Paso Robles Residence

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Advisor:

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Abstract

The Paso Robles Residence is a light framed single family residence. Architectural plans were designed by Nina Nazarov Hambly at Catch Architecture, formerly Hambly Homes. Conclusions made in the soils report by Beacon Geotechnical Inc were used to design the foundation. Structural plans and calculations were made by Kaylie Di Paola and reviewed by licensed engineer Nick McClure. Structural plans include the complete framing and foundation plans and construction details. Calculations were made in accordance with the 2019 CBC, ASCE 7 and NDS. This report with cover the architectural design, structural analysis, and all of the building systems that function in the residence. This report will take a look into how the site influenced the structural system and the various challenges that arose during the design process. To understand the impact of this project, this report will dive into the environmental, global, political, and social implications of this residence.

Table of Contents

Introduction

The Paso Robles residence is a beautifully designed light framed single family home. The design started in 2020 after the pandemic caused the clients to start traveling more locally and build a vacation home within driving distance from their current residence. Their budget was flexible and allowed for a luxurious home over 3500 square feet. Throughout the lifetime of the project, lumber prices have surged dramatically, discouraging many prospective homeowners. These clients realized the rising cost of construction from the beginning and were willing to pay premium prices for their dream home away from home. The property they inherited was around 300 acres of undeveloped land. A home on their family's land will create a gathering space for generations to come. The residence, shown in *Figure 1*, is elevated on a hill to capture the breathtaking landscape. The home will feature a large yard with north and south patios for the family to comfortably experience the outdoors.

Architectural Design

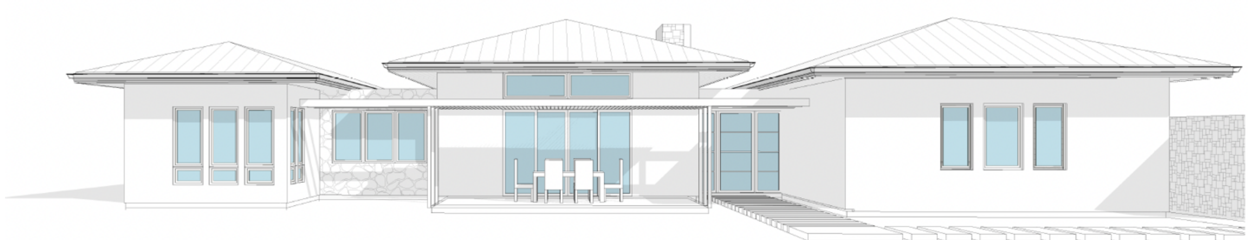

Figure 1 : Architectural Rendering

The architect responsible for this residence was Nina Nazarov Hambly, the owner of Catch Architecture. The clients requested her to design a three-bed, three-bath vacation home for them and their two sons. The high square footage allows every room in the house to be large and comfortable. Every closet is spacious and each bathroom has ample counter space and a large shower. The kitchen has plenty of room for the entire family to cook dinner together and move around with ease. Having an open concept kitchen and living room area was important in creating a gathering space for the family. Each wall surrounding this space features large glass windows to provide natural light and the beautiful view. The clients wanted each of their sons to have his own bathroom so an additional powder room was added adjacent to the great room for guests. The master bedroom was particularly exciting for the clients. They wanted a spacious bathroom for the couple to get ready in the mornings. They also requested a large, wood burning fireplace for a cozy feel. Working with the clients, Nina suggested a partition in the closet to create a separate closet space for each of them. To create privacy from their children, Nina separated the master from the other bedrooms as much as possible. The laundry room is adjacent to the master suite for the couple's convenience since they do the laundry for the family. Because the washer and dryer tend to be loud, the closet and bathroom create a sound barrier between the laundry room and sleeping area of the master.

With a property of 300 acres, choosing the residence location became the clients' first decision. The couple chose an elevated knoll which rose above the oak trees spanning the property. The orientation of the house is key in highlighting the views and combating the temperature

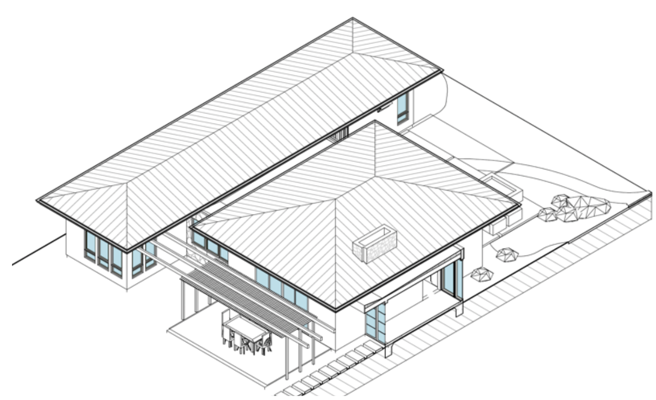

Figure 2 : North Patio

fluctuations of the area. To create a comfortable outdoor space overlooking the property Nina designed two patios. The "summer patio" was set on the north side of the building (*Figure 2)*. It was blocked from the sun and could capture the pleasant, northern breeze. Located on the south side of the building, the 'winter patio' was protected from the harsh east wind and could soak up the sun (*Figure 3)*.

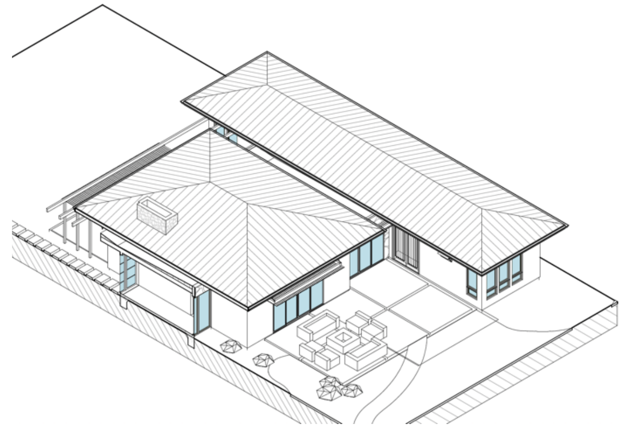

Figure 3 : South Patio

The clients' second challenge was deciding the aesthetics of the home. To aid the clients' decision, Nina conducted an exercise she calls "tender for architecture." She produces 10 renditions of the home, each with a different architectural facade. Nina spreads the printed renderings out around her office and lets the clients be drawn to different styles. Nina then incorporates all of the features the clients favored into one harmonious design. Allowing the clients to have as much input as possible, Nina created a design which exceeded the clients' expectations. The only exception was the pergola. Initially, the clients agreed on the pergola design for the north patio (*Figure 4)*. After the pergolas were completely engineered, the couple decided the appearance was no longer what they envisioned. After discussing multiple iterations, they could not decide and the pergola design was postponed. Structural plans were submitted without a pergola structure but will be designed by the same architect and engineers in the future.

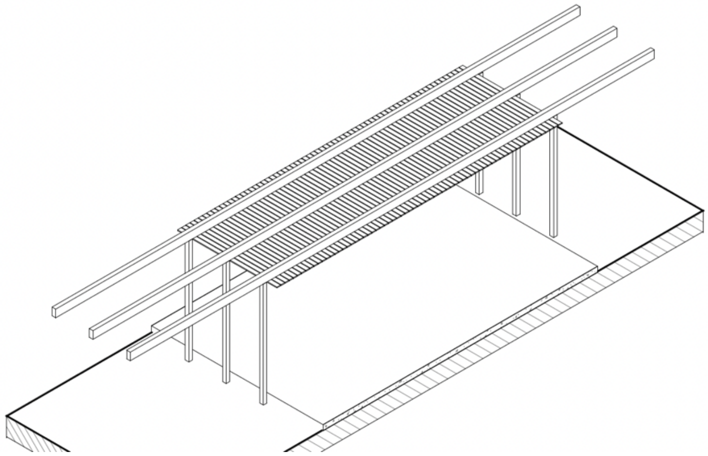

Figure 4: Initial Pergola Design

Project Site

The entire property spans over 300 acres and has been divided into three parcels. The proposed development is set on the sloping hillside of a 92-acre parcel of land. The residence is at an elevation of 2,000 feet above sea level on a slope ranging from 3:1 to 6:1. The hill will be graded to create a flat area for the residence to stand. Unsuitable soil will be excavated so the foundation can rest on uniform competent material per soils report specification (Appendix E). In addition to the residence, the graded area needs to fit the north and south patios, the yard, a large storage shed, and septic and water tanks. The clients wanted a large front and backyard with room to add a pool in the future. The yard area will be graded at a 5% slope to drain water away from the home. Non-structural concrete flatwork will create a walkway from the driveway to the front door. The residence will sit 20 feet higher than the existing access road. The driveway spanning from the road to the residence is almost 300 feet long and at a gentle slope to ensure a comfortable drive up (*Figure 5)*. All grading and sitework is to be done according to the civil engineering plans (Appendix F).

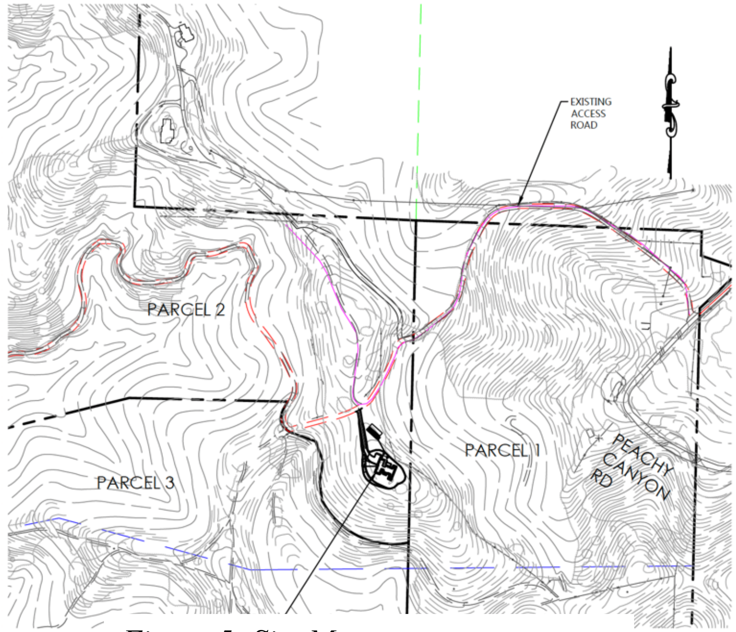

Figure 5: Site Map

The soil consisted of mainly low expansive, elastic silt. Using ASCE 7-16 site classifications, the site was determined to be Class C, "Very Stiff Soil and Dense Rock." The allowable bearing pressure was determined to be 1500 psf. The site conclusions made by GeoSolutions, Inc were used to design the foundation of the residence (Appendix E). The soils report specifies how to prepare the building pad to maintain moisture content and soil compaction. If either of these recommendations are not followed, the foundation may crack or become damaged.

The site's proximity to fault lines and expected seismic activity is used to design the residence for seismic loads. The spectral response accelerations were found using the SEAOC Seismic

Design Map online tool and the seismic design category was found to be category D. The design speed of the wind is 92 mph and was found using the ASCE 7 Hazard tool. Seismic and wind loads governed different areas of the structure, so both were a vital part of the design.

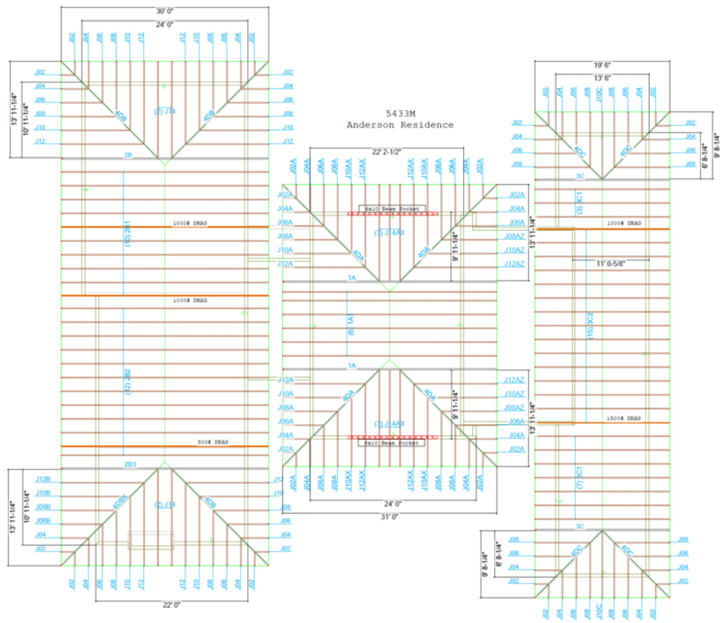

Figure 6: Truss Layout

Structural Design

The structural system of the Paso Robles Residence is light framed timber. The roof was designed with a 18 psf dead load to account for the standing seam metal roofing and solar panels and a 19 psf live load to account for the 4:12 slope. The metal roofing provides a flat, even surface that hand laid shingles cannot replicate. The upper roof framing on the great room as well as the east and west wings consist of trusses. Trusses were chosen for their efficiency and ability to span long distances. The truss types and layout (*Figure 6)* were calculated by Trusspro (Appendix D). The entry hall and kitchen are framed with Trus Joist I-Joists (TJI) rafters to create a flat roof condition. The different roof types set at varying heights create a unique framing connection. At each change in elevation, the break in the top plate creates a discontinuity. To maintain drag continuity, CS16 straps will be nailed from a beam at the lower roof and wrap around a post at the upper roof. This framing condition is unique to this project and drawn in detail 12/D1 (Appendix B). At horizontal discontinuities the roof diaphragm will be solid blocked.

Plywood shear walls are used to resist the lateral loads from wind and seismic forces. The architectural decision to have tall ceilings and large windows resulted in tall, skinny walls that must resist large loads. Because the widths of the structural walls in several locations were less than half the top plate height, a seismic increase factor was applied according to SDPWS. Lateral forces in each gridline were analyzed in each direction to determine the appropriate shear panel (Appendix C). The shear wall schedule on the roof framing plan specifies the sheathing thickness, edge supports, sill plate, nailing pattern and frequency of anchor bolts and connectors (Appendix B). In order to resist the overturning moment on the wall, holdowns are fastened from the edge of each wall to the foundation. The holdown schedule on the foundation plan specifies the holdown, post, anchor bolt, and embedment length required (Appendix B).

Typical window and door headers, with spans only 3' and 6' in length, were designed to be Douglas fir beams. At the open concept kitchen to great room transition, the supporting beam must span 24'. This beam carries a distributed load from the roof as well as point loads from two girder trusses. In order to account for the large span and heavy loading, a glue laminated beam is used. Both exterior walls in the entry hall are primarily glass and require two 9' long LVL (laminated veneer lumber) beams to support the entire room's roof. All beams demands were calculated by hand and capacities were determined in Enercalc (Appendix C).

One structural challenge occurred at the great room end wall. Large glass doors and windows span the wall, leaving little space for shear walls. In order to capture the full length of the walls the door header hung off the sides of the post, eliminating the need for trimmers. An additional window sits higher up on the wall, flush with the top of the studs. Since there is no room for the window header to sit in the wall, the header is set flush into the trusses. The lack of structural walls in the entry hall created another challenge. The lateral loads on the entry hall needed to be transferred to the surrounding rooms through CS16 straps.

The foundation, designed based on the soils report, is slab on grade. The slab consists of a 4" concrete layer with #3 bars at 12" on center over a 2" sand and 4" gravel layer per. A 15 mil visqueen layer acts a moisture barrier preventing water from the soil from reaching and damaging the concrete. A 12" wide and 24" deep footing supports the building perimeter and structural walls. The typical footings are reinforced with 2 #5 bars on the top and bottom. Grade beams at a maximum spacing of 19" on center are 12" wide and 18" deep and reinforced with 2 #4 bars on the top and bottom. The 24' kitchen beam transferred a high point load on the supporting posts that exceeded the capacity of the normal footing. To carry this high load, a 36" square, 24" deep concrete pad footing was centered under each supporting post. The pad footing is reinforced with 3 #5 bars each way on the top and bottom. A 8" thick concrete screen wall was designed for architectural aesthetics and had no structural considerations. Foundations will be constructed per details on sheet S-0.1 and D-2 (Appendix B).

Permitting Process

A grading permit is necessary in San Luis Obispo County when removing or depositing more than 50 cubic yards of soil. A grading permit for the site was obtained when the existing driveway was constructed. In order for construction to begin, the clients must obtain a building permit for the residence. The purpose of the building permit is to ensure the proposed structure meets safety standards for zoning, construction, and land usage. Nina bundled the architectural and structural plans and calculations and submitted them to San Luis Obispo County for review on behalf of the client. The county looks for errors in the architect or engineer's work for areas of potential hazard or neglect. Plan check corrections are then returned to the architect and engineer so they can make any necessary changes before sending them back for a final submission. Typically plan check corrections take 4-6 weeks to be returned. However, the county office is currently backlogged and cannot handle the amount of work they are receiving. The COVID pandemic created a boom in the construction industry as homeowners are spending more time inside and want to renovate and expand their space. The plans for the Paso Robles residence were submitted two months ago and the first review will most likely take until the deadline of four and a half months. Obtaining a building permit is the just first step in the lengthy construction process.

Other Building Systems

The clients wanted their space to feel as bright and open as possible. The home takes maximum advantage of natural daylight as much as possible. Tall glass windows and doors on every wall of the residence will provide light and a view of the property. The entry hall, the first room one enters in the house, needs to create a smooth transition from outside. The northern and southern walls are almost entirely glass allowing light to flood in. The great room, comprised of the kitchen, living, and dining area, also features large windows to help the room feel more open and create the perfect view for every meal. Natural light ensures a bright and cheery home during the day, but ample lighting fixtures are necessary to provide the same feeling at night. Recessed downlights fixtures provide a sleek and modern look. Every sink features a wall sconce for extra brightness in the mirror. The garage will receive track lighting fixtures for efficiency and an industrial look. A custom feature the clients requested was strip lighting underneath the kitchen cabinets. The kitchen and dining room will be adorned with pendant fixtures for design aesthetics. Electricity will be provided to each lighting fixture per electrical and utility plan (Appendix A). In case of a power outage, a 18-22 kW backup generator will be on site. Receptacle outlets will be placed in every room at a maximum of 12 feet apart per electrical code. To prevent electrocution, ground fault circuit interrupter outlets are used in bathrooms, the kitchen, and laundry room. Dedicated receptacles provide 220 volts for appliances requiring more than the standard 110 volts; these appliances include the dryer, stove, and refrigerator. Every room will have vacancy sensors to save energy. Both patios have outlets to service any decorative lighting or outdoor accessories they made add. In accordance with the 2020 California mandate, solar panels will be installed on the roof. Solar panels will produce power for the home efficiently and ultimately save the clients money. PGE will provide the remainder of the energy for the home.

Heating and air conditioning will be done by a split system air handling unit. The air handler consists of heating and cooling coils to change the temperature and a fan to distribute the air. The great room and each bedroom will have their own zone with a thermostat. This allows the bedrooms to be serviced at night without having the heat or cool the unoccupied great room. Each bedroom along with the great room will have a ceiling fan to provide extra cooling and circulation. A liquified petroleum gas (LPG) tank will be installed underground on the western slope leading up to the yard. A gas line runs from the tank to the two fireplaces and to the outdoor fire pit on the south patio. A 50-gallon water heater in the garage will supply the family with hot water.

Because the residence is isolated, water and sewage must be handled on site. At the base of the driveway, a well will be drilled 100 feet down, into the ground aquifer. The well will extract water from the water table but will do so at a slow rate. However, showers and faucets require a higher pressure and flowrate than the well can provide. A water tank stores a sufficient supply of water to meet the shower and faucet demand. Water lines will run from the tank to the home to pump in clean running water. The 5000-gallon water storage tank will be installed on the west end of the property, downhill from the residence. The well will continuously fill and restore the water tank. To handle and dispose of wastewater, sewage lines will run from the residence to a 1500-gallon septic tank. The septic tank is buried underground, 34 feet from the garage door and stores wastewater in order for solids to settle. The septic tank was designed for a volume of 450 gallons per day based on the size of the home. Liquid wastewater then exits the tank through a 4” PVC pipe and heads to the distribution box. The distribution box receives wastewater from the sewage lines and re-distributes it to a series of pipes and the leech field. The leach field, located 100’ away from the house, safely disposes of the wastewater without contaminating the water table or endangering any animals. The leech field consists of a system of gravel trenches covered by a layer of soil. The required length of each trench was found to be 191 feet based on the volume of wastewater and the infiltration capacity of the soil. Three rock leach trenches and three infiltrator trenches will be 64 feet each (total of 192 feet) and 48 chambers at 4 feet each (total of 192 feet) will be placed. Adequate area was left for a future leech field expansion of up to 100% of the current size. The septic tank and leech field design drawings can be found in appendix F.

One potential danger in home tucked away in the middle of 300 acres is the distance to the nearest fire station. An access road at the base of the driveway provides the fastest route for firetrucks to enter. A fire hydrant at the top of the driveway allows a hose to be connected from a fire truck and have access to the water storage tank. Water is then pumped in quickly to the sprinkler system. Every space in the home contains a smoke detector and concealed sprinkler to ensure safety. The home also needed to meet the CBC requirements for fire protection. All doors and windows have at least a 20 min fire resistance rating.

Cost Evaluation

The Paso Robles residence is estimated to cost around $350 per square foot. At 3680 square feet the estimate for this home comes out to around 1.3 million. However, the average cost of a new single family residence in the area is about $150-200 per square foot. The architectural features making this project stand out from a conventional home create expensive engineering and construction challenges. The clients wanted the entrance of their home to feature a high ceiling for a grand and open feel. The great room has a top plate height of 11'-6" which requires more materials and is harder to construct than a typical 8' or 9' top plate. The 8'-6" kitchen and entry height transitions to the 11'-6" great room height. At each of these discontinuities there are overlapping framing and extra hardware that doubles the price per square foot. Homes with conventional sized openings and ceiling heights can utilize standard windows and doors at a fixed, budget friendly price. However, this home features large glass doors and windows that will require a custom order. Increasing the door height by as small as a foot can double the cost of the door. The stone veneer on the building's facade is not only expensive to purchase but is an additional 15 psf dead load the home had to be designed for.

By the time the residence will be constructed, the initial cost estimate will most likely be inaccurate. Increasing material costs, specifically lumber, may raise the price to over $400 per square foot or over 1.5 million for the home. The clients had a flexible budget so this new price may not concern them. However, if the price of construction continues to rise, the architect may reconsider some of the more expensive design choices.

Between material and labor, construction costs will make up the great majority of the project cost. The foundation, between excavation, concrete, reinforcing, and formwork, makes up 10-15% of the construction budget. Framing costs include trusses, walls, and roofing material contribute to around 20% of the construction cost but, with the rising cost of lumber, may be much higher. Plumbing, electrical, HVAC, and septic each make up another 5% of construction costs. Half of the construction budget falls on the exterior and interior finishes. Finishings include windows and doors, insulation, drywall, appliances, plumbing and lighting fixtures, cabinets, and flooring. In an average home, the architect's fee is only about 5% of the total project cost and the structural engineer's only 1%. In a project this complex, it is difficult to estimate a percentage at this stage of the project. Clients like these, without a cap on their budget, tend to choose pricey finishes and fixtures. Prices for flooring, windows, door, appliances, lighting fixtures, and accessories can range from budget to luxury and will dramatically shift the cost for the project. Because of the clients ability to upgrade their home, the actual construction costs range greatly.

Impacts

Environmental Impacts

Anytime a new house is constructed there are environmental consequences. This residence will be constructed of timber which is the most environmentally conscious building material. Of all building materials, timber produces the least carbon emissions. Timber is also biodegradable therefore will not have harmful effects at the end of the building's life. Timber is a renewable resource as new trees can be planted regularly. However, if timber is extracted faster than it is replenished, there will be detrimental environmental effects. A surge in the construction industry during the COVID pandemic has greatly increased the demand for lumber. If we continue to consume timber at this rate, our forests will be in danger.

The foundation of the building is reinforced concrete. Concrete is a higher producer of carbon emissions and must undergo a complicated disposal process. Because the residence is isolated from main roads, transporting the materials and equipment to the site will take more time, require more fuel, and emit more greenhouse gasses. Installing this home's own septic, water, electrical, and mechanical systems require energy and resources. The home was designed to be efficient post construction; an abundance of natural light during the day will reduce the use of electricity and solar panels will provide the majority of the home's energy. The 300-acre property is its own ecosystem which is home to a variety of trees, vegetation, and wildlife. Building the home will disturb the ecosystem and can displace the wildlife living in the site. All existing trees and plants will need to be cleared and excavating the building site will disrupt the soil. Constructing the home will cause noise pollution that may scare and harm the surrounding wildlife.

<u>Economic Impacts</u>

Creating this home will provide jobs at every step of the project. The clients wanted to use local companies to design and build their home. This project will contribute to the San Luis Obispo economy by providing work to local small businesses. Catch Architecture is a five-person architecture firm located in Paso Robles. MSD professional engineering in Atascadero is also a small business with only five employees. GeoSolutions, responsible for the soils and geology report in a small business located in San Luis Obispo. Roberts Engineering provided the civil plans and is another local small business located in Templeton. This project also creates jobs for city workers when obtaining permits and plan check corrections. Construction requires a large team of drivers, contractors, landscapers, electricians, and plumbers. Staying local allows the architects, contractors, and engineers to collaborate and communicate in person if needed. Being close to the site decreases travel time and is easier for workers. Additionally, the clients will pay property taxes on their new home. Property taxes are used to fund schools, parks, infrastructure, sanitation, and public service workers. This home will contribute the local economy by providing work to local businesses and fund vital governmental services.

<u>Social Impacts</u>

This home serves as a gathering space for the clients' family. The land was passed down through the family and will be passed down to their sons. The new home will soon be a place of new memories and a great addition to the property. The clients will be able to pass down the home to their sons for generations to come. The main goal of the project was to create a vacation house within driving distance to the clients' current residence as the COVID pandemic has made travel difficult. The Paso Robles residence is the perfect quarantine destination. The vacation home will be primarily for the family but will also be used by friends and neighbors. The spacious great room will soon host parties and family gatherings, bringing people closer together. The home will bring the family closer to nature as they get to explore their 300 acre backyard. Anyone who stays at the residence will experience the tranquil outdoors as they escape from the city. The clients want to instill their same love of nature in their family for generations.

Global Impacts

Catch architecture incorporates design elements from all over the world in every project. Members of the firm have studied or worked in England, Denmark, Switzerland, and France. Their work serves to bring global designs to San Luis Obispo County and inspire future designs around the world. This home can inspire others to travel locally rather than globally throughout the pandemic. Traveling internationally can contribute to the spread of the virus, putting health at risk. By avoiding planes and exposure to others, the clients are keeping their family safe and doing their part to end the pandemic. Unfortunately, construction on this home will also contribute to the recent lumber shortage and rising construction costs. The pandemic created supply change issues making lumber not only expensive, but more difficult to obtain. Construction costs are at an all-time high and affordable housing is scarce, especially in San Luis

Obispo County. The clients, who can afford a luxurious secondary residence, are not discouraged by the rising costs of construction. By increasing the demand for resources and labor, the clients are keeping the price of construction high and may be preventing others from affording to build.

Conclusion

This home will provide a gathering space for the family to escape and enjoy the views of nature. The clients were able to design the home they always imagined and had a large hand in the architectural design. The residence was custom designed to fit the family's lifestyle and preferences, making the home feel personal. The home provided work for small businesses in San Luis Obispo County and a rewarding educational experience for me. The timeline of this project still has a long way to go. The clients and architect decided on a new pergola design which will need to be engineered. Plan check corrections were received in April. I will make corrections for the structural plans to be submitted a final time. After final revisions are approved, construction can begin. The driveway from the existing access road to the residence site has already been constructed. The site will be graded and building pad will be prepared first. Next the footings and foundation slab will be poured. Sewage, water, gas, electrical lines will need to be installed in the ground and later in the house. Framing of the home will be comprised of the walls, sheathing, trusses, windows, doors, roofing, and hardware. The construction will undergo multiple inspections before moving on the finishes, appliances, and lighting and water fixtures. The home was predicted to be completed by the end of 2022. However, plan check delays have already taken three months longer than anticipated. The project is currently behind schedule and does not have a new completion date. The finished product will ultimately be worth the wait and be cherished by the family for generations.

Reflection

Throughout my time at Cal Poly, my coursework and labs have provided hand-on experience to prepare me for work in the industry. Completing the structural design for a real home allowed me to combine and apply concepts I learned over the course of four years. This project exemplifies our schools "Learn by Doing" motto and is the perfect way to round out my education.

When I started working at MSD Professional Engineering, I worked on accessory dwelling units and small single-family homes. This project pushed me out of my comfort zone as the home was the largest and most intricate I worked on thus far. There are multiple height changes between the great room and the exterior wings. This was the first time I encountered top plate discontinuities on a project, so I had to learn how to strap and connect these diaphragms together. On the foundation level, I was familiar with slab on grade and designing footings. However, the great room required a pad footing to support a long spanning glulam beam (GLB). I learned how to design a pad footing and identify when it is required. I had also never designed a pergola before this project. I learned how a pergola is framed and connected and I even wrote an excel template for calculations. Ultimately the pergola was postponed and removed from this stage of construction. However, the time and effort I spent will only benefit me as an engineer and will benefit the clients when it is time to revisit the pergola.

Interfacing with new structural intricacies is something I experience everyday at work. Since finishing the structural design for the Paso Robles Residence, I have utilized this knowledge and worked on more complicated residences. The most rewarding part of this senior project was learning about the nonstructural side of the residence. My work on the structural system is just one part of a much bigger picture. Understanding every step of design and construction will benefit me in my engineering career and help me connect the structural system to the complete project.

Previous to this project, my communication with my project's architect was limited to clarifying discrepancies or recommending changes to improve efficiency. Nina, the architect on this home, was excited to share how she works with her clients to understand their needs and create a place they will love to call home. She walked me through her thought process for choosing the floorplan and orientation of the home. On my future homes I will take this knowledge and be more inquisitive of the architectural decisions.

While I was already familiar with soils and site reports, this project gave me the time to thoroughly read sections I normally skim. I learned about the septic, electrical, and mechanical systems which I rarely consider. Because I had little exposure to these other building systems, I found learning about them the most challenging.

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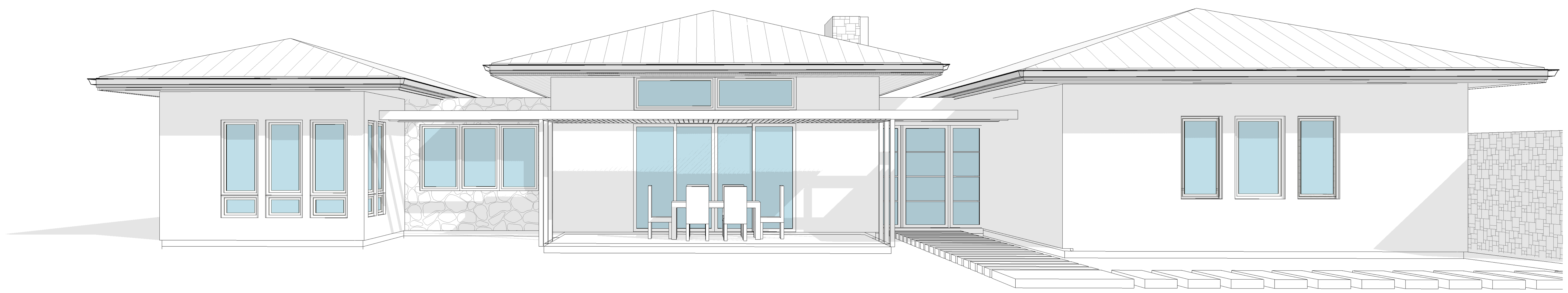
PASO ROBLES RESIDENCE

APPENDIX A: ARCHITECTURAL PLANS

SHEET INDEX



PROJECT DATA

PROJECT DESCRIPTION:
New single family residence and garage.

APN:	026-331-054
LAND USE:	RL, RURAL LANDS
CONSTRUCTION TYPE:	VB
OCCUPANCY TYPE:	R-3/U
LOT AREA:	92.28 ACRES
BUILDING AREA CALCULATIONS:	
Proposed Residence:	2949 SF
Proposed Garage:	735 SF
PROPOSED BUILDING HEIGHT:	
WILDLIFE URBAN INFERFACE:	**HIGH HAZARD**
AUTOMATIC FIRE SPRINKLERS:	**YES**

DEFERRED SUBMITTAL

1. FIRE SPRINKLER

EFFECTIVE CODES

ALL WORK SHALL CONFORM TO THE APPLICABLE BUILDING CODES INCLUDING BUT NOT LIMITED TO:

2019 California Building Code (CBC)
2019 California Electrical Code (CEC)
2019 California Plumbing Code (CBC)
2019 California Mechanical Code (CMC)
2019 California Energy Code
2019 California Fire Code
2019 California Green Building Standards Code *(if new only)*
San Luis Obispo County Municipal Code

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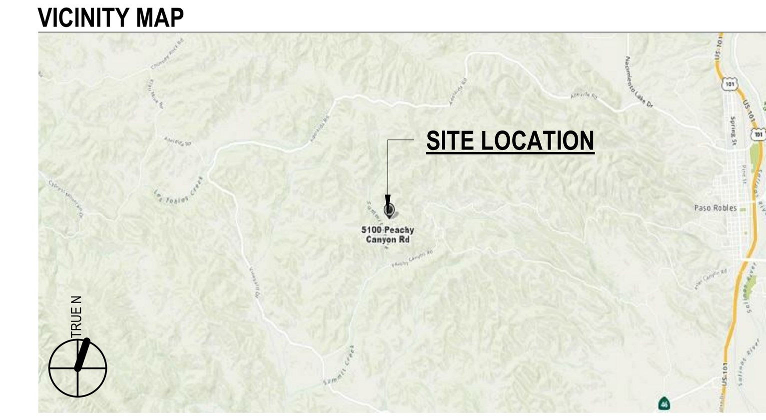
PH: 415-457-0990
EMAIL: jobs@energycalcco.com

FIRE PROTECTION ENG.:
TBD
CONT:
PH:
EMAIL:

LANDSCAPE ARCHITECT
Jeffrey Gordon Smith Landscape Architecture Inc
1320 Van Beurden Dr., Suite 202, D-5
Los Osos,CA 93402
CONT: Jeffrey Smith
PH: 805.528-2118
EMAIL: jeffrey@jgsdesigns.com

VICINITY MAP



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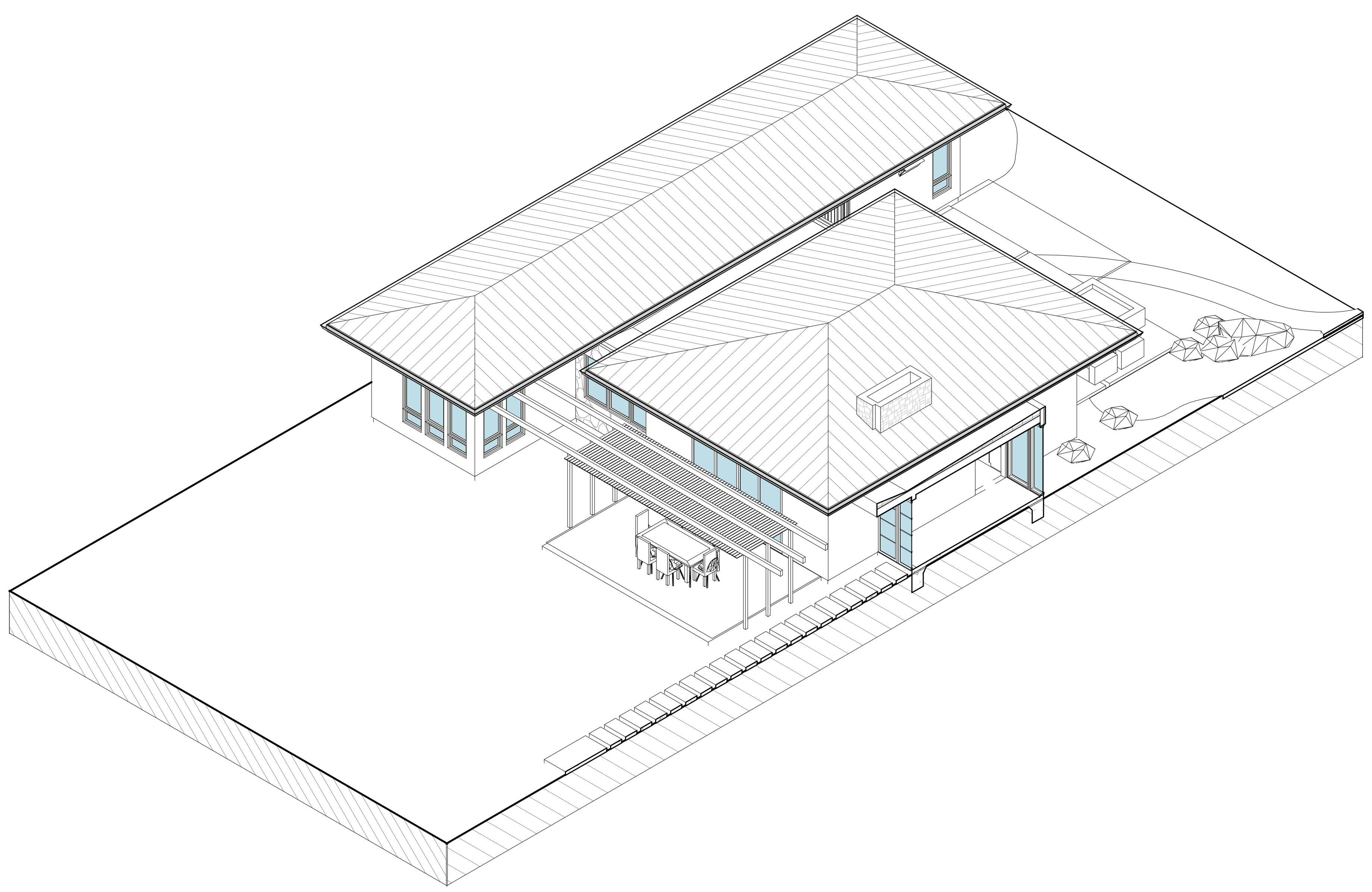
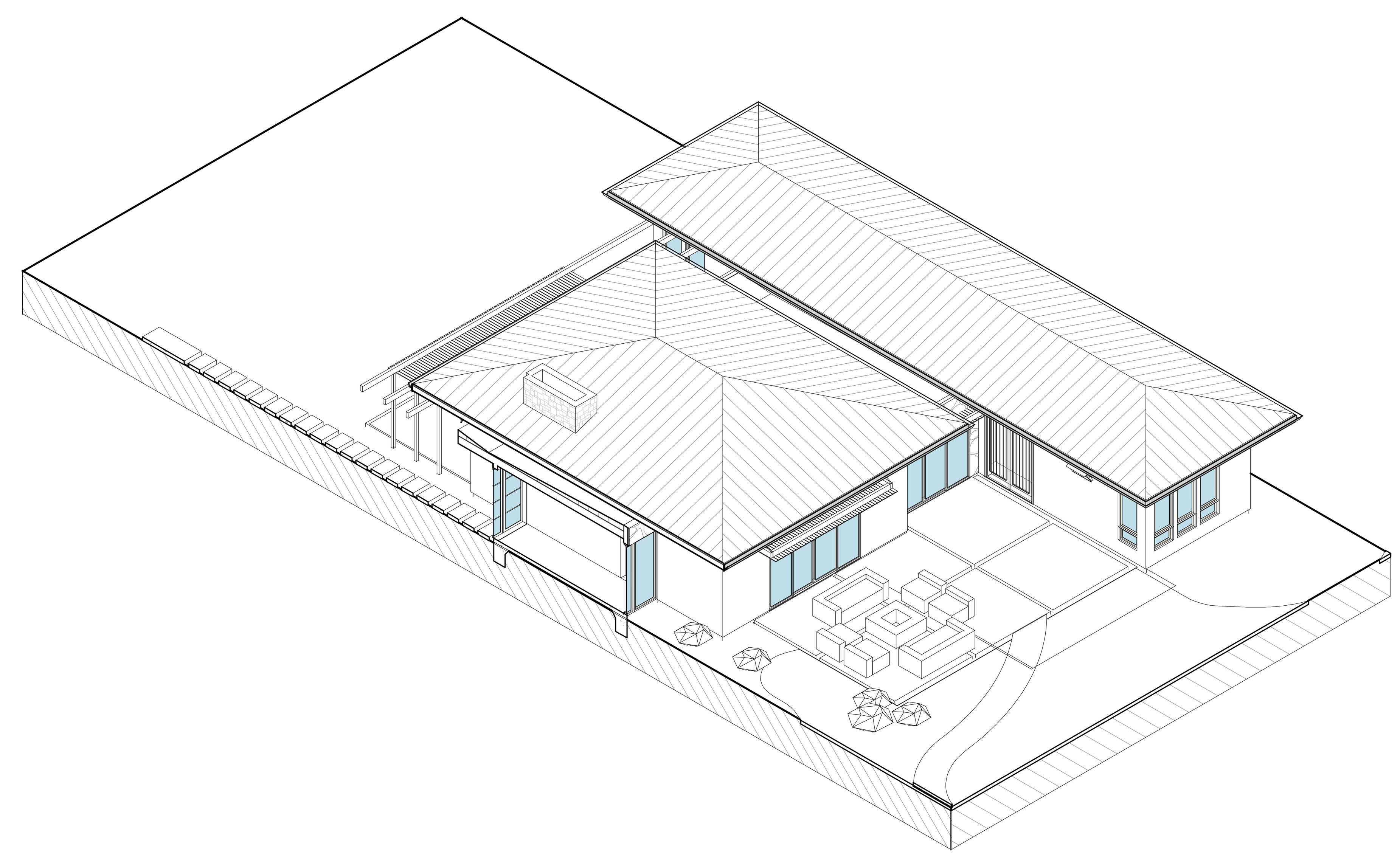
COVER SHEET

A00





AXO - FULL NE 1 **1**

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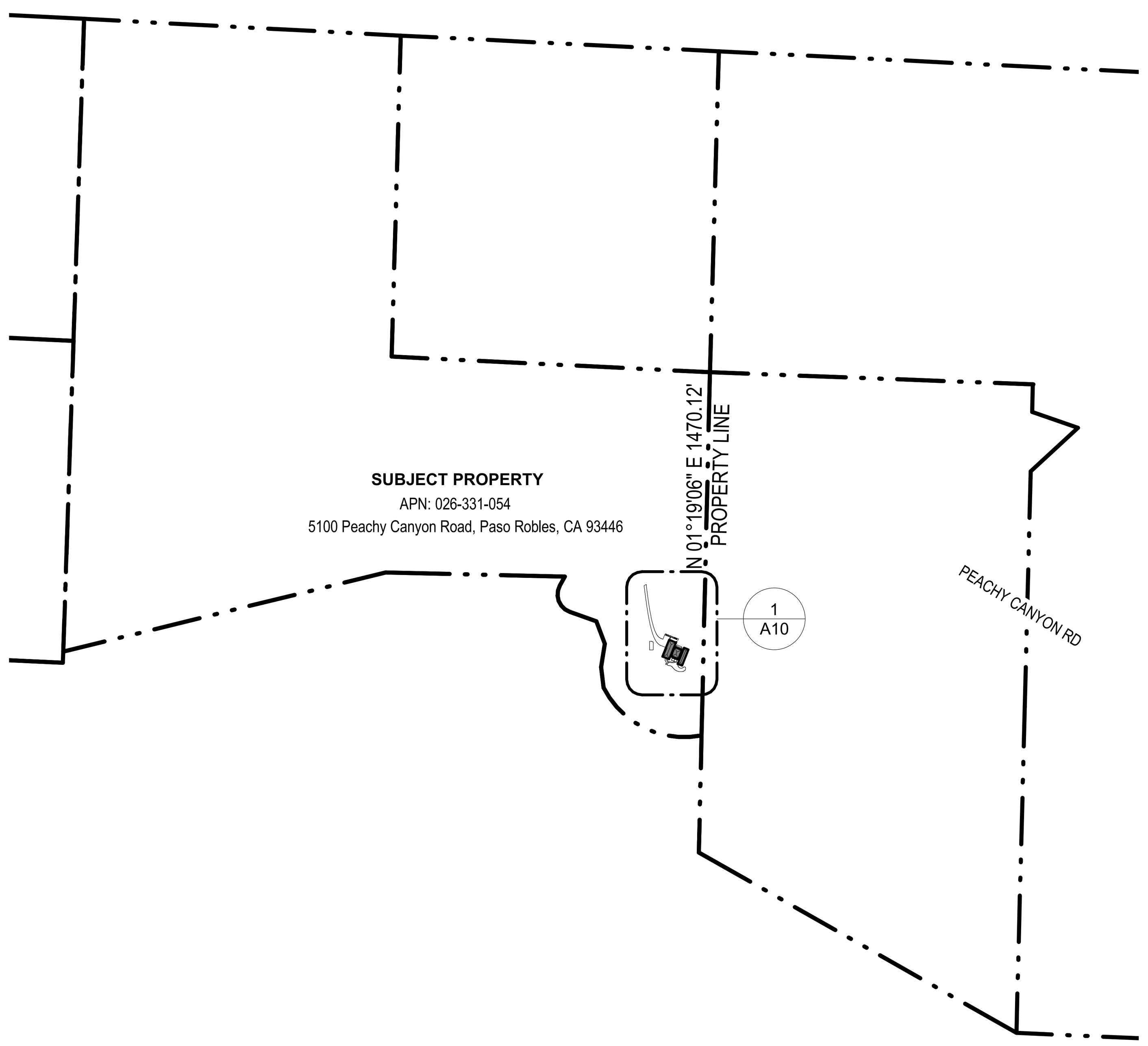
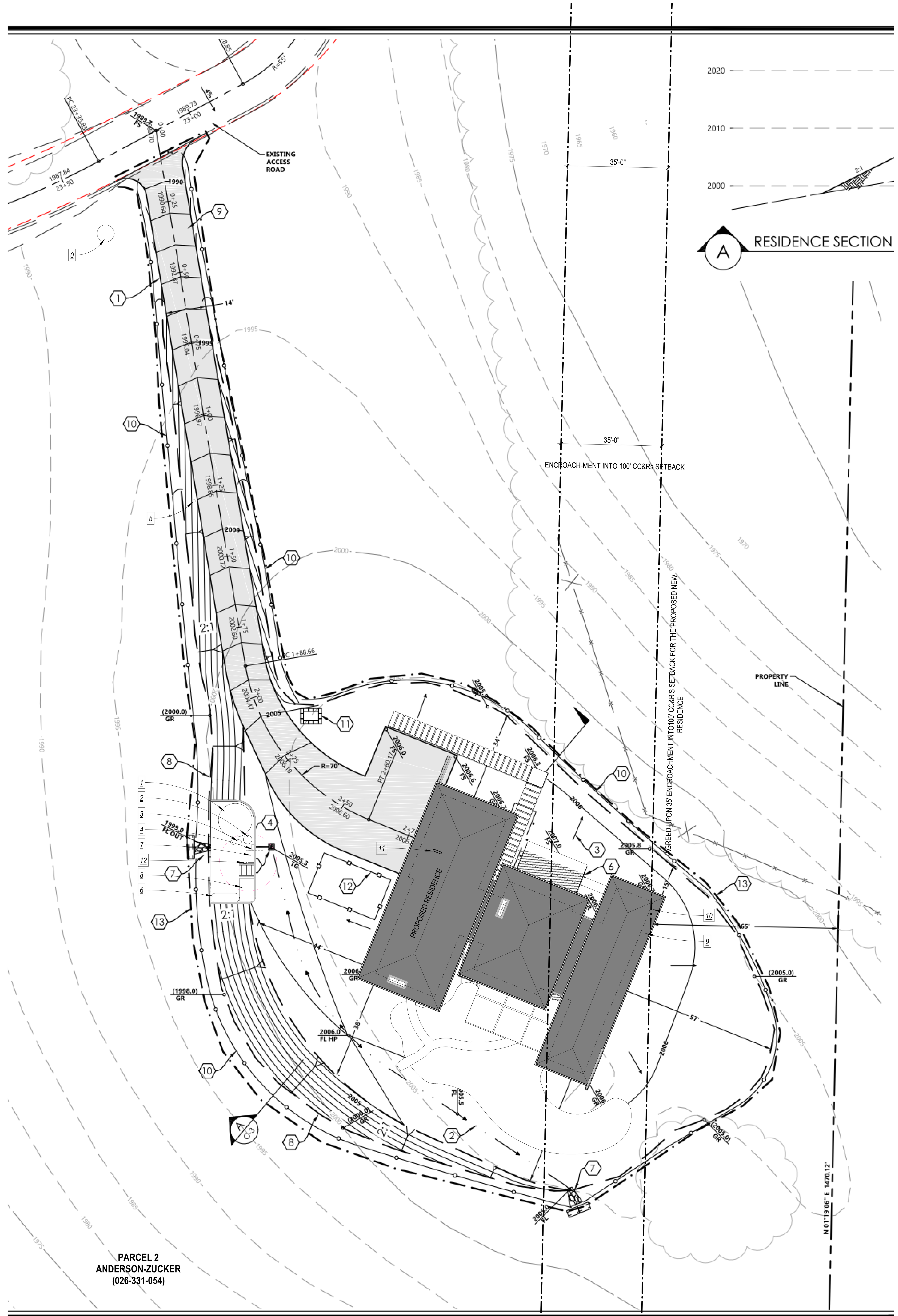
AXONOMETRICS

A02



1" = 500'-0" **OVERALL SITE PLAN** **2**



1" = 20'-0" **SITE PLAN** **1**

GENERAL NOTES

SHEET NOTES

- 0 APPROXIMATE WELL LOCATION, UNDER SEPERATE PERMIT
- 1 5000 GALLON WATER TANK
- 2 4' x 6' WATER TANK EQMT AREA
  - 3 PRESSURE TANK
  - 4 BOOSTER PUMP
  - 5 ELECTRICAL PUMP CONTROLS
- 6 500 GALLON PROPANE TANK,
- 7 PROPANE BACKUP GENERATOR, GENERAC 18-22 KW 10' CLEARANCE TO PROPANE TANK
- 8 SPA EQUIPMENT, 5' x 8' ALLOCATED
- 9 MINI SPLIT CONDENSOR
- 10 ELECTRICAL METER
- 11 ELECTRICAL SUBPANEL 1, LOCATED IN LAUNDRY RM OR GARAGE
- 12 ELECTRICAL SUBPANEL 2, LOCATED ON THE UTILITY PLATFORM

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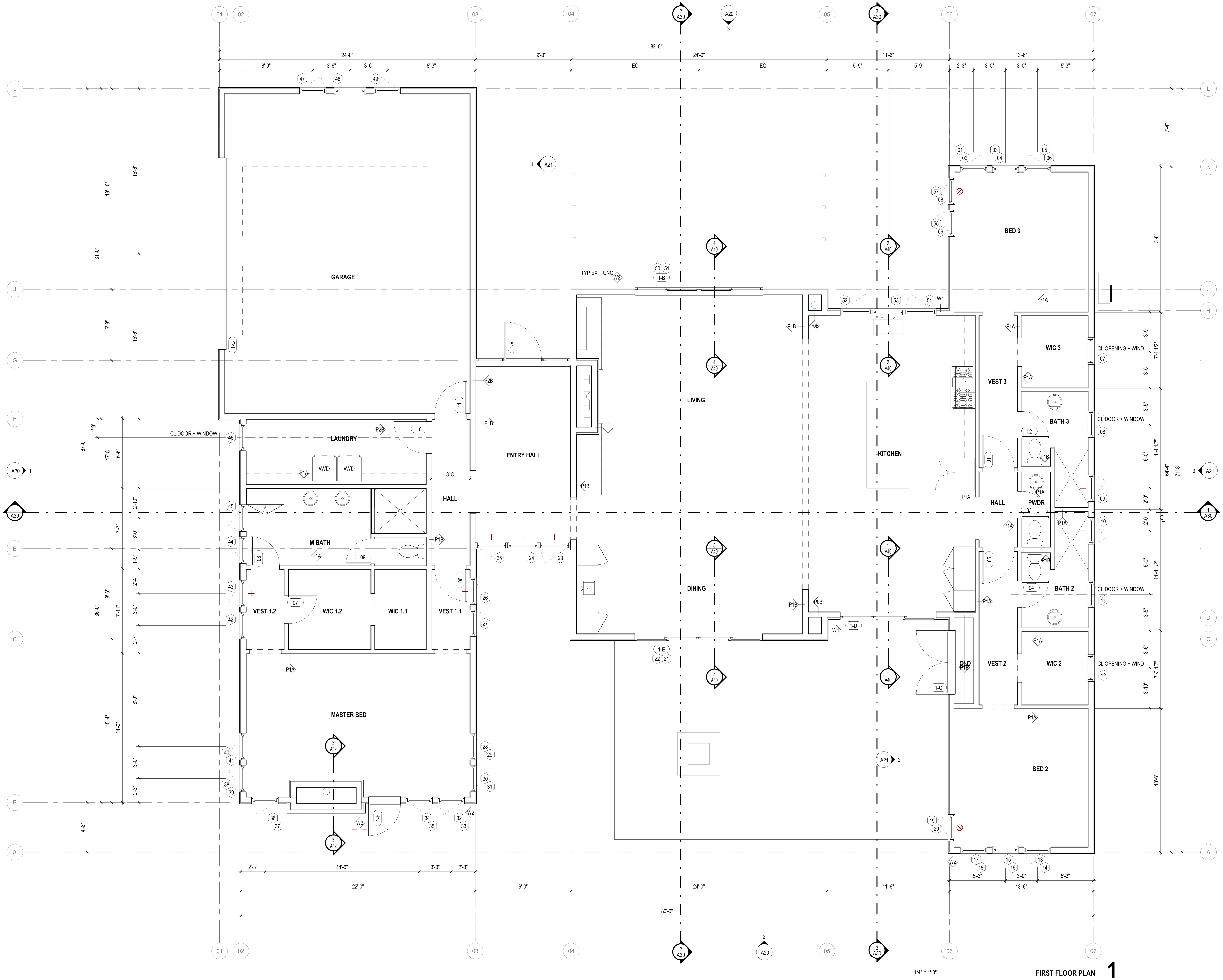
SITE PLAN

A10



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GENERAL NOTES

SHEET NOTES

1 NOTE

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FLOOR PLAN

A11

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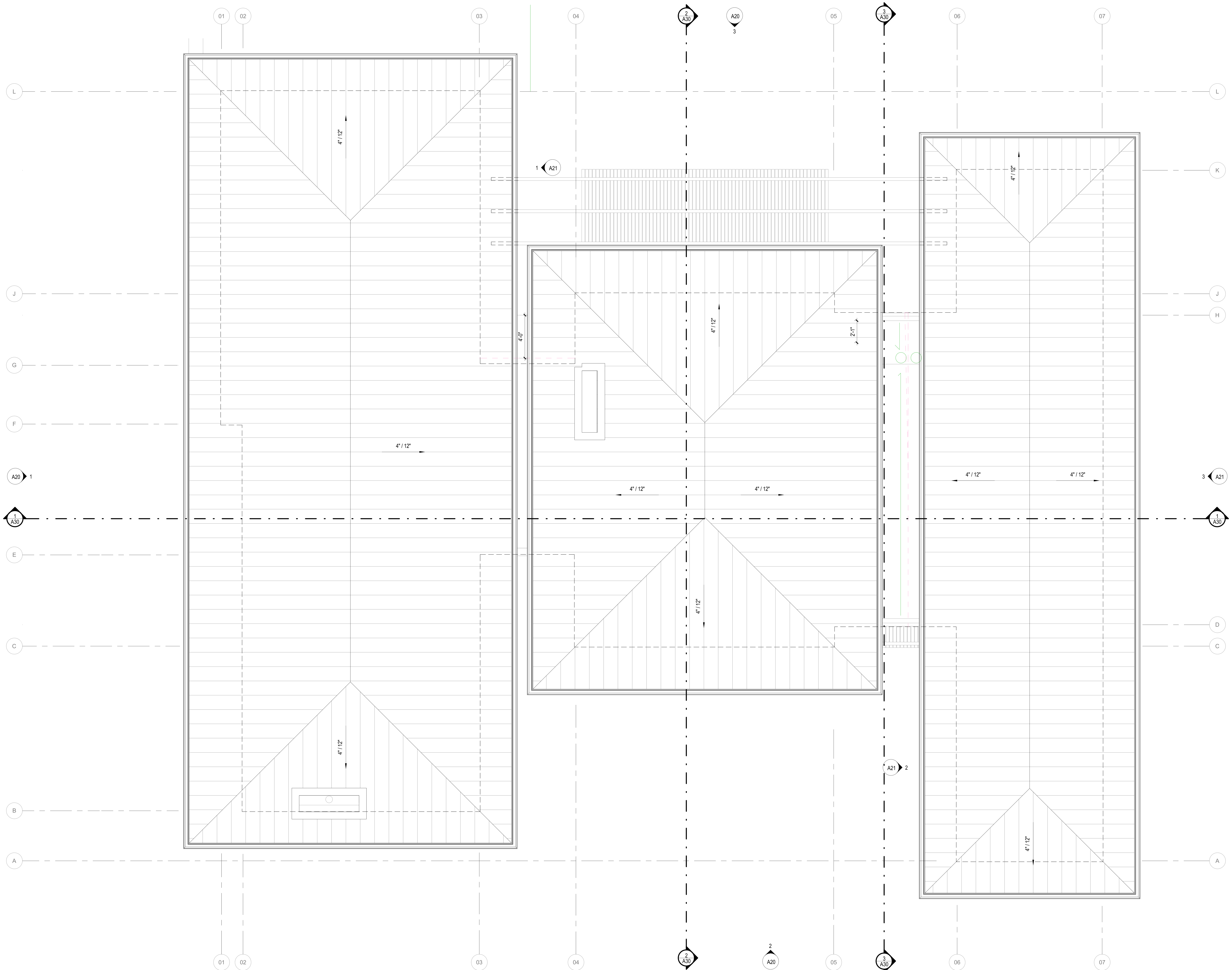
REFLECTED CEILING PLAN

A12



1/4" = 1'-0"

ROOF PLAN 1

GENERAL NOTES

SHEET NOTES

1 NOTE

ROOF VENTILATION

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ROOF PLAN

A13

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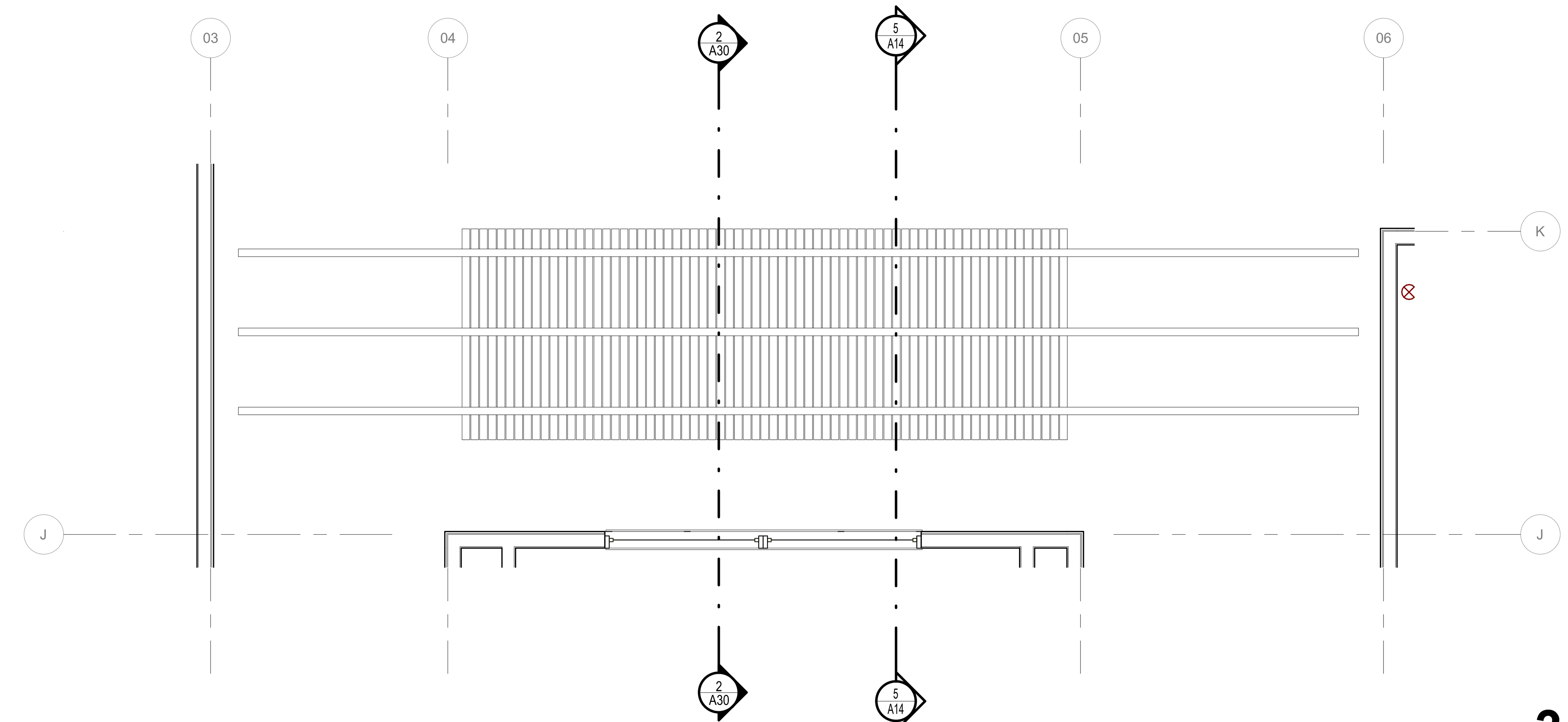
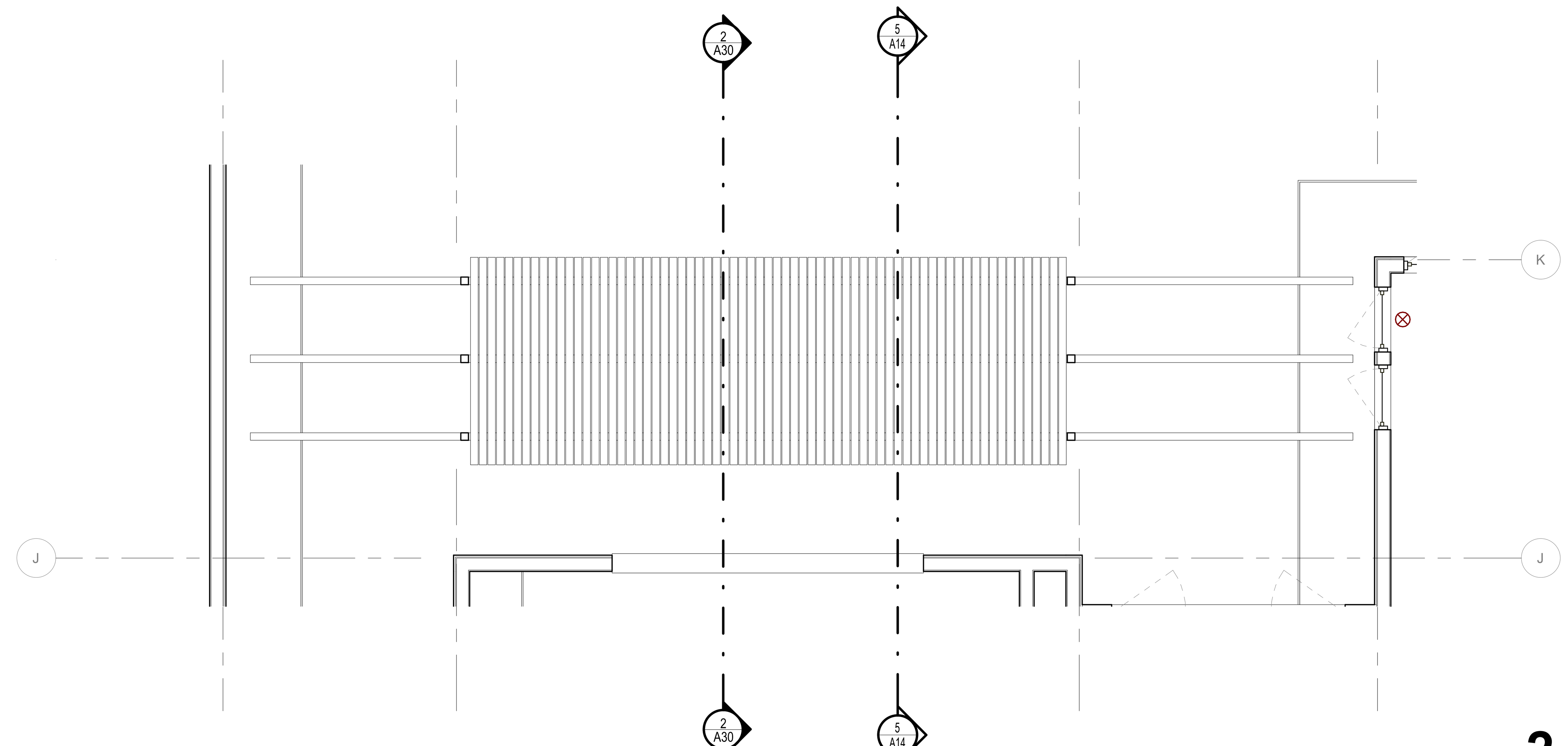
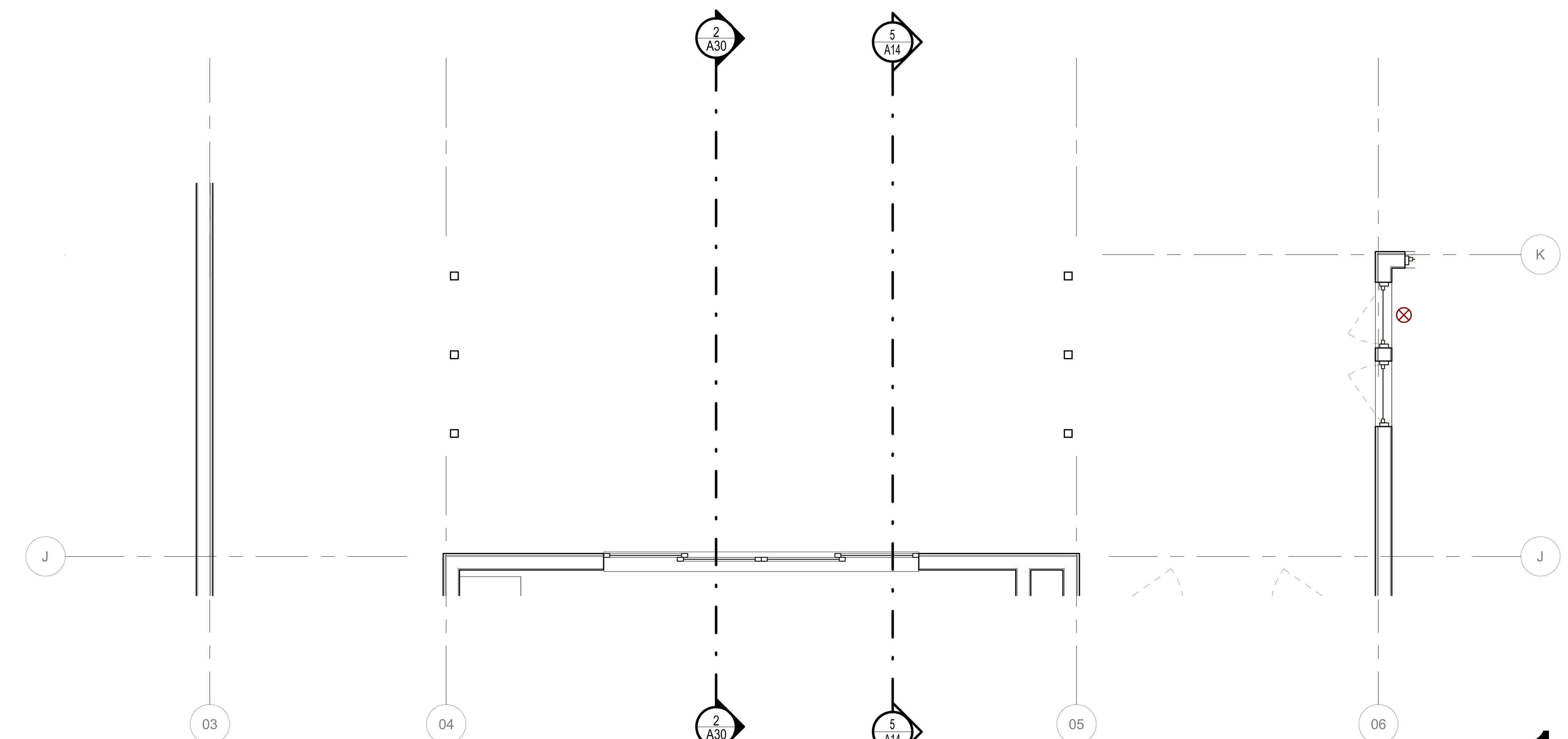


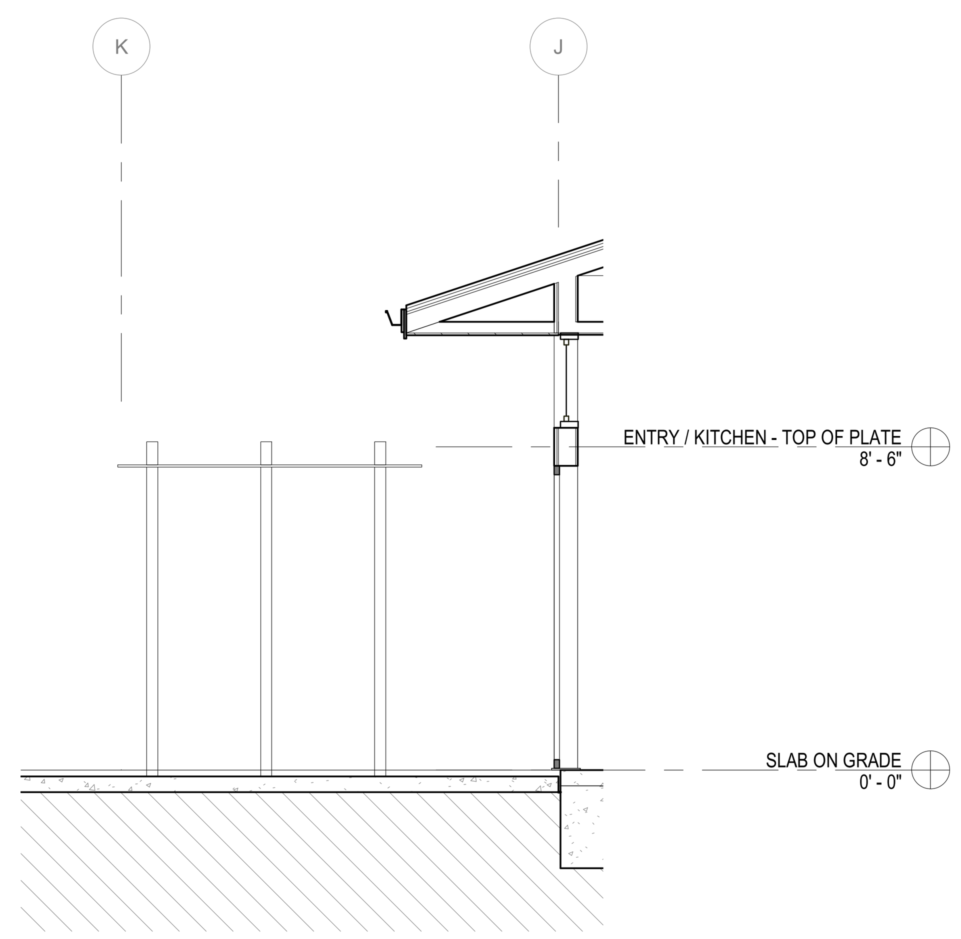
1/4" = 1'-0" TRELLIS ROOF PLAN 3



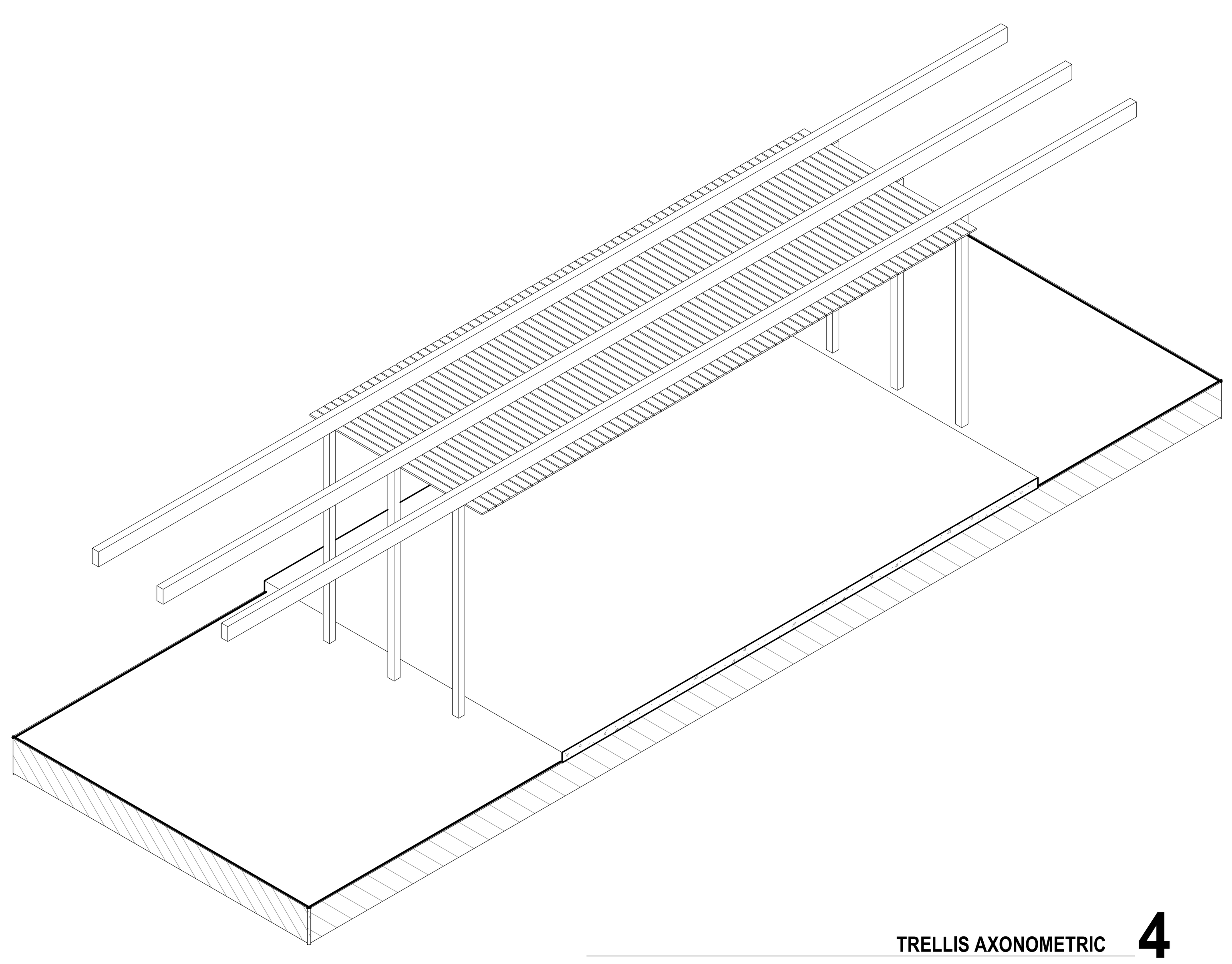
1/4" = 1'-0" TRELLIS REFLECTED CEILING PLAN 2



1/4" = 1'-0" TRELLIS FLOOR PLAN 1



1/4" = 1'-0" TRELLIS SECTION 5



TRELLIS AXONOMETRIC 4

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TRELLIS PLANS

A14

GENERAL NOTES

SHEET NOTES

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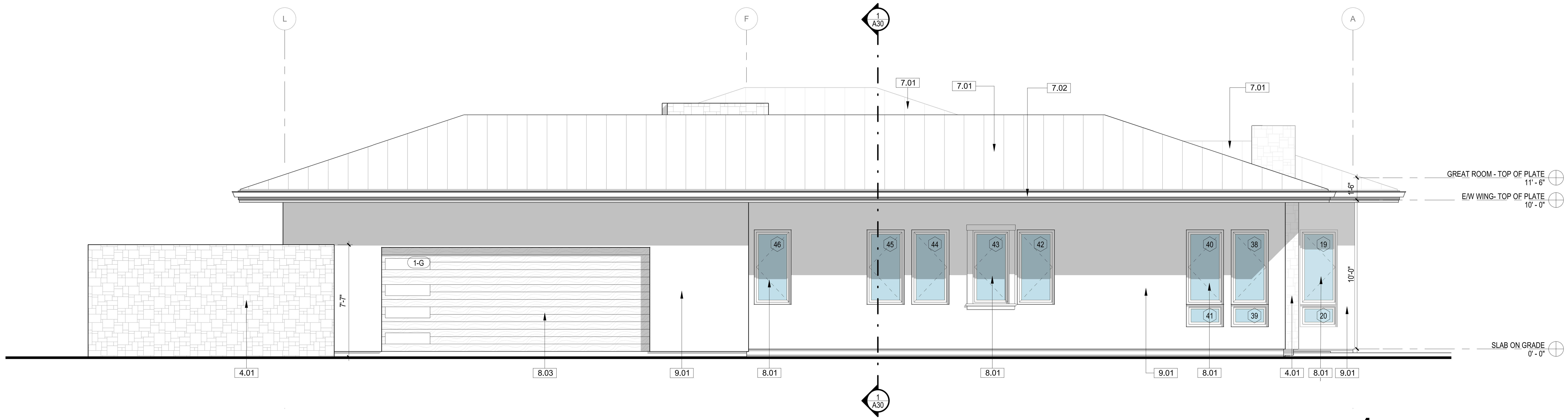
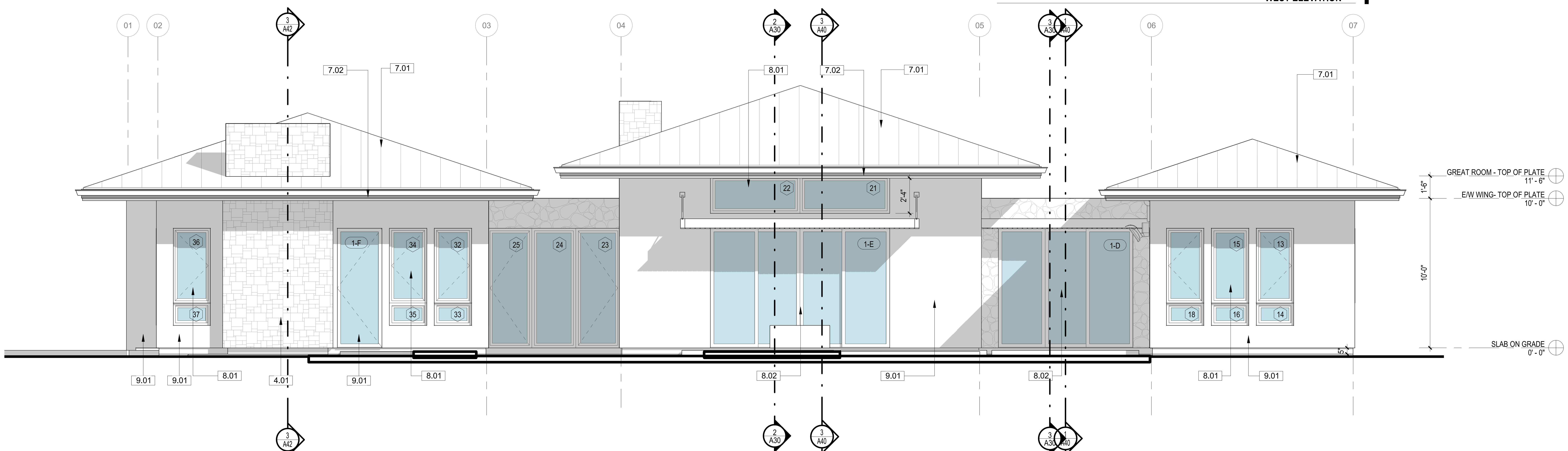
Keynote Legend

Key Value	Keynote Text
4.01	CALCAREOUS STONE VENEER
6.01	WOOD PAINTED OR STAINED TRELLIS
7.01	ROOFING - STANDING SEAM METAL ROOF
7.02	FASCIA - HARDIE OR EQUAL
8.01	BRONZE FINISHED THERMALLY BROKEN WINDOWS, RE-SCHEDULE
8.02	THERMALLY BROKEN GLASS DOORS, RE - SCHEDULE
8.03	ALUMINIUM GARAGE DOOR W/ WOOD PRINT FINISH
9.01	STUCCO



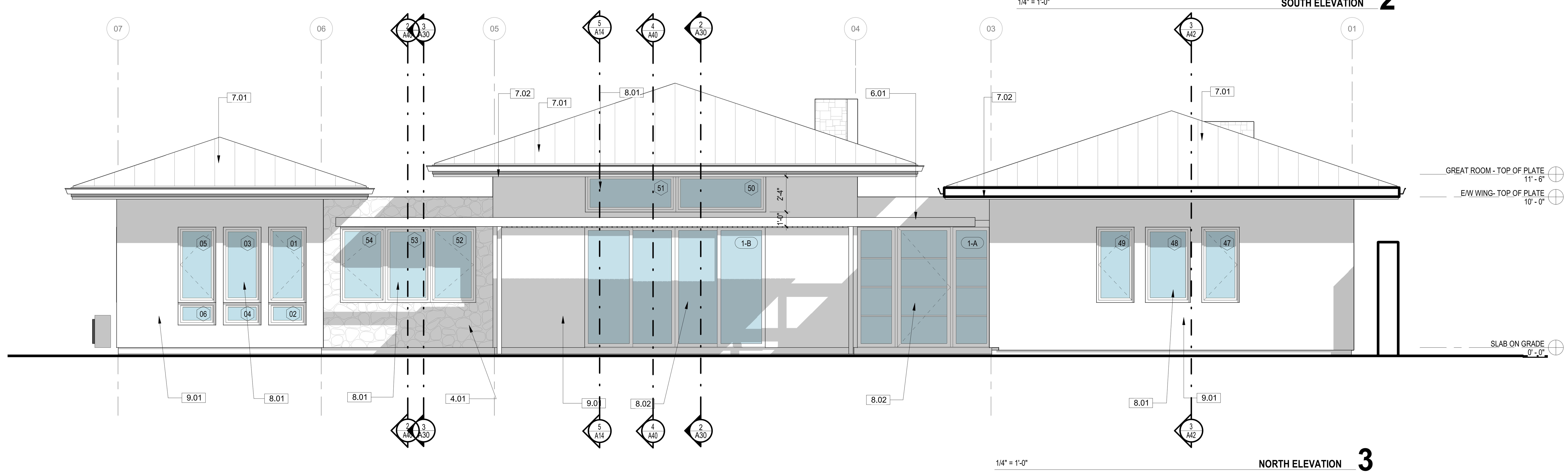
1/4" = 1'-0"

WEST ELEVATION 1



1/4" = 1'-0"

SOUTH ELEVATION 2



1/4" = 1'-0"

NORTH ELEVATION 3

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Project NO: 2025

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ISSUE DATE: AUGUST 28, 2021

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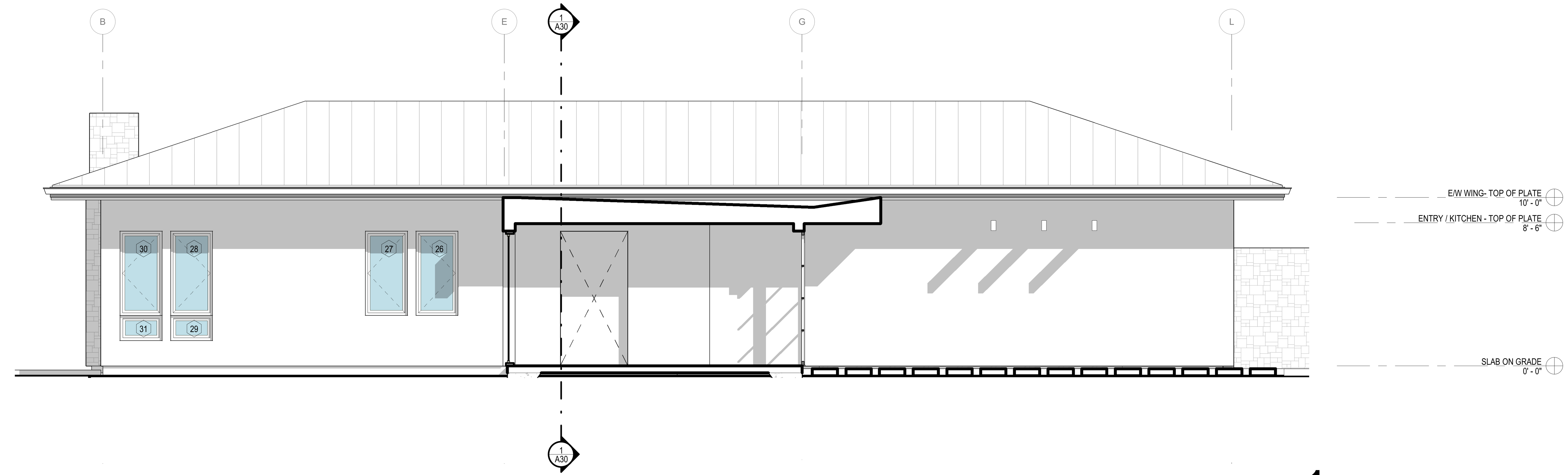
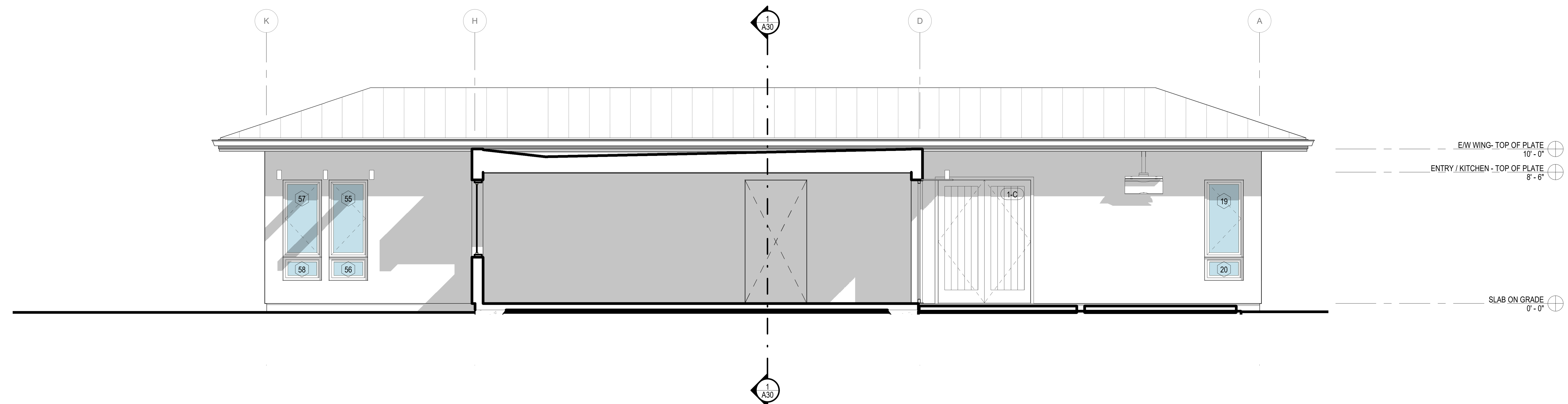
BUILDING ELEVATIONS

A20



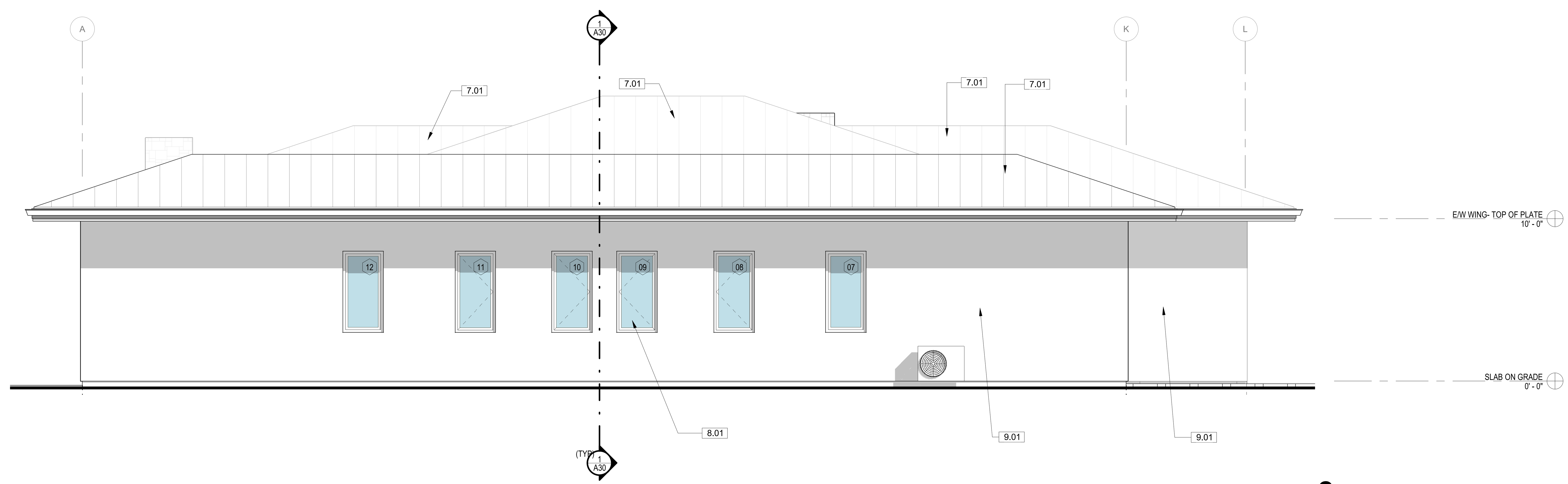
1/4" = 1'-0"

EAST ELEVATION **1**



1/4" = 1'-0"

WEST ELEVATION 2 **2**



1/4" = 1'-0"

EAST ELEVATION **3**

GENERAL NOTES

SHEET NOTES

Keynote Legend

Key Value	Keynote Text
7.01	ROOFING - STANDING SEAM METAL ROOF
8.01	BRONZE FINISHED THERMALLY BROKEN WINDOWS, RE-SCHEDULE
9.01	STUCCO

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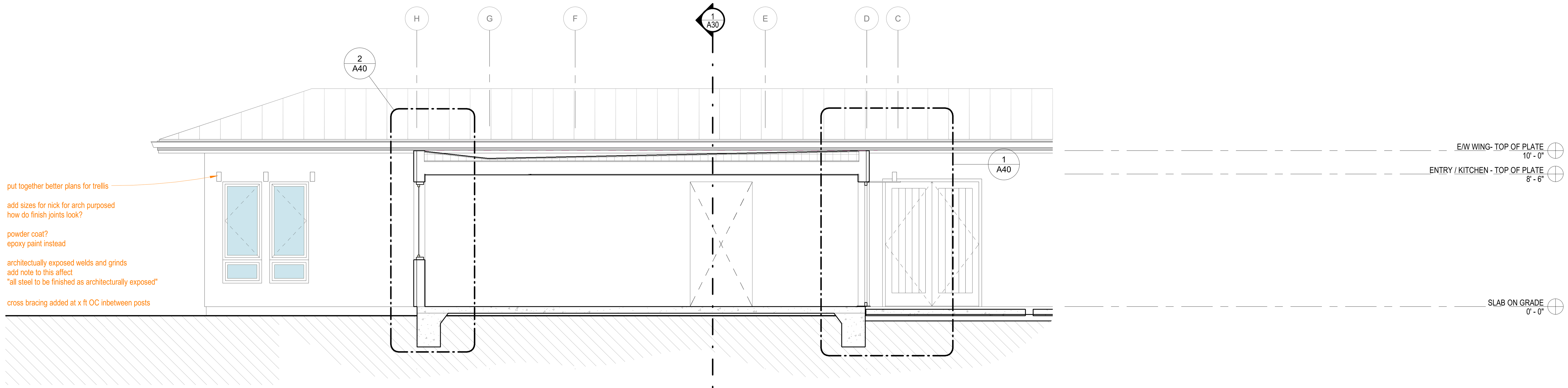
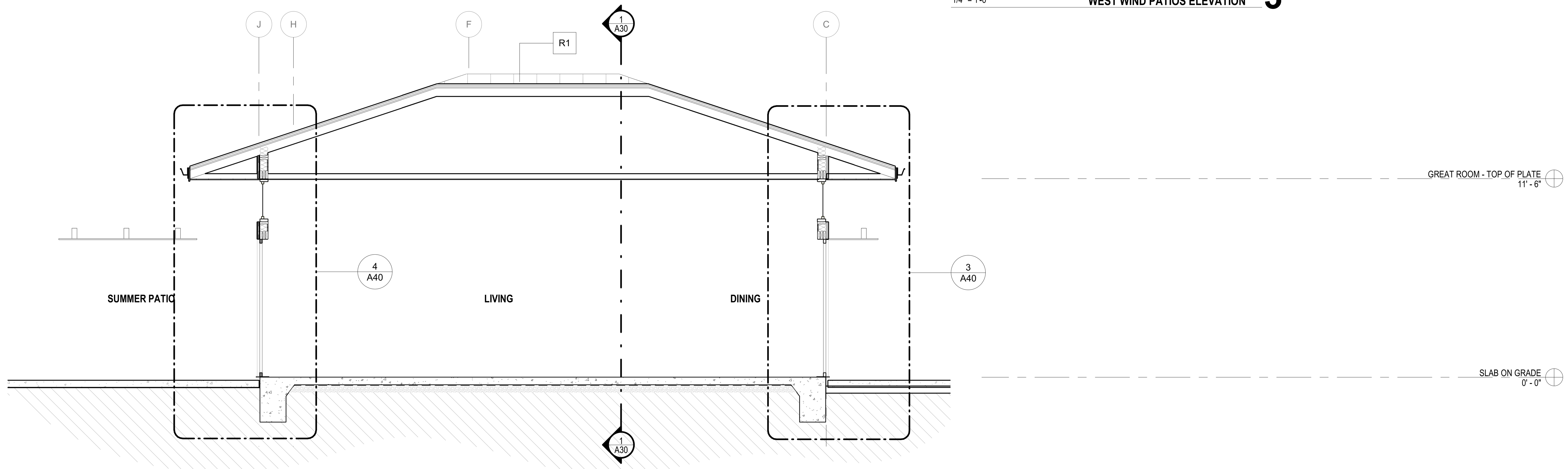
BUILDING ELEVATIONS

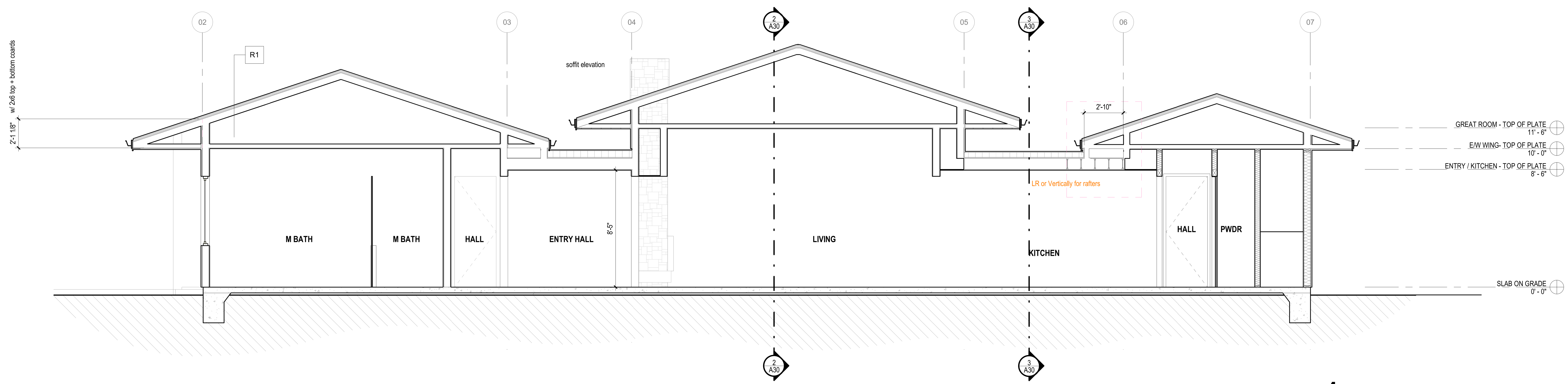
A21



1/4" = 1'-0" WEST WIND PATIOS ELEVATION **3**



1/4" = 1'-0" N-S Section **2**



1/4" = 1'-0" E-W Section **1**

GENERAL NOTES

SHEET NOTES

Keynote Legend

Key Value	Keynote Text

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BUILDING SECTIONS

A30

GENERAL NOTES

SHEET NOTES

1 NOTE

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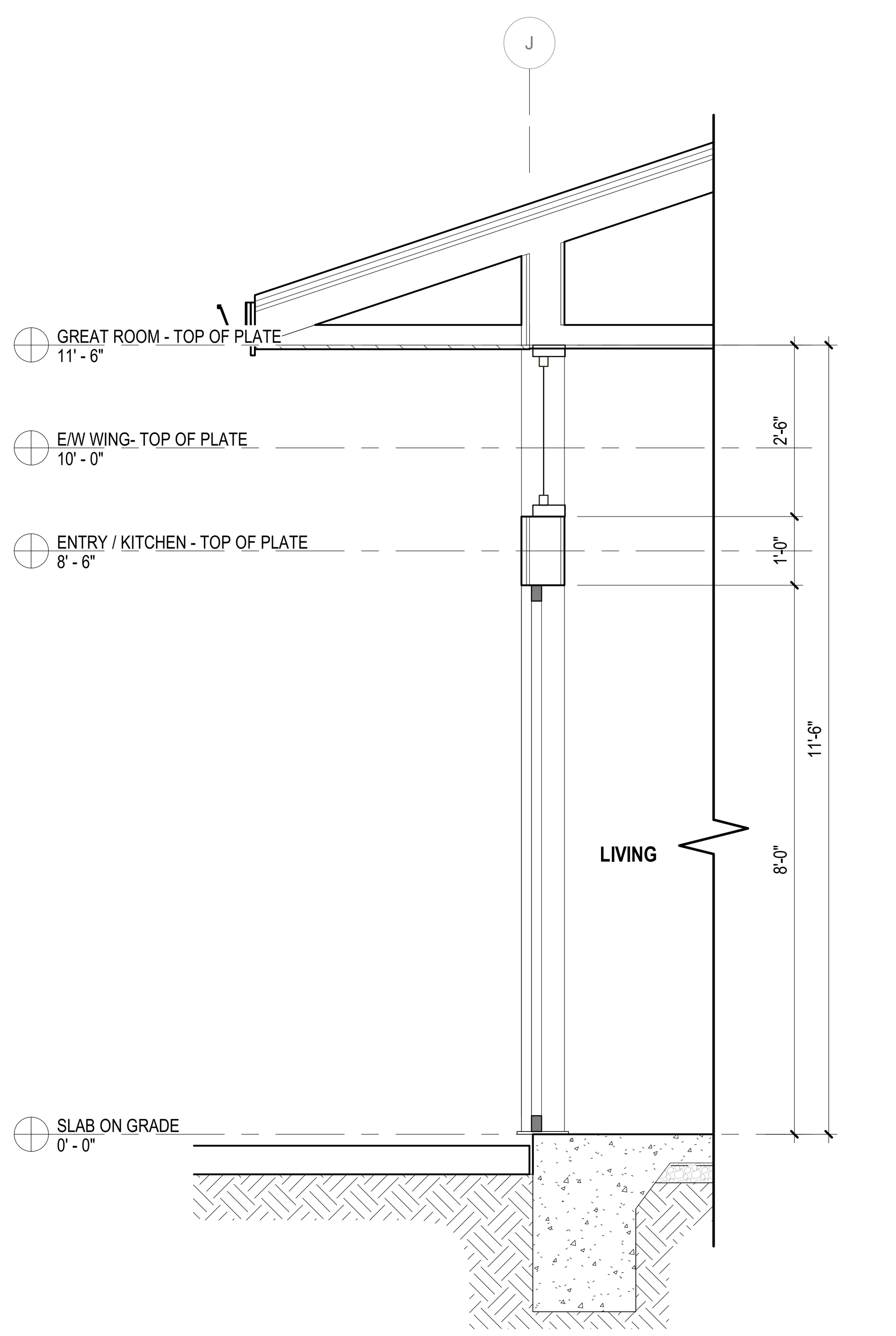
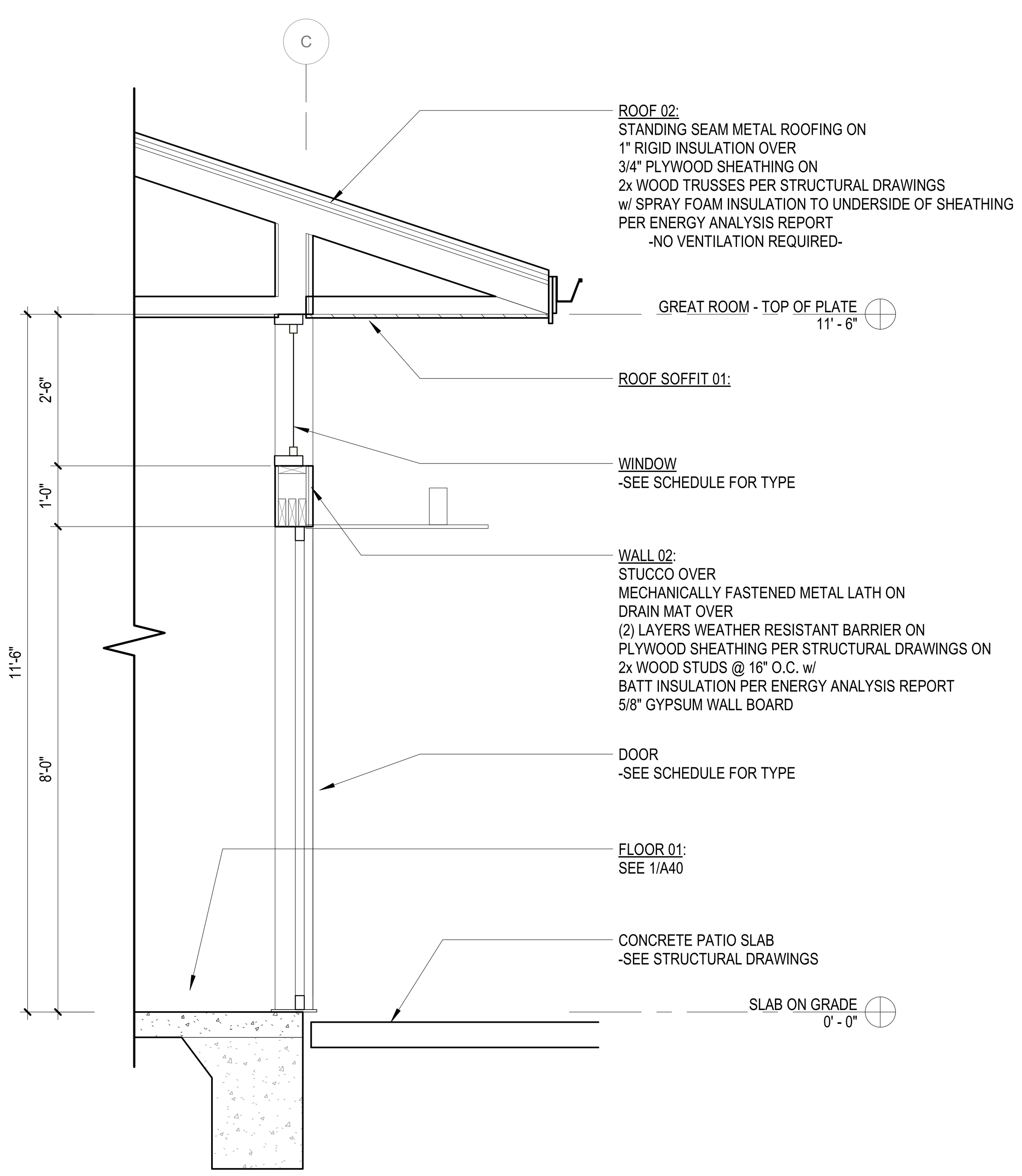
WALL SECTIONS

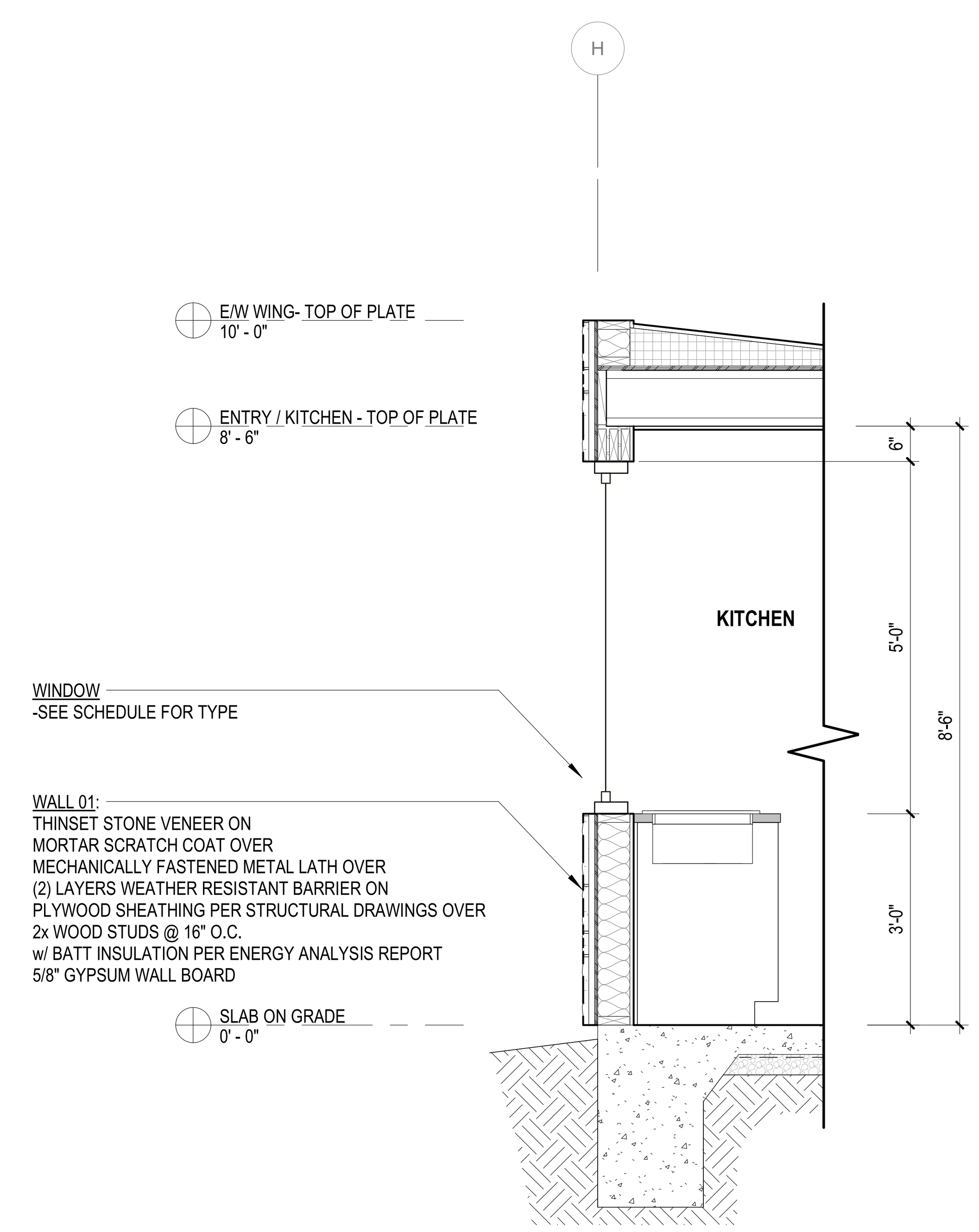
A40



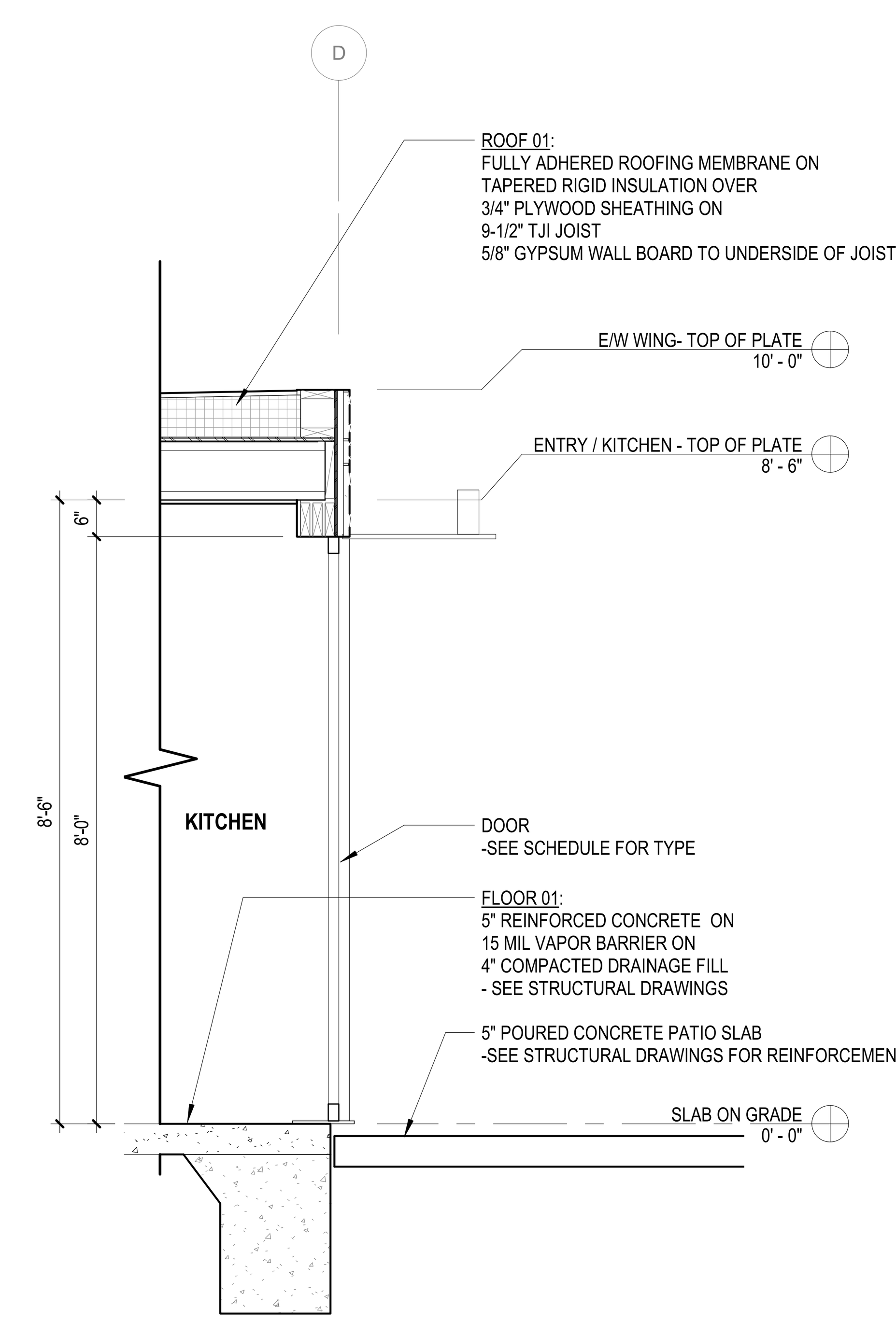
1/2" = 1'-0" **N Dining Wall Section** **4**



1/2" = 1'-0" **S Dining Wall Section** **3**



1/2" = 1'-0" **N Kitchen Wall Section** **2**



1/2" = 1'-0" **S Kitchen Wall Section** **1**

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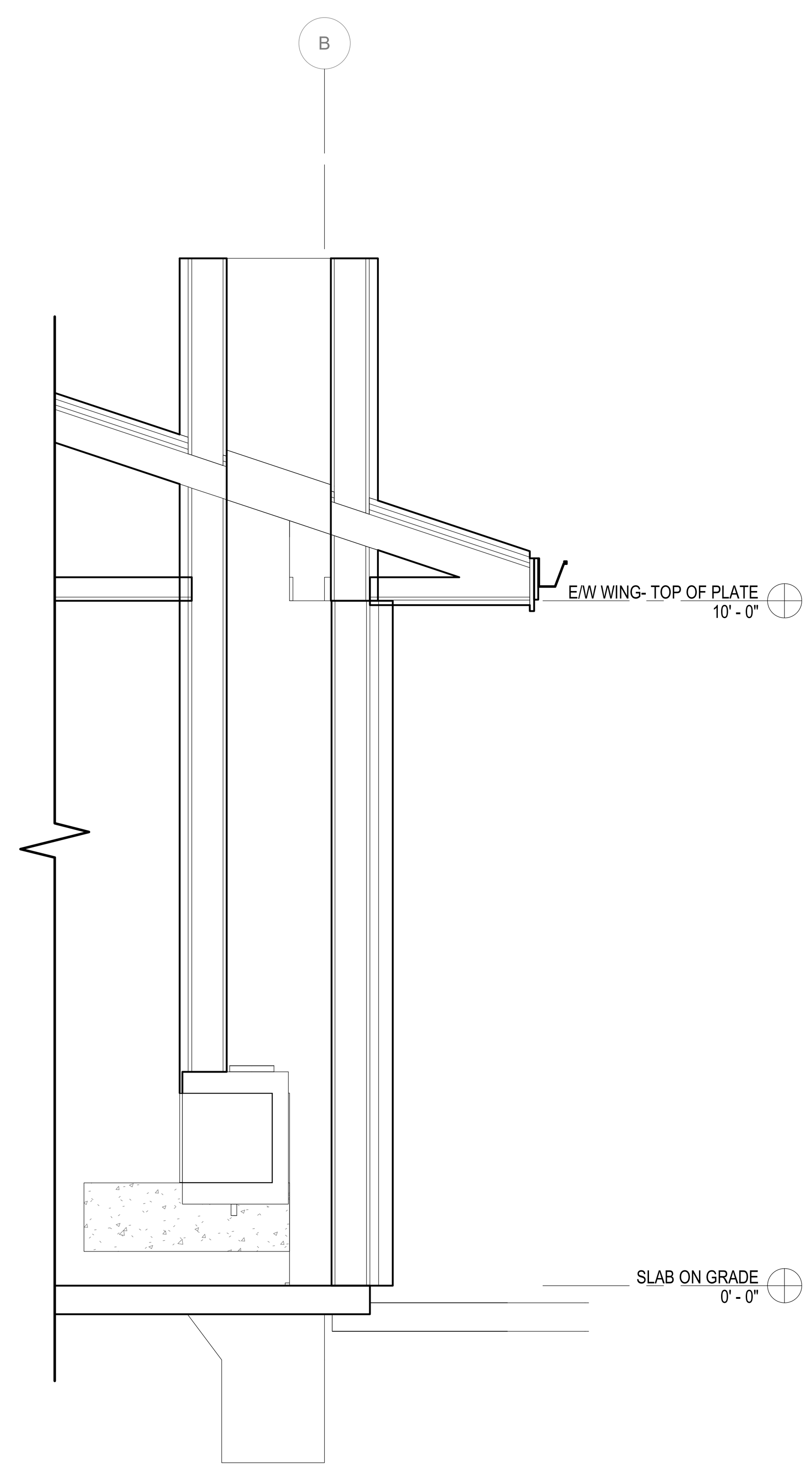
WALL SECTIONS

A41



1/2" = 1'-0" **Chimney Section** **3**

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WALL SECTIONS

A42

EXTERIOR DOOR SCHEDULE

DOOR ASSEMBLY			DOOR DIMENSIONS		
Number	Location	Type	Width	Height	Remarks
1-A	ENTRY HALL	OHO	3' - 6"	8' - 0"	
1-B	LIVING	OXXO	12' - 0"	8' - 0"	OXXO, OXXX OR PER JUDY
1-C	CLO	HH-2	6' - 0"	8' - 0"	U-FACTOR 1
1-D	KITCHEN	OXO	9' - 0"	8' - 0"	
1-E	DINING	OXXO	12' - 0"	8' - 0"	OCCO, OXXX, OR PER JUDY
1-F	MASTER BED	H-1	3' - 0"	8' - 0"	
1-G	GARAGE	G	18' - 0"	7' - 0"	U-FACTOR 1

INTERIOR DOOR SCHEDULE

DOOR ASSEMBLY			DOOR DIMENSIONS			
No.	Location	Type	Width	Height	Thickness	Remarks
01	VEST 3	H-2	3' - 0"	8' - 0"	0' - 1 3/4"	
02	BATH 3	H-2	2' - 6"	8' - 0"	0' - 1 3/4"	
03	PWDR	H-2	2' - 6"	8' - 0"	0' - 1 3/4"	
04	BATH 2	H-2	2' - 6"	8' - 0"	0' - 1 3/4"	
05	VEST 2	H-2	3' - 0"	8' - 0"	0' - 1 3/4"	
06	VEST 1.1	H-2	3' - 0"	8' - 0"	0' - 1 3/4"	
07	WIC 1.2	H-2	2' - 8"	8' - 0"	0' - 1 3/4"	
08	M BATH	H-2	2' - 8"	8' - 0"	0' - 1 3/4"	
09	M BATH	H-2	2' - 4"	8' - 0"	0' - 1 3/4"	
10	LAUNDRY	H-2	3' - 0"	8' - 0"	0' - 1 3/4"	
11	GARAGE	H-2	3' - 0"	8' - 0"	0' - 1 3/4"	20 MIN FIRE RATING

WINDOW SCHEDULE

WINDOW ASSEMBLY				WINDOW DIMENSIONS			SPECIFICATIONS	
Mark	Location	Type	Description	Unit Width	Unit Ht	Head Height	Glazing	Remarks
01	BED 3	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
02	BED 3	F	FIXED	2' - 6"	1' - 6"	3' - 0"		
03	BED 3	F	FIXED	2' - 6"	5' - 0"	8' - 0"		
04	BED 3	F	FIXED	2' - 6"	1' - 6"	3' - 0"		
05	BED 3	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
06	BED 3	F	FIXED	2' - 6"	1' - 6"	3' - 0"		
07	WIC 3	F	FIXED	2' - 6"	5' - 0"	8' - 0"		
08	BATH 3	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
09	BATH 3	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"	TEMPERED	
10	BATH 2	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"	TEMPERED	
11	BATH 2	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
12	WIC 2	F	FIXED	2' - 6"	5' - 0"	8' - 0"		
13	BED 2	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
14	BED 2	F	FIXED	2' - 6"	1' - 6"	3' - 0"		
15	BED 2	F	FIXED	2' - 6"	5' - 0"	8' - 0"		
16	BED 2	F	FIXED	2' - 6"	1' - 6"	3' - 0"		
17		C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
18	BED 2	F	FIXED	2' - 6"	1' - 6"	3' - 0"		
19	BED 2	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		EGRESS
20	BED 2	F	FIXED	2' - 6"	1' - 6"	3' - 0"		
21	DINING	F	FIXED	6' - 0"	2' - 6"	11' - 6"		
22	DINING	F	FIXED	6' - 0"	2' - 6"	11' - 6"		
23	ENTRY HALL	C	CASEMENT	2' - 11 1/2"	8' - 0"	8' - 0"	TEMPERED	
24	ENTRY HALL	F	FIXED	2' - 11 1/2"	8' - 0"	8' - 0"	TEMPERED	
25	ENTRY HALL	C	CASEMENT	2' - 11 1/2"	8' - 0"	8' - 0"	TEMPERED	
26	VEST 1.1	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"	TEMPERED	
27	VEST 1.1	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
28	MASTER BED	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
29	MASTER BED	F	FIXED	2' - 6"	1' - 6"	3' - 0"		
30	MASTER BED	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
31	MASTER BED	F	FIXED	2' - 6"	1' - 6"	3' - 0"		
32	MASTER BED	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
33	MASTER BED	F	FIXED	2' - 6"	1' - 6"	3' - 0"		
34	MASTER BED	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
35	MASTER BED	F	FIXED	2' - 6"	1' - 6"	3' - 0"		
36	MASTER BED	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
37	MASTER BED	F	FIXED	2' - 6"	1' - 6"	3' - 0"		
38	MASTER BED	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
39	MASTER BED	F	FIXED	2' - 6"	1' - 6"	3' - 0"		
40	MASTER BED	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
41	MASTER BED	F	FIXED	2' - 6"	1' - 6"	3' - 0"		
42	VEST 1.2	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
43	VEST 1.2	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"	TEMPERED	
44	M BATH	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"	TEMPERED	
45	M BATH	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
46	LAUNDRY	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
47	GARAGE	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
48	GARAGE	F	FIXED	3' - 0"	5' - 0"	8' - 0"		
49	GARAGE	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
50	LIVING	F	FIXED	6' - 0"	2' - 6"	11' - 6"		
51	LIVING	F	FIXED	6' - 0"	2' - 6"	11' - 6"		
52	KITCHEN	C	CASEMENT	3' - 0"	5' - 0"	8' - 0"		
53	KITCHEN	F	FIXED	3' - 0"	5' - 0"	8' - 0"		
54	KITCHEN	C	CASEMENT	3' - 0"	5' - 0"	8' - 0"		
55	BED 3	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		
56	BED 3	F	FIXED	2' - 6"	1' - 6"	3' - 0"		
57	BED 3	C	CASEMENT	2' - 6"	5' - 0"	8' - 0"		EGRESS
58	BED 3	F	FIXED	2' - 6"	1' - 6"	3' - 0"		

GENERAL NOTES

1. **U VALUE OF 0.45 MAX, SHGC OF 0.32 MAX**. SEE ENERGY ANALYSIS REPORT FOR MIN REQUIRED VALUES.
2. VERIFY DIMENSIONS AND LOCATIONS OF WALLS AS REQUIRED.
3. ALL WINDOW DIMENSIONS ARE ROUGH OPENING DIMENSIONS BASED ON EXTENT OF WINDOW FRAME, VERIFY ACTUAL OPENING SIZE WITH MANUFACTURER.
4. SEE PLANS FOR DIRECTION OF SWING.

TEMPERED GLAZING

GLAZING IS TO BE TEMPERED IN ALL SWINGING, SLIDING AND BI-FOLD DOORS.

GLAZING IS TO BE TEMPERED IN WINDOWS IF:

IT IS WITHIN:
- 24" RADIUS OF DOOR EDGE IN CLOSED POSITION AND
- 60" ABOVE WALKING SURFACE,
- EXCEPT FOR GLAZING ADJ TO FIXED PANEL OF DOOR.
- ADJ TO A BOTTOM STAIR LANDING, W/ GLAZING LESS THAN 36" ABOVE THE LANDING AND W/IN 60" HORIZONTALLY OF THE LANDING.
- ADJ TO STAIRS WHERE GLAZING IS LESS THAN 36" ABOVE THE WALKING SURFACE
- ADJ TO A SHOWER / TUB W/ GLAZING LESS THEN 60" ABOVE THE FLOOR SURFACE.

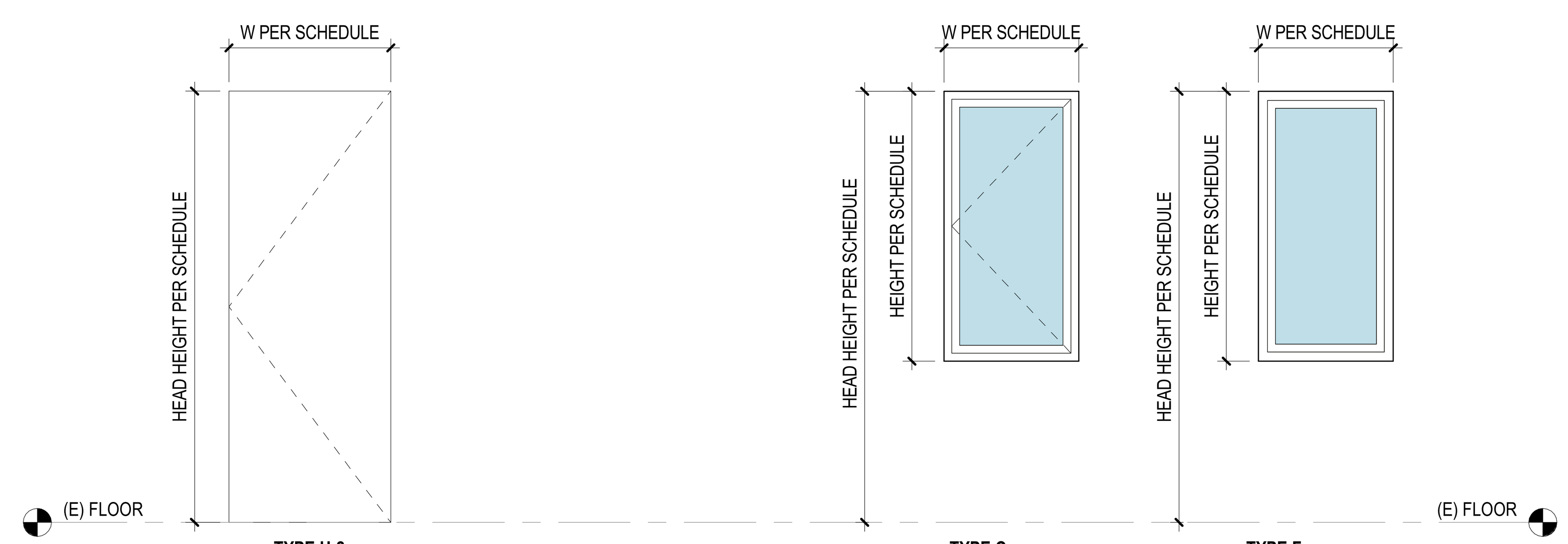
IF ALL 4 CONDITIONS EXIST:
- > 9SF,
- LOWER EDGE IS <18" AFF,
- UPPER EDGE IS 36" AFF AND
- WITHIN 36" OF WALKING SURFACE.

WILDLAND URBAN INTERFACE

GENERAL NOTE:
EXISTING BUILDINGS LOCATED IN WILDLAND-URBAN INTERFACE FIRE AREA AS DESIGNATED BY THE FIRE MARSHALL PER MARIN COUNTY CODE 16.17, SHALL COMPLY WITH THE PROVISIONS OF CHAPTER 7A OF C.B.C. ALL MODIFICATIONS TO EXISTING MATERIALS, SYSTEMS AND/OR ASSEMBLIES USED IN THE EXTERIOR DESIGN AND CONSTRUCTION SHALL COMPLY WITH CHAPTER 7A OF C.B.C.

ALL EXTERIOR GLAZING INCLUDING SKYLIGHTS IS TO COMPLY WITH THE FOLLOWING:
1. BE CONSTRUCTED OF MULTI-PANE GLAZING WITH A **MINIMUM OF ONE TEMPERED PANE** MEETING THE REQUIREMENTS OF SECTION 2406 SAFETY GLAZING, OR
2. BE CONSTRUCTED OF GLASS BLOCK UNITS, OR
3. HAVE A FIRE-RESISTANCE RATING OF NOT LESS THAN 20 MINUTES WHEN TESTED ACCORDING TO NFPA 257, OR
4. BE TESTED TO MEET THE PERFORMANCE REQUIREMENTS OF SFM STANDARD 12-7A-2.

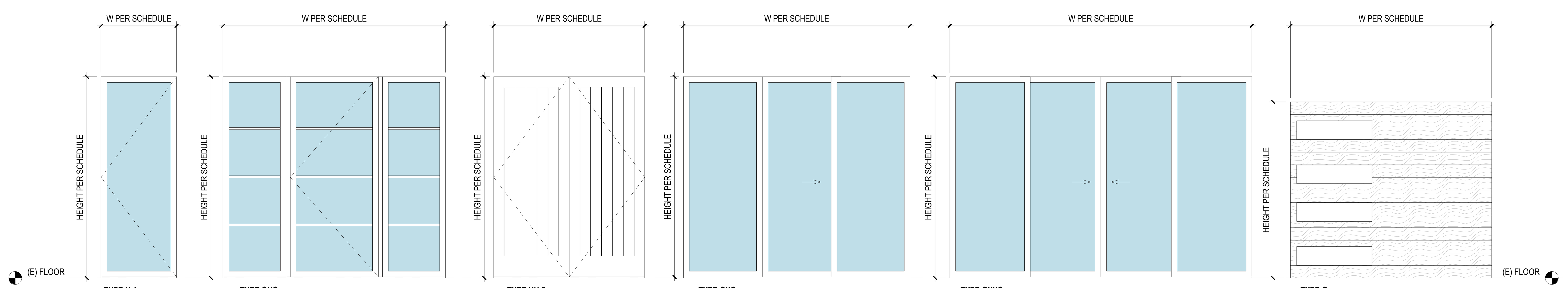
EXTERIOR DOORS ARE TO COMPLY WITH THE FOLLOWING:
1. THE EXTERIOR SURFACE OR CLADDING SHALL BE OF IGNITION RESISTANT OR NON-COMBUSTIBLE MATERIAL, OR
2. 20 MINUTE RATED, OR
3. 1 3/8" SOLID CORE WOOD OR PANEL DOORS. RAISED PANELS ARE TO BE 1 1/ 4" THICK MINIMUM TAPERING TO NOT LESS THAN 3/8" THICK.
4. SHALL BE TESTED TO MEET THE PERFORMANCE REQUIREMENTS OF SFM STANDARD 12-7A-1.



TYPE H-2

TYPE C
CASEMENT

TYPE F
FIXED



TYPE H-1

TYPE OHO
MAIN ENTRY
SIDELITE BOTH SIDE

TYPE HH-2

TYPE OXO

TYPE OXXO

TYPE G

Hambly Homes Architecture

HH

2048 Vine Street, Paso Robles, CA 93446
805.550.5499 | nina@hamblyhomes.com

Paso Robles Residence
Project NO: 2025
Address Removed for Privacy

ISSUE DATE: AUGUST 28, 2021

REVISIONS
:

DOOR / WINDOW SCHEDULE + TYPES

A60

LEGEND

LIGHTING FIXTURES

- RECESSED DOWNLIGHT; TYP. INT
- RECESSED DOWNLIGHT; WET @ BATHS RATED FOR WET LOCATIONS W/IN SHOWER / TUB + W/IN 3' OF. RATED FOR DAMP LOCATION ELSEWHERE IN BATHROOM.
- RECSSED DOWNLIGHT;WET @ EXT
- CEILING MOUNT; TYPICAL
- CEILING MOUNT; WET @ BATH
- PENDANT
- WALL SCONCE; BEDROOMS
- WALLS SCONCE; BATHS
- WALL SCONCE; WET @ EXTERIOR
- CEILING FAN
- WIRE FUTURE FAN & LIGHT
- UNDERCABINET LIGHT
- LINEAR LIGHTING; GARAGE
- TRACK FXITURE; GALLERY

LIGHTING CONTROLS

- DIMMER SWITCH - SINGLE POLE
- DIMMER SWITCH - 3 OR 4 WAY CIRCUIT
- SWITCH - SINGLE POLE
- SWITCH - 3 OR 4 WAY CIRCUIT
- VACANCY SENSOR W/ DIMMER
- JAMB SWITCH
- PHOTOCELL + MOTION SENSOR SEE NOTE 7 IN GENERAL NOTES, LIGHTING CONTROLS
- PHOTOCELL + TIME SWITCH SEE NOTE 7 IN GENERAL NOTES, LIGHTING CONTROLS
- ASTRONOMICAL CLOCK SEE NOTE 7 IN GENERAL NOTES, LIGHTING CONTROLS
- EMCS W/ ASTRONOMICAL CLOCK SEE NOTE 7 IN GENERAL NOTES, LIGHTING CONTROLS
- ELECTRICAL CIRCUIT

LIFE SAFETY

- COMBINATION CEILING MOUNTED EXHAUST FAN W/ LIGHT ENERGY STAR RATED, TERMINATE TO OUTSIDE OF BUILDING AND W/ BACK-DRAFT DAMPERS
- CEILING MOUNTED EXHAUST FAN ENERGY STAR RATED, TERMINATE TO OUTSIDE OF BUILDING AND W/ BACK-DRAFT DAMPERS
- CONCEALED SPRINKLER HEAD
- SMOKE DETECTOR
- COMBINATION SMOKE / CARBON MONOXIDE DETECTOR

ELECTRICAL

- 1 GANG RECEPTACLE
- GFCI GROUND FAULT CIRCUIT INTERRUPT RECEPTACLE
- GFCI, WP GROUND FAULT CIRCUIT INTERRUPT + WATERPROOF RECEPTACLE
- 2 GANG RECEPTACLE
- HALF HOT RECEPTACLE
- DEDICATED RECEPTACLE
- FLOOR RECEPTACLE

UTILITIES

- DATA COMMUNICATION
- DATA COMMUNICATION @ FLOOR
- TELEPHONE COMMUNICATION
- TELEPHONE COMMUNICATION @ FLOOR
- CABLE TELEVISION COMMUNICATION
- GAS LINE
- HOSE BIBB
- WM WASHING MACHINE OUTLET BOX

MECHANICAL / HVAC

- SUPPLY REGISTER
- SUPPLY REGISTER, WALL
- EXHAUST REGISTER
- EXHAUST REGISTER, WALL / CABINET
- MECH. THRU ROOF UNIT, SUPPLY
- MECH. THRU ROOF UNIT, EXHAUST
- MECH. DUCT, SIZE AS NEEDED, COORDINATE TO FIT
- HVAC ZONE THERMOSTAT

SHEET NOTES

1. CENTERLINE DOOR / WINDOW
2. SELF SWITCHING
3. ELECTRICAL SUBPANEL 1, SEE SITE PLAN FOR MORE INFO

Hambly Homes Architecture

HH

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Paso Robles Residence

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REVISIONS
:

FIRST FLOOR ELECTRICAL + UTILTY PLAN

A70

APPENDIX B: STRUCTURAL PLANS

TABLE 2304.10.1
FASTENING SCHEDULE

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	SPACING AND LOCATION
Roof		
1. Blocking between ceiling joists, rafters or trusses to top plate or other framing below	3-8d common (2½" × 0.131"); or 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	Each end, toenail
Blocking between rafters or truss not at the wall top plate, to rafter or truss	2-8d common (2½" × 0.131"); 2-3" × 0.131" nails; 2-3" 14 gage staples	Each end, toenail
	2-16d common (3½" × 0.162"); 3-3" × 0.131" nails; 3-3" 14 gage staples	End nail
Flat blocking to truss and web filler	16d common (3½" × 0.162") @ 6" o.c.; 3" × 0.131" nails @ 6" o.c.; 3" × 14 gage staples @ 6" o.c.	Face nail
2. Ceiling joists to top plate	3-8d common (2½" × 0.131"); or 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	Each joist, toenail
3. Ceiling joist not attached to parallel rafter, laps over partitions (no thrust) (see Section 2308.7.3.1, Table 2308.7.3.1)	3-16d common (3½" × 0.162"); or 4-10d box (3" × 0.128"); or 4-3" × 0.131" nails; or 4-3" 14 gage staples, 7/16" crown	Face nail
4. Ceiling joist attached to parallel rafter (heel joint) (see Section 2308.7.3.1, Table 2308.7.3.1)	Per Table 2308.7.3.1	Face nail
5. Collar tie to rafter	3-10d common (3" × 0.148"); or 4-10d box (3" × 0.128"); or 4-3" × 0.131" nails; or 4-3" 14 gage staples, 7/16" crown	Face nail
6. Rafter or roof truss to top plate (See Section 2308.7.5, Table 2308.7.5)	3-10 common (3" × 0.148"); or 3-16d box (3½" × 0.135"); or 4-10d box (3" × 0.128"); or 4-3" × 0.131 nails; or 4-3" 14 gage staples, 7/16" crown	Toenail
7. Roof rafters to ridge valley or hip rafters; or roof rafter to 2-inch ridge beam	2-16d common (3½" × 0.162"); or 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails; or 3-3" 14 gage staples, 7/16" crown; or	End nail
	3-10d common (3½" × 0.148"); or 3-16d box (3½" × 0.135"); or 4-10d box (3" × 0.128"); or 4-3" × 0.131" nails; or 4-3" 14 gage staples, 7/16" crown	Toenail
Wall		
8. Stud to stud (not at braced wall panels)	16d common (3½" × 0.162");	24" o.c. face nail
	10d box (3" × 0.128"); or 3" × 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	16" o.c. face nail
9. Stud to stud and abutting studs at intersecting wall corners (at braced wall panels)	16d common (3½" × 0.162");	16" o.c. face nail
	16d box (3½" × 0.135"); or 3" × 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	12" o.c. face nail
10. Built-up header (2" to 2" header)	16d common (3½" × 0.162"); or	16" o.c. each edge, face nail
	16d box (3½" × 0.135")	12" o.c. each edge, face nail
11. Continuous header to stud	4-8d common (2½" × 0.131"); or 4-10d box (3" × 0.128")	Toenail
12. Top plate to top plate	16d common (3½" × 0.162"); or	16" o.c. face nail
	10d box (3" × 0.128"); or 3" × 0.131" nails; or 3" 14 gage staples, 7/16" crown	12" o.c. face nail
13. Top plate to top plate, at end joints	8-16d common (3½" × 0.162"); or 12-10d box (3" × 0.128"); or 12-3" × 0.131" nails; or 12-3" 14 gage staples, 7/16" crown	Each side of end joint, face nail (minimum 24" lap splice length each side of end joint)
14. Bottom plate to joist, rim joist, band joist or blocking (not at braced wall panels)	16d common (3½" × 0.162"); or	16" o.c. face nail
	16d box (3½" × 0.135"); or 3" × 0.131" nails; or 3" 14 gage staples, 7/16" crown	12" o.c. face nail
15. Bottom plate to joist, rim joist, band joist or blocking at braced wall panels	2-16d common (3½" × 0.162"); or 3-16d box (3½" × 0.135"); or 4-3" × 0.131" nails; or 4-3" 14 gage staples, 7/16" crown	16" o.c. face nail
16. Stud to top or bottom plate	4-8d common (2½" × 0.131"); or 4-10d box (3" × 0.128"); or 4-3" × 0.131" nails; or 4-3" 14 gage staples, 7/16" crown; or	Toenail
	2-16d common (3½" × 0.162"); or 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	End nail
17. Top or bottom plate to stud	2-16d common (3½" × 0.162"); or 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	End nail
18. Top plates, laps at corners and intersections	2-16d common (3½" × 0.162"); or 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	Face nail
19. 1" brace to each stud and plate	2-8d common (2½" × 0.131"); or 2-10d box (3" × 0.128"); or 2-3" × 0.131" nails; or 2-3" 14 gage staples, 7/16" crown	Face nail
20. 1" × 6" sheathing to each bearing	2-8d common (2½" × 0.131"); or 2-10d box (3" × 0.128")	Face nail
21. 1" × 8" and wider sheathing to each bearing	3-8d common (2½" × 0.131"); or 3-10d box (3" × 0.128")	Face nail
Floor		
22. Joist to sill, top plate, or girder	3-8d common (2½" × 0.131"); or floor 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	Toenail
23. Rim joist, band joist, or blocking to top plate, sill or other framing below	8d common (2½" × 0.131"); or 10d box (3" × 0.128"); or 3" × 0.131" nails; or 3" 14 gage staples, 7/16" crown	6" o.c., toenail
24. 1" × 6" subfloor or less to each joist	2-8d common (2½" × 0.131"); or 2-10d box (3" × 0.128")	Face nail
25. 2" subfloor to joist or girder	2-16d common (3½" × 0.162")	Face nail
26. 2" planks (plank & beam – floor & roof)	2-16d common (3½" × 0.162")	Each bearing, face nail
27. Built-up girders and beams, 2" lumber layers	20d common (4" × 0.192");	32" o.c., face nail at top and bottom staggered on opposite sides
	10d box (3" × 0.128"); or 3" × 0.131" nails; or 3" 14 gage staples, 7/16" crown	24" o.c. face nail at top and bottom staggered on opposite sides
	And: 2-20d common (4" × 0.192"); or 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails; or 3-3" 14 gage staples, 7/16" crown	Ends and at each splice, face nail
28. Ledger strip supporting joists or rafters	3-16d common (3½" × 0.162"); or 4-10d box (3" × 0.128"); or 4-3" × 0.131" nails; or 4-3" 14 gage staples, 7/16" crown	Each joist or rafter, face nail
29. Joist to band joist or rim joist	3-16d common (3½" × 0.162"); or 4-10d box (3" × 0.128"); or 4-3" × 0.131" nails; or 4-3" 14 gage staples, 7/16" crown	End nail
30. Bridging or blocking to joist, rafter or truss	2-8d common (2½" × 0.131"); or 2-10d box (3" × 0.128"); or 2-3" × 0.131" nails; or 2-3" 14 gage staples, 7/16" crown	Each end, toenail

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER	Edges (inches)	Intermediate supports (inches)
Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing			
31. 3/8" – 1/2"	6d common or deformed (2" × 0.113") (subfloor and wall)	6	12
	8d box or deformed (2½" × 0.113") (roof)	6	12
	2⅜" × 0.113" nail (subfloor and wall)	6	12
	1¾" 16 gage staple, 7/16" crown (subfloor and wall)	4	8
	2⅜" × 0.113" nail (roof)	4	8
	1¾" 16 gage staple, 7/16" crown (roof)	3	6
32. 19/32" – 3/4"	8d common (2½" × 0.131"); or 6d deformed (2" × 0.113")	6	12
	2⅜" × 0.113" nail; or 2" 16 gage staple, 7/16" crown	4	8
33. 7/8" – 1¼"	10d common (3" × 0.148"); or 8d deformed (2½" × 0.131")	6	12
Other exterior wall sheathing			
34. 1/2" fiberboard sheathing	1½" galvanized roofing nail (7/16" head diameter); or 1¼" 16 gage staple with 7/16" or 1" crown	3	6
35. 25/32" fiberboard sheathing	1¾" galvanized roofing nail (7/16" diameter head); or 1½" 16 gage staple with 7/16" or 1" crown	3	6
Wood structural panels, combination subfloor underlayment to framing			
36. 3/4" and less	8d common (2½" × 0.131"); or 6d deformed (2" × 0.113")	6	12
37. 7/8" – 1"	8d common (2½" × 0.131"); or 8d deformed (2½" × 0.131")	6	12
38. 1⅛" – 1¼"	10d common (3" × 0.148"); or 8d deformed (2½" × 0.131")	6	12
Panel siding to framing			
39. 1/2" or less	6d corrosion-resistant siding (1⅞" × 0.106"); or 6d corrosion-resistant casing (2" × 0.099")	6	12
40. 5/8"	8d corrosion-resistant siding (2⅜" × 0.128"); or 8d corrosion-resistant casing (2½" × 0.113")	6	12
Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing			
Interior paneling			
41. 1/4"	4d casing (1½" × 0.080"); or 4d finish (1½" × 0.072")	6	12
42. 3/8"	6d casing (2" × 0.099"); or 6d finish (Panel supports at 24 inches)	6	12

For SI: 1 inch = 25.4 mm.
a. Nails spaced at 6 inches at intermediate supports where spans are 48 inches or more. For nailing of wood structural panel and particleboard diaphragms and shear walls, refer to Section 2305. Nails for wall sheathing are permitted to be common, box or casing.
b. Spacing shall be 6 inches on center on the edges and 12 inches on center at intermediate supports for nonstructural applications. Panel supports at 16 inches (20 inches if strength axis in the long direction of the panel, unless otherwise marked).
c. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule and the ceiling joist is fastened to the top plate in accordance with this schedule, the number of toenails in the rafter shall be permitted to be reduced by one nail.

PROJECT STRUCTURAL CODE REFERENCES AND CONSTRUCTION SPECIFICATIONS:

BUILDING CODE REFERENCES:

Unless otherwise specified below, the most current version of the following codes and standards shall govern the design and construction of the project. All work on the project shall be performed in accordance with the building codes and standards referenced below, the requirements of the local building official, or the specifications of these project plans, whichever is most conservative.

Governing Code:	*2019 California Building Code (CBC)*
Supporting Code References:	
Vertical and Lateral Load Development	*Minimum Design Loads for Buildings and Other Structures (ASCE 7)*
Lumber and Timber	*National Design Specification for Wood Construction (NDS)*
Bolts and Nails	*National Design Specification for Wood Construction (NDS)*
Reinforced Concrete	*Building Code Requirements for Structural Concrete (ACI 318)*
Masonry Construction	*Building Code Requirements for Masonry Structures (ACI 530)* *Masonry Codes and Specifications for California (MIA)*
Structural Plywood Sheathing	*Special Design Provisions for Wind and Seismic (SDPWS)*

GENERAL STRUCTURAL NOTES AND REQUIREMENTS:

1) The following notes and specifications shall govern the construction of the project unless otherwise specifically noted on the project structural plans, construction details or other supporting documentation from this office.
2) Modification of these plans, notes, specifications and details shall not be permitted unless approved in writing from the Architect or Engineer.
3) The project Contractor and Sub-Contractors shall verify all dimensions and conditions at the job site before proceeding with work and report any discrepancies of changes to MSD Professional Engineering, Inc. prior to construction of the affected aspects of the project.
4) The following structural plans have been prepared to correlate with the architectural plans provided by others. Unless otherwise referenced on the structural plans or details, see project architectural plans for all building construction dimensions, wall locations, window sizes and floor/ceiling heights.
5) Written dimensions shown on architectural or structural plans shall govern over all scaled measurements.
6) All work directly or indirectly referenced within the project structural plans and details shall be performed in accordance with the best practices associated with the work specified. The Contractor shall be responsible for coordinating the work of all trades.
7) The following structural plans and details represent the finished structure and are not intended to specify the means or method of construction. The Contractor shall provide all necessary bracing, shoring and temporary supports to properly protect the structure referenced in these plans as well as any adjacent existing structures affected by the work proposed within these documents.
8) All bracing, shoring and temporary supports shall remain in place until the structure is otherwise sufficiently complete to be self-supporting of all the building elements referenced within these project plans.
9) This structure has been prepared to support the building and occupancy loads referenced within the structural calculations and specifications provided by this office. Any additional loads or variations to the project that differ from the referenced in the calculations should be brought to the attention of this office.
10) During construction, building materials shall be spread out when placed on raised floors or roofs. Construction loads shall not exceed the live loads shown on these project plans and specifications unless the contractor provides adequate shoring or bracing to support the materials.
11) Only structural plans denoted with an "Approved " stamp from the local building official shall be used for the purpose of construction. The Contractor shall be responsible for all coordination of "Approved" construction plans between the various trades and Sub- Contractors working on the project. All other revisions of the project plans shall be considered obsolete and the Contractor assumes responsibility for all work not performed in accordance with the "Approved" construction documents.
12) The following structural plans and details have been provided to accommodate typical drainage and waterproofing methods used in construction, however, these plans are not intended to provide all the necessary drainage and waterproofing solutions required for a typical project. The project Architect and Contractor shall be responsible for determining all necessary drainage and waterproofing details and shall coordinate these conditions with this office when necessary for structural purposes.
13) See architectural plans for all roof drainage mechanisms, crickets, roof openings, drainage slopes and other waterproofing measures not shown on these plans.

BUILDING PAD PREPARATION AND FOUNDATION EXCAVATIONS:

1) Contractor shall refer to the "Project Specific Construction Conditions and Design Parameters" on structural sheet S-0.1 for additional compaction, fill, backfilling, foundation excavation and site preparation requirements.
2) Prior to performing grading and/or excavation work at the project site, the Contractor shall locate and protect all sub-surface utilities.
3) The Building Official/Building Inspector and when referenced within these documents, the project soils engineer, shall inspect and approve in writing all grading work and foundation excavations prior to placement of steel reinforcement and concrete forms.
4) Any site irregularities, disturbances, groundwater, pumping-soils or sub-surface structures encountered during the grading work shall immediately be brought to the attention of the project soils engineer and MSD Professional Engineering, Inc. for appropriate recommendations and remediation, if necessary.
5) Regardless of any other foundation recommendations specified within these plans, graded sites to be filled twelve (12) inches or more shall require a compaction test provided by the project soils engineer and submitted to the Building Official/Building Inspector for review and approval prior to the foundation inspection.
6) Foundation excavations shall be prepared to the depths and dimensions shown on the following construction plans and details. Excavations shall be cut square and smooth with the base of excavations prepared level and into uniformly firm soil material, unless noted otherwise.
7) Foundation excavations shall be moistened immediately prior to pouring concrete. See the "Project Specific Construction Conditions and Design Parameters" on structural sheet S-0.1 for additional foundation pre-saturation requirements, if applicable.
8) De-water to maintain stability and clean working conditions when water or sub-surface moisture collects and ponds in foundation excavations.
9) Foundations shall not be poured until all required formwork, reinforcing steel, anchor bolts, holdowns, etc. have been properly placed and verified by the local Building Official/Building Inspector as well as any additional inspections specified on these project documents.
10) No stakes shall be left or abandoned in place following concrete pour. Holes and openings in concrete created by stakes shall be filled with a non-shrink grout.
11) Unless otherwise specified in the project soils report, all required backfill at footings and retaining walls shall be compacted to at least 90% of maximum density as determined by ASTM - 1557.

STRUCTURAL ABBREVIATIONS

A.C.	ASPHALTIC CONCRETE	GALV.	GALVANIZED
A.F.F.	ABOVE FINISH FLOOR	G.I.	GALVANIZED IRON
A.N.G.	AVERAGE NATURAL GRADE	GYP	GYPSUM
BLDG	BUILDING	HORIZ.	HORIZONTAL
BLKG	BLOCKING	HR	HOUR
BM	BEAM	INT.	INTERIOR
B.O.W.	BOTTOM OF WALL	L.F.F.	LOWER FINISH FLOOR
℄	CENTER LINE	MAX	MAXIMUM
CLG	CEILING	MTL	METAL
CONT.	CONTINUOUS	MFR	MANUFACTURER
DBL	DOUBLE	MIN	MINIMUM
DIA	DIAMETER	MISC	MISCELLANEOUS
DN	DOWN	NTS	NOT TO SCALE
EA.	EACH	N/A	NOT APPLICABLE
ELEC.	ELECTRICAL	O.C.	ON CENTER
EQ	EQUAL	O/	OVER
EXT	EXTERIOR	P.T.D.F.	PRESSURE TREATED DOUG FIR
FND	FOUNDATION	PLYWD	PLYWOOD
F.F.	FINISH FLOOR	REQ'D	REQUIRED
FLR	FLOOR	SIM	SIMILIAR
F.O.C.	FACE OF CONCRETE	T.O.W.	TOP OF WALL
F.O.F.	FACE OF FINISH	TYP	TYPICAL
F.O.S.	FACE OF STUD	U.O.N.	UNLESS OTHERWISE NOTED
FT.	FOOT	U.F.F.	UPPER FINISH FLOOR
FTG	FOOTING	VERT	VERTICAL
FURR	FURRING	W/	WITH
HT.	HEIGHT	WD	WOOD
HGR	HANGER	W/O	WITHOUT
GA.	GAUGE	WP	WATERPROOF

CONCRETE AND ANCHORAGE:

1) Contractor shall refer to the "Project Specific Construction Conditions and Design Parameters" on structural sheet S-0.1 and the Foundation Plan on sheet S-1 for project specific concrete slab and footing construction specifications.
2) All concrete and concrete work shall be performed in accordance with the latest edition of the California Building Code, Chapter 19 (CBC – Chapter 19), the ACI Building Code (ACI 318) and the ACI Manual of Concrete Practice.
3) The maximum concrete slump shall be:
   a. 3" (+/-1") – Slabs
   b. 4" (+/-1") – All other work
4) Cement shall be Portland Cement, Type I or II, low alkali, per ASTM C-150.
5) The maximum water-to-cement ratio shall be 0.45-0.5 unless otherwise noted on the project plans or pre-approved by this office.
6) Any water reducing agents added to the concrete mix shall be reviewed and approved by the Engineer prior to mixing.
7) Mix designs shall be prepared by an approved testing laboratory in order to meet the minimum required compressive strength values shown on these project plans.
8) Aggregate shall conform to ASTM C-33 and shall be limited to the following sizes:
   a. 1" – 1 ½ " – Footings and grade beams
   b. ¾" – Slabs-on-grade
9) Minimum aggregate size for concrete placed with pumping equipment shall be 3/8" with no more than 20% of the aggregate proportion being 3/8" in size (50/50 mix)
10) Concrete shall not free-fall more than six (6) feet. Use tremie, pump or other approved methods to provide proper placement for heights greater than six (6) feet.
11) Vibrate all concrete (including slabs) as it is placed with a mechanical vibrator. Vibration equipment is to be operated by experienced personnel only. Vibration equipment shall be used to consolidate concrete only, and not for transport. Reinforcing and forms shall not be vibrated.
12) Freshly deposited concrete shall be protected from premature drying and excessively hot or cold temperatures and shall be maintained with minimal moisture loss for the time necessary for the hydration of the cement (typically 7 days). Continual wetting or other approved methods to control curing shall be used.
13) All poured-in-place anchor bolts shall have the minimum total embedments:
   a. 5/8" Diameter – 7"
   b. 3/4" Diameter – 8"
   c. 7/8" Diameter – 9"
   d. 1" Diameter – 10"
14) The Contractor shall order the necessary anchor bolt lengths to accommodate the embedment depths referenced above and various sill plate thicknesses (2x or 3x) specified on the project plans and shear wall schedule.
15) Anchor bolt spacing shall be five (5) feet maximum on center unless otherwise noted on plans or shear wall schedule. Bolts shall be a maximum of 12" from sill ends and splices with a minimum of two (2) bolts per splice.
16) Structural anchor bolts shall be full diameter, cut thread, Grade A-36 steel bolts provided by an American Manufacturer.
17) Anchor bolts, fasteners and hardware at pressure-treated wood connections shall be hot-dipped zinc coated galvanized, stainless steel, silicon bronze or copper.
18) Anchor bolt washers at shear and bearing wall sill plates connections to concrete shall be 3"x3"x0.229" galvanized steel plate washers. Ok to use Simpson Strong Tie BP 5/8-3 washers for standard conditions and BPS 5 /8-3 washers for conditions where a slotted washer is required.
19) The project Contractor is responsible for all concrete formwork design and installation.
20) Concrete forms shall be removed in accordance with the following schedule:
   a. 1 day minimum – Edge forms of slab-on grade panels
   b. 2 days minimum – Side forms of footings
   c. 10 days minimum – Concrete retaining or stem walls
   d. 15 days minimum – Concrete columns or beams
   e. 28 days minimum – Raised concrete slabs
21) All holes in wood or steel plates to receive anchor bolts shall be drilled 1/16" diameter larger than the anchor bolt diameter specified. No oversizing is allowed, unless otherwise noted on the structural details.
22) The location of all construction cold joints shall be as shown on the structural details or as approved by the project Engineer. Construction cold joints shall be thoroughly cleaned with compressed air and water and shall be rough with exposed coarse aggregates. Construction cold joints shall be continuously wet at least 3 hours in advance of pouring concrete.
23) Control and/or construction joints shall be provided in all slabs-on-grade as shown in the typical details and shall be installed so that areas within joints does not exceed 400 SQ FT.
24 The Contractor shall removed and replace any concrete that fails to meet the required compressive strength shown on these project plans and details.

STEEL REINFORCEMENT FOR CONCRETE:

1) Unless otherwise noted on project plans and details, reinforcing steel shall conform to ASTM A-615 and be of the following grades:
   a. #4 Bars and Smaller -- 40 KSI
   b. #5 Bars and Larger -- 60 KSI
2) Reinforcing steel shall be clean of rust, grease, or other material likely to impair the bond between the steel and concrete.
3) Concrete cover over steel reinforcing is required as follows:
   a. 3" Clear – Concrete cast against and permanently exposed to earth
   b. 2" Clear – #6 bars or greater, concrete is exposed to earth or weather (poured against forms)
   c. 1 ½" Clear – #5 bars or smaller, concrete is exposed to earth or weather (poured against forms)
   d. ¾" Clear – Concrete not exposed to weather or in contact with ground
   e. 1 ½" Clear – Beams and columns reinforcement ties, stirrups and spirals (poured against forms)
4) All reinforcing steel shall be securely tied in place and braced prior to inspection from Building Official and/or pouring concrete.
5) All reinforcing steel shall clear form stakes and braces by 2", minimum.
6) Where reinforcing steel is referenced on the project plans as continuous, splice laps at adjacent bars a minimum of 40 bar diameters or 24", whichever is greatest. Stagger splices in adjacent bars a minimum of 24 inches.
7) Reinforcing steel shall not be welded unless otherwise noted on the project plans or structural details.
8) For no reason shall reinforcing bars be heated in order to aid in bending or placing.

STRUCTURAL FASTENERS AND CONNECTION HARDWARE:

1) Connection Hardware:
   a. All metal framing connectors referenced in the calculations or on the following structural plans and details are "Simpson Strong Tie."
   b. Substitutions of equal (must be code listed) connectors are acceptable with written permission of the Engineer.
   c. All framing connectors shall be filled or bolted to their full capacity (all holes to be filled) with fasteners as specified by "Simpson Strong Tie".
2) Bolts:
   a. All bolts and threaded rod shall be ASTM A307 unless otherwise noted on the project plans and details.
   b. Where specified on plans, high strength bolts shall be ASTM A325 or ASTM A449 and require special inspection.
   c. Nuts for high strength bolts shall be ASTM A563 with F436 washers, U.O.N.
   d. Pre-drill holes in lumber and steel 1/32" – 1/16" larger than specified bolt diameter.
   e. All bolted connections shall have standard cut washers under the head and nut, unless larger washers are specified on the project plans or details.
   f. All bolts shall be re-tightened prior to the application of the sheathing or other finish materials.
3) Lag Screws:
   a. Lag screws shall be screwed into pre-drilled holes 75% of the diameter of the root of the thread.
4) Nails:
   a. As a minimum, all nailing shall be performed in accordance with the CBC Nailing Table 2304.10.1 unless otherwise noted on the project plans and structural details.
   b. All nails shall conform to "common" sizing unless otherwise noted on plans or details.
   c. Installation with pneumatic air gun requires the use of a flush nailer attachment for nailing of all structural shear wall, floor or roof sheathing.
5) Simpson Strong Tie Titen-HD heavy duty screw anchors:
   a. Titen-HD screw anchors may be used in-lieu of standard anchor bolts and shall match the diameter of the anchor bolt specified on the project plans.
   b. Titen-HD screw anchors shall be installed per all the manufacturer's recommendations.
   c. Embedment depth into concrete shall be 4 " (minimum) for standard anchor bolt replacement in shear wall bottom plate application.
   d. All other applications shall require embedment depth into concrete to be specified by Engineer.
6) Wedge Anchors:
   a. Simpson Strong Tie Wedge-All, Red Head Wedge Anchor or other similar code listed wedge anchors may be used in-lieu of standard anchor bolts only at connections of wall bottom plates. No other applications are permitted unless approved in writing by the Engineer.
   b. Wedge anchors shall be the same size diameter as the anchor bolts specified on the project plans.
   c. Embedment depth into concrete shall be 4" (minimum) for standard anchor bolt replacement in shear wall bottom plate application
7) Powder Actuated Fasteners:
   a. Shot pins may be used at interior non-shear wall, non-bearing wall applications only.
   b. Provide 1" (minimum) diameter washer at fastener head contact with wood plate or light gauge steel track.
   c. Shot pins shall be 0.145" diameter (minimum) w/ length as needed to provide 1 1/2" (minimum) embedment into concrete.

STRUCTURAL DIAPHRAGM SPECIFICATIONS:

1) Horizontal Sheathing:
   a. Horizontal diaphragms shall be fully blocked and nailed at all boundary edges (see plans for specifications for solid blocking and nailing requirements at panel edges, if occurs).
   b. Roof diaphragm ply shall be CDX or OSB Struct II (or better) with Panel ID# 32/16 and glued and nailed with 10 d nails @ 6-6-12" spacing. See roof framing plans for specified thickness.
   c. Floor diaphragm ply shall be 23/32" (min) CDX or OSB Struct II (or better) with Panel ID# 40/20 and glued and nailed with 10d nails @ 6-6-10" spacing.
   d. All horizontal plywood diaphragms to be installed perpendicular to supports and shall be staggered in Case I layout.
   e. All boundary blocking shall be solid, full depth blocking with (3) 16d toe nails for 24" long and (2) 16d toe nails for 16" long blocks (Typical each end).
   f. Structural design properties for wood structural panels are based on DOC PS-1 and DOC PS-2 or wood structural panel design properties given in the APA SDPWS according to the CBC Section 2306.3.
   g. Nail heads shall not be driven through outer laminate of panels. If a nail gun is used it must be equipped with a flush nailer attachment.
   h. For roof conditions, provide 2x blocking along all ridge lines.
2) Vertical Sheathing (Shear Wall Construction):
   a. Refer to Shear Wall Schedule for material specifications and nail spacing.
   b. Where nail guns are used to install nails for shear wall sheathing, care shall be taken to use common sized nail equivalents regarding diameter and length.
   c. All edges of plywood shear walls are to be fully blocked and nailed with full perimeter edge nailing. Plywood shall be edge nailed to end posts/studs and any member attached to a holdown.
   d. "Panels" shall be structural plywood sheathing Group 1 or 2 or APA performance related panels.
   e. Panels to be applied horizontally or vertically to studs spaced at 16" or 24" on center spacing (see plans).
   f. Nail heads shall not be driven through outer laminate of panels. If a nail gun is used it must be equipped with a flush nailer attachment.
   g. Where sheathing is applied to both sides of wall studs, 2x6 DF#2 minimum stud thickness shall be used and panels shall be offset a minimum of one stud bay.
   h. Structural shear walls shall not be penetrated with electrical panels, conduits, plumbing pipes, or other such items unless detailed on the project plans.

TIMBER FRAMING:

1) All framing lumber, timber, and plywood to be grade stamped with a stamp of the association under whose grading rules it was produced.
2) Sawn lumber shall conform to the following minimums:
   a. DF-L#2 – Roof rafters, ceiling joists, floor joists, wall studs
   b. DF-L#2 – Posts and beams 2x – 4x nominal sizes
   c. DF-L#1 – Posts and beams 6x and larger nominal sizes
   d. Pressure Treated DF-L#1 – Lumber in contact with concrete or masonry
   e. DF-L Standard or Better – Non-bearing wall studs, sill plates and blocking
3) Glulam lumber shall conform to the following specifications:
   a. All Glulam members shall be DF-DF Grade 24F-V4 for simple span conditions and Grade 24F-V8 for cantilever conditions unless otherwise noted.
   b. An AITC Certificate of Compliance shall be provided to the Building Official/Building Inspector for each glulam beam, prior to installation.
   c. Glulam beam shall be manufactured with exterior grade glue and weather preservative.
   d. Glulam beams should be constructed with a standard camber based on a radius of 3500 feet, unless otherwise noted.
4) Engineered lumber shall conform to the following specifications.
   a. Laminated Stand Lumber (LSL) members to have the minimum properties shown below:
      i. E = 1,550 ksi
      ii. Fb = 2,325 psi
      iii. Fc – Perp. = 800 psi
      iv. Fc – Prll. = 2,050 psi
      v. Fv = 310 psi
      vi. Ft = 1070 psi
   b. Laminated Veneer Lumber (LVL) members to have the minimum properties shown below:
      I. E = 1,900 ksi
      II. Fb = 2,600 psi
      III. Fc – Perp. = 750 psi
      iv. Fc – Prll. = 2500 psi
      v. Fv = 285 psi
      vi. Ft = 1555 psi
   c. Parallam Strand Lumber (PSL) beam members to have the minimum properties shown below:
      i. E = 2,000 ksi
      ii. Fb = 2,900 psi
      iii. Fc – Perp. = 750 psi
      iv. Fc – Prll. = 2,900 psi
      v. Fv = 290 psi
      vi. Ft = 2025 psi
   d. All engineered lumber shall be fabricated by an approved manufacturer with an AITC Certification of Compliance provided to the Building Official/Building Inspector for each beam, prior to installation.
   e. Multiple members shall be connected in accordance with the manufacturer's minimum requirements or as specified on the structural plans and details, whichever is greater.
5) Pre-manufactured wood I-joists shall conform to the following specifications.
   a. All pre-manufactured I-joists shall be Trus Joist products with depth, grade and spacing as specified on project plans.
   b. No alternative product substitutions, sizes or spacing is allowed unless otherwise approved in writing by this office **prior** to installation of alternative product.
   c. Structural capacities of design provisions for prefabricated wood I-joists shall be established and monitored in accordance with ASTM D 5055.
6) All fasteners less than 1/2" diameter and all hardware in contact with pressure treated lumber shall be hot dipped galvanized.
7) The maximum moisture content of sawn lumber shall not exceed 19%
8) All double members to be nailed together with (2) rows of 16d nails @ 12" o.c. staggered U.O.N.
9) All posts shall be as wide as the beam which it supports unless a " Simpson" post cap is used. All posts not framed into walls shall be secured with both post caps and bases.
10) 2x solid blocking shall be placed between joists, rafters and trusses at both ends and all supports. Provide bridging or blocking at intervals of 8'-0" o.c. at floor joists.
11) No structural members (joists, plates, studs, beams, etc.) shall be notched, cut or drilled (except for those holes required to bolting) unless in conformance with the following code references or specifically noted or permitted in writing by the Engineer.
   a. CBC Section 2308.4.2.4 – Notching and boring of horizontal structural members.
   b. CBC Section 2308.5.10 – Notching and boring of studs and top plates
12) Interior non-bearing non-shear walls may be fastened to concrete with Hilti shot pins at 24" maximum on center. Non-bearing non-shear walls may be fastened to wood floor rims or blocking with 16d at 12" on center.
13 Fire stops shall be provided at all intersections of stud walls at floor, ceiling and roof. Fire stops shall be 2x (min) nominal thickness and shall be placed at maximum spacing of 8'-0" on center vertically.

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4355 EL CAMINO REAL, SUITE H
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These drawings and specifications are instruments of service and are the property of MSD Professional Engineering, Inc. All designs and other information on these drawings are for use on the specified project and shall not be used without the expressed, written consent of MSD Professional Engineering, Inc.

Contractor and sub-contractors shall verify all dimensions and conditions at the job site before proceeding with work and report any discrepancies or changes to MSD Professional Engineering, Inc. prior to construction of affected aspects of the project.

REGISTERED PROFESSIONAL ENGINEER
NICHOLAS A. McCLURE
70390
CIVIL
STATE OF CALIFORNIA

LICENSE EXP : 09/30/2022

Paso Robles Residence
Address Removed for Privacy

DATE: 09/28/2021

REVISION:

GENERAL NOTES & SPECIFICATIONS

SCALE: AS NOTED

SHEET:

S-0

SPECIAL INSPECTION SCHEDULES

STATEMENT OF SPECIAL INSPECTIONS

Project: **Anderson Residence**

Location: **5100 Peachy Canyon Road, Paso Robles, CA 93446**

1. This Statement of Special Inspections is submitted in fulfillment of the requirements of CBC Sections 1704 and 1705.

2. Schedule of Special Inspections and tests applicable to this project:

   Special Inspections per Sections 1704 and 1705

3. Special Inspections and Testing will be performed in accordance with the approved plans and specifications, this statement and CBC sections 1704, 1705, and 1708.

4. The Schedule of Special Inspections summarizes the Special Inspections and tests required. Special Inspectors will refer to the approved plans and specifications for detailed special inspection requirements. Any additional tests and inspections required by the approved plans and specifications will also be performed.

5. Interim reports will be submitted to the Building Official and the Registered Design Professional in Responsible Charge in accordance with CBC Section 1704.2

6. A Final Report of Special Inspections documenting required Special Inspections, testing and correction of any discrepancies noted in the inspections shall be submitted prior to issuance of a Certificate of Use and Occupancy (Section 1704.2.4). The Final Report will document:
   · Required special inspections.
   · Correction of discrepancies noted in inspections.

7. The Owner recognizes his or her obligation to ensure that the construction complies with the approved permit documents and to implement this program of special inspections. In partial fulfillment of these obligations, the Owner will retain and directly pay for the Special Inspections as required in CBC Section 1704.2.

8. 1704.4 Contractor responsibility. Each contractor responsible for the construction of a main wind- or seismic-force-resisting system, designated seismic system or a wind- or seismic-resisting component listed in the statement of special inspections shall submit a written statement of responsibility to the building official and the owner prior to the commencement of work on the system or component.

Prepared by:
Nicholas McClure, P.E. C70390
Registered Design Professional in Responsible Charge

SCHEDULE OF INSPECTION, TESTING AGENCIES, AND INSPECTORS

The following are the testing agencies and special inspectors that will be retained to conduct the majority of the tests and inspection on this project. Some of the inspections will be done by the Project Architect, Structural Engineer, Mechanical Engineer or Electrical Engineer and will be done as such in the Notes column below

Responsibility	Firm, Address, Telephone, e-mail
1. Geotechnical Inspections	GeoSolutions,Inc. 220 High Street, San Luis Obispo, CA 93401 (805)543-8539

SEISMIC REQUIREMENTS (Section 1705.12)

Description of seismic-force-resisting system and designated seismic systems subject to special inspections as per Section 1705.11: **Light-weight wood framed shear walls**

The extent of the seismic-force-resisting system is defined in more detail in the construction documents.

SCHEDULE OF SPECIAL INSPECTIONS

Notation Used in Table:

Column headers:
C Indicates continuous inspection is required.
P Indicates periodic inspections are required. The notes and or contract documents should clarify.

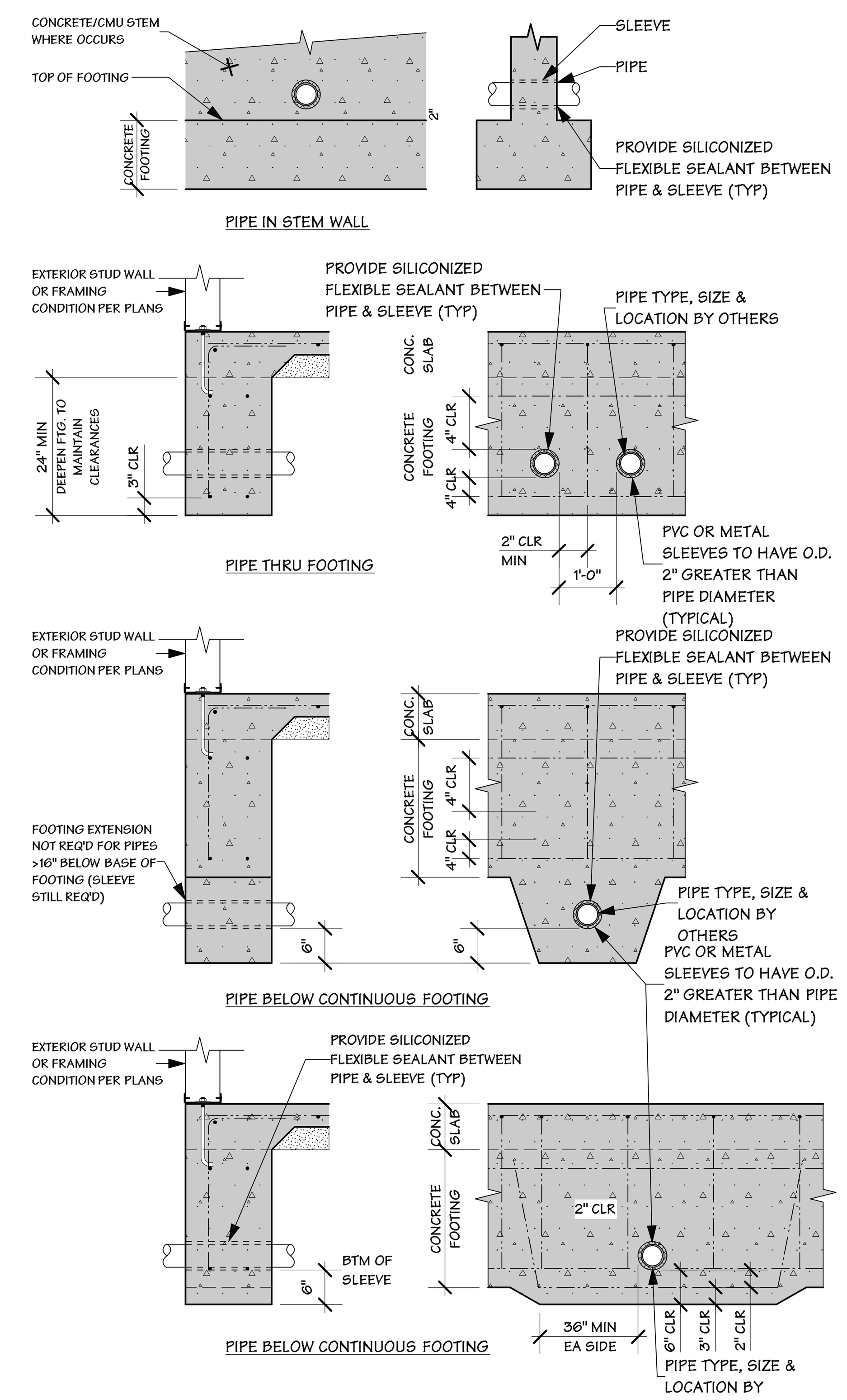
Box entries:
X Is placed in the appropriate column to denote either "C" continuous or "P" periodic inspections.
--- Denotes an activity that is either a one-time activity or one whose frequency is defined in some other manner

Additional detail regarding inspections and tests may be shown on the structural drawings

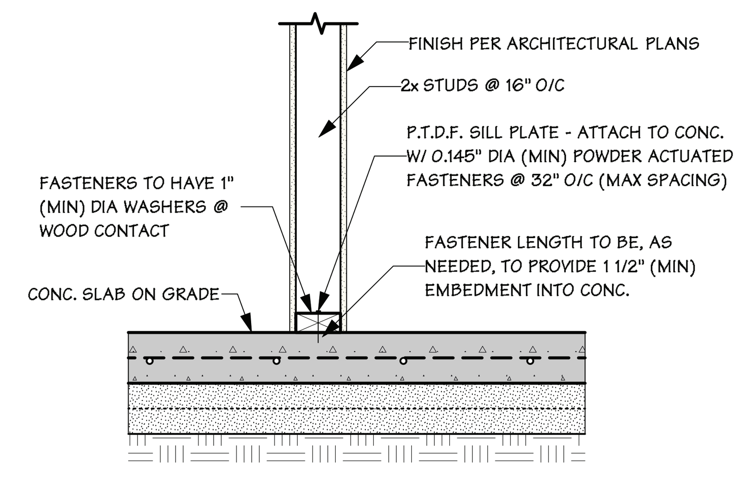
Verification and Inspection	C	P	Notes
Table 1705.6 - Inspection of Soils			
1. Verify materials below footings are adequate to achieve the desired bearing capacity.		X	
2. Verify excavations are extended to proper depth and have reached proper material.		X	
3. Perform classification and testing of controlled fill materials.		X	
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of controlled fill.	X		
5. Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly.		X	

TYPICAL CONSTRUCTION DETAILS

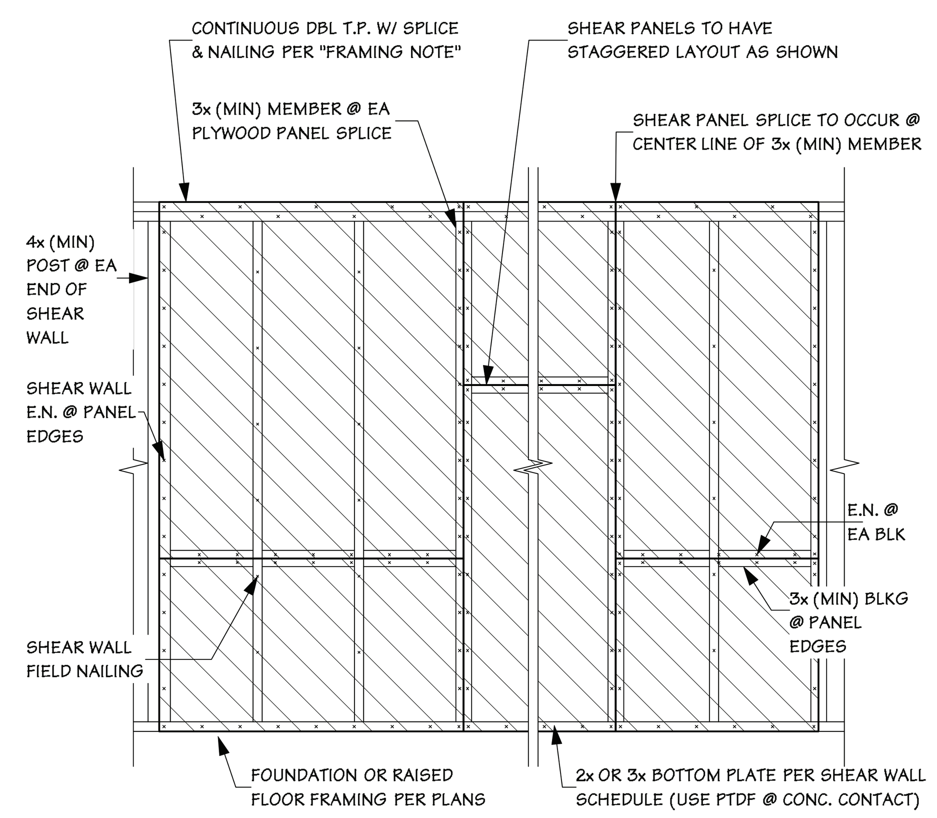
THE FOLLOWING TYPICAL DETAILS REPRESENT THE MINIMUM CONSTRUCTION REQUIREMENTS UNLESS THE PROJECT PLANS OR SPECIFIC DETAILS SPECIFY OTHERWISE. CONTRACTOR IS RESPONSIBLE FOR REVIEWING THESE DETAILS AND PEROPERLY IMPLEMENTING THEM INTO THE PROJECT.



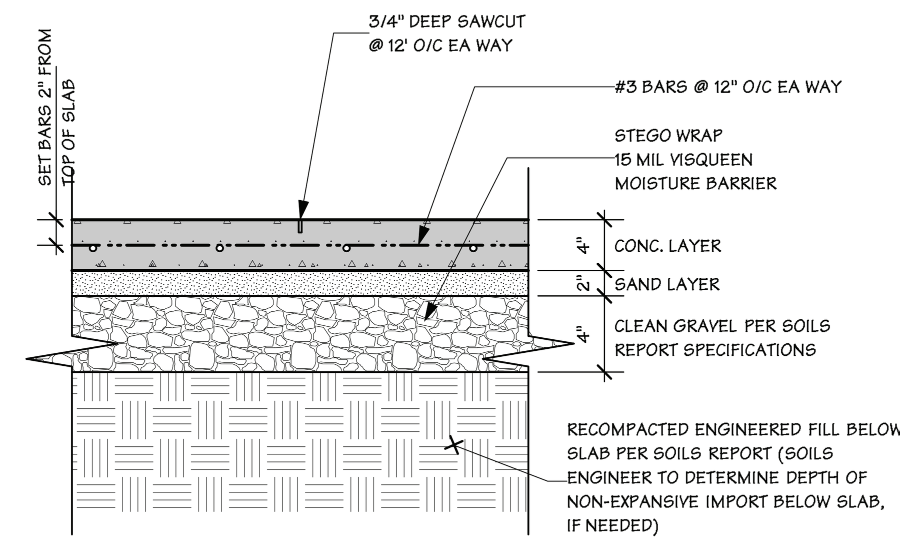
TYPICAL PENETRATION OF FOOTING
SCALE 1/2" = 1'-0"
T11



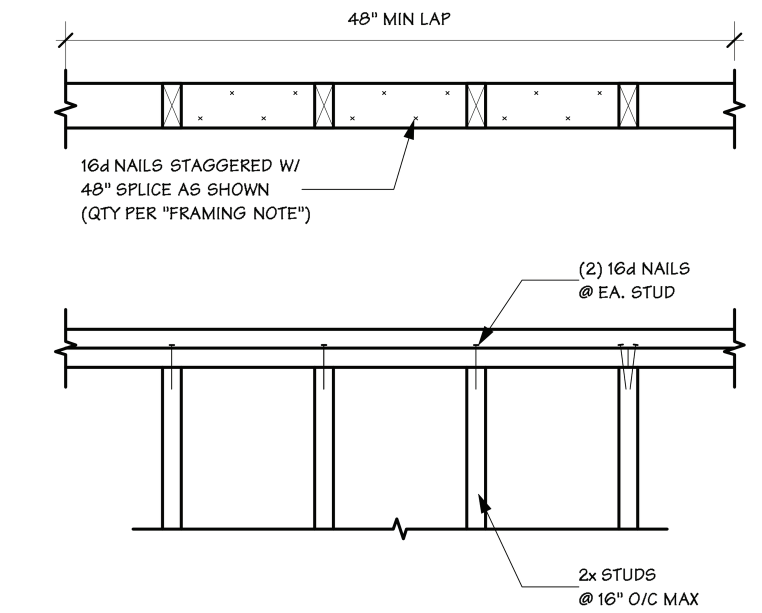
NON-BEARING INTERIOR WALL CONN.
SCALE 1" = 1'-0"
T9



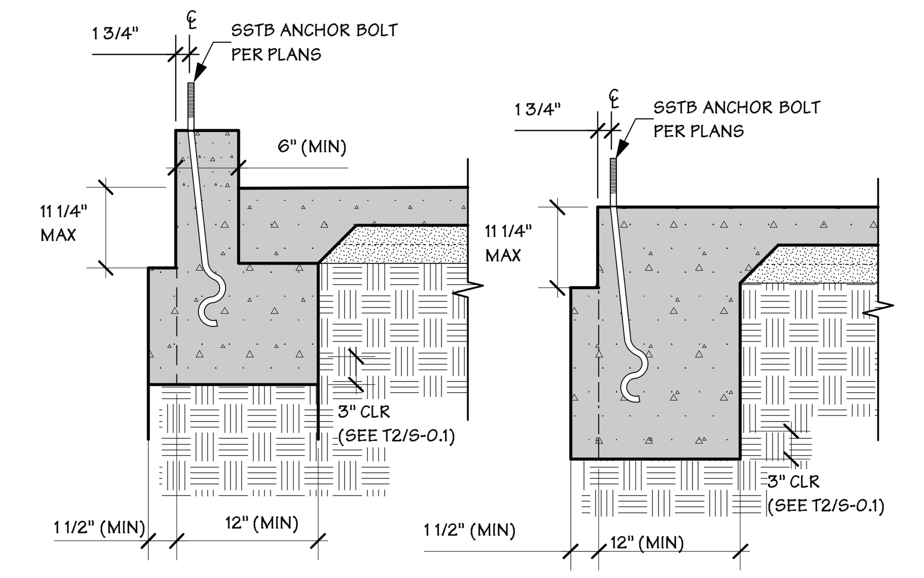
SHEAR WALL CONSTRUCTION @ TALL WALL CONDITIONS
SCALE 1/2" = 1'-0"
T10



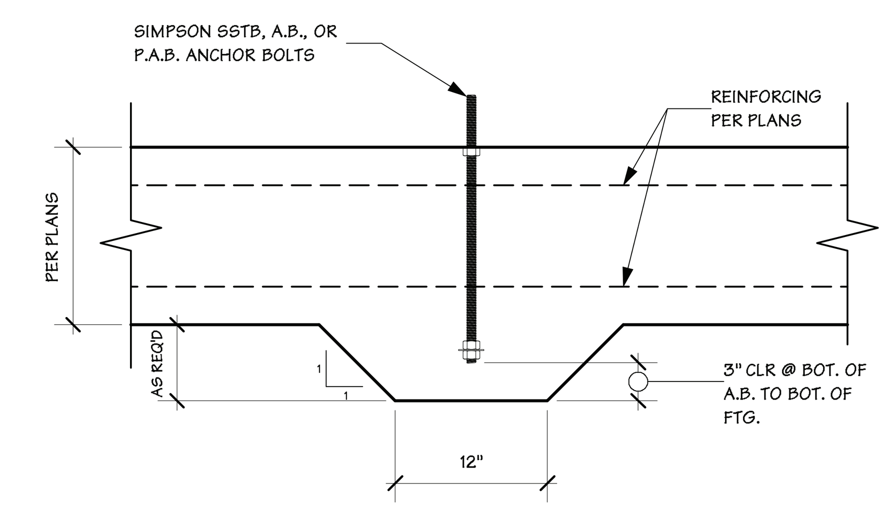
CONCRETE SLAB
SCALE 1" = 1'-0"
T5



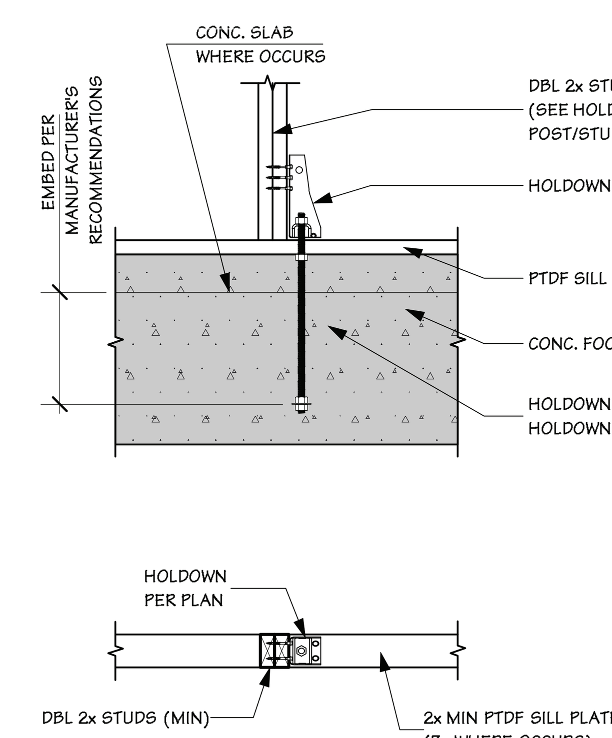
TOP PLATE SPLICE
SCALE 1" = 1'-0"
T1



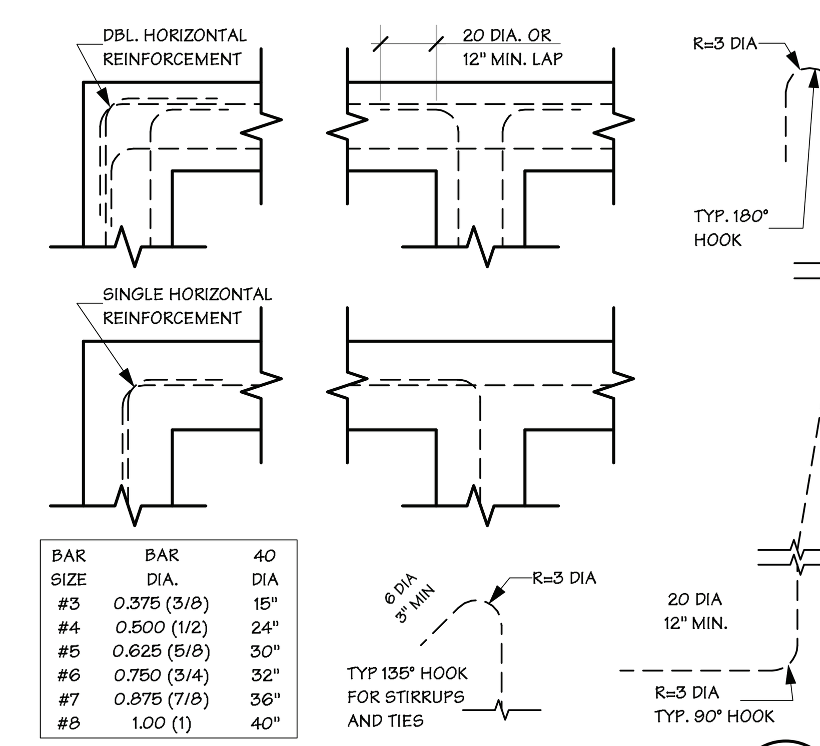
FOOTING @ HOLDOWN ANCHOR BOLT
SCALE 3/4" = 1'-0"
T6



FOOTING AT HOLDOWN
NTS
T2

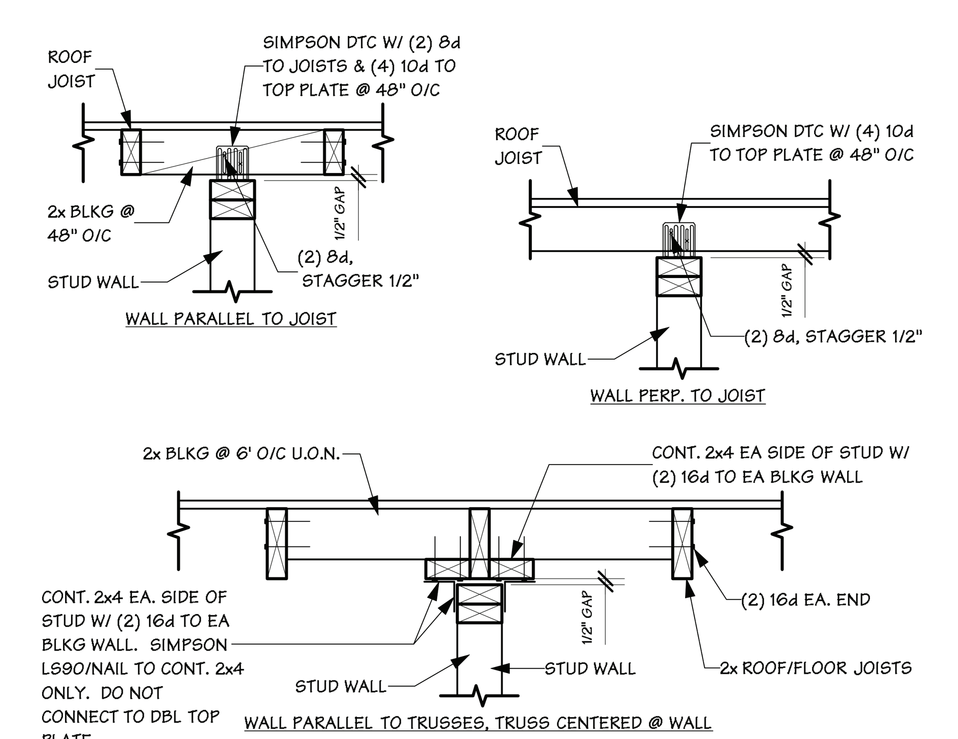


TYPICAL HOLDOWN CONNECTION
SCALE 1" = 1'-0"
T7

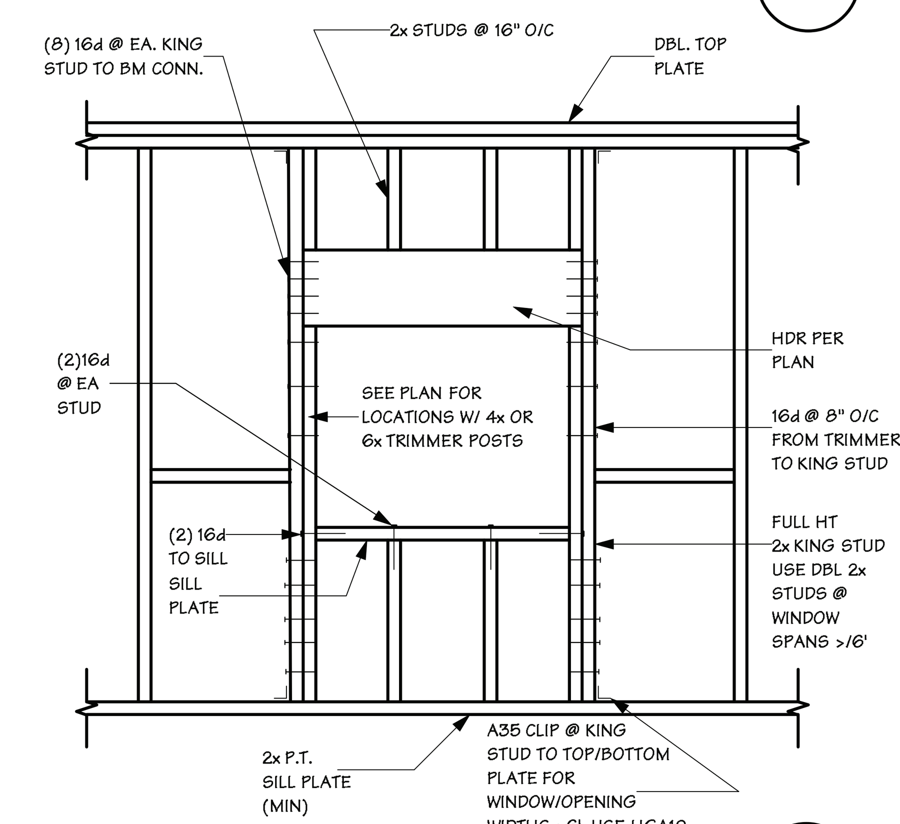


BAR SIZE	BAR DIA.	40 DIA
#3	0.375 (3/8)	15"
#4	0.500 (1/2)	24"
#5	0.625 (5/8)	30"
#6	0.750 (3/4)	32"
#7	0.875 (7/8)	36"
#8	1.00 (1)	40"

TYPICAL HORIZ. REINFORCING
N.T.S.
T3



TRUSS TO INTERIOR WALL
SCALE 1" = 1'-0"
T8



WINDOW/DOOR OPENING FRAMING - TALL WALLS
N.T.S.
T4

PROJECT SPECIFIC DESIGN PARAMETERS

PROJECT STRUCTURAL DESIGN PARAMETERS:

CONCRETE COMPRESSIVE STRENGTH	
Footings and Grade Beams	2500 psi
Concrete Slabs-on-Grade	2500 psi
LIVE LOADS [§ 1603.1 CBC]	
Roof Live Load (4:12 Pitch)	20 PSF
DEAD LOADS	
Roof Dead Load Allowance	18 PSF (Includes 3psf Surcharge for Solar)
Exterior Wall Dead Load Allowance	15 PSF (Exterior Hardi or Stucco Siding)
Interior Wall Dead Load Allowance	8 PSF (Interior Drywall)
Building Risk Category [§ 1604.5 CBC]	
Risk Category	II
WIND DESIGN DATA [§ 1603.1.4 CBC]	
Design Wind Speed, V (MPH)	92 MPH
Wind Exposure	C
Wind Design Method	Envelope Procedure ASCE7-16 Ch.28 Part 1
Wind Importance Factor, I	1.0
SEISMIC DESIGN DATA [§ 1613.5.2 CBC]	
Seismic Importance Factor, I	1.0
Site Class	C
Seismic Design Category, S_{DC}	D
Short Period Spectral Acceleration, S_S	1.065
1-Sec Period Spectral Acceleration, S_1	0.389
Short Period Design Spectral Acceleration, S_{DS}	0.852
1-Second Period Design Spectral Acceleration, S_{D1}	0.496
Basic Seismic Force Resisting System Type	
Bearing Wall/Lateral Force Restraining System:	Lt. Wt. Wood Framed Shear Walls
Design Base Shear	27,494#
Seismic Response Coefficient, C_S	0.131
Response Modification Factor, R	6.5 Lt. Wt. Wood Framed Shear Walls
Seismic Analysis Procedure	Equivalent Lateral Force Procedure (ASCE7-16, Sect. 12.8)

PROJECT SPECIFIC CONSTRUCTION CONDITIONS AND DESIGN PARAMETERS:

PROJECT SOILS DESIGN PARAMETERS:

SOILS REPORT BY: GeoSolutions, Inc.
REPORT DATED: June 23, 2021
REPORT NUMBER: SL12244-1

1) Prior to placing reinforcing steel or setting concrete forms, the soils engineer of record shall certify to the Building Official, in writing, that all site grading and foundation earthwork preparation has been prepared in accordance with the recommendations within the Soils Report.

2) A copy of the project soils report shall be on-site during all grading and foundation Inspections.

SOILS EXPANSIVE INDEX BELOW FOUNDATION PADS AND FOOTINGS:	Low Expansive Soils
SOILS EXPANSIVE INDEX BELOW SLABS-ON-GRADE:	Low Expansive Soils
SOILS DESIGN PARAMETERS:	
Allowable Bearing Pressure (DL+LL)	1500 psf (Dead + Live)
Passive Resistance Pressure	250 pcf
Coeff. Of Friction	0.35

FOUNDATIONS AND FOOTINGS BEARING CONDITIONS:
Based on the project geotechnical report, footings supporting the proposed structure shall extend twenty-four (24) inches minimum below lowest adjacent grade.

MSD PROFESSIONAL ENGINEERING, INC.
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Contractor and sub-contractors shall verify all dimensions and conditions at the job site before proceeding with work and report any discrepancies or changes to MSD Professional Engineering, Inc. prior to construction of affected aspects of the project.

REGISTERED PROFESSIONAL ENGINEER
NICHOLAS A. McCLURE
70390
CIVIL
STATE OF CALIFORNIA

LICENSE EXP : 09/30/2022

Paso Robles Residence
Address Removed for Privacy

DATE: 09/28/2021

REVISION:

PROJECT SPECIFIC SPECIFICATIONS & TYPICAL STRUCTUAL DETAILS

SCALE: AS NOTED

SHEET: S-0.1

BUILDING PAD AND FOUNDATION NOTE:

1. **AT ALL SLABS AND FOOTINGS:**
   TYPICAL CONCRETE COMPRESSIVE STRENGTH TO BE **2500 PSI.**
2. ALL HOLDOWNS AND ANCHOR BOLTS SHALL BE SECURE IN PLACE PRIOR TO CONCRETE INSPECTION.
3. A COPY OF THE SOILS REPORT SHALL BE ON SITE DURING THE FOUNDATION INSPECTION.

   SOILS REPORT BY: GeoSolutions, Inc.
   REPORT DATED: June 23, 2021
   REPORT #: SL12244-1
4. THIS PROJECT DESIGN IS BASED ON ALL FOOTINGS BEARING ON AN OVEREXCAVATED AND RECOMPACTED BUILDING PAD AS RECOMMENDED WITHIN THE ABOVE REFERENCED SOILS REPORT.
5. UNLESS OTHERWISE NOTED ON PLANS - ALL NEW FOUNDATIONS TO EXTEND TWENTY-FOUR (24) INCHES MINIMUM BELOW LOWEST ADJACENT GRADE. SEE FOUNDATION PLAN AND DETAILS FOR FOOTING WIDTHS, DEPTHS, AND REINFORCEMENT REQUIREMENTS AT ALL FOOTING LOCATIONS.
6. PRIOR TO PLACING REINFORCING STEEL OR SETTING CONCRETE FORMS, THE SOILS ENGINEER OF RECORD SHALL CERTIFY TO THE BUILDING OFFICIAL, IN WRITING, THAT ALL SITE GRADING AND FOUNDATION EARTHWORK PREPERATION HAS BEEN PREPARED IN ACCORDANCE WITH THE RECOMMENDATIONS WITHIN THE SOILS REPORT.
7. PRE-SATURATION BELOW FOOTINGS AND SLABS SHALL BE PERFORMED AS SPECIFIED IN THE PROJECT SOILS REPORT.

DIMENSION CONTROL NOTE:

ARCHITECTURAL FLOOR PLANS CONTROL ALL BUILDING DIMENSIONS.

CONTRACTOR TO REFERENCE ARCHITECTURAL PLANS FOR ALL DIMENSIONS ASSOCIATED WITH THIS PROJECT FOUNDATION AND FRAMING UNLESS OTHERWISE SPECIFIED ON THE STRUCTURAL PLANS AND DETAILS.

ANCHOR BOLT NOTE:

NEW POURED-IN-PLACE ANCHOR BOLTS SET INTO NEW CONCRETE SHALL BE EMBEDDED 7" MINIMUM INTO PERIMETER FOOTING AND SHALL BE SPACED AT 5 FEET MAX. ON CENTER UNLESS OTHERWISE NOTED ON SHEAR WALL SCHEDULE.

2 x SILL PLATE → USE 5/8" DIAMETER X 10" MIN. ANCHOR BOLTS
3 x SILL PLATE → USE 5/8" DIAMETER X 12" MIN. ANCHOR BOLTS

FOR ADDITIONAL ANCHOR BOLTS USED IN EXISTING CONCRETE, USE 5/8" DIAMETER REDHEADS (OR EQUAL) OR SIMPSON TITEN-HD BOLTS W/ 5" MIN. EMBEDMENT INTO CONCRETE.

ANCHOR BOLTS SHALL BE SPACED AS REFERENCED ON PROJECT PLANS AND DETAILS. BOLTS SHALL BE A MAXIMUM OF 12" FROM SILL ENDS AND SPLICES WITH A MINIMUM OF (2) BOLTS PER SPLICE.

USE SIMPSON BP 5/8-3 3" x 3" x 0.25" THICK PLATE WASHERS AT EACH ANCHOR BOLT.

WATERPROOFING AND VENTILATION NOTE:

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Holdown Schedule - New Foundation Conditions

Symbol	Holdown	Anchor Bolt	[1]Le - Embedment Depth Into Footing	Minimum Post Size (See Plans For Locations w/ 4x or Greater Post Requirements)
2	HDU2-SDS2.5	SSTB24	16 5/8"	Dbl 2x Studs
4	HDU4-SDS2.5	SSTB24	20 5/8"	Dbl 2x Studs
5	HDU5-SDS2.5	SSTB24	20 5/8"	4x DF#2

Note: Use SSTBL bolts where 3x plates are required per shear wall schedule

Note: Install Simpson holdown bolts per manufacturer's specifications.

Note 1: Anchorbolt embedment depth represents anchorage embedment into main structural section of footing. Add additional A-307 and ATR couplers as needed to extend main anchorage into footing .

SHEAR WALL SCHEDULE

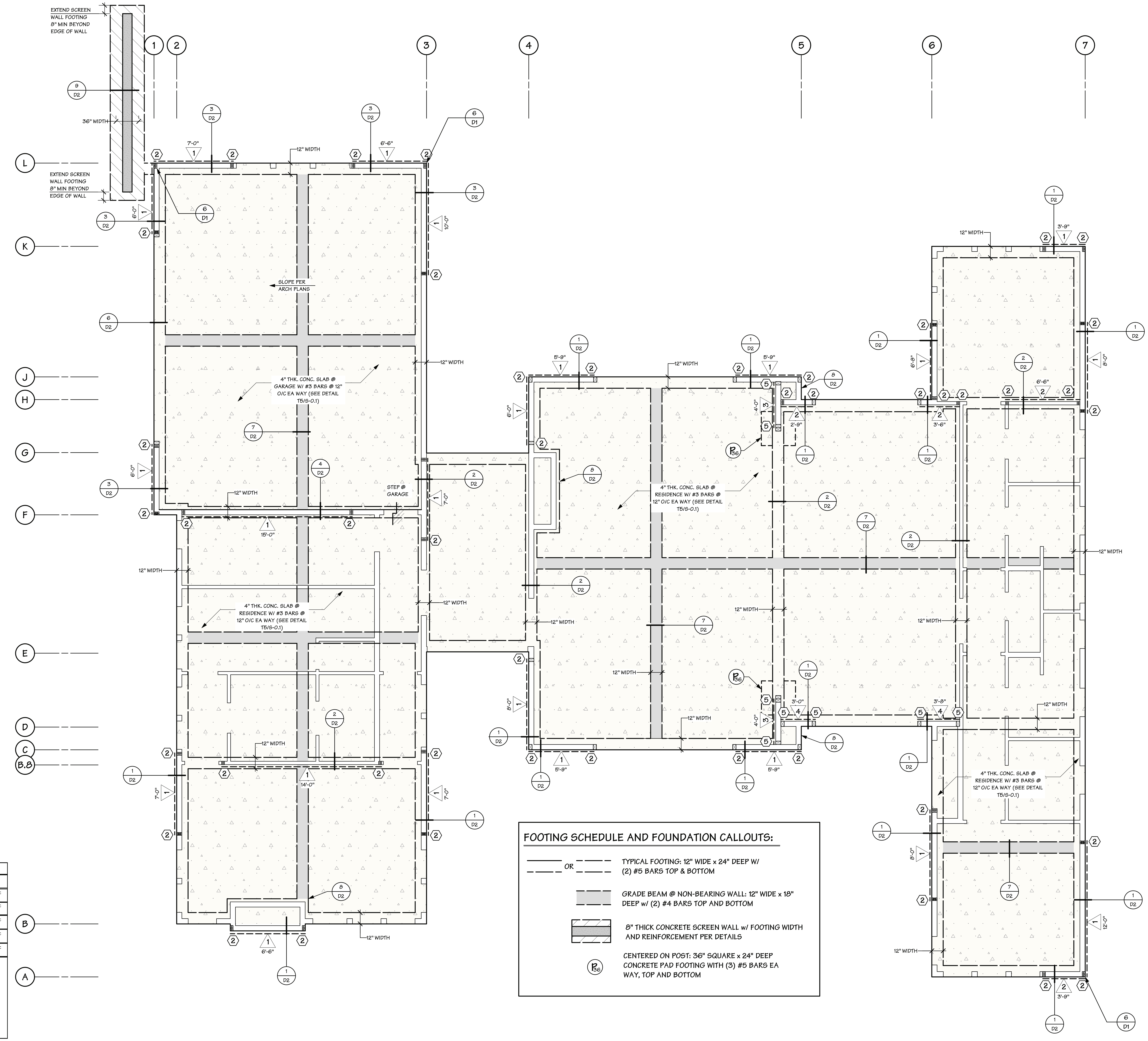
MARK	SHEATHING[8]	STUDS @ PANEL EDGES	NAILING (E.N. F.N.)	SILL PLATE	TOP PLATE CONNECTOR[7]	SILL PLATE CONNECTION AT SUBFLOOR	ANCHOR BOLTS AT FOUNDATION
1	15/32" PLY (ONE SIDE)	Dbl 2x (MIN)	8d @ 6 - 12	2x	A35 @ 18" o/c or 16d @ 6"o/c ‡	SDS1/4 x 4 1/2" Screws @ 12" o/c	5/8" DIAMETER @ 48"o/c See note 5
2	15/32" PLY (ONE SIDE)	Dbl 2x (MIN)	8d @ 4 - 12	2x	A35 @ 16" o/c or 16d @ 4"o/c ‡	SDS1/4 x 4 1/2" Screws @ 9" o/c	5/8" DIAMETER @ 32"o/c See note 5
3 †	15/32" PLY (ONE SIDE)	3x (Min)	8d @ 3 - 12	3x	A35 @ 9" o/c or 16d @ 3"o/c ‡	SDS1/4 x 6" Screws @ 8" o/c	5/8" DIAMETER @ 18"o/c See note 5
4 †	15/32" PLY (ONE SIDE)	3x (Min)	10d @ 3 - 12	3x	A35 @ 9" o/c	SDS1/4 x 6" Screws @ 6" o/c	5/8" DIAMETER @ 12"o/c See note 5
5 †	19/32" PLY (ONE SIDE)	3x (Min)	10d @ 2 - 12	3x	A35 @ 6" o/c	SDS1/4 x 6" Screws @ 4" o/c	5/8" DIAMETER @ 10"o/c See note 5

KEY

† Studs shall be 3x minimum @ panel edges, use 3x p.t.d.f. bottom plate, stagger nails @ double top plate and panel edges.
‡ Provide 16d nails for pressure blocking connections to bottom chord of truss or top plate

NOTES

1 All walls to be fully blocked.
2 All nails specified are common. Where "air-gun" nailing is used, care shall be taken to use true common nail equivalents.
3 Refer to "Vertical Diaphragm Notes" for material and application specifications.
4 For walls which bear trusses; one H-1 clip, from truss to top plate, may be used in place of one A35 top plate connector.
5 Provide Simpson BP5/8-3 bearing plate at all 5/8" dia anchor bolts, or BPS5/8-3 to allow for slotted condition.
6 Use LTP4 or RBC @ 3x sill plate to rim joist or solid blocking. Use spacing as per A35 under "Top Plate Connector".
7 Ok to use RBC in lieu of A35 @ truss/rafter blocking to top plate connections.
8 Structural design for wood structural panels based on DOC PS-1 and PS-2 or wood structural panel design properties given in the *APA Panel Design Specification* Plywood Sheathing, 24/0 panel index rated OSB or CDX ply.



FOOTING SCHEDULE AND FOUNDATION CALLOUTS:

OR	TYPICAL FOOTING: 12" WIDE x 24" DEEP W/ (2) #5 BARS TOP & BOTTOM
	GRADE BEAM @ NON-BEARING WALL: 12" WIDE x 18" DEEP w/ (2) #4 BARS TOP AND BOTTOM
	8" THICK CONCRETE SCREEN WALL w/ FOOTING WIDTH AND REINFORCEMENT PER DETAILS
P36	CENTERED ON POST: 36" SQUARE x 24" DEEP CONCRETE PAD FOOTING WITH (3) #5 BARS EA WAY, TOP AND BOTTOM

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70390
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Paso Robles Residence
Address Removed for Privacy

DATE: 09/28/2021

REVISION:

FOUNDATION PLAN

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

SHEET: S-1

FRAMING NOTE:

1. UNLESS OTHERWISE NOTED, ALL HEADERS ABOVE OPENINGS AT EXTERIOR, BEARING AND SHEAR WALLS SHALL BE A MINIMUM:
   4 x 6 DF #2 AT 2 x 4 STUD WALLS
   6 x 8 DF #1 AT 2 x 6 STUD WALLS
2. UNLESS OTHERWISE NOTED, ALL HEADERS ABOVE OPENINGS AT NON-BEARING WALLS SHALL BE A MINIMUM:
   4 x 4 DF #2 AT 2 x 4 STUD WALLS
   6 x 6 DF #1 AT 2 x 6 STUD WALLS
3. ALL TOP PLATES TO HAVE 48" MIN. LAP AT SPLICES WITH **(16)** 16d NAILS STAGGERED PER CONNECTION. (U.O.N.)
4. FRAME EXTERIOR, BEARING AND SHEAR WALLS WITH 2 X 6 DF # 2 STUDS @ 16" O.C. (U.O.N.)
5. PROVIDE 1/8" GAP BETWEEN ALL ADJACENT PLYWOOD EDGES
6. CONNECT MULTIPLE LSL OR LVL MEMBERS WITH (2) ROWS OF SDS1/4" x 3 1/2" SCREWS SPACED AT 16" O.C. (U.O.N)

ROOF FRAMING NOTE:

1. USE H-1 CLIP AT EACH TRUSS/RAFTER TO TOP PLATE CONNECTION.
1. USE H1.81Z AT EACH 1 3/4" LVL RAFTER TO TOP PLATE CONNECTION.
2. SOLID BLOCK BETWEEN EACH TRUSS/RAFTER W/ 10d AT 6" O.C. E.N. AND PROVIDE VENTED EAVE BLOCKS AT EVERY THIRD TRUSS/RAFTER IF APPLIES.
3. **ROOF SHEATHING** TO BE 19/32" CDX OR OSB ROOF PLY - INDEX #32/16 w/ 10d @6-6-12 NAILING. CASE 1 LAYOUT.
4. **ALL ROOF SHEATHING TO BE POLAR PLY OR EQUAL RADIANT SHEATHING.**
5. PROVIDE FLASHING AND COUNTER FLASHINGS @ ROOF TO WALL CONNECTIONS TO DIVERT RUNOFF.
6. PROVIDE APPROVED WATERPROOFING OVER ALL FLAT ROOF AREAS.
7. SEE ARCHITECTURAL PLANS FOR ALL FLASHING DETAILING.
8. ALL EXPOSED EAVES TO HAVE EXTERIOR RATED PLY.

TRUSS FRAMING NOTE:

1. TRUSS MANUFACTURER TO PROVIDE ALL TRUSS TO TRUSS CONNECTION HARDWARE SPECIFICATIONS AND HARDWARE CONNECTORS.
2. TRUSS MEMBERS AND COMPONENTS SHALL NOT BE CUT, NOTCHED, DRILLED, OR OTHERWISE ALTERED IN ANY WAY WITHOUT WRITTEN CONCURRENCE AND APPROVAL OF A REGISTERED DESIGN PROFESSIONAL.

EDGE NAILING NOTE:

1. PROVIDE ROOF PLY EDGE NAILING ALONG ALL RAFTERS OR TRUSSES IN-LINE.

WATERPROOFING AND VENTILATION NOTE:

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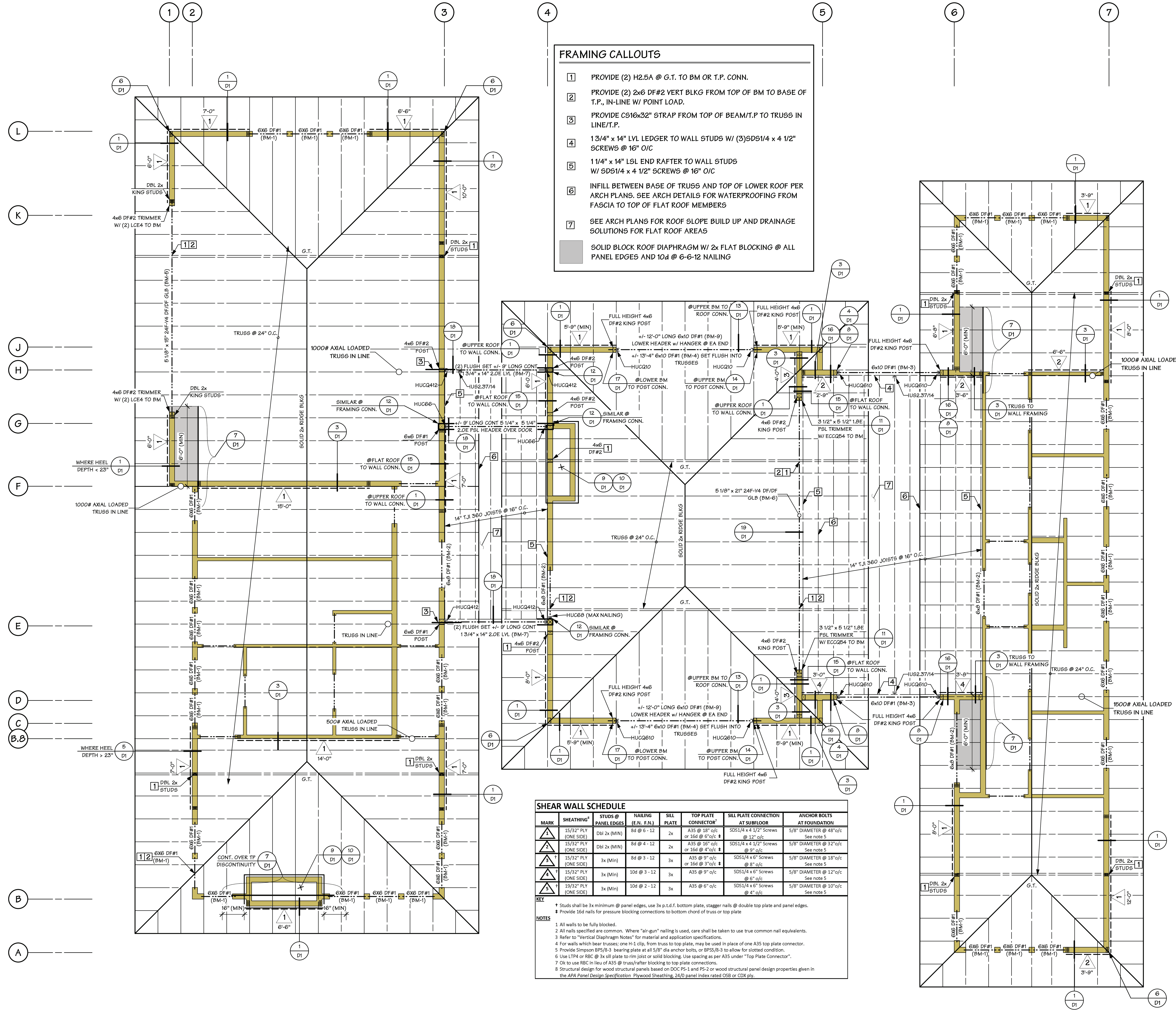
DIMENSION CONTROL NOTE:

ARCHITECTURAL FLOOR PLANS CONTROL ALL BUILDING DIMENSIONS.

CONTRACTOR TO REFERENCE ARCHITECTURAL PLANS FOR ALL DIMENSIONS ASSOCIATED WITH THIS PROJECT FOUNDATION AND FRAMING UNLESS OTHERWISE SPECIFIED ON THE STRUCTURAL PLANS AND DETAILS.



FRAMING CALLOUTS

1	PROVIDE (2) H2.5A @ G.T. TO BM OR T.P. CONN.
2	PROVIDE (2) 2x6 DF#2 VERT BLKG FROM TOP OF BM TO BASE OF T.P., IN-LINE W/ POINT LOAD.
3	PROVIDE CS16x32" STRAP FROM TOP OF BEAM/T.P TO TRUSS IN LINE/T.P.
4	1 3/4" x 14" LVL LEDGER TO WALL STUDS W/ (3)SDS1/4 x 4 1/2" SCREWS @ 16" O/C
5	1 1/4" x 14" LSL END RAFTER TO WALL STUDS W/ SDS1/4 x 4 1/2" SCREWS @ 16" O/C
6	INFILL BETWEEN BASE OF TRUSS AND TOP OF LOWER ROOF PER ARCH PLANS. SEE ARCH DETAILS FOR WATERPROOFING FROM FASCIA TO TOP OF FLAT ROOF MEMBERS
7	SEE ARCH PLANS FOR ROOF SLOPE BUILD UP AND DRAINAGE SOLUTIONS FOR FLAT ROOF AREAS
	SOLID BLOCK ROOF DIAPHRAGM W/ 2x FLAT BLOCKING @ ALL PANEL EDGES AND 10d @ 6-6-12 NAILING

SHEAR WALL SCHEDULE

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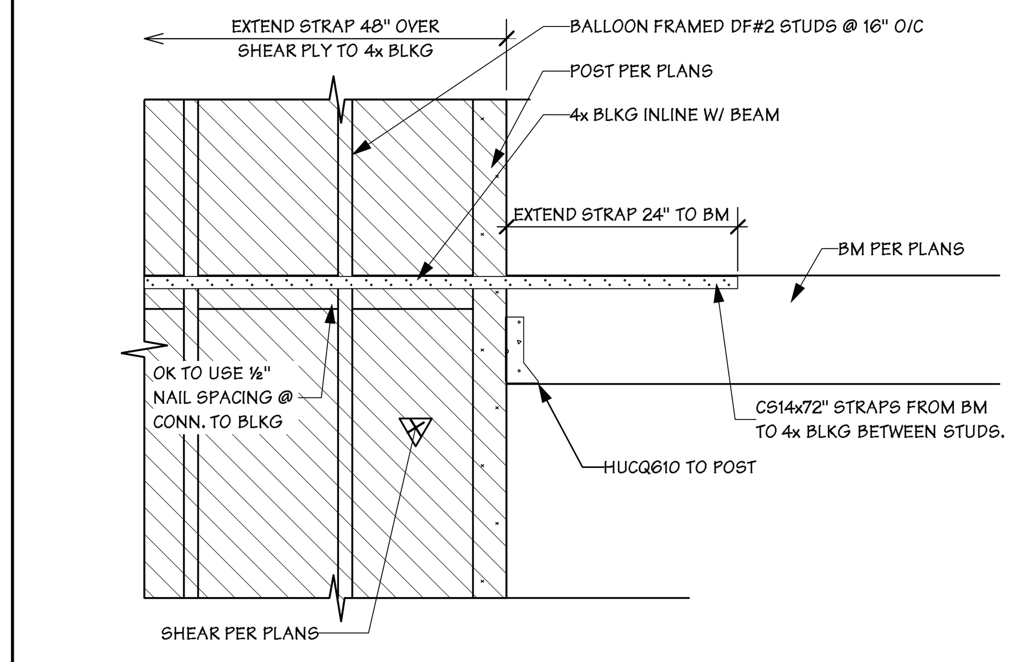
REVISION:

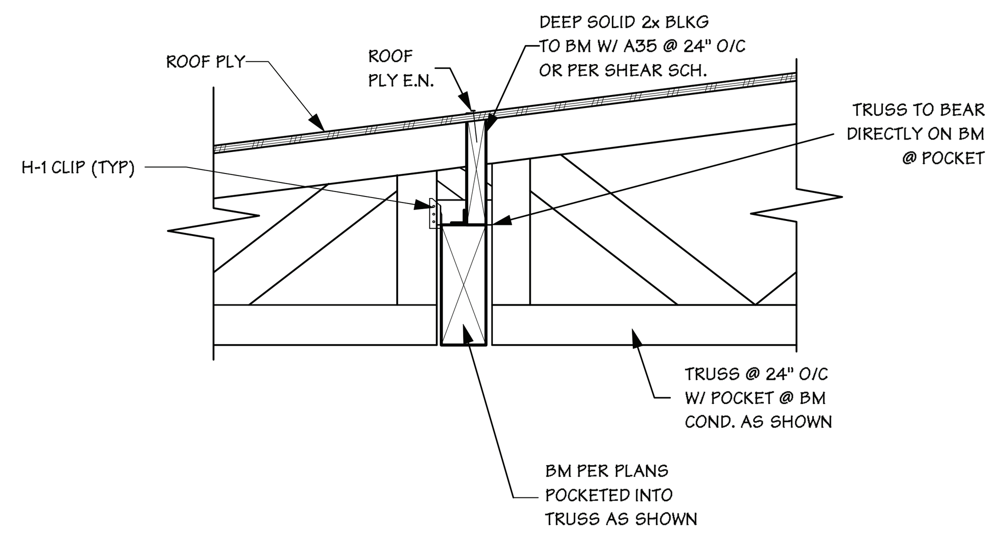
ROOF FRAMING PLAN

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

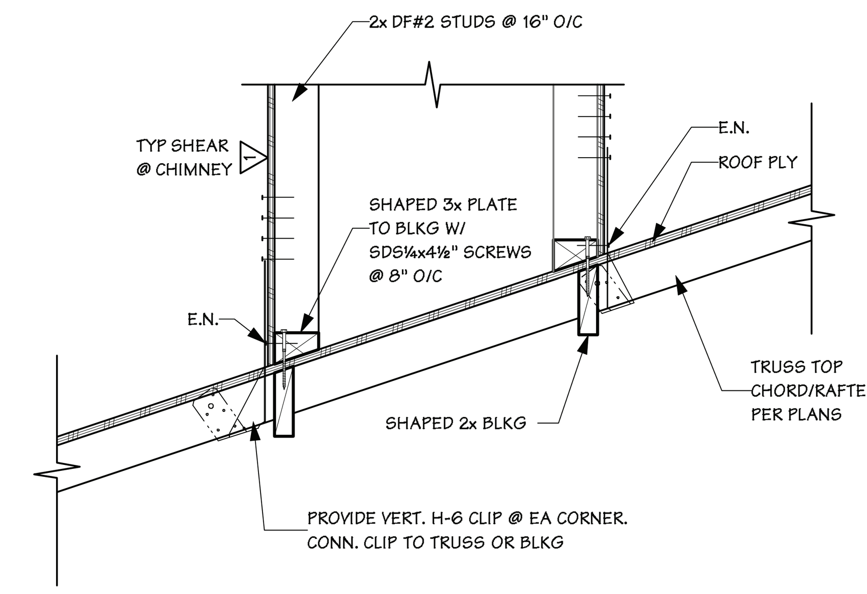
SHEET: S-2



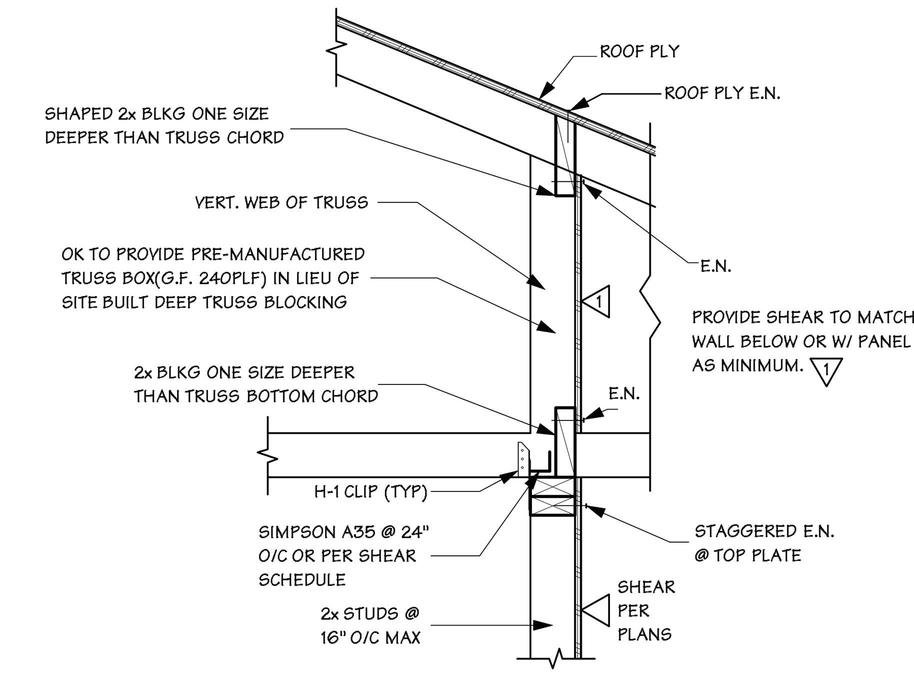
DRAG CONN. @ BM CONN.
NTS
17



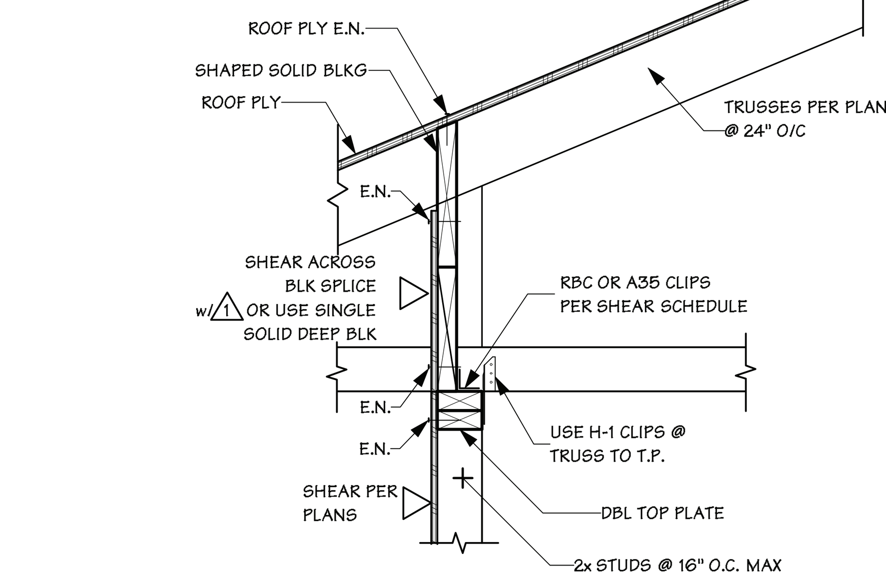
FLUSH SET BM @ BEARING WALL - INTERIOR CONDITION
SCALE 1" = 1'-0"
13



CHIMNEY CONN. DETAIL
SCALE 1" = 1'-0"
9



SHEAR TRANSFER DETAIL
SCALE 1" = 1'-0"
5



DEEP HEEL TRUSS - SHEAR TRANSFER
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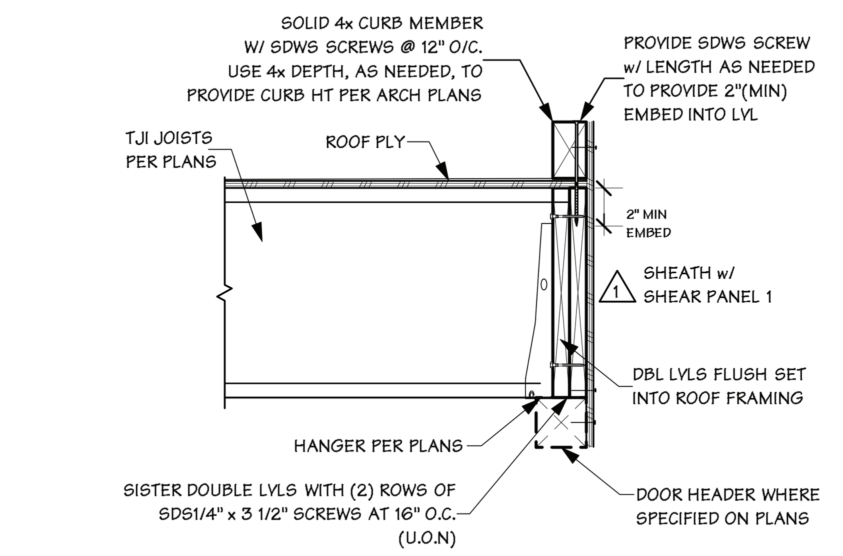
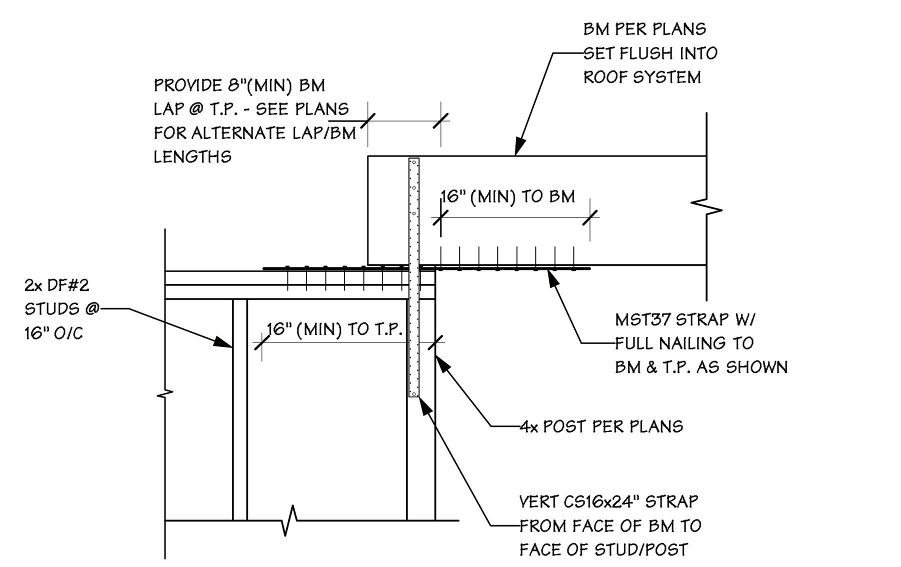


ROOF RAFTER TO LVL FRAMING CONNECTION
SCALE 3/4" = 1'-0"
18



BM TO T.P. SPLICE @ OPENING
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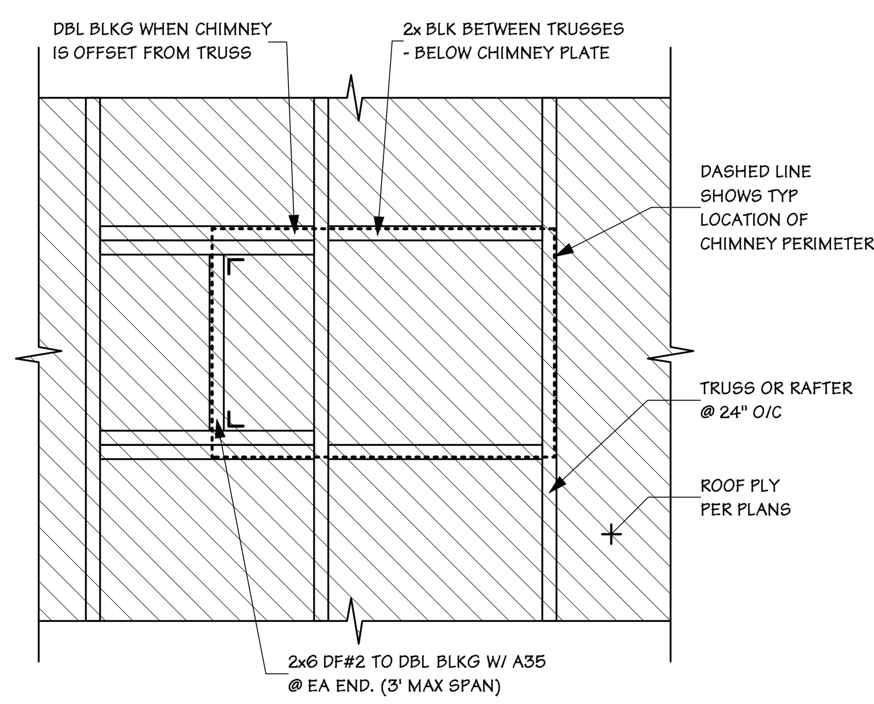
14



CHIMNEY CONN. DETAIL - TOP VIEW
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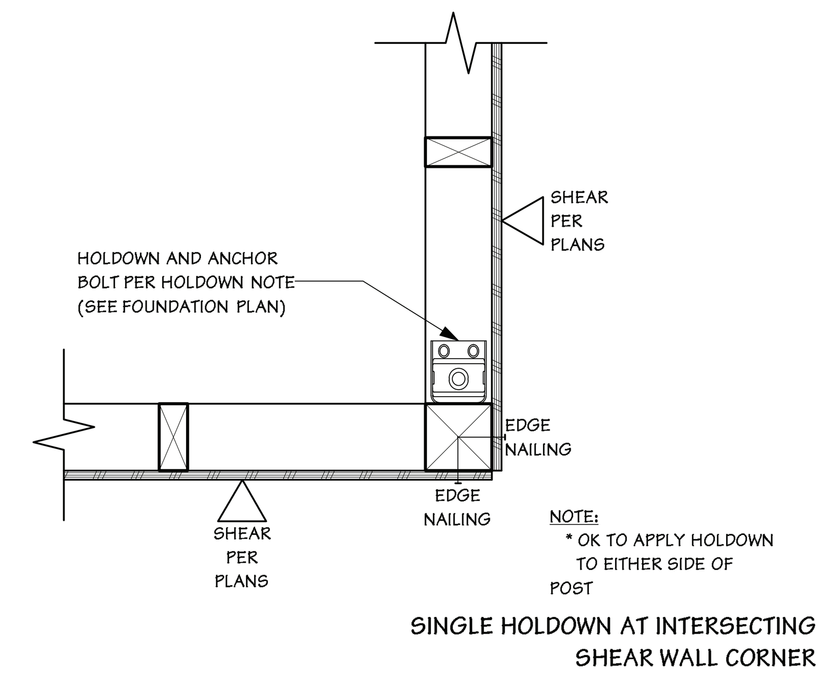
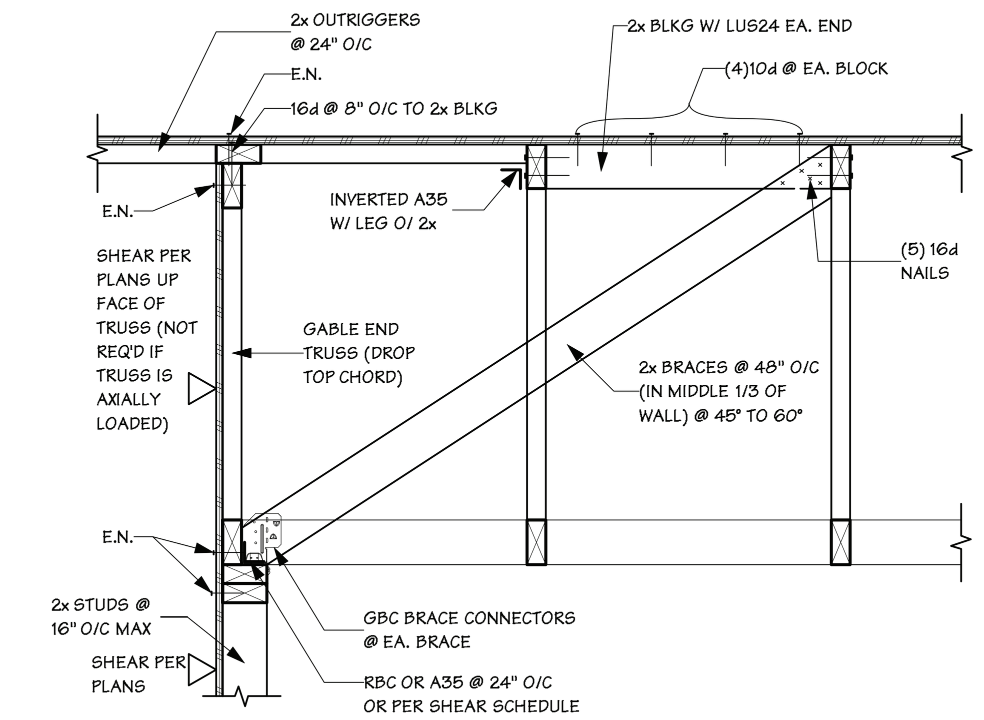


HOLDOWN AT CORNER
SCALE 1 1/2" = 1'-0"
6



BRACE CONNECTION
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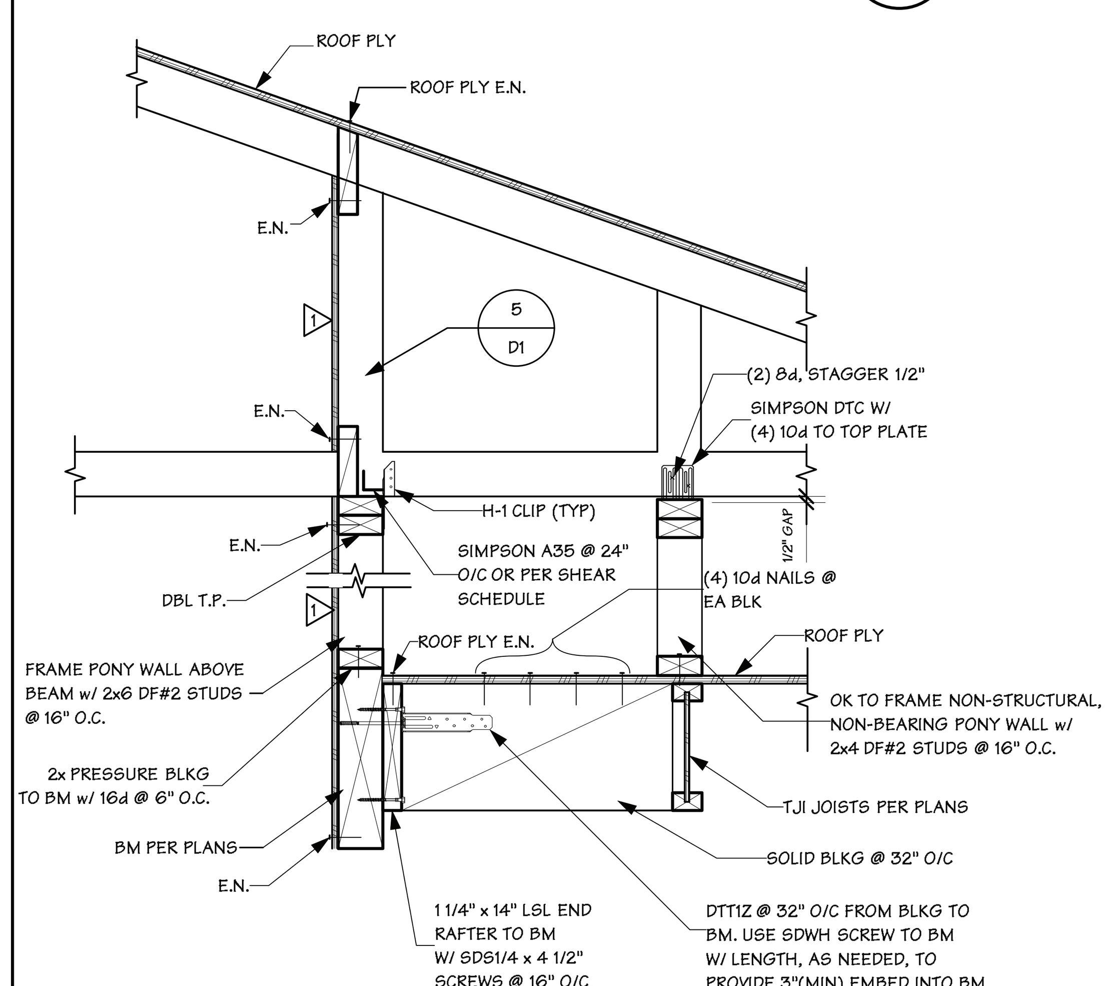
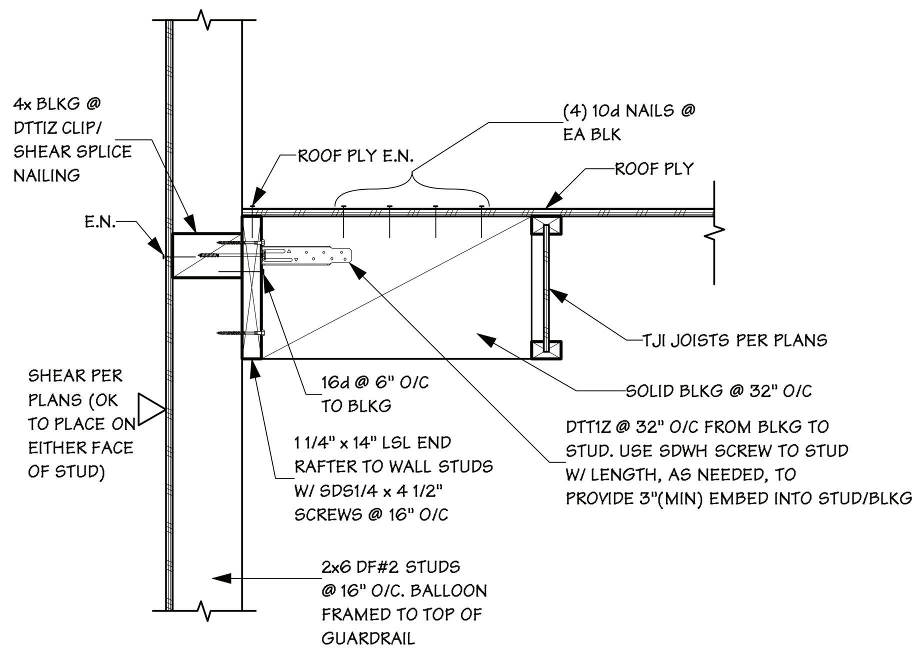


SHEAR TRANSFER @ FLAT ROOF TRANSITION
SCALE 1" = 1'-0"
19



RAFTER TO WALL FRAMING CONNECTION
SCALE 1" = 1'-0"
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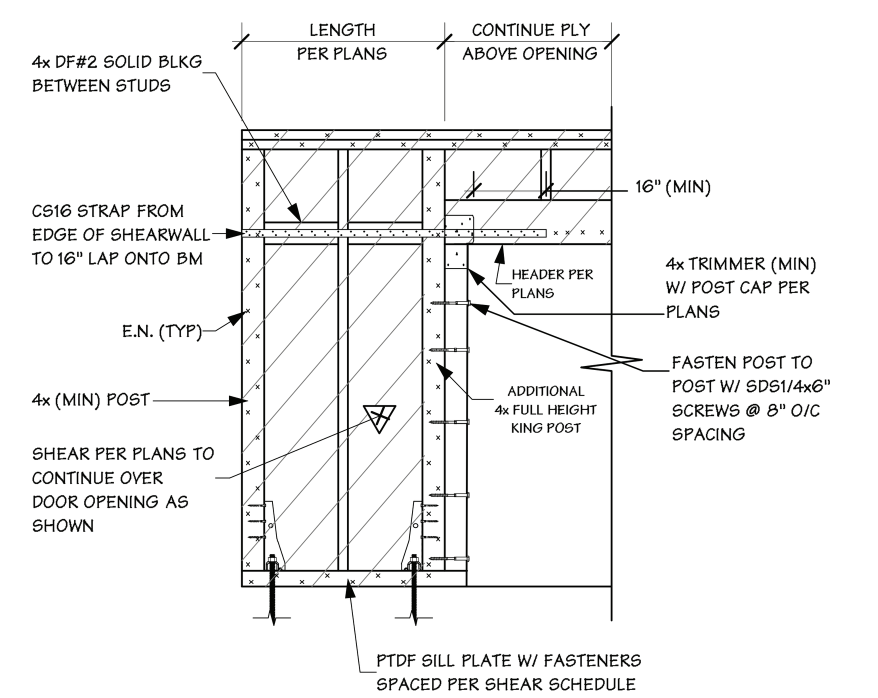
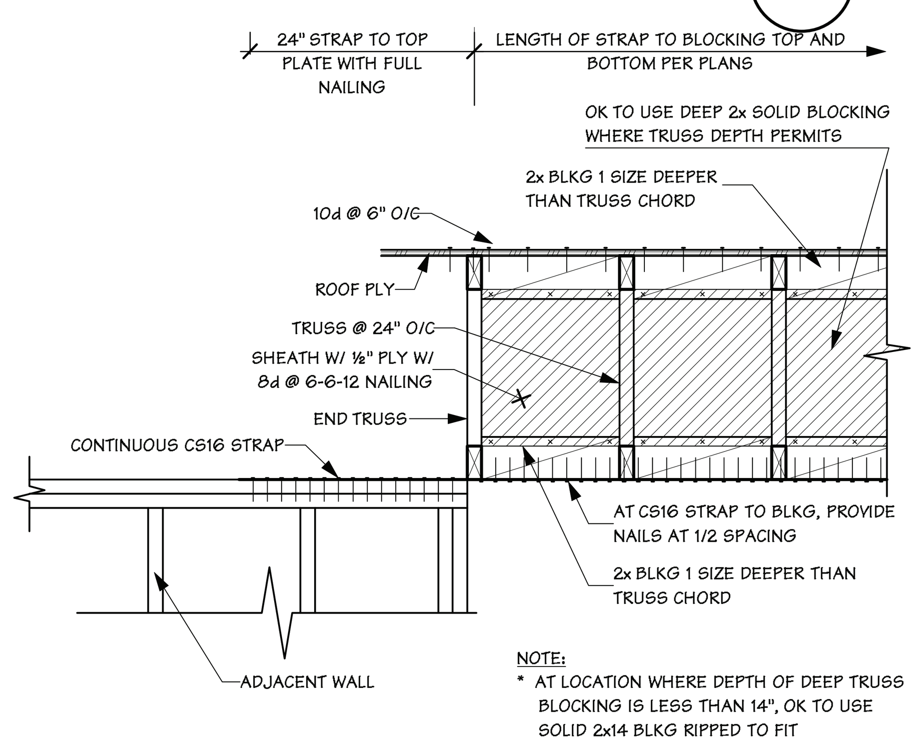
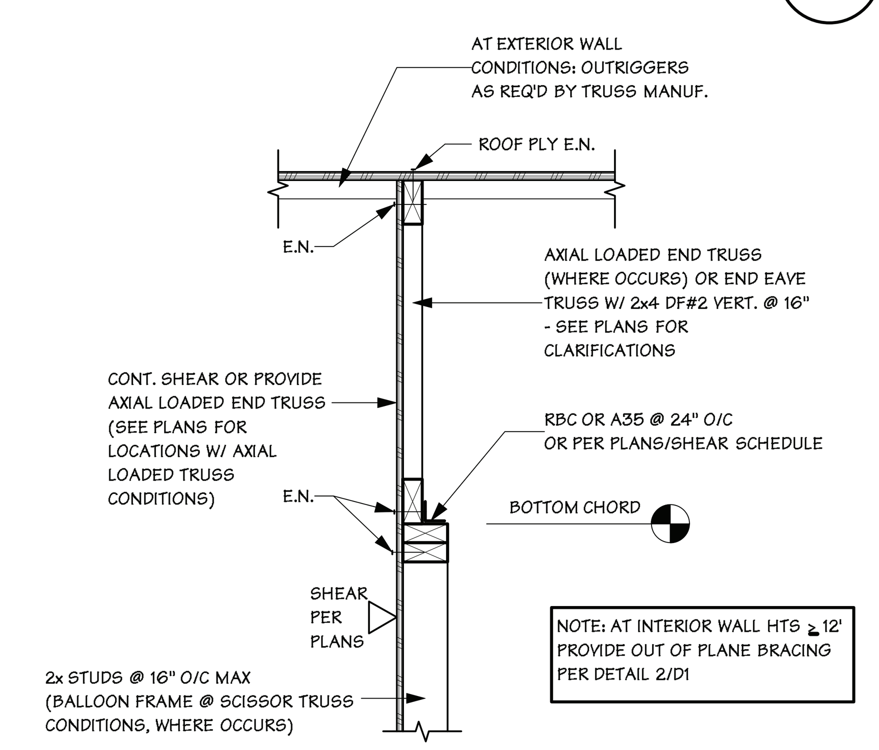


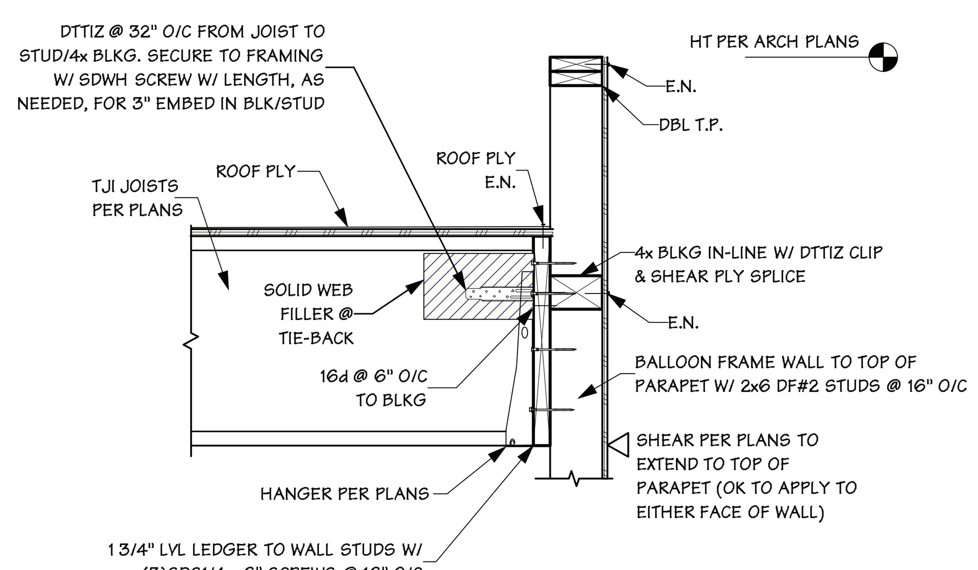
CONTINUOUS SHEAR WALL OVER OPENING
NTS
11



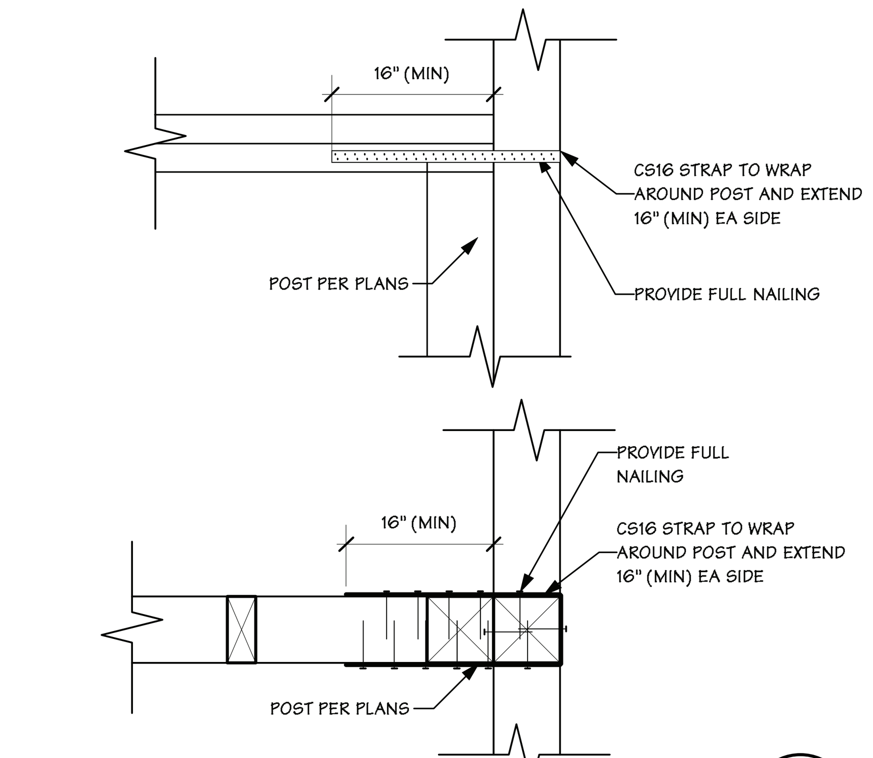
DRAG TRANSFER CONNECTION
SCALE 3/4" = 1'-0"
7



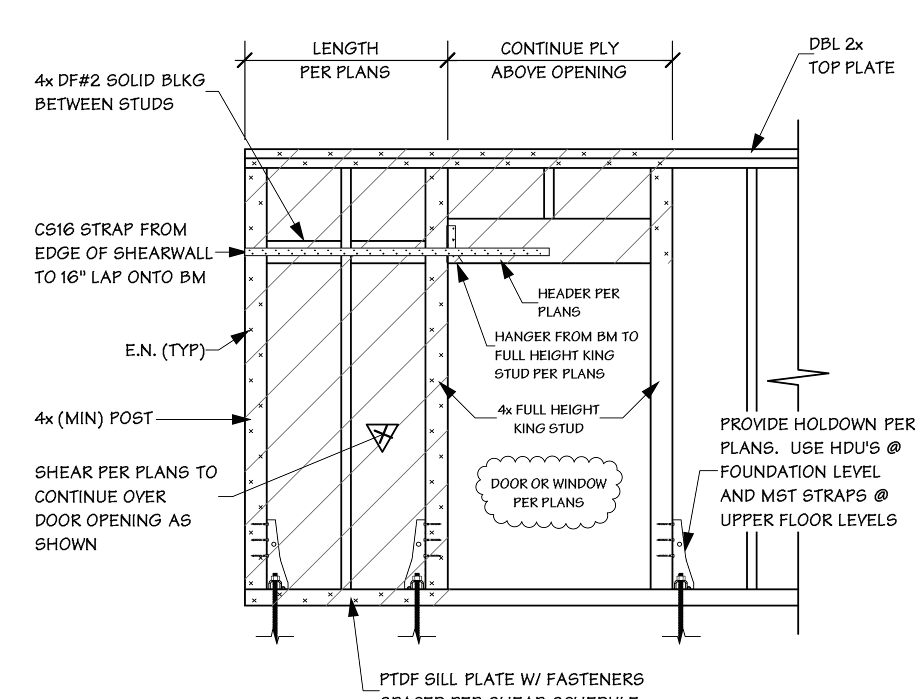
SHEAR TRANSFER
SCALE 1" = 1'-0"
3



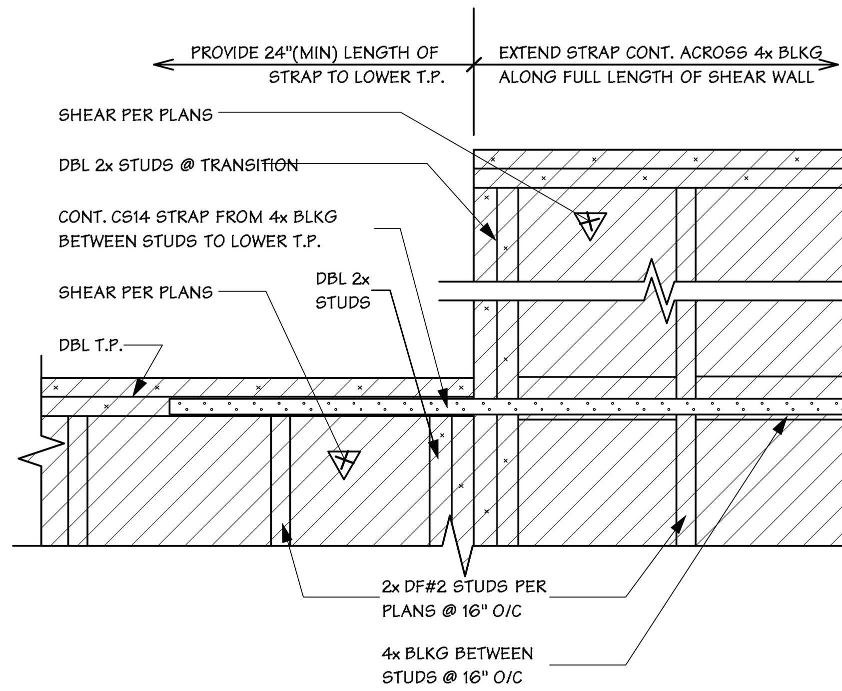
ROOF JOIST TO WALL FRAMING CONNECTION
SCALE 3/4" = 1'-0"
16



SCALE 1 1/2" = 1'-0"
12



CONTINUOUS SHEAR WALL OVER OPENING
NTS
8



DRAG CONN. @ T.P. HT. CHANGE
1"=1'-0"
4

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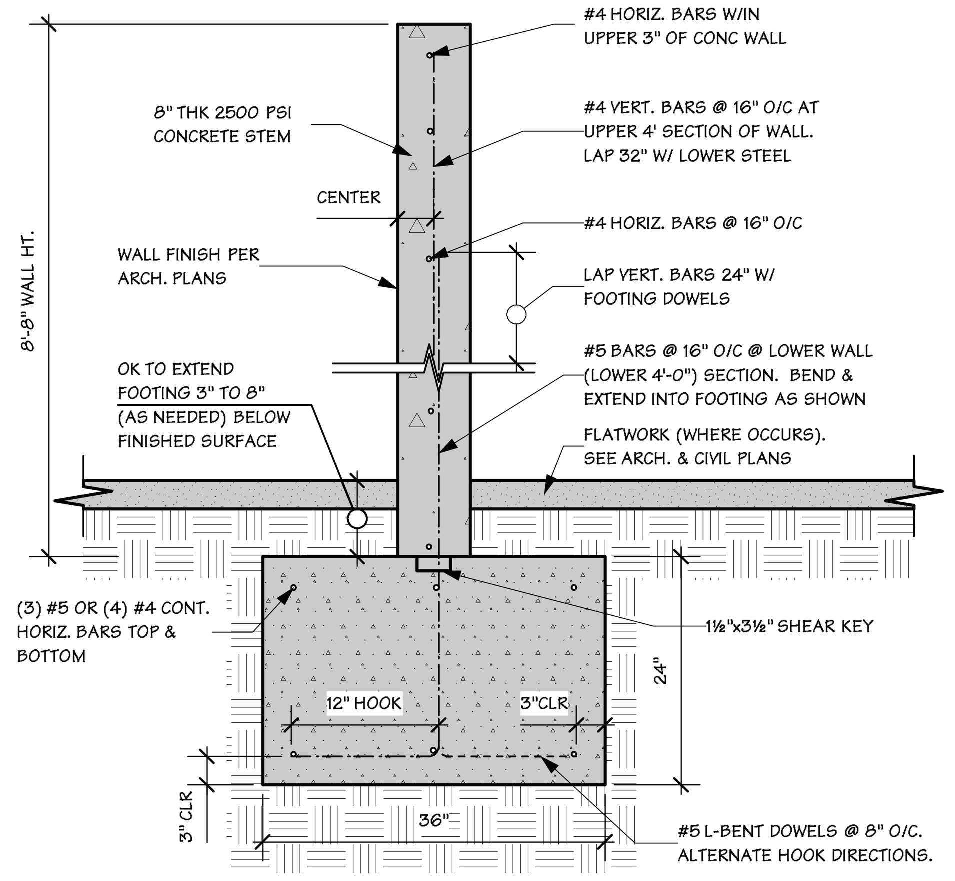
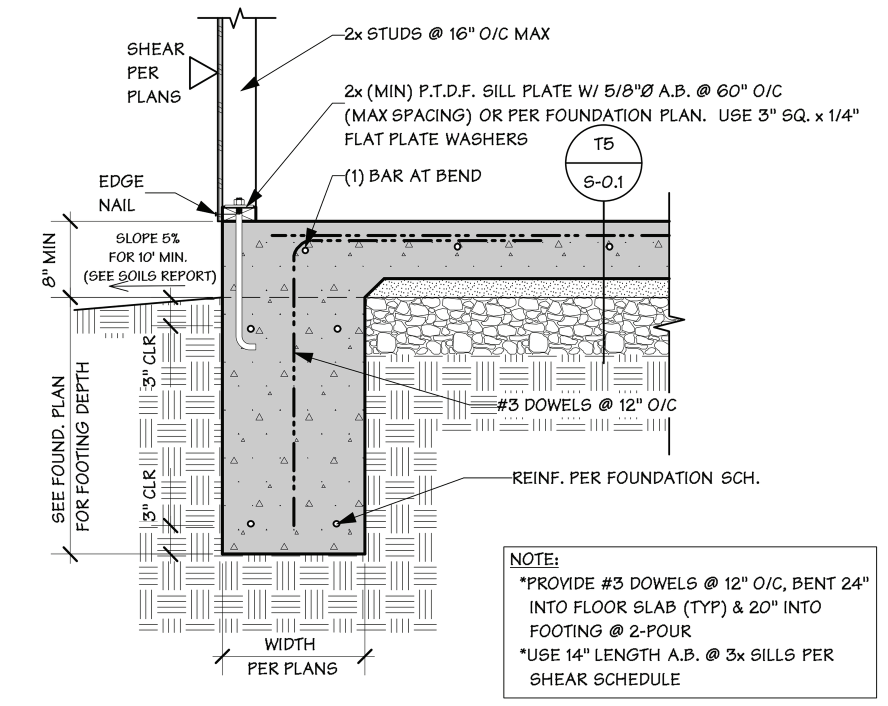
DETAILS

SCALE: AS NOTED

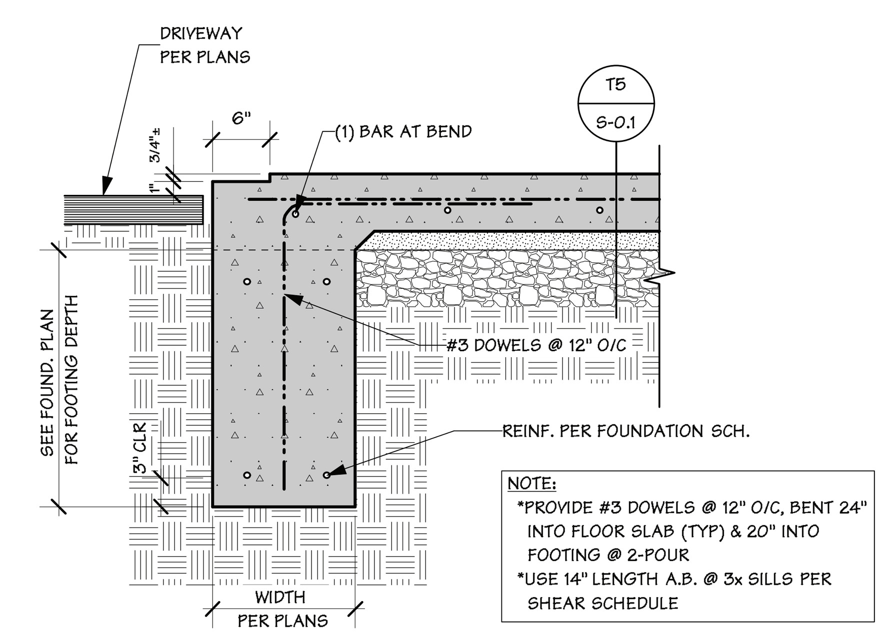
SHEET:
D-1



8'-8" TALL CONCRETE SCREEN WALL (9)
SCALE 3/4" = 1'-0"



EXTERIOR FOOTING (1)
SCALE 3/4" = 1'-0"



GARAGE OPENING (6)
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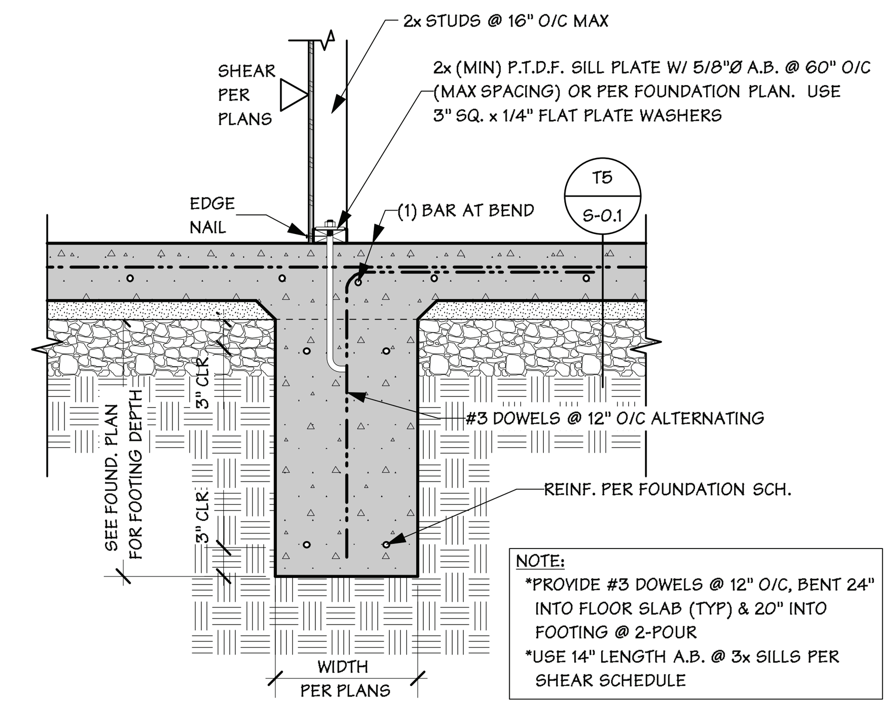

INTERIOR FOOTING (2)
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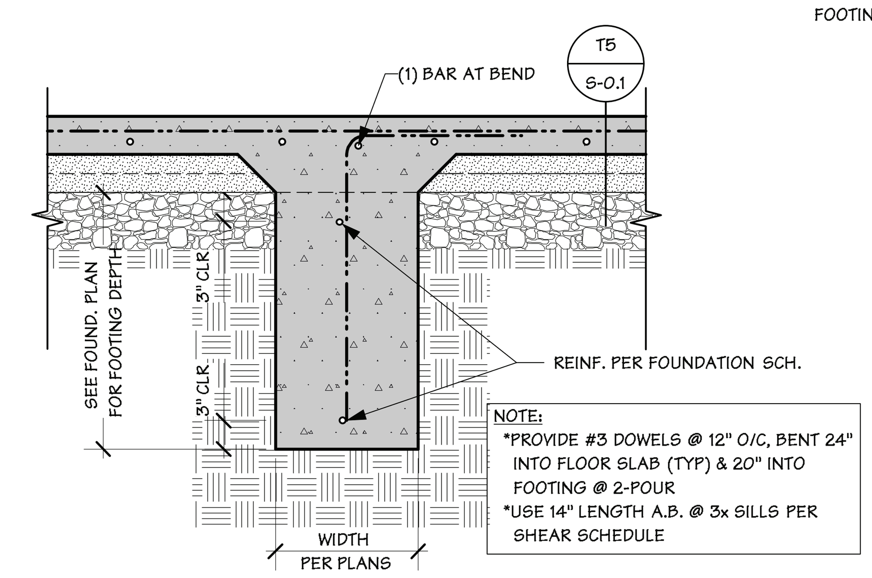

INTERIOR FOOTING - NON BEARING WALL (7)
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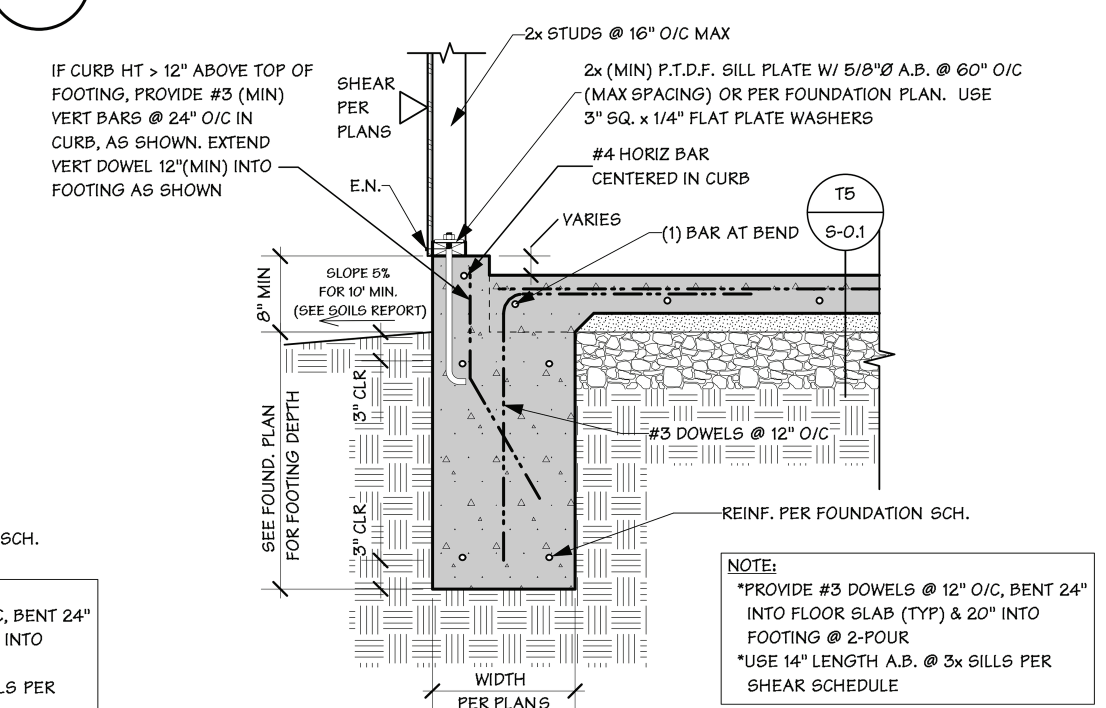
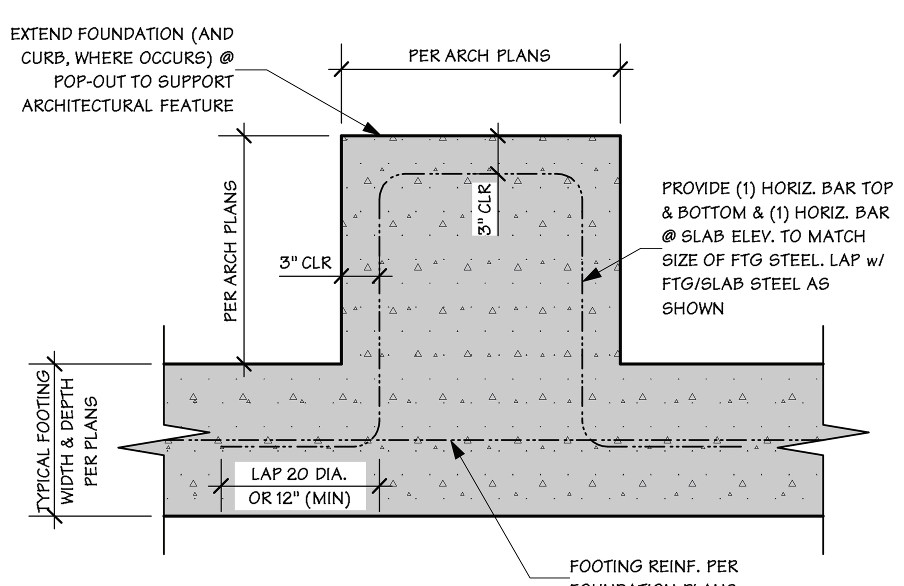
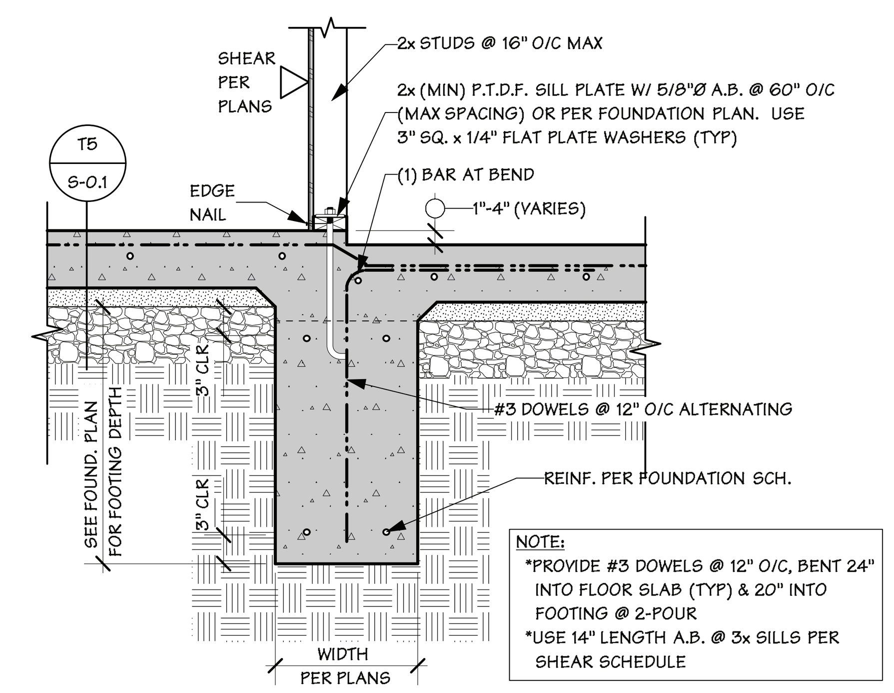


FOOTING WITH CURB (3)
SCALE 3/4" = 1'-0"



FOUNDATION EXTENSION @ POP-OUT (8)
SCALE 1" = 1'-0"



STEP @ GARAGE (4)
SCALE 3/4" = 1'-0"

MSD PROFESSIONAL ENGINEERING, INC.
4555 EL CAMINO REAL, SUITE H
ATASCADERO, CA 93422
OFFICE: 805.462.2282 FAX: 805.462.2283

These drawings and specifications are instruments of service and are the property of MSD Professional Engineering, Inc. All designs and other information on these drawings are for use on the specified project and shall not be used without the expressed, written consent of MSD Professional Engineering, Inc.

Contractor and sub-contractors shall verify all dimensions and conditions at the job site before proceeding with work and report any discrepancies or changes to MSD Professional Engineering, Inc. prior to construction of affected aspects of the project.

REGISTERED PROFESSIONAL ENGINEER NICHOLAS A. McCLURE 70390 CIVIL STATE OF CALIFORNIA

LICENSE EXP : 09/30/2022

Paso Robles Residence
Address Removed for Privacy

DATE: 09/28/2021

REVISION:

DETAILS

SCALE: AS NOTED

SHEET: D-2

PROJECT STRUCTURAL CODE REFERENCES AND CONSTRUCTION SPECIFICATIONS:

BUILDING CODE REFERENCES:

Unless otherwise specified below, the most current version of the following codes and standards shall govern the design and construction of the project. All work on the project shall be performed in accordance with the building codes and standards referenced below, the requirements of the local building official, or the specifications of these project plans, whichever is most conservative.

Governing Code: *2019 California Building Code (CBC)*

Supporting Code References:

Vertical and Lateral Load Development	*Minimum Design Loads for Buildings and Other Structures (ASCE 7)*
Lumber and Timber	*National Design Specification for Wood Construction (NDS)*
Bolts and Nails	*National Design Specification for Wood Construction (NDS)*
Reinforced Concrete	*Building Code Requirements for Structural Concrete (ACI 318)*
Masonry Construction	*Building Code Requirements for Masonry Structures (ACI 530)* *Masonry Codes and Specifications for California (MIA)*
Structural Plywood Sheathing	*Special Design Provisions for Wind and Seismic (SDPWS)*

GENERAL STRUCTURAL NOTES AND REQUIREMENTS:

1) The following notes and specifications shall govern the construction of the project unless otherwise specifically noted on the project structural plans, construction details or other supporting documentation from this office.
2) Modification of these plans, notes, specifications and details shall not be permitted unless approved in writing from the Architect or Engineer.
3) The project Contractor and Sub-Contractors shall verify all dimensions and conditions at the job site before proceeding with work and report any discrepancies of changes to MSD Professional Engineering, Inc. prior to construction of the affected aspects of the project.
4) The following structural plans have been prepared to correlate with the architectural plans provided by others. Unless otherwise referenced on the structural plans or details, see project architectural plans for all building construction dimensions, wall locations, window sizes and floor/ceiling heights.
5) Written dimensions shown on architectural or structural plans shall govern over all scaled measurements.
6) All work directly or indirectly referenced within the project structural plans and details shall be performed in accordance with the best practices associated with the work specified. The Contractor shall be responsible for coordinating the work of all trades.
7) The following structural plans and details represent the finished structure and are not intended to specify the means or method of construction. The Contractor shall provide all necessary bracing, shoring and temporary supports to properly protect the structure referenced in these plans as well as any adjacent existing structures affected by the work proposed within these documents.
8) All bracing, shoring and temporary supports shall remain in place until the structure is otherwise sufficiently complete to be self-supporting of all the building elements referenced within these project plans.
9) This structure has been prepared to support the building and occupancy loads referenced within the structural calculations and specifications provided by this office. Any additional loads or variations to the project that differ from the conditions referenced in the calculations should be brought to the attention of this office.
10) During construction, building materials shall be spread out when placed on raised floors or roofs. Construction loads shall not exceed the live loads shown on these project plans and specifications unless the contractor provides adequate shoring or bracing to support the materials.
11) Only structural plans denoted with an "Approved " stamp from the local building official shall be used for the purpose of construction. The Contractor shall be responsible for all coordination of "Approved" construction plans between the various trades and Sub-Contractors working on the project. All other revisions of the project plans shall be considered obsolete and the Contractor assumes responsibility for all work not performed in accordance with the "Approved" construction documents.
12) The following structural plans and details have been provided to accommodate typical drainage and waterproofing methods used in construction, however, these plans are not intended to provide all the necessary drainage and waterproofing solutions required for a typical project. The project Architect and Contractor shall be responsible for determining all necessary drainage and waterproofing details and shall coordinate these conditions with this office when necessary for structural purposes.
13) See architectural plans for all roof drainage mechanisms, crickets, roof openings, drainage slopes and other waterproofing measures not shown on these plans.

BUILDING PAD PREPARATION AND FOUNDATION EXCAVATIONS:

1) Contractor shall refer to the "Project Specific Construction Conditions and Design Parameters" for additional compaction, fill, backfilling, foundation excavation and site preparation requirements.
2) Prior to performing grading and/or excavation work at the project site, the Contractor shall locate and protect all sub-surface utilities.
3) The Building Official/Building Inspector and when referenced within these documents, the project soils engineer, shall inspect and approve in writing all grading work and foundation excavations prior to placement of steel reinforcement and concrete forms.
4) Any site irregularities, disturbances, groundwater, pumping-soils or sub-surface structures encountered during the grading work shall immediately be brought to the attention of the project soils engineer and MSD Professional Engineering, Inc. for appropriate recommendations and remediation, if necessary.
5) Regardless of any other foundation recommendations specified within these plans, graded sites to be filled twelve (12) inches or more shall require a compaction test provided by the project soils engineer and submitted to the Building Official/Building Inspector for review and approval prior to the foundation inspection.
6) Foundation excavations shall be prepared to the depths and dimensions shown on the following construction plans and details. Excavations shall be cut square and smooth with the base of excavations prepared level and into uniformly firm soil material, unless noted otherwise.
7) Foundation excavations shall be moistened immediately prior to pouring concrete. See the "Project Specific Construction Conditions and Design Parameters" on structural sheet S-0.1 for additional foundation pre-saturation requirements, if applicable.
8) De-water to maintain stability and clean working conditions when water or sub-surface moisture collects and ponds in foundation excavations.
9) Foundations shall not be poured until all required formwork, reinforcing steel, anchor bolts, holdowns, etc. have been properly placed and verified by the local Building Official/Building Inspector as well as any additional inspections specified on these project documents.
10) No stakes shall be left or abandoned in place following concrete pour. Holes and openings in concrete created by stakes shall be filled with a non-shrink grout.
11) Unless otherwise specified in the project soils report, all required backfill at footings and retaining walls shall be compacted to at least 90% of maximum density as determined by ASTM - 1557.

STRUCTURAL ABBREVIATIONS

A.C.	ASPHALTIC CONCRETE	GALV.	GALVANIZED
A.F.F.	ABOVE FINISH FLOOR	G.I.	GALVANIZED IRON
A.N.G.	AVERAGE NATURAL GRADE	GYP	GYPSUM
BLDG	BUILDING	HORIZ.	HORIZONTAL
BLKG	BLOCKING	HR	HOUR
BM	BEAM	INT.	INTERIOR
B.O.W.	BOTTOM OF WALL	L.F.F.	LOWER FINISH FLOOR
C	CENTER LINE	MAX	MAXIMUM
CLG	CEILING	MTL	METAL
CONT.	CONTINUOUS	MFR	MANUFACTURER
DBL	DOUBLE	MIN	MINIMUM
DIA	DIAMETER	MISC	MISCELLANEOUS
DN	DOWN	NTS	NOT TO SCALE
EA.	EACH	N/A	NOT APPLICABLE
ELEC.	ELECTRICAL	O.C.	ON CENTER
EQ	EQUAL	O/	OVER
EXT	EXTERIOR	P.T.D.F.	PRESSURE TREATED DOUG FIR
FND	FOUNDATION	PLYWD	PLYWOOD
F.F.	FINISH FLOOR	REQ'D	REQUIRED
FLR	FLOOR	SIM	SIMILIAR
F.O.C.	FACE OF CONCRETE	T.O.W.	TOP OF WALL
F.O.F.	FACE OF FINISH	TYP	TYPICAL
F.O.S.	FACE OF STUD	U.O.N.	UNLESS OTHERWISE NOTED
FT.	FOOT	U.F.F.	UPPER FINISH FLOOR
FTG	FOOTING	VERT	VERTICAL
FURR	FURRING	W/	WITH
HT.	HEIGHT	WD	WOOD
HGR	HANGER	W/O	WITHOUT
GA.	GAUGE	WP	WATERPROOF

CONCRETE AND ANCHORAGE:

1) Contractor shall refer to the "Project Specific Construction Conditions and Design Parameters" and the retaining wall structural details for project specific footing construction specifications.
2) All concrete and concrete work shall be performed in accordance with the latest edition of the California Building Code, Chapter 19 (CBC – Chapter 19), the ACI Building Code (ACI 318) and the ACI Manual of Concrete Practice.
3) The maximum concrete slump shall be:
   a. 3" (+/-1") – Slabs
   b. 4" (+/-1") – All other work
4) Cement shall be Portland Cement, Type I or II, low alkali, per ASTM C-150.
5) The maximum water-to-cement ratio shall be 0.45-0.5 unless otherwise noted on the project plans or pre-approved by this office.
6) Any water reducing agents added to the concrete mix shall be reviewed and approved by the Engineer prior to mixing.
7) Mix designs shall be prepared by an approved testing laboratory in order to meet the minimum required compressive strength values shown on these project plans.
8) Aggregate shall conform to ASTM C-33 and shall be limited to the following sizes:
   a. 1" – 1 ½ " – Footings and grade beams
   b. ¾" – Slabs-on-grade
9) Minimum aggregate size for concrete placed with pumping equipment shall be 3/8" with no more than 20% of the aggregate proportion being 3/8" in size (50/50 mix)
10) Concrete shall not free-fall more than six (6) feet. Use tremie, pump or other approved methods to provide proper placement for heights greater than six (6) feet.
11) Vibrate all concrete (including slabs) as it is placed with a mechanical vibrator. Vibration equipment is to be operated by experienced personnel only. Vibration equipment shall be used to consolidate concrete only, and not for transport. Reinforcing and forms shall not be vibrated.
12) Freshly deposited concrete shall be protected from premature drying and excessively hot or cold temperatures and shall be maintained with minimal moisture loss for the time necessary for the hydration of the cement (typically 7 days). Continual wetting or other approved methods to control curing shall be used.
13) The project Contractor is responsible for all concrete formwork design and installation.
14) Concrete forms shall be removed in accordance with the following schedule:
   a. 1 day minimum – Edge forms of slab-on grade panels
   b. 2 days minimum – Side forms of footings
   c. 10 days minimum – Concrete retaining or stem walls
   d. 15 days minimum – Concrete columns or beams
   e. 28 days minimum – Raised concrete slabs
15) All holes in wood or steel plates to receive anchor bolts shall be drilled 1/16" diameter larger than the anchor bolt diameter specified. No oversizing is allowed, unless otherwise noted on the structural details.
16) The location of all construction cold joints shall be as shown on the structural details or as approved by the project Engineer. Construction cold joints shall be thoroughly cleaned with compressed air and water and shall be rough with exposed coarse aggregates. Construction cold joints shall be continuously wet at least 3 hours in advance of pouring concrete.
17) Control and/or construction joints shall be provided in all slabs-on-grade as shown in the typical details and shall be installed so that areas within joints does not exceed 400 SQ FT.
18) The Contractor shall removed and replace any concrete that fails to meet the required compressive strength shown on these project plans and details.

STEEL REINGORCEMENT FOR CONCRETE:

1) Unless otherwise noted on project plans and details, reinforcing steel shall conform to ASTM A-615 and be of the following grades:
   a. #4 Bars and Smaller -- 40 KSI
   b. #5 Bars and Larger -- 60 KSI
2) Reinforcing steel shall be clean of rust, grease, or other material likely to impair the bond between the steel and concrete.
3) Concrete cover over steel reinforcing is required as follows:
   a. 3" Clear – Concrete cast against and permanently exposed to earth
   b. 2" Clear – #6 bars or greater, concrete is exposed to earth or weather (poured against forms)
   c. 1 ½" Clear – #5 bars or smaller, concrete is exposed to earth or weather (poured against forms)
   d. ¾" Clear – Concrete not exposed to weather or in contact with ground
   e. 1 ½" Clear – Beams and columns reinforcement ties, stirrups and spirals (poured against forms)
4) All reinforcing steel shall be securely tied in place and braced prior to inspection from Building Official and/or pouring concrete.
5) All reinforcing steel shall clear form stakes and braces by 2", minimum.
6) Where reinforcing steel is referenced on the project plans as continuous, splice laps at adjacent bars a minimum of 40 bar diameters or 24", whichever is greatest. Stagger splices in adjacent bars a minimum of 24 inches.
7) Reinforcing steel shall not be welded unless otherwise noted on the project plans or structural details.
8) For no reason shall reinforcing bars be heated in order to aid in bending or placing.

PROJECT SPECIFIC CONSTRUCTION CONDITIONS AND DESIGN PARAMETERS:

PROJECT SOILS DESIGN PARAMETERS:

SOILS REPORT BY: GeoSolutions,Inc.
REPORT DATED: June 23, 2021
REPORT NUMBER: SL12244-1

1) Prior to placing reinforcing steel or setting concrete forms, the soils engineer of record shall certify to the Building Official, in writing, that all site grading and foundation earthwork preparation has been prepared in accordance with the recommendations within the Soils Report.
2) A copy of the project soils report shall be on-site during all grading and foundation inspections.

SOILS EXPANSIVE INDEX BELOW FOUNDATION PADS AND FOOTINGS: Low Expansive Soils

SOILS DESIGN PARAMETERS:

Allowable Bearing Pressure (DL+LL)	1500 psf (Dead + Live)
Allowable Bearing Pressure (DL+LL+Seismic)	2000 psf (Dead + Live + Seismic)
Passive Resistance Pressure	250 pcf
Passive Resistance Pressure	333 pcf (Seismic Load Conditions)
Lateral Earth Pressure (Active)	50 pcf
Lateral Earth Pressure (At-Rest)	65 pcf
Coeff. Of Friction	0.35

FOUNDATIONS AND FOOTINGS BEARING CONDITIONS:
Based on the project geotechnical report, all retaining wall footings are designed to bear on an overexcavated and recompacted engineered fill.

PROJECT STRUCTURAL DESIGN PARAMETERS:

CONCRETE COMPRESSIVE STRENGTH

Footings and Grade Beams	2500 psi
Retaining Wall Stems	2500 psi

STATEMENT OF SPECIAL INSPECTIONS

Project: **Site Retaining Walls**

Location: **5100 Peachy Canyon Road, Paso Robles, CA 93446**

1. This Statement of Special Inspections is submitted in fulfillment of the requirements of CBC Sections 1704 and 1705.

2. Schedule of Special Inspections and tests applicable to this project:

Special Inspections per Sections 1704 and 1705

3. Special Inspections and Testing will be performed in accordance with the approved plans and specifications, this statement and CBC sections 1704, 1705, and 1708.

4. The Schedule of Special Inspections summarizes the Special Inspections and tests required. Special Inspectors will refer to the approved plans and specifications for detailed special inspection requirements. Any additional tests and inspections required by the approved plans and specifications will also be performed.

5. Interim reports will be submitted to the Building Official and the Registered Design Professional in Responsible Charge in accordance with CBC Section 1704.2

6. A Final Report of Special Inspections documenting required Special Inspections, testing and correction of any discrepancies noted in the inspections shall be submitted prior to issuance of a Certificate of Use and Occupancy (Section 1704.2.4). The Final Report will document:
- Required special inspections.
- Correction of discrepancies noted in inspections.

7. The Owner recognizes his or her obligation to ensure that the construction complies with the approved permit documents and to implement this program of special inspections. In partial fulfillment of these obligations, the Owner will retain and directly pay for the Special Inspections as required in CBC Section 1704.2.

8. 1704.4 Contractor responsibility. Each contractor responsible for the construction of a main wind- or seismic-force-resisting system, designated seismic system or a wind- or seismic-resisting component listed in the statement of special inspections shall submit a written statement of responsibility to the building official and the owner prior to the commencement of work on the system or component.

Prepared by:
Nicholas McClure, P.E. C70390
Registered Design Professional in Responsible Charge

SCHEDULE OF INSPECTION, TESTING AGENCIES, AND INSPECTORS

The following are the testing agencies and special inspectors that will be retained to conduct the majority of the tests and inspection on this project. Some of the inspections will be done by the Project Architect, Structural Engineer, Mechanical Engineer or Electrical Engineer and will be done as such in the Notes column below

Responsibility	Firm, Address, Telephone, e-mail
1. Geotechnical Inspections	GeoSolutions,Inc. 220 High Street, San Luis Obispo, CA 93401 (805)543-8539

SCHEDULE OF SPECIAL INSPECTIONS

Notation Used in Table:

Column headers:
C Indicates continuous inspection is required.
P Indicates periodic inspections are required. The notes and or contract documents should clarify.

Box entries:
X Is placed in the appropriate column to denote either "C" continuous or "P" periodic inspections.
--- Denotes an activity that is either a one-time activity or one whose frequency is defined in some other manner

Additional detail regarding inspections and tests may be shown on the structural drawings

Verification and Inspection	C	P	Notes
Table 1705.6 - Inspection of Soils			
1. Verify materials below footings are adequate to achieve the desired bearing capacity.		X	
2. Verify excavations are extended to proper depth and have reached proper material.		X	
3. Perform classification and testing of controlled fill materials.		X	
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of controlled fill.	X		
5. Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly.		X	

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Contractor and sub-contractors shall verify all dimensions and conditions at the job site before proceeding with work and report any discrepancies or changes to MSD Professional Engineering, Inc. prior to construction of affected aspects of the project.

REGISTERED PROFESSIONAL ENGINEER
NICHOLAS A. McCLURE
70390
CIVIL
STATE OF CALIFORNIA

LICENSE EXP : 09/30/2022

Site Retaining Walls
Paso Robles Residence

DATE: 09/13/2021

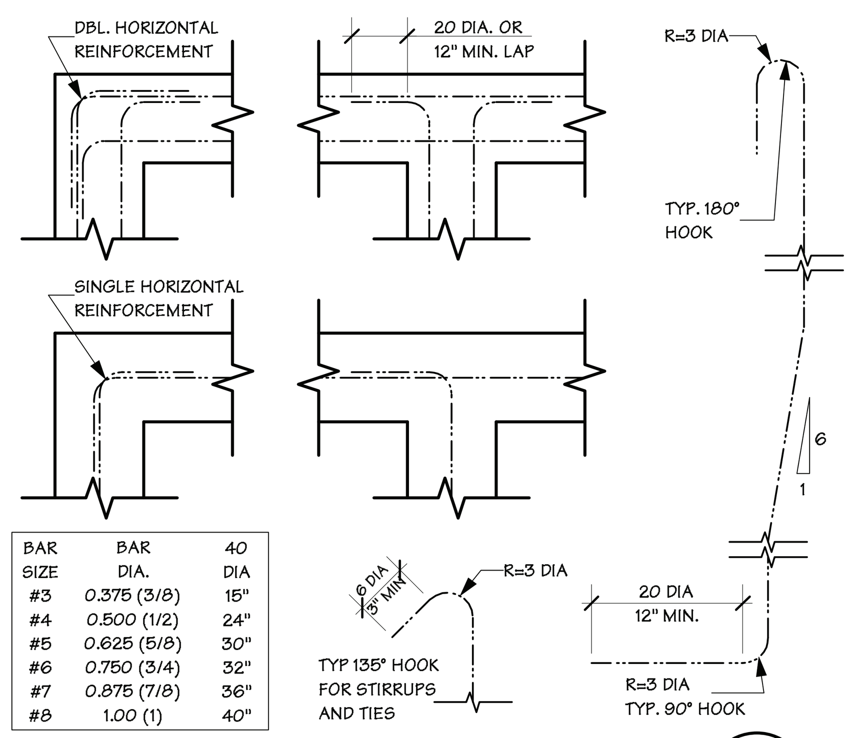
REVISION:

GENERAL NOTES & SPECIFICATIONS

SCALE: AS NOTED

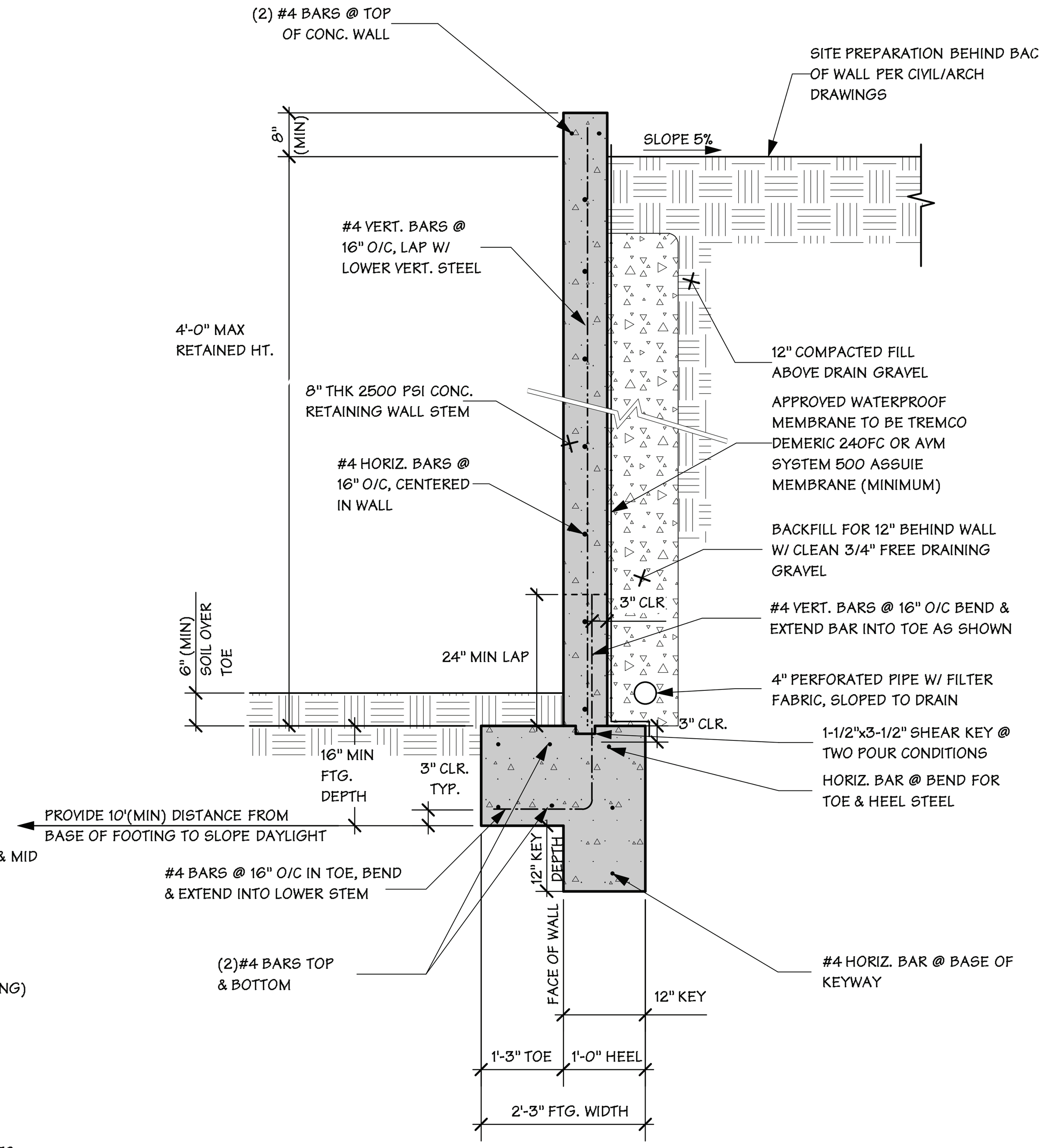
SHEET

R-0

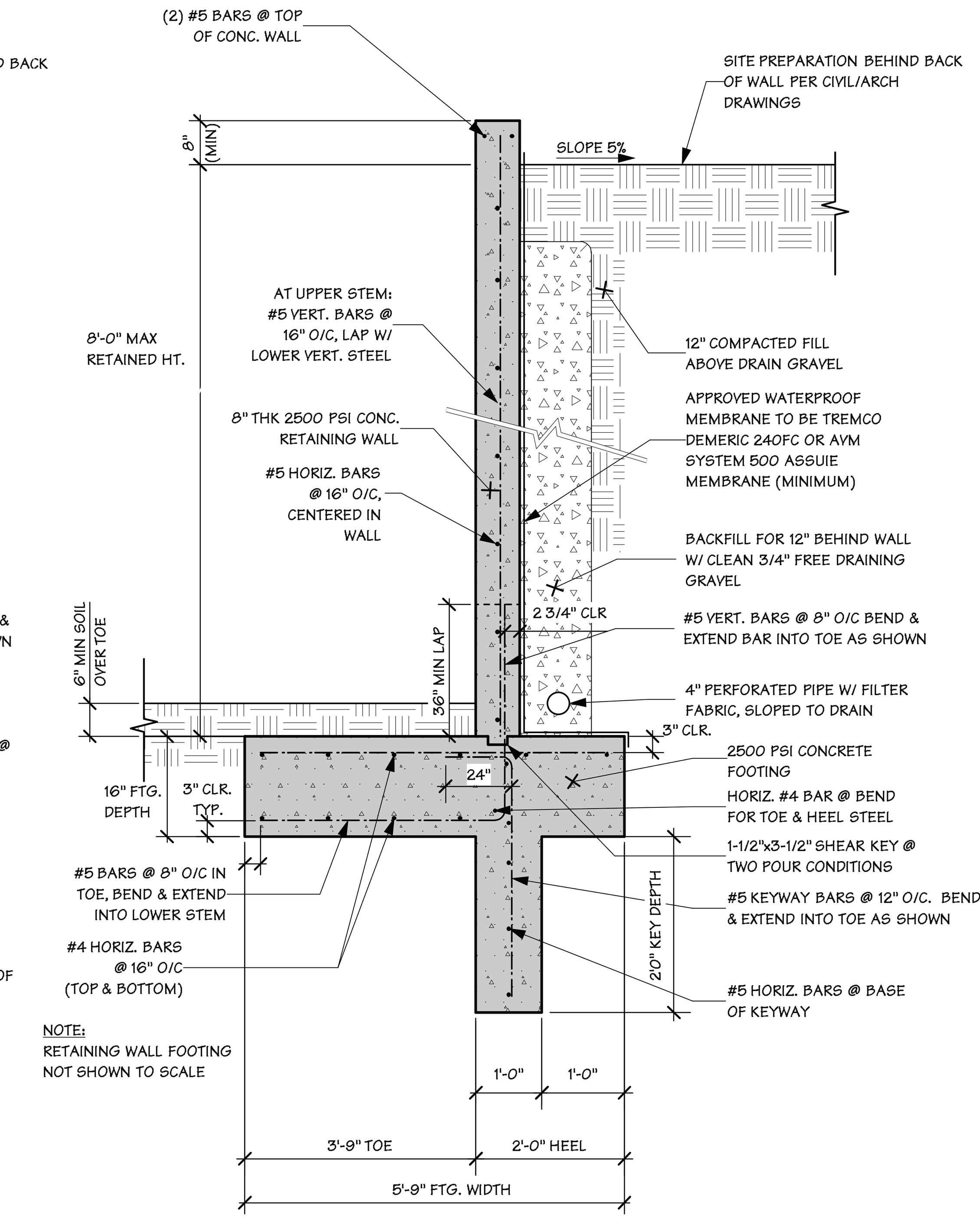


BAR SIZE	BAR DIA.	40 DIA
#3	0.375 (3/8)	15"
#4	0.500 (1/2)	24"
#5	0.625 (5/8)	30"
#6	0.750 (3/4)	32"
#7	0.875 (7/8)	36"
#8	1.00 (1)	40"

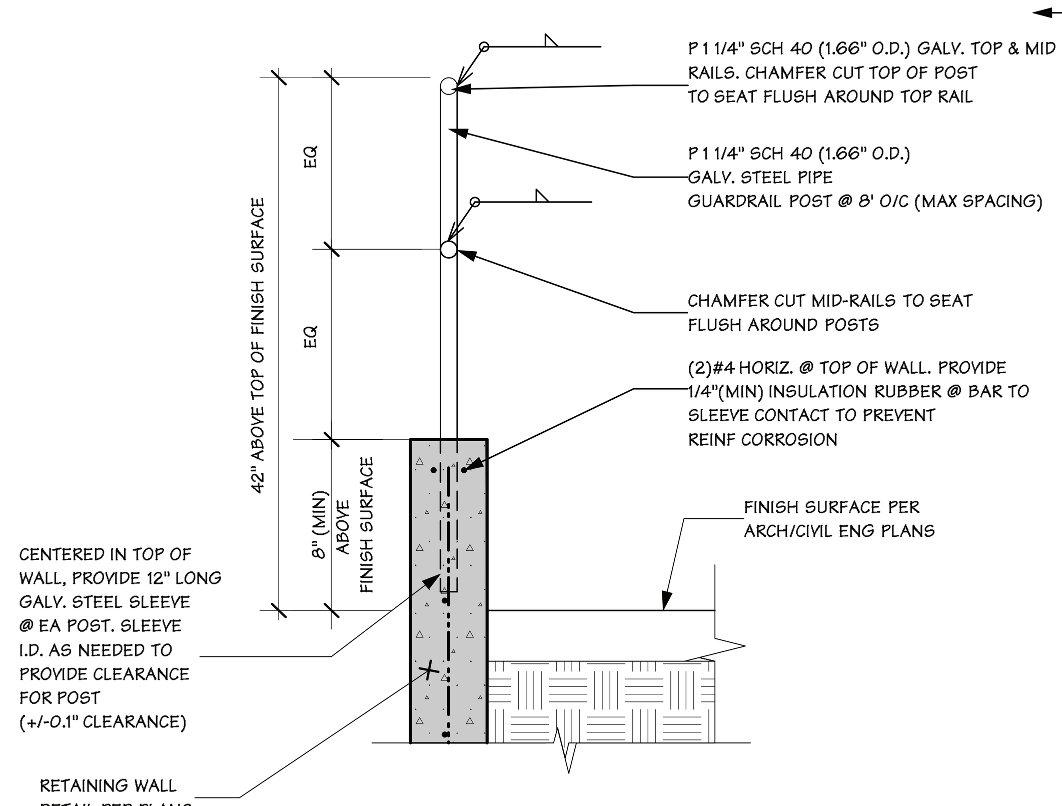
TYPICAL HORIZ. REINFORCING (5)
N.T.S.



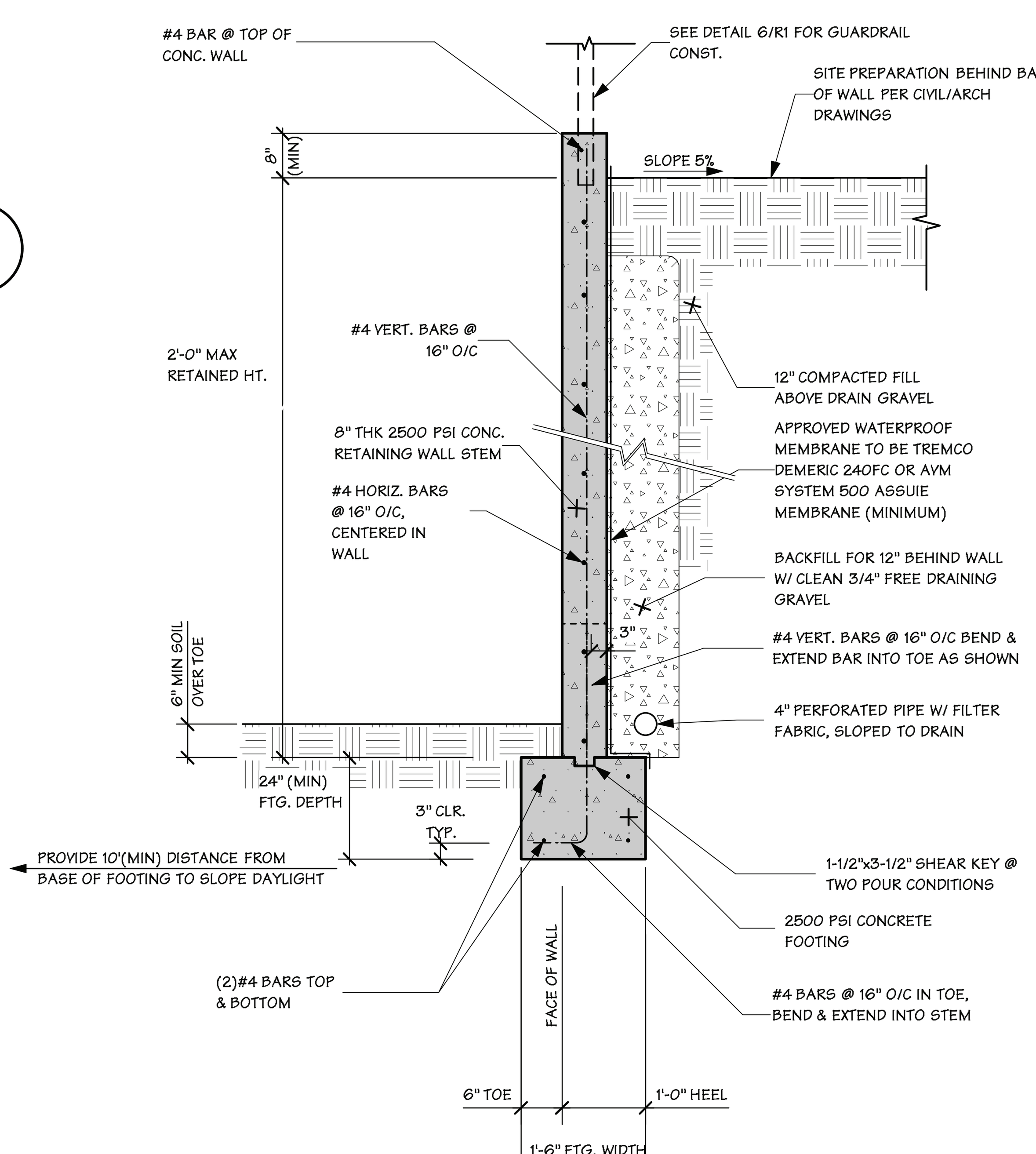
CONCRETE SITE RETAINING WALL (3)
4'-0" MAX RETAINED HEIGHT
SCALE 1/2" = 1'-0"



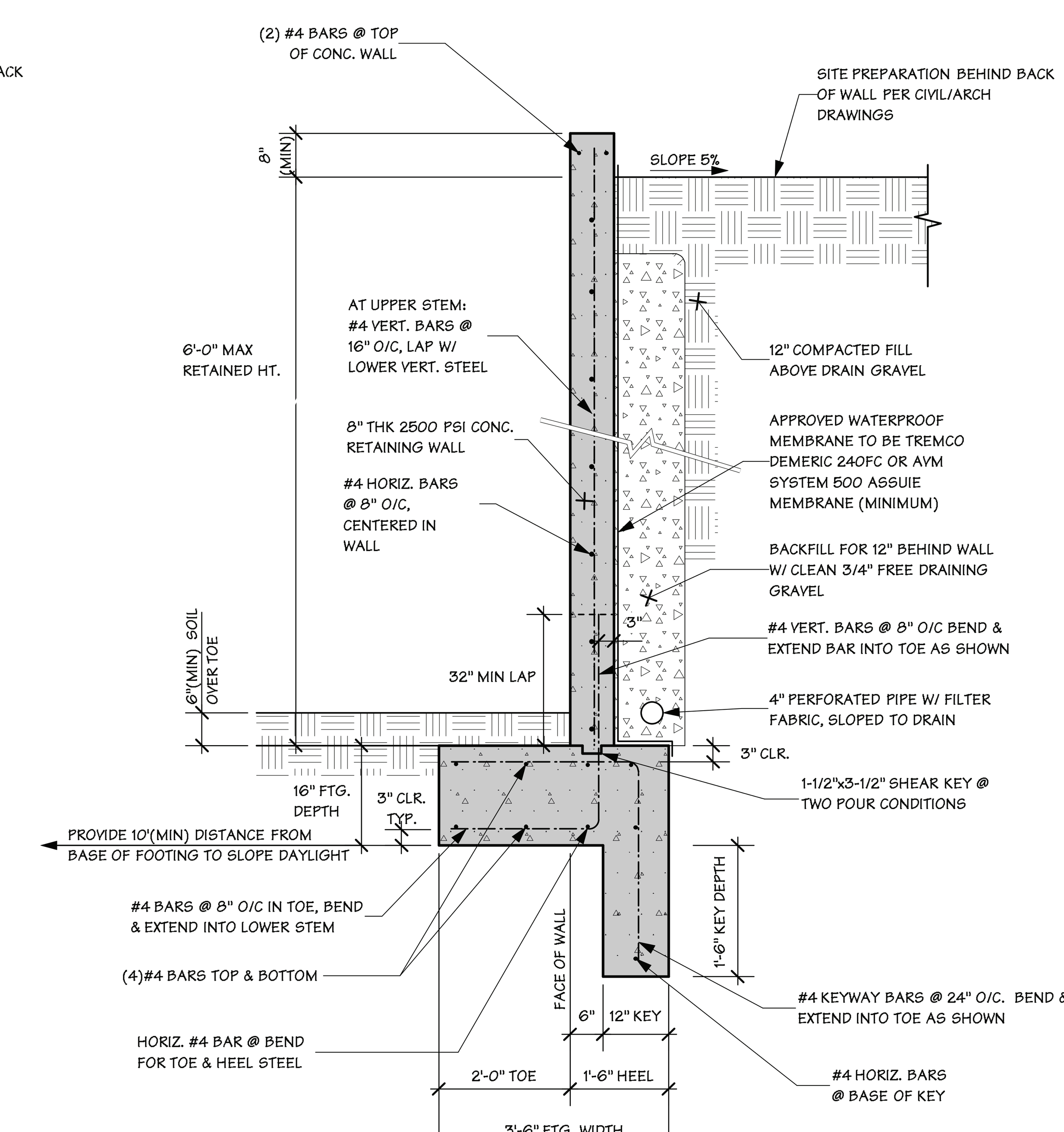
CONCRETE RETAINING WALL (1)
8'-0" MAX RETAINED HEIGHT
SCALE 1/2" = 1'-0"



GUARDRAIL CONSTRUCTION DETAIL (6)
SCALE 1" = 1'-0"



CONCRETE SITE RETAINING WALL (4)
2'-0" MAX RETAINED HEIGHT
SCALE 1/2" = 1'-0"



SITE CONCRETE RETAINING WALL (2)
6'-0" MAX RETAINED HEIGHT
N.T.S.

MSD PROFESSIONAL ENGINEERING, INC.
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ATASCADERO, CA 93422
OFFICE 805.462.2282 FAX 805.462.2283

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REGISTERED PROFESSIONAL ENGINEER
NICHOLAS A. MCGUIRE
70390
CIVIL
STATE OF CALIFORNIA

LICENSE EXP : 09/30/2022

Site Retaining Walls
Paso Robles Residence

DATE: 09/13/2021
REVISION:

RETAINING WALL DETAILS

SCALE: AS NOTED

SHEET
R-1

APPENDIX C: STRUCTURAL CALCS

MSD PROFESSIONAL ENGINEERING, INC.

4555 El Camino Real, Ste. H
Atascadero, CA 93422
(805) 462-2282

Structural Design Calculations

For

Proposed Single Family Residence

Paso Robles, California

September 28, 2021

Report #: 0921-0767

REGISTERED PROFESSIONAL ENGINEER
NICHOLAS A. McCLURE
70390
Lic. Exp.
09/30/2022
CIVIL
STATE OF CALIFORNIA

PROJECT STRUCTURAL CODE REFERENCES AND CONSTRUCTION SPECIFICATIONS:

The following engineering calculations apply to this project only. The project contractor shall verify on-site all the conditions and dimensions provided for within these calculations and the associated project plans. The engineer of record is to be notified of any discrepancies prior to proceeding with work.

BUILDING CODE REFERENCES:

Unless otherwise specified below, the most current version of the following codes and standards shall govern the design and construction of the project. All work on the project shall be performed in accordance with the building codes and standards referenced below, the requirements of the local building official, or the specifications of these project plans, whichever is most conservative.

Governing Code: *2019 California Building Code (CBC)*

Supporting Code References:

Vertical and Lateral Load Development	*Minimum Design Loads for Buildings and Other Structures (ASCE 7)*
Lumber and Timber	*National Design Specification for Wood Construction (NDS)*
Bolts and Nails	*National Design Specification for Wood Construction (NDS)*
Reinforced Concrete	*Building Code Requirements for Structural Concrete (ACI 318)*
Structural Plywood Sheathing	*Special Design Provisions for Wind and Seismic (SDPWS)*

Minimum Material Design Specifications:

Lumber (sawn)	DF-L WCLIB
2x & 4x	#2 Joists/Rafters/Headers/ Beams/Posts (U.O.N.)
6x	#1 Rafters/Headers/Beams (U.O.N.)
Glu-Lam Beams (GLB)	DF-L 24F-V4 (U.O.N.) F_b = 2400 psi E = 1800 ksi
Laminated Veneer Lumber (LVL)	DF-L F_b = 2600 psi E= 1900 ksi
Plywood Sheathing	"Panels" shall be plywood (group 1 or 2) APA performance rated panels conforming to PS 1
Structural Steel	ASTM A-36 (compact) : Angles, Sections, Plates ASTM A-53 : Pipes ASTM A-500 : Grade 'B' tubes
Hot Dipped Galvanized (All Hardware)	ASTM A-123 and ASTM A-153
Welding	AWS D1.1 E70xx Electrodes
Bolts	Anchor Bolts : ASTM A-36 or better Machine Bolts : ASTM A-307 or better
Reinforcing Steel	ASTM A-615 Grade 40 : # 4 bars and smaller Grade 60 : # 5 bars and larger
Epoxy (Rebar to Conc.)	ASTM C-881 Type 3 Grade 3
Non-Shrink Grout	MinWax Por-Rok or approved equal

BUILDING PAD PREPARATION AND FOUNDATION EXCAVATIONS:

1) Prior to performing grading and/or excavation work at the project site, the Contractor shall locate and protect all sub-surface utilities.
2) Any site irregularities, disturbances, groundwater, pumping-soils or sub-surface structures encountered during the grading work shall immediately be brought to the attention of the project soils engineer and MSD Professional Engineering, Inc. for appropriate recommendations and remediation, if necessary.
3) Regardless of any other foundation recommendations specified within these plans, graded sites to be filled twelve (12) inches or more shall require a compaction test provided by the project soils engineer and submitted to the Building Official/Building Inspector for review and approval prior to the foundation inspection.
4) Foundation excavations shall be prepared to the depths and dimensions shown on the following construction plans and details. Excavations shall be cut square and smooth with the base of excavations prepared level and into uniformly firm soil material, unless noted otherwise.
5) Foundation excavations shall be moistened immediately prior to pouring concrete.
6) De-water to maintain stability and clean working conditions when water or sub-surface moisture collects and ponds in foundation excavations.
7) Foundations shall not be poured until all required formwork, reinforcing steel, anchor bolts, holdowns, etc. have been properly placed and verified by the local Building Official/Building Inspector as well as any additional inspections specified on these project documents.
8) No stakes shall be left or abandoned in place following concrete pour. Holes and openings in concrete created by stakes shall be filled with a non-shrink grout.

STEEL REINFORCEMENT FOR CONCRETE:

1) Unless otherwise noted on project plans and details, reinforcing steel shall conform to ASTM A-615 and be of the following grades:
    a. #4 Bars and Smaller -- 40 KSI
    b. #5 Bars and Larger -- 60 KSI
2) Reinforcing steel shall be clean of rust, grease, or other material likely to impair the bond between the steel and concrete.
3) Concrete cover over steel reinforcing is required as follows:
    a. 3” Clear – Concrete cast against and permanently exposed to earth
    b. 2” Clear – #6 bars or greater, concrete is exposed to earth or weather (poured against forms)
    c. 1 ½” Clear -- #5 bars or smaller, concrete is exposed to earth or weather (poured against forms)
4) All reinforcing steel shall be securely tied in place and braced prior to inspection from Building Official and/or pouring concrete.
5) All reinforcing steel shall clear form stakes and braces by 2”, minimum.
6) Where reinforcing steel is referenced on the project plans as continuous, splice laps at adjacent bars a minimum of 40 bar diameters or 24”, whichever is greatest. Stagger splices in adjacent bars a minimum of 24 inches.
7) For no reason shall reinforcing bars be heated in order to aid in bending or placing.

CONCRETE AND ANCHORAGE:

1) All new foundations shall be constructed of concrete with a minimum compressive strength f'c of 2500 psi at 28 days. See Project Specific Specs on Sheet S-0.1 for alternative concrete strength requirements.
2) All concrete and concrete work shall be performed in accordance with the latest edition of the California Building Code, Chapter 19 (CBC – Chapter 19), the ACI Building Code (ACI 318) and the ACI Manual of Concrete Practice.
3) The maximum concrete slump shall be:
    a. 3" (+/- 1") – Slabs
    b. 4" (+/- 1") – All other work
4) Cement shall be Portland Cement, Type I or II, low alkali, per ASTM C-150.
5) The maximum water-to-cement ratio shall be 0.45-0.5 unless otherwise noted on the project plans or pre-approved by this office.
6) Mix designs shall be prepared by an approved testing laboratory in order to meet the minimum required compressive strength values shown on these project plans.
7) Aggregate shall conform to ASTM C-33 and shall be limited to the following sizes:
    a. 1" – 1 ½" – Footings and grade beams
    b. ¾" – Slabs-on-grade
8) Minimum aggregate size for concrete placed with pumping equipment shall be 3/8" with no more than 20% of the aggregate proportion being 3/8" in size (50/50 mix).
9) Concrete shall not free-fall more than six (6) feet. Use tremie, pump or other approved methods to provide proper placement for heights greater than six (6) feet.
10) Vibrate all concrete (including slabs) as it is placed with a mechanical vibrator. Vibration equipment is to be operated by experienced personnel only. Vibration equipment shall be used to consolidate concrete only, and not for transport. Reinforcing and forms shall not be vibrated.
11) Freshly deposited concrete shall be protected from premature drying and excessively hot or cold temperatures and shall be maintained with minimal moisture loss for the time necessary for the hydration of the cement (typically 7 days). Continual wetting or other approved methods to control curing shall be used.
12) All poured-in-place anchor bolts shall have the minimum total embedments:
    a. 5/8" Diameter – 7"
13) The Contractor shall order the necessary anchor bolt lengths to accommodate the embedment depths referenced above and various sill plate thicknesses (2x or 3x) specified on the project plans and shear wall schedule.
14) Anchor bolt spacing shall be five (5) feet maximum on center unless otherwise noted on plans or shear wall schedule. Bolts shall be a maximum of 12" from sill ends and splices with a minimum of two (2) bolts per splice.
15) Structural anchor bolts shall be full diameter, cut thread, Grade A-36 steel bolts provided by an American Manufacturer.
16) Anchor bolts, fasteners and hardware at pressure-treated wood connections shall be hot-dipped zinc coated galvanized, stainless steel, silicon bronze or copper.

17) Anchor bolt washers at shear and bearing wall sill plates connections to concrete shall be 3”x3”x0.229” galvanized steel plate washers. Ok to use Simpson Strong Tie BP 5/8-3 washers for standard conditions and BPS 5/8-3 washers for conditions where a slotted washer is required.

18) The project Contractor is responsible for all concrete formwork design and installation.

19) Concrete forms shall be removed in accordance with the following schedule:
    a. 1 day minimum – Edge forms of slab-on-grade panels
    b. 2 days minimum – Side forms of footings
    c. 10 days minimum – Concrete retaining or stem walls

20) The location of all construction cold joints shall be as shown on the structural details or as approved by the project Engineer. Construction cold joints shall be thoroughly cleaned with compressed air and water and shall be rough with exposed coarse aggregates. Construction cold joints shall be continuously wet at least 3 hours in advance of pouring concrete.

21) The Contractor shall remove and replace any concrete that fails to meet the required compressive strength shown on these project plans and details.

STRUCTURAL DIAPHRAGM SPECIFICATIONS:

1) Horizontal Sheathing:
    a. Horizontal diaphragms shall be fully blocked and nailed at all boundary edges.
    b. Roof diaphragm ply shall be CDX or OSB Struct II (or better) with Panel ID# 32/16 and glued and nailed with 10d nails @ 6-6-12” spacing. See roof framing plans for specified thickness.
    c. Floor diaphragm ply shall be 23/32” CDX or OSB Stuct II (or better) with Panel ID# 40/20 and glued and nailed with 10d nails @ 6-6-10” spacing.
    d. All horizontal plywood diaphragms to be installed perpendicular to supports and shall be staggered in Case I layout.
    e. All boundary blocking shall be solid, full depth blocking with (3) 16d toe nails for 24” long and (2) 16d toe nails for 16” long blocks (typical each end).
    f. Structural design properties for wood structural panels are based on DOC PS-1 and DOC PS-2 or wood structural panel design properties given in the APA SDPDS according to the CBC Section 2306.3.
    g. Nail heads <u>shall not</u> be driven through outer laminate of panels. If a nail gun is used it must be equipped with a flush nailer attachment.
    h. For trussed roof conditions, provide 2x blocking along all ridge lines.

2) Vertical Sheathing (Shear Wall Construction):
    a. Refer to Shear Wall Schedule for material specifications and nail spacing.
    b. Where nail guns are used to install nails for shear wall sheathing, care shall be taken to use <u>common</u> sized nail equivalents regarding diameter and length.
    c. All edges of plywood shear walls are to be fully blocked and nailed with full perimeter edge nailing. Plywood shall be edge nailed to end posts/studs and any member attached to a holdown.
    d. “Panels” shall be structural plywood sheathing Group 1 or 2 or APA performance rated panels.
    e. Panels to be applied horizontally or vertically to studs spaced at 16” or 24” on center spacing (see plans).
    f. Nail heads <u>shall not</u> be driven through outer laminate of panels. If a nail gun is used it must be equipped with a flush nailer attachment.
    g. Structural shear walls shall not be penetrated with electrical panels, conduits, plumbing pipes, or other such items unless detailed on the project plans.

TIMBER FRAMING:

1) All framing lumber, timber, and plywood to be grade stamped with a stamp of the association under whose grading rules it was produced.

2) Sawn lumber shall conform to the following minimums:
    a. DF-L#2 – Roof rafters, ceiling joists, floor joists, wall studs
    b. DF-L#2 – Posts and beams 2x – 4x nominal sizes
    c. DF-L#1 – Posts and beams 6x and larger nominal sizes
    d. Pressure Treated DF-L#1 – Lumber in contact with concrete or masonry
    e. DF-L Standard or Better – Non-bearing wall studs, sill plates and blocking

3) All fasteners less than ½" diameter and all hardware in contact with pressure treated lumber shall be hot dipped galvanized.

4) The maximum moisture content of sawn lumber shall not exceed 19%.

5) All double members to be nailed together with (2) rows of 16d nails @ 12" o.c. staggered.

6) All posts shall be as wide as the beam which it supports unless a "Simpson" post cap is used. All posts not framed into walls shall be secured with both post caps and bases.

7) 2x solid blocking shall be placed between joists, rafters and trusses at both ends and all supports. Provide bridging or blocking at intervals of 8'-0" o.c. at floor joists.

8) No structural members (joists, plates, studs, beams, etc.) shall be notched, cut or drilled (except for those holes required for bolting) unless in conformance with the following code references or specifically noted or permitted in writing by the Engineer.
    a. CBC Section 2308.4.2.4 – Notching and boring of horizontal structural members.
    b. CBC Section 2308.5.10 – Notching and boring of studs and top plates.

9) Interior non-bearing non-shear walls may be fastened to concrete with Hilti shot pins at 24" maximum on center. Non-bearing non-shear walls may be fasted to wood floor rims or blocking with 16d at 12" on center.

10) Fire stops shall be provided at all intersections of stud walls at floor, ceiling and roof. Fire stops shall be 2x (min) nominal thickness and shall be placed at maximum spacing of 8'-0" on center vertically.

STRUCTURAL FASTENERS AND CONNECTION HARDWARE:

1) Connection Hardware:
    a. All metal framing connectors referenced in the calculations or on the following structural plans and details are “Simpson Strong Tie.”
    b. Substitutions of equal (must be code listed) connectors are acceptable with written permission of the Engineer.
    c. All framing connectors shall be filled or bolted to their full capacity (all holes to be filled) with fasteners as specified the “Simpson Strong Tie”.

2) Bolts:
    a. All bolts shall be ASTM 307 unless otherwise noted on the project plans and details.
    b. Pre-drill holes in lumber and steel 1/32” – 1/16” larger than specified bolt diameter.
    c. All bolted connections shall have standard cut washers under the head and nut, unless larger washers are specified on the project plans or details.
    d. All bolts shall be re-tightened prior to the application of sheathing or other finish materials.

3) Nails:
    a. As a minimum, all nailing shall be performed in accordance with the CBC Nailing Table 2304.10.1 unless otherwise noted on the project plans and structural details.
    b. All nails shall conform to “common” sizing unless otherwise noted on plans or details.
    c. Installation with pneumatic air gun requires the use of a flush nailer attachment for nailing of all structural shear wall, floor or roof sheathing.

4) Simpson Strong Tie Titen-HD heavy duty screw anchors:
    a. Titen-HD screw anchors may be used in-lieu of standard anchor bolts and shall match the diameter of the anchor bolt specified on the project plans.
    b. Titen-HD screw anchors shall be installed per all the manufacturer’s recommendations.
    c. Embedment depth into concrete shall be 4” (minimum) for standard anchor bolt replacement in shear wall bottom plate application.
    d. All other applications shall require embedment depth into concrete to be specified by Engineer.

5) Wedge Anchors:
    a. Simpson Strong Tie Wedge-All, Red Head Wedge Anchor or other similar code listed wedge anchors may be used in-lieu of standard anchor bolts <u>only</u> at connections of wall bottom plates. No other applications are permitted unless approved in writing by the Engineer.
    b. Wedge anchors shall be the same size diameter as the anchor bolts specified on the project plans.
    c. Embedment depth into concrete shall be 4” (minimum) for standard anchor bolt replacement in shear wall bottom plate application.

PROJECT PROFILE

Description: Analysis of a single story single family residence

Building Information:

Roof Pitch 1:	4	: 12	
Plate Height 1:	8.5	ft.	Entry/Kitchen
Plate Height 2:	10	ft.	E/W Wings
Plate Height 3:	11.5	ft.	Great Roon
Risk Category:		**II**	ASCE 7-16 Table 1.5-1
Importance Factor:	I =	**1**	ASCE 7-16 Table 1.5-2

Load Values:

Roof 1:	18	psf Dead	Roof Base Dead Load - Standing Seam Metal w/ 3psf Surcharge for Future Solar
	19.0	**psf Dead**	**Roof DL - Adjusted for Pitch**
	20	psf Live	4 : 12 pitch
Walls:	15	psf Dead	Exterior-Stucco
	8	psf Dead	Interior-Drywall

<u>Additional Structural Loads:</u>

Stucco Lid:	10	psf Dead	Lid at Eaves
Veneer:	15	psf Dead	Cultured Stone Veneer

Site Specific Design Information:

Geographic Coordinates: 35.624719° N & 120.793501° W

Soils Report By: GeoSolutions, Inc.
Report Dated: June 23,2021
Report Number: SL12244-1

Expansive Index: Low

Bearing Pressure: 1500 psf

S_{DS} =	0.852	SDC =	D	(From Geotech. Report)
S_{D1} =	0.496	Site Class =	C	(From Geotech. Report)

WIND PROFILE

** Design for the MWFRS as Defined by ASCE 7-16: Chapter 26 & Chapter 28 - Part 1

Velocity Pressure Analysis (q_z):

Velocity Pressure - ASCE7-16 Equation 26.10-1: $q_z = (0.00256)V^2K_zK_{zt}K_dK_e$ (#/ft^2)

Wind Exposure: C

V= 92 MPH

K_d= 0.85 From ASCE7-16 Table 26.6-1

K_{zt}= 1.00 From ASCE7-16 Sect. 26.8.2

K_e= 1.00 From ASCE7-16 Table 26.9-1

Define K_z (ASCE 7-16 Table 26.10-1): Heights referenced below rounded up to the nearest multiple of 5

$z_{\text{Roof Level}}$ = 15 ft

$z_{\text{Mean Roof Ht}}$ = 20 ft

$K_{z\text{ - Roof Level}}$ = 0.85

$K_{z\text{ - Mean Roof Ht}}$ = 0.9

$q_{z\text{ - Roof Level}}$= 15.7 (#/ft^2)

$q_{z\text{ - Mean Roof Ht}}$= 16.6 (#/ft^2)

Design Wind Pressure Analysis (p_z):

Design Wind Pressure - ASCE7-16 Equation 28.3-1: $p_z = q_z[(GC_{pf\text{-net}})-(GC_{pi})]$ (#/ft^2)

$GC_{pf\text{-net}} = [(GC_{pf\text{-Windward}})-(GC_{pf\text{-Leeward}})]$

Define Building Enclosure Classification - ASCE7-16 Table 26.13-1:

Enclosed or Partially Open Building	x
Partially Enclosed Building	
Open Building	

$(GC_{pi})= \pm$ 0.18 Internal Pressure Coefficient

Define $GC_{pf\text{-net}}$: Σ Windward and Leeward - ASCE7-16 Figure 28.3-1:

Wall Conditions: $GC_{pf\text{-net Walls}}$ = 1.04

Roof Pitch 1: 4 :12 $GC_{pf\text{-net Roof-1}}$ = -0.4

Define p_z (#/ft^2):

$p_{z\text{ - Roof Level}}$ = 19.1 psf

$p_{z\text{ - Roof Area}}$ = 9.614 psf

Analysis Assumptions:

1) Wind analysis conservatively incorporates external pressure coefficients (GC_{pf}) for edge/corner conditions across full wall and roof widths

2) Code defined minimum wind pressure of 8psf is used for roof wind analysis when roof wind pressure < 8 psf (ASCE7-16 - 28.3.4)

ROOF LEVEL E-W WIND LOADS

Lateral Wind Loads Governing Combination -ASCE7-16 Section 2.4.1, Combination 5: 0.6W

W (#) = Wind Loads Transverse to Building Ridge ($W_\perp$) + Wind Loads to Gable End Wall (W_{EW})

W (#) = [(Projected Roof Area)*$P_{net\text{-}Roof\ Area}$ + (Wall Area)*$P_{net\text{-}Roof\ Level}$] + [(Area of End Wall)*$P_{net\text{-}Roof\ Level}$]

Line A:

Plate Height = 10 ft

Tributary Dimensions: **Tributary Loads:**

	Areas Perpendicular to Ridge		Area of End Wall		Wind Load Perpendicular to Ridge		Wind Load to End Wall		Total Wind Load
	Height	Width	Height	Width	0.6*($W_\perp$)	+	0.6*(W_{EW})	=	0.6*($W_\perp$+W_{EW})
Projected Roof Area:	4 ft x	14 ft	(Roof area N/A)						
Wall Area:	5 ft x	11 ft	ft x	ft	953 #	+	0 #	=	**953** #

Line B:

Plate Height = 10 ft

Tributary Dimensions: **Tributary Loads:**

	Areas Perpendicular to Ridge		Area of End Wall		Wind Load Perpendicular to Ridge		Wind Load to End Wall		Total Wind Load
	Height	Width	Height	Width	0.6*($W_\perp$)	+	0.6*(W_{EW})	=	0.6*($W_\perp$+W_{EW})
Projected Roof Area:	4 ft x	12 ft	(Roof area N/A)						
Wall Area:	5 ft x	9 ft	ft x	ft	793 #	+	0 #	=	**793** #

Line B.8:

Plate Height = 10 ft

Tributary Dimensions: **Tributary Loads:**

	Areas Perpendicular to Ridge		Area of End Wall		Wind Load Perpendicular to Ridge		Wind Load to End Wall		Total Wind Load
	Height	Width	Height	Width	0.6*($W_\perp$)	+	0.6*(W_{EW})	=	0.6*($W_\perp$+W_{EW})
Projected Roof Area:	4 ft x	18 ft	(Roof area N/A)						
Wall Area:	5 ft x	18 ft	ft x	ft	1447 #	+	0 #	=	**1447** #

Line C:

Plate Height = 11.5 ft

Tributary Dimensions: **Tributary Loads:**

	Areas Perpendicular to Ridge		Area of End Wall		Wind Load Perpendicular to Ridge		Wind Load to End Wall		Total Wind Load
	Height	Width	Height	Width	0.6*($W_\perp$)	+	0.6*(W_{EW})	=	0.6*($W_\perp$+W_{EW})
Projected Roof Area:	5 ft x	13 ft	(Roof area N/A)						
Wall Area:	6 ft x	9 ft	ft x	ft	994 #	+	0 #	=	**994** #

Line D:

No Wind Loads into this Line

Plate Height = 8.5 ft

Line E:

No Wind Loads into this Line

Plate Height = 8.5 ft

ROOF LEVEL E-W WIND LOADS

Line F:

Plate Height = 10 ft

Tributary Dimensions: **Tributary Loads:**

	Areas Perpendicular to Ridge				Area of End Wall				Wind Load Perpendicular to Ridge			Wind Load to End Wall			Total Wind Load	
	Height		Width		Height		Width		$0.6^*(W_\perp)$		+	$0.6^*(W_{EW})$		=	$0.6^*(W_\perp+W_{EW})$	
Projected Roof Area:	5	ft x	25	ft	(Roof area N/A)											
Wall Area:	5	ft x	25	ft		ft x		ft	2153	#	+	0	#	=	**2153**	#

Line G:

No Wind Loads into this Line

Plate Height = 8.5 ft

Line H:

No Wind Loads into this Line

Plate Height = 8.5 ft

Line J:

Plate Height = 11.5 ft

Tributary Dimensions: **Tributary Loads:**

	Areas Perpendicular to Ridge				Area of End Wall				Wind Load Perpendicular to Ridge			Wind Load to End Wall			Total Wind Load	
	Height		Width		Height		Width		$0.6^*(W_\perp)$		+	$0.6^*(W_{EW})$		=	$0.6^*(W_\perp+W_{EW})$	
Projected Roof Area:	5	ft x	10	ft	(Roof area N/A)											
Wall Area:	6	ft x	6	ft		ft x		ft	701	#	+	0	#	=	**701**	#

Line K:

Plate Height = 10 ft

Tributary Dimensions: **Tributary Loads:**

	Areas Perpendicular to Ridge				Area of End Wall				Wind Load Perpendicular to Ridge			Wind Load to End Wall			Total Wind Load	
	Height		Width		Height		Width		$0.6^*(W_\perp)$		+	$0.6^*(W_{EW})$		=	$0.6^*(W_\perp+W_{EW})$	
Projected Roof Area:	4	ft x	10	ft	(Roof area N/A)											
Wall Area:	5	ft x	7	ft		ft x		ft	632	#	+	0	#	=	**632**	#

Line L:

Plate Height = 10 ft

Tributary Dimensions: **Tributary Loads:**

	Areas Perpendicular to Ridge				Area of End Wall				Wind Load Perpendicular to Ridge			Wind Load to End Wall			Total Wind Load	
	Height		Width		Height		Width		$0.6^*(W_\perp)$		+	$0.6^*(W_{EW})$		=	$0.6^*(W_\perp+W_{EW})$	
Projected Roof Area:	4	ft x	18.5	ft	(Roof area N/A)											
Wall Area:	5	ft x	15.5	ft		ft x		ft	1315	#	+	0	#	=	**1315**	#

ROOF LEVEL N-S WIND LOADS

Lateral Wind Loads Governing Combination -ASCE7-16 Section 2.4.1, Combination 5: 0.6W

W (#) = Wind Loads Transverse to Building Ridge ($W_{\perp}$) + Wind Loads to Gable End Wall (W_{EW})

W (#) = [(Projected Roof Area)*$P_{net\text{-}Roof\ Area}$ + (Wall Area)*$P_{net\text{-}Roof\ Level}$] + [(Area of End Wall)*$P_{net\text{-}Roof\ Level}$]

Line 1/2:

Plate Height = 10 ft

	Areas Perpendicular to Ridge Height		Width		Area of End Wall Height		Width		Wind Load Perpendicular to Ridge 0.6*($W_{\perp}$)		+	Wind Load to End Wall 0.6*(W_{EW})		=	Total Wind Load 0.6*($W_{\perp}$+W_{EW})	
Projected Roof Area:	3	ft x	15	ft	(Roof area N/A)											
Wall Area:	5	ft x	12	ft		ft x		ft	947	#	+	0	#	=	**947**	#

Line 3:

Plate Height = 10 ft

	Areas Perpendicular to Ridge Height		Width		Area of End Wall Height		Width		Wind Load Perpendicular to Ridge 0.6*($W_{\perp}$)		+	Wind Load to End Wall 0.6*(W_{EW})		=	Total Wind Load 0.6*($W_{\perp}$+W_{EW})	
Projected Roof Area:	3	ft x	16.5	ft	(Roof area N/A)											
Wall Area:	5	ft x	16.5	ft		ft x		ft	1231	#	+	0	#	=	**1231**	#

Line 4:

Plate Height = ### ft

	Areas Perpendicular to Ridge Height		Width		Area of End Wall Height		Width		Wind Load Perpendicular to Ridge 0.6*($W_{\perp}$)		+	Wind Load to End Wall 0.6*(W_{EW})		=	Total Wind Load 0.6*($W_{\perp}$+W_{EW})	
Projected Roof Area:	3	ft x	16.5	ft	(Roof area N/A)											
Wall Area:	5.5	ft x	16.5	ft		ft x		ft	1325	#	+	0	#	=	**1325**	#

Line 5:

Plate Height = ### ft

	Areas Perpendicular to Ridge Height		Width		Area of End Wall Height		Width		Wind Load Perpendicular to Ridge 0.6*($W_{\perp}$)		+	Wind Load to End Wall 0.6*(W_{EW})		=	Total Wind Load 0.6*($W_{\perp}$+W_{EW})	
Projected Roof Area:	3	ft x	18	ft	(Roof area N/A)											
Wall Area:	5.5	ft x	18	ft		ft x		ft	1446	#	+	0	#	=	**1446**	#

Line 6:

Plate Height = 10 ft

	Areas Perpendicular to Ridge Height		Width		Area of End Wall Height		Width		Wind Load Perpendicular to Ridge 0.6*($W_{\perp}$)		+	Wind Load to End Wall 0.6*(W_{EW})		=	Total Wind Load 0.6*($W_{\perp}$+W_{EW})	
Projected Roof Area:	3	ft x	12.5	ft	(Roof area N/A)											
Wall Area:	5	ft x	12.5	ft		ft x		ft	933	#	+	0	#	=	**933**	#

ROOF LEVEL N-S WIND LOADS

Line 7:

Plate Height = 10 ft

Tributary Dimensions: **Tributary Loads:**

	Areas Perpendicular to Ridge		Area of End Wall		Wind Load Perpendicular to Ridge		Wind Load to End Wall		Total Wind Load
	Height	Width	Height	Width	$0.6*(W_{\perp})$	+	$0.6*(W_{EW})$	=	$0.6*(W_{\perp}+W_{EW})$
Projected Roof Area:	3 ft x	10 ft	(Roof area N/A)						
Wall Area:	5 ft x	7 ft	ft x	ft	574 #	+	0 #	=	**574** #

STRUCTURE WEIGHTS

Roof:

Weight of structure into roof diaphragm

Element	Load		x	Tributary Area (ft^2)	=	Weight	
Roofing	19.0	psf	x	5030	=	95438	#
Exterior Wall	15	psf	x	2540	=	38100	#
Interior Wall	8	psf	x	1060	=	8480	#
Porch Lid	10	psf	x	1780	=	17800	#
Stone Veneer	15	psf	x	102	=	1530	#
				Total Weight of Roof	=	**161348**	#

Weight of Structure Into Lateral Force Restraining System = 161348 #

SEISMIC PROFILE

** The following equations are from the ASCE 7-16 Section 12.8

Terms:

Defined in ASCE 7-16 Section 12.8

C_t = 0.02
x = 0.75
h_{tot} = 18 ft
T_L = 8 s (Coast -->8, Inland of Mountains --> 12)

S_{DS} = 0.852
S_{D1} = 0.496
R = 6.5
I = 1

w = 161348 #
k = 1
ρ = 1.3

Design Base Shear:

ASCE 7-16 12.8.1 & 12.8.2

$T_a = C_t h_n^x$ = 0.175 s — Approximate Fundamental Period (EQ. 12.8-7)

For $T_a > T_L$: $C_{Smax} = S_{D1} / (T_a (R/I))$ = 0.437 — Maximum Seismic Response Coefficient (EQ. 12.8-3)

C_{Smin} = 0.01 — Minimum Seismic Response Coefficient (EQ. 12.8-5)

$C_S = S_{DS} / (R/I)$ = 0.131 — Seismic Response Coefficient (EQ. 12.8-2)

$C_{Smin} < C_S < C_{Smax}$ OKAY

$V = \rho\, C_S\, w$ = **27494** # — Base Shear with Assumed Redundancy (EQ. 12.8-1)

Vertical Distribution of Seismic Forces:

ASCE 7-16 12.8.3

$E_h = C_{vx} V$ Lateral Seismic Force (EQ. 12.8-11)

$$C_{vx} = \frac{w_x h_x^k}{\sum_{i=1}^{n} W_i h_i^k}$$ Vertical Distribution Factor (EQ. 12.8-12)

$E_{h\text{-}ASD} = 0.7 E_h$

Level	w_x (#)	h_x (ft)	$w_x h_x$ (#-ft)	C_{vx}	E_h (#)	E_h / w_x	$E_{h\text{-}ASD}$ (#)
Roof	161348	10	1613475	1.000	27494	0.170	19246
Sum	161348	----	1613475	1	27494	0.170	19246

ROOF LEVEL E-W SEISMIC LOAD ANALYSIS

Story Area = 3680 ft^2 Story Weight = 161348 # C_S = 0.131 F_x/w_x = 0.17 Story Shear = 19246 #

Check: Total Story Shear ≤ Sum of All Line Shear, $\sum V_i$

Story Shear	≤	$\sum V_i$	
19246 #	≤	19314 #	GOOD

Line A:

Line Shear = Story Shear x (Tributary Area (ft^2) / Story Area)

= 19246 # x (150 ft^2 / 3680 ft^2) = **784 #**

Line B:

Line Shear = Story Shear x (Tributary Area (ft^2) / Story Area)

= 19246 # x (160 ft^2 / 3680 ft^2) = **837 #**

Line B.8:

Line Shear = Story Shear x (Tributary Area (ft^2) / Story Area)

= 19246 # x (475 ft^2 / 3680 ft^2) = **2484 #**

Line C:

Line Shear = Story Shear x (Tributary Area (ft^2) / Story Area)

= 19246 # x (394 ft^2 / 3680 ft^2) = **2061 #**

Line D:

Line Shear = Story Shear x (Tributary Area (ft^2) / Story Area)

= 19246 # x (508 ft^2 / 3680 ft^2) = **2657 #**

Line E:

Seismic loads at this line distributed into adjacent gridlines

Line F:

Line Shear = Story Shear x (Tributary Area (ft^2) / Story Area)

= 19246 # x (700 ft^2 / 3680 ft^2) = **3661 #**

Line G:

Seismic loads at this line distributed into adjacent gridlines

Line H:

Line Shear = Story Shear x (Tributary Area (ft^2) / Story Area)

= 19246 # x (450 ft^2 / 3680 ft^2) = **2353 #**

ROOF LEVEL E-W SEISMIC LOAD ANALYSIS

Line J:

Line Shear =		**Story Shear**		**x (**	**Tributary Area (ft^2)**		**/**	**Story Area**		**)**	
	=	19246	#	x (	394	ft^2	/	3680	ft^2	) =	**2061** #

Line K:

Line Shear =		**Story Shear**		**x (**	**Tributary Area (ft^2)**		**/**	**Story Area**		**)**	
	=	19246	#	x (	90	ft^2	/	3680	ft^2	) =	**471** #

Line L:

Line Shear =		**Story Shear**		**x (**	**Tributary Area (ft^2)**		**/**	**Story Area**		**)**	
	=	19246	#	x (	372	ft^2	/	3680	ft^2	) =	**1945** #

ROOF LEVEL N-S SEISMIC LOAD ANALYSIS

Story Area = 3680 ft^2 Story Weight = 161348 # C_S = 0.131 F_x/w_x = 0.17 Story Shear = 19246 #

Check: Total Story Shear ≤ Sum of All Line Shear, $\sum V_i$

Story Shear	≤	$\sum V_i$	
19246 #	≤	19256 #	GOOD

Line 1/2:

Line Shear = Story Shear x (Tributary Area (ft^2) / Story Area)

= 19246 # x (768 ft^2 / 3680 ft^2) = **4016 #**

Line 3:

Line Shear = Story Shear x (Tributary Area (ft^2) / Story Area)

= 19246 # x (847 ft^2 / 3680 ft^2) = **4430 #**

Line 4:

Line Shear = Story Shear x (Tributary Area (ft^2) / Story Area)

= 19246 # x (473 ft^2 / 3680 ft^2) = **2474 #**

Line 5:

Line Shear = Story Shear x (Tributary Area (ft^2) / Story Area)

= 19246 # x (560 ft^2 / 3680 ft^2) = **2929 #**

Line 6:

Line Shear = Story Shear x (Tributary Area (ft^2) / Story Area)

= 19246 # x (600 ft^2 / 3680 ft^2) = **3138 #**

Line 7:

Line Shear = Story Shear x (Tributary Area (ft^2) / Story Area)

= 19246 # x (434 ft^2 / 3680 ft^2) = **2270 #**

Roof E-W Lateral Analysis & Drag Force

Line A:

Seismic loads increased by a factor of 1/((2w/h)) per AF&PA SDPWS 4.3.4.

Plate Height = 10 ft

[ ] Interior Cond. [X] Exterior Cond. [ ] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.): 3.75 9.75

Total Wall Length = 13.5 ft.
Shear Wall Length = 3.75 ft.

From Wind Design Analysis: Governs

Wind = --> = **953** #

From Seismic Design Analysis:

Seismic = Seismic @ Line A x Increase per AF&PA SDPWS 4.3.4

Seismic = **784** # x 1.33 = **1046** #

Diaph. Shear = 77 plf | Line Shear = 77 plf | **Wall Shear = 279 plf** | Net Shear = -201 plf

M_{RES} = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x $L_{min}/2$

= -0.6 [(18.97 psf x 2 x 7.75)+(15 psf x 3.75 x 5)

+(20 psf x x 7.75)+(18.97 psf x x 7.75)] x 1.9 = **-647 ft-#**

M_{OT} = wall shear x L_{min} x H_{plate} = 278.9 plf x 3.75 x 10 ---------------> = **10460 ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{10460 \text{ ft-\#} + -647 \text{ ft-\#}}{3.25}$ -----------------> = **3020** #

Shear Panel: 2 Holdown & Post: HDU2-SDS2.5 and Dbl 2x Studs Sheathing: (1) 3'-9" wall

Note: H:W ratio at shear walls addressed through seismic increase.

Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	3.75	9.75	0	0	0	0	0	0	0	0	0	0	0
Drag Force:	-755	0	0	0	0	0	0	0	0	0	0	0	0

Maximum Drag = 755 #

Provide (6) 16d nails

Line B:

Plate Height = 10 ft

[ ] Interior Cond. [X] Exterior Cond. [ ] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.): 5 6.5 10.5

Total Wall Length = 22 ft.
Shear Wall Length = 6.5 ft.

From Wind Design Analysis:

Wind = --> = **793** #

From Seismic Design Analysis: Governs

Seismic = --------------------------------------> = **837** #

Diaph. Shear = 38 plf | Line Shear = 38 plf | **Wall Shear = 129 plf** | Net Shear = -91 plf

M_{RES} = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x $L_{min}/2$

= -0.6 [(18.97 psf x 4 x 10.5)+(15 psf x 6.5 x 5)

+(20 psf x x 10.5)+(18.97 psf x x 10.5)] x 3.3 = **-2505 ft-#**

M_{OT} = wall shear x L_{min} x H_{plate} = 128.7 plf x 6.5 x 10 ---------------> = **8368 ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{8368 \text{ ft-\#} + -2505 \text{ ft-\#}}{6.5}$ -----------------> = **903** #

Shear Panel: 1 Holdown & Post: HDU2-SDS2.5 and Dbl 2x Studs Sheathing: (1) 6'-6" wall

Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	0	5	6.5	10.5	0	0	0	0	0	0	0	0	0
Drag Force:	0	190	-399	0	0	0	0	0	0	0	0	0	0

Maximum Drag = 399 #

Provide (3) 16d nails

Roof E-W Lateral Analysis & Drag Force

Line B.8:

Plate Height = 10 ft

[ ] Interior Cond. [X] Exterior Cond. [ ] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.): 4 | 14 | 4

Total Wall Length = 22 ft.
Shear Wall Length = 14 ft.

From Wind Design Analysis:

Wind = --> = **1447** #

From Seismic Design Analysis: Governs

Seismic = --------------------------------------> = **2484** #

Diaph. Shear = 113 plf | Line Shear = 113 plf | **Wall Shear = 177 plf** | Net Shear = -65 plf

M_{RES} = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x L_{min}/2

= -0.6 [(18.97 psf x 2 x 18)+(15 psf x 14 x 5)

+(20 psf x x 18)+(18.97 psf x x 18)] x 7 = **-7279 ft-#**

M_{OT} = wall shear x L_{min} x H_{plate} = 177.4 plf x 14 x 10 ---------------> = **24841 ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{24841 \text{ ft-\#} + -7279 \text{ ft-\#}}{14}$ ------------------> = **1255** #

Shear Panel: 1 | Holdown & Post: HDU2-SDS2.5 and Dbl 2x Studs | Sheathing: (1) 14' wall

Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	0	4	14	4	0	0	0	0	0	0	0	0	0
Drag Force:	0	452	-452	0	0	0	0	0	0	0	0	0	0

Maximum Drag = 452 #

Provide (4) 16d nails

Line C:

Plate Height = 11.5 ft

[ ] Interior Cond. [X] Exterior Cond. [ ] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.): 5.75 | 13 | 5.75

Total Wall Length = 24.5 ft.
Shear Wall Length = 11.5 ft.

From Wind Design Analysis:

Wind = --> = **994** #

From Seismic Design Analysis: Governs

Seismic = --------------------------------------> = **2061** #

Diaph. Shear = 84 plf | Line Shear = 84 plf | **Wall Shear = 179 plf** | Net Shear = -95 plf

M_{RES} = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x L_{min}/2

= -0.6 [(18.97 psf x 2 x 9.75)+(15 psf x 5.75 x 0)

+(20 psf x x 9.75)+(18.97 psf x x 9.75)] x 2.9 = **-638 ft-#**

M_{OT} = wall shear x L_{min} x H_{plate} = 179.2 plf x 5.75 x 0 ---------------> = **0 ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{0 \text{ ft-\#} + -638 \text{ ft-\#}}{5.75}$ ------------------> = **-111** #

Shear Panel: 1 | Holdown & Post: HDU2-SDS2.5 and 4x DF#2 Posts | Sheathing: (2) 5'-9" walls

Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	5.75	13	5.75	0	0	0	0	0	0	0	0	0	0
Drag Force:	-547	547	0	0	0	0	0	0	0	0	0	0	0

Maximum Drag = 547 #

Provide (4) 16d nails

Roof E-W Lateral Analysis & Drag Force

Line D:

Seismic loads increased by a factor of 1/((2w/h)) per AF&PA SDPWS 4.3.4. Plate Height = 8.5 ft

[ ] Interior Cond. [X] Exterior Cond. [ ] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.): 3 | 9 | 3.6

Total Wall Length = 15.6 ft.
Shear Wall Length = 6.6 ft.

From Wind Design Analysis:

Wind = --> = **0** #

From Seismic Design Analysis: Governs

Seismic = Seismic @ Line D x Increase per AF&PA SDPWS 4.3.4

Seismic = **2657** # x 1.42 = **3764** #

Diaph. Shear = 241 plf | Line Shear = 241 plf | **Wall Shear = 570 plf** | Net Shear = -329 plf

M_{RES} = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x $L_{min}/2$

= -0.6 [(18.97 psf x 14 x 7)+(15 psf x 3 x 4.25)

+(20 psf x x 7)+(18.97 psf x x 7)] x 1.5 = **-1846 ft-#**

M_{OT} = wall shear x L_{min} x H_{plate} = 570.3 plf x 3 x 8.5 ---------------> = **14542 ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{14542 \text{ ft-\#} + -1846 \text{ ft-\#}}{2.5}$ -----------------> = **5079** #

Shear Panel: 4 | Holdown & Post: HDU5-SDS2.5 and 4x DF#2 posts | Sheathing: (1) 3' and (1) 3'-8" wall

Note: H:W ratio at shear walls addressed through seismic increase and framing detailing.

Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	3	9	3.6	0	0	0	0	0	0	0	0	0	0
Drag Force:	-987	1184	0	0	0	0	0	0	0	0	0	0	0

Maximum Drag = 1184 #

Provide (9) 16d nails

Line E:

Lateral loads at this line distributed into adjacent gridlines Plate Height = 8.5 ft

Line F:

Plate Height = 10 ft

[ ] Interior Cond. [X] Exterior Cond. [ ] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.): | 3 | 15 | 6

Total Wall Length = 24 ft.
Shear Wall Length = 15 ft.

From Wind Design Analysis:

Wind = --> = **2153** #

From Seismic Design Analysis: Governs

Seismic = --------------------------------------> = **3661** #

Diaph. Shear = 153 plf | Line Shear = 153 plf | **Wall Shear = 244 plf** | Net Shear = -92 plf

M_{RES} = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x $L_{min}/2$

= -0.6 [(18.97 psf x 2 x 19)+(15 psf x 15 x 5)

+(20 psf x x 19)+(18.97 psf x x 19)] x 7.5 = **-8307 ft-#**

M_{OT} = wall shear x L_{min} x H_{plate} = 244.1 plf x 15 x 10 ---------------> = **36608 ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{36608 \text{ ft-\#} + -8307 \text{ ft-\#}}{15}$ -----------------> = **1887** #

Shear Panel: 1 | Holdown & Post: HDU2-SDS2.5 and Dbl 2x Studs | Sheathing: (1) 15' wall

Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	0	3	15	6	0	0	0	0	0	0	0	0	0
Drag Force:	0	458	-915	0	0	0	0	0	0	0	0	0	0

Maximum Drag = 915 #

Provide (7) 16d nails

Roof E-W Lateral Analysis & Drag Force

Line G: Lateral loads at this line distributed into adjacent gridlines

Plate Height = 8.5 ft

Line H: Seismic loads increased by a factor of 1/((2w/h)) per AF&PA SDPWS 4.3.4.

Plate Height = 8.5 ft

[ ] Interior Cond. [X] Exterior Cond. [ ] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.): 6.5 | 4.5 | 3.5 | 9.5 | 2.75

Total Wall Length = 26.75 ft.
Shear Wall Length = 12.75 ft.

From Wind Design Analysis:

Wind = ---> = 0 #

From Seismic Design Analysis: Governs

Seismic = Seismic @ Line H x Increase per AF&PA SDPWS 4.3.4

Seismic = 2353 # x 1.55 = 3637 #

Diaph. Shear = 136 plf	Line Shear = 136 plf	**Wall Shear = 285 plf**	Net Shear = -149 plf

M_{RES} = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x L_{min}/2

= -0.6 [(18.97 psf x 2 x 6.75)+(15 psf x 2.75 x 4.25)

+(20 psf x x 6.75)+(18.97 psf x x 6.75)] x 1.4 = **-356 ft-#**

M_{OT} = wall shear x L_{min} x H_{plate} = 285.3 plf x 2.75 x 8.5 ---------------> = **6668 ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{6668 \text{ ft-\#} + -356 \text{ ft-\#}}{2.25}$ ------------------> = **2806 #**

Shear Panel: 2 Holdown & Post: HDU2-SDS2.5 and Dbl 2x Studs Sheathing: (1) 6-6" (1) 3'-6" and (1) 2'-9" wall

Note: H:W ratio at shear walls addressed through seismic increase. Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	6.5	4.5	3.5	9.5	2.75	0	0	0	0	0	0	0	0
Drag Force:	-970	-359	-881	411	0	0	0	0	0	0	0	0	0

Maximum Drag = 970 #

Provide (7) 16d nails

Line J:

Plate Height = 11.5 ft

[ ] Interior Cond. [X] Exterior Cond. [ ] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.): 5.75 | 13 | 5.75

Total Wall Length = 24.5 ft.
Shear Wall Length = 11.5 ft.

From Wind Design Analysis:

Wind = ---> = 701 #

From Seismic Design Analysis: Governs

Seismic = --------------------------------------> = 2061 #

Diaph. Shear = 84 plf	Line Shear = 84 plf	**Wall Shear = 179 plf**	Net Shear = -95 plf

M_{RES} = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x L_{min}/2

= -0.6 [(18.97 psf x 2 x 9.75)+(15 psf x 5.75 x 5.75)

+(20 psf x x 9.75)+(18.97 psf x x 9.75)] x 2.9 = **-1494 ft-#**

M_{OT} = wall shear x L_{min} x H_{plate} = 179.2 plf x 5.75 x 12 ---------------> = **11848 ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{11848 \text{ ft-\#} + -1494 \text{ ft-\#}}{5.75}$ ------------------> = **1801 #**

Shear Panel: 1 Holdown & Post: HDU2-SDS2.5 and 4x DF#2 Posts Sheathing: (2) 5'-9" walls

Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	5.75	13	5.75	0	0	0	0	0	0	0	0	0	0
Drag Force:	-547	547	0	0	0	0	0	0	0	0	0	0	0

Maximum Drag = 547 #

Provide (4) 16d nails

Roof E-W Lateral Analysis & Drag Force

Line K:

Seismic loads increased by a factor of 1/((2w/h)) per AF&PA SDPWS 4.3.4.

Plate Height = 10 ft

[ ] Interior Cond. [X] Exterior Cond. [ ] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.): 3.75 9.75

Total Wall Length = 13.5 ft.
Shear Wall Length = 3.75 ft.

From Wind Design Analysis: Governs

Wind = ---> = **632** #

From Seismic Design Analysis:

Seismic = Seismic @ Line K x Increase per AF&PA SDPWS 4.3.4

Seismic = **471** # x 1.33 = **628** #

Diaph. Shear = 47 plf | Line Shear = 47 plf | **Wall Shear = 168 plf** | Net Shear = -122 plf

M_{RES} = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x $L_{min}/2$

= -0.6 [(18.97 psf x 2 x 7.75)+(15 psf x 3.75 x 5)

+(20 psf x x 7.75)+(18.97 psf x x 7.75)] x 1.9 = **-647 ft-#**

M_{OT} = wall shear x L_{min} x H_{plate} = 168.5 plf x 3.75 x 10 ---------------> = **6318 ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{6318 \text{ ft-\#} + -647 \text{ ft-\#}}{3.25}$ ------------------> = **1745 #**

Shear Panel: 1 Holdown & Post: HDU2-SDS2.5 and Dbl 2x Studs Sheathing: (1) 3'-9" wall

Note: H:W ratio at shear walls addressed through seismic increase.

Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	3.75	9.75	0	0	0	0	0	0	0	0	0	0	0
Drag Force:	-456	0	0	0	0	0	0	0	0	0	0	0	0

Maximum Drag = 456 #

Provide (4) 16d nails

Line L:

Plate Height = 10 ft

[ ] Interior Cond. [X] Exterior Cond. [ ] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.): 7 10.5 6.5

Total Wall Length = 24 ft.
Shear Wall Length = 13.5 ft.

From Wind Design Analysis:

Wind = ---> = **1315** #

From Seismic Design Analysis: Governs

Seismic = ---------------------------------------> = **1945** #

Diaph. Shear = 81 plf | Line Shear = 81 plf | **Wall Shear = 144 plf** | Net Shear = -63 plf

M_{RES} = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x $L_{min}/2$

= -0.6 [(18.97 psf x 2 x 10.5)+(15 psf x 6.5 x 5)

+(20 psf x x 10.5)+(18.97 psf x x 10.5)] x 3.3 = **-1728 ft-#**

M_{OT} = wall shear x L_{min} x H_{plate} = 144.1 plf x 6.5 x 10 ---------------> = **9367 ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{9367 \text{ ft-\#} + -1728 \text{ ft-\#}}{6.5}$ ------------------> = **1176 #**

Shear Panel: 1 Holdown & Post: HDU2-SDS2.5 and Dbl 2x Studs Sheathing: (1) 7' and (1) 6'-6" wall

Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	7	10.5	6.5	0	0	0	0	0	0	0	0	0	0
Drag Force:	-441	410	0	0	0	0	0	0	0	0	0	0	0

Maximum Drag = 441 #

Provide (4) 16d nails

Roof N-S Lateral Analysis & Drag Force

Line 1/2:

Plate Height = 10 ft

[ ] Interior Cond. [X] Exterior Cond. [X] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.): 6 | 18.5 | 6 | 21 | 7 | 8.5

Total Wall Length = 67 ft.
Shear Wall Length = 19 ft.

From Wind Design Analysis:

Wind = --> = **947 #**

Diaph. Shear = 60 plf | Line Shear = 60 plf

From Seismic Design Analysis: Governs

Seismic = --------------------------------------> = **4016 #**

Wall Shear = 211 plf | Net Shear = -151 plf

M_{RES} = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x $L_{min}/2$

= -0.6 [(18.97 psf x 2 x 10)+(15 psf x 6 x 5)

+(20 psf x x 10)+(18.97 psf x x 10)] x 3 = **-1493 ft-#**

M_{OT} = wall shear x L_{min} x H_{plate} = 211.4 plf x 6 x 10 ---------------> = **12684 ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{12684 \text{ ft-\#} + -1493 \text{ ft-\#}}{6}$ -----------------> = **1866 #**

Shear Panel: 1 | Holdown & Post: HDU2-SDS2.5 and Dbl 2x Studs | Sheathing: (2) 6' and (1) 7' wall

Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	6	18.5	6	21	7	8.5	0	0	0	0	0	0	0
Drag Force:	-909	200	-708	551	-510	0	0	0	0	0	0	0	0

Maximum Drag = 1136 #

Provide (9) 16d nails

** Design drag loads have been increased 25% for loading into collectors and connectors, due to horizontal irregularity Type 2

Line 3:

Plate Height = 10 ft

[ ] Interior Cond. [X] Exterior Cond. [ ] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.): 10 | 16 | 7 | 19 | 7 | 8

Total Wall Length = 67 ft.
Shear Wall Length = 24 ft.

From Wind Design Analysis:

Wind = --> = **1231 #**

Diaph. Shear = 66 plf | Line Shear = 66 plf

From Seismic Design Analysis: Governs

Seismic = --------------------------------------> = **4430 #**

Wall Shear = 185 plf | Net Shear = -118 plf

M_{RES} = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x $L_{min}/2$

= -0.6 [(18.97 psf x 2 x 11)+(15 psf x 7 x 5)

+(20 psf x 2 x 11)+(18.97 psf x 2 x 11)] x 3.5 = **-3780 ft-#**

M_{OT} = wall shear x L_{min} x H_{plate} = 184.6 plf x 7 x 10 ---------------> = **12920 ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{12920 \text{ ft-\#} + -3780 \text{ ft-\#}}{7}$ -----------------> = **1306 #**

Shear Panel: 1 | Holdown & Post: HDU2-SDS2.5 and Dbl 2x Studs | Sheathing: (1) 8' and (2) 7' walls

Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	10	16	7	19	7	8	0	0	0	0	0	0	0
Drag Force:	-1185	-127	-956	300	-529	0	0	0	0	0	0	0	0

Maximum Drag = 1185 #

Provide (9) 16d nails

Roof N-S Lateral Analysis & Drag Force

Line 4:

Plate Height = 10 ft

[ ] Interior Cond. [X] Exterior Cond. [ ] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.): 6 19 8

Total Wall Length = 33 ft.
Shear Wall Length = 14 ft.

From Wind Design Analysis:

Wind = --> = **1325** **#**

From Seismic Design Analysis: Governs

Seismic = --------------------------------------> = **2474** **#**

Diaph. Shear = 75 plf	Line Shear = 75 plf	**Wall Shear = 177 plf**	Net Shear = -102 plf

$\mathbf{M_{RES}}$ = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x $L_{min}/2$

= -0.6 [(18.97 psf x 2 x 10)+(15 psf x 6 x 5)

+(20 psf x x 10)+(18.97 psf x x 10)] x 3 = **-1493** **ft-#**

$\mathbf{M_{OT}}$ = wall shear x L_{min} x H_{plate} = 176.7 plf x 6 x 10 ---------------> = **10601** **ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{10601 \text{ ft-\#} + -1493 \text{ ft-\#}}{6}$ ------------------> = **1519** **#**

Shear Panel: 1 Holdown & Post: HDU2-SDS2.5 and 4x6 DF#2 Posts Sheathing: (1) 6' and (1) 8' wall

Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	6	19	8	0	0	0	0	0	0	0	0	0	0	**Maximum Drag =**	**814**	**#**
Drag Force:	-610	814	0	0	0	0	0	0	0	0	0	0	0	**Provide (6) 16d nails**		

Line 5:

Seismic loads increased by a factor of 1/((2w/h)) per AF&PA SDPWS 4.3.4.

Plate Height = 10 ft

[ ] Interior Cond. [X] Exterior Cond. [ ] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.): 4 24 4

Total Wall Length = 32 ft.
Shear Wall Length = 8 ft.

From Wind Design Analysis:

Wind = --> = **1446** **#**

From Seismic Design Analysis: Governs

Seismic = Seismic @ Line 5 x Increase per AF&PA SDPWS 4.3.4

Seismic = **2929** **#** x 1.25 = **3661** **#**

Diaph. Shear = 114 plf	Line Shear = 114 plf	**Wall Shear = 458 plf**	Net Shear = -343 plf

$\mathbf{M_{RES}}$ = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x $L_{min}/2$

= -0.6 [(18.97 psf x 2 x 8)+(15 psf x 4 x 5)

+(20 psf x x 8)+(18.97 psf x x 8)] x 2 = **-724** **ft-#**

$\mathbf{M_{OT}}$ = wall shear x L_{min} x H_{plate} = 457.6 plf x 4 x 10 ---------------> = **18304** **ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{18304 \text{ ft-\#} + -724 \text{ ft-\#}}{3.5}$ ------------------> = **5023** **#**

Shear Panel: 3 Holdown & Post: HDU5-SDS2.5 and 4x DF#2 posts Sheathing: (2) 4' walls

Note: H:W ratio at shear walls addressed through seismic increase.

Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	4	24	4	0	0	0	0	0	0	0	0	0	0	**Maximum Drag =**	**1373**	**#**
Drag Force:	-1373	1373	0	0	0	0	0	0	0	0	0	0	0	**Provide (10) 16d nails**		

Roof N-S Lateral Analysis & Drag Force

Line 6:

Plate Height = 10 ft

[ ] Interior Cond. [X] Exterior Cond. [ ] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.):		7	6.6	37	8	5.7							

Total Wall Length = 64.3 ft.
Shear Wall Length = 14.6 ft.

From Wind Design Analysis:

Wind = --> = **933** #

From Seismic Design Analysis: Governs

Seismic = --------------------------------------> = **3138** #

Diaph. Shear = 49 plf | Line Shear = 49 plf | **Wall Shear = 215 plf** | Net Shear = -166 plf

M_{RES} = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x $L_{min}/2$

= -0.6 [(18.97 psf x 2 x 10.6)+(15 psf x 6.6 x 5)

+(20 psf x 2 x 10.6)+(18.97 psf x 2 x 10.6)] x 3.3 = **-3412 ft-#**

M_{OT} = wall shear x L_{min} x H_{plate} = 214.9 plf x 6.6 x 10 ---------------> = **14185 ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{14185 \text{ ft-\#} + -3412 \text{ ft-\#}}{6.6}$ -----------------> = **1633** #

Shear Panel: 1 | Holdown & Post: HDU2-SDS2.5 and Dbl 2x Studs | Sheathing: (1) 6'-8" and (1) 8' wall

Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	0	7	6.6	37	8	5.7	0	0	0	0	0	0	0
Drag Force:	0	342	-755	1051	-278	0	0	0	0	0	0	0	0

Maximum Drag = 1051 #

Provide (8) 16d nails

Line 7:

Plate Height = 10 ft

[ ] Interior Cond. [X] Exterior Cond. [ ] Horizontal Irregularity (ASCE 7-16 Table 12.3-1)

Walls (ft.):	12	44	8										

Total Wall Length = 64 ft.
Shear Wall Length = 20 ft.

From Wind Design Analysis:

Wind = --> = **574** #

From Seismic Design Analysis: Governs

Seismic = --------------------------------------> = **2270** #

Diaph. Shear = 35 plf | Line Shear = 35 plf | **Wall Shear = 113 plf** | Net Shear = -78 plf

M_{RES} = (0.6) x [(roof load) + (wall load) + (floor load) + (additional loads)] x $L_{min}/2$

= -0.6 [(18.97 psf x 2 x 12)+(15 psf x 8 x 5)

+(20 psf x x 12)+(18.97 psf x x 12)] x 4 = **-2533 ft-#**

M_{OT} = wall shear x L_{min} x H_{plate} = 113.5 plf x 8 x 10 ---------------> = **9079 ft-#**

Holdown = $\frac{M_{OT} - M_{RES}}{L_{min}}$ = $\frac{9079 \text{ ft-\#} + -2533 \text{ ft-\#}}{8}$ -----------------> = **819** #

Shear Panel: 1 | Holdown & Post: HDU2-SDS2.5 and Dbl 2x Studs | Sheathing: (1) 12' and (1) 8' wall

Grade Beam Uplift Check: Use typical footing per concrete note.

Walls (ft.):	12	44	8	0	0	0	0	0	0	0	0	0	0
Drag Force:	-936	624	0	0	0	0	0	0	0	0	0	0	0

Maximum Drag = 936 #

Provide (7) 16d nails

SHEAR WALL SCHEDULE

MARK	SHEATHING[8]	STUDS @ PANEL EDGES	NAILING (E.N. F.N.)	SILL PLATE	TOP PLATE CONNECTOR[7]	SILL PLATE CONNECTION AT SUBFLOOR	ANCHOR BOLTS AT FOUNDATION
1	15/32" PLY (ONE SIDE)	Dbl 2x	8d @ 6 - 12	2x	A35 @ 18" o/c or 16d @ 6"o/c ‡	SDS1/4 x 4 1/2" Screws @ 12" o/c	5/8" DIAMETER @ 48"o/c See note 5
2	15/32" PLY (ONE SIDE)	Dbl 2x	8d @ 4 - 12	2x	A35 @ 16" o/c or 16d @ 4"o/c ‡	SDS1/4 x 4 1/2" Screws @ 9" o/c	5/8" DIAMETER @ 32"o/c See note 5
3 †	15/32" PLY (ONE SIDE)	3x (Min)	8d @ 3 - 12	3x	A35 @ 9" o/c or 16d @ 3"o/c ‡	SDS1/4 x 6" Screws @ 8" o/c	5/8" DIAMETER @ 18"o/c See note 5
4 †	15/32" PLY (ONE SIDE)	3x (Min)	10d @ 3 - 12	3x	A35 @ 9" o/c	SDS1/4 x 6" Screws @ 6" o/c	5/8" DIAMETER @ 12"o/c See note 5
5 †	19/32" PLY (ONE SIDE)	3x (Min)	10d @ 2 - 12	3x	A35 @ 6" o/c	SDS1/4 x 6" Screws @ 4" o/c	5/8" DIAMETER @ 10"o/c See note 5

KEY

† Studs shall be 3x minimum @ panel edges, use 3x p.t.d.f. bottom plate, stagger nails @ double top plate and panel edges.

‡ Provide 16d nails for pressure blocking connections to bottom chord of truss or top plate

NOTES

1 All walls to be fully blocked.
2 All nails specified are common. Where "air-gun" nailing is used, care shall be taken to use true common nail equivalents.
3 Refer to "Vertical Diaphragm Notes" for material and application specifications.
4 For walls which bear trusses; one H-1 clip, from truss to top plate, may be used in place of one A35 top plate connector.
5 Provide Simpson BP5/8-3 bearing plate at all 5/8" dia anchor bolts, or BPS5/8-3 to allow for slotted condition.
6 Use LTP4 or RBC @ 3x sill plate to rim joist or solid blocking. Use spacing as per A35 under "Top Plate Connector".
7 Ok to use RBC in lieu of A35 @ truss/rafter blocking to top plate connections.
8 Structural design for wood structural panels based on DOC PS-1 and PS-2 or wood structural panel design properties given in the *APA Panel Design Specification* Plywood Sheathing, 24/0 panel index rated OSB or CDX ply.

Roof Level Vertical Analysis

Beam 1: Typical Header- 3' Max Span

Simple Span: 3 ft.

Uniform Loads:

ω_{DL} = 19 psf x 11 + 10 psf x 5 = 259 plf
ω_{LL} = 20 psf x 11 = 220 plf
ω_{TL} = ω_{DL} + ω_{LL} = 479 plf

Reactions:

R_{LEFT} = $R_{DL,LT}$ + $R_{LL,LT}$ = **388 # + 330 # = 718 #**
R_{RIGHT} = $R_{DL,RT}$ + $R_{LL,RT}$ = **388 # + 330 # = 718 #**

Use 6x6 DF#1 Beam

Left Support: Use Single 2x Trimmer
Right Support: Use Single 2x Trimmer

Beam 2: Typical Header- 6' Max Span

Simple Span: 6 ft.

Uniform Loads:

ω_{DL} = 19 psf x 11 + 10 psf x 4 = 249 plf
ω_{LL} = 20 psf x 11 = 220 plf
ω_{TL} = ω_{DL} + ω_{LL} = 469 plf

Point Loads: (Referenced from the left end of beam)

P_{DL} = 665 # at 3 ft.
P_{LL} = 700 #

Reactions:

R_{LEFT} = $R_{DL,LT}$ + $R_{LL,LT}$ = **1079 # + 1010 # = 2089 #**
R_{RIGHT} = $R_{DL,RT}$ + $R_{LL,RT}$ = **1079 # + 1010 # = 2089 #**

Use 6x8 DF#1 Beam

Left Support: Use Single 2x Trimmer
Right Support: Use Single 2x Trimmer

Roof Level Vertical Analysis

Beam 3: Kitchen Header-9' Max Span

Simple Span: 9 ft.

Uniform Loads:

ω_{DL} = 19 psf x 14 + 30 psf x 4 = 386 plf
ω_{LL} = 20 psf x 14 = 280 plf
ω_{TL} = ω_{DL} + ω_{LL} = 666 plf

Reactions:

R_{LEFT} = $R_{DL,LT}$ + $R_{LL,LT}$ = **1735 # + 1260 # = 2995 #**
R_{RIGHT} = $R_{DL,RT}$ + $R_{LL,RT}$ = **1735 # + 1260 # = 2995 #**

Use 6x10 DF#1 Beam

Left Support: Use 4x6 DF# 2
Right Support: Use 4x6 DF# 2

Beam 4: Great Room Flush Set Beam

Simple Span: 12 ft.

Uniform Loads:

ω_{DL} = 19 psf x 10 + 10 psf x 4 = 230 plf
ω_{LL} = 20 psf x 10 = 200 plf
ω_{TL} = ω_{DL} + ω_{LL} = 430 plf

Reactions:

R_{LEFT} = $R_{DL,LT}$ + $R_{LL,LT}$ = **1378 # + 1200 # = 2578 #**
R_{RIGHT} = $R_{DL,RT}$ + $R_{LL,RT}$ = **1378 # + 1200 # = 2578 #**

Use 6x10 DF#1 Beam

Left Support: Use 4x6 DF# 2
Right Support: Use 4x6 DF# 2

Roof Level Vertical Analysis

Beam 5: Garage Door Header

Simple Span: 18 ft.

Uniform Loads:

ω_{DL} = 19 psf x 12 + 10 psf x 3 + 15 psf x 3 = 303 plf
ω_{LL} = 20 psf x 12 = 240 plf
ω_{TL} = ω_{DL} + ω_{LL} = 543 plf

Point Loads: (Referenced from the left end of beam)

P_{DL} = 1330 # at 4.5 ft.
P_{LL} = 1400 #

Reactions:

R_{LEFT} = $R_{DL, LT}$ + $R_{LL, LT}$ = **3722** # + **3210** # = **6932** #

R_{RIGHT} = $R_{DL, RT}$ + $R_{LL, RT}$ = **3057** # + **2510** # = **5567** #

Use 5 1/8" x 15" 24F-V4 DF/DF GLB

Left Support: **Use 4x6 DF# 2**
Right Support: **Use 4x6 DF# 2**

Beam 6: Roof support beam @ Line 5

Simple Span: 24 ft.

Uniform Loads:

ω_{DL} = 19 psf x 18 + 10 psf x 6 = 402 plf
ω_{LL} = 20 psf x 18 = 360 plf
ω_{TL} = ω_{DL} + ω_{LL} = 762 plf

Point Loads: (Referenced from the left end of beam)

P_{DL} = 800 # at 5.5 ft. P_{DL} = 800 # at 19 ft.
P_{LL} = 800 # P_{LL} = 800 #

Reactions:

R_{LEFT} = $R_{DL, LT}$ + $R_{LL, LT}$ = **5900** # + **5120** # = **11020** #

R_{RIGHT} = $R_{DL, RT}$ + $R_{LL, RT}$ = **5900** # + **5120** # = **11020** #

Use 5 1/8" x 21" 24F-V4 DF/DF GLB

Left Support: **Use 4x6 DF# 2**
Right Support: **Use 4x6 DF# 2**

Beam 7: Entry Cantilever Support Beam

Simple Span: 9 ft.

Uniform Loads:

ω_{DL} = 19 psf x 2.5 = 47 plf
ω_{LL} = 20 psf x 2.5 = 50 plf
ω_{TL} = ω_{DL} + ω_{LL} = 97 plf

Reactions:

R_{LEFT} = $R_{DL, LT}$ + $R_{LL, LT}$ = **213** # + **225** # = **438** #

R_{RIGHT} = $R_{DL, RT}$ + $R_{LL, RT}$ = **213** # + **225** # = **438** #

Use (2) 1 3/4" x 14" 2.0E LVL

Left Support: **Use 4x4 DF# 2**
Right Support: **Use 4x4 DF# 2**

Roof Level Vertical Analysis

Beam 8: Typical Header- Max Span 3' w/ GT Support — Simple Span: 3 ft.

Uniform Loads:

ω_{DL} = 19 psf x 11 + 10 psf x 5 = 259 plf
ω_{LL} = 20 psf x 11 = 220 plf
ω_{TL} = ω_{DL} + ω_{LL} = 479 plf

Point Loads: (Referenced from the left end of beam)

P_{DL} = 1250 # at 1.5 ft.
P_{LL} = 1000 #

Reactions:

R_{LEFT} = $R_{DL, LT}$ + $R_{LL, LT}$ = **1013 #** + **830 #** = **1843 #**
R_{RIGHT} = $R_{DL, RT}$ + $R_{LL, RT}$ = **1013 #** + **830 #** = **1843 #**

Use 6x6 DF#1 Beam

Left Support: Use Single 2x Trimmer
Right Support: Use Single 2x Trimmer

Beam 9: Great Room Lower Header — Simple Span: 12 ft.

Uniform Loads:

ω_{DL} = 19 psf x 10 + 10 psf x 4 = 230 plf
ω_{LL} = 20 psf x 10 = 200 plf
ω_{TL} = ω_{DL} + ω_{LL} = 430 plf

Reactions:

R_{LEFT} = $R_{DL, LT}$ + $R_{LL, LT}$ = **1378 #** + **1200 #** = **2578 #**
R_{RIGHT} = $R_{DL, RT}$ + $R_{LL, RT}$ = **1378 #** + **1200 #** = **2578 #**

Use 6x10 DF#1 Beam

Left Support: Use 4x6 DF# 2
Right Support: Use 4x6 DF# 2

Beam 10: Entry/Kitchen Rafters — Simple Span: 29 ft.

Uniform Loads:

ω_{DL} = 19 psf x 2 = 38 plf
ω_{LL} = 20 psf x 2 = 40 plf
ω_{TL} = ω_{DL} + ω_{LL} = 78 plf

Reactions:

R_{LEFT} = $R_{DL, LT}$ + $R_{LL, LT}$ = **550 #** + **580 #** = **1130 #**
R_{RIGHT} = $R_{DL, RT}$ + $R_{LL, RT}$ = **550 #** + **580 #** = **1130 #**

Use 14" TJI 360 Joists @ 16" O/C

Left Support: Use 1 3/4" LVL Ledger
Right Support: Use 1 3/4" LVL Ledger

4555 El Camino Real
Suite H
Atascadero, CA

PROFESSIONAL ENGINEERING, INC.

Description : Vert Analysis (BM 1-9)

Wood Beam Design : Beam 1- Typical Header 3' Max Span

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

BEAM Size : **6x6, Sawn, Fully Unbraced**

Using Allowable Stress Design with ASCE 7-16 Load Combinations, Major Axis Bending

Wood Species : Douglas Fir-Larch — Wood Grade : No.1

Fb - Tension	1,350.0 psi	Fc - Prll	925.0 psi	Fv	170.0 psi	Ebend- xx	1,600.0 ksi	Density	31.210 pcf
Fb - Compr	1,350.0 psi	Fc - Perp	625.0 psi	Ft	675.0 psi	Eminbend - xx	580.0 ksi		

Applied Loads

Beam self weight calculated and added to loads

Unif Load: D = 0.2590, Lr = 0.220 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.140** : 1
fb : Actual : 236.39 psi at 1.500 ft in Span # 1
Fb : Allowable : 1,687.50 psi
Load Comb : +D+Lr+H

Max fv/FvRatio = **0.119** : 1
fv : Actual : 25.28 psi at 2.550 ft in Span # 1
Fv : Allowable : 212.50 psi
Load Comb : +D+Lr+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.40		0.33				
Right Support	0.40		0.33				

Max Deflections

Transient Downward	0.003 in	Total Downward	0.007 in
Ratio	9999	Ratio	4937
	LC: Lr Only		LC: +D+Lr+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : Beam 2- Typical Header 6' Max Span

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

BEAM Size : **6x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with ASCE 7-16 Load Combinations, Major Axis Bending

Wood Species : Douglas Fir-Larch — Wood Grade : No.1

Fb - Tension	1,350.0 psi	Fc - Prll	925.0 psi	Fv	170.0 psi	Ebend- xx	1,600.0 ksi	Density	31.210 pcf
Fb - Compr	1,350.0 psi	Fc - Perp	625.0 psi	Ft	675.0 psi	Eminbend - xx	580.0 ksi		

Applied Loads

Beam self weight calculated and added to loads

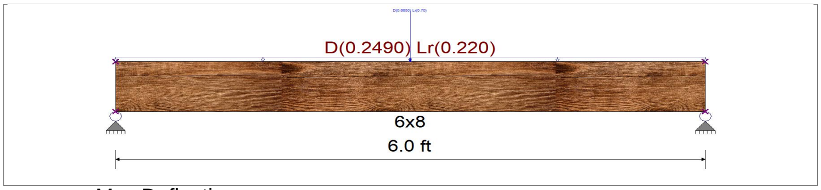
Unif Load: D = 0.2490, Lr = 0.220 k/ft, Trib= 1.0 ft

Point: D = 0.6650, Lr = 0.70 k @ 3.0 ft

Design Summary

Max fb/Fb Ratio = **0.582** : 1
fb : Actual : 977.04 psi at 3.000 ft in Span # 1
Fb : Allowable : 1,679.83 psi
Load Comb : +D+Lr+H

Max fv/FvRatio = **0.311** : 1
fv : Actual : 66.18 psi at 5.380 ft in Span # 1
Fv : Allowable : 212.50 psi
Load Comb : +D+Lr+H



Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.11		1.01				
Right Support	1.11		1.01				

Max Deflections

Transient Downward	0.039 in	Total Downward	0.080 in
Ratio	1868	Ratio	902
	LC: Lr Only		LC: +D+Lr+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : Beam 3- Kitchen Header 9' Max Span

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

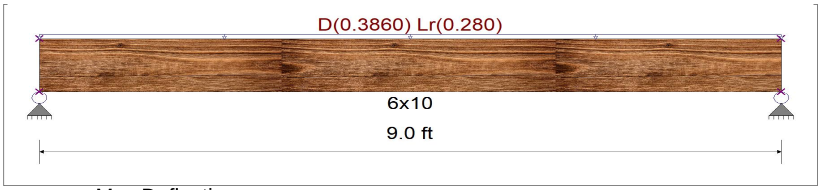
BEAM Size : **6x10, Sawn, Fully Unbraced**
Using Allowable Stress Design with ASCE 7-16 Load Combinations, Major Axis Bending

Wood Species :	Douglas Fir-Larch			Wood Grade :	No.1				
Fb - Tension	1,350.0 psi	Fc - Prll	925.0 psi	Fv	170.0 psi	Ebend- xx	1,600.0 ksi	Density	31.210 pcf
Fb - Compr	1,350.0 psi	Fc - Perp	625.0 psi	Ft	675.0 psi	Eminbend - xx	580.0 ksi		

Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.3860, Lr = 0.280 k/ft, Trib= 1.0 ft

Design Summary



Max fb/Fb Ratio = **0.595** : 1
fb : Actual : 994.75 psi at 4.500 ft in Span # 1
Fb : Allowable : 1,672.24 psi
Load Comb : +D+Lr+H

Max fv/FvRatio = **0.340** : 1
fv : Actual : 72.33 psi at 0.000 ft in Span # 1
Fv : Allowable : 212.50 psi
Load Comb : +D+Lr+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.79		1.26				
Right Support	1.79		1.26				

Max Deflections

Transient Downward	0.066 in	Total Downward	0.160 in
Ratio	1634	Ratio	675
	LC: Lr Only		LC: +D+Lr+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : Beam 4- Great Room Flush Set Beam

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

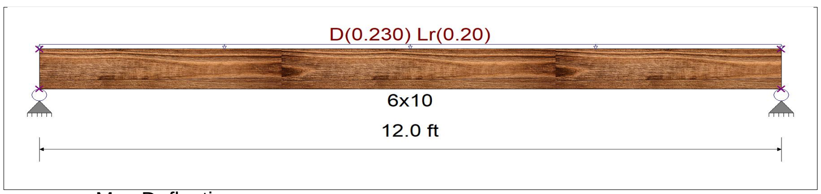
BEAM Size : **6x10, Sawn, Fully Unbraced**
Using Allowable Stress Design with ASCE 7-16 Load Combinations, Major Axis Bending

Wood Species :	Douglas Fir-Larch			Wood Grade :	No.1				
Fb - Tension	1,350.0 psi	Fc - Prll	925.0 psi	Fv	170.0 psi	Ebend- xx	1,600.0 ksi	Density	31.210 pcf
Fb - Compr	1,350.0 psi	Fc - Perp	625.0 psi	Ft	675.0 psi	Eminbend - xx	580.0 ksi		

Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.230, Lr = 0.20 k/ft, Trib= 1.0 ft

Design Summary



Max fb/Fb Ratio = **0.691** : 1
fb : Actual : 1,152.27 psi at 6.000 ft in Span # 1
Fb : Allowable : 1,666.76 psi
Load Comb : +D+Lr+H

Max fv/FvRatio = **0.312** : 1
fv : Actual : 66.39 psi at 11.240 ft in Span # 1
Fv : Allowable : 212.50 psi
Load Comb : +D+Lr+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.45		1.20				
Right Support	1.45		1.20				

Max Deflections

Transient Downward	0.149 in	Total Downward	0.329 in
Ratio	965	Ratio	437
	LC: Lr Only		LC: +D+Lr+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : Beam 5- Garage Door Header

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

BEAM Size : **5.125x15, GLB, Fully Unbraced**

Using Allowable Stress Design with ASCE 7-16 Load Combinations, Major Axis Bending

Wood Species :	DF/DF				Wood Grade :	24F-V4					
Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.210 pcf		
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi				

Applied Loads

Beam self weight calculated and added to loads

Unif Load: D = 0.3030, Lr = 0.240 k/ft, Trib= 1.0 ft

Point: D = 1.330, Lr = 1.40 k @ 4.50 ft

Design Summary

Max fb/Fb Ratio = **0.647** : 1
fb : Actual : 1,824.77 psi at 7.800 ft in Span # 1
Fb : Allowable : 2,819.57 psi
Load Comb : +D+Lr+H

Max fv/FvRatio = **0.378** : 1
fv : Actual : 125.13 psi at 0.000 ft in Span # 1
Fv : Allowable : 331.25 psi
Load Comb : +D+Lr+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	3.87		3.21				
Right Support	3.21		2.51				

Max Deflections

Transient Downward	0.298 in		Total Downward	0.666 in
Ratio	723		Ratio	324
	LC: Lr Only			LC: +D+Lr+H
Transient Upward	0.000 in		Total Upward	0.000 in
Ratio	9999		Ratio	9999
	LC:			LC:

Wood Beam Design : Beam 6- Roof support beam @ Line 5

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

BEAM Size : **5.125x21, GLB, Braced @ 1/3 Points**

Using Allowable Stress Design with ASCE 7-16 Load Combinations, Major Axis Bending

Wood Species :	DF/DF				Wood Grade :	24F-V4			
Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.210 pcf
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi		

Applied Loads

Beam self weight calculated and added to loads

Unif Load: D = 0.4020, Lr = 0.360 k/ft, Trib= 1.0 ft

Point: D = 0.80, Lr = 0.80 k @ 5.50 ft

Point: D = 0.80, Lr = 0.80 k @ 18.50 ft

Design Summary

Max fb/Fb Ratio = **0.744** : 1
fb : Actual : 2,081.62 psi at 12.000 ft in Span # 1
Fb : Allowable : 2,799.10 psi
Load Comb : +D+Lr+H

Max fv/FvRatio = **0.408** : 1
fv : Actual : 135.26 psi at 22.320 ft in Span # 1
Fv : Allowable : 331.25 psi
Load Comb : +D+Lr+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	5.90		5.12				
Right Support	5.90		5.12				

Max Deflections

Transient Downward	0.451 in		Total Downward	0.972 in
Ratio	638		Ratio	296
	LC: Lr Only			LC: +D+Lr+H
Transient Upward	0.000 in		Total Upward	0.000 in
Ratio	9999		Ratio	9999
	LC:			LC:

Wood Beam Design : Beam 7- Entry Cantilever Support Beam

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

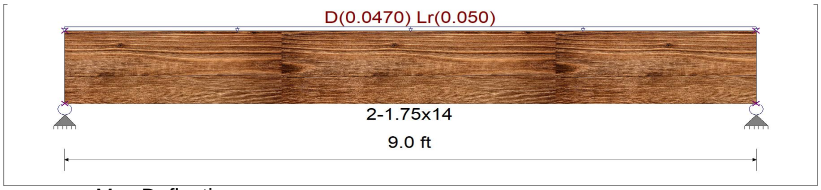
BEAM Size : **2-1.75x14, Microllam LVL, Fully Unbraced**
Using Allowable Stress Design with ASCE 7-16 Load Combinations, Major Axis Bending

Wood Species :	iLevel Truss Joist			Wood Grade :	MicroLam LVL 2.0 E				
Fb - Tension	2,600.0 psi	Fc - Prll	2,510.0 psi	Fv	285.0 psi	Ebend- xx	2,000.0 ksi	Density	42.010 pcf
Fb - Compr	2,600.0 psi	Fc - Perp	750.0 psi	Ft	1,555.0 psi	Eminbend - xx	1,016.54 ksi		

Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.0470, Lr = 0.050 k/ft, Trib= 1.0 ft

Design Summary



Max fb/Fb Ratio = **0.039** : 1
fb : Actual : 118.27 psi at 4.500 ft in Span # 1
Fb : Allowable : 3,009.78 psi
Load Comb : +D+Lr+H

Max fv/FvRatio = **0.032** : 1
fv : Actual : 11.45 psi at 0.000 ft in Span # 1
Fv : Allowable : 356.25 psi
Load Comb : +D+Lr+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.28		0.23				
Right Support	0.28		0.23				

Max Deflections

Transient Downward	0.005 in	Total Downward	0.010 in
Ratio	9999	Ratio	9999
	LC: Lr Only		LC: +D+Lr+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : Beam 8- Typical Header 3' Max Span w/ GT Support

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

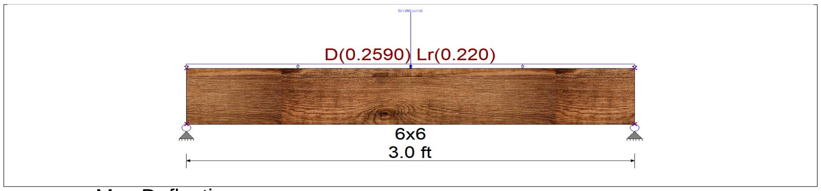
BEAM Size : **6x6, Sawn, Fully Unbraced**
Using Allowable Stress Design with ASCE 7-16 Load Combinations, Major Axis Bending

Wood Species :	Douglas Fir-Larch			Wood Grade :	No.1				
Fb - Tension	1,350.0 psi	Fc - Prll	925.0 psi	Fv	170.0 psi	Ebend- xx	1,600.0 ksi	Density	31.210 pcf
Fb - Compr	1,350.0 psi	Fc - Perp	625.0 psi	Ft	675.0 psi	Eminbend - xx	580.0 ksi		

Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.2590, Lr = 0.220 k/ft, Trib= 1.0 ft
Point: D = 1.250, Lr = 1.0 k @ 1.50 ft

Design Summary



Max fb/Fb Ratio = **0.573** : 1
fb : Actual : 966.67 psi at 1.500 ft in Span # 1
Fb : Allowable : 1,687.50 psi
Load Comb : +D+Lr+H

Max fv/FvRatio = **0.381** : 1
fv : Actual : 81.07 psi at 2.550 ft in Span # 1
Fv : Allowable : 212.50 psi
Load Comb : +D+Lr+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.02		0.83				
Right Support	1.02		0.83				

Max Deflections

Transient Downward	0.011 in	Total Downward	0.025 in
Ratio	3182	Ratio	1422
	LC: Lr Only		LC: +D+Lr+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : Beam 9- Great Room Lower Header

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

BEAM Size : **6x10, Sawn, Fully Unbraced**
Using Allowable Stress Design with ASCE 7-16 Load Combinations, Major Axis Bending

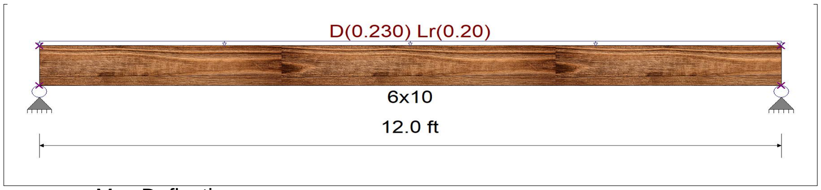
Wood Species : Douglas Fir-Larch | Wood Grade : No.1

Fb - Tension	1,350.0 psi	Fc - Prll	925.0 psi	Fv	170.0 psi	Ebend- xx	1,600.0 ksi	Density	31.210 pcf
Fb - Compr	1,350.0 psi	Fc - Perp	625.0 psi	Ft	675.0 psi	Eminbend - xx	580.0 ksi		

Applied Loads

Beam self weight calculated and added to loads
Unif Load: D = 0.230, Lr = 0.20 k/ft, Trib= 1.0 ft

Design Summary



Max fb/Fb Ratio = **0.691** : 1
fb : Actual : 1,152.27 psi at 6.000 ft in Span # 1
Fb : Allowable : 1,666.76 psi
Load Comb : +D+Lr+H

Max fv/FvRatio = **0.312** : 1
fv : Actual : 66.39 psi at 11.240 ft in Span # 1
Fv : Allowable : 212.50 psi
Load Comb : +D+Lr+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.45		1.20				
Right Support	1.45		1.20				

Max Deflections

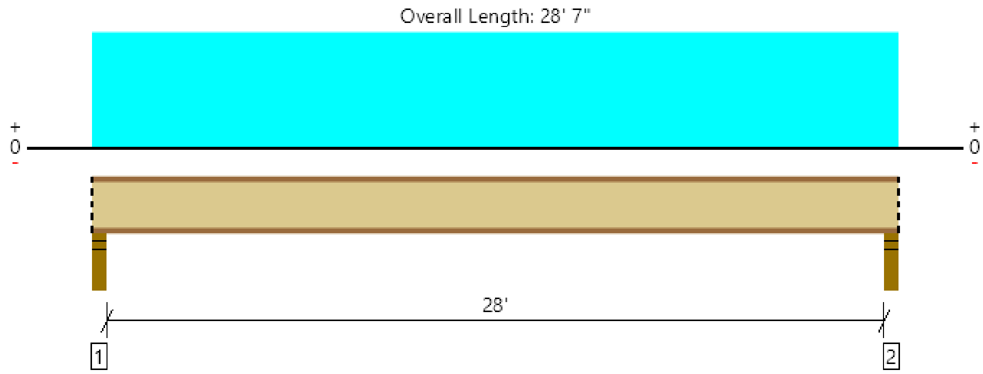
Transient Downward	0.149 in	Total Downward	0.329 in
Ratio	965	Ratio	437
	LC: Lr Only		LC: +D+Lr+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

MEMBER REPORT

PASSED

Level, Roof: Joist

1 piece(s) 14" TJI® 360 @ 16" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	724 @ 2 1/2"	1881 (3.50")	Passed (38%)	1.25	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	709 @ 3 1/2"	2444	Passed (29%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	5025 @ 14' 3 1/2"	9169	Passed (55%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.657 @ 14' 3 1/2"	1.408	Passed (L/514)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	1.249 @ 14' 3 1/2"	1.878	Passed (L/271)	--	1.0 D + 1.0 Lr (All Spans)

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 0/12

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Total	
1 - Stud wall - DF	3.50"	3.50"	1.75"	343	381	724	Blocking
2 - Stud wall - DF	3.50"	3.50"	1.75"	343	381	724	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 7" o/c	
Bottom Edge (Lu)	28' 7" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Comments
1 - Uniform (PSF)	0 to 28' 7"	16"	18.0	20.0	Default Load

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Nick McClure MSD Professional Engineering, Inc. (805) 462-2282 nick@msdpe.com	

Allowable Point Loads on Doug Fir Wood Posts / Columns

Post Size (inches)	Height (feet)	L_e / d (in / in)	F_{CE} (psi)	C_P	F_C'' (psi)	F_C' (psi)	Area of post (in^2)	P_{ALLOW} (lbs)
4 x 4	8	27.4	638	0.38	1495	568	12.25	6958
	9	30.9	523	0.32	1495	475	12.25	5819
	10	34.3	408	0.26	1495	382	12.25	4680
	11	37.7	346	0.22	1495	327	12.25	4000
	12	41.1	283	0.18	1495	271	12.25	3320
	13	44.6	246	0.16	1495	237	12.25	2897
	14	48.0	208	0.14	1495	202	12.25	2475
4 x 6	8	27.4	638	0.39	1430	564	19.25	10857
	9	30.9	523	0.33	1430	472	19.25	9086
	10	34.3	408	0.27	1430	380	19.25	7315
	11	37.7	346	0.23	1430	325	19.25	6256
	12	41.1	283	0.19	1430	270	19.25	5198
	13	44.6	246	0.16	1430	236	19.25	4533
	14	48.0	208	0.14	1430	201	19.25	3869
4 x 8	8	27.4	638	0.41	1365	560	25.38	14210
	9	30.9	523	0.34	1365	470	25.38	11914
	10	34.3	408	0.28	1365	379	25.38	9617
	11	37.7	346	0.24	1365	325	25.38	8234
	12	41.1	283	0.20	1365	270	25.38	6851
	13	44.6	246	0.17	1365	236	25.38	5976
	14	48.0	208	0.15	1365	201	25.38	5100
6 x 6	8	17.5	1280	0.91	475	431	30.25	13038
	9	19.6	1050	0.87	475	415	30.25	12554
	10	21.8	819	0.84	475	399	30.25	12070
	11	24.0	694	0.79	475	378	30.25	11419
	12	26.2	569	0.75	475	356	30.25	10769
	13	28.4	494	0.70	475	331	30.25	10013
	14	30.5	418	0.64	475	306	30.25	9257
	15	32.7	638	0.59	475	282	30.25	8531
	16	34.9	320	0.54	475	258	30.25	7805
	17	37.1	408	0.50	475	238	30.25	7184
	18	39.3	253	0.46	475	217	30.25	6564
	19	41.5	283	0.42	475	200	30.25	6035
	20	43.6	205	0.38	475	182	30.25	5506
6 x 8	8	17.5	1280	0.91	475	431	41.25	17779
	9	19.6	1050	0.87	475	415	41.25	17119
	10	21.8	819	0.84	475	399	41.25	16459
	11	24.0	694	0.79	475	378	41.25	15572
	12	26.2	569	0.75	475	356	41.25	14685
	13	28.4	494	0.70	475	331	41.25	13654
	14	30.5	418	0.64	475	306	41.25	12623
	15	32.7	638	0.59	475	282	41.25	11633
	16	34.9	320	0.54	475	258	41.25	10643
	17	37.1	408	0.50	475	238	41.25	9797
	18	39.3	253	0.46	475	217	41.25	8951
	19	41.5	283	0.42	475	200	41.25	8229
	20	43.6	205	0.38	475	182	41.25	7508

Exterior Stud Capacity

Lateral Pressures and Load:

Wind: (See Wind Profile, P_A=0.6*$p_{z\text{-}max}$)

P_A = 11.5 psf = 0.08 psi

Seismic: (See Seismic Profile)

P = (C_S x W)/1.4 = (0.131 x 15 psf) / 1.4 = 1.40 psf = 0.01 psi

Governing Lateral Load: W_{max} = P_A x Stud Spacing = 1.27 lb/in

Term Definitions:

NDS 2015 Section 3.9.2

Stud Spacing = 16 " o/c

l_{e1} = Plate Height, unbraced

d = depth of stud

E_{min}' = 580000 psi *

F_b = 900 psi *

F_c = 1350 psi *

* Design values for Douglas Fir from NDS 2015 Table 4A

Design Equations for Bending and Axial Compression:

NDS 2015 Section 3.9.2

$$\left[\frac{f_c}{F_c'}\right]^2 + \frac{f_b}{F_b'[1-(f_c/F_{cE})]} \leq 1.0$$

NDS 2015 Eqn. 3.93-3

Where, $$f_c < F_{cE} = \frac{0.822\,E_{min}'}{(l_e/d)^2}$$ (Buckling Check)

Plate Height 1:

Plate Height = 8.5 ft Compressive Load = 1000 #

	Area	Section Modulus	Max Moment	Critical Buckling Load	Column Stability Factor	Allowable Stresses		Actual Stresses		Buckling Check	Bending and Axial Compression Check
						Comp.	Bending	Comp.	Bending		
Stud Size	A [in^2]	S_x [in^3]	M_{max} [lb-in]	F_{cE} [lb]	C_P [-]	F_c' [psi]	F_b' [psi]	f_c [psi]	f_b [psi]		
2x4	5.25	3.06	1656	561	0.37	502	1656	190	541	GOOD	GOOD
→ 2x6	8.25	7.56	1656	1386	0.70	945	1656	121	219	GOOD	GOOD
2x8	10.9	13.14	1656	2409	0.85	1143	1656	92	126	GOOD	GOOD

Plate Height 2:

Plate Height = 10 ft Compressive Load = 1000 #

	Area	Section Modulus	Max Moment	Critical Buckling Load	Column Stability Factor	Allowable Stresses		Actual Stresses		Buckling Check	Bending and Axial Compression Check
						Comp.	Bending	Comp.	Bending		
Stud Size	A [in^2]	S_x [in^3]	M_{max} [lb-in]	F_{cE} [lb]	C_P [-]	F_c' [psi]	F_b' [psi]	f_c [psi]	f_b [psi]		
2x4	5.25	3.06	2292	406	0.28	376	1656	190	748	GOOD	FAILS
→ 2x6	8.25	7.56	2292	1002	0.58	784	1656	121	303	GOOD	GOOD
2x8	10.9	13.14	2292	1740	0.77	1041	1656	92	174	GOOD	GOOD

Plate Height 3:

Plate Height = 11.5 ft Compressive Load = 1000 #

	Area	Section Modulus	Max Moment	Critical Buckling Load	Column Stability Factor	Allowable Stresses		Actual Stresses		Buckling Check	Bending and Axial Compression Check
						Comp.	Bending	Comp.	Bending		
Stud Size	A [in^2]	S_x [in^3]	M_{max} [lb-in]	F_{cE} [lb]	C_P [-]	F_c' [psi]	F_b' [psi]	f_c [psi]	f_b [psi]		
2x4	5.25	3.06	3031	307	0.22	291	1656	190	990	GOOD	FAILS
→ 2x6	8.25	7.56	3031	757	0.48	641	1656	121	401	GOOD	GOOD
2x8	10.9	13.14	3031	1316	0.68	921	1656	92	231	GOOD	GOOD

CONTINUOUS FOOTING CHECK

Grade Beam Uplift Check:

depth of footing	=	24	in.
d'	=	21	in.
Ø	=	0.9	
f_{Y40}	=	40	ksi
f_{Y60}	=	60	ksi
f'_C	=	2.5	ksi
b	=	12	in.

ω_{DL} =

		19	x	3	=	56.9	plf	(roof)
		8	x	8	=	64	plf	(wall)
150	x	2	x	1	=	300	plf	(footing)
150	x	0.33	x	3	=	150	plf	(slab)
		ω_{DL} =				**571**	**plf**	**(total)**

A_s	a	M (kip*ft)	L' (ft)	P_{max} (lbs)	
0.31	0.729	28.8	7.7	**8794.3**	***(1) # 5 rebar top & bottom***
→ **0.62**	1.459	56.6	10.8	**12326.6**	***(2) # 5 rebar top & bottom***

Point Load Check:

depth of footing	=	24	in.
d'	=	21	in.
Ø	=	0.9	
f_{Y40}	=	40	ksi
f_{Y60}	=	60	ksi
f'_C	=	2.5	ksi
b	=	12	in.
f_B	=	1500	psf

A_s	a	M (kip*ft)	L' (ft)	P_{max} (lbs)	
0.31	0.729	28.8	6.2	**9292.9**	***(1) # 5 rebar top & bottom***
→ **0.62**	1.459	56.6	8.7	**13025.5**	***(2) # 5 rebar top & bottom***

FOUNDATION PAD CHECK

Foundation Pad Capacity

soil bearing capacity	=	1500	psf
width of footing	=	36	in
length of footing	=	36	in
depth of footing	=	24	in
area of footing	=	9	ft^2

Bar Size	Area (in^2)
#3	0.11
#4	0.2
#5	0.31
#6	0.44
#7	0.6
#8	0.79

capacity = (1500 psf)(9 ft^2)

= 13500 #

A_s = (0.0018)(36 in)(24 in)

= 1.555 in^2

At point load locations with loads ≤ 13,500#, provide 36" square x 24" deep concrete pad with (3) #5 bars each way, top and bottom.

MSD PROFESSIONAL ENGINEERING, INC.
4555 El Camino Real, Ste. H
Atascadero, CA 93422
(805) 462-2282

Job # : Dsgnr: **See Detail 9/D2** Date: 25 SEP 2021
Description....
8'-8" Max Ht Conc Screen Wall

This Wall in File: E:\Work Folder\MSD Engineering Files\Hambly Homes - Anderson Residence\Engineerin

RetainPro **Build 11.17.11.03**
License : KW-06056653
License To : MSD PROFESSIONAL ENGINEERING, INC.

Cantilevered Retaining Wall

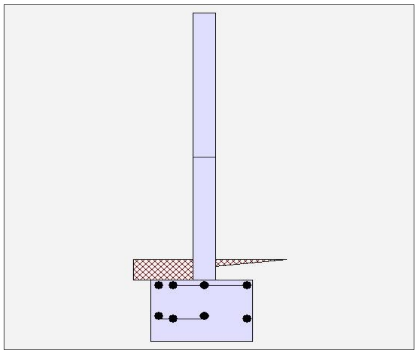
Code: CBC2019, ASCE7-16, ACI 318-14

Criteria

Retained Height	=	0.67 ft
Wall height above soil	=	8.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	8.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	2,325.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	50.0 psf/ft
	=	
Passive Pressure	=	333.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.340
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	=	0.0 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 (Service Level)	=	0.0 psf

Adjacent Footing Load

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

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.472 g

Added seismic base force 286.5 lbs

Design Summary

Wall Stability Ratios

Overturning	=	1.69	OK
Sliding	=	4.15	OK
Total Bearing Load	=	1,939 lbs	
...resultant ecc.	=	10.45 in	
Soil Pressure @ Toe	=	2,054 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	2,325 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	2,876 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	0.5 psi	OK
Footing Shear @ Heel	=	2.0 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	404.2 lbs	
less 100% Passive Force	= -	1,017.5 lbs	
less 100% Friction Force	= -	659.1 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 considered in the calculation of soil bearing pressures.

Load Factors

Building Code	CBC 2016,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

			2nd	Bottom
			Stem OK	Stem OK
Design Height Above Ftg	ft	=	4.00	0.00
Wall Material Above "Ht"		=	Concrete	Concrete
Design Method		=	LRFD	LRFD
Thickness		=	8.00	8.00
Rebar Size		=	# 4	# 5
Rebar Spacing		=	16.00	16.00
Rebar Placed at		=	Center	Center
Design Data				
fb/FB + fa/Fa		=	**0.295**	**0.456**
Total Force @ Section				
Service Level	lbs	=		
Strength Level	lbs	=	220.4	427.2
Moment....Actual				
Service Level	ft-#	=		
Strength Level	ft-#	=	514.7	1,778.0
Moment.....Allowable	ft-#	=	1,746.9	3,898.0
Shear.....Actual				
Service Level	psi	=		
Strength Level	psi	=	4.6	8.9
Shear.....Allowable	psi	=	75.0	75.0
Anet (Masonry)	in2	=		
Rebar Depth 'd'	in	=	4.00	4.00
Masonry Data				
f'm	psi	=		
Fs	psi	=		
Solid Grouting		=		
Modular Ratio 'n'		=		
Wall Weight	psf	=	100.0	100.0
Short Term Factor		=		
Equiv. Solid Thick.		=		
Masonry Block Type		=	Medium Weight	
Masonry Design Method		=	ASD	
Concrete Data				
f'c	psi	=	2,500.0	2,500.0
Fy	psi	=	40,000.0	60,000.0

Concrete Stem Rebar Area Details

2nd Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0466 in2/ft		
(4/3) * As :	0.0621 in2/ft	Min Stem T&S Reinf Area 0.628 in2	
200bd/fy : 200(12)(4)/40000 :	0.24 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.134 in2/ft	
0.0014bh : 0.0014(12)(8) :	0.1344 in2/ft	Horizontal Reinforcing Options :	
	============	One layer of :	Two layers of :
Required Area :	0.1344 in2/ft	#4@ 17.86 in	#4@ 35.71 in
Provided Area :	0.15 in2/ft	#5@ 27.68 in	#5@ 55.36 in
Maximum Area :	0.8128 in2/ft	#6@ 39.29 in	#6@ 78.57 in

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.1073 in2/ft		
(4/3) * As :	0.1431 in2/ft	Min Stem T&S Reinf Area 0.538 in2	
200bd/fy : 200(12)(4)/60000 :	0.16 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.134 in2/ft	
0.0014bh : 0.0014(12)(8) :	0.1344 in2/ft	Horizontal Reinforcing Options :	
	============	One layer of :	Two layers of :
Required Area :	0.1431 in2/ft	#4@ 17.86 in	#4@ 35.71 in
Provided Area :	0.2325 in2/ft	#5@ 27.68 in	#5@ 55.36 in
Maximum Area :	0.5419 in2/ft	#6@ 39.29 in	#6@ 78.57 in

Footing Dimensions & Strengths

Toe Width	=	1.25 ft
Heel Width	=	1.75
Total Footing Width	=	3.00
Footing Thickness	=	18.00 in
Key Width	=	36.00 in
Key Depth	=	6.00 in
Key Distance from Toe	=	0.00 ft
f'c = 2,500 psi	Fy =	60,000 psi
Footing Concrete Density	=	150.00 pcf
Min. As %	=	0.0018
Cover @ Top 2.00	@ Btm.=	3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	2,876	0 psf
Mu' : Upward	=	1,751	0 ft-#
Mu' : Downward	=	280	210 ft-#
Mu: Design	=	1,471	210 ft-#
Actual 1-Way Shear	=	0.53	2.02 psi
Allow 1-Way Shear	=	40.00	40.00 psi
Toe Reinforcing	=	# 5 @ 16.00 in	
Heel Reinforcing	=	# 5 @ 18.00 in	
Key Reinforcing	=	None Spec'd	

Other Acceptable Sizes & Spacings

Toe: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm

Min footing T&S reinf Area	1.17 in2
Min footing T&S reinf Area per foot	0.39 in2 /ft
If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.17 in	#4@ 12.35 in
#5@ 9.57 in	#5@ 19.14 in
#6@ 13.58 in	#6@ 27.16 in

Cantilevered Retaining Wall Code: CBC2019, ASCE7-16, ACI 318-14

Summary of Overturning & Resisting Forces & Moments

.....OVERTURNING.....

Item		Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	117.7	0.72	85.2
Surcharge over Heel	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
	=			
Seismic Stem Self Wt		286.5	5.84	1,671.5
Total		404.2	**O.T.M.**	1,756.6
	=		=	

Resisting/Overturning Ratio = **1.69**
Vertical Loads used for Soil Pressure = 1,938.5 lbs

If seismic is included, the OTM and sliding ratios
be 1.1 per section 1807.2.3 of IBC 2009 or IBC 201

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

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

.....RESISTING.....

		Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	79.8	2.46	196.3
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=	91.7	0.63	57.3
Surcharge Over Toe	=			
Stem Weight(s)	=	867.0	1.58	1,372.8
Earth @ Stem Transitions	=			
Footing Weight	=	675.0	1.50	1,012.5
Key Weight	=	225.0	1.50	337.5
Vert. Component	=		3.00	
Total =		1,938.5 lbs	**R.M.=**	2,976.3

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

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.

PRELIMINARY

Job: 5433M

Invoice:

APPENDIX D: TRUSS LAYOUT

Design Date: 09/22/2021

Revise Date:

Revise Date:

Revise Date:

695 Obispo Street / P.O. Box 850
Guadalupe, CA 93434

Phone (805)343-2555
Fax (805)343-2377
www.TrusPro.com

Project name:

Address:

City/State: **Paso Robles** **CA**

Customer: **Owner/Builder**

TIMBER PRODUCTS INSPECTION, INC.
dba
GENERAL TESTING AND INSPECTION AGENCY

105 SE 124th AVENUE
VANCOUVER WA 98684

Timber Products Inspection (TP) and General Testing and Inspection (GTI) are code recognized by the International Conference of Building Officials (ICBO E.S.) which as of January 1, 2003 became the International Accreditation Service, Inc. (IAS) with the new assigned number of AA-664.

This is to verify that:

TRUSPRO
GUADALUPE CA
#7728

Is currently an active member in good standing in the
TP Third Party Truss Auditing Program and has been since

OCTOBER, 2012

Brian Hensley

Brian Hensley
Truss Manager- Western Division
Office: 360.449.3840
Cell: 208.818.77869
July 30, 2014

071709

TIMBER PRODUCTS
We Deliver Confidence.

March 6, 2020

Truspro
695 Obispo Street
Guadalupe, CA 93434

To Whom It May Concern,

Timber Products Inspection, Inc. is proud to announce that the following truss manufacturing facility, Truspro is a subscriber to our nationally accredited "Truss Quality Auditing Program".

The TP Truss Quality Auditing Program is accredited under the IAS AA696 Evaluation Report and conforms to requirements for independent inspection of trusses under the International Building Code and International Residential Code.

The TP program involves daily in-plant quality control checks by plant personnel and periodic unannounced inspections by TP personnel for conformance to engineering and industry standards for fabricators. The TP quality stamp on each truss bearing the registered GTI log is your assurance that the trusses were fabricated in accordance with the TP Truss Quality Auditing Program and applicable sections of the IBC and IRC. Specific design loads and installation requirements are not covered by the TP Auditing Program.

Please note that the quality programs are automatically renewed unless requested otherwise. Any questions about this program, the facilities status in the program or the use of the TP registered quality stamps should be directed to Timber Products Inspection, Inc. at (770) 922-8000.

Sincerely,
Timber Products Inspection

Patrick C. Edwards, P.E.
Director of Engineering

ICC-ES Evaluation Report

ESR-1082

Reissued February 2021

This report is subject to renewal February 2022.

www.icc-es.org | (800) 423-6587 | (562) 699-0543 *A Subsidiary of the International Code Council®*

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 17 53—Shop-Fabricated Wood Trusses

REPORT HOLDER:

EAGLE METAL PRODUCTS

EVALUATION SUBJECT:

EAGLE METAL PRODUCTS EAGLE 20, EAGLE 18, EAGLE 16, EAGLE 20HS, EAGLE 18HS AND EAGLE 18 HINGE PLATE CONNECTOR TRUSS METAL CONNECTOR PLATES

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015, 2012, 2009 and 2006 *International Building Code®* (IBC)
- 2018, 2015, 2012, 2009 and 2006 *International Residential Code®* (IRC)

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see ESR-1082 LABC and LARC Supplement.

Property evaluated:

Structural

2.0 USES

The Eagle Metal Products Eagle 20, Eagle 18, Eagle 16, Eagle 20HS, Eagle 18HS and Eagle 18 Hinge Plate Connector truss metal connector plates are used as joint connectors of light-framed wood roof and floor trusses.

3.0 DESCRIPTION

3.1 Eagle 20:

Eagle 20 truss metal connector plates are manufactured from minimum No. 20 gage [0.0356 inch (0.904 mm) total thickness], ASTM A653, SS designation, Grade 40, structural steel with a G60 galvanization coating [0.0005 inch (0.013 mm) thickness each side] with base-metal thickness of 0.0346 inch (0.878 mm). Each plate has $^{3}/_{8}$-inch-long (9.5 mm) teeth that are stamped in pairs and bent at right angles from the face of the plate. The teeth are spaced 1 inch (25.4 mm) on center along the length, and $^{1}/_{4}$ inch (6.4 mm) on center along the width, and are staggered $^{3}/_{32}$ inch (2.38 mm) off center. Each plate has eight teeth per square inch (1.24 teeth/cm^2). See Figure 2 for details.

3.2 Eagle 18:

Eagle 18 truss metal connector plates are manufactured from minimum No.18 gage [0.0466 inch (1.184 mm) total thickness], ASTM A653, SS designation, Grade 40, structural steel with a minimum G60 galvanization coating [0.0005 inch (0.013 mm) thickness each side] with base-metal thickness of 0.0456 inch (1.158 mm). Eagle 18 truss metal connector plates are stamped identically to the Eagle 20 truss metal connector plates. See Figure 2 for details.

3.3 Eagle 16:

Eagle 16 truss metal connector plates are manufactured from minimum No. 16 gage [0.0575 inch (1.461 mm) total thickness], ASTM A653, SS designation, Grade 40, structural steel with a G60 galvanization coating [0.0005 inch (0.013 mm) thickness each side] with base-metal thickness of 0.0565 inch (1.435 mm). Each plate is stamped with slightly staggered rows of slots, punched to form two teeth in each slot, with one tooth slightly longer than the other. Teeth are $^{7}/_{16}$ inch (11.1 mm) and $^{5}/_{16}$ inch (7.9 mm) long, and are formed with a slight twist that alternates (twists in the opposite direction) every third row. Slots are $^{5}/_{32}$ inch (4 mm) in width and $^{7}/_{16}$ inch (11.1 mm) in length. The slots are spaced every 1 inch (25.4 mm) along the plate length and every $^{1}/_{3}$ inch (8.5 mm) along the plate width. Every third row of slots is staggered $^{1}/_{8}$ inch (3.2 mm). Each plate has six teeth per square inch of plate area (0.93 tooth/cm^2). See Figure 3 for details.

3.4 Eagle 20HS:

Eagle 20HS truss metal connector plates are manufactured from minimum No. 20 gage [0.0356 inch (0.904 mm) total thickness], ASTM A653, HSLAS designation, Grade 60, structural steel with a G60 galvanization coating [0.0005 inch (0.013 mm) thickness each side] with base-metal thickness of 0.0346 inch (0.878 mm). Each plate has $^{3}/_{8}$-inch-long (9.5 mm) teeth that are stamped in pairs and bent at right angles from the face of the plate. The teeth are spaced 1 inch (25.4 mm) on center along the length, and $^{1}/_{4}$ inch (6.4 mm) on center along the width, and are staggered $^{3}/_{32}$ inch (2.4 mm) off center. Each plate has six teeth per square inch (1.24 teeth/cm^2), and every fourth row is removed. See Figure 4 for details.

3.5 Eagle 18HS:

Eagle 18HS truss metal connector plates are manufactured from minimum No. 18 gage [0.0466 inch (1.184 mm) total thickness], ASTM A653, HSLAS designation, Grade 60, structural steel with a G60 galvanization coating [0.0005 inch (0.013 mm) thickness

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W A R N I N G !

GENERAL NOTES

Trusses are not marked in any way to identify the frequency or location of temporary lateral restraint and diagonal bracing. Follow the recommendations for handling, installing and temporary restraining and bracing of trusses. Refer to BCSI – Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses*** for more detailed information.

Truss Design Drawings may specify locations of permanent lateral restraint or reinforcement for individual truss members. Refer to the **BCSI-B3***** for more information. All other permanent bracing design is the responsibility of the building designer.

NOTAS GENERALES

*Los trusses no están marcados de ningún modo que identifique la frecuencia o localización de restricción lateral y arriostre diagonal temporales. Use las recomendaciones de manejo, instalación, restricción y arriostre temporal de los trusses. Vea el folleto BCSI – Guía de Buena Práctica para el Manejo, Instalación, Restricción y Arriostre de los Trusses de Madera Conectados con Placas de Metal*** para información más detallada.*

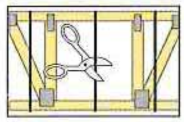
*Los dibujos de diseño de los trusses pueden especificar las localizaciones de restricción lateral permanente o refuerzo en los miembros individuales del truss. Vea la hoja resumen BCSI-B3*** para más información. El resto de los diseños de arriostres permanentes son la responsabilidad del diseñador del edificio.*

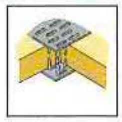
WARNING! The consequences of improper handling, erecting, installing, restraining and bracing can result in a collapse of the structure, or worse, serious personal injury or death.

¡ADVERTENCIA! *El resultado de un manejo, levantamiento, instalación, restricción y arrisotre incorrecto puede ser la caída de la estructura o aún peor, heridos o muertos.*

CAUTION! Exercise care when removing banding and handling trusses to avoid damaging trusses and prevent injury. Wear personal protective equipment for the eyes, feet, hands and head when working with trusses.

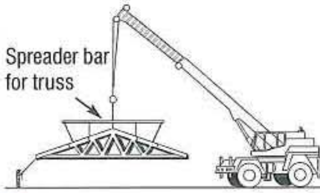
¡CAUTELA! *Utilice cautela al quitar las ataduras o los pedazos de metal de sujetar para evitar daño a los trusses y prevenir la herida personal. Lleve el equipo protectivo personal para ojos, pies, manos y cabeza cuando trabaja con trusses.*





CAUTION! Use special care in windy weather or near power lines and airports.

¡CAUTELA! *Utilice cuidado especial en días ventosos o cerca de cables eléctricos o de aeropuertos.*



HANDLING — *MANEJO*

NOTICE Avoid lateral bending.
Evite la flexión lateral.

NOTICE The contractor is responsible for properly receiving, unloading and storing the trusses at the jobsite. Unload trusses to smooth surface to prevent damage.

El contratista tiene la responsabilidad de recibir, descargar y almacenar adecuadamente los trusses en la obra. Descargue los trusses en la tierra liso para prevenir el daño.

☑ Use proper rigging and hoisting equipment.

Use equipo apropiado para levantar e improvisar.

☑ Trusses may be unloaded directly on the ground at the time of delivery or stored temporarily in contact with the ground after delivery. If trusses are to be stored for more than one week, place blocking of sufficient height beneath the stack of trusses at 8' (2.4 m) to 10' (3 m) on-center (o.c.).

Los trusses pueden ser descargados directamente en el suelo en aquel momento de entrega o almacenados temporalmente en contacto con el suelo después de entrega. Si los trusses estarán guardados para más de una semana, ponga bloqueando de altura suficiente detrás de la pila de los trusses a 8 hasta 10 pies en centro (o.c.).

☑ For trusses stored for more than one week, cover bundles to protect from the environment.

Para trusses guardados por más de una semana, cubra los paquetes para protegerlos del ambiente.

Refer to **BCSI***** for more detailed information pertaining to handling and jobsite storage of trusses.

*Vea el folleto BCSI*** para información más detallada sobre el manejo y almacenado de los trusses en área de trabajo.*

⊘ **DO NOT** store unbraced bundles upright.

NO *almacene verticalmente los trusses sueltos.*

⊘ **DO NOT** store on uneven ground.

NO *almacene en tierra desigual.*

HOISTING AND PLACEMENT OF TRUSS BUNDLES
RECOMENDACIONES PARA LEVANTAR PAQUETES DE TRUSSES

⊘ **DON'T** overload the crane.

NO *sobrecargue la grúa.*

⊘ **NEVER** use banding to lift a bundle.

NUNCA *use las ataduras para levantar un paquete.*

☑ A single lift point may be used for bundles of top chord pitch trusses up to 45' (13.7 m) and parallel chord trusses up to 30' (9.1 m). Use at least two lift points for bundles of top chord pitch trusses up to 60' (18.3m) and parallel chord trusses up to 45' (13.7m). Use at least three lift points for bundles of top chord pitch trusses >60' (18.3m) and parallel chord trusses >45' (13.7m).

Puede usar un solo lugar de levantar para paquetes de trusses de la cuerda superior hasta 45' y trusses de cuerdas paralelas de 30' o menos. Use por lo menos dos puntos de levantar con grupos de trusses de cuerda superior inclinada hasta 60' y trusses de cuerdas paralelas hasta 45'. Use por lo menos dos puntos de levantar con grupos de trusses de cuerda superior inclinada mas de 60' y trusses de cuerdas paralelas mas de 45'.

WARNING! Do not over load supporting structure with truss bundle.

¡ADVERTENCIA! *No sobrecargue la estructura apoyada con el paquete de trusses.*

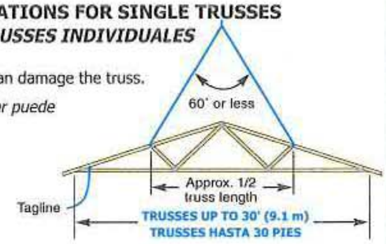
☑ Place truss bundles in stable position.

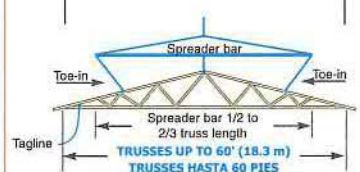
Puse paquetes de trusses en una posición estable.

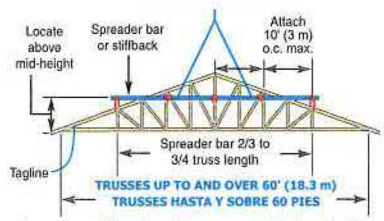
MECHANICAL HOISTING RECOMMENDATIONS FOR SINGLE TRUSSES
RECOMENDACIONES PARA LEVANTAR TRUSSES INDIVIDUALES

NOTICE Using a single pick-point at the peak can damage the truss.

El uso de un solo lugar en el pico para levantar puede hacer daño al truss.







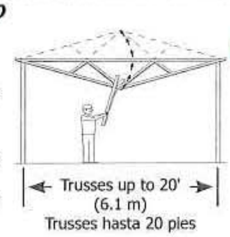
☑ Hold each truss in position with the erection equipment until top chord temporary lateral restraint is installed and the truss is fastened to the bearing points.

Sostenga cada truss en posición con equipo de grúa hasta que la restricción lateral temporal de la cuerda superior esté instalado y el truss está asegurado en los soportes.

INSTALLATION OF SINGLE TRUSSES BY HAND
RECOMMENDACCIONES DE LEVANTAMIENTO DE TRUSSES INDIVIDUALES POR LA MANO

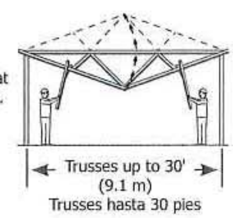
☑ Trusses 20' (6.1 m) or less, support near peak.

Soporte cerca al pico los trusses de 20 pies o menos.



☑ Trusses 30' (9.1 m) or less, support at quarter points.

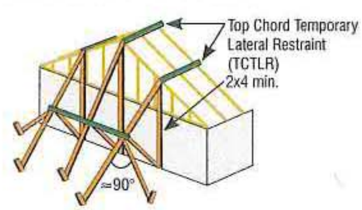
Soporte de los cuartos de tramo los trusses de 30 pies o menos.



TEMPORARY RESTRAINT & BRACING
RESTRICCIÓN Y ARRIOSTRE TEMPORAL

NOTICE Refer to **BCSI-B2***** for more information.

*Vea el resumen BCSI-B2*** para más información.*

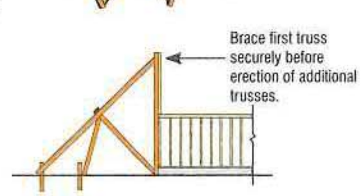


☑ Locate ground braces for first truss directly in line with all rows of top chord temporary lateral restraint (see table in the next column).

Coloque los arriostres de tierra para el primer truss directamente en línea con cada una de las filas de restricción lateral temporal de la cuerda superior (vea la tabla en la próxima columna).

⊘ **DO NOT** walk on unbraced trusses.

NO *camine en trusses sueltos.*



STEPS TO SETTING TRUSSES
LAS MEDIDAS DE LA INSTALACIÓN DE LOS TRUSSES

☑ **1)** Install ground bracing. **2)** Set first truss and attach securely to ground bracing. **3)** Set next 4 trusses with short member temporary lateral restraint (see below). **4)** Install top chord diagonal bracing (see below). **5)** Install web member plane diagonal bracing to stabilize the first five trusses (see below). **6)** Install bottom chord temporary lateral restraint and diagonal bracing (see below). **7)** Repeat process with groups of four trusses until all trusses are set.

__1)__ Instale los arriostres de tierra. __2)__ Instale el primero truss y ate seguramente al arriostre de tierra. __3)__ Instale los próximos 4 trusses con restricción lateral temporal de miembro corto (vea abajo). __4)__ Instale el arriostre diagonal de la cuerda superior (vea abajo). __5)__ Instale arriostre diagonal para los planos de los miembros secundarios para estabilice los primeros cinco trusses (vea abajo). __6)__ Instale la restricción lateral temporal y arriostre diagonal para la cuerda inferior (vea abajo). __7)__ Repita éste procedimiento en grupos de cuatro trusses hasta que todos los trusses estén instalados.

NOTICE Refer to **BCSI-B2***** for more information.

*Vea el resùmen __BCSI-B2***__ para más información.*

RESTRAINT/BRACING FOR ALL PLANES OF TRUSSES
RESTRICCIÓN/ARRIOSTRE PARA TODOS PLANOS DE TRUSSES

☑ This restraint & bracing method is for all trusses except 3x2 and 4x2 parallel chord trusses (PCTs). See top of next column for temporary restraint and bracing of PCTs.

Este método de restricción y arriostre es para todo trusses excepto trusses de cuerdas paralelas (PCTs) 3x2 y 4x2. Vea la parte superior de la columna para la restricción y arriostre temporal de PCTs.

1) TOP CHORD — *CUERDA SUPERIOR*

Truss Span *Longitud de Tramo*	Top Chord Temporary Lateral Restraint (TCTLR) Spacing *Espaciamiento del Arriostre Temporal de la Cuerda Superior*
Up to 30' (9.1 m)	10' (3 m) o.c. max.
30' (9.1 m) – 45' (13.7 m)	8' (2.4 m) o.c. max.
45' (13.7 m) – 60' (18.3 m)	6' (1.8 m) o.c. max.
60' (18.3 m) – 80' (24.4 m)*	4' (1.2 m) o.c. max.

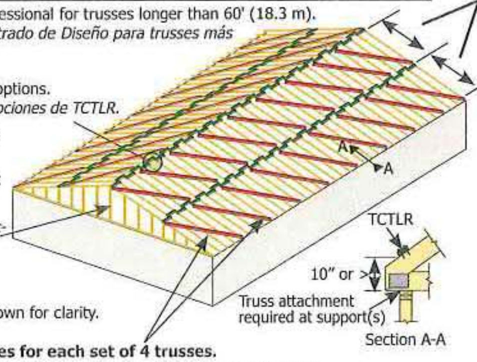
*Consult a Registered Design Professional for trusses longer than 60' (18.3 m).
**Consulte a un Professional Registrado de Diseño para trusses más de 60 pies.*

☑ See **BCSI-B2***** for TCTLR options.
*Vea el __BCSI-B2***__ para las opciones de TCTLR.*

NOTICE Refer to **BCSI-B3***** for Gable End Frame restraint/bracing/ reinforcement information.

*Para información sobre restricción/arriostre/refuerzo para Armazones Hastiales vea el resumen __BCSI-B3***__*

Note: Ground bracing not shown for clarity.



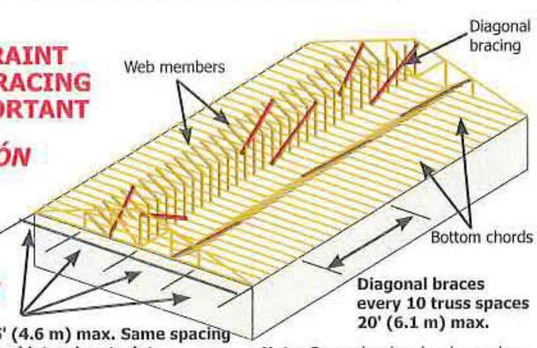
☑ **Repeat diagonal braces for each set of 4 trusses.**
Repita los arrisotres diagonales para cada grupo de 4 trusses.

2) WEB MEMBER PLANE — *PLANO DE LOS MIEMBROS SECUNDARIOS*

NOTICE

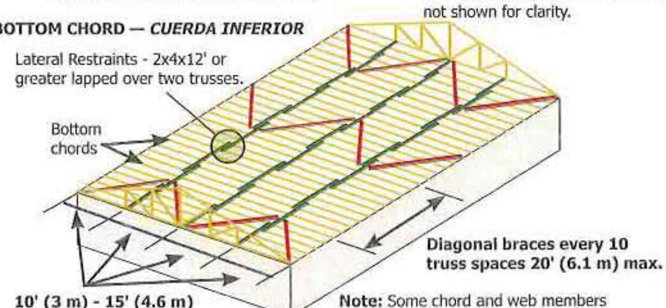
LATERAL RESTRAINT & DIAGONAL BRACING ARE VERY IMPORTANT

¡LA RESTRICCIÓN LATERAL Y EL ARRIOSTRE DIAGONAL SON MUY IMPORTANTES!



Note: Some chord and web members not shown for clarity.

3) BOTTOM CHORD — *CUERDA INFERIOR*

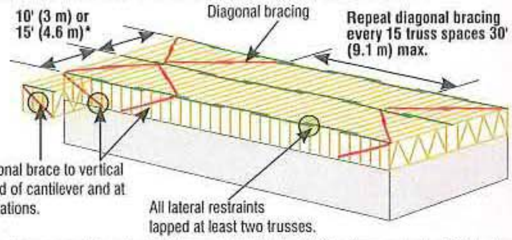


Note: Some chord and web members not shown for clarity.

RESTRAINT & BRACING FOR 3x2 AND 4x2 PARALLEL CHORD TRUSSES
RESTRICCIÓN Y ARRIOSTRE PARA TRUSSES DE CUERDAS PARALELAS 3X2 Y 4X2

NOTICE Refer to **BCSI-B7***** for more information.

*Vea el resumen __BCSI-B7***__ para más información.*

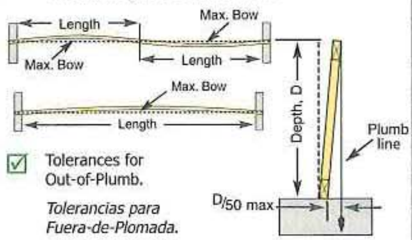


***Top chord temporary lateral restraint spacing shall be 10' (3 m) o.c. max. for 3x2 chords and 15' (4.6 m) o.c. for 4x2 chords.**

INSTALLING — *INSTALACIÓN*

☑ Tolerances for Out-of-Plane.
Tolerancias para Fuera-de-Plano.

☑ Tolerances for Out-of-Plumb.
Tolerancias para Fuera-de-Plomada.



Out-of-Plumb	
D/50	D (ft.)
1/4" (6 mm)	1' (0.3 m)
1/2" (13 mm)	2' (0.6 m)
3/4" (19 mm)	3' (0.9 m)
1" (25 mm)	4' (1.2 m)
1-1/4" (32 mm)	5' (1.5 m)
1-1/2" (38 mm)	6' (1.8 m)
1-3/4" (45 mm)	7' (2.1 m)
2" (51 mm)	≥8' (≥2.4 m)

Out-of-Plane	
Max. Bow	Truss Length
3/4" (19 mm)	12.5' (3.8 m)
7/8" (22 mm)	14.6' (4.5 m)
1" (25 mm)	16.7' (5.1 m)
1-1/8" (29 mm)	18.8' (5.7 m)
1-1/4" (32 mm)	20.8' (6.3 m)
1-3/8" (35 mm)	22.9' (7.0 m)
1-1/2" (38 mm)	25.0' (7.6 m)
1-3/4" (45 mm)	29.2' (8.9 m)
2" (51 mm)	≥33.3' (10.1 m)

CONSTRUCTION LOADING
CARGA DE CONSTRUCCIÓN

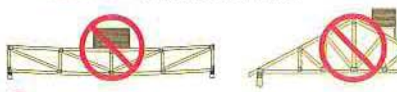
⃠ **DO NOT** proceed with construction until all lateral restraint and bracing is securely and properly in place.

***NO** proceda con la construcción hasta que todas las restricciones laterales y los arriostres estén colocados en forma apropiada y segura.*

⃠ **DO NOT** exceed maximum stack heights. Refer to **BCSI-B4***** for more information.

NO** exceda las alturas máximas de montón. Vea el resumen __BCSI-B4__ para más información.*

Maximum Stack Height for Material on Trusses	
Material	Height
Gypsum Board	12" (305 mm)
Plywood or OSB	16" (406 mm)
Asphalt Shingles	2 bundles
Concrete Block	8" (203 mm)
Clay Tile	3-4 tiles high

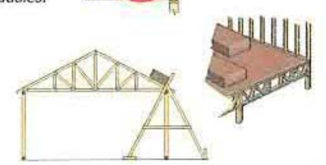


⃠ **NEVER** stack materials near a peak or at mid-span.
***NUNCA** amontone los materiales cerca de un pico.*

⃠ **DO NOT** overload small groups or single trusses.
***NO** sobrecargue pequeños grupos o trusses individuales.*

☑ Place loads over as many trusses as possible.
Coloque las cargas sobre tantos trusses como sea posible.

☑ Position loads over load bearing walls.
Coloque las cargas sobre las paredes soportantes.



Truss bracing not shown for clarity.

ALTERATIONS — ALTERACIONES

NOTICE Refer to **BCSI-B5.*****

*Vea el resumen __BCSI-B5.***__*

⃠ **DO NOT** cut, alter, or drill any structural member of a truss unless specifically permitted by the truss design drawing.

***NO** corte, altere o perfore ningún miembro estructural de un truss, a menos que esté específicamente permitido en el dibujo del diseño del truss.*

NOTICE Trusses that have been overloaded during construction or altered without the Truss Manufacturer's prior approval may render the Truss Manufacturer's limited warranty null and void.

Trusses que se han sobrecargado durante la construcción o han sido alterados sin la autorización previa del Fabricante de Trusses, pueden hacer nulo y sin efecto la garantía limitada del Fabricante de Trusses.

*****Contact the Component Manufacturer for more information or consult a Registered Design Professional for assistance.**
To view a non-printing PDF of this document, visit www.sbcindustry.com/b1.

NOTE: The truss manufacturer and truss designer rely on the presumption that the contractor and crane operator (if applicable) are professionals with the capability to undertake the work they have agreed to do on any given project. If the contractor believes it needs assistance in some aspect of the construction project, it should seek assistance from a competent party. The methods and procedures outlined in this document are intended to ensure that the overall construction techniques employed will put the trusses into place SAFELY. These recommendations for handling, installing, restraining and bracing trusses are based upon the collective experience of leading personnel involved with truss design, manufacture and installation, but must, due to the nature of responsibilities involved, be presented only as a GUIDE for use by a qualified building designer or contractor. It is not intended that these recommendations be interpreted as superior to the building designer's design specification for handling, installing, restraining and bracing trusses and it does not preclude the use of other equivalent methods for restraining/bracing and providing stability for the walls, columns, floors, roofs and all the interrelated structural building components as determined by the contractor. Thus, SBCA and TPI expressly disclaim any responsibility for damages arising from the use, application, or reliance on the recommendations and information contained herein.

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B1WARN11x17 110705

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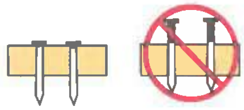
WARNING Disregarding permanent restraint/bracing is a major cause of truss field performance problems and has been known to lead to roof or floor system collapse.

¡ADVERTENCIA! *Descuidar el arriostre/restricción permanente es una causa principal de problemas de rendimiento del truss en campo y habia conocido a llevar al derrumbamiento del sistema del techo o piso.*

NOTICE Section 2303.4.1.3 of the International Building Code (IBC) requires the permanent individual truss member restraint/bracing for all trusses with clear spans 60 feet (18.3 m) or greater to be designed by a registered design professional.

Sección 2303.4.1.3 del International Building Code (IBC) requiere que la instalación temporal de restricción/arriostre para todos armazones con lapso libre de 60 pies (18.3 m) o más se diseña por un profesional del diseño registrado.

Restraint/Bracing Materials & Fasteners
Materiales y Cierres de Restricción/Arriostre



☑ Commonly used restraint/bracing materials include wood structural panels, gypsum board sheathing, stress-graded lumber, proprietary metal products, and metal purlins and straps.

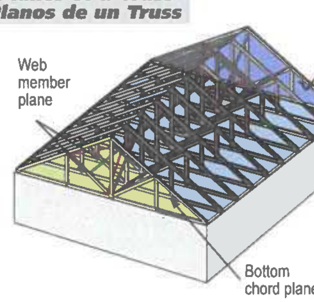
Materiales comunes de arriostrar/restringir incluyen paneles estructurales de madera, entablado de yeso, madera graduada por esfuerza, productos de metal patentados, y vigas de soporte y tiras de metal.

MINIMUM ATTACHMENT REQUIREMENTS FOR LUMBER RESTRAINT/BRACING[1,2]

Lumber Size	Minimum Nail Size	Minimum Number of Nails per Connection
2x4 stress-graded	10d (0.128x3") 12d (0.128x3.25") 16d (0.131x3.5")	2
2x6 stress-graded	10d (0.128x3") 12d (0.128x3.25") 16d (0.131x3.5")	3

[1] Other attachment requirements may be specified by the building designer or truss designer.
[2] The grade/size and attachment for bracing materials such as wood structural panels, gypsum board sheathing, proprietary metal restraint/bracing products, and metal purlins and straps are provided by the building designer.

Permanent Bracing for the Various Planes of a Truss
Arriostre Permanente para Varios Planos de un Truss



☑ Permanent bracing is important because it,
a) prevents out-of-plane buckling of truss members,
b) helps maintain proper truss spacing, and
c) resists and transfers lateral loads from wind and seismic forces.

El arriostre permanente es importante porque,
a) impide el torcer fuera-de-plano de los miembros del truss,
b) ayuda en mantener espaciamiento apropiado de los trusses, y
c) resiste y pasa las cargas laterales de viento y fuerzas sísmicas aplicadas al sistema del truss.

☑ Trusses require permanent bracing within ALL of the following planes:
1. Top chord plane
2. Bottom chord plane
3. Web member plane

Trusses requieren arriostre permanente dentro de TODOS los siguientes planos:
1. Plano de la cuerda superior
2. Plano de la cuerda inferior
3. Plano del miembro secundario

CAUTION The truss, or a portion of its members, will buckle (i.e., fail) at loads far less than design without permanent bracing.

¡CAUTELA! *Sin el arriostre permanente, del truss, o un parte de los miembros, torcerán (ej. fallarán) de cargas muchas menos que las cargas que el truss es diseñado a llevar.*

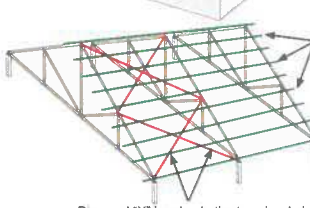
1. Permanent Bracing for the Top Chord Plane
Arriostre Permanente para el Plano de la Cuerda Superior

☑ Use plywood, oriented strand board (OSB), or wood or metal structural purlins that are properly braced. Attach to each truss.

Use contrachapado, panel de fibras orientado (OSB), o vigas de soporte de madera o metal que estén arriostrados apropiadamente. Sujete a cada truss.

☑ The Truss Design Drawing (TDD) provides information on the assumed support for the top chord.

El Dibujo del Diseño de Truss (TDD) provee información sobre el soporte supuesto para la cuerda superior.

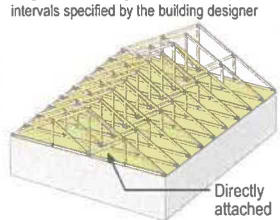


Diagonal "X" bracing in the top chord plane at intervals specified by the building designer

☑ Fastener size and spacing requirements and grade for the sheathing, purlins and bracing are provided in the building code and/or by the building designer.

El tamaño de cierre y requisitos de espaciamiento y grado para el entablado, vigas de soporte y arriostre son provistos en el código del edificio y/o por el diseñador del edificio.

2. Permanent Bracing for the Bottom Chord Plane
Arriostre Permanente para el Plano de la Cuerda Inferior



☑ Use rows of continuous lateral restraint with diagonal bracing, gypsum board sheathing or some other ceiling material capable of functioning as a diaphragm.

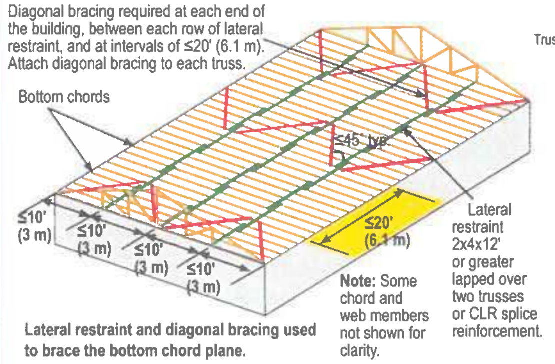
Use filas de restricción lateral continua con arriostre diagonal, entablado de yeso o cualquier otro material para techo que pueda funcionar como un diafragma.

☑ The TDD provides information on the assumed support for the bottom chord.

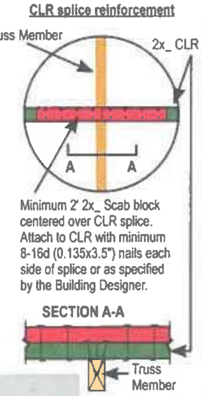
El TDD provee información sobre el soporte supuesto para la cuerda inferior.

☑ **Install bottom chord permanent lateral restraint at the spacing indicated on the TDD and/or by the building designer with a maximum of 10' (3 m) on center.**

Instale restricción lateral permanente de la cuerda inferior al espaciamiento indicado en el TDD y/o por el diseñador del edificio con un máximo de 10 pies en el centro.



Lateral restraint and diagonal bracing used to brace the bottom chord plane.



3. Permanent Bracing for the Web Member Plane
Arriostre Permanente Para El Plano del Miembro Secundario

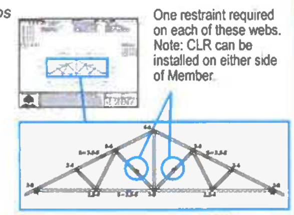
Web member permanent bracing collects and transfers buckling restraint forces and/or lateral loads from wind and seismic forces. The same bracing can often be used for both functions.

Arriostre permanente de los miembros secundarios recogen y pasan fuerzas de restricción de torcer y/o cargas laterales de viento y fuerzas sísmicas. A menudo el mismo arriostre puede ser usado para ambos funciones.

Individual Web Member Permanent Restraint & Bracing
Restricción y Arriostre Permanente de Miembros Secundarios Individuales

☑ Check the TDD to determine which web members (if any) require restraint to resist buckling.

Revisa el TDD para determinar cuales miembros secundarios (si algunos) requieren restricción para resistir el torcer.



☑ Restrain and brace with,
A. Continuous lateral restraint & diagonal bracing, or
B. Individual member web reinforcement.

Restrinja y arriostre con,
A. Restricción lateral continua y arriostre diagonal, o
B. Refuerzo de miembros secundarios individuales.

A. Continuous Lateral Restraint (CLR) & Diagonal Bracing
Restricción Lateral Continua (CLR) y Arriostre Diagonal

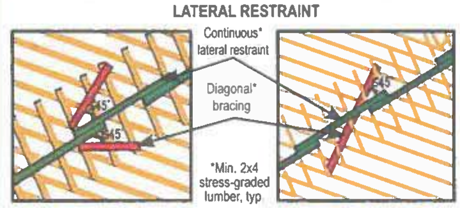
☑ Attach each row of CLR at the locations shown on the TDD.

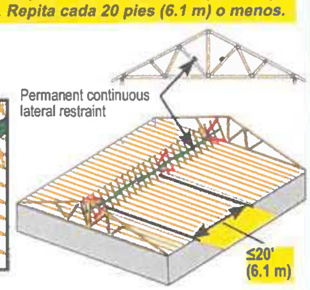
Sujete cada fila de CLR en las ubicaciones mostrados en el TDD.

☑ Install the diagonal bracing at an angle of less-than-or-equal-to 45° to the CLR and position so that it crosses the web in close proximity to the CLR. Attach the diagonal brace as close to the top and bottom chords as possible and to each web it crosses. **Repeat every 20' (6.1 m) or less.**

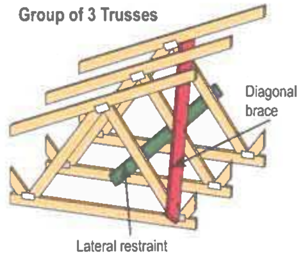
Instale el arriostre diagonal a un ángulo menos de o igual a 45° al CLR y colóquelo para que cruce la cuerda muy cerca del CLR. Sujete el arriostre diagonal tan próximo a las cuerdas superiores y inferiores como sea posible y a cada cuerda que lo cruza. ***Repita cada 20 pies (6.1 m) o menos.***

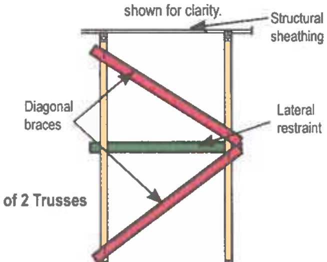
EXAMPLES OF DIAGONAL BRACING WITH CONTINUOUS LATERAL RESTRAINT





Note: Some chord and web members not shown for clarity.





☑ Lateral restraint & diagonal bracing can also be used with small groups of trusses (i.e., three or less). Attach the lateral restraint and diagonal brace to each web member.

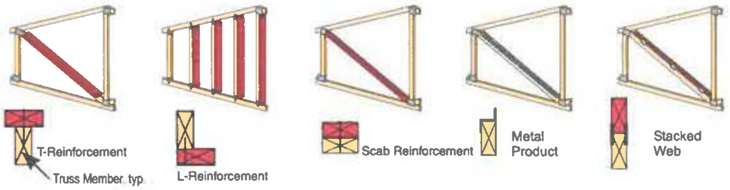
Restricción lateral y arriostre diagonal también puede ser usado con grupos pequeños de trusses (ej. tres o menos). Sujete la restricción lateral y el arriostre diagonal a cada miembro.

ALWAYS DIAGONALLY BRACE THE CONTINUOUS LATERAL RESTRAINT!
¡SIEMPRE ARRIOSTRE LA RESTRICCIÓN LATERAL CONTINUA DIAGONALMENTE!

B. Individual Web Member Reinforcement
Refuerzo de Miembros Secundarios Individuales

T-, L-, Scab, I-, U-Reinforcement, proprietary metal reinforcement and stacked web products provide an alternative for resisting web buckling.

T-, L-, costra, I-, U-Refuerzo, refuerzo de metal patentando y productos de miembros secundarios amontonados proveen una alternativa para resistir el torcer de los miembros secundarios.



☑ The following table may be used unless more specific information is provided.

La siguiente tabla puede ser usada a menos que información más específica está provista.

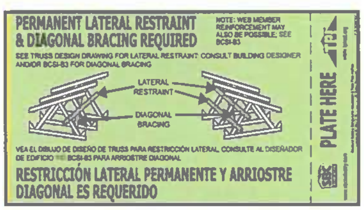
WEB REINFORCEMENT FOR SINGLE PLY TRUSSES[1]

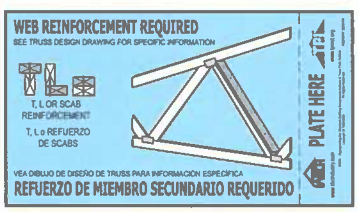
Specified CLR	Size of Truss Web	Type & Size of Web Reinforcement: T	L	Scab[2]	I or U	Grade of Web Reinforcement	Minimum Length of Web Reinforcement	Minimum Connection of Web Reinforcement to Web
1 Row	2x4	2x4	2x4	2x4		Same species and grade or better than web member	90% of web or extend to within 6" (150 mm) of end of web member, whichever is greater	16d (0.131x3.5") nails @ 6" (150 mm) on center[2]
	2x6	2x6	2x6	2x6				
	2x8	2x8	2x8	2x8				
2 Rows	2x4	---	---	---	2-2x4			
	2x6	---	---	---	2-2x6			
	2x8	---	---	---	2-2x8			

[1]Maximum web length is 14 feet (4.3m).
[2]Attach Scab Reinforcement to web with 2 rows of minimum 10d (0.120x3") nails at 6" (150 mm) on center.

☑ Some truss manufacturers provide additional assistance by using tags to mark the web members that require lateral restraint or reinforcement.

Algunos fabricantes de trusses marcan en el truss las ubicaciones de refuerzo o restricción lateral de miembros secundarios con etiquetas similares a las arriba.

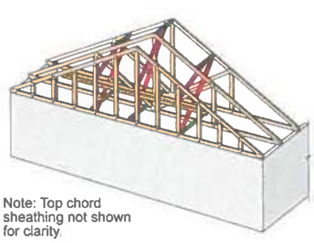


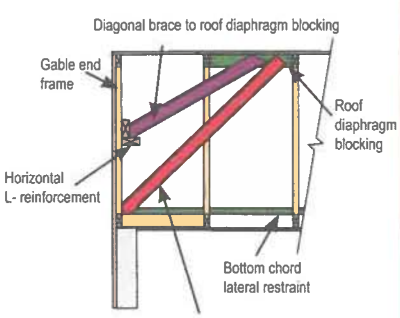


Web Member Plane Permanent Building Stability Bracing to Transfer Wind & Seismic Forces
Arriostre de Estabilidad Permanente del Edificio del Plano de Miembros Secundarios para Desplazar Fuerzas de Viento y Fuerzas Sísmicas

☑ The web member restraint or reinforcement specified on a TDD is required to resist buckling due to axial forces caused by the in-plane loads applied to the truss. Additional restraint and bracing within the web member plane may also be required to transfer lateral forces due to wind and/or seismic loads applied perpendicular to the plane of the trusses. This restraint and bracing is typically specified by the building designer.

La restricción o refuerzo de miembros secundarios especificada en un TDD es requerido para resistir la deformación bajo fuerzas axiales causadas por cargas verticales aplicadas al truss. Restricción adicional y el aparato ortopédico dentro del plano miembro de banda también puede ser necesaria para transferir fuerzas laterales debidas al viento y / o cargas sísmicas aplicadas perpendicular al plano de las cerchas. Esta restricción y arriostre es típicamente provisto por el diseñador del edificio.





Gable end/wall permanent diagonal bracing. Locate in line with bottom chord permanent CLR or as specified by the building designer.

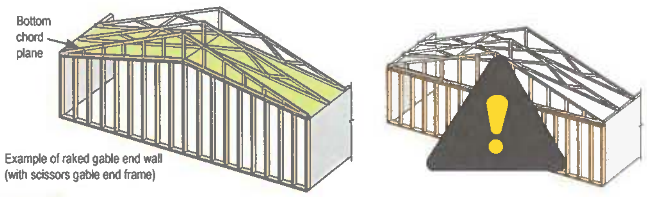
☑ Some truss designers provide general design tables and details to assist the building designer in determining the bracing required to transfer lateral loads due to wind and/or seismic forces from the gable end frame into the roof and/or ceiling diaphragm.

Algunos diseñadores de trusses proveen tablas y detalles de diseño generales para asistir el diseñador del edificio en determinar el arriostre requerido para pasar cargas laterales debidas a fuerzas de viento y/o fuerzas sísmicas del armazón hastial al diafragma del techo.

Gable End Frames and Trusses with Sloped Bottom Chords
Armazones Hastiales Y Trusses con Cuerdas Inferiores Pendientes

☑ The gable end frame should always match the profile of the adjacent trusses to ensure the top of the end wall aligns with, and can be braced by, the ceiling diaphragm.

El armazón hastial siempre debe encajar el perfil de los trusses contiguos para permitir la instalación de restricción y arriostre apropiada de la cuerda inferior a menos que arriostre especial es diseñado para soportar la pared de extremo.



Example of raked gable end wall (with scissors gable end frame)

CAUTION Using a flat bottom chord gable end frame with adjacent trusses that have sloped bottom chords is prohibited by some building codes as adequate bracing of this condition is difficult and sometimes impossible. Special end wall bracing design considerations are required by the building designer if the gable end frame profile does not match the adjacent trusses.

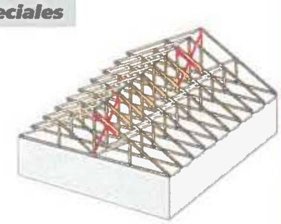
¡CAUTELA! *El uso de un armazón hastial de la cuerda inferior con trusses contiguos cuales tienen cuerdas inferiores pendientes es prohibido por algunos códigos de edificios porque arriostre adecuado de esta condición es difícil y a veces imposible. Consideraciones especiales de diseño para el arriostre de la pared de extremo son requeridos por el diseñador del edificio si el perfil del armazón hastial no hace juego con los trusses contiguos.*

Permanent Bracing for Special Conditions
Arriostre Permanente Para Condiciones Especiales

Sway Bracing—*Arriostre de "Sway"*

☑ "Sway" bracing is installed at the discretion of the building designer to help stabilize the truss system and minimize the lateral movement due to wind and seismic loads.

Arriostre de "sway" está instalado por la discreción del diseñador del edificio para ayudar en estabilizar el sistema de trusses y para minimizar el movimiento lateral debido a cargas de viento y cargas sísmicas.



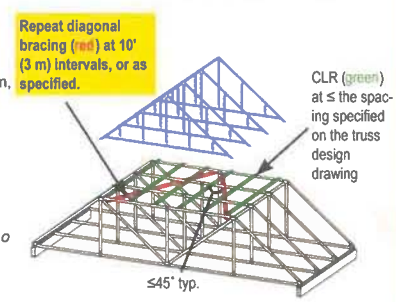
☑ Sway bracing installed continuously across the building also serves to distribute gravity loads between trusses of varying stiffness.

Arriostre de "sway" que es instalada continuadamente al través del edificio también es usado para distribuir las cargas de gravedad entre trusses de rigidez variando.

Permanent Restraint/Bracing for the Top Chord in a Piggyback Assembly
Restricción/Arriostre Permanente para la Cuerda Superior en un Ensamblaje de Piggyback

☑ Provide restraint and bracing by:
- using rows of minimum 4x2 stress-graded lumber CLR and diagonal bracing, or
- connecting the CLR into the roof diaphragm, or
- adding structural sheathing or bracing frames, or
- some other equivalent means.

Provee restricción y arriostre por:
- *usando filas de 4x2 CLR de madera graduada por esfuerzo y arriostre diagonal, o*
- *conectando el CLR al diafragma del echo, o*
- *añadiendo entablado estructural o armazones de arriostre, o*
- *algunos otros métodos equivalentes.*

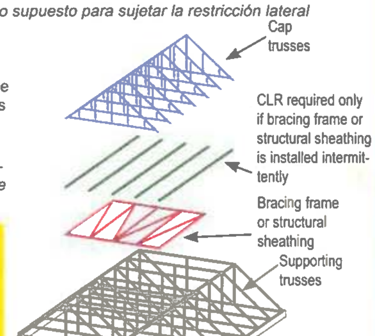


☑ Refer to the TDD for the maximum assumed spacing between rows of lateral restraint (e.g. purlins) attached to the top chord of the supporting truss.

Consulte el TDD para el espaciamiento máximo supuesto para sujetar la restricción lateral (p. ej., vigas) a la cuerda superior del truss soportante.

☑ The TDD provides the assumed thickness of the restraint and minimum connection requirements between the cap and the supporting truss or restraint.

El TDD provee el grosor supuesto de la restricción y los requisitos de conexión mínimos entre la capa y el truss soportante o la restricción.



☑ If diagonal bracing is used to restrain the CLR(s), repeat **at 10' (3 m) intervals, or as specified** in the construction documents.

Si arriostre diagonal es usado para restringir el/los CLR(s), repita en ***intervalos de 10 pies o como especificado*** *en los documentos de construcción.*

SBCA WTCA Wood Truss Council
6300 Enterprise Lane • Madison, WI 53719
608-274-4849 • sbcindustry.com

TPI TRUSS PLATE INSTITUTE
218 N. Lee St., Ste. 312 • Alexandria, VA 22314
703-683-1010 • tpinst.org

B3WEB11x17 170825

This document summarizes the information provided in Section B3 of the 2013 Edition (updated March 2015) of Building Component Safety Information BCSI – Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses. Copyright 2004-2017 Structural Building Components Association and Truss Plate Institute. All rights reserved. This guide or any part thereof may not be reproduced in any form without the written permission of the publishers. This document should appear in more than one color. Printed in the United States of America.

TrusPro Structural Components Inc

P.O. Box 850
Guadalupe, CA. 93434
Phone: (805) 343-2555 Fax: (805) 343-2377
Steve@TrusPro.com   www.TrusPro.com

Order#: 5433M
Salesperson: Mark Herring
Designer: Mark Herring
Company Code: Owner
Invoice#: 5433M

Bill Of Lading

Customer: _Owner/Builder

Contact:

Job Name: 5433M

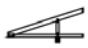
Job Description: Anderson Residence

Phone **Fax**

Bill To	
Name:	**_Owner/Builder**
Address:	
City, State, Zip:	**, CA ______**
Phone:	**Fax:**

Ship To	
Name:	
Address:	**5100 Peachy Canyon**
City, State, Zip:	**Paso Robles, CA 93446**
Phone:	**(___) ___-_____ Fax: (___) ___-_____**

						Overhangs		**Heel Heights**		
Qty	**Truss ID**	**Profile**	**Span**	**Pitch**	**Wght.**	**Left**	**Right**	**Left**	**Right**	**Height**
2	1A (2 Ply)		31-0-0	4	171			0-6-1	0-6-1	5-1-13
6	1A1		31-0-0	4	145			0-6-1	0-6-1	5-8-1
1	2B (2 Ply)		30-0-0	4	172			0-6-1	0-6-1	5-1-13
10	2B1		30-0-0	4	140			0-6-1	0-6-1	5-6-1
12	2B2		30-0-0	4	160			0-6-1	0-6-1	5-6-1
1	2B3 (2 Ply)		30-0-0	4	170			0-6-1	0-6-1	5-1-13
2	3C (2 Ply)		19-6-0	4	101			0-6-1	0-6-1	3-9-5
10	3C1		19-6-0	4	87			0-6-1	0-6-1	3-9-1
15	3C2		19-6-0	4	86			0-6-1	0-6-1	3-9-1
4	4DA		19-7-12	2.828	106			0-6-1	5-1-10	5-1-10
3	4DB		19-7-12	2.828	108			0-6-1	5-1-10	5-1-10
1	4DBX		19-7-12	2.828	111			0-6-1	5-1-10	5-1-10
4	4DC		13-8-3	2.828	70			0-6-1	3-8-12	3-8-12
16	J02		1-10-15	4	7			0-6-1	1-1-11	1-1-11
8	J02A		1-10-15	4	7			0-6-1	1-1-11	1-1-11
16	J04		3-10-15	4	14			0-6-1	1-9-11	1-9-11

Qty	Truss ID	Profile	Span	Pitch	Wght.	Overhangs Left	Overhangs Right	Heel Heights Left	Heel Heights Right	Height
8	J04A		3-10-15	4	14			0-6-1	1-9-11	1-9-11
15	J06		5-10-15	4	22			0-6-1	2-5-11	2-5-11
8	J06A		5-10-15	4	22			0-6-1	2-5-11	2-5-11
1	J06B		5-10-15	4	23			0-6-1	2-5-11	2-5-11
15	J08		7-10-15	4	28			0-6-1	3-1-11	3-1-11
6	J08A		7-10-15	4	29			0-6-1	3-1-11	3-1-11
2	J08AZ		7-10-15	4	29			0-6-1	3-1-11	3-1-11
1	J08B		7-10-15	4	29			0-6-1	3-1-11	3-1-11
7	J10		9-10-15	4	35			0-6-1	3-9-11	3-9-11
2	J10A		9-10-15	4	35			0-6-1	3-9-11	3-9-11
4	J10AX		5-10-15	4	45	4-0-0		1-10-1	3-9-11	3-9-11
2	J10AZ		9-10-15	4	41			0-6-1	3-9-11	3-9-11
1	J10B		9-10-15	4	41			0-6-1	3-9-11	3-9-11
2	J10C		9-8-4	4	34			0-6-1	3-8-13	3-8-13
7	J12		11-10-15	4	53			0-6-1	4-5-11	4-5-11
2	J12A		11-10-15	4	42			0-6-1	4-5-11	4-5-11
4	J12AX		7-10-15	4	54	4-0-0		1-10-1	4-5-11	4-5-11
2	J12AZ		11-10-15	4	42			0-6-1	4-5-11	4-5-11
1	J12B		11-10-15	4	50			0-6-1	4-5-11	4-5-11
4	J14		13-11-4	4	64			0-6-1	5-1-13	5-1-13
6	J14AX		9-11-4	4	67	4-0-0		1-10-1	5-1-13	5-1-13

Total Board Feet	Total Lineal Feet	Total Trusses	Max Span	Total Truss Weight	Max Truss Height
7382	9061	217	31-0-0	13124 lbs	5-8-1

Additional Materials Description	Qty	Unit Label
2x6 solid block	100	f

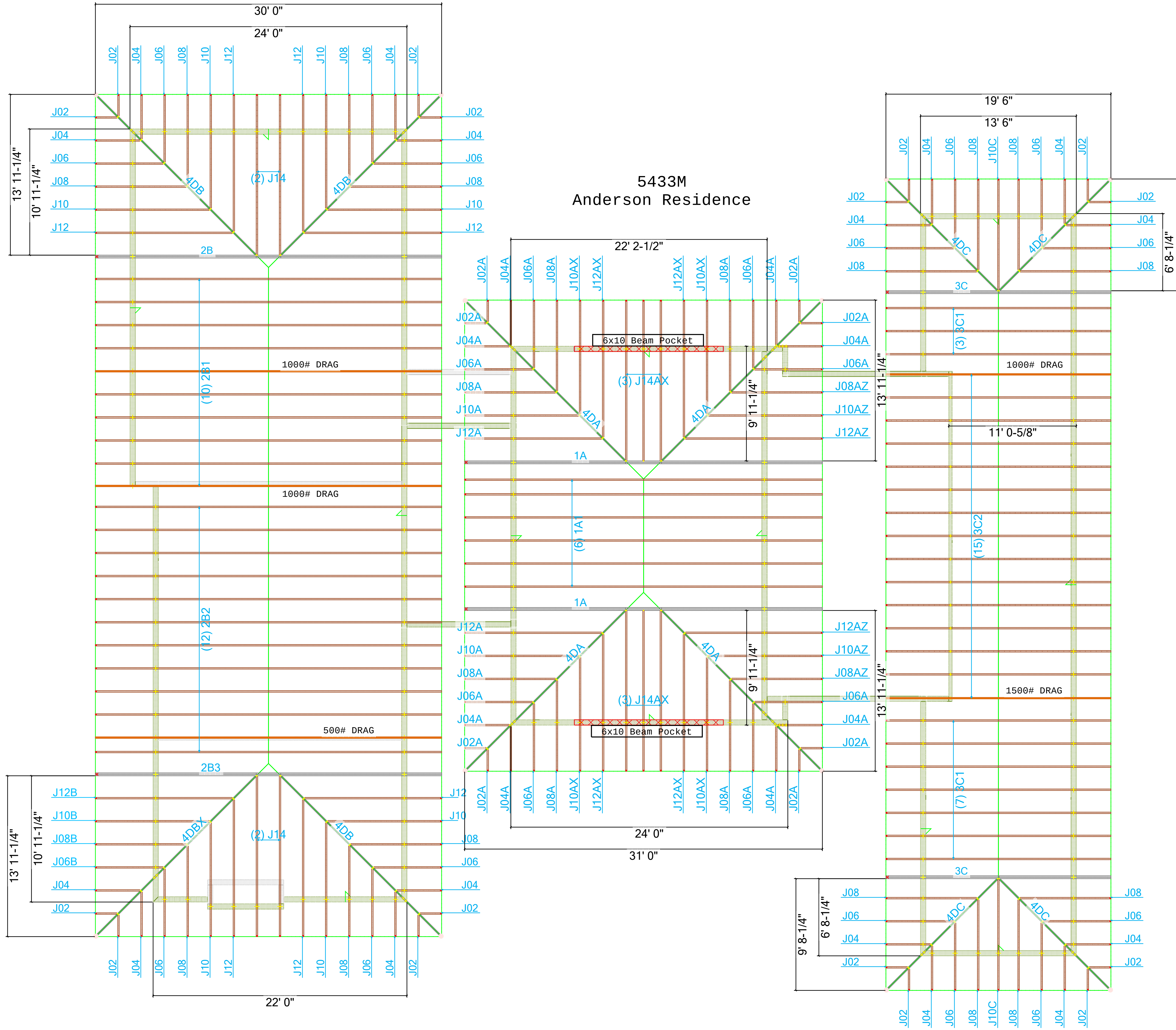
WARRANTIES PROVISIONS:
Supplier warrants for one year from date of delivery that its manufactured Products shall be new and of industry standard quality in the trade and within the description set forth in this Agreement. Any items not manufactured by Supplier are warranted only as warranted by the manufacturer of such items, otherwise all such items are sold on an "AS IS" basis. THE FOREGOING WARRANTIES ARE EXCLUSIVE, AND ARE IN LIEU OF ALL OTHER WARRANTIES (WHETHER WRITTEN, ORAL, OR IMPLIED AND INCLUDING ANY REGARDING THE MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) NOT SPECIFIED HEREIN, RESPECTING THIS CONTRACT. Supplier's warranty shall exclude losses caused by improper operating, storing, handling, installation, and bracing. Supplier's obligations and liabilities under this Contract are expressly and exclusively limited to repair or replacement of defective Products or, at the option of the Supplier, to the refund of the purchase price. IN NO EVENT SHALL THE CONTRACTOR BE ENTITLED TO RECOVER FOR INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGE, INCLUDING THE LOSS OF PROFITS, OR OTHER COMMERCIAL LOSS.

DEFAULT AND TERMINATION PROVISIONS:
In case of a good faith claim against Supplier for any defect or non-conformity with respect to the Products sold, written notice setting forth such defect or non-conformity must be submitted to Supplier within 30 days of truss delivery. Supplier shall have no less than 7 business days from date of receipt of such notice to either accept such claim or commence any necessary repair or replacement of Product. Upon termination for convenience, Supplier shall be paid for all Products manufactured and delivered.

By signing below, it is agreed that at least one set of bracing and installation instructions have been received with this order.

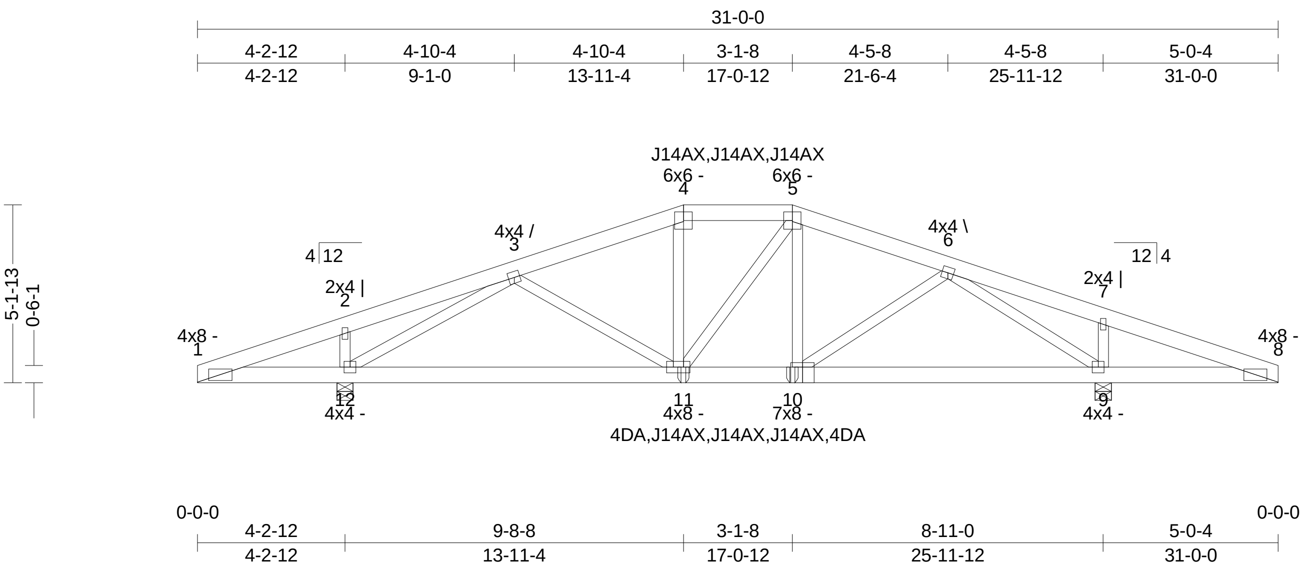
Accepted By:____ Date:______________

5433M
Anderson Residence



	TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:1A Job: 5433M Date: 09/22/21 10:30:36 Page: 1 of 2 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
31-0-0	4/12	2	0-0-0	0-0-0	0-0-0	0-0-0	2	21 in	171 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI		Deflection		L/	(loc)	Allowed
Carried Loads (psf)	Bldg Code :	CBC 2019/	TC :	0.15 (7-8)	Vert TL:	0.07 in	L / 999	(10-11)	L / 240
TCLL : 20		TPI 1-2014	BC :	0.21 (11-12)	Vert LL:	0.02 in	L / 999	(11-12)	L / 360
TCDL : 15(rake)	Rep Mbr :	No	Web :	0.24 (3-12)	Cant / OH TL:	0.01 in	2L / 999	(1-1)	2L / 120
BCLL : 0	Lumber D.O.L. :	125 %			Cant / OH LL:	0.01 in	2L / 999	(1-1)	2L / 120
BCDL : 10					Horz TL:	0.02 in		9	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
12	1	5.5 in	1.50 in	1,539 lbs	·	-296 lbs	·	-296 lbs	-18 lbs
9	1	5.5 in	1.50 in	1,655 lbs	·	-321 lbs	·	-321 lbs	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 6
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Load Case Lr1: Std Live Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	31-0-0	Down	Proj	15 plf	15 plf	
Top	0-0-0	12-2-6	Down	Proj	20 plf	18.67 plf	
Top	12-2-6	13-11-4	Down	Proj	18.67 plf	1.25 plf	
Top	17-0-12	18-9-11	Down	Proj	1.25 plf	18.67 plf	
Top	18-9-11	31-0-0	Down	Proj	18.67 plf	20 plf	

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:1A
Job: 5433M
Date: 09/22/21 10:30:36

Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
31-0-0	4/12	2	0-0-0	0-0-0	0-0-0	0-0-0	2	21 in	171 lbs

Load Case D1: Std Dead Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	31-0-0	Down	Proj	11.25 plf	11.25 plf	
Top	0-0-0	12-2-6	Down	Proj	15 plf	14 plf	
Top	12-2-6	13-11-4	Down	Proj	14 plf	0.94 plf	
Top	17-0-12	18-9-11	Down	Proj	0.94 plf	14 plf	
Top	18-9-11	31-0-0	Down	Proj	14 plf	15 plf	
Bot	0-0-0	31-0-0	Down	Proj	7.5 plf	7.5 plf	
Bot	0-0-0	12-2-6	Down	Proj	10 plf	9.34 plf	
Bot	12-2-6	13-11-4	Down	Proj	9.34 plf	0.62 plf	
Bot	17-0-12	18-9-11	Down	Proj	0.62 plf	9.34 plf	
Bot	18-9-11	31-0-0	Down	Proj	9.34 plf	10 plf	

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	3-4	0.059	-874 lbs		5-6	0.056	-833 lbs	
	4-5	0.059	-807 lbs					
BC	9-10	0.179	596 lbs	(-168 lbs)	11-12	0.205	685 lbs	(-184 lbs)
	10-11	0.177	780 lbs	(-203 lbs)				
Web	3-12	0.242	-929 lbs					
	6-9	0.238	-948 lbs					

Truss to Truss Connection Summary

Carried Truss	Carrying Chord	Carrying Offset
4DA	BC	13-11-4
J14AX	TC	14-0-0
J14AX	BC	14-0-0
J14AX	TC	15-6-0
J14AX	BC	15-6-0
J14AX	TC	17-0-0
J14AX	BC	17-0-0
4DA	BC	17-0-12

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Provide adequate drainage to prevent ponding.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) The forces shown for this multi-ply truss are per ply and the reactions are for all plies. Two identical trusses shall be built and attached as follows, per ply:
0.131"x3" Nails TC - 2 staggered rows @ 12 in oc, BC - 2 staggered rows @ 12 in oc , Webs - 1 row @ 12 in oc.

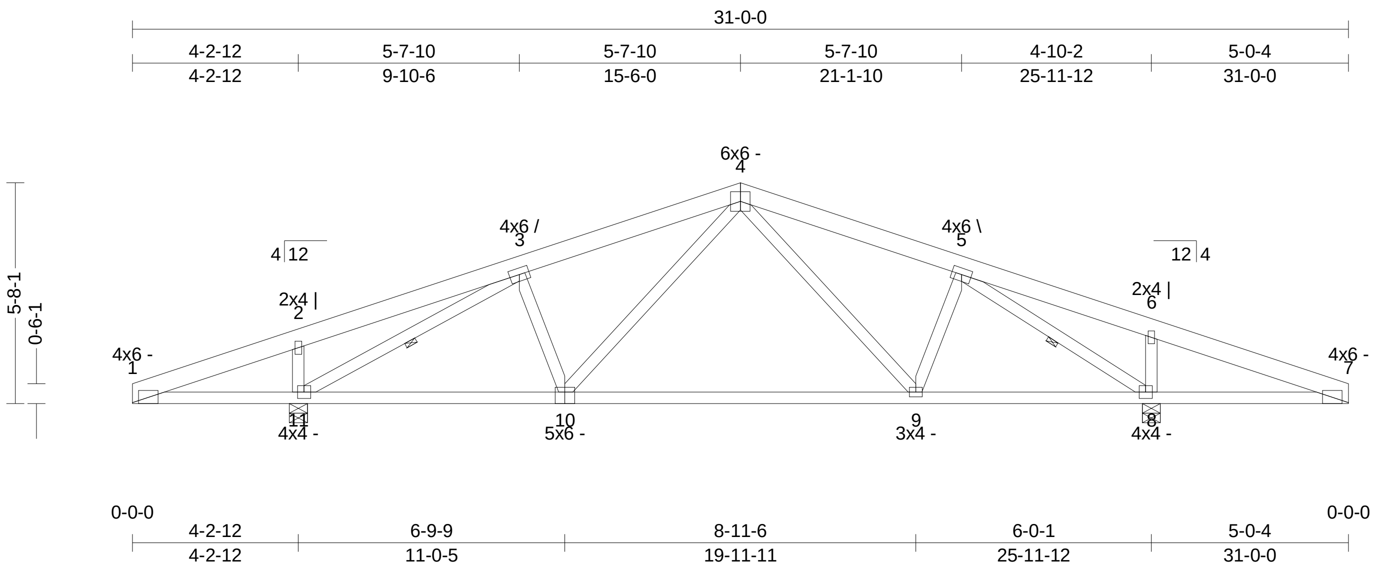
Provided the hanger connections do not adequately transfer the applied load to all plies: in addition to connectors shown above, attach each pair of girder plies with supplemental 0.131"x3" Nails as follows within 24" of the location shown:
BC: 13-11-4,(2)Connectors
BC: 17-0-12,(2)Connectors

Connectors shall not encroach on other girder ply connectors or truss-to-truss connectors in accordance with the NDS or the connector manufacturer recommendations.
8) When applied loads are on one side of girder, do not flip girder during girder connector installation, install connectors on the girder side where supported loads are applied. When applied loads are on both sides of girder, double the spacing and install half of the connectors on one side of girder and then flip the girder to install the other half of the connectors on the opposite side (at double the connector spacing). Connectors on opposite sides of the girder shall be offset.
9) Lateral bracing shall be attached to each ply.
10) All fasteners minimum 2-1/2" long, unless otherwise noted.
11) Nails in 1st and 2nd ply shall be offset from succes sive plies by 1/2 the nail spacing.
12) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

	TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:1A1 Job: 5433M Date: 09/22/21 10:30:37 Page: 1 of 1 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
31-0-0	4/12	6	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	145 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI		Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/	TC :	0.34 (6-7)	Vert TL:	0.35 in	L / 734	(9-10)	L / 240
TCDL : 15(rake)		TPI 1-2014	BC :	0.59 (10-11)	Vert LL:	0.14 in	L / 999	(9-10)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web :	0.46 (3-11)	Cant / OH TL:	0.05 in	2L / 999	(7-8)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %			Cant / OH LL:	0.02 in	2L / 999	(7-8)	2L / 120
					Horz TL:	0.04 in		8	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
11	1	5.5 in	1.49 in	1,393 lbs	-	-79 lbs	-114 lbs	-114 lbs	25 lbs
8	1	5.5 in	1.59 in	1,490 lbs	-	-85 lbs	-145 lbs	-145 lbs	-

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 9-1-0, Purlin design by Others.
Web: One Midpoint Row: 3-11, 5-8

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	1-2	0.322	460 lbs	(-153 lbs)	3-4	0.175	-1,220 lbs		5-6	0.319	535 lbs	(-119 lbs)
	2-3	0.305	436 lbs	(-96 lbs)	4-5	0.174	-1,101 lbs		6-7	0.337	583 lbs	(-180 lbs)
BC	7-8	0.171	-495 lbs		9-10	0.572	943 lbs		11-1	0.205	-396 lbs	
	8-9	0.536	954 lbs		10-11	0.593	1,111 lbs	(-4 lbs)				
Web	2-11	0.095	-461 lbs		5-8	0.421	-1,569 lbs					
	3-11	0.463	-1,551 lbs		6-8	0.097	-461 lbs					

Notes

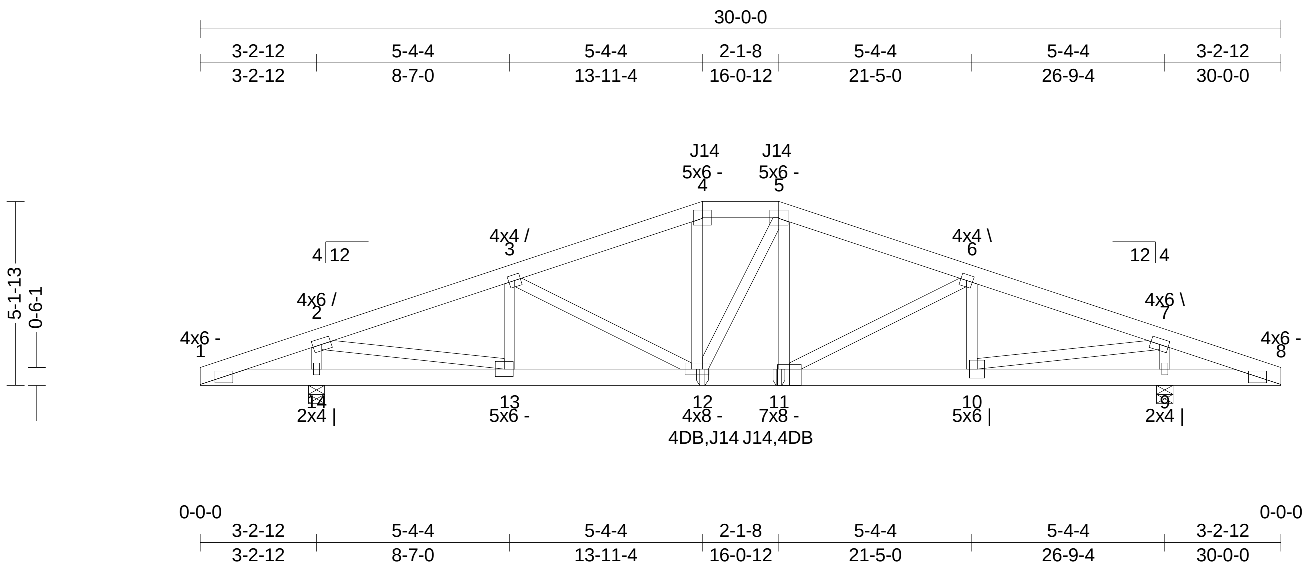
1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
5) Lateral bracing shown is for illustration purposes only and may be placed on either edge of truss member.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Indicates lateral bracing required perpendicular to the plane of the truss at either the midpoint (one shown) or third points (two shown), bracing by others. See BCSI-B3 for additional information.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:2B
Job: 5433M
Date: 09/22/21 10:30:38
Page: 1 of 2
Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
30-0-0	4/12	1	0-0-0	0-0-0	0-0-0	0-0-0	2	23.62 in	172 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
Carried Loads (psf)	Bldg Code :	CBC 2019/	TC : 0.17 (2-3)	Vert TL:	0.19 in	L / 999	(10-11)	L / 240
TCLL : 20		TPI 1-2014	BC : 0.33 (11-12)	Vert LL:	0.05 in	L / 999	(11-12)	L / 360
TCDL : 15(rake)	Rep Mbr :	No	Web : 0.72 (7-10)	Cant / OH TL:	0.01 in	2L / 999	(1-1)	2L / 120
BCLL : 0	Lumber D.O.L. :	125 %		Cant / OH LL:	0.01 in	2L / 999	(8-8)	2L / 120
BCDL : 10				Horz TL:	0.04 in		9	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
14	1	5.5 in	1.50 in	2,657 lbs	·	-406 lbs	·	-406 lbs	-21 lbs
9	1	5.5 in	1.50 in	2,669 lbs	·	-409 lbs	·	-409 lbs	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 6
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Load Case Lr1: Std Live Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	30-0-0	Down	Proj	19.37 plf	19.37 plf	
Top	0-0-0	12-2-6	Down	Proj	20 plf	18.67 plf	
Top	12-2-6	13-11-4	Down	Proj	18.67 plf	1.25 plf	
Top	16-0-12	17-9-11	Down	Proj	1.25 plf	18.67 plf	
Top	17-9-11	30-0-0	Down	Proj	18.67 plf	20 plf	

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

TrusPro Inc.

695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:2B
Job: 5433M
Date: 09/22/21 10:30:38

Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
30-0-0	4/12	1	0-0-0	0-0-0	0-0-0	0-0-0	2	23.62 in	172 lbs

Load Case D1: Std Dead Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	30-0-0	Down	Proj	14.53 plf	14.53 plf	
Top	0-0-0	12-2-6	Down	Proj	15 plf	14 plf	
Top	12-2-6	13-11-4	Down	Proj	14 plf	0.94 plf	
Top	16-0-12	17-9-11	Down	Proj	0.94 plf	14 plf	
Top	17-9-11	30-0-0	Down	Proj	14 plf	15 plf	
Bot	0-0-0	30-0-0	Down	Proj	9.69 plf	9.69 plf	
Bot	0-0-0	12-2-6	Down	Proj	10 plf	9.34 plf	
Bot	12-2-6	13-11-4	Down	Proj	9.34 plf	0.62 plf	
Bot	16-0-12	17-9-11	Down	Proj	0.62 plf	9.34 plf	
Bot	17-9-11	30-0-0	Down	Proj	9.34 plf	10 plf	

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	2-3	0.174	-2,011 lbs		4-5	0.140	-2,131 lbs		6-7	0.173	-2,025 lbs					
	3-4	0.156	-2,291 lbs		5-6	0.155	-2,282 lbs									
BC	10-11	0.328	1,884 lbs	(-308 lbs)	12-13	0.325	1,870 lbs	(-305 lbs)								
	11-12	0.329	2,113 lbs	(-355 lbs)												
Web	2-14	0.237	-1,181 lbs		3-12	0.127	321 lbs	(-64 lbs)	6-11	0.121	304 lbs	(-61 lbs)	7-9	0.238	-1,187 lbs	
	2-13	0.711	1,796 lbs	(-288 lbs)	4-12	0.200	506 lbs	(-90 lbs)	6-10	0.078	-376 lbs					
	3-13	0.078	-378 lbs		5-11	0.201	507 lbs	(-91 lbs)	7-10	0.717	1,812 lbs	(-292 lbs)				

Truss to Truss Connection Summary

Carried Truss	Carrying Chord	Carrying Offset
4DB	BC	13-11-4
J14	TC	14-0-0
J14	BC	14-0-0
J14	TC	16-0-0
J14	BC	16-0-0
4DB	BC	16-0-12

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Provide adequate drainage to prevent ponding.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) The forces shown for this multi-ply truss are per ply and the reactions are for all plies. Two identical trusses shall be built and attached as follows, per ply:
0.131"x3" Nails TC - 2 staggered rows @ 12 in oc, BC - 2 staggered rows @ 12 in oc , Webs - 1 row @ 12 in oc.

Provided the hanger connections do not adequately transfer the applied load to all plies: in addition to connectors shown above, attach each pair of girder plies with supplemental 0.131"x3" Nails as follows within 24" of the location shown:
BC: 13-11-4,(6)Connectors
BC: 16-0-12,(6)Connectors

Connectors shall not encroach on other girder ply connectors or truss-to-truss connectors in accordance with the NDS or the connector manufacturer recommendations.
8) When applied loads are on one side of girder, do not flip girder during girder connector installation, install connectors on the girder side where supported loads are applied. When applied loads are on both sides of girder, double the spacing and install half of the connectors on one side of girder and then flip the girder to install the other half of the connectors on the opposite side (at double the connector spacing). Connectors on opposite sides of the girder shall be offset.
9) Lateral bracing shall be attached to each ply.
10) All fasteners minimum 2-1/2" long, unless otherwise noted.
11) Nails in 1st and 2nd ply shall be offset from successive plies by 1/2 the nail spacing.
12) Listed wind uplift reactions based on MWFRS & C&C loading.

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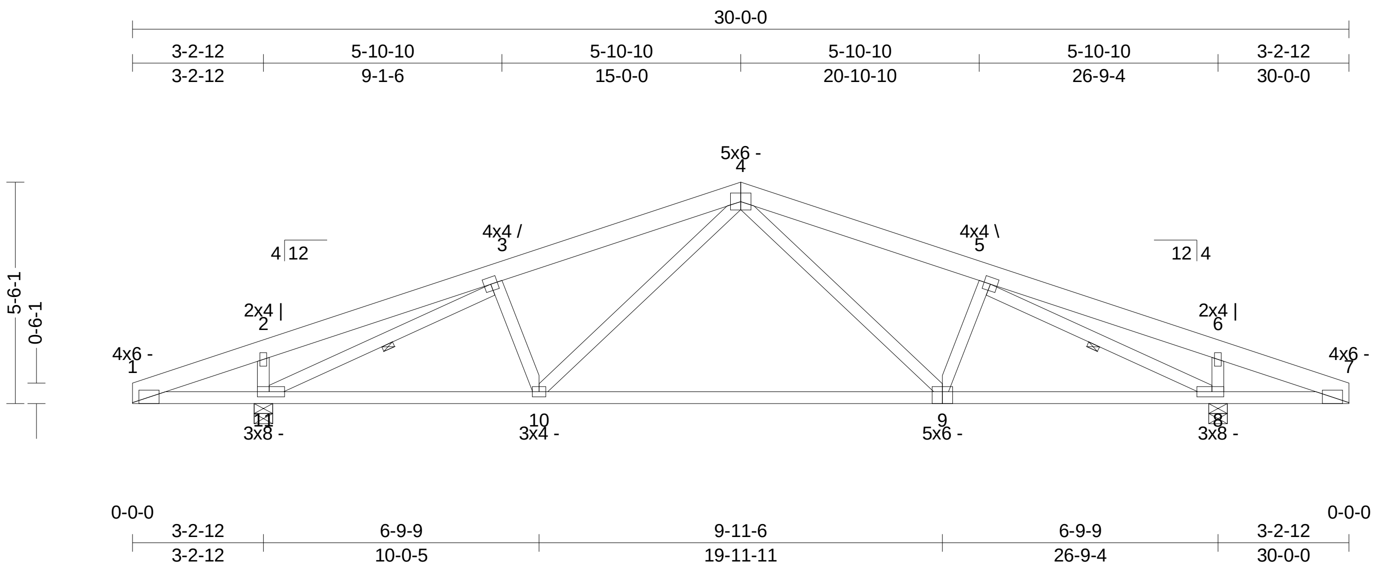
TrueBuild® Truss Software v5.6.375
Eagle Metal Products

TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:2B1 Job: 5433M Date: 09/22/21 10:30:38 Page: 1 of 1 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
30-0-0	4/12	10	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	140 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/	TC : 0.31 (1-2)	Vert TL:	0.54 in	L / 513	(9-10)	L / 240
TCDL : 15(rake)		TPI 1-2014	BC : 0.73 (10-11)	Vert LL:	0.2 in	L / 999	(9-10)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web : 0.50 (3-11)	Cant / OH TL:	0.03 in	2L / 999	(1-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.02 in UP	2L / 999	(1-1)	2L / 120
				Horz TL:	0.07 in		8	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
11	1	5.5 in	1.48 in	1,385 lbs	·	-79 lbs	-91 lbs	-91 lbs	-1,003 lbs
8	1	5.5 in	1.48 in	1,385 lbs	·	-79 lbs	-91 lbs	-91 lbs	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.
Web: One Midpoint Row: 3-11, 5-8

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects due to a 1,000 lbs (31.6 plf) drag load distributed along the TC rake from each direction.
3) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
4) Minimum storage attic loading has been applied in accordance with IBC 1607.1
5) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	1-2	0.306	310 lbs	(-110 lbs)	3-4	0.207	-1,585 lbs		5-6	0.289	312 lbs	(-158 lbs)
	2-3	0.289	315 lbs	(-162 lbs)	4-5	0.207	-1,585 lbs		6-7	0.306	310 lbs	(-110 lbs)
BC	8-9	0.730	1,468 lbs	(-31 lbs)	10-11	0.730	1,468 lbs	(-31 lbs)				
	9-10	0.696	1,217 lbs									
Web	2-11	0.092	-452 lbs		4-10	0.148	386 lbs		5-8	0.495	-1,712 lbs	
	3-11	0.495	-1,712 lbs		4-9	0.148	390 lbs		6-8	0.092	-452 lbs	

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
5) Lateral bracing shown is for illustration purposes only and may be placed on either edge of truss member.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Indicates lateral bracing required perpendicular to the plane of the truss at either the midpoint (one shown) or third points (two shown), bracing by others. See BCSI-B3 for additional information.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

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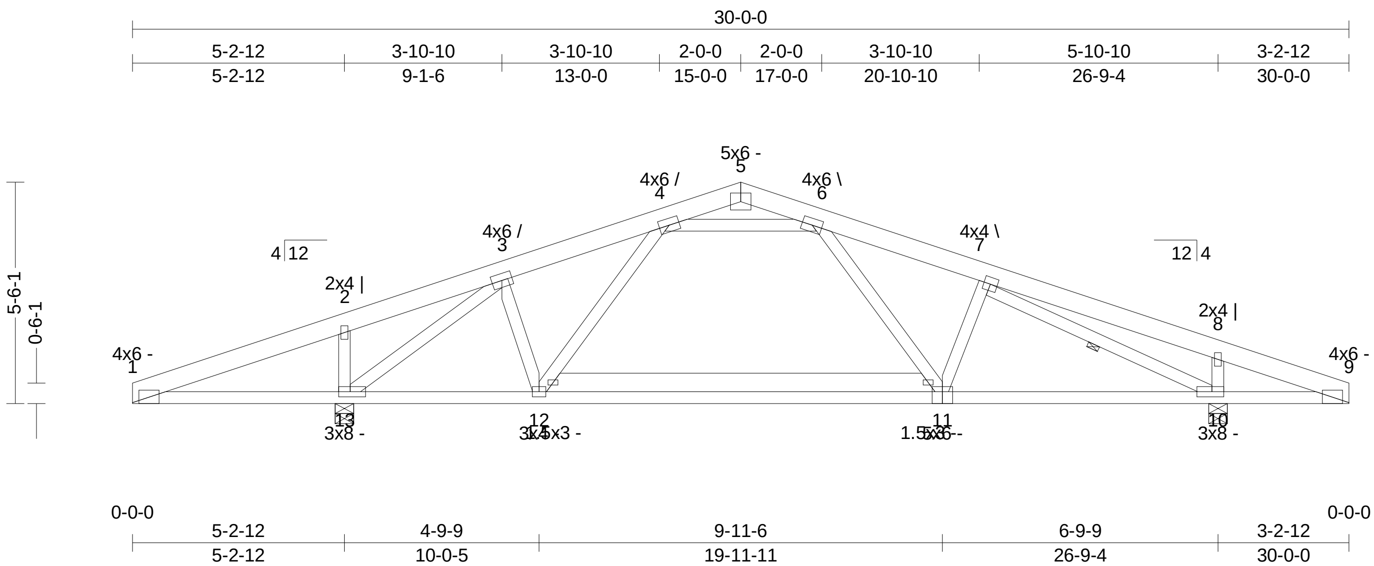
TrueBuild® Truss Software v5.6.375
Eagle Metal Products

	TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:2B2 Job: 5433M Date: 09/22/21 10:30:39 Page: 1 of 2 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
30-0-0	4/12	12	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	160 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI		Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/ TPI 1-2014	TC :	0.36 (1-2)	Vert TL:	0.77 in	L / 328	(11-12)	L / 240
TCDL : 15(rake)			BC :	0.90 (11-12)	Vert LL:	0.3 in	L / 834	(11-12)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web :	0.85 (3-13)	Cant / OH TL:	0.08 in	2L / 999	(13-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %			Cant / OH LL:	0.04 in UP	2L / 999	(1-1)	2L / 120
					Horz TL:	0.05 in		10	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
13	1	5.5 in	1.67 in	1,568 lbs	·	-54 lbs	-125 lbs	-125 lbs	-1,003 lbs
10	1	5.5 in	1.50 in	1,319 lbs	·	-44 lbs	-52 lbs	-52 lbs	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 8-8-0, Purlin design by Others.
Web: One Midpoint Row: 7-10

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects due to a 1,000 lbs (31.6 plf) drag load distributed along the TC rake from each direction.
3) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
4) Minimum storage attic loading has been applied in accordance with IBC 1607.1
5) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Load Case D1: Std Dead Load

Point Loads

Member	Location	Direction	Load	Trib Width
Bot	13-0-0	Down	50 lbs	
Bot	17-0-0	Down	50 lbs	

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	1-2	0.357	632 lbs	(-177 lbs)	3-4	0.248	-1,090 lbs		6-7	0.294	-1,468 lbs		8-9	0.306	332 lbs	(-103 lbs)
	2-3	0.339	559 lbs	(-117 lbs)	4-5	0.246	-360 lbs		7-8	0.289	326 lbs	(-130 lbs)				
BC	10-11	0.854	1,364 lbs		12-13	0.877	1,176 lbs	(-268 lbs)								
	11-12	0.898	1,117 lbs		13-1	0.167	-532 lbs									
Web	2-13	0.103	-485 lbs		4-12	0.179	-304 lbs		7-10	0.469	-1,620 lbs					
	3-13	0.847	-1,608 lbs		4-6	0.271	-789 lbs		8-10	0.092	-455 lbs					
	3-12	0.188	521 lbs		6-11	0.180	499 lbs									

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).

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TrueBuild® Truss Software v5.6.375
Eagle Metal Products

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
30-0-0	4/12	12	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	160 lbs

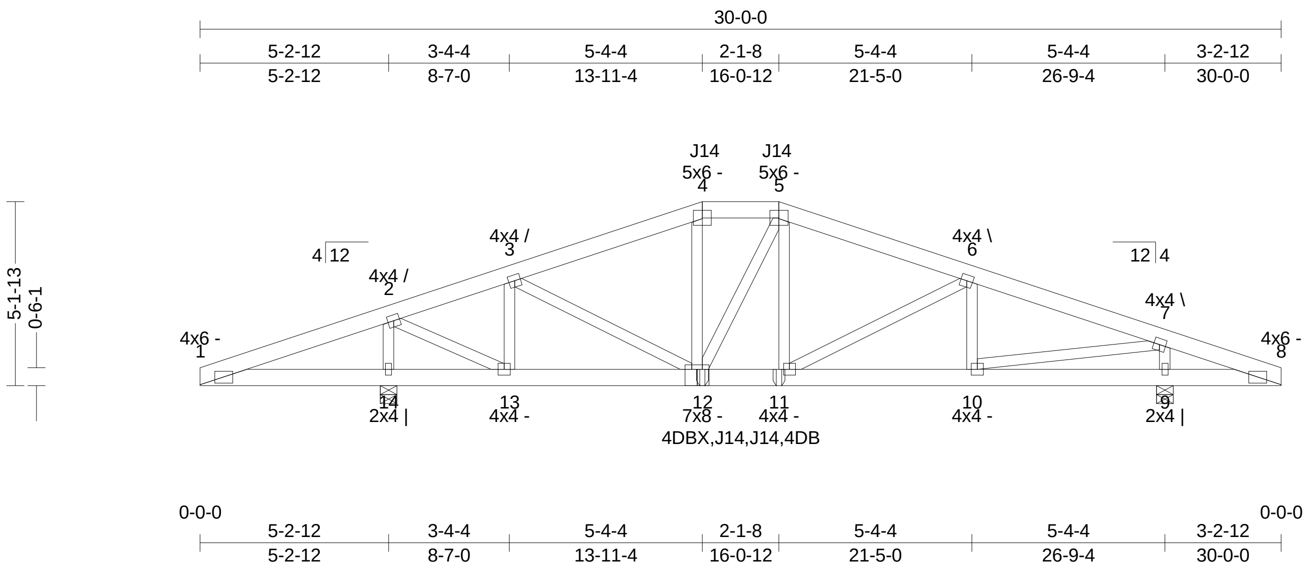
4) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
5) Lateral bracing shown is for illustration purposes only and may be placed on either edge of truss member.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) ⊠ Indicates lateral bracing required perpendicular to the plane of the truss at either the midpoint (one shown) or third points (two shown), bracing by others. See BCSI-B3 for additional information.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:2B3
Job: 5433M
Date: 09/22/21 10:30:40

Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
30-0-0	4/12	1	0-0-0	0-0-0	0-0-0	0-0-0	2	23.62 in	170 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
Carried Loads (psf)	Bldg Code :	CBC 2019/	TC : 0.15 (1-2)	Vert TL:	0.11 in	L / 999	(10-11)	L / 240
TCLL : 20		TPI 1-2014	BC : 0.23 (11-12)	Vert LL:	0.03 in	L / 999	(10-11)	L / 360
TCDL : 15(rake)	Rep Mbr :	No	Web : 0.48 (7-10)	Cant / OH TL:	0.01 in	2L / 999	(8-8)	2L / 120
BCLL : 0	Lumber D.O.L. :	125 %		Cant / OH LL:	0.01 in	2L / 999	(8-8)	2L / 120
BCDL : 10				Horz TL:	0.02 in		9	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
14	1	5.5 in	1.50 in	2,161 lbs	-	-494 lbs	-	-494 lbs	-21 lbs
9	1	5.5 in	1.50 in	1,922 lbs	-	-402 lbs	-	-402 lbs	-

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 6
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Load Case Lr1: Std Live Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	12-2-6	Down	Proj	20 plf	18.67 plf	
Top	12-2-6	13-11-4	Down	Proj	18.67 plf	1.25 plf	
Top	16-0-12	17-9-11	Down	Proj	1.25 plf	18.67 plf	
Top	17-9-11	30-0-0	Down	Proj	18.67 plf	20 plf	
Top	0-0-0	30-0-0	Down	Proj	19.37 plf	19.37 plf	

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TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:2B3
Job: 5433M
Date: 09/22/21 10:30:40

Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
30-0-0	4/12	1	0-0-0	0-0-0	0-0-0	0-0-0	2	23.62 in	170 lbs

Load Case D1: Std Dead Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	12-2-6	Down	Proj	15 plf	14 plf	
Top	12-2-6	13-11-4	Down	Proj	14 plf	0.94 plf	
Top	16-0-12	17-9-11	Down	Proj	0.94 plf	14 plf	
Top	17-9-11	30-0-0	Down	Proj	14 plf	15 plf	
Top	0-0-0	30-0-0	Down	Proj	14.53 plf	14.53 plf	
Bot	0-0-0	12-2-6	Down	Proj	10 plf	9.34 plf	
Bot	12-2-6	13-11-4	Down	Proj	9.34 plf	0.62 plf	
Bot	16-0-12	17-9-11	Down	Proj	0.62 plf	9.34 plf	
Bot	17-9-11	30-0-0	Down	Proj	9.34 plf	10 plf	
Bot	0-0-0	30-0-0	Down	Proj	9.69 plf	9.69 plf	

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	2-3	0.091	-759 lbs		4-5	0.077	-1,113 lbs		6-7	0.130	-1,316 lbs	
	3-4	0.081	-1,206 lbs		5-6	0.096	-1,385 lbs					
BC	10-11	0.222	1,215 lbs	(-302 lbs)	12-13	0.154	696 lbs	(-220 lbs)				
	11-12	0.229	1,272 lbs	(-350 lbs)								
Web	2-14	0.196	-971 lbs		3-12	0.192	485 lbs	(-152 lbs)	7-10	0.478	1,208 lbs	(-286 lbs)
	2-13	0.413	1,042 lbs	(-272 lbs)	5-12	0.089	-370 lbs		7-9	0.170	-845 lbs	
	3-13	0.102	-492 lbs		5-11	0.237	600 lbs	(-95 lbs)				

Truss to Truss Connection Summary

Carried Truss	Carrying Chord	Carrying Offset
4DBX	BC	13-11-4
J14	TC	14-0-0
J14	BC	14-0-0
J14	TC	16-0-0
J14	BC	16-0-0
4DB	BC	16-0-12

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Provide adequate drainage to prevent ponding.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) The forces shown for this multi-ply truss are per ply and the reactions are for all plies. Two identical trusses shall be built and attached as follows, per ply:
0.131"x3" Nails TC - 2 staggered rows @ 12 in oc, BC - 2 staggered rows @ 12 in oc , Webs - 1 row @ 12 in oc.

Provided the hanger connections do not adequately transfer the applied load to all plies: in addition to connectors shown above, attach each pair of girder plies with supplemental 0.131"x3" Nails as follows within 24" of the location shown:
BC: 13-11-4,(3)Connectors
BC: 16-0-12,(6)Connectors

Connectors shall not encroach on other girder ply connectors or truss-to-truss connectors in accordance with the NDS or the connector manufacturer recommendations.
8) When applied loads are on one side of girder, do not flip girder during girder connector installation, install connectors on the girder side where supported loads are applied. When applied loads are on both sides of girder, double the spacing and install half of the connectors on one side of girder and then flip the girder to install the other half of the connectors on the opposite side (at double the connector spacing). Connectors on opposite sides of the girder shall be offset.
9) Lateral bracing shall be attached to each ply.
10) All fasteners minimum 2-1/2" long, unless otherwise noted.
11) Nails in 1st and 2nd ply shall be offset from successive plies by 1/2 the nail spacing.
12) Listed wind uplift reactions based on MWFRS & C&C loading.

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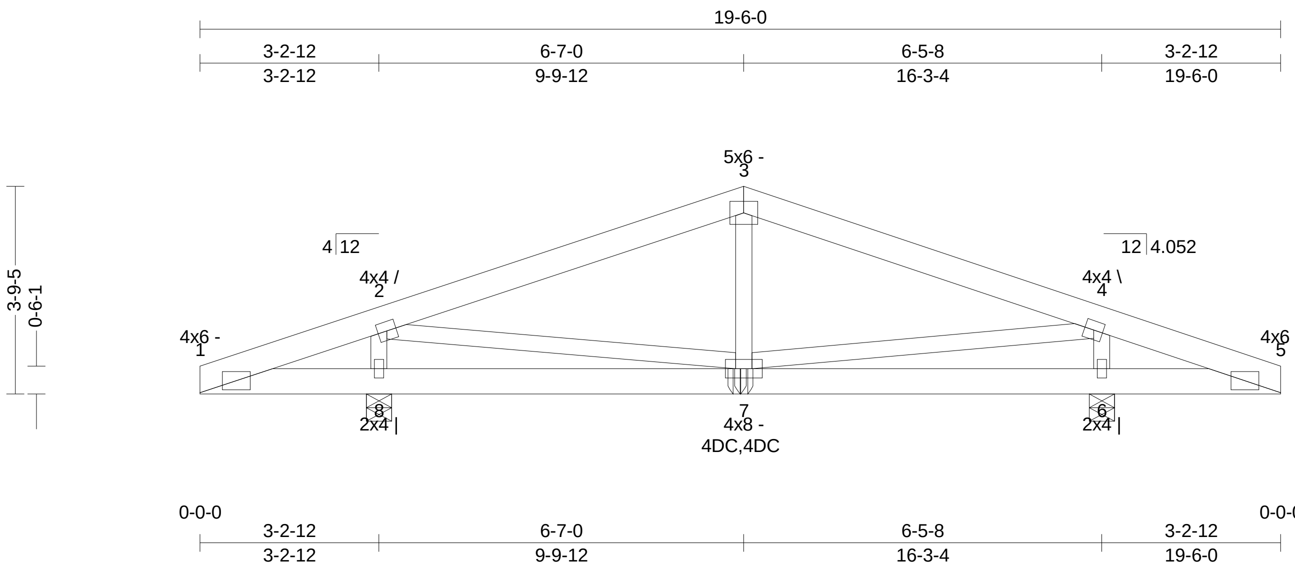
TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:3C
Job: 5433M
Date: 09/22/21 10:30:40

Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
19-6-0	4/12	2	0-0-0	0-0-0	0-0-0	0-0-0	2	19.12 in	101 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
Carried Loads (psf)	Bldg Code :	CBC 2019/	TC : 0.11 (1-2)	Vert TL:	0.01 in	L / 999	(7-8)	L / 240
TCLL : 20		TPI 1-2014	BC : 0.06 (7-8)	Vert LL:	0.01 in	L / 999	(7-8)	L / 360
TCDL : 15(rake)	Rep Mbr :	No	Web : 0.06 (4-7)	Cant / OH TL:	0.01 in	2L / 999	(1-1)	2L / 120
BCLL : 0	Lumber D.O.L. :	125 %		Cant / OH LL:	0.01 in	2L / 999	(1-1)	2L / 120
BCDL : 10				Horz TL:	0 in		6	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
8	1	5.5 in	1.50 in	588 lbs	-	-210 lbs	-220 lbs	-220 lbs	11 lbs
6	1	5.5 in	1.50 in	586 lbs	-	-213 lbs	-220 lbs	-220 lbs	-

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 6
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Load Case Lr1: Std Live Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	19-6-0	Down	Proj	13.75 plf	13.75 plf	
Top	0-0-0	8-0-0	Down	Proj	18.13 plf	18.13 plf	
Top	8-0-0	9-8-4	Down	Proj	18.13 plf	1.25 plf	
Top	9-9-12	11-6-0	Down	Proj	1.25 plf	18.13 plf	
Top	11-6-0	19-6-0	Down	Proj	18.13 plf	18.13 plf	

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TrusPro Inc.

695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:3C
Job: 5433M
Date: 09/22/21 10:30:41

Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
19-6-0	4/12	2	0-0-0	0-0-0	0-0-0	0-0-0	2	19.12 in	101 lbs

Load Case D1: Std Dead Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	19-6-0	Down	Proj	10.31 plf	10.31 plf	
Top	0-0-0	8-0-0	Down	Proj	13.59 plf	13.59 plf	
Top	8-0-0	9-8-4	Down	Proj	13.59 plf	0.94 plf	
Top	9-9-12	11-6-0	Down	Proj	0.94 plf	13.59 plf	
Top	11-6-0	19-6-0	Down	Proj	13.59 plf	13.59 plf	
Bot	0-0-0	19-6-0	Down	Proj	6.88 plf	6.88 plf	
Bot	0-0-0	8-0-0	Down	Proj	9.06 plf	9.06 plf	
Bot	8-0-0	9-8-4	Down	Proj	9.06 plf	0.62 plf	
Bot	9-9-12	11-6-0	Down	Proj	0.62 plf	9.06 plf	
Bot	11-6-0	19-6-0	Down	Proj	9.06 plf	9.06 plf	

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC

BC

Web

Truss to Truss Connection Summary

Carried Truss	Carrying Chord	Carrying Offset
4DC	BC	9-8-4
4DC	BC	9-9-12

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
5) A creep factor of 2.00 has been applied for this truss analysis.
6) The forces shown for this multi-ply truss are per ply and the reactions are for all plies. Two identical trusses shall be built and attached as follows, per ply:
0.131"x3" Nails TC - 2 staggered rows @ 12 in oc, BC - 2 staggered rows @ 12 in oc , Webs - 1 row @ 12 in oc.

Provided the hanger connections do not adequately transfer the applied load to all plies: in addition to connectors shown above, attach each pair of girder plies with supplemental 0.131"x3" Nails as follows within 24" of the location shown:
BC: 9-8-4,(2)Connectors
BC: 9-9-12,(2)Connectors

Connectors shall not encroach on other girder ply connectors or truss-to-truss connectors in accordance with the NDS or the connector manufacturer recommendations.
7) When applied loads are on one side of girder, do not flip girder during girder connector installation, install connectors on the girder side where supported loads are applied. When applied loads are on both sides of girder, double the spacing and install half of the connectors on one side of girder and then flip the girder to install the other half of the connectors on the opposite side (at double the connector spacing). Connectors on opposite sides of the girder shall be offset.
8) Lateral bracing shall be attached to each ply.
9) All fasteners minimum 2-1/2" long, unless otherwise noted.
10) Nails in 1st and 2nd ply shall be offset from successive plies by 1/2 the nail spacing.
11) Listed wind uplift reactions based on MWFRS & C&C loading.

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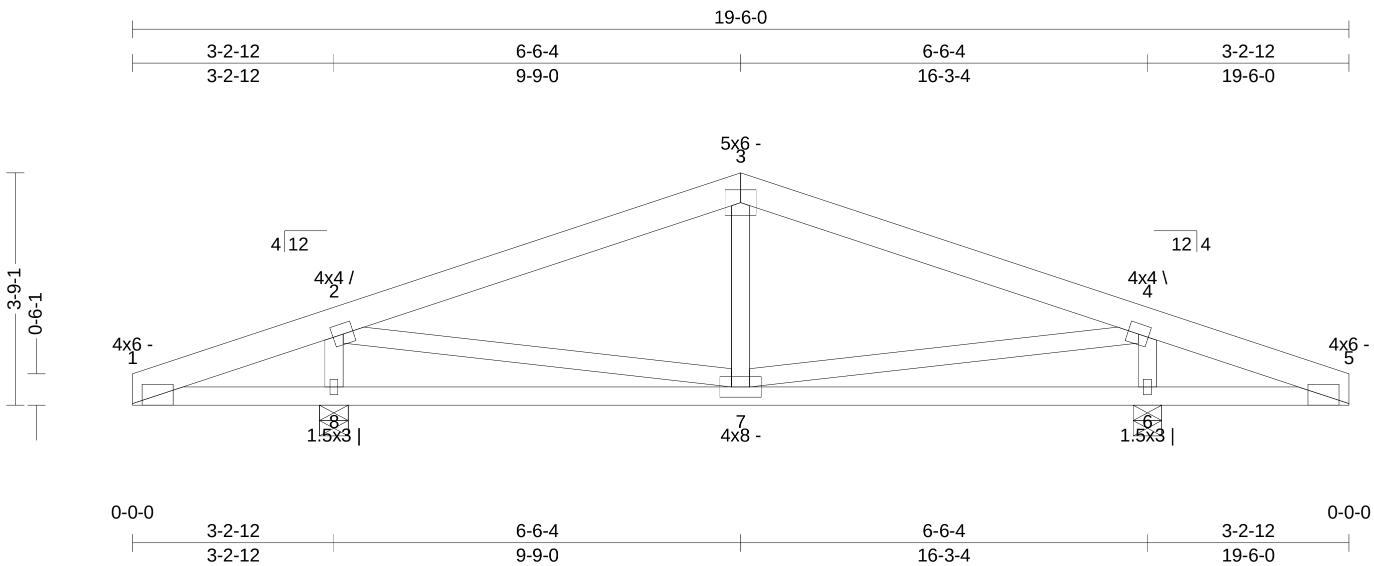
	TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:3C1 Job: 5433M Date: 09/22/21 10:30:41 Page: 1 of 1 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
19-6-0	4/12	10	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	87 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	**General**		**CSI**	**Deflection**		**L/**	**(loc)**	**Allowed**
TCLL : 20	Bldg Code :	CBC 2019/ TPI 1-2014	TC : 0.27 (1-2)	Vert TL:	0.08 in	L / 999	(6-7)	L / 240
TCDL : 15(rake)			BC : 0.24 (7-8)	Vert LL:	0.05 in	L / 999	(6-7)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web : 0.28 (4-7)	Cant / OH TL:	0.03 in	2L / 999	(5-5)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.01 in	2L / 999	(5-5)	2L / 120
				Horz TL:	0 in		6	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
8	1	5.5 in	1.50 in	911 lbs	-	-51 lbs	-204 lbs	-204 lbs	16 lbs
6	1	5.5 in	1.50 in	911 lbs	-	-51 lbs	-204 lbs	-204 lbs	-

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	1-2	0.274	326 lbs	(-130 lbs)	2-3	0.195	-694 lbs		3-4	0.195	-694 lbs		4-5	0.274	326 lbs	(-130 lbs)
BC																
Web	2-8	0.159	-784 lbs		4-7	0.275	695 lbs	(-87 lbs)								
	2-7	0.275	695 lbs	(-87 lbs)	4-6	0.159	-784 lbs									

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
5) A creep factor of 2.00 has been applied for this truss analysis.
6) Listed wind uplift reactions based on MWFRS & C&C loading.

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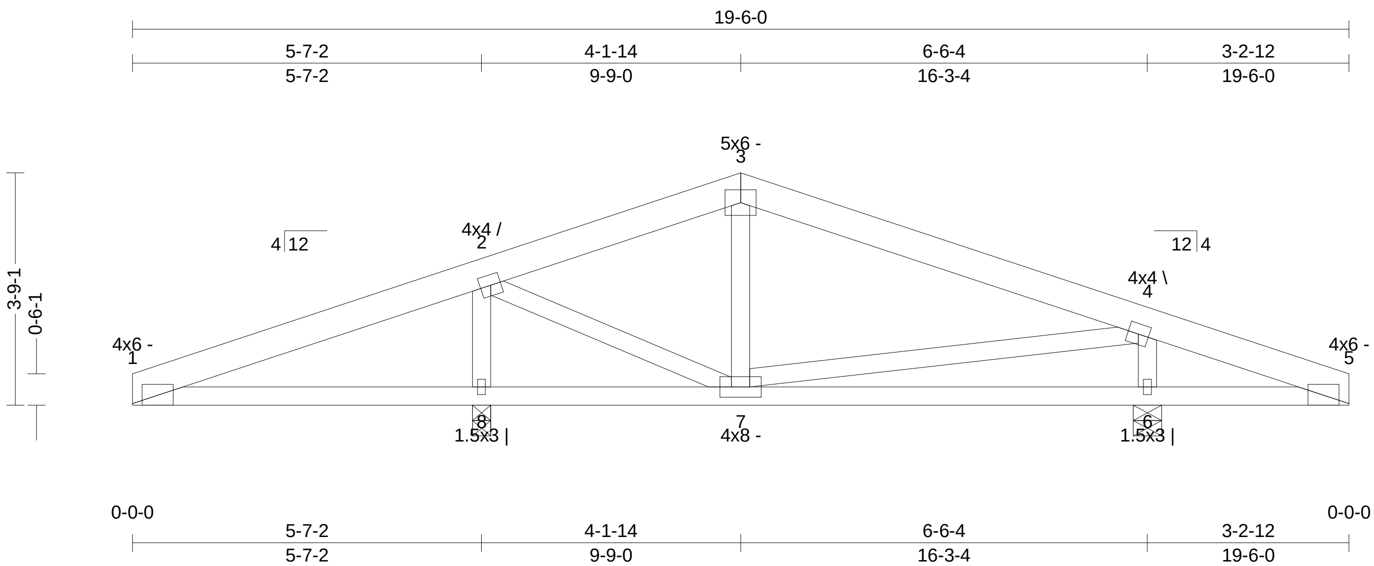
TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:3C2 Job: 5433M Date: 09/22/21 10:30:41 Page: 1 of 1 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
19-6-0	4/12	15	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	86 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General	CSI	Deflection	L/	(loc)	Allowed
TCLL : 20	Bldg Code : CBC 2019/ TPI 1-2014	TC : 0.33 (1-2)	Vert TL: 0.09 in	L / 999	(6-7)	L / 240
TCDL : 15(rake)		BC : 0.25 (6-7)	Vert LL: 0.05 in	L / 999	(6-7)	L / 360
BCLL : 0	Rep Mbr : Yes	Web : 0.54 (4-7)	Cant / OH TL: 0.1 in	2L / 999	(8-1)	2L / 120
BCDL : 10	Lumber D.O.L. : 125 %		Cant / OH LL: 0.04 in UP	2L / 999	(1-1)	2L / 120
			Horz TL: 0.01 in		6	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
8	1	3.5 in	1.50 in	1,112 lbs	·	-62 lbs	-329 lbs	-329 lbs	-1,507 lbs
6	1	5.5 in	1.50 in	755 lbs	·	-40 lbs	-150 lbs	-150 lbs	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 4-11-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects due to a 1,500 lbs (73 plf) drag load distributed along the TC rake from each direction.
3) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
4) Minimum storage attic loading has been applied in accordance with IBC 1607.1
5) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	1-2	0.334	679 lbs	(-281 lbs)	2-3	0.233	-332 lbs		3-4	0.188	-670 lbs		4-5	0.267	324 lbs	(-131 lbs)
BC	7-8	0.211	-1,644 lbs		8-1	0.169	-568 lbs									
Web	2-8	0.212	-989 lbs		4-7	0.535	873 lbs	(-602 lbs)								
	2-7	0.305	981 lbs	(-148 lbs)	4-6	0.127	-625 lbs									

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
5) A creep factor of 2.00 has been applied for this truss analysis.
6) Listed wind uplift reactions based on MWFRS & C&C loading.

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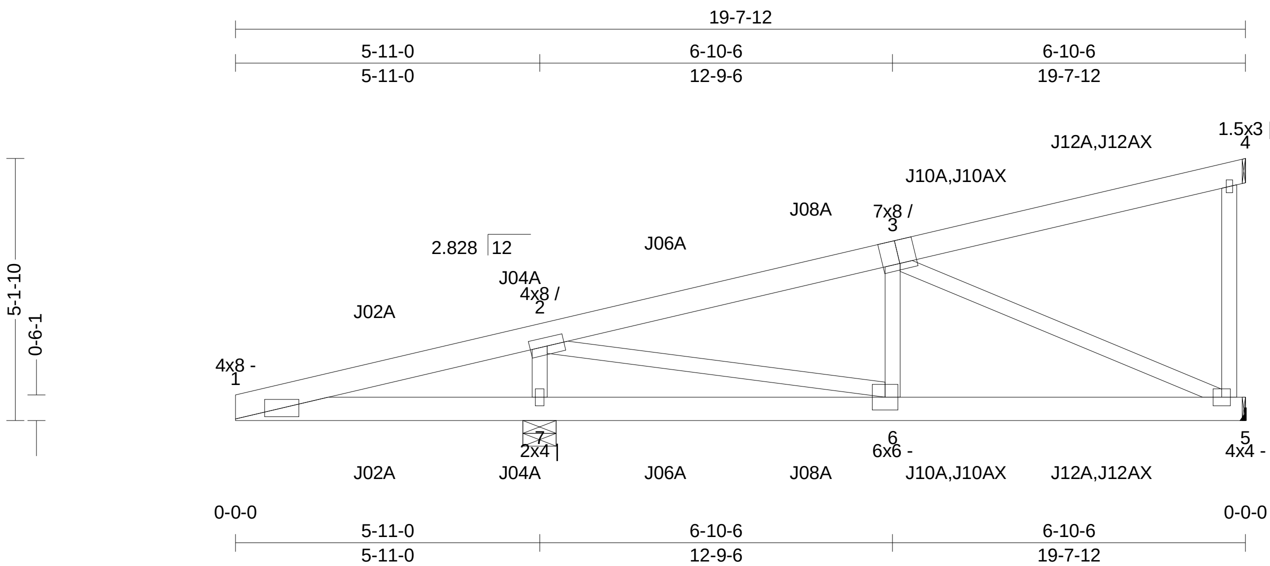
TrueBuild® Truss Software v5.6.375
Eagle Metal Products

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:4DA
Job: 5433M
Date: 09/22/21 10:30:42

Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
19-7-12	2.828 /12	4	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	106 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
Carried Loads (psf)	Bldg Code :	CBC 2019/	TC : 0.66 (2-3)	Vert TL:	0.15 in UP	L / 999	(6-7)	L / 240
TCLL : 20		TPI 1-2014	BC : 0.43 (7-1)	Vert LL:	0.04 in UP	L / 999	(6-7)	L / 360
TCDL : 15(rake)	Rep Mbr :	No	Web : 0.83 (2-6)	Cant / OH TL:	0.5 in	2L / 267	(1-1)	2L / 120
BCLL : 0	Lumber D.O.L. :	125 %		Cant / OH LL:	0.14 in	2L / 932	(1-1)	2L / 120
BCDL : 10				Horz TL:	0.04 in		5	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
7	1	7.778 in	1.57 in	1,468 lbs	·	·	·	·	11 lbs
5	1	1.5 in	---	116 lbs	-47 lbs	-202 lbs	·	-202 lbs	·

Material

TC: DFL SS 2 x 6
BC: DFL SS 2 x 6
Web: SPF Stud 2 x 4 except:
DFL Stud 2 x 4: 2-6

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 3-10-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Load Case Lr1: Std Live Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	0-8-2	Down	Proj	0 plf	14.14 plf	
Top	0-8-2	2-9-3	Down	Proj	14.14 plf	0 plf	
Top	0-0-0	0-8-2	Down	Proj	0 plf	14.14 plf	
Top	0-8-2	2-9-3	Down	Proj	14.14 plf	0 plf	

Point Loads

Member	Location	Direction	Load	Trib Width
Top	-0-0-1	Down	440 lbs	

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TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:4DA
Job: 5433M
Date: 09/22/21 10:30:42

Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
19-7-12	2.828 /12	4	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	106 lbs

Load Case D1: Std Dead Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	0-8-2	Down	Proj	0 plf	10.61 plf	
Top	0-8-2	2-9-3	Down	Proj	10.61 plf	0 plf	
Top	0-0-0	0-8-2	Down	Proj	0 plf	10.61 plf	
Top	0-8-2	2-9-3	Down	Proj	10.61 plf	0 plf	

Point Loads

Member	Location	Direction	Load	Trib Width
Top	-0-0-1	Down	560 lbs	

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	1-2	0.590	3,779 lbs	(-10 lbs)	2-3	0.656	1,091 lbs				
BC	5-6	0.217	-951 lbs		6-7	0.431	-3,594 lbs		7-1	0.433	-3,594 lbs
Web	2-7	0.240	-1,171 lbs		3-6	0.154	-608 lbs				
	2-6	0.825	2,681 lbs		3-5	0.417	1,053 lbs				

Truss to Truss Connection Summary

Carried Truss	Carrying Chord	Carrying Offset
J02A	TC	2-8-7
J02A	TC	2-8-7
J02A	BC	2-8-7
J02A	BC	2-8-7
J04A	TC	5-6-6
J04A	TC	5-6-6
J04A	BC	5-6-6
J04A	BC	5-6-6
J06A	TC	8-4-5
J06A	TC	8-4-5
J06A	BC	8-4-5
J06A	BC	8-4-5
J08A	TC	11-2-4
J08A	TC	11-2-4
J08A	BC	11-2-4
J08A	BC	11-2-4
J10AX	TC	14-0-3
J10AX	BC	14-0-3
J10A	TC	14-0-3
J10A	BC	14-0-3
J12AX	TC	16-10-2
J12AX	BC	16-10-2
J12A	TC	16-10-2
J12A	BC	16-10-2

Notes

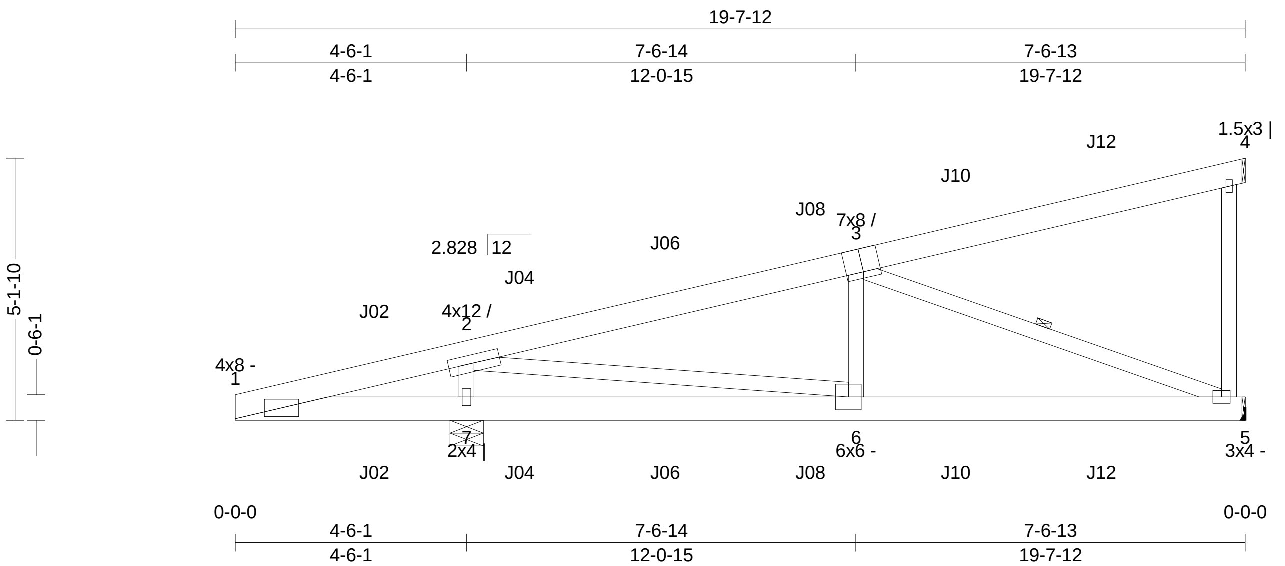
1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Hanger is for graphical intrepretation only. Install hanger per manufacturer's recommendation.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Due to negative reactions in gravity load cases, special connections to the bearing surface at joint 5 may need to be considered.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

TrueBuild® Truss Software v5.6.375
Eagle Metal Products

	TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:4DB Job: 5433M Date: 09/22/21 10:30:43 Page: 1 of 2 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
19-7-12	2.828 /12	3	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	108 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	**General**		**CSI**	**Deflection**		**L/**	**(loc)**	**Allowed**
Carried Loads (psf)	Bldg Code :	CBC 2019/ TPI 1-2014	TC : 0.43 (3-4)	Vert TL:	0.32 in	L / 552	(5-6)	L / 240
TCLL : 20			BC : 0.52 (5-6)	Vert LL:	0.07 in	L / 999	(5-6)	L / 360
TCDL : 15(rake)	Rep Mbr :	No	Web : 0.86 (2-6)	Cant / OH TL:	0.3 in	2L / 338	(1-1)	2L / 120
BCLL : 0	Lumber D.O.L. :	125 %		Cant / OH LL:	0.09 in	2L / 999	(1-1)	2L / 120
BCDL : 10				Horz TL:	0.01 in		5	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
7	1	7.778 in	2.05 in	1,921 lbs	·	·	·	·	11 lbs
5	1	1.5 in	---	943 lbs	·	-256 lbs	·	-256 lbs	·

Material

TC: DFL SS 2 x 6
BC: DFL SS 2 x 6
Web: SPF Stud 2 x 4 except:
DFL Stud 2 x 4: 2-6
HF Standard 2 x 4: 3-5

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 5-7-0, Purlin design by Others.
Web: One Midpoint Row: 3-5

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Load Case Lr1: Std Live Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	0-8-2	Down	Proj	0 plf	14.14 plf	
Top	0-8-2	2-9-3	Down	Proj	14.14 plf	0 plf	
Top	0-0-0	0-8-2	Down	Proj	0 plf	14.14 plf	
Top	0-8-2	2-9-3	Down	Proj	14.14 plf	0 plf	

Point Loads

Member	Location	Direction	Load	Trib Width
Top	-0-0-1	Down	330 lbs	

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:4DB
Job: 5433M
Date: 09/22/21 10:30:43

Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
19-7-12	2.828 /12	3	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	108 lbs

Load Case D1: Std Dead Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	0-8-2	Down	Proj	0 plf	10.61 plf	
Top	0-8-2	2-9-3	Down	Proj	10.61 plf	0 plf	
Top	0-0-0	0-8-2	Down	Proj	0 plf	10.61 plf	
Top	0-8-2	2-9-3	Down	Proj	10.61 plf	0 plf	

Point Loads

Member	Location	Direction	Load	Trib Width
Top	-0-0-1	Down	420 lbs	

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	1-2	0.417	2,069 lbs	(-10 lbs)	2-3	0.252	-893 lbs					
BC	5-6	0.519	819 lbs	(-447 lbs)	6-7	0.220	-1,939 lbs		7-1	0.199	-1,939 lbs	
Web	2-7	0.319	-1,577 lbs		3-5	0.290	-883 lbs					
	2-6	0.857	2,783 lbs									

Truss to Truss Connection Summary

Carried Truss	Carrying Chord	Carrying Offset
J02	TC	2-8-7
J02	TC	2-8-7
J02	BC	2-8-7
J02	BC	2-8-7
J04	TC	5-6-6
J04	TC	5-6-6
J04	BC	5-6-6
J04	BC	5-6-6
J06	TC	8-4-5
J06	TC	8-4-5
J06	BC	8-4-5
J06	BC	8-4-5
J08	TC	11-2-4
J08	TC	11-2-4
J08	BC	11-2-4
J08	BC	11-2-4
J10	TC	14-0-3
J10	TC	14-0-3
J10	BC	14-0-3
J10	BC	14-0-3
J12	TC	16-10-2
J12	TC	16-10-2
J12	BC	16-10-2
J12	BC	16-10-2

Notes

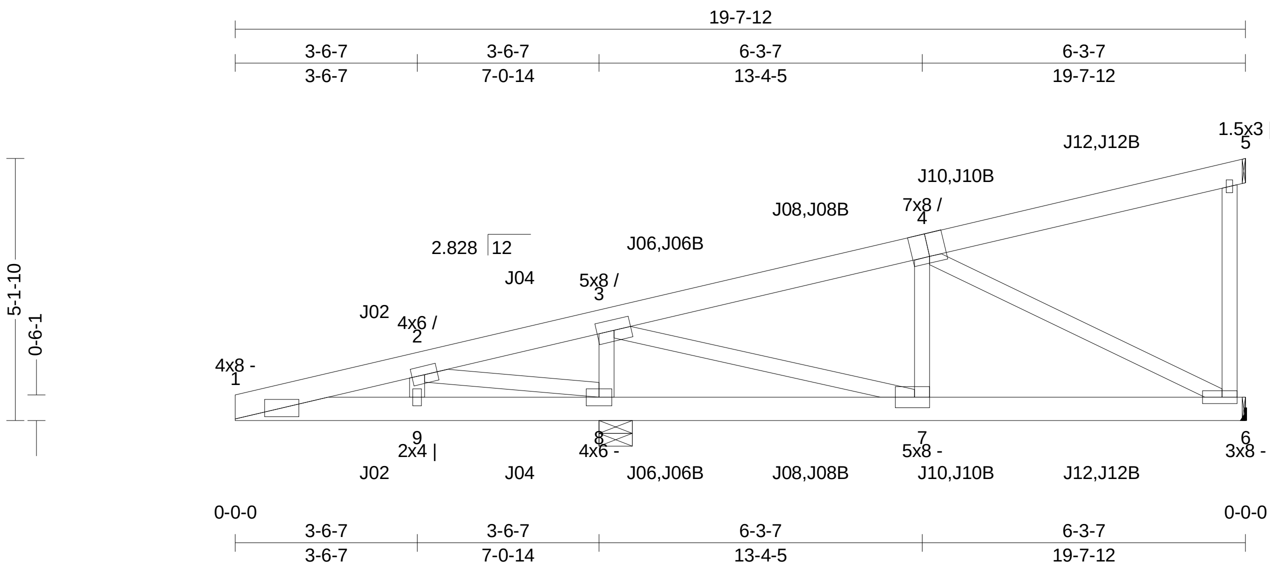
1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Hanger is for graphical intrepretation only. Install hanger per manufacturer's recommendation.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) Lateral bracing shown is for illustration purposes only and may be placed on either edge of truss member.
7) A creep factor of 2.00 has been applied for this truss analysis.
8) ⊠ Indicates lateral bracing required perpendicular to the plane of the truss at either the midpoint (one shown) or third points (two shown), bracing by others. See BCSI-B3 for additional information.
9) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:4DBX
Job: 5433M
Date: 09/22/21 10:30:43
Page: 1 of 2
Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
19-7-12	2.828 /12	1	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	111 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	**General**		**CSI**	**Deflection**		**L/**	**(loc)**	**Allowed**
Carried Loads (psf)	Bldg Code :	CBC 2019/ TPI 1-2014	TC : 0.56 (1-2)	Vert TL:	0.07 in UP	L / 999	(7-8)	L / 240
TCLL : 20			BC : 0.32 (7-8)	Vert LL:	0.02 in UP	L / 999	(7-8)	L / 360
TCDL : 15(rake)	Rep Mbr :	No	Web : 0.67 (3-7)	Cant / OH TL:	0.61 in	2L / 278	(1-1)	2L / 120
BCLL : 0	Lumber D.O.L. :	125 %		Cant / OH LL:	0.18 in	2L / 967	(1-1)	2L / 120
BCDL : 10				Horz TL:	0.04 in		6	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
8	1	7.75 in	2.43 in	2,281 lbs	·	·	·	·	11 lbs
6	1	1.5 in	N/A	0 lbs	-299 lbs	-336 lbs	-78 lbs	-336 lbs	·

Material

TC: DFL SS 2 x 6
BC: DFL SS 2 x 6
Web: SPF Stud 2 x 4 except:
DFL #2 2 x 4: 3-7

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 3-5-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Load Case Lr1: Std Live Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	0-8-2	Down	Proj	0 plf	14.14 plf	
Top	0-8-2	2-9-3	Down	Proj	14.14 plf	0 plf	
Top	0-0-0	0-8-2	Down	Proj	0 plf	14.14 plf	
Top	0-8-2	2-9-3	Down	Proj	14.14 plf	0 plf	

Point Loads

Member	Location	Direction	Load	Trib Width
Top	-0-0-1	Down	528 lbs	

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

	TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:4DBX Job: 5433M Date: 09/22/21 10:30:44 Page: 2 of 2 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
19-7-12	2.828 /12	1	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	111 lbs

Load Case D1: Std Dead Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	0-8-2	Down	Proj	0 plf	10.61 plf	
Top	0-8-2	2-9-3	Down	Proj	10.61 plf	0 plf	
Top	0-0-0	0-8-2	Down	Proj	0 plf	10.61 plf	
Top	0-8-2	2-9-3	Down	Proj	10.61 plf	0 plf	

Point Loads

Member	Location	Direction	Load	Trib Width
Top	-0-0-1	Down	672 lbs	

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	1-2	0.555	3,084 lbs	(-10 lbs)	2-3	0.552	5,021 lbs	3-4	0.364	1,279 lbs					
BC	6-7	0.158	-1,153 lbs		7-8	0.316	-4,862 lbs	8-9	0.177	-2,893 lbs		9-1	0.300	-2,893 lbs	
Web	2-9	0.120	304 lbs		3-8	0.367	-1,761 lbs	4-7	0.315	-1,196 lbs					
	2-8	0.666	-2,023 lbs		3-7	0.675	3,819 lbs	4-6	0.520	1,313 lbs					

Truss to Truss Connection Summary

Carried Truss	Carrying Chord	Carrying Offset
J02	TC	2-8-7
J02	TC	2-8-7
J02	BC	2-8-7
J02	BC	2-8-7
J04	TC	5-6-6
J04	TC	5-6-6
J04	BC	5-6-6
J04	BC	5-6-6
J06	TC	8-4-5
J06B	TC	8-4-5
J06	BC	8-4-5
J06B	BC	8-4-5
J08	TC	11-2-4
J08B	TC	11-2-4
J08	BC	11-2-4
J08B	BC	11-2-4
J10	TC	14-0-3
J10B	TC	14-0-3
J10	BC	14-0-3
J10B	BC	14-0-3
J12	TC	16-10-2
J12B	TC	16-10-2
J12	BC	16-10-2
J12B	BC	16-10-2

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Hanger is for graphical intrepretation only. Install hanger per manufacturer's recommendation.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Due to negative reactions in gravity load cases, special connections to the bearing surface at joint 6 may need to be considered.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

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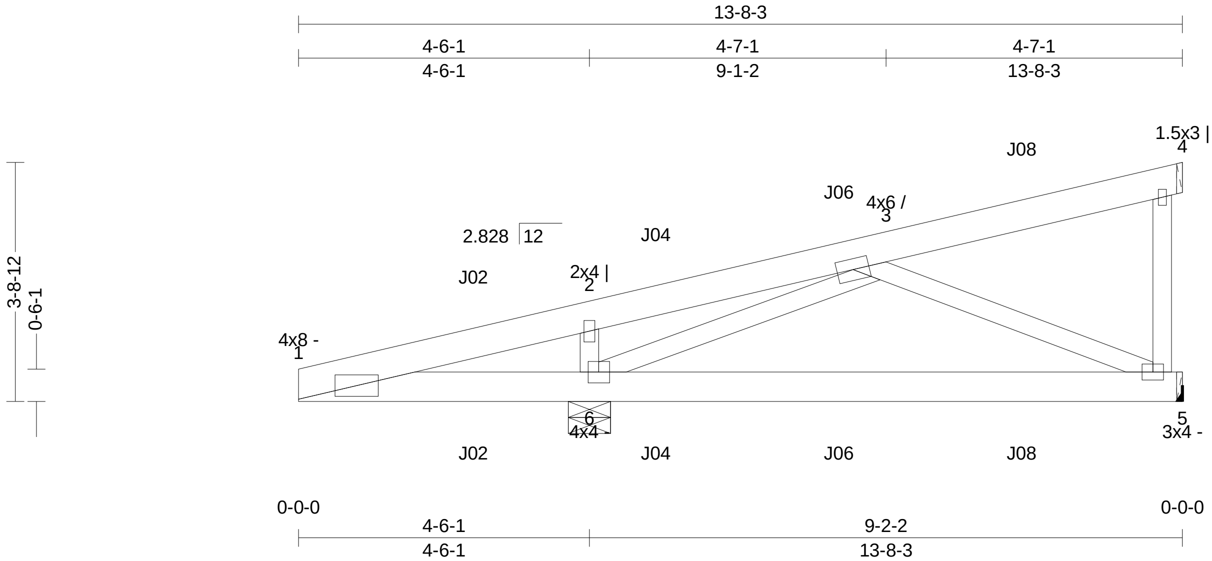
Eagle Metal Products

	TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:4DC Job: 5433M Date: 09/22/21 10:30:44 Page: 1 of 2 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
13-8-3	2.828 /12	4	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	70 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
Carried Loads (psf)	Bldg Code :	CBC 2019/ TPI 1-2014	TC : 0.75 (1-2)	Vert TL:	0.05 in UP	L / 999	(5-6)	L / 240
TCLL : 20			BC : 0.31 (6-1)	Vert LL:	0.05 in	L / 999	(5-6)	L / 360
TCDL : 15(rake)	Rep Mbr :	No	Web : 0.75 (3-6)	Cant / OH TL:	0.22 in	2L / 463	(1-1)	2L / 120
BCLL : 0	Lumber D.O.L. :	125 %		Cant / OH LL:	0.07 in	2L / 999	(1-1)	2L / 120
BCDL : 10				Horz TL:	0.01 in		5	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
6	1	7.778 in	1.75 in	1,641 lbs	·	·	·	·	14 lbs
5	1	1.5 in	---	9 lbs	-165 lbs	-165 lbs	-34 lbs	-165 lbs	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 6
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 5-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Load Case Lr1: Std Live Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	0-8-2	Down	Proj	0 plf	14.14 plf	
Top	0-8-2	2-9-3	Down	Proj	14.14 plf	0 plf	
Top	0-0-0	0-8-2	Down	Proj	0 plf	14.14 plf	
Top	0-8-2	2-9-3	Down	Proj	14.14 plf	0 plf	

Point Loads

Member	Location	Direction	Load	Trib Width
Top	-0-0-1	Down	330 lbs	

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:4DC
Job: 5433M
Date: 09/22/21 10:30:44

Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
13-8-3	2.828 /12	4	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	70 lbs

Load Case D1: Std Dead Load

Distributed Loads

Member	Location 1	Location 2	Direction	Spread	Start Load	End Load	Trib Width
Top	0-0-0	0-8-2	Down	Proj	0 plf	10.61 plf	
Top	0-8-2	2-9-3	Down	Proj	10.61 plf	0 plf	
Top	0-0-0	0-8-2	Down	Proj	0 plf	10.61 plf	
Top	0-8-2	2-9-3	Down	Proj	10.61 plf	0 plf	

Point Loads

Member	Location	Direction	Load	Trib Width
Top	-0-0-1	Down	420 lbs	

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	1-2	0.754	2,155 lbs	(-14 lbs)	2-3	0.735	2,067 lbs				
BC	5-6	0.293	-628 lbs		6-1	0.309	-2,017 lbs				
Web	2-6	0.126	-624 lbs		3-6	0.753	-1,562 lbs		3-5	0.269	679 lbs

Truss to Truss Connection Summary

Carried Truss	Carrying Chord	Carrying Offset
J02	TC	2-8-7
J02	TC	2-8-7
J02	BC	2-8-7
J02	BC	2-8-7
J04	TC	5-6-6
J04	TC	5-6-6
J04	BC	5-6-6
J04	BC	5-6-6
J06	TC	8-4-5
J06	TC	8-4-5
J06	BC	8-4-5
J06	BC	8-4-5
J08	TC	11-2-4
J08	TC	11-2-4
J08	BC	11-2-4
J08	BC	11-2-4

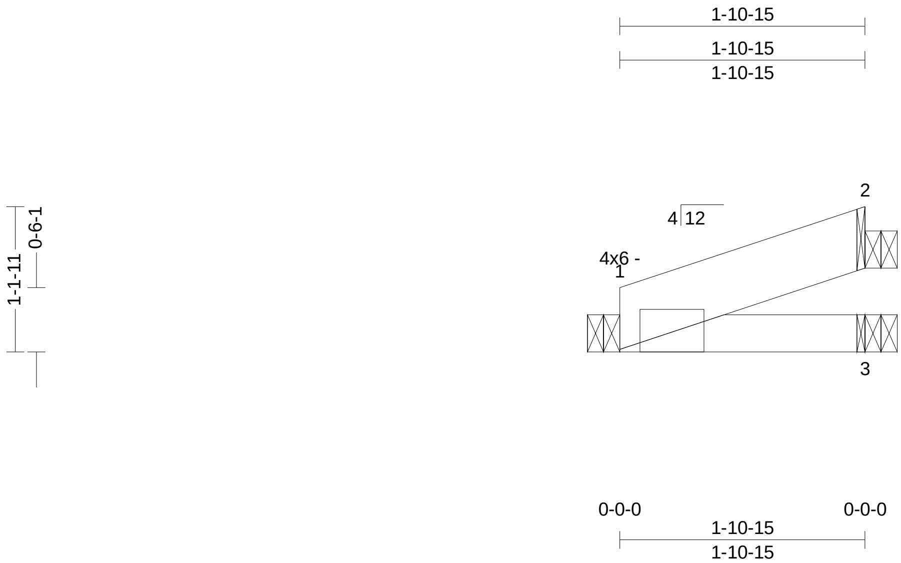
Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Hanger is for graphical intrepretation only. Install hanger per manufacturer's recommendation.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Due to negative reactions in gravity load cases, special connections to the bearing surface at joint 5 may need to be considered.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

	TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:J02 Job: 5433M Date: 09/22/21 10:30:45 Page: 1 of 1 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
1-10-15	4/12	16	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	7 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	**General**		**CSI**	**Deflection**		**L/**	**(loc)**	**Allowed**
TCLL : 20	Bldg Code :	CBC 2019/	TC : 0.04 (1-2)	Vert TL:	0 in	L / 999	(3-1)	L / 240
TCDL : 15(rake)		TPI 1-2014	BC : 0.04 (3-1)	Vert LL:	0 in	L / 999	(3-1)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web : 0.00 (1)	Horz TL:	0 in		2	
BCDL : 10	Lumber D.O.L. :	125 %						

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
1	1	1.5 in	1.50 in	125 lbs	·	·	-37 lbs	-37 lbs	63 lbs
2	1	1.5 in	1.50 in	99 lbs	·	-15 lbs	-62 lbs	-62 lbs	·
3	1	1.5 in	1.50 in	63 lbs	·	·	-1 lbs	-1 lbs	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web:

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC				
BC				
Web				

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

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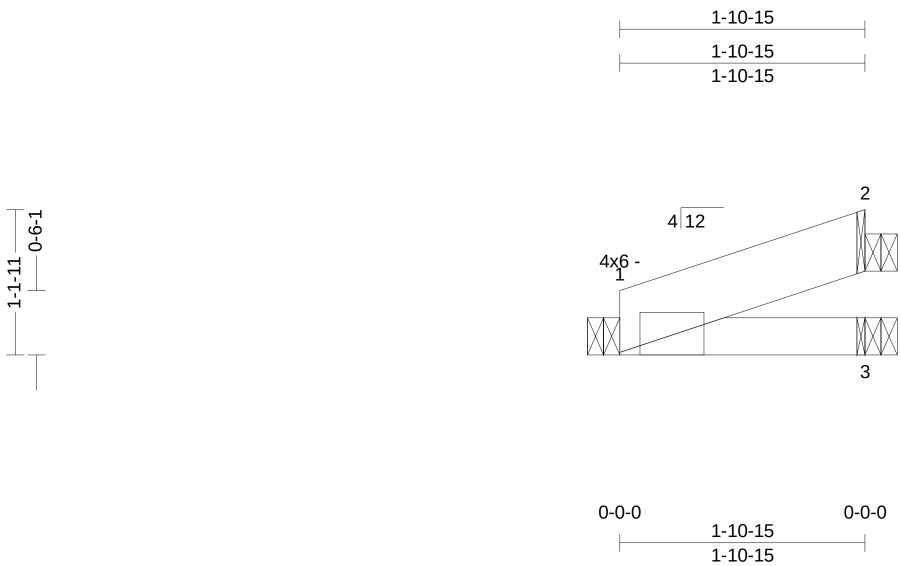
Eagle Metal Products

	TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:J02A Job: 5433M Date: 09/22/21 10:30:45 Page: 1 of 1 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
1-10-15	4/12	8	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	7 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/	TC : 0.04 (1-2)	Vert TL:	0 in	L / 999	(3-1)	L / 240
TCDL : 15(rake)		TPI 1-2014	BC : 0.04 (3-1)	Vert LL:	0 in	L / 999	(3-1)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web : 0.00 (1)	Horz TL:	0 in		2	
BCDL : 10	Lumber D.O.L. :	125 %						

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
1	1	1.5 in	1.50 in	125 lbs	-	-	-37 lbs	-37 lbs	63 lbs
2	1	1.5 in	1.50 in	99 lbs	-	-15 lbs	-62 lbs	-62 lbs	-
3	1	1.5 in	1.50 in	63 lbs	-	-	-1 lbs	-1 lbs	-

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web:

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC				
BC				
Web				

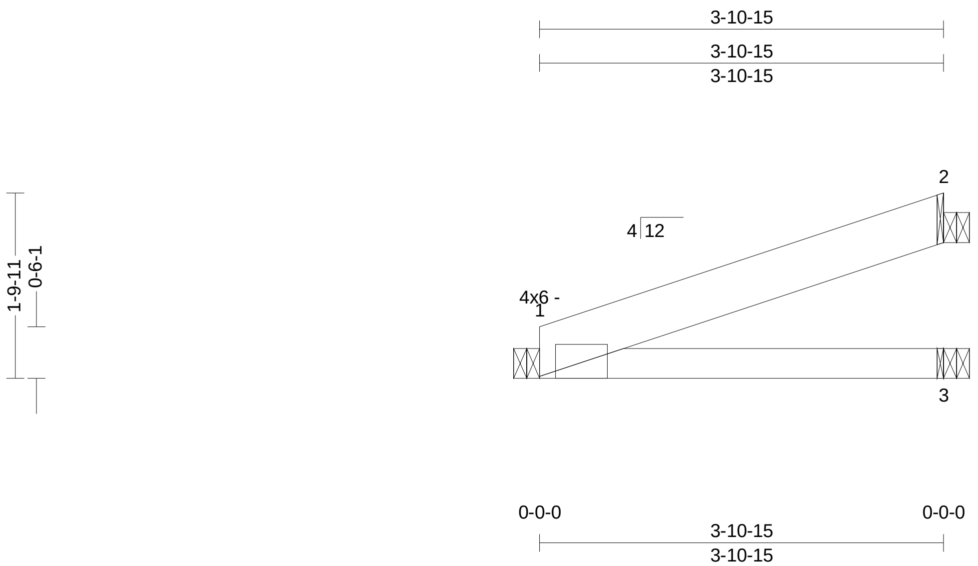
Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

	TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:J04 Job: 5433M Date: 09/22/21 10:30:46 Page: 1 of 1 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
3-10-15	4/12	16	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	14 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	**General**		**CSI**	**Deflection**		**L/**	**(loc)**	**Allowed**
TCLL : 20	Bldg Code :	CBC 2019/ TPI 1-2014	TC : 0.11 (1-2)	Vert TL:	0.02 in	L / 999	(3-1)	L / 240
TCDL : 15(rake)			BC : 0.12 (3-1)	Vert LL:	0.01 in	L / 999	(3-1)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web : 0.00 (1)	Horz TL:	0 in		2	
BCDL : 10	Lumber D.O.L. :	125 %						

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
1	1	1.5 in	1.50 in	194 lbs	·	-0 lbs	-81 lbs	-81 lbs	119 lbs
2	1	1.5 in	1.50 in	154 lbs	·	-33 lbs	-130 lbs	-130 lbs	·
3	1	1.5 in	1.50 in	108 lbs	·	·	·	·	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web:

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC				
BC				
Web				

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Listed wind uplift reactions based on MWFRS & C&C loading.

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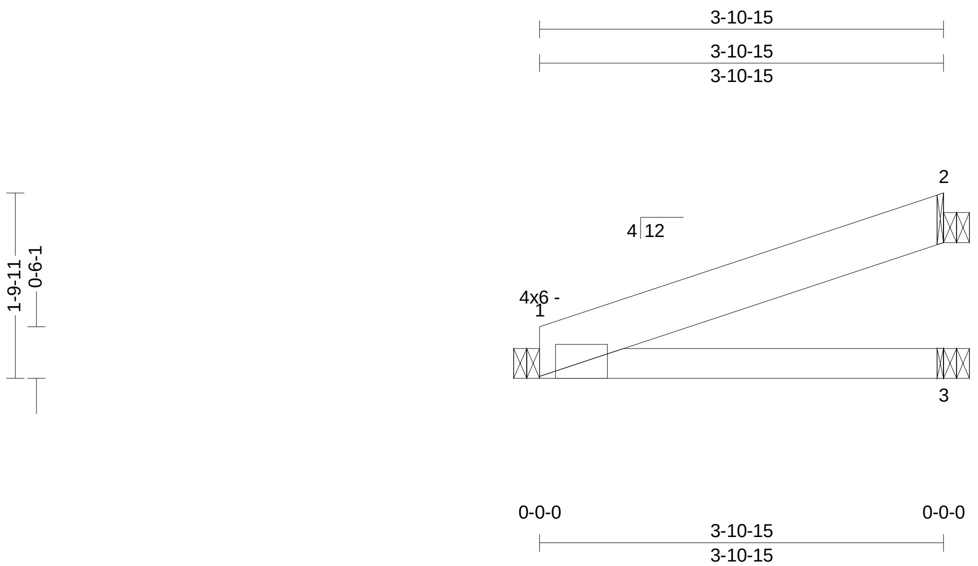
TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:J04A
Job: 5433M
Date: 09/22/21 10:30:46

Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
3-10-15	4/12	8	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	14 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/	TC : 0.11 (1-2)	Vert TL:	0.02 in	L / 999	(3-1)	L / 240
TCDL : 15(rake)		TPI 1-2014	BC : 0.12 (3-1)	Vert LL:	0.01 in	L / 999	(3-1)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web : 0.00 (1)	Horz TL:	0 in		2	
BCDL : 10	Lumber D.O.L. :	125 %						

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
1	1	1.5 in	1.50 in	194 lbs	·	-0 lbs	-81 lbs	-81 lbs	119 lbs
2	1	1.5 in	1.50 in	154 lbs	·	-33 lbs	-130 lbs	-130 lbs	·
3	1	1.5 in	1.50 in	108 lbs	·	·	·	·	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web:

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC				
BC				
Web				

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Listed wind uplift reactions based on MWFRS & C&C loading.

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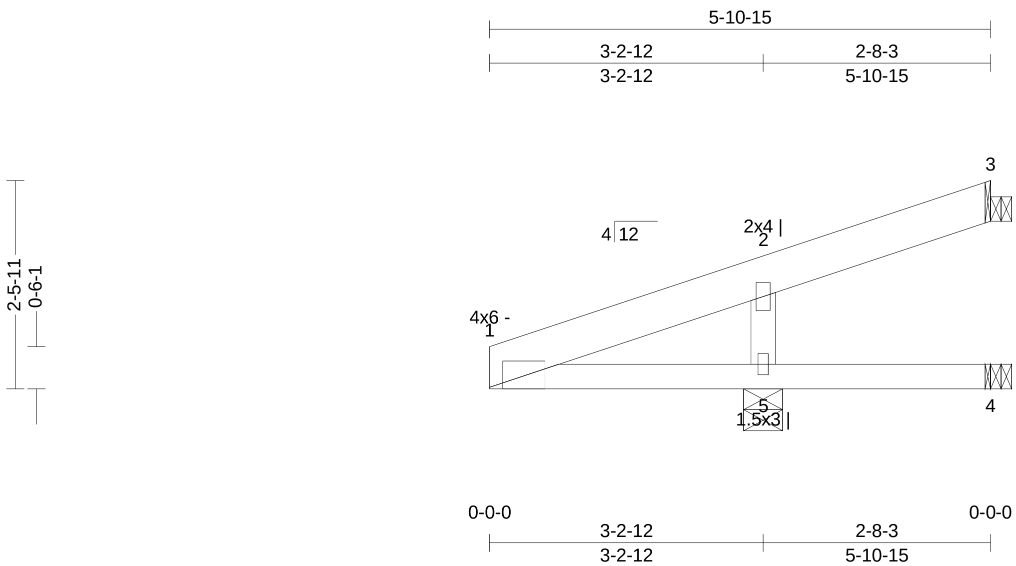
Eagle Metal Products

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:J06
Job: 5433M
Date: 09/22/21 10:30:47

Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
5-10-15	4/12	15	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	22 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	**General**		**CSI**	**Deflection**		**L/**	**(loc)**	**Allowed**
TCLL : 20	Bldg Code :	CBC 2019/ TPI 1-2014	TC : 0.41 (1-2)	Vert TL:	0.01 in UP	L / 999	(4-5)	L / 240
TCDL : 15(rake)			BC : 0.27 (4-5)	Vert LL:	0.01 in	L / 999	(4-5)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web : 0.12 (2-5)	Cant / OH TL:	0.18 in	2L / 403	(1-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.08 in	2L / 911	(1-1)	2L / 120
				Horz TL:	0.07 in		3	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
5	1	5.5 in	1.50 in	600 lbs	·	-5 lbs	-429 lbs	-429 lbs	170 lbs
3	1	1.5 in	1.50 in	46 lbs	-116 lbs	-36 lbs	-8 lbs	-116 lbs	·
4	1	1.5 in	1.50 in	74 lbs	-23 lbs	·	·	-23 lbs	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC				
BC				
Web	2-5 0.117 -462 lbs			

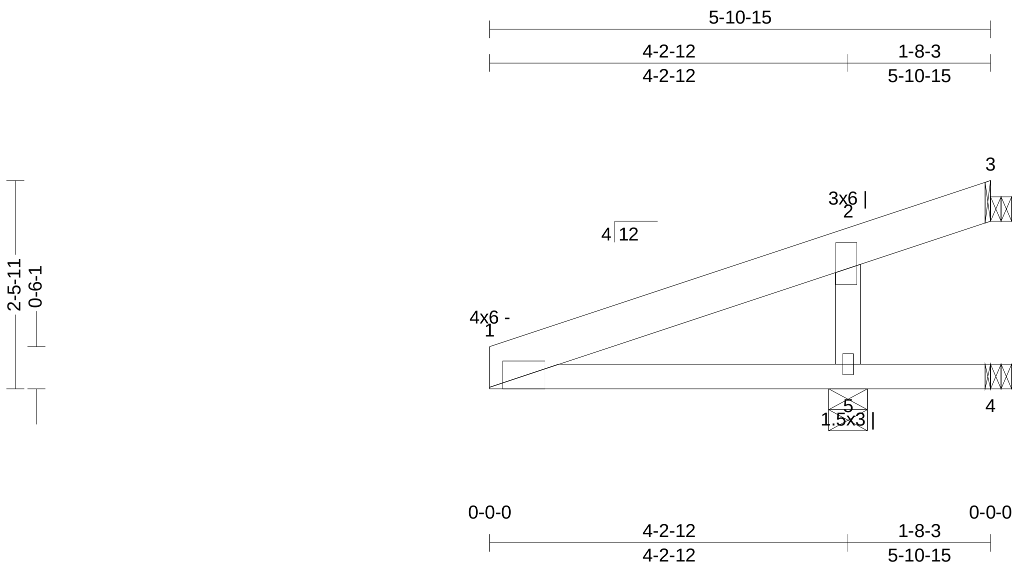
Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Due to negative reactions in gravity load cases, special connections to the bearing surface at joints 3, 4 may need to be considered.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

	TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:J06A Job: 5433M Date: 09/22/21 10:30:47 Page: 1 of 1 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
5-10-15	4/12	8	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	22 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)		**General**		**CSI**		**Deflection**		**L/**	**(loc)**	**Allowed**
TCLL :	20	Bldg Code :	CBC 2019/ TPI 1-2014	TC :	0.63 (1-2)	Vert TL:	0.01 in UP	L / 999	(4-5)	L / 240
TCDL :	15(rake)			BC :	0.42 (4-5)	Vert LL:	0.01 in	L / 999	(4-5)	L / 360
BCLL :	0	Rep Mbr :	Yes	Web :	0.18 (2-5)	Cant / OH TL:	0.42 in	2L / 228	(1-1)	2L / 120
BCDL :	10	Lumber D.O.L. :	125 %			Cant / OH LL:	0.19 in UP	2L / 513	(1-1)	2L / 120
						Horz TL:	0.15 in		3	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
5	1	5.5 in	1.50 in	956 lbs	-	-29 lbs	-733 lbs	-733 lbs	170 lbs
3	1	1.5 in	1.50 in	208 lbs	-363 lbs	-64 lbs	-	-363 lbs	-
4	1	1.5 in	1.50 in	91 lbs	-105 lbs	-15 lbs	-	-105 lbs	-

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC			
BC			
Web	2-5 0.182 -734 lbs		

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Due to negative reactions in gravity load cases, special connections to the bearing surface at joints 3, 4 may need to be considered.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

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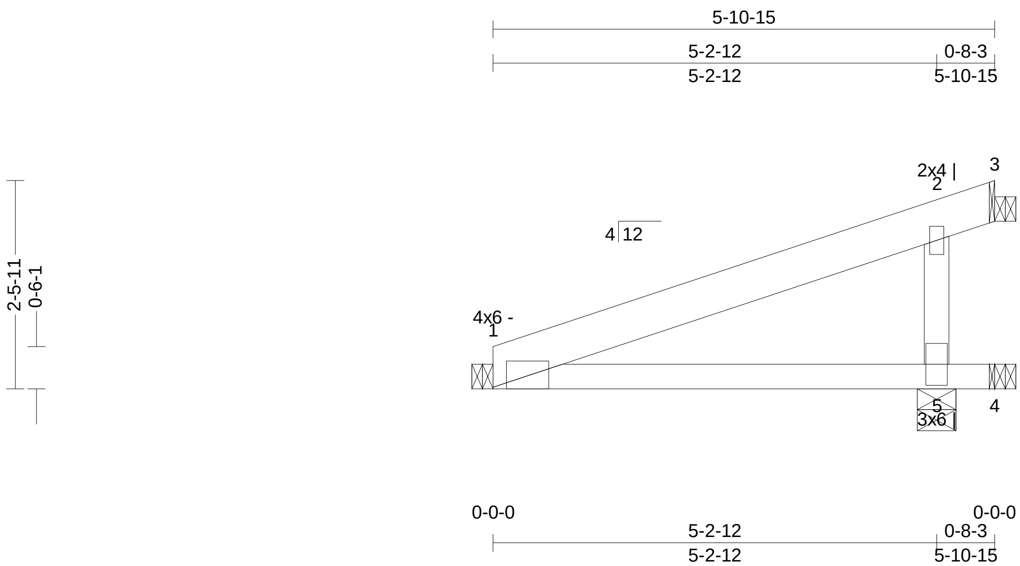
Eagle Metal Products

	TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:J06B Job: 5433M Date: 09/22/21 10:30:48 Page: 1 of 1 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
5-10-15	4/12	1	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	23 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	**General**	**CSI**	**Deflection**		**L/**	**(loc)**	**Allowed**
TCLL : 20	Bldg Code : CBC 2019/ TPI 1-2014	TC : 0.16 (1-2)	Vert TL:	0.04 in	L / 999	(5-1)	L / 240
TCDL : 15(rake)		BC : 0.21 (4-5)	Vert LL:	0.02 in	L / 999	(5-1)	L / 360
BCLL : 0	Rep Mbr : No	Web : 0.13 (2-5)	Horz TL:	0 in		3	
BCDL : 10	Lumber D.O.L. : 125 %						

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
1	1	3.5 in	1.50 in	204 lbs	-	-	-71 lbs	-71 lbs	170 lbs
5	1	5.5 in	1.50 in	631 lbs	-	-64 lbs	-408 lbs	-408 lbs	-
3	1	1.5 in	1.50 in	168 lbs	-207 lbs	-8 lbs	-	-207 lbs	-
4	1	1.5 in	1.50 in	13 lbs	-124 lbs	-24 lbs	-	-124 lbs	-

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC				
BC				
Web	2-5 0.128 -472 lbs			

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Due to negative reactions in gravity load cases, special connections to the bearing surface at joints 3, 4 may need to be considered.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

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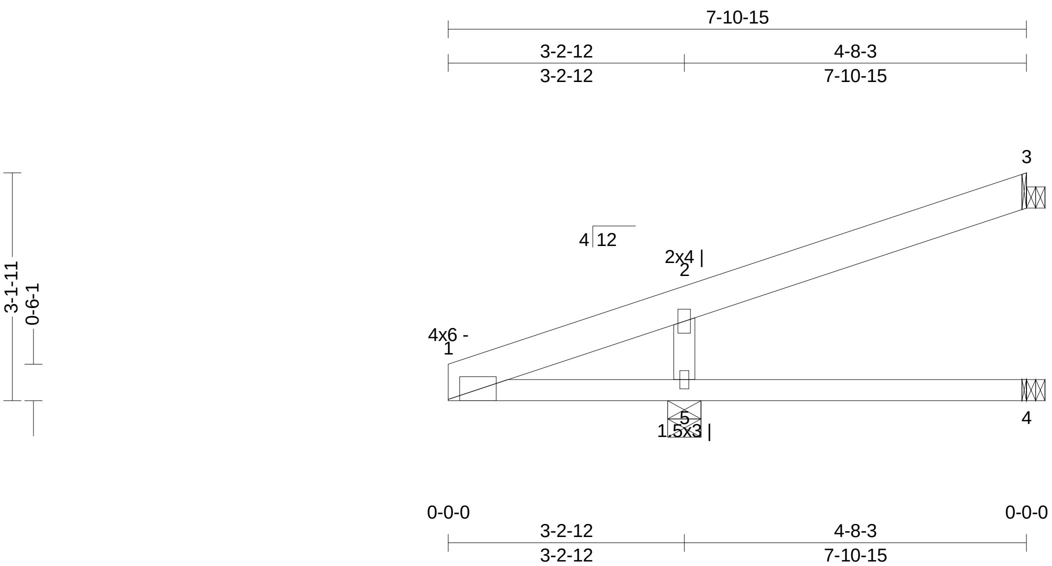
Eagle Metal Products

	TrusPro Inc.	Truss:J08
	695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Job: 5433M Date: 09/22/21 10:30:48 Page: 1 of 1 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
7-10-15	4/12	15	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	28 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/	TC : 0.40 (1-2)	Vert TL:	0.03 in	L / 999	(4-5)	L / 240
TCDL : 15(rake)		TPI 1-2014	BC : 0.29 (5-1)	Vert LL:	0.03 in	L / 999	(4-5)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web : 0.11 (2-5)	Cant / OH TL:	0.18 in	2L / 410	(1-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.1 in	2L / 692	(1-1)	2L / 120
				Horz TL:	0.07 in		3	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
5	1	5.5 in	1.50 in	615 lbs	·	-5 lbs	-351 lbs	-351 lbs	199 lbs
3	1	1.5 in	1.50 in	123 lbs	-15 lbs	-55 lbs	-103 lbs	-103 lbs	·
4	1	1.5 in	1.50 in	113 lbs	·	·	·	·	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC				
BC				
Web	2-5 0.111 -476 lbs			

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Due to negative reactions in gravity load cases, special connections to the bearing surface at joint 3 may need to be considered.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

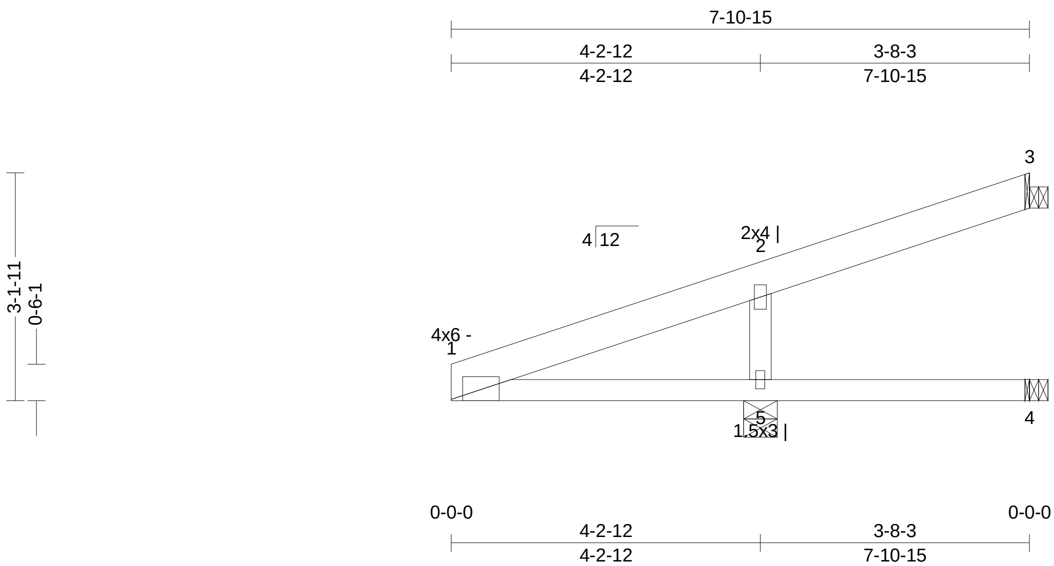
ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

TrueBuild® Truss Software v5.6.375
Eagle Metal Products

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:J08A
Job: 5433M
Date: 09/22/21 10:30:49
Page: 1 of 1
Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
7-10-15	4/12	6	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	29 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/ TPI 1-2014	TC : 0.63 (1-2)	Vert TL:	0.03 in UP	L / 999	(4-5)	L / 240
TCDL : 15(rake)			BC : 0.41 (4-5)	Vert LL:	0.02 in	L / 999	(4-5)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web : 0.13 (2-5)	Cant / OH TL:	0.51 in	2L / 188	(1-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.19 in	2L / 509	(1-1)	2L / 120
				Horz TL:	0.19 in		3	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
5	1	5.5 in	1.50 in	782 lbs	·	-8 lbs	-485 lbs	-485 lbs	199 lbs
3	1	1.5 in	1.50 in	49 lbs	-121 lbs	-48 lbs	-15 lbs	-121 lbs	·
4	1	1.5 in	1.50 in	85 lbs	-18 lbs	·	·	-18 lbs	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC				
BC				
Web	2-5 0.134 -607 lbs			

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Due to negative reactions in gravity load cases, special connections to the bearing surface at joints 3, 4 may need to be considered.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

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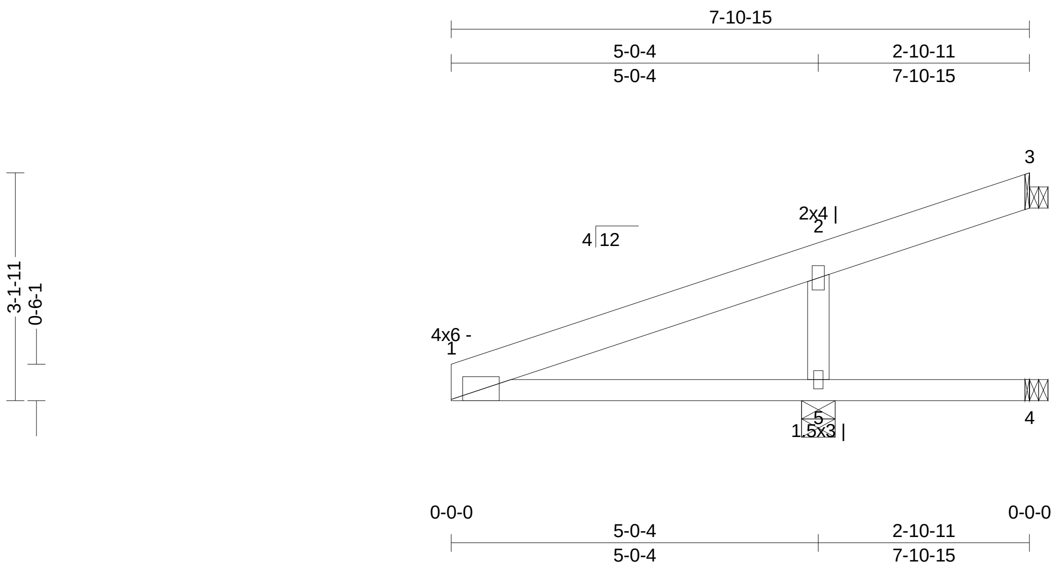
TrueBuild® Truss Software v5.6.375
Eagle Metal Products

	TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:J08AZ Job: 5433M Date: 09/22/21 10:30:49 Page: 1 of 1 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
7-10-15	4/12	2	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	29 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/	TC : 0.99 (1-2)	Vert TL:	0.04 in UP	L / 818	(4-5)	L / 240
TCDL : 15(rake)		TPI 1-2014	BC : 0.61 (4-5)	Vert LL:	0.02 in	L / 999	(4-5)	L / 360
BCLL : 0	Rep Mbr :	No	Web : 0.17 (2-5)	Cant / OH TL:	0.89 in	2L / 129	(1-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.35 in UP	2L / 328	(1-1)	2L / 120
				Horz TL:	0.32 in		3	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
5	1	5.5 in	1.50 in	996 lbs	·	-24 lbs	-650 lbs	-650 lbs	199 lbs
3	1	1.5 in	1.50 in	99 lbs	-258 lbs	-57 lbs	·	-258 lbs	·
4	1	1.5 in	1.50 in	68 lbs	-63 lbs	-4 lbs	·	-63 lbs	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC			
BC			
Web	2-5 0.168 -773 lbs		

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Due to negative reactions in gravity load cases, special connections to the bearing surface at joints 3, 4 may need to be considered.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

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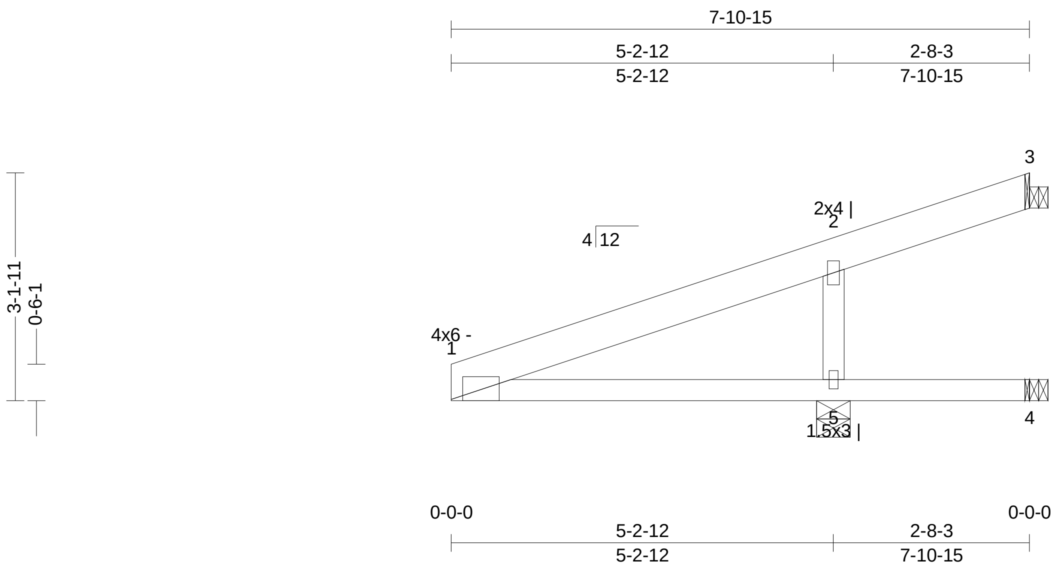
TrueBuild® Truss Software v5.6.375
Eagle Metal Products

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:J08B
Job: 5433M
Date: 09/22/21 10:30:50

Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
7-10-15	4/12	1	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	29 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/ TPI 1-2014	TC : 0.96 (1-2)	Vert TL:	0.03 in UP	L / 833	(4-5)	L / 240
TCDL : 15(rake)			BC : 0.51 (5-1)	Vert LL:	0.02 in	L / 999	(4-5)	L / 360
BCLL : 0	Rep Mbr :	No	Web : 0.18 (2-5)	Cant / OH TL:	0.94 in	2L / 128	(1-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.38 in UP	2L / 319	(1-1)	2L / 120
				Horz TL:	0.34 in		3	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
5	1	5.5 in	1.50 in	1,073 lbs	·	-29 lbs	-708 lbs	-708 lbs	199 lbs
3	1	1.5 in	1.50 in	138 lbs	-307 lbs	-64 lbs	·	-307 lbs	·
4	1	1.5 in	1.50 in	81 lbs	-83 lbs	-9 lbs	·	-83 lbs	·

Material

TC: DFL #1 2 x 6
BC: DFL #1B 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC					
BC					
Web	2-5 0.179 -825 lbs				

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Due to negative reactions in gravity load cases, special connections to the bearing surface at joints 3, 4 may need to be considered.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

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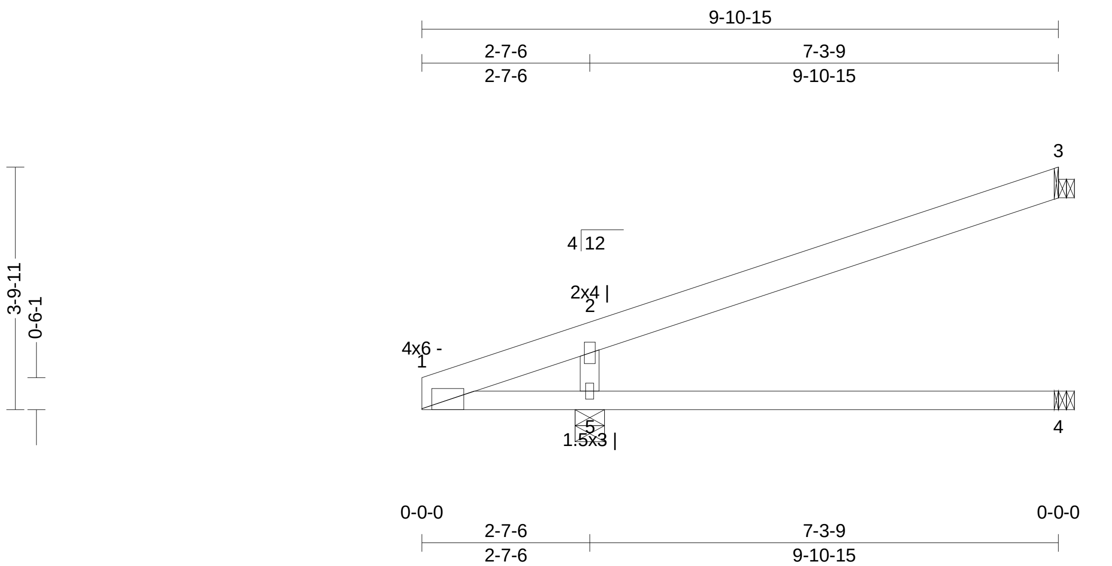
Eagle Metal Products

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:J10
Job: 5433M
Date: 09/22/21 10:30:50

Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
9-10-15	4/12	7	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	35 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/	TC : 0.33 (2-3)	Vert TL:	0.2 in	L / 425	(4-5)	L / 240
TCDL : 15(rake)		TPI 1-2014	BC : 0.41 (4-5)	Vert LL:	0.1 in	L / 809	(4-5)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web : 0.11 (2-5)	Cant / OH TL:	0.08 in UP	2L / 694	(1-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.08 in	2L / 710	(1-1)	2L / 120
				Horz TL:	0.03 in		3	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
5	1	5.5 in	1.50 in	619 lbs	-	-6 lbs	-264 lbs	-264 lbs	221 lbs
3	1	1.5 in	1.50 in	229 lbs	-	-77 lbs	-174 lbs	-174 lbs	-
4	1	1.5 in	1.50 in	150 lbs	-	-	-	-	-

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC				
BC				
Web	2-5	0.115	-477 lbs	

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Listed wind uplift reactions based on MWFRS & C&C loading.

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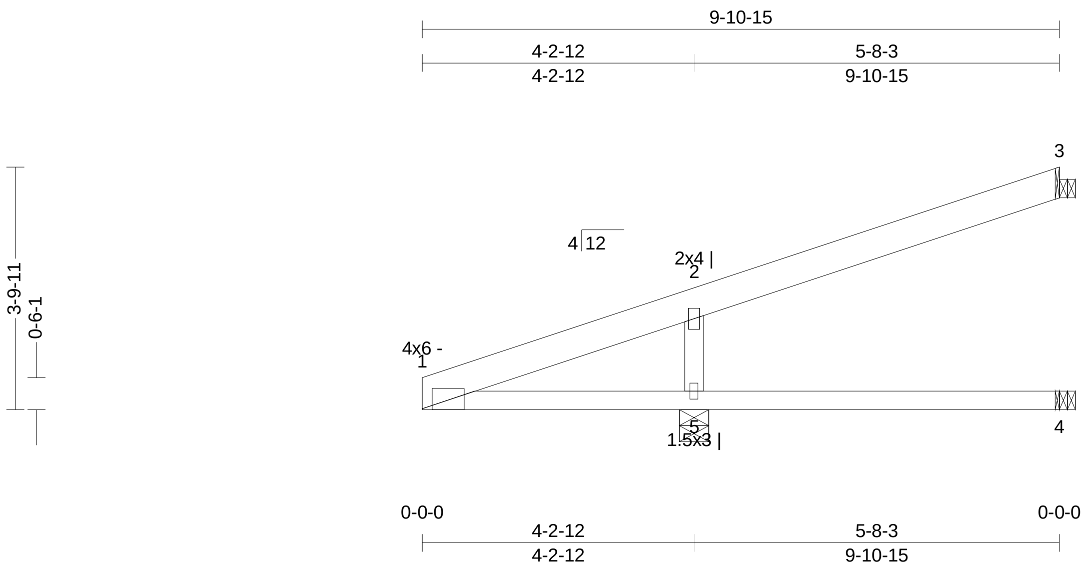
TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:J10A
Job: 5433M
Date: 09/22/21 10:30:51
Page: 1 of 1
Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
9-10-15	4/12	2	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	35 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/ TPI 1-2014	TC : 0.71 (1-2)	Vert TL:	0.06 in	L / 999	(4-5)	L / 240
TCDL : 15(rake)			BC : 0.50 (5-1)	Vert LL:	0.05 in	L / 999	(4-5)	L / 360
BCLL : 0	Rep Mbr :	No	Web : 0.13 (2-5)	Cant / OH TL:	0.52 in	2L / 186	(1-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.23 in	2L / 409	(1-1)	2L / 120
				Horz TL:	0.19 in		3	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
5	1	5.5 in	1.50 in	794 lbs	-	-7 lbs	-400 lbs	-400 lbs	221 lbs
3	1	1.5 in	1.50 in	138 lbs	-24 lbs	-67 lbs	-97 lbs	-97 lbs	-
4	1	1.5 in	1.50 in	120 lbs	-	-	-	-	-

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC				
BC				
Web	2-5 0.128 -618 lbs			

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
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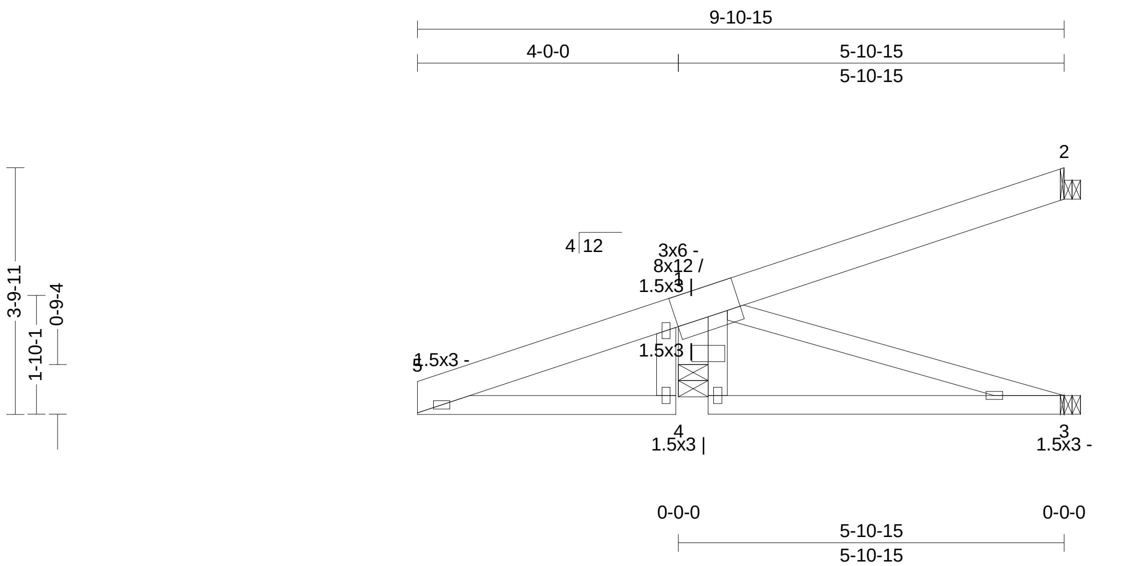
TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:J10AX
Job: 5433M
Date: 09/22/21 10:30:51
Page: 1 of 1
Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
5-10-15	4/12	4	4-0-0	0-0-0	0-0-0	0-0-0	1	24 in	45 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/	TC : 0.69 (5-1)	Vert TL:	0.08 in	L / 801	(3-4)	L / 240
TCDL : 15(rake)		TPI 1-2014	BC : 0.31 (3-4)	Vert LL:	0.05 in	L / 999	(3-4)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web : 0.06 (1-4)	Horz TL:	0 in		3	
BCDL : 10	Lumber D.O.L. :	125 %						

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
1	1	5.5 in	1.50 in	698 lbs	·	-121 lbs	-534 lbs	-534 lbs	320 lbs
2	1	1.5 in	1.50 in	137 lbs	-46 lbs	-19 lbs	-27 lbs	-46 lbs	·
3	1	1.5 in	1.50 in	164 lbs	·	·	·	·	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC				
BC				
Web				

Notes

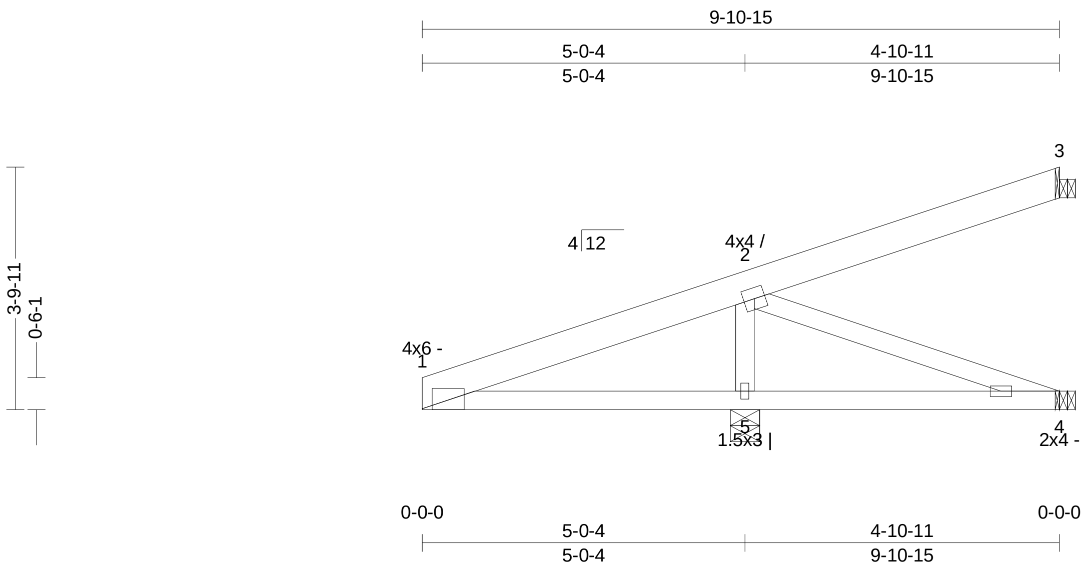
1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) Unlabeled plates are 1.5x3 20ga.
3) This truss has been designed using the green service reduction factors.
4) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
5) Nailing schedule shall be specified by truss manufacturer per NDS.
6) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
7) A creep factor of 2.00 has been applied for this truss analysis.
8) Horizontal clearance between inside face of bearing and where the outside edge of the end web meets the bottom side of the top chord shall not exceed 0.5"
9) Due to negative reactions in gravity load cases, special connections to the bearing surface at joint 2 may need to be considered.
10) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:J10AZ
Job: 5433M
Date: 09/22/21 10:30:52
Page: 1 of 1
Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
9-10-15	4/12	2	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	41 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/	TC : 0.36 (1-2)	Vert TL:	0.03 in	L / 999	(4-5)	L / 240
TCDL : 15(rake)		TPI 1-2014	BC : 0.19 (5-1)	Vert LL:	0.02 in	L / 999	(4-5)	L / 360
BCLL : 0	Rep Mbr :	No	Web : 0.21 (2-4)	Cant / OH TL:	0.07 in	2L / 999	(5-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.04 in UP	2L / 999	(5-1)	2L / 120
				Horz TL:	0.02 in		3	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
5	1	5.5 in	1.50 in	937 lbs	-	-9 lbs	-503 lbs	-503 lbs	221 lbs
3	1	1.5 in	1.50 in	140 lbs	-	-41 lbs	-91 lbs	-91 lbs	-
4	1	1.5 in	1.50 in	109 lbs	-165 lbs	-20 lbs	-	-165 lbs	-

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 8-7-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	1-2	0.360	588 lbs	(-384 lbs)				
BC	4-5	0.192	-503 lbs		5-1	0.192	-503 lbs	
Web	2-5	0.170	-809 lbs		2-4	0.215	542 lbs	(-193 lbs)

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Due to negative reactions in gravity load cases, special connections to the bearing surface at joint 4 may need to be considered.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

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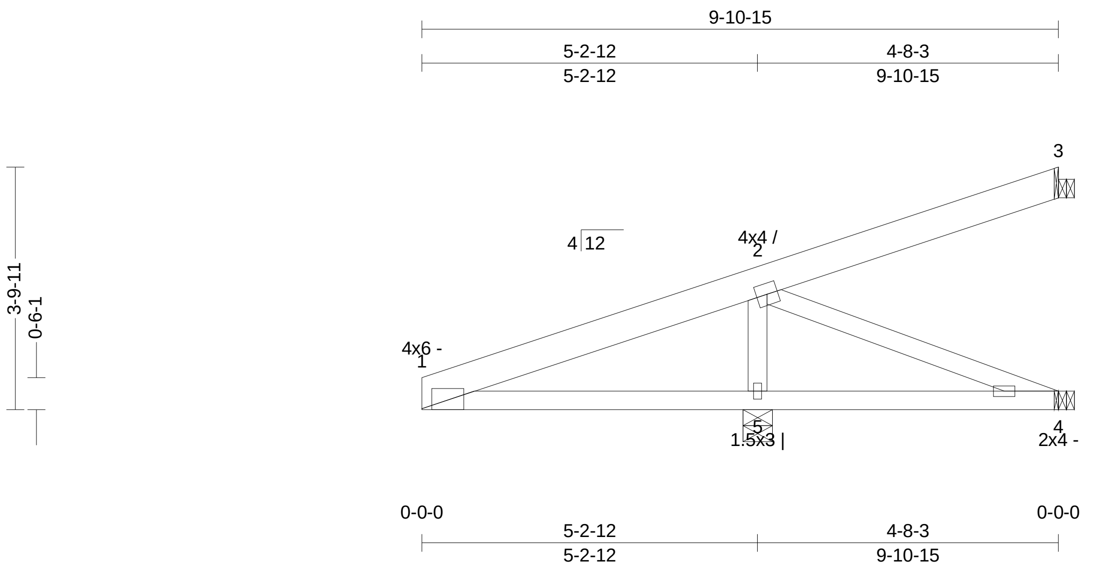
TrueBuild® Truss Software v5.6.375
Eagle Metal Products

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:J10B
Job: 5433M
Date: 09/22/21 10:30:52
Page: 1 of 1
Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
9-10-15	4/12	1	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	41 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/	TC : 0.37 (1-2)	Vert TL:	0.04 in	L / 999	(4-5)	L / 240
TCDL : 15(rake)		TPI 1-2014	BC : 0.21 (4-5)	Vert LL:	0.03 in	L / 999	(4-5)	L / 360
BCLL : 0	Rep Mbr :	No	Web : 0.22 (2-4)	Cant / OH TL:	0.08 in	2L / 999	(5-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.04 in UP	2L / 999	(5-1)	2L / 120
				Horz TL:	0.02 in		3	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
5	1	5.5 in	1.50 in	965 lbs	·	-11 lbs	-523 lbs	-523 lbs	221 lbs
3	1	1.5 in	1.50 in	134 lbs	·	-39 lbs	-82 lbs	-82 lbs	·
4	1	1.5 in	1.50 in	114 lbs	-177 lbs	-24 lbs	·	-177 lbs	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 8-5-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	1-2	0.370	613 lbs	(-407 lbs)				
BC	4-5	0.211	-521 lbs		5-1	0.211	-521 lbs	
Web	2-5	0.176	-830 lbs		2-4	0.222	561 lbs	(-218 lbs)

Notes

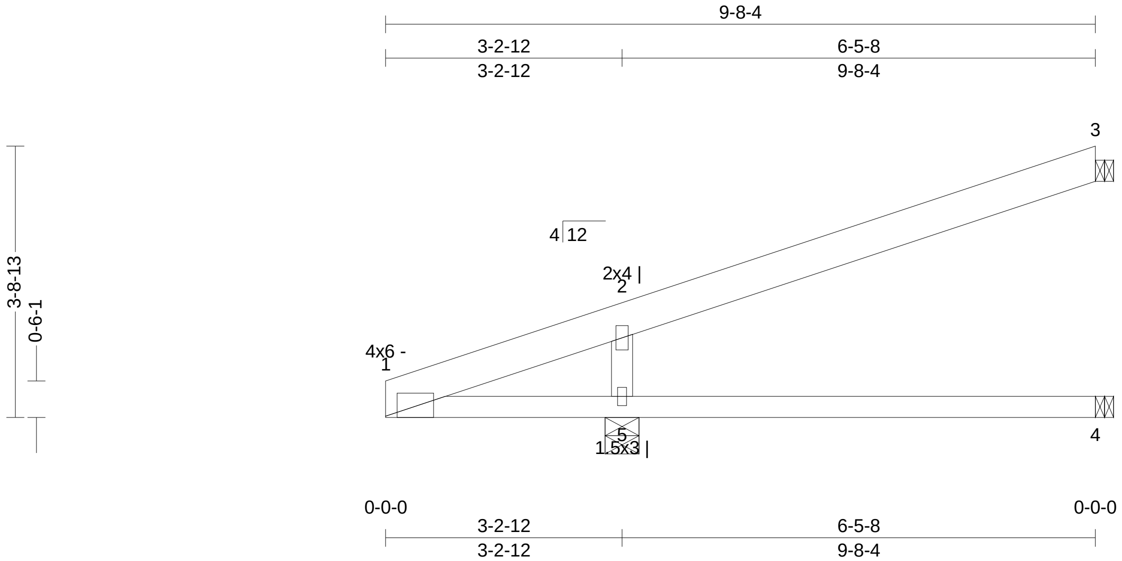
1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Due to negative reactions in gravity load cases, special connections to the bearing surface at joint 4 may need to be considered.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:J10C
Job: 5433M
Date: 09/22/21 10:30:53
Page: 1 of 1
Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
9-8-4	4/12	2	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	34 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/ TPI 1-2014	TC : 0.44 (1-2)	Vert TL:	0.12 in	L / 593	(4-5)	L / 240
TCDL : 15(rake)			BC : 0.42 (4-5)	Vert LL:	0.07 in	L / 946	(4-5)	L / 360
BCLL : 0	Rep Mbr :	No	Web : 0.11 (2-5)	Cant / OH TL:	0.16 in	2L / 443	(1-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.13 in	2L / 567	(1-1)	2L / 120
				Horz TL:	0.06 in		3	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
5	1	5.5 in	1.50 in	668 lbs	-	-6 lbs	-313 lbs	-313 lbs	219 lbs
3	1	3.5 in	1.50 in	192 lbs	-	-72 lbs	-146 lbs	-146 lbs	-
4	1	5.5 in	1.50 in	137 lbs	-	-	-	-	-

Material
TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing
TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads
1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces
Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC				
BC				
Web	2-5 0.114 -518 lbs			

Notes
1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Listed wind uplift reactions based on MWFRS & C&C loading.

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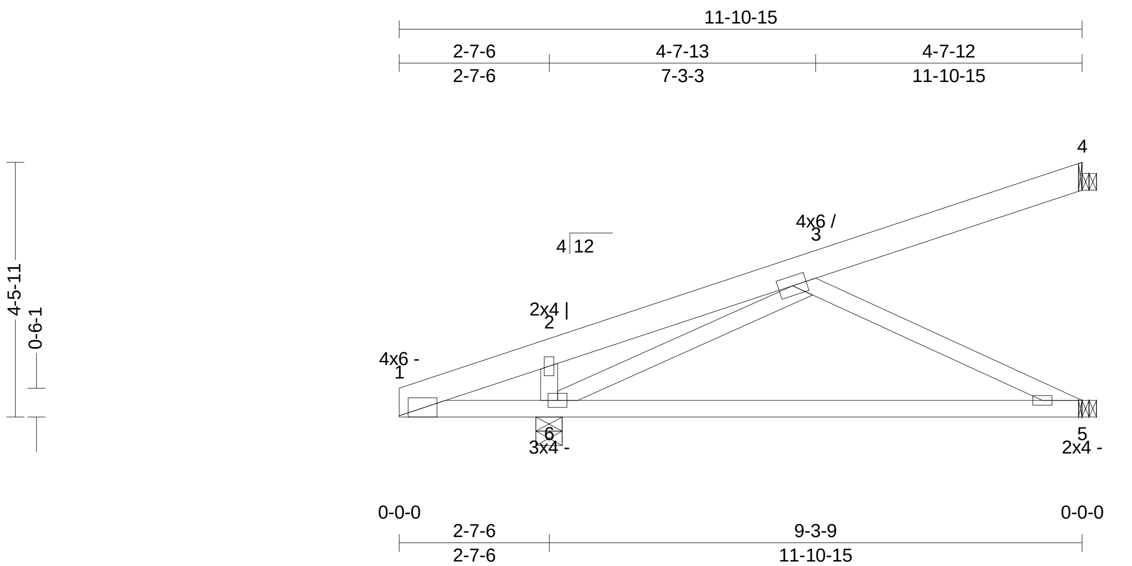
	TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:J12 Job: 5433M Date: 09/22/21 10:30:53 Page: 1 of 1 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
11-10-15	4/12	7	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	53 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	**General**		**CSI**	**Deflection**		**L/**	**(loc)**	**Allowed**
TCLL : 20	Bldg Code :	CBC 2019/ TPI 1-2014	TC : 0.15 (3-4)	Vert TL:	0.4 in	L / 267	(5-6)	L / 240
TCDL : 15(rake)			BC : 0.75 (5-6)	Vert LL:	0.2 in	L / 531	(5-6)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web : 0.24 (3-6)	Cant / OH TL:	0.01 in UP	2L / 999	(6-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.01 in	2L / 999	(1-1)	2L / 120
				Horz TL:	0.01 in		5	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
6	1	5.5 in	1.50 in	700 lbs	-	-7 lbs	-240 lbs	-240 lbs	238 lbs
4	1	1.5 in	1.50 in	160 lbs	-	-47 lbs	-105 lbs	-105 lbs	-
5	1	1.5 in	1.50 in	246 lbs	-	-8 lbs	-54 lbs	-54 lbs	-

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC								
BC	5-6	0.746	350 lbs	(-214 lbs)				
Web	3-6	0.240	-450 lbs		3-5	0.227	-386 lbs	

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Listed wind uplift reactions based on MWFRS & C&C loading.

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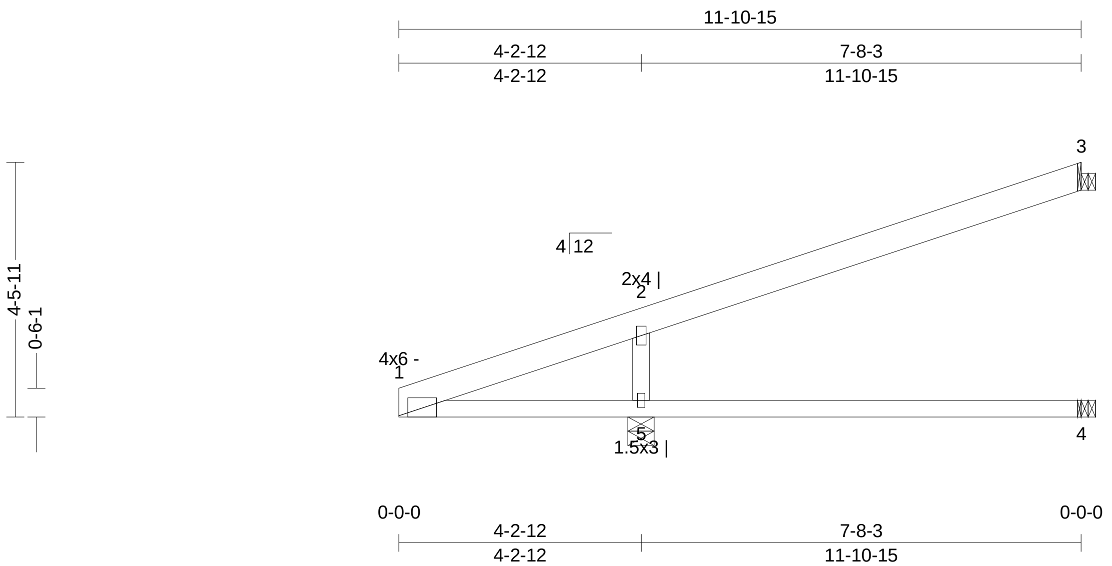
	TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:J12A Job: 5433M Date: 09/22/21 10:30:54 Page: 1 of 1 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
11-10-15	4/12	2	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	42 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	**General**		**CSI**	**Deflection**		**L/**	**(loc)**	**Allowed**
TCLL : 20	Bldg Code :	CBC 2019/ TPI 1-2014	TC : 0.71 (1-2)	Vert TL:	0.2 in	L / 438	(4-5)	L / 240
TCDL : 15(rake)			BC : 0.65 (4-5)	Vert LL:	0.13 in	L / 697	(4-5)	L / 360
BCLL : 0	Rep Mbr :	No	Web : 0.14 (2-5)	Cant / OH TL:	0.42 in	2L / 229	(1-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.28 in	2L / 340	(1-1)	2L / 120
				Horz TL:	0.15 in		3	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
5	1	5.5 in	1.50 in	848 lbs	-	-8 lbs	-348 lbs	-348 lbs	238 lbs
3	1	1.5 in	1.50 in	221 lbs	-	-86 lbs	-141 lbs	-141 lbs	-
4	1	1.5 in	1.50 in	147 lbs	-	-	-	-	-

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC					
BC					
Web	2-5 0.136 -660 lbs				

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

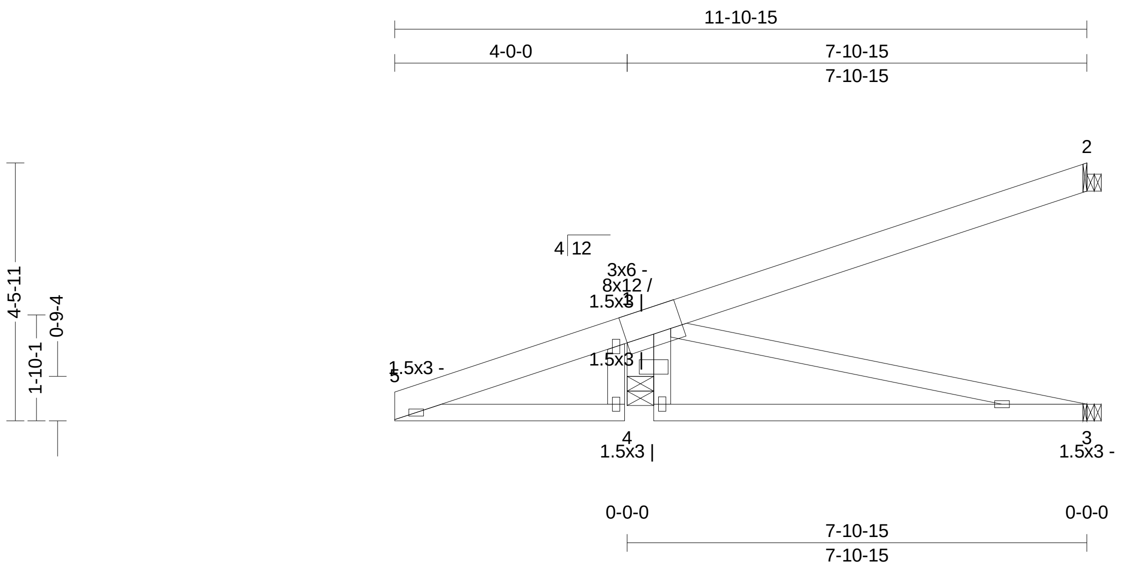
TrueBuild® Truss Software v5.6.375
Eagle Metal Products

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:J12AX
Job: 5433M
Date: 09/22/21 10:30:54

Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
7-10-15	4/12	4	4-0-0	0-0-0	0-0-0	0-0-0	1	24 in	54 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/	TC : 0.69 (5-1)	Vert TL:	0.24 in	L / 374	(3-4)	L / 240
TCDL : 15(rake)		TPI 1-2014	BC : 0.51 (3-4)	Vert LL:	0.12 in	L / 721	(3-4)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web : 0.07 (1-4)	Horz TL:	0 in		2	
BCDL : 10	Lumber D.O.L. :	125 %						

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
1	1	5.5 in	1.50 in	752 lbs	-	-113 lbs	-496 lbs	-496 lbs	349 lbs
2	1	1.5 in	1.50 in	219 lbs	-	-51 lbs	-109 lbs	-109 lbs	-
3	1	1.5 in	1.50 in	189 lbs	-	-	-	-	-

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: HF Standard 2 x 4 except:
SPF Stud 2 x 4: 1-4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC				
BC				
Web				

Notes

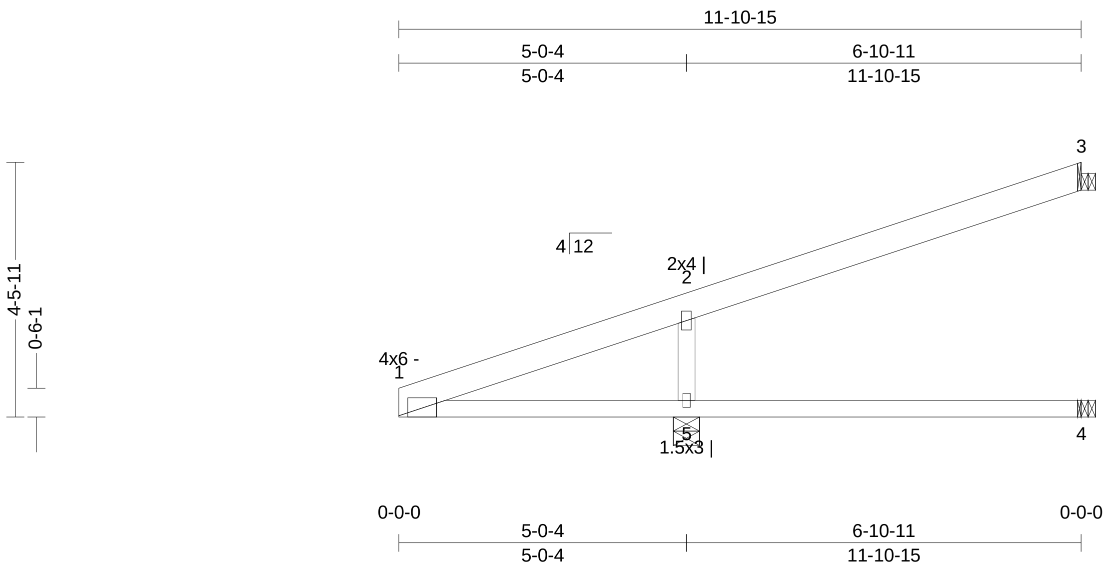
1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) Unlabeled plates are 1.5x3 20ga.
3) This truss has been designed using the green service reduction factors.
4) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
5) Nailing schedule shall be specified by truss manufacturer per NDS.
6) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
7) A creep factor of 2.00 has been applied for this truss analysis.
8) Horizontal clearance between inside face of bearing and where the outside edge of the end web meets the bottom side of the top chord shall not exceed 0.5"
9) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:J12AZ
Job: 5433M
Date: 09/22/21 10:30:55
Page: 1 of 1
Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
11-10-15	4/12	2	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	42 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/	TC : 0.89 (1-2)	Vert TL:	0.09 in	L / 827	(4-5)	L / 240
TCDL : 15(rake)		TPI 1-2014	BC : 0.55 (5-1)	Vert LL:	0.08 in	L / 933	(4-5)	L / 360
BCLL : 0	Rep Mbr :	No	Web : 0.15 (2-5)	Cant / OH TL:	0.94 in	2L / 123	(1-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.38 in	2L / 303	(1-1)	2L / 120
				Horz TL:	0.34 in		3	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
5	1	5.5 in	1.50 in	946 lbs	·	-9 lbs	-415 lbs	-415 lbs	238 lbs
3	1	1.5 in	1.50 in	171 lbs	-14 lbs	-81 lbs	-103 lbs	-103 lbs	·
4	1	1.5 in	1.50 in	130 lbs	·	·	·	·	·

Material

TC: DFL #1 2 x 6
BC: DFL #1B 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC				
BC				
Web	2-5 0.154 -734 lbs			

Notes

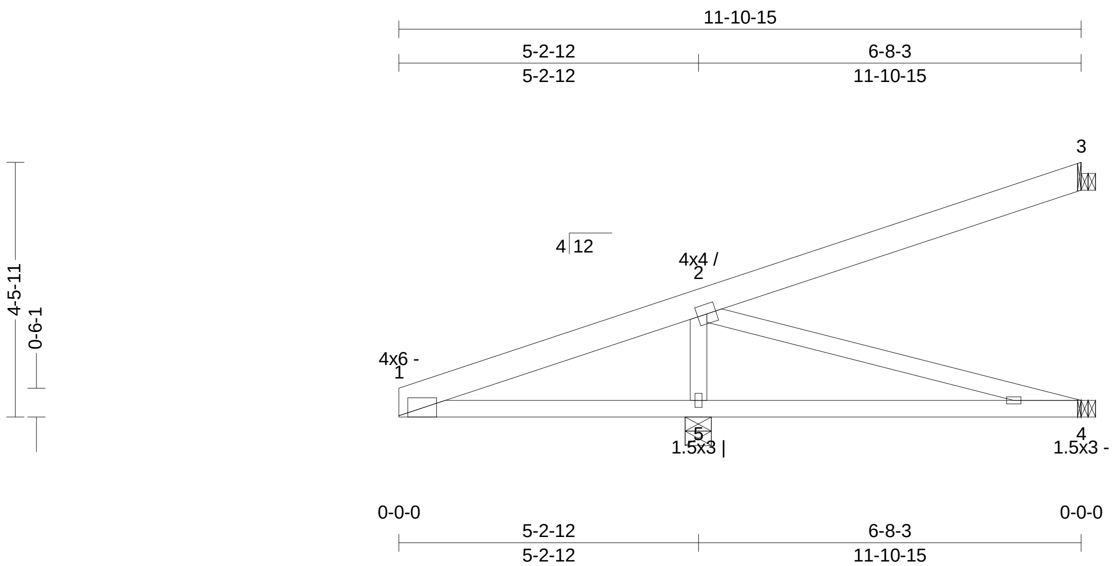
1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Due to negative reactions in gravity load cases, special connections to the bearing surface at joint 3 may need to be considered.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:J12B
Job: 5433M
Date: 09/22/21 10:30:55
Page: 1 of 1
Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
11-10-15	4/12	1	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	50 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/	TC : 0.47 (1-2)	Vert TL:	0.09 in	L / 806	(4-5)	L / 240
TCDL : 15(rake)		TPI 1-2014	BC : 0.35 (4-5)	Vert LL:	0.06 in	L / 999	(4-5)	L / 360
BCLL : 0	Rep Mbr :	No	Web : 0.20 (2-4)	Cant / OH TL:	0.08 in	2L / 999	(1-1)	2L / 120
BCDL : 10	Lumber D.O.L. :	125 %		Cant / OH LL:	0.04 in UP	2L / 999	(5-1)	2L / 120
				Horz TL:	0.02 in		3	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
5	1	5.5 in	1.50 in	981 lbs	·	-10 lbs	-442 lbs	-442 lbs	238 lbs
3	1	1.5 in	1.50 in	195 lbs	·	-58 lbs	-119 lbs	-119 lbs	·
4	1	1.5 in	1.50 in	84 lbs	-92 lbs	-1 lbs	·	-92 lbs	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 8-7-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	1-2	0.471	589 lbs	(-351 lbs)				
BC	4-5	0.346	-491 lbs		5-1	0.286	-491 lbs	
Web	2-5	0.176	-834 lbs		2-4	0.203	513 lbs	(-129 lbs)

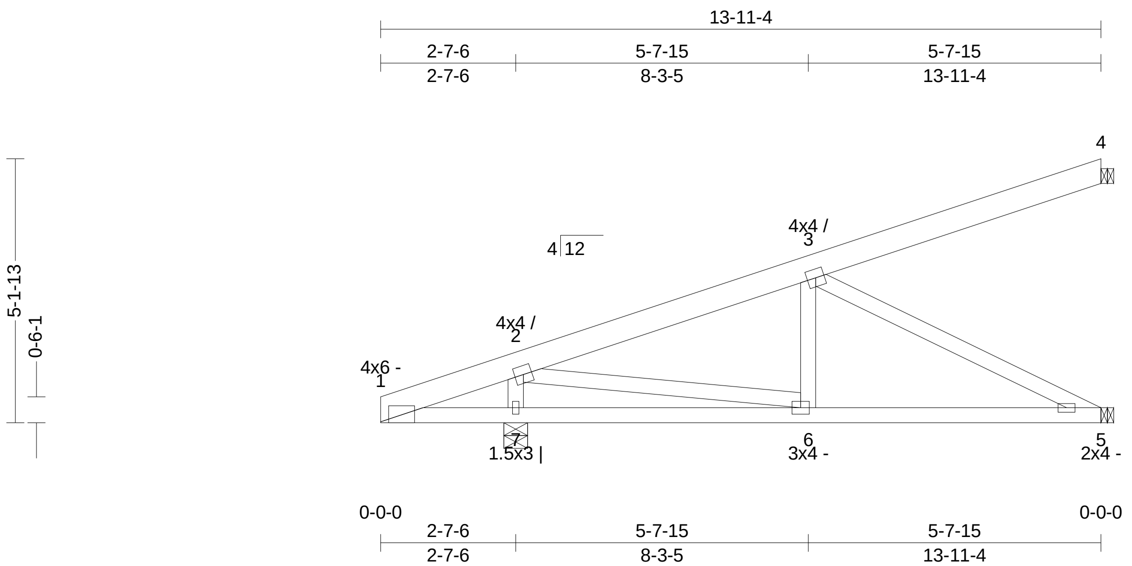
Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Due to negative reactions in gravity load cases, special connections to the bearing surface at joint 4 may need to be considered.
8) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

TrusPro Inc. 695 Obispo Street Guadalupe, CA 93434 Ph: (805)343-2555 Fax: (805)343-2377	Truss:J14 Job: 5433M Date: 09/22/21 10:30:56 Page: 1 of 1 Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
13-11-4	4/12	4	0-0-0	0-0-0	0-0-0	0-0-0	1	24 in	64 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	**General**	**CSI**	**Deflection**	**L/**	**(loc)**	**Allowed**
TCLL : 20	Bldg Code : CBC 2019/ TPI 1-2014	TC : 0.20 (1-2)	Vert TL: 0.09 in	L / 999	(5-6)	L / 240
TCDL : 15(rake)		BC : 0.33 (5-6)	Vert LL: 0.05 in	L / 999	(5-6)	L / 360
BCLL : 0	Rep Mbr : Yes	Web : 0.47 (3-5)	Cant / OH TL: 0.02 in	2L / 999	(1-1)	2L / 120
BCDL : 10	Lumber D.O.L. : 125 %		Cant / OH LL: 0.01 in	2L / 999	(1-1)	2L / 120
			Horz TL: 0.01 in		4	

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
7	1	5.5 in	1.50 in	787 lbs	·	-8 lbs	-216 lbs	-216 lbs	252 lbs
4	1	1.5 in	1.50 in	174 lbs	·	-47 lbs	-95 lbs	-95 lbs	·
5	1	1.5 in	1.50 in	324 lbs	·	-18 lbs	-67 lbs	-67 lbs	·

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	2-3	0.146	-635 lbs									
BC	5-6	0.334	542 lbs	(-182 lbs)								
Web	2-7	0.136	-676 lbs		2-6	0.245	619 lbs	(-74 lbs)	3-5	0.470	-609 lbs	

Notes

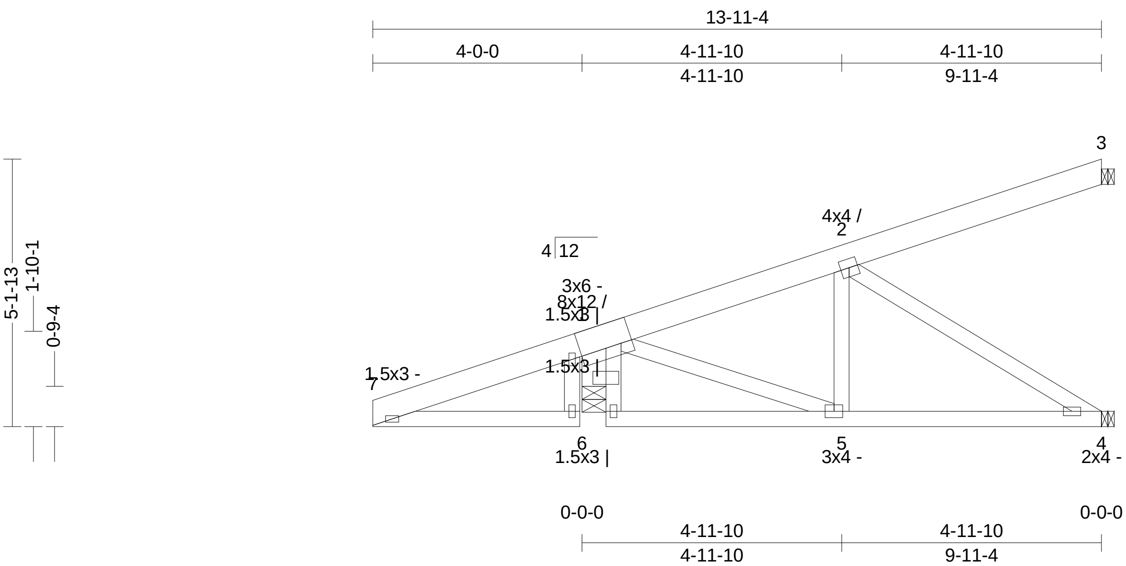
1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) This truss has been designed using the green service reduction factors.
3) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
4) Nailing schedule shall be specified by truss manufacturer per NDS.
5) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
6) A creep factor of 2.00 has been applied for this truss analysis.
7) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.

TrusPro Inc.
695 Obispo Street
Guadalupe, CA 93434
Ph: (805)343-2555 Fax: (805)343-2377

Truss:J14AX
Job: 5433M
Date: 09/22/21 10:30:56
Page: 1 of 1
Notes: All connector plates to be Eagle 20 gauge unless otherwise noted

SPAN	PITCH	QTY	OHL	OHR	CANT L	CANT R	PLYS	SPACING	WGT/PLY
9-11-4	4/12	6	4-0-0	0-0-0	0-0-0	0-0-0	1	24 in	67 lbs



All plates shown to be Eagle 20 unless otherwise noted.

Loading (psf)	General		CSI	Deflection		L/	(loc)	Allowed
TCLL : 20	Bldg Code :	CBC 2019/	TC : 0.69 (7-1)	Vert TL:	0.05 in	L / 999	(4-5)	L / 240
TCDL : 15(rake)		TPI 1-2014	BC : 0.26 (4-5)	Vert LL:	0.03 in	L / 999	(4-5)	L / 360
BCLL : 0	Rep Mbr :	Yes	Web : 0.24 (2-4)	Horz TL:	0 in		4	
BCDL : 10	Lumber D.O.L. :	125 %						

Reaction

JT	Brg Combo	Brg Width	Rqd Brg Width	Max React	Max Grav Uplift	Max MWFRS Uplift	Max C&C Uplift	Max Uplift	Max Horiz
1	1	5.5 in	1.50 in	832 lbs	-	-103 lbs	-428 lbs	-428 lbs	358 lbs
3	1	1.5 in	1.50 in	173 lbs	-	-50 lbs	-140 lbs	-140 lbs	-
4	1	1.5 in	1.50 in	239 lbs	-	-	-	-	-

Material

TC: DFL #2 2 x 6
BC: DFL #2 2 x 4
Web: SPF Stud 2 x 4

Bracing

TC: Sheathed or Purlins at 6-3-0, Purlin design by Others.
BC: Sheathed or Purlins at 10-0-0, Purlin design by Others.

Loads

1) This truss has been designed for the effects due to 10 psf bottom chord live load plus dead loads.
2) This truss has been designed for the effects of wind loads in accordance with ASCE7 - 16 with the following user defined input: 110 mph (Factored), Exposure C, Enclosed, Gable, Risk Category II, h=B=L=10 ft, Not End Zone Truss, Both end webs considered. DOL = 1.60
3) Minimum storage attic loading has been applied in accordance with IBC 1607.1
4) A moving/sprinkler point load of 300 lbs to the TC and 300 lbs to the BC has been applied concurrent with other dead loads.

Member Forces

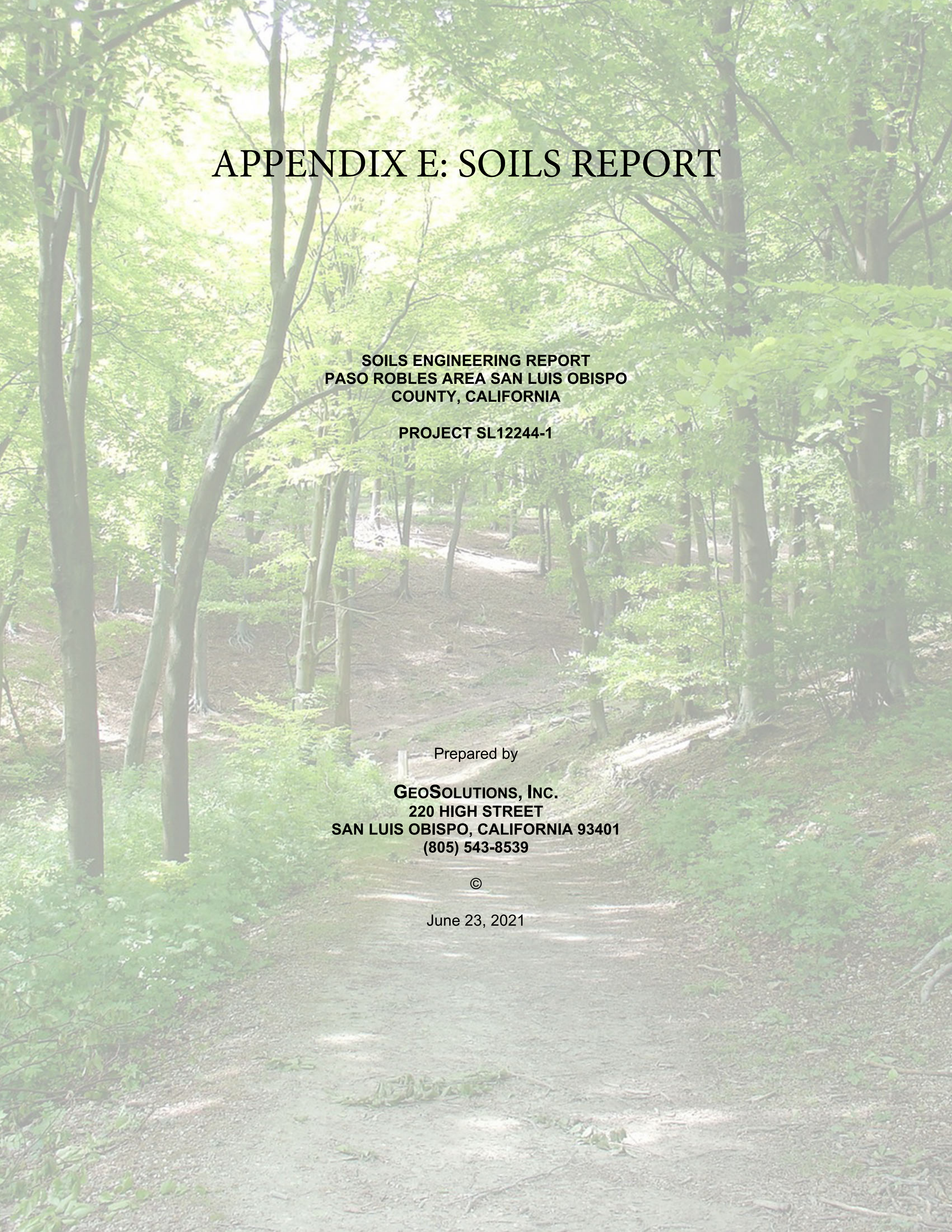
Table indicates: Member ID, max CSI, max axial force, (max compr. force if different from max axial force). Only forces greater than 300lbs are shown in this table.

TC	1-2	0.522	-363 lbs			
BC	4-5	0.264	302 lbs			
Web	1-5	0.127	321 lbs	2-4	0.238	-357 lbs

Notes

1) Unless noted otherwise, do not cut or alter any truss member or plate without prior approval from a Professional Engineer.
2) Unlabeled plates are 1.5x3 20ga.
3) This truss has been designed using the green service reduction factors.
4) The fabrication tolerance for this roof truss is 20 % (Cq = 0.80).
5) Nailing schedule shall be specified by truss manufacturer per NDS.
6) Brace bottom chord with approved sheathing or purlins per Bracing Summary.
7) A creep factor of 2.00 has been applied for this truss analysis.
8) Horizontal clearance between inside face of bearing and where the outside edge of the end web meets the bottom side of the top chord shall not exceed 0.5"
9) Listed wind uplift reactions based on MWFRS & C&C loading.

ALL PERSONS FABRICATING, HANDLING, ERECTING OR INSTALLING ANY TRUSS BASED UPON THIS TRUSS DESIGN DRAWING ARE INSTRUCTED TO REFER TO ALL OF THE INSTRUCTIONS, LIMITATIONS AND QUALIFICATIONS SET FORTH IN THE EAGLE METAL PRODUCT'S DESIGN NOTES ISSUED WITH THIS DESIGN AND AVAILABLE FROM EAGLE UPON REQUEST. DESIGN VALID ONLY WHEN EAGLE METAL CONNECTORS ARE USED.



APPENDIX E: SOILS REPORT

SOILS ENGINEERING REPORT
PASO ROBLES AREA SAN LUIS OBISPO
COUNTY, CALIFORNIA

PROJECT SL12244-1

Prepared by

GEOSOLUTIONS, INC.
220 HIGH STREET
SAN LUIS OBISPO, CALIFORNIA 93401
(805) 543-8539

©

June 23, 2021

GEO
SOLUTIONS

SOILS ENGINEERING REPORT

DATE:
June 23, 2021

PROJECT NUMBER:
SL12244-1

This Soils Engineering Report has been prepared for the proposed single-family residence to be located at [removed] in the Paso Robles area of San Luis Obispo County, California. Geotechnically, the site is suitable for the proposed development provided the recommendations in this report for site preparation, earthwork, foundations, slabs, retaining walls, and pavement sections are incorporated into the design.

It is anticipated that all foundations for the proposed residence will be excavated into the competent formational material encountered at a depth of 2.0 to 3.0 feet below ground surface during the field investigation. As an alternative, a graded pad may be developed for the proposed residence with all foundations excavated into engineered fill. All foundations are to be excavated into uniform material to limit the potential for distress of the foundation systems due to differential settlement. If cuts steeper than allowed by State of California Construction Safety Orders for "Excavations, Trenches, Earthwork" are proposed, a numerical slope stability analysis may be necessary for temporary construction slopes.

Thank you for the opportunity to have been of service in preparing this report. If you have any questions, please contact the undersigned at (805) 543-8539.

Sincerely,
GeoSolutions, Inc.

REGISTERED PROFESSIONAL ENGINEER
KRAIG ROBERT CROZIER
No. C61361
CIVIL
STATE OF CALIFORNIA

Kraig R. Crozier, PE
Principal, C61361

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San Luis Obispo CA 93401
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Santa Maria, CA 93455
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805.966.2200

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sbinfo@geosolutions.net

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

SOILS ENGINEERING REPORT

PASO ROBLES AREA SAN LUIS OBISPO COUNTY, CALIFORNIA

PROJECT SL12244-1

1.0 INTRODUCTION

This report presents the results of the geotechnical investigation for the proposed single-family residence to be located at [removed]in the Paso Robles area of San Luis Obispo County, California. See Figure 1: Site Location Map for the general location of the project area. Figure 1: Site Location Map was obtained from the program GIS Surfrider 1.8 (Elfelt, 2016).

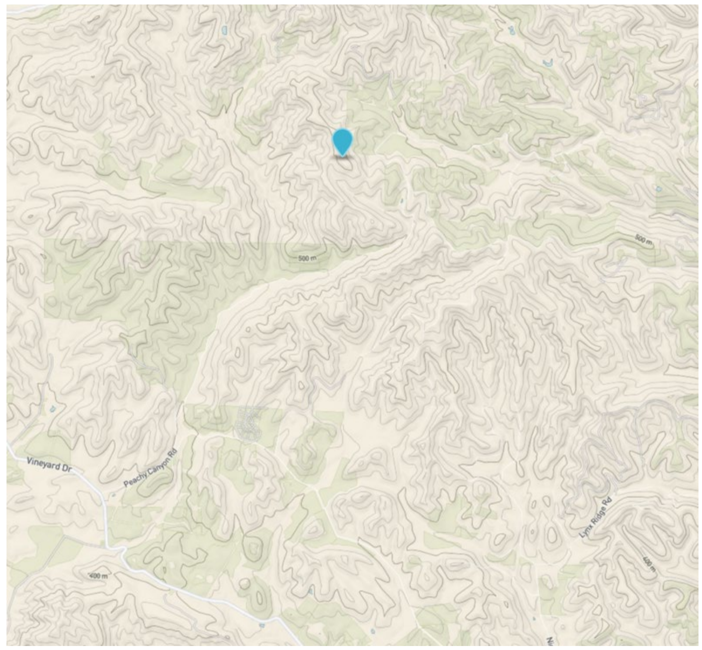

Figure 1: Site Location Map

1.1 Site Description

[removed] degrees west longitude at a general elevation of 2,000 feet above mean sea level. The parcel is irregularly shaped and 92 acres in size. The proposed development is to be limited to the southeast portion of the parcel. The site is access from a paved roadway to the north. See Figure 2: Site Plan for the general layout of the Site.

The Site is situated on a hill top that drops to the east, south and west at varying slope gradients from 3:1 to 6:1 (horizontal to vertical). Surface drainage follows the topography to the east, west and south towards existing slopes. Annual grasses currently vegetate the Site.

1.2 Project Description

A single-family residence and associated driveway are proposed on the hilltop in the southeast portion of the parcel. Grading quantities are anticipated to consist of 1,000 cubic yards of cut and 800 cubic yards of fill. At the time of the preparation of this report, the proposed single-family residence is to be constructed using light wood framing. The proposed development area will hereafter be referred to as the “Site.”

It is anticipated that the proposed single-family residence will utilize a slab-on-grade and/or raised wood lower floor system. Dead and sustained live loads are currently unknown, but they are anticipated to be relatively light with maximum continuous footing and column loads estimated to be approximately 1.5 kips per linear foot and 15 kips, respectively.

2.0 PURPOSE AND SCOPE

The purpose of this study was to explore and evaluate the surface and sub-surface soil conditions at the Site and to develop geotechnical information and design criteria. The scope of this study includes the following items:

Figure 2: Site Plan

1. A literature review of available published and unpublished geotechnical data pertinent to the project site including geologic maps, and available on-line or in-house aerial photographs.

2. A field study consisting of site reconnaissance and subsurface exploration including exploratory trenches in order to formulate a description of the sub-surface conditions at the Site.

3. Laboratory testing performed on representative soil samples that were collected during our field study.

4. Engineering analysis of the data gathered during our literature review, field study, and laboratory testing.

5. Development of recommendations for site preparation and grading as well as geotechnical design criteria for building foundations, retaining walls, pavement sections, underground utilities, and drainage facilities.

3.0 FIELD AND LABORATORY INVESTIGATION

The field investigation was conducted on May 6, 2021 using a mini excavator with a twelve-inch bucket. Three exploratory trenches were advanced to a maximum depth of 6 feet below ground surface (bgs) at the approximate locations indicated on Figure 3: Field Investigation.

Data gathered during the field investigation suggest that the soil materials at the Site consist of colluvial soil overlying competent formational material. The surface material at the Site generally consisted of dark olive brown sandy elastic SILT (MH) with cobbles encountered in a dry to slightly moist condition. The sub-surface materials consisted of light brown sandy SILT (MH), interpreted as shale and encountered in a highly fractured, thinly bedded, moderately hard and moderately weathered and dry condition.

Regional site geology was obtained from United States Geological Survey MapView internet application (USGS, 2013) which compiles existing geologic maps. Figure 4: Regional Geologic Map presents the geologic conditions in site vicinity as mapped on the *Geologic Map of the Adelaida Quadrangle* (Dibblee, 2006). The majority of all underlying material at the Site was interpreted as Monterey Shale and will hereafter be referred to as competent formational material.

Groundwater was not encountered in any of the trenches. It should be expected that groundwater elevations may vary seasonally and with irrigation practices.

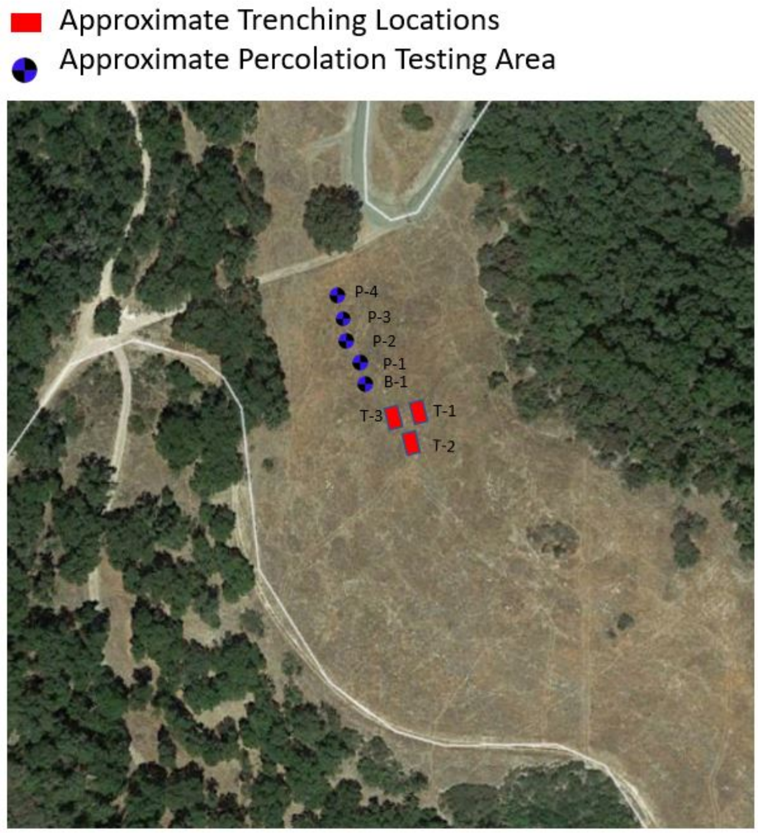

Figure 3: Field Investigation

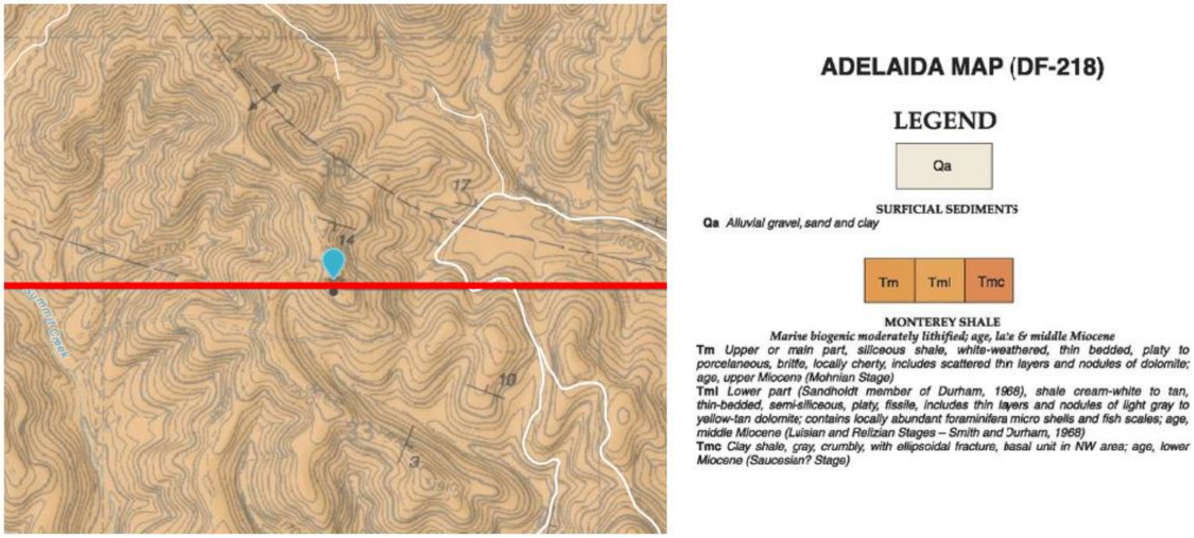

Figure 4: Regional Geologic Map

During the trenching operations the soils encountered were continuously examined, visually classified, and sampled for general laboratory testing. A project engineer has reviewed a continuous log of the soils encountered at the time of field investigation. See **Appendix A** for the Trenching Logs from the field investigation.

Laboratory tests were performed on soil samples that were obtained from the Site during the field investigation. The results of these tests are listed below in Table 1: Engineering Properties. Laboratory data reports and detailed explanations of the laboratory tests performed during this investigation are provided in **Appendix B**.

Table 1: Engineering Properties

Sample Name	Sample Description	USCS Specification	Expansion Index	Expansion Potential	Maximum Dry Density, γ_d (pcf)	Optimum Moisture (%)	Plasticity Index	Fines Content (%)
A	Dark Olive Brown Sandy Elastic SILT	MH	23	Low	86.5	27.8	26 Medium	66.3
B	Pale Brown Elastic SILT	MH	-	-	-	-	16 Low	-

4.0 SEISMIC DESIGN CONSIDERATIONS

Estimating the design ground motions at the Site depends on many factors including the distance from the Site to known active faults; the expected magnitude and rate of recurrence of seismic events produced on such faults; the source-to-site ground motion attenuation characteristics; and the Site soil profile characteristics. According to section 1613 of the 2019 CBC (CBSC, 2019), all structures and portions of structures should be designed to resist the effects of seismic loadings caused by earthquake ground motions in accordance with the ASCE 7: Minimum Design Loads for Buildings and Other Structures, hereafter referred to as ASCE 7-16 (ASCE, 2016). The Site soil profile classification (Site Class) can be determined by the average soil properties in the upper 100 feet of the Site profile and the criteria provided in Table 20.3-1 of ASCE 7-16.

Spectral response accelerations and peak ground accelerations, provided in this report were obtained using the computer-based Seismic Design Maps tool available from the Structural Engineers Association of California (SEAOC, 2019). This program utilizes the methods developed in ASCE 7-16 in conjunction with user-inputted Site location to calculate seismic design parameters and response spectra (both for period and displacement) for soil profile Site Classes A through E.

Site coordinates of 35.624819 degrees north latitude and -120.793501 degrees east longitude were used in the web-based probabilistic seismic hazard analysis (SEAOC, 2019). Based on the results from the in-situ tests performed during the field investigation, the Site was defined as **Site Class C**, “Very Stiff Soil and Dense Rock” profile per ASCE7-16, Chapter 20. Relevant seismic design parameters obtained from the program are summarized in Table 2: Seismic Design Parameters.

Table 2: Seismic Design Parameters

Site Class	**C "Very Dense Soil & Soft Rock"**
Seismic Design Category	**D**
1-Second Period Design Spectral Response Acceleration, S_{D1}	**(See Note 1)**
Short-Period Design Spectral Response Acceleration, S_{DS}	**0.854g**
Site Specific MCE Peak Ground Acceleration, PGA_M	**0.551g**

Note 1: It is assumed that this design-period acceleration will not be required for the project.

5.0 LIQUEFACTION HAZARD ASSESSMENT

Liquefaction occurs when saturated cohesionless soils lose shear strength due to earthquake shaking. Ground motion from an earthquake may induce cyclic reversals of shear stresses of large amplitude. Lateral and vertical movement of the soil mass combined with the loss of bearing strength can result from this phenomenon. Liquefaction potential of soil deposits during earthquake activity depends on soil type, void ratio, groundwater conditions, the duration of shaking, and confining pressures on the potentially liquefiable soil unit. Fine, poorly graded loose sand, shallow groundwater, high intensity earthquakes, and long duration of ground shaking are the principal factors leading to liquefaction.

As the underlying material encountered at the Site was weathered rock rather than soil, there is no potential for liquefaction, seismically induced settlement or differential settlement. Rock material differs from soil in that it cannot be saturated, cohesion is considered infinite and relative density is not applicable. Assuming the rock material encountered at the Site accurately represents these conditions, liquefaction potential does not apply.

6.0 GENERAL SOIL-FOUNDATION DISCUSSION

It is anticipated that all foundations for the proposed residence will be excavated into the competent formational material encountered at a depth of 2.0 to 3.0 feet below ground surface during the field investigation. As an alternative, a graded pad may be developed for the proposed residence with all foundations excavated into engineered fill. All foundations are to be excavated into uniform material to limit the potential for distress of the foundation systems due to differential settlement. If cuts steeper than allowed by State of California Construction Safety Orders for "Excavations, Trenches, Earthwork" are proposed, a numerical slope stability analysis may be necessary for temporary construction slopes.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The Site is suitable for the proposed development provided the recommendations presented in this report are incorporated into the project plans and specifications.

The primary geotechnical concerns at the Site are:

1. The presence of potentially expansive material. Influx of water from irrigation, leakage from the residence, or natural seepage could cause expansive soil problems. Foundations supported by expansive soils should be designed by a Structural Engineer in accordance with the 2019 California Building Code.

2. The potential for differential settlement occurring between foundations supported on two soil materials having different settlement characteristics, such as native soil and engineered fill or competent formational material. Therefore, it is important that all of the foundations are founded in equally competent uniform material in accordance with this report.

7.1 Preparation of Building Pad

1. It is anticipated that the foundations for the proposed residence will be excavated into the uniform competent formational material encountered approximately 2.0 to 3.0 below ground surface during the field investigation, as observed and approved by a representative of GeoSolutions, Inc. Deepened footings may be required in certain areas to achieve the required embedment depth in uniform competent formational material. As an alternative, a graded pad may be developed for the proposed residence with foundations excavated into engineered fill.

2. For slab-on-grade construction with footings founded a minimum of 12 inches into uniform competent formational material, the pad area to receive slab-on-grade construction should be graded such that all slabs are supported on uniform competent material. The native material should be over-excavated beneath the slab at least 10 inches below finished floor elevation, or to competent (dense) material; whichever is greatest. The exposed surface should be scarified to a depth of 6 inches, moisture conditioned to slightly above optimum moisture content, and compacted to a minimum relative density of 90 percent (ASTM D1557-12). Refer to Figure 6: Sub-Slab Detail for under-slab drainage material and **Appendix D** for more details on fill placement.

3. For the development of an engineered fill pad, the native material should be over-excavated at least 12 inches below existing grade, 12 inches below the bottom of the footings, to competent (dense) material, or to two-thirds the depth of the deepest fill (measured from the bottom of the deepest footing); whichever is greatest. The limits of over-excavation should extend a minimum of 5 feet beyond the perimeter foundation, to property lines, or existing improvements, whichever is least. The exposed surface should be scarified to a depth of 6 inches; moisture conditioned to 3% over optimum moisture content, and compacted to a minimum relative density of 90 percent (ASTM D1557-12). The over-excavated material may then be processed as engineered fill. Onsite soil and rock material is suitable as fill material provided it is processed to remove concentrations of organic material, debris, and oversize particles. Refer to Figure 6: Sub-Slab Detail for under-slab drainage material and **Appendix D** for more details on fill placement.

4. The ground immediately adjacent to the foundation shall be sloped away from the building at a slope of not less than one unit vertical in 20 units horizontal (5 percent slope) for a minimum distance of 10 feet measured perpendicular to the exterior of the structure per Section 1804.3 of the 2019 CBC.

5. If fill areas are constructed on slopes greater than 10-to-1 (horizontal-to-vertical), we recommend that benches be cut every four (vertical) feet as fill is placed. Each bench shall be a minimum of 10 feet wide with a minimum of two percent gradient into the slope. If fill areas are constructed on slopes greater than 5-to-1, we recommend that the toe of all areas to receive fill be keyed a minimum of 24 inches into underlying dense material. Sub-drains shall be placed in the keyway and benches as required. See **Appendix D**, Detail A, Key and Bench with Backdrain for details on key and bench construction.

6. The recommended soil moisture content should be maintained during construction and following construction of the proposed development. Where soil moisture content is not maintained, desiccation cracks may develop which indicate a loss of soil compaction, leading to the potential for damage to foundations, flatwork, pavements, and other improvements. Soils that have become cracked due to moisture loss should be removed sufficient depth to repair the cracked soil as observed by the soils engineer, and the removed materials should then be moisture conditioned to approximately 3 percent over optimum value, and compacted.

7.2 Conventional Foundations

1. Conventional continuous and spread footings with grade beams may be used for support of the proposed structure. Isolated pad footings are not permitted. Spread footings should be a minimum of 2 feet square and connected to the perimeter foundation by grade beams.

2. Minimum footing and grade beam sizes and depths in engineered fill or uniform competent formational material should conform to the following table, as observed and approved by a representative of GeoSolutions, Inc.

Table 3: Minimum Footing and Grade Beam Recommendations

	Perimeter Footings	Grade Beams
Minimum Width	12 inches (one or two story)	12 inches
Minimum Depth	24 inches	18 inches
Minimum Embedment into Competent Formational Material	12 inches	--
Minimum Reinforcing*	4 #5 bars (2 top / 2 bottom)	4 #4 bars (2 top / 2 bottom)
Spacing	-	19 feet on-center each way
***** Steel should be held in place by stirrups at appropriate spacing to ensure proper positioning of the steel (see WRI Design of Slab-on-Ground Foundations and ACI 318, Section 26.6.6 – Placing Reinforcement).		

3. Minimum reinforcing for footings should conform to the recommendations provided in Table 3: Minimum Footing and Grade Beam Recommendations which meets the specifications of Section 1808.6 of the 2019 California Building Code for the soil conditions at the Site. Reinforcing steel should be held in place by stirrups at appropriate spacing to ensure proper positioning of the steel in accordance with WRI Design of Slab-on-Ground Foundations, and ACI 318, Section 26.6.6 – Placing Reinforcement.

4. A representative of this firm should observe and approve all foundation excavations for required embedment depth prior to the placement of reinforcing steel and/or concrete. Concrete should be placed only in excavations that are free of loose, soft soil and debris that have been maintained in a moist condition with no desiccation cracks present.

5. An allowable dead plus live load bearing pressure of **1,500 psf** may be used for the design of footings founded in engineered fill or uniform competent formational material.

6. Allowable bearing capacities may be increased by one-third when transient loads such as wind and/or seismicity are included.

7. A total settlement of less than 1 inch and a differential settlement of less than 1 inch in 30 feet are anticipated.

8. Lateral forces on structures may be resisted by passive pressure acting against the sides of shallow footings and/or friction between the engineered fill or uniform competent formational material and the bottom of the footings. For resistance to lateral loads, a friction factor of **0.35** may be utilized for sliding resistance at the base of footings extending a minimum of 24 inches into engineered fill or 24 inches deep with a minimum embedment of 12 inches into uniform competent formational material. A passive pressure of **250-pcf** equivalent fluid weight may be used against the side of shallow footings in engineered fill or uniform competent formational material. If friction and passive pressures are combined to resist lateral forces acting on shallow footings, the lesser value should be reduced by 50 percent.

9. Foundation excavations should be observed and approved by a representative of this firm prior to the placement of formwork, reinforcing steel and/or concrete.

10. Foundation design should conform to the requirements of Chapter 18 of the latest edition of the CBC (CBSC, 2019).

11. The base of all grade beams and footings should be level and stepped as required to accommodate any change in grade while still maintaining the minimum required footing embedment and slope setback distance.

12. The minimum footing setback distance from ascending or descending slope steeper than 3-to-1 (horizontal-to-vertical) but less than 1-to-1 must be maintained. See Figure 5: Setback Dimensions – Slope Gradients Between 3-to-1 and 1-to-1 Setback Dimensions – Slope Gradients Between 3-to-1 and 1-to-1 for the minimum horizontal setback distances from ascending and descending slopes steeper than 3-to-1 but not steeper than 1-to-1.

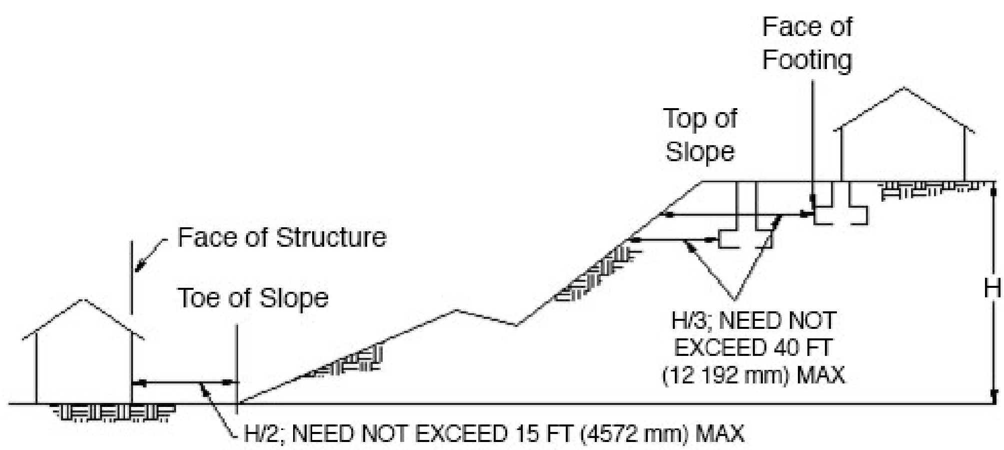

Figure 5: Setback Dimensions – Slope Gradients Between 3-to-1 and 1-to-1

7.3 Slab-On-Grade Construction

1. Concrete slabs-on-grade and flatwork should not be placed directly on unprepared native materials. Preparation of sub-grade to receive concrete slabs-on-grade and flatwork should be processed as discussed in the preceding sections of this report. Concrete slabs should be placed only over sub-grade that is free of loose, soft soil and debris and that has been maintained in a moist condition with no desiccation cracks present.

2. Concrete slabs-on-grade should be in conformance with the recommendations provided in Table 4: Minimum Slab Recommendations. Reinforcing should be placed on-center both ways at or slightly above the center of the structural section. Reinforcing bars should

have a minimum clear cover of 1.5 inches. Where lapping of the slab steel is required, laps in adjacent bars should be staggered a minimum of every five feet (see WRI Design of Slab-on-Ground Foundations, Steel Placement). The recommended reinforcement may be used for anticipated uniform floor loads not exceeding 200 psf. If floor loads greater than 200 psf are anticipated, a Structural Engineer should evaluate the slab design.

Table 4: Minimum Slab Recommendations

Minimum Thickness	4 inches
Reinforcing*	#3 bars at 12 inches on-center each way
* Where lapping of the slab steel is required, laps in adjacent bars should be staggered a minimum of every five feet (see WRI/CSRI-81 recommendations for Steel Placement, Section 2).	

3. Concrete for all slabs should be placed at a maximum slump of less than 5 inches. Excessive water content is the major cause of concrete cracking. If fibers are used to aid in the control of cracking, a water-reducing admixture may be added to the concrete to increase slump while maintaining a water/cement ratio, which will limit excessive shrinkage. Control joints should be constructed as required to control cracking.

4. Where concrete slabs-on-grade are to be constructed for interior conditioned spaces, the slabs should be underlain by a minimum of four inches of clean free-draining material, such as a ¾ inch coarse aggregate mix, to serve as a cushion and a capillary break. Where moisture susceptible storage or floor coverings are anticipated, a 15-mil Stego Wrap membrane (or equivalent installed per manufacturer's specifications) should be placed between the free-draining material and the slab to minimize moisture condensation under the floor covering. See Figure 6: Sub-Slab Detail for the placement of under-slab drainage material. It is suggested, but not required, that a two-inch thick sand layer be placed on top of the membrane to assist in the curing of the concrete, increasing the depth of the under-slab material to a total of six inches. The sand should be lightly moistened prior to placing concrete.

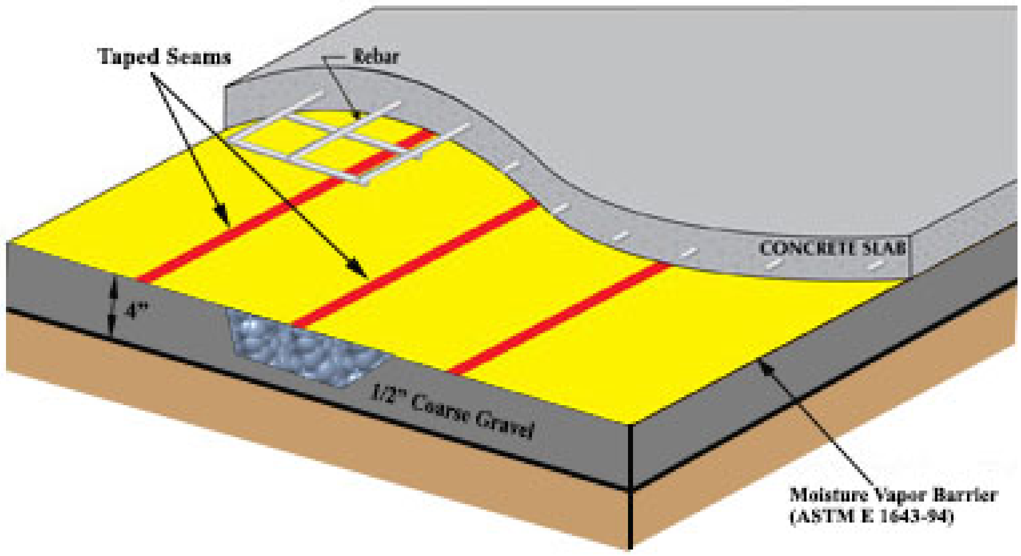

Figure 6: Sub-Slab Detail

5. It should be noted that for a vapor barrier installation to conform to manufacturer's specifications, sealing of penetrations, joints and edges of the vapor barrier membrane are typically required. As required by the California Building Code, joints in the vapor barrier should be lapped a minimum of 6 inches. If the installation is not performed in accordance with the manufacturer's specifications, there is an increased potential for water vapor to affect the concrete slabs and floor coverings.

6. The most effective method of reducing the potential for moisture vapor transmission through concrete slabs-on-grade would be to place the concrete directly on the surface of the vapor barrier membrane. However, this method requires a concrete mix design specific to this application with low water-cement ratio in addition to special concrete finishing and curing practices, to minimize the potential for concrete cracks and surface defects. The contractor should be familiar with current techniques to finish slabs poured directly onto the vapor barrier membrane.

7. Moisture condensation under floor coverings has become critical due to the use of water-soluble adhesives. Therefore, it is suggested that moisture sensitive slabs not be constructed during inclement weather conditions.

7.4 Exterior Concrete Flatwork

1. Due to the presence of expansive surface soils within the proposed development areas, there is a potential for considerable soil movement and distress to reinforced concrete flatwork if conventional measures are used, such as the placement of 4 to 6 inches of imported sand materials placed beneath concrete flatwork. Heaving and cracking are anticipated to occur. To reduce the potential for movement associated with expansive soils, we recommend the placement of a minimum of **12 inches of approved non-expansive import material placed as engineered fill beneath the flatwork**.

2. Minimum flatwork for conventional pedestrian areas should be a minimum of 4 inches thick and consist of No. 3 (#3) rebar spaced at 24 inches on-center each-way at or slightly above the center of the structural section.

3. Flatwork should be constructed with frequent joints to allow for movement due to fluctuations in temperature and moisture content in the adjacent soils. Flatwork at doorways, driveways, curbs and other areas where restraining the elevation of the flatwork is desired, should be doweled to the perimeter foundation by a minimum of No. 3 reinforcing steel dowels, spaced at a maximum distance of 24 inches on-center.

4. As an alternative, interlocking concrete pavers may be utilized for exterior improvements in lieu of reinforced concrete flatwork. Concrete pavers, when installed in accordance with manufacturers' recommendations and industry standards (ICPI), allow for a greater degree of soil movement as they are part of a flexible system. If interlocking concrete pavers are selected for use in the driveway area, the structural section should be underlain by a woven geotextile fabric, such as Mirafi HP570 or equivalent, to function as a separation layer and to provide additional support for vehicle tire loads.

7.5 Retaining Walls

1. Retaining walls should be designed to resist lateral pressures from adjacent soils and surcharge loads applied behind the walls. We recommend using the lateral pressures presented in Table 5: Retaining Wall Design Parameters and Figure 7: Retaining Wall Detail for the design of retaining walls at the Site. The Active Case may be used for the design of unrestrained retaining walls, and the At-Rest Case may be used for the design of restrained retaining walls.

Table 5: Retaining Wall Design Parameters

Lateral Pressure and Condition	Equivalent Fluid Pressure, pcf
Static, Active Case, Native ($\gamma' K_A$)	50
Static, At-Rest Case, Native ($\gamma' K_O$)	65
Static, Passive Case, Engineered Fill or Uniform Competent Formational Material ($\gamma' K_P$)	250

2. The above values for equivalent fluid pressure are based on retaining walls having level retained surfaces, having an approximately vertical surface against the retained material, and retaining granular backfill material or engineered fill composed of native soil within the active wedge. See Figure 7: Retaining Wall Detail and Figure 8: Retaining Wall Active and Passive Wedges for a description of the location of the active wedge behind a retaining wall.

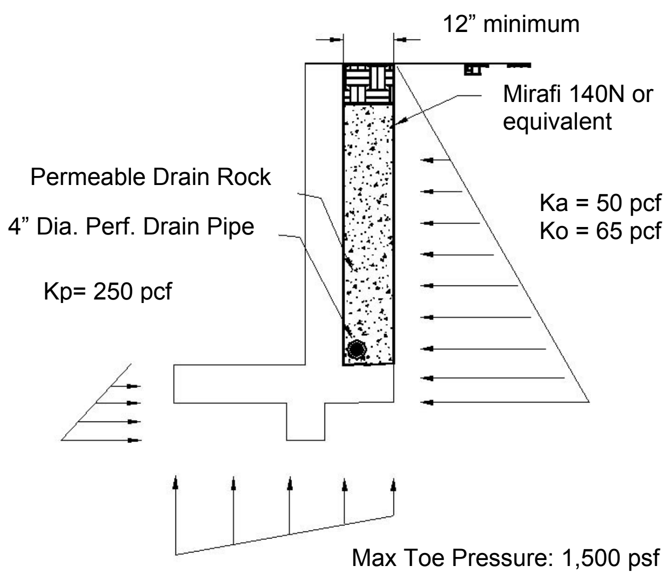

Figure 7: Retaining Wall Detail

3. Proposed retaining walls having a retained surface that slopes upward from the top of the wall should be designed for an additional equivalent fluid pressure of 1 pcf for the active case and 1.5 pcf for the at-rest case, for every degree of slope inclination.

4. We recommend that the proposed retaining walls at the Site have an approximately vertical surface against the retained material. If the proposed retaining walls are to have sloped surfaces against the retained material, the project designers should contact the Soils Engineer to determine the appropriate lateral earth pressure values for retaining walls located at the Site.

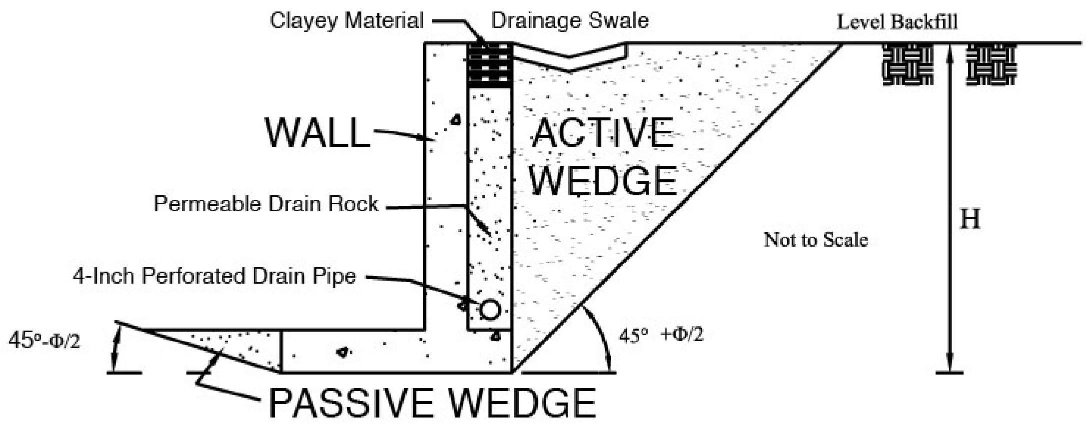

Figure 8: Retaining Wall Active and Passive Wedges

5. Retaining wall foundations should be founded a minimum of 24 inches below lowest adjacent grade in engineered fill or founded a minimum of 24 inches below lowest adjacent grade with a minimum embedment of 12 inches in uniform competent formational material as observed and approved by a representative of GeoSolutions, Inc. A coefficient of friction of **0.35** may be used between engineered fill or uniform competent formational material and concrete footings. Project designers may use a maximum toe pressure of **1,500 psf** for the design of retaining wall footings founded in engineered fill or uniform competent formational material.

6. For earthquake conditions, retaining walls greater than 6 feet in height should be designed to resist an additional seismic lateral soil pressure of **25 pcf** equivalent fluid pressure for unrestrained walls (active condition). The pressure resultant force from earthquake loading should be assumed to act a distance of $^{1}/_{3}H$ above the base of the retaining wall, where H is the height of the retaining wall. Seismic active lateral earth pressure values were determined using the simplified dynamic lateral force component (SEAOC 2010) utilizing the design peak ground acceleration, PGA_M, discussed in Section 4.0 (**PGA_M = 0.551g**). The dynamic increment in lateral earth pressure due to earthquakes should be considered during the design of retaining walls at the Site. Based on research presented by Dr. Marshall Lew (Lew et al., 2010), lateral pressures associated with seismic forces should not be applied to restrained walls (at-rest condition).

7. Seismically induced forces on retaining walls are considered to be short-term loadings. Therefore, when performing seismic analyses for the design of retaining wall footings, we recommend that the allowable bearing pressure and the passive pressure acting against the sides of retaining wall footings be increased by a factor of one-third.

8. In addition to the static lateral soil pressure values reported in Table 5: Retaining Wall Design Parameters, the retaining walls at the Site should be designed to support any design live load, such as from vehicle and construction surcharges, etc., to be supported by the wall backfill. If construction vehicles are required to operate within 10 feet of a retaining wall, supplemental pressures will be induced and should be taken into account in the design of the retaining wall.

9. The recommended lateral earth pressure values are based on the assumption that sufficient sub-surface drainage will be provided behind the walls to prevent the build-up of hydrostatic pressure. To achieve this we recommend that a granular filter material be

placed behind all proposed walls. The blanket of granular filter material should be a minimum of 12 inches thick and should extend from the bottom of the wall to 12 inches from the ground surface. The top 12 inches should consist of moisture conditioned, compacted, clayey soil. Neither spread nor wall footings should be founded in the granular filter material used as backfill.

10. A 4-inch diameter perforated or slotted drainpipe (ASTM D1785 PVC) should be installed near the bottom of the filter blanket with perforations facing down. The drainpipe should be underlain by at least 4 inches of filter type material and should daylight to discharge in suitably projected outlets with adequate gradients. The filter material should consist of a clean free-draining aggregate, such as a coarse aggregate mix. If the retaining wall is part of a structural foundation, the drainpipe must be placed below finished slab sub-grade elevation.

11. The filter material should be encapsulated in a permeable geotextile fabric. A suitable permeable geotextile fabric, such as non-woven needle-punched Mirafi 140N or equal, may be utilized to encapsulate the retaining wall drain material and should conform to Caltrans Standard Specification 88-1.03 for underdrains.

12. For hydrostatic loading conditions (i.e. no free drainage behind retaining wall), an additional loading of 45-pcf equivalent fluid weight should be added to the active and at-rest lateral earth pressures. If it is necessary to design retaining structures for submerged conditions, the allowed bearing and passive pressures should be reduced by 50 percent. In addition, soil friction beneath the base of the foundations should be neglected.

13. Precautions should be taken to ensure that heavy compaction equipment is not used adjacent to walls, so as to prevent undue pressure against, and movement of the walls.

14. The use of water-stops/impermeable barriers should be used for any basement construction, and for building walls that retain earth. Dampproofing and waterproofing shall meet the minimum standards of Section 1805 of the 2019 California Building Code.

7.6 Preparation of Paved Areas

1. Pavement areas should be excavated to approximate sub-grade elevation or to competent material; whichever is deeper. The exposed surface should be scarified an additional depth of 12 inches, moisture conditioned to slightly above optimum moisture content, and compacted to a minimum relative density of 95 percent (ASTM D1557-12 test method).

2. The top 12 inches of sub-grade soil under all pavement sections should be compacted to a minimum relative density of 95 percent based on the ASTM D1557-12 test method at slightly above optimum.

3. Sub-grade soils should not be allowed to dry out or have excessive construction traffic between moisture conditioning and compaction, and placement of the pavement structural section.

4. Due to the expansive potential of the soils at the Site, the base courses beneath un-reinforced pavement sections may fail, causing cracking of the pavement surfaces, as the sub-grade materials move laterally during expansive shrink-swell cycles.

5. Therefore, in order to minimize the potential for the failure of pavement sections at the Site, GeoSolutions, Inc. recommends that a Type 2 laterally-reinforcing geotextile grid, such as Tensar BX1200, Syntec SBX12, ADS BX124GG, or equivalent, be installed between the prepared sub-grade and base materials at the Site.

6. GeoSolutions, Inc. should be contacted prior to the design and construction of pavement sections at the Site in order to assist in the selection of an appropriate laterally-reinforcing biaxial geogrid product and to provide recommendations regarding the procedures for the installation of geogrid products at the Site.

7.7 Pavement Design

1. All pavement construction and materials used should conform to Sections 25, 26 and 39 of the latest edition of the State of California Department of Transportation Standard Specifications (State of California, 1999).

2. As indicated previously in Section 7.6, the top 12 inches of sub-grade soil under pavement sections should be compacted to a minimum relative density of 95 percent based on the ASTM D1557-12 test method at slightly above optimum moisture content. Aggregate bases and sub-bases should also be compacted to a minimum relative density of 95 percent based on the aforementioned test method.

3. A minimum of six inches of Class II Aggregate Base is recommended for all pavement sections. All pavement sections should be crowned for good drainage.

4. In order to minimize the potential for cracking of the pavement surfaces at the Site due to lateral movement of the base courses during expansive shrink-swell cycles of the sub-grade materials, GeoSolutions, Inc. recommends that a Type 2 laterally-reinforcing geotextile grid, such as Tensar BX1200, Syntec SBX12, ADS BX124GG, or equivalent, be installed between the prepared sub-grade and base materials at the Site.

5. GeoSolutions, Inc. should be contacted prior to the design and construction of the pavement sections to provide recommendations regarding the selection of and installation of an appropriate laterally-reinforcing biaxial geogrid product.

8.0 ADDITIONAL GEOTECHNICAL SERVICES

The recommendations contained in this report are based on a limited number of trenches and on the continuity of the sub-surface conditions encountered. GeoSolutions, Inc. assumes that it will be retained to provide additional services during future phases of the proposed project. These services would be provided by GeoSolutions, Inc. as required by the County of San Luis Obispo, the 2019 CBC, and/or industry standard practices. These services would be in addition to those included in this report and would include, but are not limited to, the following services:

1. Consultation during plan development.

2. Plan review of grading and foundation documents prior to construction and a report certifying that the reviewed plans are in conformance with our geotechnical recommendations.

3. Consultation during selection and placement of a laterally-reinforcing biaxial geogrid product.

4. Construction inspections and testing, as required, during all grading and excavating operations beginning with the stripping of vegetation at the Site, at which time a site meeting or pre-job meeting would be appropriate.

5. Special inspection services during construction of reinforced concrete, structural masonry, high strength bolting, epoxy embedment of threaded rods and reinforcing steel, and welding of structural steel.

6. Preparation of construction reports certifying that building pad preparation and foundation excavations are in conformance with our geotechnical recommendations.

7. Preparation of special inspection reports as required during construction.

8. In addition to the construction inspections listed above, section 1705.6 of the 2019 CBC (CBSC, 2019) requires the following inspections by the Soils Engineer for controlled fill thicknesses greater than 12 inches as shown in Table 6: Required Special Inspections and Tests of Soils:

Table 6: Required Special Inspections and Tests of Soils

Verification and Inspection Task	Continuous During Task Listed	Periodically During Task Listed
1. Verify materials below footings are adequate to achieve the design bearing capacity.	-	X
2. Verify excavations are extended to proper depth and have reached proper material.	-	X
3. Perform classification and testing of controlled fill materials.	-	X
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of controlled fill.	X	-
5. Prior to placement of controlled fill, observe sub-grade and verify that site has been prepared properly.	-	X

9.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations of this report are based upon the assumption that the soil conditions do not deviate from those disclosed during our study. Should any variations or undesirable conditions be encountered during the development of the Site, GeoSolutions, Inc. should be notified immediately and GeoSolutions, Inc. will provide supplemental recommendations as dictated by the field conditions.

2. This report is issued with the understanding that it is the responsibility of the owner or his/her representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project, and incorporated into the project plans and specifications. The owner or his/her representative is responsible to ensure that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

3. As of the present date, the findings of this report are valid for the property studied. With the passage of time, changes in the conditions of a property can occur whether they are due to natural processes or to the works of man on this or adjacent properties. Therefore, this report should not be relied upon after a period of 3 years without our review nor should it be used or is it applicable for any properties other than those studied. However many events such as floods, earthquakes, grading of the adjacent properties and building and municipal code changes could render sections of this report invalid in less than 3 years.

REFERENCES

REFERENCES

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APPENDIX A

Field Investigation

Soil Classification Chart

Trench Logs

FIELD INVESTIGATION

The field investigation was conducted May 6, 2021 using a backhoe. The surface and sub-surface conditions were studied by advancing three exploratory trenches. This exploration was conducted in accordance with presently accepted geotechnical engineering procedures consistent with the scope of the services authorized to GeoSolutions, Inc.

The mini excavator advanced three exploratory trenches near the approximate locations indicated on Figure 3: Field Investigation. The drilling and field observation were performed under the direction of the project engineer. A representative of GeoSolutions, Inc. maintained a log of the soil conditions and obtained soil samples suitable for laboratory testing. The soils were classified in accordance with the Unified Soil Classification System. See the Soil Classification Chart in this appendix.

Disturbed bulk samples are obtained from cuttings developed during trenching operations. The bulk samples are selected for classification and testing purposes and may represent a mixture of soils within the noted depths. Recovered samples are placed in transport containers and returned to the laboratory for further classification and testing.

Logs of the trenches showing the approximate depths and descriptions of the encountered soils, applicable geologic structures, and the results of laboratory tests are presented in this appendix. The logs represent the interpretation of field logs and field tests as well as the interpolation of soil conditions between samples. The results of laboratory observations and tests are also included in the trenching logs. The stratification lines recorded in the trenching logs represent the approximate boundaries between the surface soil types. However, the actual transition between soil types may be gradual or varied.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS		LABORATORY CLASSIFICATION CRITERIA		GROUP SYMBOLS	PRIMARY DIVISIONS
COARSE GRAINED SOILS More than 50% retained on No. 200 sieve	GRAVELS More than 50% of coarse fraction retained on No. 4 (4.75mm) sieve	Clean gravels (less than 5% fines*)	C_u greater than 4 and C_z between 1 and 3	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			Not meeting both criteria for GW	GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		Gravel with fines (more than 12% fines*)	Atterberg limits plot below "A" line or plasticity index less than 4	GM	Silty gravels, gravel-sand-silt mixtures
			Atterberg limits plot below "A" line and plasticity index greater than 7	GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 (4.75mm) sieve	Clean sand (less than 5% fines*)	C_u greater than 6 and C_z between 1 and 3	SW	Well graded sands, gravely sands, little or no fines
			Not meeting both criteria for SW	SP	Poorly graded sands and gravelly and sands, little or no fines
		Sand with fines (more than 12% fines*)	Atterberg limits plot below "A" line or plasticity index less than 4	SM	Silty sands, sand-silt mixtures
			Atterberg limits plot above "A" line and plasticity index greater than 7	SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS 50% or more passes No. 200 sieve	SILTS AND CLAYS (liquid limit less than 50)	Inorganic soil	PI < 4 or plots below "A"-line	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
		Inorganic soil	PI > 7 and plots on or above "A" line**	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		Organic Soil	LL (oven dried)/LL (not dried) < 0.75	OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS (liquid limit 50 or more)	Inorganic soil	Plots below "A" line	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
		Inorganic soil	Plots on or above "A" line	CH	Inorganic clays of high plasticity, fat clays
		Organic Soil	LL (oven dried)/LL (not dried) < 0.75	OH	Organic silts and organic clays of high plasticity
Peat	Highly Organic	Primarily organic matter, dark in color, and organic odor		PT	Peat, muck and other highly organic soils

*Fines are those soil particles that pass the No. 200 sieve. For gravels and sands with between 5 and 12% fines, use of dual symbols is required (I.e. GW-GM, GW-GC, GP-GM, or GP-GC).

**If the plasticity index is between 4 and 7 and it plots above the "A" line, then dual symbols (I.e. CL-ML) are required.
the "A" line, then dual symbols (I.e. CL-ML) are required.

CLASSIFICATIONS BASED ON PERCENTAGE OF FINES

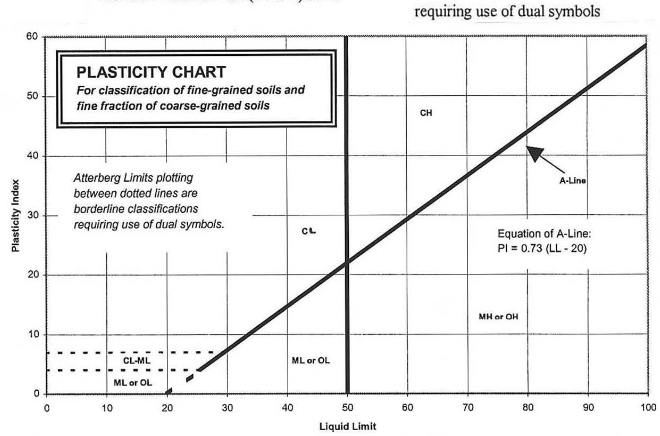
Less than 5%, Pass No. 200 (75mm)sieve)	GW, GP, SW, SP
More than 12% Pass N. 200 (75 mm) sieve	GM, GC, SM, SC
5%-12% Pass No. 200 (75 mm) sieve	Borderline Classification requiring use of dual symbols

CONSISTENCY

CLAYS AND PLASTIC SILTS	STRENGTH TON/SQ. FT ++	BLOWS/ FOOT +
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	Over 4	Over 32

RELATIVE DENSITY

SANDS, GRAVELS AND NON-PLASTIC SILTS	BLOWS/ FOOT +
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	Over 50



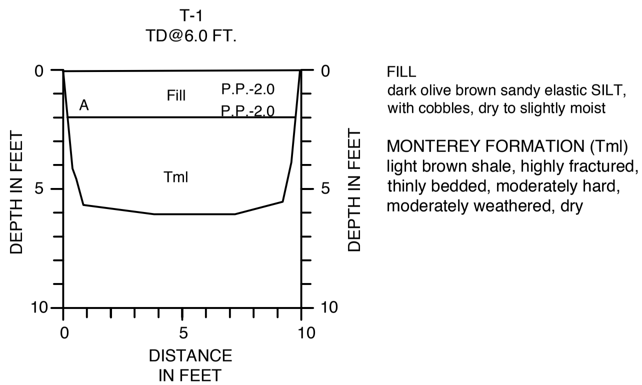
+ Number of blows of a 140-pound hammer falling 30-inches to drive a 2-inch O.D. (1-3/8-inch I.D.) split spoon (ASTM D1586).

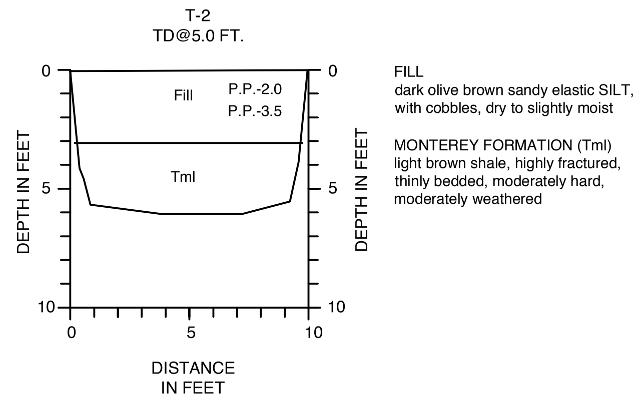
++ Unconfined compressive strength in tons/sq.ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D1586), pocket penetrometer, torvane, or visual observation.

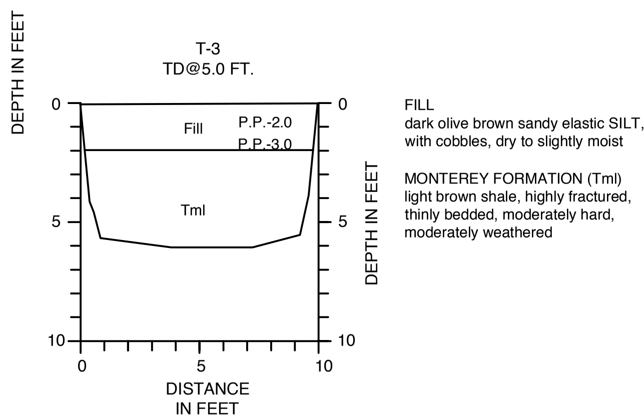
Drilling Notes:

1. Sampling and blow counts
   a. California Modified – number of blows per foot of a 140 pound hammer falling 30 inches
   b. Standard Penetration Test – number of blows per 12 inches of a 140 pound hammer falling 30 inches

Types of Samples:
X – Sample
SPT - Standard Penetration
CA - California Modified
N - Nuclear Gauge
PO – Pocket Penetrometer (tons/sq.ft.)







NO SCALE

GeoSolutions, Inc.
220 High Street
San Luis Obispo, CA 93401
(805) 543-8539

TRENCHING LOGS

PASO ROBLES AREA, SAN LUIS OBISPO COUNTY, CALIFORNIA

LOGS
T1-T3

PROJECT
SL12244-1

APPENDIX B

Laboratory Testing

Soil Test Reports

LABORATORY TESTING

This appendix includes a discussion of the test procedures and the laboratory test results performed as part of this investigation. The purpose of the laboratory testing is to assess the engineering properties of the soil materials at the Site. The laboratory tests are performed using the currently accepted test methods, when applicable, of the American Society for Testing and Materials (ASTM).

Undisturbed and disturbed bulk samples used in the laboratory tests are obtained from various locations during the course of the field exploration, as discussed in **Appendix A** of this report. Each sample is identified by sample letter and depth. The Unified Soils Classification System is used to classify soils according to their engineering properties. The various laboratory tests performed are described below:

Expansion Index of Soils (ASTM D4829) is conducted in accordance with the ASTM test method and the California Building Code Standard, and are performed on representative bulk and undisturbed soil samples. The purpose of this test is to evaluate expansion potential of the site soils due to fluctuations in moisture content. The sample specimens are placed in a consolidometer, surcharged under a 144-psf vertical confining pressure, and then inundated with water. The amount of expansion is recorded over a 24-hour period with a dial indicator. The expansion index is calculated by determining the difference between final and initial height of the specimen divided by the initial height.

Laboratory Compaction Characteristics of Soil Using Modified Effort (ASTM D1557) is performed to determine the relationship between the moisture content and density of soils and soil-aggregate mixtures when compacted in a standard size mold with a 10-lbf hammer from a height of 18 inches. The test is performed on a representative bulk sample of bearing soil near the estimated footing depth. The procedure is repeated on the same soil sample at various moisture contents sufficient to establish a relationship between the maximum dry unit weight and the optimum water content for the soil. The data, when plotted, represents a curvilinear relationship known as the moisture density relations curve. The values of optimum water content and modified maximum dry unit weight can be determined from the plotted curve.

Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) are the water contents at certain limiting or critical stages in cohesive soil behavior. The liquid limit (LL or W_L) is the lower limit of viscous flow, the plastic limit (PL or W_P) is the lower limit of the plastic stage of clay and plastic index (PI or I_P) is a range of water content where the soil is plastic. The Atterberg Limits are performed on samples that have been screened to remove any material retained on a No. 40 sieve. The liquid limit is determined by performing trials in which a portion of the sample is spread in a brass cup, divided in two by a grooving tool, and then allowed to flow together from the shocks caused by repeatedly dropping the cup in a standard mechanical device. To determine the Plastic Limit a small portion of plastic soil is alternately pressed together and rolled into a 1/8-inch diameter thread. This process is continued until the water content of the sample is reduced to a point at which the thread crumbles and can no longer be pressed together and re-rolled. The water content of the soil at this point is reported as the plastic limit. The plasticity index is calculated as the difference between the liquid limit and the plastic limit.

Particle Size Analysis of Soils (ASTM D422) is used to determine the particle-size distribution of fine and coarse aggregates. In the test method the sample is separated through a series of sieves of progressively smaller openings for determination of particle size distribution. The total percentage passing each sieve is reported and used to determine the distribution of fine and coarse aggregates in the sample.

GeoSolutions, Inc.	LABORATORY SUMMARY REPORT SHEET	(805) 543 - 8539

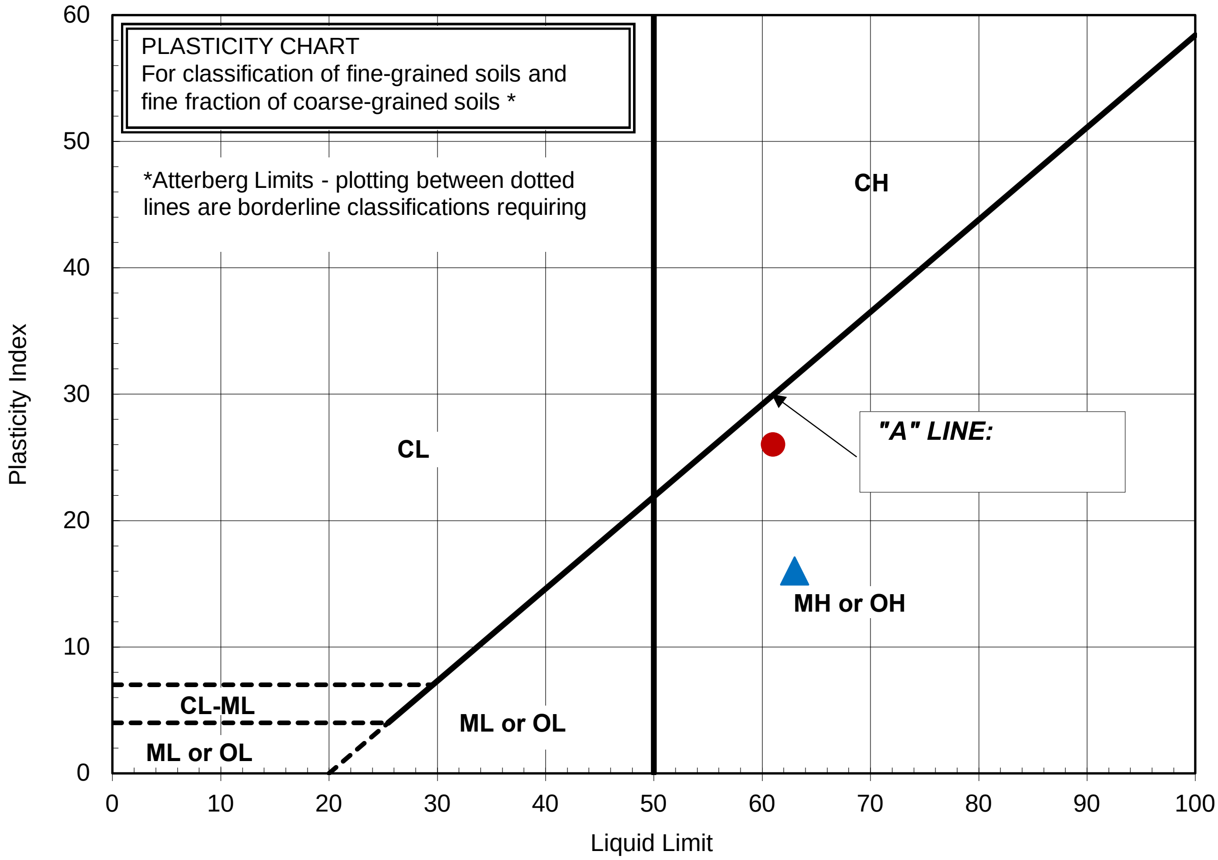
Project: 5100 Peachy Canyon Road
Client: Doug and Judy Anderson
Job #: SL12244-1

Lab #: 11283
Date: 6/1/21
Checked By: AE

Sample ID			Material Description	USCS Specifications	Dry Density (pcf)	Moisture Content (%)	% Fines	Atterberg Limits		Compaction Test		Direct Shear		Compressive Strength		Expansion Index	R-Value
Boring Hole	Depth (ft)	Sample No.						LL	PI	γ_{d_max} (pcf)	ω_{c_opt} (%)	C (psf)	ø (deg)	q_u (psf)	S_u (psf)		
T-1	1'	A	Dark Olive Brown Sandy Elastic SILT	MH			66.3	61	26	86.5	27.8					23	
T-1	4'	B	Pale Brown Elastic SILT	MH				63	16								

GeoSolutions, Inc.	**PLASTICITY INDEX TEST SUMMARY REPORT (ASTM D4318)**	(805) 543-8539

Project: 5100 Peachy Canyon Road
Client: Doug and Judy Anderson — Date: 6/1/21
Project #: SL12244-1 — Checked by: AE



LEGEND			CLASSIFICATION	TEST RESULTS		
symbol	location	depth		Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
● (red circle)	T-1	1'	Dark Olive Brown Sandy Elastic SILT	61	35	26
▲ (blue triangle)	T-1	4'	Pale Brown Elastic SILT	63	47	16

Remarks:

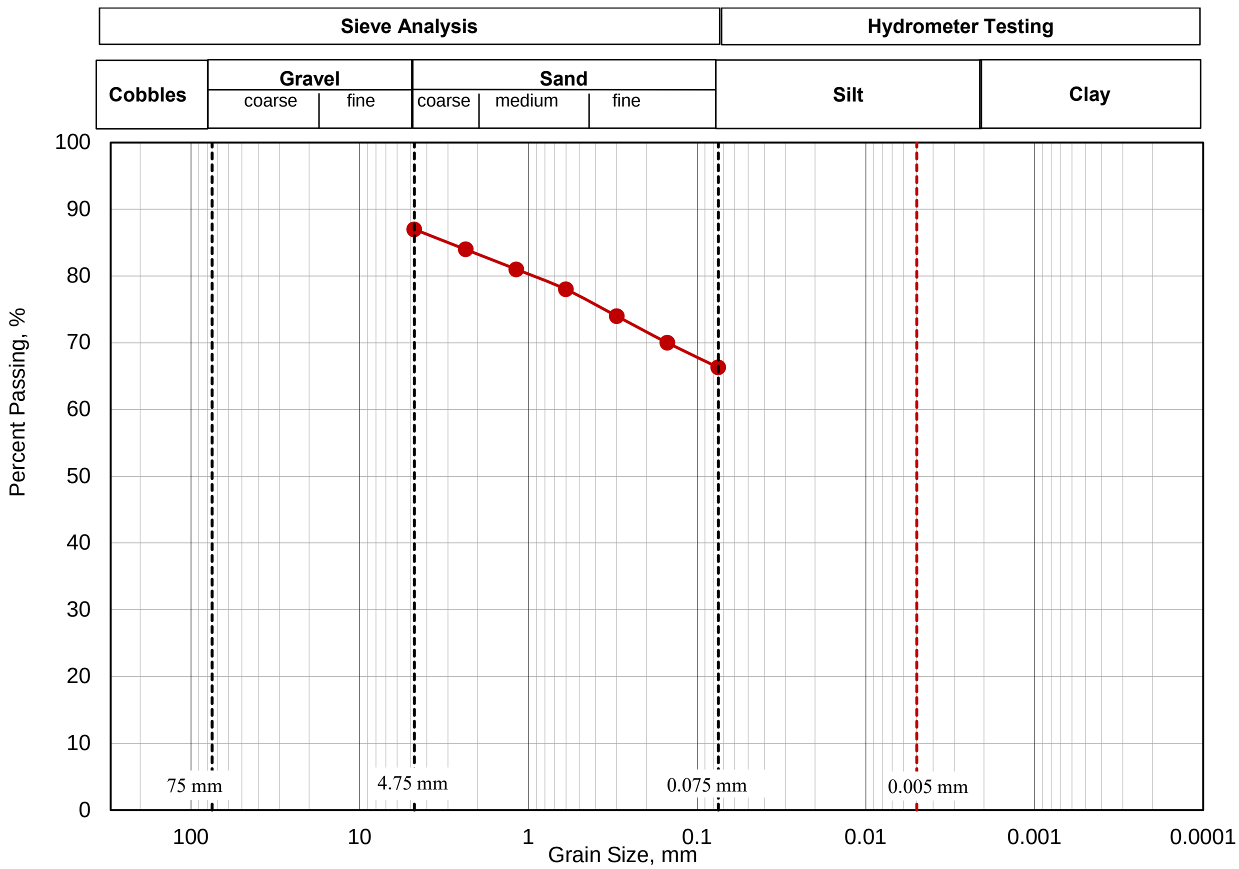
Testing was performed in accordance with ASTM D4318

NP - material tested is nonplastic (liquid or plastic limit tests could not be performed)

Report By: Aaron Eichman

GeoSolutions, Inc.	PARTICLE SIZE ANALYSIS SUMMARY REPORT	(805) 543-8539

Project: 5100 Peachy Canyon Road
Client: Doug and Judy Anderson
Project #: SL12244-1
Date: 6/1/2021
Checked By: AE



LEGEND / **SAMPLE DESCRIPTION** / **PLASTICITY (FINER FRACTION)**

symbol	location	depth	SAMPLE DESCRIPTION	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	Expansion Index (EI)
●	T-1	1'	Dark Olive Brown Sandy Elastic SILT	61	35	26	23

LEGEND / **PARTICLE SIZE ANALYSIS SUMMARY**

symbol	location	depth	D_{100}	D_{60}	D_{30}	D_{10}	C_u	C_c	% Gravel	% Sand	% Passing No. 200	% Silt	% Clay
●	T-1	1'	#N/A	0.068	NA	NA	NA	NA	13.0	20.7	66.3	NM	NA

Remarks: Testing was performed in accordance with ASTM D422 and D4318 (where applicable)

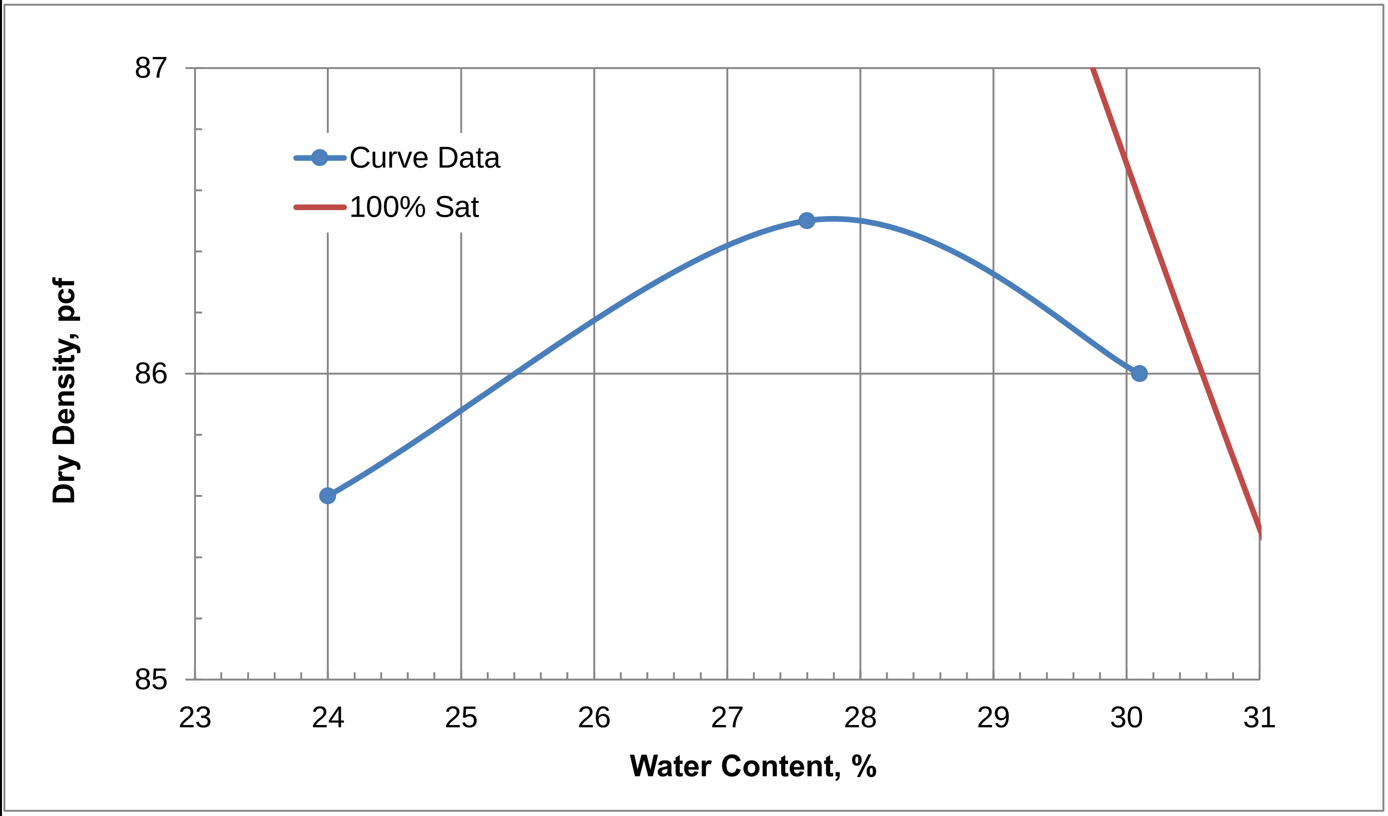
NP - non-plastic
NA - not available (could not be calculated from data)

D_{100} - grain size diameter corresponding to 100% passing (mm)
D_{60} - grain size diameter corresponding to 60% passing (mm)
D_{30} - grain size diameter corresponding to 30% passing (mm)
D_{10} - grain size diameter corresponding to 30% passing (mm)

C_c - coefficient of curvature: $C_c = (D_{30})^2 / (D_{60} * D_{10})$
Cu - coefficient of uniformity: $C_u = D_{60} / D_{10}$

GeoSolutions, Inc.	LAB COMPACTION REPORT ASTM D1557	(805) 543-8539

Project:	5100 Peachy Canyon Road		Date Tested:	May 20, 2021
Client:	Doug and Judy Anderson		Project #:	SL12244-1
Sample:	A	Depth: 1.0 Foot	Lab #:	11283
Source:	T-1		Sample Date:	May 6, 2021
Material:	Dark Olive Brown Sandy Elastic SILT		Sampled By:	JP



ASTM Test Designation: [ ] D 698 [x] D 1557
Method (sieve size): [ ] A (#4) [x] B (3/8") [ ] C (3/4")
% Passing, Pf: ________ *% Retained, Pc:* ________ [x] Estimated [ ] Measured
Type of Rammer: [x] Mechanical [ ] Manual
Preparation Method [x] Moist [ ] Dry
100% Saturation Curve-Estimated Gs: **2.38**

Laboratory Test Results

Trial #	1	2	3	4
Water Content,%	24.0	27.6	30.1	
Dry Density, pcf	85.6	86.5	86.0	

MAXIMUM DRY DENSITY, pcf:	86.5	OPTIMUM MOISTURE, %:	27.8

Report By: Aaron Eichman

APPENDIX C

Seismic Hazard Analysis

Design Map Summary (SEAOC, 2019)

SEISMIC HAZARD ANALYSIS

According to section 1613 of the 2019 CBC (CBSC, 2019), all structures and portions of structures should be designed to resist the effects of seismic loadings caused by earthquake ground motions in accordance with the *ASCE 7: Minimum Design Loads for Buildings and Other Structures*, hereafter referred to as ASCE7-16 (ASCE, 2016). Estimating the design ground motions at the Site depends on many factors including the distance from the Site to known active faults; the expected magnitude and rate of recurrence of seismic events produced on such faults; the source-to-site ground motion attenuation characteristics; and the Site soil profile characteristics. As per section 1613.2.2 of the 2019 CBC, the Site soil profile classification is determined by the average soil properties in the upper 100 feet of the Site profile and can be determined based on the criteria provided in Table 20.3-1 of ASCE7-16.

ASCE7-16 provides recommendations for estimating site-specific ground motion parameters for seismic design considering a Risk-targeted Maximum Considered Earthquake (MCE_R) in order to determine *design spectral response accelerations* and a Maximum Considered Earthquake Geometric Mean (MCE_G) in order to determine probabilistic geometric mean *peak ground accelerations*.

Spectral accelerations from the MCE_R are based on a 5% damped acceleration response spectrum and a 1% probability of exceedance in 50 years. *Maximum* short period (S_s) and 1-second period (S_1) spectral accelerations are interpolated from the MCE_R-based ground motion parameter maps for bedrock, provided in ASCE7-16. These spectral accelerations are then multiplied by site-specific coefficients (F_a, F_v), based on the Site soil profile classification and the maximum spectral accelerations determined for bedrock, to yield the *maximum* short period (S_{MS}) and 1-second period (S_{M1}) spectral response accelerations at the Site. According to section 11 of ASCE7-16 and section 1613 of the 2019 CBC, buildings and structures should be specifically proportioned to resist *design* earthquake ground motions. Section 1613.2.4 of the 2019 CBC indicates the site-specific *design* spectral response accelerations for short (S_{DS}) and 1-second (S_{D1}) periods can be taken as two-thirds of *maximum* ($S_{DS} = 2/3*S_{MS}$ and $S_{D1} = 2/3*S_{M1}$).

Per ASCE7-16, Section 21.5, the probabilistic maximum mean peak ground acceleration (PGA) corresponding to the MCE_G can be computed assuming a 2% probability of exceedance in 50 years (2475-year return period) and is initially determined from mapped ground accelerations for bedrock conditions. The site-specific peak ground acceleration (PGA_M) is then determined by multiplying the PGA by the site-specific coefficient F_h (where F_h is a function of Site Class and PGA).

Spectral response accelerations and peak ground accelerations, provided in this report were obtained using the computer-based Seismic Design Maps tool available from the Structural Engineers Association of California (SEAOC, 2019). This program utilizes the methods developed in ASCE 7-16 in conjunction with user-inputted Site location to calculate seismic design parameters and response spectra (both for period and displacement) for soil profile Site Classes A through E.

Date	6/23/2021, 2:34:16 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	C - Very Dense Soil and Soft Rock

Type	Value	Description
S_S	1.067	MCE_R ground motion. (for 0.2 second period)
S_1	0.39	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.28	Site-modified spectral acceleration value
S_{M1}	0.585	Site-modified spectral acceleration value
S_{DS}	0.854	Numeric seismic design value at 0.2 second SA
S_{D1}	0.39	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	D	Seismic design category
F_a	1.2	Site amplification factor at 0.2 second
F_v	1.5	Site amplification factor at 1.0 second
PGA	0.46	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.551	Site modified peak ground acceleration
T_L	12	Long-period transition period in seconds
SsRT	1.067	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.148	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.661	Factored deterministic acceleration value. (0.2 second)
S1RT	0.39	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.428	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.688	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.929	Mapped value of the risk coefficient at short periods
C_{R1}	0.911	Mapped value of the risk coefficient at a period of 1 s

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APPENDIX D

Preliminary Grading Specifications

Key and Bench with Backdrain

PRELIMINARY GRADING SPECIFICATIONS

A. General

1. These preliminary specifications have been prepared for the subject site; GeoSolutions, Inc. should be consulted prior to the commencement of site work associated with site development to ensure compliance with these specifications.

2. GeoSolutions, Inc. should be notified at least 72 hours prior to site clearing or grading operations on the property in order to observe the stripping of surface materials and to coordinate the work with the grading contractor in the field.

3. These grading specifications may be modified and/or superseded by recommendations contained in the text of this report and/or subsequent reports.

4. If disputes arise out of the interpretation of these grading specifications, the Soils Engineer shall provide the governing interpretation.

B. Obligation of Parties

1. The Soils Engineer should provide observation and testing services and should make evaluations to advise the client on geotechnical matters. The Soils Engineer should report the findings and recommendations to the client or the authorized representative.

2. The client should be chiefly responsible for all aspects of the project. The client or authorized representative has the responsibility of reviewing the findings and recommendations of the Soils Engineer. During grading the client or the authorized representative should remain on-site or should remain reasonably accessible to all concerned parties in order to make decisions necessary to maintain the flow of the project.

3. The contractor is responsible for the safety of the project and satisfactory completion of all grading and other operations on construction projects, including, but not limited to, earthwork in accordance with project plans, specifications, and controlling agency requirements.

C. Site Preparation

1. The client, prior to any site preparation or grading, should arrange and attend a meeting which includes the grading contractor, the design Structural Engineer, the Soils Engineer, representatives of the local building department, as well as any other concerned parties. All parties should be given at least 72 hours' notice.

2. All surface and sub-surface deleterious materials should be removed from the proposed building and pavement areas and disposed of off-site or as approved by the Soils Engineer. This includes, but is not limited to, any debris, organic materials, construction spoils, buried utility line, septic systems, building materials, and any other surface and subsurface structures within the proposed building areas. Trees designated for removal on the construction plans should be removed and their primary root systems grubbed under the observations of a representative of GeoSolutions, Inc. Voids left from site clearing should be cleaned and backfilled as recommended for structural fill.

3. Once the Site has been cleared, the exposed ground surface should be stripped to remove surface vegetation and organic soil. A representative of GeoSolutions, Inc. should determine the required depth of stripping at the time of work being completed. Strippings may either be disposed of off-site or stockpiled for future use in landscape areas, if approved by the landscape architect.

D. Site Protection

1. Protection of the Site during the period of grading and construction should be the responsibility of the contractor.

2. The contractor should be responsible for the stability of all temporary excavations.

3. During periods of rainfall, plastic sheeting should be kept reasonably accessible to prevent unprotected slopes from becoming saturated. Where necessary during periods of rainfall, the contractor should install check-dams, de-silting basins, sand bags, or other devices or methods necessary to control erosion and provide safe conditions.

E. Excavations

1. Materials that are unsuitable should be excavated under the observation and recommendations of the Soils Engineer. Unsuitable materials include, but may not be limited to: 1) dry, loose, soft, wet, organic, or compressible natural soils; 2) fractured, weathered, or soft bedrock; 3) non-engineered fill; 4) other deleterious materials; and 5) materials identified by the Soils Engineer or Engineering Geologist.

2. Unless otherwise recommended by the Soils Engineer and approved by the local building official, permanent cut slopes should not be steeper than 2:1 (horizontal to vertical). Final slope configurations should conform to section 1804 of the 2019 California Building Code unless specifically modified by the Soil Engineer/Engineering Geologist.

3. The Soil Engineer/Engineer Geologist should review cut slopes during excavations. The contractor should notify the Soils Engineer/Engineer Geologist prior to beginning slope excavations.

F. Structural Fill

1. Structural fill should not contain rocks larger than 3 inches in greatest dimension, and should have no more than 15 percent larger than 2.5 inches in greatest dimension.

2. Imported fill should be free of organic and other deleterious material and should have very low expansion potential, with a plasticity index of 12 or less. Before delivery to the Site, a sample of the proposed import should be tested in our laboratory to determine its suitability for use as structural fill.

G. Compacted Fill

1. Structural fill using approved import or native should be placed in horizontal layers, each approximately 8 inches in thickness before compaction. On-site inorganic soil or approved imported fill should be conditioned with water to produce a soil water content near optimum moisture and compacted to a minimum relative density of 90 percent based on ASTM D1557-12$_{e1}$.

2. Fill slopes should not be constructed at gradients greater than 2-to-1 (horizontal to vertical). The contractor should notify the Soils Engineer/Engineer Geologist prior to beginning slope excavations.

3. If fill areas are constructed on slopes greater than 10-to-1 (horizontal to vertical), we recommend that benches be cut every 4 feet as fill is placed. Each bench shall be a minimum of 10 feet wide with a minimum of 2 percent gradient into the slope.

4. If fill areas are constructed on slopes greater than 5-to-1, we recommend that the toe of all areas to receive fill be keyed a minimum of 24 inches into underlying dense material. Key depths are to be observed and approved by a representative of GeoSolutions, Inc. Sub-drains shall be placed in the keyway and benches as required.

H. Drainage

1. During grading, a representative of GeoSolutions, Inc. should evaluate the need for a sub-drain or back-drain system. Areas of observed seepage should be provided with sub-surface drains to release the hydrostatic pressures. Sub-surface drainage facilities may include gravel blankets, rock filled trenches or Multi-Flow systems or equal. The drain system should discharge in a non-erosive manner into an approved drainage area.

2. All final grades should be provided with a positive drainage gradient away from foundations. Final grades should provide for rapid removal of surface water runoff. Ponding of water should not be allowed on building pads or adjacent to foundations. Final grading should be the responsibility of the contractor, general Civil Engineer, or architect.

3. Concentrated surface water runoff within or immediately adjacent to the Site should be conveyed in pipes or in lined channels to discharge areas that are relatively level or that are adequately protected against erosion.

4. Water from roof downspouts should be conveyed in solid pipes that discharge in controlled drainage localities. Surface drainage gradients should be planned to prevent ponding and promote drainage of surface water away from building foundations, edges of pavements and sidewalks. For soil areas we recommend that a minimum of 2 percent gradient be maintained.

5. Attention should be paid by the contractor to erosion protection of soil surfaces adjacent to the edges of roads, curbs and sidewalks, and in other areas where hard edges of structures may cause concentrated flow of surface water runoff. Erosion resistant matting such as Miramat, or other similar products, may be considered for lining drainage channels.

6. Sub-drains should be placed in established drainage courses and potential seepage areas. The location of sub-drains should be determined after a review of the grading plan. The sub-drain outlets should extend into suitable facilities or connect to the proposed storm drain system or existing drainage control facilities. The outlet pipe should consist of a non-perforated pipe the same diameter as the perforated pipe.

I. Maintenance

1. Maintenance of slopes is important to their long-term performance. Precautions that can be taken include planting with appropriate drought-resistant vegetation as recommended by a landscape architect, and not over-irrigating, a primary source of surficial failures.

2. Property owners should be made aware that over-watering of slopes is detrimental to long term stability of slopes.

J. Underground Facilities Construction

1. The attention of contractors, particularly the underground contractors, should be drawn to the State of California Construction Safety Orders for “Excavations, Trenches, Earthwork.” Trenches or excavations greater than 5 feet in depth should be shored or sloped back in accordance with OSHA Regulations prior to entry.

2. Bedding is defined as material placed in a trench up to 1 foot above a utility pipe and backfill is all material placed in the trench above the bedding. Unless concrete bedding is required around utility pipes, free-draining sand should be used as bedding. Sand to be used as bedding should be tested in our laboratory to verify its suitability and to measure its compaction characteristics. Sand bedding should be compacted by mechanical means to achieve at least 90 percent relative density based on ASTM D1557-12$_{e1}$.

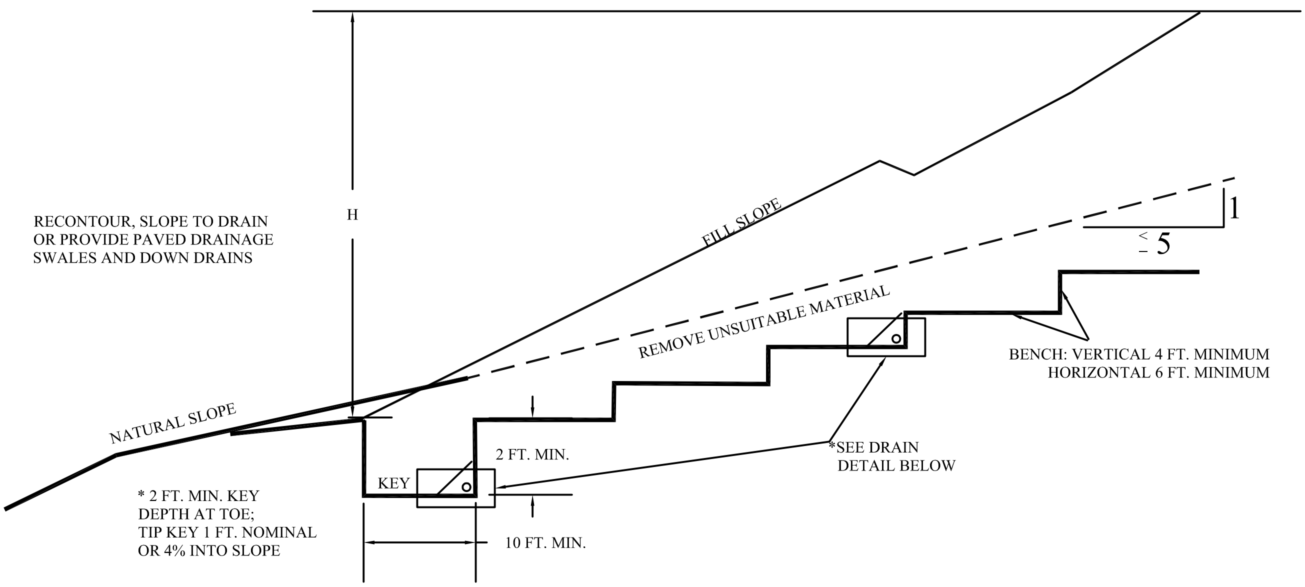
3. On-site inorganic soils, or approved import, may be used as utility trench backfill. Proper compaction of trench backfill will be necessary under and adjacent to structural fill, building foundations, concrete slabs, and vehicle pavements. In these areas, backfill should be conditioned with water (or allowed to dry), to produce a soil water content of about 2 to 3 percent above the optimum value and placed in horizontal layers, each not exceeding 8 inches in thickness before compaction. Each layer should be compacted to at least 90 percent relative density based on ASTM D1557-12$_{e1}$. The top lift of trench backfill under vehicle pavements should be compacted to the requirements given in report under Preparation of Paved Areas for vehicle pavement sub-grades. Trench walls must be kept moist prior to and during backfill placement.

K. Completion of Work

1. After the completion of work, a report should be prepared by the Soils Engineer retained to provide such services. The report should including locations and elevations of field density tests, summaries of field and laboratory tests, other substantiating data, and comments on any changes made during grading and their effect on the recommendations made in the approved Soils Engineering Report.

2. Soils Engineers shall submit a statement that, to the best of their knowledge, the work within their area of responsibilities is in accordance with the approved soils engineering report and applicable provisions within Chapter 18 of the 2019 CBC.

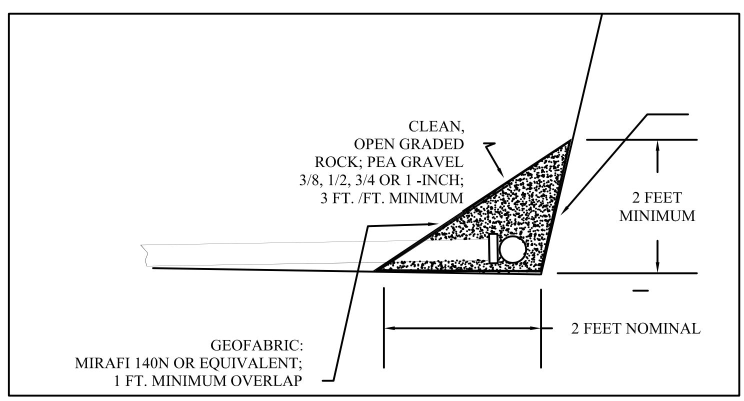
FILL OVER SLOPE



NOTES:

*BACKDRAIN AS RECOMMENDED BY GEOTECHNICAL PER DETAIL.

DRAIN DETAIL



NTS

GeoSolutions, Inc.
220 High Street
San Luis Obispo, CA 93401
(805) 543-8539 Fax: (805) 543-2171

KEY AND BENCH WITH BACKDRAIN

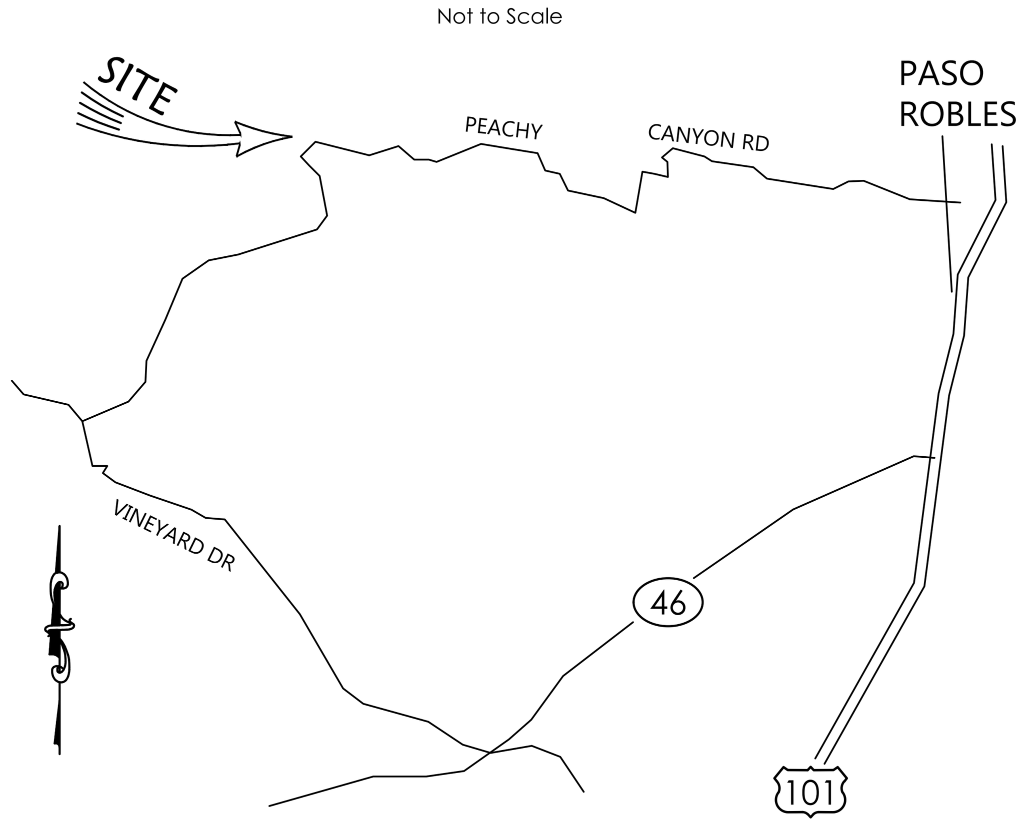
DETAIL
A

APPENDIX E: CIVIL PLANS

Grading, Drainage & Erosion Control Plan

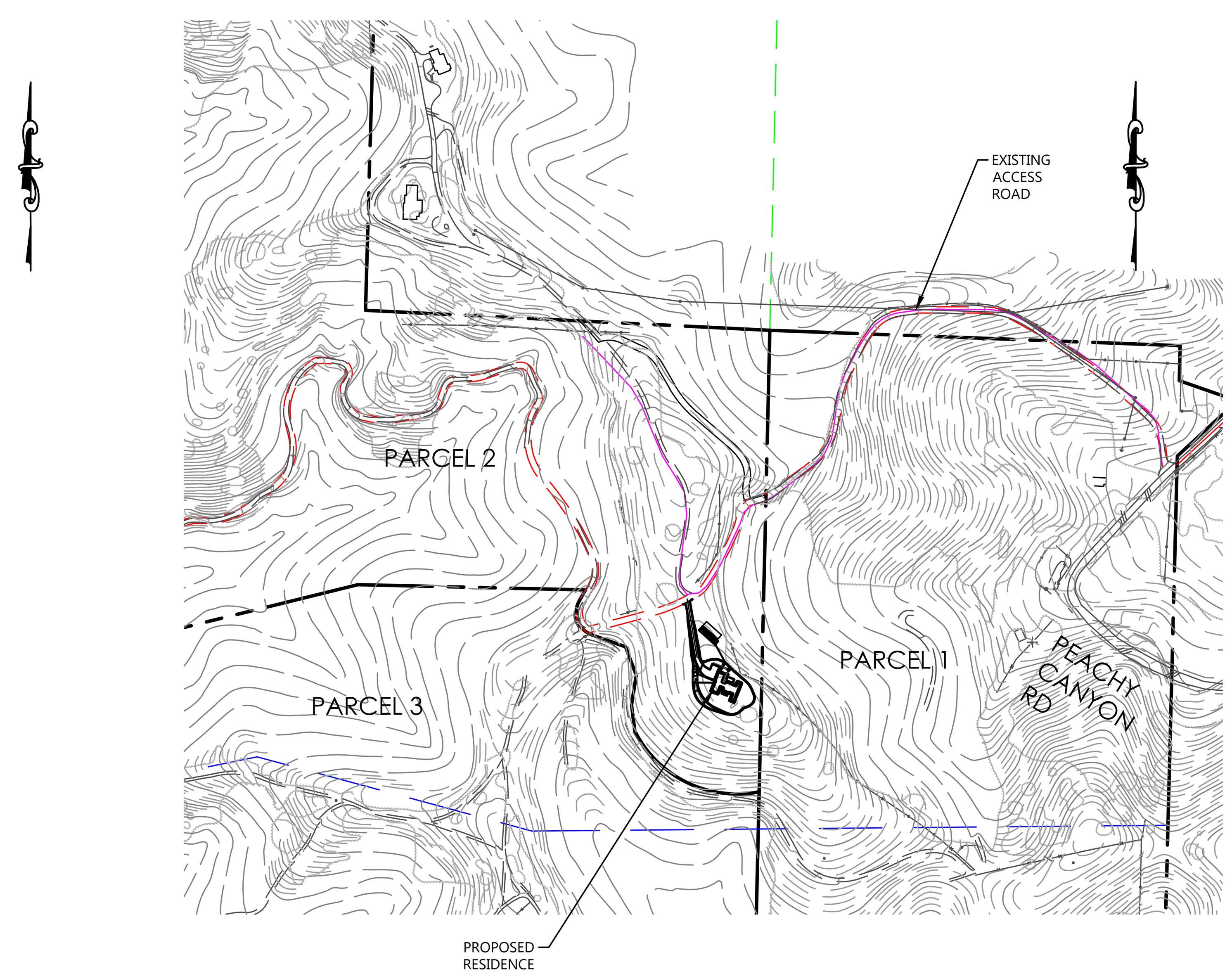
VICINITY MAP

Not to Scale



SITE MAP

SCALE: 1" = 400'



LEGAL DESCRIPTION

Parcel 2 of Certificate of Compliance Doc. No. 14-015121

OWNER

SURVEYOR

Twin Cities Surveying, Inc.
615 Main Street, Ste. C
Templeton, CA 93465
(805) 434-1834

APPLICABLE CODES

- 2019 California Building Code, Vols 1 & 2
- 2019 California Residential Code
- 2019 California Plumbing Code
- 2019 California Mechanical Code
- 2019 California Electrical Code
- 2019 California Energy Code
- 2019 California Green Building Code
- 2019 California Fire Code
- 2019 California Reference Standards Code
- County Building and Construction Ordinance -Title 19
- County Coastal Zone Land Use Ordinance - Title 23
- County Fire Code Ordinance - Title 16
- County Land Use Ordinance -Title 22

PROJECT STATISTICS

Earthwork*		Pre-Project Area (sf±)	
Cut (cy±) Fill (cy±) Total (cy±)	1000 800 1800	Impervious Total Project	0 37000
		Post-Project Area (sf±)	
Max. cut (ft) Max. fill (ft)	4 5	Total Impervious Pervious New Impervious Removed Impervious Replaced Impervious Total Site Disturbance	6500 30500 6500 0 0 37000
Site			
Average slope Parcel Area (ac±)	<10% .		

*Quantities shown are unadjusted. When subsidence and losses are considered, the earthwork will balance on site.

9/2/2021 2:17 PM

ABBREVIATIONS

AC	Asphalt Concrete Paving
BW	Bottom of Wall
CO	Clean-out
CL	Centerline
CONC	Concrete
CONST	Construction
DIA & Ø	Diameter
ELEV	Elevation
(E) & ( )	Existing
FF	Finished Floor
FS	Finished Surface
FH	Fire Hydrant
FL	Flow Line
G	Gas
GB	Grade Break
GR	Finished Grade
HDPE	Hi-density Polyethylene
HP	High Point
INV	Invert Elevation
LT	Left
LF	Linear Feet
LP	Low Point
MH	Manhole
(N)	New or Proposed
P	Power
PC	Point Of Curvature
PL	Property Line
PRC	Point Of Reverse Curvature
PT	Point Of Tangency
PUE	Public Utility Easement
PVC	Polyvinyl Chloride
R	Radius
RT	Right
RW	Right-of-way
S	Slope
SD	Storm Drain
SS	Sanitary Sewer
STA	Station
T	Telephone
TC	Top of Curb
TW	Top Of Wall
TYP	Typical
W	Water

LEGEND

Symbol	Description
	Property Line
	Centerline
550	Existing Ground Contour
550	Finish Grade Contour
	Concrete
	Edge of Pavement
W	Water Line
WV	Water Valve
	Fire Hydrant
S	Sanitary Sewer Main
FM	Sanitary Sewer Force Main
E	Electrical Line
OH	Overhead Line
	Utility Pole
	Guy Anchor
E	Elec. Vault / Pedestal / Pull Box
T	Telephone Line
T	Tele. Vault / Pedestal / Pull Box
	Fence
G	Gas Main
	Flowline
2%	Proposed Grade & Direction
1	Construction Note Reference
100.00 ELEV	Spot Elevation
	Proposed Slope
	Retaining Wall
	Silt Fence

GENERAL NOTES

1. No construction shall be started without plans approved by the County Building Department. The Building Department shall be notified at least 24 hours prior to starting of construction and of the time location of the preconstruction conference. Any construction performed without approved plans or prior notification to the Building Department will be rejected and will be at the contractor's and/or owner's risk.
2. For any construction performed that is not in compliance with plans or permits approved for the project the Building Department may revoke all active permits and recommend that County Code Enforcement provide a written notice or stop work order in accordance with Section 22.52.140 [23.10] of the Land Use Ordinance.
3. All construction work and installations shall conform to the most current County of San Luis Obispo Public Improvement Standards and all work shall be subject to the approval of the Building Department.
4. The project owner and contractor shall be responsible for providing and/or maintaining all weather access at all times to existing properties located in the vicinity of work. Additionally, they shall be responsible for maintaining all existing services, including utility, garbage collection, mail distribution, etc., to all existing properties located in the vicinity of work.
5. On-site hazards to public safety shall be shielded by construction fencing. Fencing shall be maintained by the project owner and contractor until such time that the project is completed and occupied, potential hazards have been mitigated, or alternative protective measures have been installed.
6. Soils tests shall be done in accordance with the County Public Improvement Standards, Section 3.2.3. All tests must be made within 15 days prior to the placing material. The test results shall clearly indicate the location and source of the material.
7. Roadway compaction tests shall be made on subgrade material, aggregate base material, and material as specified by the Soils Engineer. Said tests shall be made prior to the placement of the next material lift.
8. Subgrade material shall be compacted to a relative compaction of 95% in the zone between finished subgrade elevation and a minimum of 1-foot below. All material in fill sections below the zone mentioned above shall be compacted to 90% relative compaction.
9. A registered civil engineer shall certify that the improvements when completed are in accordance with the plans prior to the request for a final inspection. Record Drawings shall be prepared after construction is completed. The civil engineer certifying the improvements and preparing as-built plans may be present when the final inspection is made by the County.
10. An Engineer of Work Agreement and an Engineer Checking and Inspection Agreement are required prior to the start of construction. The Building Department shall be notified in writing of any changes to the Engineer of Work Agreement. Construction shall not proceed without an Engineer or Work.
11. All utility companies shall be notified prior to the start of construction.
12. A County Encroachment Permit is required for all work done within the County right-ofway. The Encroachment Permit may establish additional construction, utility and traffic control requirements.
13. The County Inspector acting on behalf of the County Building Department may require revisions in the plans to solve unforeseen problems that may arise in the field. All revisions shall be subject to the approval of the Developer's Engineer of Work.
14. The structural section shall be based on soils tests taken at the time of construction and using a Traffic Index of for (road name). The structural section shall be approved by the Building Department prior to road construction.
15. Hydro-seeding or other permanent erosion control shall be placed and established with 90% coverage on all disturbed surfaces (other than paved or gravel surfaces) prior to the final inspection.
16. For any public improvements to be maintained by the County, if environmental permits from the U.S. Army Corps of Engineers, the California Regional Water Quality Control Board/State Water Resources Control Board, or the California Department of Fish & Game are required, the Developer shall: a. submit a copy of all such completed permits to the County Building Department OR, b. document that the regulatory agencies determined that said permit is not required; prior to acceptance of the completed improvements for County maintenance and release of improvement security. Any mitigation monitoring required by said permits will remain the responsibility of the Developer.
17. When the project site earthwork is not intended to balance then a separate grading permit for the sending or receiving property may be required. A copy of the permit/s or evidence that no permits are required shall be submitted to the Department prior to commencing project earthwork.
18. A final report from the designing engineer is required for the engineered leach field design.

GRADING NOTES

1. All grading construction shall conform to the applicable codes as noted under "Applicable Codes" heading.
2. The developer shall be responsible for scheduling a pre-construction meeting with the County and other affected agencies. The contractor shall notify the County Building Department at least 24 hours prior to any work being performed, and arrange for inspection.
3. Grading shall comply with the recommendations of the preliminary soils report by GeoSolutions, Inc., dated June 23, 2021, filed with the County of San Luis Obispo.
4. Estimated earth quantities:
   Cut: 1000 CY± Fill: 800 CY±

   Note: exact shrinkage, consolidation, and subsidence factors and losses due to clearing operations are not included. Estimated earthwork quantities are based upon the difference between existing ground surface and proposed finish grades, or sub grades as shown on the plan, and should vary according to these factors. The contractor shall be responsible for site inspection and quantity take off, and shall bid accordingly.
5. Soils engineer to determine the soil is suitable to support the intended structure. Such report including progress and/or compaction reports shall be submitted to the field inspector prior to final inspection when a soils report is obtained. The County policy regarding pad certification shall be followed. When applicable the engineer shall observe the grading operation(s) and provide the field inspector with required compaction reports and a report stating that the grading performed has been observed and is in conformance with the UBC and County ordinances.
6. No cut or fill slopes will be constructed steeper than two horizontal to one vertical (2:1).
7. Dust control is to be maintained at all times during construction.
8. Areas of fill shall be scarified, benched and recompacted prior to replacing fill and observed by a soil or civil engineer.
9. Fill material will be recompacted to 90% of maximum density.
10. Remove any deleterious material encountered before placing fill.
11. All disturbed areas shall be hydro seeded or planted with approved erosion control vegetation as soon as practical after construction is complete.
12. Minimum setback to creeks and bluffs shall be maintained. Minimum setback of two feet from all property lines will be maintained for all grading.
13. Minimum slope away from buildings shall be 5% for the first ten feet around perimeter.
14. The contractor shall be responsible for the protection of all existing survey markers during construction. All such monuments or markers disturbed shall be reset at the contractor's expense.
15. All contractors and subcontractors working within the right of way shall have an appropriate contractor's license, a local business license, and shall obtain an encroachment permit.
16. Engineering reports for cut or fill slope steeper than 2:1 shall be submitted to the field inspector.

UNDERGROUND UTILITY NOTES

1. An effort has been made to define the location of underground facilities within the job site. However, all existing utility and other underground structures may not be shown on this plan and their location where shown is approximate. The construction contractor agrees that he shall assume sole and complete responsibility for locating or having located all underground utilities and other facilities and for protecting them during construction.
2. All utility companies must be notified prior to the start of construction. The construction contractor shall contact underground service alert (USA) at 811 two to ten days prior to the start of excavation and shall verify the location of any known utilities and whether or not a representative of each company will be present during excavation.

DIGALERT 811

PACIFIC MILEPOST Drafting Services linkedin.com/in/pacificmilepost

REGISTERED PROFESSIONAL ENGINEER
TIMOTHY P. ROBERTS
35366
Exp. 9/30/21
CIVIL
STATE OF CALIFORNIA

Roberts Engineering
Timothy P. Roberts
Civil Engineer - RCE 35366
2015 Vista de la Vina
Templeton, CA 93465
Phone (805) 239-0664
Fax (805) 238-6148
Email tim@robertsenginc.com
Website robertsenginc.com

Record Drawings

Timothy P. Roberts, RCE 35366 exp 09/30/21 Date

Revisions:

Roberts Engineering, Inc.

Parcel 2 Residence

Title Sheet

Design/Drawn	County Plan Checker	Approved for County Requirements
TR/JM		Development Services Engineer Date
Job # 1628	County W.O. No.	9/2/2021 Timothy P. Roberts, RCE 35366 exp 09/30/21 Date
California Coordinates (CCS83, Zone 5) .	.	County Road # / Sheet C-1 of 3

EROSION CONTROL NOTES

1. Erosion control measures for wind, water, material stockpiles, and tracking shall be implemented on all projects at all times and shall include source control, including protection of stockpiles, protection of slopes, protection of all disturbed areas, protection of accesses, and perimeter containment measures. Erosion control shall be placed prior to the commencement of grading and site disturbance activities unless the Building Department determines temporary measures to be unnecessary based upon location, site characteristics or time of year. The intent of erosion control measures shall be to keep all generated sediments from entering a swale, drainage way, watercourse, atmosphere, or migrate onto adjacent properties or onto the public right-of-way.
2. Site inspections and appropriate maintenance of all erosion control measures/devices shall be conducted and documented at all times during construction and especially prior to, during, and after rain events.
3. The Developer shall be responsible for the placement and maintenance of all erosion control measures/devices as specified by the approved plan until such time that the project is accepted as complete by the Building Department or until released from the Conditions of Approval of their General Permit. Erosion control measures/devices may be relocated, deleted or additional measures/devices may be required depending on the actual conditions encountered during construction. Additional erosion control measures/devices shall be placed at the discretion of the Engineer of Work, County Inspector, SWPPP Monitor, or RWQCB Inspector. Guidelines for determining appropriate erosion control devices shall be included in the plans with additional measures/devices noted from the appendix of the Public Improvement Standards.
4. Wet weather erosion control measures/devices shall be available, installed, and/or applied between October 15 and April 15 or anytime when the rain probability exceeds 30%.
5. The Contractor, Developer, and Engineer of Work shall be responsible to review the project site prior to October 15 (rainy season) and to coordinate an implementation plan for wet weather erosion control devices. A locally based standby crew for emergency work shall be available at all times during the rainy season (October 15 through April 15). Necessary materials shall be available and stock piled at convenient locations to facilitate rapid construction or maintenance of temporary devices when rain is imminent.
6. In the event of a failure, the Developer and/or his representative shall be responsible for cleanup and all associated costs or damage. In the event that damage occurs within the right-of-way and the County is required to perform cleanup, the owner shall be responsible for County reimbursement of all associated costs or damage.
7. In the event of failure and/or lack of performance by the owner and/or contractor to correct erosion control related problems the Building Department may revoke all active permits and recommend that County Code Enforcement provide a written notice or stop work order in accordance with Section 22.52.140 [23.10] of the Land Use Ordinance.
8. Permanent erosion control shall be placed and established with 90% coverage on all disturbed surfaces other than paved or gravel surfaces, prior to final inspection. Permanent erosion control shall be fully established prior to final acceptance. Temporary erosion control measures shall remain in place until permanent measures are established.
9. The County Air Pollution Control District (APCD) may have additional project specific erosion control requirements. The Contractor, Developer, and Engineer of Work shall be responsible for maintaining self-regulation of these requirements.
10. All projects involving site disturbance of one acre or greater shall comply with the requirements of the National Pollutant Discharge Elimination System (NPDES). The Developer shall submit a Notice of intent (NOI) to comply with the General Permit for Construction Activity with the Regional Water Quality Control Board (RWQCB). The Developer shall provide the County with the Waste Discharge Identification Number (WDID #) or with verification that an exemption has been granted by RWQCB.

WDID No.: n/a less than one acre site disturbance

Person to contact 24 hours a day in the event there is an erosion control/sedimentation problem (Storm Water Compliance Officer):
Name: -
Local Phone: -

TREE PROTECTION NOTES

1. No oak tree shall be removed without prior County approval.
2. Trees within 20 feet of grading or trenching shall be protected by placement of protective fencing as indicated.
3. Protective fencing shall be four feet high chain link or safety fence, and shall be placed at the dripline unless otherwise indicated
4. Trenching and excavation within tree driplines shall be hand dug or bored to minimize root disturbance. Any root encountered 1" diameter or greater, shall be hand cut and appropriately treated.
5. Pruning of lower limbs in the construction area shall occur prior to construction activities to minimize damage.

EROSION CONTROL & INSPECTIONS

Erosion and Sediment Control Best Management Practices must be in place and functional PRIOR to the first inspection. No inspections can be performed if they are not in place or have failed to provide erosion control. Failure to maintain erosion control will cause inspections to be delayed until erosion control measures are functional.

SPECIAL INSPECTIONS

1. All construction & inspections shall conform to 2016 California Building Code (CBC) Chapter 17.
2. Special inspection requirement are required for this project, the owner or registered design professional in responsible charge acting as the owner's agent shall employ one or more special inspectors to provide inspections during construction on all tasks identified below.
3. Special inspectors shall be a qualified person who shall demonstrate competence, to the satisfaction of the County Building Department. Names and qualifications of special inspector(s) shall be submitted to the County Building Department for approval.
4. Each contractor responsible for the construction of components listed in the special inspections shall submit a written statement of responsibility to the County Building Department and the owner prior to the commencement of work. The statement shall contain the items listed in CBC 1706.1.
5. A final report prepared by a soil or civil engineer shall be submitted to the field inspector stating the work performed is in substantial conformance with the approved plans, applicable codes, and is found to be suitable to support the intended structure. Such report shall include any field progress reports, compaction data etc.

Section 1705, Statement of Special Inspections:

- 1705.1 General. Where special inspection or testing is required by Section 1704, 1707 or 1708, the registered design professional in responsible charge shall prepare a statement of special inspections in accordance with Section 1705 for submittal by the permit application (see Section 1704.1.1).
- 1705.2 Content of statement of special inspections. The statement of special inspections shall identify the following:

a) The materials, systems, components and work required to have special inspection or testing by the building official or by the registered design professional responsible for each portion of the work.

b) The type and extent of each special inspection.

c) The type and extent of each test.

d) Additional requirements for special inspection or testing for seismic or wind resistance as specified in Section 1705.3, 1705.4, 1707 or 1708.

e) For each type of special inspection, identification as to whether it will be continuous special inspection or periodic special inspection.

1706.5 Soils. Special inspections for existing site soil conditions, fill placement and load-beraing requirements shall be as required by this section and Table 1705.6. The approved geotechnical report, and the construction documents prepared by the registered design professionals shall be used to determine compliance. During fill placement, the special inspector shall determine that proper materials and procedures are used in accordance with the provisions of the approved geotechnical report.

Observation & Testing Program.

The project soils engineer shall perform periodic inspection & testing for the following tasks:
- Final plan review
- Stripping and clearing of vegetation
- Verification of overexcavation to the correct depth
- Utility trench backfill
- Fill quality, placement, moisture conditioning, and compaction, including nonexpansive material
- Foundation excavations

The soils engineer of work shall be GeoSolutions, Inc., 220 High Street, San Luis Obispo, CA 93401, Phone (805) 543-8539.

Soils report # SL 12244-1.

The project engineer of work shall perform periodic inspection for the following tasks:
- Rough grading & site preparation
- Final grading inspection prior to final County inspection

The project engineer of work shall be Tim Roberts of Roberts Engineering, Inc., RCE 35366, 2015 Vista de la Vina, Templeton, CA 93465, phone (805) 239-0664

The Engineer of work shall state in writing the work is in substantial conformance with the approved plans.

The person responsible for BMP inspection is Doug Anderson, phone 949-510-5513.

SEPTIC SYSTEM DESIGN AND NOTES:

ALL CONSTRUCTION STANDARDS MUST CONFORM TO SAN LUIS OBISPO COUNTY STANDARD, DOCUMENT BLD-2028, 05/11/2018.

1. SEPTIC TANK CAPACITY SHALL BE AT LEAST 1500 GALLON. A NEW STANDARD TWO COMPARTMENT CONCRETE OR POLYETHYLENE SEPTIC TANK SHALL BE INSTALLED.
2. ALL PIPING TO AND FROM THE SEPTIC TANK SHALL BE 4" ASTM APPROVED SEWER PIPE, MINIMUM PIPE SLOPE SHALL BE 2%.
3. TRENCH BOTTOM SHALL BE LEVEL THROUGHOUT THE ENTIRE LENGTH.
4. TRENCH DEPTH MUST BE SUFFICIENT TO MAINTAIN AT LEAST 15 FEET TO "DAYLIGHT" AT THE TOP OF THE INFILTRATIVE SURFACE.
5. THE LEACH SYSTEM SHALL BE STANDARD ROCK OR HIGH-CAPACITY INFILTRATORS, AS FOLLOWS:

SYSTEM TYPE	100% TRENCH LENGTH (A)	TRENCH WIDTH	TOTAL TRENCH DEPTH (C)	TOTAL ROCK DEPTH (B)
ALT 1: 3' GRAVEL TRENCH	764'	36"	30" MIN	18" MIN
ALT 2: HIGH CAPACITY INFILTRATOR	764'	36"	28" MIN	N/A

A. NO TRENCH SHALL EXCEED 100 FEET IN LENGTH.
B. TOTAL ROCK DEPTH BELOW DISTRIBUTION PIPING, PLUS 6 INCHES.
C. FILTER FABRIC SHALL BE PLACED OVER GRAVEL PRIOR TO BACKFILLING.

6. INSPECTION RISERS WITH REMOVABLE CAPS SHALL BE INSTALLED WHEN THE TANK IS NOT WITHIN 6" FROM FINISHED GRADE SURFACE.
7. SYSTEM INSTALLATION SHALL BE INSPECTED BY COUNTY OFFICIALS PRIOR TO BACKFILLING. MINIMUM 48 HOURS NOTICE IS NECESSARY IF INSPECTION BY ENGINEER IS REQUIRED.
8. FINISH GRADING SHALL DIRECT ALL SURFACE RUNOFF AROUND THE LEACH AREA, AS INDICATED BY DRAINAGE ARROWS, THIS IS VERY IMPORTANT.
9. DESIGN BASIS:
VOLUME OF WASTE WATER (4 BEDROOM) = 450 GAL/DAY
RECOMMENDED PERCOLATION RATE PER PERCOLATION TEST = 25 MPI
SOIL APPLICATION RATE = 0.589 GAL/DAY/SF
REQUIRED ABSORPTION AREA = 450 / 0.589 = 764 SF
STANDARD ROCK AND HIGH-CAPACITY INFILTRATOR = 4 SF/LF

TRENCH LENGTH:
ROCK LEACH TRENCH = 764 SF/(4 SF/LF) = 191 LF TOTAL MIN.
(3) - TRENCH @ 64' EACH = 192'
'INFILTRATOR' TRENCH = 764 SF/(4 SF/LF) = 191 LF TOTAL MIN.
(48) - CHAMBERS @ 4' EACH = 192'
(3) - TRENCH @ 64' EACH = 192'

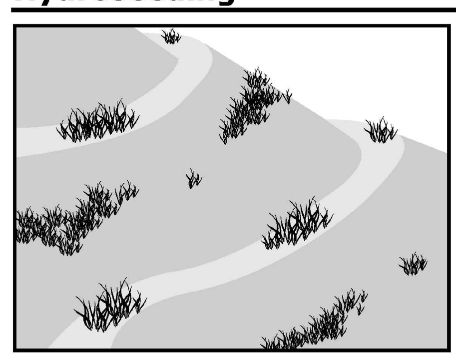
10. ALL UTILITY COMPANIES SHALL BE NOTIFIED PRIOR TO START OF CONSTRUCTION BY THE CONTRACTOR BY CALLING 811.

SEPTIC SYSTEM SETBACKS

SETBACK ELEMENT	SEPTIC TANK (FT)	DISPERSAL FIELD (FT)
1. WELLS: POTABLE, IRRIGATION, MONITORING, CATHODIC PROTECTION	100	100a
2. WELLS: GEOTHERMAL	50	50
3. DOMESTIC WATER SUPPLIES (THAT DO NOT SERVE A PUBLIC WATER SYSTEM)	100	100a
4. PUBLIC WATER SYSTEM SUPPLY WELLS (EXISTING)		
WHERE THE DISPERSAL SYSTEM IS LESS THAN OR EQUAL TO 10 FEET DEEP.	100d	150
WHERE THE DISPERSAL SYSTEM IS DEEPER THAN 10 FEET AND SUPPLEMENTAL TREATMENT, INCLUDING DISINFECTION, HAS BEEN INCORPORATED	100d	150
5. PUBLIC WATER SYSTEMS' SURFACE WATER INTAKE		
WHERE THE EFFLUENT DISPERSAL SYSTEM IS LESS THAN 1,200 FEET FROM A PUBLIC WATER SYSTEMS' SURFACE WATER INTAKE, WITHIN THE CATCHMENT OF THE DRAINAGE, AND LOCATED SUCH THAT IT MAY IMPACT WATER QUALITY AT THE INTAKE POINT SUCH AS UPSTREAM OF THE INTAKE POINT FOR FLOWING WATER BODIES (MEASURED FROM HIGH WATER MARK OF THE RESERVOIR, LAKE OR FLOWING WATER BODY)	100d	400
WHERE THE EFFLUENT DISPERSAL SYSTEM IS MORE THAN 1,200 FEET BUT LESS THAN 2500 FEET FROM A PUBLIC WATER SYSTEMS' SURFACE WATER INTAKE, WITHIN THE CATCHMENT OF THE DRAINAGE, AND LOCATED SUCH THAT IT MAY IMPACT WATER QUALITY AT THE INTAKE POINT SUCH AS UPSTREAM OF THE INTAKE POINT FOR FLOWING WATER BODIES (MEASURED FROM HIGH WATER MARK OF THE RESERVOIR, LAKE OR FLOWING WATER BODY)	100d	200
6. BODIES OF WATER: VERNAL POOLS, WETLANDS, LAKES, PONDS OR OTHER SURFACE WATER BODIES	100d	200
7. WATERCOURSE: MEASURED FROM THE HIGH-WATER MARK	100	100
8. SPRINGS, NATURAL OR ANY PART OF MAN-MADE SPRING	100a	100
9. DRAINAGEWAY: MEASURED FROM EDGE OF FLOW PATH		
UP SLOPE (WHEN ELEVATION OF THE BOTTOM OF THE DRAINAGE WAY IS AT OR ABOVE THE ELEVATION OF THE EFFLUENT DISTRIBUTION PIPE)	25	25
DOWN SLOPE (WHEN ELEVATION OF THE BOTTOM OF THE DRAINAGE IS BELOW THE ELEVATION OF THE EFFLUENT DISTRIBUTION PIPE)	50	50
10. CURTAIN DRAINS		
UP SLOPE	10	SITE SPECIFIC ENGINEERING
DOWN SLOPE	10	50
11. DOMESTIC WATER LINE	10	10
12. BUILDING, STRUCTURE, OR MOBILE HOME	5	10
13. PROPERTY LINE	5	10
14. LARGE TREES (WHEN DIAMETER OF TRUNK IS GREATER THAN OR EQUAL TO 5 INCHES, MEASURED 2 FEET FROM GROUND LEVEL	10	10
15. DOWNHILL EMBANKMENT WITH CHANGE IN SLOPE GREATER THAN 20% OR CUT SLOPE	10	4XHbc
16. STEEP SLOPES >50 PERCENT (MEASURED FROM THE BREAK OF THE SLOPE)		
HEIGHT OF STEEP SLOPE IS LESS THAN 12 FEET	10	25
HEIGHT OF STEEP SLOPE IS GREATER THAN OR EQUAL TO 12 FEET	10	50
17. IN GROUND SWIMMING POOLS/SPAS		
UP SLOPE (WHEN THE ELEVATION OF THE BOTTOM OF THE POOL OR SPA IS AT OR ABOVE THE ELEVATION OF THE OWTS COMPONENT)	10	10
DOWN SLOPE	10	25
18. UNSTABLE LAND MASS OR AREAS SUBJECT TO LANDSLIDES	100c	100c

a. The required setback distance for existing seepage pits without supplemental treatment shall not be less than 150 feet.
b. H equals the height of cut or embankment, in feet. The required setback distance shall not more than 50 feet, measured from the distribution pipe.
c. This distance may be reduced if recommended by a Geotechnical Report.
d. All new or replacement septic tanks, pump tanks and supplemental treatment system tanks will be tested and confirmed to be watertight prior to final inspection; therefore, a 100 feet horizontal setback is adequate to protect public water supply wells, bodies of water and public water system intake points from contamination.

Hydroseeding EC-4



Categories
EC Erosion Control ☒
SE Sediment Control
TC Tracking Control
WE Wind Erosion Control ☒
NS Non-Stormwater Management Control
WM Waste Management and Materials Pollution Control

Legend:
☒ Primary Category
☒ Secondary Category

Targeted Constituents
Sediment ☒
Nutrients
Trash
Metals
Bacteria
Oil and Grease
Organics

Potential Alternatives
EC-3 Hydraulic Mulch
EC-5 Soil Binders
EC-6 Straw Mulch
EC-7 Geotextiles and Mats
EC-8 Wood Mulching
EC-14 Compost Blanket
EC-16 Non-Vegetative Stabilization

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Description and Purpose

Hydroseeding typically consists of applying a mixture of a hydraulic mulch, seed, fertilizer, and stabilizing emulsion with a hydraulic mulcher, to temporarily protect exposed soils from erosion by water and wind. Hydraulic seeding, or hydroseeding, is simply the method by which temporary or permanent seed is applied to the soil surface.

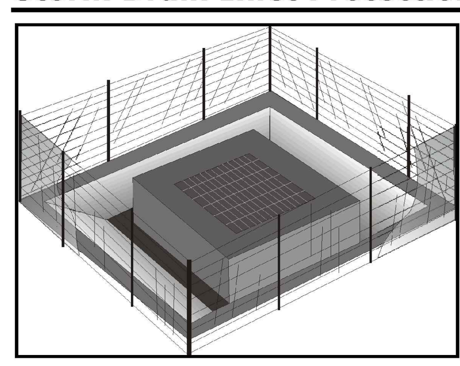
Suitable Applications

Hydroseeding is suitable for disturbed areas requiring temporary protection until permanent stabilization is established, for disturbed areas that will be re-disturbed following an extended period of inactivity, or to apply permanent stabilization measures. Hydroseeding without mulch or other cover (e.g. EC-7, Erosion Control Blanket) is not a stand-alone erosion control BMP and should be combined with additional measures until vegetation establishment.

Typical applications for hydroseeding include:

- Disturbed soil/graded areas where permanent stabilization or continued earthwork is not anticipated prior to seed germination.
- Cleared and graded areas exposed to seasonal rains or temporary irrigation.
- Areas not subject to heavy wear by construction equipment or high traffic.

Storm Drain Inlet Protection SE-10



Categories
EC Erosion Control
SE Sediment Control ☒
TC Tracking Control
WE Wind Erosion Control
NS Non-Stormwater Management Control
WM Waste Management and Materials Pollution Control

Legend:
☒ Primary Category
☒ Secondary Category

Targeted Constituents
Sediment ☒
Nutrients
Trash ☒
Metals
Bacteria
Oil and Grease
Organics

Potential Alternatives
SE-1 Silt Fence
SE-5 Fiber Rolls
SE-6 Gravel Bag Berm
SE-8 Sandbag Barrier
SE-14 Biofilter Bags
SE-13 Compost Socks and Berms

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Description and Purpose

Storm drain inlet protection consists of a sediment filter or an impounding area in, around or upstream of a storm drain, drop inlet, or curb inlet. Storm drain inlet protection measures temporarily pond runoff before it enters the storm drain, allowing sediment to settle. Some filter configurations also remove sediment by filtering, but usually the ponding action results in the greatest sediment reduction. Temporary geotextile storm drain inserts attach underneath storm drain grates to capture and filter storm water.

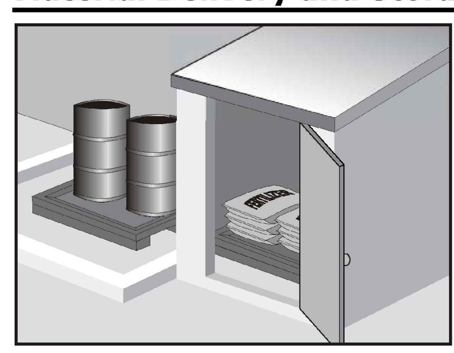
Suitable Applications

- Every storm drain inlet receiving runoff from unstabilized or otherwise active work areas should be protected. Inlet protection should be used in conjunction with other erosion and sediment controls to prevent sediment-laden stormwater and non-stormwater discharges from entering the storm drain system.

Limitations

- Drainage area should not exceed 1 acre.
- In general straw bales should not be used as inlet protection.
- Requires an adequate area for water to pond without encroaching into portions of the roadway subject to traffic.
- Sediment removal may be inadequate to prevent sediment discharges in high flow conditions or if runoff is heavily sediment laden. If high flow conditions are expected, use

Material Delivery and Storage WM-1



Categories
EC Erosion Control
SE Sediment Control
TC Tracking Control
WE Wind Erosion Control
NS Non-Stormwater Management Control
WM Waste Management and Materials Pollution Control ☒

Legend:
☒ Primary Category
☒ Secondary Category

Targeted Constituents
Sediment ☒
Nutrients ☒
Trash ☒
Metals ☒
Bacteria
Oil and Grease ☒
Organics ☒

Potential Alternatives
None

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Description and Purpose

Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in watertight containers and/or a completely enclosed designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

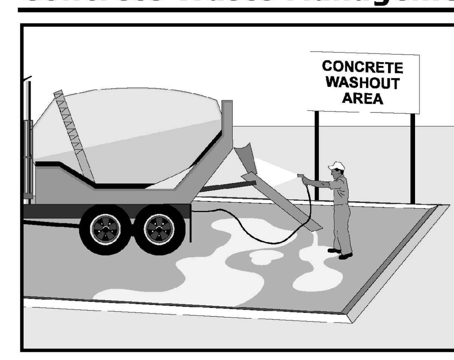
This best management practice covers only material delivery and storage. For other information on materials, see WM-2, Material Use, or WM-4, Spill Prevention and Control. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

Concrete Waste Management WM-8



Categories
EC Erosion Control
SE Sediment Control
TC Tracking Control
WE Wind Erosion Control
NS Non-Stormwater Management Control ☒
WM Waste Management and Materials Pollution Control ☒

Legend:
☒ Primary Category
☒ Secondary Category

Targeted Constituents
Sediment ☒
Nutrients
Trash
Metals ☒
Bacteria
Oil and Grease
Organics

Potential Alternatives
None

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Description and Purpose

Prevent the discharge of pollutants to stormwater from concrete waste by conducting washout onsite or offsite in a designated area, and by employee and subcontractor training.

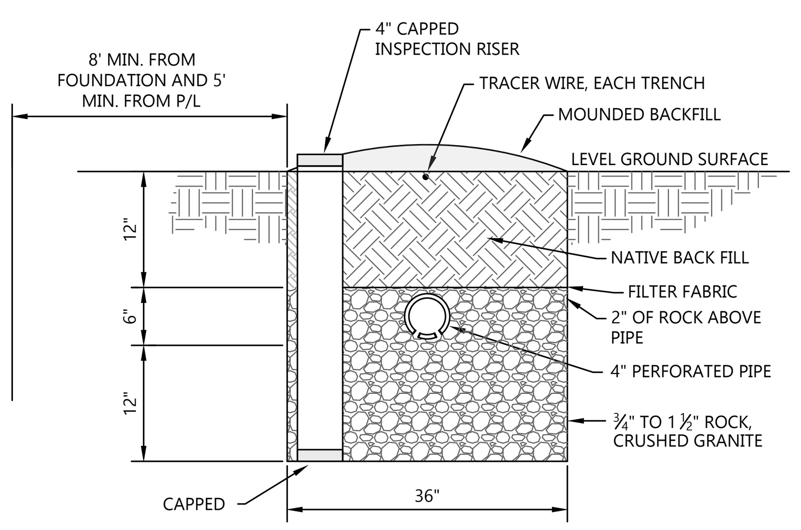
The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows and raising pH to levels outside the accepted range.

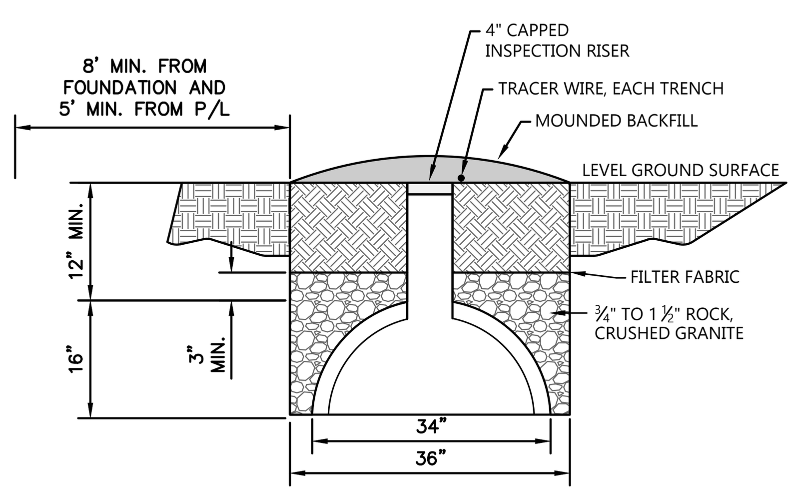
Suitable Applications

Concrete waste management procedures and practices are implemented on construction projects where:

- Concrete is used as a construction material or where concrete dust and debris result from demolition activities.
- Slurries containing portland cement concrete (PCC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.
- Concrete trucks and other concrete-coated equipment are washed onsite.



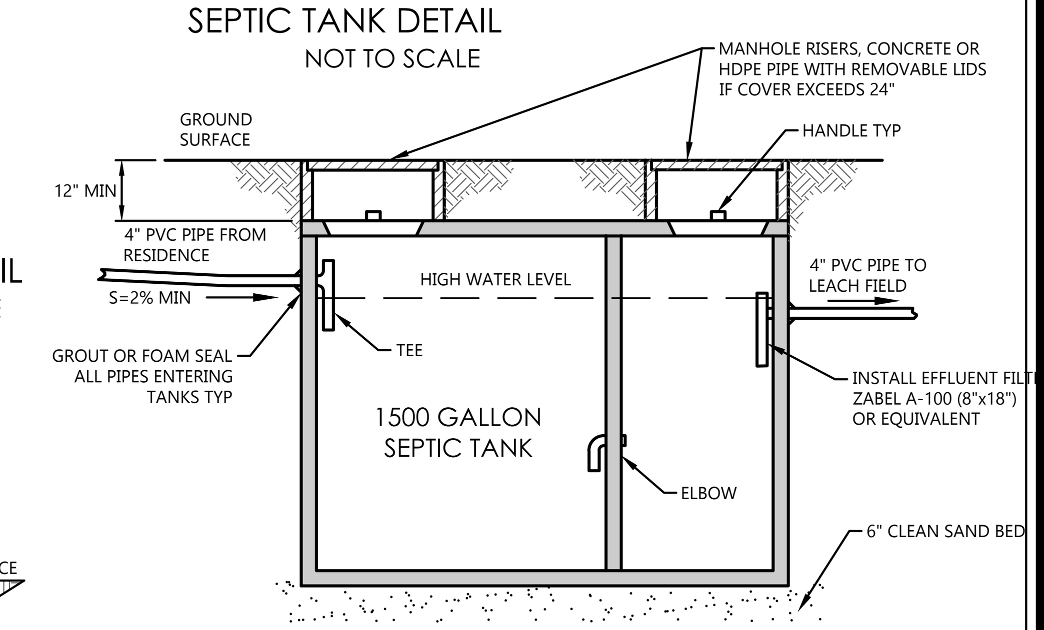
STANDARD LEACH FIELD TRENCH DETAIL
NOT TO SCALE



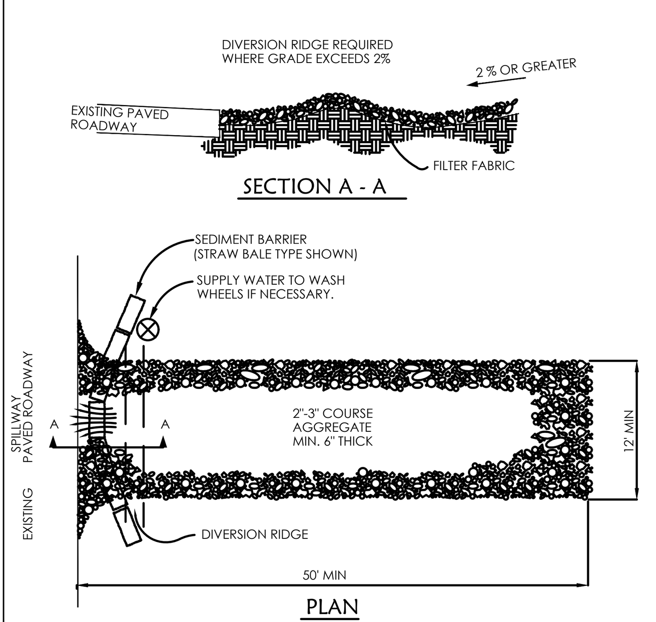
NOTE: PER LAMP PAGE 53, SECTION F, PARAGRAPH B: LEACHING CHAMBER TRENCHES MUST BE FILLED WITH LEACH ROCK TO A DEPTH OF 3" OVER THE CHAMBER

HIGH CAPACITY INFILTRATOR DETAIL
NOT TO SCALE

SEPTIC TANK DETAIL
NOT TO SCALE

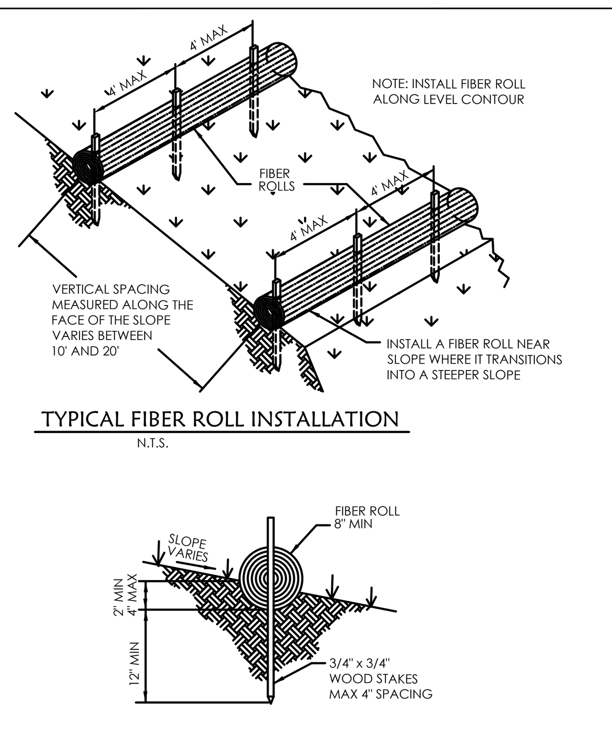


NOTE: TANK WILL BE CONCRETE OR POLYETHYLENE. ACCESS RISERS ARE NOT NECESSARY UNLESS THE SEPTIC TANK IS PLACED MORE THAN 24" BELOW GROUND SURFACE.



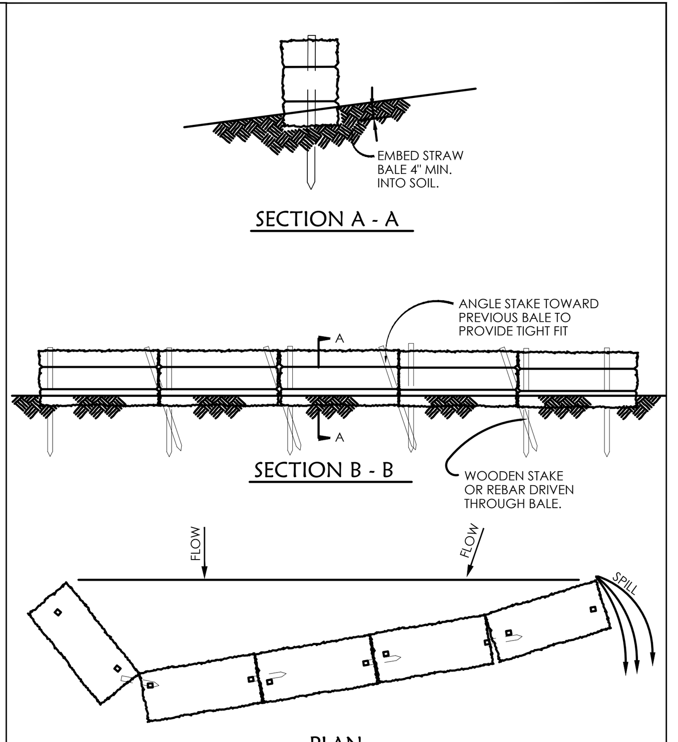
NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT



NOTE:
1. INSPECT AND REPAIR FIBER ROLLS AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN NECESSARY.
2. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.
3. FIBER ROLLS SHALL BE PLACED ALONG LEVEL SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.

FIBER ROLLS



NOTES:
1. THE STRAW BALES SHALL BE PLACED ON SLOPE CONTOUR.
2. BALES TO BE PLACED IN A ROW WITH THE ENDS TIGHTLY ABUTTING. USE STRAW, ROCKS, OR FILTER FABRIC TO FILL GAPS BETWEEN THE BALES AND TAMP THE BACKFILL MATERIAL TO PREVENT EROSION OR FLOW AROUND BALES.

STRAW BALE DIKE

TABLE 1705.6 REQUIRED VERIFICATION AND INSPECTION OF SOILS

VERIFICATION AND INSPECTION TASK	CONTINUOUS DURING TASK LISTED	PERIODICALLY DURING TASK LISTED
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	-	X
2. Verify excavations are extended to proper depth and have reached proper material.	-	X
3. Perform classification and testing of compacted fill materials.	-	X
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.	X	-
5. Prior to placement of compacted fill, observe subgrade and verify that site has been prepared properly.	-	X

REGISTERED PROFESSIONAL ENGINEER
TIMOTHY P. ROBERTS
35366
Exp. 9/30/21
CIVIL
STATE OF CALIFORNIA

Roberts Engineering
Timothy P. Roberts
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Record Drawings
Timothy P. Roberts, RCE 35366 exp 09/30/21 Date
Revisions:

Roberts Engineering, Inc.
Parcel 2 Residence
Notes & Details

Design/Drawn	County Plan Checker	Approved for County Requirements
TR/JM		Development Services Engineer Date
Job #	County W.O. No.	9/2/2021
1628		Timothy P. Roberts, RCE 35366 exp 09/30/21 Date
California Coordinates (CCS83, Zone 5)	County Road #	Sheet C-2 of 3

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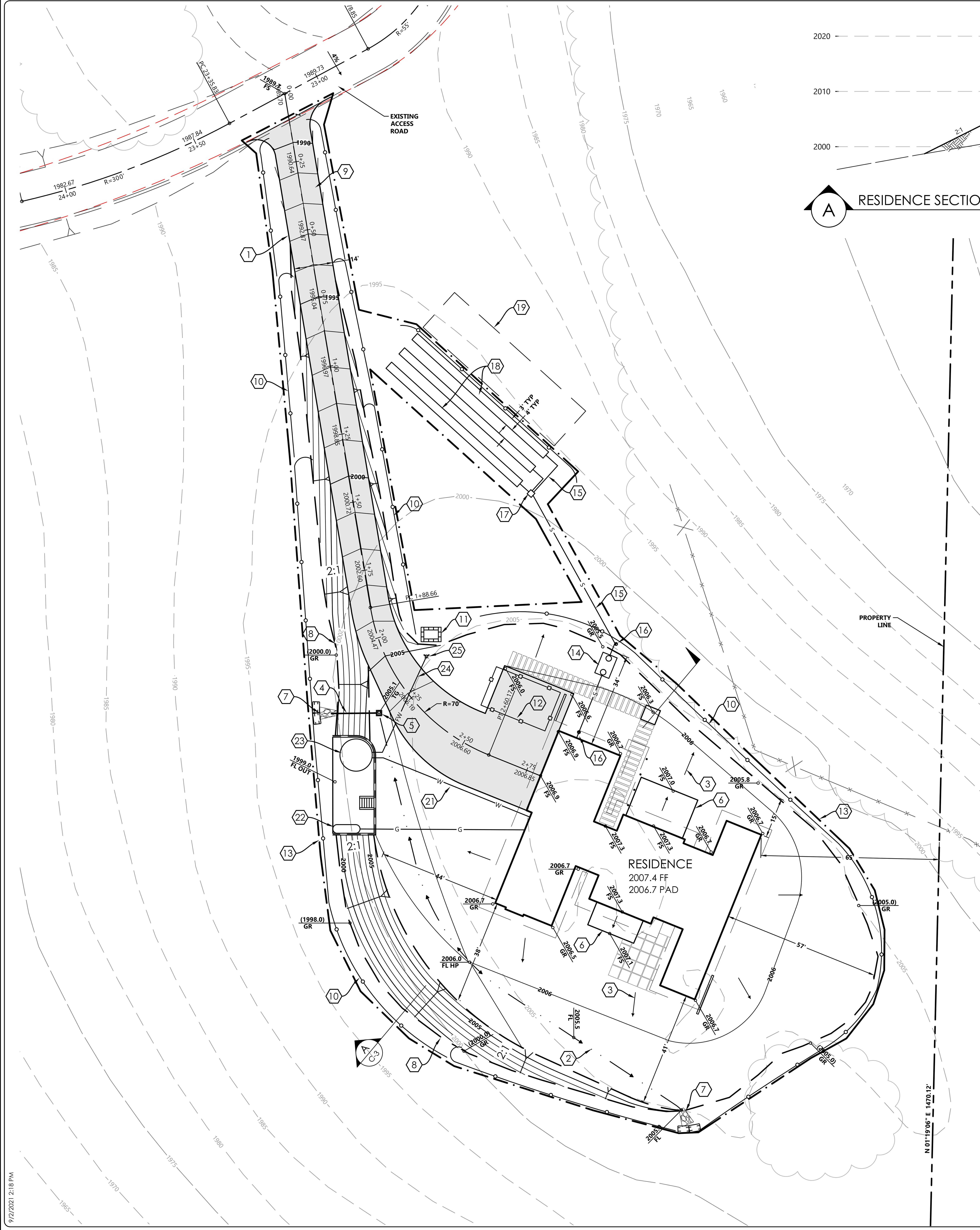
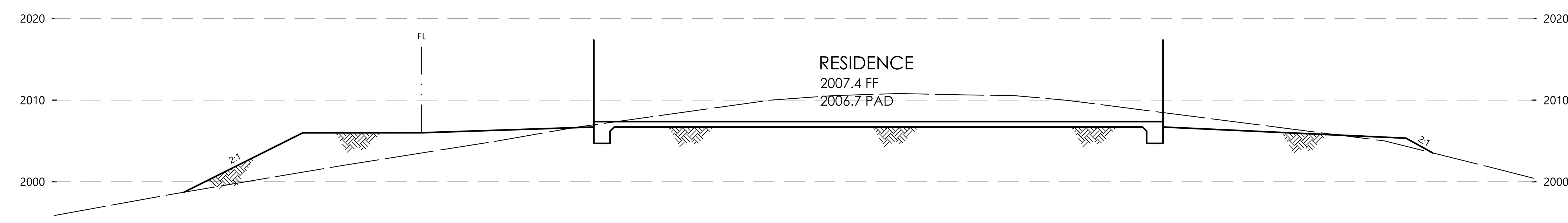
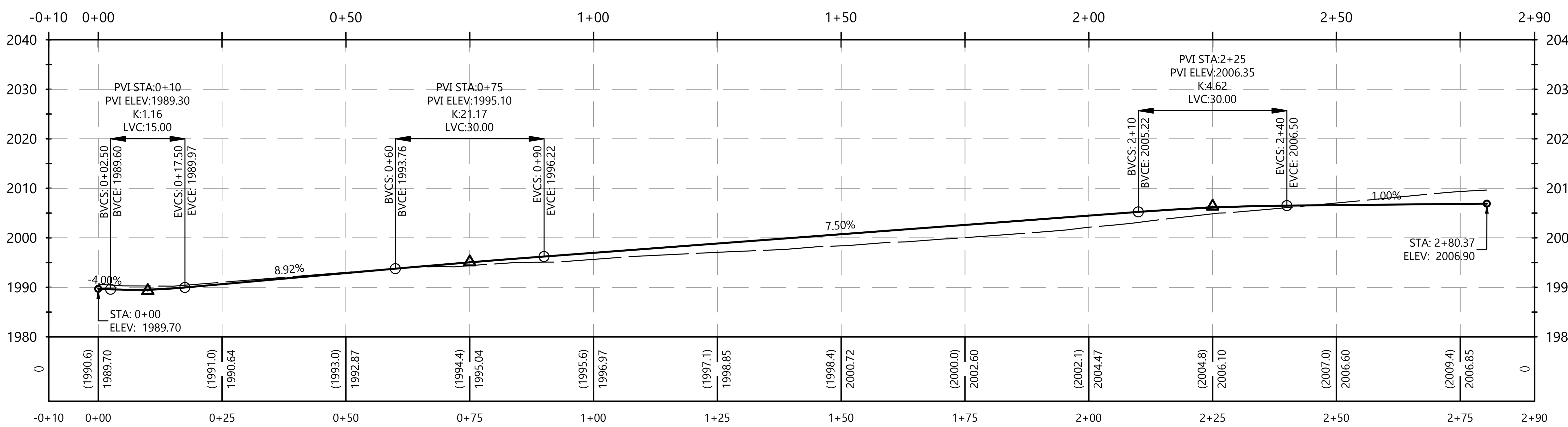




A RESIDENCE SECTION

HORZ SCALE: 1" = 10'
VERT SCALE: 1" = 10'



1 DRIVEWAY PROFILE
NOT TO SCALE

HORZ SCALE: 1" = 20'
VERT SCALE: 1" = 10'

CONSTRUCTION NOTES

The footprint of the residence shown hereon is based upon a graphic exhibit provided by the owner. While assumed accurate for purposes of this plan, it is not intended for precise building layout.

1. Construct 2" min asphalt driveway over 6" min Class 2 base compacted to 95% relative density. Over-ex 12" native soil and re-compact to 90% relative density.
2. Construct earth swale at S = 1% typical (36" wide by 6" deep).
3. Grade to drain away from proposed structure at S = 5% for 10 feet min. typical.
4. Install 6" PVC pipe @ S=1% min.
5. Install 18" concrete drainage inlet box, Mid State Concrete Products or equal. Install drain inlet protection per CASQA detail Sheet C-2.
6. Install 4" PCC concrete flatwork, S=2% typical. See architect's plans for details.
7. Install rock rip rap slope protection over erosion control fabric, typical. Install temporary straw bale barrier per detail sheet 2.
8. Track straw into, or hydro seed all newly graded slopes with County approved native erosion control seed mix.
9. Construct temporary construction entrance per CASQA detail Sheet C-2.
10. Install biodegradable fiber rolls at toe of slope and as indicated. See CASQA detail Sheet C-2.
11. Construct concrete washout structure per CASQA detail Sheet C-2.
12. Construct temporary material storage area per CASQA detail Sheet C-2.
13. Limits of disturbance.
14. Install 1,500-gallon septic tank.
15. Install 4" PVC sewer pipe at S=2% min.
16. Install sanitary sewer clean out.
17. Install distribution box.
18. Install leach trenches; Alternate 1: (3) - 64' standard trench 3' wide with rock below pipe. Alternate 2: (3) - 64' high capacity infiltrator (standard trench shown). See Sheet C-2 for details and specifications.
19. Provide adequate area for 100% expansion.
20. Approximate location of PG&E and telephone. Extend to serve new residence in joint utility trench.
21. Install domestic water service and extend to serve new residence.
22. Install LPG tank and extend LPG service to new residence.
23. Install 5000 gallon water storage tank.
24. Install 4" sch 40 PVC fire line.
25. Install $2\frac{1}{2}$" fire department connection per Cal Fire requirements.
26. Not used.

SCALE: 1" = 20'

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Record Drawings

Timothy P. Roberts, RCE 35366 exp 09/30/21 Date
Revisions:

Roberts Engineering, Inc.

Parcel 2 Residence

Grading, Drainage & Erosion Control Plan

Design/Drawn	County Plan Checker	Approved for County Requirements
####		Development Services Engineer Date
Job # 1628	County W.O. No.	Timothy P. Roberts, RCE 35366 exp 09/30/21 9/2/2021 Date
California Coordinates (CCS83, Zone 5)	County Road #	Sheet C-3 of 3

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