

The image shows the exterior of the Cathedral of Christ the Light. The central feature is a tall, cylindrical tower with a glass facade that reflects the sky. To the left is a curved building with a similar glass facade. In the foreground, there is a green lawn with a path leading towards the cathedral. On either side of the path are low, rectangular concrete planters with trees. The sky is blue with some clouds.

Cathedral of Christ the Light

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Introduction

Location - Oakland, California

Architect - Skidmore, Owings & Merrill

Year - 2008

Site Area - 2.50 acres

Site Location - 4.7 km from
Hayward Fault / 25 km from San
Andreas Fault

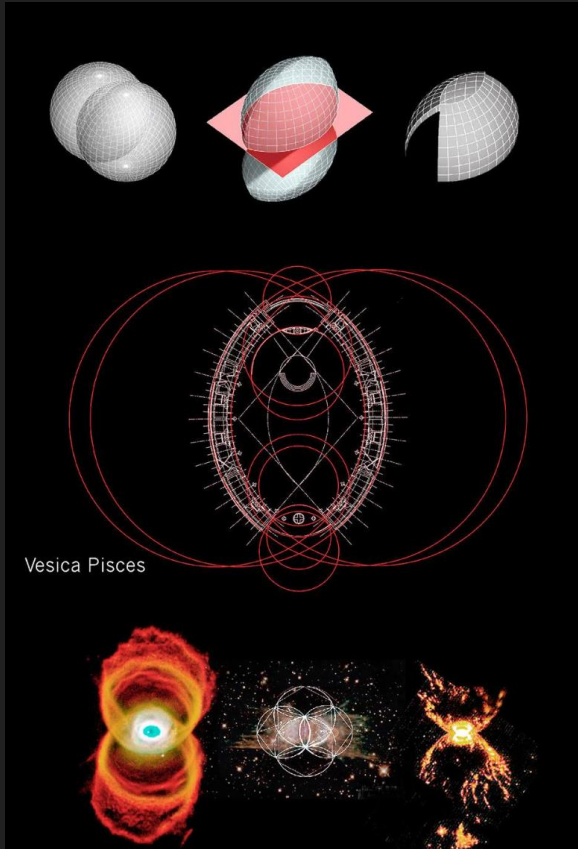
Project Area - 250,000 ft²

Building Height - 136 ft

Cost - \$112.9 million

Seats - 1,350





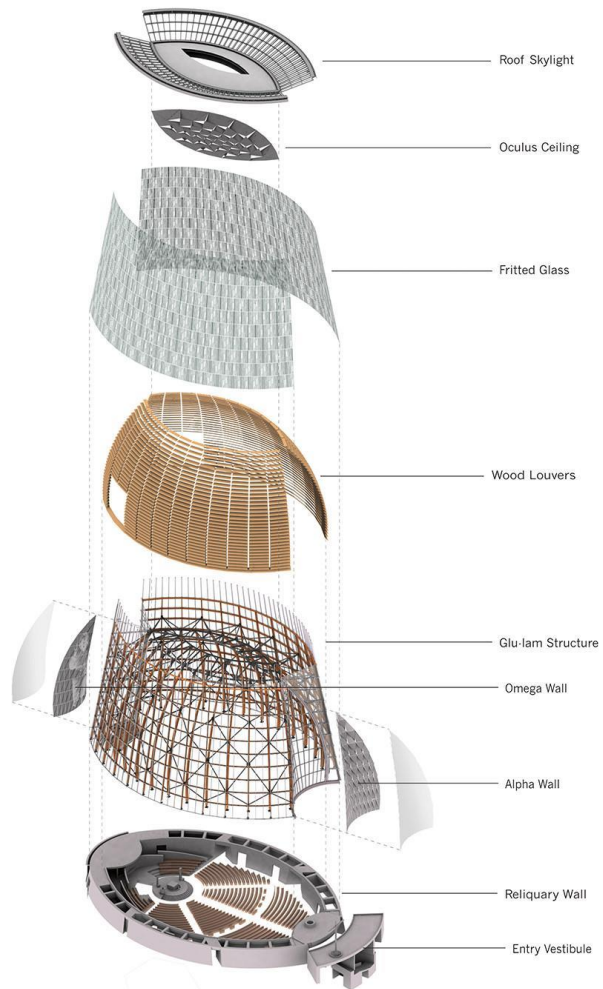
Project Description

- Non-linear shape was created in order to honor the over 2,000 year old history of the structure
- Relies on sunlight to light chapel
- Aim to cause small ecological footprint
- Design life of 300 years
- Design goal is to withstand a 1000 year earthquake event

Structural Overview

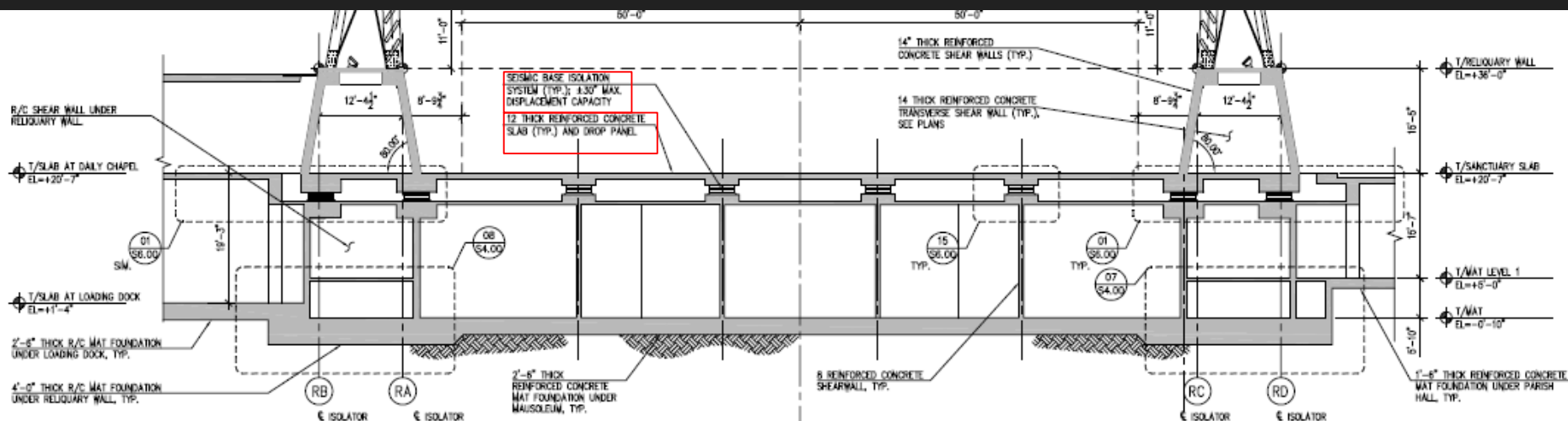
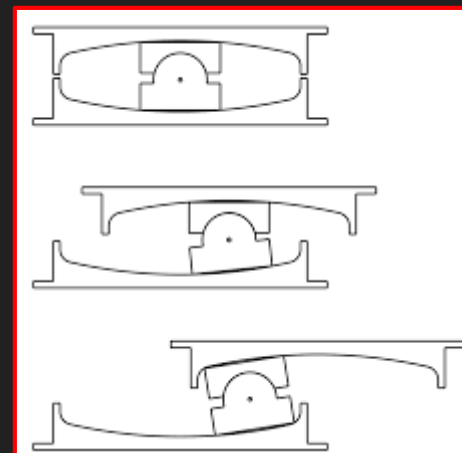
- Douglas fir inner structure
- Glass carapace
- Poured-in-place reinforced concrete base



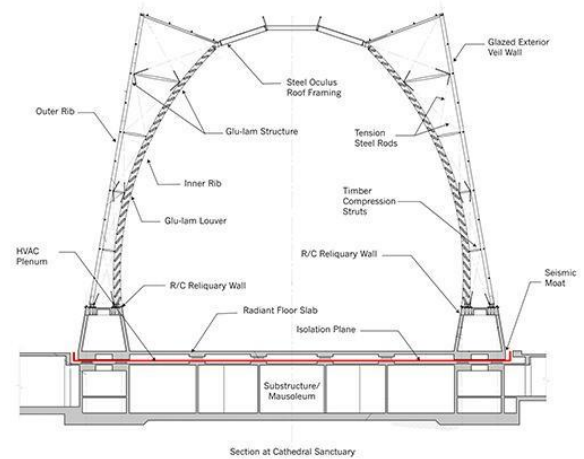
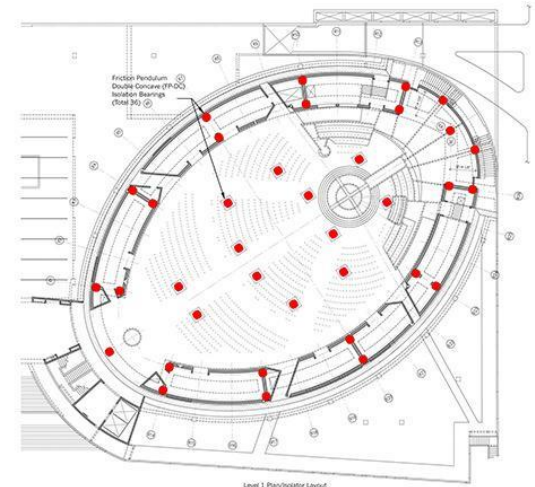


Base Isolation – Double Concave Friction Pendulum Isolators

- 36 isolators
- Moves independently from structure and foundation
- Loads are transferred through to shear walls

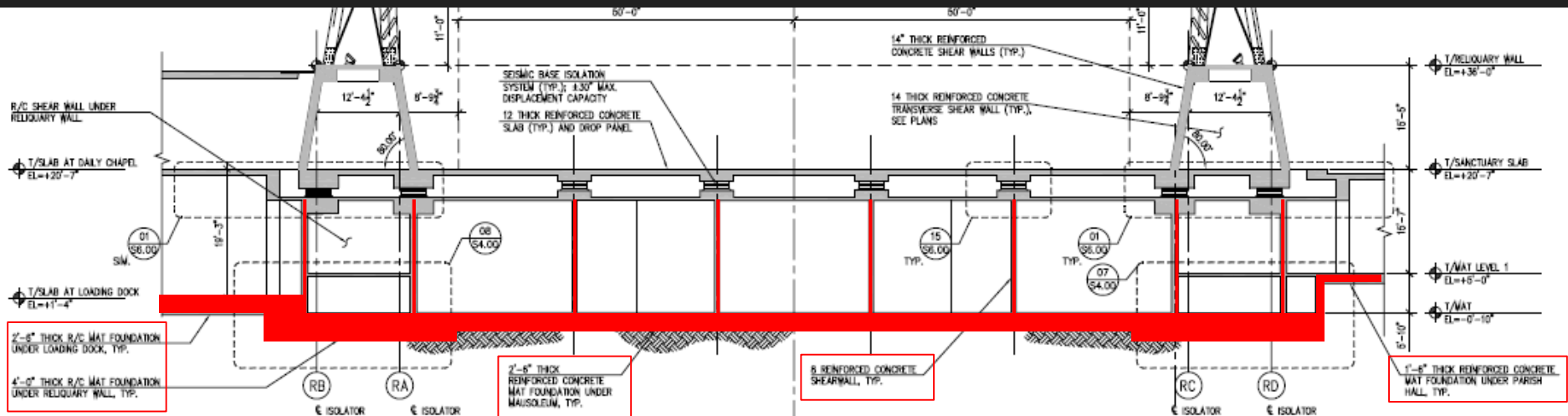


Base Isolation Joints



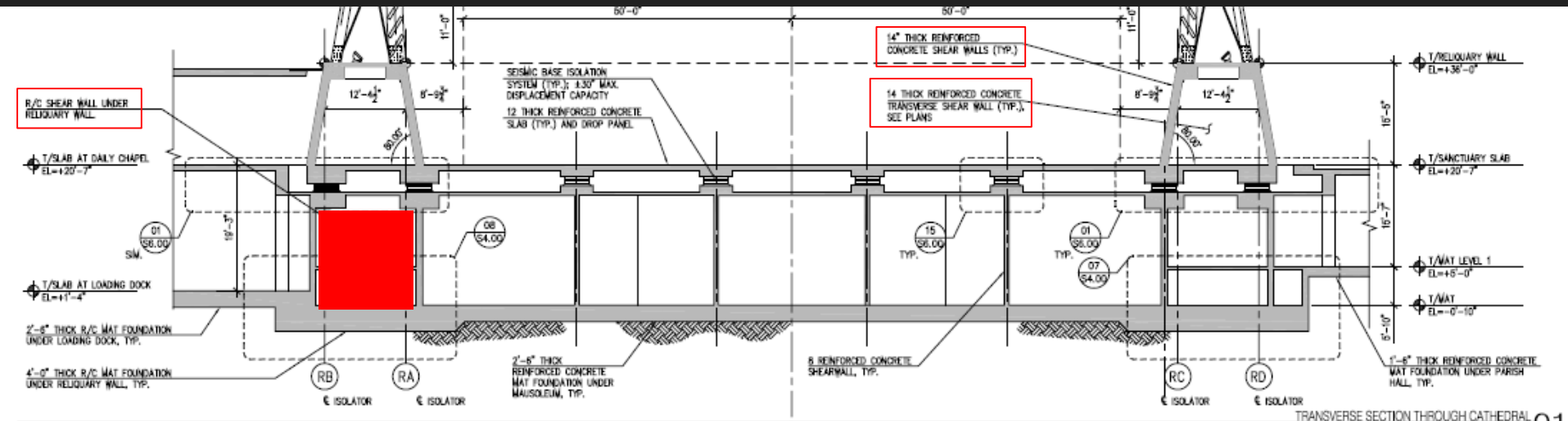
Foundation

- 8 Reinforced Concrete (Shear Wall)
- 2'-6" / 4'-0" / 1'-6" Reinforced Concrete (Mat Foundation)



Reliquary Wall

- R/C Shear Wall
- 14" thick Reinforced Concrete Transverse Shear Walls



Construction



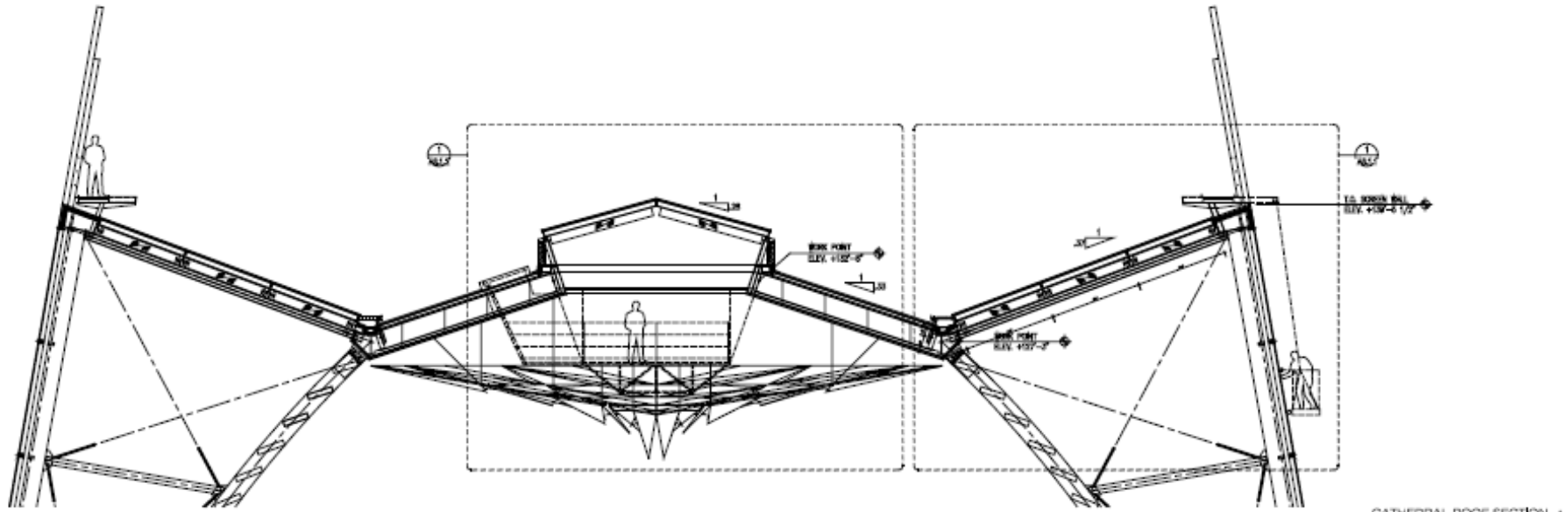
Installation of Reliquary Wall



**Installation of
Oculus**

Foundation

- 1 ½ Metal Roof Deck
- Diagonal in-place Bracing



Construction



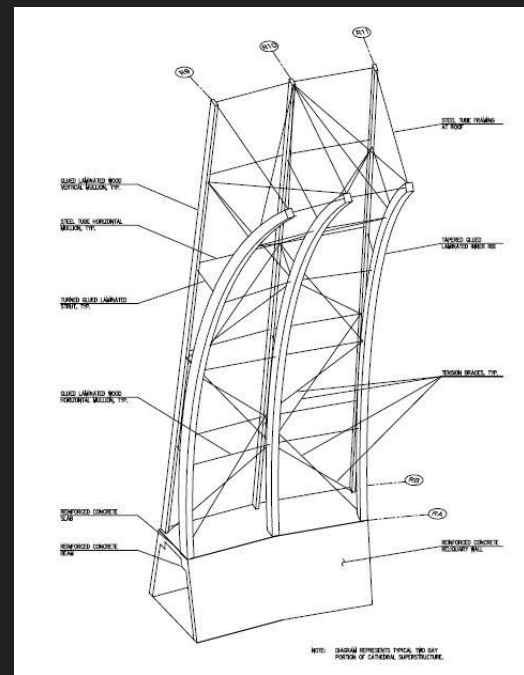
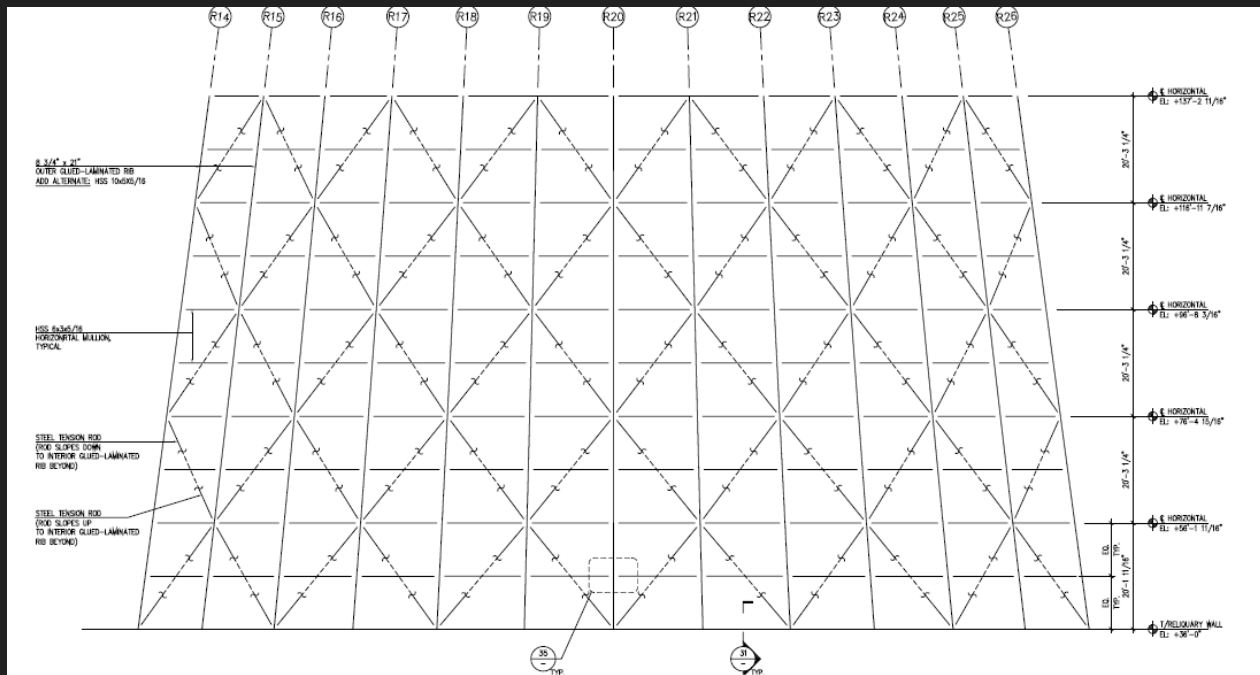
Glulam Erection - Installation of Ribs, Louvers and Mullions

Construction

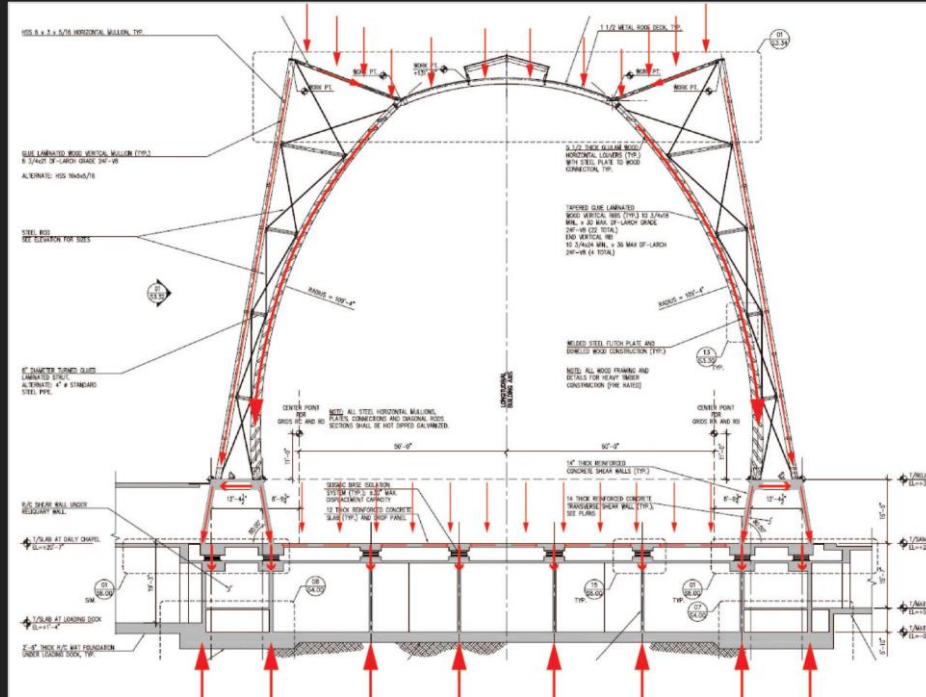


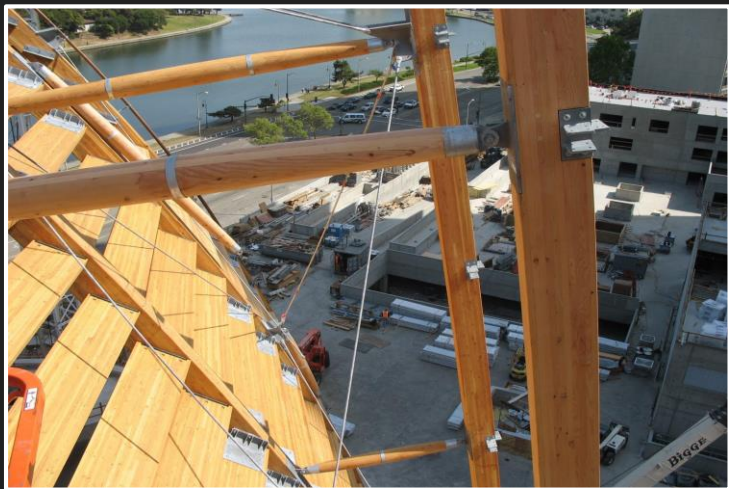
Installing Glazing

Loading Conditions

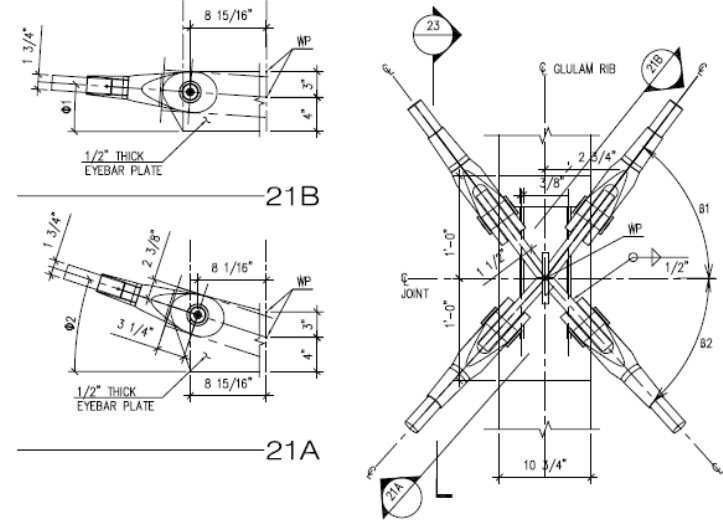
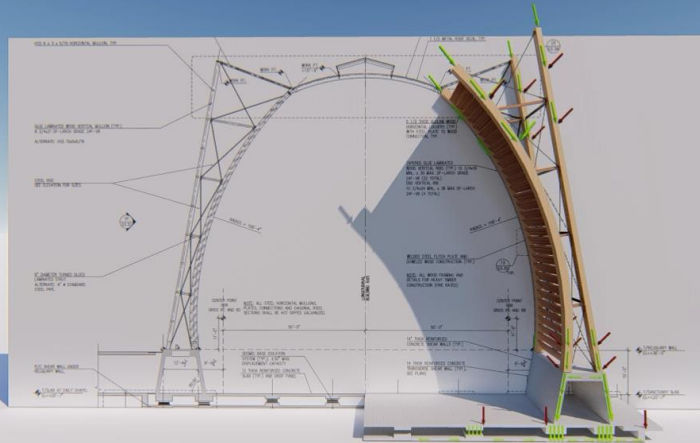


Load Tracing





Free Body Video



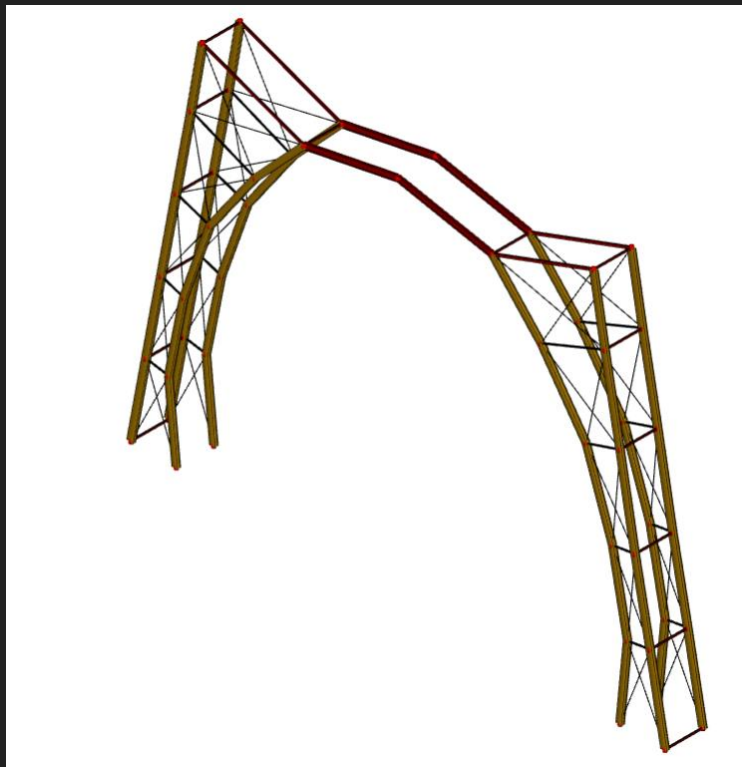
NOTES:

1. HIGH STRENGTH TIERRDS (66 ksi) AND CLEVIS ATTACHMENTS SHALL BE M/CALLOY 460 SYSTEM, TRIPYRAMID GALVANIZED SYSTEM, OR EQUIVALENT. (HOT DIPPED GALVANIZED)
2. TIROD DIAMETER VARIES SEE SECTION 01/S3.33
3. DETAILS DRAWN RELATIVE TO THE TANGENT OF THE CURVED GLULAM SURFACE. ORIENTATION TO THE VERTICAL PLANE VARIES, SEE SECTION 01/S3.01
4. ANGLES $\phi 1$ AND $\phi 1$ AND REFER TO TIERRDS CONNECTING TO NODES ONE LEVEL HIGHER THAN NODE DRAWN.
5. ANGLES $\phi 2$ AND $\phi 2$ AND REFER TO TIERRDS CONNECTING TO NODES ONE LEVEL LOWER THAN NODE DRAWN.

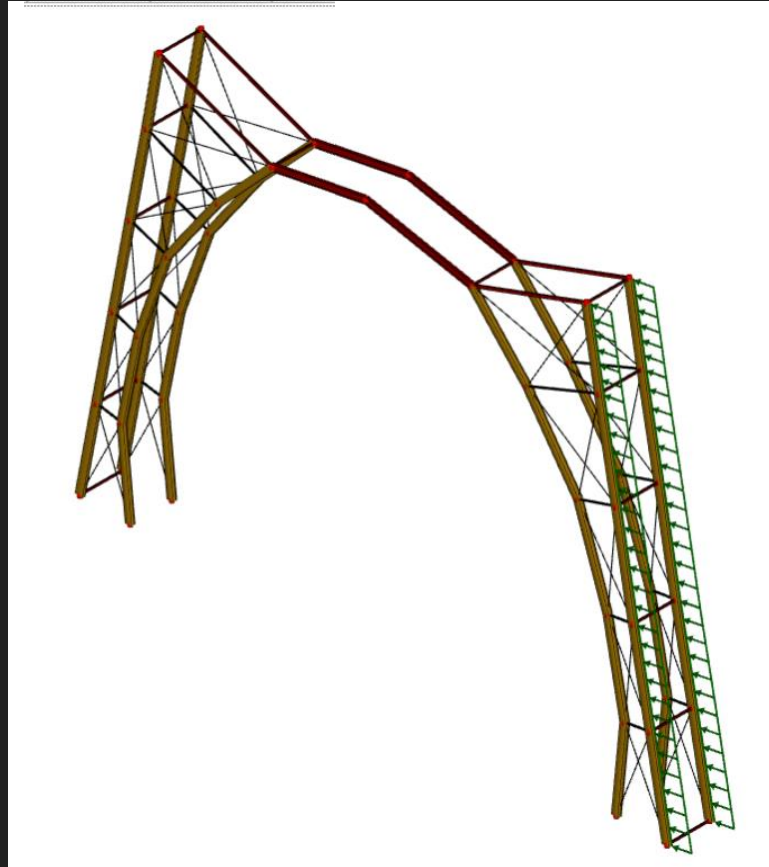
PRICING ALTERNATE 1A
ELEVATION - TYPICAL TENSION BRACE TO GLULAM RIB CONNECTION

1-1/2" = 1/4"
21

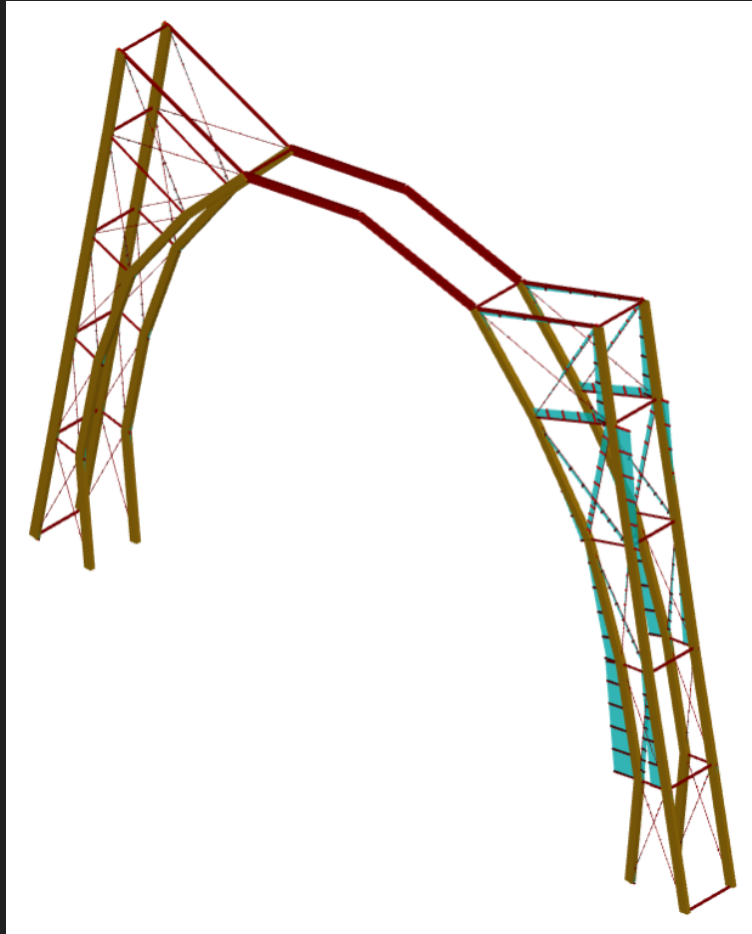
Visual Analysis



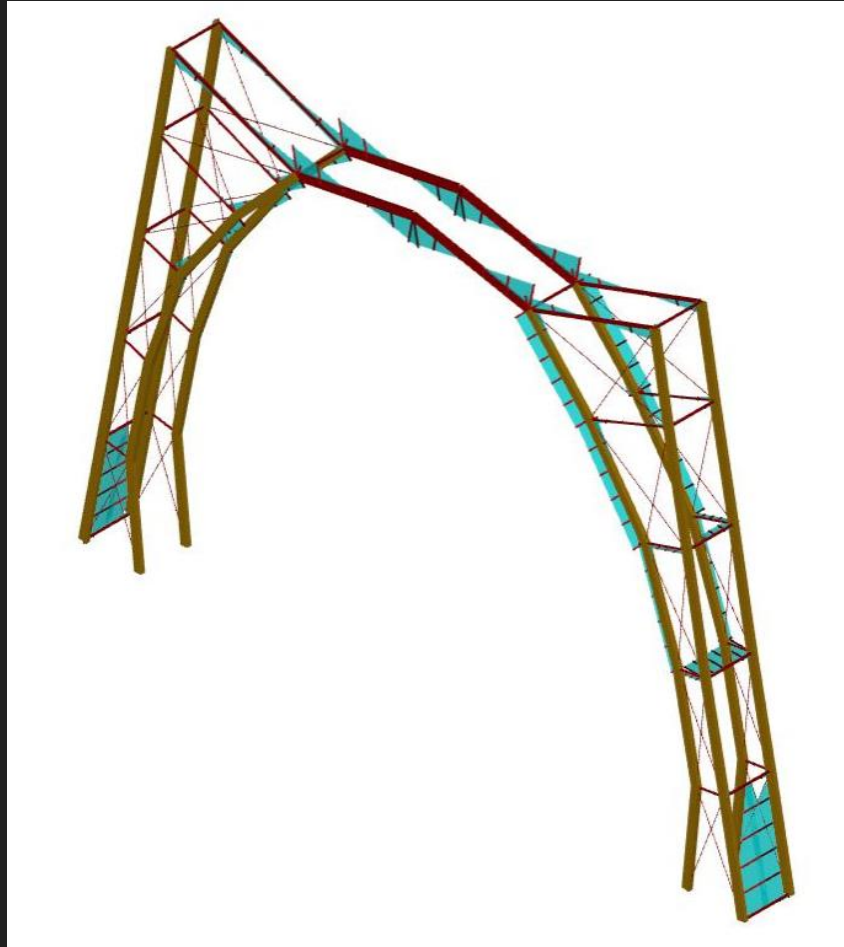
Lateral Load



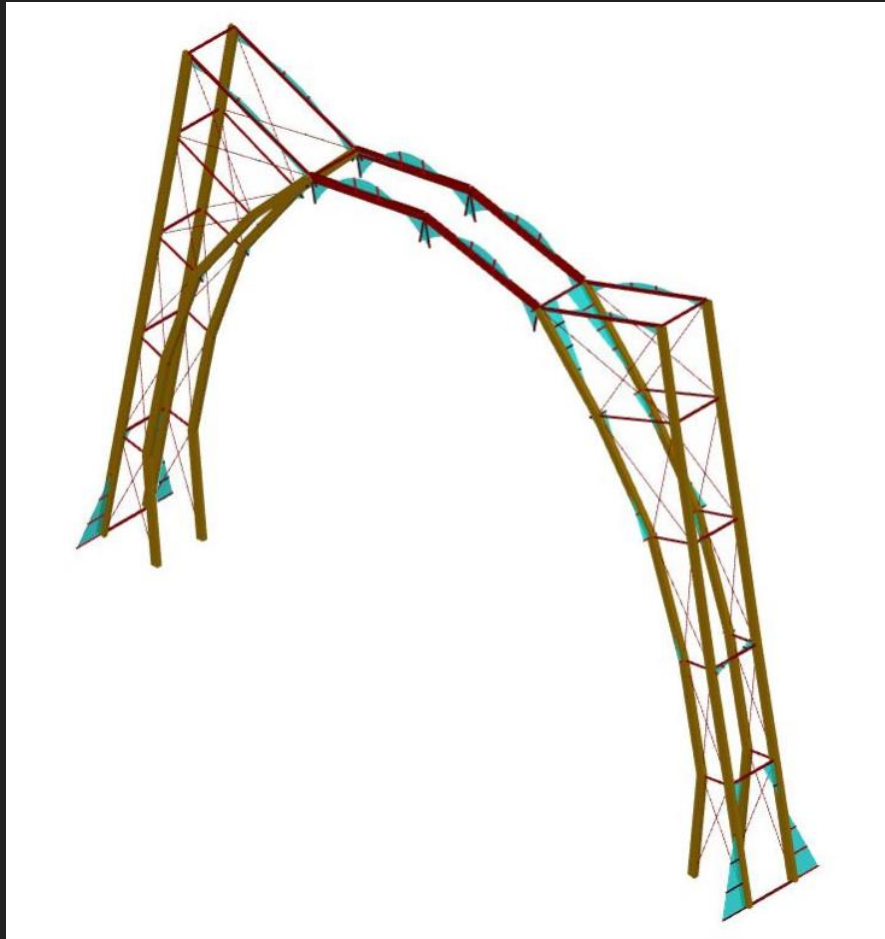
Axial Force



Shear



Moment



References

- [https://www.som.com/projects/cathedral of christ the light_structural engineering](https://www.som.com/projects/cathedral%20of%20christ%20the%20light_structural_engineering)
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