SEISMIC EVALUATION

HMSC OFFICE BUILDING
NEWPORT, OREGON

For

OREGON DEPARTMENT OF FISH & WILDLIFE

6/22/2013
Project: 2013007

CIVIL ENGINEERING

STRUCTURAL ENGINEERING

PILLAR CONSULTING GROUP, INC.

Professional Engineering and Project Management

FACILITIES ENGINEERING

PROJECT MANAGEMENT

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Engineering Memorandum

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ENGINEERING MEMORANDUM

TO	State of Oregon, Department of Fish and Wildlife				
FROM	John Evans, P.E, S.E., Pillar Consulting Group, Inc.				
PROJECT	ODFW HMSC Office Building Seismic Study – Newport, Oregon				
SUBJECT	ASCE 31-03 Seismic Evaluation & Schematic Upgrade Design - FINAL				
DATE	6/22/2013	**PROJECT #**	2013007	**MEMO #**	EM-01

The purpose of this memorandum is to provide a preliminary seismic assessment of the ODFW HMSC Office Building in Newport, OR. This report includes a description of the local seismic hazard, a description of the building's lateral force resisting system, a description of the methods employed to evaluate the building, evaluation findings, a preliminary schematic design for mitigation of deficiencies and preliminary construction cost estimates to implement the schematic design. It is expected that this information will be used by ODFW to gain a better understanding of the expected performance of the building in a seismic event, and to help make planning decisions for the future of the building.

This report addresses seismic aspects of the structure only. This report is not intended to satisfy any jurisdictional requirements. To our knowledge, neither a seismic evaluation nor a seismic upgrade is required by any authority having jurisdiction over the building. This evaluation is being done on a voluntary basis by the ODFW.

Image 1: ODFW HMSC Exterior Elevation Facing South West

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Executive Summary

The ODFW HMSC Office Building is in a location with little seismic activity in recent history, but with a known seismic fault capable of producing extreme seismic forces coupled with a tsunami. The subject building was built in the early 1970s using tilt-up concrete bearing walls with a wood framed diaphragm. This structural system of this age is known to perform poorly in seismic events. The review has found that this building has the common seismic deficiencies associated with the building's structural system and age along with other seismic deficiencies. Schematic drawings have been provided, which, if implemented, would improve the seismic performance of the structure.

The main components of the proposed schematic seismic upgrade are:

1. Remove the heavy concrete tile roof and replace it with a lighter asphalt composition roof system.
2. Improve the connection between bearing walls and gravity framing systems.
3. Install new shear walls and associated footings on the interior of the building to take seismic loads.
4. Brace interior unreinforced masonry bearing walls with light gauge steel studs.
5. Brace interior unreinforced masonry partition walls with light gauge steel studs.
6. Provide columns to support major girders currently supported by unreinforced masonry.
7. Brace elements subject to falling such as bookshelves and cabinets.
8. Replace windows that are subject to shattering.
9. Perform geotechnical studies to better understand the implications of liquefaction and surface fault rupture on the subject building.

An opinion of the cost to implement the schematic drawings has been made. The total cost to implement the project, including a 20% contingency is expected to be $615,857. Based on the buildings are of 8960 square feet, this yields $68.73/SF. Within the cost opinion, major subprojects have been broken out to provide the owner the ability to get a sense of the cost to implement individual portions of the seismic upgrade.

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Seismic Hazard

Cascadia Subduction Zone Seismic Hazard

The surface of the earth is broken into many tectonic plates which slowly move over the earth's mantle below. Faults are created where these plates interact with each other, storing and releasing energy as they attempt to move. The western edge of the North American Plate runs along the west coast of North America and shares a plate boundary with the Juan de Fuca Plate to the west. This plate boundary stretches from Vancouver Island to northern California and is called the Cascadia Fault, or Cascadia Subduction Zone.

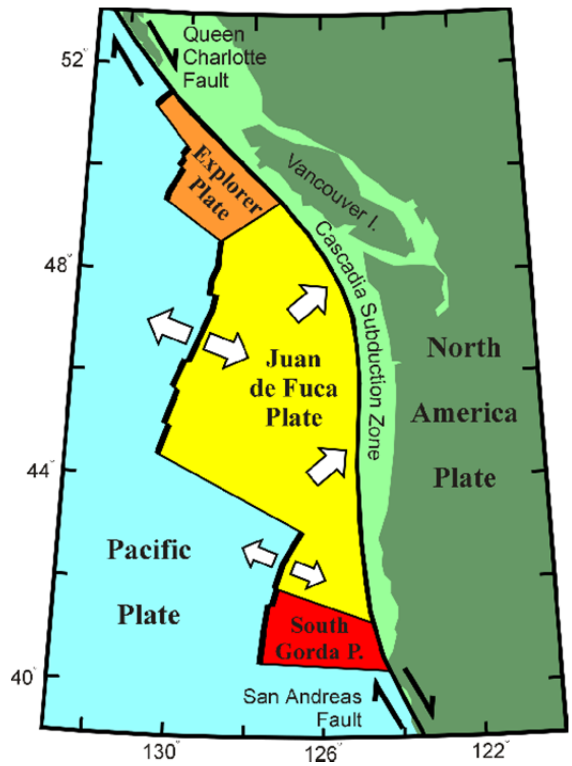

Image 2: Tectonic Plates of the Pacific Northwest

The ODFW HMSC building is located in Newport, OR, which sits on the Oregon Coast, adjacent to the Cascadia fault. This fault is expected to be capable of producing a magnitude-9 earthquake leading to a tsunami. Predictions of when the next earthquake on the Cascadia fault may occur are not scientifically possible; however, according to page 5 of the Oregon Resilience Plan dated February 2013, ". . . the calculated odds that a Cascadia earthquake will occur in the next 50 years range from 7-15 percent for a great earthquake affecting the entire Pacific Northwest to about 37 percent for a very large earthquake affecting southern Oregon and northern California." The Oregon Resilience Plan defines a "very large earthquake" as one have an estimated magnitude of 8.3 to 8.6 and a "great earthquake" as having an estimated magnitude of 8.7 to 9.3.

To put this magnitude of earthquake in context, the following is a list of similar magnitude earthquakes that may be familiar to the reader:

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Loma Prieta Earthquake – October 1989 – Santa Cruz, CA – M6.9
Northridge Earthquake – January 1994 – Northridge, CA – M6.7
2004 Sumatra Earthquake – December 2004 – Sumatra Indonesia – M9.1
2010 Haiti Earthquake – January 2010 – Port-au-Prince, Haiti – M7.0
2010 Chile Earthquake – February 2010 – Bio Bio Chile – M8.8
2011 Tohoku Earthquake – March 2011 – Off Coast of Tohoku Japan – M9.0

Liquefaction Hazard

Along with the direct risk of ground shaking and its effect on the building, the building is in an area that is likely susceptible to liquefaction during ground shaking. Liquefaction is a process in which moist, unconsolidated soils behave more like a liquid during ground shaking. This can lead to uneven foundation settlement and severe damage to the supported structure. This report does not include geotechnical analysis. Geotechnical analysis would be required for any final conclusions regarding soil liquefaction.

Tsunami Hazard

A subduction earthquake at the Cascadia Subduction Zone would likely displace a large amount of water at the ocean floor leading to a tsunami. With the building just above sea level, and with very little protection, it seems that the building is likely very susceptible to tsunami waves. The tsunami could potentially be comparable to that seen at the aforementioned 2004 Sumatra Earthquake, 2010 Chile Earthquake and 2011 Tohoku Earthquake.

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Building Structural System

The ODFW HMSC building was built in 1970, prior to seismic design standards being in place in Oregon. The building was built using tilt-up concrete walls with a plywood sheathed roof system. This construction methodology of this age has historically performed poorly in earthquakes. A common failure of this type of building is for concrete bearing walls to pull away from the wood roof framing, leading to collapse, or partial collapse of the building. The ODFW HMSC building is susceptible to this failure mechanism as well as other seismic failure mechanisms.

According to available record drawings, the building was designed in 1969 and is 56' x 160'-8" in plan. The ground floor ceiling is at 9' above the floor and the roof has a peak at approximately 26' above the floor. There is an interior second floor mezzanine that measures approximately 120' in length and varies in width from approximately 9' to approximately 15' wide.

The building exterior is 6" thick tilt-up concrete bearing walls. The roof is framed with a combination of gang-nailed trusses and dimensional lumber framing. Framing is supported at the interior by 8" masonry walls. These walls appear to be un-reinforced with the exception of minimal reinforcing around openings.

The interior of the building is defined by 4" masonry partition walls. Like the 8" masonry walls, these walls appear to be un-reinforced. The mezzanine is supported by 8" masonry bearing walls and is framed with conventional wood framing.

The building roof is a double hipped Tahitian style roof. It is sheathed with plywood and is currently roofed with concrete roof tiles.

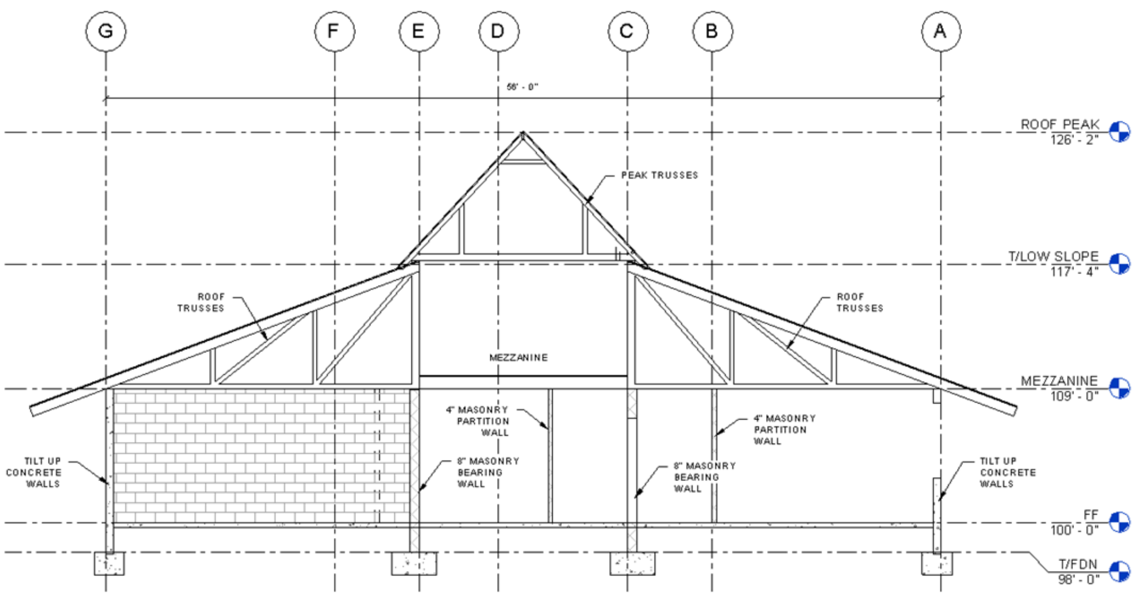

Image 3: Building Section (Facing North)

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Structural Evaluation

ASCE 31-03

We have evaluated the existing structure using ASCE 31-03, Seismic Evaluation of Existing Buildings. This nationally recognized standard provides a three-tiered process for seismic evaluation of existing buildings. This report is limited to Tier 1 – Screening Phase and deficiency only Tier 2 - Evaluation Phase. Tier 1 consists of checklist and limited calculations in order to screen out buildings and/or components that comply with the provisions of the standard and to identify potential seismic deficiencies within the building. Deficiencies found in Tier 1 are either mitigated or are evaluated using a Tier 2 evaluation. Deficiencies evaluated in Tier 2 are determined to either need further evaluation (Tier 3) or are mitigated.

The standard provides for the evaluation of a building based on two different performance levels: Life Safety and Immediate Occupancy. The Immediate Occupancy performance level is generally reserved for essential facilities such as fire stations and hospitals which are required for post-earthquake recovery. This building was evaluated based on the Life Safety performance level. Per ASCE 41-06, Seismic Rehabilitation of Existing Buildings, the Life Safety performance level is characterized by moderate damage to the overall structure including some permanent drift in the building and the potential that costs of repair following a code level earthquake would be beyond the monetary value of the building. The goal of this performance level is to prevent the collapse of the building and prevent loss of life due to building damage.

ASCE 31-03 provides for multiple levels of seismicity. This building is located within an area with a “High” level of seismicity. ASCE 31-03 is approximately based on an earthquake with a probability of exceedance of 10% in 50 years. This is an earthquake with a mean return period of approximately 474 years. It is expected that the reliability of achieving the Life Safety level of performance for buildings meeting ASCE 31-03 is approximately 60%, per ASCE 41-06 Section C1.3.

The building has been dual classified as Building Type PC1, Precast/Tilt-Up Concrete Shear Walls with Flexible Diaphragms and URM, Unreinforced Masonry Bearing Walls with Flexible Diaphragms. The dual classification reflects the existing use of precast concrete walls at the exterior and unreinforced masonry walls at the interior. Because of its age and construction, the building is not a benchmark building. Benchmark buildings are building which were designed and constructed based on acceptable seismic code provisions.

Based on the above information, the appropriate checklists were used to perform the Tier 1 Evaluation. Per ASCE 31-03 Table 3-3, only the deficiencies found within Tier 1 require a Tier 2 evaluation.

Within the Tier 1 checklists, items are identified as “C” (Compliant), “NC” (Non-Compliant) or “N/A” (Not Applicable). This report will identify non-compliant items only. The full checklists can be found within subsequent sections of this report.

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Record Drawings

Much of the evaluation is based on record drawings dated August 26, 1969. These drawings show much of basic structural layout of the building, including building layout, framing layout, member sizes and tilt-up wall construction. The record drawings are lacking in detail on connections, such as nailing, attachment of walls to slabs and reinforcing steel at masonry walls. The drawings reference a specification manual that may contain more of this information. The specification manual could not be located.

Site Visits

Our office visited the site on February 28th and again on May 1st. The purpose of the site visit was to review the condition of visible structural elements in the building, confirm that construction generally followed that shown on record drawings, and review as-built conditions of items that were not well detailed within the record drawings.

No destructive demolition or testing was performed in order to view items not readily viewable. These items include but are not limited to foundations, reinforcing steel and wall to roof connections.

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Evaluation Results

Overview of Findings

In general, the structure appears to have performed adequately over its 40 plus year life. Baring significant lateral loading due to wind or seismic forces, our office has found no reason to believe that the building would not continue to serve its purpose well into the future. However, as previously discussed, the building is in an area that is known to be susceptible to earthquakes of very large magnitude. Under this scenario, it is expected that the building would perform very poorly in its current state.

ASCE 31 – Tier 1 Potential Seismic Deficiencies

The following matrix provides a prioritized list of potential seismic deficiencies found. Deficiencies are ranked based on our professional opinion in order of most to least important from a life safety perspective in the event of an earthquake. This includes the likelihood of structural failure coupled with the anticipated risk to life safety. Anticipated cost or feasibility is not considered within these rankings. It is strongly recommended that all listed deficiencies are mitigated; however, if mitigation of all deficiencies is not an option, it is recommended that deficiencies be prioritized for mitigation as shown below.

Rank	Item #s *	Rank Name	Location / Description / Concern
1	1-14, 2-6	Exterior Wall Out of Plane Anchorage	Exterior concrete walls have inadequate connection to roof for out of plane loads (i.e. loads perpendicular to the face of the wall). This could allow the wall to separate from the roof leading to collapse of the structure or portions of the structure.
2	3-15	Interior Wall Out of Plane Anchorage	Interior masonry walls may have inadequate connection to the main lateral force resisting system. This could allow the wall to separate from the roof framing leading to collapse of the structure or portions of the structure.
3	4-1	Interior Bearing Wall Out of Plane Strength	Interior masonry walls may lack capacity to span between supporting elements. This could lead to excessive deformation and failure of walls and collapse or partial collapse of the structure.
4	1-16	Exterior In Plane Shear Transfer	Exterior concrete walls have inadequate connection to the roof for in plane loads. This could allow the roof to move independently of the walls leading to collapse of the structure or portions of the structure.
5	2-11	Diaphragm Strength	The roof may be inadequate to support seismic loads and may deflect excessively. Lack of strength can lead to failure of diaphragms and lack of stiffness may lead to excessive deflection and failure of supporting walls.
6	3-17	Mezzanine In Plane Shear Transfer	Masonry walls at the mezzanine have inadequate connection to the mezzanine diaphragm. This could allow the mezzanine to move independently of the walls leading to collapse of the mezzanine or portions of the mezzanine.
7	2-2, 2-3	Wall In Plane Strength	East and South walls exterior walls are primarily open with windows and doors. This leads to inadequate wall strength and a potential shear and/or overturning failure.

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8	1-17	Foundation Connection	Exterior concrete walls do not appear to have connection to the foundation. This could allow walls to move independently of the foundation leading to collapse of the structure or portions of the structure.
9	6-1, 6-18	Partition Failure	Interior masonry walls likely have inadequate capacity to span from floor to ceiling and are susceptible to failure and collapse.
10	6-3, 6-24, 7-9	Attached Elements	Elements hung from the ceiling are susceptible to failure and become a falling hazard if they are not adequately attached. This includes emergency exit signs, hung cabinets, and hung mechanical equipment.
11	6-20	Tall Narrow Contents	Bookshelves and storage cabinets that are not attached to the wall have the potential to tip over potentially causing injury and/or blocking exits.
12	4-6	Girder Support at Masonry	Failure or excessive movement of masonry at girders could lead to collapse or partial collapse of the structure.
13	2-15	Girder Support at Precast	Failure or excessive movement of exterior walls at girders could lead to collapse or partial collapse of the structure.
14	7-5	Glazing	Existing windows are very large and appear to not have safety glazing. These windows are susceptible to shattering during a seismic event.
15	5-1	Liquefaction	Excessive differential settlement due to liquefaction of supporting soils could lead to structural failure and collapse or partial collapse.
16	5-3	Surface Fault Rupture	Surface fault rupture could lead differential movement within the foundations leading to structural failure and collapse or partial collapse.

* Item # corresponds to AISC 31-03 Checklist Item # (see Appendix).

ASCE 31 – Tier 2 Potential Seismic Deficiencies

Potential deficiencies found within the Tier 1 checklists were evaluated under Tier 2, where applicable. Many Tier 1 items do not have a Tier 2 evaluation methodology and others could not be evaluated because the item does not exist. For instance, foundation connection to shear walls could not be checked because record drawings do not indicate that there is any connection between the foundation and concrete walls. All Tier 1 potential deficiencies that were evaluated within Tier 2 were found to still be potential deficiencies.

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Recommended Course of Action

As discussed in the Evaluation section of this report, the purpose of the Tier 1 and Tier 2 evaluation is to locate potential deficiencies within the building. Three courses of action are available for each potential deficiency found. One course of action is to provide more in-depth engineering analysis per ASCE 31-03 Tier 3 to determine whether or not a deficiency truly exists. A second course of action is to design and implement a solution to bring the deficiency to an acceptable performance level. The third course of action is to do nothing and accept the risk caused by the deficiency.

The table below gives our recommendations for the course of action to be taken for each of the ranked deficiencies above.

Rank	Rank Name	Recommended Course of Action
1	Exterior Wall Out of Plane Anchorage	**Design/Mitigate:** Install anchors from wood top plate to concrete wall and add clips from roof framing to top plate. See drawings for a schematic solution.
2	Interior Wall Out of Plane Anchorage	**Design/Mitigate:** Add clips from roof framing to top plate. See drawings for a schematic solution.
3	Interior Wall Out of Plane Strength	**Design/Mitigate:** Install metal stud bracing walls on one side of each interior bearing wall. See drawings for a schematic solution. As an alternative, interior non-bearing partition walls could be removed.
4	Exterior In Plane Shear Transfer	**Design/Mitigate:** Install blocking and strapping. See drawings for a schematic solution.
5	Diaphragm Strength	**Design/Mitigate:** Install interior shear walls to reduce diaphragm span. See drawings for a schematic solution.
6	Mezzanine In Plane Shear Transfer	**Design/Mitigate:** Install interior shear walls to support the mezzanine and provide a transfer mechanism. See drawings for a schematic solution.
7	Wall In Plane Strength	**Design/Mitigate:** Install new shear walls to take lateral forces. See drawings for a schematic solution.
8	Foundation Connection	**Design/Mitigate:** Contractor to provide local exploratory demolition to verify connection of exterior walls to slab and install additional connection if needed. Install interior shear walls to take lateral forces. See drawings for a schematic solution.
9	Partition Failure	**Design/Mitigate:** Install metal stud bracing walls on one side of each partition wall. See drawings for a schematic solution. As an alternative, interior non-bearing partition walls could be removed.
10	Attached Elements	**Design/Mitigate:** Remove and replace or anchor attached elements that are susceptible to falling. See drawings for a schematic solution.
11	Tall Narrow Contents	**Design/Mitigate:** Strap bookshelves, storage cabinets, etc. to braced walls. See drawings for a schematic solution.
12	Girder Support at Masonry	**Design/Mitigate:** Provide secondary support for girders at masonry. See drawings for a schematic solution.
13	Girder Support at Precast	**Tier 3 Evaluation:** Evaluate ability of precast panels to take out of plane forces at girder connection. No schematic solution provided.
14	Glazing	**Mitigate:** Replace windows with new windows with safety glass.
15	Liquefaction	**Further Analysis:** Retain services of geotechnical engineer to evaluation potential for liquefaction and ramifications on structure.
16	Surface Fault Rupture	**Further Analysis:** Retain services of geotechnical engineer to evaluation potential for surface fault rupture and ramifications on structure.

The 2010 Oregon Structural Specialty Code, the current state adopted building code, allows voluntary seismic improvements for the purpose of improving the performance of the seismic force-resisting system of an existing structure. The code specifies that the improvements must not make the structure be in less compliance with the building code; however, the code does not provide any specific provisions for seismic upgrades.

We recommend that any rehabilitation be done per ASCE 41-06, “Seismic Rehabilitation of Existing Buildings” or the currently adopted building code. In order to effectively use ASCE 41-06 a rehabilitation objective will need to be chosen based on the target building performance and the earthquake hazard level.

The target building performance is the combined performance of the buildings structural and non-structural components. ASCE 41-06 defines multiple target building performances ranging from Collapse Prevention (building has all but collapsed due to the design earthquake) to Operational Level (building is fully functional after the design earthquake with only minor repairs needed). We recommend a “Life Safety” performance level. ASCE 41-06 describes this target building performance level as moderate overall damage to the building with some strength left within the building to support loads and some permanent drift to the building.

The earthquake hazard level is a probabilistic hazard due to ground shaking at the specific location of the building. Any hazard level could potentially be used but common hazard level used are: 50%/50 year, (50% probability of exceedance in 50 years), 20%/50 year, 10%/50 year and 2%/50 year. These four hazard level earthquakes have a mean return period of 72 years, 225 years, 474 years and 2475 years respectively. We recommend that design and evaluation be made based on an earthquake having a 10% probability of exceedance in 50 years.

The combination of the Building Performance Level and the Earthquake Hazard Level are referred to as the Rehabilitation Objective. **The Rehabilitation Objective that we are proposing is a Life Safety Building Performance Level for the Earthquake Hazard Level of 10% in 50 year Earthquake.**

ASCE 41-06 puts this into perspective by stating in C1.3.2 that “The actual ground motion will seldom be comparable to that specified in the Rehabilitation Objective, so in most events, designs targeted at various damage states may only determine relative performance. Even given a ground motion similar to that specified in the Rehabilitation Objective and used in design, variations from stated performance objectives should be expected and compliance with this standard should not be considered a guarantee for performance.”

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Schematic Seismic Upgrade

The enclosed schematic drawings are intended to reflect one possible strategy to strengthen the structure to meet the Life Safety performance level for the 10% in 50 year earthquake.

The major components of the seismic upgrade are as follows:

- Remove the heavy concrete tile roof and replace with a lighter asphalt composition roof system. Based on record drawings, it appears that the originally intended roof for the building was a wood shake roof. Our office has not reviewed the capacity of the existing structural system to support this much heavier roof system, as it is assumed that this was done at the time the concrete tile roof was installed. This much heavier roof system adds significant seismic mass to the building, increasing the demand on all components of the seismic force resisting system. Seismic upgrades could be implemented using the mass of the concrete tile roof in the analysis. However, since the roof needs to be removed in order to implement many components of the proposed seismic upgrade, this analysis and proposed schematic upgrade assumes that the existing roof would be replaced with a lighter asphalt shingle system.
- Improve the connection between bearing walls and gravity framing systems. The potential for detachment of the roof framing system from tilt-up concrete walls is a frequently cited seismic deficiency in buildings of this construction type and age. This building is particularly vulnerable because of its relatively long and narrow roof diaphragm. The upgrade would include increasing the connection capacity for the exterior tilt-up concrete walls and interior unreinforced masonry bearing walls to roof framing members.
- Install new shear walls and associated footings on the interior of the building to take seismic loads. Existing concrete tilt-up walls do not have adequate capacity to support seismic loads and they do not appear to be attached to existing foundations. The existing roof diaphragm does not appear to have adequate capacity to support seismic loads and transfer them to the exterior concrete walls. This schematic design proposes the addition of plywood shear walls within the building. These plywood shear walls can be strategically placed to take building seismic loads while reducing loads within the roof diaphragm and providing support to the interior mezzanine.
- Brace interior unreinforced masonry bearing walls with light gauge steel studs. New metal stud walls would be built alongside of and anchored to existing masonry bearing walls.
- Brace interior unreinforced masonry partition walls with light gauge steel studs. This is similar to the above item for bearing walls but is applicable to the 4" masonry partition walls separating offices. A second alternative would be to remove existing masonry non-bearing partitions and replace them with metal stud walls. This second option was not considered within the cost opinion.
- Provide columns to support major girders supported by unreinforced masonry. New tube steel columns would be installed at four locations where wood girders are supported by unreinforced masonry walls.
- Brace elements subject to falling such as bookshelves and cabinets. Tall narrow items such as book cases and hung items such as mechanical equipment or hung books shelves would be strapped to the supporting structure to prevent them from falling in a seismic event. This is not included in the cost opinion.
- Replace windows that are subject to shattering. All existing windows would be replaced with non-shattering glass windows.

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- Perform geotechnical studies to better understand the implications of liquefaction and surface fault rupture on the subject building.

The most intrusive component of the proposed schematic upgrade is the addition of metal stud walls at each interior masonry wall to act as bracing. Some of these walls are also used as shear walls to reduce forces at existing concrete shear walls and diaphragms. This has the effect of mitigating deficiency #4, #5, #6, #7, #8 and #9. Other mitigation strategies such as adding wall anchorage, girder support and safety glass at windows are less intrusive.

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Cost for Proposed Seismic Upgrade:

The enclosed cost opinion reflects approximate costs to implement the schematic seismic upgrade. The intent of the cost opinion is to provide a basis for decision making and budgeting.

We have come up with a bare construction cost of $427,839 and an owner provided general conditions cost of $85,375 for a total cost before contingency of $513,214. We are recommending a contingency of 20% for a total project cost of **$615,857**. Based on the 8960 square footage, this total project cost yields a cost per square foot of **$68.73/SF**.

Within the cost opinion, we have attempted to break out major subprojects. This is represented by letter designations next to individual cost items that represent certain portions of the project. For instance, the letter “A” is used next to items that would be included in the reroof. We have summarized the costs of these portions of the project at the bottom of the cost opinion. The goal of this summarized breakdown of subprojects is to give the owner a general idea of the costs to implement portions of the project, or to remove portions of the project from the overall seismic upgrade. It should be noted, that some projects can stand-alone more easily than others. This is mainly due to economies of scale. For example, if two portions of the project that both require gyp-board ceiling work are done at the same time, the cost will likely be less than if these two projects are implemented separately. This is not captured in the subproject breakout summary. Please also note that owner provided general conditions are not captured in the subproject breakout summary.

There are a number of items that are not included within the cost opinion, mainly due to unknown factors. A list of these exclusions can be found at the bottom of the cost opinion.

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Report Presentation

This report is scheduled to be presented to Caren Braby, ODFW Marine Program Manager, and Fred Wright, ODFW Project Engineer, on May 15, 2013 at 10:00 AM. The presentation will be held at the ODFW HMSC office in Newport Oregon.

Exclusions

This report represents our professional opinion based on visual observations of the existing structure in conjunction with review of nationally recognized standards. The evaluation is intended to identify areas of potential deficiency and recommendations are intended to give a general idea of how to mitigate these deficiencies to the desired performance level. Further analysis and design is required prior to implementing mitigation strategies.

Please do not hesitate to contact our office should you have any questions or comments regarding this memorandum. I can be reached directly by phone, 541-752-9202, extension 114, or by email, john@pillar-inc.com.

Sincerely,

John J. Evans, P.E., S.E.
Pillar Consulting Group, Inc.

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Section 2

Basic Structural Checklist for Building Type PC1

3.7.11 Basic Structural Checklist for Building Type PC1: Precast/Tilt-Up Concrete Shearwalls with Flexible Diaphragms

Building System

1-1 C NC NA LOAD PATH: The structure shall contain a minimum of one complete load path for Life Safety and Immediate Occupancy for seismic force effects from any horizontal direction that serves to transfer the inertial forces from the mass to the foundation.

For the roof, the structure contains a complete load path from the roof diaphragm through the exterior concrete walls.

For the mezzanine, the structure contains a complete load path from the mezzanine diaphragm through the interior masonry walls.

1-2 C NC NA ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent buildings shall be greater than 4 percent of the height of the shorter building for Life Safety and Immediate Occupancy.

No adjacent buildings.

1-3 C NC NA MEZZANINES: Interior mezzanine levels shall be braced independently from the main structure, or shall be anchored to the lateral-force-resisting elements of the main structure.

Braced to masonry walls below. See Checklist 3.7.15.

1-4 C NC NA WEAK STORY: The strength of the lateral-force resisting system in any story shall not be less than 80 percent of the strength in the adjacent story, above or below, for Life Safety and Immediate Occupancy.

Single story building.

1-5 C NC NA SOFT STORY: The stiffness of the lateral-force-resisting system in any story shall not be less than 70 percent of the lateral-force-resisting system stiffness in an adjacent story above or below, or less than 80 percent of the average lateral-force-resisting system stiffness of the three stories above or below for Life Safety and Immediate Occupancy.

Single story building.

1-6 C NC NA GEOMETRY: There shall be no changes in horizontal dimensions of the lateral-force-resisting system of more than 30 percent in a story relative to adjacent stories for Life Safety and Immediate Occupancy, excluding one-story penthouses and mezzanines.

Single story building, mezzanine excluded.

3.7.11 Basic Structural Checklist for Building Type PC1: Precast/Tilt-Up Concrete Shearwalls with Flexible Diaphragms

1-7 C NC NA VERTICAL DISCONTINUITIES: All vertical elements in the lateral-force-resisting system shall be continuous to the foundation.

All walls are continuous to the foundation.

1-8 C NC NA MASS: There shall be no change in effective mass more than 50 percent from one story to the next for Life Safety and Immediate Occupancy. Light roofs, penthouses, and mezzanines need not be considered.

Single story building, mezzanine excluded.

1-9 C NC NA DETERIORATION OF WOOD: There shall be no signs of decay, shrinkage, splitting, fire damage, or sagging in any of the wood members, and none of the metal connection hardware shall be deteriorated, broken or loose.

No deterioration observed.

1-10 C NC NA PRECAST CONCRETE WALLS: There shall be no visible deterioration of concrete or reinforcing steel or evidence of distress, especially at the connections.

No deterioration observed.

Lateral-Force-Resisting System

1-11 C NC NA REDUNDANCY: The number of lines of shear walls in each principal direction shall be greater than or equal to 2 for Life Safety and Immediate Occupancy.

For the main building, there is a line of concrete shear wall on each perimeter side of the building.

For the mezzanine, there are two or more masonry walls in each direction.

1-12 C NC NA SHEAR STRESS CHECK: The shear stress in the precast panels, calculated using the Quick Check procedure of section 3.5.3.3, shall be less than the greater of 100 psi or 2sqrt(f'c) for Life Safety and Immediate Occupancy.

For the main building, concrete walls are compliant for lateral support of roof, ceiling, partitions and walls. See attached calculations.

For the mezzanine, see checklist 3.7.15 "Basic Structural Checklist for Building Type URM."

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3.7.11 Basic Structural Checklist for Building Type PC1: Precast/Tilt-Up Concrete Shearwalls with Flexible Diaphragms

1-13 C NC NA REINFORCING STEEL: The ratio of reinforcing steel area to gross concrete area shall not be less than 0.0015 in the vertical direction and 0.0025 in the horizontal direction for Life Safety and Immediate Occupancy. The spacing of reinforcing steel shall be equal to or less than 18 inches for Life Safety and Immediate Occupancy.

Record drawings indicate #4 @ 12" oc vertical and horizontal. This works out to a ratio of 0.0028 for both vertical and horizontal.

Connections

1-14 C NC NA WALL ANCHORAGE: Exterior concrete or masonry walls that are dependent on the diaphragm for lateral support shall be anchored for out-of-plane forces at each diaphragm level with steel anchors, reinforcing dowels, or straps that are developed into the diaphragm. Connections shall have adequate strength to resist the connection forces calculated in Quick Check procedure of Section 3.5.3.7.

Record drawing detail A on sheet 11 indicates "framing anchors" between the trusses and the wall top plate. These anchors could not be located in the building.

Photo 1-1: Wall plate anchor bolt

Photo 1-2: Roof truss at wall plate

1-15 C NC NA WOOD LEDGERS: The connection between the wall panels and the diaphragm shall not induce cross-grain bending or tension.

No cross grain bending is induced at ledgers.

3.7.11 Basic Structural Checklist for Building Type PC1: Precast/Tilt-Up Concrete Shearwalls with Flexible Diaphragms

1-16 C NC NA TRANSFER TO SHEAR WALLS: Diaphragms shall be connected for transfer of loads to the shear walls for Life Safety and the connections shall be able to develop the lesser of the shear strength of the walls or diaphragms for Immediate Occupancy.

Details do not show blocking between diaphragm and top plate. Blocking is present but does not appear to be full depth and is therefore not able to transfer forces. No connection between blocking and diaphragm. See Photo 1-1 & 1-2.

1-17 C NC NA PRECAST WALL PANELS: Precast wall panels shall be connected to the foundation for Life Safety and the connections shall be able to develop the strength of the walls for Immediate Occupancy.

Wall panels appear, per record drawings, to have dowels between the wall panels and the slab. At the footing, the wall panels sit in a pocket, but do not appear to have a positive connection to the footing.

1-18 C NC NA GIRDER/COLUMN CONNECTION: There shall be a positive connection utilizing plates, connection hardware, or straps between the girder and the column support.

Girders have a steel plate connection to wall per A/11/10, B/11/10 & F/11/10. See photos 1-3 & 1-4.

Photo 1-3: Connection Per F/11/10

Photo 1-3: Connection per A/11/10

Section 3
Supplemental Structural Checklist for Building Type PC1

3.7.11S Supplemental Structural Checklist for Buildings Type PC1: Precast/Tilt-Up Concrete Shear Walls with Flexible Diaphragms

Lateral-Force-Resisting System

2-1 C NC NA COUPLING BEAMS: The stirrups in coupling beams over means of egress shall be spaced at or less than d/2 and shall be anchored into the confined core of the beam with hooks of 135° or more for Life Safety. All coupling beams shall comply with the requirements above and shall have the capacity in shear to develop the uplift capacity of the adjacent wall for Immediate Occupancy.

No coupling beams in building.

2-2 C NC NA WALL OPENINGS: The total width of openings along any perimeter wall line shall constitute less than 75 percent of the length of any perimeter wall for Life Safety and 50 percent of Immediate Occupancy with the wall piers having aspect ratios of less than 2-to-1 for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.4.2.3.3)

The east wall is approximately 94% open with all panels except one having window for the full width of the panel. – Non-Compliant

The west wall is approximately 44% open. - Compliant

The north wall is approximately 6% open. - Compliant

The south wall is approximately 70% open. - Compliant

2-3 C NC NA CORNER OPENINGS: Walls with openings at a building corner larger than the width of a typical panel shall be connected to the remainder of the wall with collector reinforcing. (Tier 2: Sec. 4.4.2.3.4)

Corner openings with no collectors exist at the north end of the east wall as well as the west end of the south wall.

2-4 C NC NA PANEL-TO-PANEL CONNECTIONS: Adjacent wall panels shall be interconnected to transfer overturning forces between panels by methods other than welded steel inserts. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: Sec. 4.4.2.3.5)

Not applicable to Life Safety Performance Level. However, panels are interconnected with welded steel inserts.

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3.7.11S Supplemental Structural Checklist for Buildings Type PC1: Precast/Tilt-Up Concrete Shear Walls with Flexible Diaphragms

2-5 C NC NA WALL THICKNESS: Thickness of bearing walls shall not be less than 1/24 the unsupported height or length, whichever is shorter, nor less than 4 inches. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: 4.4.2.3.6)

*Not applicable to Life Safety Performance Level. However, thickness of bearing walls would meet this requirement. 6"/(9'*12"/') = 0.05556 > 1/24 = 0.041667*

Diaphragms

2-6 C NC NA CROSS TIES: There shall be continuous cross ties between diaphragm chords. (Tier 2: Sec. 4.5.1.2)

Cross ties are not provided in either direction.

2-7 C NC NA PLAN IRREGULARITIES: There shall be tensile capacity to develop the strength of the diaphragm at re-entrant corners or other locations of plan irregularities. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: Sec. 4.5.1.7)

Not applicable to Life Safety Performance Level, and there are no plan irregularities.

2-8 C NC NA DIAPHRAGM REINFORCEMNT AT OPENINGS: There shall be reinforcing around all diaphragm openings larger than 50 percent of the building width in either major plan dimension. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: Sec. 4.5.1.8)

Not applicable to Life Safety Performance Level, and there are no significant diaphragm openings.

2-9 C NC NA STRAIGHT SHEATHING: All straight sheathed diaphragms shall have aspect ratios less than 2-to-1 for Life Safety and 1-to-1 for Immediate Occupancy in the direction being considered. (Tier 2: Sec. 4.5.2.1)

Not applicable to Life Safety Performance Level, and there is no straight sheathing. This building has plywood diaphragms.

3.7.11S Supplemental Structural Checklist for Buildings Type PC1: Precast/Tilt-Up Concrete Shear Walls with Flexible Diaphragms

2-10 C NC NA SPANS: All wood diaphragms with spans greater than 24 feet for Life Safety and 12 feet for Immediate Occupancy shall consist of wood structural panels or diagonal sheathing. (Tier 2: Sec. 4.5.2.3)

Not applicable to Life Safety Performance Level; however, the building does have wood structural panels.

2-11 C NC NA UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms shall have horizontal spans less than 40 feet for Life Safety and 30 feet for Immediate Occupancy and shall have aspect ratios less than or equal to 4-to-1 for Life Safety and 3-to-1 for Immediate Occupancy. (Tier 2: Sec. 4.5.1.2)

The diaphragm spans are 56' for forces in the north-south direction and 160'-8" for forces in the east-west direction. The diaphragm aspect ratio is 2.9-to-1.

2-12 C NC NA OTHER DIAPHRAGMS: The diaphragm shall not consist of a system other than wood, metal deck, concrete or horizontal bracing. (Tier 2: Sec. 4.5.7.1)

Diaphragm is plywood.

Connections

2-13 C NC NA PRECAST PANEL CONNECTIONS: There shall be at least two anchors from each precast wall panel into the diaphragm elements for Life Safety and the anchors shall be able to develop the strength of the panels for Immediate Occupancy. (Tier 2: Sec. 4.6.1.3)

Capacity of truss to top plate connection is unknown.

2-14 C NC NA UPLIFT AT PILE CAPS: Pile caps shall have top reinforcement and piles shall be anchored to the pile caps for Life Safety, and the pile cap reinforcement and pile anchorage shall be able to develop the tensile capacity of the piles for Immediate Occupancy. (Tier 2: Sec. 4.6.3.10)

No pile caps.

2-15 C NC NA GIRDERS: Girders supported by walls or pilasters shall have at least two ties securing the anchor bolts for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.6.4.2)

Drawings do not identify any ties at girder connections.

Section 4

Basic Structural Checklist for Building Type URM

3.7.15 Basic Structural Checklist for Building Type URM: Unreinforced Masonry Bearing Walls with Flexible Diaphragms

***This form is used for the support of the mezzanine only. See 3.7.11 for the main building checklist.**

Building System

3-1 C NC NA LOAD PATH: The structure shall contain a minimum of one complete load path for Life Safety and Immediate Occupancy for seismic force effects from any horizontal direction that serves to transfer the inertial forces from the mass to the foundation.

For the mezzanine, the structure contains a complete load path from the mezzanine diaphragm through the interior masonry walls.

3-2 C NC NA ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent buildings shall be greater than 4 percent of the height of the shorter building for Life Safety and Immediate Occupancy.

No adjacent buildings.

3-3 C NC NA MEZZANINES: Interior mezzanine levels shall be braced independently from the main structure, or shall be anchored to the lateral-force-resisting elements of the main structure.

Braced to masonry walls below. Attachment to be verified.

3-4 C NC NA WEAK STORY: The strength of the lateral-force resisting system in any story shall not be less than 80 percent of the strength in the adjacent story, above or below, for Life Safety and Immediate Occupancy.

Single story building.

3-5 C NC NA SOFT STORY: The stiffness of the lateral-force-resisting system in any story shall not be less than 70 percent of the lateral-force-resisting system stiffness in an adjacent story above or below, or less than 80 percent of the average lateral-force-resisting system stiffness of the three stories above or below for Life Safety and Immediate Occupancy.

Single story building.

3-6 C NC NA GEOMETRY: There shall be no changes in horizontal dimensions of the lateral-force-resisting system of more than 30 percent in a story relative to adjacent stories for Life Safety and Immediate Occupancy, excluding one-story penthouses and mezzanines.

Single story building, mezzanine excluded.

3.7.15 Basic Structural Checklist for Building Type URM: Unreinforced Masonry Bearing Walls with Flexible Diaphragms

3-7 C NC NA VERTICAL DISCONTINUITIES: All vertical elements in the lateral-force-resisting system shall be continuous to the foundation.

All walls are continuous to the foundation.

3-8 C NC NA MASS: There shall be no change in effective mass more than 50 percent from one story to the next for Life Safety and Immediate Occupancy. Light roofs, penthouses, and mezzanines need not be considered.

Single story building, mezzanine excluded.

3-9 C NC NA DETERIORATION OF WOOD: There shall be no signs of decay, shrinkage, splitting, fire damage, or sagging in any of the wood members, and none of the metal connection hardware shall be deteriorated, broken or loose.

No deterioration observed.

3-10 C NC NA MASONRY UNITS: There shall be no visible deterioration of masonry units.

No deterioration observed.

3-11 C NC NA MASONRY JOINTS: The mortar shall not be easily scraped away from the joints by hand with a metal tool, and there shall be no areas of eroded mortar.

No weakened mortar observed.

3-12 C NC NA UNREINFORCED MASONRY WALL CRACKS: All existing diagonal cracks in wall elements shall be less than 1/8 inch for Life Safety and 1/16 inch for Immediate Occupancy, or out-of-plane offsets in the bed joints greater than 1/8 inch for Life Safety and 1/16 inch for Immediate Occupancy, and shall not form an X pattern.

No significant wall cracks or out-of-plane offsets were observed.

Lateral-Force-Resisting System

3-13 C NC NA REDUNDANCY: The number of lines of shear walls in each principal direction shall be greater than or equal to 2 for Life Safety and Immediate Occupancy.

For the mezzanine, there are two or more masonry walls in each direction.

3.7.15 Basic Structural Checklist for Building Type URM: Unreinforced Masonry Bearing Walls with Flexible Diaphragms

3-14 C NC NA SHEAR STRESS CHECK: The shear stress in the reinforced masonry shear walls, calculated using the Quick Check procedure of section 3.5.3.3, shall be less than 30 psi for clay masonry units and 70 psi for concrete units for Life Safety and Immediate Occupancy.

For the mezzanine, URM walls are compliant for lateral support. See calculations.

Connections

3-15 C NC NA WALL ANCHORAGE: Exterior concrete or masonry walls that are dependent on the diaphragm for lateral support shall be anchored for out-of-plane forces at each diaphragm level with steel anchors, reinforcing dowels, or straps that are developed into the diaphragm. Connections shall have adequate strength to resist the connection forces calculated in Quick Check procedure of Section 3.5.3.7.

Roof trusses appear to be toe-nailed with (3) toe-nails at joist to top plate. Bolts to walls are ok. See calculations. Add clips to attach mezzanine joists to walls.

Photo 1-1: Wall plate anchor bolt

3.7.15 Basic Structural Checklist for Building Type URM: Unreinforced Masonry Bearing Walls with Flexible Diaphragms

3-16 C NC NA WOOD LEDGERS: The connection between the wall panels and the diaphragm shall not induce cross-grain bending or tension.

No cross grain bending is induced at ledgers.

3-17 C NC NA TRANSFER TO SHEAR WALLS: Diaphragms shall be connected for transfer of loads to the shear walls for Life Safety and the connections shall be able to develop the lesser of the shear strength of the walls or diaphragms for Immediate Occupancy.

No connection between blocking and diaphragm. See Photo 1-1.

3-18 C NC NA GIRDER/COLUMN CONNECTION: There shall be a positive connection utilizing plates, connection hardware, or straps between the girder and the column support.

Girders have a steel plate connection to wall per A/11/10, B/11/10 & F/11/10. See photos 1-3 & 1-4.

Photo 1-3: Connection per F/11/10

Photo 1-3: Connection per A/11/10

Section 5

Supplemental Structural Checklist for Building Type URM

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3.7.15S Supplemental Structural Checklist for Buildings Type URMA: Unreinforced Masonry Bearing Walls with Stiff Diaphragms

Lateral-Force-Resisting System

4-1 C NC NA PROPORTIONS: The height to thickness ratio of the shear walls at each story shall be less than the following for Life Safety and Immediate Occupancy.

First story of single-story building 13

Interior masonry shearwalls supporting the mezzanine:

*4" walls: (9'*12"/')/3.625" = 29.8 > 15 – Non-Compliant*

*8" walls: (9'*12"/')/7.625" = 14 > 15 – Non-Compliant*

Diaphragms

4-2 C NC NA OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls shall be less than 25 percent of the wall length for Life Safety and 15 percent of the wall length for Immediate Occupancy.

No diaphragm openings adjacent to shear walls.

4-3 C NC NA OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls shall not be greater than 8 feet long for Life Safety and 4 feet long for Immediate Occupancy.

No diaphragm openings adjacent to shear walls.

4-4 C NC NA PLAN IRREGULARITIES: There shall be tensile capacity to develop the strength of the diaphragm at re-entrant corners or other locations of plan irregularities. This statement shall apply to the Immediate Occupancy Performance Level only.

Not applicable to Life Safety Performance Level, and there are no plan irregularities.

4-5 C NC NA DIAPHRAGM REINFORCEMENT AT OPENINGS: There shall be reinforcing around all diaphragm openings larger than 50 percent of the building width in either major plan dimension. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: Sec. 4.5.1.8)

Not applicable to Life Safety Performance Level, and there are no significant diaphragm openings.

3.7.15S Supplemental Structural Checklist for Buildings Type URMA: Unreinforced Masonry Bearing Walls with Stiff Diaphragms

Connections

4-6 C NC NA BEAM, GIRDER, AND TRUSS SUPPORTS: Beams, girders, and trusses supported by unreinforced masonry walls or pilasters shall have independent secondary columns for support of vertical loads.

No secondary support provided at interior masonry walls for girders.

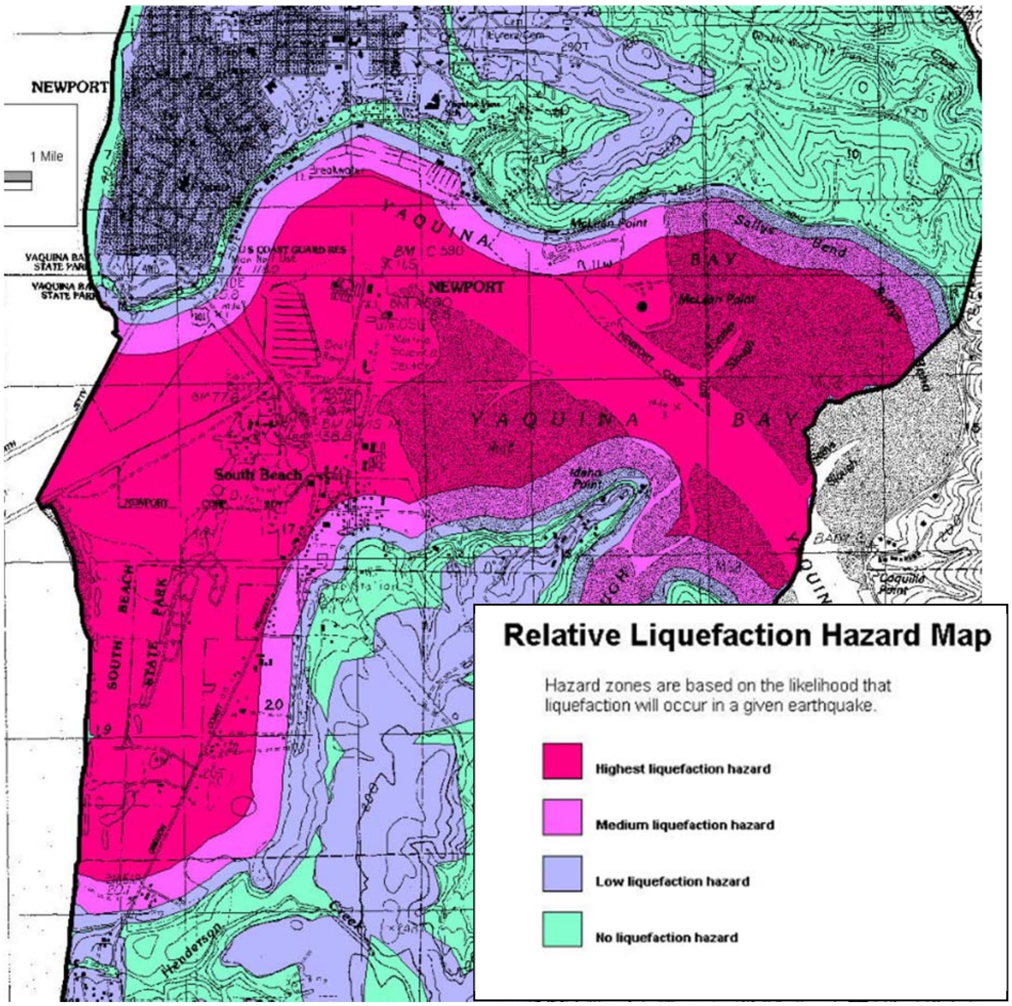
Section 6
Geologic Site Hazards and Foundations Checklist

3.8 Geologic Site Hazards and Foundations Checklist

Geologic Site Hazards

5-1 C NC NA LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance shall not exist in the foundation soils at depths within 50 feet under the building for Life Safety and Immediate Occupancy.

The building is in an area known to have a high liquefaction hazard according to maps published by the State of Oregon Department of Geology and Mineral Industries. A site specific geotechnical study would be required to determine the hazard level at this site.



5-2 C NC NA SLOPE FAILURE: The building site shall be sufficiently remote from potential earthquake-induced slope failures or rock falls to be unaffected by such failures or shall be capable of accommodating any predicted movements without failure

The building is located in an area with no significant slopes.

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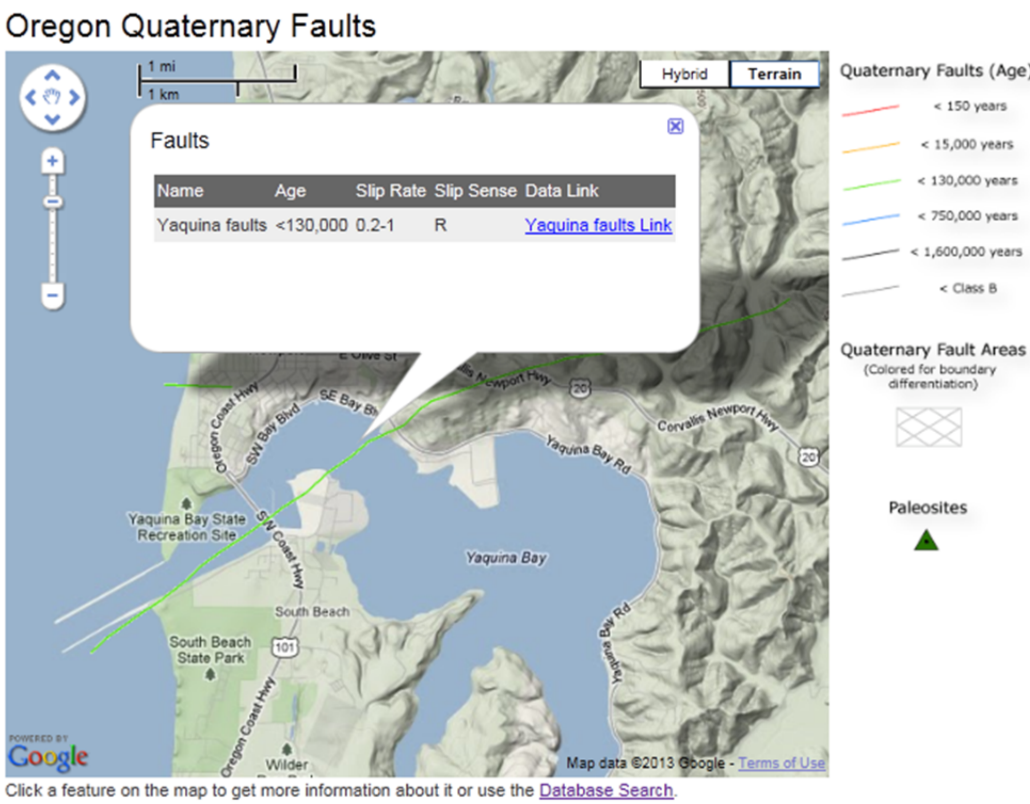
3.8 Geologic Site Hazards and Foundations Checklist

5-3 C NC NA SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site is not anticipated.

The building is in close proximity to the mapped Yaquina fault. This fault is anticipated to have been active within the last 130,000 years but has not been active within recorded history. It is unknown whether this fault would act on its own or if its displacement would coincide with a larger megathrust earthquake on the subduction zone.



Condition of Foundations

5-4 C NC NA FOUNDATION PERFORMANCE: There shall be no evidence of excessive foundation movement such as settlement or heave that would affect the integrity or strength of the structure.

No evidence of excessive foundation movement was detected. Excessive foundation movement would likely be evidenced by cracks in walls and slabs or out-of-plumb walls.

3.8 Geologic Site Hazards and Foundations Checklist

5-5 C NC NA DETERIORATION: There shall not be evidence that foundation elements have deteriorated due to corrosion, sulfate attack, material breakdown, or other reasons in a manner that would affect the integrity or strength of the structure.

This statement is not applicable to the Life Safety performance level. Foundations were not readily available for observation since they are covered by the building slab at the interior, and sidewalk and soil at the exterior. Further investigation would be required to confirm foundations have not deteriorated; however, foundation deterioration seems unlikely and further investigation is not recommended at this time.

Capacity of Foundations

5-6 C NC NA POLE FOUNDATIONS: Pole foundations shall have a minimum embedment depth of 4 feet for Life Safety and Immediate Occupancy.

No pole foundations are used at this building.

5-7 C NC NA OVERTURNING: The ratio of the horizontal dimension of the lateral-force-resisting system at the foundation level to the building height (base/height) shall be greater than $0.6S_a$.

*East wall: 9.75'/11' = 0.89 > 0.6*1.07 = 0.642 – Compliant*

*West wall: 9.75'/11' = 0.89 > 0.6*1.07 = 0.642 – Compliant*

*North wall: 9.75'/11' = 0.89 > 0.6*1.07 = 0.642 – Compliant*

*South Wall: 10.4'/11' = 0.95 > 0.6*1.07 = 0.642 – Compliant*

5-8 C NC NA TIES BETWEEN FOUNDATION ELEMENTS: The foundation shall have ties adequate to resist seismic forces where footings, piles, and piers are not restrained by beams, slabs, or soils classified as Class A, B, or C.

Foundation elements are continuous at the perimeter and therefore can be considered tied. Interior foundations supporting the 8" masonry walls are generally continuous, with the exception of those at the east side of the mezzanine. The interior foundations on the east side of the mezzanine are connected by an interior slab that would be effective in preventing lateral spreading.

5-9 C NC NA DEEP FOUNDATIONS: Piles and piers shall be capable of transferring the lateral forces between the structure and the soil. This statement shall apply to the Immediate Occupancy Performance Level only.

Deep foundations are not used in this building.

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3.8 Geologic Site Hazards and Foundations Checklist

5-10 C NC NA SLOPING SITES: The difference in foundation embedment depth from one side of the building to another shall not exceed one story in height. This statement shall apply to the Immediate Occupancy Performance Level only.

This statement is not applicable to the Life Safety performance level. However, the building is compliant with this statement.

Section 7

Basic Nonstructural Component Checklist

3.9.1 Basic Nonstructural Component Checklist

Partitions

6-1 C NC NA UNREINFORCED MASONRY: Unreinforced masonry or hollow clay tile partitions shall be braced at spacing equal to or less than 10 feet in levels of low or moderate seismicity and 6 feet in levels of high seismicity.

All interior partitions are unreinforced masonry. Partitions are 9' tall and are unbraced.

Ceiling Systems

6-2 C NC NA SUPPORT: The integrated suspended ceiling system shall not be used to laterally support the tops of gypsum board, masonry, or hollow clay tile partitions. Gypsum board partitions need not be evaluated where only the Basic Nonstructural Component Checklist is required by Table 3-2.

Suspended ceilings are used in a room at the Northwest corner of the building. There are no full height partitions in this room. Room bounding walls are supported by roof framing.

Light Fixtures

6-3 C NC NA EMERGENCY LIGHTING: Emergency lighting shall be anchored or braced to prevent falling during an earthquake.

Emergency exit lighting is attached to emergency exit signs. It is unclear how these are attached.

Photo 6-1: Exit Sign and Lights

3.9.1 Basic Nonstructural Component Checklist

Cladding and Glazing

6-4 C NC NA CLADDING ANCHORS: Cladding components weighing more than 10 psf shall be mechanically anchored to the exterior wall framing at spacing equal to or less than 4 feet. A spacing of up to 6 feet is permitted where only the Basic Nonstructural Component Checklist is required by Table 3-2.

The building has precast walls acting as the exterior wall system. The building does not have a cladding system.

6-5 C NC NA DETERIORATION: There shall be no evidence of deterioration, damage or corrosion in any of the connection elements.

The building does not have a cladding system.

6-6 C NC NA CLADDING ISOLATION: For moment frame buildings of steel or concrete, panel connections shall be detailed to accommodate a story drift ratio of 0.02. Panel connection detailing for a story drift ratio of 0.01 is permitted where only the Basic Nonstructural Component Checklist is required by Table 3-2.

The building does not have a cladding system.

6-7 C NC NA MULTI-STORY PANELS: For multi-story panels attached at each floor level, panel connections shall be detailed to accommodate a story drift ratio of 0.02. Panel connection detailing for a story drift ratio of 0.01 is permitted where only the Basic Nonstructural Component Checklist is required by Table 3-2.

The building is single story.

6-8 C NC NA BEARING CONNECTIONS: Where bearing connections are required, there shall be a minimum of two bearing connections for each wall panel.

The building does not have a cladding system.

6-9 C NC NA INSERTS: Where inserts are used in concrete connections, the inserts shall be anchored to reinforcing steel or other positive anchorage.

The building does not have a cladding system.

6-10 C NC NA PANEL CONNECTIONS: Exterior cladding panels shall be anchored out-of-plane with a minimum of 4 connections for each wall panel. Two connections per wall panel are permitted where only the Basic Nonstructural Component Checklist is required by Table 3-2.

The building does not have a cladding system.

3.9.1 Basic Nonstructural Component Checklist

Masonry Veneer

6-11 C NC NA SHELF ANGLES: Masonry veneer shall be supported by shelf angles or other elements at each floor 30 feet or more above the ground for Life Safety and at each floor above the first floor for Immediate Occupancy.

The building has precast walls acting as the exterior wall system. The building does not have masonry veneer.

6-12 C NC NA TIES: Masonry veneer shall be connected to the back-up with corrosion-resistant ties. The ties shall have spacing equal to or less than 24 inches with a minimum of one tie for every 2-2/3 square feet. A spacing of up to 36 inches is permitted where only the Basic Nonstructural Component Checklist is required by Table 3-2.

The building does not have masonry veneer.

6-13 C NC NA WEAKENED PLANES: Masonry veneer shall be anchored to the back-up adjacent to weakened planes, such as at the locations of flashing.

The building does not have masonry veneer.

6-14 C NC NA DETERIORATION: There shall be no evidence of deterioration, damage or corrosion in any of the connection elements.

The building does not have masonry veneer.

Parapets, Cornices, Ornamentation, and Appendages

6-15 C NC NA URM PARAPETS: There shall be no laterally unsupported unreinforced masonry parapets or cornices with height-to-thickness ratios greater than 1.5. A height-to-thickness ratio of up to 2.5 is permitted where only the Basic Nonstructural Component Checklist is required by Table 3-2.

The building does not have URM Parapets.

6-16 C NC NA CANOPIES: Canopies located at building exits shall be anchored to the structural framing at a spacing of 6 feet or less. An anchorage spacing of up to 10 feet is permitted where only the Basic Nonstructural Component Checklist is required by Table 3-2.

The building does not have canopies.

3.9.1 Basic Nonstructural Component Checklist

Masonry Chimneys

6-17 C NC NA URM CHIMNEYS: No unreinforced masonry chimney shall extend above the roof surface more than twice the least dimension of the chimney. A height above the roof surface of up to three times the least dimension of the chimney is permitted where only the Basic Nonstructural Component Checklist is required by Table 3-2.

The building does not have masonry chimneys.

Stairs

6-18 C NC NA URM WALLS: Walls around stair enclosures shall not consist of unbraced hollow clay tile or unreinforced masonry with a height-to-thickness ratio greater than 12-to-1. A height-to-thickness ratio of up to 15-to-1 is permitted where only the Basic Nonstructural Component Checklist is required by Table 3-2.

*The stair to the mezzanine is supported by unbraced unreinforced masonry with a height-to-thickness ratio of (9'*12"/')/7.625" = 14.2 –to-1 > 12-to-1.*

6-19 C NC NA STAIR DETAILS: In moment frame structures, the connection between the stairs and the structure shall not rely on shallow anchors in concrete. Alternatively, the stair details shall be capable of accommodating the drift calculated using the Quick Check procedure of Section 3.5.3.1 without including tension in the anchors.

This building is not a moment frame structure.

Building Contents and Furnishings

6-20 C NC NA TALL NARROW CONTENTS: Contents over 4 feet in height with a height-to-depth or height-to-width ratio greater than 3-to-1 shall be anchored to the floor slab or adjacent structural walls. A height-to-depth or height-to-width ratio of up to 4-to-1 is permitted where only the Basic Nonstructural Component Checklist is required by Table 3-2.

Most offices, as well as the mezzanine, have some bookshelves and storage cabinets. Many of the storage shelf units in the mezzanine have been anchored to walls; some have not. Most book shelves in offices have not been anchored.

Mechanical and Electrical Equipment

6-21 C NC NA EMERGENCY POWER: Equipment used as part of an emergency power system shall be mounted to maintain continued operation after an earthquake.

This building is not equipped with emergency power, owner to confirm.

3.9.1 Basic Nonstructural Component Checklist

6-22 C NC NA HAZARDOUS MATERIAL EQUIPMENT: HVAC or other equipment containing hazardous material shall not have damaged supply lines or unbraced isolation supports.

This building does not have equipment containing hazardous material, owner to confirm.

6-23 C NC NA DETERIORATION: There shall be no evidence of deterioration, damage, or corrosion in any of the anchorage or supports of mechanical or electrical equipment.

No deterioration of equipment anchorage was observed.

6-24 C NC NA ATTACHED EQUIPMENT: Equipment weighing over 20 lb. that is attached to ceilings, walls, or other supports 4 feet above the floor level shall be braced.

Large cabinets as well as a large ceiling hung fan were observed. These present a fall hazard in a seismic event.

Photo 6-2: Hung cabinet

Photo 6-3: Hung Fan

Piping

6-25 C NC NA FIRE SUPPRESSION PIPING: Fire suppression piping shall be anchored and braced in accordance with NFPA-13 (NFPA, 1996).

Fire sprinklers exist at the entrance to the building, at the South West corner. Fire suppression piping runs above the ceiling and is not currently anchored.

6-26 C NC NA FLEXIBLE COUPLINGS: Fluid, gas and fire suppression piping shall have flexible couplings.

This building may require flexible couplings at the fire riser per NFPA 13.

Hazardous Materials Storage and Distribution

ASCE 31-03

3.9.1 Basic Nonstructural Component Checklist

6-27 C NC NA TOXIC SUBSTANCES: Toxic and hazardous substances stored in breakable containers shall be restrained from falling by latched doors, shelf lips, wires, or other methods.

Toxic substances appear to be stored in a way that would prevent them from falling.

Photo 6-4: Hazardous substance storage

Section 8

Intermediate Nonstructural Component Checklist

3.9.2 Intermediate Nonstructural Component Checklist

Ceiling System

7-1 C NC NA LAY-IN-TILES: Lay-in tiles used in ceiling panels located at exits and corridors shall be secured with clips.

Northwest corner of building is the only location with lay-in tiles. Tile is not anchored to the grid. This is not expected to be a significant hazard given the size and weight of the tiles.

7-2 C NC NA INTEGRATED CEILINGS: Integrated suspended ceilings at exits and corridors or weighing more than 2 pounds per square foot shall be laterally restrained with a minimum of four diagonal wires or rigid members attached to the structure above at a spacing equal to or less than 12 feet.

Suspended ceilings are only located in the room at the Northwest corner of the building. This ceiling has multiple diagonal wires for lateral support.

7-3 C NC NA SUSPENDED LATH AND PLASTER: Ceilings consisting of suspended lath and plaster or gypsum board shall be attached to resist seismic forces for every 12 square feet of area.

There is not suspended lath and plaster or suspended gypsum ceilings in the building.

Light Fixtures

7-4 C NC NA INDEPENDENT SUPPORT: Light fixtures in suspended grid ceilings shall be supported independently of the ceiling suspension system by a minimum of two wires at diagonally opposite corners of the fixtures.

Light fixtures are suspended independently of the ceiling system in the area with suspended ceilings.

Cladding and Glazing

7-5 C NC NA GLAZING: Glazing in curtain walls and individual panes over 16 square feet in area, located up to a height of 10 feet above an exterior walking surface, shall have safety glazing. Such glazing located over 10 feet above an exterior walking surface shall be laminated annealed or laminated heat-strengthened safety glass or other glazing system that will remain in the frame when glass is cracked.

Office windows are typically 9’ x 4.75’ giving a total area of 42.75 square feet. These windows do not appear to have safety glazing.

3.9.2 Intermediate Nonstructural Component Checklist

Parapets, Cornices, Ornamentation, and Appendages

7-6 C NC NA CONCRETE PARAPETS: Concrete parapets with height-to-thickness ratios greater than 2.5 shall have vertical reinforcement.

This building does not have concrete parapets.

7-7 C NC NA APPENDAGES: Cornices, parapets, signs, and other appendages that extend above the highest point of anchorage to the structure or cantilever from exterior wall faces and other exterior wall ornamentation shall be reinforced and anchored to the structural system at a spacing equal to or less than 10 feet for Life Safety and 6 feet for Immediate Occupancy. This requirement need not apply to parapets or cornices compliant with Section 4.8.8.1 or 4.8.8.3.

This building does not have any appendages.

7-8 C NC NA ANCHORAGE: Masonry chimneys shall be anchored at each floor level and the roof.

This building does not have masonry chimneys.

7-9 C NC NA VIBRATION ISOLATORS: Equipment mounted on vibration isolators shall be equipped with restraints or snubbers.

A fan on the west side of the building is hung from the roof and uses vibration isolators. The fan appears to have no lateral restraint.

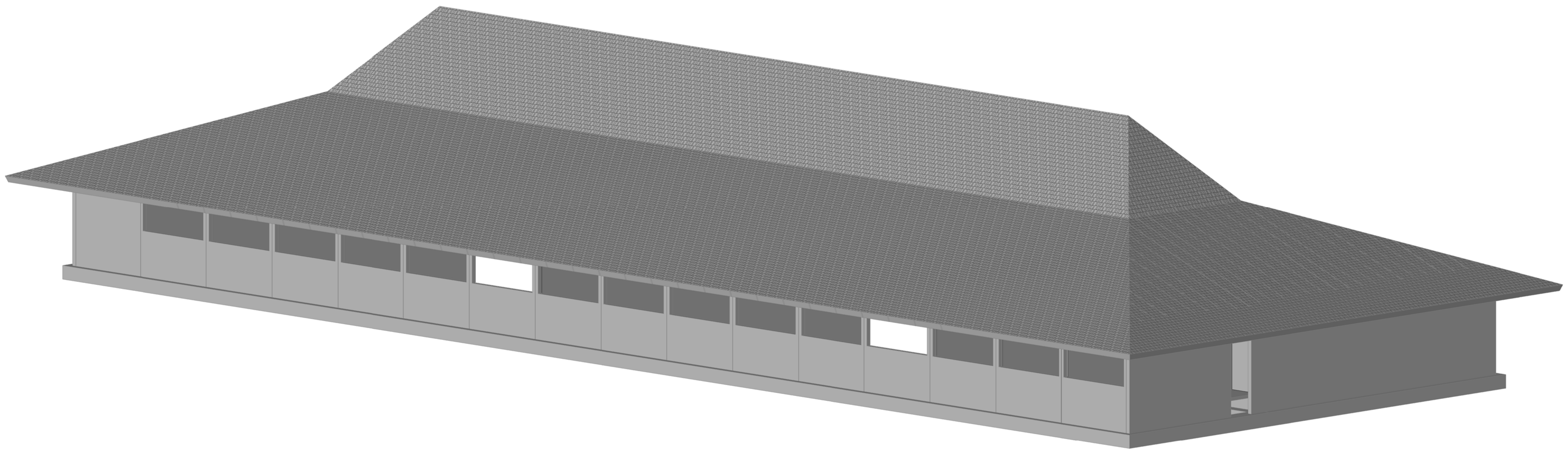
Photo 7-1: Fan with vibration isolators

7-10 C NC NA STAIR AND SMOKE DUCTS: Stair pressurization and smoke control ducts shall be braced and shall have flexible connections at seismic joints.

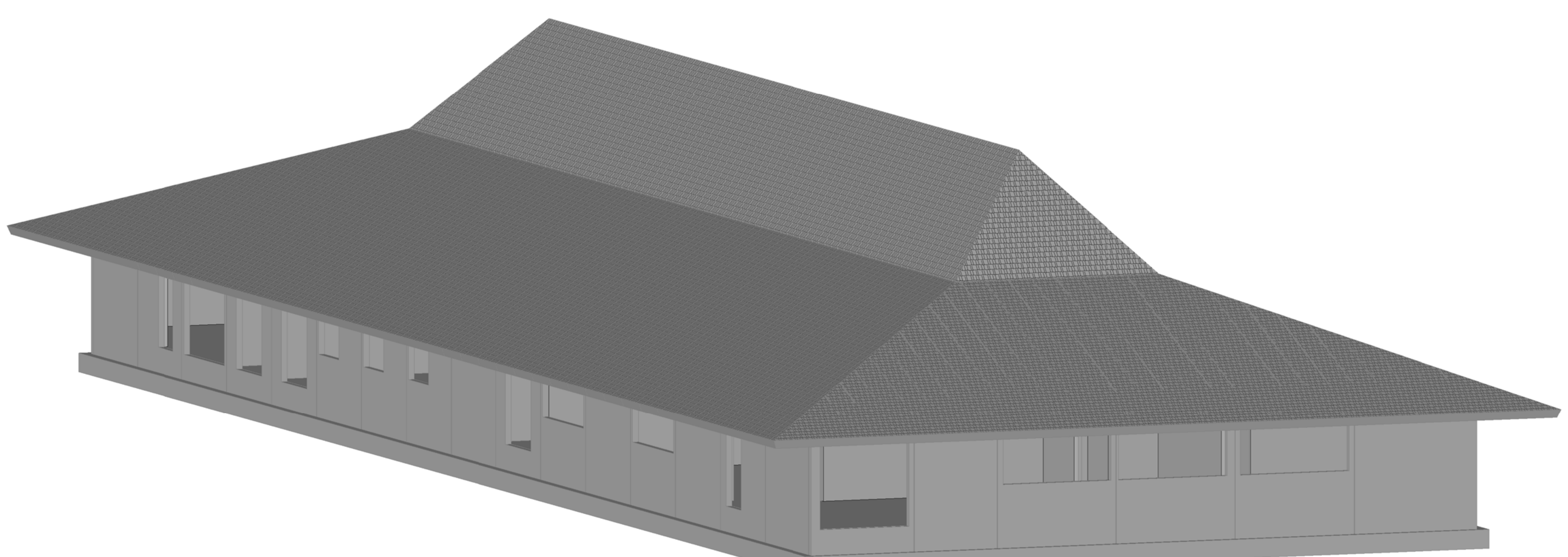
This building does not have ducts which are part of the fire protection system.

Section 9

Schematic Seismic Upgrade Drawings

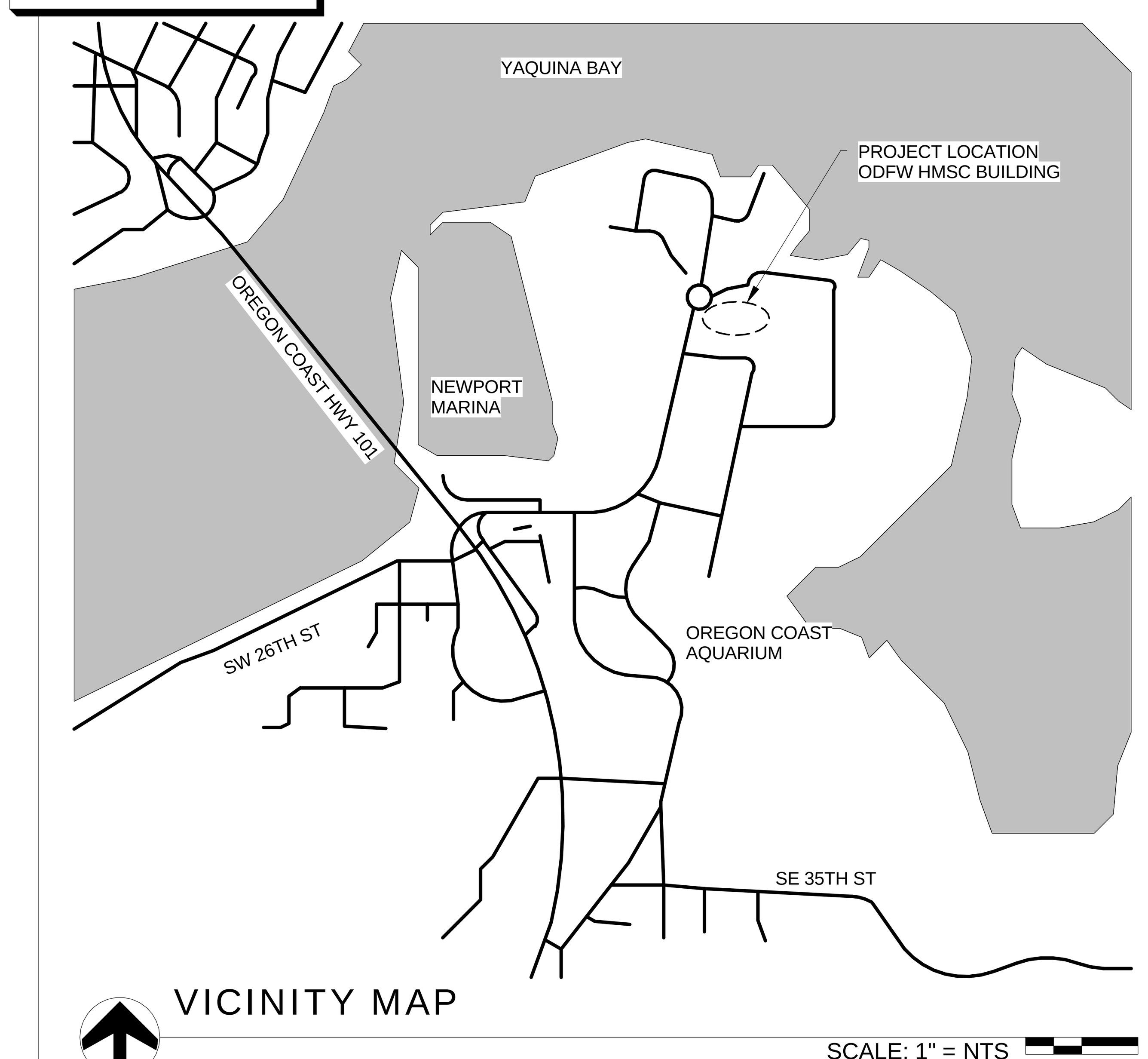


2 NW PERSPECTIVE VIEW
S0.1



1 SE PERSPECTIVE VIEW
S0.1

VICINITY MAP



VICINITY MAP

SCALE: 1" = NTS

GENERAL NOTES

THESE DRAWINGS ARE PART OF A STRUCTURAL EVALUATION REPORT BY PILLAR CONSULTING GROUP, INC. DATED MAY 16, 2013 AND ARE NOT INTENDED FOR CONSTRUCTION.

THE PURPOSE OF THESE DRAWINGS IS TO PROVIDE SOME SCHEMATIC DETAIL OF POTENTIAL MITIGATION STRATEGIES FOR POTENTIAL SEISMIC DEFICIENCIES FOUND USING TIER 1 SCREEN PHASE OF ASCE 31-03 "SEISMIC EVALUATION OF EXISTING BUILDINGS".

THESE DRAWINGS DO NOT PROVIDE FOR ALL ASPECTS OF POTENTIAL MITIGATION STRATEGIES AND DO NOT NECESSARILY REFLECT POTENTIAL MITIGATION STRATEGIES ADDRESSING ALL SEISMIC DEFICIENCIES FOUND.

DETAIL ITEMS HAVE NOT NECESSARILY BEEN SUBSTANTIATED WITH CALCULATION. WHERE SPECIFIC CALLOUTS ARE MADE, THESE ARE LIKELY BASED ON THE ENGINEERS JUDGEMENT, BASED ON SCHEMATIC CALCULATION OR BASED PREVIOUS EXPERIENCE WITH CONSTRUCTION OF SIMILAR VINTAGE.

EXISTING CONSTRUCTION SHOWN IS BASED ON VISUAL OBSERVATION AND REVIEW OF RECORD DRAWINGS. ALL EXISTING CONSTRUCTION SHOULD BE FIELD VERIFIED PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES.

EXISTING DIMENSIONS SHOWN IS BASED ON VISUAL OBSERVATION AND REVIEW OF RECORD DRAWINGS. ALL EXISTING DIMENSIONS SHOULD BE FIELD VERIFIED PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES.

SOME AREAS OF THE BUILDING ARE NOT ACCESSIBLE FOR OBSERVATION WITHOUT THE REMOVAL OF FINISHES. NO FINISHES WERE REMOVED FOR THIS EVALUATION. DETAILS OF THESE AREAS ARE BASED ON THE ENGINEERS BEST GUESS OF FRAMING BASED ON OBSERVATIONS WITHIN THIS BUILDING AS WELL AS WITHIN OTHER BUILDINGS OF SIMILAR VINTAGE.

THESE DRAWINGS ARE PRELIMINARY ONLY. FURTHER ANALYSIS AND DESIGN WILL BE REQUIRED PRIOR TO CREATING CONSTRUCTION DOCUMENTS.

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No.	Description	Date

COVER SHEET

ODFW HMSC OFFICE SEISMIC STUDY

OREGON DEPARTMENT OF FISH & WILDLIFE

PRELIMINARY
NOT FOR CONSTRUCTION

Project number	2013007
Date	05/16/2013
Drawn by	JNC
Checked by	JJE

S0.1

Scale 1 : 1

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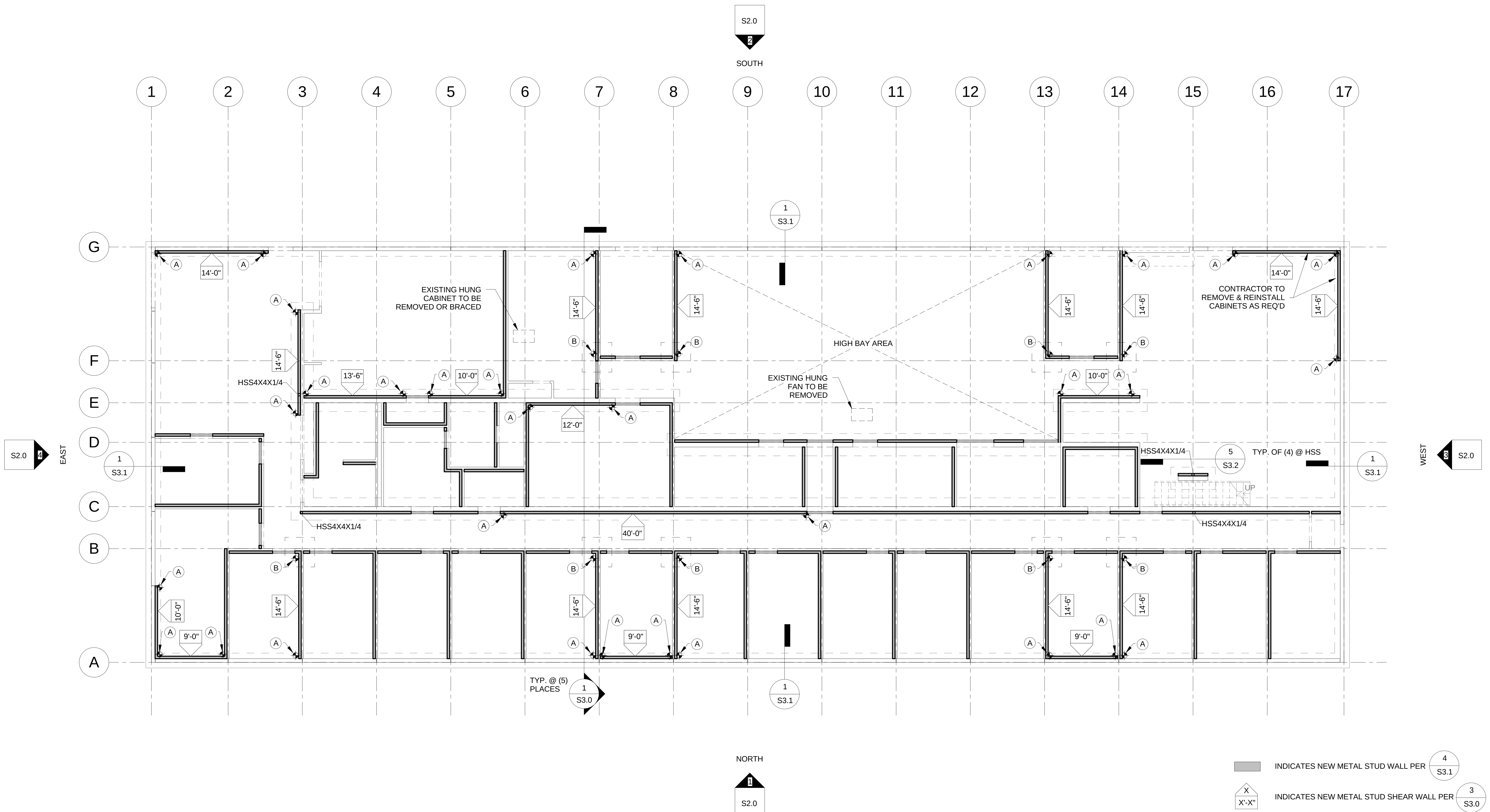

1 S1.0 FOUNDATION PLAN
1/8" = 1'-0"

INDICATES NEW METAL STUD WALL PER 4 S3.1

X X'-X" INDICATES NEW METAL STUD SHEAR WALL PER 3 S3.0

A INDICATES HOLDOWN TO (E) FTG PER 5 S3.0

B INDICATES HOLDOWN TO NEW FTG PER 6 S3.0

* ADDITION OF METAL STUD WALL MAY REDUCE ROOM & CORRIDOR AREAS BELOW THAT ALLOWED BY BUILDING CODE

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FOUNDATION PLAN

ODFW HMSC OFFICE SEISMIC STUDY

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Project number	2013007
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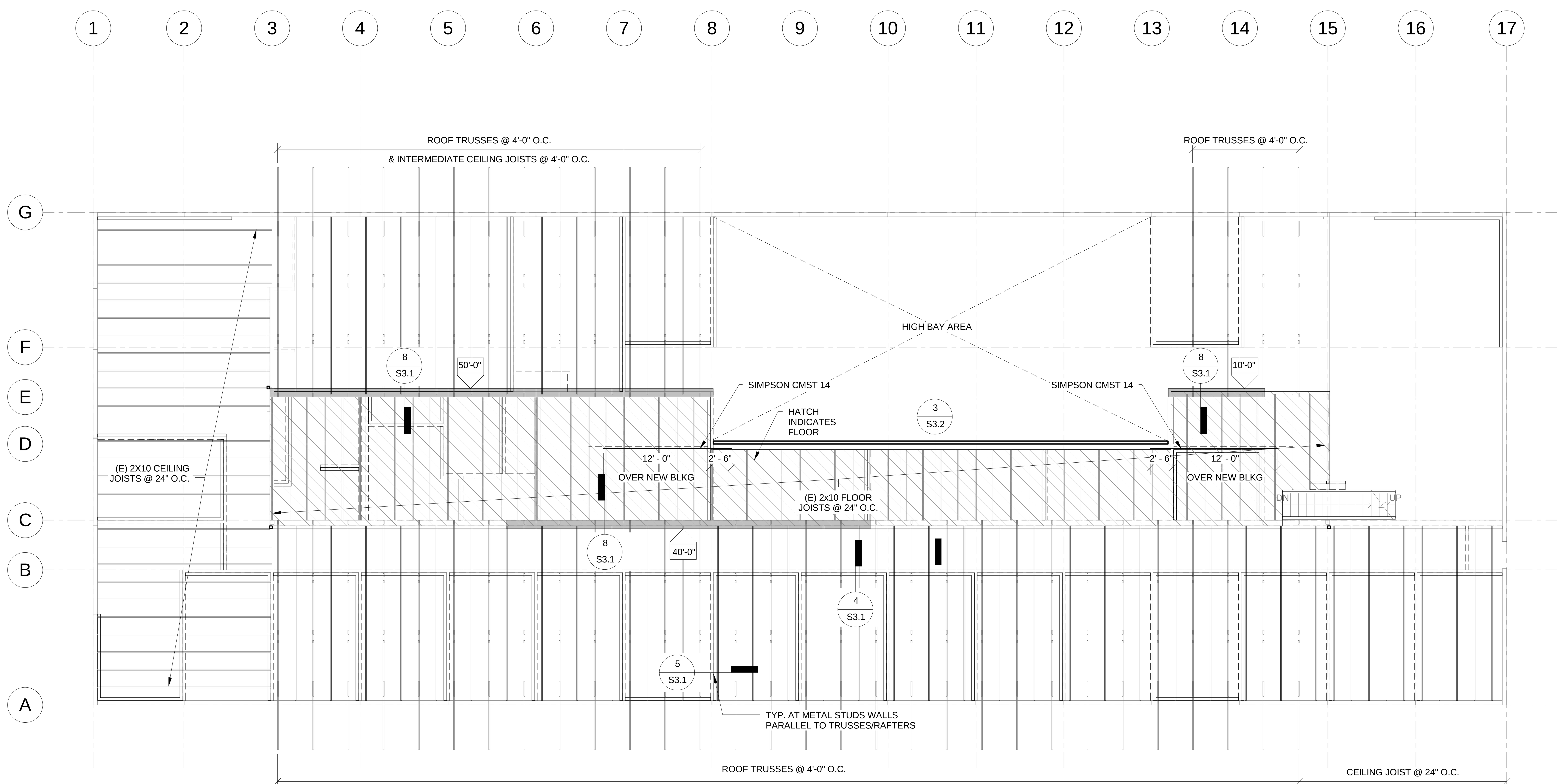
S1.0

Scale	As indicated

6/22/2013 8:30:18 AM



NOTE:
CONTRACTOR TO VERIFY (E) FLOOR SHEATHING HAS 10d @ 6" O.C. EN & 10d @ 12" O.C. FIELD NAILING. PROVIDE IF NOT (E).

1
S1.1
MEZZANINE FRAMING PLAN
1/8" = 1'-0"

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MEZZANINE FRAMING PLAN

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Project number	2013007
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S1.1

Scale	1/8" = 1'-0"

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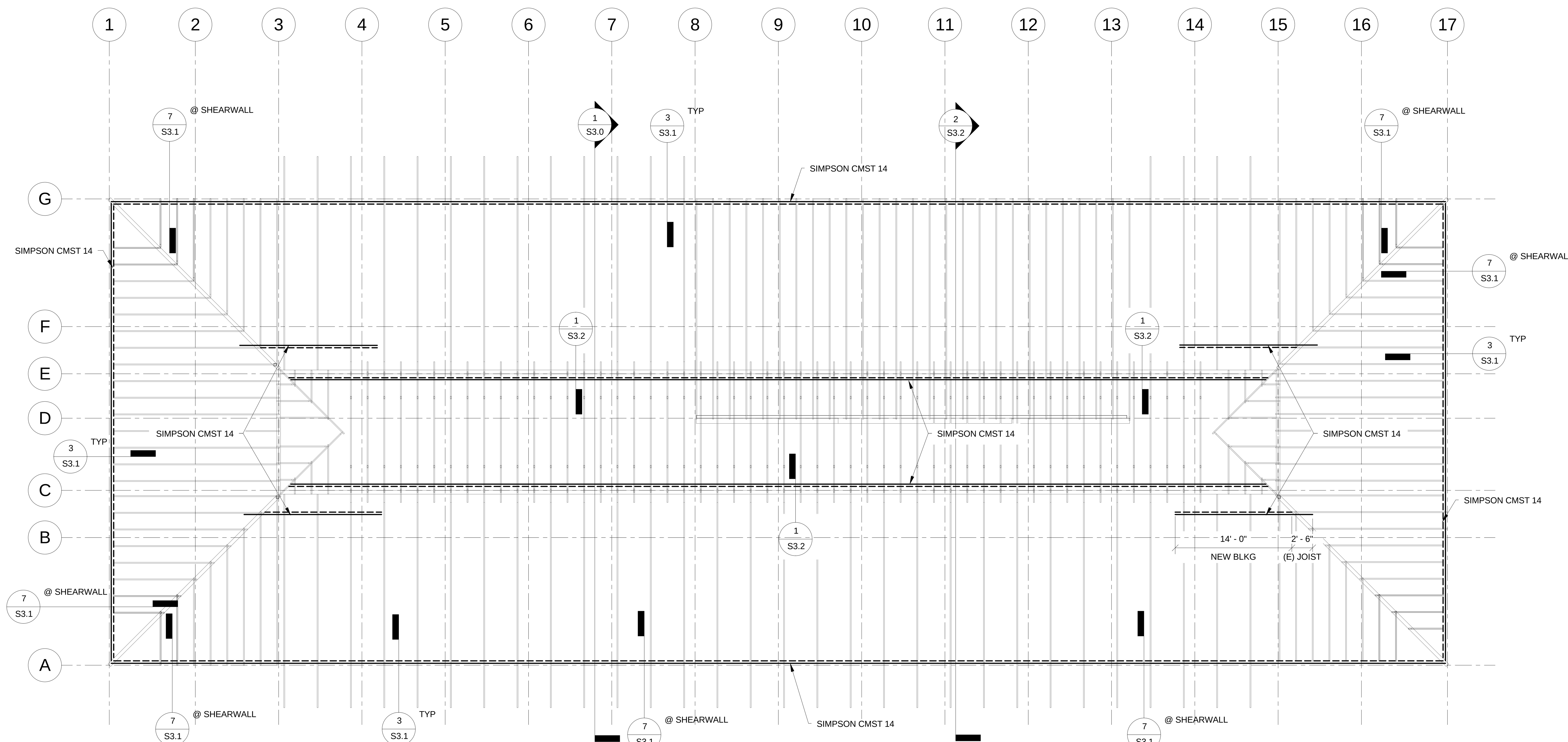

NOTE:

1. REMOVE (E) CONCRETE ROOF TILES & REPLACE W/ COMP SHINGLE ROOF

2. CONTRACTOR TO VERIFY (E) ROOF SHEATHING HAS 10d @ 6" O.C. E.N. & 10d @ 12" O.C. FIELD NAILING. PROVIDE IF NOT (E).

1
S1.2
ROOF FRAMING PLAN
1/8" = 1'-0"

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ROOF FRAMING PLAN

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Project number	2013007
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S1.2

Scale	As indicated

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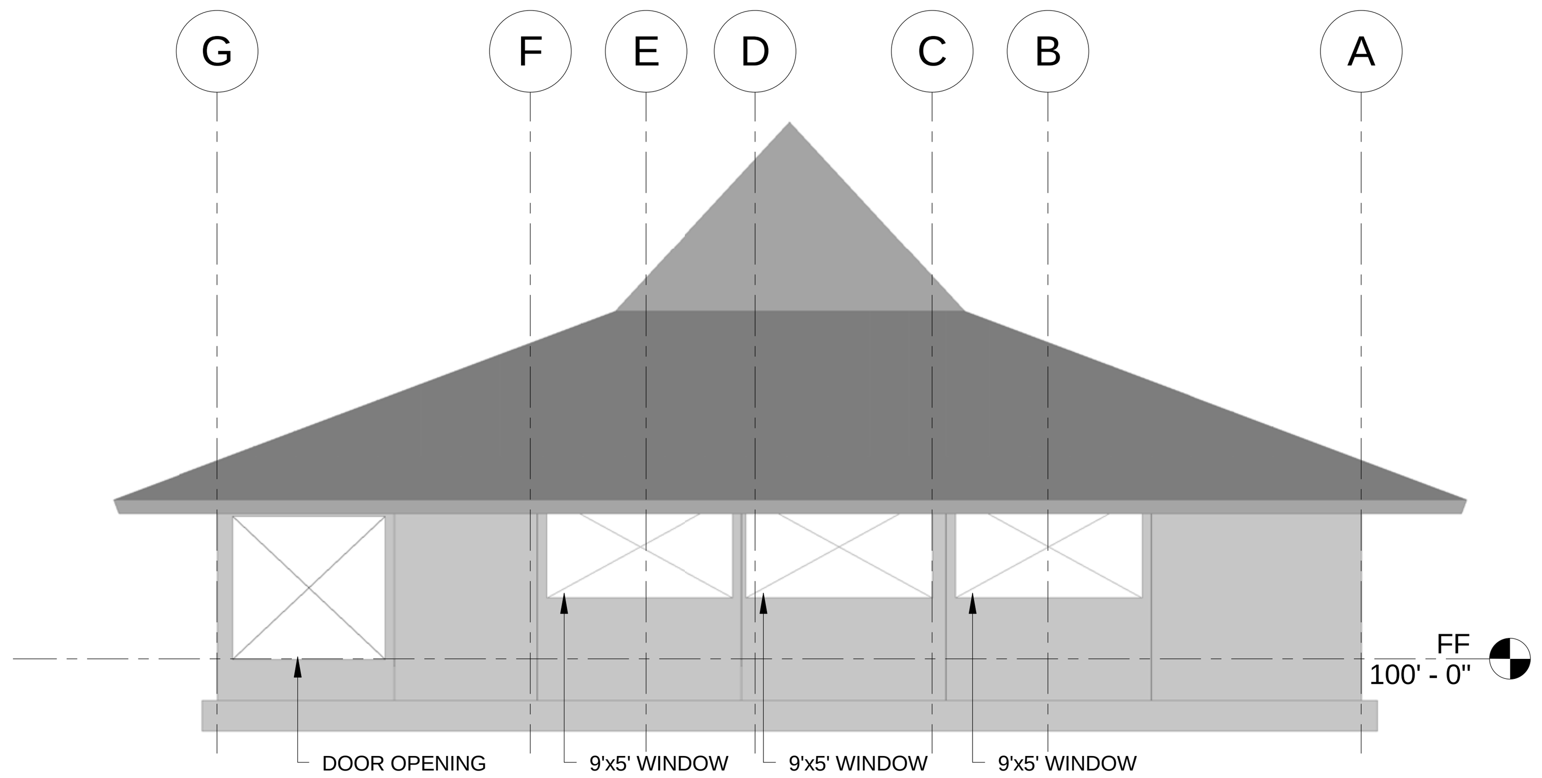
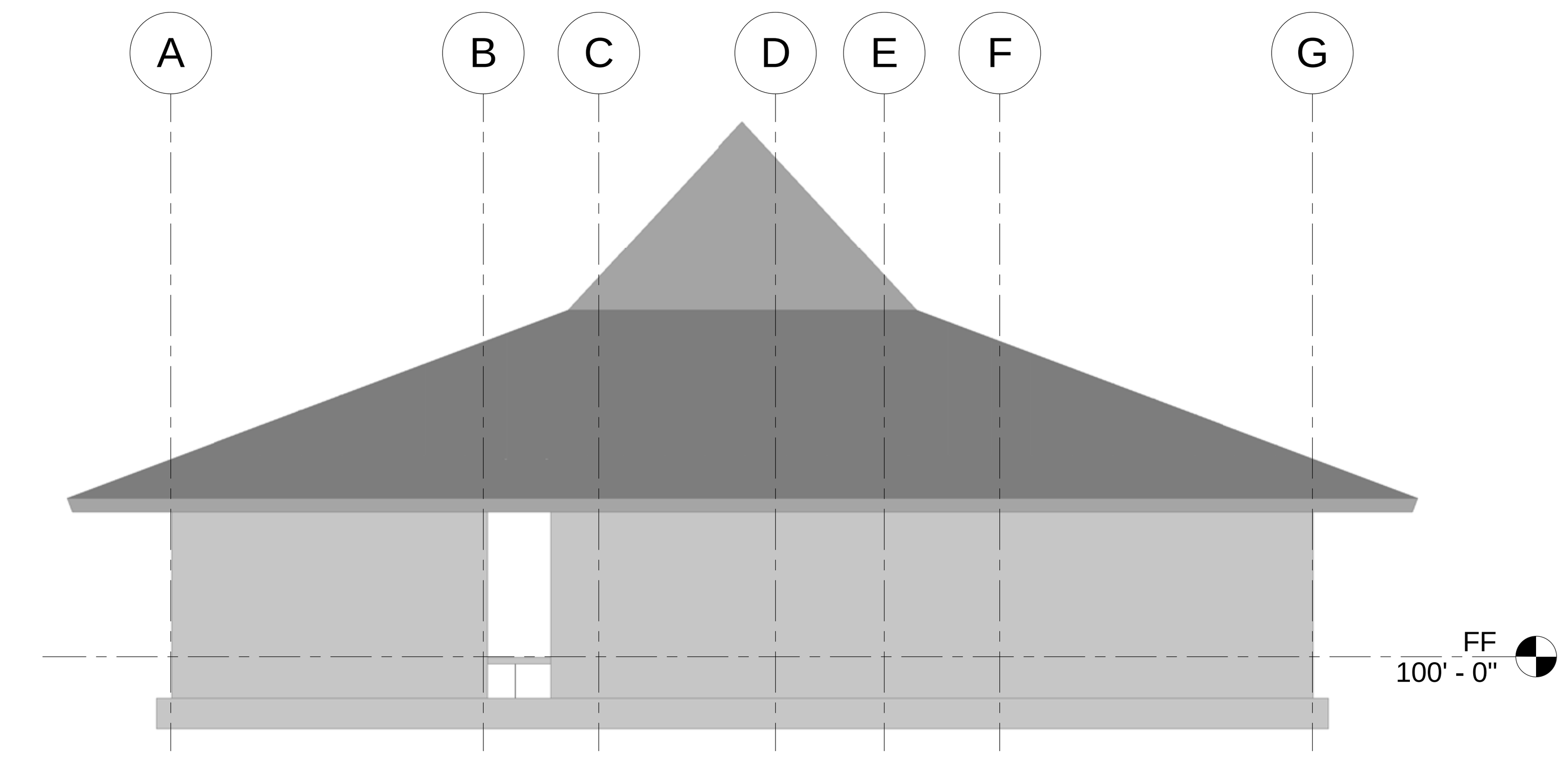
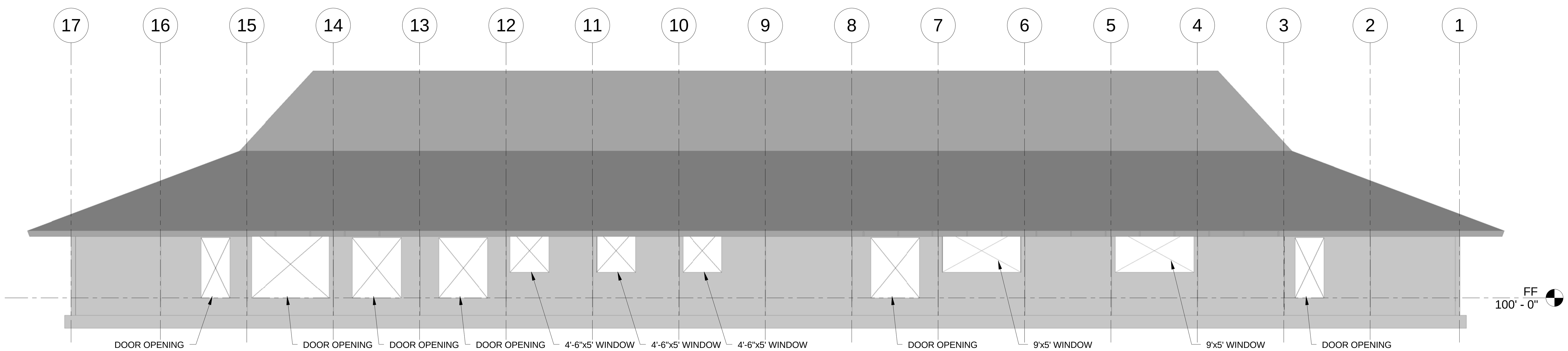


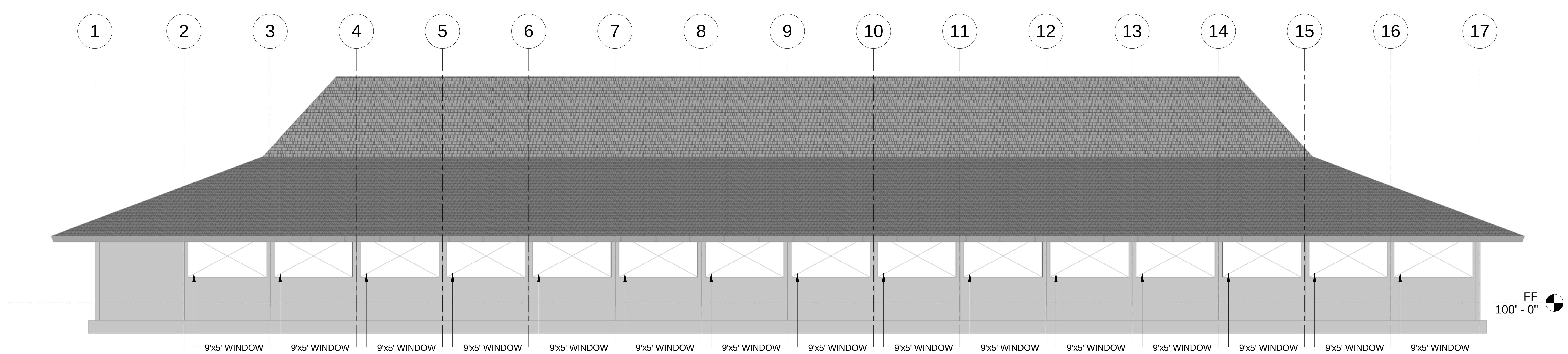
4 EAST ELEVATION
S2.0 1/8" = 1'-0"



3 WEST ELEVATION
S2.0 1/8" = 1'-0"



2 SOUTH ELEVATION
S2.0 1/8" = 1'-0"



1 NORTH ELEVATION
S2.0 1/8" = 1'-0"

NOTE:
ALL EXISTING WINDOWS ARE TO BE REMOVED & REPLACED W/ WINDOWS HAVING SAFETY GLASS

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ELEVATIONS

ODFW HMSC OFFICE SEISMIC STUDY

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S2.0

Scale	1/8" = 1'-0"

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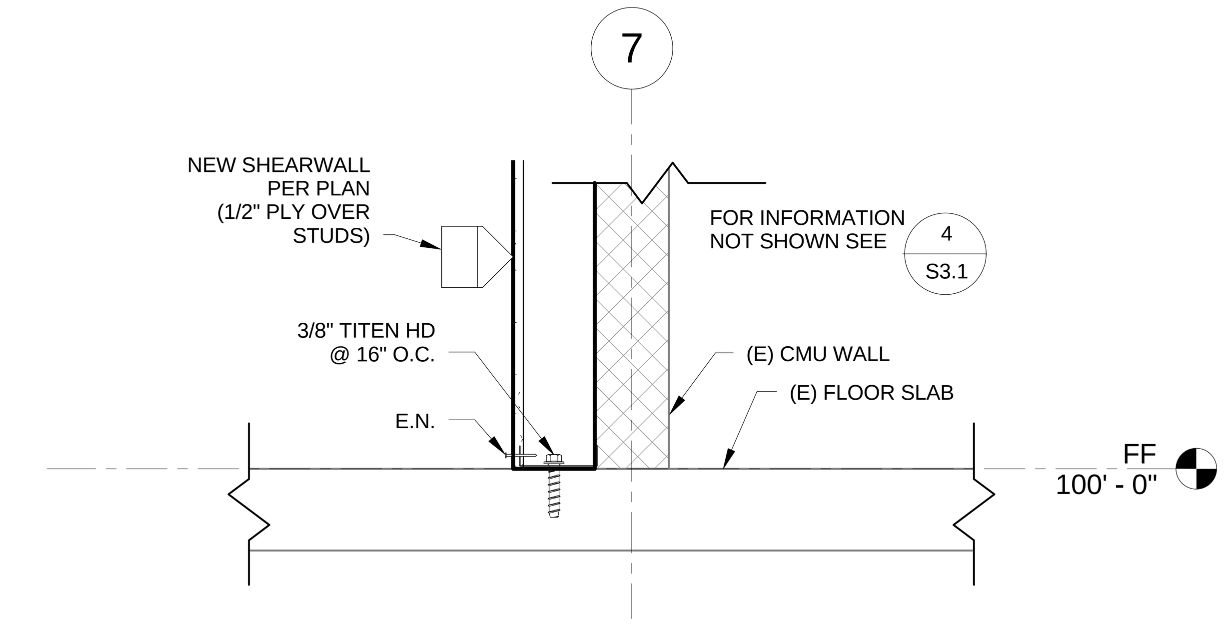
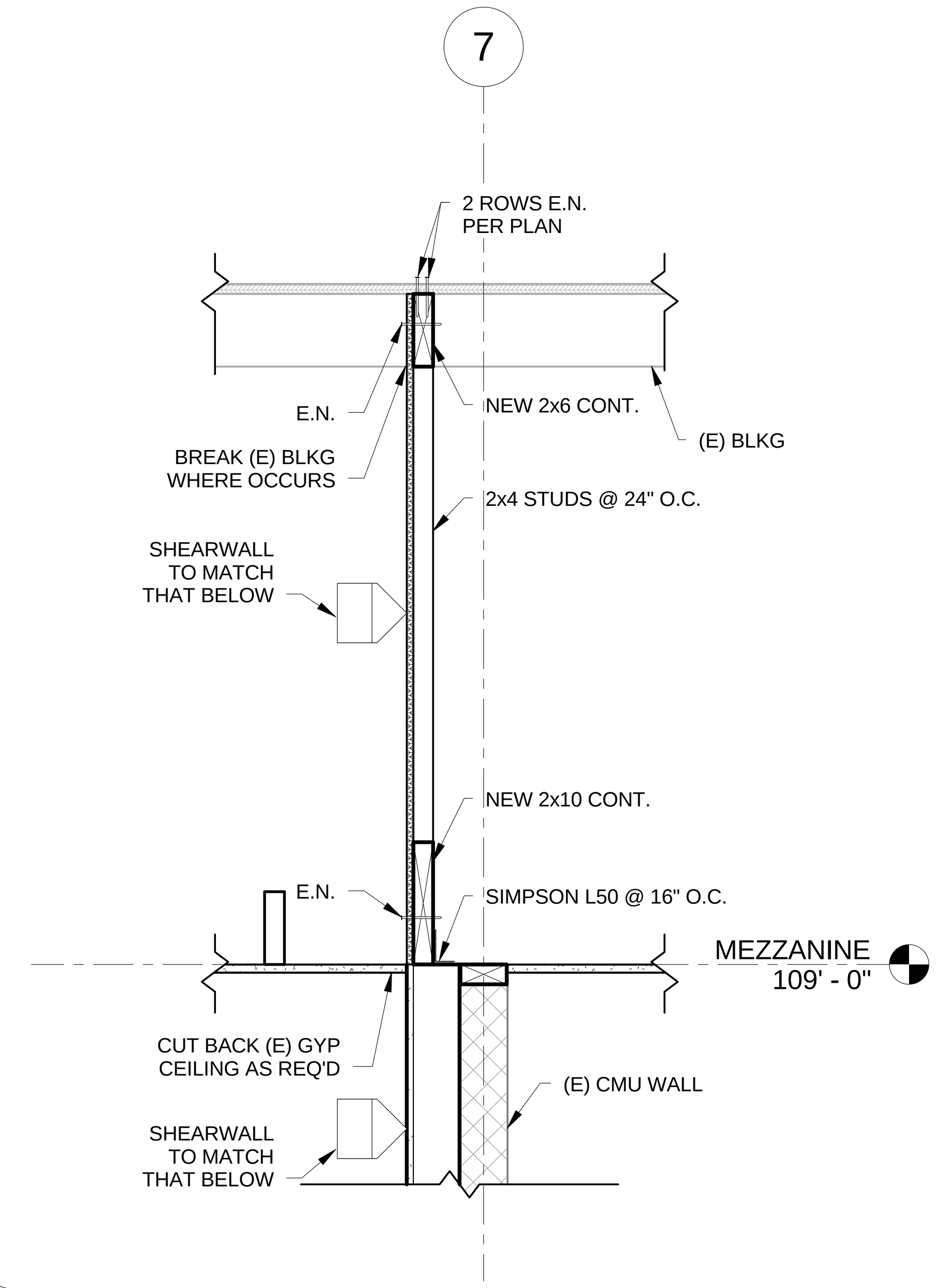
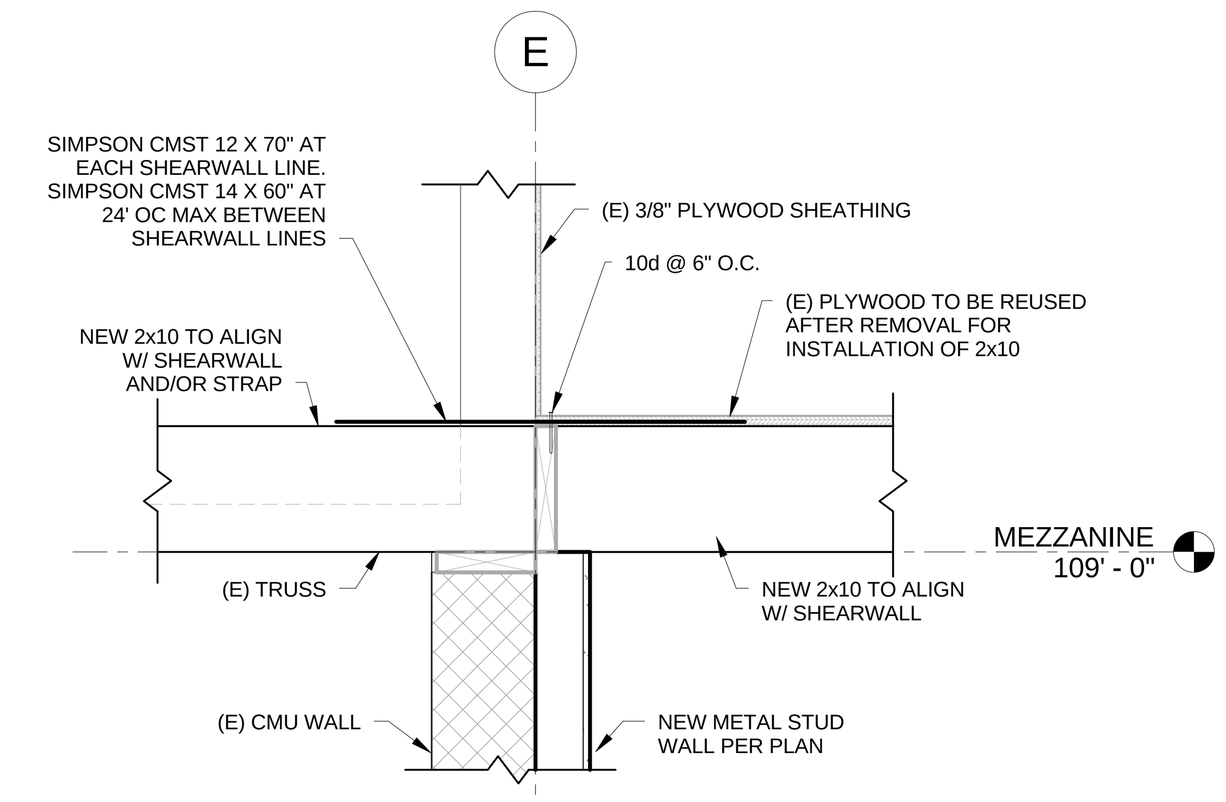


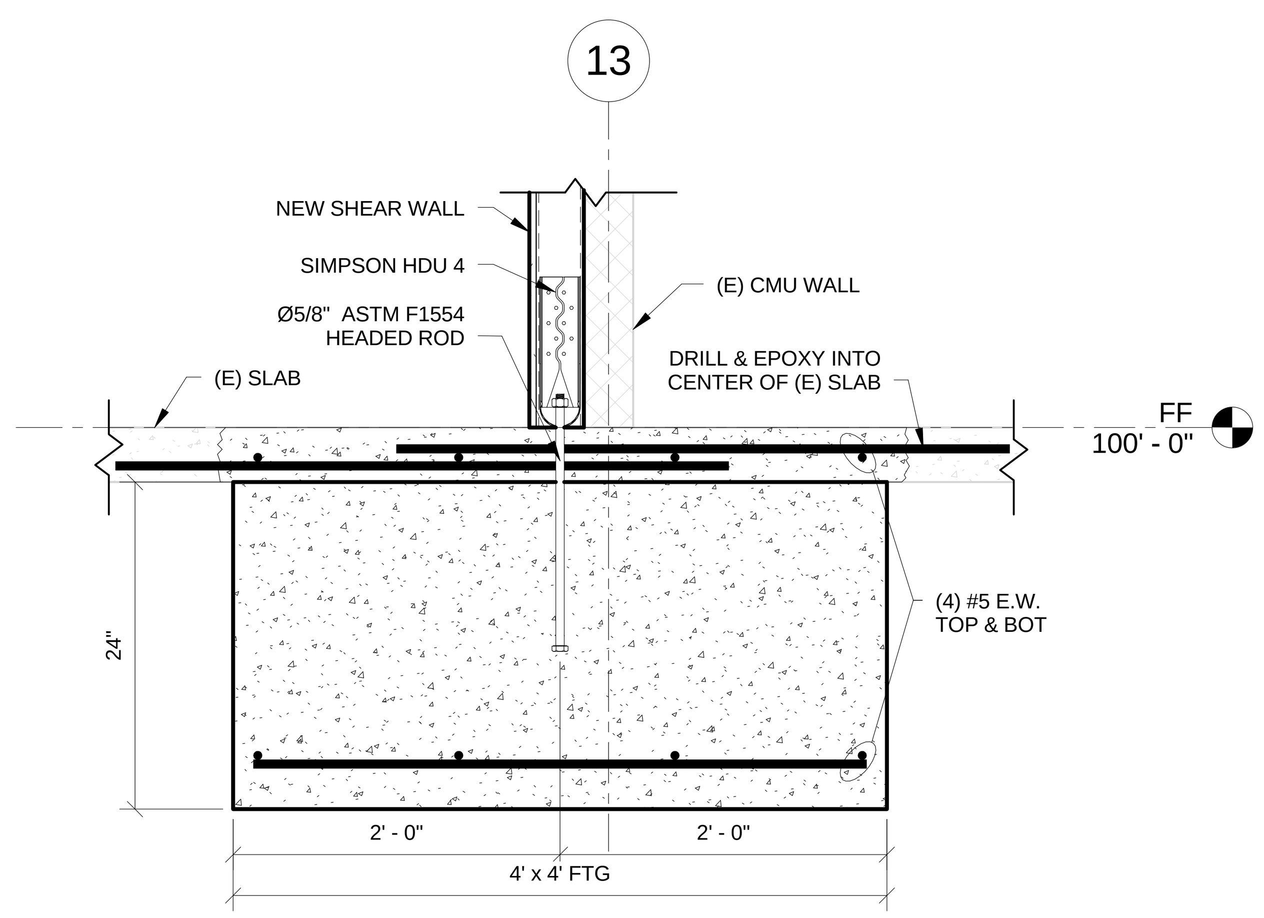
3 SHEARWALL SILL BOLTS
S3.0 1 1/2" = 1'-0"



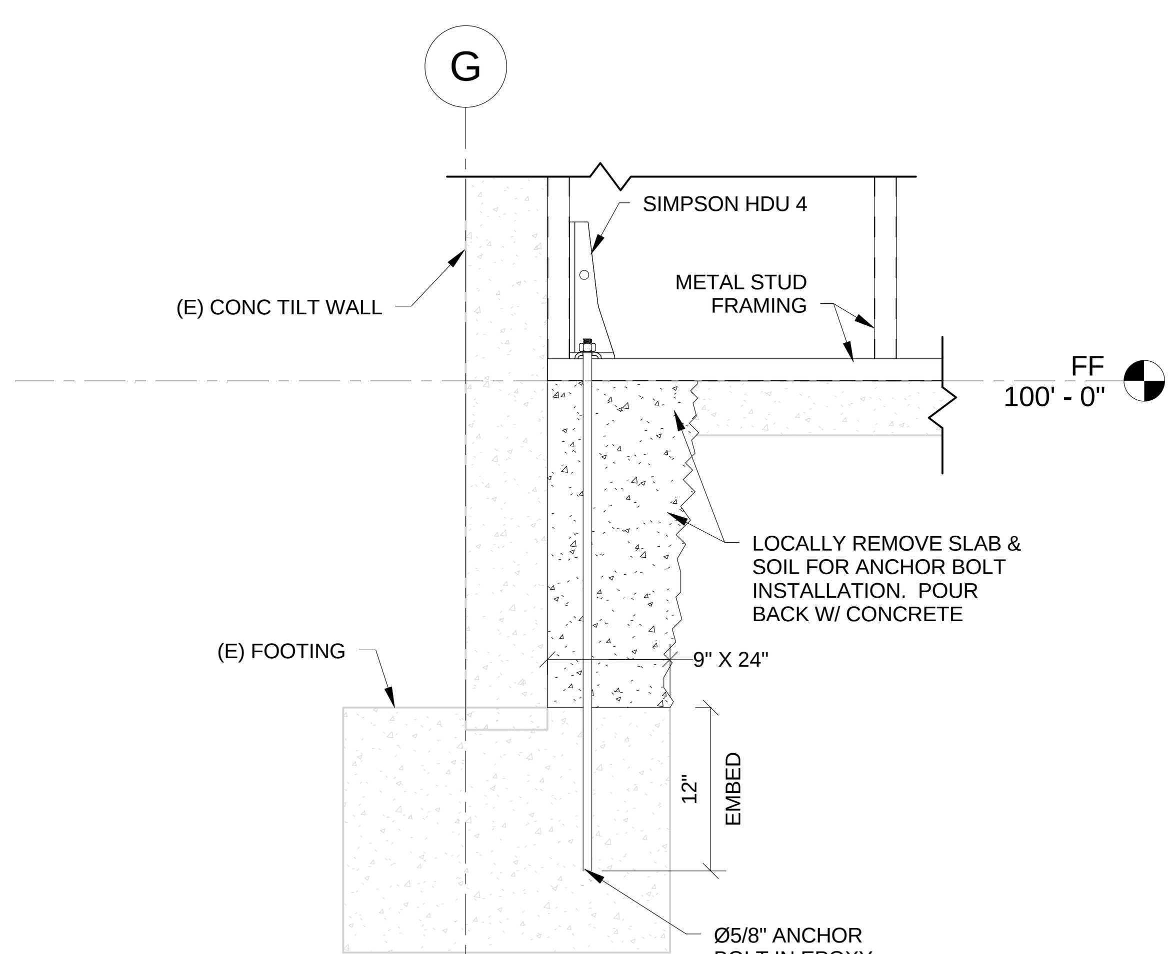
4 NEW SHEARWALL SECTION
S3.0 1" = 1'-0"



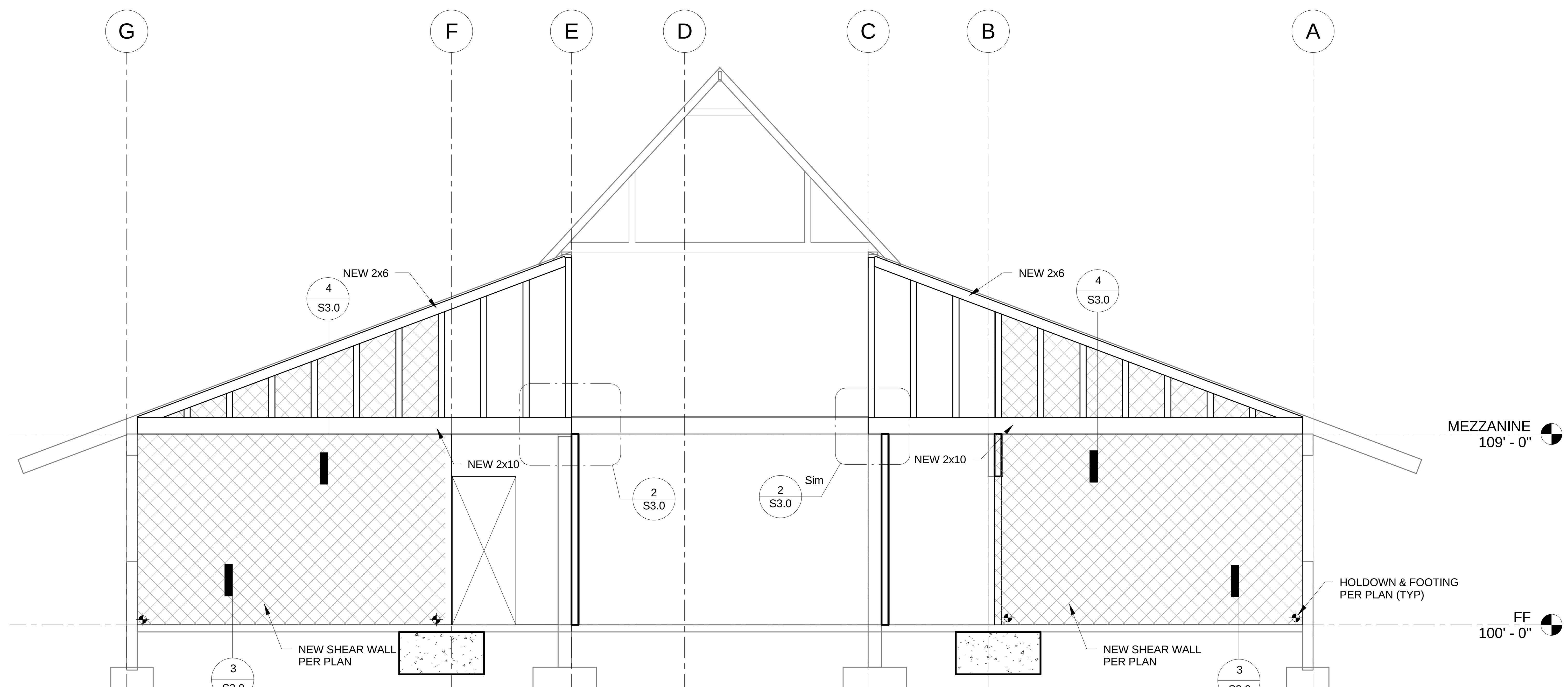
2 2ND FLOOR MEZZANINE @ WALL
S3.0 1" = 1'-0"



6 HOLDOWN TO NEW FTG (TYPE B)
S3.0 1" = 1'-0"



5 HOLDOWN TO (E) FTG (TYPE A)
S3.0 1" = 1'-0"



1 BLDG SECTION @ SHEARWALL
S3.0 1/4" = 1'-0"

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SECTIONS & DETAILS

ODFW HMSC OFFICE SEISMIC STUDY

OREGON DEPARTMENT OF FISH & WILDLIFE

PRELIMINARY NOT FOR CONSTRUCTION

Project number	2013007
Date	05/16/2013
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S3.0

Scale	As indicated

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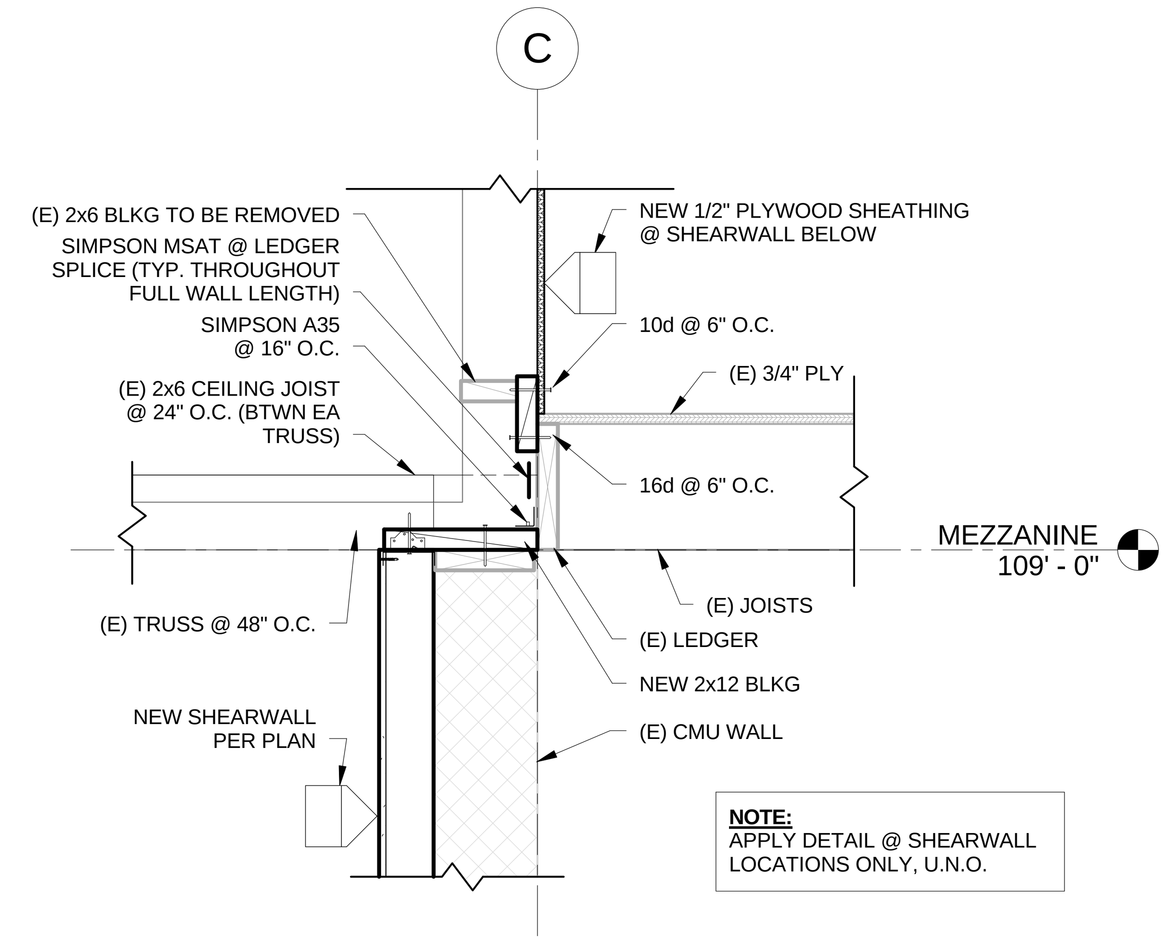
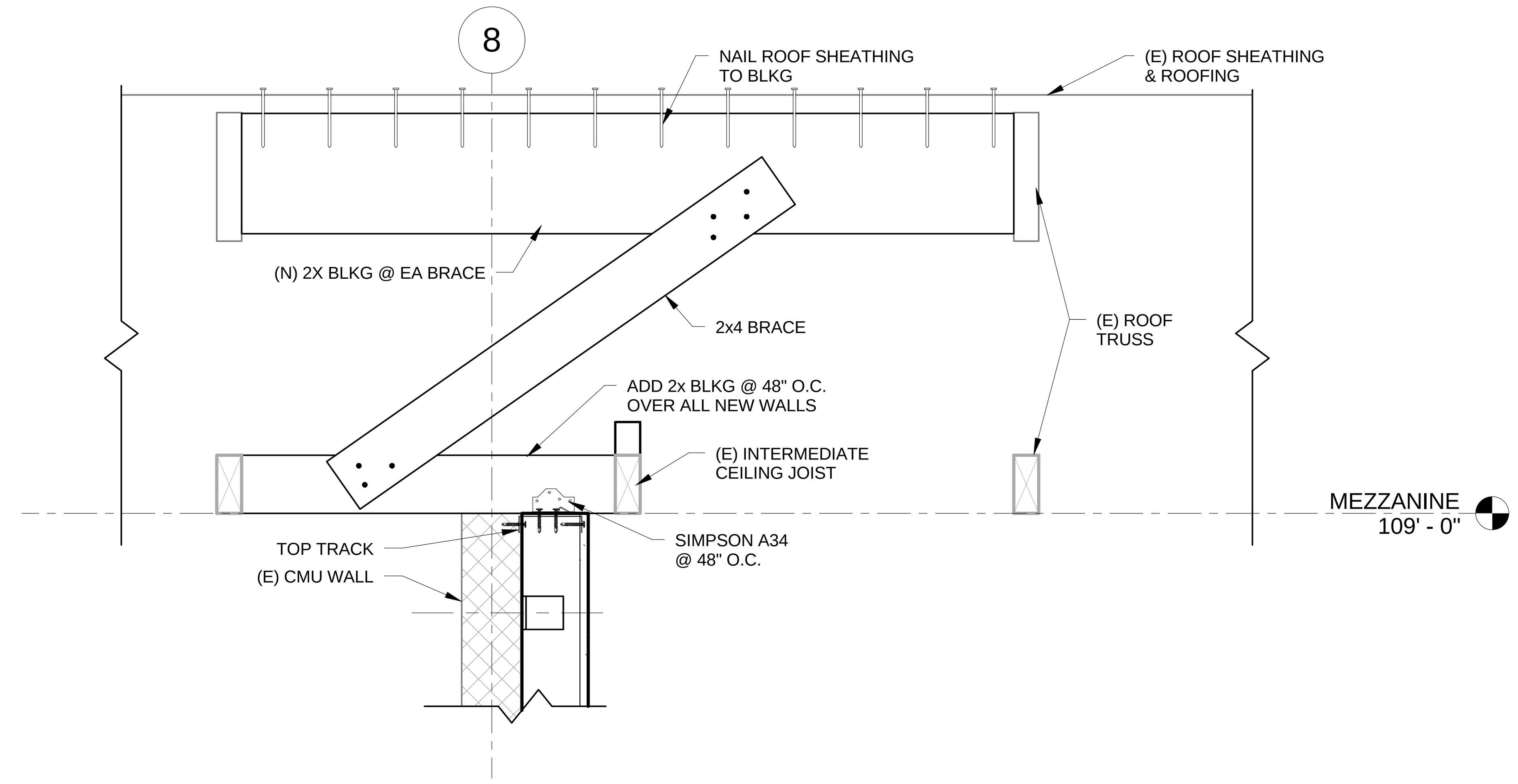
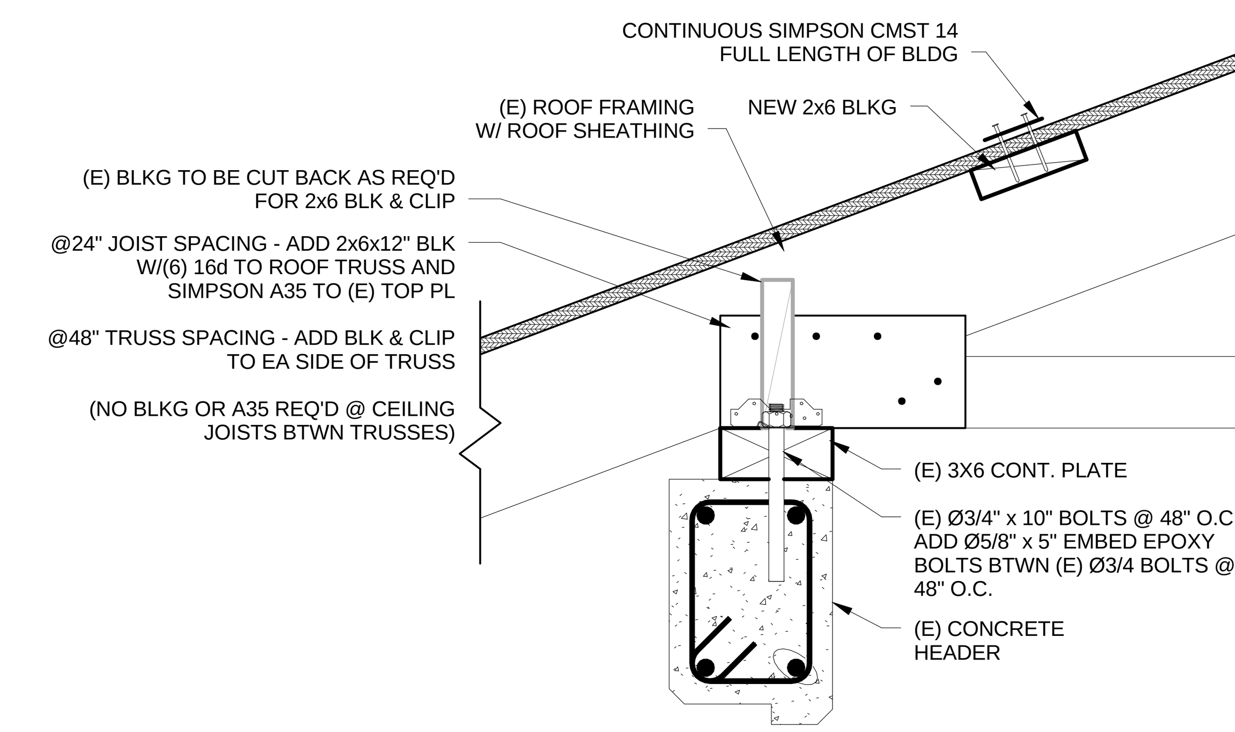


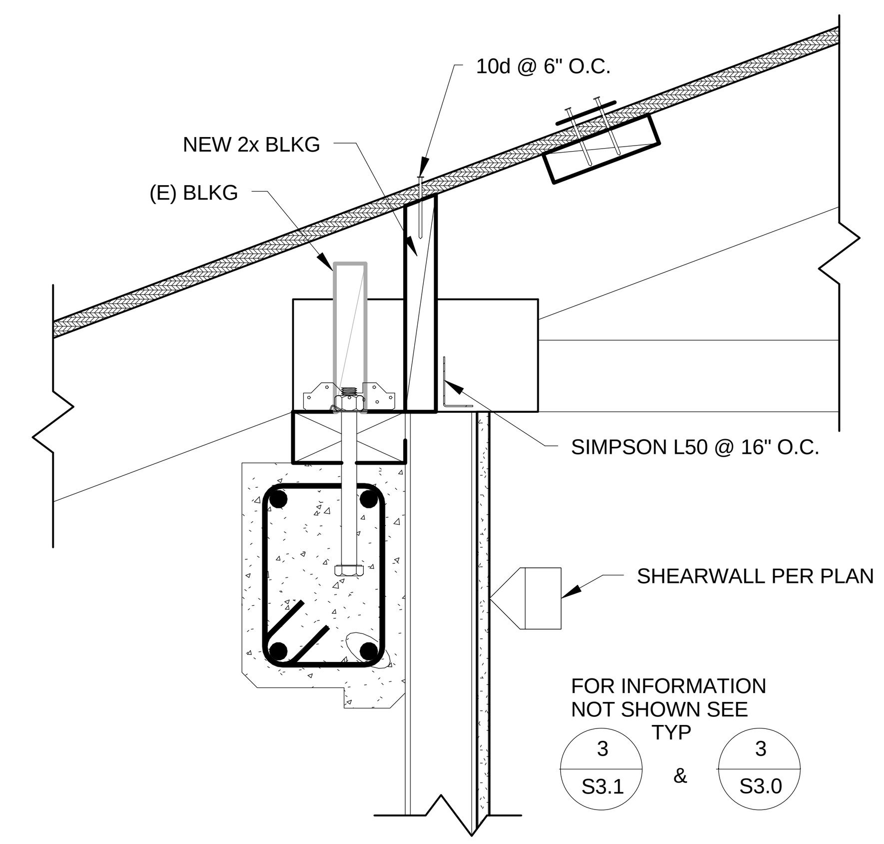
8 MEZZANINE SHEARWALL
S3.1 1" = 1'-0"



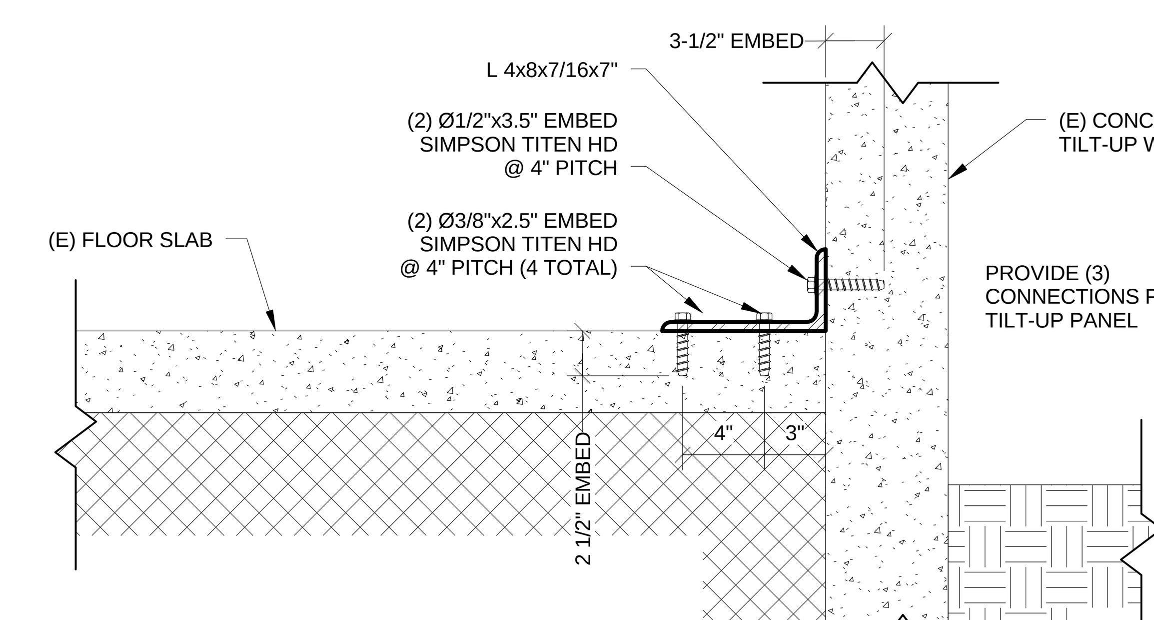
5 METAL STUD T/WALL SECTION
S3.1 1 1/2" = 1'-0"



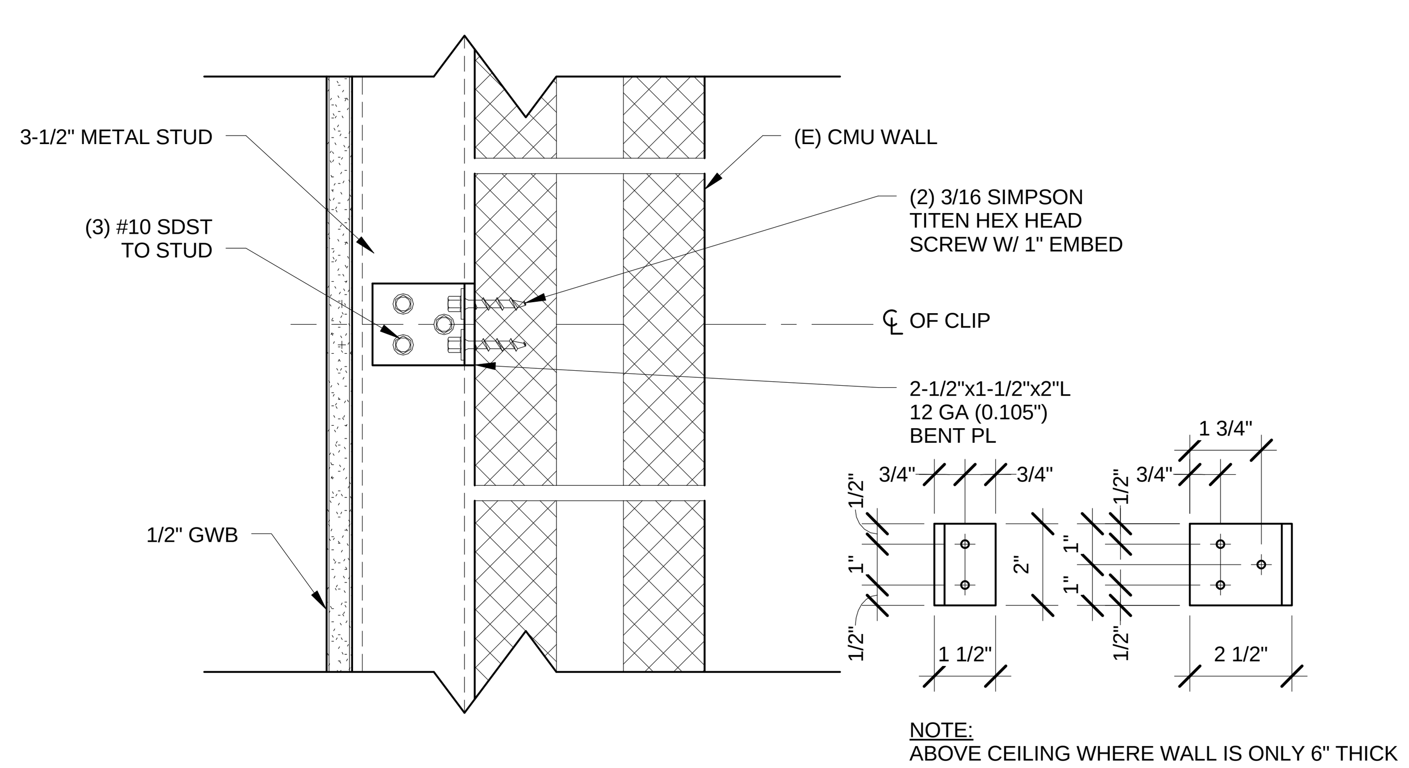
3 (E) CONC. HEADER
S3.1 1 1/2" = 1'-0"



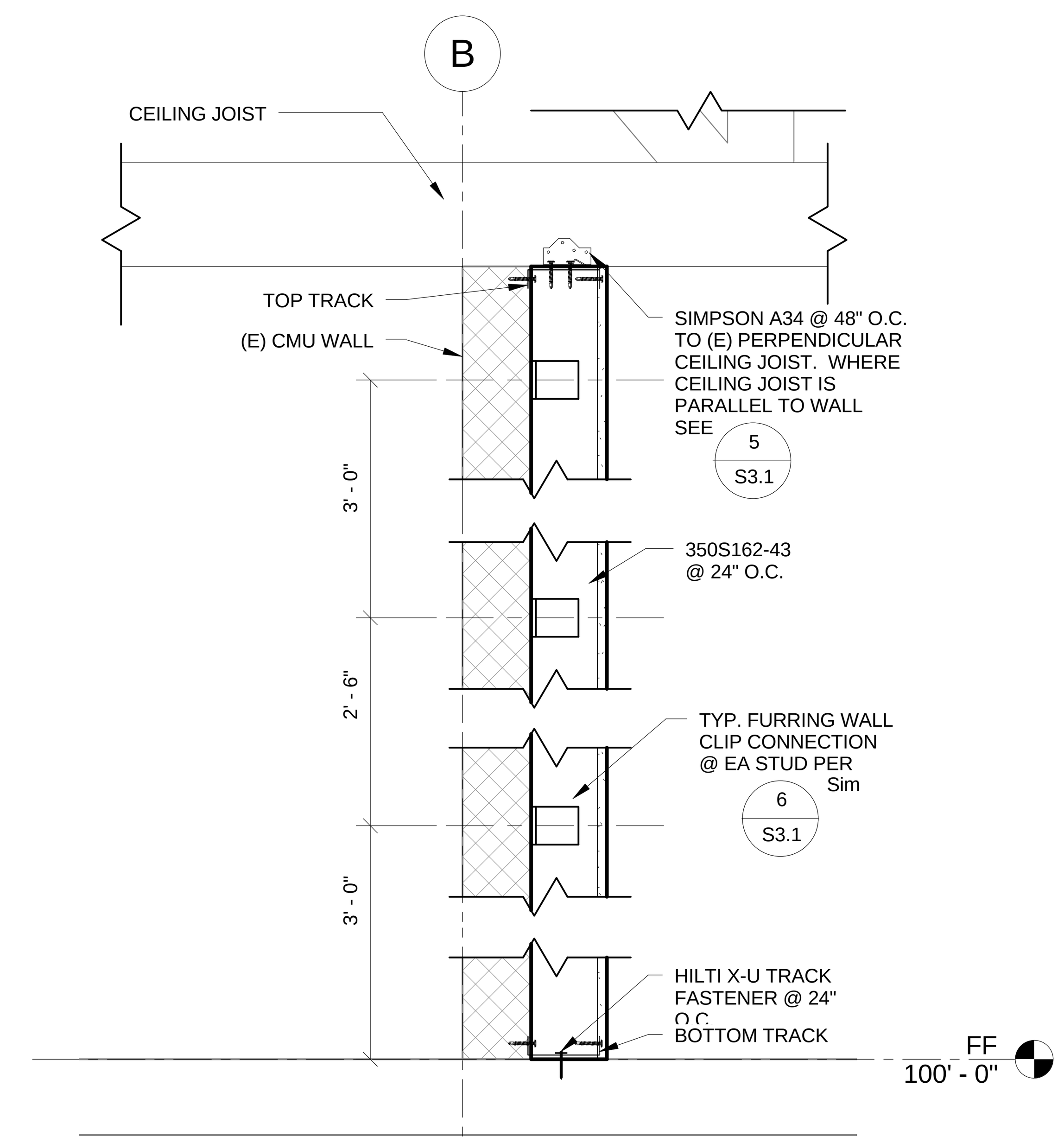
7 NEW SHEARWALL @ EXTERIOR
S3.1 1 1/2" = 1'-0"



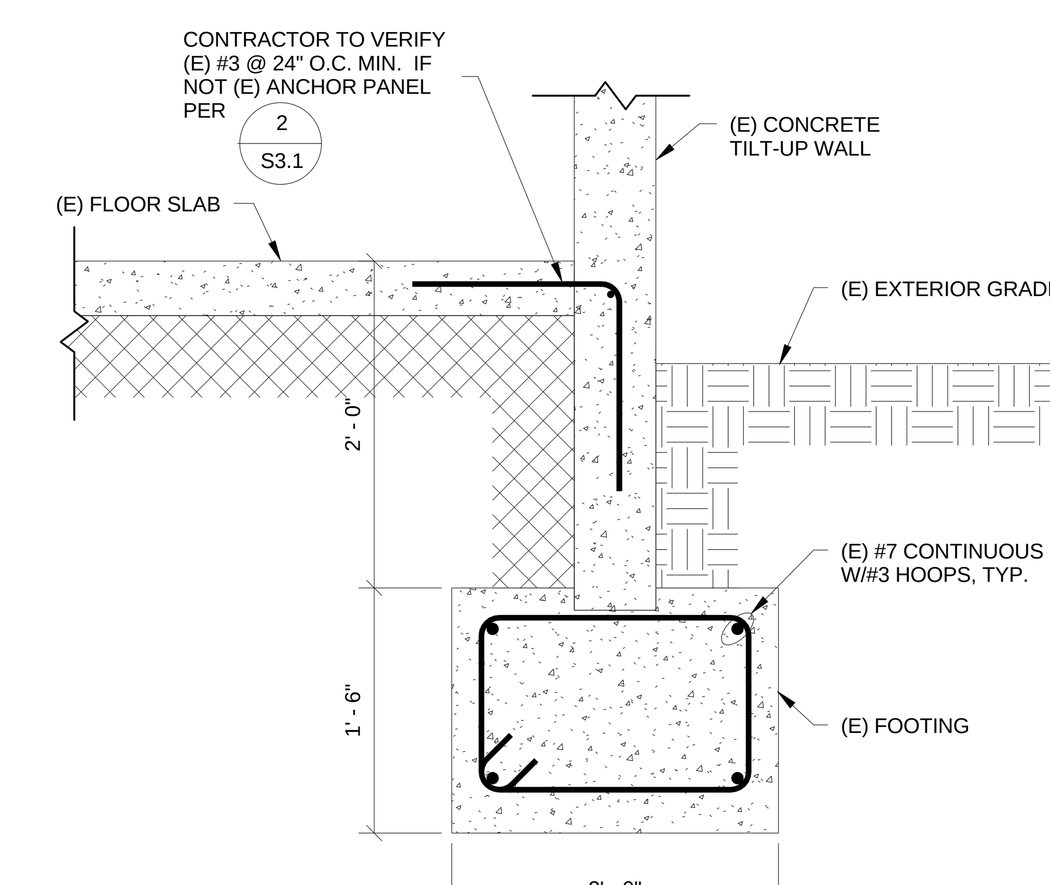
2 SLAB-TO-TILT WALL CONN.
S3.1 1 1/2" = 1'-0"



6 TYP. FURRING WALL CLIP CONN.
S3.1 3" = 1'-0"



4 METAL STUD WALL SECTION
S3.1 1 1/2" = 1'-0"



1 (E) TILT-UP FOOTING
S3.1 1" = 1'-0"

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SECTIONS & DETAILS

ODFW HMSC OFFICE SEISMIC STUDY

OREGON DEPARTMENT OF FISH & WILDLIFE

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Project number	2013007
Date	05/16/2013
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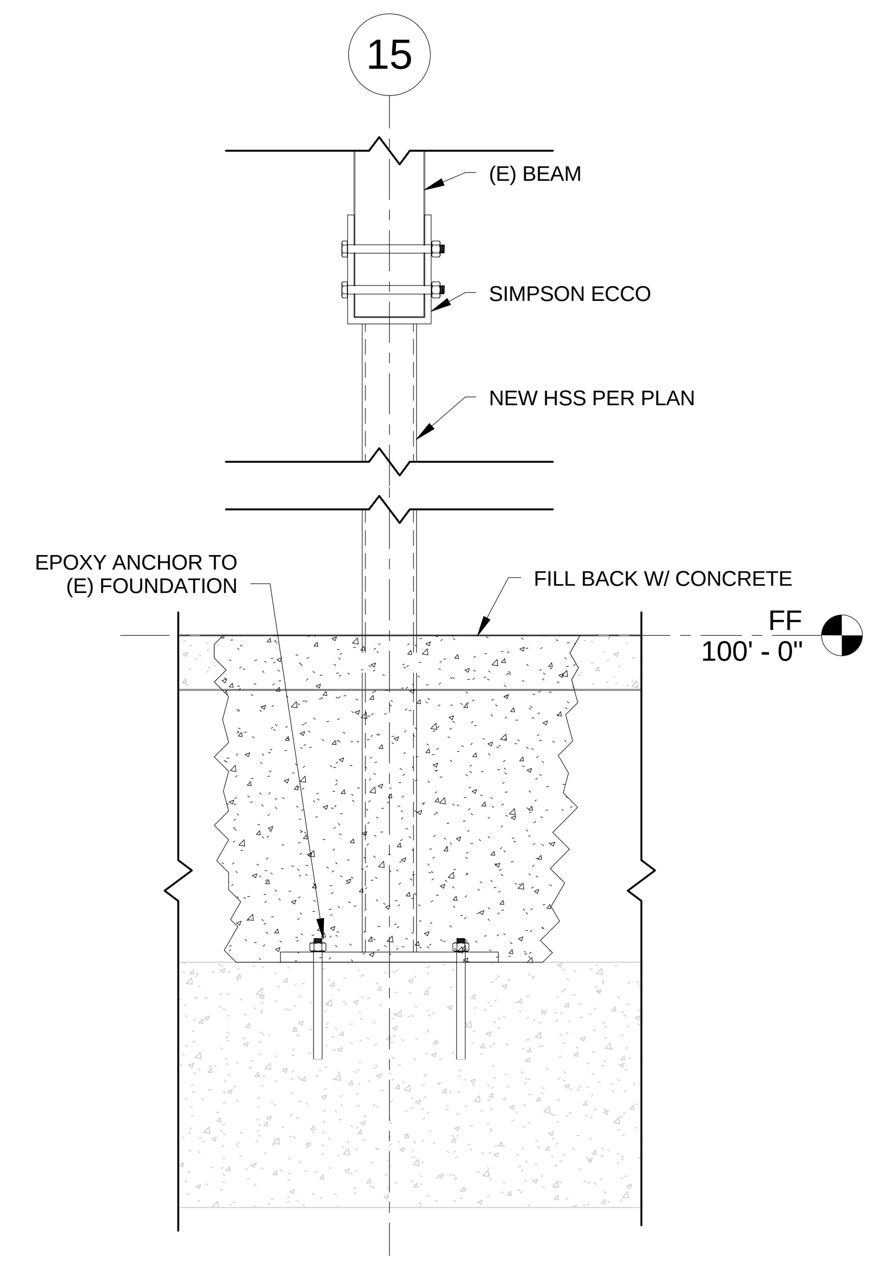
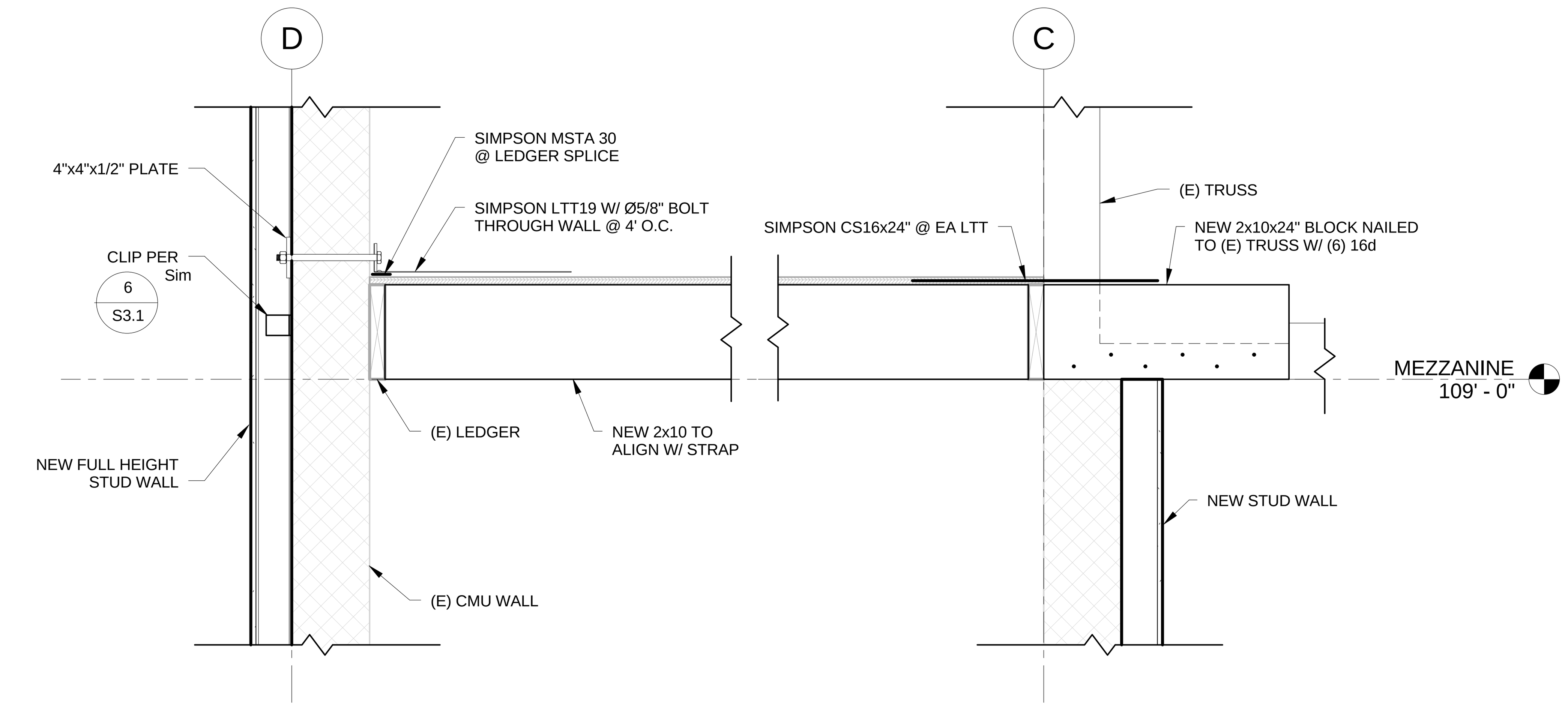
S3.1	
Scale	As indicated

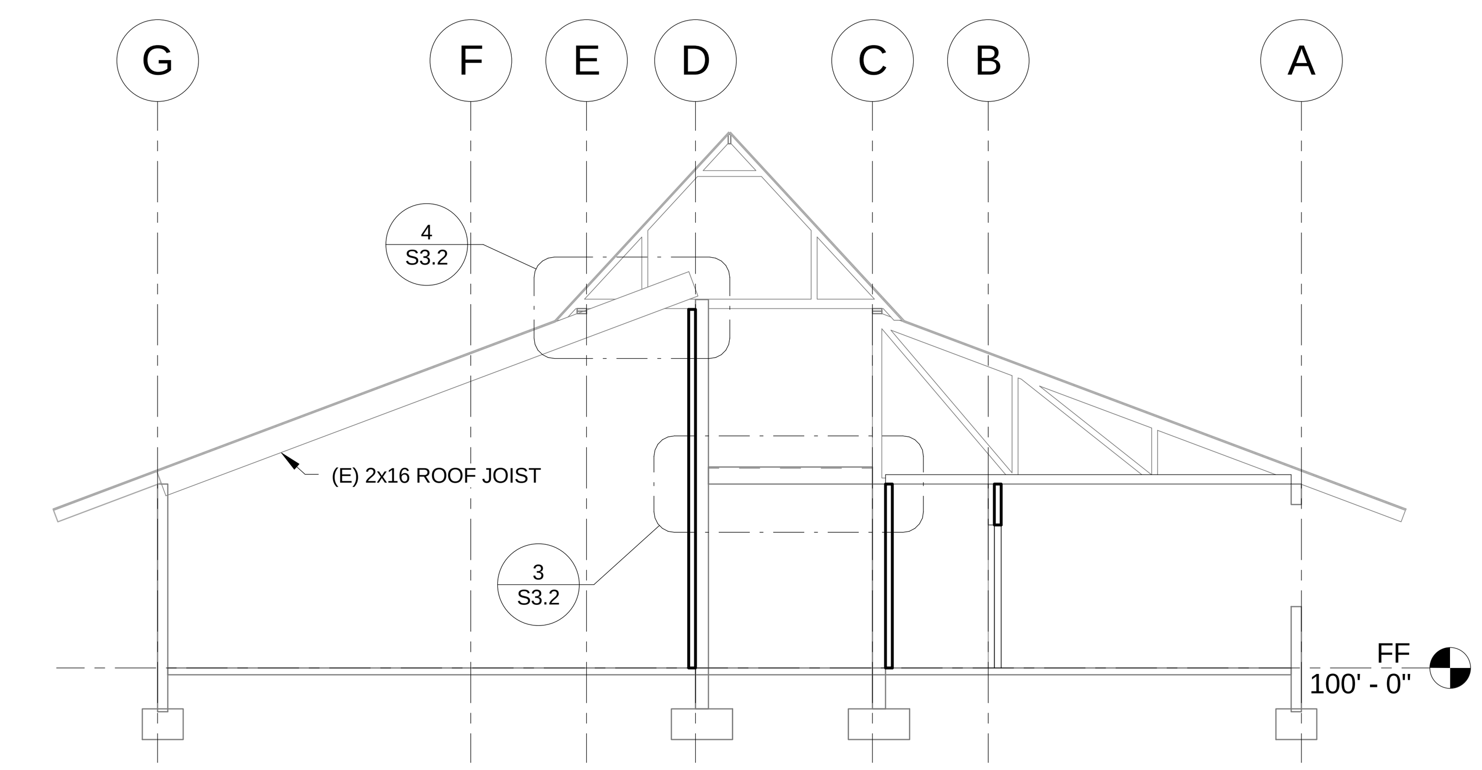
6/22/2013 8:30:25 AM



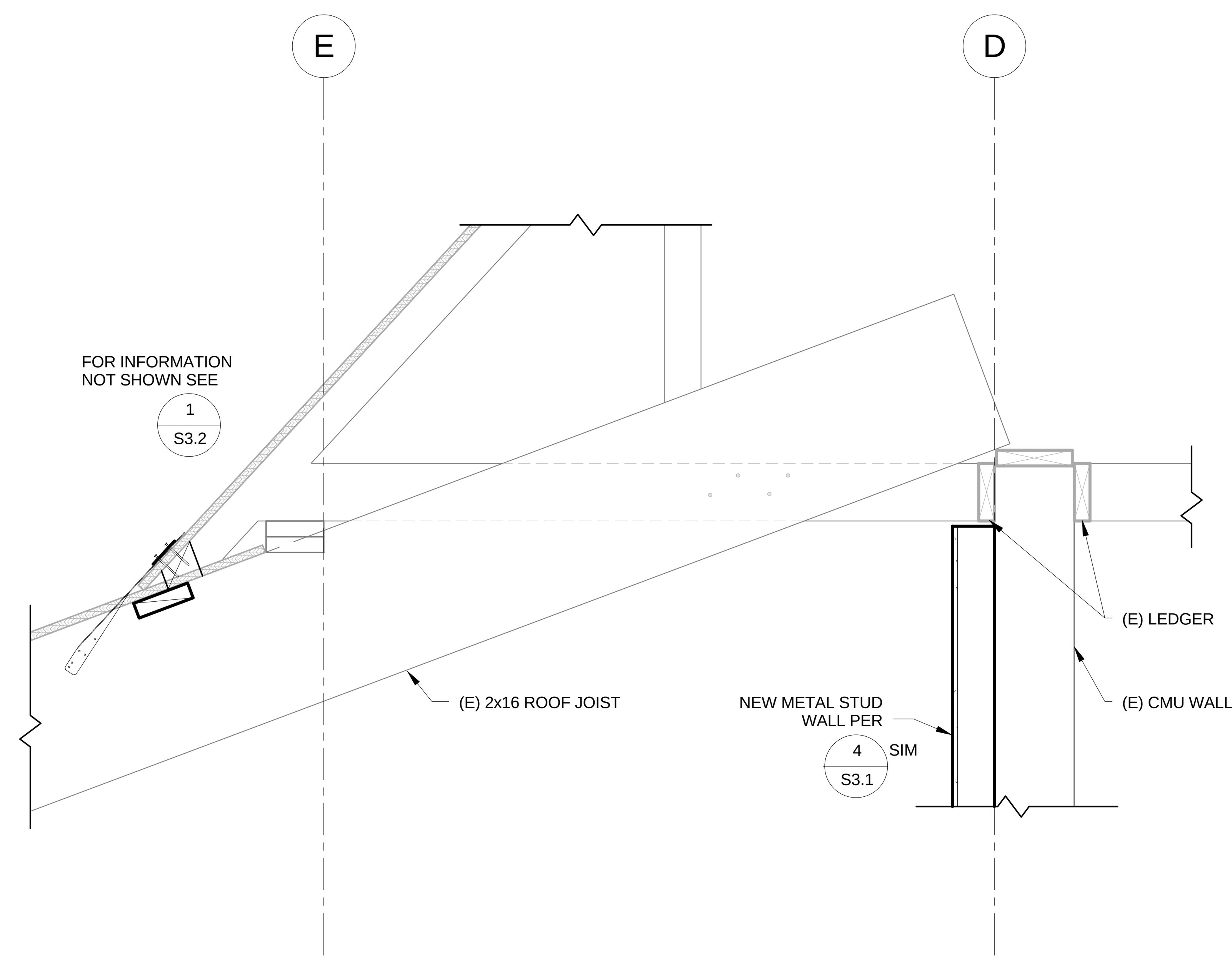
5 GIRDER SUPPORT @ MASONRY
S3.2 1" = 1'-0"



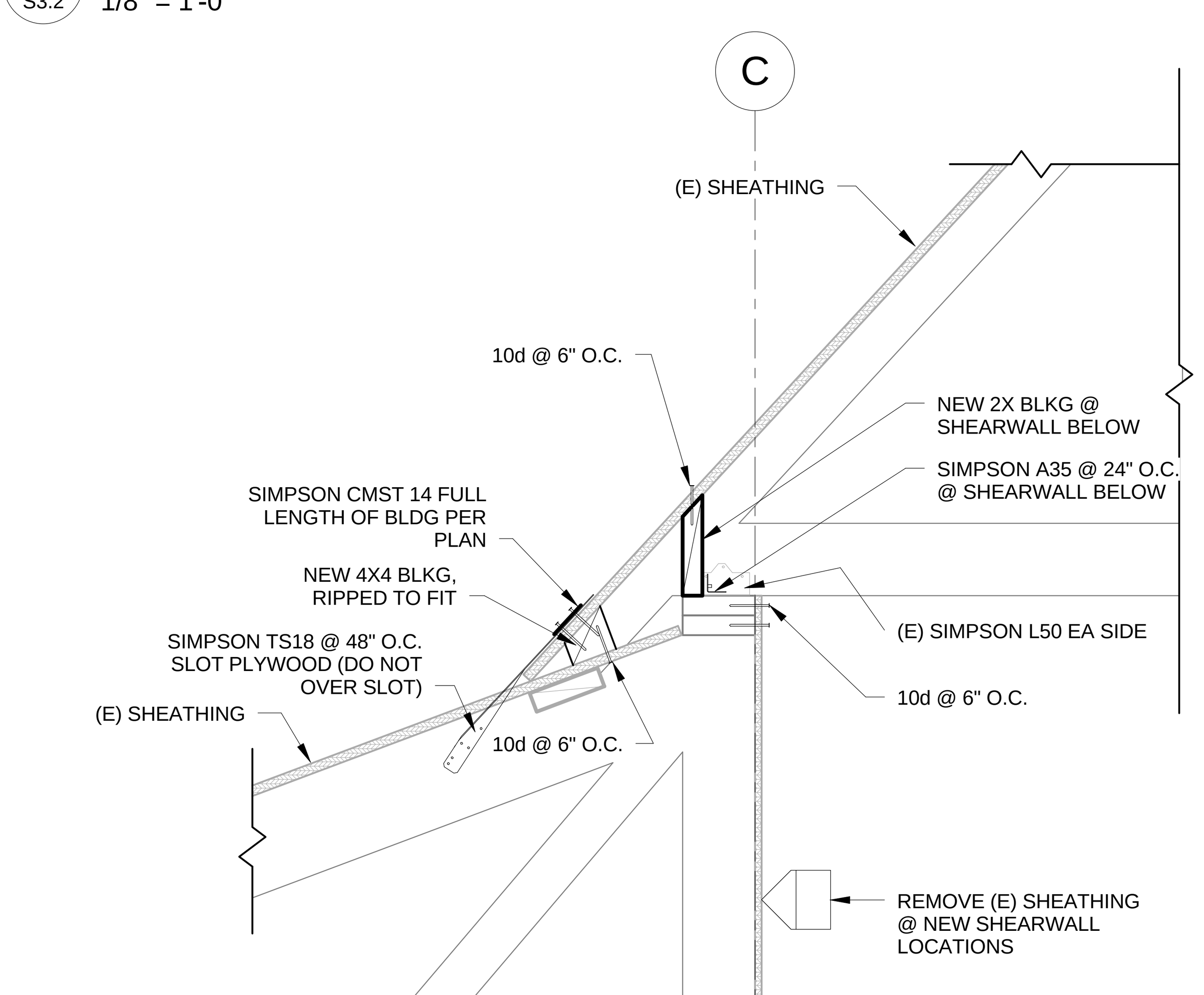
3 WALL SUPPORT @ HIGH BAY
S3.2 1" = 1'-0"



2 BLDG SECTION @ HIGH BAY
S3.2 1/8" = 1'-0"



4 ROOF JOIST CONNECTION @ HIGH BAY
S3.2 1" = 1'-0"



1 HIGH ROOF TO LOW ROOF
S3.2 1" = 1'-0"

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ODFW HMSC OFFICE SEISMIC STUDY

OREGON DEPARTMENT OF FISH & WILDLIFE

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NOT FOR CONSTRUCTION

Project number	2013007
Date	05/16/2013
Drawn by	JNC
Checked by	JJE

S3.2

Scale	As indicated

6/22/2013 8:30:26 AM

Section 10

Engineers Cost Opinion

Pillar Consulting Group, Inc.
1600 SW Western Blvd, Ste #290
Corvallis, Oregon 97333
phone: (541) 752-9202

Project # *2013-007*
Description *ODFW HMSC OFFICE SEISMIC STUDY*
Designer *JTS*
Date *5/13/2013*

Area Basis
8960

ENGINEER'S COST ESTIMATE-Schematic Design							BARE UNIT COST			LABOR	ITEM	DIVISION		$/SF			
DIV	ITEM	SOURCE	DETAIL	NOTES	QTY	LOT	MAT	LAB	EQUIP	OH	COST	BARE	Bare SF	w/OH &P	% of Direct Const. Cost	% of Total Const	MH
1	**General Conditions (Directly by Owner)**										$ -	**$ 85,375.0**	**$9.53**			**20%**	
	Architectural				1			10000			$ 10,000.0						
	Structural Engineering				1			25000			$ 25,000.0						
	MEP			None shown							$ -						
	Geotechnical study			Estimate & shallow ex. Only	1			10000			$ 10,000.0						
	Project management/bid admin				6	MTHS		2500			$ 15,000.0						
	Landuse planning			N/R							$ -						
	Plan review			Plan review only	1		5000				$ 5,000.0						
	Asbestos assessment				1		3000				$ 3,000.0						
	Lead assessment				1		3000				$ 3,000.0						
	Insurance				1		1500				$ 1,500.0						
	Special inspection			Assume about 8 trips	1		8000				$ 8,000.0						
	Bid advertisement				1		1500				$ 1,500.0						
	Legal			Excluded							$ -						
	Moving/relocation			Excluded							$ -						
	Travel expense for professional				2500	miles	0.55				$ 1,375.0						
	Reimbursable expenses			Reprographics & shipping	1		2000				$ 2,000.0						
2	**Existing conditions/ Demo**											**$ 46,781.6**	**$5.22**	**$6.63**	**14%**	**11%**	
										0.00	$ -						
	Chipping to verify #3 dowel/panel anchor	Estimate	1/S3.1		4	EA		50	20	20.00	$ 360.0						
	Saw cut for Type A hold down	RSM	5/S3.0	2 SF*29 /EA	58	SF		19.1	3.03	7.64	$ 1,726.7						
	Saw cut and demo for Type B footing	RSM	6/S3.0	16SF*9EA	144	SF		19.1	3.03	7.64	$ 4,286.9						
	Temporary support and repair of walls at B	Estimate	6/S3.0		36	LF	20	50	5	20.00	$ 3,420.0						
	Remove flooring in materials	RSM			250	SF		0.57		0.23	$ 199.5						
D	Saw cut and demo for HSS column	RSM	5/S3.2	4SF * 4EA	16	SF		19.1	3.03	7.64	$ 476.3						
	Remove mezzanine sheathing	RSM			1400	SF		0.76		0.30	$ 1,489.6						
	Remove sheathing from bldg.	Estimate			8	MH		50		20.00	$ 560.0						
B	Remove sheathing from edge	RSM	3/S3.1		864	SF		0.41		0.16	$ 495.9						
	Remove wall sheathing at mezzanine	RSM	1/S3.2		800	SF		0.76		0.30	$ 851.2						
	Remove ribbon of sheathing @ edge of upper roof	RSM	1/S3.2		480	SF		0.41		0.16	$ 275.5						
A	Remove existing roof	RSM			13400	SF		1		0.40	$ 18,760.0						
	General clean-up			12 weeks * 10h/week	120	MH		35		14.00	$ 5,880.0						
	Asbestos abatement			Excluded						0.00	$ -						
	Lead abatement			Excluded						0.00	$ -						
	Disposal fees	Estimate			200	CY		20		8.00	$ 5,600.0						
	Disposal shipping	Estimate			200	CY		5	5	2.00	$ 2,400.0						
										0.00	$ -						
3	**Concrete**											**$ 27,403.4**	**$3.06**	**$3.88**	**8%**	**6%**	**201.5954**
										0.00	$ -						0
	Repair investigation of wall/dowel anchor	Estimate	1/S3.1		4	EA	10	50	5	20.00	$ 340.0						4
	Repair around type A holddown		5/S3.0		6	CY	162	172	1.16	68.80	$ 2,423.8						20.64
	Footing Type B		6/S3.0		12	CY	197	112	0.76	44.80	$ 4,254.7						26.88
	Line pump & placement for footings				4	h		100	120	40.00	$ 1,040.0						8
	Anchor rods for Type A		5/S3.0		29	EA	10	10		4.00	$ 696.0						5.8
	Epoxy for rod Type A		5/S3.0		29	EA	6.9	11.2		4.48	$ 654.8						6.496
	Drilling for Type A		5/S3.0		29	EA	0.24	19.5		7.80	$ 798.7						11.31
	Anchors rods for Type B		6/S3.0		9		5	2.83		1.13	$ 80.7						0.5094
	Dowels for Type B		6/S3.0	Drilling	144	EA	0.1	10.5		4.20	$ 2,131.2						30.24
	Dowels for Type B		6/S3.0	Epoxy	144	EA	4.61	10.25		4.10	$ 2,730.2						29.52
	Dowels for Type B		6/S3.0	Rods	144	EA	1.65			0.00	$ 237.6						0
D	Footing HSS		5/S3.2		1.5	CY	162	172	1.16	68.80	$ 605.9						5.16
D	Anchor rods for HSS		5/S3.2		16	EA	8.9	24	4.17	9.60	$ 746.7						7.68
B	Epoxy anchor rods		3/S3.1	MH	108	EA	4	21		8.40	$ 3,607.2						45.36
										0.00	$ -						
	Add 50% for access limitations				100.7977			50		20.00	$ 7,055.8						
										0.00	$ -						

	5 Metals												$ 47,937.5	$5.35	$6.79	15%	11%	382.456
											0.00	$ -						0
D	HSS 4x4x columns	RSM		20%		4	EA	258	57	31.8	22.80	$ 1,478.4						4.56
D	HSS 4x4x columns	Estimate		Install		4	EA	40	120	31.8	48.00	$ 959.2						9.6
	LG wall framing floor 1 - Bearing and/or Shear	RSM	4/S3.1	9' walls	350S16243	438	LF	7.05	6.85		2.74	$ 7,288.3						60.006
C	LG wall framing floor 1 - Partition	RSM	4/S3.1	9' walls	350S16243	497	LF	7.05	6.85		2.74	$ 8,270.1						68.089
	LG wall framing floor 1	RSM	4/S3.1	18' walls	350S16243	92	LF	15.8	10.7		4.28	$ 2,831.8						19.688
	LG clips - Bearing and/or Shear	RSM	4/S3.1	Concrete anchor		737	EA	0.2	1.2		0.48	$ 1,385.6						17.688
C	LG clips - Partition	RSM	4/S3.2	Concrete anchor		948	EA	0.2	1.2		0.48	$ 1,782.2						22.752
	LG Clips - Bearing and/or Shear	RSM	4/S3.1	Clip and ancho Based on web stiffe		737	EA	0.85	2.99		1.20	$ 3,711.5						44.0726
C	LG Clips - Partition	RSM	4/S3.1	Clip and anchor		948	EA	0.85	2.99		1.20	$ 4,774.1						56.6904
	Simpson A34 - Bearing and/or Shear	RSM	4/S3.1	Framing angle		111	EA	2.4	2.05		0.82	$ 585.0						4.551
C	Simpson A34 - Partition	RSM	4/S3.2	Framing angle		149	EA	2.4	2.05		0.82	$ 785.2						6.109
	Anchors for Type A shear wall	RSM	5/S3.0	HDU-4		29		28	25		10.00	$ 1,827.0						14.5
	Anchors for Type B shear wall	RSM	6/S3.0			9		28	25		10.00	$ 567.0						4.5
	Titen Anchors	RSM	3/S3.0	3/8"	Drill	250		0.05	5.7		2.28	$ 2,007.5						28.5
	Titen Anchors	RSM	3/S3.0	3/8"	Bolt	250		0.69	4.23		1.69	$ 1,653.0						21.15
											0.00	$ -						
	Add 30% for access limitations			MH		114.7368			50		20.00	$ 8,031.6						
											0.00	$ -						
	6 Wood & Plastic Framing												$ 50,928.4	$5.68	$7.22	15%	12%	399.7422
	Sheathing for 1st floor shear walls	RSM	3/S3.0	310 LF	1/2" CDX	2790	SF	0.58	0.52		0.21	$ 3,649.3						29.016
B	2x10 Cont. block for Shear wall ties	RSM	2/S3.0	6 lines @ 56'	2x labor	336		1.08	1.6		0.64	$ 1,115.5						10.752
B	CMST 12x70	RSM	2/S3.0			10	EA	33	16.8		6.72	$ 565.2						3.36
B	CMST 14x60	RSM	2/S3.0			2	EA	20.5	16.8		6.72	$ 88.0						0.672
B	Mezzanine sheathing	RSM	2/S3.0	3/4" Underlayment		1400	SF	1.24	0.45		0.18	$ 2,618.0						12.6
	Truss shear wall sheathing	RSM	4/S3.0		3x labor	500	SF	0.58	1.56		0.62	$ 1,382.0						15.6
	Truss stud blk'g	RSM	4/S3.0		2x labor	400	LF	0.54	3.4		1.36	$ 2,120.0						27.2
	New 2x6 T/chord	RSM	4/S3.0		3x labor	220	LF	0.58	2.64		1.06	$ 940.7						11.616
	Framing anchors	RSM	4/S3.0	Framing angle		150	EA	2.4	2.05		0.82	$ 790.5						6.15
B	2x6 Perimeter truss blk'g	RSM	3/S3.1	2x6 x1	3x labor	216	EA	0.595	3.98		1.59	$ 1,332.1						17.1936
B	Framing anchor	RSM	3/S3.1	Framing angle		216	EA	2.4	2.05		0.82	$ 1,138.3						8.856
B	2x4 Roof blk'g	RSM	3/S3.1	For strap	2x labor	432	LF	0.595	2.65		1.06	$ 1,859.8						22.896
B	CMST roof strapping- Lower roof perimeter	RSM	3/S3.1	CMST		432	LF	4.1	1.4		0.56	$ 2,617.9						12.096
B	Replace plywood at roof perimeter	RSM	3/S3.1	1./2" x 2'	2x labor	864	SF	0.58	1.02		0.41	$ 1,734.9						17.6256
B	Replace freeze blk'g	RSM	3/S3.1	2x6 x2-4		432	LF	0.595	2.65		1.06	$ 1,859.8						22.896
	OOP blk'g for metal stud walls - bearing and/or shear	RSM	5/S3.1	Note clips covered LG section		65	LF	0.595	2.65		1.06	$ 279.8						3.445
C	OOP blk'g for metal stud walls - partition	RSM	5/S3.2	Note clips covered LG section		87	LF	0.595	2.65		1.06	$ 374.5						4.611
	OOP bracing/Blk'g for stud walls - bearing and/or shear	RSM	5/S3.1	Angle brace/top block		324	LF	0.595	2.65		1.06	$ 1,394.8						17.172
C	OOP bracing/Blk'g for stud walls - partition	RSM	5/S3.2	Angle brace/top block		436	LF	0.595	2.65		1.06	$ 1,877.0						23.108
	Add'l freeze blk'g @ perimeter shear wall	RSM	7/S3.1			80	LF	1.32	2.65		1.06	$ 402.4						4.24
	Framing anchor at perimeter shear wall	RSM	7/S3.1			60	EA	2.4	2.05		0.82	$ 316.2						2.46
	2x12 blk'g ledge at mezzanine shear wall	RSM	8/S3.1			100	LF	1.32	2.65		1.06	$ 503.0						5.3
	2x4 blk'g at mezzanine shearwall	RSM	8/S3.1			100	LF	0.595	2.65		1.06	$ 430.5						5.3
	MSTA Strap splice at mezzanine shear wall	RSM	8/S3.1			100	LF	4.1	1.4		0.56	$ 606.0						2.8
	Framing anchor @ mezzanine shear wall	RSM	8/S3.1			75	EA	2.4	2.05		0.82	$ 395.3						3.075
	Shear wall Sheathing- Second floor	RSM	8/S3.1			800	SF	0.58	0.52		0.21	$ 1,046.4						8.32
	Mezzanine level CMST 14-EW	RSM	1/S1.1	CMST-14		30	LF	4.1	1.4		0.56	$ 181.8						0.84
	Upper roof strap	RSM	1/S1.2	CMST-14		306	LF	4.1	1.4		0.56	$ 1,854.4						8.568
	Upper roof strap blk'g	RSM	1/S1.2			68	LF	0.595	2.65		1.06	$ 292.7						3.604
	Upper roof strap blk'g 4x4	RSM	1/S3.2			240	LF	1.32	2.65		1.06	$ 1,207.2						12.72
	Twist strap	RSM	1/S3.2			60	EA	7	20		8.00	$ 2,100.0						24
	New freeze blk'g	RSM	1/S3.2			100	LF	1.32	2.65		1.06	$ 503.0						5.3
	Framing anchors	RSM	1/S3.2			50	EA	2.4	2.05		0.82	$ 263.5						2.05
	Replace sheathing at upper roof	RSM	1/S3.2		2x labor	480	SF	0.58	1.02		0.41	$ 963.8						9.792
B	2x10 Block @ high bay	RSM	3/S3.2		2x labor	26	LF	1.08	1.6		0.64	$ 86.3						0.832
B	2x10 Joist-new @ high bay	RSM	3/S3.2		2x labor	169	LF	1.08	1.6		0.64	$ 561.1						5.408
B	New Joist hangers for 2x10	RSM	3/S3.2		Labor est	26	EA	20	10		4.00	$ 884.0						5.2
B	CS16x24	RSM	3/S3.2			13	EA	5	2.8		1.12	$ 116.0						0.728
B	Drilling for LTT19	RSM	3/S3.2			13	EA	0.1	10		4.00	$ 183.3						2.6
B	LTT-19	RSM	3/S3.2			13	EA	14	14		5.60	$ 436.8						3.64
B	Bolts for LTT-19	RSM	3/S3.2	w/plate washer		13	EA	10	5		2.00	$ 221.0						1.3
B	MSTA strap at splice	RSM	3/S3.2			50	LF	4.1	1.4		0.56	$ 303.0						1.4
	Verify roof nailing	RSM		General verification & some nails		13400	SF		0.05		0.02	$ 938.0						13.4
											0.00	$ -						
	Add 30% for access limitations			Labor only		119.92266	MH		50		20.00	$ 8,394.6						
											0.00	$ -						

	7 Thermal & Moisture Protection											**$ 53,857.2**	**$6.01**	**$7.63**	**16%**	**13%**
										0.00	$ -					
A	Roofing	RSM		Architectural comp.		13400	SF	1.96	1.23	0.49	$ 49,338.8					
B	Underlayment	RSM		30# felt		13400	SF	0.1035	0.07	0.03	$ 2,700.1					
B	Edge underlayment	RSM		Self adhering		948	SF	0.78	0.139	0.06	$ 923.9					
A	Ridge shingles	RSM				260	LF	1.9	1.1	0.44	$ 894.4					
										0.00	$ -					
	8 Doors & Windows											**$ 60,338.2**	**$6.73**	**$8.55**	**18%**	**14%**
										0.00	$ -					
	Attic access doors	RSM				5	EA	430	45	18.00	$ 2,465.0					
E	Exterior window framing	RSM	1/S2.0		Proj N	570	LF	13.1	7.05	2.82	$ 13,092.9					
E	Exterior window glazing	RSM	1/S2.0	Glazing	Proj N	675	SF	19.25	9.25	3.70	$ 21,735.0					
E	Exterior window framing	RSM	2/S2.0		Proj S-E	253	LF	13.1	7.05	2.82	$ 5,811.4					
E	Exterior window glazing	RSM	2/S2.0	Glazing	Proj S-E	293	SF	19.25	9.25	3.70	$ 9,434.6					
E	Remove existing Glazing & frames	RSM				23	Opening		56.5	22.60	$ 1,819.3					
E	Additional preparation of existing openings	Estimate				23		50	150	60.00	$ 5,980.0					
										0.00	$ -					
										0.00	$ -					
										0.00	$ -					
										0.00	$ -					
	9 Finishes											**$ 37,612.0**	**$4.20**	**$5.33**	**11%**	**9%**
										0.00	$ -					
	Repair/replace floor at investigations		1/S3.1			14	SF	2	2	0.80	$ 67.2					
	Floor repairs for Footing A		5/S3.0	VCT		80	SF	2	2	0.80	$ 384.0					
	Floor repairs for Footing B		6/S3.0			200	SF	2	2	0.80	$ 960.0					
D	Floor repairs for HSS	RSM	5/S3.2			64	SF	2	2	0.80	$ 307.2					
	GWB-1 side for LG first floor walls - bearing and/or shear	RSM	4/S3.1	Level 4 type X		4406	SF	0.34	0.74	0.30	$ 6,062.7					
C	GWB-1 side for LG first floor walls - partition	RSM	4/S3.2	Level 4 type X		5665	SF	0.34	0.74	0.30	$ 7,795.0					
	Paint for LG first floor walls - bearing and/or shear walls	RSM	4/S3.1	2 coats/roller		4406	SF	0.12	0.39	0.16	$ 2,934.4					
C	Paint for LG first floor walls - partition	RSM	4/S3.2	3 coats/roller		5665	SF	0.12	0.39	0.16	$ 3,772.9					
	GWB wrap at door openings - bearing and/or shear walls	RSM				10	EA	21	50	20.00	$ 910.0					
C	GWB wrap at door openings - partition	RSM				28	EA	21	50	20.00	$ 2,548.0					
	GWB ceiling patch - bearing and/or shear wall	Estimate	4//S3.1			438	LF	1	2	0.80	$ 1,664.4					
C	GWB ceiling patch - partition	Estimate	4//S3.1			589	LF	1	2	0.80	$ 2,238.2					
	GWB wraps at window openings - bearing and/or shear	Estimate				2	EA	40	50	20.00	$ 220.0					
E	GWB wraps at window openings - glazing replace	Estimate			Repairs	4	EA	40	50	20.00	$ 440.0					
	Paint at wraps - bearing and/or shear	Estimate				12	EA	15	30	12.00	$ 684.0					
C	Paint at wraps - partition	Estimate				28	EA	15	30	12.00	$ 1,596.0					
E	Paint at wraps - glazing	Estimate				4	EA	15	30	12.00	$ 228.0					
	Misc. Repairs & touch up - bearing and/or shear	Estimate				20	MH	50	50	20.00	$ 2,400.0					
	Misc. Repairs & touch up - partition	Estimate				20	MH	50	50	20.00	$ 2,400.0					
										0.00	$ -					
	10 Specialty											**$ -**	**$0.00**	**$0.00**	**0%**	**0%**
										0.00	$ -					
	15 Mechanical											**$ -**	**$0.00**	**$0.00**	**0%**	**0%**
										0.00	$ -					
										0.00	$ -					
	16 Electrical											**$ -**	**$0.00**	**$0.00**	**0%**	**0%**
										0.00	$ -					
										0.00	$ -					
										0.00	$ -					
	22 Plumbing											**$ -**	**$0.00**	**$0.00**	**0%**	**0%**
											$ -					
											$ -					
										0.00	$ -					
	31 Excavation											**$ 5,417.3**	**$0.60**	**$0.77**	**2%**	**1%**
										0.00	$ -					
	Excavation for Type A hold-down	RSM	5/S3.0	Hand excavation		8	BCY		71	28.40	$ 795.2					
	Excavation for Type B hold-down	RSM	6/S3.0	Hand excavation		15	BCY		71	28.40	$ 1,491.0					
D	Excavation for HSS	RSM	5/S3.2	Hand excavation		1.5	BCY		71	28.40	$ 149.1					
	Remove excavated material from building	Estimate				30	CY		71	28.40	$ 2,982.0					
	Haul-off		See demo							0.00	$ -					

32 Site improvements											**$ -**	**$0.00**	**$0.00**	**0%**	**0%**
									0.00	$ -					
									0.00	$ -					
33 Utilities											**$ -**	**$0.00**	**$0.00**	**0%**	**0%**
									0.00	$ -					
									0.00	$ -					
1 Contractor General Conditions											**$ 97,563.4**	**$10.89**	**$13.83**		**23%**
Contractor direct subtotal			Total M-U					29%		$ 330,275.6	**$ 330,275.6**	**$36.86**	**$46.81**	100%	
Direct overhead (including mobilization)			Excludes non-contract general conditions					10%		$ 33,027.6					
General overhead & profit			Excludes non-contract general conditions					10%		$ 33,027.6					
Sub contractor OH&P			Excludes non-contract general conditions					7%		$ 23,119.3					
Bond			Excludes non-contract general conditions					2%		$ 8,389.0					
Labor overhead assumption			Overhead percentage on direct labor cost					40%							
Contract Total											**$ 427,839.0**				
General Conditions											**$ 85,375.0**				
Project Subtotal											**$ 513,214.0**				
Contingency								20%			$ 102,642.8		**$/SF**		
Total Project Cost Opinion						**Total**					**$ 615,856.8**		**$68.73**		
						Construction only w/Cont.					**$ 513,406.8**		**$57.30**		
											$ 85,567.8				
Alternate Items											**Bare Cost**			**w/OH&P**	**W/Contingency**
Alternate Hold downs											**$ 14,195.0**			**$ 18,311.50**	**$ 21,973.80**
									0.00	$ -					
Alternate hold-down	RSM	2/S3.1	10#/EA	130	EA	7.52	27.7	3	11.08	$ 6,409.0					
Drilling holes	RSM	2/S3.1		780	EA	0.05	4.25		1.70	$ 4,680.0					
Anchors	RSM	2/S3.1		780		0.51	2.48		0.99	$ 3,106.0					
									0.00	$ -					
									0.00	$ -					

<u>Exclusion/notes</u>

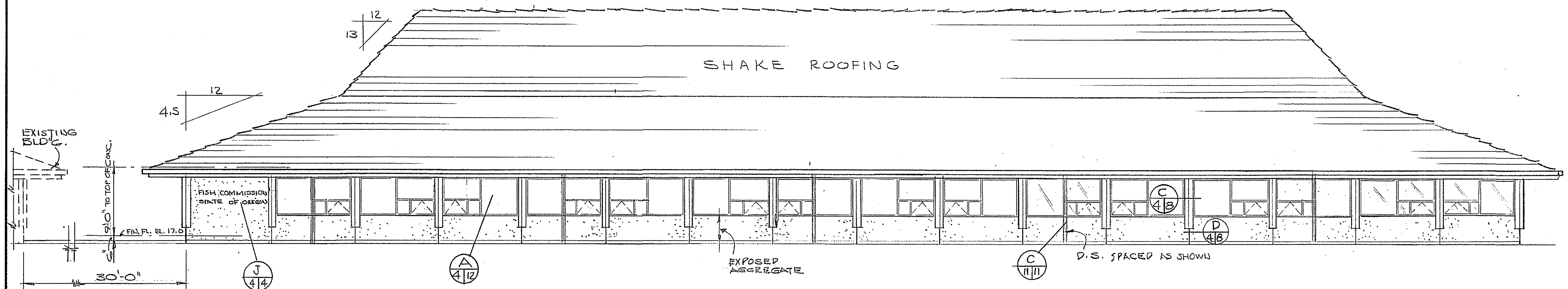
More demo-as required for access maybe required. This is a variable
Electrical extensions may be required where metal stud walls are added to masonry walls
Extent of floor repairs may be greater than assumed
Extent of ceiling repairs may be greater than assumed in trying to match the existing
HVAC modification may be required where metal stud walls are added to masonry walls
No trims, base boards, etc. have been included for new partitions
Removal and replacement of existing shelving and cabinets.
ACM (asbestos containing material) abatement is excluded
Lead paint abatement is excluded
Bracing of bookshelves, cabinets and other elements subject to falling is excluded
Assumes the building is vacant during work. Cost to relocate employees is not included.

<u>MAJOR SUBPROJECT BREAKOUT SUMMARY</u>

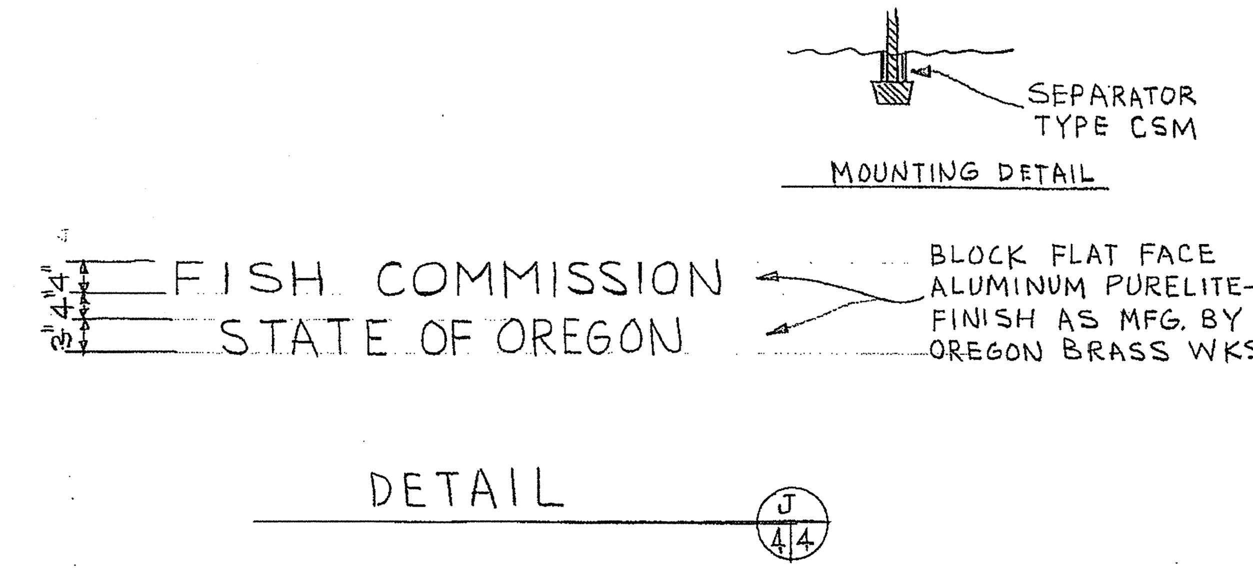
Letter Designations Address the following major seismic deficiency mitigation strategies			Bare	W/OH&P	W/cont
A	Reroof		$ 68,993.20	$ 89,001.23	$ 106,801.47
B	Interior and Exterior Wall Out of Plane	Must do reroof	$ 25,448.12	$ 32,828.08	$ 39,393.69
C	Partition Failure		$ 35,813.32	$ 46,199.19	$ 55,439.02
D	Girder Support at Masonry		$ 4,722.88	$ 6,092.52	$ 7,311.02
E	Glazing		$ 58,541.21	$ 75,518.16	$ 90,621.79

* This can also be used to subtract certain items from the tota
It is anticipated that item B would not be implemented without item A
Owner provided general conditions are not included.

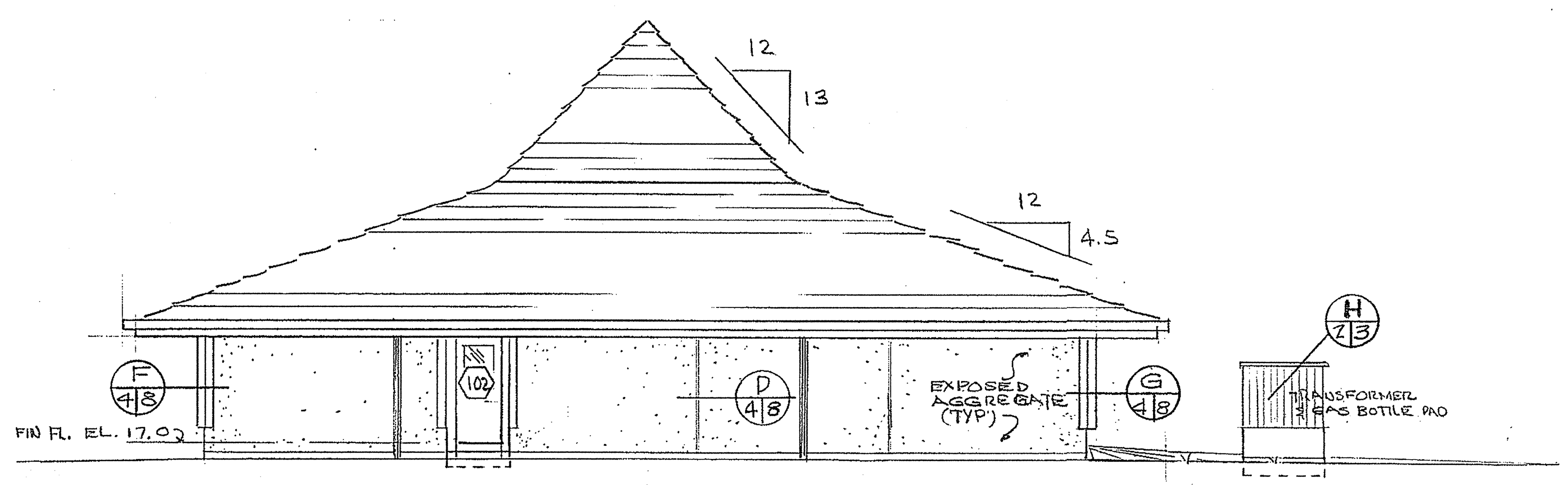
Section 11
Record Drawings



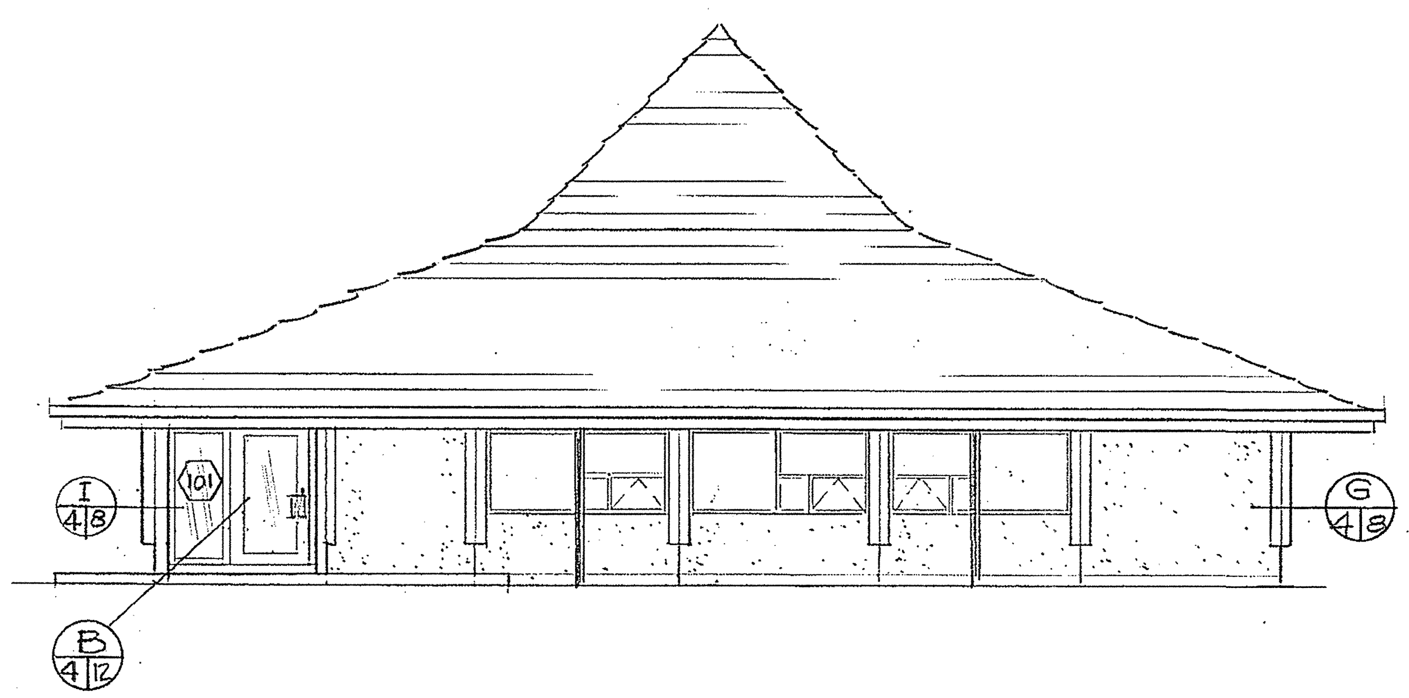
·NORTH ELEVATION·
SCALE: 1/8" = 1'-0"



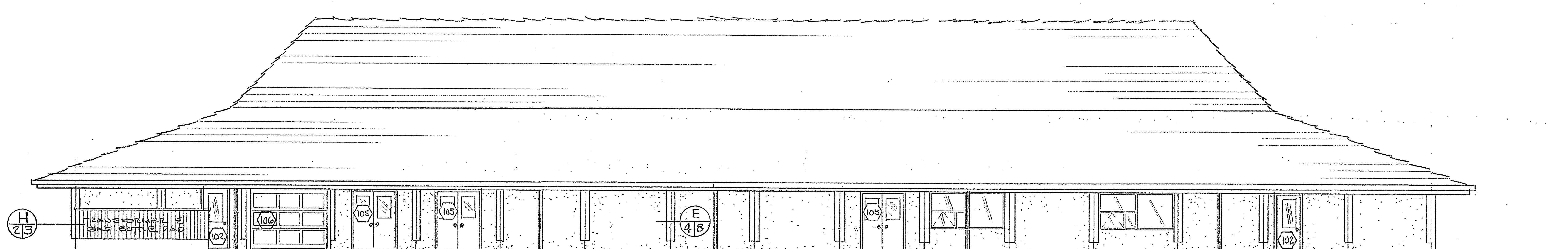
DETAIL



·WEST ELEV.·
SCALE: 1/8" = 1'-0"



·EAST ELEV.·
SCALE: 1/8" = 1'-0"



·SOUTH ELEVATION·
SCALE: 1/8" = 1'-0"

PILLAR 203007

FISH COMMISSION STATE OF OREGON	
NEWPORT MARINE LABORATORY	
ELEVATIONS	
DATE AUG. 26, 1969	APP'VD Robert W. Schoning FISHERIES DIRECTOR
DESIGN BY CVR	APP'VD [signature] DIRECTOR OF ENGR.
DRAWN BY CVR	FILE NO. R4-6914 SHT. 4 OF 23
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REVISIONS

REGISTERED PROFESSIONAL ENGINEER 4884 OREGON JULY 9, 1962 LEW K. NEUBAUER

SHANNON & COMPANY

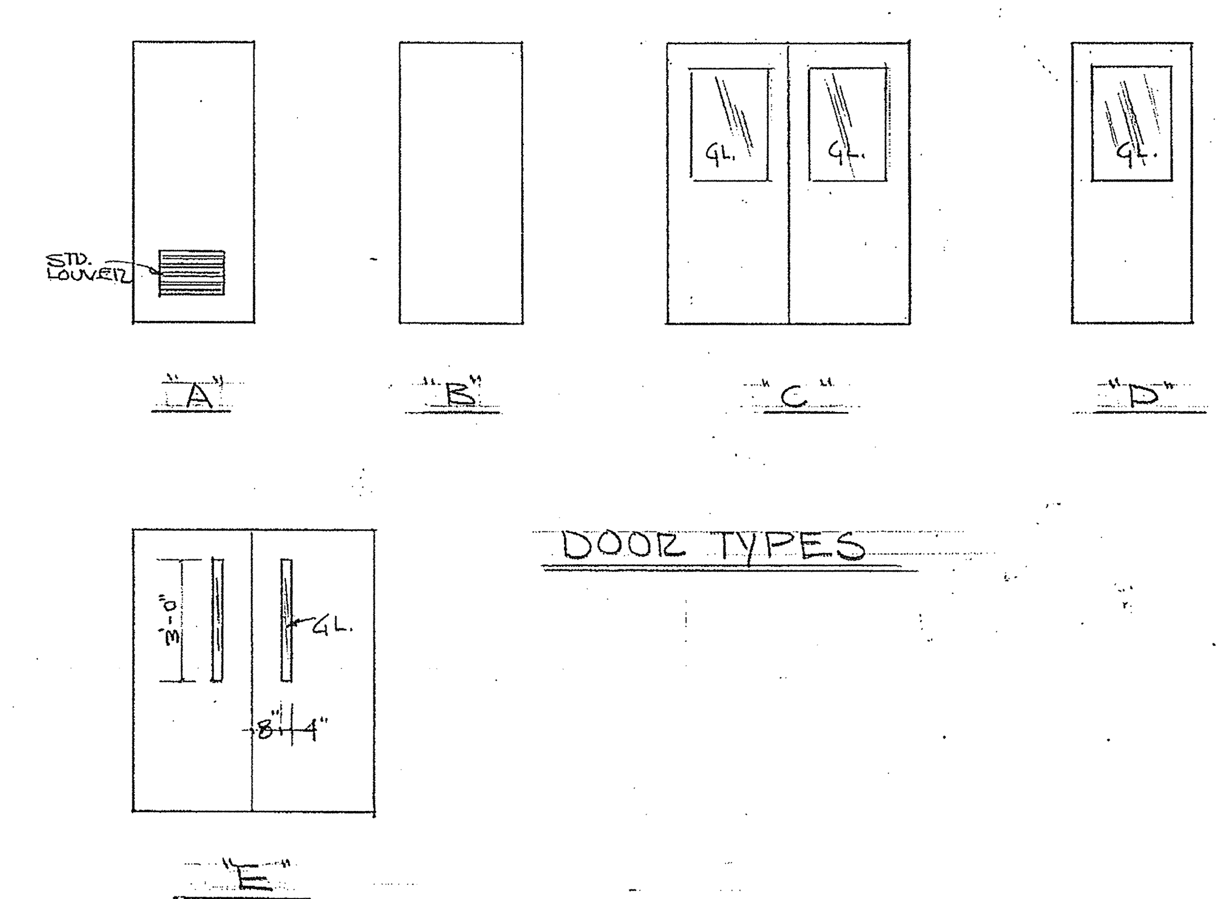
FLOOR PLAN

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

ROOM FINISH SCHEDULE													
ROOM	FLOOR: CONCRETE	FLOOR: TILE ASB. VINYL	FLOOR: CARPETING	BASE: RUBBER	BASE: CONC. (SEE DETAIL)	WALL: CONC. BLK. (PAINT)	WALL: GYPSUM BOARD	WALL: PANELING	WALL: UNPAINTED PLY	CEILING: FIN. GYP. BOARD	CEILING: NONE	CEILING: UNFIN. GYP. BOARD	CEILING: PAINTED GYP. BD.	REMARKS
ENTRANCE AREA		X		X				X		X				
SECRETARY RECP.		X		X		X		X		X				PANEL OUTSIDE WALL ONLY
SUPV. OFFICE #1		X		X		X				X				
LIBRARY		X		X		X				X				
OFFICES #2 - #16		X		X		X				X				
CORRIDOR #2		X		X		X				X				
" #1		X		X		X				X				
CONFERENCE R'M.		(1)	(1)	X				X		X				(1) SEE SPEC. FOR ALTERNATE
WOMENS REST R'M.		X		X		X							X	
MENS " "		X		X		X							X	
SHOWER R'M	X			X		X							X	
SHOWER STALL	X				X	X							X	
JANITOR R'M.	X					X							X	
CHEM LAB & BAL. RM.		X				X							X	
WET LAB	X					X							X	
AQUARIA R'M.	X					X							X	
CONTROL TEMP. #1	X					X							X	
" " #2	X					X							X	
RESEARCH AREA	X					X							X	
HALL #1	X					X							X	
" #2	(2)					X							X	(2) ON RESEARCH AREA SIDE OF DR.
SCALE READING R'M.		X		X		X								
MACHINE R'M.	X					X						X		
HALL #3	X					X							X	
SHOP	X					X							X	
STORAGE AREA	X										X			
*ATTIC AREA									X			X		SEE DWG DETAILS

SHANNON & COMPANY

DOOR SCHEDULE								
NO.	SIZE	THICK	TYPE	FRAME	DETAIL SHT.	REQ. NO.	HARDWARE (SEE SPEC'S.)	REMARKS
101	3070	1¾"	—	—		1	D.A. CLOSER	ALUM. STORE. FRONT
102	3070	"	"D"	M		3	S.A. "	METAL FRAME & DOOR
103	6070	"	"E"	W		1	PUSH PLATE HANDLE S.A. CLOSER	WOOD FRAME - WOOD DOOR
104	2870	"	"B"	M		23	S.A. CLOSER	METAL FRAME & WOOD DR.
105	5470	"	"C"	M		3	S.A. CLOSER	" " & DOOR
106	9-0 x 8-0	—	—	W		1	—	OVERHEAD DOOR OR EQ.
107	2470	1¾	"A"	W		2	S.A. CLOSER	METAL FRAME & WOOD DR.
108	3070	"	"A"	M		1	" "	" " & DOOR
109	"	"	"B"	M		4	" "	" " & "
110	AS DETAILED		—			1		FOLDING DOOR
111	" "		—			1		" "
112	SHOWER CURTIN	—	—	—		1		SEE DETAIL
113	2470	1¾"	"C"	M		2		METAL FRAME - METAL DR.
114	2870	1¾"	"A"	M		2		METAL FRAME - WOOD DR.



DOOR TYPES

NOTE: ALL DOORS MUST SWING AS SHOWN ON DRAWINGS AND BEVELED FOR SWING, LEFT OR RIGHT HAND.

REGISTERED PROFESSIONAL ENGINEER 4864 OREGON JULY 9, 1952 ELLY K. NEUBAUER

REVISIONS

FISH COMMISSION
STATE OF OREGON

NEWPORT MARINE LABORATORY

MAIN FLOOR PLAN

DATE AUG. 26, 1969	APPV'D Robert W. Schoning FISHERIES DIRECTOR		
DESIGN BY EKN	APPV'D EM DIRECTOR OF ENGR.		
DRAWN BY CVR	FILE NO. R4-69.14	SHT. 5	OF 23
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DATE AUG. 26, 1969	APPV'D Robert W. Schoning FISHERIES DIRECTOR
DESIGN BY CVR	APPV'D [signature] DIRECTOR OF ENGR.
DRAWN BY CVR	FILE NO. R4-6914 SHT. 6 OF 23
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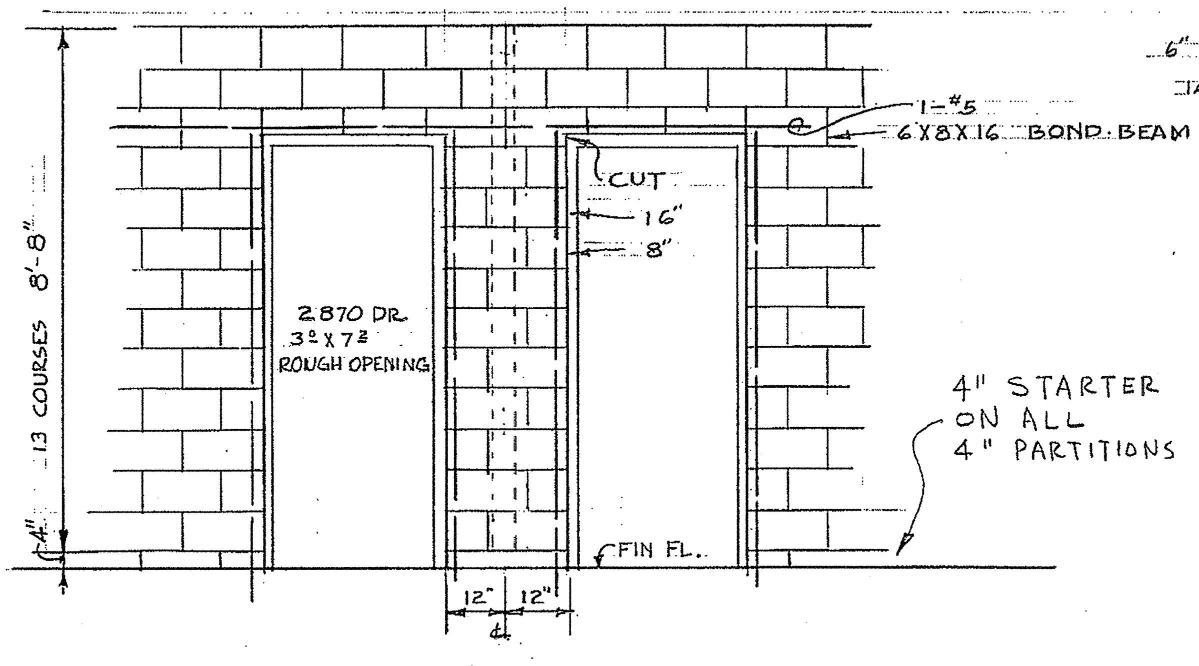
FISH COMMISSION
STATE OF OREGON

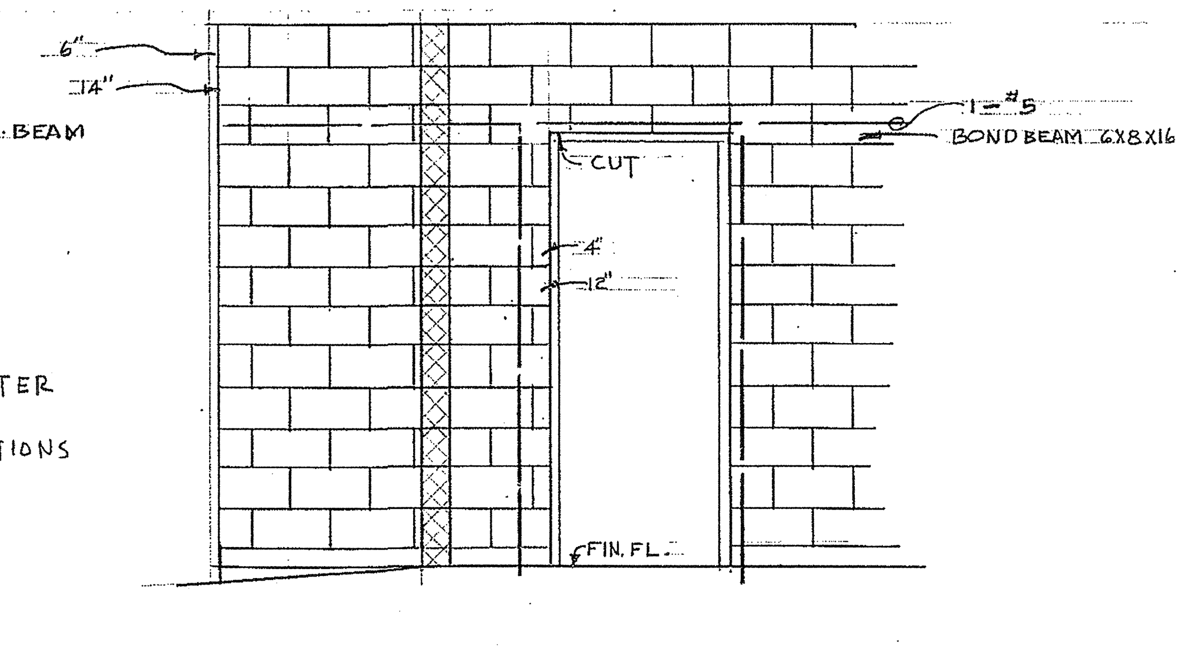
NEWPORT MARINE LABORATORY

FOUNDATION PLAN

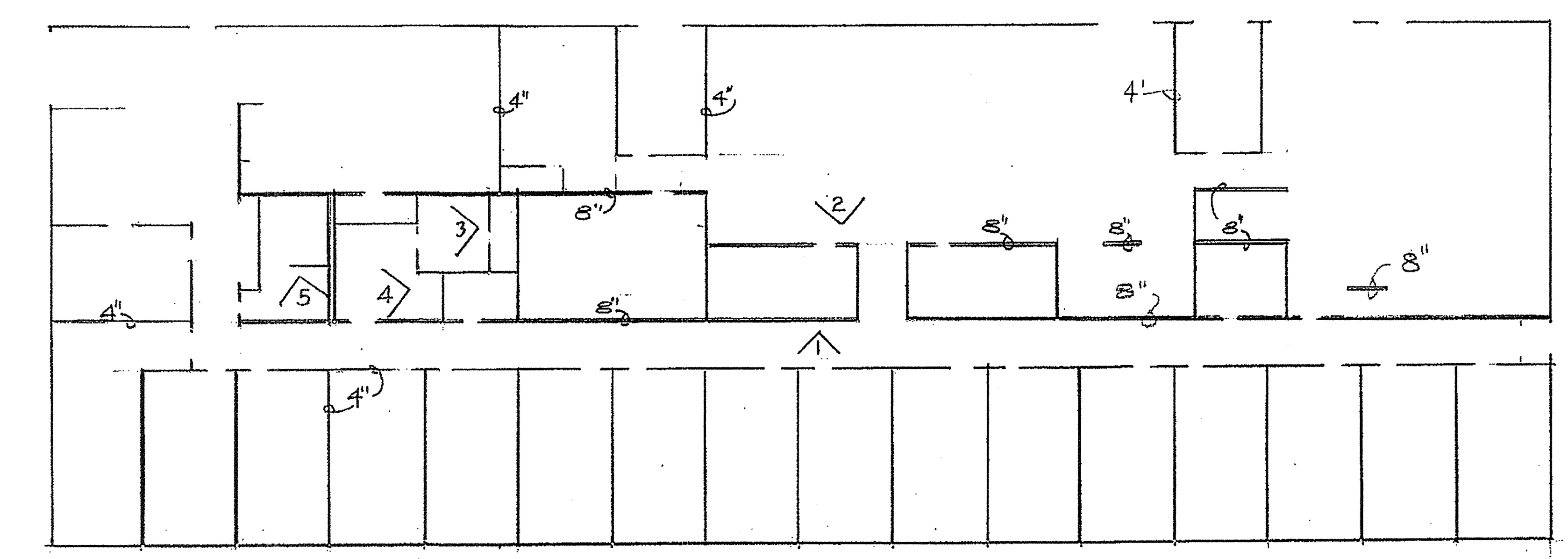
REGISTERED PROFESSIONAL ENGINEER 4884 OREGON JULY 9, 1962 LLOYD R. NEUBAUER



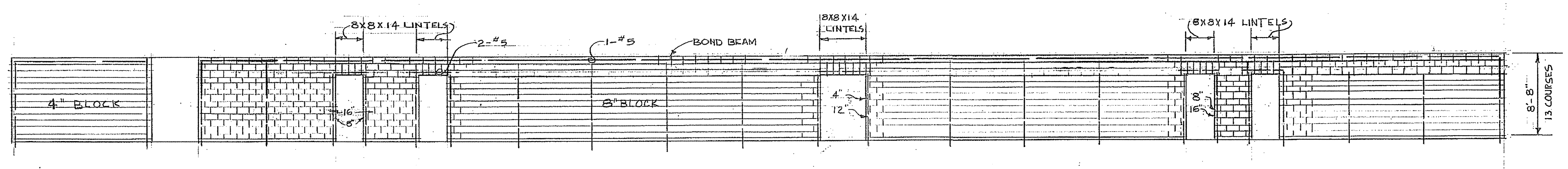
TYPICAL FOR DOORS AT OFFICES 2 THRU 15



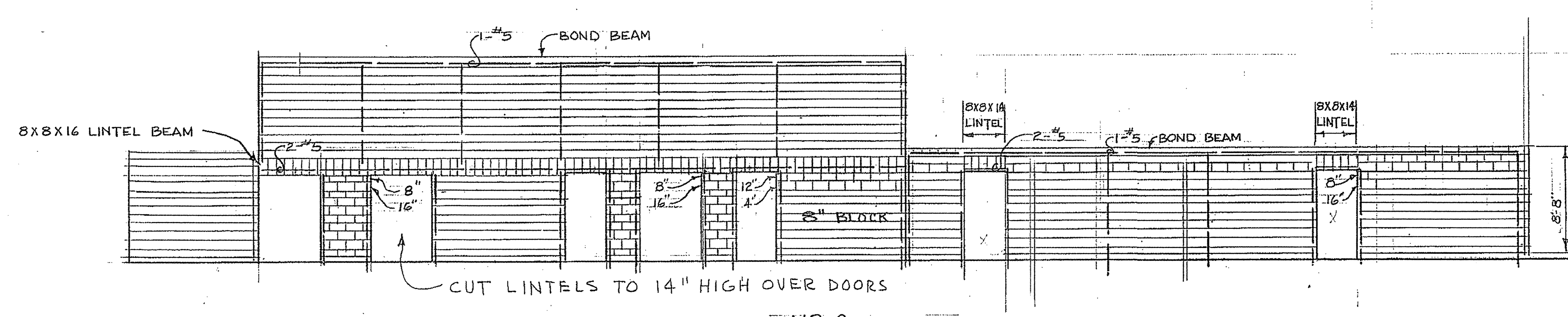
OFFICE 16 DOOR



KEY PLAN



Nº 1



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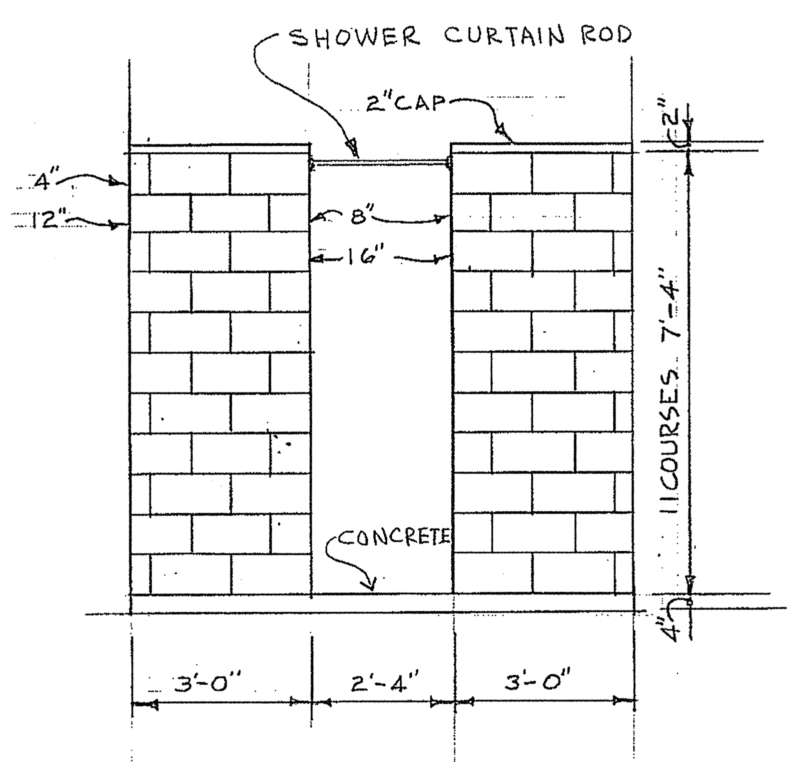

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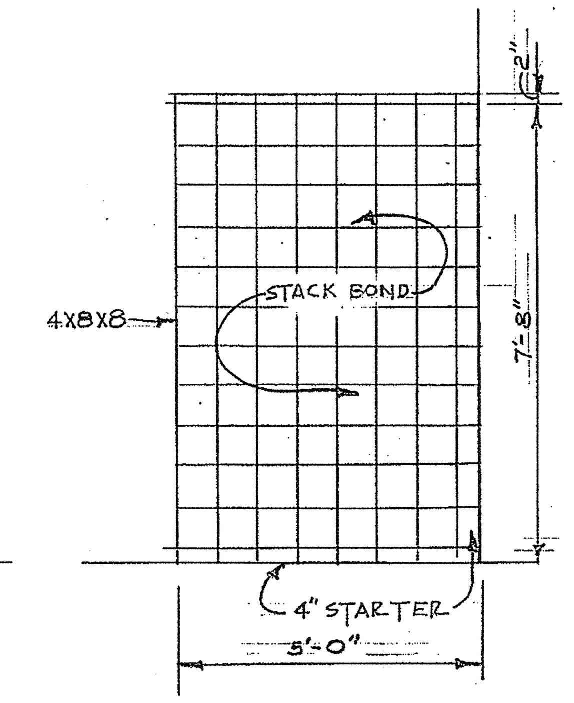

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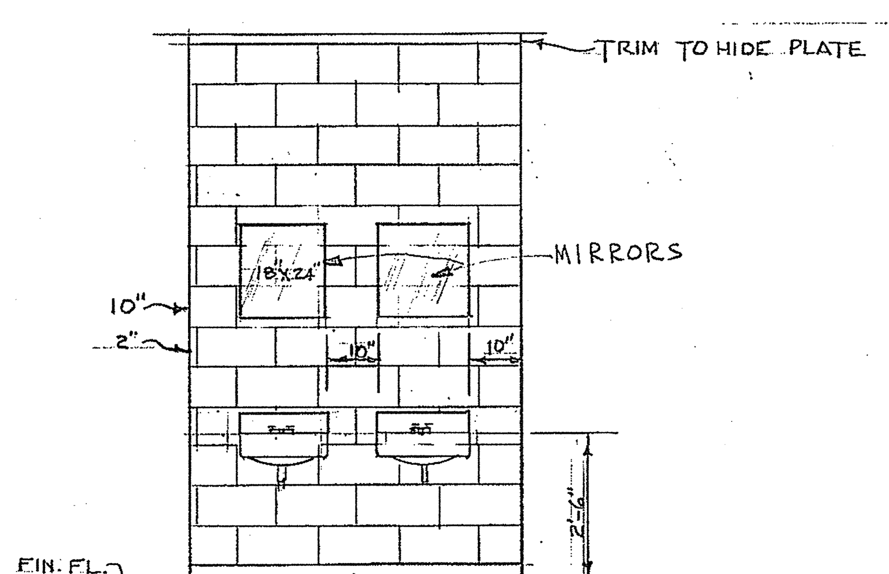

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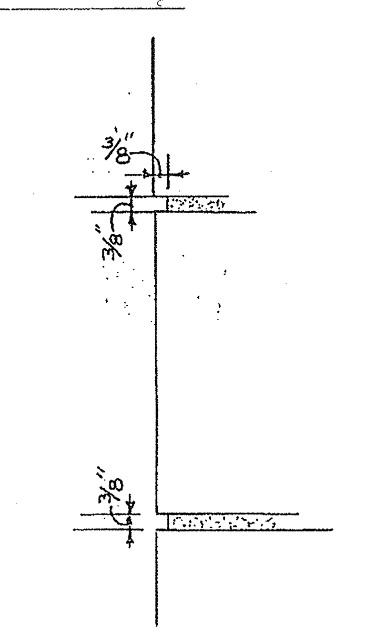

RAKE JOINT
VERT. & HORIZ.

NOTES:
1. ALL VERT. REINF. AT OPENINGS, CORNERS, INTERSECTIONS & INTERMED. PTS. TO BE #5
2. PROVIDE 1/2X8 ANCHOR BOLTS @48" OC. FOR WOOD PLATES
3. BOND BEAMS, LINTELS & ALL OTHER UNITS REINF. TO BE CONC. FILLED (SHADED)
4. K-WEB & REINF. TO BE CONTINUOUS AROUND CORNERS & WALL INTERSECTIONS
5. SEE SPECS FOR OTHER DETAILS

REVISIONS

REGISTERED PROFESSIONAL ENGINEER 4864 OREGON JULY 9, 1951 LEV. K. NEUBAUER

FISH COMMISSION
STATE OF OREGON
NEWPORT MARINE LABORATORY
CONCRETE MASONRY DETAILS

DATE AUG. 26, 1969	APP'VD Robert W. Schoning FISHERIES DIRECTOR
DESIGN BY CRC	APP'VD DIRECTOR OF ENGR.
DRAWN BY CRC	FILE NO. R4-6914 SHT. 7 OF 23
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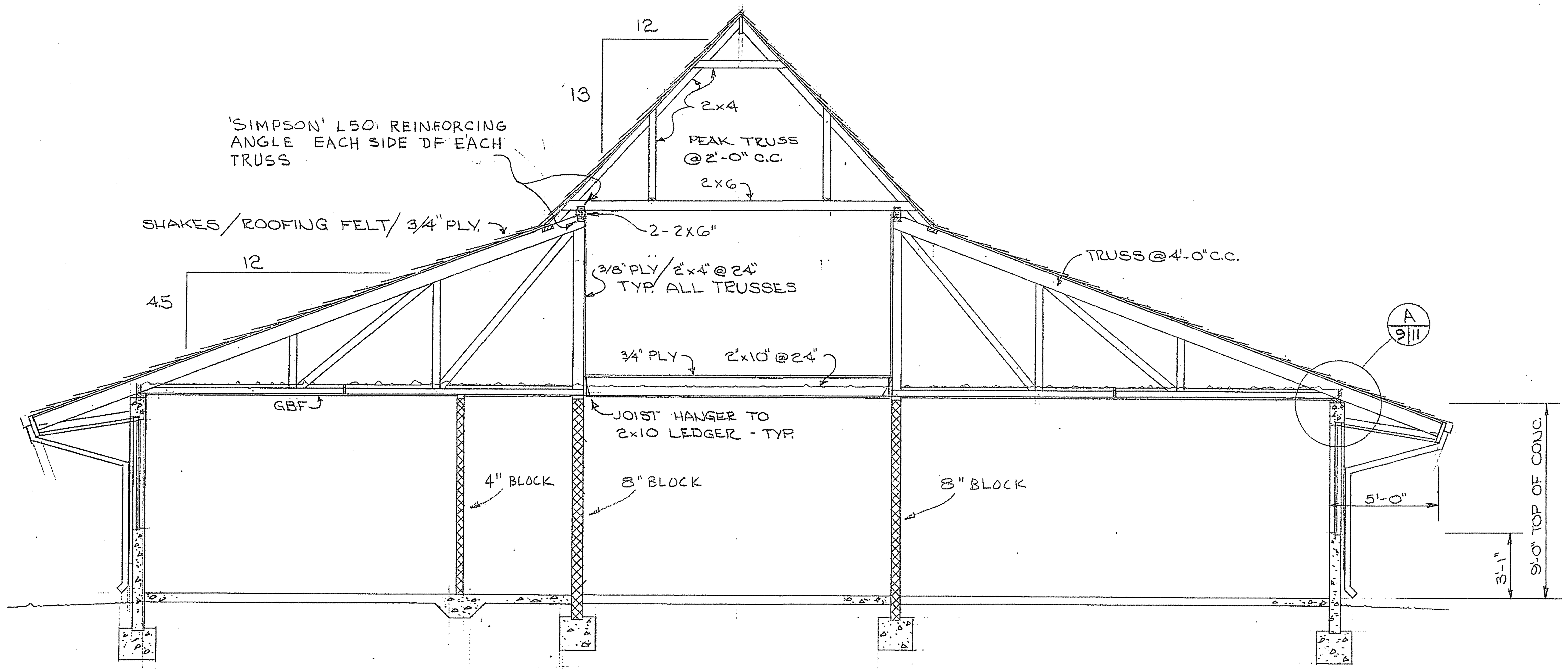
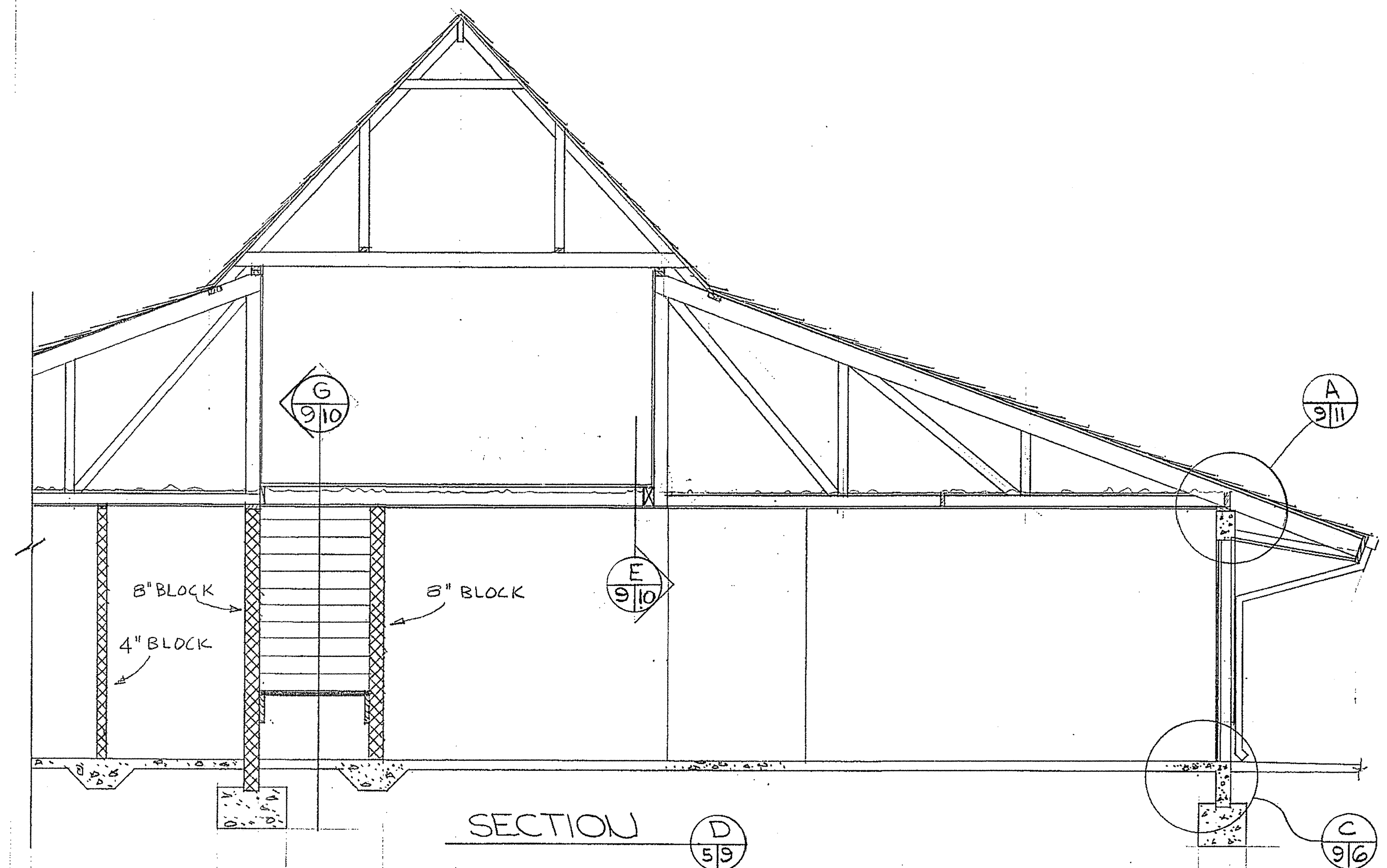
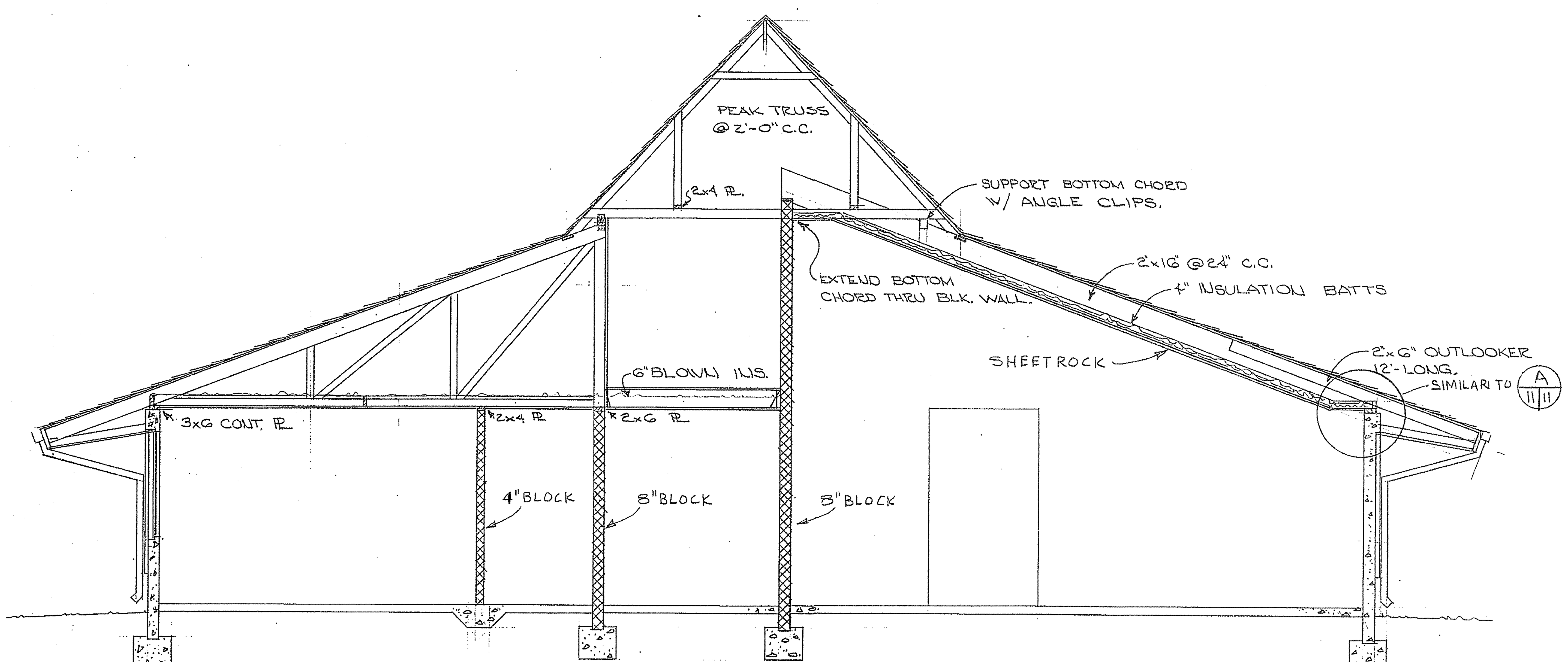
TURN DOWN TOP BARS INTO COLUMN
2-#7 TOP & BOTTOM W/ #2 TIES @ 8" O.C.
BEAM PRE-CAST W/ COLUMNS & SPANDREL (OR WALL)
#4 @ 12" HORIZ. & VERT. EXTEND VERT. 4" INTO BEAM
EQUAL WELDING PLATE SPACING
2-#5 VERTICAL W/ #2 TIES @ 8" O.C.
INTEGRAL BEAM & COLUMNS W/ EXPOSED AGGREGATE SOLID WALL
SPANDREL WALL CAST WITH COLUMNS & HEADER BEAM
2-#4
#4 @ 12" HORIZ. & VERT.
TYPICAL EXT. WALL FTG. SEE FND. DETAILS
10'-0"
TYPICAL PRECAST PANEL REINFORCEMENT DETAILS
1/2" = 1'-0"
2-#7 TOP & BOTTOM W/ #2 TIES @ 8" O.C.
#4 @ 12" O.C. H & V.
E. AGG.
LIMIT OF E. AGG.
SEE FND. DETAILS FOR RE-STEEL & DIMENSIONS NOT SHOWN
SECTION A 8/8
TYPICAL WINDOW ANCHOR
2-#5 VERT. W/ #2 TIES @ 8" O.C. (TYPICAL)
SECTION C 4/8
1/2" TYPICAL
#4 @ 12" O.C. H & V.
2-#5 EA. END - OFFSET BAR FROM PILASTER ABOVE ON SPANDREL PANELS. ON SOLID PANELS W/O COLUMNS, W/ #2 TIES @ 8" O.C.
SECTION D 4/8
1/2" TYPICAL
2-#5 VERT. W/ #2 TIES @ 8" O.C. (TYPICAL)
SECTION E 4/8
BEND BAR INTO PANEL BELOW
TYPICAL WINDOW ANCHOR
2-#5 VERT. W/ #2 TIES @ 8" O.C.
3-#5 VERT. W/ #2 TIES @ 8" O.C.
SECTION F 4/8
6" DROP PANEL MAIN ENTRANCE ONLY
WIDTH VARIES
FLOOR LINE
CAST-IN-PLACE PANEL
FOOTING
CONCRETE DOORWAY ARCH - TYPICAL of 3 PLACES
SCALE: 1/2" = 1'-0"
2 #5 VERT. W/ #2 TIES @ 8" O.C.
SECTION B 8/8
#4 @ 12" E.W.
#5 VERTICALS #2 TIES @ 8" O.C.
DOOR FRAME
SECTION I 4/8
SECTION G 4/8
OTHER DETAILS SIMILAR TO I 4/8
PACK JOINT FULL WITH OAKUM & CAULK BOTH FACES. CONTINUOUS TOP TO BOTTOM OF PANEL.
REBAR FILLER 1/4" FILLET WELD EA. SIDE TO 1/4" PL
1/2" CAULK SPACE
FILL W/ GROUT @ RT. BASE
INSIDE
1/4" x 3" STEEL PL 8" LONG W/ 2 5/8 x 4" STUDS, WELDED TO PL CAST INTO CONC. THREE REQ'D EACH PANEL VERTICAL EDGE
TYP. PANEL STRUCTURAL TIE
3" = 1'-0"
#7 TOP BARS TURNED DOWN INTO COL. SECTION.
BOLT LOCATIONS FOR SECURING 3x6 WOOD PL CONT. OVER JOINT
SECTION C 8/8
4" SLAB
3'-0"
2-#4
1/2" thick SPONGE RUBBER EXPANSION JOINT FILLER GRACE 'CEMENTONE' CODE 3329 ON ALL FOUR SIDE AT TOP
ISOLATED VIBRATION DAMPENING BLOCK. NO PART TO BE IN CONTACT WITH BUILDING STRUCTURAL MEMBERS OR FLOOR SLAB.
1'-8 1/2" ± x 2'-0" BASE
SECTION R 6/8
REVISIONS
REGISTERED PROFESSIONAL ENGINEER 4884 OREGON
FISH COMMISSION
STATE OF OREGON
NEWPORT MARINE LABORATORY
STRUCTURAL DETAILS
DATE AUG. 26, 1969
DESIGN BY CVR
CHECKED BY CVR
APP'VD FISHERIES DIRECTOR
APP'VD DIRECTOR OF ENGR.
FILE NO. R4-6914
SHT. 8 of 23
SHANNON & COMPANY



SECTION B 5|9



SECTION D 5|9



SECTION C 5|9

REVISIONS	
REGISTERED PROFESSIONAL ENGINEER 4884 OREGON JULY 8, 1952 LEE K. NEUBAUER	**FISH COMMISSION** STATE OF OREGON
	NEWPORT MARINE LABORATORY
	SECTIONS
DATE AUG. 26, 1969	APP'VD Robert W. Schoning FISHERIES DIRECTOR
DESIGN BY R. W. M	APP'VD [signature] DIRECTOR OF ENGR.
DRAWN BY R. W. M.	FILE NO. R4-6914 SHT. 9 OF 23
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SHANNON & COMPANY

REGISTERED PROFESSIONAL ENGINEER 4884 OREGON JULY 9, 1951 LEE K. NEUBAUER

REVISIONS

FISH COMMISSION
STATE OF OREGON

NEWPORT MARINE LABORATORY

SECTIONS

DATE AUG. 26, 1969	APP'VD Robert W. Schoning FISHERIES DIRECTOR
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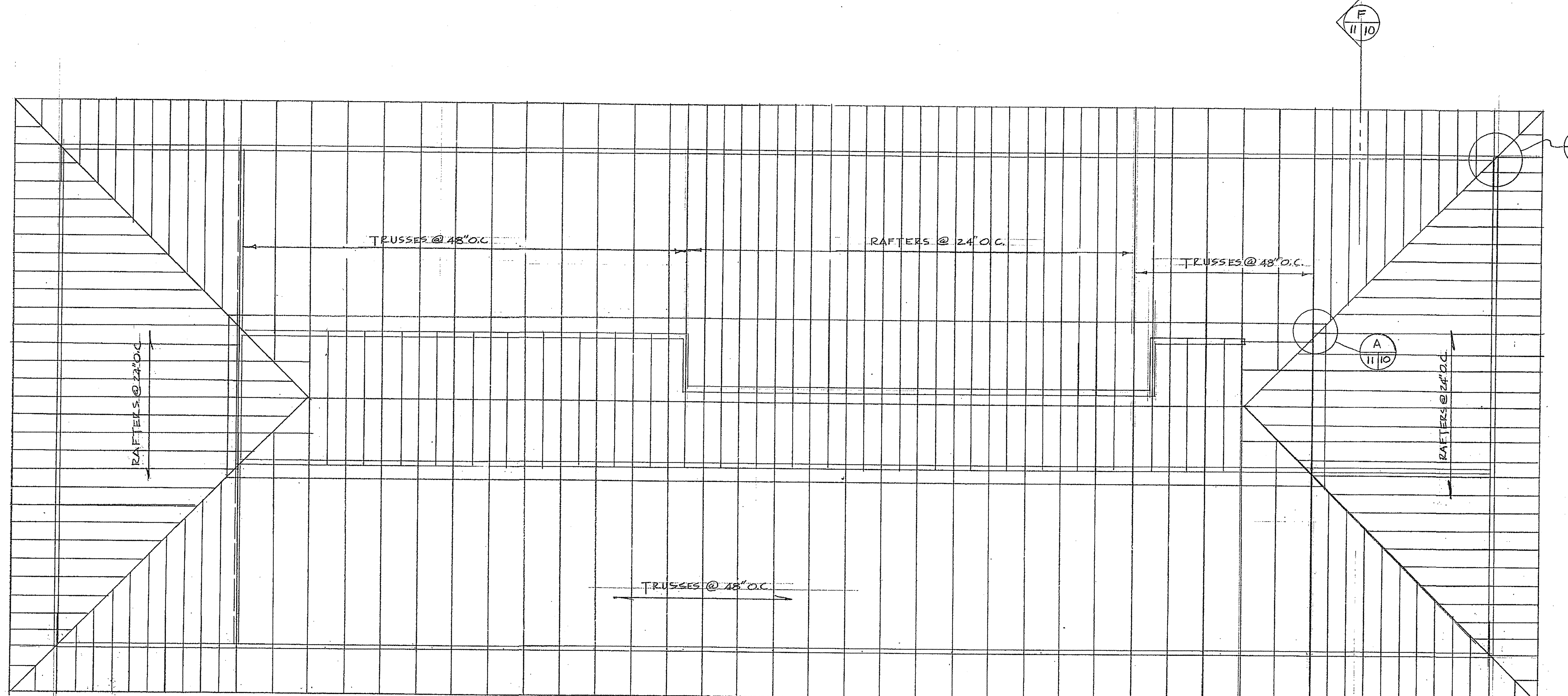
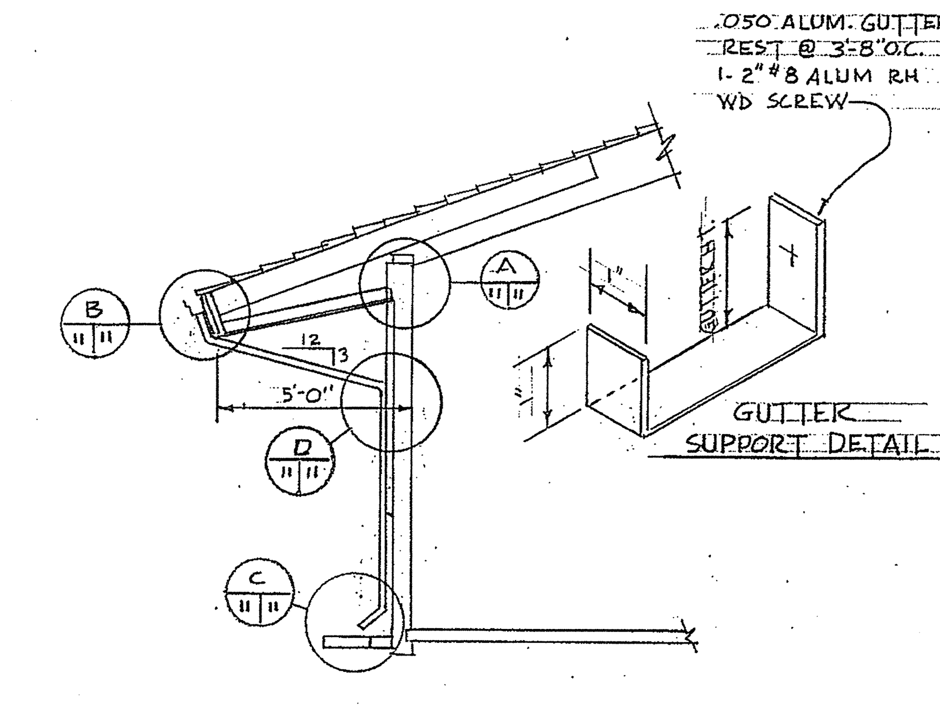
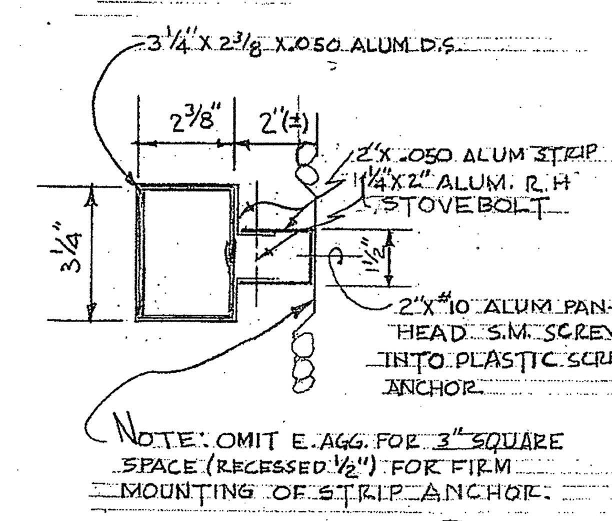


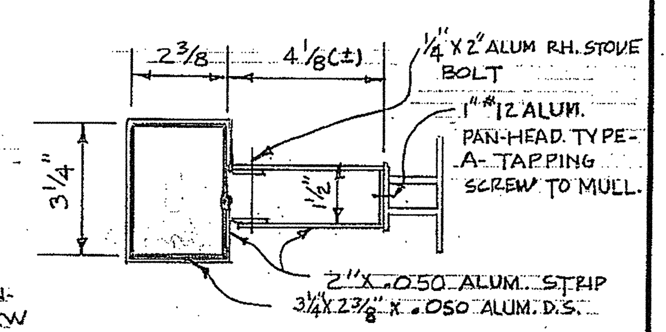
ROOF FRAMING PLAN
SCALE: 1/8"=1'-0"



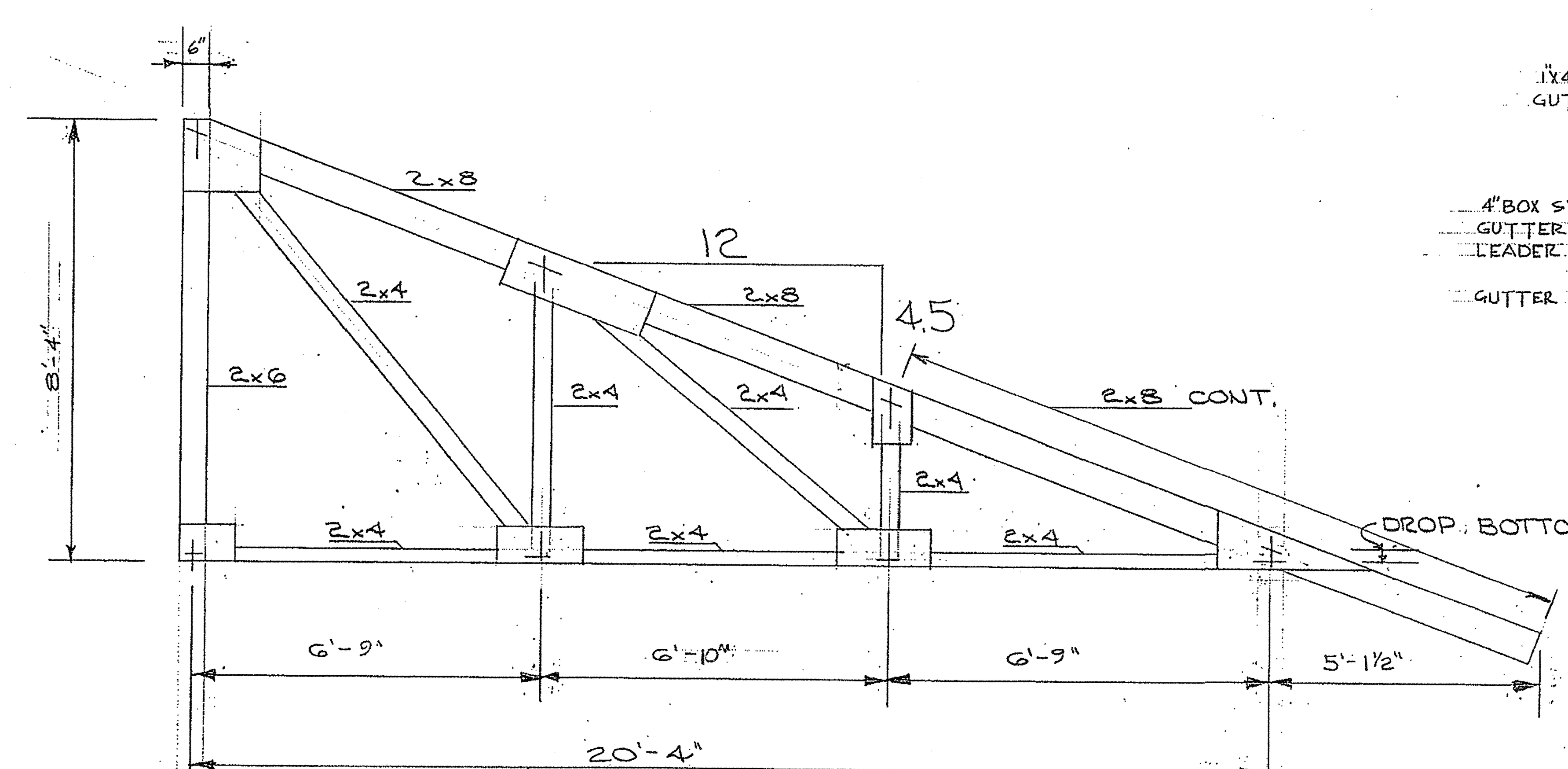
SECTION @ EAVE TYPICAL
SCALE: 1/4"=1'-0"



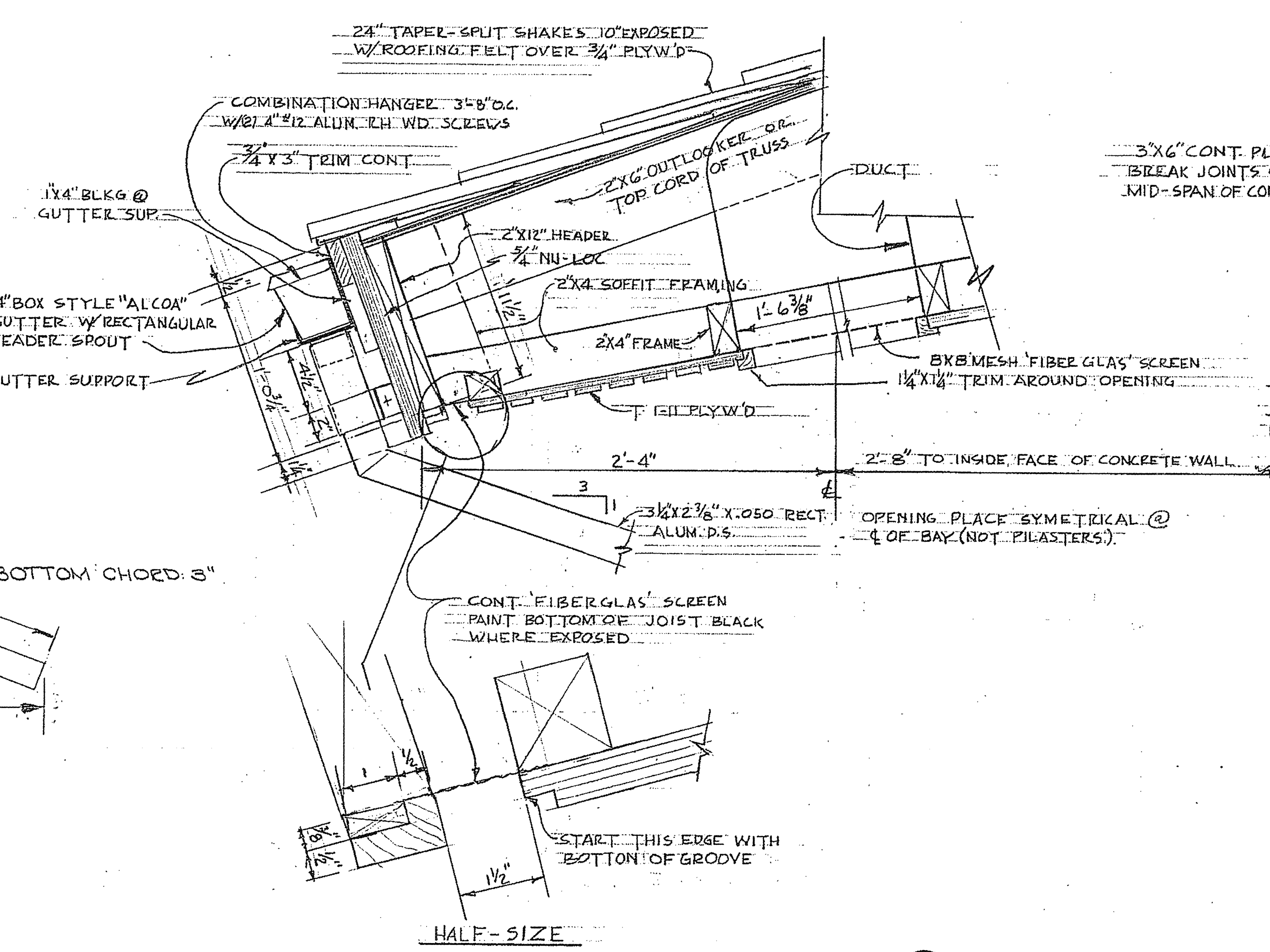
D.S. DETAIL E 11 11



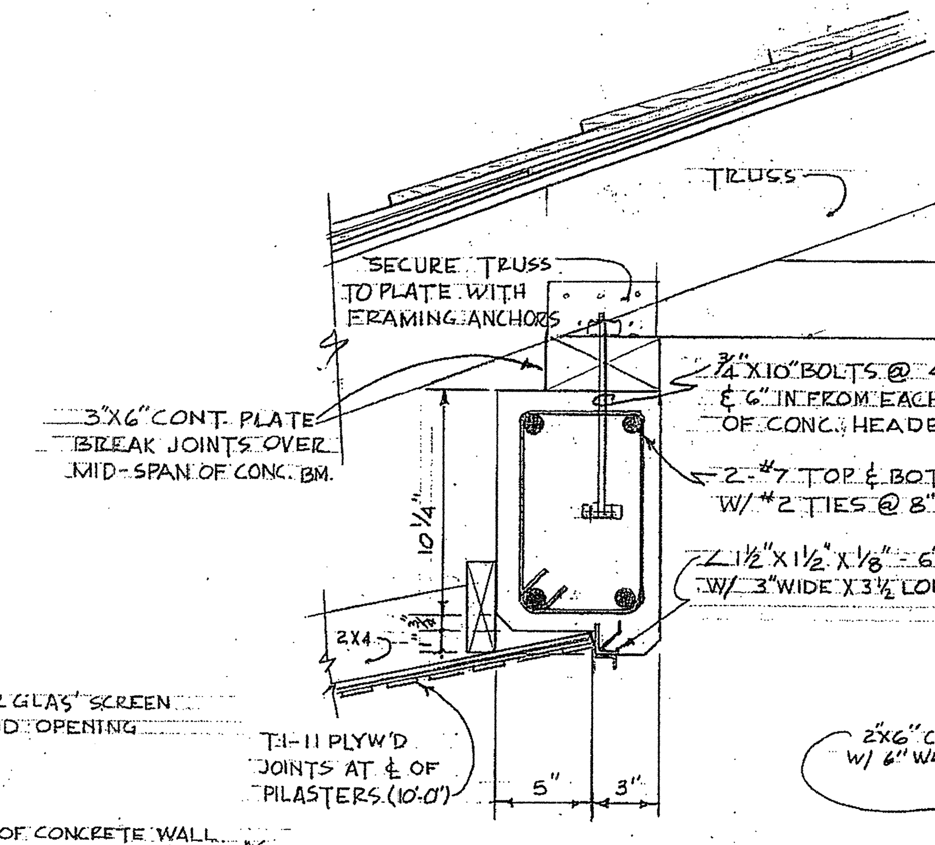
D.S. DETAIL D 11 11



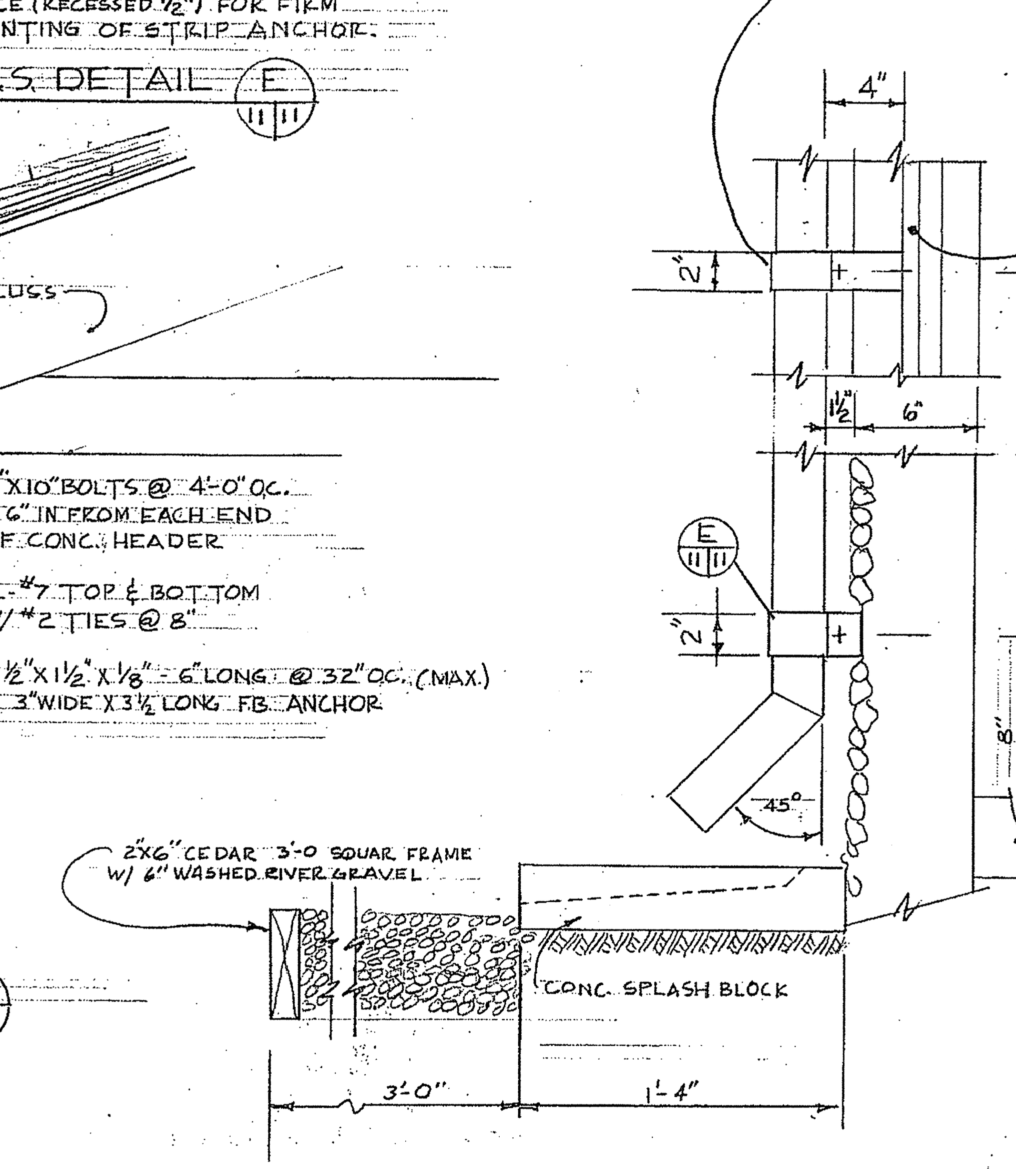
TRUSS A
SCALE: 3/8"=1'-0"



DETAIL B 11 11



DETAIL 9 A 11 11



DOWN SPOUT DETAILS C 11 11

REGISTERED PROFESSIONAL ENGINEER 4384 OREGON JULY 6, 1955 L.W. R. NEUBAUER	FISH COMMISSION STATE OF OREGON
	NEWPORT MARINE LABORATORY
REVISIONS	ROOF FRAMING
DATE AUG. 26, 1969	APP'VD Robert W. Schoning FISHERIES DIRECTOR
DESIGN BY R.W.M.	APP'VD [signature] DIRECTOR OF ENGR.
DRAWN BY R.W.M.	FILE NO. R4-6914 SHT. 11 OF 23
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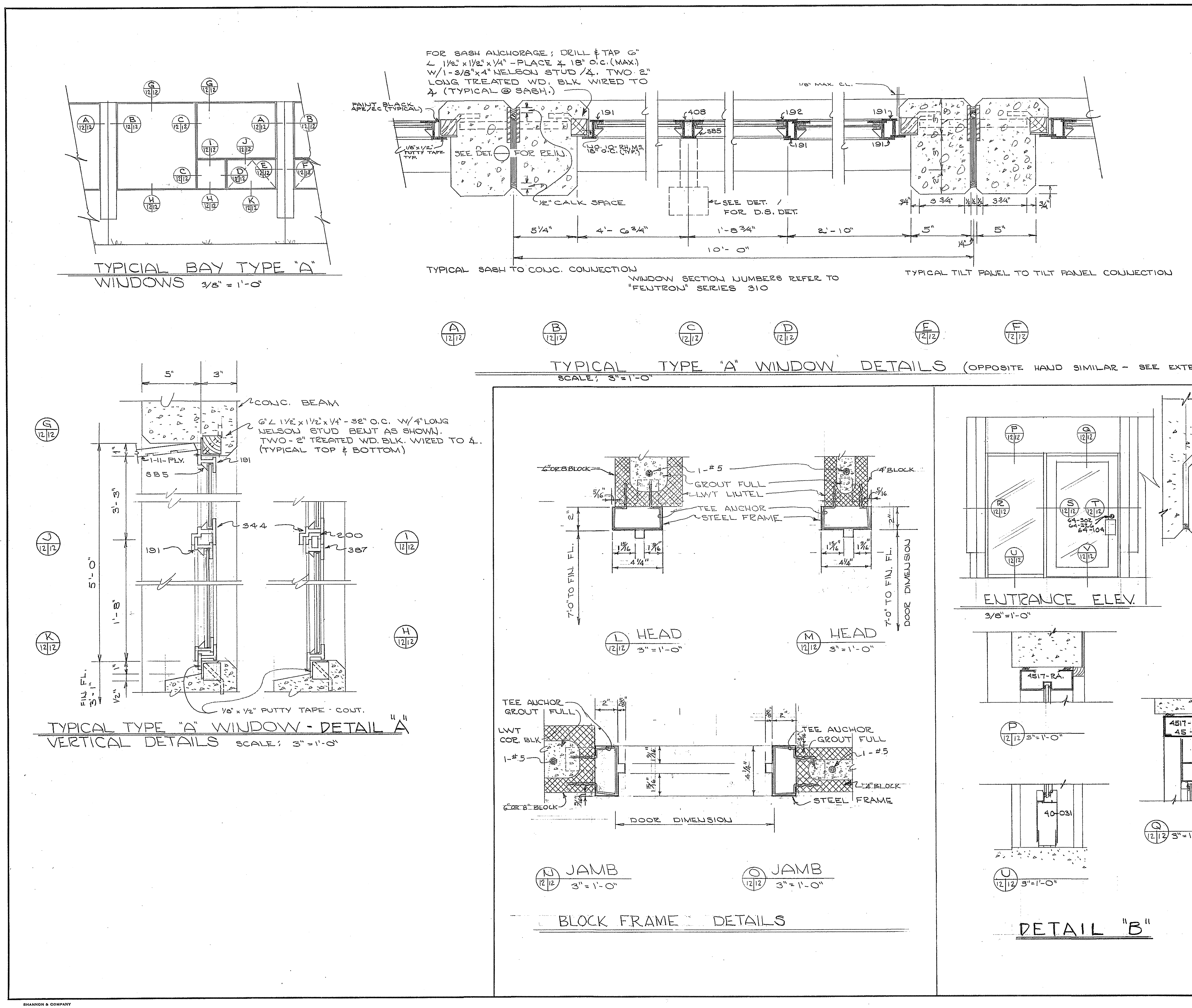

FISH COMMISSION
STATE OF OREGON

NEWPORT MARINE LABORATORY

WINDOW & DOOR DETAILS

REGISTERED PROFESSIONAL ENGINEER 4984 OREGON JULY 8, 1958 ELW. R. NEUBAUER

REVISIONS

DATE AUG. 26, 1969	APP'VD Robert W. Schoning FISHERIES DIRECTOR
DESIGN BY RWM	APP'VD SWN DIRECTOR OF ENGR.
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