



# Electrosonics Building Renovation and Remediation

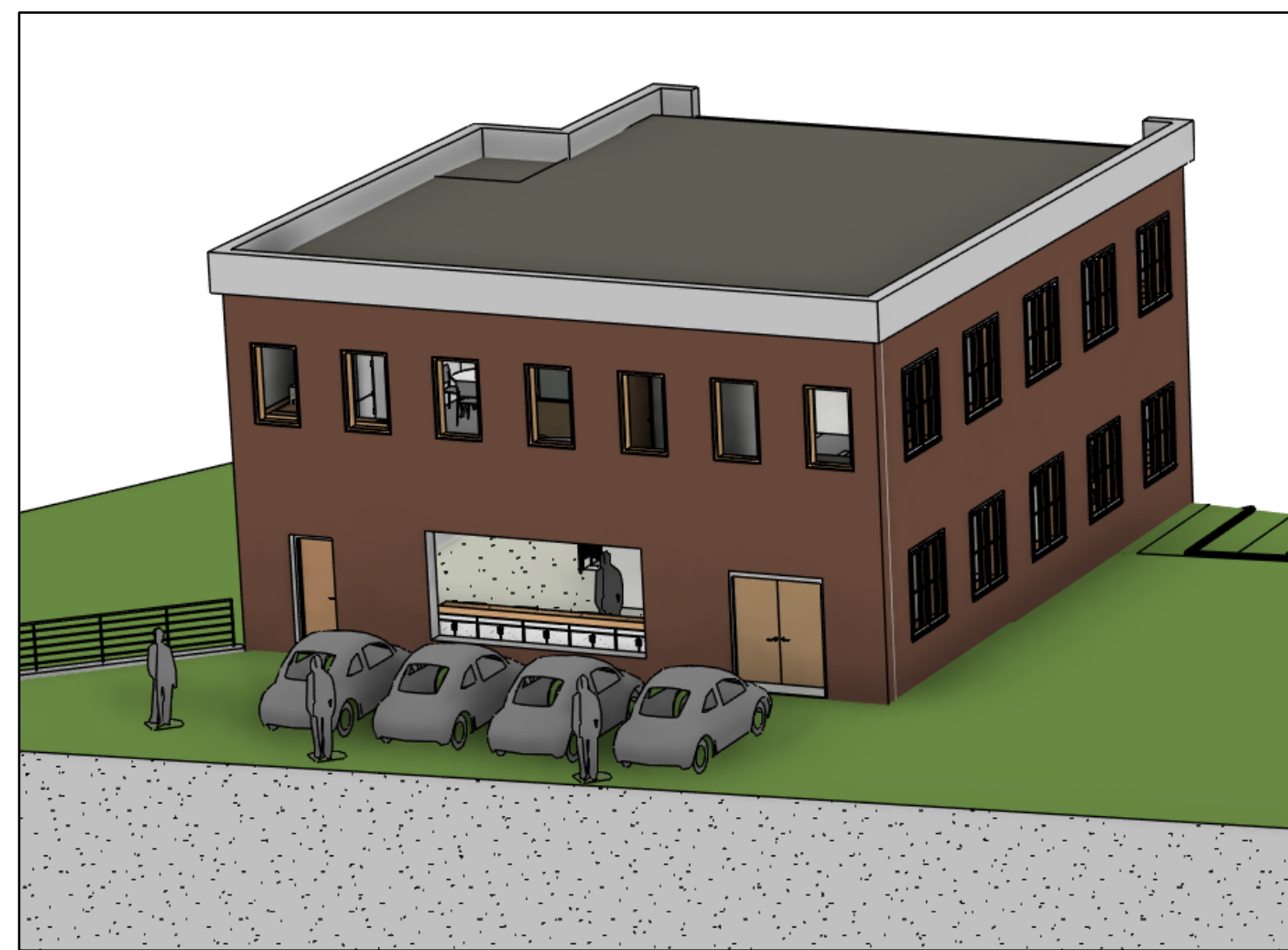
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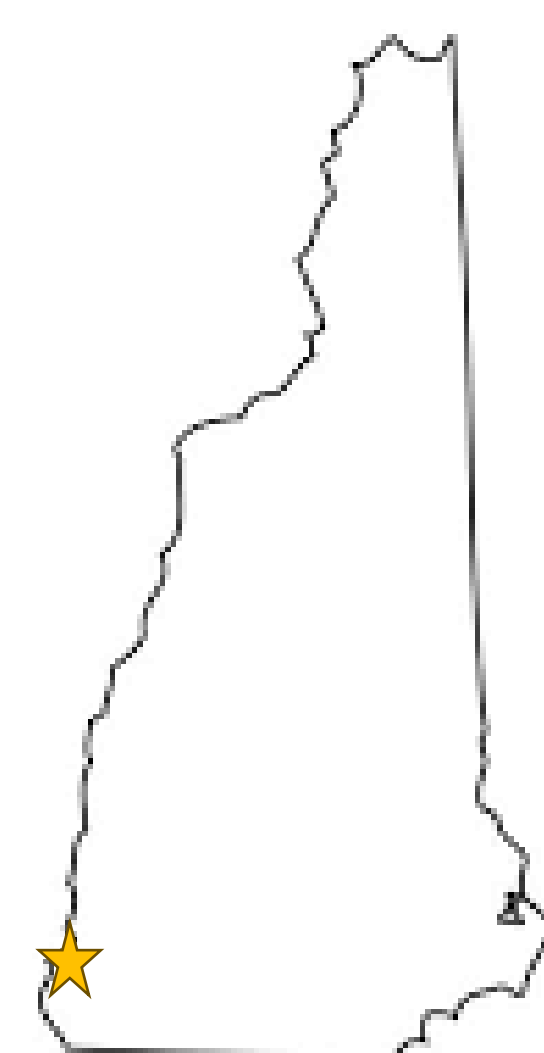
## Introduction

**Background:** The Town of Chesterfield, with the Chesterfield Revitalization Group, and the New Hampshire Department of Environmental Services, requests a redevelopment of the former Electrosonics building and property on NH Route 9A to be redeveloped. The building is experiencing severe structural deterioration after being abandoned for 30 years and has a variety of contamination concerns after a history of industrial use.

**Goal:** Provide the town with a recommendation for the building usage with a proposed structural design to restore the existing building, along with a site remediation plan to address contamination concerns. The scope includes site visit observations, a code review of the existing structure, proposed alternative design development plans, structural renovation calculations, calculated cost estimates, and environmental remediation schematics.



3D model of the existing site



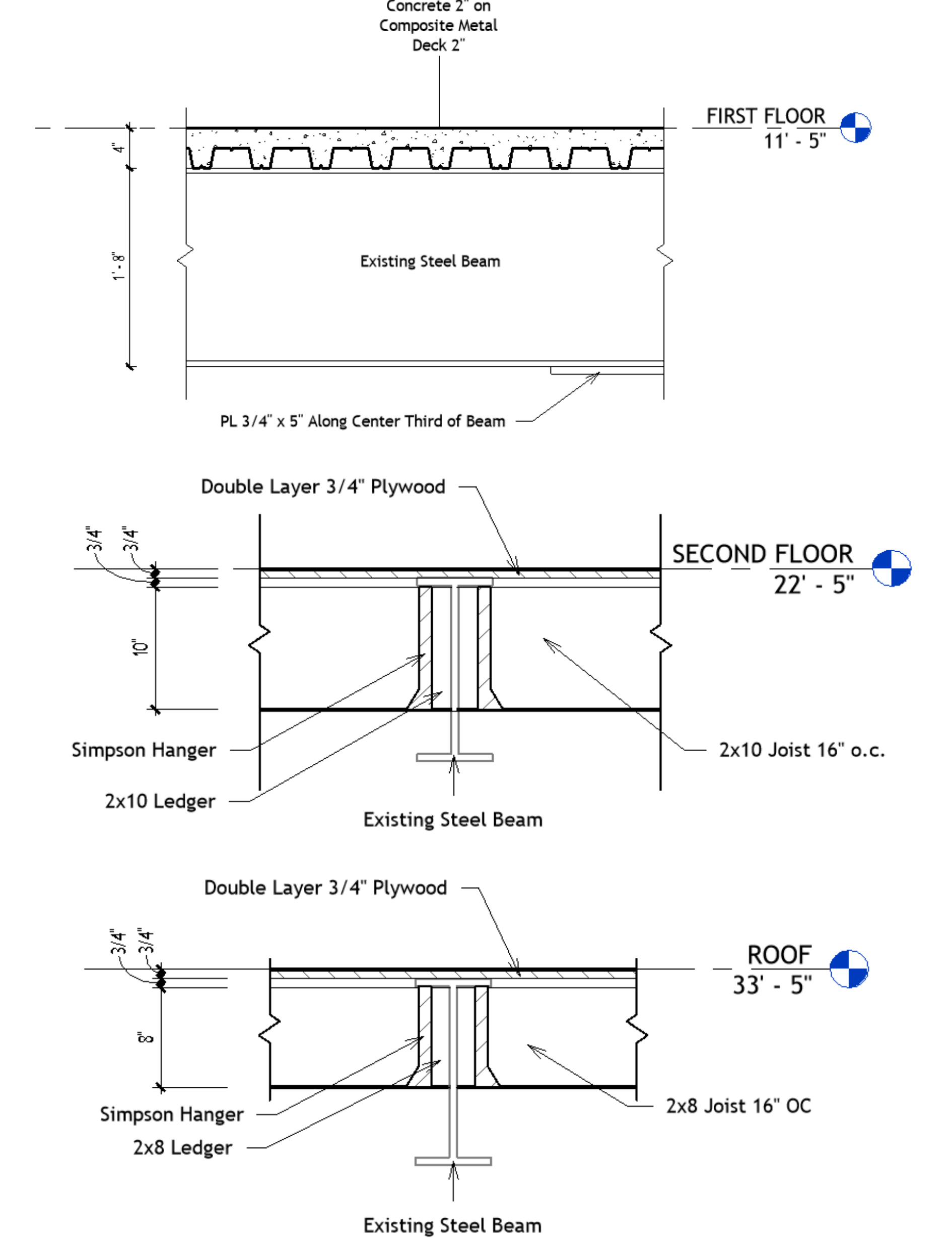
## Decision Matrix

Consideration	Elderly Housing	Café / Apartment	Pub / Function Room
Usage / Parking Needs	3	2	1
Town Interest / Benefit	1	2	3
On-Site Wastewater Treatment System	2	3	1
Economic Viability	1	3	2
<b>Total</b>	<b>7</b>	<b>10</b>	<b>7</b>

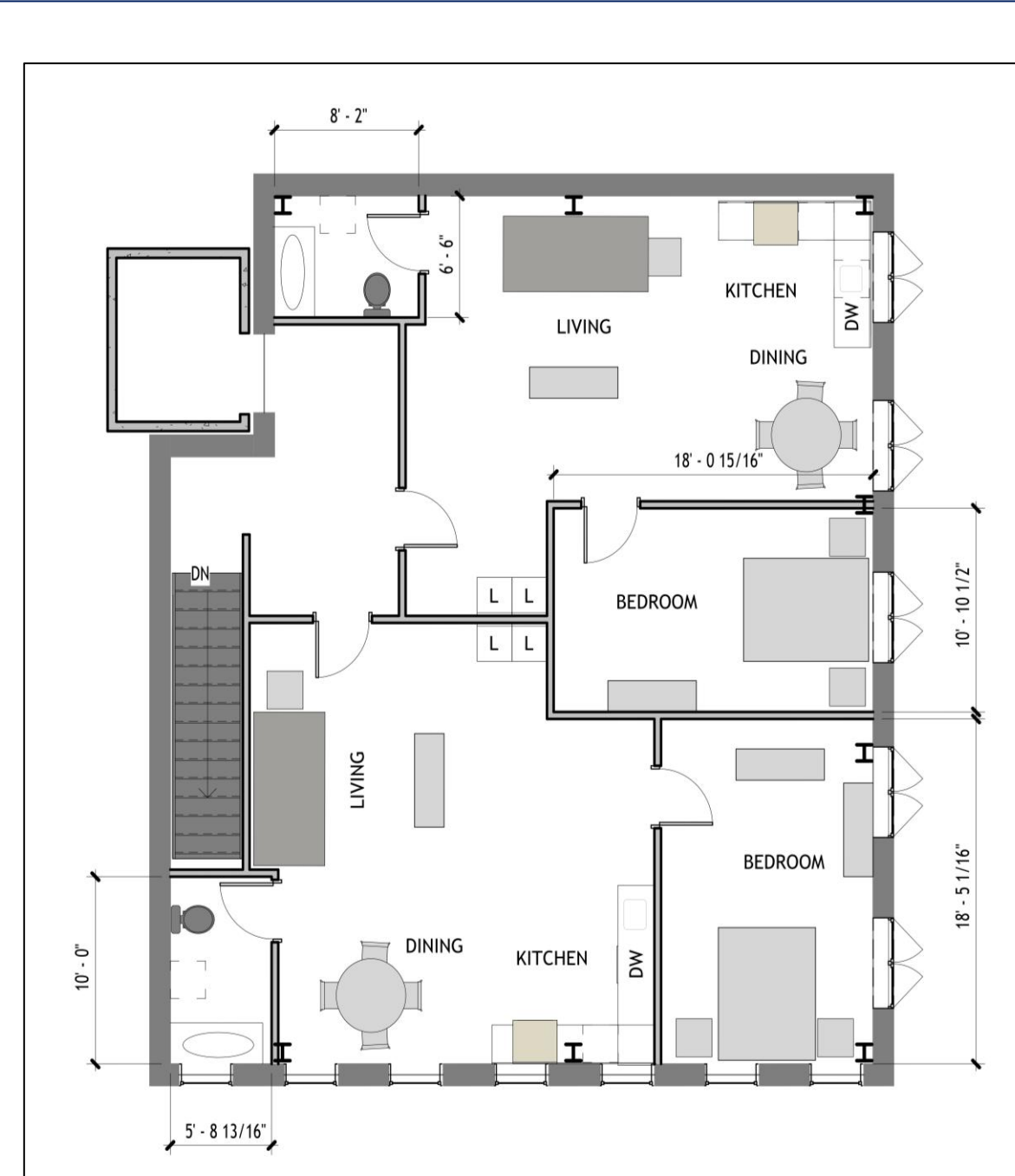
In the table above the highest score indicates the most preferred. The image was AI generated using Canva Magic Media, producing an example of the envisioned interior design.



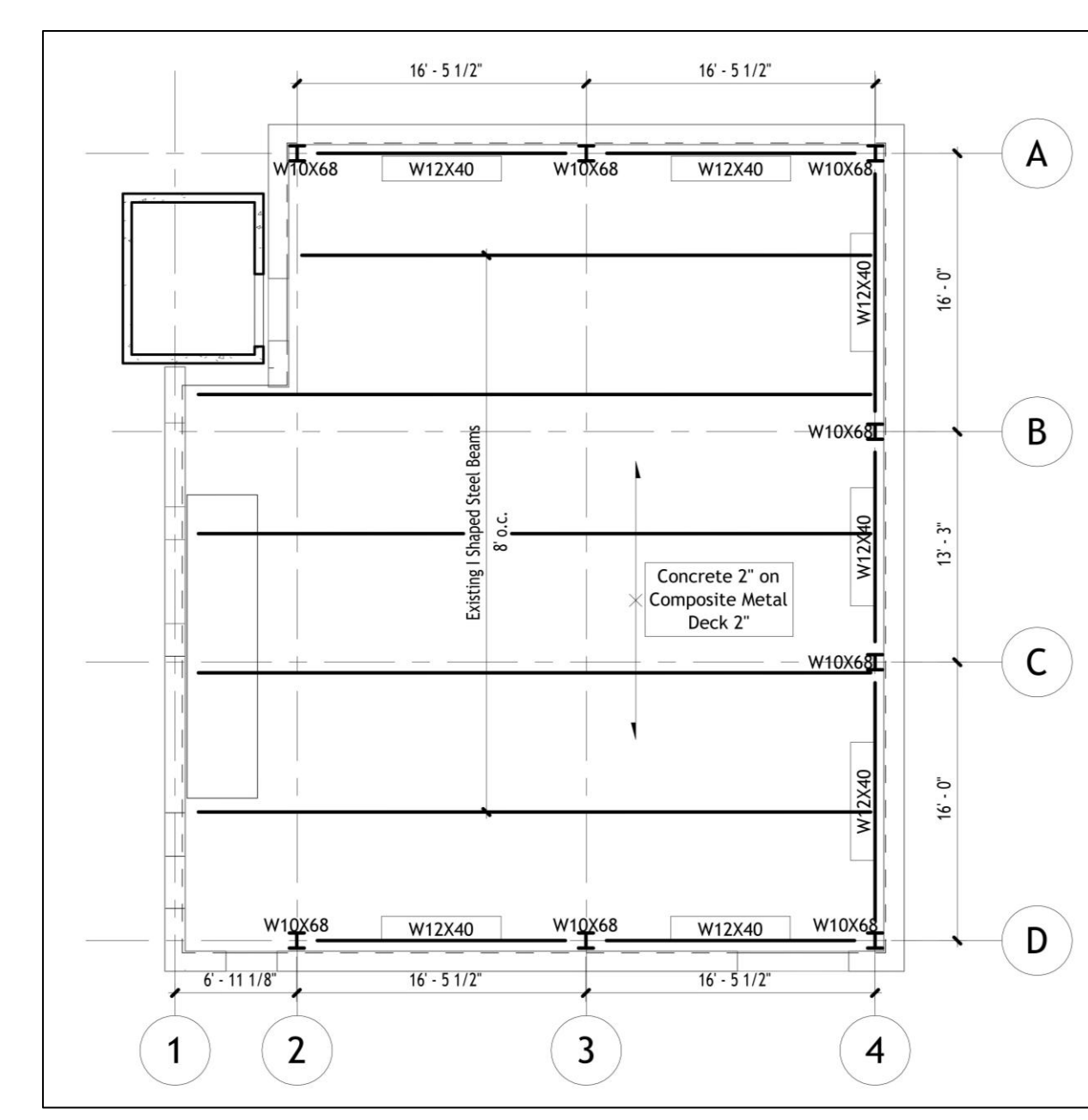
## Structural Details



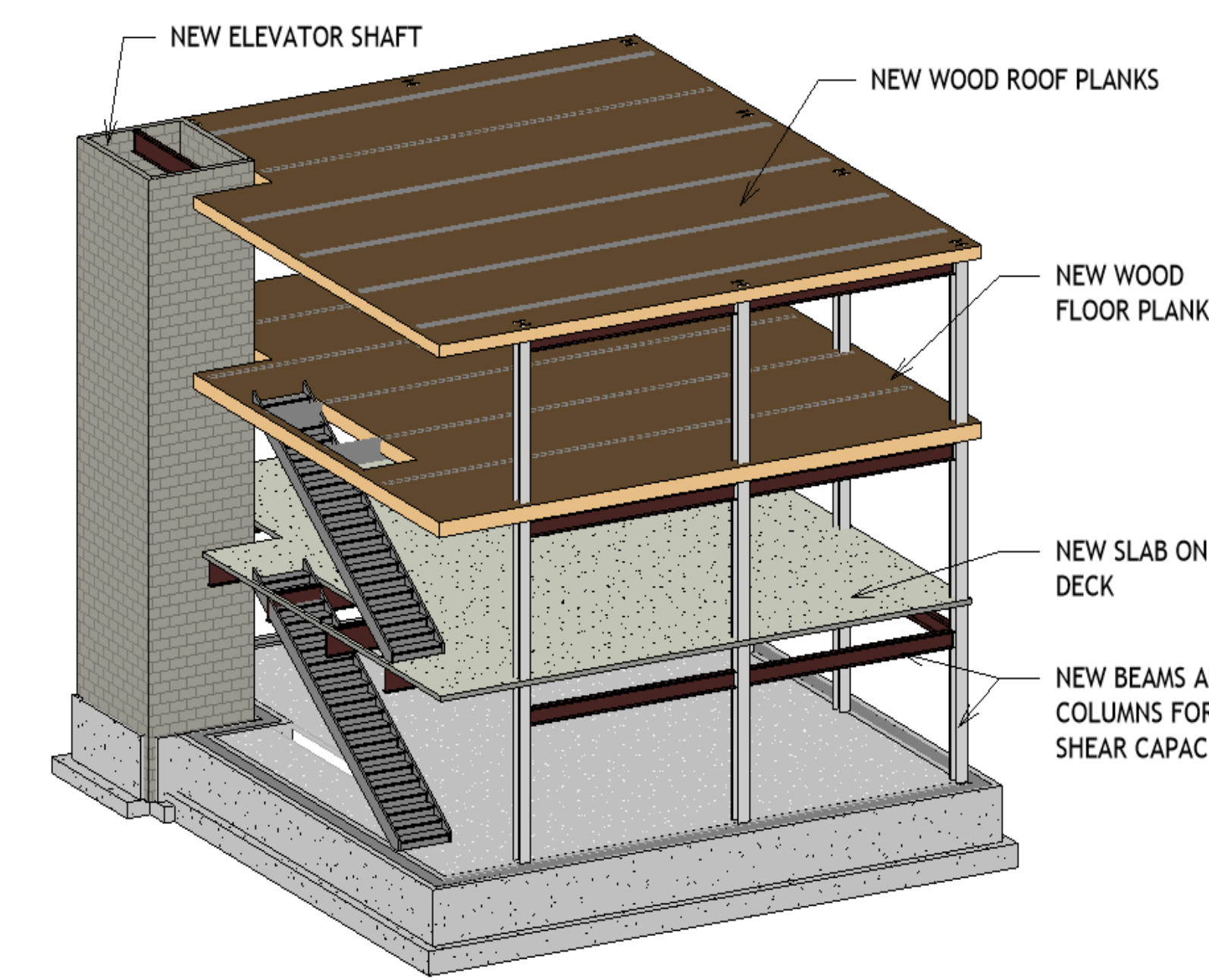
## Design



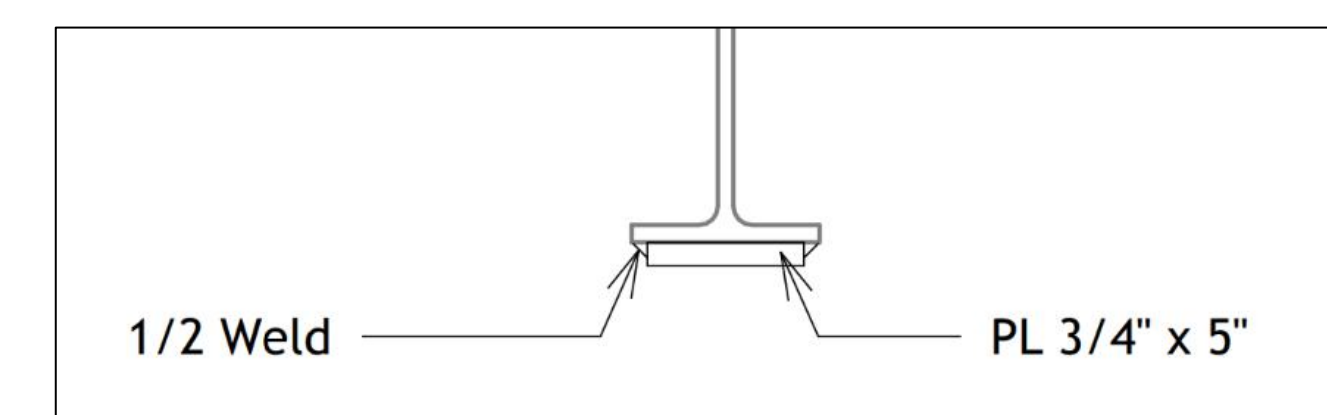
Sample Floor Plan



Sample Structural Plan



Modeled 3D Structure



Reinforcement to strengthen the existing steel beams

Existing W section Carnegie Steel B3 Beam

$$\Phi Mn = 260.5 \text{ k} \cdot \text{ft}$$

Existing W section with 5" x 3/4" plate welded to the bottom

Z = increases from 145 in<sup>3</sup> to 179 in<sup>3</sup>

$$\Phi Mn = \frac{36 \text{ ksi} (179 \text{ in}^3)}{1.67} = 321 \text{ k} \cdot \text{ft}$$

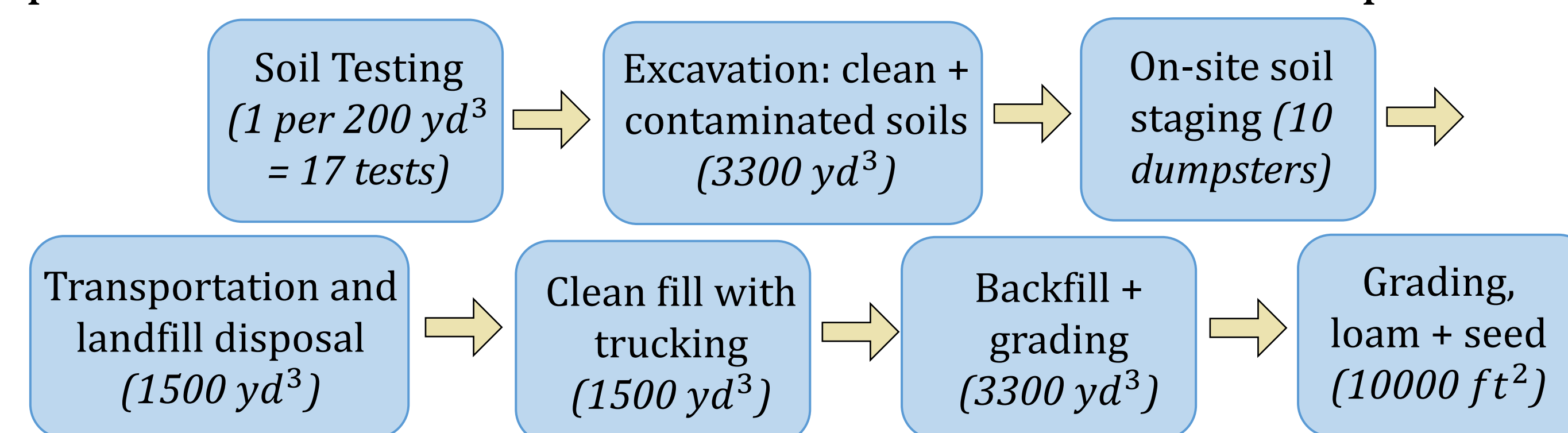
## Existing Conditions



The structure has extreme deterioration, including corroded metal decking, rotting wood framing, and toxic organic growth on the brick masonry. Testing found bulk moisture, asbestos, lead paint, and PCBs within the building. The site has severely limited space, posing challenges for site expansion.

## Environmental Remediation

The building has had multiple prior usages resulting in significant quantities of electroplating metals and solvents being discharged into the ground and multiple fuel oil spills. The surrounding soils and ground water are contaminated with cVOCs, RCRA metals, and petroleum. Below outlines the recommended remediation process.



Google Earth image with marked areas of concern proposed for excavation

## Cost Estimate

Item	Estimated Cost
Environmental	\$615,000
Demolition/Cosmetic	\$196,000
Structural	\$703,000
Site/Interior	\$919,000
<b>Total</b>	<b>\$2,433,000</b>

## Acknowledgements

Sydni Clark: Project Sponsor, Weston & Sampson  
Alissa Reitter: Project Sponsor, Weston & Sampson  
Lisa Damiano: Faculty Advisor  
Kenneth Flesher: Faculty Advisor

## References

AISC 16<sup>th</sup> Edition Steel Construction Manual  
ASCE 7-16 Minimum Design Loads for Buildings and Other Structures  
2021 International Building Code  
Phase II Environmental Site Assessment and Hazardous Materials Inventory (2013) by Ransom Consulting