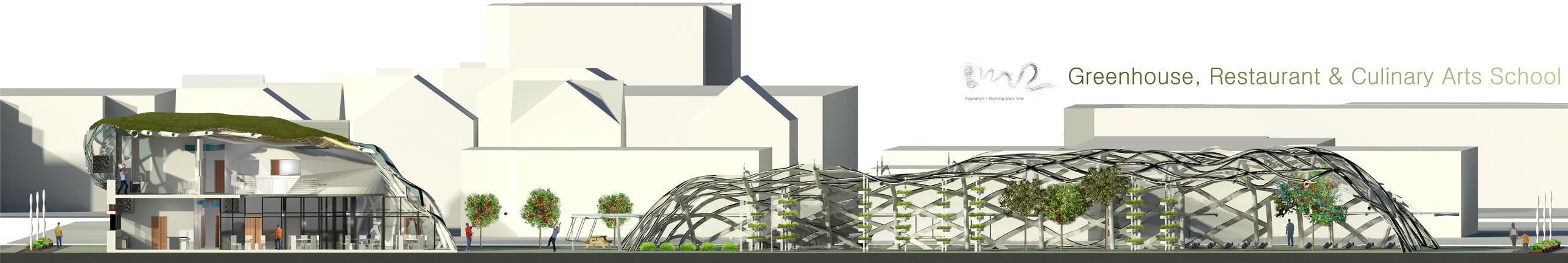
Increasing Population, Decreasing Food Supply



Inspiration – Morning Glory Vine

Greenhouse, Restaurant & Culinary Arts School

Solar panels provide heat to the ground during the cold seasons. During the warm seasons the solar panels power the lights for the greenhouse, restaurant, and culinary arts school.

Wind turbines are strategically placed on a depression located at the top of the greenhouse. This depression cuts across the length of the greenhouse to harness the strong winds from the northwest.

6" diameter tube steel supports the solar panels and the large swings for two or more people to enjoy.

Clamps hold the ethelene tetrafluoroethylene (ETFE) in place.

ETFE is used in place of glass. ETFE is a polymer that performs well in curved forms. It is self-cleaning, a better insulator than glass, and much lighter weight than glass, thus the building will require less structure. Fritted ETFE is used on the restaurant and culinary arts building near the roof line to reduce solar heat gain. The greenhouse features operable ETFE windows connected to a thermostat. The windows automatically open to exhaust humidity through the high points of the roof during the warm summer days. ETFE windows at the ends of the greenhouse open to allow fans to draw cooler air to quickly cool down the space. In the winter, excess heat can be directed through a pipe in the ground to warm the restaurant and culinary arts building.

Extensive green roof helps keep the building at a cooler temperature during the summer.

Gutters control the water to an underground holding tank. The water is filtered and reused in the greenhouse and on the north and west green wall drip line.

Metal decking provides a platform for the extensive green roof system.

Mullion grid provides lateral bracing for the buildings.

Steel angles span between the main structural members to help support the metal decking.

12" diameter tube steel is the main structural system.

Mechanical exhaust system

Second floor plan is used by the culinary arts school. The kitchens can be rented out to the public after school hours. The floor plate is comprised of post-tensioned concrete to allow for an open restaurant seating area and a thinner concrete floor.

First floor plan is the restaurant and supporting spaces. It features a glass elevator and clear views to the park across NP Avenue. The greenhouse has both ground plants and stacked planters to take advantage of the high ceilings where fruit trees are not planted. Two of the pipes for the vertical planters are used as roof drains.

Insulated concrete bearing walls are located on the north and west facades. These walls, along with the 12" diameter tube steel, hold up the second floor concrete slab.

Red horizontal square tube steel and red vertical steel hat channels are attached to the concrete bearing wall.

24"x36" planted pans are attached to the red steel grid to make a living wall. The plants are watered through a vertical drip line. Each fall, the pans are taken into the greenhouse leaving the concrete wall and red structure exposed. The planters are reinstalled in the spring.

Exhaust vents are red and contrast nicely with the green living wall but, blend in with the red grid structure during the winter months.

The project site is located in Fargo, ND, east of the Union Cold Storage building and on the former site of the Nester Lounge. The Nester Lounge will be torn down and recycled. The area north of NP Ave. will have the greenhouse, restaurant, and culinary arts school. South of NP Ave. will be the park, basketball court, and public gardens. The green shaded areas, east and west of the main site, represent areas where the park and garden can expand.

First Floor Plan
1 Entry
2 Restaurant Seating
3 Bakery/Overflow Kitchen
4 Food Storage
5 Glass Elevator & Stairs
6 Waiting
7 Kitchen
8 Clean-Up
9 Women's
10 Men's
11 Stairs
12 Elevator
13 Mechanical Shaft
14 Mechanical Room
15 Janitor

Second Floor Plan
16 Glass Elevator & Stairs
17 Balcony Overlook
18 Seating
19 Demonstration Lab
20 Women's
21 Men's
22 Stairs
23 Elevator
24 Mechanical Shaft
25 Office
26 Lab

Main Avenue
10th Street
NP Avenue
11th Street
University Avenue

ARCH 722 Design Thesis
Spring 2012
Heather Bredeson
Cindy Urness

Software
Adobe InDesign
Adobe Photoshop
AutoCad Architecture 2012
AutoDesk 3ds Max 2012
Google SketchUp
Revit Architecture 2012
Rhinoceros 4.0

Restaurant View looking Southwest

Urban sprawl has caused lengthy commutes. Vehicles require fuel to run and some of that fuel is made from plants. Land used to grow plants for fuel is taking away valuable space needed to grow food to eat. When there is less food, there is more demand, which raises the price of food. Higher food prices make it difficult for poor people of our world to get proper nutrition. A decrease in food demand can be reached if every city in the world limits their amount of expansion and incorporates more agriculture within the city. This can be achieved by residential outdoor garden plots, community high tunnels, community greenhouses, and roof top gardens.

My thesis project consists of an urban greenhouse, a restaurant and culinary arts school, and a public park. The greenhouse and restaurant and culinary arts school are located in downtown Fargo, ND, at the Nester Lounge and parking lot, which would be torn down and recycled. The park is located in the empty lot east of the Union Cold Storage building. Visitors can park along the street or in the parking lot north of the greenhouse. One enters the greenhouse from the northeast entrance and picks fruits and vegetables to eat. Another option is to choose a recipe of the on-site cooks' choice and pick the ingredients accordingly. The visitor exits the greenhouse and enters the restaurant. To the left of the entrance there are fresh foods and canned foods stored in large glass display cases, refrigerators, and freezers that the restaurant uses to cook meals. The visitor takes the food up to the counter where a cook teaches how to prepare it. The visitor can take their meal to a nearby table and view the beautiful park scenery or enjoy eating at the counter. The culinary arts school is located on the second level. Students learn new cooking techniques and recipes. The students obtain hands-on experience working in the restaurant kitchen and bakery.

Greenhouse View looking Southwest