

# Milstein Hall by OMA



Eric Opperman – Rajvi Patel – Eric Stafford – Zach Wise

Location: Ithaca, New York

Architect: OMA (Office for  
Metropolitan Architecture)

Area: 47,000 SF

Client: Cornell University

Awards: LEED Gold certification  
in August 2012.



Milstein Hall



# Design Intent

- Act as a bridge between existing architecture buildings to unify the architecture complex.
- Provide interaction between buildings as a collaborative space.
- Cantilevers over University Avenue to provide visual connection to the Foundry.



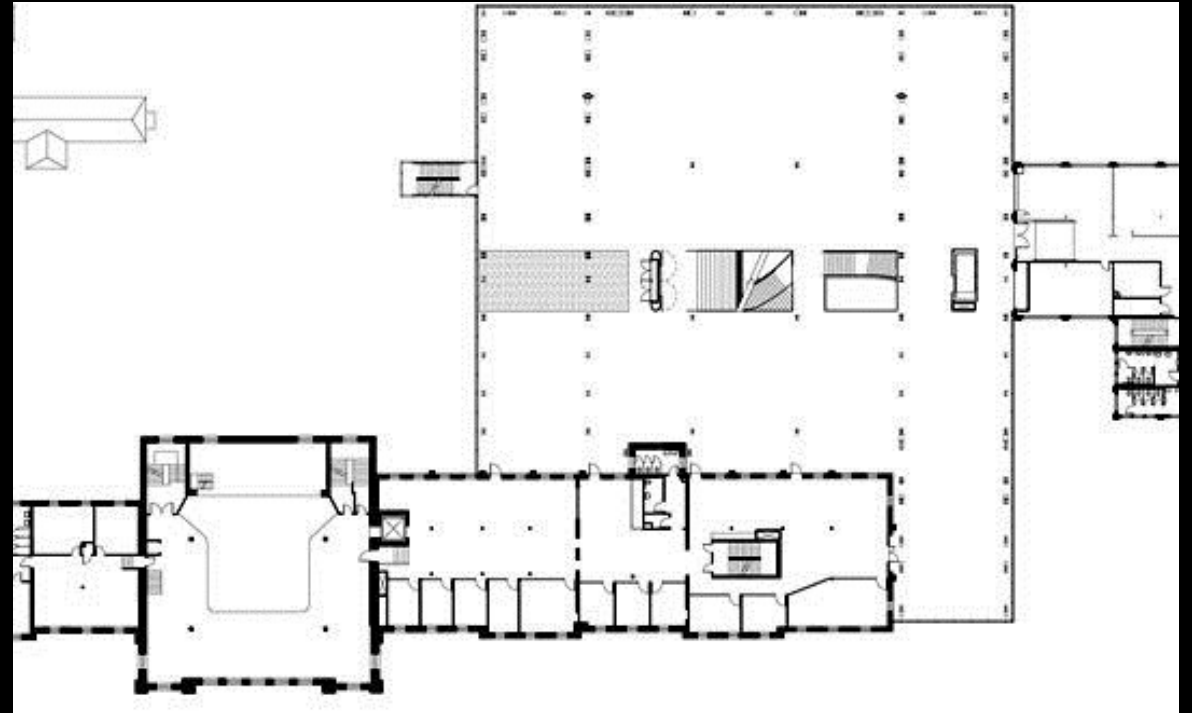
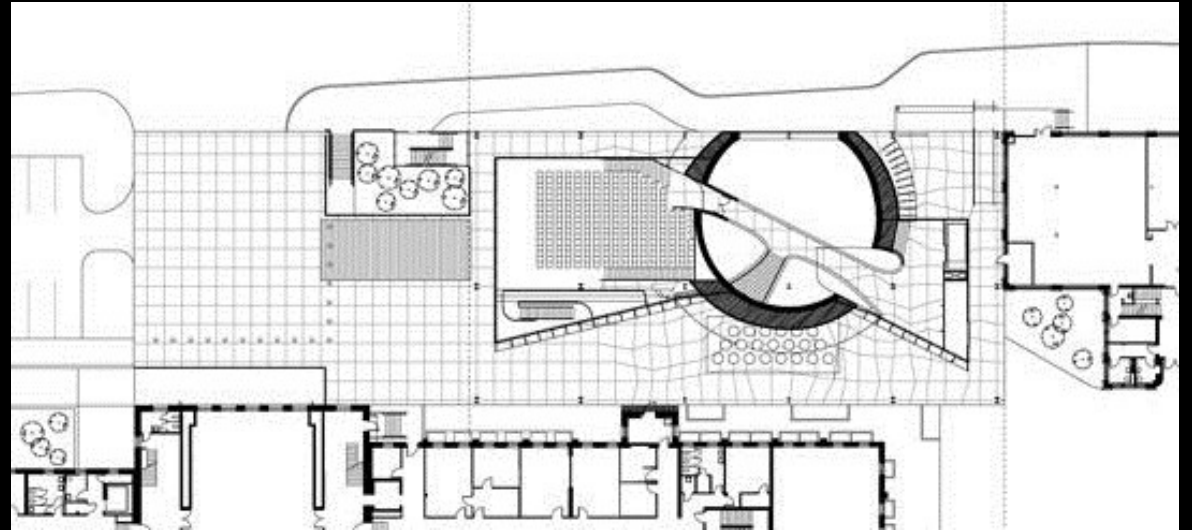
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# First Floor Plan

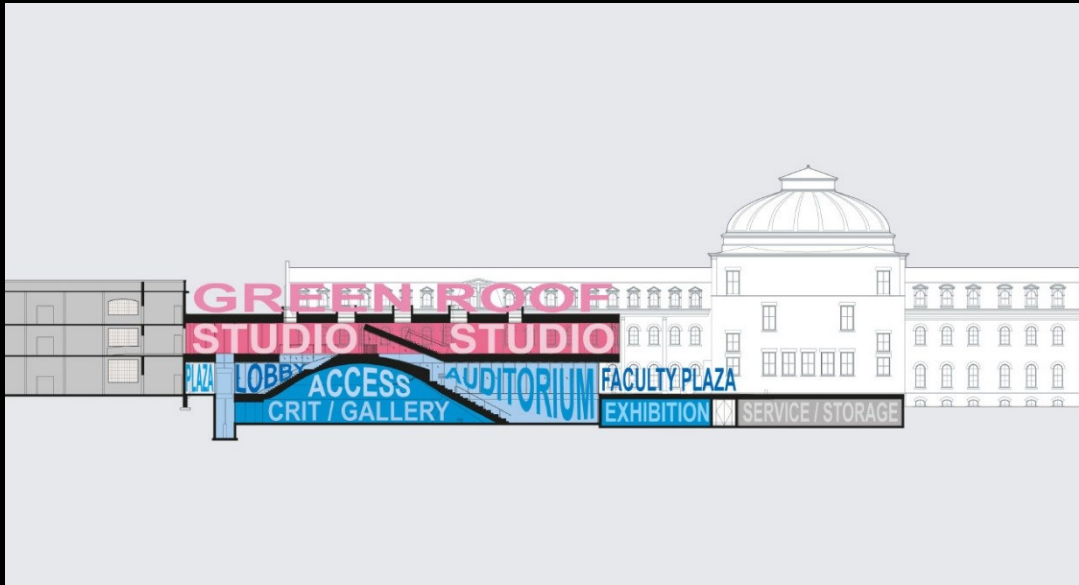
- Lobby
- Auditorium
- Exhibition and Critique Space

# Second Floor Plan

- Studio Spaces



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# First Floor

- Auditorium
- Exhibit Area and Critique Space



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# First Floor

- Dome surface is the transition between first and second levels.
- Cantilever above provides covered walkway parallel to University Avenue

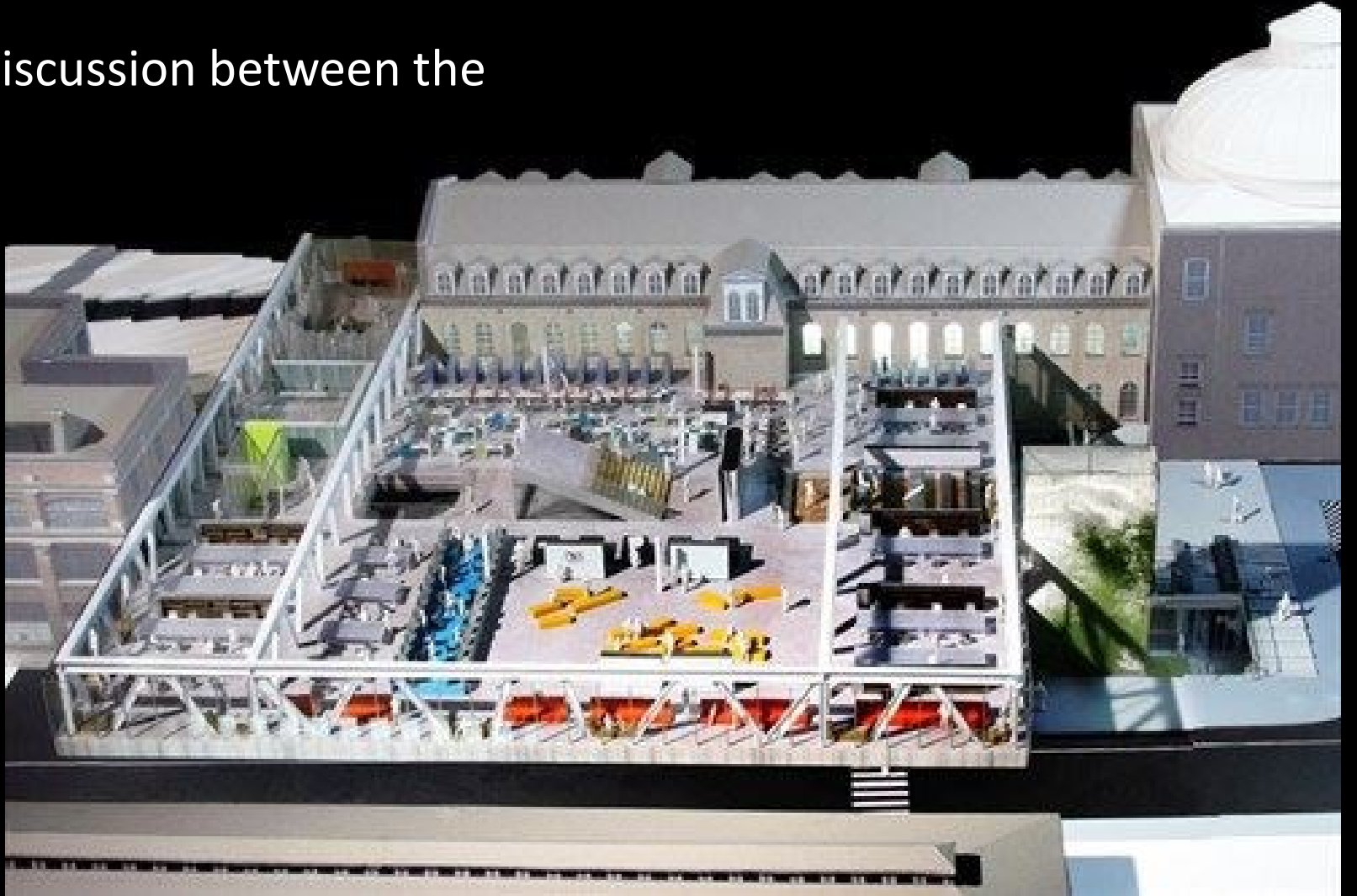


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# Second Floor Plate

- Encourages interaction and discussion between the different architecture fields.
- Bridge between existing buildings.
- Dedicated to Studio Space.



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# Roof Plate

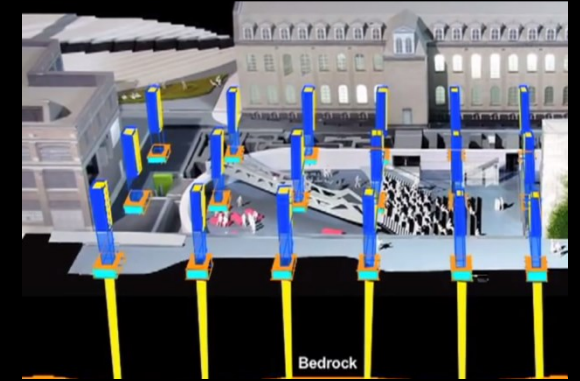
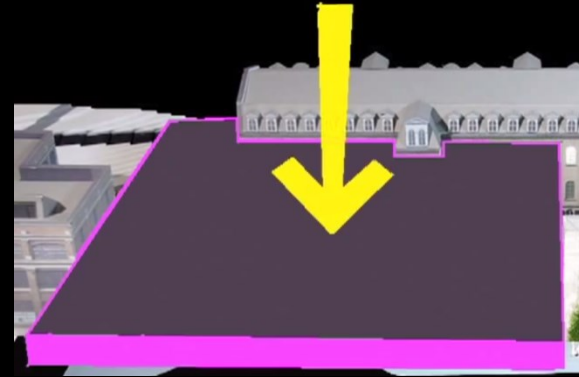
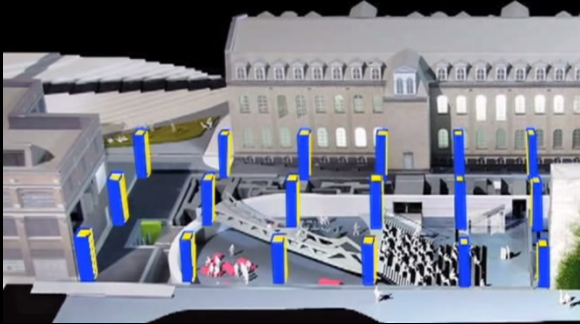
- Green Roof
- Skylights increasing in size towards the center of the building.
- Dot Pattern through use of two types of sedum.



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# Soil and Foundation



- Relatively few columns supporting Milstein Hall's heavy superstructure.
- Cylindrical concrete caissons placed beneath the footings and column caps almost 30 feet below the ground to touch the solid bedrock.



Foundation wall for addition to Statler Hall, Foundation for Milstein Hall, Cornell University (photos by J. Ochshorn)

# Structural system

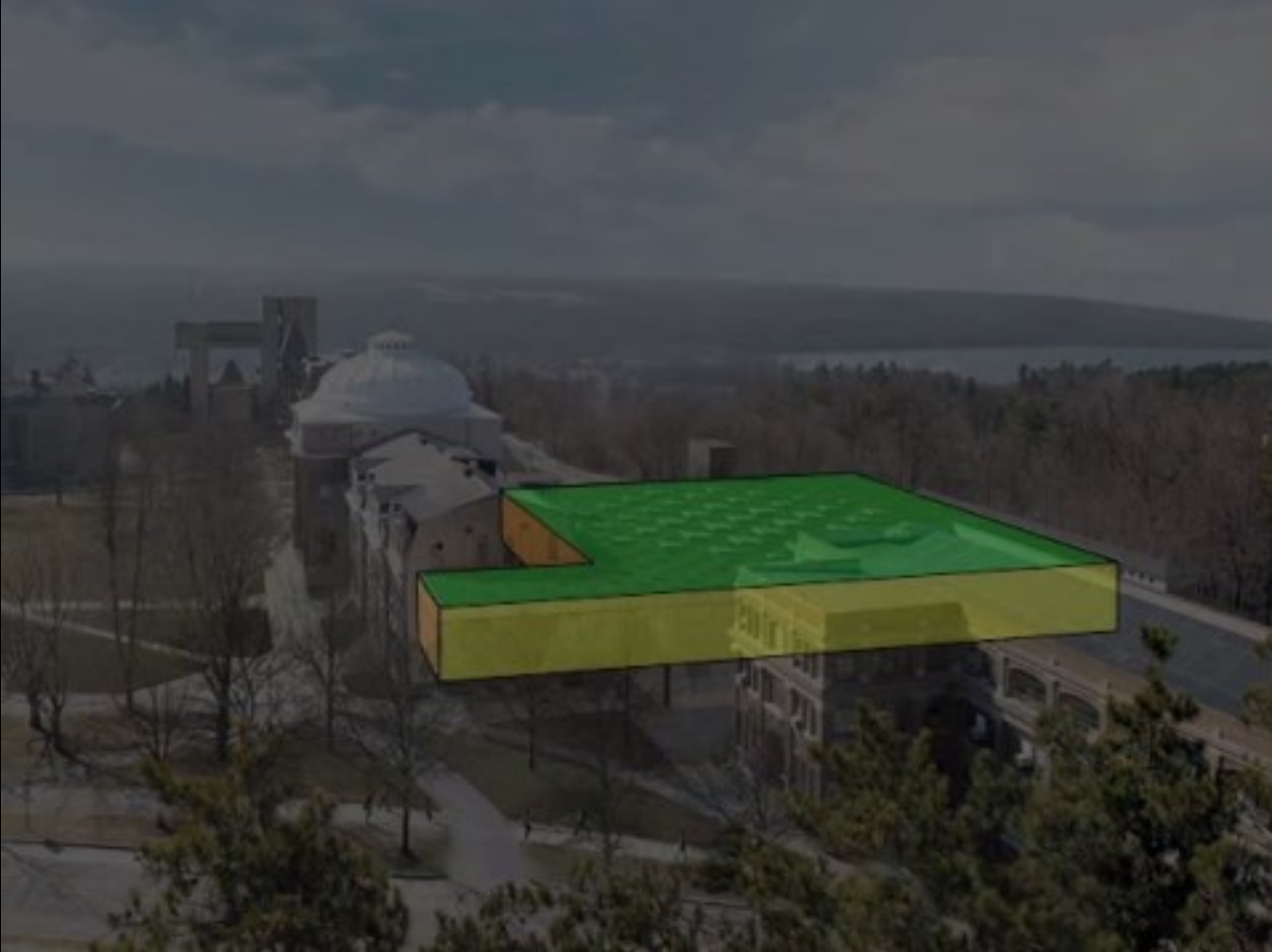


- Consists of a large floor plate.
- Raised above the ground on a grid of columns.
- Transfers all the loads vertically to the ground.

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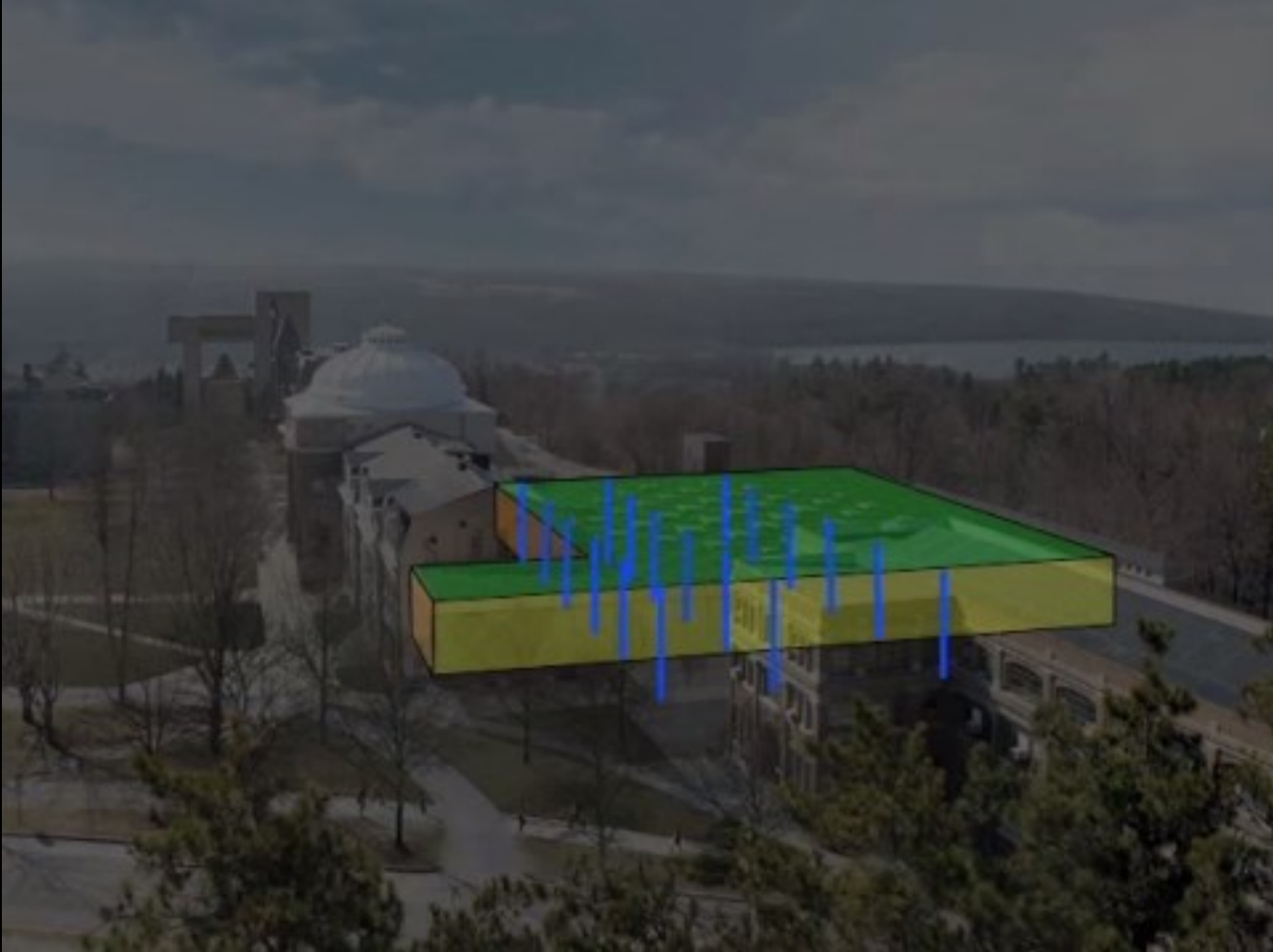
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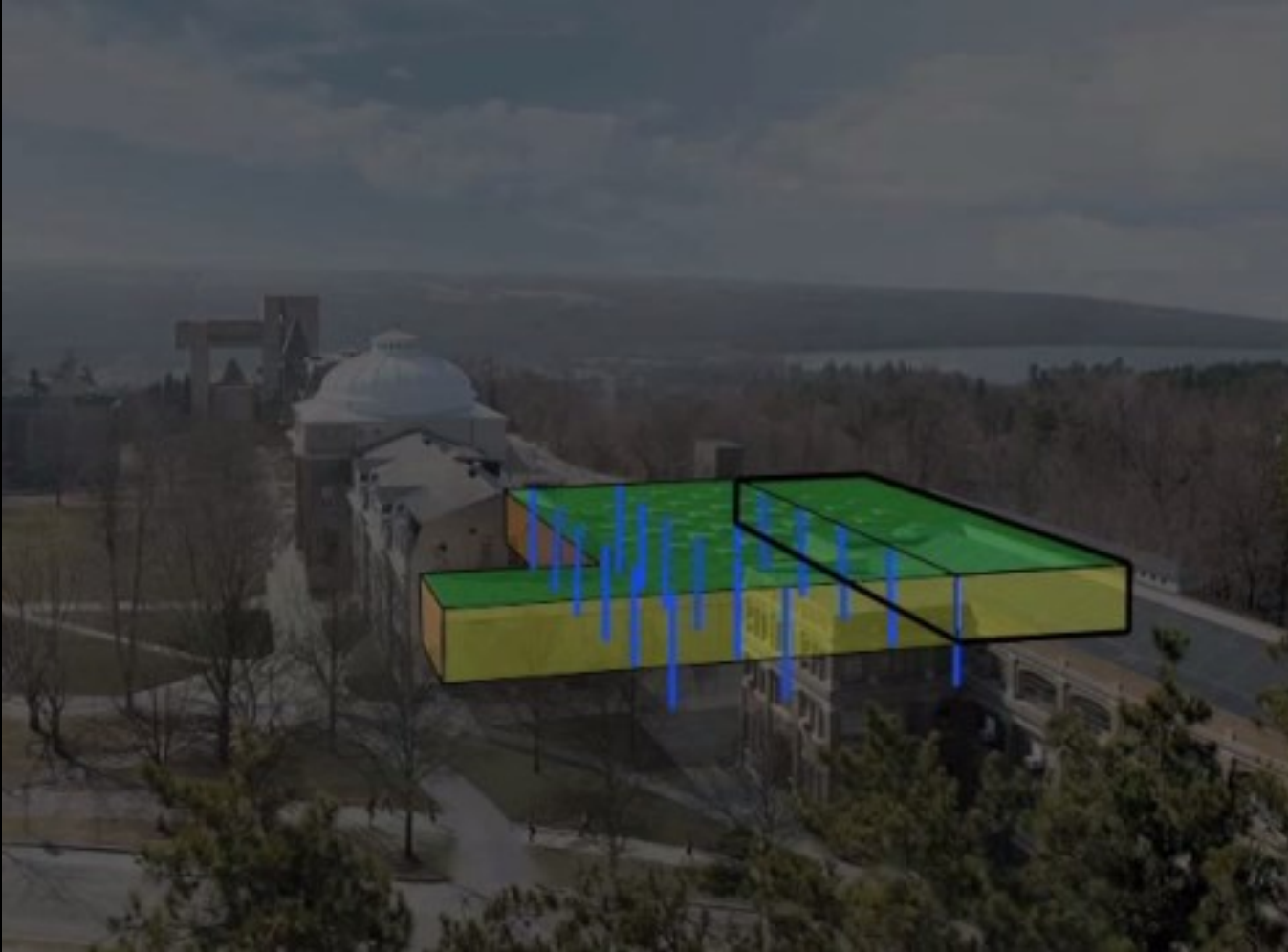


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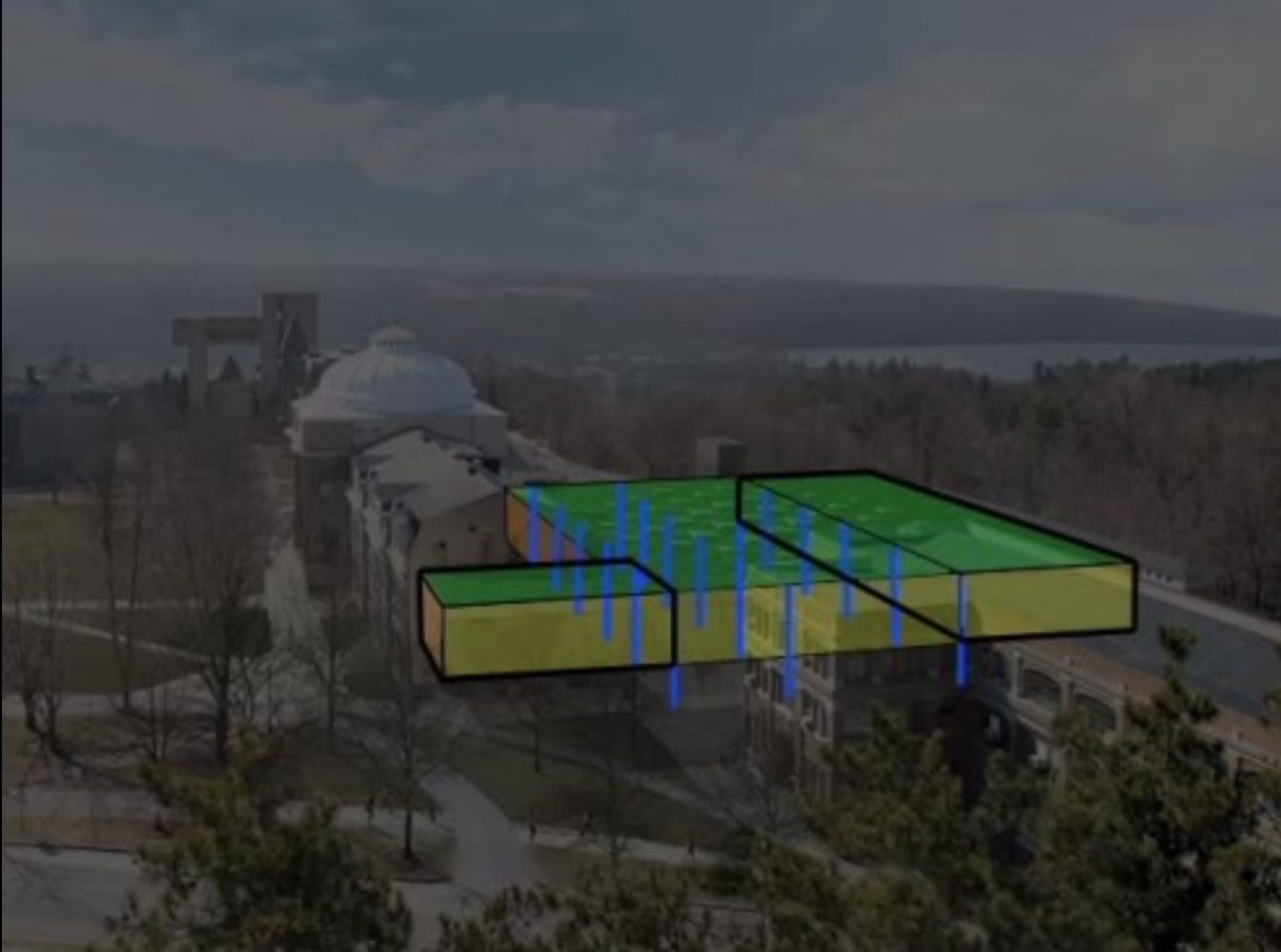
# Structural system



- Cantilevers in two directions.
- University Avenue to the North, Sibley Hall to the South.

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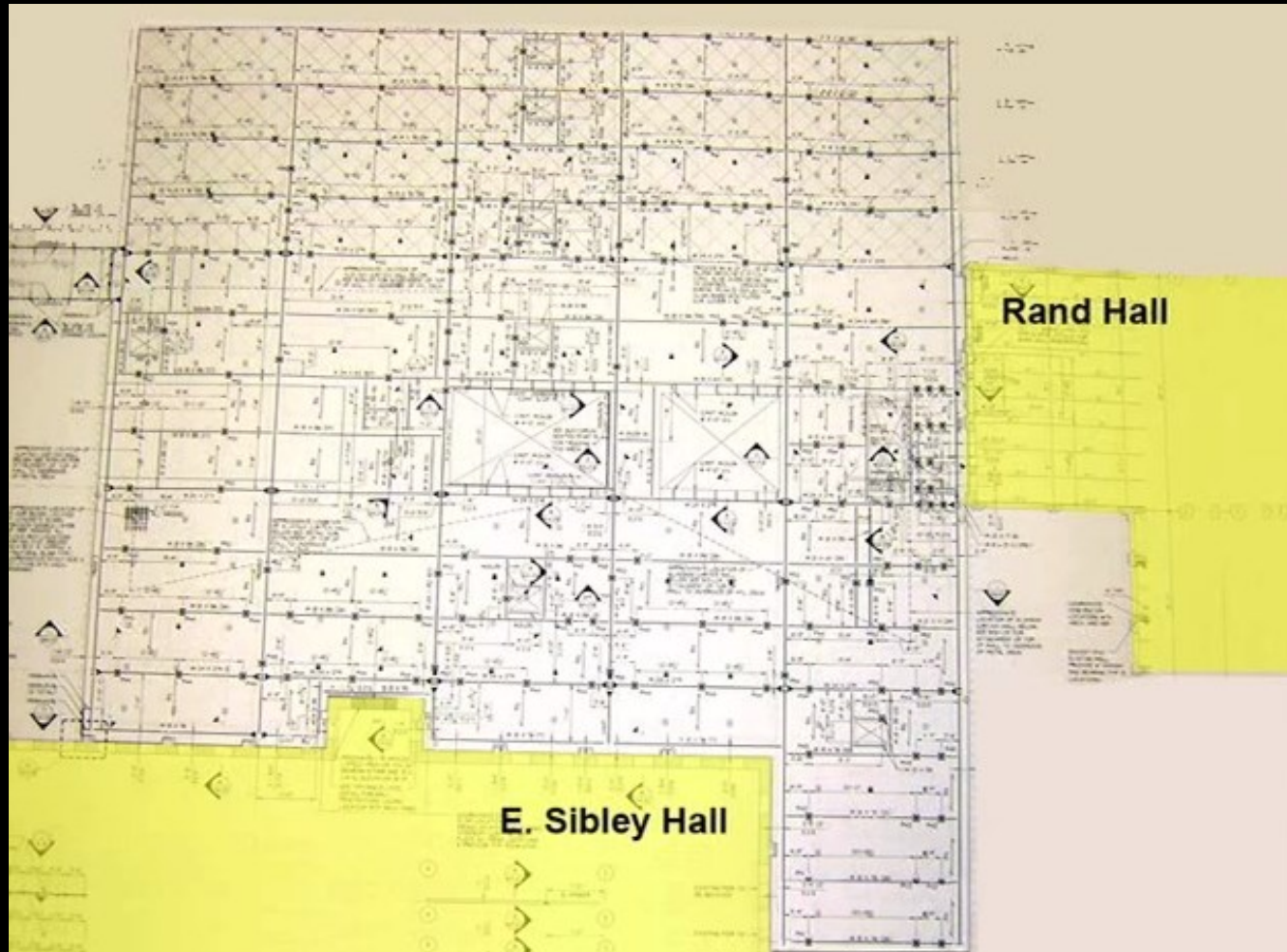
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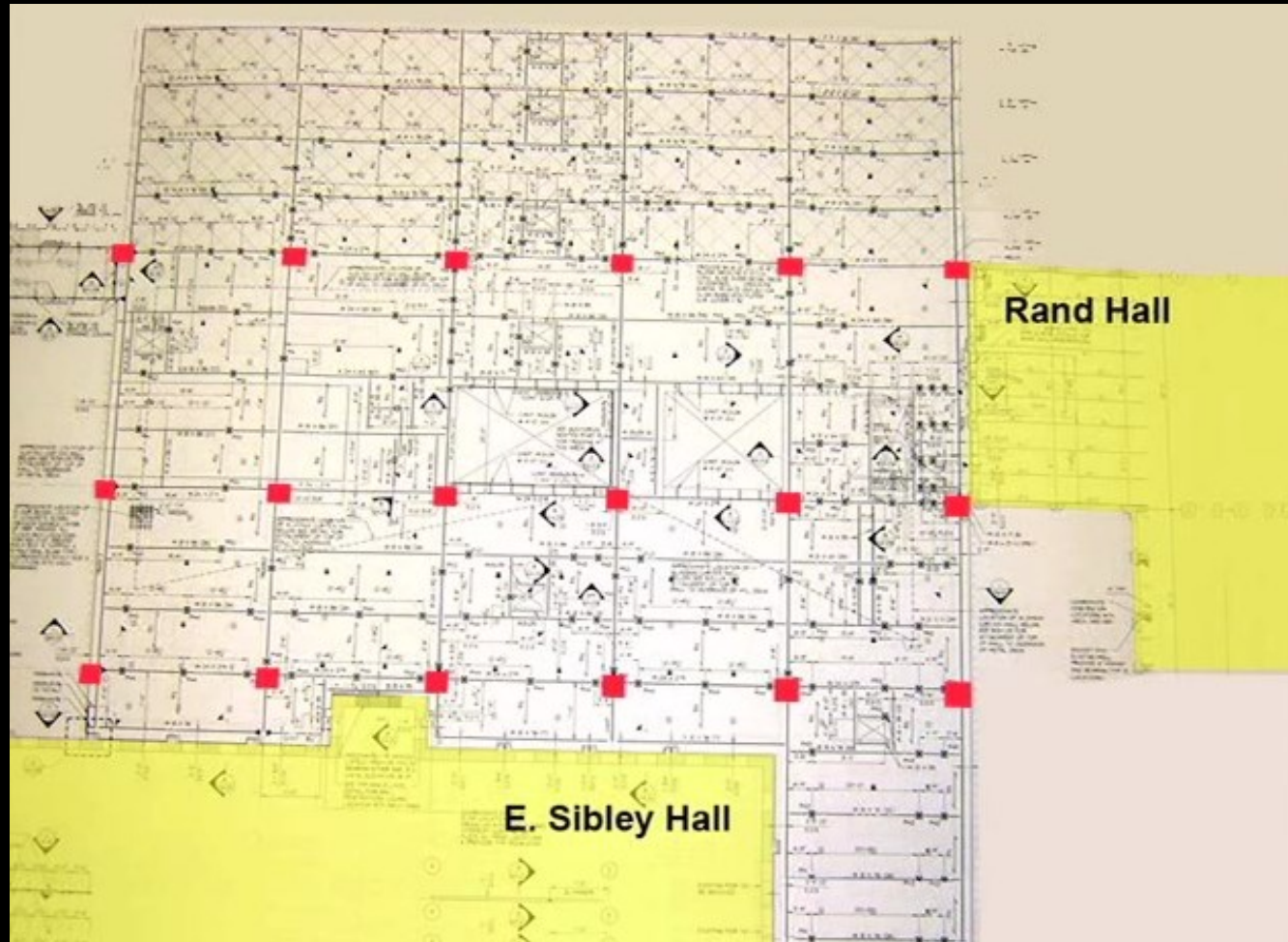
# Structural system



- Second Floor Plan

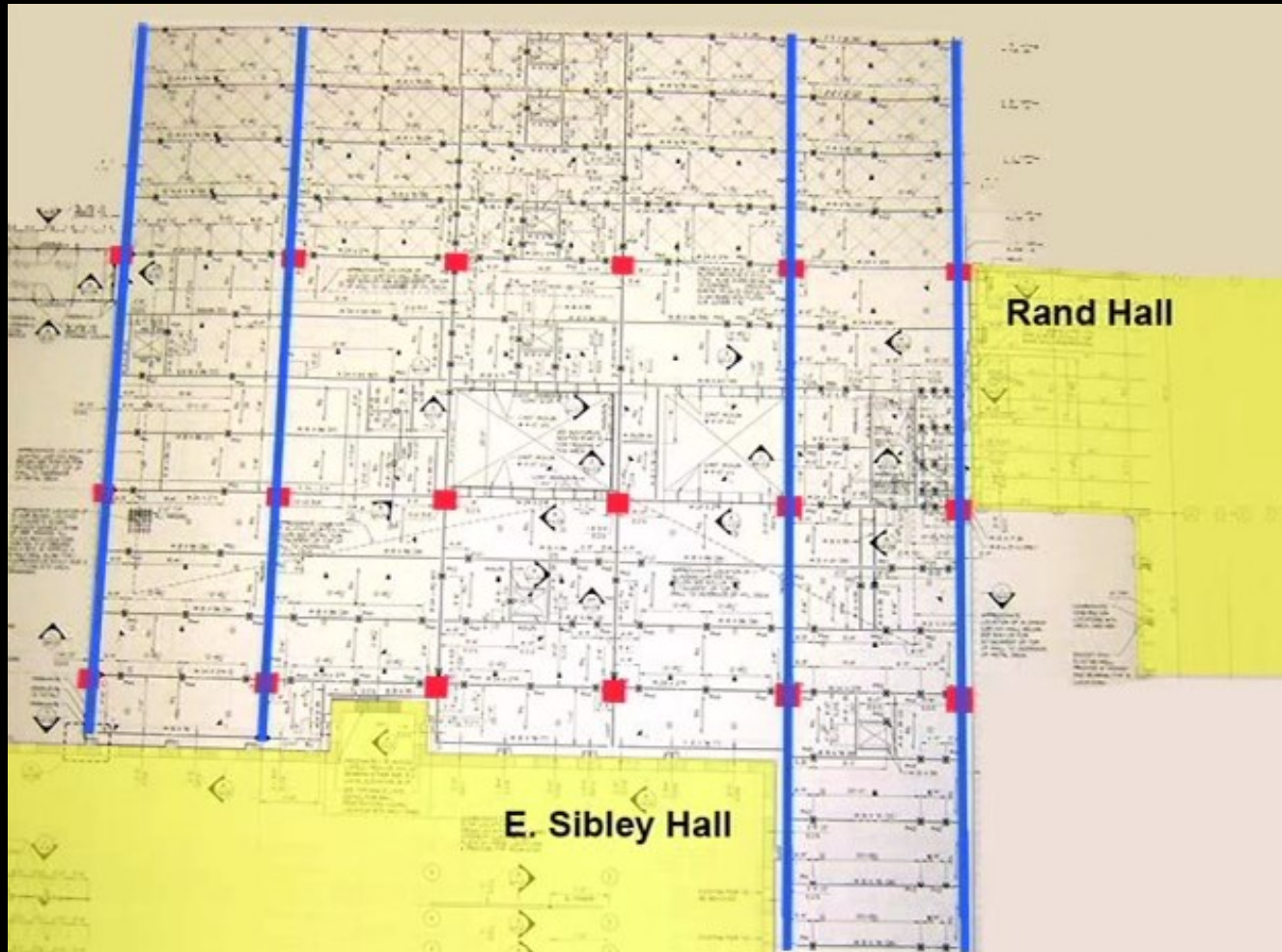


# Structural system



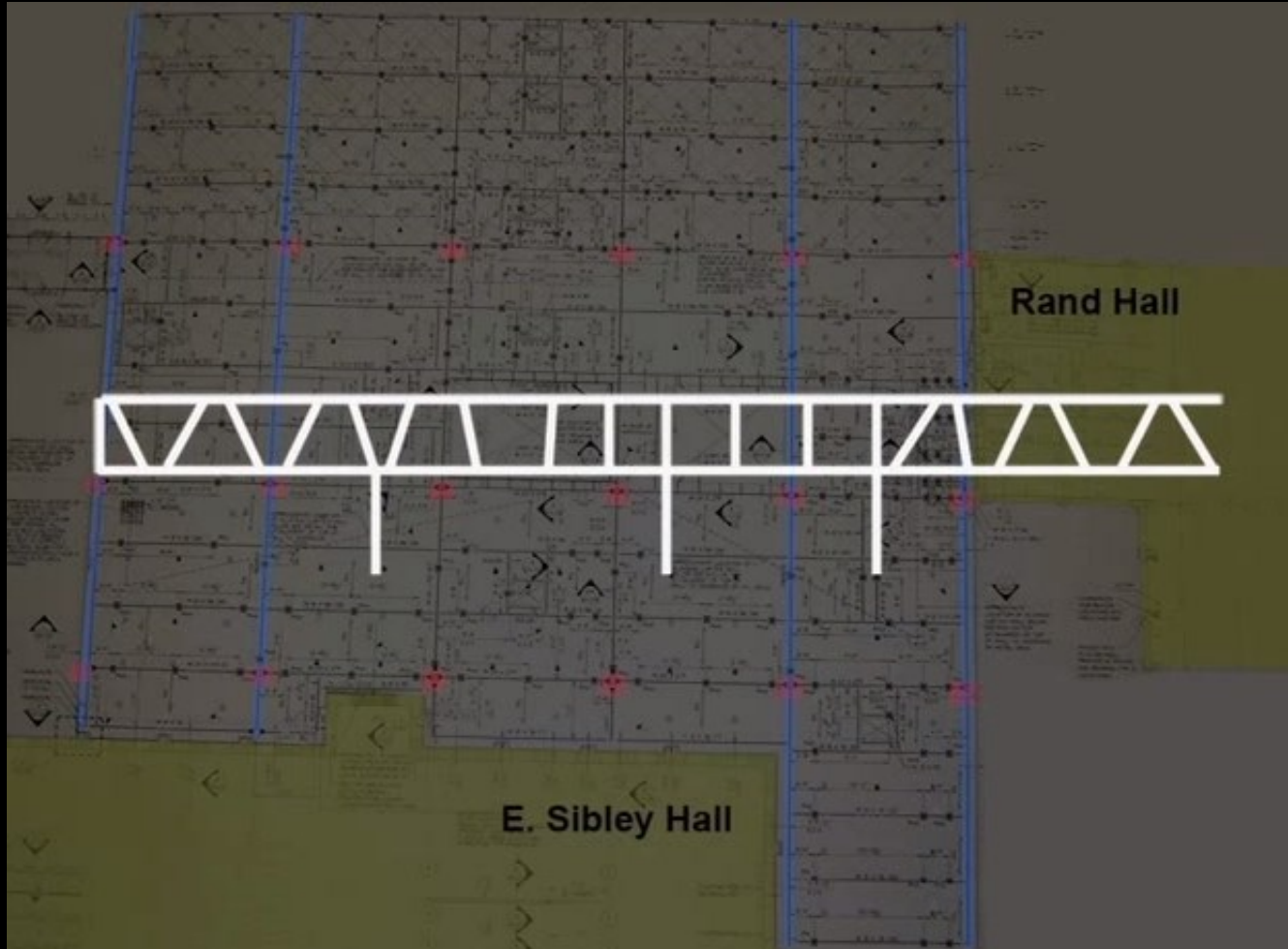
- Columns lay in a strict grid

# Structural system



- Four single story-high trusses.
- Two at each end.
- Supported on four rows of columns.

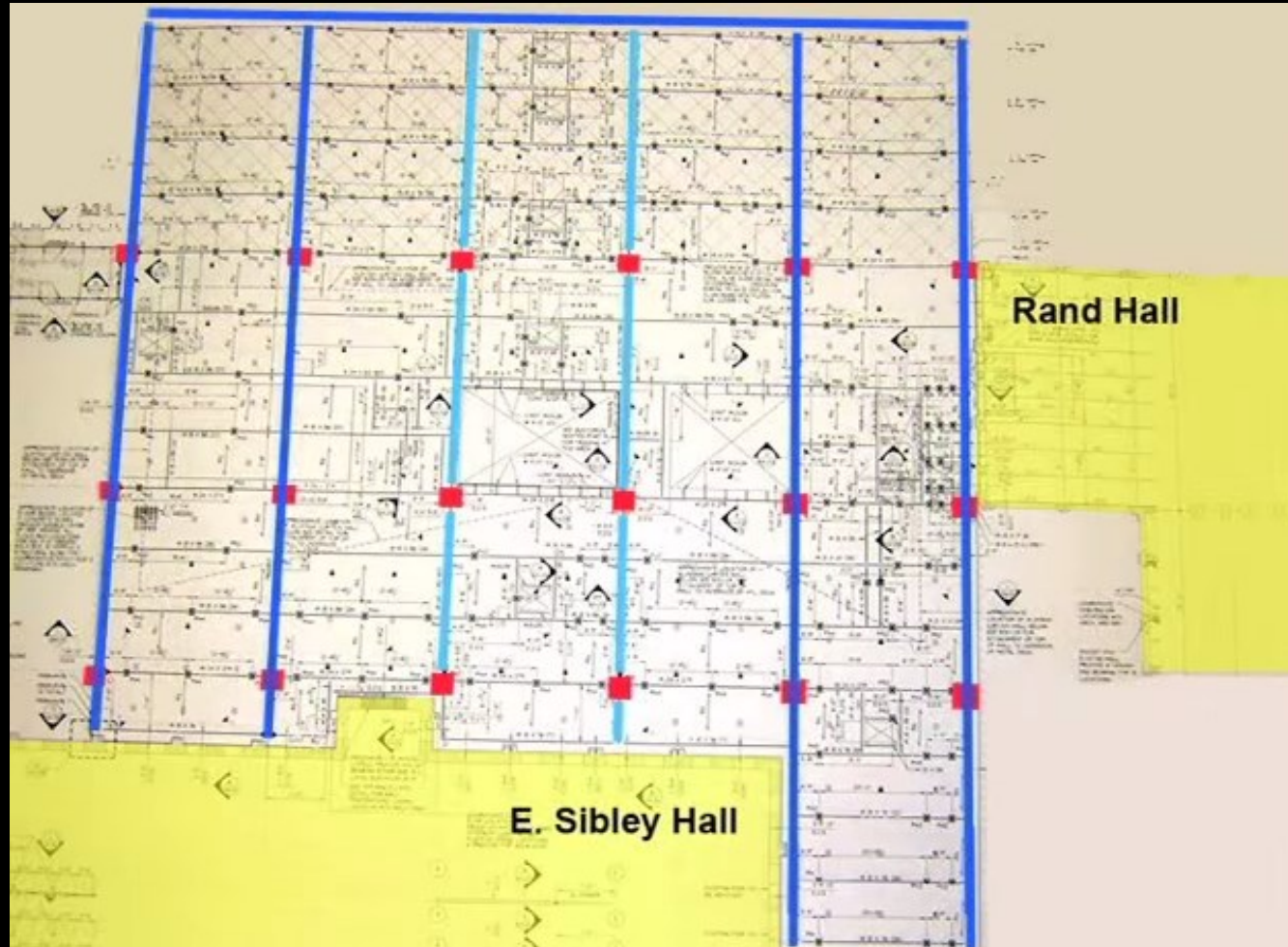
# Structural system



- The trusses are a hybrid: the traditional truss design and the Vierendeel design.
- Actually rigid frames with some slanted members to reduce bending stresses.

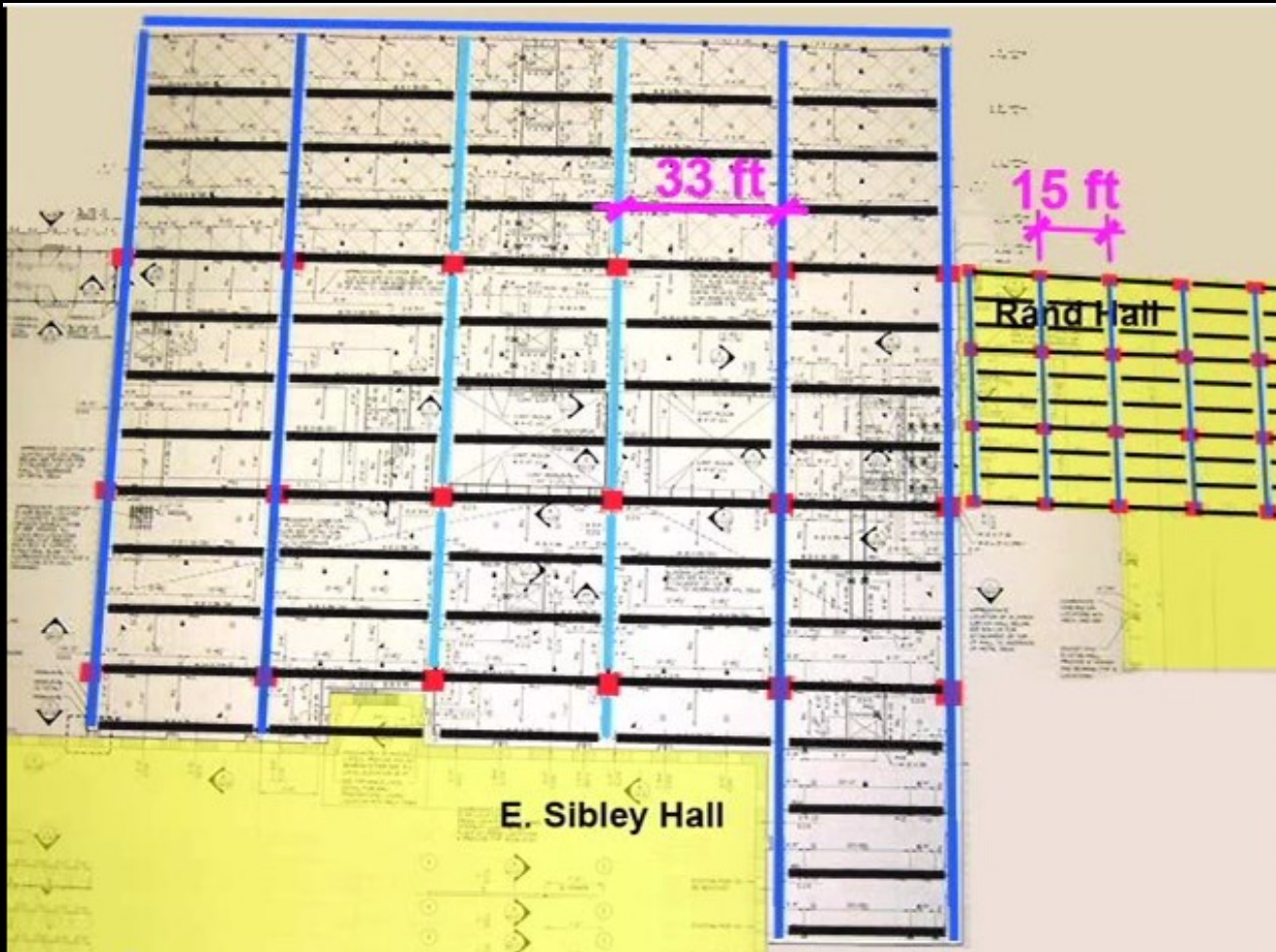


# Structural system



- Another truss at the end of the trusses to provide support.
- Only five trusses remain exposed.
- All other trusses are hidden behind walls.

# Structural system



- Regular pattern of floor and roof beams over the six lines of structure complete the structural frame with a clear span of 33 ft.



# Dome

- Independent from building structure. Concrete mass in the middle of steel building structure.
- One side supports auditorium seating.
- Stairway to second floor plate on opposite side.
- Entire dome cast-in-place in one pour.
- Concrete bridge spanning through the dome space.



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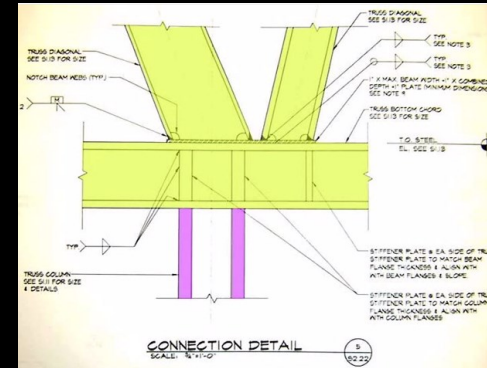
# Lateral Force

- The lateral forces are dealt without using shear walls or diagonal bracings.
- Uses rigid connections where the columns intersect the trusses or the girders to resist lateral loading.

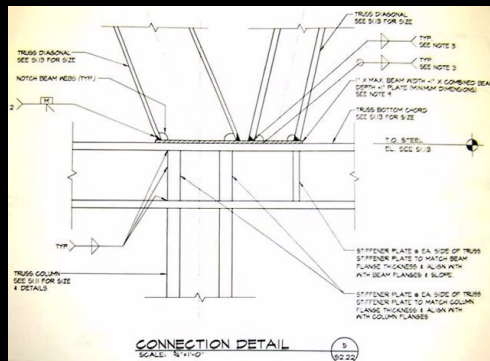


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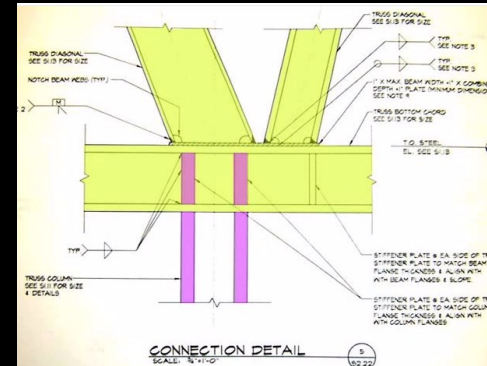
# Lateral Force



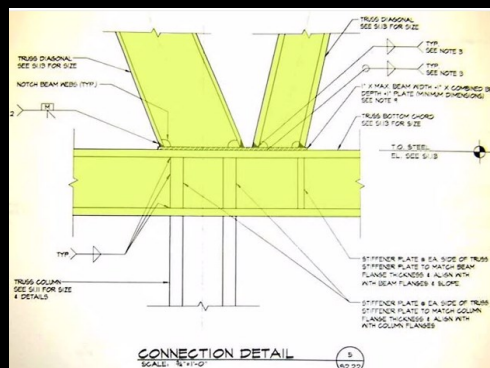
First floor column flanges.



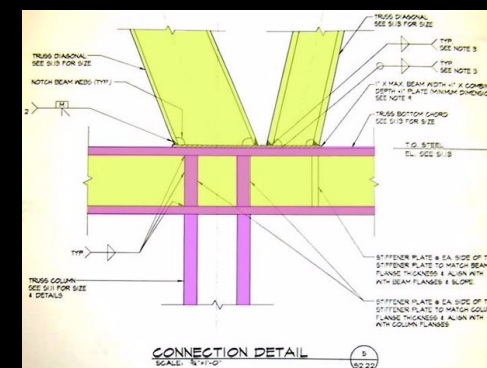
Typical rigid connection detail.



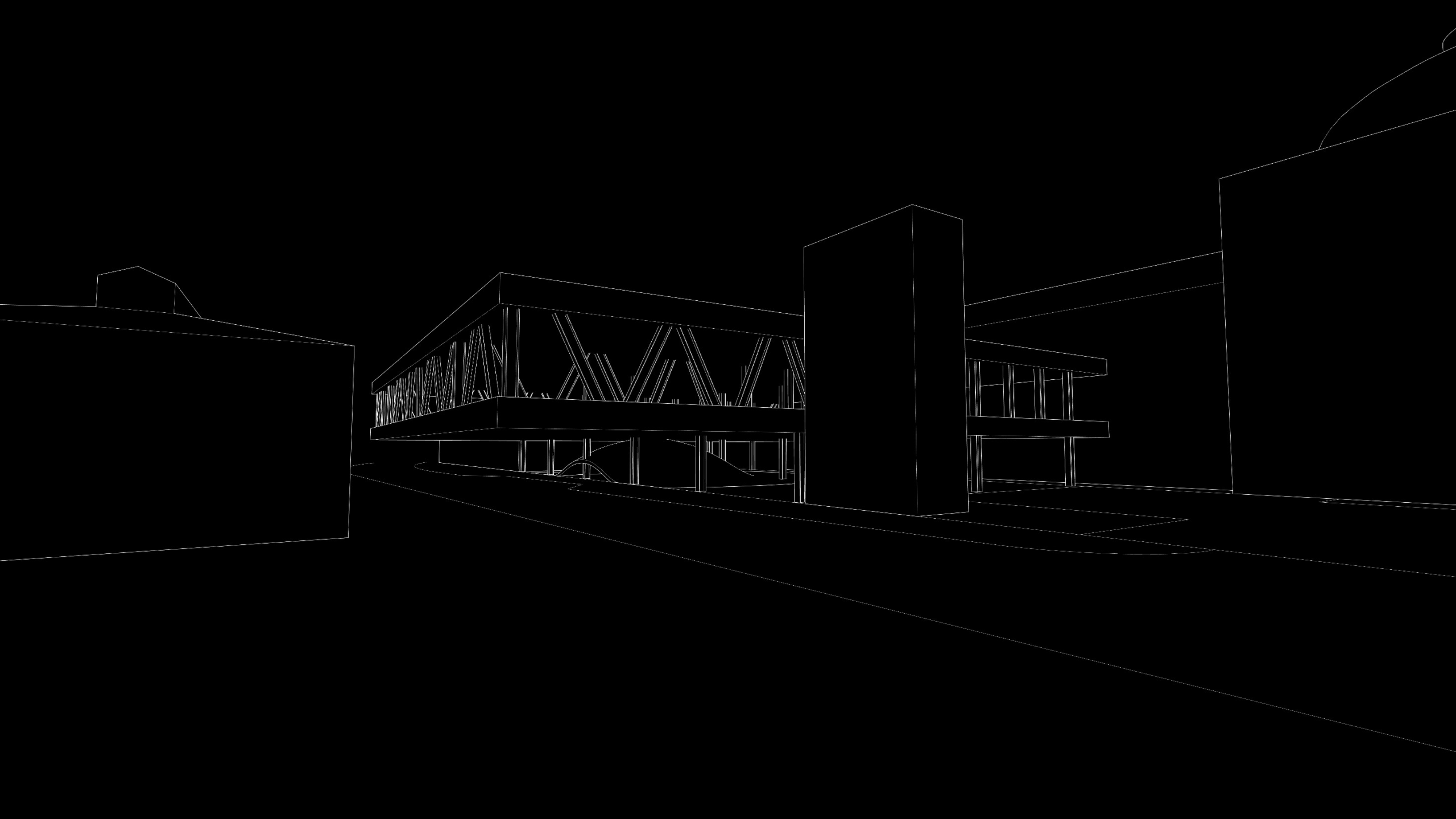
Stiffener plate matching the size of the column flanges that are welded to the bottom truss chord.



Bottom of the truss.



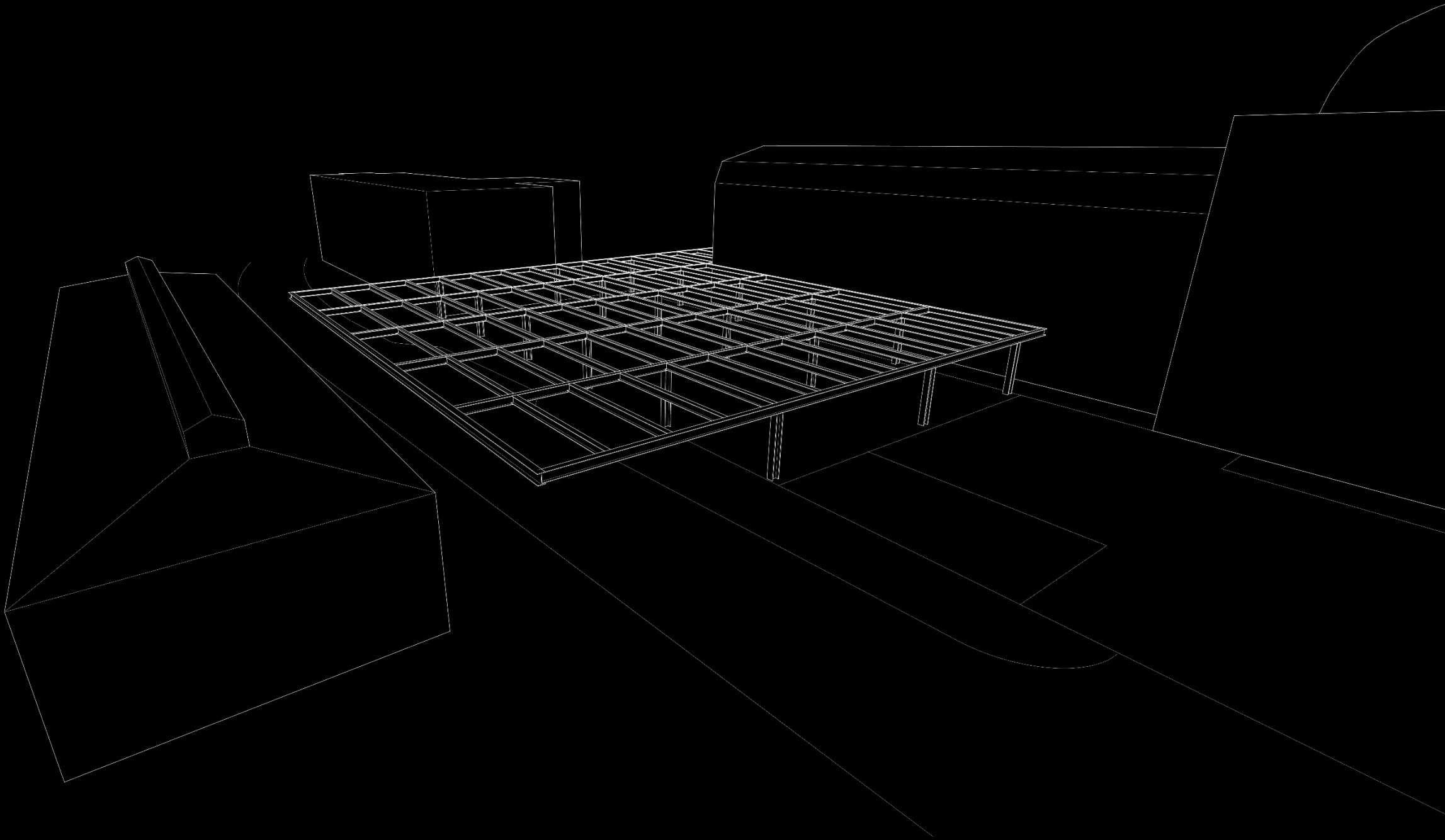
Flanges of the bottom chord.



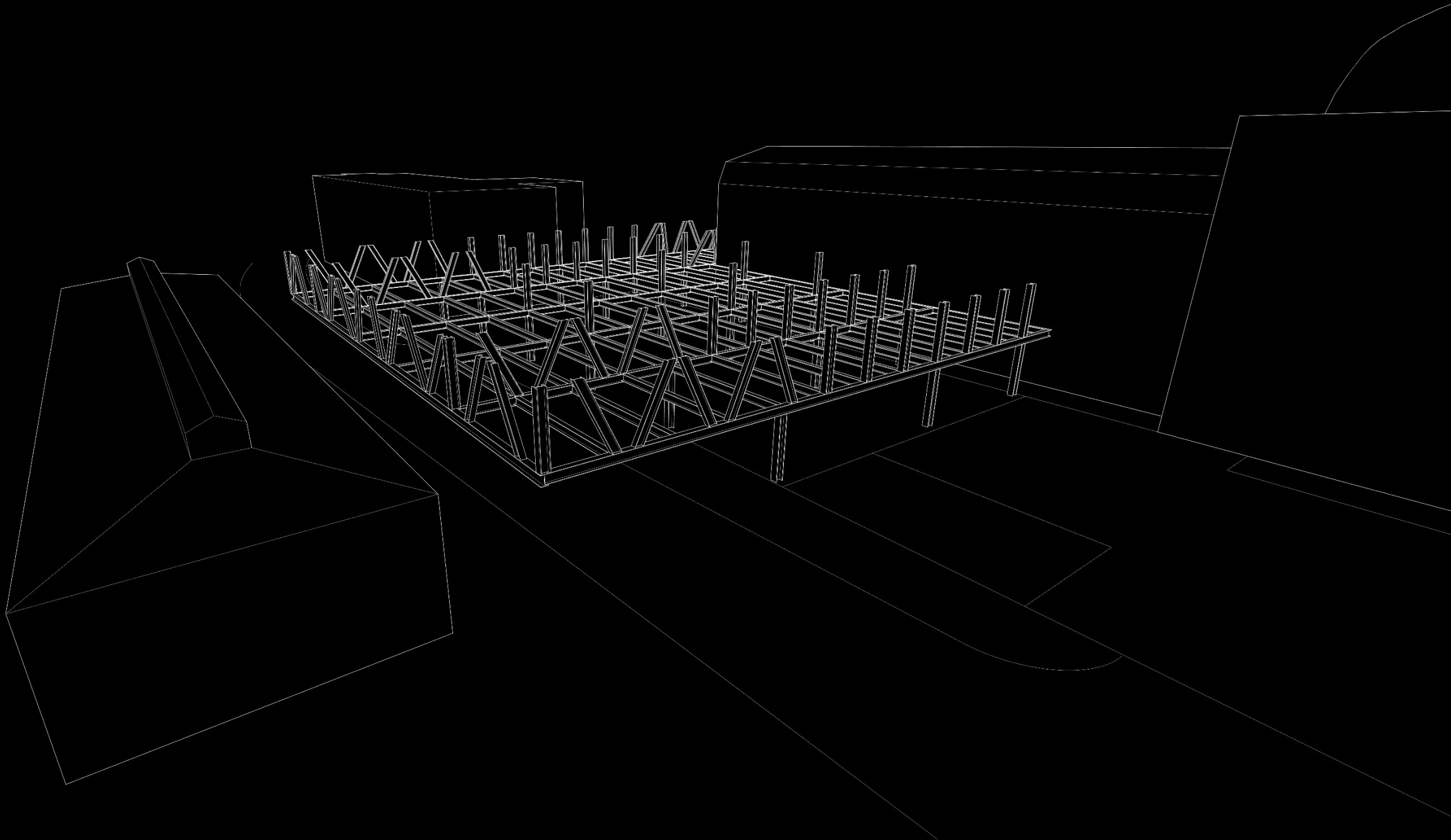


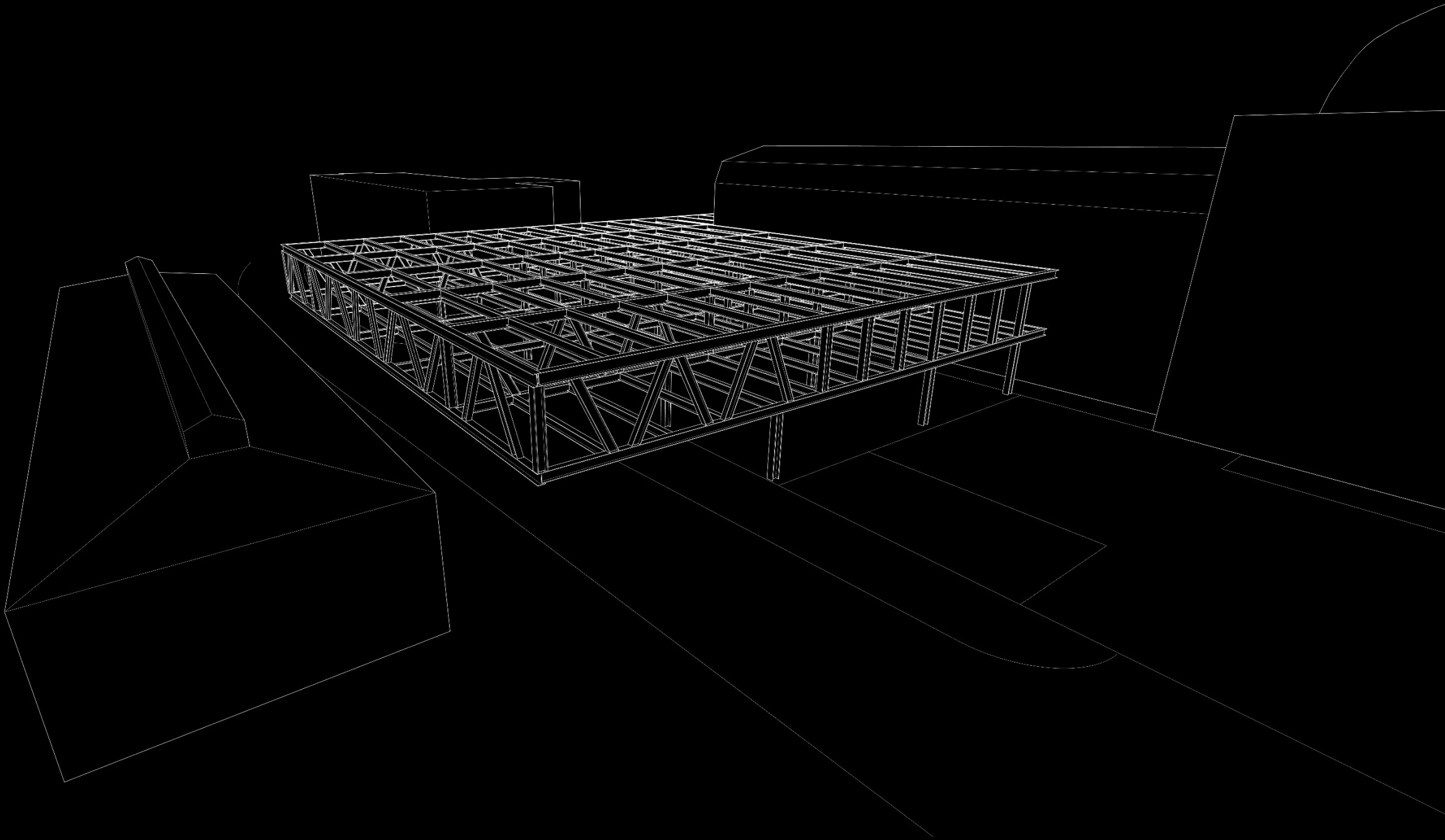


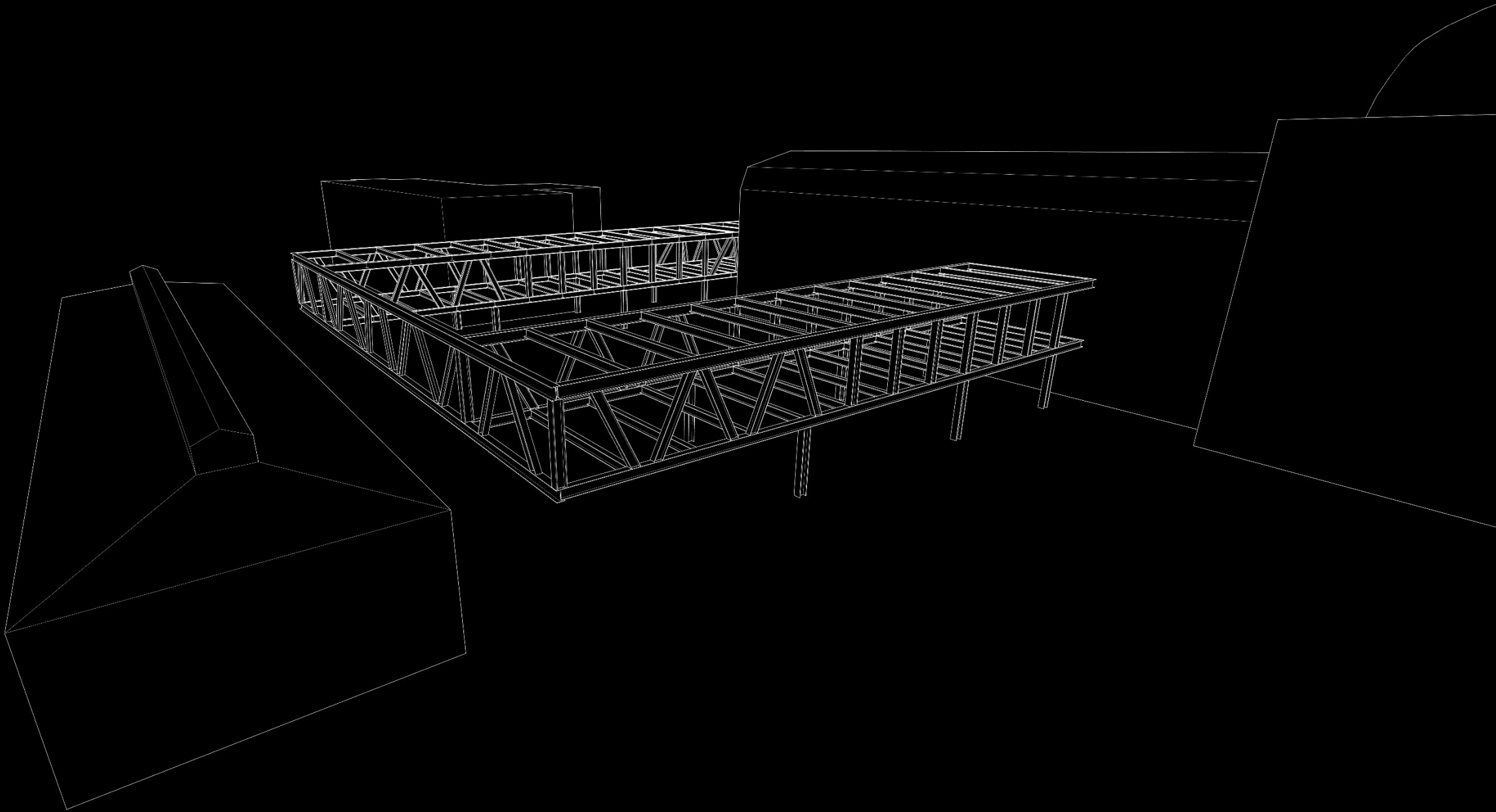








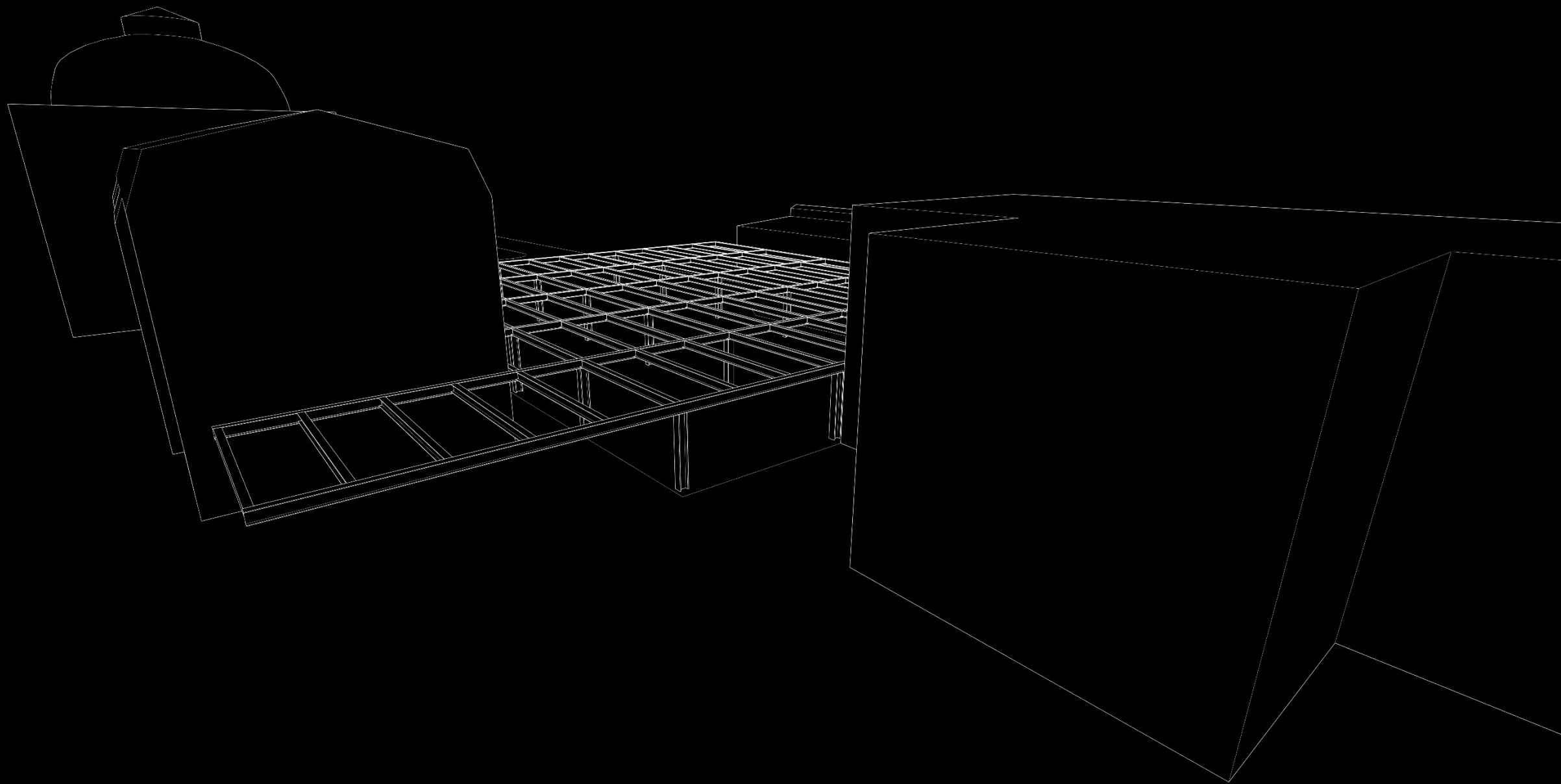




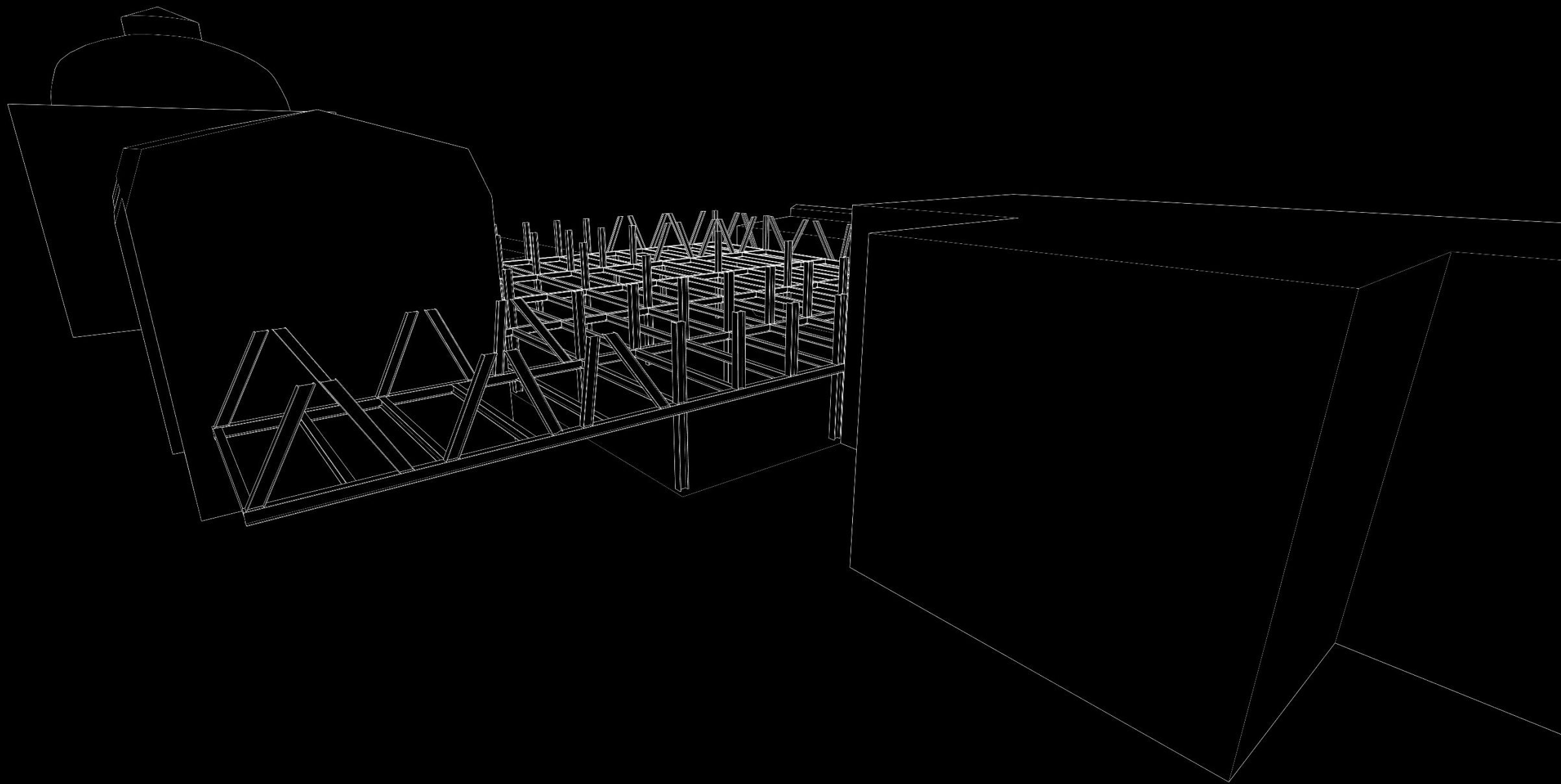


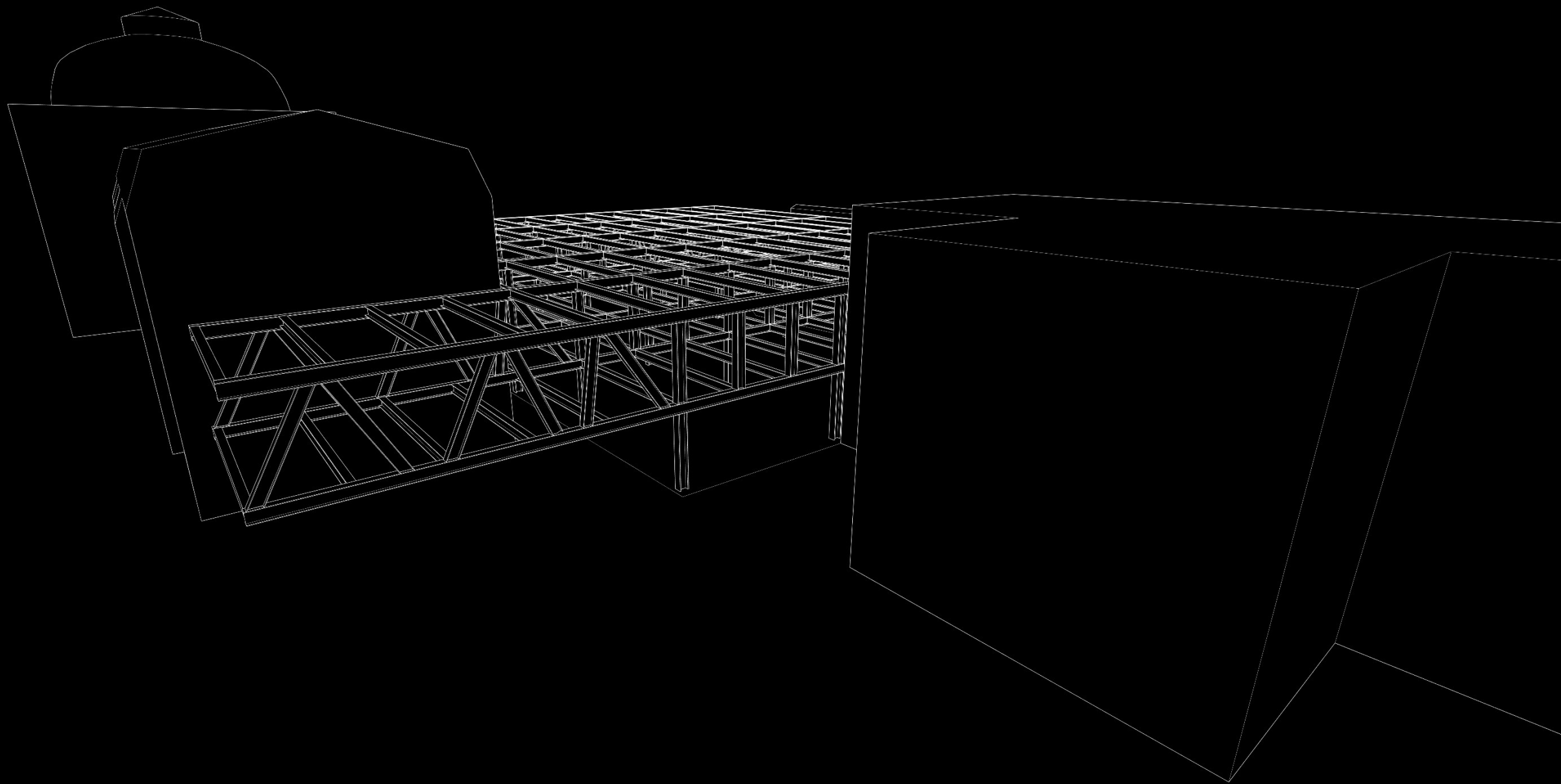




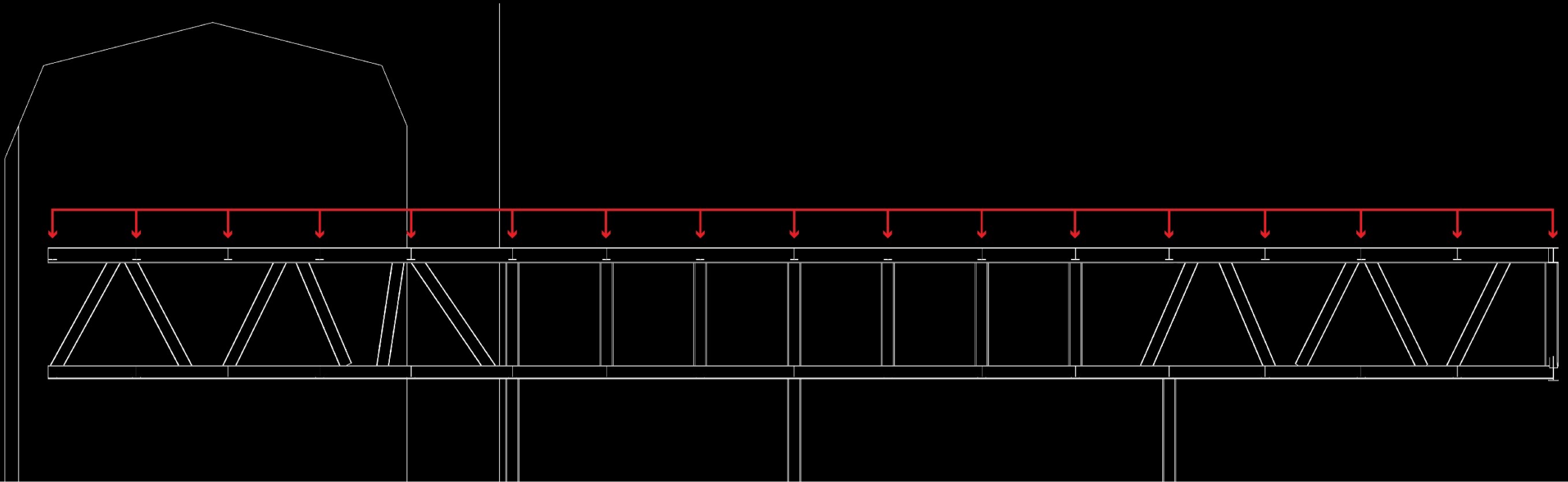






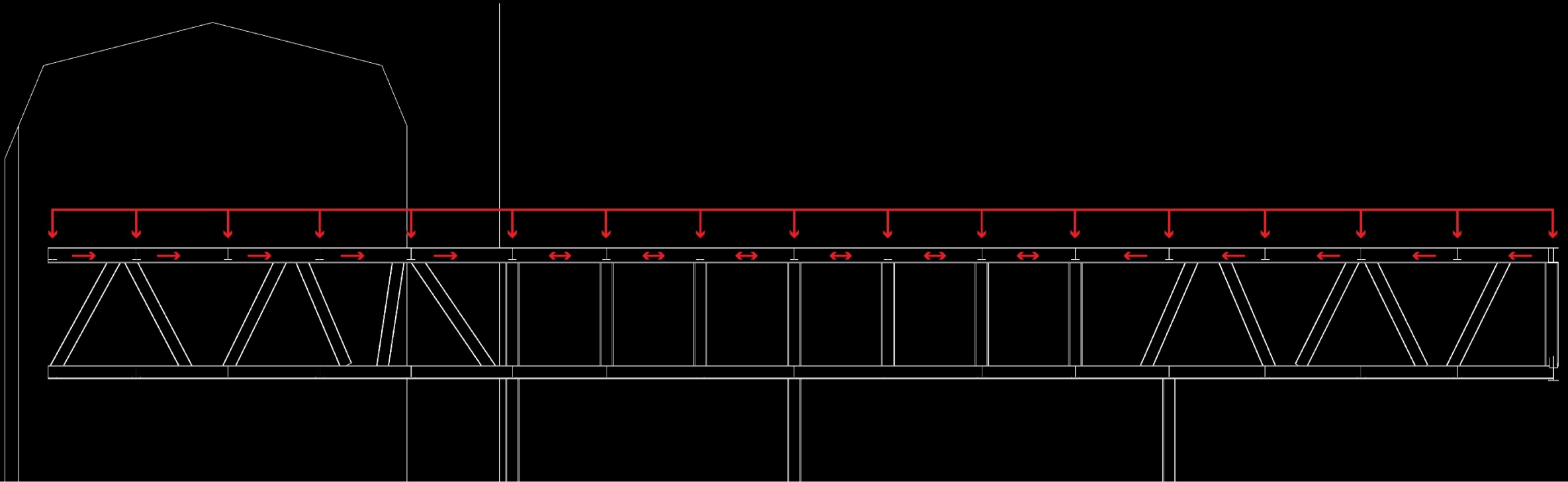


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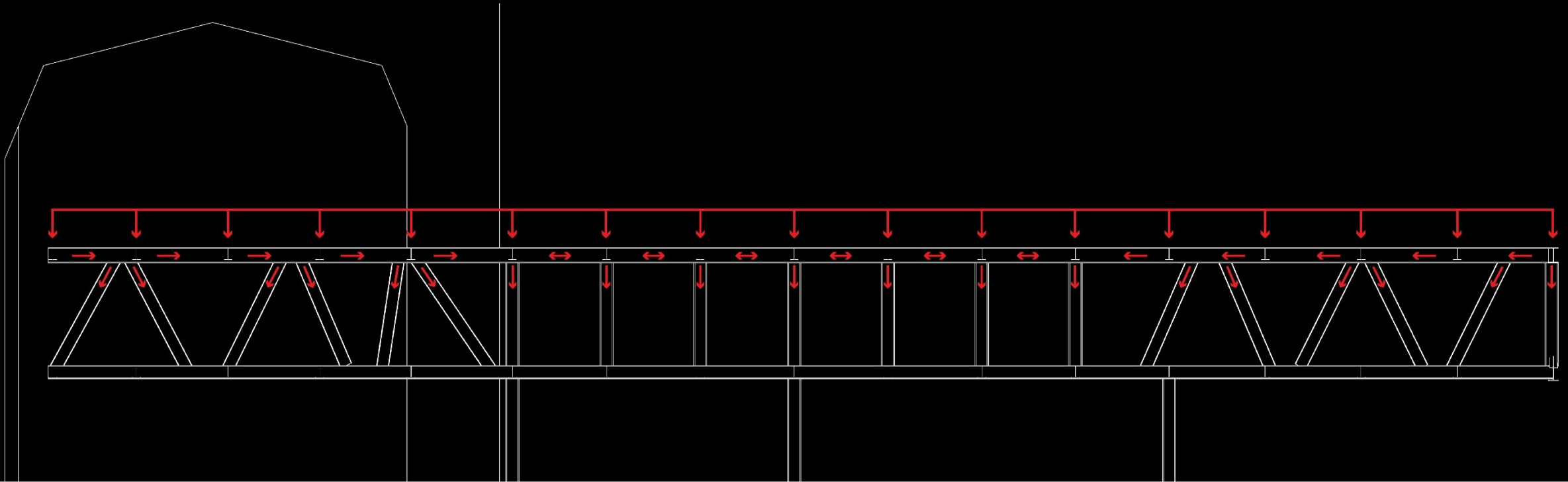


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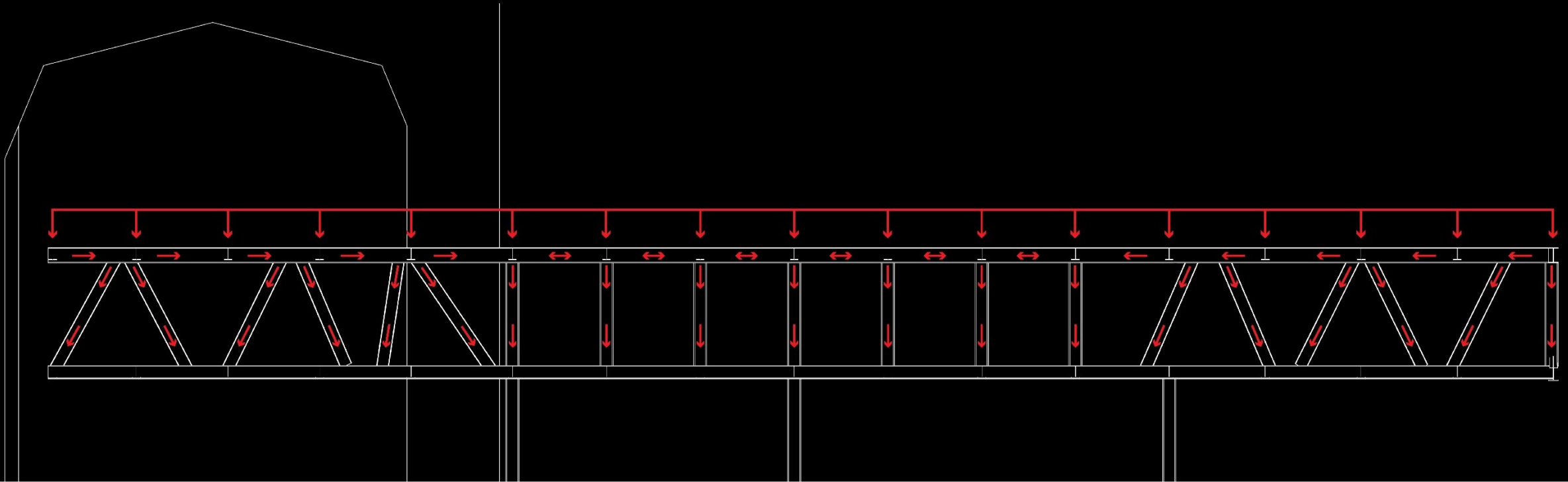


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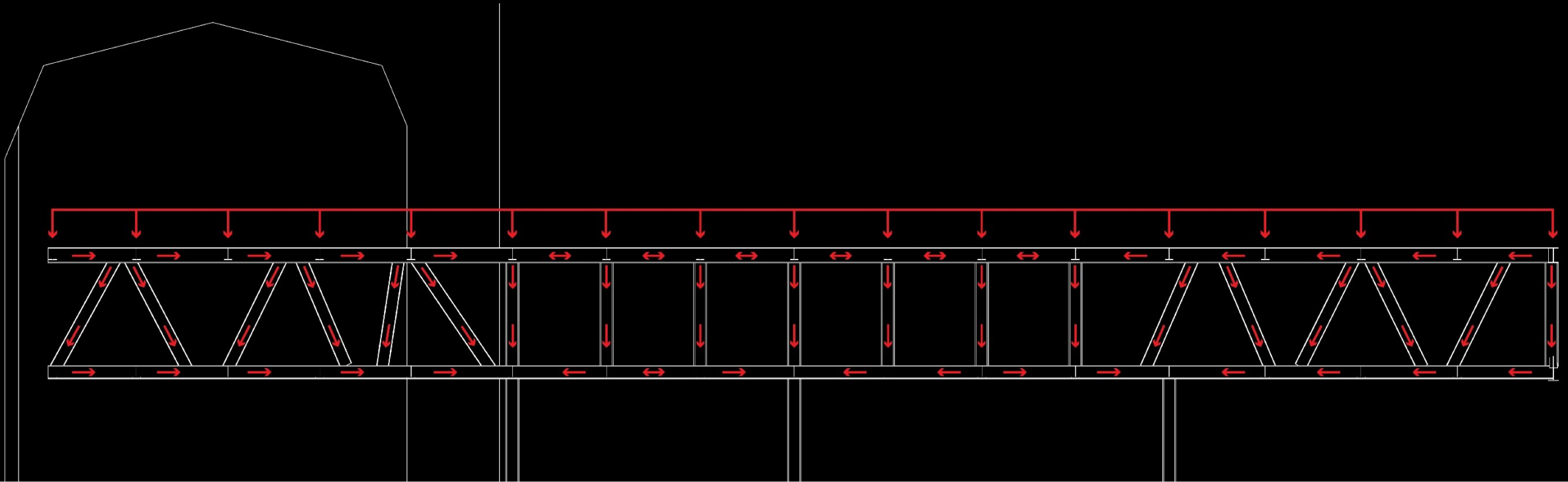
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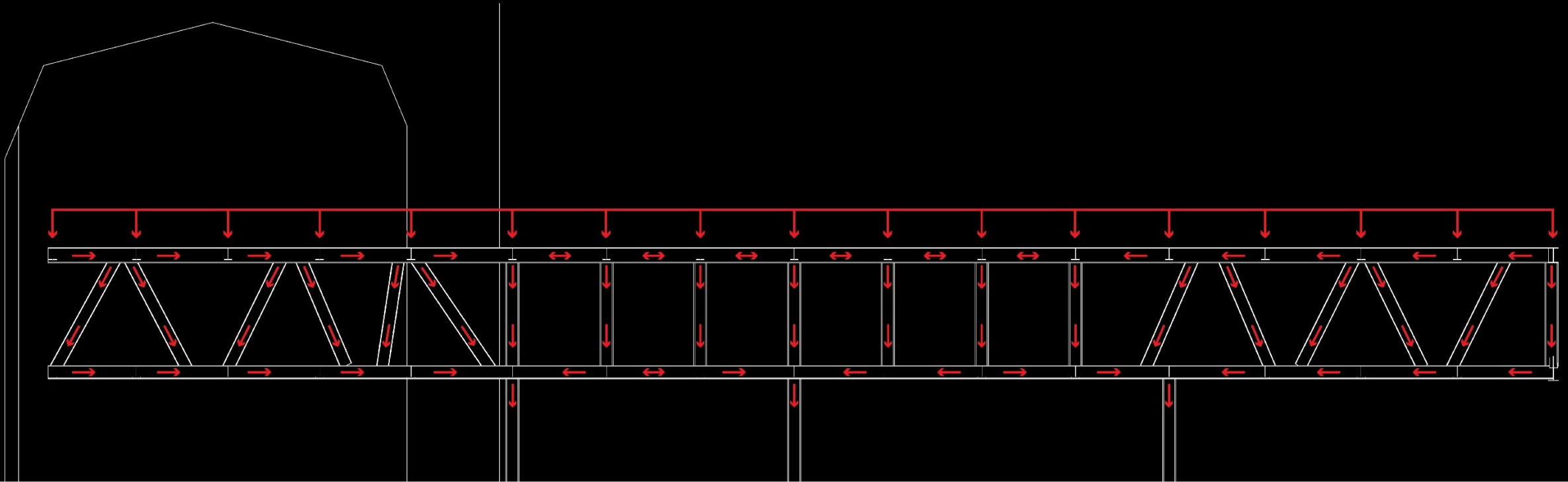
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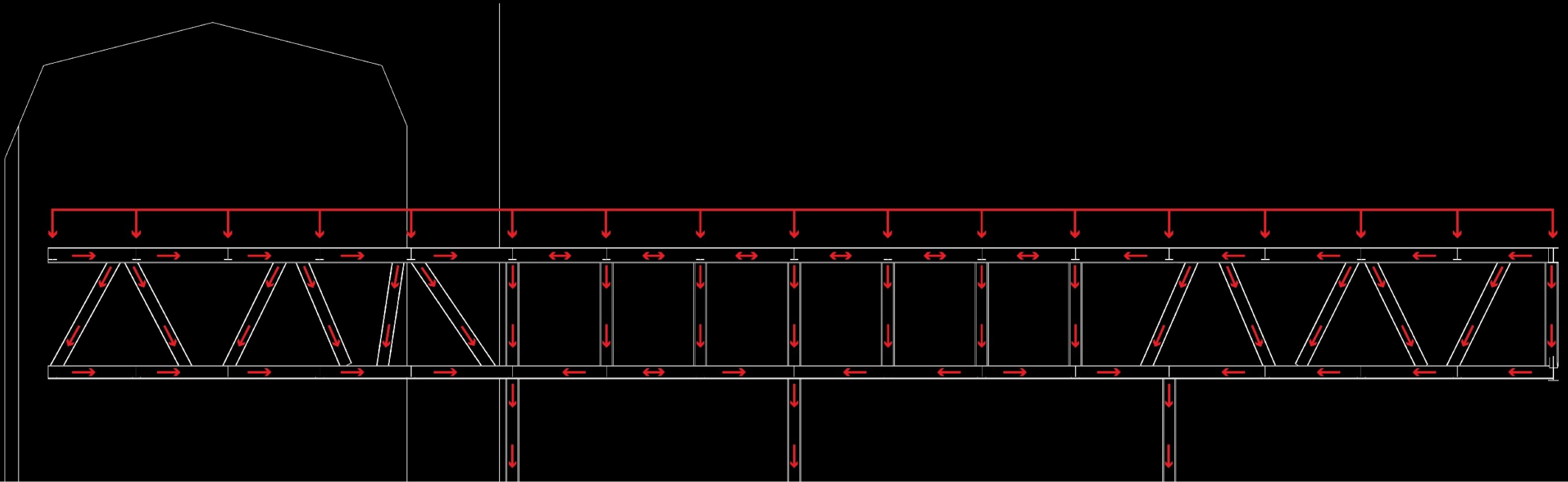
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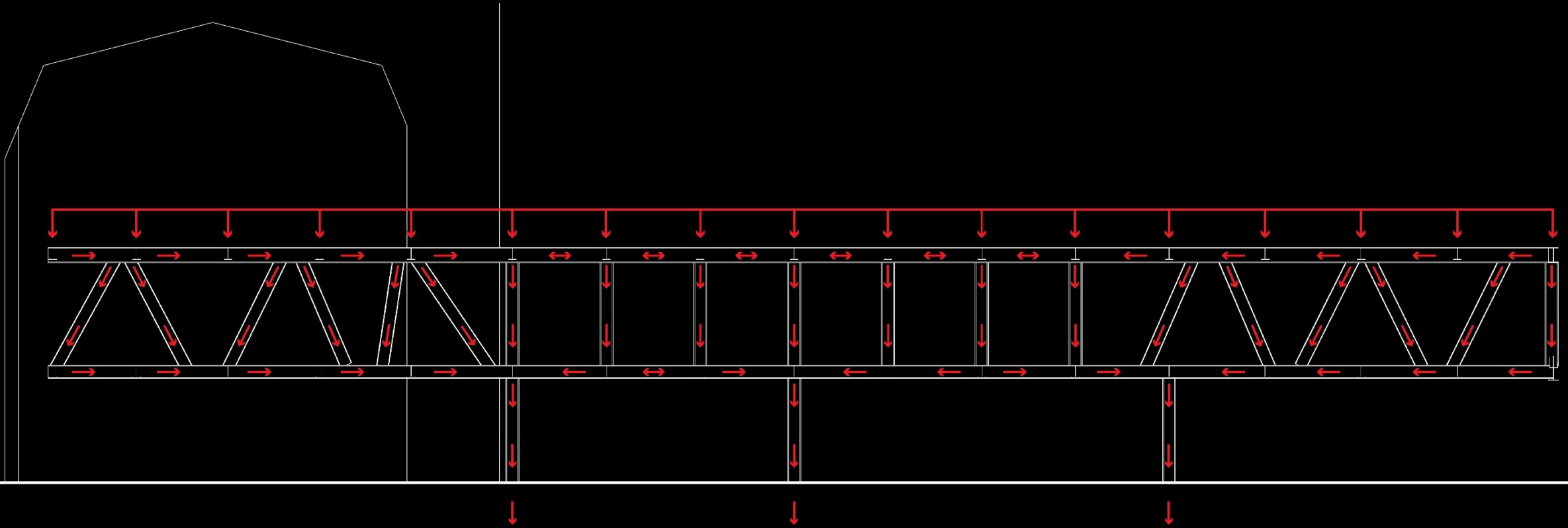


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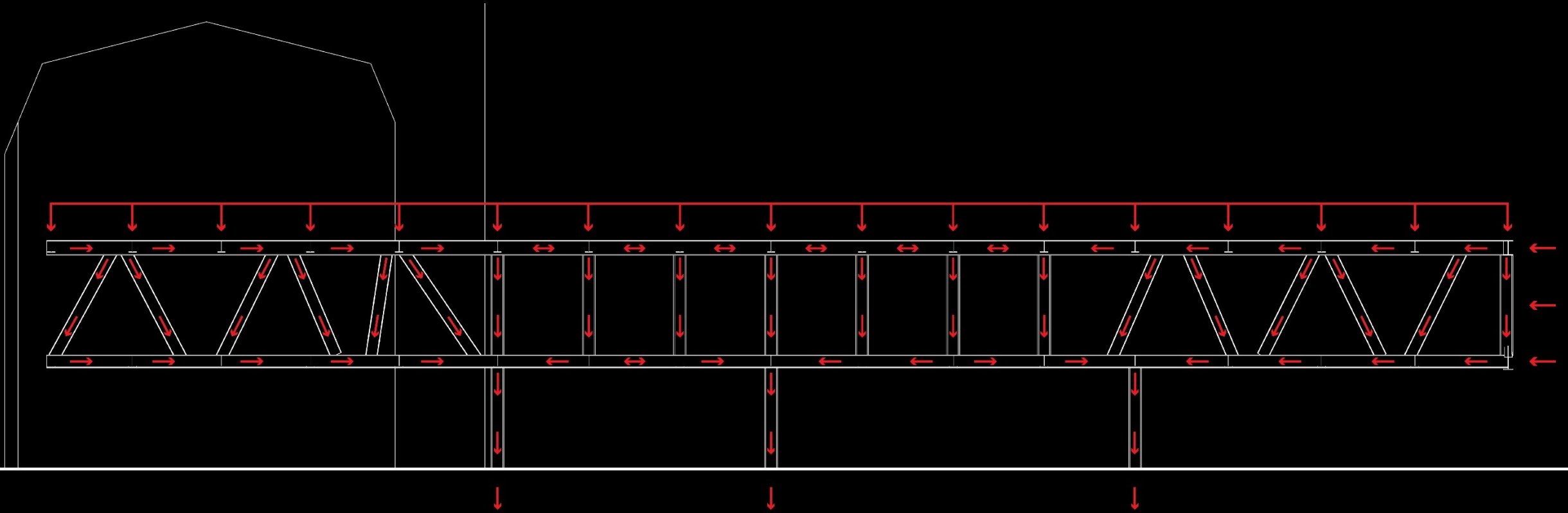
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# Load Tracing



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# Load Tracing - Lateral

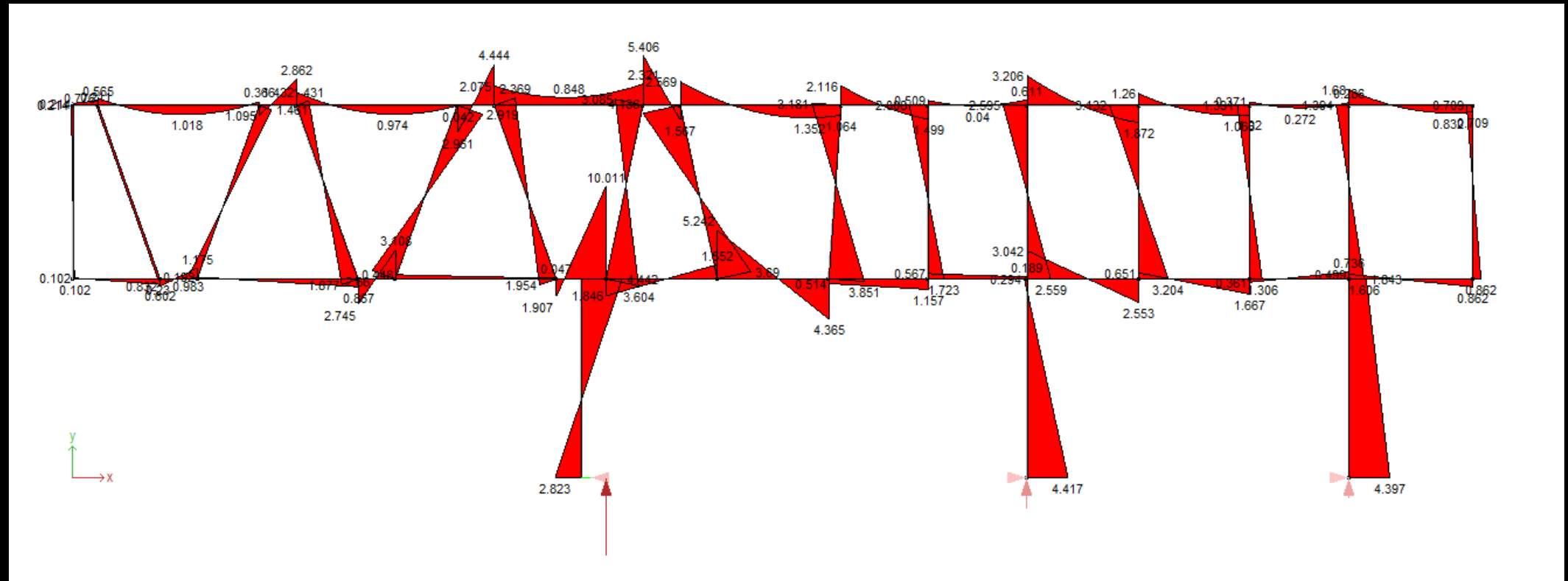


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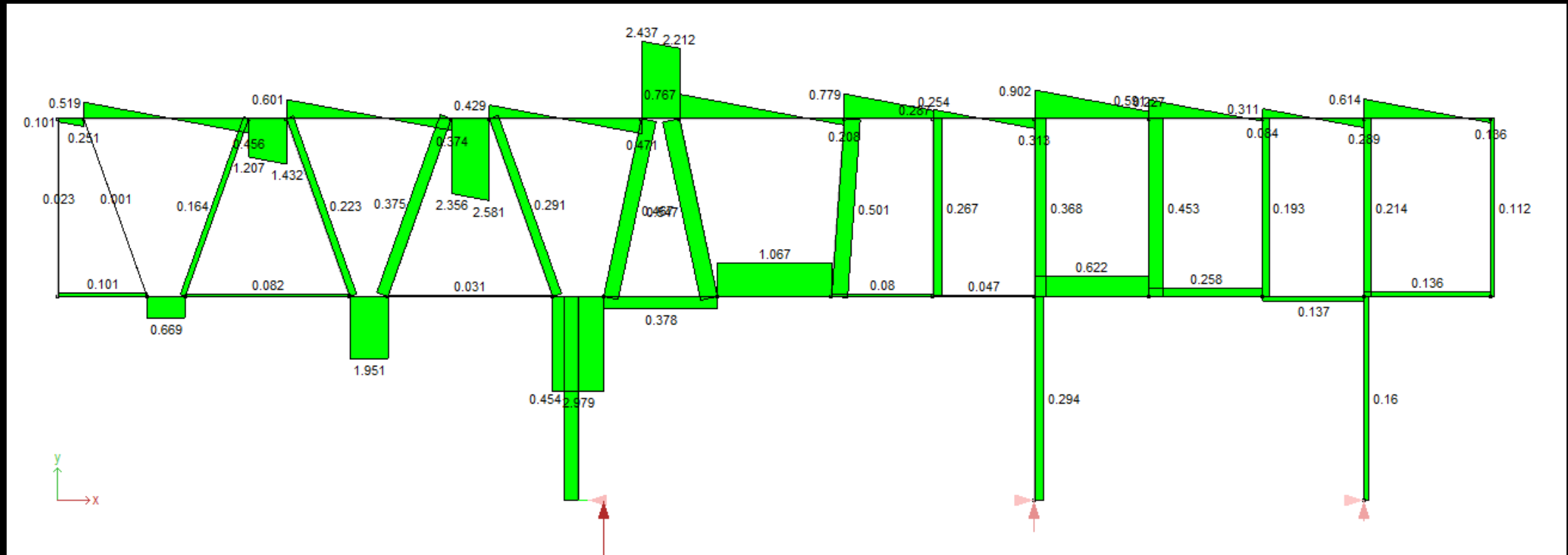
# Multiframe Analysis

## Moments



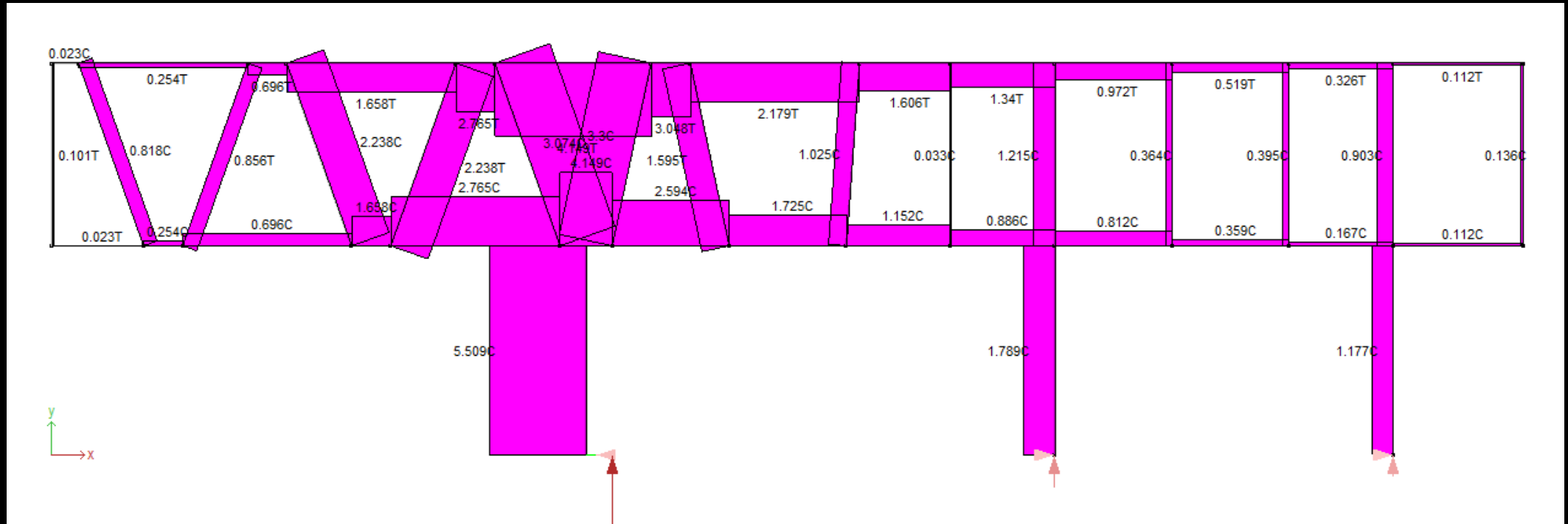
# Multiframe Analysis

## Shear



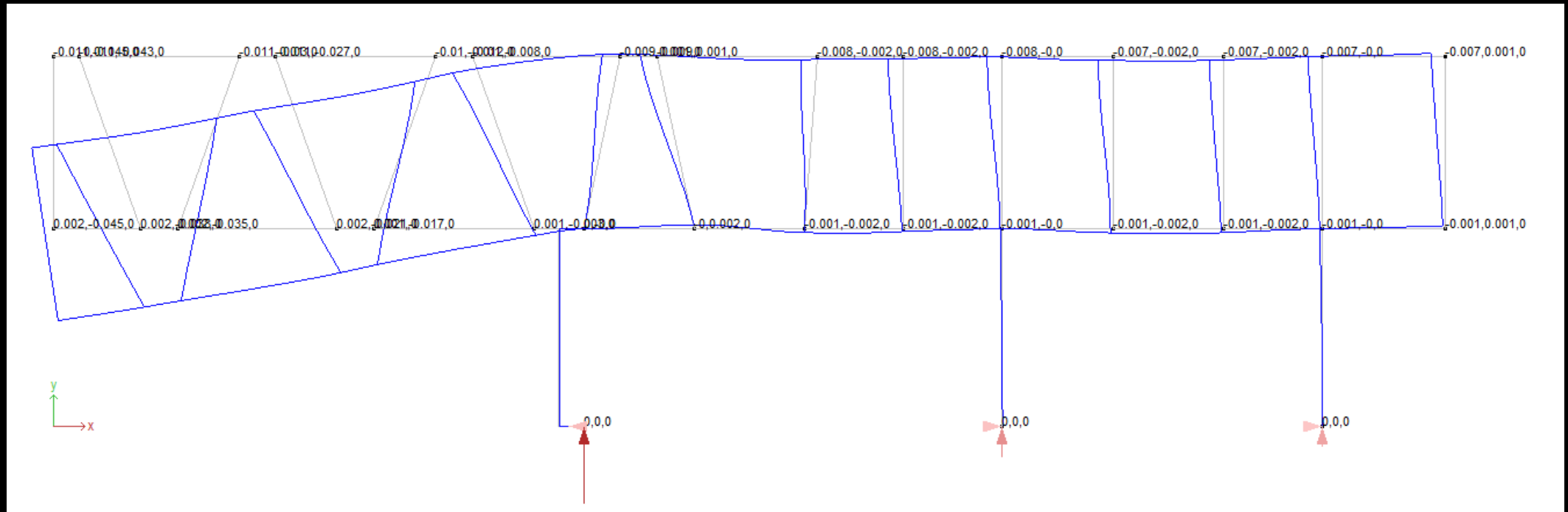
# Multiframe Analysis

## Axial Forces



# Multiframe Analysis

## Deflections





# Construction

- Framework comprised of 1,125 tons of steel.
- All trusses shop fabricated and transported to site.
- 600-ton crane necessary to lift each 62-ton beam.
- Assembly required welding pieces together on site.
- Trusses required significant shoring until all the welding was complete.
- Dome required extensive formwork and was all poured within a single 12 hour period.



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# Fire Safety, Compliance and Funding Issues

- Johnathan Ochshorn,  
Cornell Arch. Professor
- Single exit at Critique Space.
- Protruding objects into egress paths.
- Some instances without guards for headroom.
- Inadequate fire barriers between  
Milstein and Sibley Halls.
- Delay in Construction due to funding.



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