

## STRUCTURAL CONCEPTS

### **DEGENKOLB ENGINEERS**

The existing Laundry Building is a one-story structure, with a partial basement, of mixed construction. The roof consists of steel trusses spanning to perimeter concrete bearing walls and interior steel columns. The roof is sheathed with wood framing members that are laid on edge. The west side of the building contains a clerestory roof. The foundation consists of concrete spread footings at the perimeter and isolated spread footings at interior columns. The lateral force resisting system is concrete shear walls. Additions of wood frame construction are located on the west and south sides of the building and a concrete masonry addition is located on the east side of the building.

The structural work for the conversion of the Laundry Building to the Historic Boat Museum consists of a seismic retrofit and building addition. The existing additions around the building will be removed.

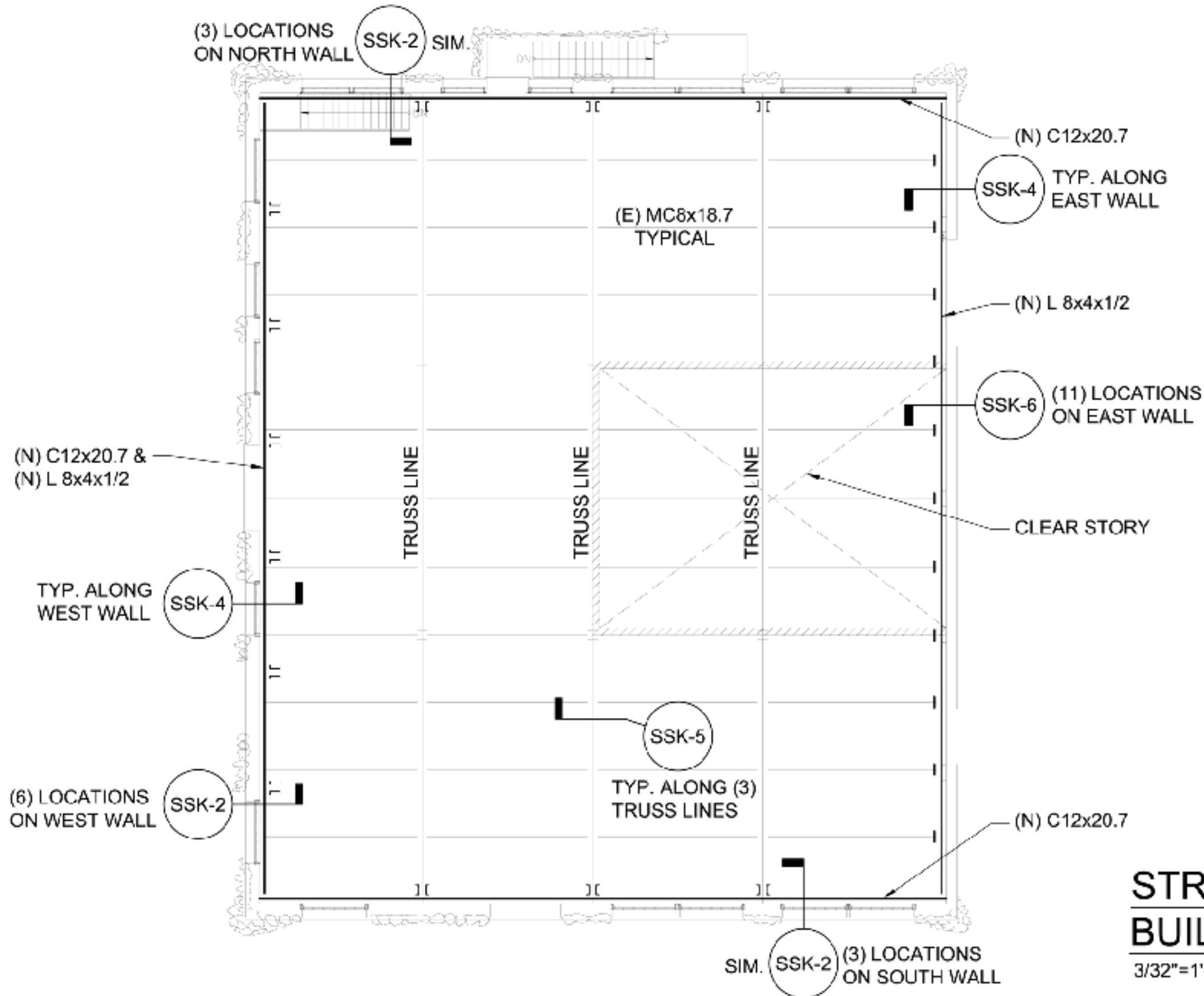
The seismic upgrade concepts presented are designed in accordance with the Life-Safety provisions of ASCE 41 – Seismic Rehabilitation of Existing Structures. Seismic upgrade measures include:

- Strengthen the roof diaphragm by installing new plywood on top of the existing 2x3 planks.
- Attach the existing steel trusses to the roof with metal clips.
- Strengthen the north, west, and south walls with double channel columns so that the walls do not bend and buckle outward during an earthquake.
- Install connections between the concrete walls and the roof to keep the walls from falling away from the building during an earthquake.
- Repair degraded concrete on the north exterior and damaged roof planks in the northeast corner of the building.

## STRUCTURAL CONCEPTS

The new addition on the east side of the Laundry Building will be constructed of a combination of wood and steel framing members. In general, wood and steel beams and steel columns will support the gravity loads and steel braced frames will resist the lateral loads. The new structure will be seismically separated from the existing structure.

GRAND CANYON RIVER HERITAGE MUSEUM  
LAUNDRY BUILDING MAIN LEVEL



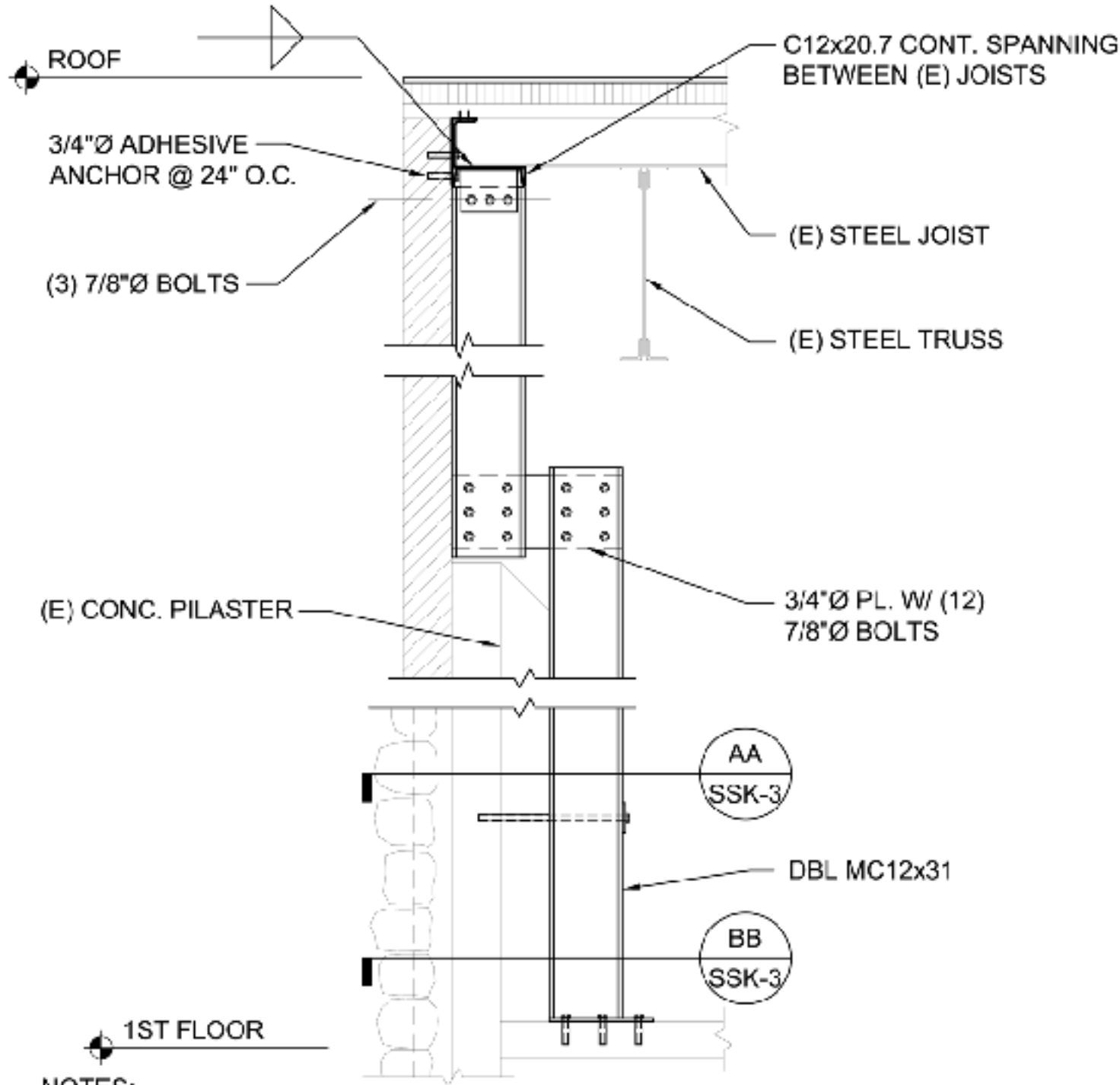
**NOTES:**

1. INSTALL (N) 3/4" PLYWOOD ON TOP OF (E) 2x3 SHEATHING OVER ENTIRE ROOF WITH 10d NAILS AT 3" SPACING ON ALL EDGES AND 12" SPACING DOWN CENTERLINE OF PANEL.
2. REPLACE DAMAGED 2x3 PLANKS IN NORTHEAST CORNER OF ROOF.
3. REPAIR CONCRETE COLUMNS AND SLAB THAT SUPPORT EXTERIOR NORTH STAIR.
4. REPAIR CONCRETE LINTEL ABOVE BASEMENT WINDOWS ON NORTH SIDE OF BUILDING.

**STRUCTURAL PLAN OF (E)  
BUILDING SEISMIC UPGRADE**

3/32" = 1'-0"

GRAND CANYON RIVER HERITAGE MUSEUM  
STRUCTURAL DETAILS

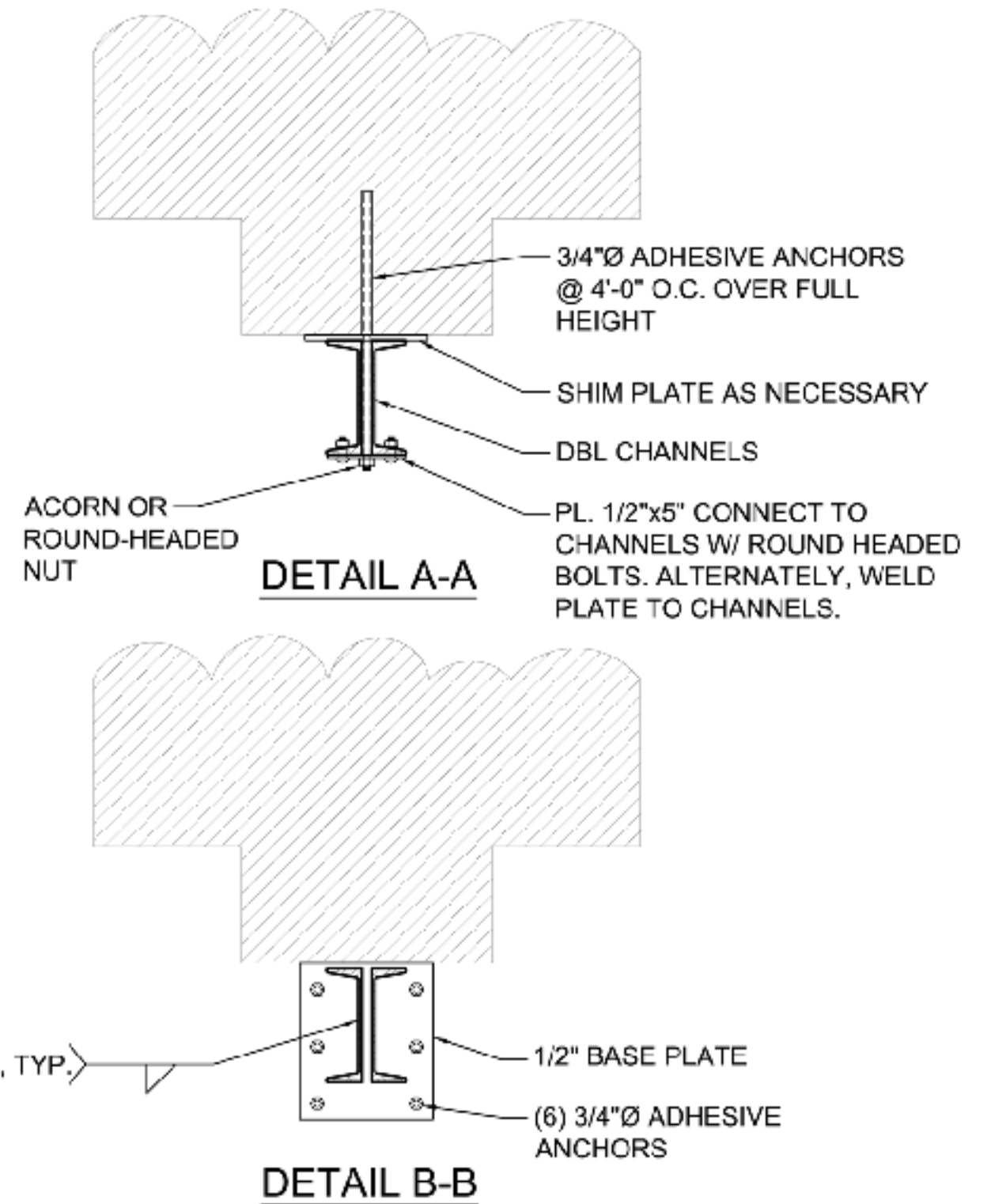


NOTES:

1. ALTERNATELY, PLACE VERTICAL CHANNELS ON EACH SIDE OF (E) PILASTER. IN THIS CONFIGURATION, SPLICE IN CHANNELS CAN BE ELIMINATED.
2. ON NORTH AND SOUTH WALLS, INSTALL C12 ON UNDERSIDE OF DECK AND ATTACH TO EXISTING 2x3's SIM. TO SSK-4.

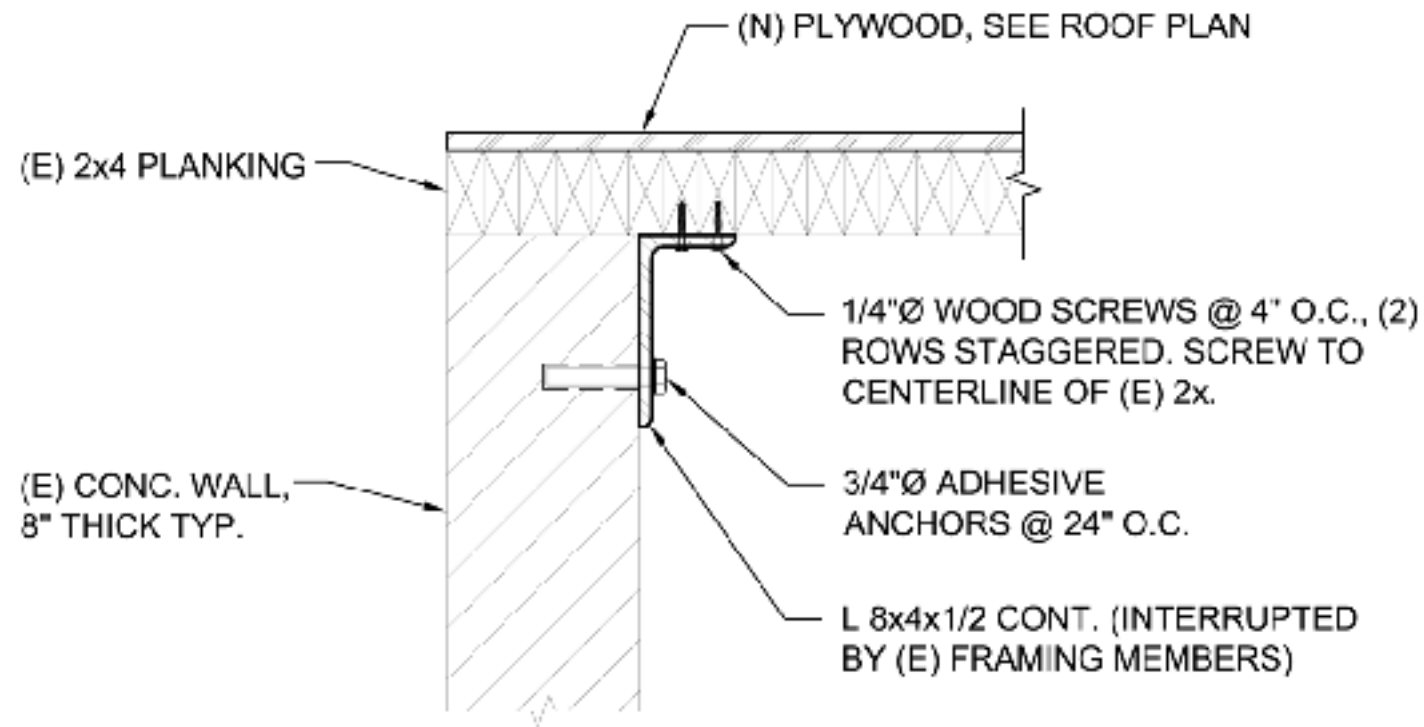
**SSK-2 WALL STRONG BACK**

1/2"=1'-0"



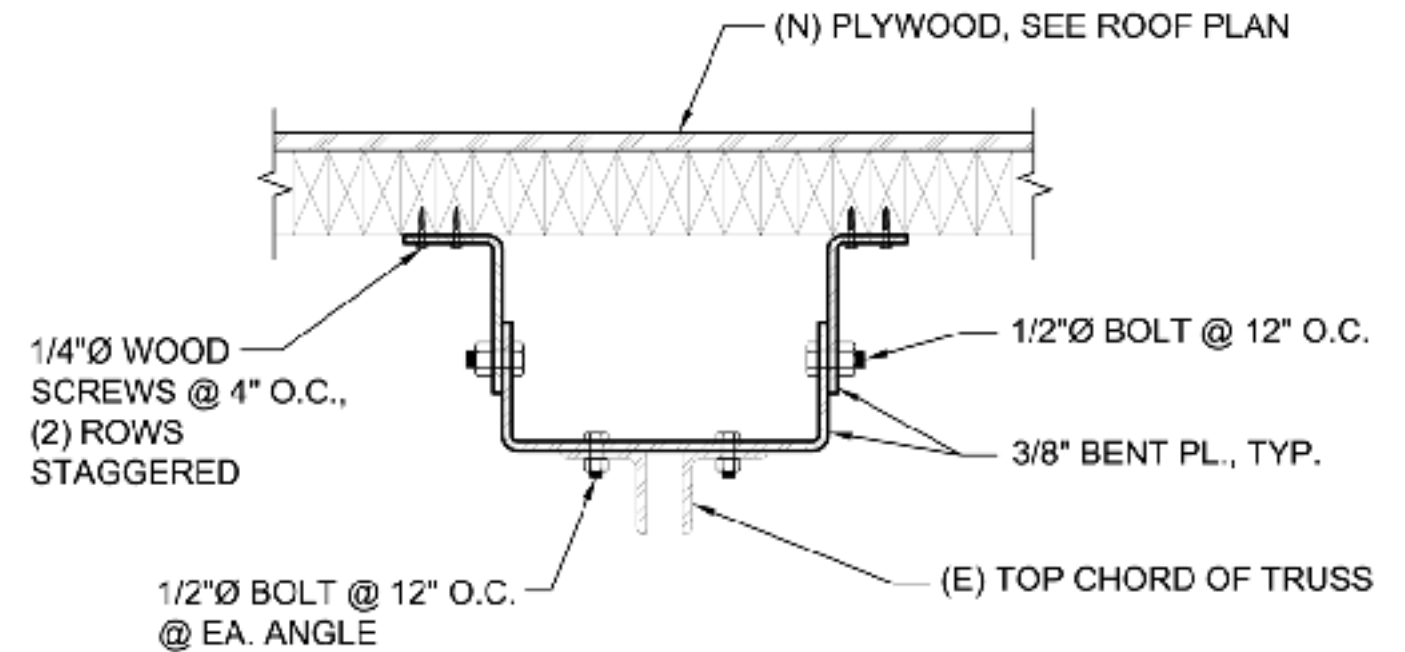
**SSK-3 WALL STRONG BACK SECTIONS**

3/4"=1'-0"



**SSK-4 SHEAR TRANSFER CONNECTION BETWEEN DIAPHRAGM AND WALL**

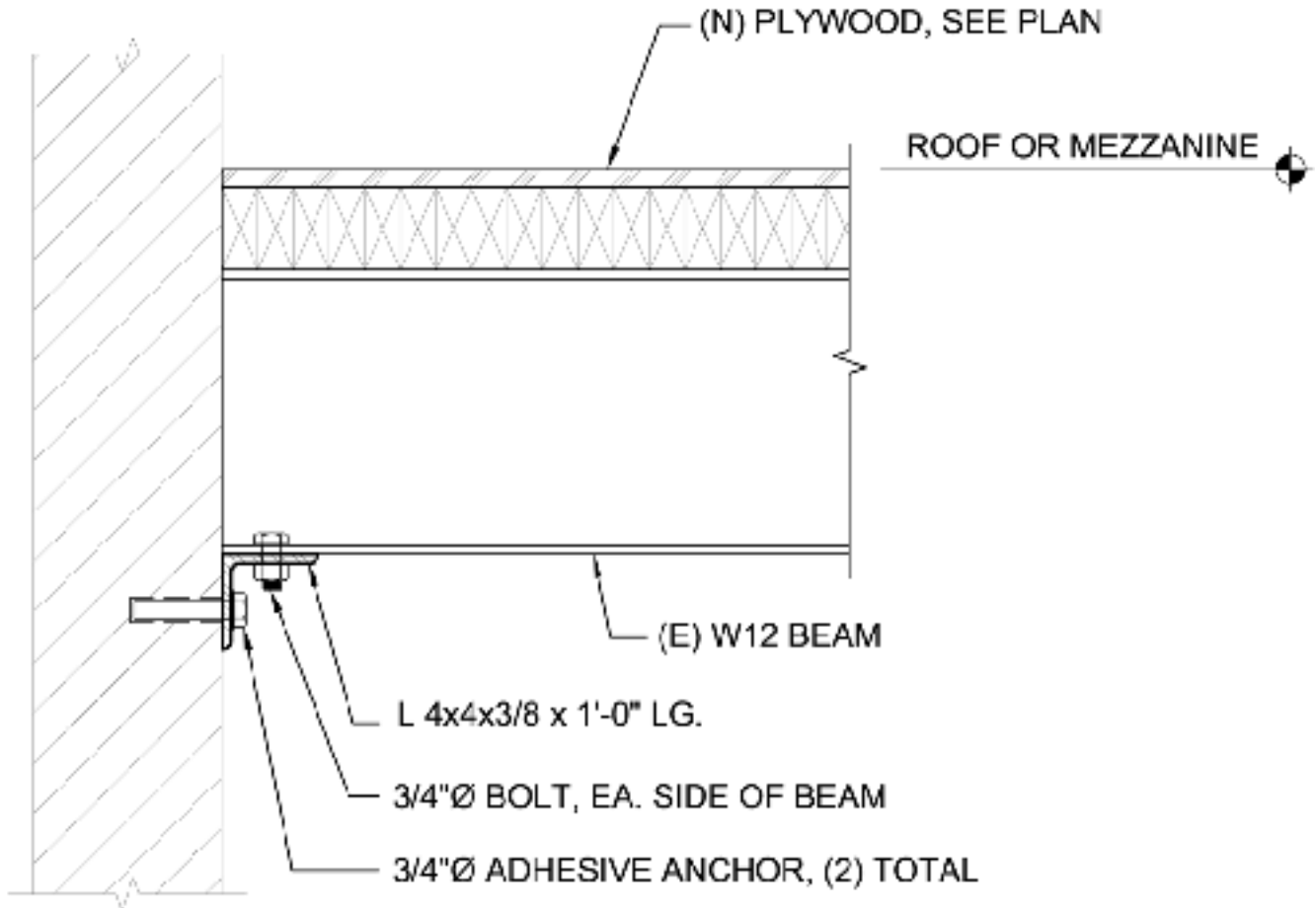
1 1/2"=1'-0"



**SSK-5 TRUSS TO DIAPHRAGM CONNECTION**

1 1/2"=1'-0"

**NOTE:**  
ALTERNATELY, PROVIDE WELDED CONNECTIONS IN LIEU OF BOLTED CONNECTIONS.



**NOTE:**  
ALTERNATELY, PROVIDE WELDED CONNECTIONS IN LIEU OF  
BOLTED CONNECTIONS.

## SSK-6 OUT OF PLANE WALL CONNECTION BETWEEN DIAPHRAGM AND WALL

1 1/2" = 1'-0"