

# Housing and the Construction Labor Shortage

Designing for Jobs in Duluth MN

## Software Used:

- AutoCad
- Sketchup
- Twin Motion
- Lumion
- Adobe Photoshop
- Adobe Illustrator

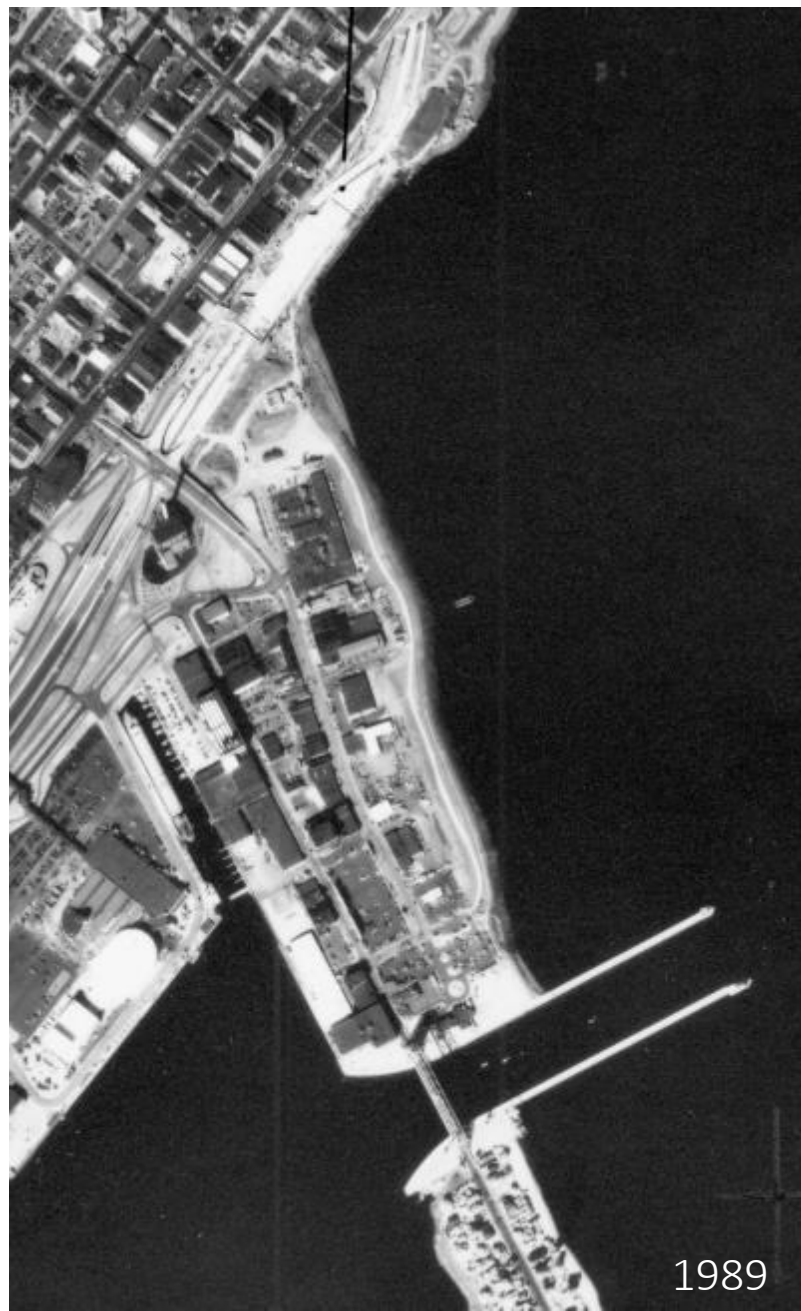
# Duluth's Economy

A Closer Look at Tourism

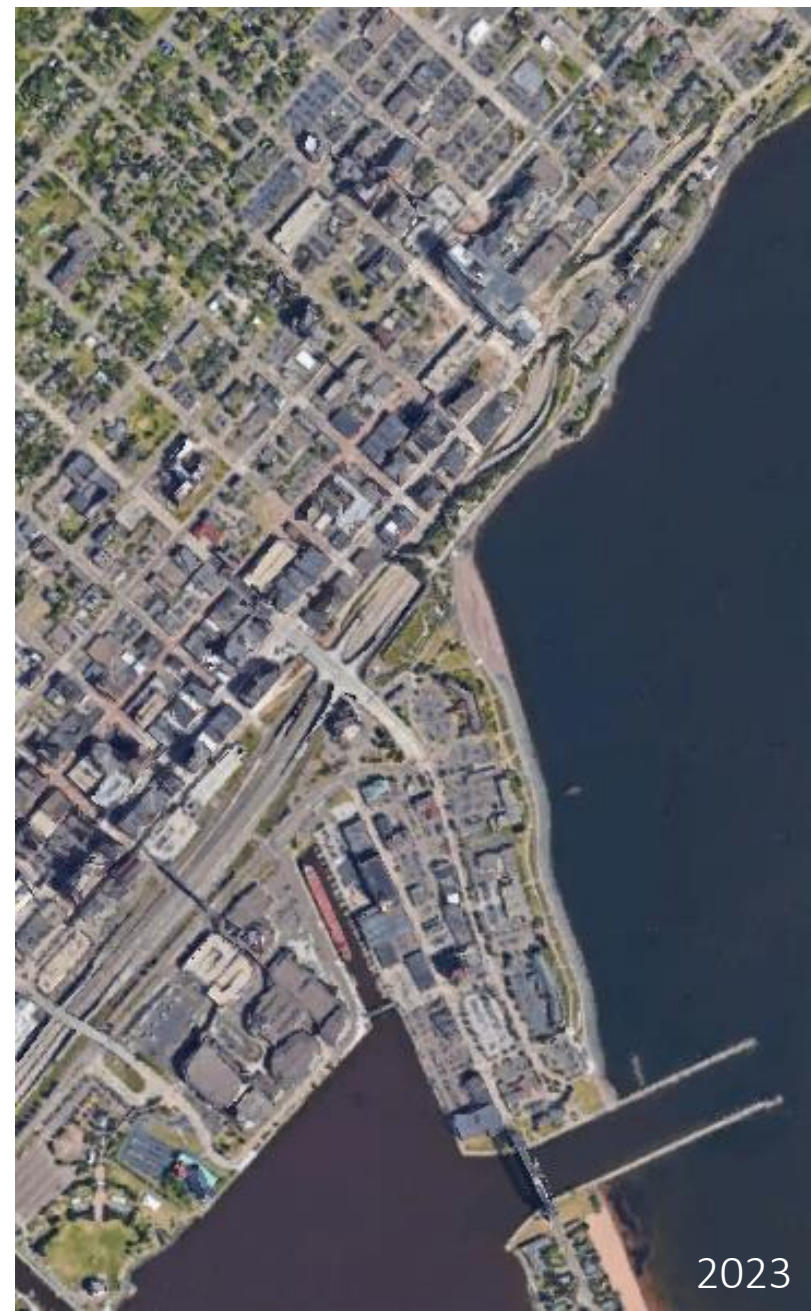
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1981



1989



2023

Figure 1



Source: Google

# Thesis Question:

How can we grow the construction labor force, AND lower the cost of housing?

To answer this, we need to understand:

- The perfect conditions for a construction company to thrive
- What a perfect housing market looks like
- Why these markets aren't thriving

To work towards a solution, we need to know how housing and labor are connected.

According to the publication *The Minnesota Visitor Economy 2022* by Tourism Economics, “Among all spending categories, growth in lodging, including short-term rentals and second homes, was especially notable in 2022.” The publication also noted that total visitor spending in Minnesota reached 13.1B in 2022, an increase of 19.3%



Figure 3:

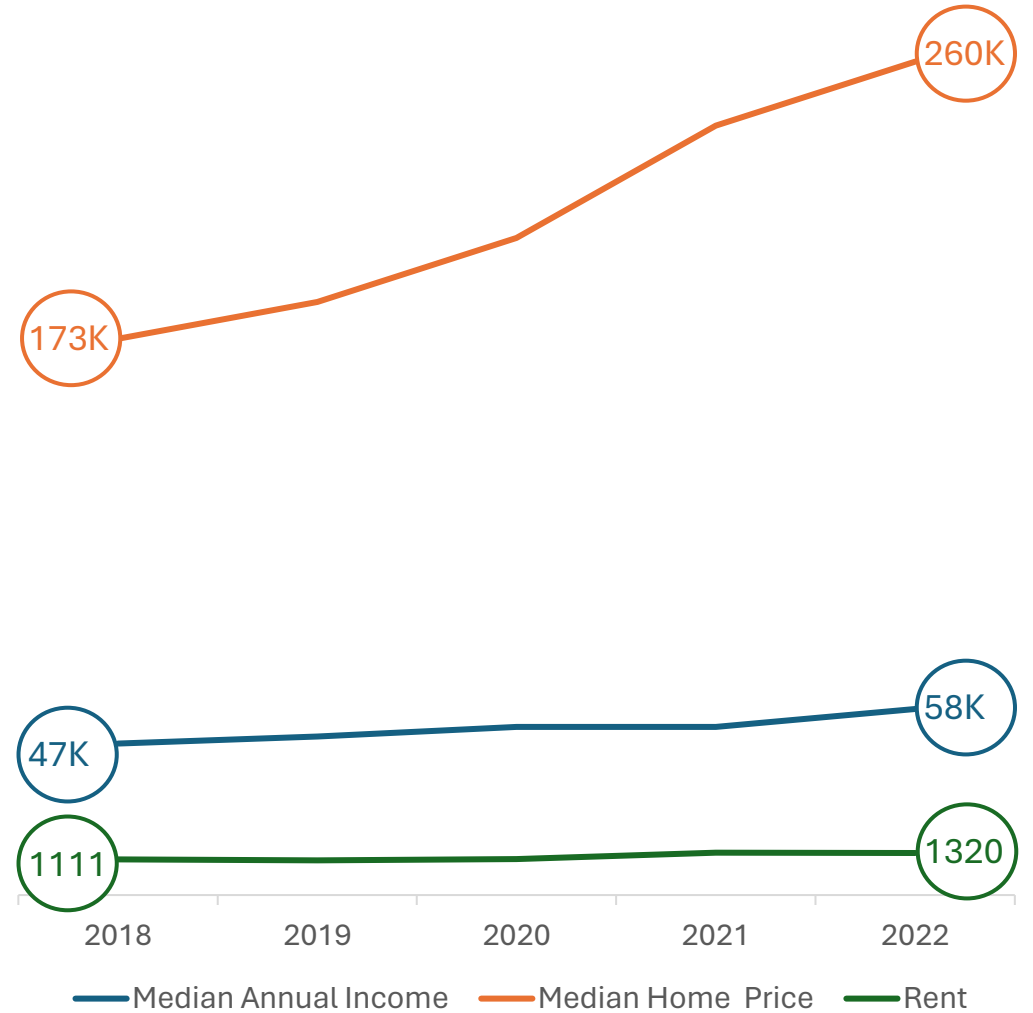


Figure 4:

Design Services:

2.

Excavation / Prep:

3.

Plumbing / Electrical:

6.

Skilled Labor:

7.

1.

Real-estate:

4.

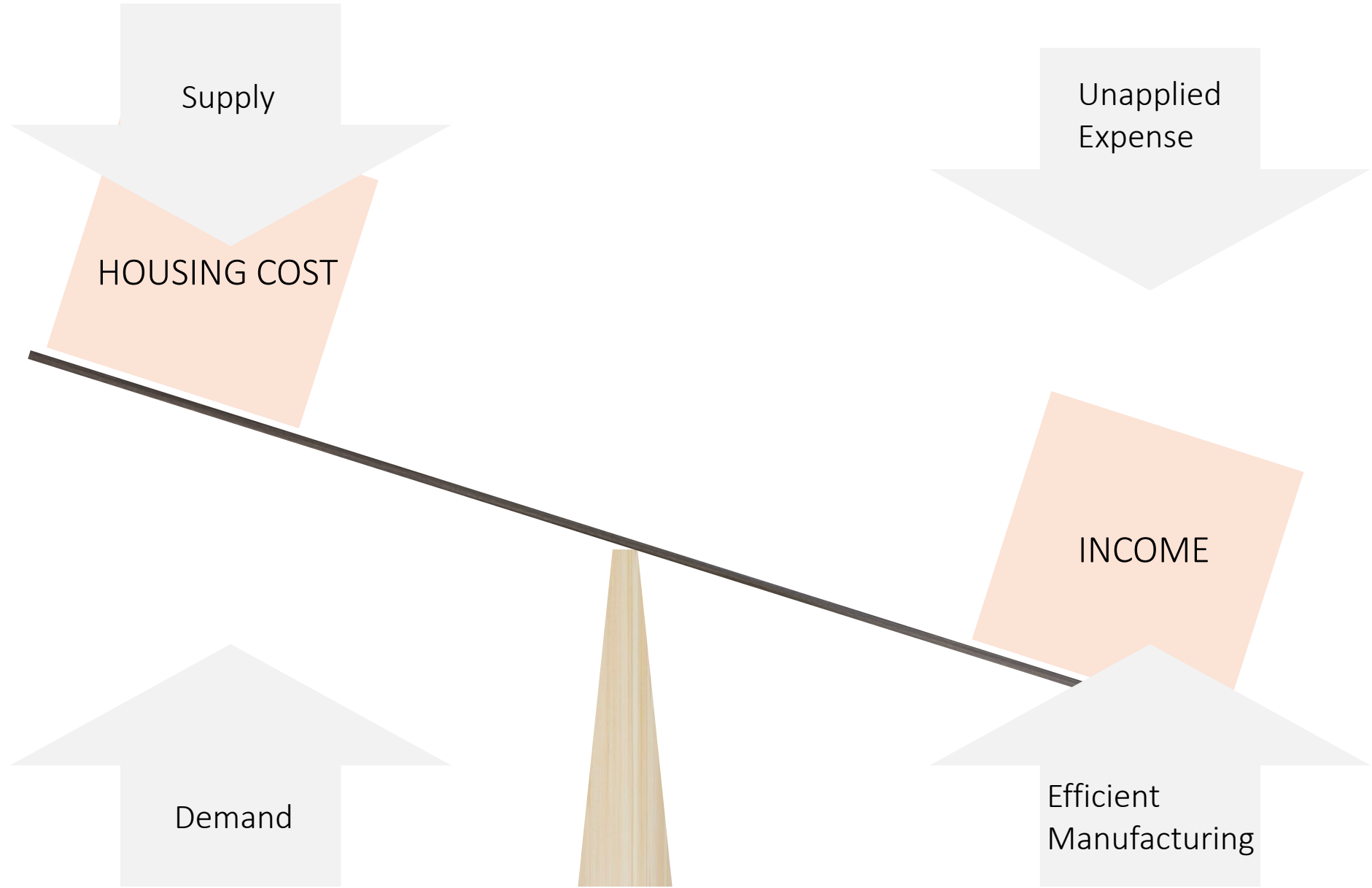
Manufacturing:

Transportation:

5.

8.

Landscape:



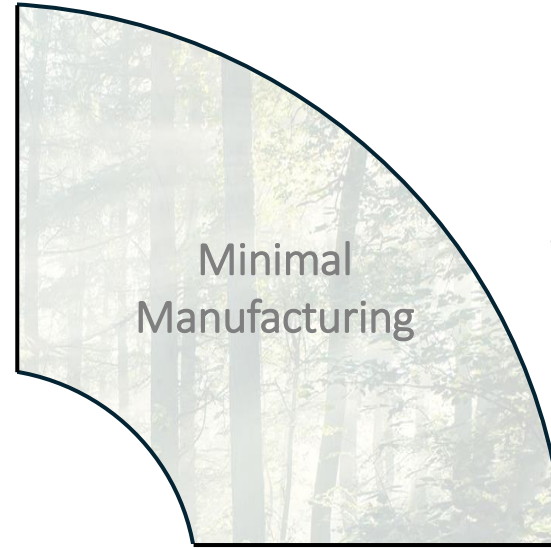
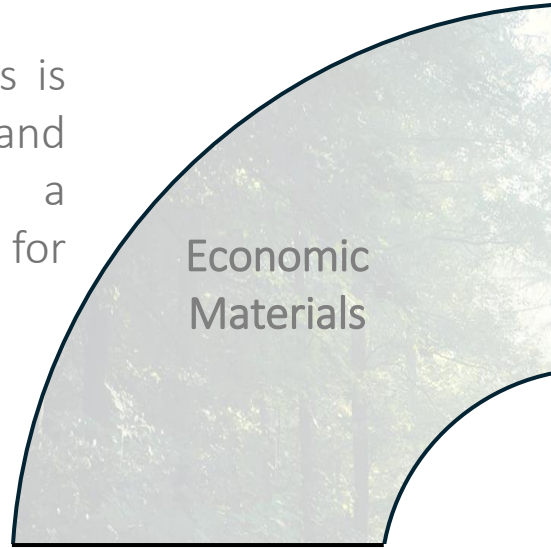


# Towards a Solution

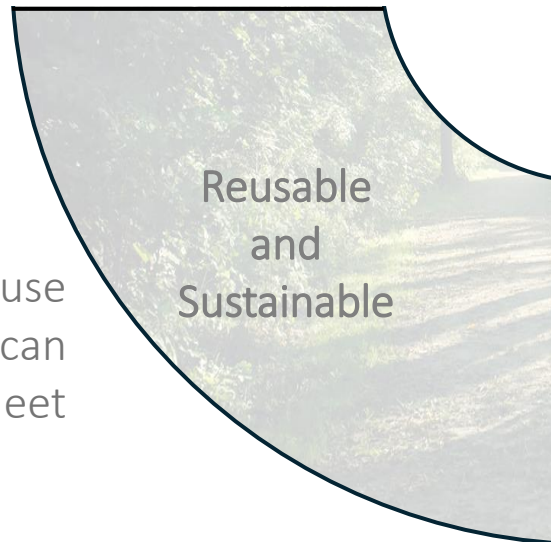
A search for economy

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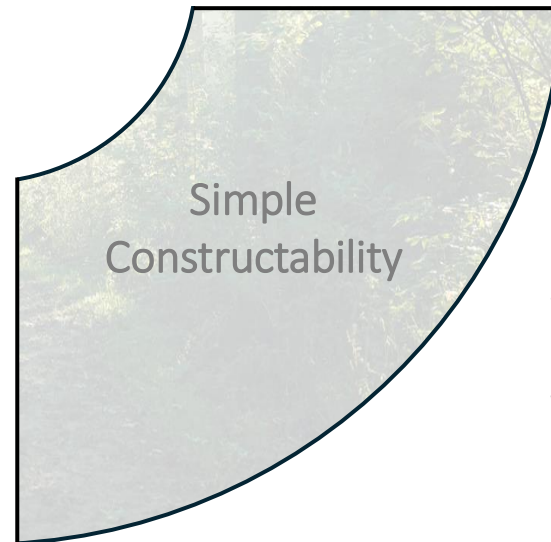
The use of local resources is both more affordable and sustainable, permitting a larger budget allocation for construction.



By minimizing manufacturing, more of the building expense can go to construction workers.



Designing for adaptive reuse of space and materials can help northern cities meet environmental goals.



Simple construction can increase pay for construction workers and reduce the overall expense of a project.

# TIMBER

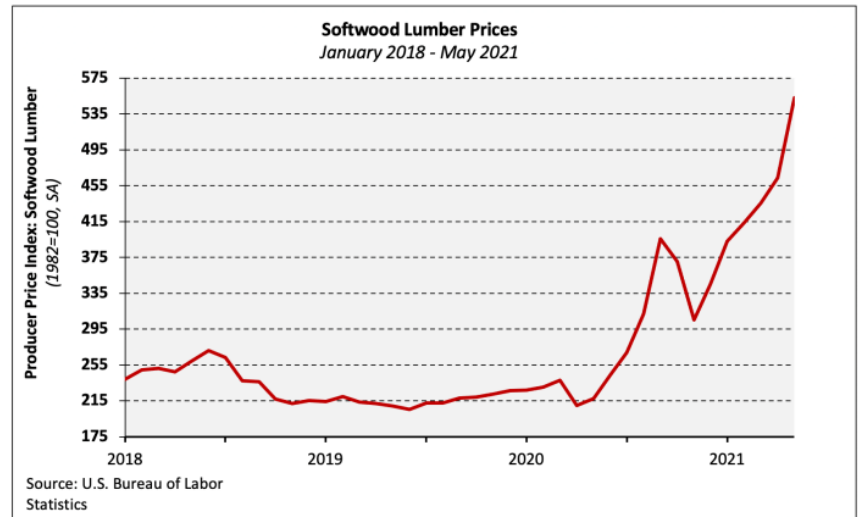


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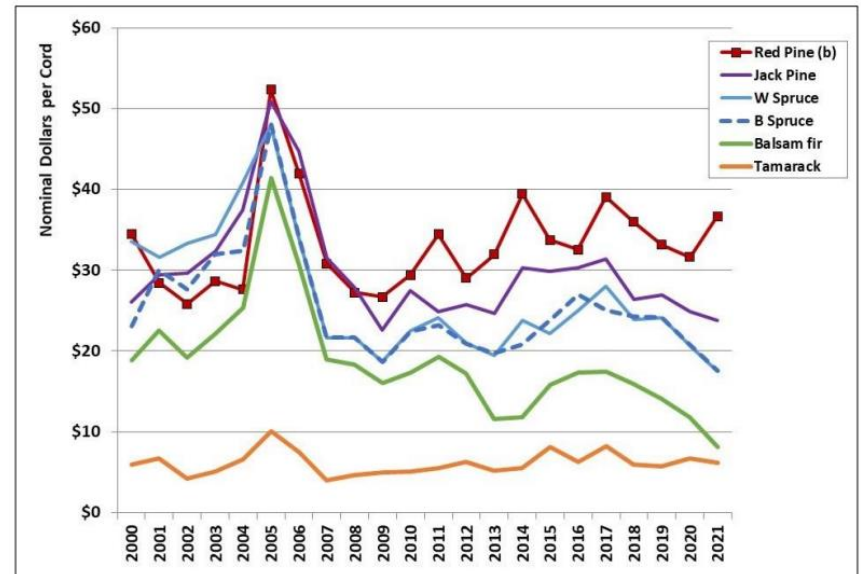


Figure 7:

Figure 5:

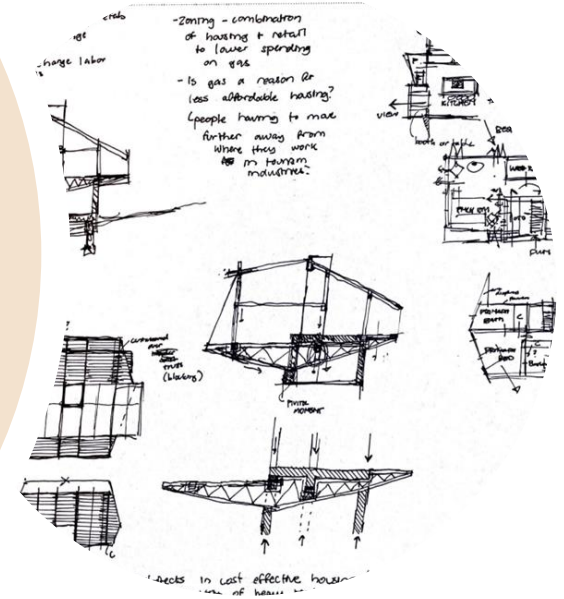
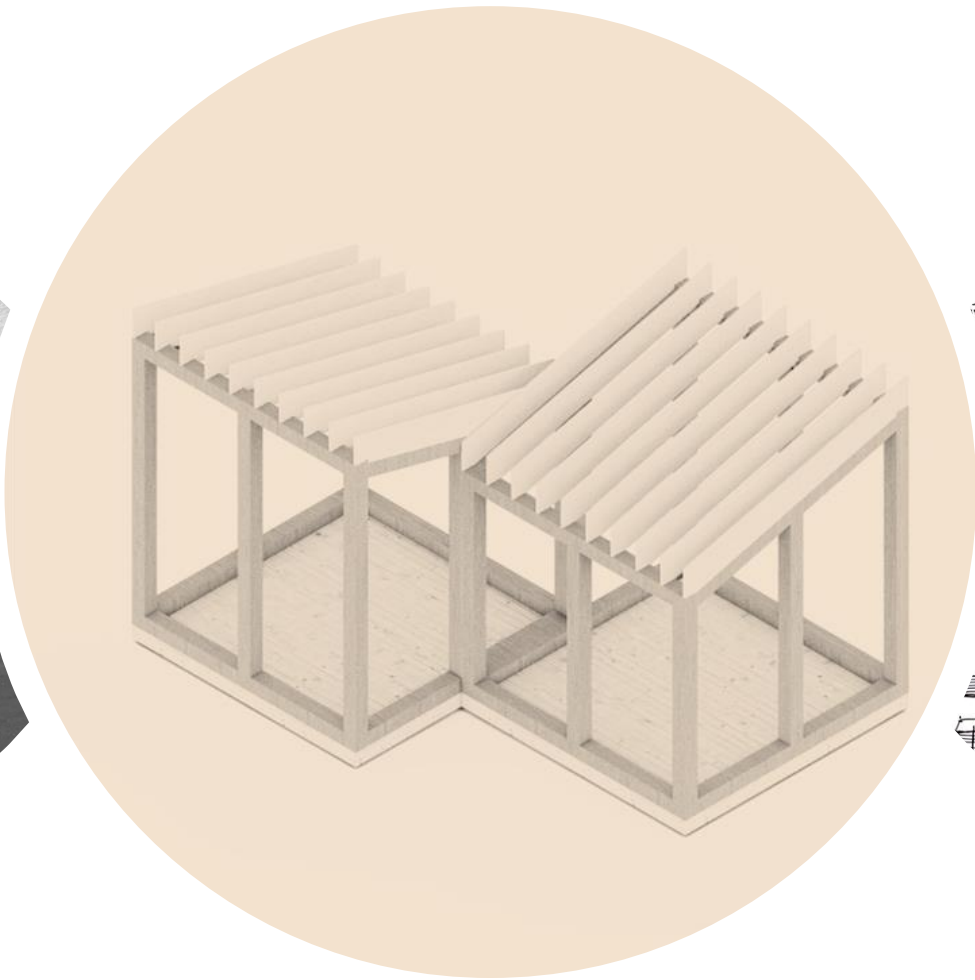




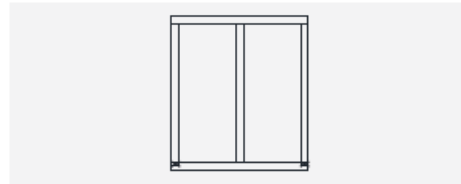
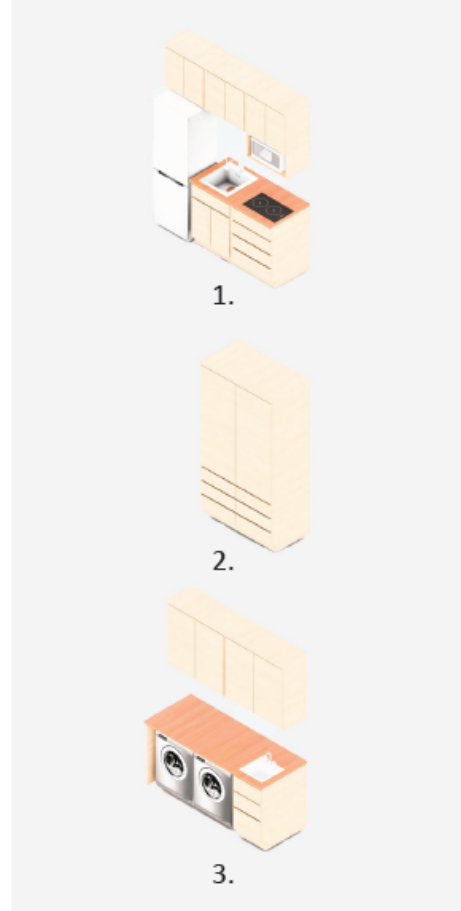
# Project Implementation

Progression with Architecture

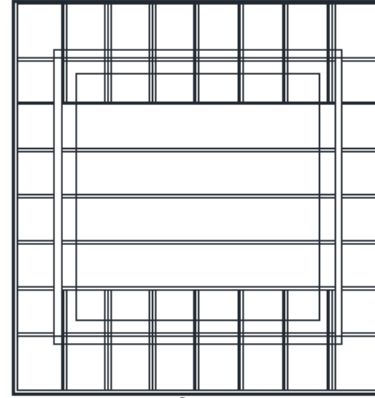
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1. Kitchen module
2. Entry or bedroom storage module
3. Laundry and bathroom sink module



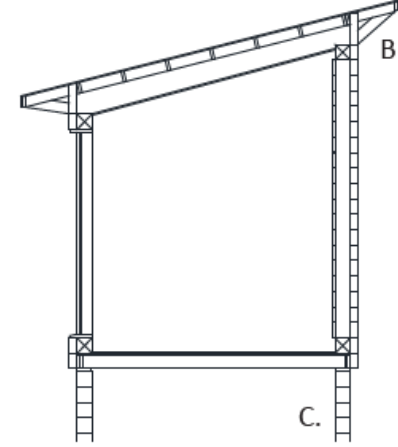
- A. Lookouts extend over wall framing
- B. Customizable eave extension
- C. Customizable CMU foundation
- D. Joists and belt joists start at the same length
- E. Wooden weather barrier is attached to log structure



A.

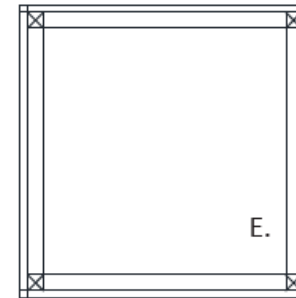


D.

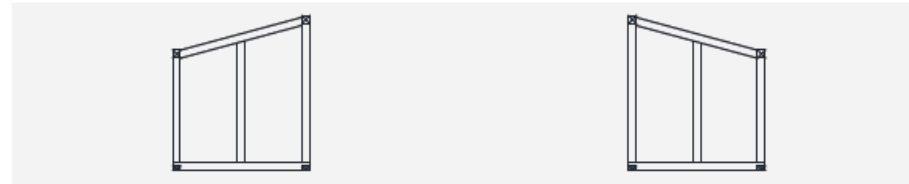


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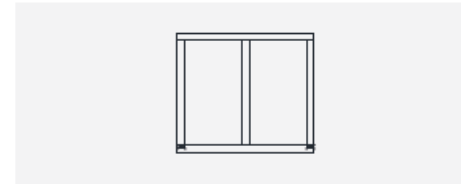
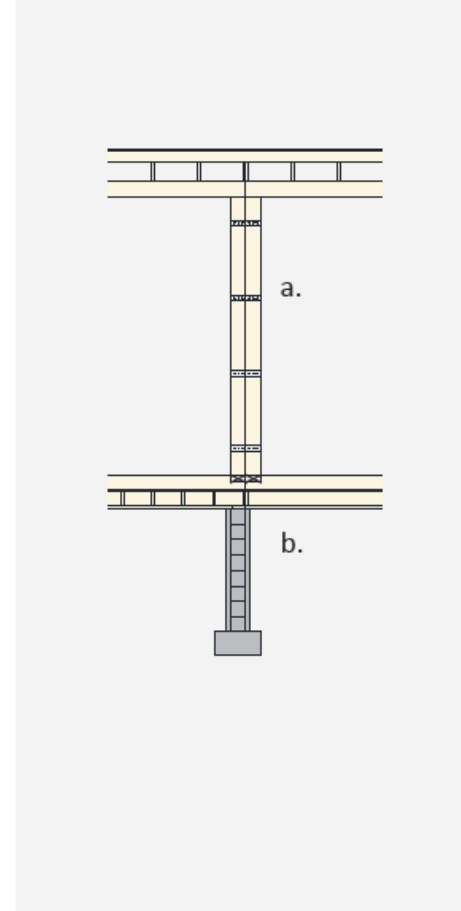
C.



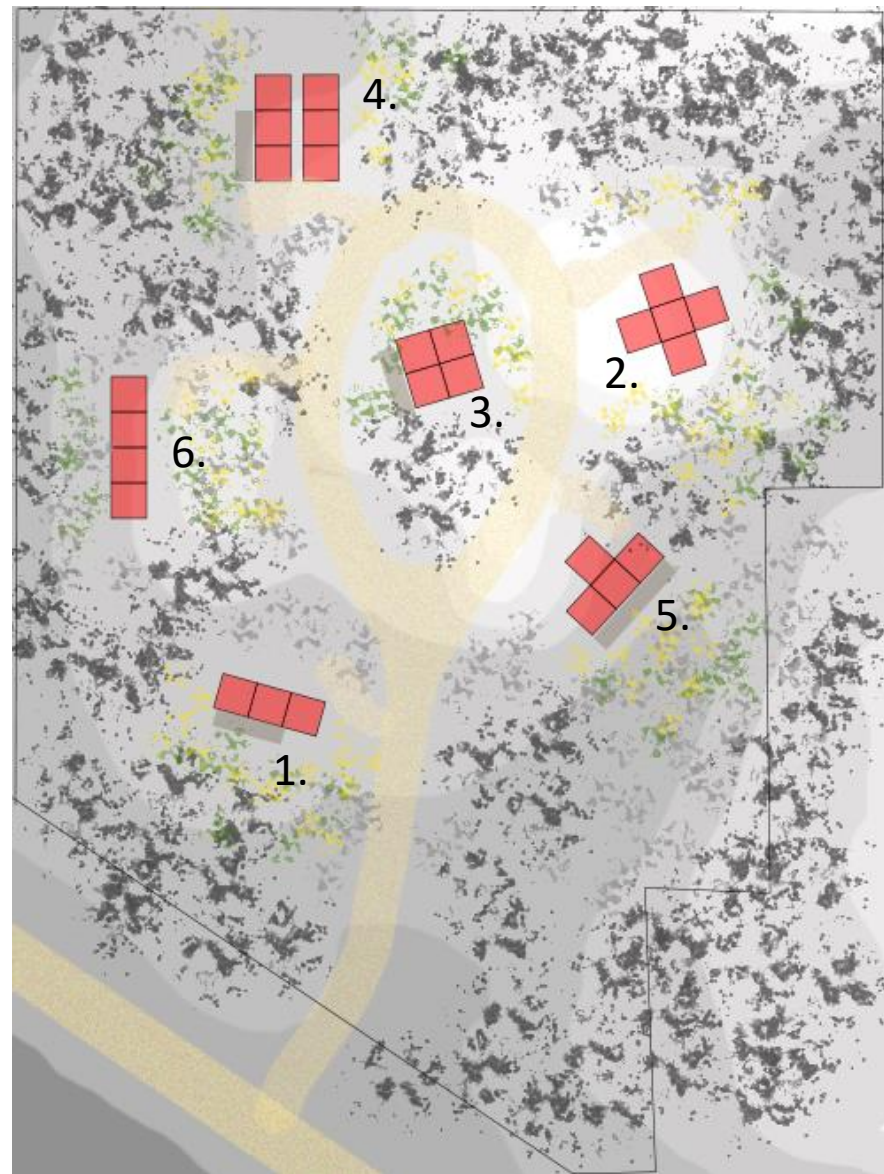
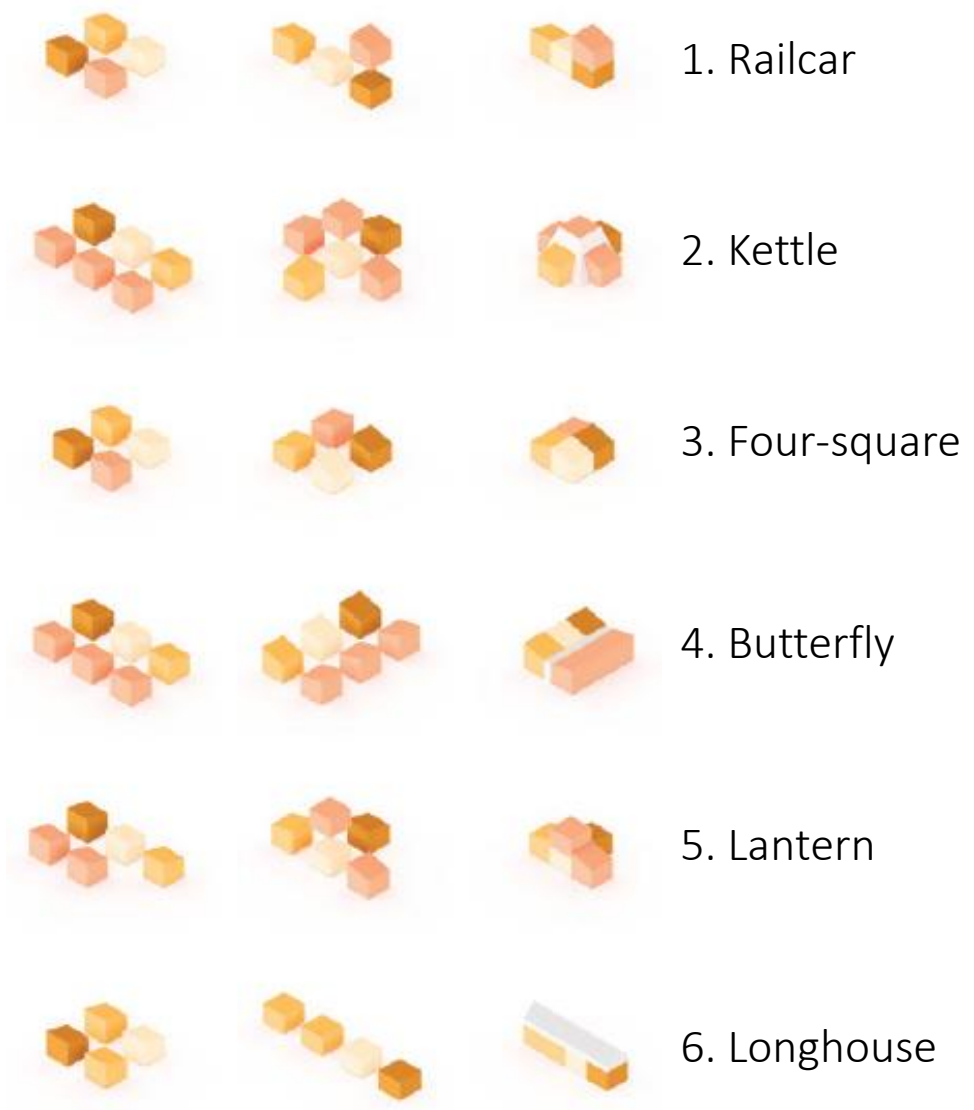
E.

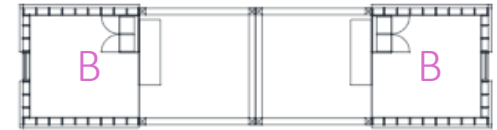
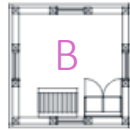
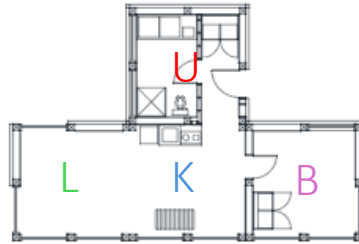
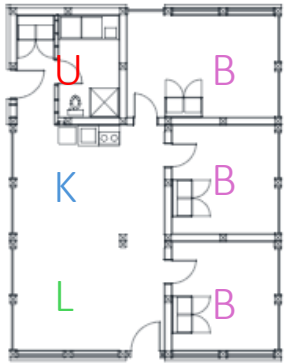
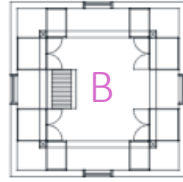
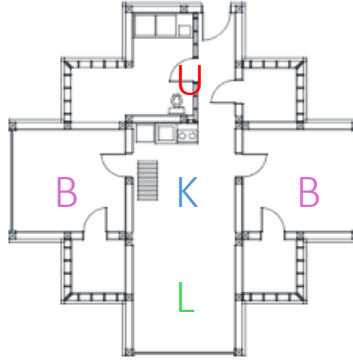


- a. Columns are attached with steel strapping
- b. Extensions are accomplished by rotating the joist configuration for support









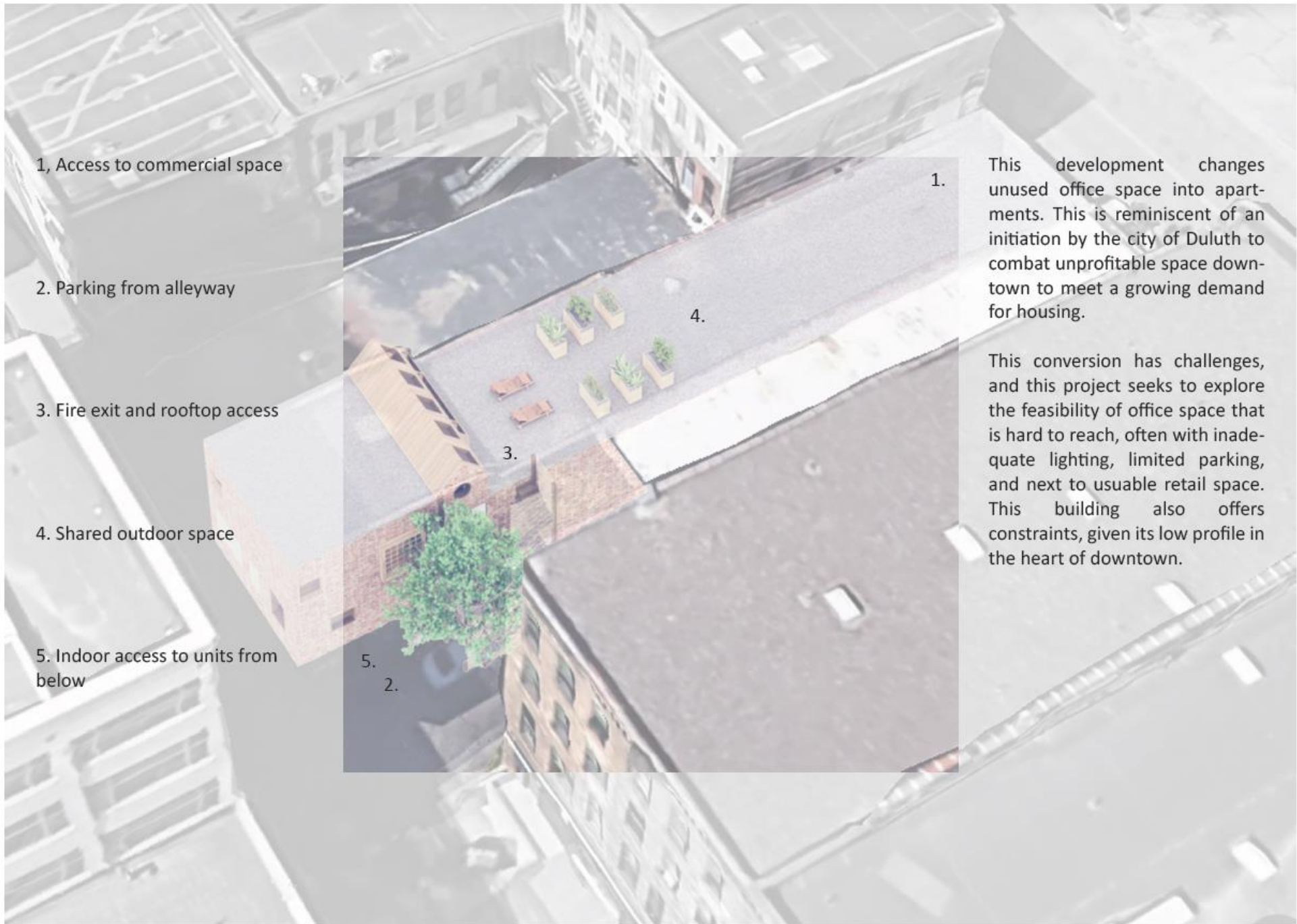


# Renovations

New ways to think about investing

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1, Access to commercial space

2. Parking from alleyway

3. Fire exit and rooftop access

4. Shared outdoor space

5. Indoor access to units from below

1.

4.

3.

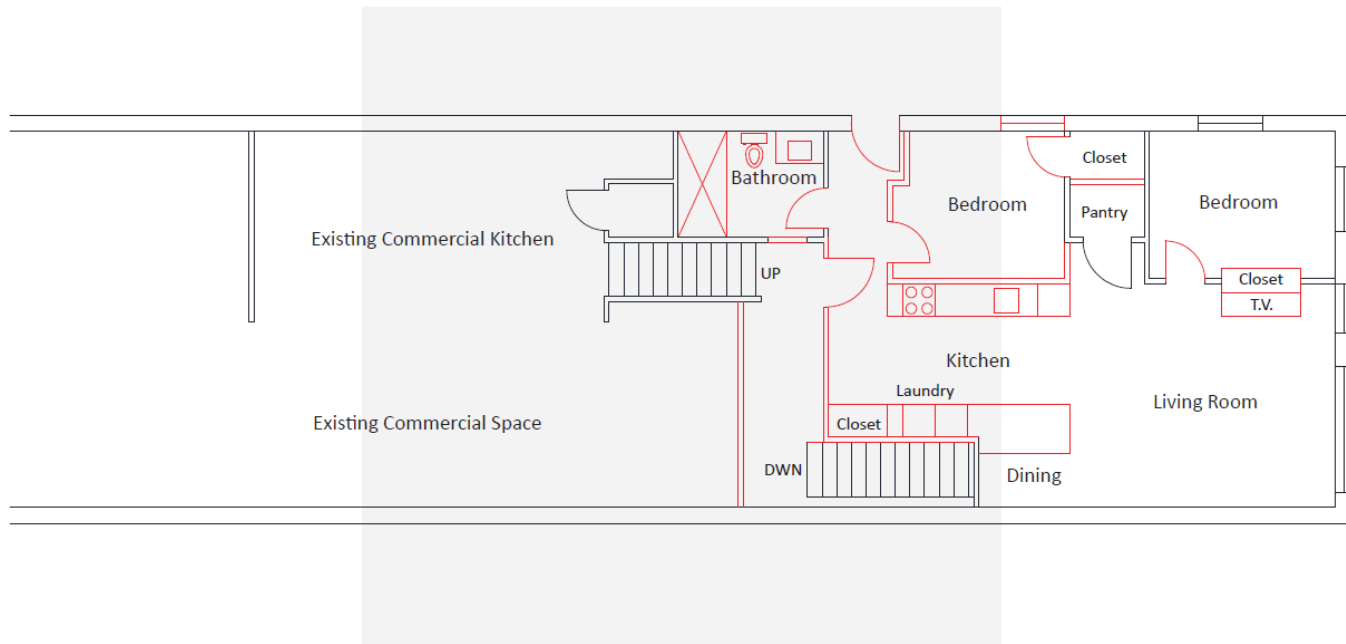
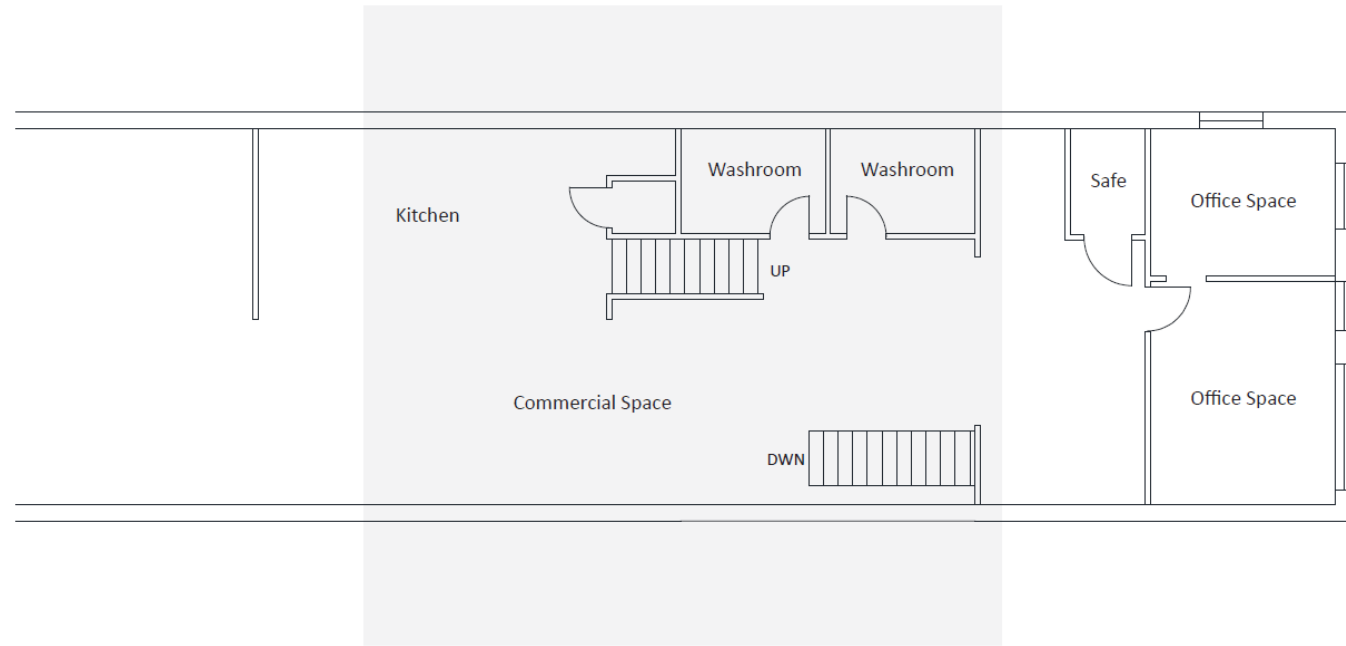
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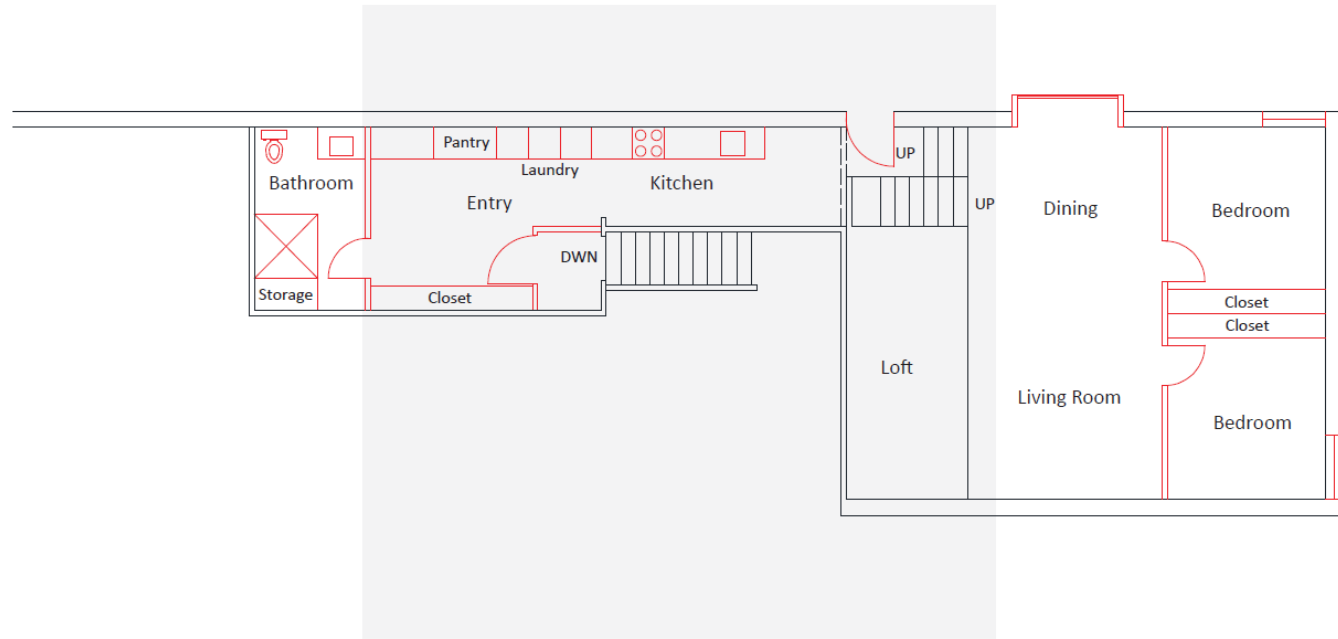
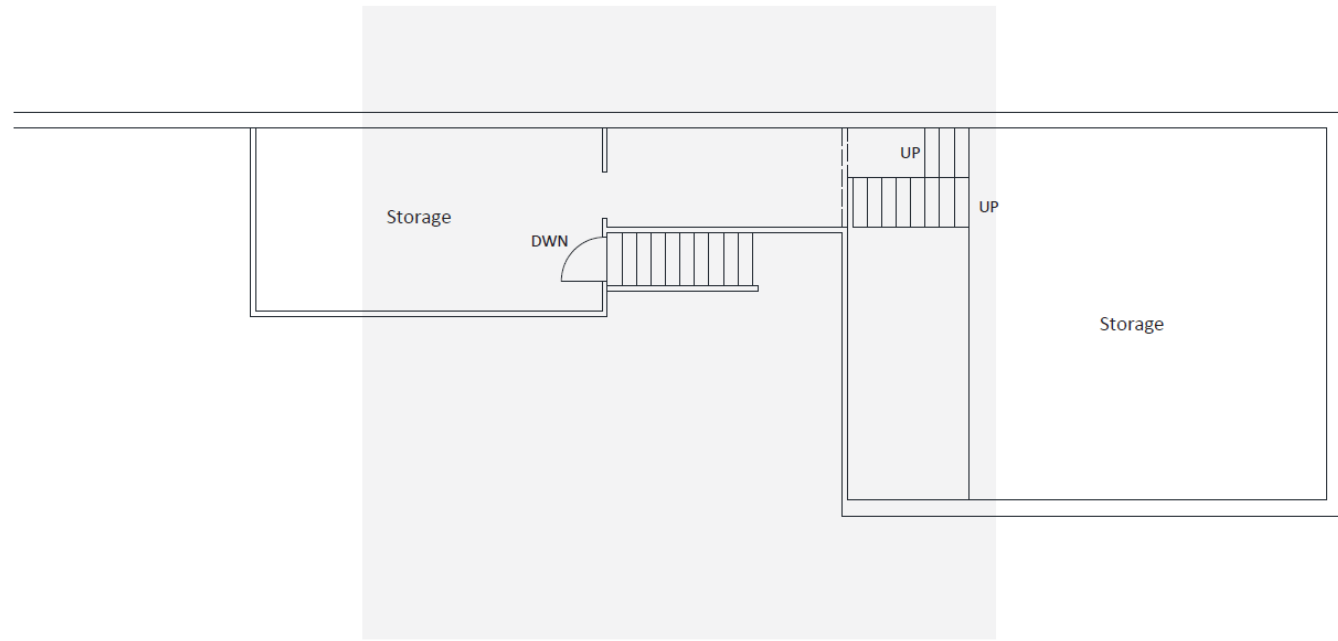
2.

This development changes unused office space into apartments. This is reminiscent of an initiation by the city of Duluth to combat unprofitable space downtown to meet a growing demand for housing.

This conversion has challenges, and this project seeks to explore the feasibility of office space that is hard to reach, often with inadequate lighting, limited parking, and next to usable retail space. This building also offers constraints, given its low profile in the heart of downtown.

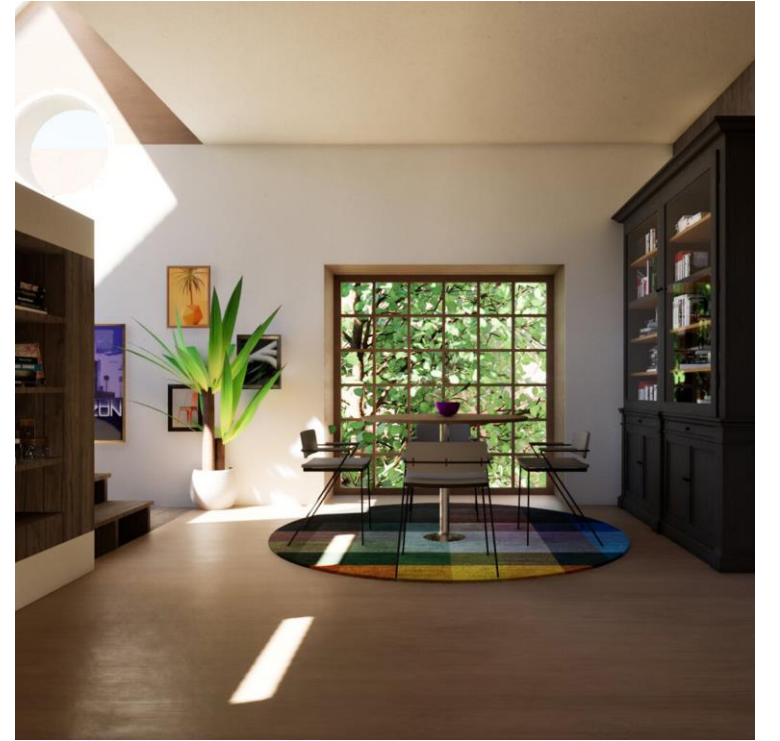
Figure 8:

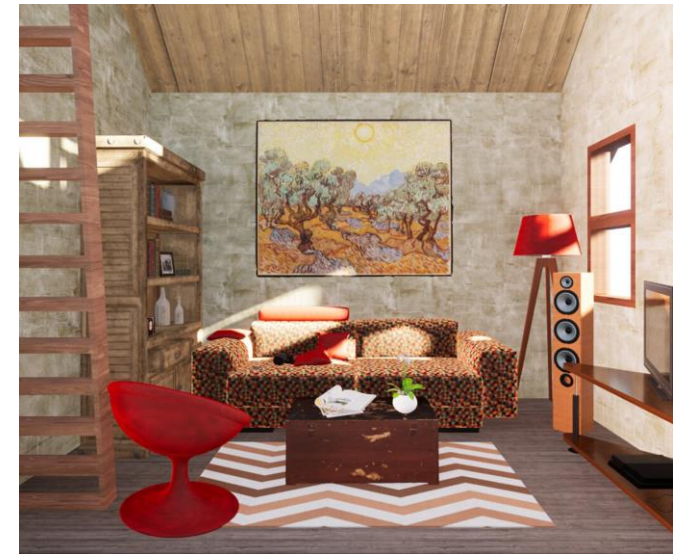
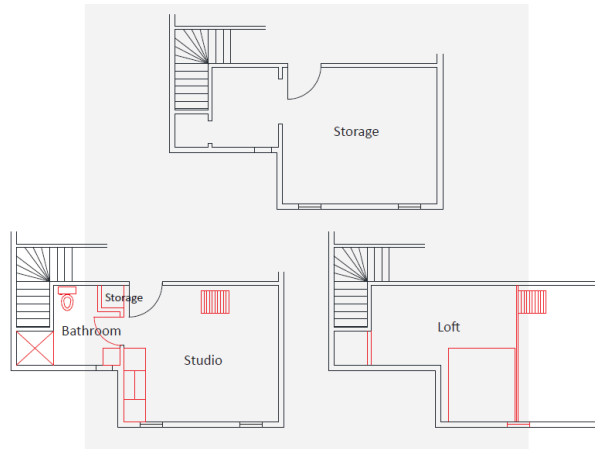
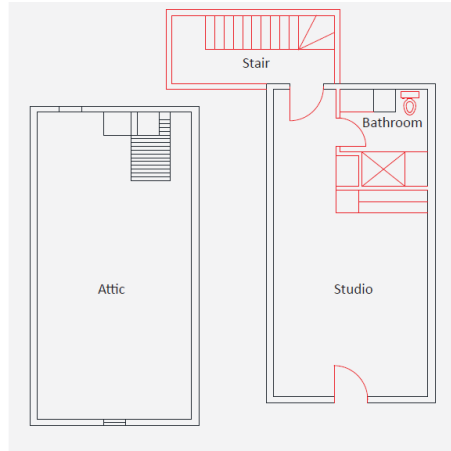












# Custom Homes

The Beauty in Economy

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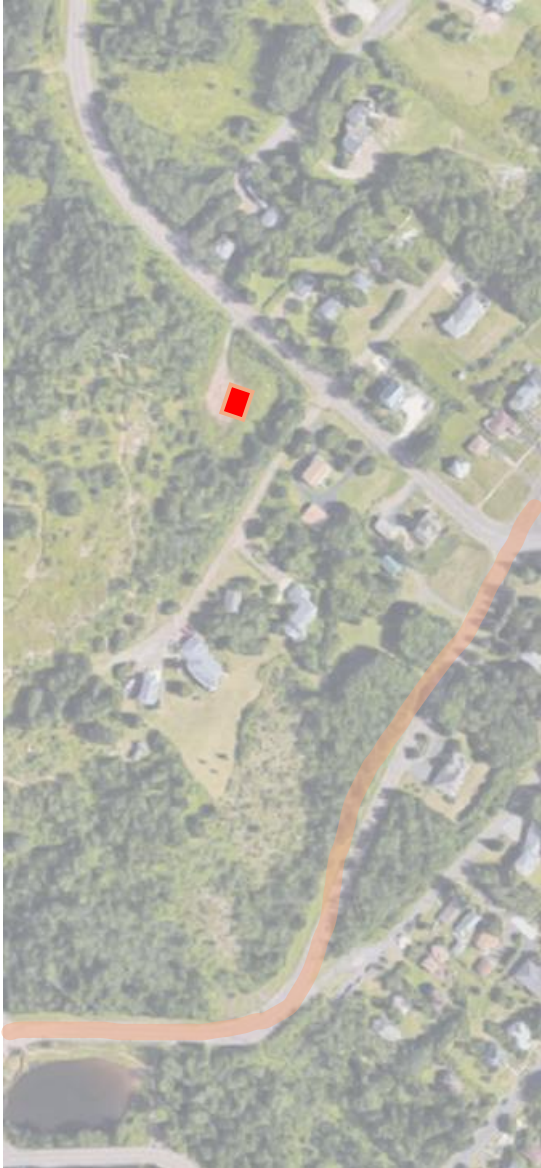


Figure 8:



Figure 9:

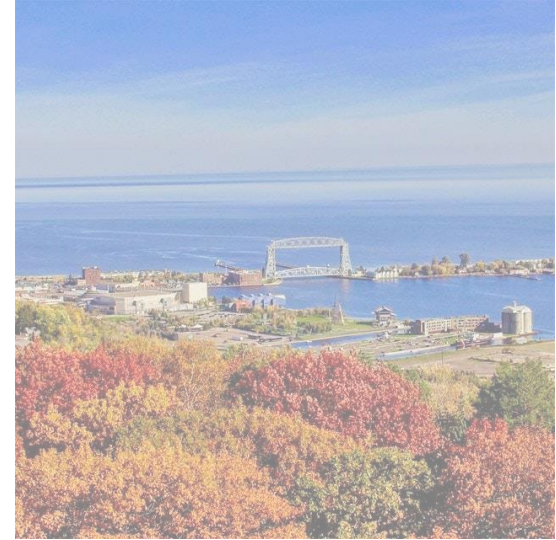
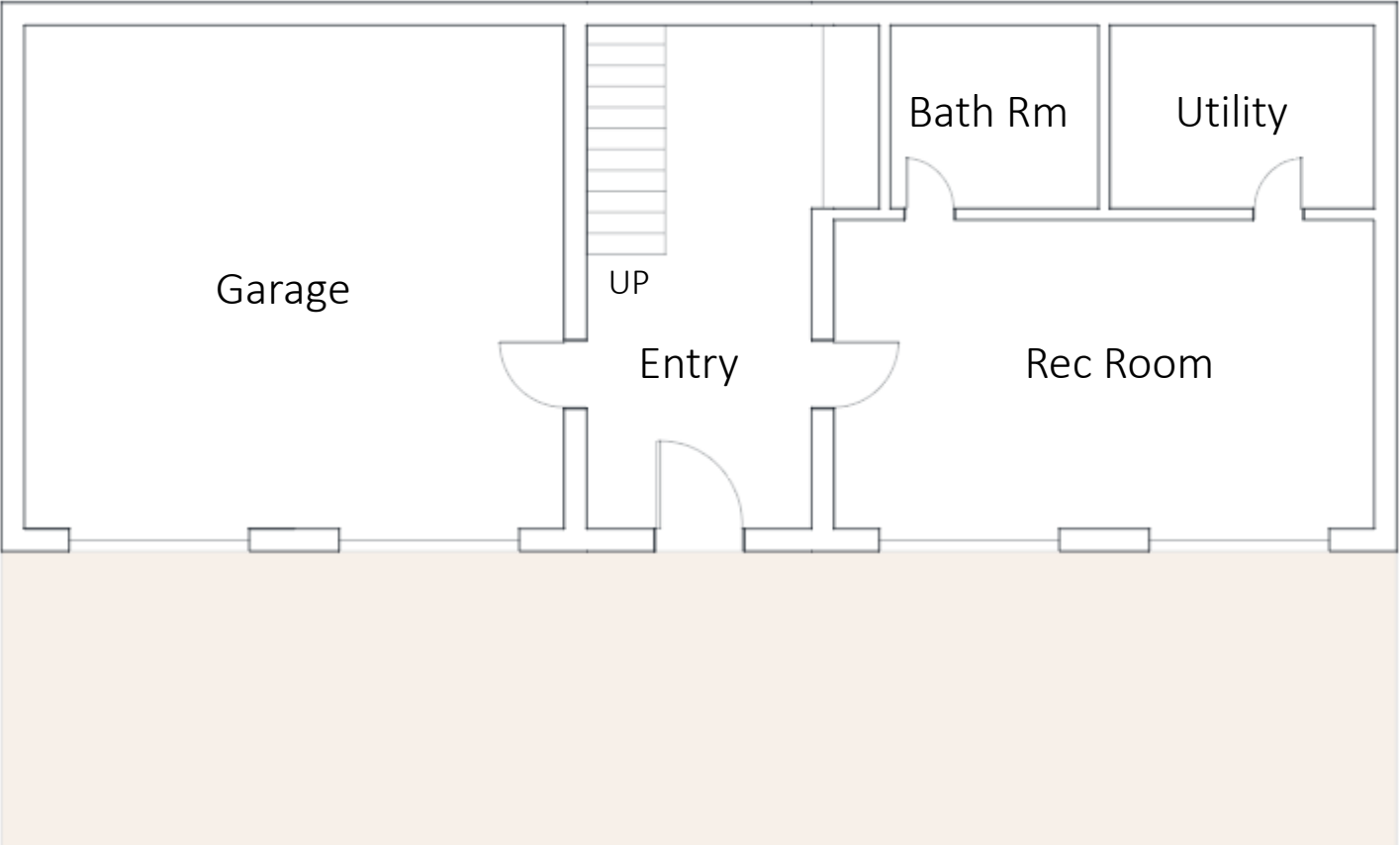
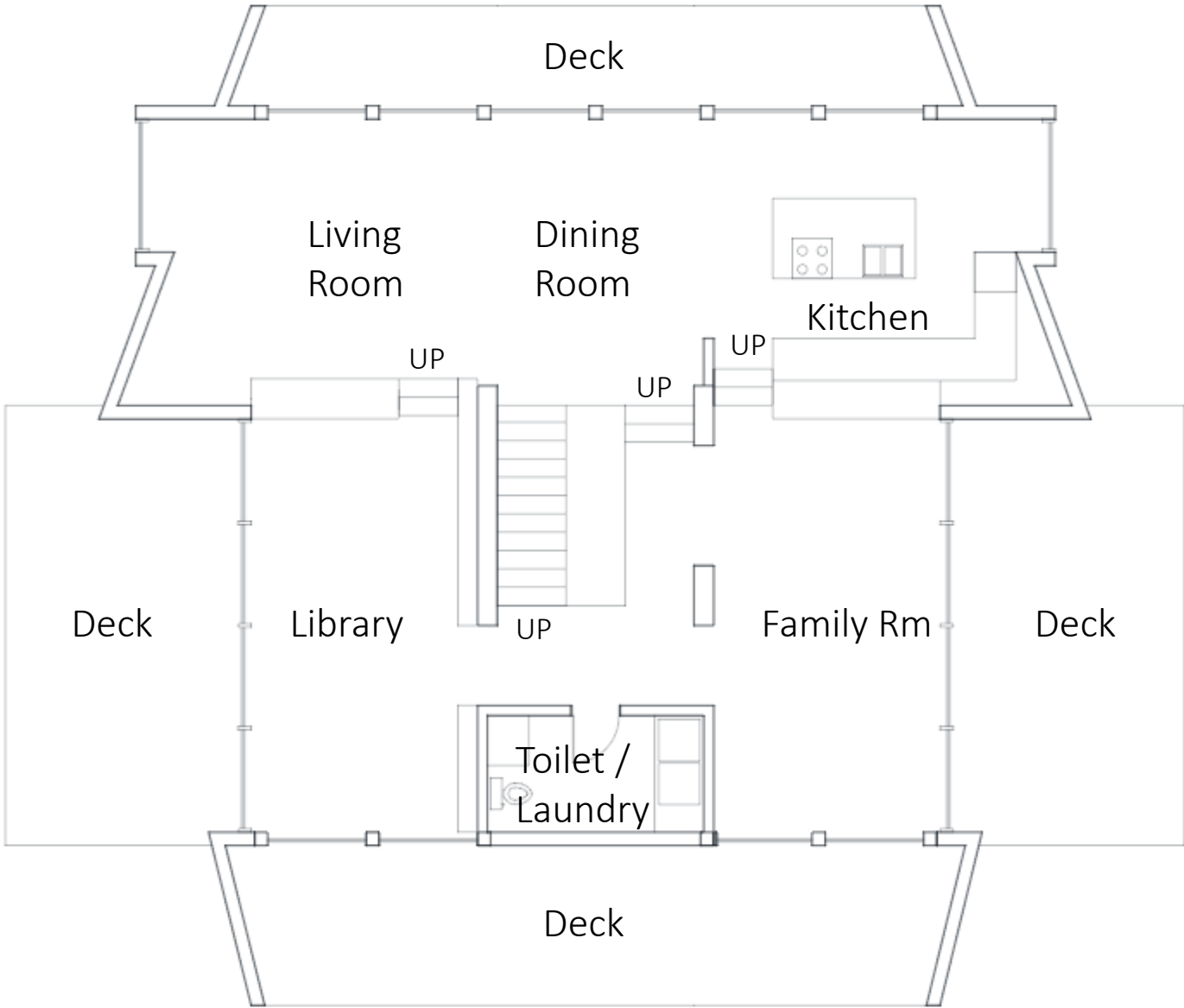


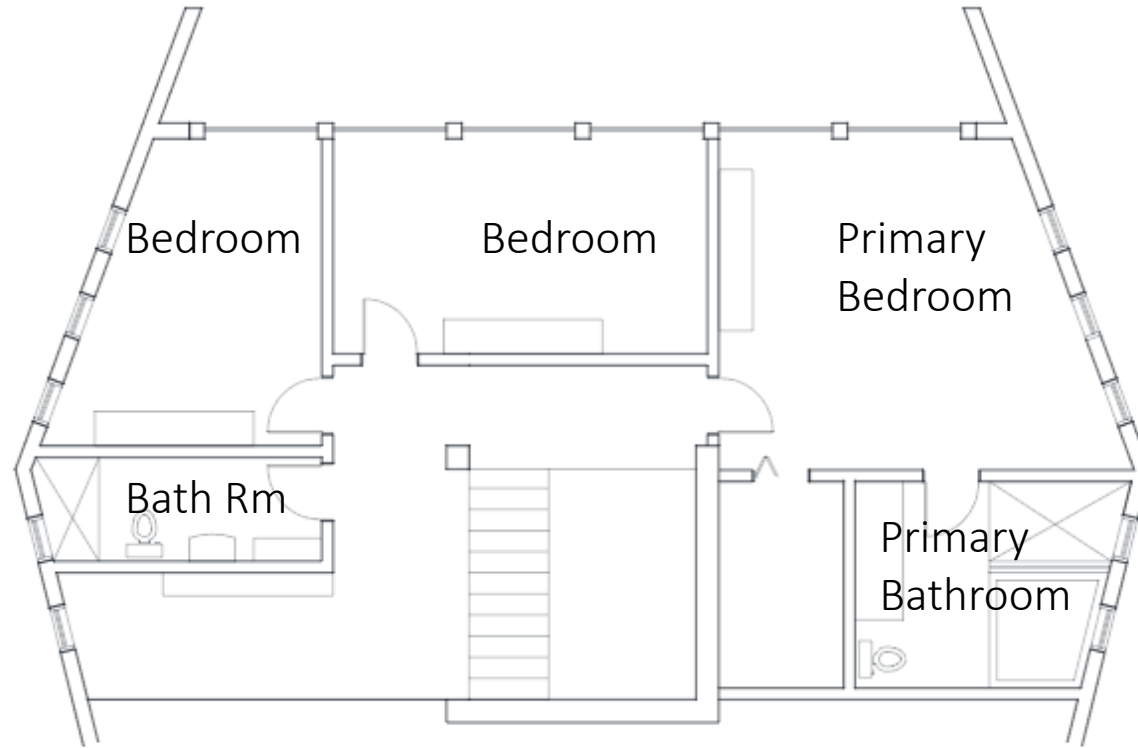
Figure 10:













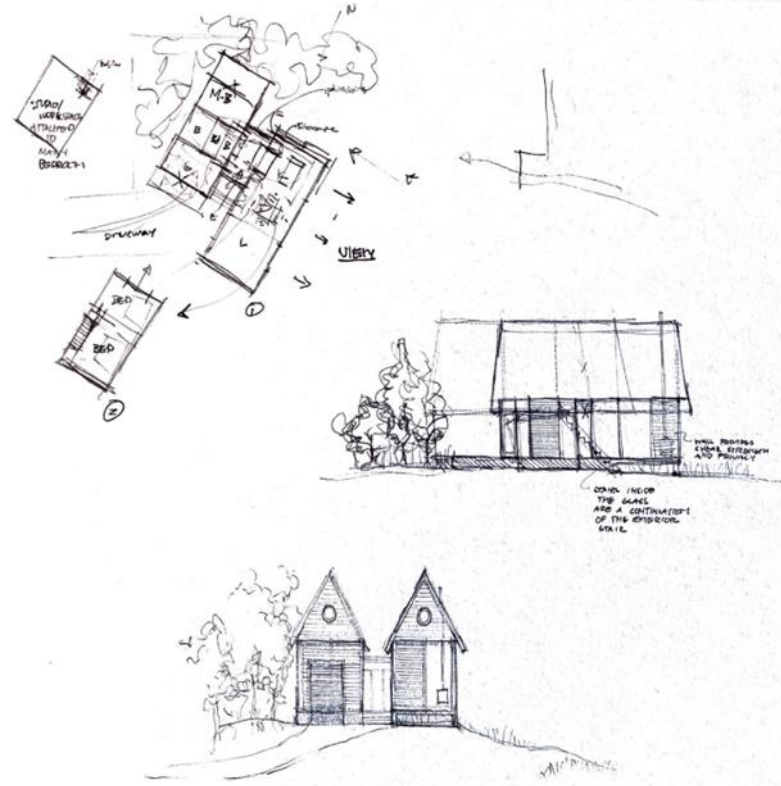
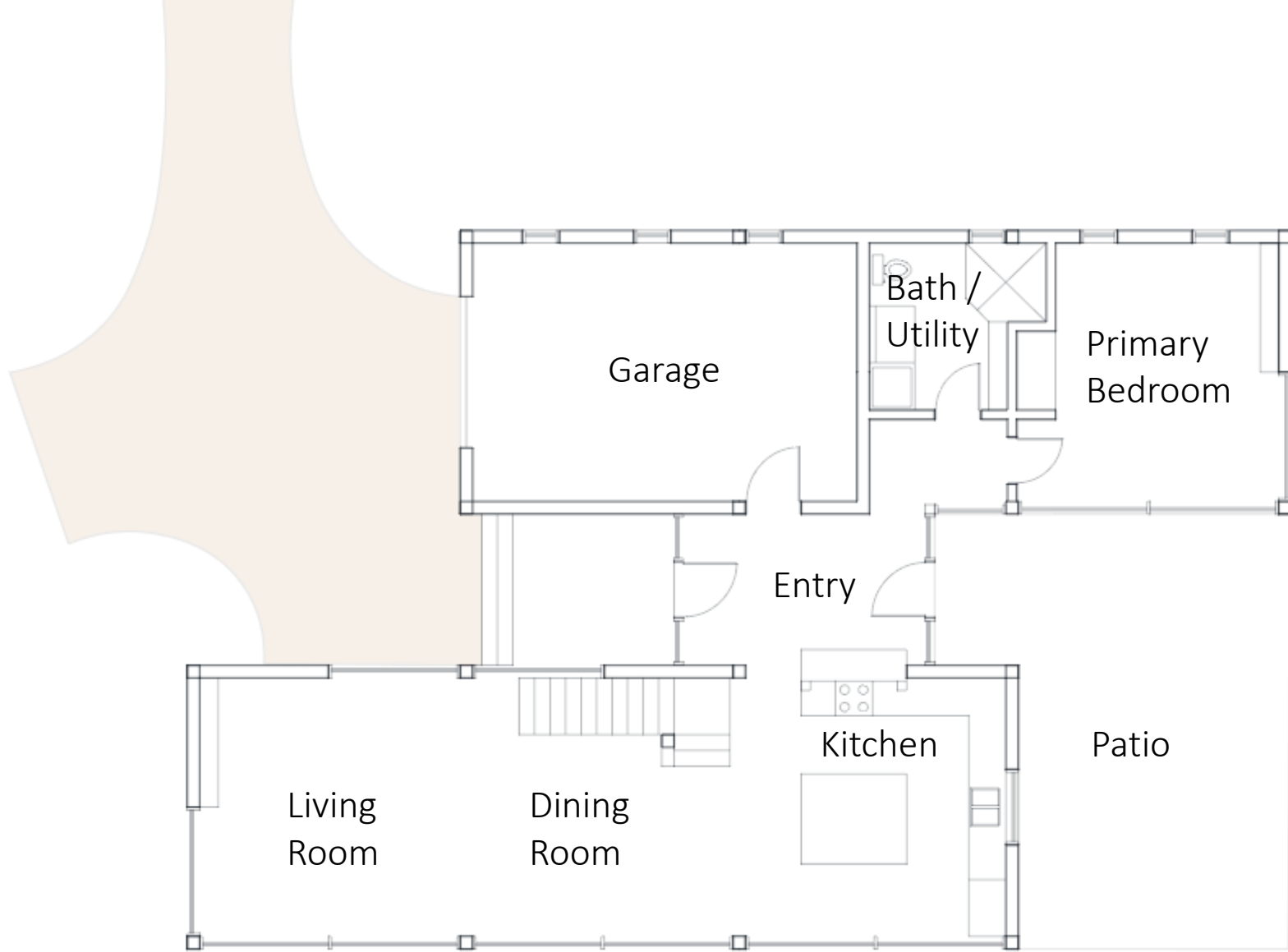
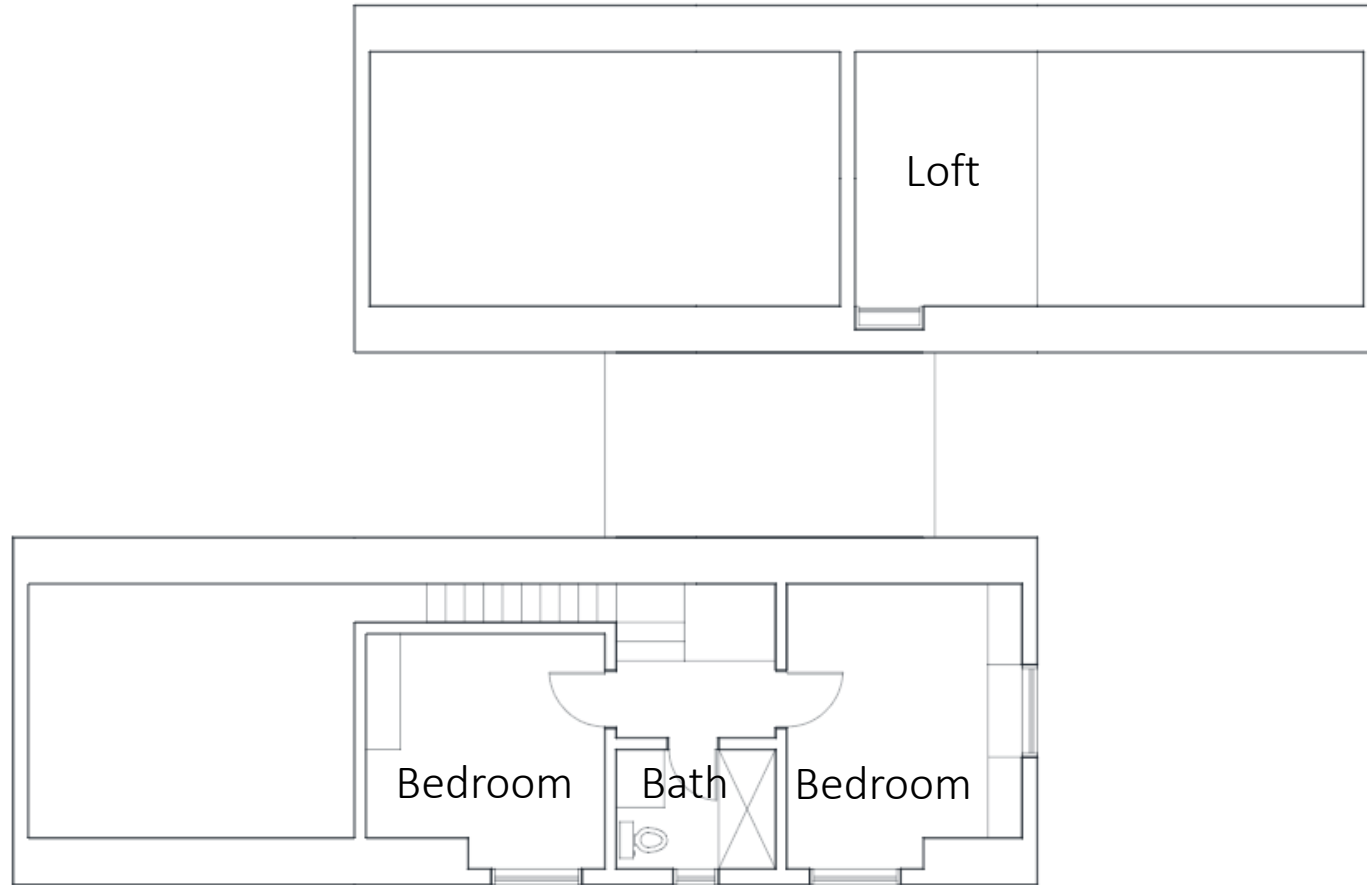


Figure 11:











# Construction in Education



# What you can do:



## Educators

Change the way students think about industries that need help—don't encourage them to be content with lower wages but inspire them to be innovative.



## Designers

Pursue construction related experience to become a better designer and see if construction is meant to be part of your routine.



## Economic Contributors

Look around you for industries that are struggling and work a solution in to the work that you do. How can you improve the livelihood of the ones you interact with?

# Figures and References:

## Figure 1:

[1981 Aerial Photo of Duluth MN]. (2015). NHAPO.  
[https://maps.dnr.state.mn.us/airphotos/projects/stl/y1981/stl\\_010\\_010.jpg](https://maps.dnr.state.mn.us/airphotos/projects/stl/y1981/stl_010_010.jpg)

[1989 Aerial Photo of Duluth MN]. (2015). NHAPO.  
[https://maps.dnr.state.mn.us/airphotos/projects/stl/y1989/stl\\_031\\_109.jpg](https://maps.dnr.state.mn.us/airphotos/projects/stl/y1989/stl_031_109.jpg)

Google. (August 2023). [Satellite Image of Duluth]. Retrieved 28, April, 2024.

## Figure 2:

Google. (August 2023). [Satellite Image of Duluth]. Retrieved 28, April, 2024.

## Figure 3:

Reconnect with friends from high school, find reunions, view yearbook photos and more. Classmates.com. (n.d.).  
[https://www.classmates.com/?title=Old+High+School+Yearbook+s+Online&s=80955&utm\\_campaign=Brand%3A+Vertical+%26+o+Network&msclkid=42705fd640731892f04f39f89c4a386c&utm\\_source=bing&utm\\_medium=cpc&utm\\_term=classmates.&utm\\_content=Brand%3A+Vertical%3A+Expansion+Mar+%2724](https://www.classmates.com/?title=Old+High+School+Yearbook+s+Online&s=80955&utm_campaign=Brand%3A+Vertical+%26+o+Network&msclkid=42705fd640731892f04f39f89c4a386c&utm_source=bing&utm_medium=cpc&utm_term=classmates.&utm_content=Brand%3A+Vertical%3A+Expansion+Mar+%2724)

## Figure 4:

Housing indicator report 2022 - Duluth, Minnesota. (2022).  
[https://duluthmn.gov/media/15127/final\\_2022-hir-report\\_042723.pdf](https://duluthmn.gov/media/15127/final_2022-hir-report_042723.pdf)

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Housing indicator report 2022 - Duluth, Minnesota. (2020).  
<https://duluthmn.gov/media/11361/2020-hir-report-final.pdf>

Housing indicator report 2022 - Duluth, Minnesota. (2019).  
<https://duluthmn.gov/media/9877/housing-indicator-report-2019.pdf>

Housing indicator report 2022 - Duluth, Minnesota. (2018).  
<https://duluthmn.gov/media/8390/2018-housing-indicator-report.pdf>

## Figure 5:

Macht, C. (2023, August 9). Logging in: Northeast Minnesota's Forest Products Industry. Minnesota Department of Employment and Economic Development.  
<https://mn.gov/deed/newscenter/publications/review/january-2019/logging-in.jsp>

**Figure 6:**

Logan, D. (2021). Prices of Residential Inputs Up 23% Year-Over-Year. Eye On Housing. National Home Builders Association.

**Figure 7:**

Macht, C. (2023, August 9). Logging in: Northeast Minnesota's Forest Products Industry. Minnesota Department of Employment and Economic Development.

<https://mn.gov/deed/newscenter/publications/review/january-2019/logging-in.jsp>

**Figure 8:**

Google. (August 2023). [Satellite Image of Duluth]. Retrieved 28, April, 2024.

**Figure 9:**

Find homes in Duluth on Airbnb. Airbnb. (n.d.).

[https://www.airbnb.com/a/stays/Duluth--Minnesota--United-States?account\\_id=142001799&campaign\\_id=380404469&ad\\_id=81638801485427&ad\\_group\\_id=1306220037862330&keyword\\_id=kwd-81638884548005%3Aloc-190&device=c&c=.pi2.pk380404469\\_1306220037862330&gclid=389da93374531d6f9369cf1d92cf1bd0&gclsrc=3p.ds&msclkid=389da93374531d6f9369cf1d92cf1bd0&utm\\_source=bing&utm\\_medium=cpc&utm\\_campaign=USA%3ADTM%3ADEST%3AUSA%2BMN%2BDuluth%5BEXACT%5D&utm\\_term=duluth+bed+and+breakfast+mn&utm\\_content=Duluth%3ABed%26Breakfast%2BEXACT](https://www.airbnb.com/a/stays/Duluth--Minnesota--United-States?account_id=142001799&campaign_id=380404469&ad_id=81638801485427&ad_group_id=1306220037862330&keyword_id=kwd-81638884548005%3Aloc-190&device=c&c=.pi2.pk380404469_1306220037862330&gclid=389da93374531d6f9369cf1d92cf1bd0&gclsrc=3p.ds&msclkid=389da93374531d6f9369cf1d92cf1bd0&utm_source=bing&utm_medium=cpc&utm_campaign=USA%3ADTM%3ADEST%3AUSA%2BMN%2BDuluth%5BEXACT%5D&utm_term=duluth+bed+and+breakfast+mn&utm_content=Duluth%3ABed%26Breakfast%2BEXACT)

**Figure 10:**

Light poles & posts - steel, Aluminum & Fiberglass. Light Poles Plus. (n.d.).

[https://lightpolesplus.com/collections/light-poles?msclkid=5ea15eed01241b65cb4138c3e7311f92&utm\\_source=bing&utm\\_medium=cpc&utm\\_campaign=LPP\\_S\\_1101\\_LightPoles-Primary&utm\\_term=buy+light+poles&utm\\_content=buy+light+poles+%5Bp%5D](https://lightpolesplus.com/collections/light-poles?msclkid=5ea15eed01241b65cb4138c3e7311f92&utm_source=bing&utm_medium=cpc&utm_campaign=LPP_S_1101_LightPoles-Primary&utm_term=buy+light+poles&utm_content=buy+light+poles+%5Bp%5D)

**Figure 11:**

Google. (August 2023). [Satellite Image of Duluth]. Retrieved 28, April, 2024.