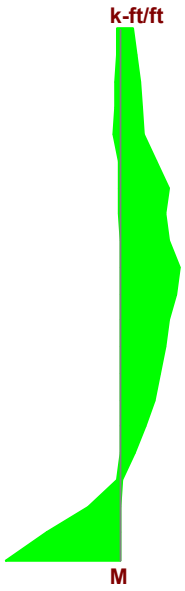
ENVELOPE DIAGRAMS



Min: -0.05 at 4.8 ft
Max: 8.428 at 8.4 ft



Min: -0.121 at 8.4 ft
Max: 0.157 at 0 ft



Min: -0.109 at 6.6 ft
Max: 0.206 at 0 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.036	**phi eff. Int (-z):**	0.65	**Gov Mu Ext (+z) (k-ft/ft):**	0
Location (ft):	8.4	**Gov LC Int (-z):**	1	**phi*Mn Ext (+z):**	NC
Gov Pu Int (-z) (k/ft):	8.428	**UC Max Ext (+z):**	0.036	**phi eff. Ext (+z):**	0.65
phi*Pn Int (-z) (k/ft):	233.535	**Location (ft):**	8.4	**Gov LC Ext (+z):**	1
Gov Mu Int (-z) (k-ft/ft):	-0.09	**Gov Pu Ext (+z) (k/ft):**	8.428		
phi*Mn Int (-z) (k-ft/ft):	2.486	**phi*Pn Ext (+z) (k/ft):**	233.535		

SHEAR DETAILS

UC Max:	0.023	**Gov Vu (k/ft):**	0.157	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	6.769	**Gov LC:**	1

DEFLECTION DETAILS

Delta max (in):	0.007	**Location (ft):**	23
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	4.418	**As min (V) (in^2):**	1.095
rho Provided (V):	0.006	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

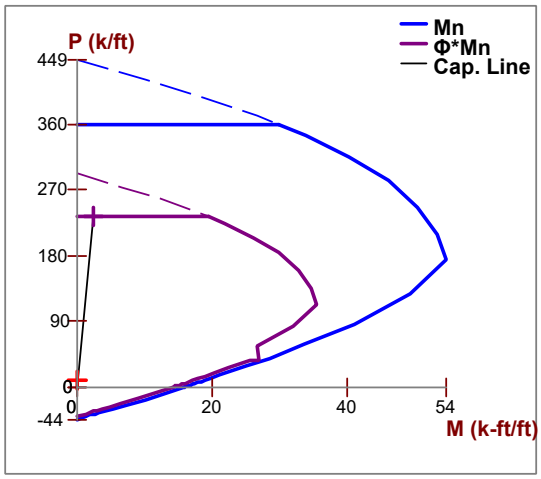
Total Width (in):	16	**Icracked (in^4):**	466.667	**KL/r:**	49.883
A (in^2):	160	**Cracked Mom, Mcr (k-ft):**	48.09		
Igross (in^4):	1333.333	**r (in):**	1.708		

SLENDER BENDING SPAN RESULTS

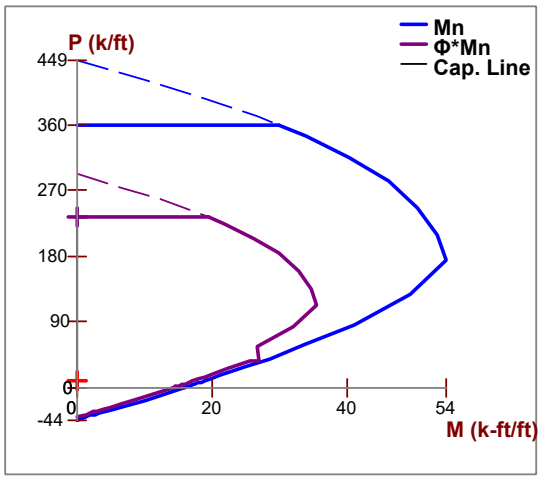
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

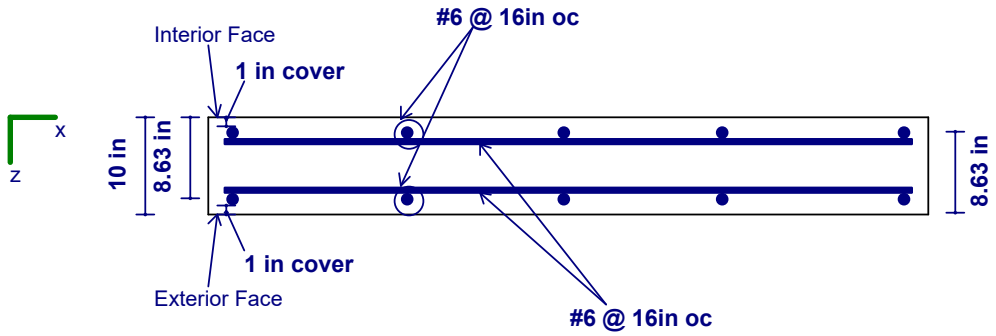
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



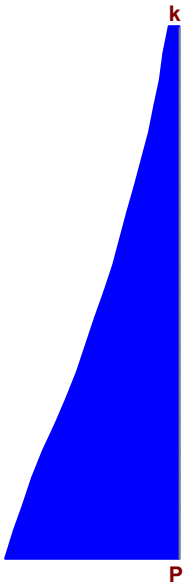
CROSS SECTION DETAILING



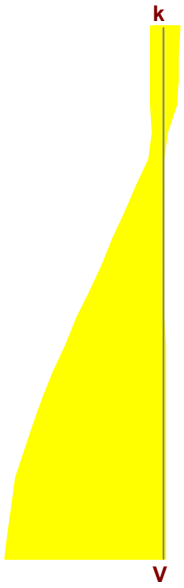
Detail Report: WP16 (In-Plane, Region R3)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	6.083	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	10	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.7	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

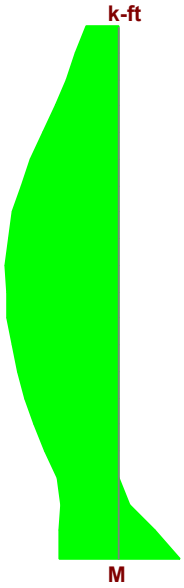
ENVELOPE DIAGRAMS



Min: 1.991 at 11 ft
Max: 36.328 at 0 ft



Min: -1.871 at 11 ft
Max: 17.522 at 0 ft



Min: -12.298 at 0 ft
Max: 22.117 at 6.05 ft

ACI 318-19 Code Check

AXIAL/BENDING DETAILS

UC Max:	0.033	**phi*Pn:**	NC	**phi eff.:**	0.9
Location (ft):	6.05	**Gov Mu (k-ft):**	22.117	**Gov LC:**	1
Gov Pu (k):	0	**phi*Mn (k-ft):**	673.225		

SHEAR DETAILS

UC Max:	0.066	**phi*Vn (k):**	263.923	**Vs (k):**	241.865
Location (ft):	0	**Vnmax (k):**	369.334	**Gov LC:**	5
Gov Vu (k):	17.522	**Vc (k):**	110.032		

DEFLECTION DETAILS

Delta max (in):	0.006	**Location (ft):**	23
Deflection Ratio:	H/10000	**Gov LC:**	5

REINFORCEMENT DETAILS

As Provided (H) (in^2):	7.952	**rho min (H):**	0.002	**As min (V) (in^2):**	1.095
rho Provided (H):	0.006	**As Provided (V) (in^2):**	4.418	**rho min (V):**	0.002
As min (H) (in^2):	2.64	**rho Provided (V):**	0.006		

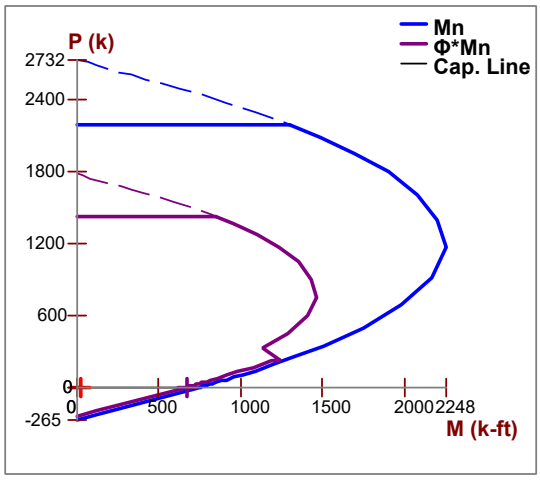
WALL SEGMENT SECTION PROPERTIES

Total Length (ft):	6.083	**Icracked (in^4):**	2.269e+5	**KL/r:**	6.264
A (in^2):	729.96	**Cracked Mom, Mcr (k-ft):**	351.04		
Igross (in^4):	3.241e+5	**r (in):**	17.63		

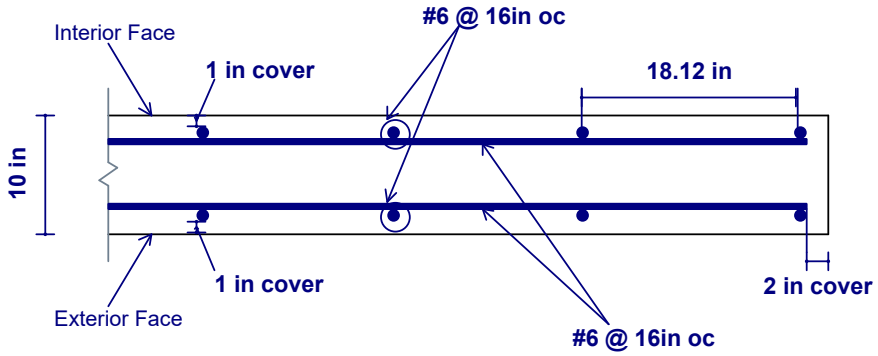
SLENDER BENDING SPAN RESULTS

-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

IN-PLANE WALL INTERACTION DIAGRAM



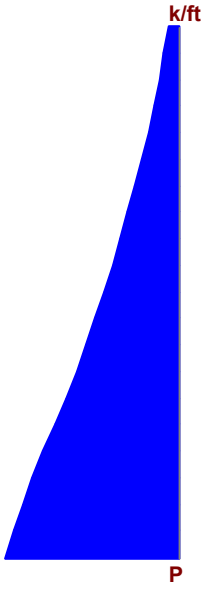
CROSS SECTION DETAILING



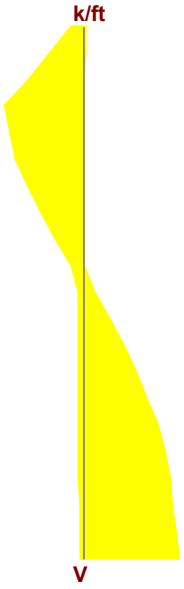
Detail Report: WP16 (Out-of-Plane, Region R3)

CRITERIA		GEOMETRY		MATERIALS	
Code:	ACI 318-19	**Total Height (ft):**	11	**Material Set:**	Conc4000NW
Design Rule:	Avalanche	**Total Length (ft):**	6.083	**Concrete f'c (ksi):**	4
Seismic Rule:	SDR_Conc1	**Thickness (in):**	10	**Concrete E (ksi):**	3644
Loc of r/f:	Each Face	**Int Cover (-z) (in):**	1	**Concrete G (ksi):**	1584
Outer Bars:	Vertical	**Ext Cover (+z) (in):**	1	**Conc Density (k/ft^3):**	0.145
Vert Bar Size:	#6	**Cover Open/Edge (in):**	2	**Lambda:**	1
Horz Bar Size:	#6	**K:**	1	**Conc Str Blk:**	Rectangular
Vert Bar Spac (in):	16	**Use Cracked?:**	Yes	**Vert Bar Fy (ksi):**	60
Horz Bar Spac (in):	16	**Icr Factor:**	0.35	**Horz Bar Fy (ksi):**	60
Group Wall?:	No			**Steel E (ksi):**	29000

ENVELOPE DIAGRAMS



Min: 0.327 at 11 ft
Max: 5.972 at 0 ft



Min: -0.013 at 0.55 ft
Max: 0.011 at 9.35 ft

Min: -0.022 at 0 ft
Max: 0.031 at 5.5 ft

AXIAL/BENDING DETAILS

UC Max Int (-z):	0.026	**phi eff. Int (-z):**	0.65	**Gov Mu Ext (+z) (k-ft/ft):**	0
Location (ft):	0	**Gov LC Int (-z):**	1	**phi*Mn Ext (+z):**	NC
Gov Pu Int (-z) (k/ft):	5.972	**UC Max Ext (+z):**	0.026	**phi eff. Ext (+z):**	0.65
phi*Pn Int (-z) (k/ft):	233.535	**Location (ft):**	0	**Gov LC Ext (+z):**	1
Gov Mu Int (-z) (k-ft/ft):	0	**Gov Pu Ext (+z) (k/ft):**	5.972		
phi*Mn Int (-z):	NC	**phi*Pn Ext (+z) (k/ft):**	233.535		

SHEAR DETAILS

UC Max:	0.002	**Gov Vu (k/ft):**	-0.013	**phi*Vns (k/ft):**	0
Location (ft):	0	**phi*Vnc (k/ft):**	6.389	**Gov LC:**	2

DEFLECTION DETAILS

Delta max (in):	0.005	**Location (ft):**	23
Deflection Ratio:	H/10000	**Gov LC:**	1

REINFORCEMENT DETAILS

As Provided (V) (in^2):	4.418	**As min (V) (in^2):**	1.095
rho Provided (V):	0.006	**rho min (V):**	0.002

WALL SEGMENT SECTION PROPERTIES

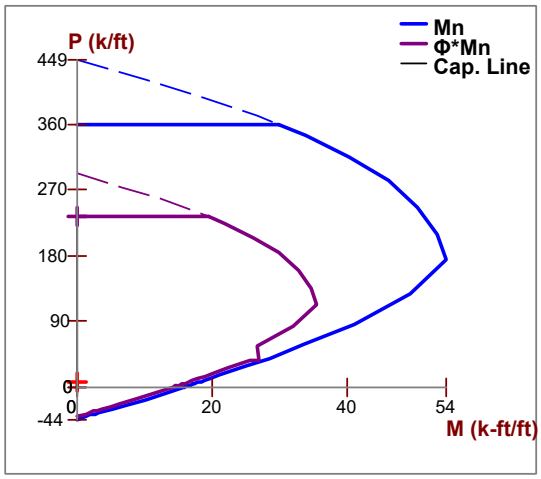
Total Width (in):	16	**Icracked (in^4):**	466.667	**KL/r:**	45.726
A (in^2):	160	**Cracked Mom, Mcr (k-ft):**	48.09		
Igross (in^4):	1333.333	**r (in):**	1.708		

SLENDER BENDING SPAN RESULTS

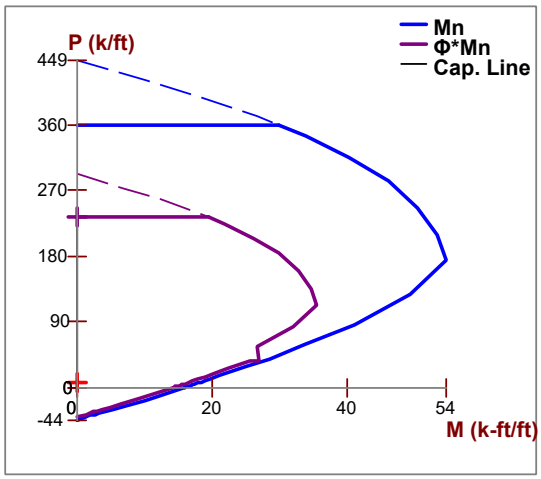
-Slenderness(P - Little Delta) and minimum moment considerations are only done for full - height regions.

OUT-PLANE WALL INTERACTION DIAGRAM

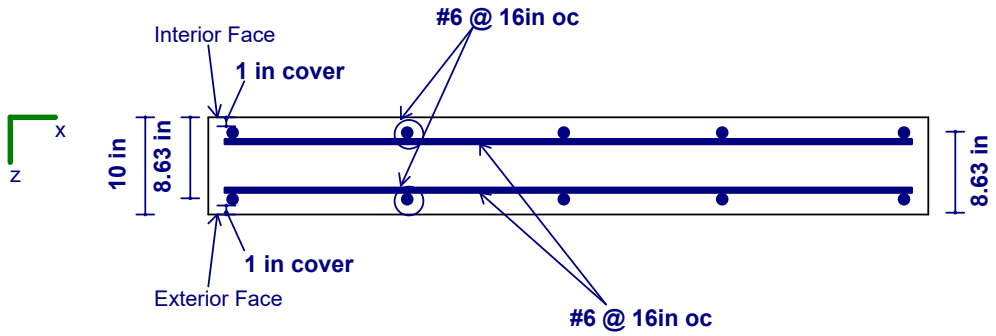
Interior (-z) Face Wall Interaction Diagram



Exterior (+z) Face Wall Interaction Diagram



CROSS SECTION DETAILING



Nodal Loads and Enforced Displacements

No Data to Print...

Member Point Loads

No Data to Print...

Wall Panel Point Loads

No Data to Print...

Diaphragm Point Loads

No Data to Print...

Member Distributed Loads

No Data to Print...

Wall Panel Distributed Loads (BLC 3 : Dead)

	Wall Label	Direction	Start Magnitude [k/ft, F]	End Magnitude [k/ft, F]	Start Location [(ft, %)]	End Location [(ft, %)]
1	WP1(36.75ft)	Y	-0.04	-0.04	0	19.566
2	WP12(12ft)	Y	-0.04	-0.04	0	7.104
3	WP3(36.75ft)	Y	-0.04	-0.04	0	7.143
4	WP5(34ft)	Y	-0.04	-0.04	0	6.333
5	WP6(28.75ft)	Y	-0.04	-0.04	0	27.124
6	WP2(36.75ft)	Y	-0.155	-0.155	0	10.038
7	WP4(36.75ft)	Y	-0.225	-0.225	0	21.587
8	WP7(28.75ft)	Y	-0.24	-0.24	0	13.583
9	WP8(23ft)	Y	-0.24	-0.24	0	14.83
10	WP11(12ft)	Y	-0.36	-0.36	0	23.288
11	WP13(12ft)	Y	-0.16	-0.16	0	28.878

Wall Panel Distributed Loads (BLC 4 : Snow)

	Wall Label	Direction	Start Magnitude [k/ft, F]	End Magnitude [k/ft, F]	Start Location [(ft, %)]	End Location [(ft, %)]
1	WP1(36.75ft)	Y	-0.2	-0.2	0	19.566
2	WP3(36.75ft)	Y	-0.2	-0.2	0	7.143
3	WP5(34ft)	Y	-0.2	-0.2	0	6.333
4	WP6(28.75ft)	Y	-0.2	-0.2	0	27.124
5	WP2(36.75ft)	Y	-0.775	-0.775	0	10.038
6	WP4(36.75ft)	Y	-1.25	-1.25	0	21.587
7	WP7(28.75ft)	Y	-1.2	-1.2	0	13.583
8	WP8(23ft)	Y	-1.2	-1.2	0	14.83
9	WP11(12ft)	Y	-1.8	-1.8	0	23.288
10	WP12(12ft)	Y	-0.1	-0.1	0	7.104
11	WP13(12ft)	Y	-0.4	-0.4	0	28.878

Diaphragm Distributed Loads

No Data to Print...

Member Area Loads

No Data to Print...

Plate Surface Loads

No Data to Print...

Wall Panel Surface Loads (BLC 1 : Avalanche Load)

	Wall Panel Label	Direction	Top Magnitude [ksf, F]	Bottom Magnitude [ksf, F]	Start Location [ft]	Height [ft]
1	WP15	z	0	0.151	9.2	4.1
2	WP15	z	0.151	0.151	4	5.2
3	WP10	z	0	0.194	9	5.2
4	WP10	z	0.194	0.194	4	5
5	WP9	z	0	0.273	9.2	7.4
6	WP9	z	0.273	0.273	4	5.2
7	WP8	z	0	0.363	9.3	9.75
8	WP8	z	0.363	0.363	4	5.3
9	WP7	z	0	0.434	9.5	11.6
10	WP7	z	0.434	0.434	4	5.5
11	WP6	z	0.276	0.276	4	6.2
12	WP6	z	0	0.276	10.2	7.4
13	WP5	z	0	0.573	22	15.3
14	WP5	z	0.573	0.573	12	10
15	WP4	z	0	0.72	21.3	19.2
16	WP4	z	0.72	0.72	12	9.3
17	WP3	z	0	0.424	20.6	11.3
18	WP3	z	0.424	0.424	12	8.6
19	WP2	z	0	0.582	20.15	15.5
20	WP2	z	0.582	0.582	12	8.15
21	WP1	z	0	-0.143	18.4	3.8
22	WP1	z	-0.143	-0.143	12	6.4

Wall Panel Surface Loads (BLC 2 : Retaining)

	Wall Panel Label	Direction	Top Magnitude [ksf, F]	Bottom Magnitude [ksf, F]	Start Location [ft]	Height [ft]
1	WP13	z	0	0.66	0	12
2	WP12	z	0	-0.66	0	12
3	WP11	z	0	-0.66	0	12
4	WP1	z	0	-0.66	0	12
5	WP2	z	0	0.66	0	12
6	WP3	z	0	0.66	0	12
7	WP4	z	0	0.66	0	12
8	WP5	z	0	0.66	0	12
9	WP6	z	0	0.22	0	4
10	WP7	z	0	0.22	0	4
11	WP8	z	0	0.22	0	4
12	WP10	z	0	0.22	0	4
13	WP9	z	0	0.22	0	4

Diaphragm Surface Loads

No Data to Print...

Basic Load Cases

	BLC Description	Category	Y Gravity	Distributed	Surface(Plate/Wall)
1	Avalanche Load	IL			22
2	Retaining	EPL			13
3	Dead	DL	-1	11	
4	Snow	SL		11	

Moving Loads

No Data to Print...

Moving Load Patterns

No Data to Print...

Time History Loads

No Data to Print...

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Combine	Yes	Y	1	1	2	1	3	1	4	1		
2	Avalanche + Retaining	Yes	Y	1	1	2	1						
3	DL	Yes	Y	3	1								
4	SL	Yes	Y	4	1								
5	AVY	Yes	Y	1	1								
6	Retaining	Yes	Y	2	1								
7	Deflection 1	Yes	Y	DL	1								
8	Deflection 2	Yes	Y	LL	1								
9	Deflection 3	Yes	Y	DL	1	LL	1						
10	IBC 16-1	Yes	Y	DL	1.4								
11	IBC 16-2 (a)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6				
12	IBC 16-2 (b)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	SL	0.5	SLN	0.5
13	IBC 16-3 (c)	Yes	Y	DL	1.2	SL	1.6	SLN	1.6	LL	0.5	LLS	1

Load Combination Design

	Description	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	Combine		Yes	Yes		Yes	Yes	Yes	Yes	Yes
2	Avalanche + Retaining		Yes	Yes		Yes	Yes	Yes	Yes	Yes
3	DL		Yes	Yes		Yes	Yes	Yes	Yes	Yes
4	SL		Yes	Yes		Yes	Yes	Yes	Yes	Yes
5	AVY		Yes	Yes		Yes	Yes	Yes	Yes	Yes
6	Retaining		Yes	Yes		Yes	Yes	Yes	Yes	Yes
7	Deflection 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	Deflection 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	Deflection 3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	IBC 16-1		Yes	Yes		Yes	Yes	Yes	Yes	Yes
11	IBC 16-2 (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
12	IBC 16-2 (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
13	IBC 16-3 (c)		Yes	Yes		Yes	Yes	Yes	Yes	Yes

Design Size and Code Check Parameters

	Label	Max Axial/Bending Chk	Max Shear Chk
1	Typical	1	1

Concrete Rebar Parameters

	Label	Optimize Rebar ?	Min Flex Bar	Max Flex Bar	Shear Bar	Legs per Stirrup	Top (Column) Cover [in]	Bottom Cover [in]	Side Cover [in]	Top/Bottom Bars	Add'l Side Bars	Shear Bar Spacing [in]
1	Typical	Optimize	#6	#10	#4	2	1.5	1.5	1.5	2	1	12

Deflection Design

	Label	LC	Ratio	LC	Ratio	LC	Ratio
1	Typical	1	240	2	360	3	240

Wall Panel U.C. Parameters

	Label	Max Bending Chk	Max Shear Chk
1	Typical	1	1
2	Avalanche	1	1
3	Garage Retaining	1	1
4	Test1	1	1
5	R5	1	1

Masonry Wall Panel Parameters

	Label	Block Nom Width	Block Grouting	Reinforced	Wall Area Method
1	Typical	10"	Partially Grouted	Yes	NCMA
2	Avalanche	8"	Partially Grouted	Yes	NCMA
3	Garage Retaining	8"	Partially Grouted	Yes	NCMA
4	Test1	8"	Partially Grouted	Yes	NCMA
5	R5	8"	Partially Grouted	Yes	NCMA

Masonry Wall Panel In-Plane Parameters

	Label	Vert Bar Size	Bars Per Cell	Min Bound Zone Width [in]	Max Bound Zone Width [in]	Horz Bar Size	Transfer Load
1	Typical	#5	1	8	40	#5	
2	Avalanche	#5	1	8	40	#5	
3	Garage Retaining	#5	1	8	40	#5	
4	Test1	#5	1	8	40	#5	
5	R5	#5	1	8	40	#5	

Masonry Wall Panel Out-of-Plane Parameters

	Label	Bar Size	Bar Space Min	Bar Space Max	Bar Placement	Cover [in]	Mortar Type	Cement Type	Transfer Load
1	Typical	#5	8"	72"	Center	Min	Type M or S	Portland, Lime/Mortar	
2	Avalanche	#5	8"	72"	Center	Min	Type M or S	Portland, Lime/Mortar	
3	Garage Retaining	#5	8"	72"	Center	Min	Type M or S	Portland, Lime/Mortar	
4	Test1	#5	8"	72"	Center	Min	Type M or S	Portland, Lime/Mortar	
5	R5	#5	8"	72"	Center	Min	Type M or S	Portland, Lime/Mortar	

Masonry Wall Panel Lintel Parameters

	Label	Depth [in]	Bear Length [in]	Bar Size	Min # Bars Per Layer	Max # Bars Per Layer	Num of Layers	c/c Sp of Layers [in]	Dist To Bot [in]	Stirrup Size	Analysis Method
1	Typical	16	8	#5	1	3	1	N/A	3.5	#4	Simply Supported
2	Avalanche	16	8	#5	1	3	1	N/A	3.5	#4	Simply Supported
3	Garage Retaining	16	8	#5	1	3	1	N/A	3.5	#4	Simply Supported
4	Test1	16	8	#5	1	3	1	N/A	3.5	#4	Simply Supported
5	R5	16	8	#5	1	3	1	N/A	3.5	#4	Simply Supported

Wood Wall Panel Parameters

	Label	Top Plate	Sill Plate	Studs	Min Stud Space [in]	Max Stud Space [in]	Green Lumber?	Header Size	Header Matl
1	Typical	2-2X8	2X6	2X6	16	16		6x8	Same as Wall
2	Avalanche	2-2X6	2X6	2X6	16	16		6X8	Same as Wall

Wood Wall Panel Parameters (Continued)

	Label	Top Plate	Sill Plate	Studs	Min Stud Space [in]	Max Stud Space [in]	Green Lumber?	Header Size	Header Matl
3	Garage Retaining	2-2X6	2X6	2X6	16	16		6X8	Same as Wall
4	Test1	2-2X6	2X6	2X6	16	16		6X8	Same as Wall
5	R5	2-2X6	2X6	2X6	16	16		6X8	Same as Wall

Additional Wood Wall Panel Parameters

	Label	Schedule	Min Panel Thick [in]	Max Panel Thick [in]	Double Sided Panel?	Max. Nail Spacing	Min. Nail Spacing	HD Chords	HD Chord Matl	Hold Down	Chord Strap	Eccentricity
1	Typical	AWC 2015 OSB	0.375	0.75	Optimum	6-in.	2-in.	2-2X8	Same as Wall	SIMPSON HoldDowns	SIMPSON Chord Straps	
2	Avalanche	AWC 2015 OSB	0.375	0.469	Optimum	6-in.	3-in.	2-2X6	Same as Wall	CAN SIMPSON Catalog	SIMPSON Chord Straps	
3	Garage Retaining	AWC 2015 OSB	0.375	0.469	Optimum	6-in.	3-in.	2-2X6	Same as Wall	CAN SIMPSON Catalog	SIMPSON Chord Straps	
4	Test1	AWC 2015 OSB	0.375	0.469	Optimum	6-in.	3-in.	2-2X6	Same as Wall	CAN SIMPSON Catalog	SIMPSON Chord Straps	
5	R5	AWC 2015 OSB	0.375	0.469	Optimum	6-in.	3-in.	2-2X6	Same as Wall	CAN SIMPSON Catalog	SIMPSON Chord Straps	

Concrete Wall Panel Rebar Parameters

	Label	Vert Bar Size	Max Vert Bar Space [in]	Min Vert Bar Space [in]	Vert Bar Inc [in]	Horz Bar Size	Max Horz Bar Space [in]	Min Horz Bar Space [in]	Horz Bar Inc [in]	Group Wall
1	Typical	#6	18	4	2	#4	18	4	2	
2	Avalanche	#6	16	8	2	#6	16	8	2	
3	Garage Retaining	#5	12	4	2	#5	12	4	2	
4	Test1	#4	18	4	2	#4	18	4	2	
5	R5	#6	16	4	2	#5	16	4	2	

Concrete Wall Panel Cover Parameters

	Label	Outer Bars	Location	Int Cover -z [in]	Ext Cover +z [in]	Edge Cover [in]	Transfer In	Transfer Out
1	Typical	Vertical	Each Face	1	1	2		
2	Avalanche	Vertical	Each Face	1	1	2		
3	Garage Retaining	Vertical	Centered	NA	NA	2		
4	Test1	Vertical	Each Face	1	1	2		
5	R5	Vertical	Each Face	1	1	2		

Frame / HR Seismic Design Rule

	Label	Frame Type	Column Ductility	Column Overstrength	Beam Ductility	Connection	Beam Overstrength	Z Factor	Hinge Location [in]	Brace Ductility	Brace Overstrength	KL/r
1	OCBF	OCBF	Minimal	Yes	Minimal	Other/None		N/A	N/A	Minimal		
2	SCBF	SCBF	High	Yes	High	Other/None	Yes	N/A	N/A	High		Yes
3	OMF	OMF	Minimal	Yes	Minimal	BUEEP			12	N/A		
4	IMF	IMF	Moderate	Yes	Moderate	BFP			12	N/A		
5	SMF-RBS	SMF	High	Yes	High	RBS		0.685	14.625	N/A		
6	SMF-KaiserB	SMF	High	Yes	High	KBB-B			12	N/A		
7	SMF-KaiserW	SMF	High	Yes	High	KBB-W			12	N/A		
8	SMF-BSEEP	SMF	High	Yes	High	BSEEP			12	N/A		
9	SMF-WUF-W	SMF	High	Yes	High	WUF-W				N/A		

Concrete Wall Seismic Design Rule

	Label	Wall Type	Diagonal Bar Size
1	SDR_Conc1	Ordinary	N/A

Masonry Wall Seismic Design Rule

No Data to Print...

Connection Design Rules

	Label	Conn Type	Type	Beam Conn	Col/Girder Conn	Eccentricity
1	Col/Bm Single Angle Shear	Shear	Column/Beam Clip Single Angle Shear	Bolted	Bolted	1.5
2	Col/Bm Double Angle Shear	Shear	Column/Beam Clip Double Angle Shear	Bolted	Bolted	0
3	Col/Bm Two Side Clip Angle Shear	Shear	Column/Beam Clip Double Angle (Both Side) Shear	Bolted	Bolted	N/A
4	Col/Bm End Plate Shear	Shear	Column/Beam End-Plate Shear	N/A	Bolted	N/A
5	Col/Bm Shear Tab Shear	Shear	Column/Beam Shear Tab Shear	Bolted	N/A	0
6	Girder/Bm Single Angle Shear	Shear	Girder/Beam Clip Single Angle Shear	Bolted	Bolted	N/A
7	Girder/Bm Double Angle Shear	Shear	Girder/Beam Clip Double Angle Shear	Bolted	Bolted	N/A
8	Grd/Bm Two Side Clip Angle Shear	Shear	Girder/Beam Clip Double Angle (Both Side) Shear	Bolted	Bolted	N/A
9	Girder/Bm End Plate Shear	Shear	Girder/Beam End-Plate Shear	N/A	Bolted	N/A
10	Girder/Bm Shear Tab Shear	Shear	Girder/Beam Shear Tab Shear	Bolted	N/A	N/A
11	Beam Shear Splice	Shear	Beam Shear Tab Splice	Bolted	N/A	N/A
12	Column Shear Splice	Shear	Column Shear Tab Splice	N/A	Bolted	N/A
13	Col/Bm Ext. End Plate Moment	Moment	Column/Beam Extended End-Plate Moment	N/A	N/A	N/A
14	Col/Bm PartExt. End Plate Moment	Moment	Column/Beam Partially Extended End-Plate Moment (Tension side)	N/A	N/A	N/A
15	Col/Bm Flush End Plate Moment	Moment	Column/Beam Flush End-Plate Moment	N/A	N/A	N/A
16	Col/Bm Flange Plate Moment	Moment	Column/Beam Flange Plate Moment	Bolted	N/A	N/A
17	Col/Bm Direct Weld Moment	Moment	Column/Beam Direct Weld Moment	Bolted	N/A	N/A
18	Col/Bm Seismic Moment	Moment	Column/Beam Seismic Moment	N/A	N/A	N/A
19	Beam Moment Plate Splice	Moment	Beam Moment Plate Splice	Bolted	N/A	N/A
20	Column Moment Plate Splice	Moment	Column Moment Plate Splice	N/A	N/A	N/A
21	Beam Direct Weld Moment Splice	Moment	Beam Direct Weld Splice	Bolted	N/A	N/A
22	Col Direct Weld Moment Splice	Moment	Column Direct Weld Splice	N/A	Bolted	N/A
23	Bm Ext. End Plate Moment Splice	Moment	Beam Extended End Plate Splice	Bolted	N/A	N/A
24	Col Ext. End Plate Moment Splice	Moment	Column Extended End Plate Splice	N/A	Bolted	N/A
25	Diagonal Vertical Brace	Brace	Diagonal Vertical Brace	N/A	N/A	N/A
26	Chevron Vertical Brace	Brace	Chevron Vertical Brace	N/A	N/A	N/A
27	Seismic Diagonal Brace	Brace	Diagonal Brace Seismic	N/A	N/A	N/A
28	Seismic Chevron Brace	Brace	Chevron Brace Seismic	N/A	N/A	N/A
29	Knee Brace	Brace	Knee Brace	N/A	N/A	N/A
30	Single Column Base Plate	Baseplate	Single Column Baseplate	N/A	N/A	N/A
31	Base Plate with Vertical Brace	Baseplate	Brace to Column Base Plate	N/A	N/A	N/A
32	HSS Truss Connection	Truss	HSS T-Connection	N/A	N/A	N/A

Drift Definitions

	Type	Floor/Diaphragm	Node Label	Elevation [ft]
1	Diaphragm	Diaph.: 1	-	12
2	Diaphragm	Diaph.: 2	-	0

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	7.104	0	89.708	
2	N2	26.67	0	89.708	
3	N3	26.67	0	79.67	
4	N4	33.8125	0	79.67	
5	N5	33.8125	0	58.083	
6	N6	7.104	36.75	89.708	
7	N7	26.67	36.75	89.708	
8	N8	26.67	36.75	79.67	
9	N9	33.8125	36.75	79.67	

Node Coordinates (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
10	N10	33.8125	36.75	58.083	
11	N11	40.146	8	58.083	
12	N12	40.146	34	58.083	
13	N13	40.146	36.75	58.083	
14	N14	33.8125	34	58.083	
15	N15	67.27	8	58.083	
16	N16	67.27	36.75	58.083	
17	N17	67.27	8	44.5	
18	N18	67.27	36.75	44.5	
19	N19	67.27	31	44.5	
20	N20	67.27	8	29.67	
21	N22	74.604	8	29.67	
22	N23	74.604	31	29.67	
23	N24	67.27	31	29.67	
24	N25	70.604	8	29.67	
25	N26	70.604	26	29.67	
26	N27	70.604	8	18.5	
27	N28	70.604	26	18.5	
28	N29	7.104	12	89.708	
29	N30	7.104	0	66.42	
30	N31	7.104	12	66.42	
31	N32	0	0	66.42	
32	N33	0	12	66.42	
33	N34	0	0	37.542	
34	N35	0	12	37.542	
35	N36	26.67	0	61.542	
36	N37	26.67	36	61.542	
37	N38	33.8125	0	61.542	
38	N39	33.8125	36	61.542	
39	N40	40.146	0	58.083	
40	N41	70.604	31	29.67	
41	N42	40.146	0	52	
42	N43	40.146	23	52	
43	N44	40.146	23	58.083	
44	N44A	26.67	12	89.708	
45	N45	26.67	12	79.67	
46	N46	33.8125	12	79.67	
47	N47	33.8125	12	58.083	
48	N48	40.146	12	58.083	
49	N49	67.27	12	58.083	
50	N50	67.27	12	44.5	
51	N51	67.27	12	29.67	
52	N52	70.604	12	29.67	
53	N53	70.604	12	18.5	
54	N54	33.8125	12	61.542	
55	N55	26.67	12	61.542	
56	N56	74.604	12	29.67	
57	N57	40.146	12	52	

Node Boundary Conditions

No Data to Print...

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B RECT	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A500 Gr.C RND	29000	11154	0.3	0.65	0.527	46	1.4	62	1.3
7	A500 Gr.C RECT	29000	11154	0.3	0.65	0.527	50	1.4	62	1.3
8	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
9	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3
10	A913 Gr.65	29000	11154	0.3	0.65	0.49	65	1.1	80	1.1

Cold Formed Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Yield [ksi]	Fu [ksi]
1	A653 SS Gr33	29500	11346	0.3	0.65	0.49	33	45
2	A653 SS Gr50/1	29500	11346	0.3	0.65	0.49	50	65

Wood Properties

	Label	Type	Database	Species	Grade	Cm	Ci	Emod	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]
1	DF	Solid Sawn	Visually Graded	Douglas Fir-Larch	No.1			1	0.3	0.3	0.035
2	SP	Solid Sawn	Visually Graded	Southern Pine	No.1			1	0.3	0.3	0.035
3	HF	Solid Sawn	Visually Graded	Hem-Fir	No.1			1	0.3	0.3	0.035
4	SPF	Solid Sawn	Visually Graded	Spruce-Pine-fir	No.1			1	0.3	0.3	0.035
5	24F-1.8E DF Balanced	Glulam	NDS Table 5A	24F-1.8E_DF_BAL	na			1	0.3	0.3	0.035
6	24F-1.8E DF Unbalanced	Glulam	NDS Table 5A	24F-1.8E_DF_UNBAL	na			1	0.3	0.3	0.035
7	24F-1.8E SP Balanced	Glulam	NDS Table 5A	24F-1.8E_SP_BAL	na			1	0.3	0.3	0.035
8	24F-1.8E SP Unbalanced	Glulam	NDS Table 5A	24F-1.8E_SP_UNBAL	na			1	0.3	0.3	0.035
9	1.3E-1600F_VERSALAM	SCL	Boise Cascade	1.3E-1600F_VERSALAM	na			1	0.3	0.3	0.035
10	1.35E LSL_SolidStart	SCL	Louisiana Pacific	1.35E LSL_SolidStart	na			1	0.3	0.3	0.035
11	1.3E_RIGIDLAM LVL	SCL	Roseburg Forest Products	1.3E_RIGIDLAM LVL	na			1	0.3	0.3	0.035
12	2.0E_DF Parallam PSL	SCL	TrusJoist	2.0E_DF Parallam PSL	na			1	0.3	0.3	0.035
13	LVL_PRL_1.5E_2250F	Custom	N/A	LVL_PRL_1.5E_2250F	na			1	0.3	0.3	0.035
14	LVL_Microlam_1.9E_2600F	Custom	N/A	LVL_Microllam_1.9E_2600F	na			1	0.3	0.3	0.035
15	PSL_Parallam_2.0E_2900F	Custom	N/A	PSL_Parallam_2.0E_2900F	na			1	0.3	0.3	0.035
16	LSL_TimberStrand_1.55E_2325F	Custom	N/A	LSL_TimberStrand_1.55E_2325F	na			1	0.3	0.3	0.035

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	f'c [ksi]	Lambda	Flex Steel [ksi]	Shear Steel [ksi]
1	Conc3000NW	3156	1372	0.15	0.6	0.145	3	1	60	60
2	Conc3500NW	3409	1482	0.15	0.6	0.145	3.5	1	60	60
3	Conc4000NW	3644	1584	0.15	0.6	0.145	4	1	60	60
4	Conc3000LW	2085	907	0.15	0.6	0.11	3	0.75	60	60
5	Conc3500LW	2252	979	0.15	0.6	0.11	3.5	0.75	60	60
6	Conc4000LW	2408	1047	0.15	0.6	0.11	4	0.75	60	60
7	CONC5000NW	4030	1752	0.15	0.6	0.145	5	1	60	60

Masonry Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Self Weight [k/ft³]	f'm [ksi]	Flex Steel [ksi]	Shear Steel [ksi]
1	Concrete Matl	1350	540	0.25	0.6	Custom	1.5	60	60
2	Clay Matl	1050	420	0.25	0.6	Custom	1.5	60	60

Masonry Properties (Continued)

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Self Weight [k/ft³]	f'm [ksi]	Flex Steel [ksi]	Shear Steel [ksi]
3	Gen Masonry	1050	420	0.25	0.6	0.08	1.5	60	60

Aluminum Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Table B.4	kt	Ftu [ksi]	Fty [ksi]	Fcy [ksi]	Fsu [ksi]	Ct
1	3003-H14	10100	3787.5	0.33	1.3	0.173	Table B.4-1	1	19	16	13	12	141
2	6061-T6	10100	3787.5	0.33	1.3	0.173	Table B.4-2	1	38	35	35	24	141
3	6063-T5	10100	3787.5	0.33	1.3	0.173	Table B.4-2	1	22	16	16	13	141
4	6063-T6	10100	3787.5	0.33	1.3	0.173	Table B.4-2	1	30	25	25	19	141
5	5052-H34	10200	3787.5	0.33	1.3	0.173	Table B.4-1	1	34	26	24	20	141
6	6061-T6 W	10100	3787.5	0.33	1.3	0.173	Table B.4-1	1	24	15	15	15	141

Stainless Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	n	Yield [ksi]	Fu [ksi]
1	A276 S316	28000	10780	0.3	0.93	0.5	5.6	30	75
2	A276 S321	29000	11165	0.3	0.73	0.48	5.6	65	94
3	A276 S304	28000	10780	0.3	0.93	0.49	5.6	30	75

General Materials Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Plate Methodology
1	gen_Conc3NW	3155	1372	0.15	0.6	0.145	Isotropic
2	gen_Conc4NW	3644	1584	0.15	0.6	0.145	Isotropic
3	gen_Conc3LW	2085	906	0.15	0.6	0.11	Isotropic
4	gen_Conc4LW	2408	1047	0.15	0.6	0.11	Isotropic
5	gen_Alum	10100	4077	0.3	1.29	0.173	Isotropic
6	gen_Steel	29000	11154	0.3	0.65	0.49	Isotropic
7	gen_Plywood	1800	38	0	0.3	0.035	Isotropic
8	RIGID	1e+6		0.3	0	0	Isotropic
9	gen_Ortho	N/A	N/A	N/A	0.65	0.49	Orthotropic

Custom Wood Properties

	Label	Fb	Ft	Fv	Fc	E	E05	Type
1	LVL_PRL_1.5E_2250F	2.25	1.5	0.22	1.95	1500	0.5	SCL
2	LVL_PRL_2.0E_2900F	2.9	1.9	0.285	2.75	2000	0.5	SCL
3	LVL_Microllam_1.9E_2600F	2.6	1.555	0.285	2.51	1900	0.5	SCL
4	PSL_Parallam_2.0E_2900F	2.9	2.025	0.29	2.9	2000	0.5	SCL
5	PSL_Parallam_1.8E	2.4	1.755	0.18	2.5	1800	0.5	SCL
6	LSL_TimberStrand_1.55E_2325F	2.325	1.07	0.31	2.05	1550	0.5	SCL
7	LSL_TimberStrand_1.3E_1700F	1.7	1.075	0.4	1.4	1300	0.5	SCL

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	HR1	W10X33	Beam	Wide Flange	A992	Typical	9.71	36.6	171	0.583

Cold Formed Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	CF1	8CU1.25X057	Beam	CU	A653 SS Gr33	Typical	0.581	0.057	4.41	0.00063

Wood Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	WOOD1	2X6	Beam	Rectangular Double	DF	Typical	8.25	1.547	20.797	5.125

Concrete Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	CONC1	CRECT12X8	Beam	Rectangular	Conc3000NW	Typical	96	512	1152	1187.84

Aluminum Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	AL1	AAI3X1.64	Beam	None	3003-H14	Typical	1.39	0.522	2.24	0.019

Stainless Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	SS1	W10X33_SS	Beam	None	A276 S316	Typical	9.71	36.6	171	0.583

General Section Sets

	Label	Shape	Type	Material	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	GEN1	RE4X4	Beam	gen_Conc3NW	16	21.333	21.333	31.573
2	RIGID		None	RIGID	1e+6	1e+6	1e+6	1e+6

Member Primary Data

No Data to Print...

Member Advanced Data

No Data to Print...

Hot Rolled Steel Design Parameters

No Data to Print...

Cold Formed Steel Design Parameters

No Data to Print...

Wood Design Parameters

No Data to Print...

Concrete Beam Design Parameters

No Data to Print...

Concrete Column Design Parameters

No Data to Print...

Aluminum Design Parameters

No Data to Print...

Stainless Steel Design Parameters

No Data to Print...

Member RISAConnection Properties

No Data to Print...

Plate Primary Data

No Data to Print...

Plate Advanced Data

No Data to Print...

Solid Primary Data

No Data to Print...

Wall Panel Data

	Label	A Node	B Node	C Node	D Node	Material Type	Material Set	Thickness [in]	Design Rule	Panel/Spacing
1	WP1	N7	N2	N1	N6	Concrete	Conc4000NW	20	Avalanche	N/A
2	WP2	N7	N2	N3	N8	Concrete	Conc4000NW	20	Avalanche	N/A
3	WP3	N8	N3	N4	N9	Concrete	Conc4000NW	20	Avalanche	N/A
4	WP4	N9	N4	N5	N10	Concrete	Conc4000NW	20	Avalanche	N/A
5	WP6	N13	N11	N15	N16	Concrete	Conc4000NW	20	Avalanche	N/A
6	WP7	N16	N15	N17	N18	Concrete	Conc4000NW	20	Avalanche	N/A
7	WP8	N19	N17	N20	N24	Concrete	Conc4000NW	20	Avalanche	N/A
8	WP10	N26	N25	N27	N28	Concrete	Conc4000NW	20	Avalanche	N/A
9	WP11	N29	N1	N30	N31	Concrete	Conc4000NW	10	Avalanche	N/A
10	WP12	N31	N30	N32	N33	Concrete	Conc4000NW	10	Avalanche	N/A
11	WP13	N35	N34	N32	N33	Concrete	Conc4000NW	10	R5	N/A
12	WP14	N39	N38	N36	N37	Concrete	Conc4000NW	20	Avalanche	N/A
13	WP5	N14	N5	N40	N12	Concrete	Conc4000NW	20	Avalanche	N/A
14	WP15	N41	N25	N22	N23	Concrete	Conc4000NW	20	Avalanche	N/A
15	WP9	N24	N20	N25	N41	Concrete	Conc4000NW	20	Avalanche	N/A
16	WP16	N44	N40	N42	N43	Concrete	Conc4000NW	10	Avalanche	N/A

Wall Panel Advanced Data

	Label	Seismic Rule	Design Method	SSAF	Stud Bracing	Sheathing Connect Dist [in]
1	WP1	SDR_Conc1	N/A	N/A	N/A	N/A
2	WP2	SDR_Conc1	N/A	N/A	N/A	N/A
3	WP3	SDR_Conc1	N/A	N/A	N/A	N/A
4	WP4	SDR_Conc1	N/A	N/A	N/A	N/A
5	WP6	SDR_Conc1	N/A	N/A	N/A	N/A
6	WP7	SDR_Conc1	N/A	N/A	N/A	N/A
7	WP8	SDR_Conc1	N/A	N/A	N/A	N/A
8	WP10	SDR_Conc1	N/A	N/A	N/A	N/A
9	WP11	SDR_Conc1	N/A	N/A	N/A	N/A
10	WP12	SDR_Conc1	N/A	N/A	N/A	N/A
11	WP13	SDR_Conc1	N/A	N/A	N/A	N/A
12	WP14	SDR_Conc1	N/A	N/A	N/A	N/A
13	WP5	SDR_Conc1	N/A	N/A	N/A	N/A
14	WP15	SDR_Conc1	N/A	N/A	N/A	N/A
15	WP9	SDR_Conc1	N/A	N/A	N/A	N/A
16	WP16	SDR_Conc1	N/A	N/A	N/A	N/A

Diaphragms

	Node Label	Plane	Inactive	No Wind/Drift
1	N29	ZX	Yes	
2	N1	ZX	Yes	

STRUCTURAL SPECIFICATION

SPECIAL INSPECTIONS

IBC 2018, TABLE 1705.3
REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCE STANDARD (a)	IBC REFERENCE
1. Inspection of reinforcing steel, including pre-stressing tendons, and placement.	-	X	ACI 318: Ch. 20, 25.2, 25.3, 26.6.1-26.6.3	1908.4
2. Inspection of reinforcing steel welding in accordance with table 1705.2.2, item 2b.	-	-	AWS D1.4 ACI 318: 26.6.4	-
3. Inspection of anchors cast in concrete where allowable loads have been increased or where strength design is used.	-	X	ACI 318: 17.8.2	-
4. Inspection of anchors post installed in hardened concrete members.	-	X	ACI 318: 17.8.24, 17.8.2	-
5. Verifying use of required design mix.	-	X	ACI 318: Ch. 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
6. At the time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	X	-	ASTM C 172 ASTM C 31 ACI 318: 25.5, 26.12	1908.10
7. Inspection of concrete and shotcrete placement for proper application techniques.	X	-	ACI 318: 26.5	1908.6, 1908.7, 1908.8
8. Inspection for maintenance of specified curing temperature and techniques.	-	X	ACI 318: 26.5.3-26.5.5	1908.9
9. Inspection of prestressed concrete: a. Application of prestressing forces. b. Grouting of bonded prestressing tendons in the seismic-force-resisting system.	X X	- -	ACI 318: 26.10	-
10. Erection of precast concrete members.	-	X	ACI 318: 26.9	-
11. Verification of in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.	-	X	ACI 318: 26.11.2	-
12. Inspect formwork for shape, location and dimensions of the concrete member being formed.	-	X	ACI 318: 26.11.1.2(b)	-

a. Where applicable, see also Section 1705.11, Special inspection for seismic resistance.

AISC 360-16 CHAPTER N
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION

WELDING INSPECTION TASK	TABLE REFERENCE
PRIOR TO WELDING	TABLE N5.4-1
DURING TO WELDING	TABLE N5.4-2
AFTER TO WELDING	TABLE N5.4-3
BOLTING INSPECTION TASK	
PRIOR TO BOLTING	TABLE N5.6-1
DURING TO BOLTING	TABLE N5.6-2
AFTER TO BOLTING	TABLE N5.6-3

AISC 341-16 CHAPTER J
REQUIRED VERIFICATION AND INSPECTION OF SEISMIC STEEL MOMENT FRAMES AND BRACED FRAMES

WELDING INSPECTION TASK	TABLE REFERENCE
PRIOR TO WELDING	TABLE J6.1
DURING TO WELDING	TABLE J6.2
AFTER TO WELDING	TABLE J6.3
BOLTING INSPECTION TASK	
PRIOR TO BOLTING	TABLE J7.1
DURING TO BOLTING	TABLE J7.2
AFTER TO BOLTING	TABLE J7.3

GENERAL NOTES

The General Contractor shall verify all existing site conditions and coordinate dimensions among all drawings prior to proceeding with any work or off site fabrication.

Any discrepancies found among the drawings, specifications and notes shall be reported to the Engineer Of Record for clarification.

Contractor to submit a request to Engineer for any substitution of materials or products specified in the contract drawings or specifications.

Contractor to provide shop drawings to the Engineer for review prior to the fabrication and erection of the following items: Structurally Insulated Panels (SIP's), Structural Steel and Miscellaneous Metals, Manufactured Wood Joists and Trusses.

Holes, notching or other penetrations through structural members shall not be permitted without prior Engineer approval.

It is the responsibility of the General Contractor for safety and protection within and adjacent to the job site.

CONCRETE & REINFORCEMENT

CONCRETE
Structural concrete shall be of normal weight concrete (145pcf) with a maximum aggregate size of 3/4" conforming to ASTM C 33, and shall meet the following criteria:

LOCATION	MINIMUM 28day COMPRESSIVE STRENGTH, psi	MAXIMUM WATER-CEMENT RATIO (b)	MAXIMUM SLUMP, inches (a)	AIR-ENTRAINMENT PERCENT ± 1.5%	CEMENT TYPE
ALL STRUCTURAL CONCRETE	4500	.50	4	6	II

a) Maximum slump based on maximum water-cementitious ratio. Mid and high range water reducing agents can be used to increase slump beyond these maximums with Approval of Engineer.
b) Water shall not be added at the job site such that the water-cementitious ratio is exceeded.

CONCRETE BATCHING, MIXING, TRANSPORTATION, PLACEMENT, CONSOLIDATION, HOT & COLD WEATHER PROTECTION
Concrete batching, mixing, and transportation shall conform to ACI 304R.
Cement to conform to ASTM C 150.
Aggregates to conform to ASTM C 33.
Water shall conform to ACI 318-3A.
Placing of concrete shall conform to ACI 304R and ACI 318-5.10.
Pumping of concrete shall conform to ACI 304.2R.
No more than 90 minutes shall elapse between batching and placement of concrete.
Form work shall conform to ACI 347R and ACI 318-6.1.
Reinforcing steel and Embedded items shall be clean and free of foreign debris and be tied securely in place and care taken not to displace during concrete placement.
Conduits and Pipes shall not be embedded in concrete without Engineers written approval.
Consolidation of concrete shall conform to ACI 309R. The unconfined fall of concrete shall not exceed 5'-0".
Hot weather concreting shall conform to ACI 305R.
Cold weather concreting shall conform to ACI 306R.
Concrete shall not be placed on disturbed soil, frozen soil, or placed in water.
Forms shall not be stripped from walls and footings until concrete strength reaches a minimum of 1000psi. Forms supporting suspended slabs shall not be stripped until full 28day specified compressive strength is achieved.

CONCRETE WALLS
Provide dowels from footing to wall to match vertical reinforcement size, spacing and location with embed hooks minimum 12 bar diameters in length, U.O.N.

Provide corner bars with 2'-0" long legs to match horizontal reinforcement size, spacing and location unless otherwise noted in drawings. Lap splice horizontal steel full length with corner bars.

Reinforcing steel shall be continuous through all cold joints.

Stem walls shall not be back filled until main floor is framed and sheathed, and concrete has cured a minimum 7 days.

Provide adequate drainage behind walls as required to prevent standing water behind walls.

Anchor bolts shall be ASTM F1554 Grade 36 and of the size and spacing as indicated on the drawing and have a 7" minimum embedment depth. Anchor bolts to be within 1'-0" of all plate ends, with a minimum of two per wall, and closer than 6" from concrete wall corners.

CONCRETE SLABS ON GRADE
Unless otherwise noted on drawings, concrete slabs on grade to be minimum 6" thick, reinforced with #4 @ 12"o.c. each way placed at slab centerline.

Slabs to be placed over 6" thick compacted gravel base over undisturbed or compacted native strata.

All surfaces of construction joints shall be free of dust, chips and foreign matter prior to casting adjacent slab. Reinforcement shall be continuous through construction and crack control joints.

Provide 3/8" thick expansion joint material and sealant between slab edges and abutting walls and columns unless otherwise noted on the drawings.

Provide 3/4" deep tooled or saw-cut crack control joints at a maximum of 15'-0" apart in both directions. Fill joint with and elastomeric sealant. Contractor to submit to the Architect/Engineer proposed control and construction joint locations for review prior to concrete placement.

REINFORCING STEEL
Reinforcing steel shall conform to ASTM A615, grade 60. Welded Wire Fabric shall conform to ASTM A185. Reinforcing steel to be detailed, fabricated, and placed in accordance with ACI 315 and ACI 318.

Reinforcement and deformed bar anchors to be welded shall be A706 weldable or prior approved equal. Welding of rebar to be approved by Engineer. Welding shall conform to AWS D1.4 standards.

LAP SPLICES
Unless otherwise noted, lap splices shall be minimum 48 x bar diameter.

Clear spacing between bars to be greater than 2 bar diameters. Clear cover greater than 1 bar diameter.

Reinforcement concrete cover requirements, unless otherwise noted in drawings, as follows:

(1) Cast against earth 3"
(2) Cast against form,
Exposed to earth or weather 2"
(3) Walls, slabs, joists
Not exposed to earth or weather 3/4"
(4) Beams, columns
Not exposed to earth or weather 1-1/2"

SOIL & FILL

FOUNDATION/SOILS
Design soil bearing pressure = 4000 psf - See Bulter Associates Geotechnical Report

All foundations shall bear on firm, undisturbed, drained, granular soil free of organic material. If soil is disturbed, compact soil in maximum 8" deep lifts to 95% maximum dry density per ASTM D698.

Contractor to notify Engineer if soil conditions are contrary to the assumed design conditions which may require over excavation and placement of structural fill or a lower assumed soil bearing pressure such as clays, silts or organics.

Exterior footings shall bear a minimum of 2'-8" below finished grade unless otherwise noted in the drawings.

STRUCTURAL FILL
Structural Fill to be GW, GP, SW, or Sp soil under the unified classification system.
Structural Fill shall consist of 4" minus select, clean, granular soil with no more than 12% passing the #200 sieve.
Fill shall be placed in lifts of no more than 8", moisture conditioned, and compacted to 95% of modified proctor density ASTM D1557.
Structural Fill placed below footings must extend laterally outside the perimeter of the footing for a distance equal to the thickness of the fill measured from the bottom of the footing to the underlying undisturbed soil.
Back fill behind stem walls and retaining walls to be the same as prescribed above, except the maximum aggregate size should be 2". Compaction of back fill behind walls shall be done by hand compactors.

DESIGN CRITERIA

BUILDING CODE
Design, construction, and inspection shall conform to the International Building Code, (IBC), 2018 Edition and International Residential Code, 2018 Edition and all Local Codes that may be applicable.

Material test standards referenced shall be the edition referenced in the 2018 IBC.

RISK CATEGORY OF BUILDING: II

DESIGN LOAD CRITERIA
At all times, the General Contractor and Owner shall keep the loads on the structure within the limits of the design load criteria.

The General Contractor is responsible to provide all bracing and shoring as required to support the loads that may be imposed on the structure during construction until all structural elements are complete.

DESIGN ROOF LOADS

Live Load (Snow)	100 PSF (Balanced Snow Load)
Dead Load	20 PSF
Importance Factor Snow (Is)	1.0
Drift and Un-Balanced Loads per ASCE/SEI 7-16	
Ground Snow Load	120 PSF
Exposure Factor (Ce)	1.0
Temperature Factor (Ct)	1.1

DESIGN FLOOR LOADS

Live Load	40 PSF
Dead Load	20 PSF

DESIGN DECK LOADS

Live Load	40 PSF
Dead Load	35 PSF

WIND LOAD DATA

Wind Speed (3 sec. gust)	103 MPH
Importance Factor (Iw)	1.0
Building Category	II
Exposure Category	B
Internal Pressure Coefficient	+/- 0.18

SEISMIC LOAD DATA

Project Coordinates	(43.69, -114.4)
Importance Factor (Is)	1.0
Ss	0.631
S1	0.194
Sds	0.545
Sd1	0.287
Site Class	D
Seismic Design Category	D

Basic Seismic Force Resisting System - Light Frame Walls with Wood Structural Panels
Response Modification Coefficient (R) = 6.5
Equivalent Force Analysis Procedure
F = 1.0
Vbase (unmodified) 0.084*W
Seismic Weights (W) Dead Loads + 35% Balanced Snow Load

STRUCTURAL STEEL

STRUCTURAL STEEL AND MISCELLANEOUS METALS
All structural steel, fabrication, painting, and erection shall comply with AISC Manual of Steel Construction including the Code of Standard Practice and the IBC 2018 edition.

All wide flange sections shall conform to ASTM A992 yield stress = 50 ksi.

All plates, angles, and channels to conform to ASTM A36 yield stress = 36 ksi.

All structural steel tubing to conform to ASTM A500 grade B yield stress = 46 ksi.

All structural steel pipe shall conform to ASTM A501 grade B yield stress = 36 ksi.

Use ASTM A325 bolts where specified in documents for all steel to steel connections with a minimum diameter of 5/8".

Threaded rod to be welded shall conform to ASTM A307 S1 or ASTM F1554 Grade 36. Alternate weldable steel materials may be used with Engineer prior approval.

All bolts shall be tightened to the minimum bolt tension in Accordance with AISC Specifications For Structural Joints Using ASTM A325 or A490 Bolts. Direct tension indicators or twist-off-type tension-control bolt assemblies may be used. Provide carbonized washers between turned element and steel. Connections indicated as slip critical (SCr), shall have a minimum of a Class A contact surface preparation and bolts tightened to the specified minimum bolt tension utilizing direct tension indicators.

Holes in structural steel may be made only with Engineer prior approval.

All welding shall be performed in accordance with a Welding Procedure Specification (WPS) as required in AWS D1.1 Structural Welding Code and the IBC 2018 code.

Weld Filler to comply with E70XX low hydrogen electrodes with a Charpy-V-Notch (CVN) of 20 foot-pounds at -20 degrees F. The WPS shall be within the parameters established by the filler metal manufacturer.

Welder shall be certified by AWS standards within the past 12 months. Upon request, written certification shall be submitted to the Architect/Engineer or special inspectors for review.

Welder shall avoid welding directly in the K-area of structural steel.

Shop drawings shall be approved by Engineer prior to fabrication or erection. Shop drawing submittal shall include, but not be limited to, all welding, bolting, dimensions, member size and grade.

CONCRETE MASONRY

Concrete masonry materials and construction shall conform to the American Concrete Institute (ACI) 530.
All concrete masonry units shall conform to ASTM C 90, Grade N-1, and normal weight. Minimum net area compressive strength of masonry units shall be 2,500 PSI at 28 days.
Mortar for all work shall be type M or S.
Grout for filling shall be a minimum compressive strength (f'm) of 2800 psi, and shall conform to ASTM C476, place grout filling 8'-0" maximum lift vertically.
All reinforcing bars for masonry construction shall conform to ASTM A-615 grade 60. Lap length shall be minimum 40 bar diameters.

WOOD FRAMING

SAWN STRUCTURAL LUMBER
Structural lumber shall conform to the latest edition of the West Coast Lumber Inspection Bureau (WCLIB) or Western Wood Products Association (WWPA) grading rules for the specified sizes and minimum grades listed below:

2x & 4x Douglas Fir-Larch No.2
6x and larger Douglas Fir-Larch No.1

Wood Members in contact with concrete or masonry walls below grade or supported by concrete or masonry foundations that are less than 8" from exposed earth shall be naturally durable wood or preservative-treated per AWPA U1. See IRC section 2304.11 for additional decay and termite protection requirements.

LAMINATED VENEER LUMBER (LVL)
Laminated Veneer Lumber shall conform to the minimum allowable design properties listed below. LVL material to be of solid sections. Substitution of multiple piece sections requires Engineer's prior approval.

Where multiple piece LVL sections are specified in drawings, nail two ply and three ply LVL sections with (3) rows 16d common at 12"o.c. each ply.

LVL Minimum Allowable Design Properties:

1-3/4" thick		3-1/2" - 7" thick	
Fb (bending) =	2800psi	Fb (bending) =	3100psi
Fv (horizontal) =	285psi	Fv (horizontal) =	285psi
Fc (parallel) =	3000psi	Fc (parallel) =	3000psi
Fc (perpendicular) =	750psi	Fc (perpendicular) =	750psi
E =	2,000,000psi	E =	2,000,000psi

GLUED-LAMINATED TIMBER
All Glued-Laminated Timber shall conform to the AITC 117 Combination 24F-V8 DF/DF 1.8E unless noted otherwise in drawings. Enclosed or wrapped glued-laminated timbers to be industrial grade finish. Exposed glued-laminated timbers to be architectural grade finish or as indicated in drawings.

Fabrication shall be in accordance with AITC 117. Provide wet use adhesives. Maximum moisture content shall be 15%.

Timbers to be fabricated with single piece lumber across the width or multiple pieces that have been edge bonded.

Install Glued Laminated Timber beams with "TOP SIDE" up as designated on beam.

MANUFACTURED WOOD JOISTS
Manufactured wood "I's" joists, to be manufactured by RedBUILT, Truss Joist Corporation or Boise Cascade, and to be of the type and spacing specified in the drawings.

Joists shall be erected, installed and braced per manufacturer's specifications.

Other manufactured wood joists may be substituted with prior Engineer approval.

All holes must be cut within joist web and meet manufacturer's requirements.

WOOD FRAMING
Conventional Light Framing construction shall conform to IRC section 2308.

All framing fastening shall be in accordance with IRC section 2304.9 unless otherwise noted on the drawings.

Minimum header shall be (3) 2x8 unless otherwise noted in drawings.

Minimum header post shall be 2x6 bearing (trimmer) stud plus 2x6 king stud each end below 6x8 and (2) 2x6 trimmer studs plus 2x6 king stud for 6x10 and larger, unless otherwise noted in drawings.

Typical beam pocket at beam bearing locations shall consist of full beam width 2x6 bearing trimmers and 2x6 grabber stud each side. Where 2x6 grabber studs are not possible, provide Simpson MTS20 or ST6224 steel strap attached equally to beam and bearing stud.

Provide minimum 1-1/4" thick solid blocking below all bearing walls. Provide minimum 1-1/4" thick solid rim board at perimeter of all floors.

Provide solid blocking in floor space below all posts and trimmers from above. Where "I" joists interrupt blocking, provide joist web stiffeners and blocking per manufacturers recommendations.

Typical wall construction to consist of 2x6 studs @ 16"/24"o.c. module with framing members above, U.O.N.
Where wall heights exceed 13'-0", wall construction to consist of 1-1/2"x5-1/2" BCI 2.0E VERSA-STUD at 16"o.c. (or equivalent).

PLYWOOD SHEATHING
All plywood sheathing shall be APA rated exposure 1 plywood with thickness, veneer grades and span ratings as noted herein or in drawings.

Plywood at roof and floors shall be laid with face grain perpendicular to supports and end joints staggered at 4'-0" o.c.. Provide 1/8" space at all panel edges.

Nail roof sheathing with 10d common (0.148"ø x 3") at 6"o.c. boundary edges, 6"o.c. interior panel edges, and 12"o.c. intermediate unless otherwise noted on drawings. Nails shall be driven with the head of the nail flush with the surface of the sheathing, over-driven nails will be subject to rejection.

Glue floor sheathing and nail with 10d common (0.148"ø x 3") at 6"o.c. boundary edges, 6"o.c. interior panel edges, 12"o.c. intermediate unless otherwise noted. Nails shall be driven with the head of the nail flush with the surface of the sheathing, over-driven nails will be subject to rejection.

Unless otherwise noted in drawings and shear wall schedule, nail APA rated wall panel edges and boundaries with 8d galvanized box (0.131"ø x 2½") at 6"o.c., and 12"o.c. intermediate. Block and edge nail all horizontal panel edges at designated shear walls. Nails shall be driven with the head of the nail flush with the surface of the sheathing, over-driven nails will be subject to rejection.

Roof Sheathing:
5/8" CDX minimum (40/20) span rating.

Floor Sheathing:
3/4" CDX T&G minimum (48/24) span rating.

Exterior Wall Sheathing:
15/32" CDX minimum (24/0) span rating unless otherwise noted. 7/16" Oriented Strand Board with the same span rating may be substituted for exterior wall sheathing with panel long dimension applied perpendicular to wall studs.

NAILS, BOLTS, LAGS AND PREFABRICATED CONNECTIONS FOR WOOD
Unless otherwise noted in drawings or hardware supplier specification, all nails shall be common or galvanized box.

Wood bolts and lags shall conform to ASTM A307 grade unless otherwise noted. Provide mild steel plate washers at all bolt heads and nuts bearing against wood.

Metal connectors specified in drawings shall be manufactured by the Simpson Strong Tie Company and installed per their specifications. Other manufacturers may be considered where load capacity and dimensions are equal or better. All substitutions must be submitted to the Engineer for review.

Provide the maximum nailing pattern for all metal connectors.

Nail or screw substitutions, other than manufacturers specified, must have Architect/Engineer prior approval.

Anchoring adhesive shall be two component 100% solids epoxy based system supplied in manufacturer's standard side-by-side cartridge and dispensed through a static mixing nozzle supplied by the manufacturer. Epoxy shall meet the minimum requirements of ASTM C-881 specification for type I,II,IV and V grade 3, class B and C and must develop a minimum 13,390 psi compressive yield strength after 7 day cure.

FOUNDATION NOTES

SEE SPECIFICATION SHEET FOR CONCRETE DESIGN PROPERTIES, MINIMUM REINFORCEMENT SPLICE LENGTHS, ETC.

PLACE ALL FOOTINGS ON UNDISTURBED STRATA OR COMPACTED STRUCTURAL FILL TO THE MINIMUM REQUIRED FROST DEPTH. FOR MORE INFORMATION SEE GEOTECHNICAL REPORT AND SHEET S1.0

FOOTING BEARING CONDITIONS TO BE VERIFIED PRIOR TO THE PLACEMENT OF CONCRETE FORM WORK.

FOOTING REINFORCEMENT TO BE PLACED AT MINIMUM 3" CLEAR FROM BOTTOM OF FOOTING, U.O.N.

LOCATE HOLD DOWNS AT ENDS OF SHEAR WALL ABOVE

ANCHOR BOLTS TO BE ⅝"ø x10" J BOLTS PLACED 6" FROM ENDS OF WALLS AND @ 48" o.c. BETWEEN U.O.N. PER PLAN AND / OR DETAILS

(32) NUMBER IN SYMBOL DENOTES ANCHOR BOLT SPACING IN INCHES ON CENTER. 48"o.c. MAX.

EXTERIOR WALLS TO BE BACK FILLED WITH COMPACTED FREE DRAINING GRAVEL.

INSTALL RADON ABATEMENT SYSTEM AS MAY BE REQUIRED TO MEET PROVISIONS OF 2018 INTERNATIONAL RESIDENTIAL CODE, APPENDIX F.

FIELD VERIFY ALL FOOTING STEPS AND ELEVATIONS. BOTTOM OF ALL FOOTINGS TO BE A MINIMUM 2'-8" BELOW EXTERIOR FINISH GRADE, SEE GEOTECHNICAL REPORT, GRADING PLAN AND SHEET S1.0 FOR MORE INFORMATION.

FOOTING SCHEDULE

MARK	DEPTH	WIDTH	LENGTH	REINF.
F2.0	1'-0"	2'-0"	2'-0"	(2) #5's E.W.
F4.5	1'-0"	4'-6"	4'-6"	(5) #5's E.W.

1. REINFORCEMENT ASTM A615 GR60
2. PLACE 3" CLEAR BOTTOM FACE

FLOOR AND ROOF FRAMING NOTES

STRUCTURAL FLOOR SYSTEM SHALL BE 3/4" CDX T&G FLOOR SHEATHING GLUE AND NAIL W/ 10d COMMON @ 6"o.c. EDGE, 6"o.c. BOUNDARY, AND 12"o.c. FIELD NAILING OVER I-JOIST PER PLAN, U.O.N.

STRUCTURAL ROOF SYSTEM SHALL BE 5/8" CDX SHEATHING NAIL W/ 10d COMMON @ 6"o.c. EDGE, 6"o.c. BOUNDARY, AND 12"o.c. FIELD NAILING OVER RAFTERS PER PLAN, U.O.N.

FOR TYPICAL BEAM POCKET (NOTED "BP"), AND ALL BEAM BEARING LOCATIONS PROVIDE FULL BEAM WIDTH OF 2x6 TRIMMERS WITH 2x6 KING STUD EACH SIDE. NAIL KING STUD WITH (2) 16d @ 6"o.c. (I5 MINIMUM) TO BEAM AND (1) 16d @ 9" o.c. TO TRIMMER STUD PACK. WHERE KING STUDS NOT POSSIBLE PROVIDE SIMPSON MTS20, OR ST6224 EACH SIDE U.N.O.

PROVIDE SOLID BLOCKING IN JOIST SPACE BELOW ALL POSTS OR TRIMMERS FROM ABOVE. WHERE I-JOISTS INTERFERE WITH SOLID BLOCKING, PROVIDE SQUASH BLOCKING PER JOIST MANUF. INSTRUCTIONS

PROVIDE MST37 STRAP ACROSS ALL BREAK IN TOP PLATES, U.O.N.

WHERE POST STOPS AT A CONTINUOUS HEADER PROVIDE A35 ON EACH SIDE OF POST TO HEADER (10x4½" NAILS TO POST)

NAIL SHEATHING TO ALL MEMBERS LABELED "COLLECTOR" W/ 10d @ 6"o.c. PROVIDE MSTA30 STRAP ACROSS RIDGE AND AT SPLICE LOCATIONS. U.O.N.

WHERE JOISTS FRAME INTO A CONTINUOUS WALL, PROVIDE 1¾ LVL LEDGER TO MATCH JOIST DEPTH, ATTACH LEDGER TO WALL FRAMING W/ (3) SDS25412 SCREWS @ 16"o.c. U.O.N. (USE (2) SDS25412 SCREWS @ 16"o.c. FOR LEDGERS 9½" AND LESS), PROVIDE SOLID WOOD BLOCKING WHERE STUD NOT AVAILABLE.

AT ENDS OF ALL HEADERS, PROVIDE MINIMUM 2x6 TRIMMER AND 2x6 KING STUD BELOW 6x8 HEADER AND (2) 2x6 TRIMMERS AND (1) 2x6 KING STUD UNDER 6x10 HEADER OR GREATER, U.O.N. PER PLAN. NAIL KING STUD WITH (2) 16d @ 6"o.c. ((6) MINIMUM) TO HEADER AND (1) 16d @ 9" o.c. TO TRIMMER STUD PACK, U.N.O.

#T = NUMBER OF TRIMMER STUDS
#K = NUMBER OF KING STUDS
FA = POST FROM ABOVE, SEE UPPER FRAMING FOR POST SIZE.
AF = ACROSS FLOOR
BP = BEAM POCKET
ATR = ALL THREADED ROD ASTM F1554 GRADE 36 OR A307

WHERE STUD HEIGHT EXCEEDS 13'-0" USE LSL OR LVL STUDS PER STRUCTURAL SPECIFICATIONS ON SHEET S1.0.

PARALLEL STRAND LUMBER (PSL) MAY BE SUBSTITUTED FOR LVL MATERIAL WITH THE SAME DIMENSIONS AS NOTED ON PLAN AND WITH DESIGN PROPERTIES PER S1.0.

PROVIDE SOLID BLOCKING W/ IN WALL FRAMING FOR HANDRAIL / GAURDRAIL / GRAB BARS ETC. ATTACHMENT WHERE OCCUR.

ISSUE DATE
CUP SET: FEBRUARY 13, 2023

PRATT RESIDENCE
406 SAGE ROAD KETCHUM, ID

PROFESSIONAL ENGINEER LICENSED 02/13/23 14254 STATE OF IDAHO CRAIG MAXWELL

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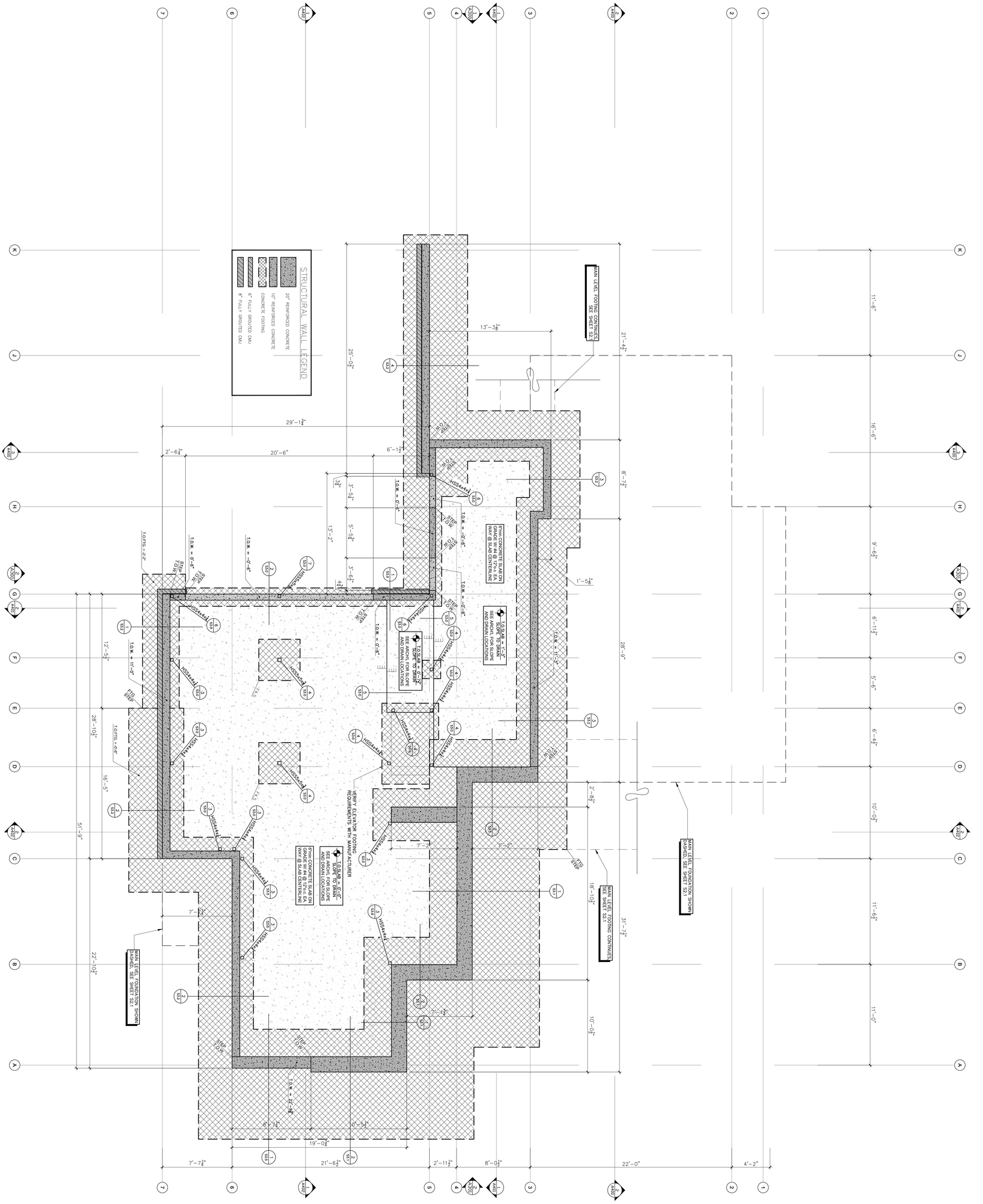
S1.0

FOUNDATION PLAN

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



S2.0

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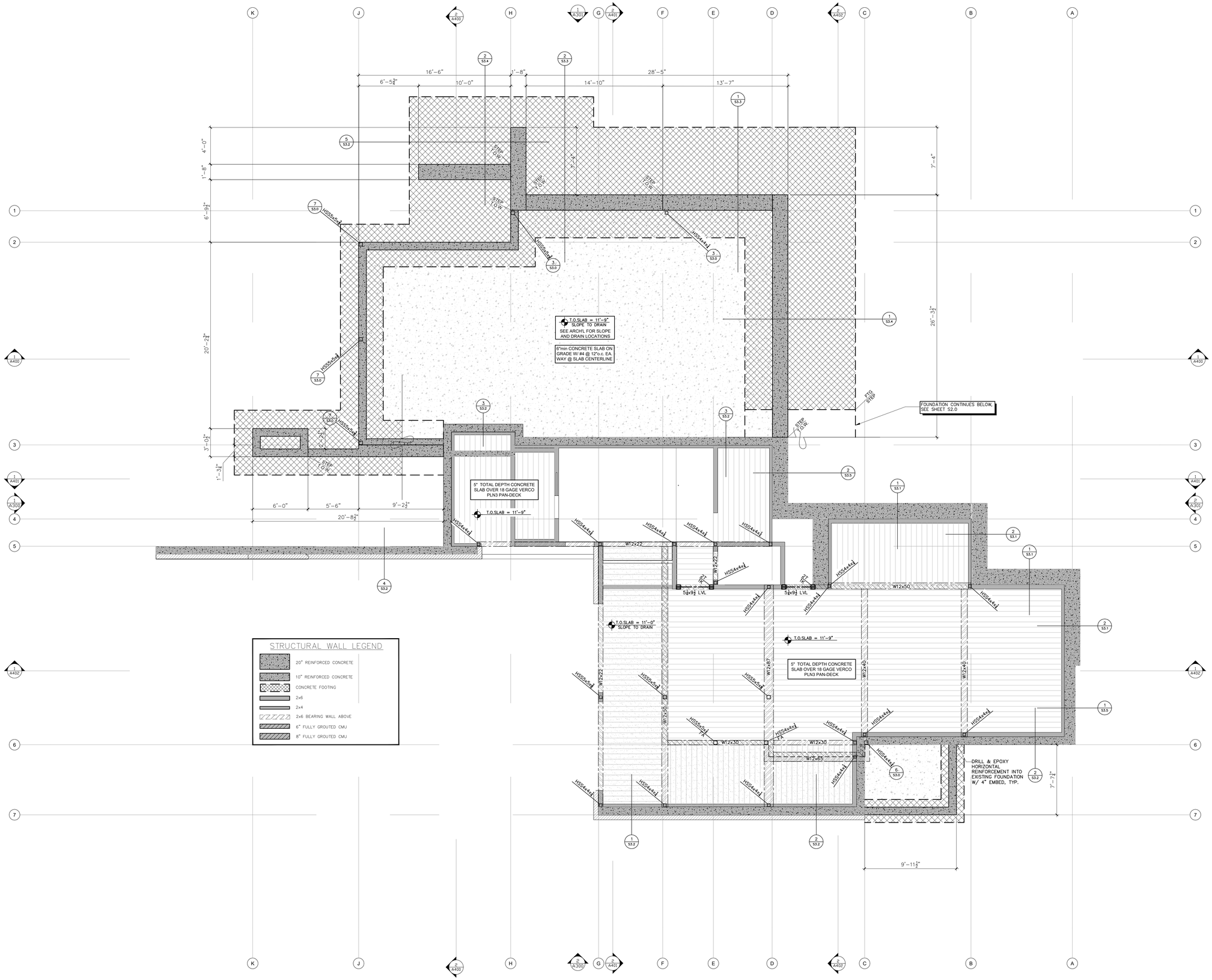
CRAIG MAXWELL — STATE OF IDAHO — 14254 — REGISTERED PROFESSIONAL ENGINEER

PRATT RESIDENCE

406 SAGE ROAD — KETCHUM, ID

ISSUE DATE
CUP SET - FEBRUARY 13, 2023



SECOND LEVEL FLOOR FRAMING PLAN

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

ISSUE DATE

CUP SET: FEBRUARY 13, 2023

PRATT RESIDENCE

406 SAGE ROAD KETCHUM, ID

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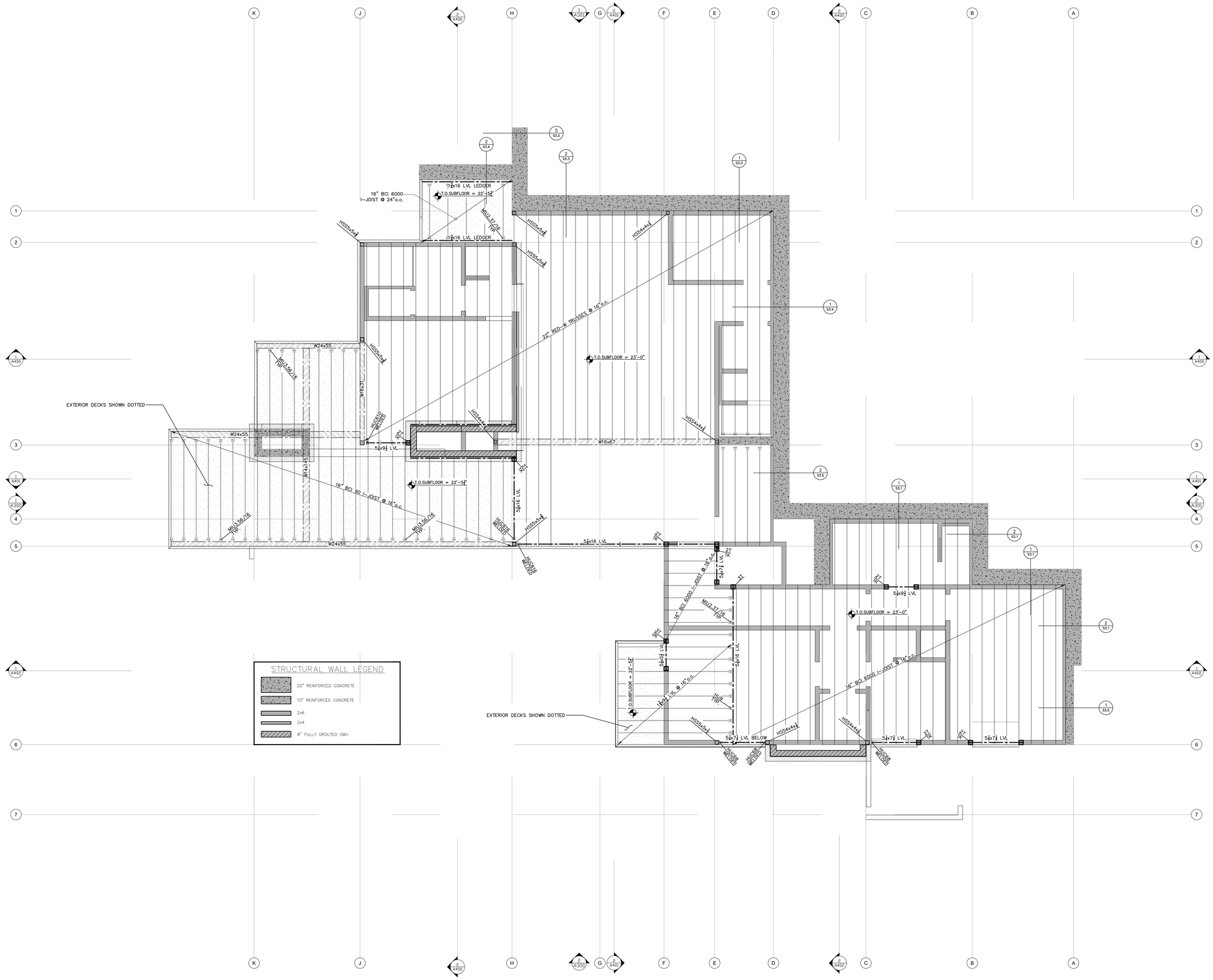
S2.1



THIRD LEVEL FLOOR FRAMING PLAN

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

ISSUE DATE

CUP SET: FEBRUARY 13, 2023

PRATT RESIDENCE

406 SAGE ROAD

KETCHUM, ID

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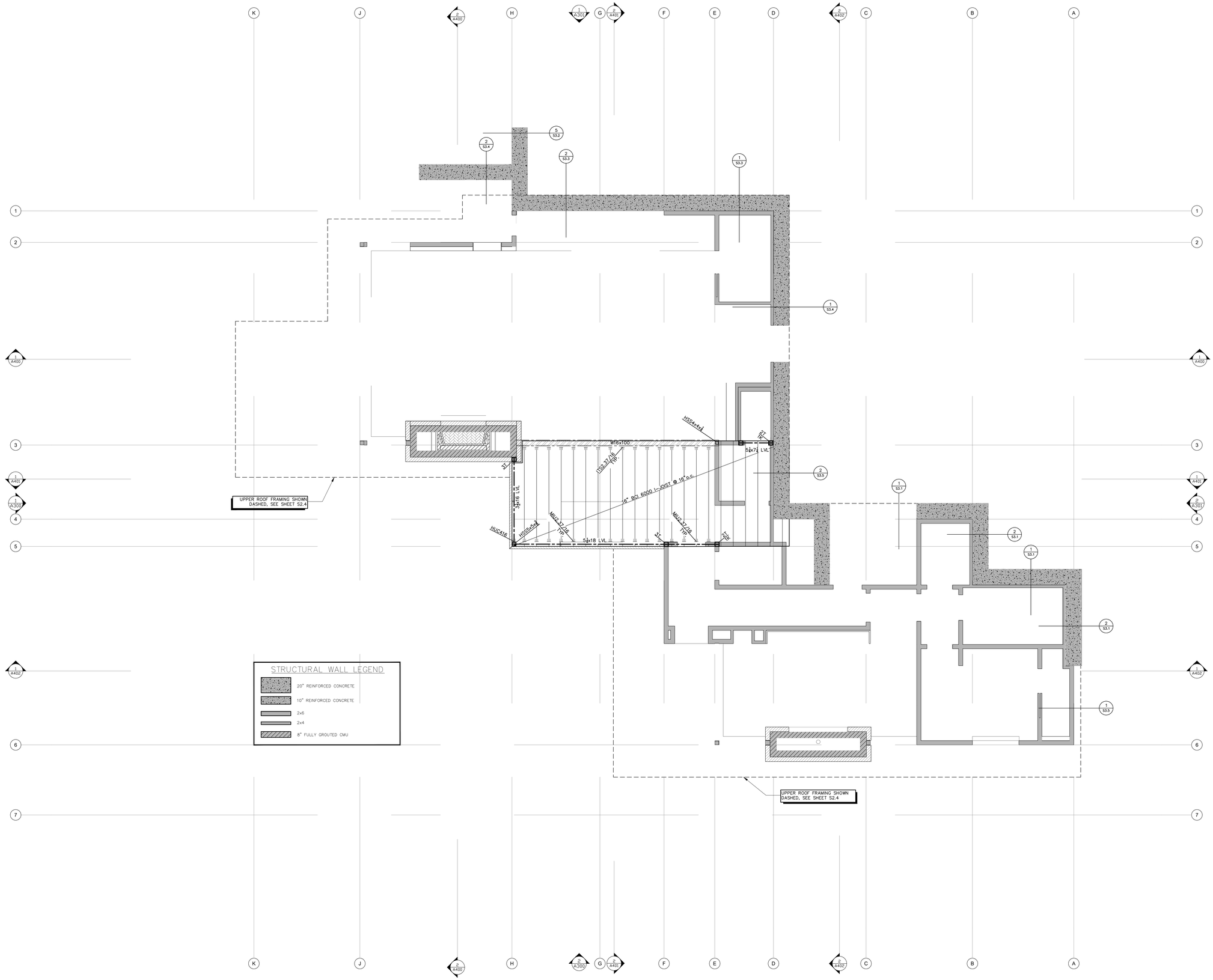
www.maxwellsds.com

S2.2



LOWER ROOF FRAMING PLAN

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

ISSUE DATE

CUP SET: FEBRUARY 13, 2023

PRATT RESIDENCE

406 SAGE ROAD

KETCHUM, ID

PROFESSIONAL ENGINEER LICENSED 02/13/23 14254 STATE OF IDAHO CRAIG MAXWELL

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Craig@ maxwellsds.com :: 208.721.2171
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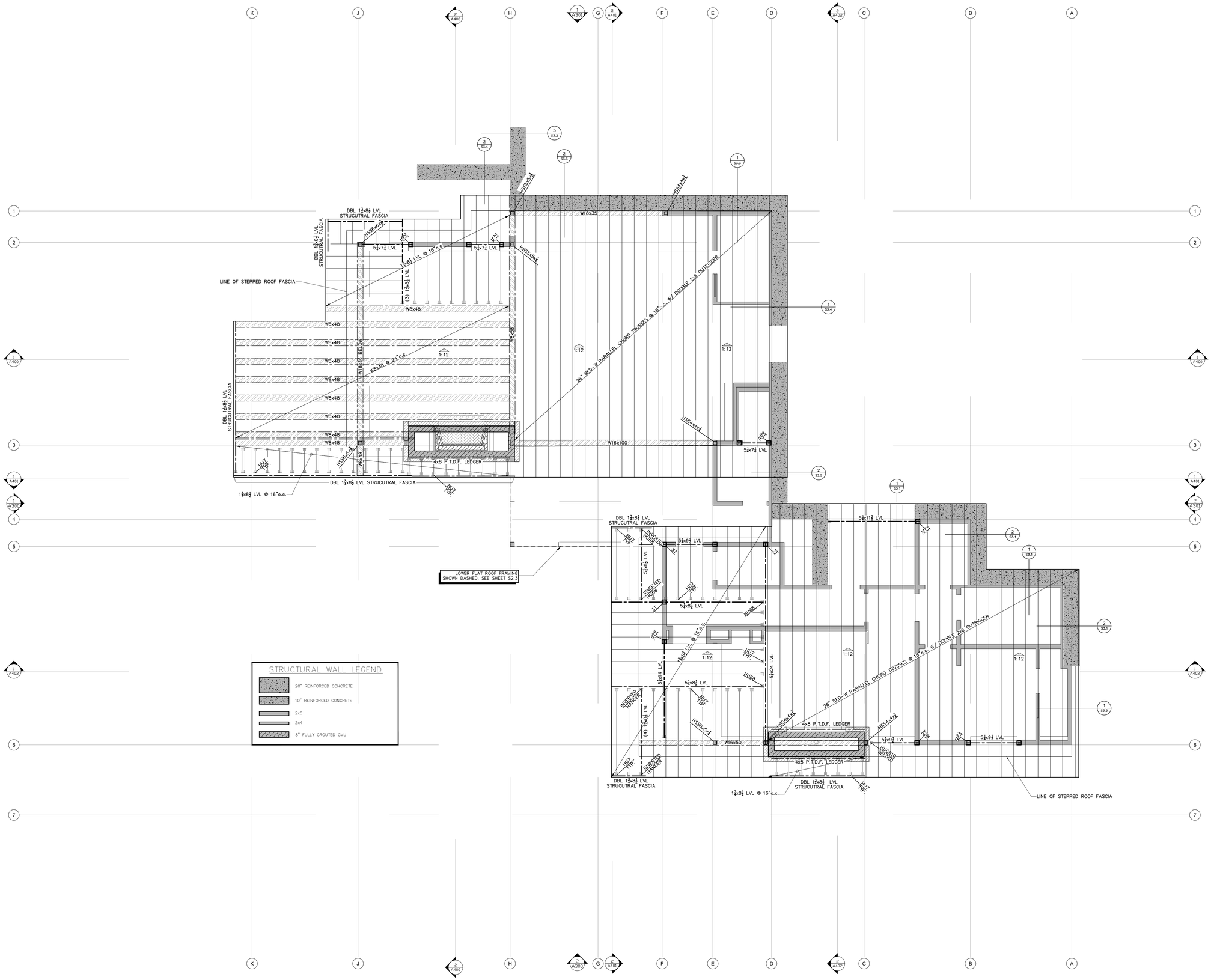
S2.3



UPPER ROOF FRAMING PLAN

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

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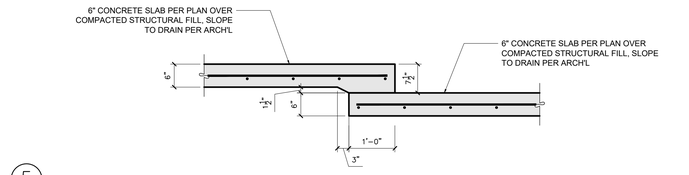
S2.4



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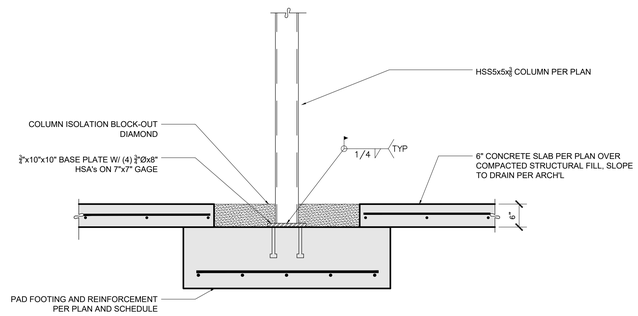

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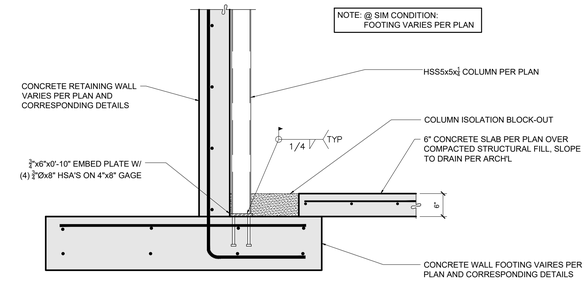

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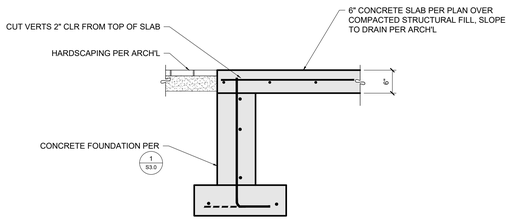

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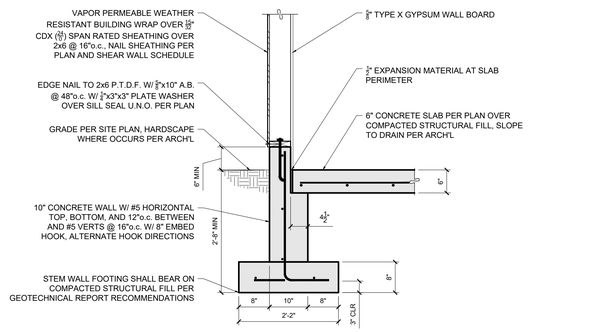
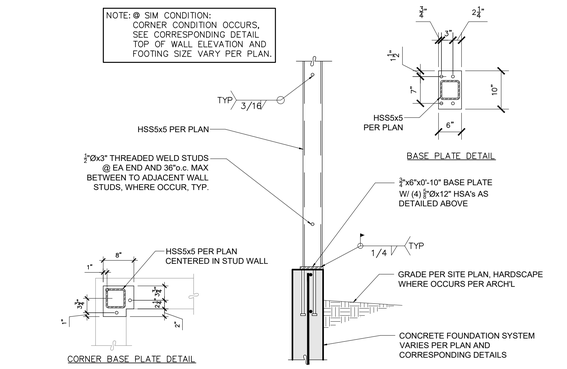


1

SCALE: 3/4" = 1'-0" U.N.O.



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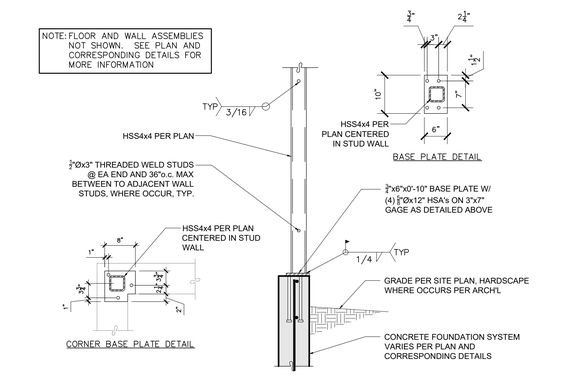

6

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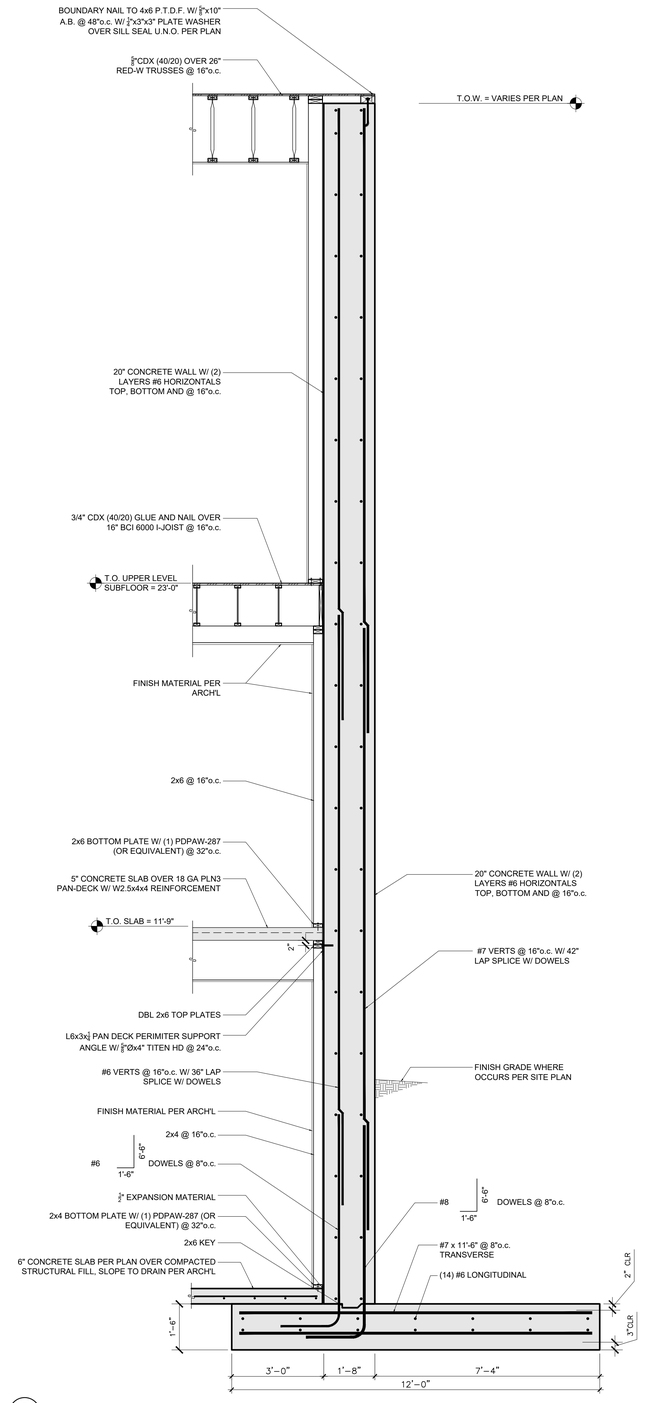
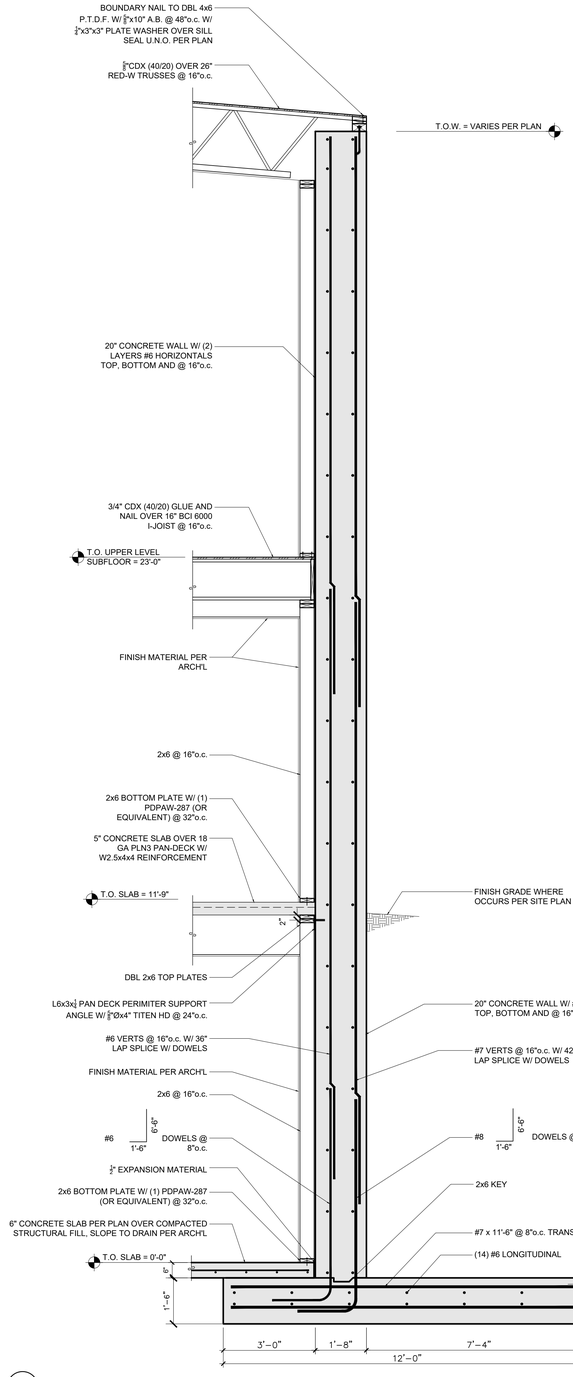
S3.0





SCALE: 1/2" = 1'-0" U.N.O.

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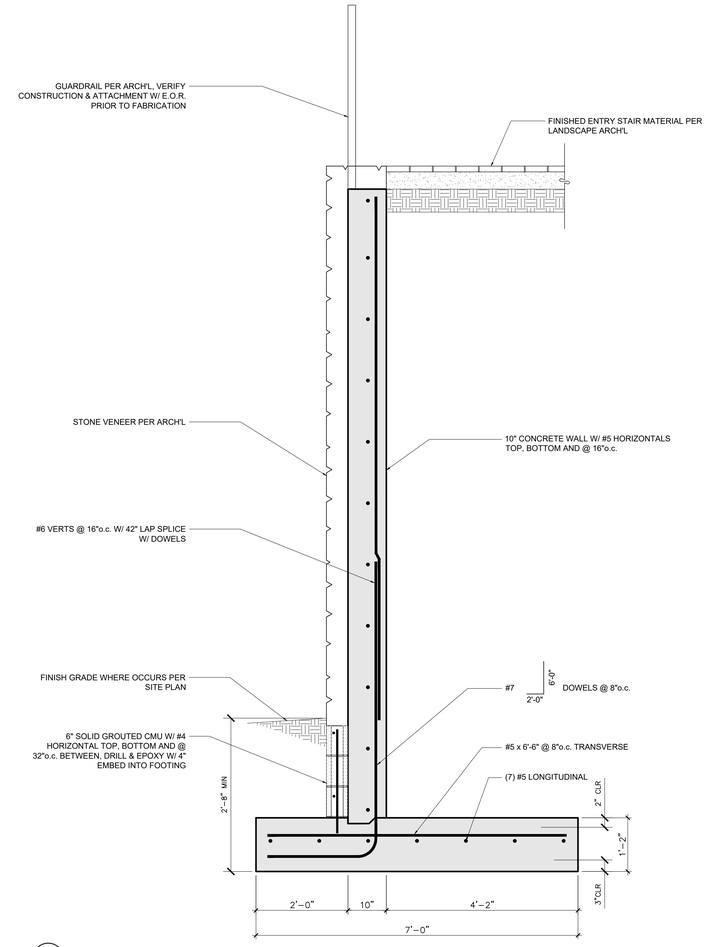
S3.1



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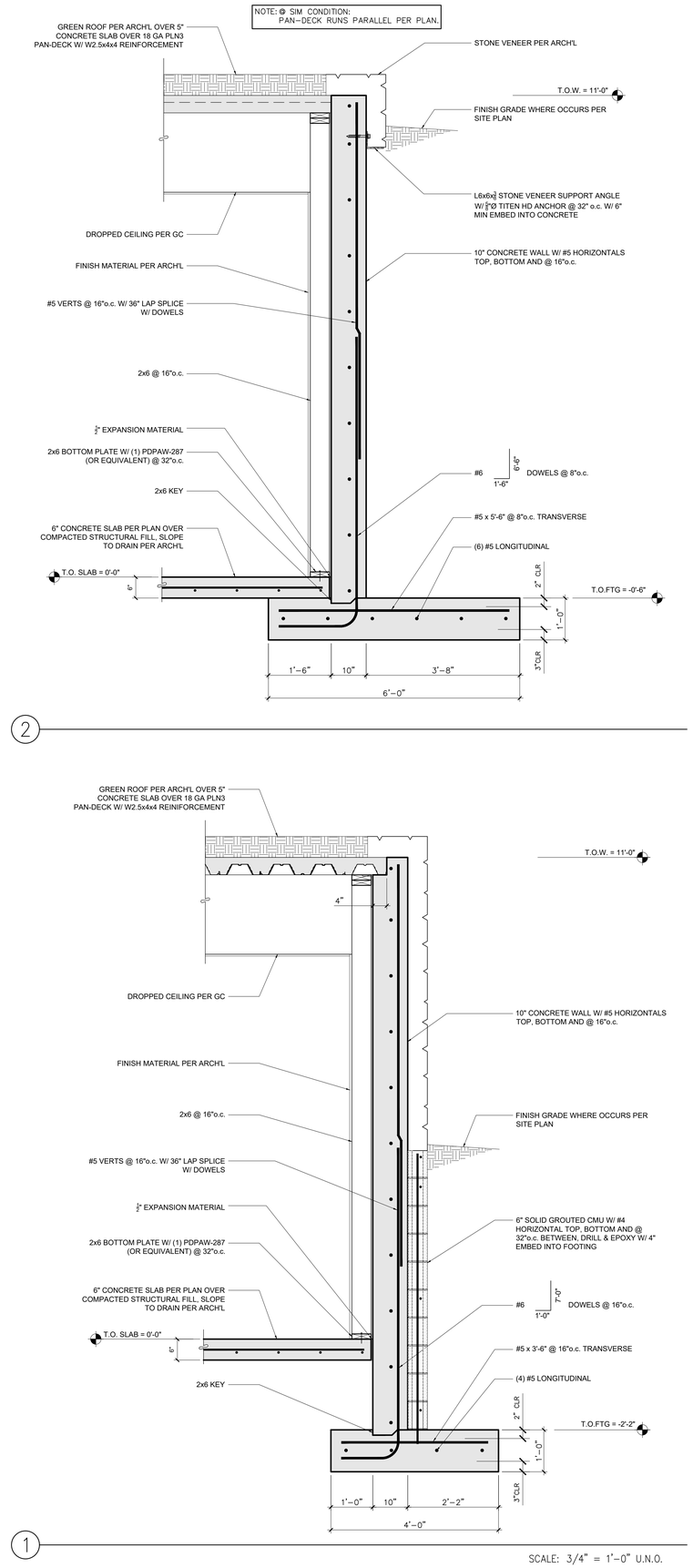

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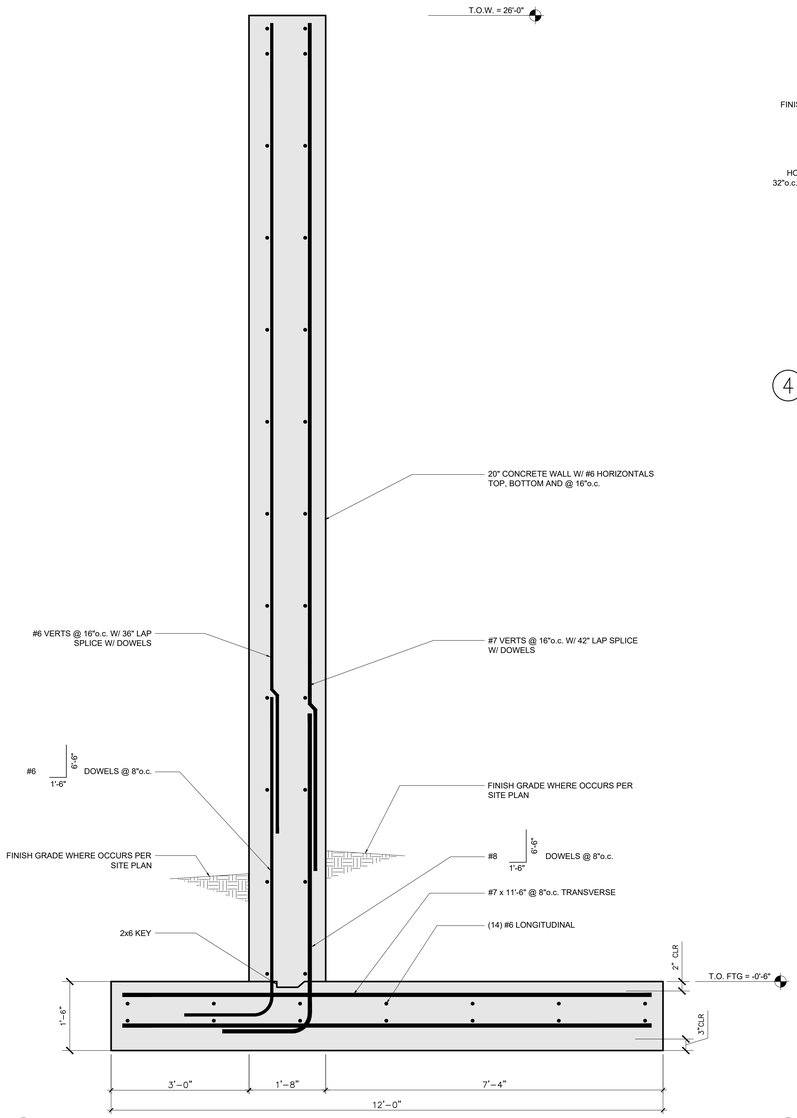

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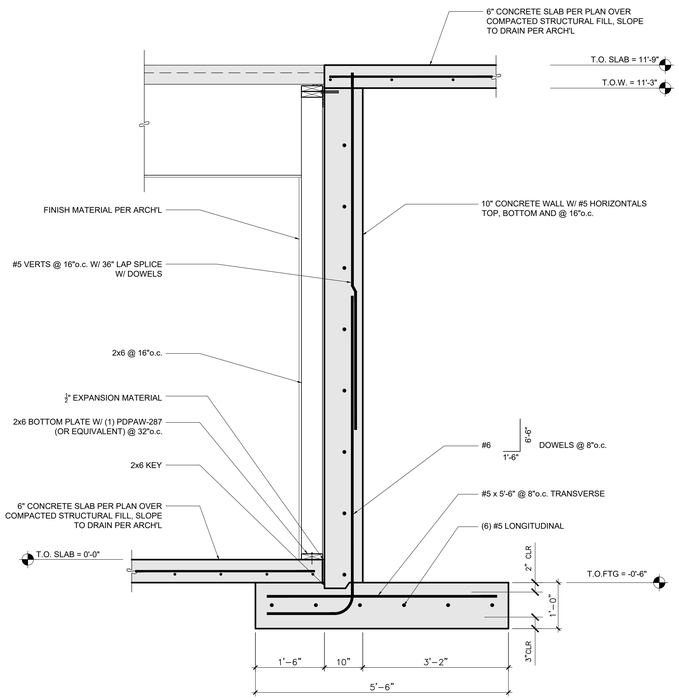

3

1

SCALE: 3/4" = 1'-0" U.N.O.

ISSUE DATE

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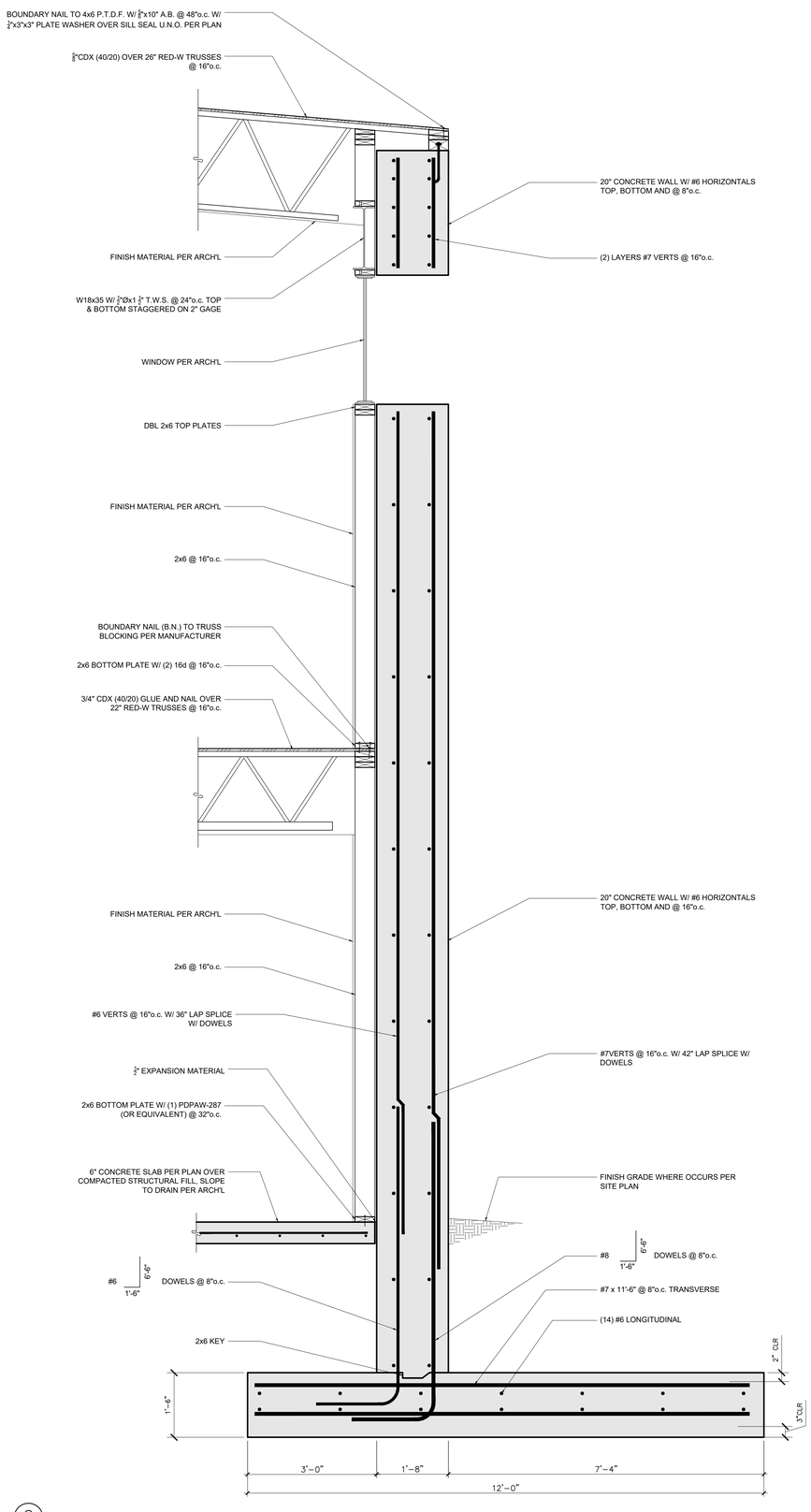
S3.2



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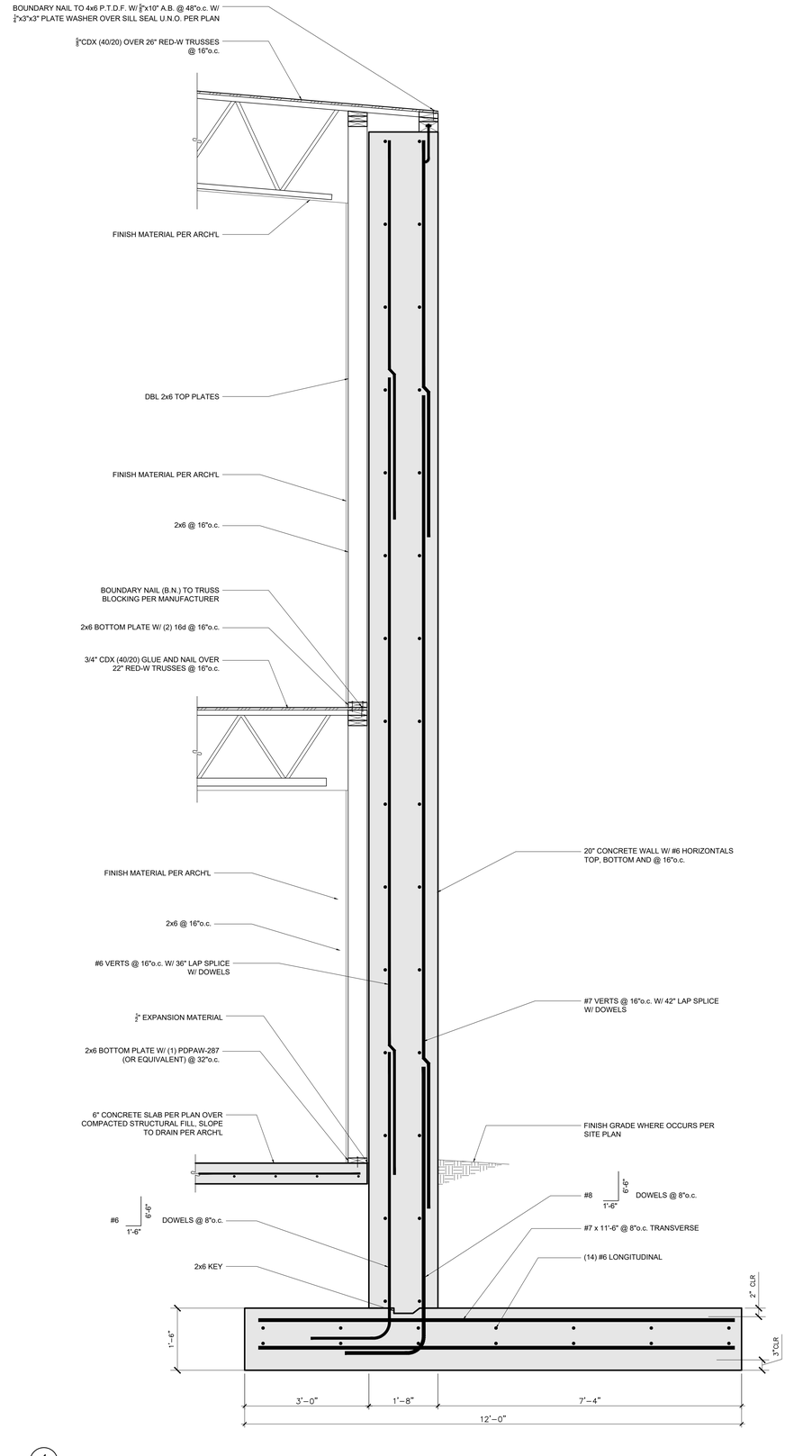

1

SCALE: 3/4" = 1'-0" U.N.O.

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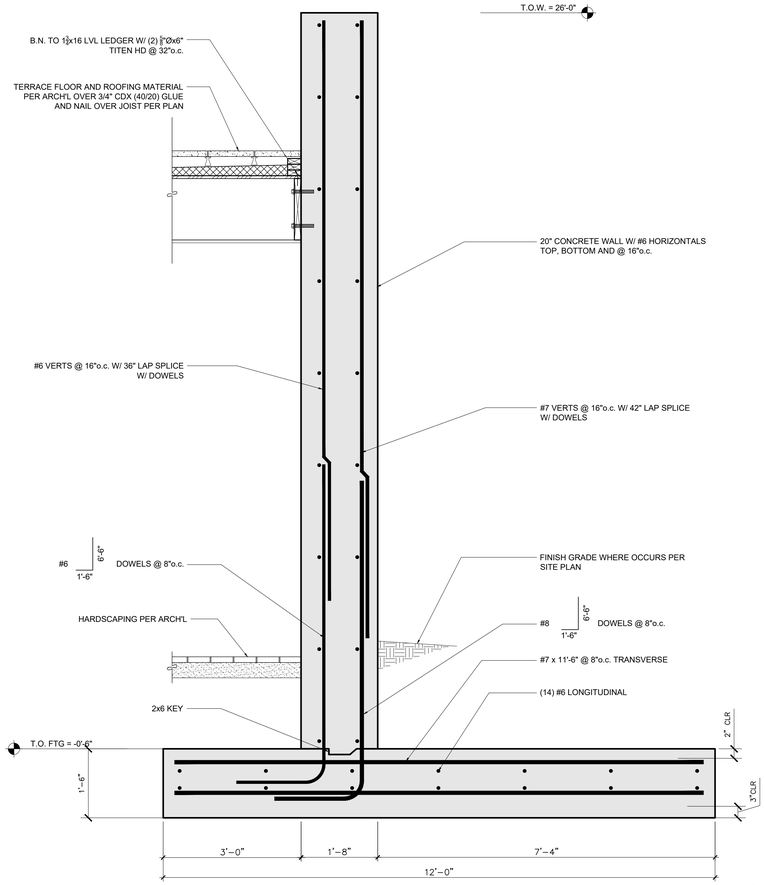
S3.3



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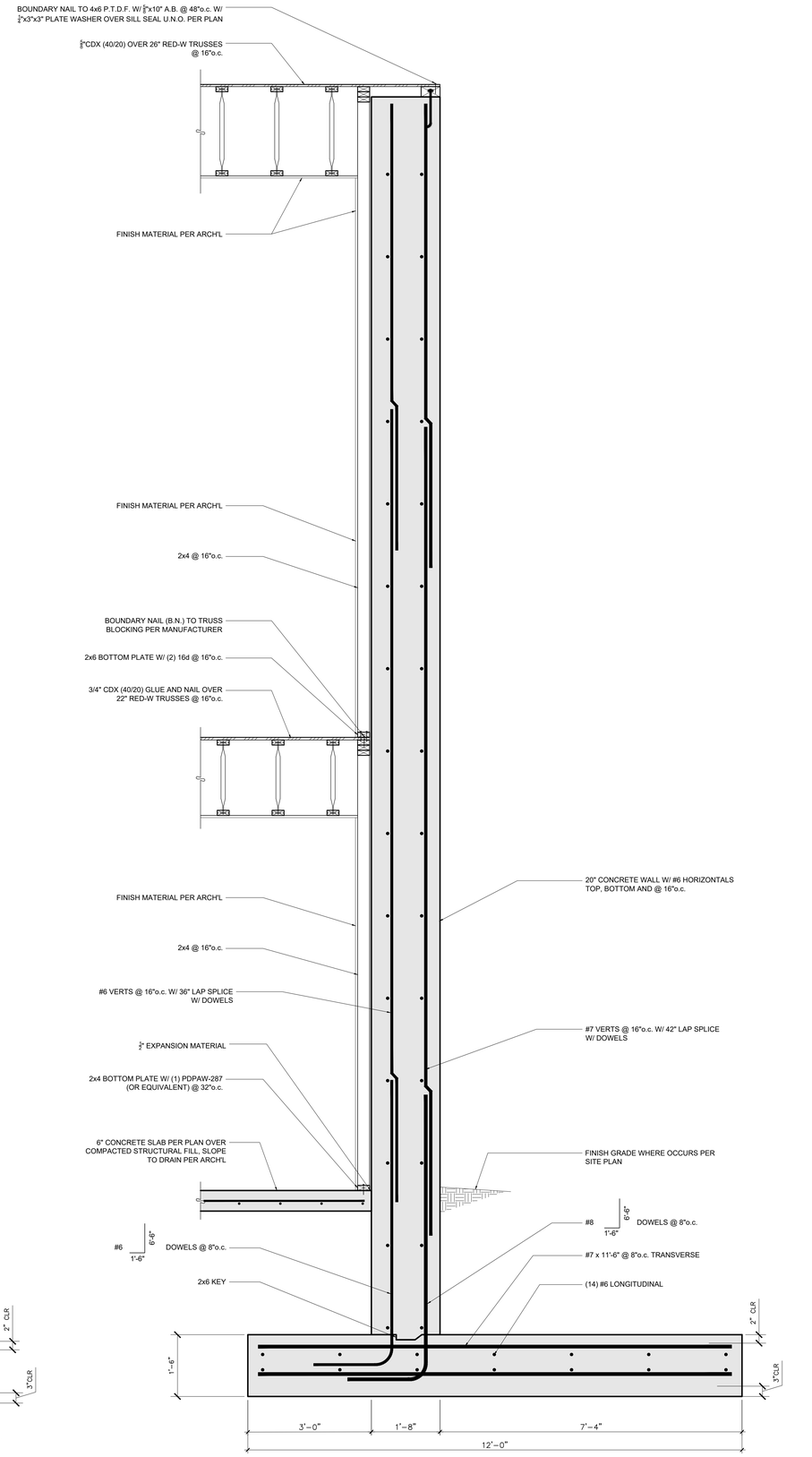

1

SCALE: 3/4" = 1'-0" U.N.O.

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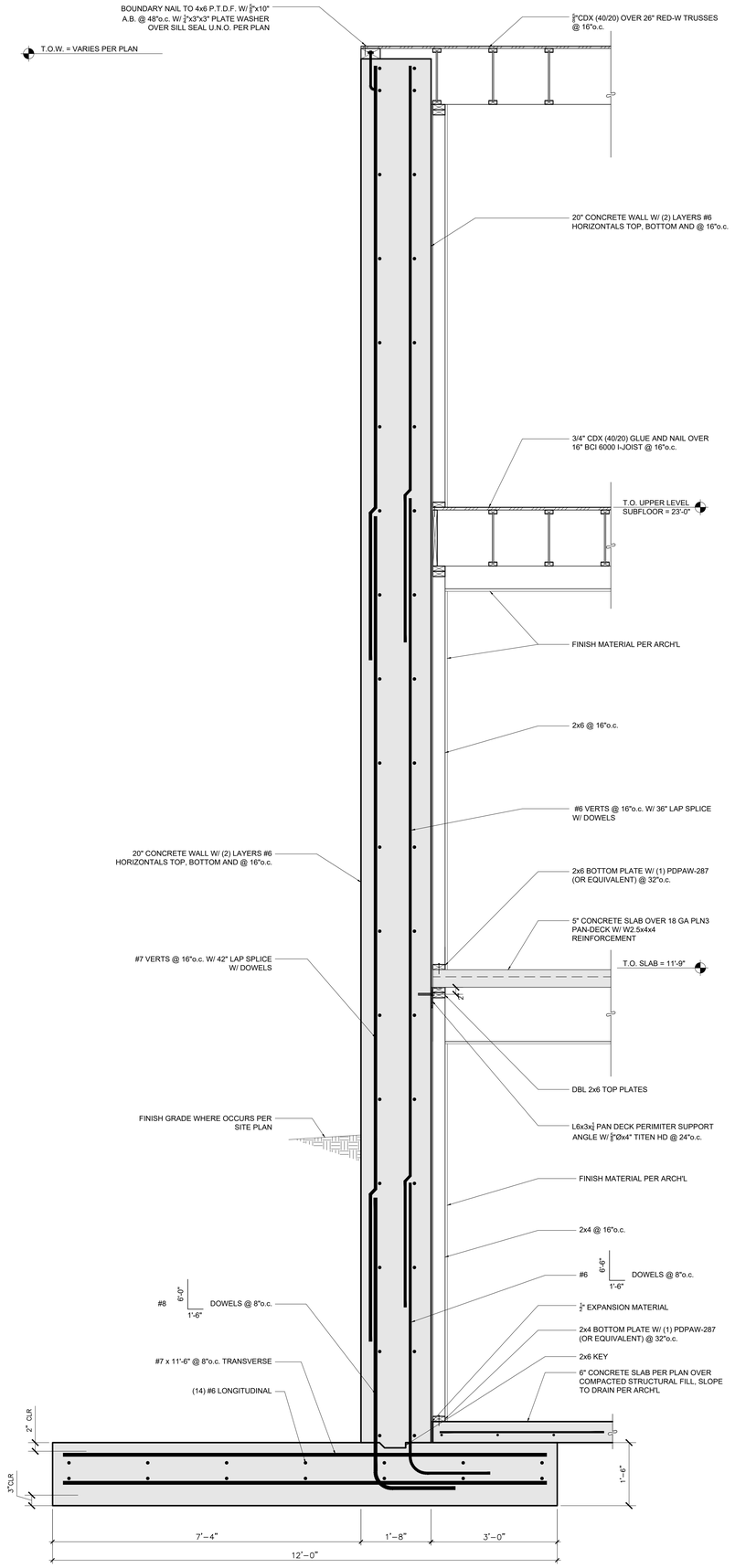
S3.4



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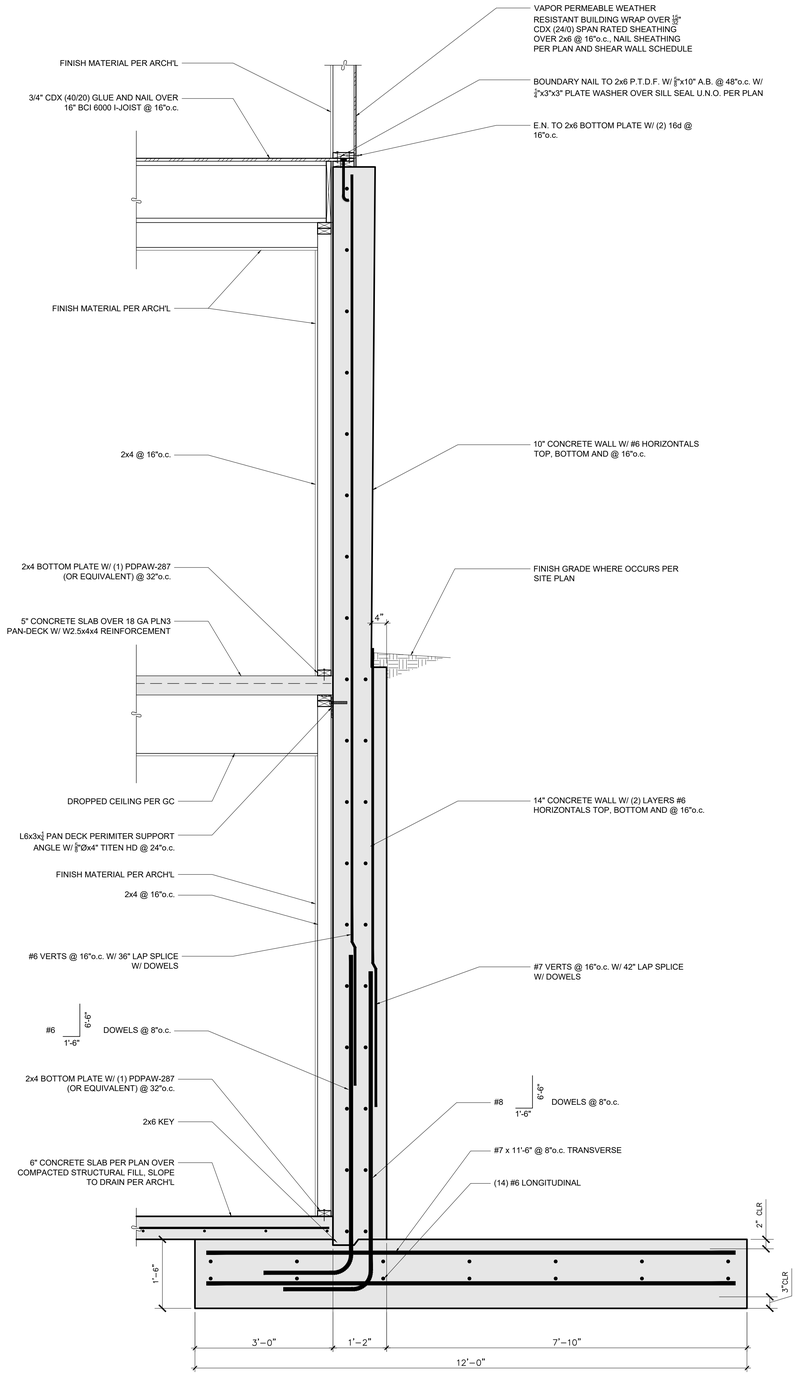

1

SCALE: 3/4" = 1'-0" U.N.O.

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S3.5