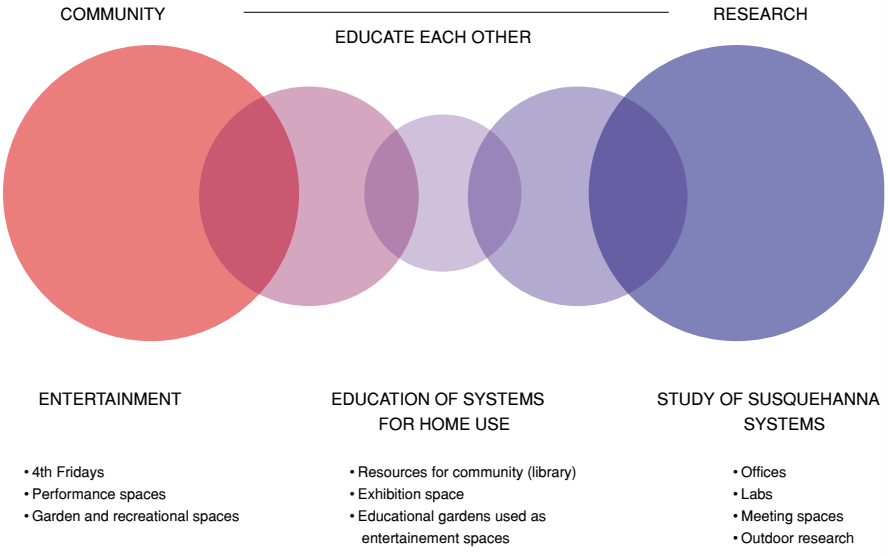
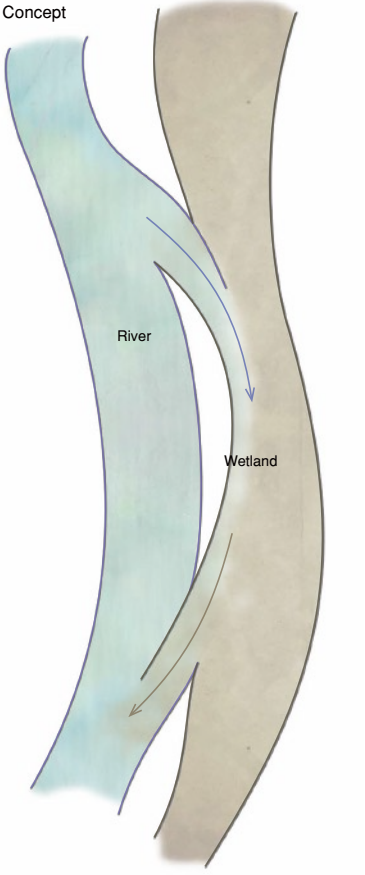
CONCEPT

The concept behind this design was formed by the motion found in passive flooding mitigation systems, primarily constructed wetlands. Wetlands are designed to take in the flow of an adjacent body of water and redirect it, during flooding conditions, downstream. When in motion, there is a sort of stepping down into the new wetland channel where the water is redirected through a multiple of different systems and eventually makes its way back into river.

This idea of moving from one system to another has shaped our construction, creating zones where the user can experience a multitude of environments. Going from the outdoor environment, to a mediated greenhouse, and finally into the built environment that forms the resiliency center that has been created out of the two existing structures.

We decided to leave the two existing structures as intact as possible and instead created a beautiful and educational construction wrapping around the buildings in a flowing form, reminiscent of the path that water takes when going through wetlands. This enabled us to showcase how simple moves can create elegant yet powerful messages to the locals and community abroad.

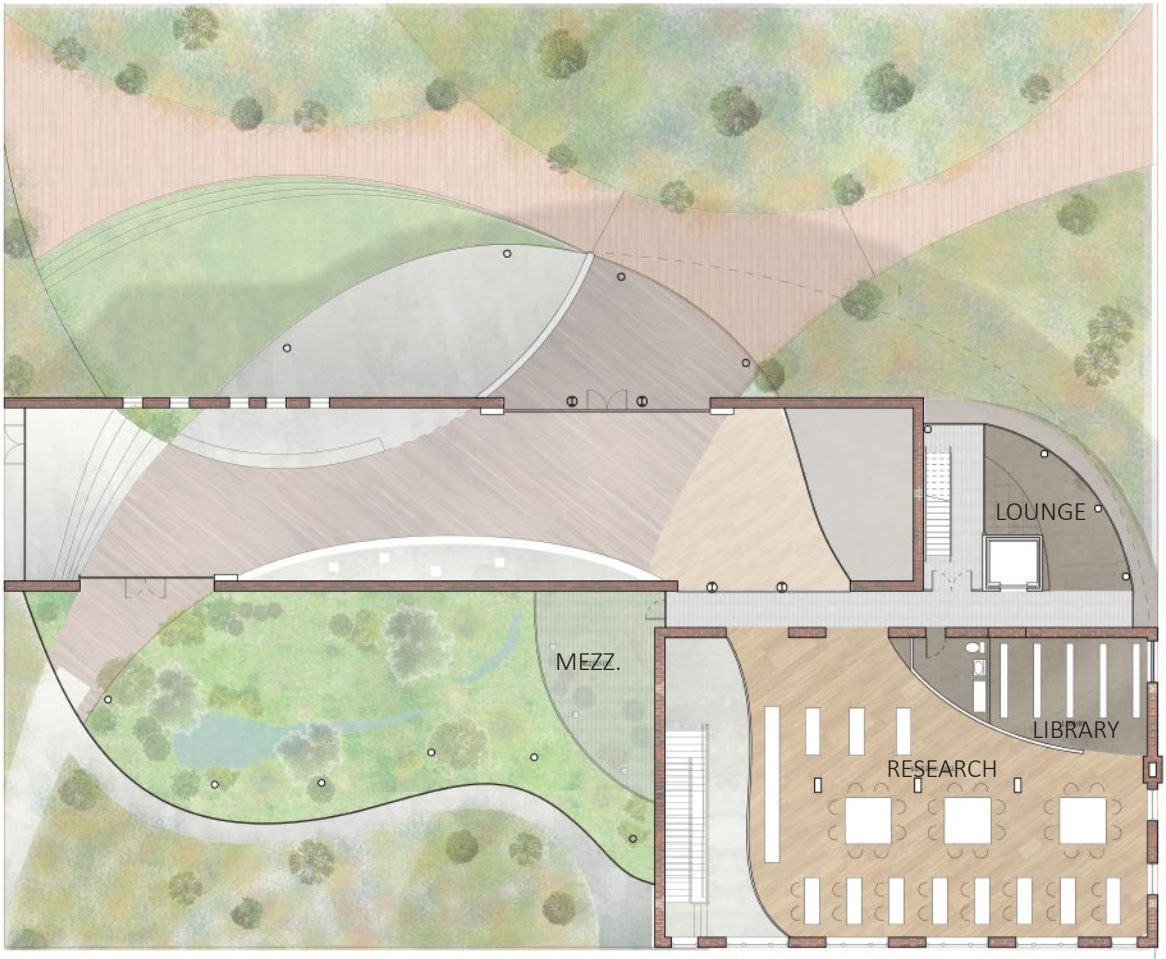




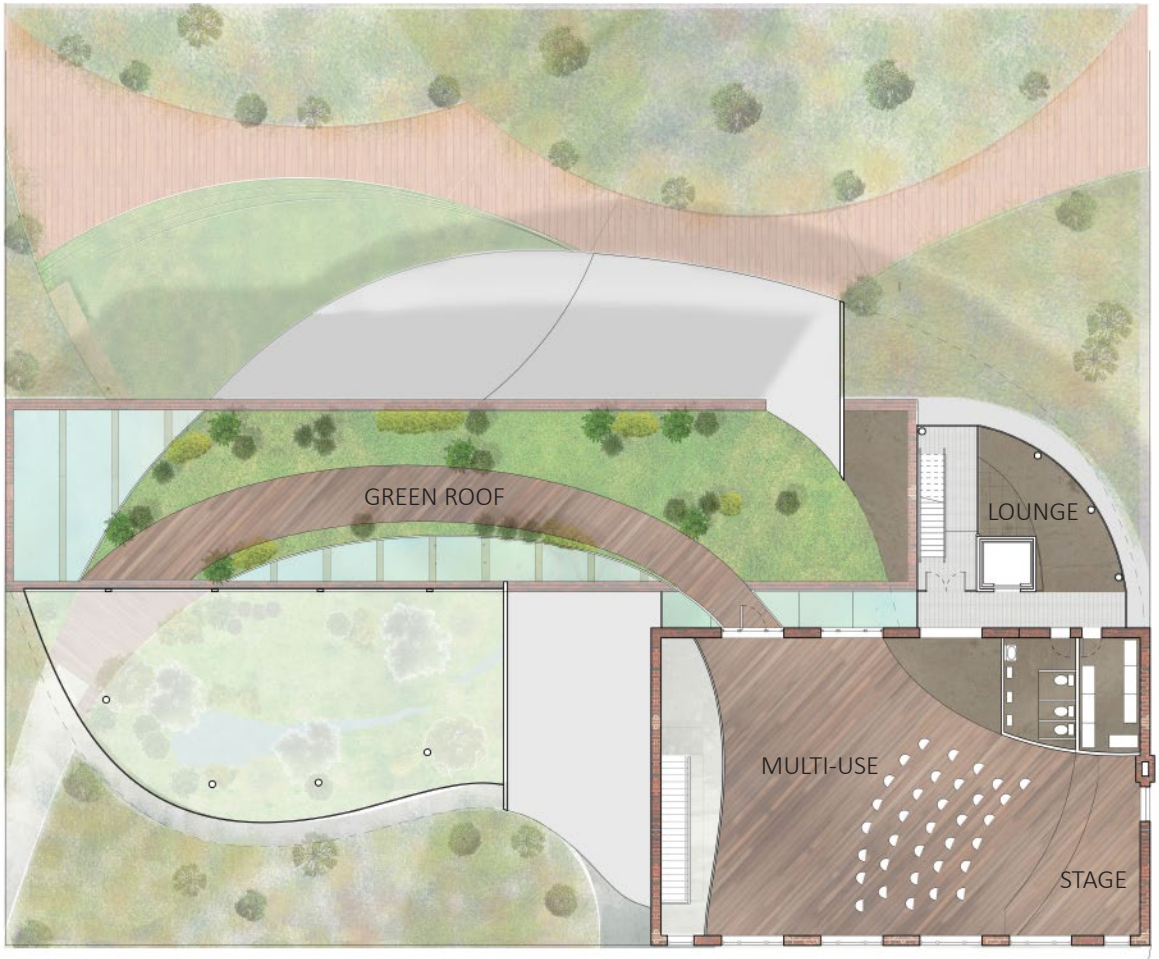
SITE PLAN

FIRST-FLOOR PLAN

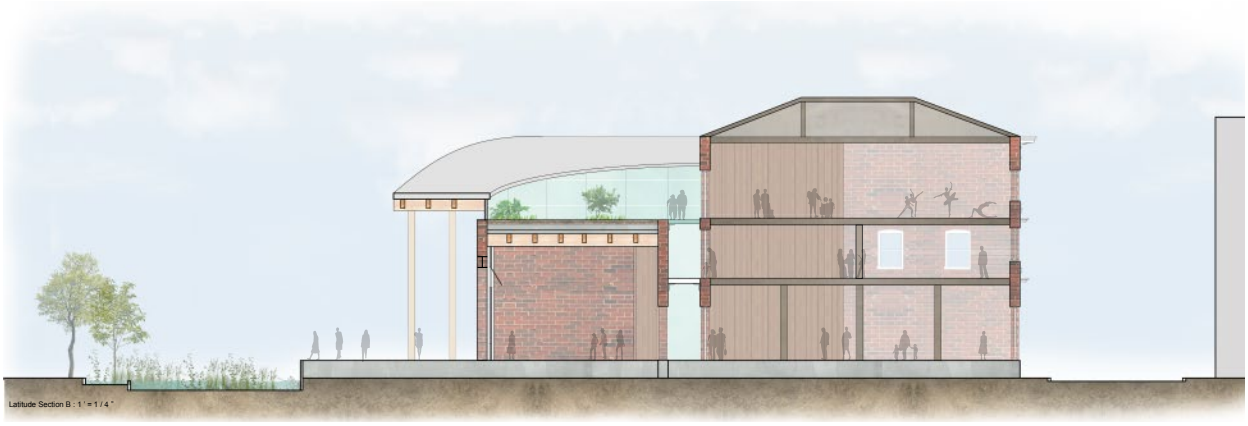
SECOND-FLOOR PLAN



THIRD-FLOOR PLAN



SECTION



ELEVATIONS

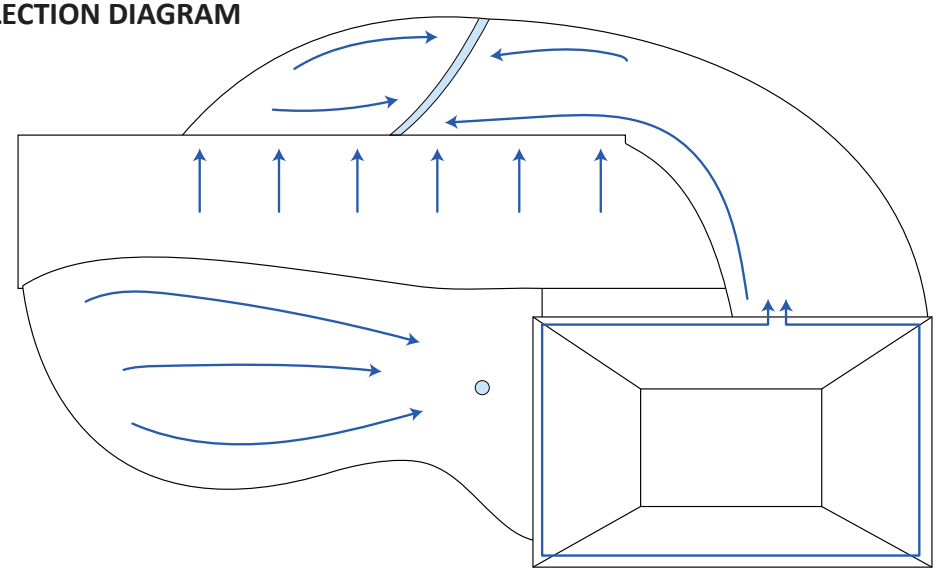
WEST ELEVATION

EAST ELEVATION

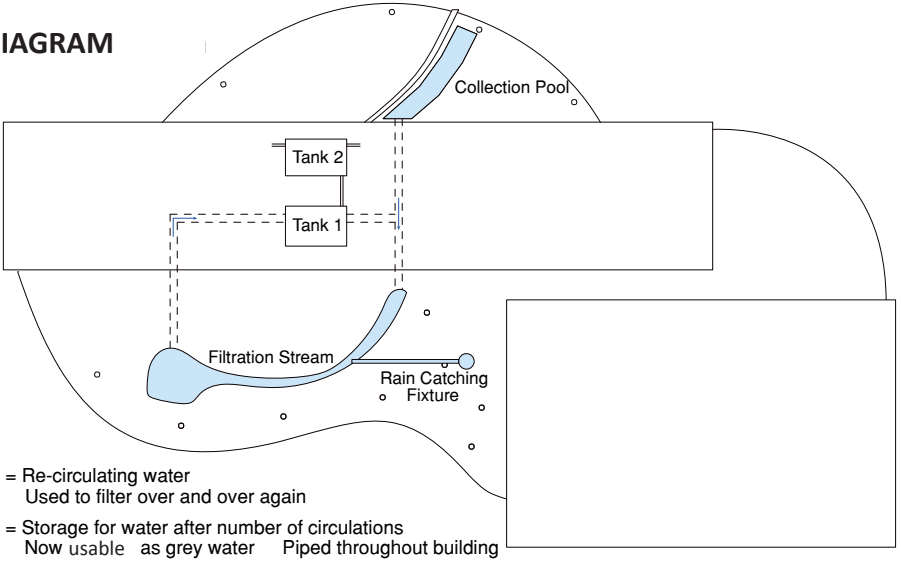
NORTH ELEVATION

SOUTH ELEVATION

WATER COLLECTION DIAGRAM



FILTRATION DIAGRAM



Tank 1 = Re-circulating water
Used to filter over and over again

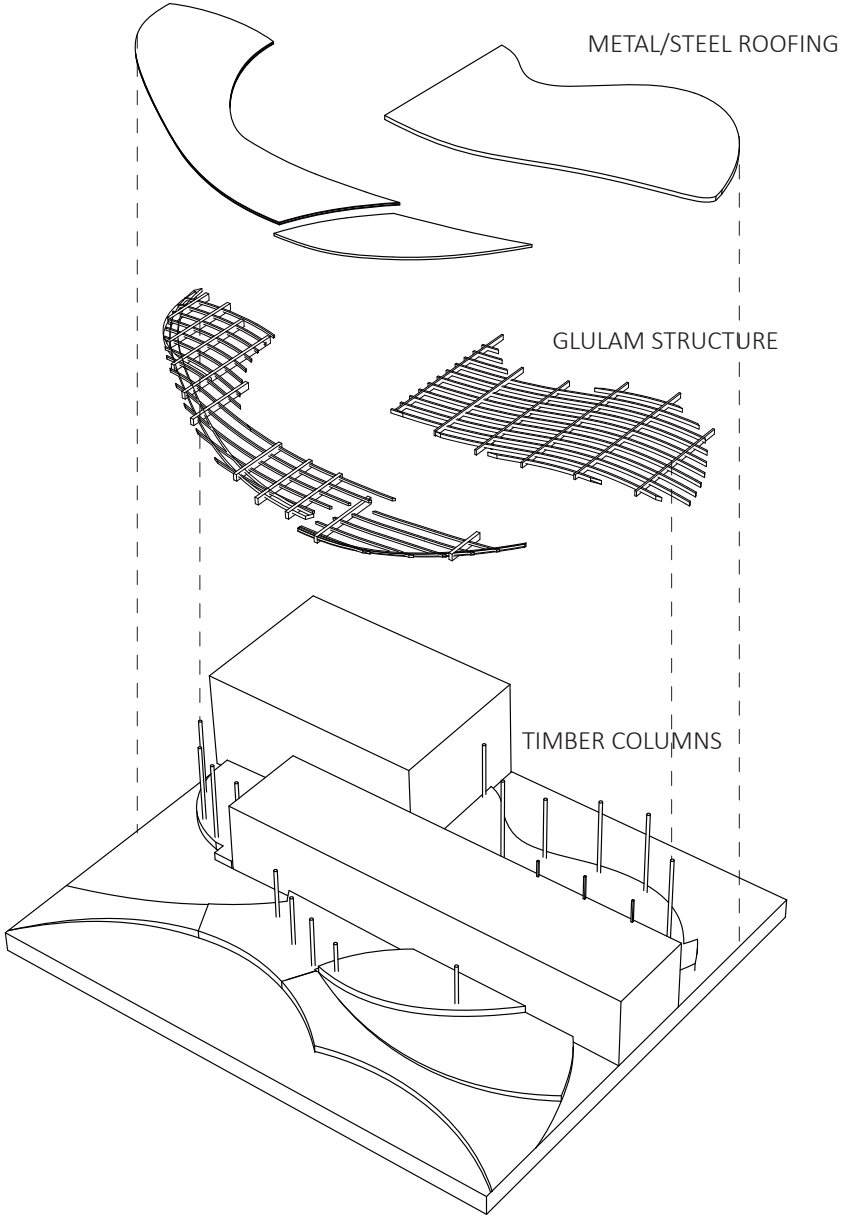
Tank 2 = Storage for water after number of circulations
Now usable as grey water Piped throughout building

Collection Pool = Water collected from all roofs Piped into filtration loop

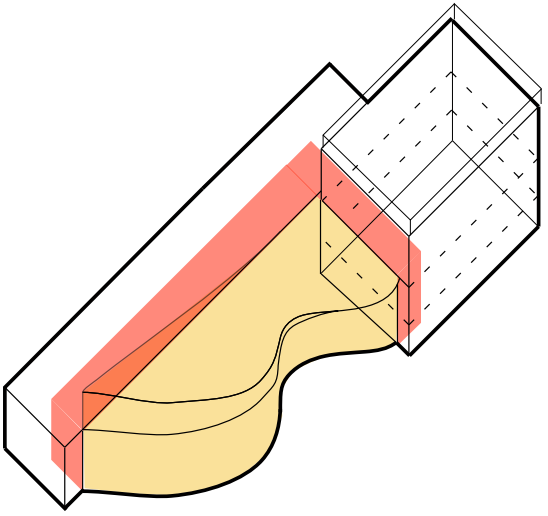
Filtration Stream = Area for water to circulate Purified by vegetation

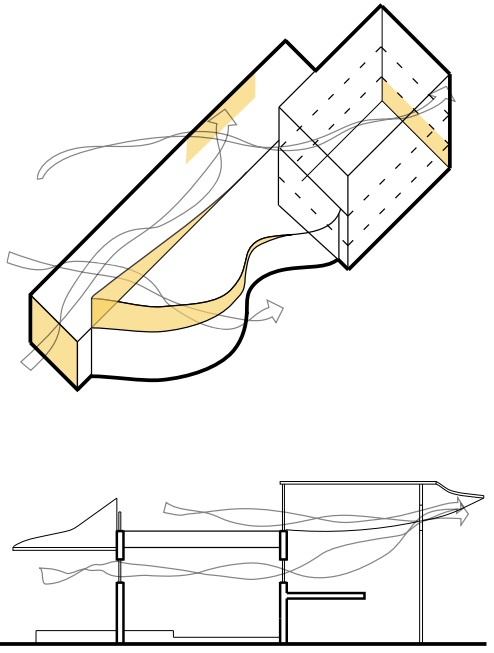
Rain Catcher = Artistic fixture designed to take water from the greenhouse roof and bring it into the greenhouse waterway

STRUCTURE AXONOMETRIC



PASSIVE SYSTEMS



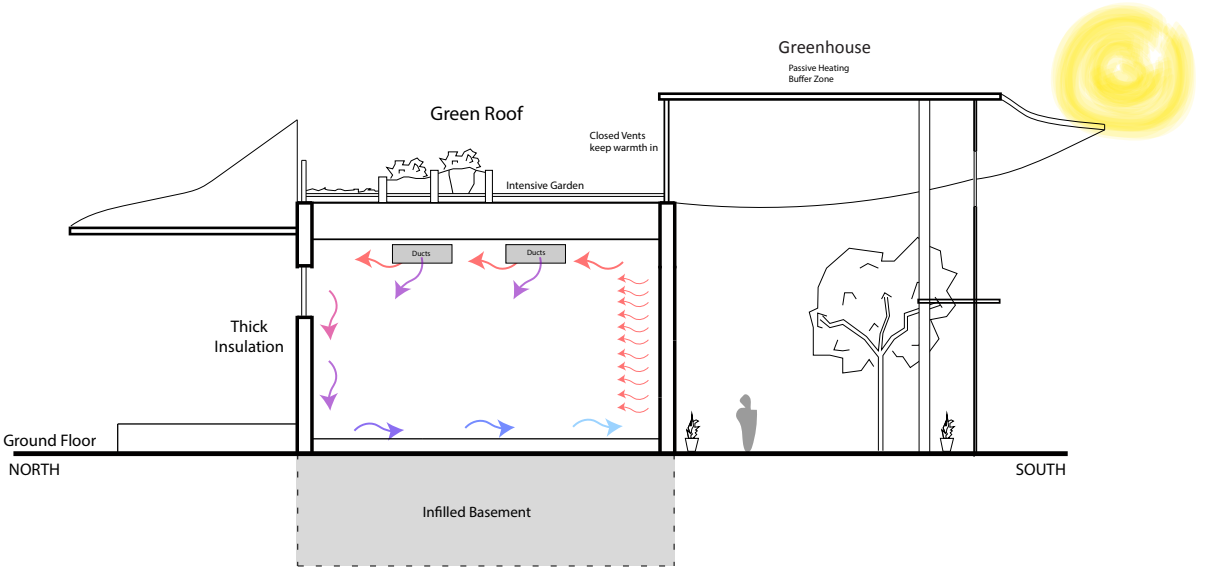


PASSIVE HEATING

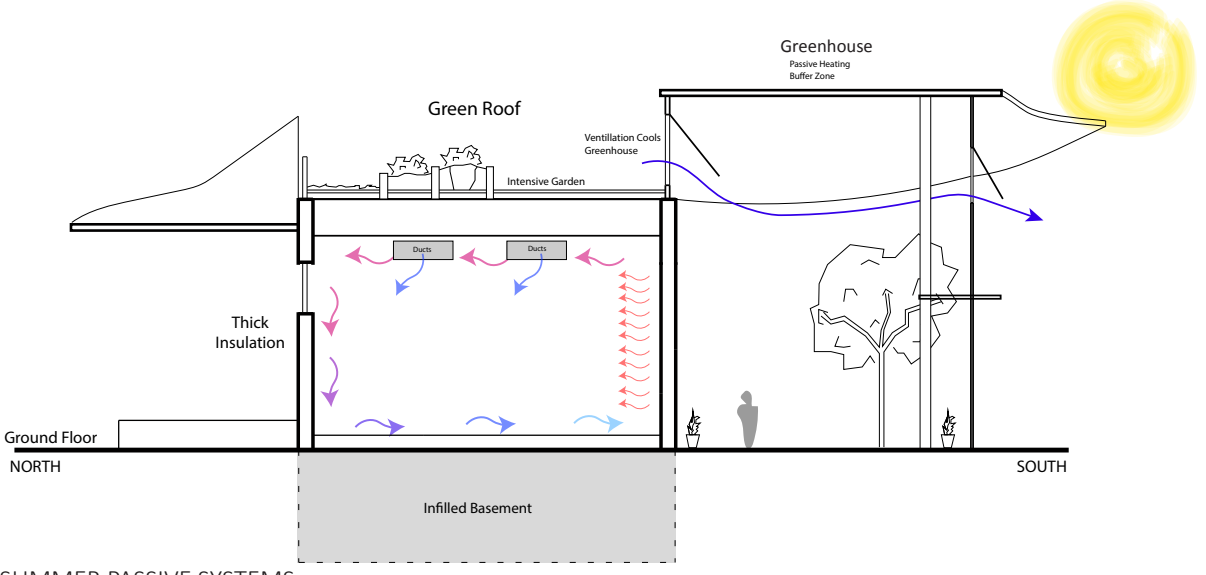
Works in tandem with HVAC system. Greenhouse reduces heating costs drastically.

CROSS-VENTILATION

Catch wind in greenhouse from west coming from river. Circulates through buildings.

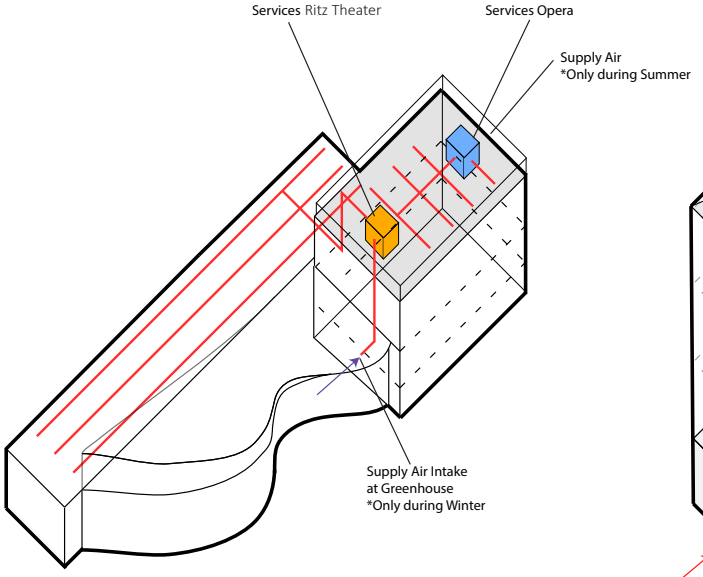


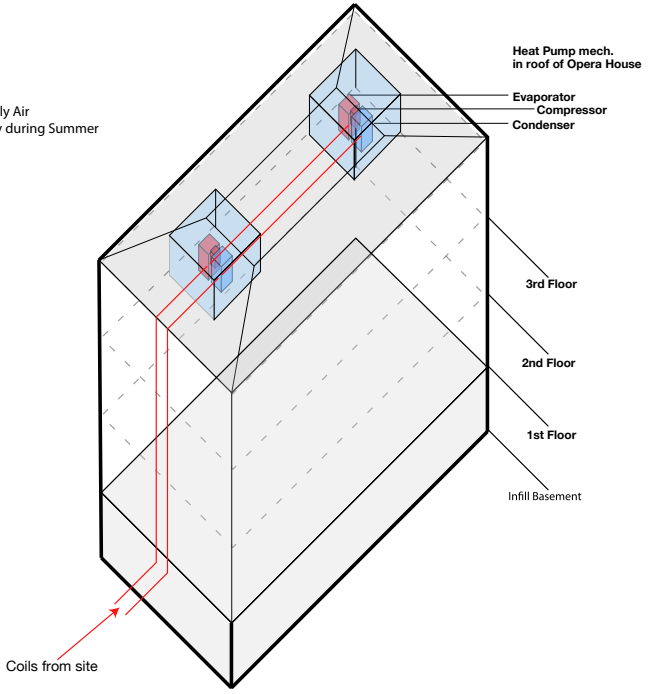
WINTER PASSIVE SYSTEMS



SUMMER PASSIVE SYSTEMS

MECHANICAL SYSTEMS



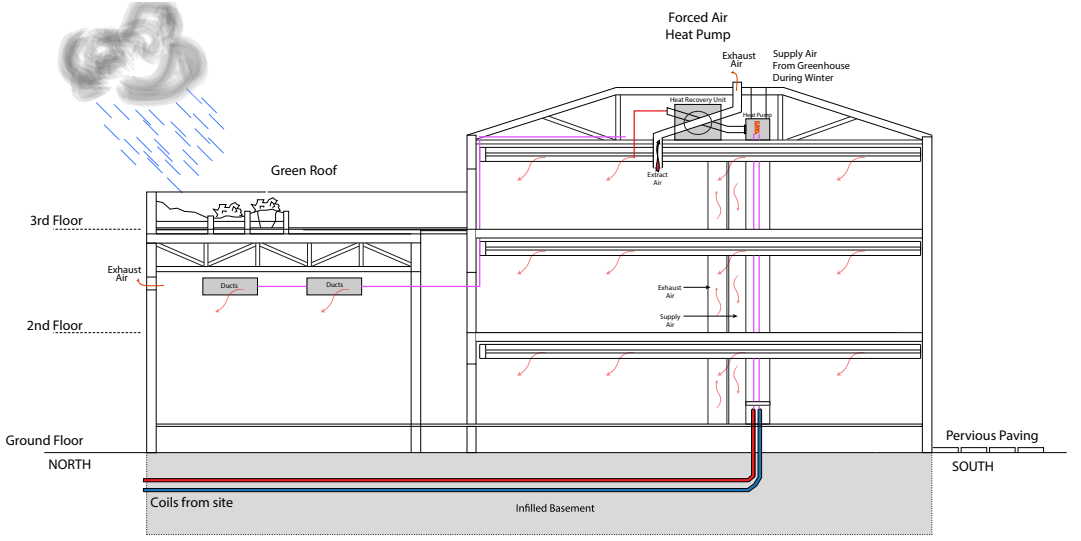


HVAC DUCT DISTRIBUTION

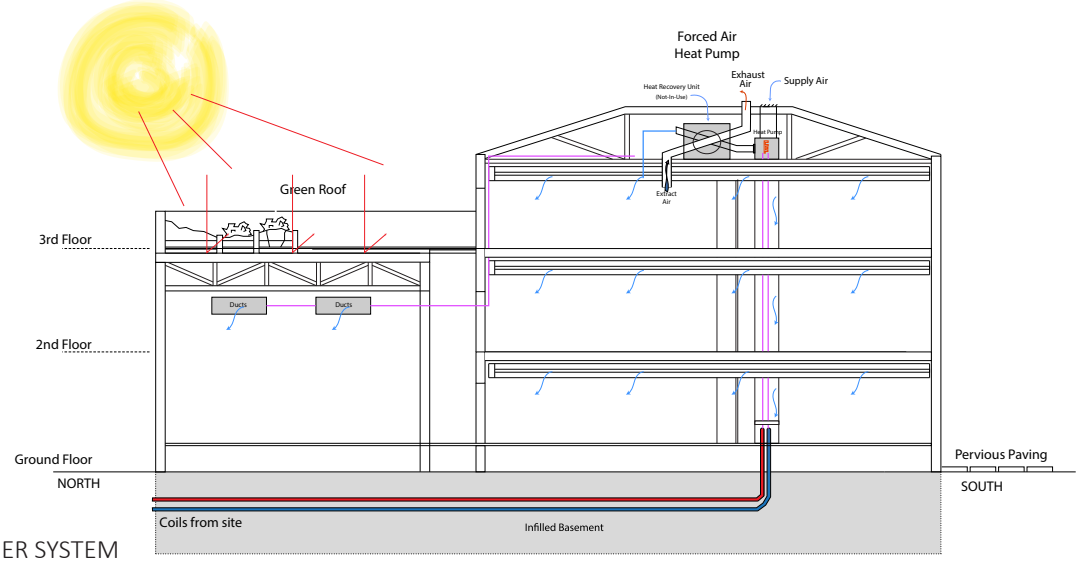
Uses attic of Opera House with 2 heat pump systems to distribute forced air

GEOTHERMAL HEAT PUMP

Uses entire site as source for coils

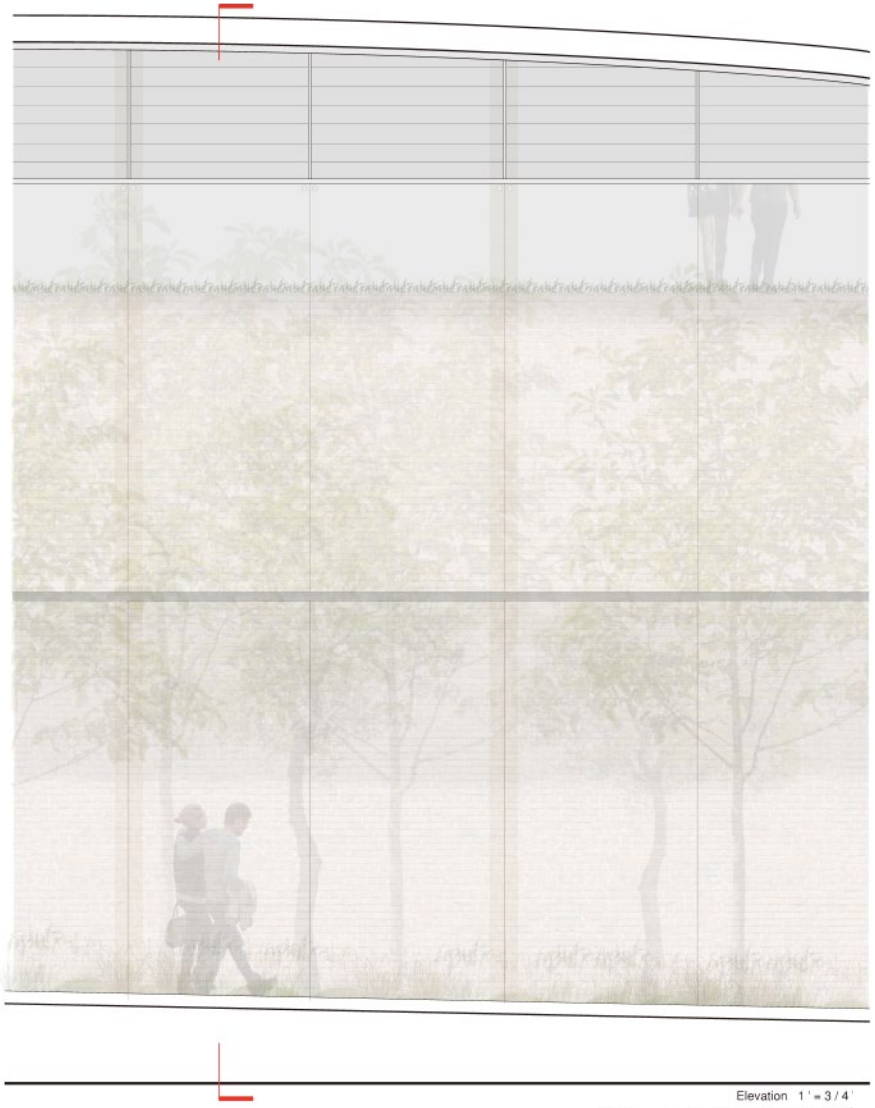


WINTER SYSTEM



SUMMER SYSTEM

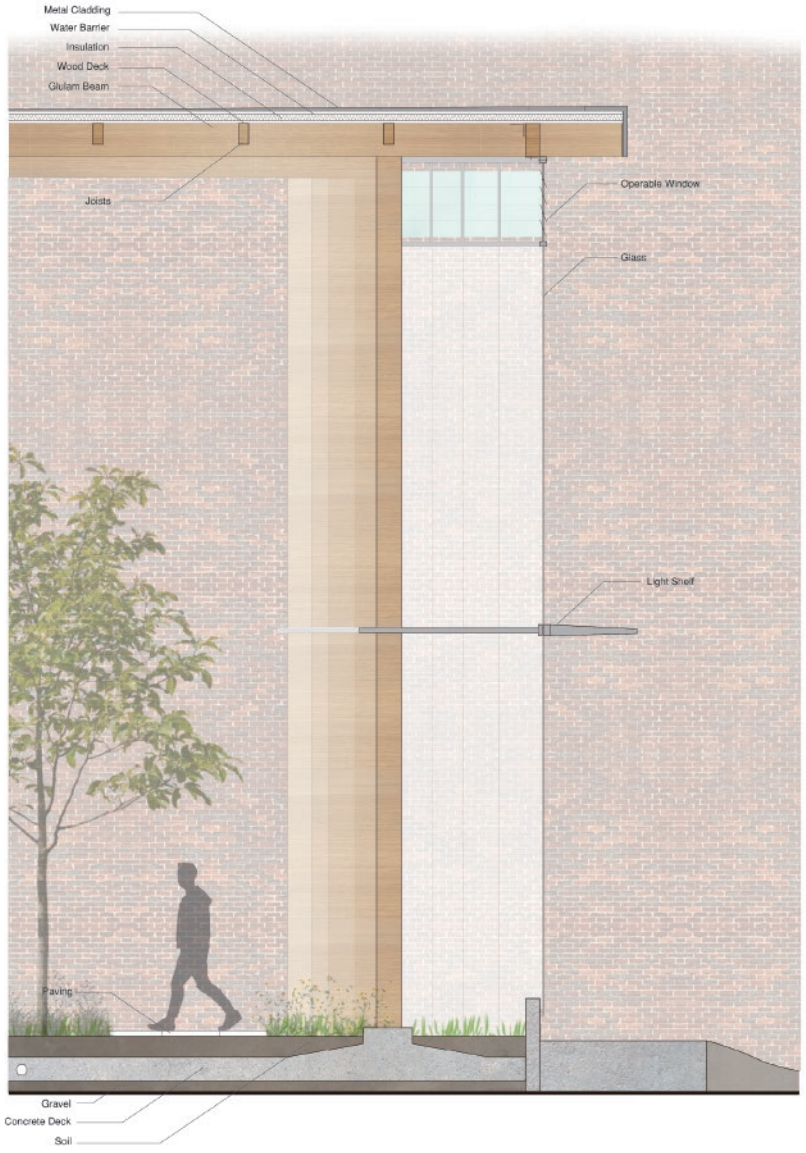
GREEN HOUSE WALL ELEVATION



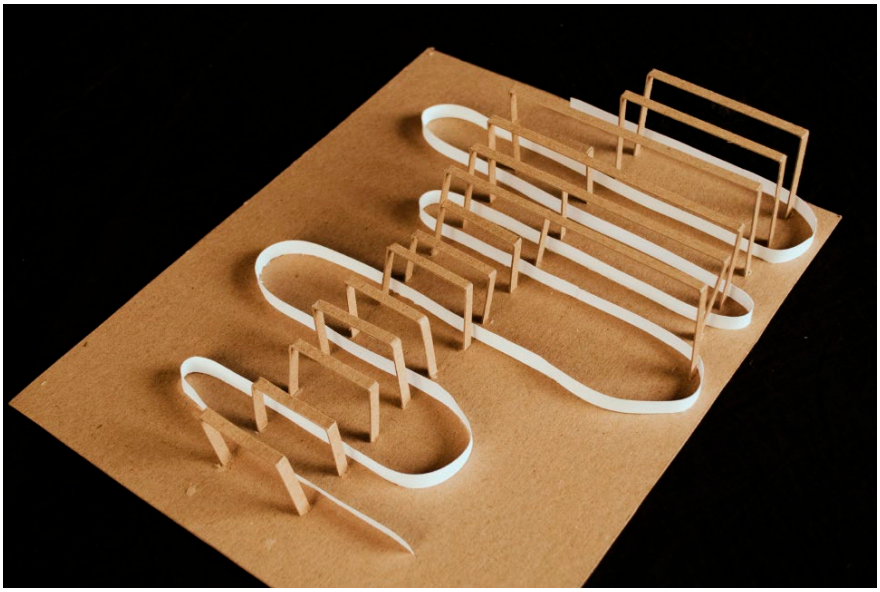
Elevation 1 ' = 3 / 4 '

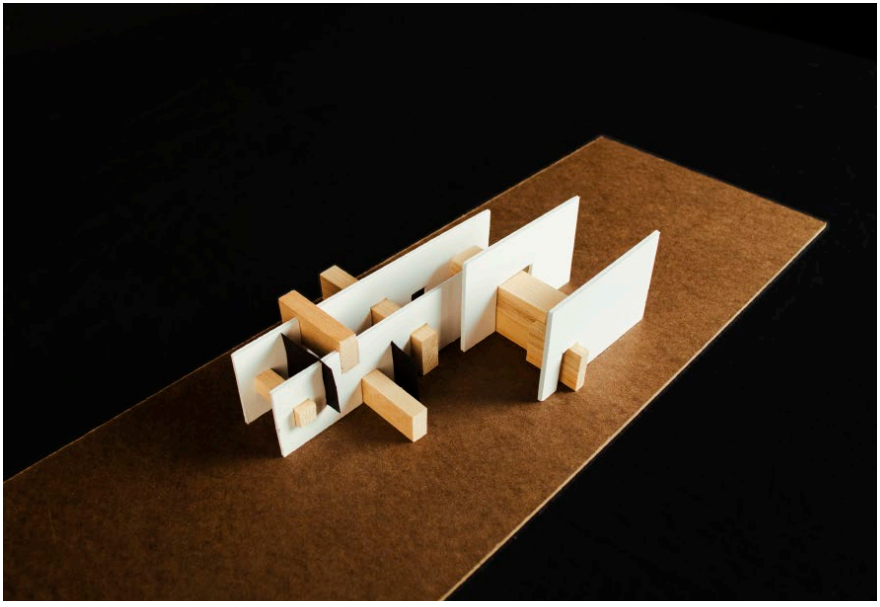
Key PLan

GREEN HOUSE WALL SECTION



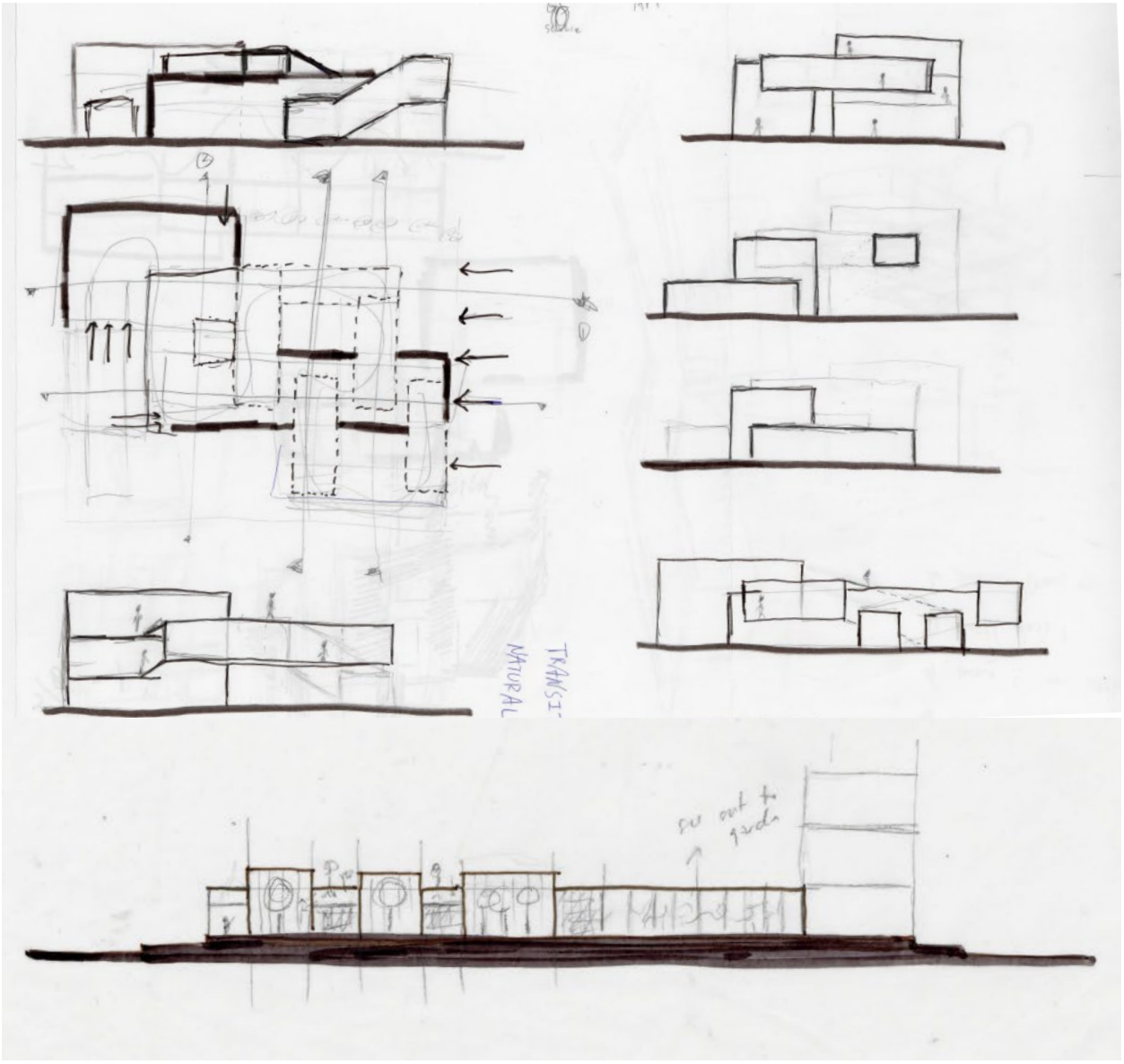
PROCESS MODEL PHOTOS

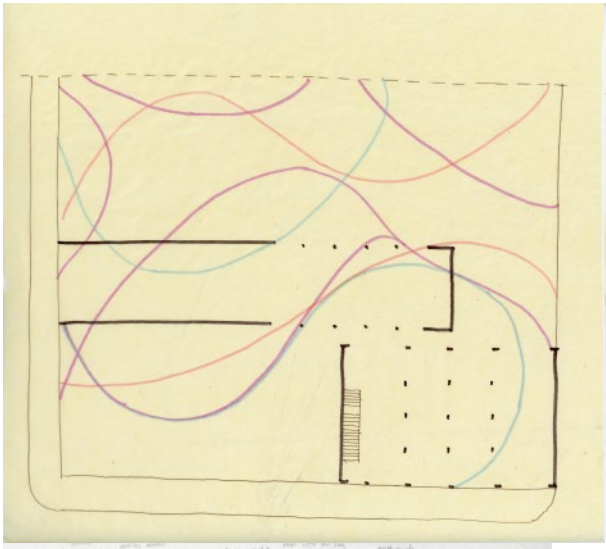


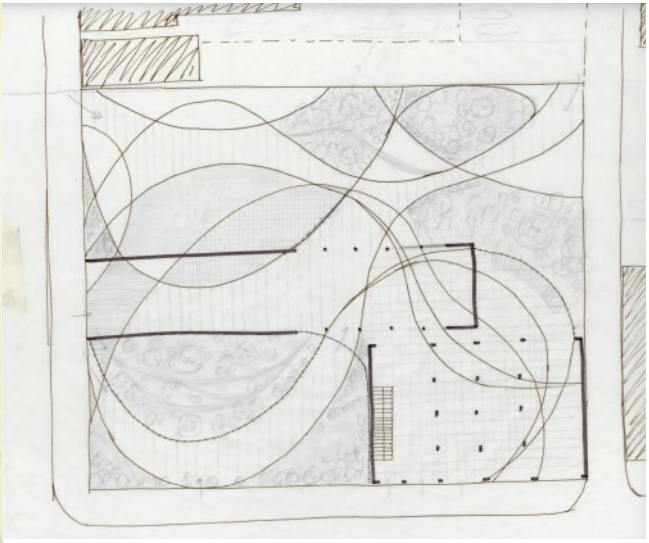


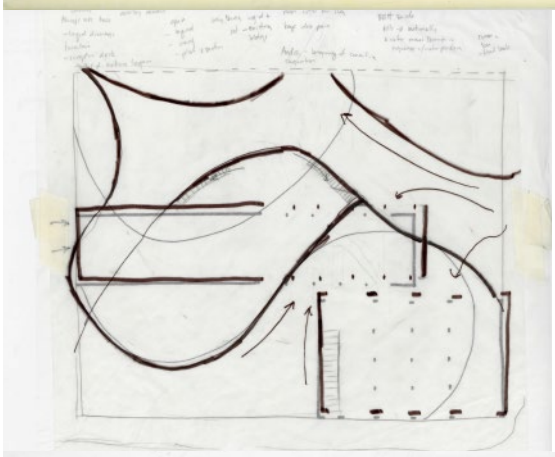
FINAL MODEL PHOTOS

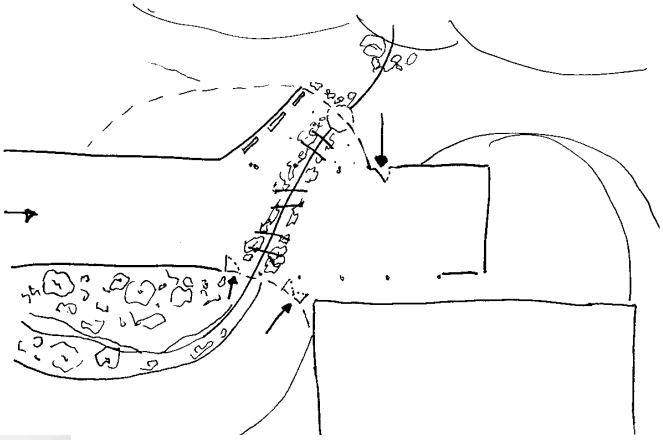
PROCESS SKETCHES

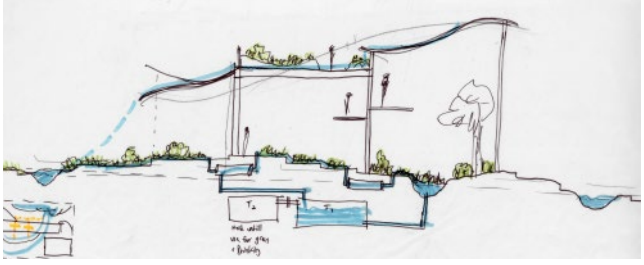












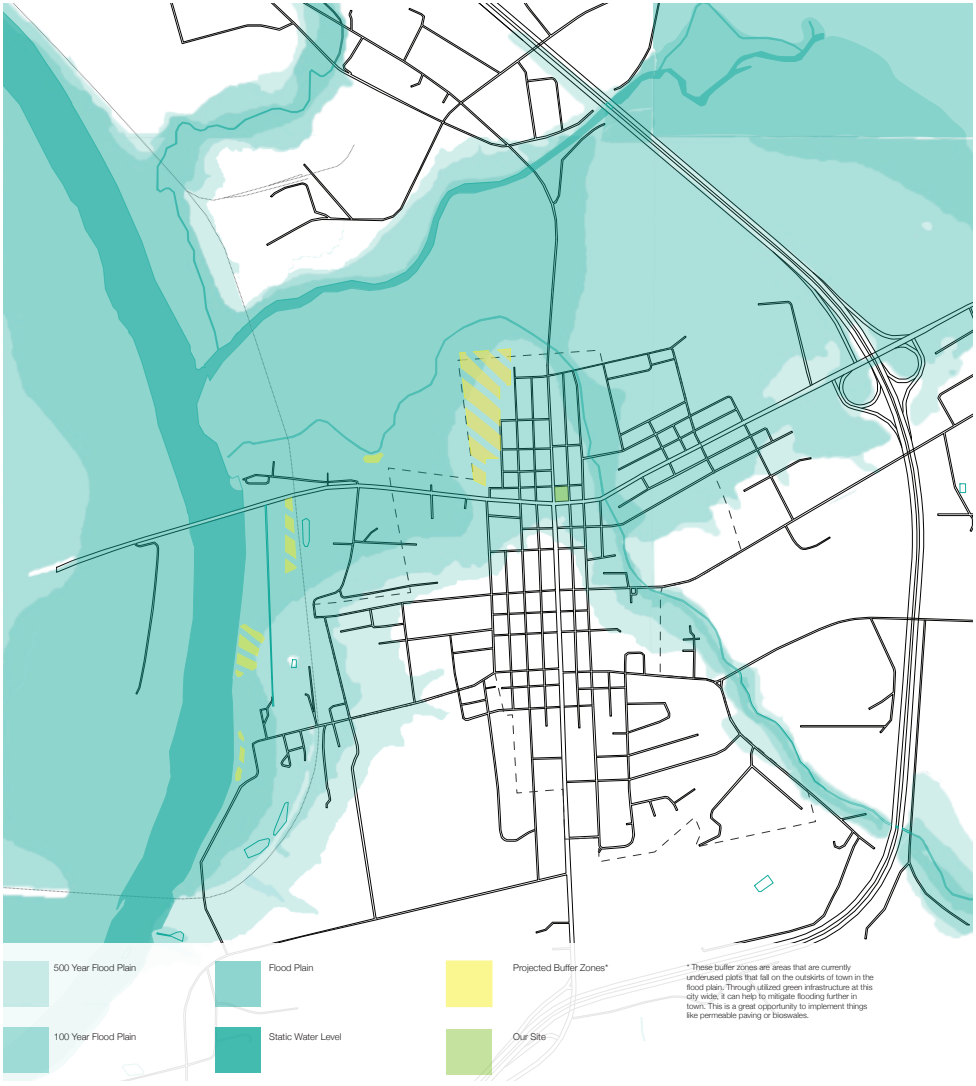
THE DESIGN HAS PROGRESSED THROUGH A NUMBER OF ITERATIONS, GOING FROM A LINEAR BOXY FORM, TO A CURVED AND FLOWING FORM.

INTERSECTION

Adelynn Rabold, Cristina DiFazio, Megan Shrout

Our project is meant to be a precedent for resiliency within Pennsylvania — an example of what can be done at both the building and community scale. At the building scale, the base floor height has been raised 18 inches to remove it from the 100 year flood plain. Additionally, all mechanical and sensitive program has been placed above the second floor. The site is sloped away from our building and works with the canopy to divert rainwater away from the building and into bio-retention zones. Our site also uses stormwater management techniques, such as permeable paving and bioswales, at a smaller scale to show strategies than can be implemented at a community scale as well. The canopy is meant to encourage exploration and learning, to bring the community and outside visitors in to learn about sustainability and resiliency within the Muncy Resilience Center of Excellence.

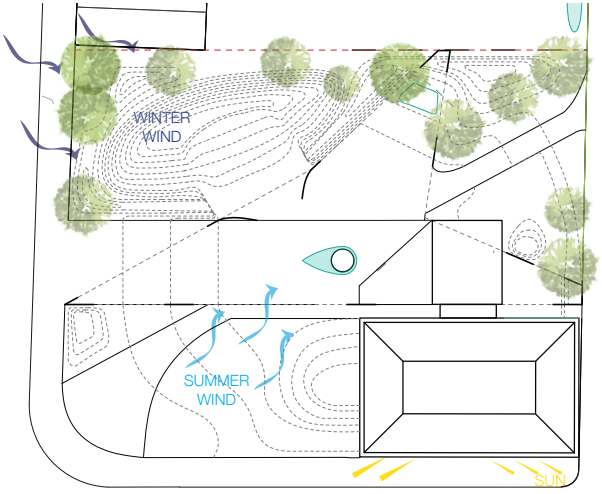
SITE: MUNCY, PA

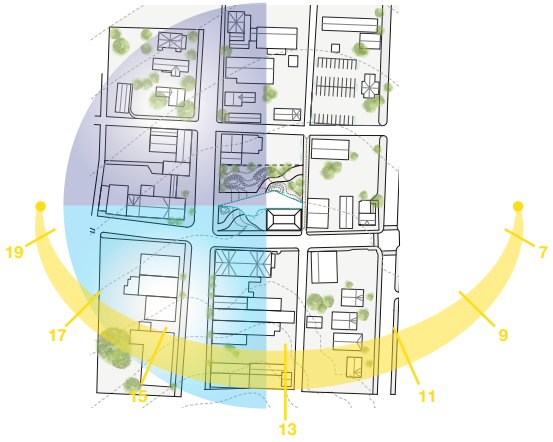


Flood Map of Muncy

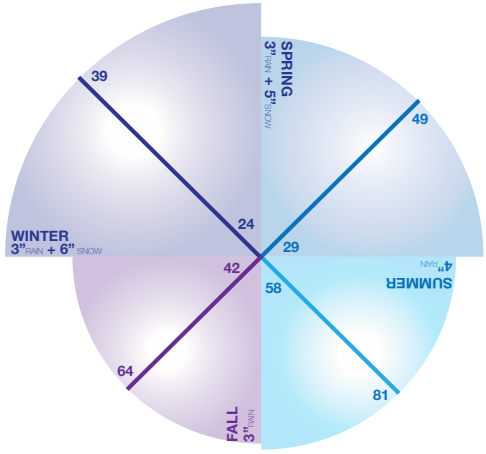
Our site falls in both the 100 year and 500 year flood plain.

WIND/SOLAR PLANNING





Wind/Solar Study of Site



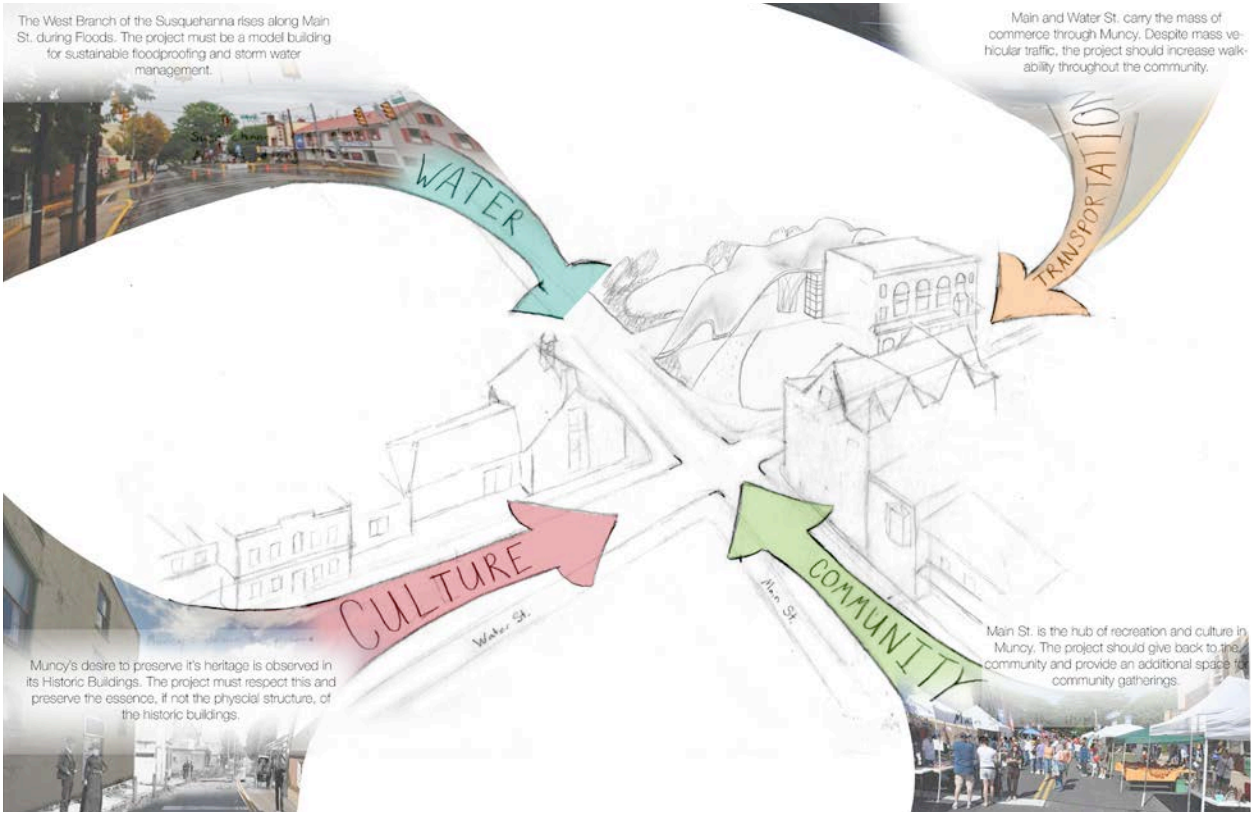
Average Temperature/Precipitation

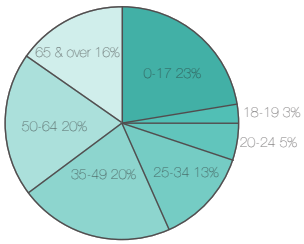
The winter wind is blocked by the trees, the raised mound, and the canopy on the site. The summer wind blows underneath the canopy across the site and through the existing opera house for cross ventilation. The sun path along the front of the opera house allows maximum daylighting in interior spaces.

EXISTING COMMUNITY CONDITIONS

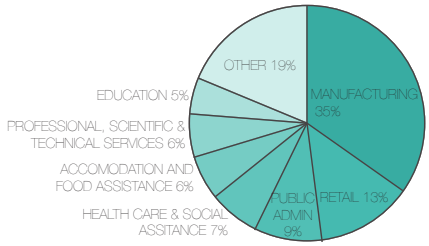
Contextual Analysis of Muncy

Our site lies in the heart of Muncy at not only the busiest traffic intersection, but the intersection of the historical and commercial districts.

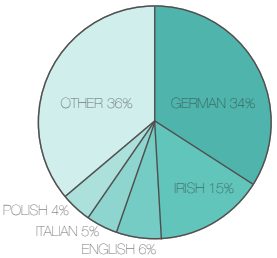




Age Demographics



Career Demographics



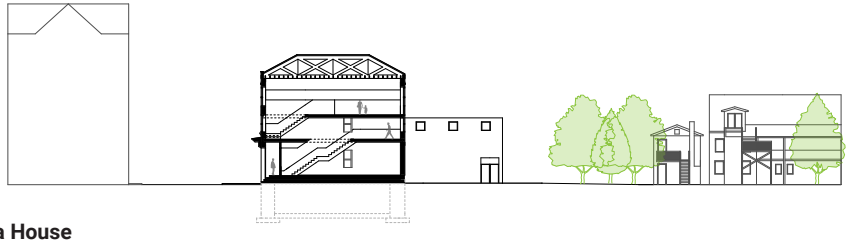
Ethnic Demographics

Our site lays in the heart of Muncy at the intersection of Main Street and Water Street. However, intersection describes more than just the junction of two streets. It is a meeting point. It is where commercial district meets historic district. It is where the community gathers. It is where old meets new.

EXISTING SITE CONDITIONS

Existing Site Plan

Main Street View A



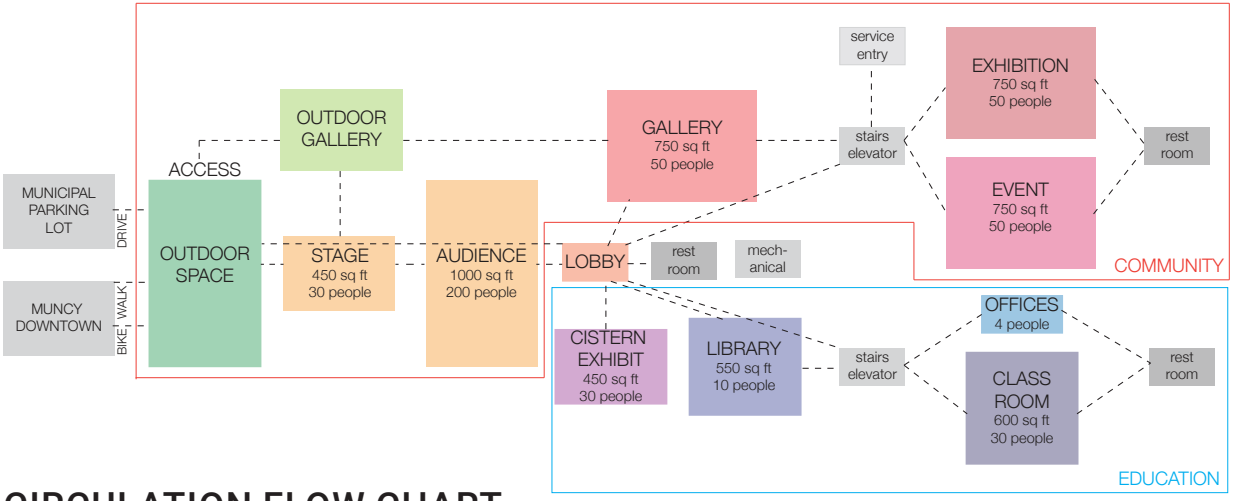
Section 1 Through Opera House

Water Street View B

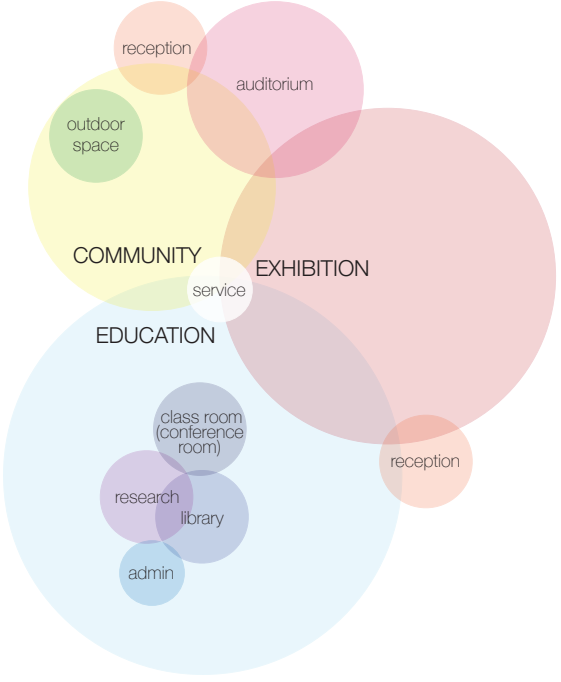
Section 2 Through Opera House

The two existing structures on the site are the historic opera house and the vintage Ritz Theater. Preservation and restoration of the opera house is required, while only the marquis of the Ritz must be preserved. Between the two buildings is a brownfield where an auto parts store used to sit, and behind, there is an existing parking lot.

PROGRAM

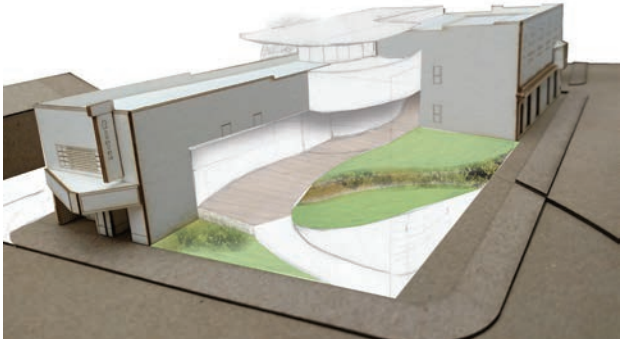


CIRCULATION FLOW CHART

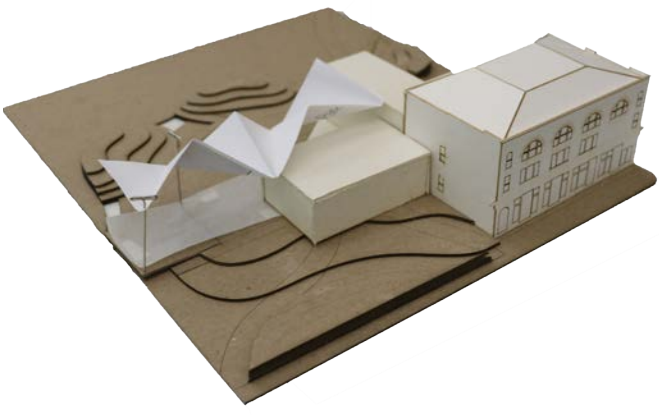


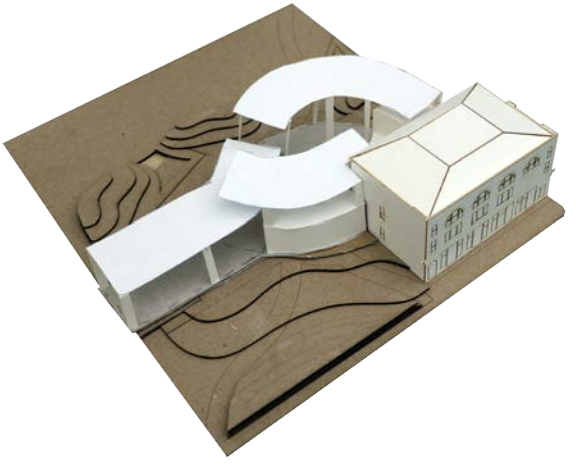
Our program is oriented around two distinct user groups, the community and the educators. Programmatically, we have created three main groups — education, exhibition, and community — but the proposed center provides the intersection point for all three. By providing flexible spaces within, we can create a classroom that can also serve as a conference room or workshop space. We can create an exhibition space for use by on-site researchers or community historians. It is this same flexibility that will allow our Center of Excellence to adapt to different communities.

CONCEPT DEVELOPMENT



Many of the early iterations of the project centered around keeping the Ritz Theater and the opera house, and adding an annex to the back between the two buildings. Large consideration was also given as to how to manipulate the landscape and open up the site to create an outdoor stage for the community.

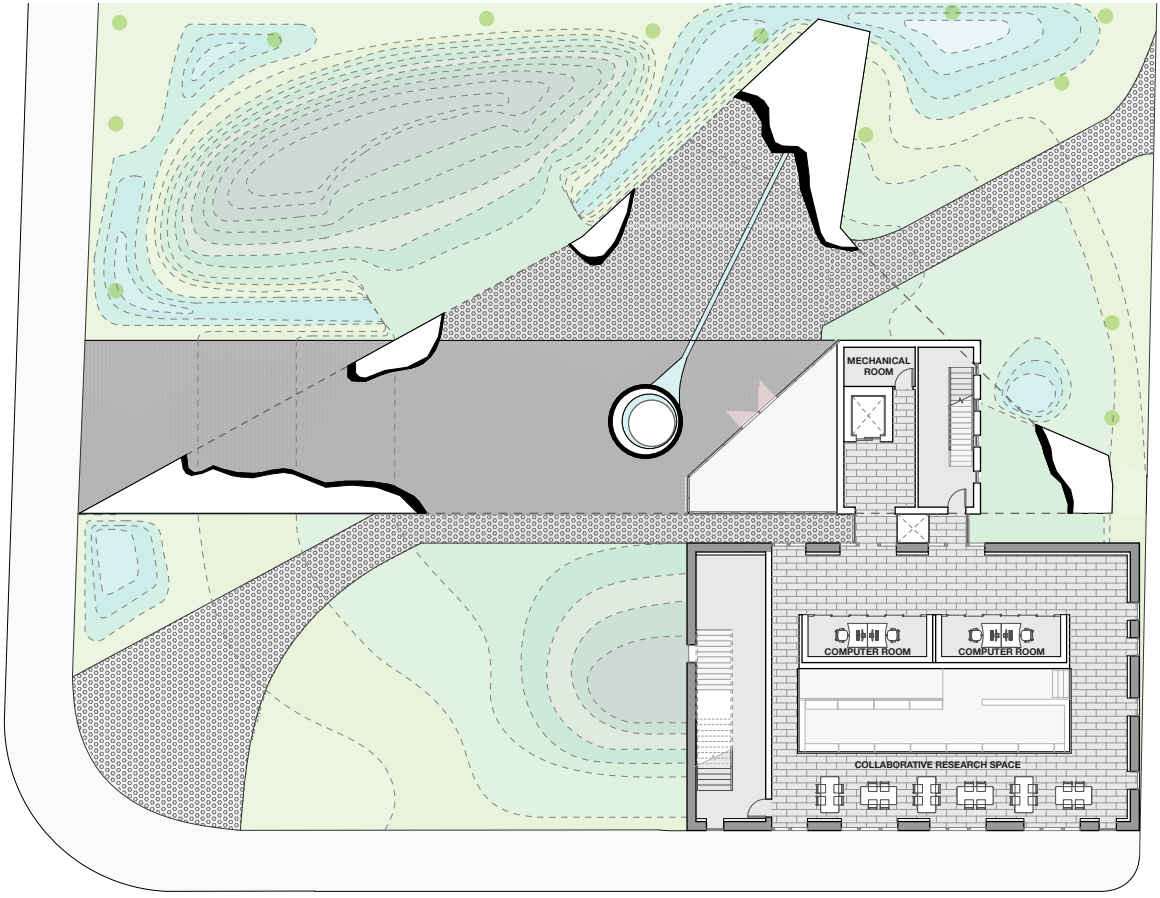




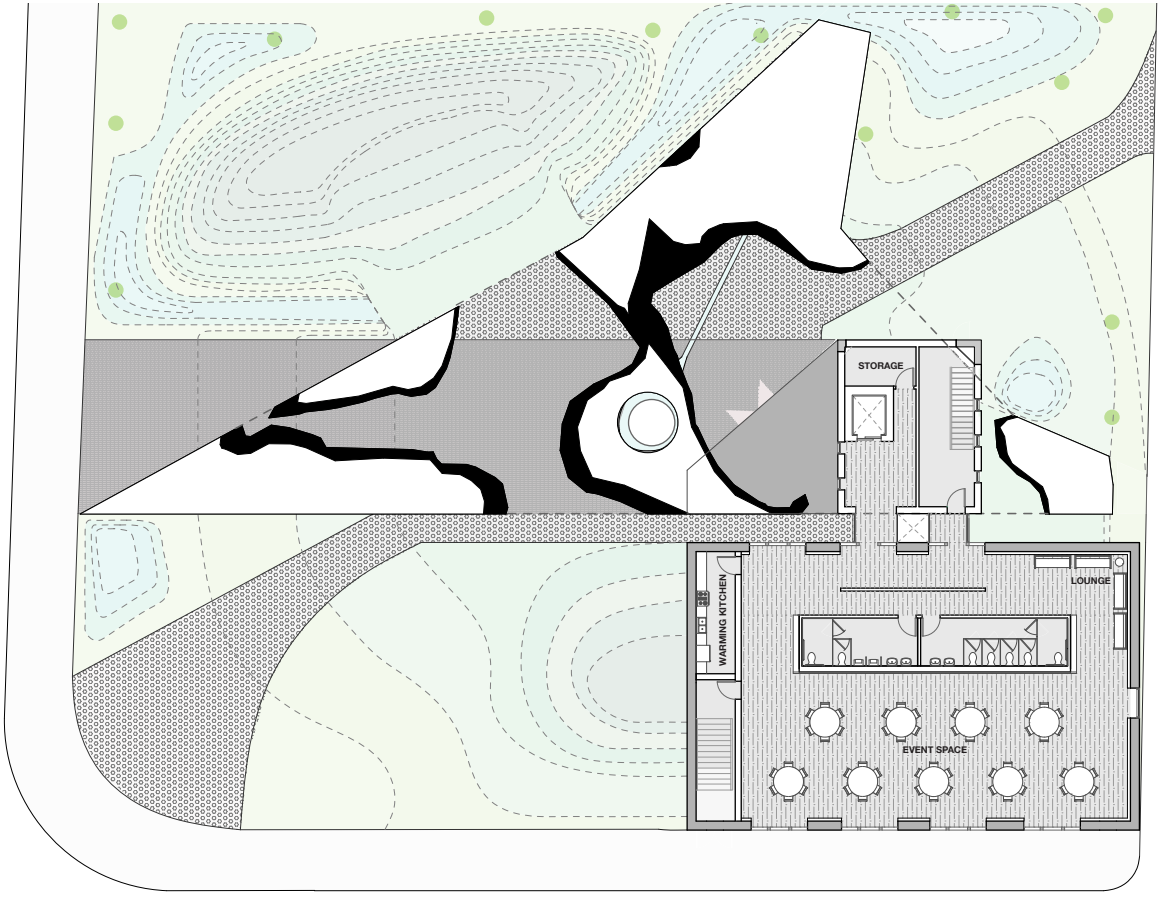
As the project progressed, the decision was made to remove the Ritz Theater and preserve the memory of the theater with a new modern marquis, in the form of a canopy.

Proposed Site Plan

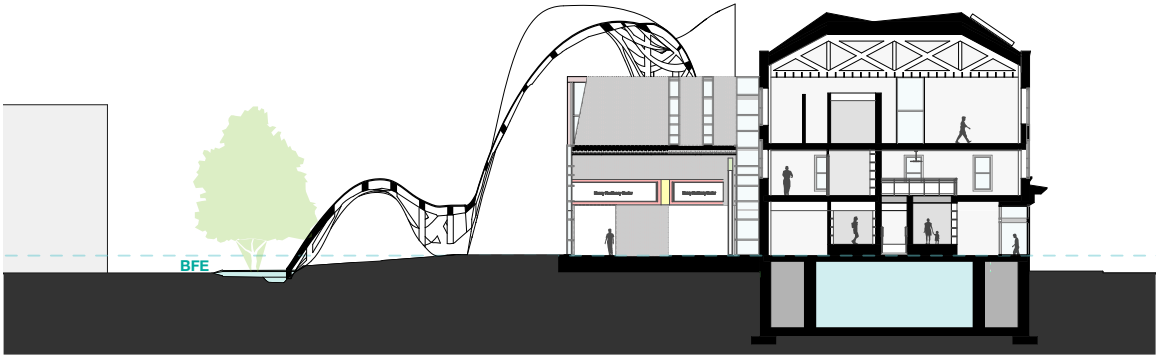
First-Floor Plan



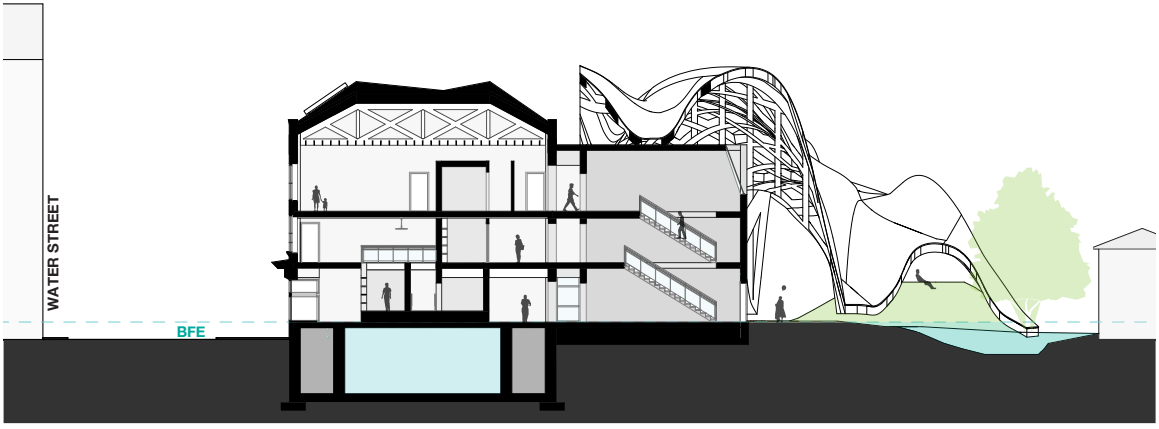
Second-Floor Plan



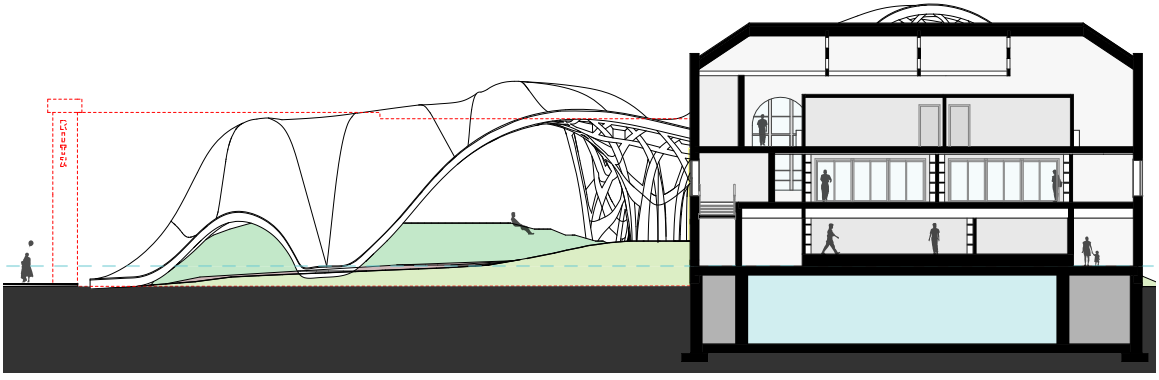
Third-Floor Plan



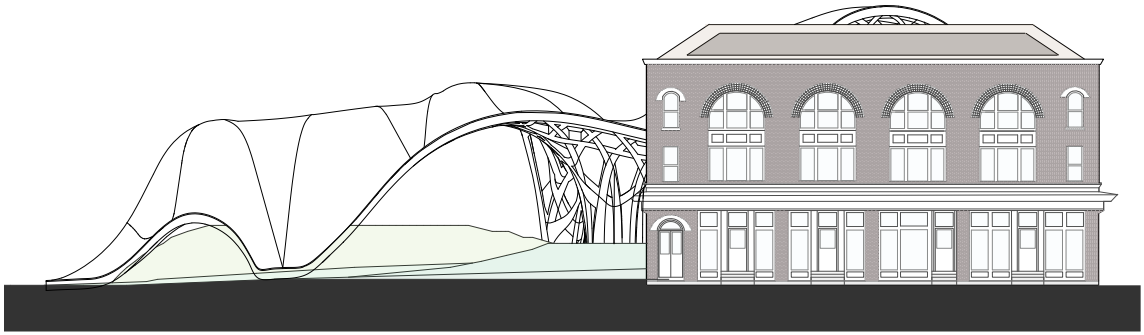
Section 1



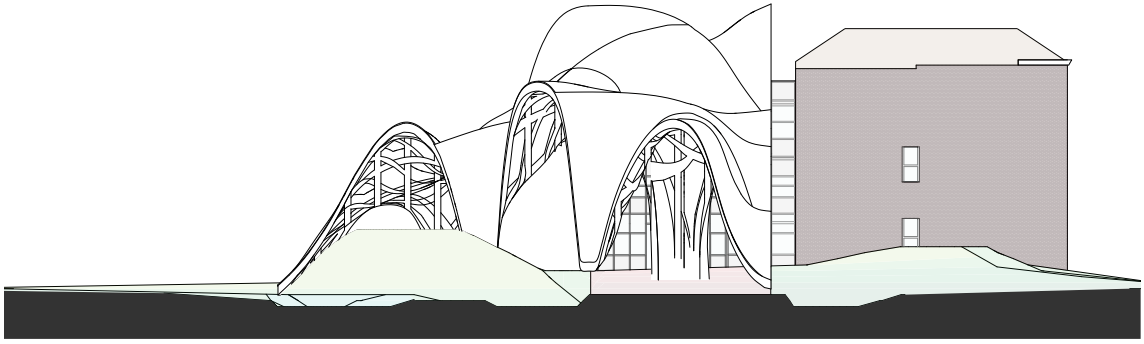
Section 2



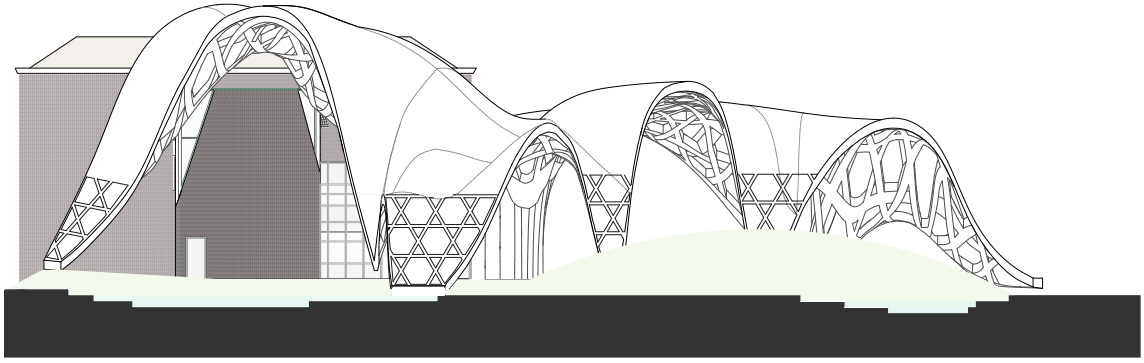
Section 3



South Elevation



West Elevation

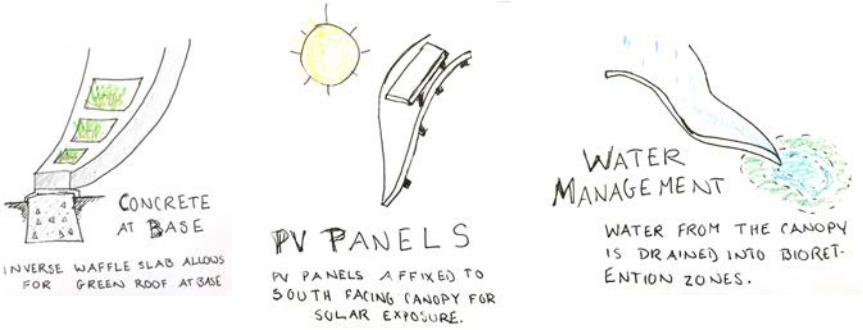


North Elevation

This is a view looking from the Main Street approach to our site.

This is a view looking down from the top of our audience mound towards the stage.

At night the canopy is lit from below and becomes a beacon of resiliency to the community. It becomes the end destination of various street fairs and community gatherings, where people can come to listen to music or simply to mingle.



From the start, it was hoped the canopy could serve as more than an architectural, aesthetic feature, but hold a functional purpose as well to enhance the site's resiliency.

First-Floor Perspective

Third-Floor Perspective

ARCH 480 ASSIGNMENTS

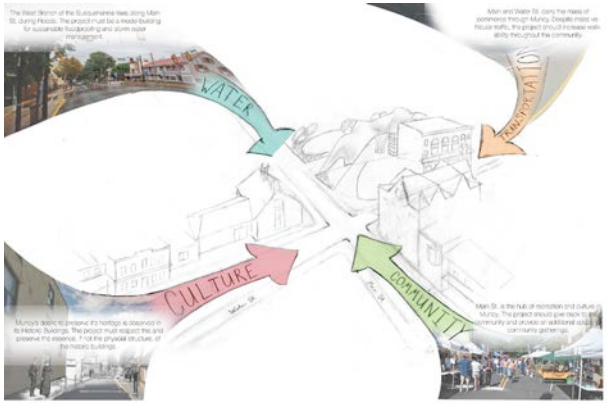
A-1 Context

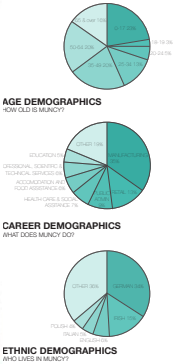
This assignment focused on researching Muncy as a community. Evaluating the existing architecture and figuring out who made up the community were key components.

WATER STREET
VIEW B

HEART OF MUNCY
SCALE 1/512" = 1'-0"

CONNECTING MUNCY
SCALE 1/512" = 1'-0"

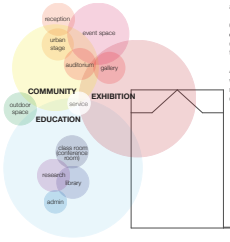




CONTEXT

M. SHROUT, C. DIFAZIO, & A. RABOLD

MAIN STREET
VIEW A

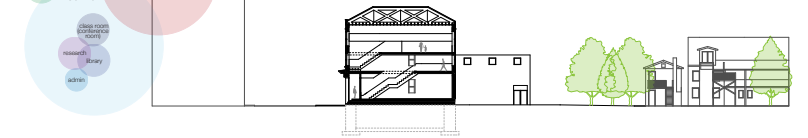


PROGRAM DIAGRAM

Our site lays in the **heart of Muncy** on the intersection of Main Street and Water Street. However, **intersection** describes more than just the junction of two streets. It is a meeting point. It is where commercial district meets historic district. It is where the community gathers. It is where **old meets new**.

Our program is oriented around two distinct user groups, **the community** and **the educators**. Programmatically, we have created three main groups, **education**, **exhibition**, and **community**, but the **proposed center provides the intersection point for all three**. By providing flexible spaces within, we can create a classroom that can also serve as a conference room or workshop space. We can create an exhibition space for use by on-site researchers or community historians. It is this same flexibility that will allow our Center of Excellence to adapt to different communities.

As living proof of **resiliency**, the **existing structures will be floodproofed and reused** to maintain the history of Muncy, while a new circulation and **service core** will be added to provide new mechanical systems and increased accessibility. A sculptural **canopy** will also be added to house outdoor programs, facilitate rainwater management, and support solar panels. Phytoremidiation and bioretion techniques will be implemented to help remediate the existing brown field. Our site will also use examples of **storm water management**, like permeable paving, to show systems that can be utilized at a larger **community scale**.



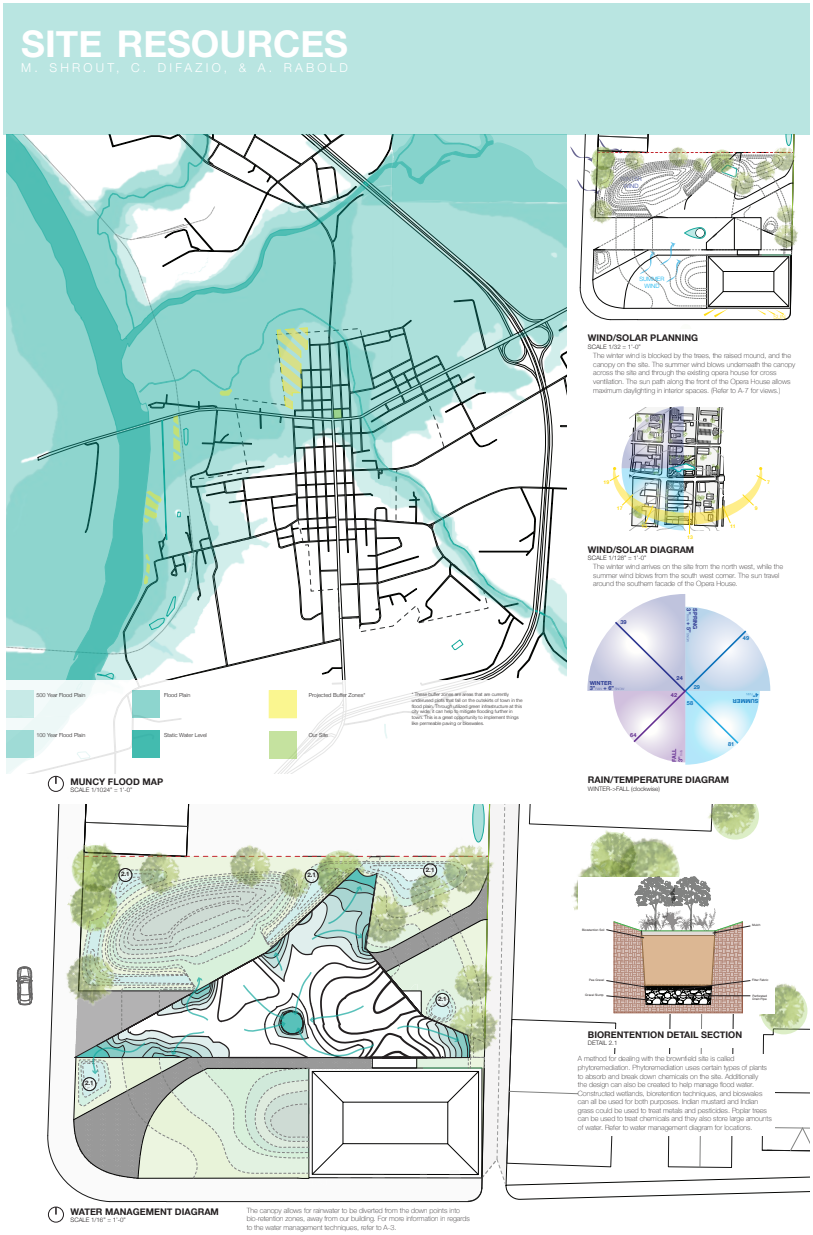
EXISTING SITE SECTION 1
SCALE 1/16" = 1'-0"

EXISTING SITE SECTION 2
SCALE 1/16" = 1'-0"

EXISTING SITE PLAN
SCALE 1/32" = 1'-0"

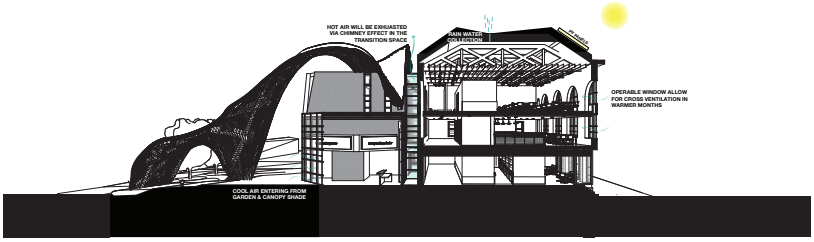
A-2 Site Resources

This assignment focused on researching the natural features of Muncy, such as the wind, rain, and sun, and how they affect the site.



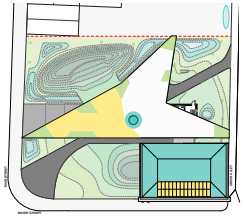
ENERGY

M. SHROUT, C. DIFAZIO, & A. RABOLD



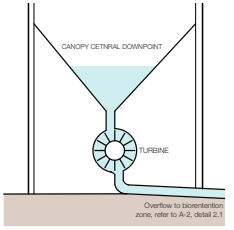
PASSIVE SYSTEM SECTION
SCALE 1/8" = 1'-0"

As shown on A-2, there is a summer wind from the south west that can be used to cross ventilate the spaces to help with cooling. Through the use of operable windows and an open floor plan, the breeze will be able to carry across to the catwalks and atrium space between new and old building. The atrium allows the warm air to rise and exit the space. Air will also be brought in through the lobby, that has been naturally cooled by the garden and shade of the canopy.



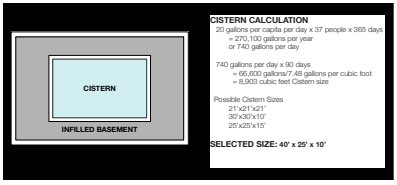
The roof and canopy will feature a combination blue and green roof with combination solar panels and solar collectors. The green roof will help to keep the canopy and spaces below cool. The solar panels will drain rainwater down into the blue roof. All solar panels will be oriented to the southern sun. See diagrams to right for conceptual sketches of systems. Refer to A-2 for solar chart for panel orientation.

SOLAR/BLUE/GREEN ROOF DIAGRAM
SCALE 1/16" = 1'-0"

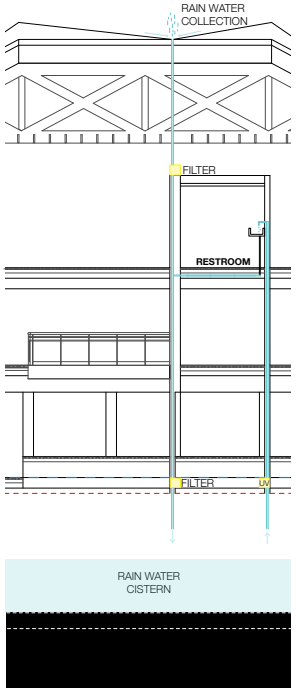


Rainwater will be collected from the canopy at the down points and diverted to bioretention zones, refer to A-2 detail 2.1. The central down point, closest to the main entrance, will contain a turbine to collect energy for a back-up generator, to be used in emergency situations. The turbine will capitalize on the use of gravity and velocity to create greater energy. Overflow water will be diverted down a "stream" to a bioretention zone.

CISTERN WATER COLLECTION
DETAIL 3.1 SCALE 1/2"=1'-0"



CISTERN LOCATION PLAN
SCALE 1/16" = 1'-0"



GRAY + RAIN WATER RECYCLING
SCALE 3/8" = 1'-0"

A-3 Energy

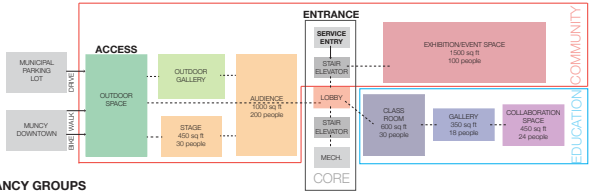
This assignment focused on the passive energy systems that would be utilized in the design based on the research from A-2. The largest part of the passive system is related to the collection of rainwater into the cistern in the basement of the opera house. Natural daylighting and natural ventilation are also utilized in the passive strategies.

A-4 Circulation

This assignment focused on the circulation of our program, both interior and exterior. After a conceptual circulation scheme, fire safety and accessibility were then added in and considered.

CIRCULATION

M. SHROUT, C. DIFAZIO, & A. RABOLD



OCCUPANCY GROUPS

ASSEMBLY GROUP A3: lobby in the new addition, the exhibit and event space on the third floor of the opera house, the gallery space on the first floor of the opera house, and the computer rooms and the collaboration space on the second floor of the opera house.

EDUCATIONAL GROUP E: the classroom space on the first floor of the opera house.

OCCUPANT LOAD

Lobby: 20 people at 15 sq. ft. per person (net)
Event space : 50 people at 15 sq. ft. per person (net)
Exhibit: 50 people at 15 sq. ft. per person (net)
Collaboration space: 24 people at 15 sq. ft. per person (net)
Computer rooms: 4 people at 15 sq. ft. per person (net)
Classroom: 16 people at 20 sq. ft. per person (net)
Gallery: 20 people at 15 sq. ft. per person (net)

TOTALS

First Floor Addition – 20 people, 300 sq. ft.
First Floor Opera House – 36 People, 620 sq. ft.
Second Floor Mezzanine Opera House – 28 people, 420 sq. ft.
Third Floor Opera House – 100 people, 1,500 sq. ft.

NOTES:

STAIR WIDTHS: 100 people x 0.3in = 30 in, 2' 6" minimum, 48", **4' for accessible**
DOOR WIDTH: 32" minimum

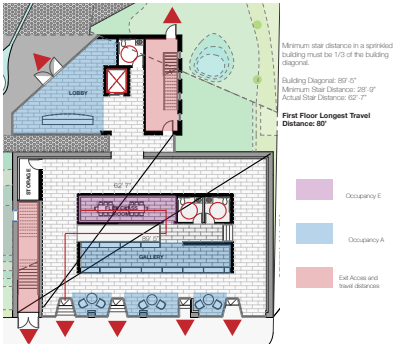
Occupant load is over 49 so there must be **two fire stairs**

Stair distance must be half or 1/3 of the building diagonal based on non sprinklered or sprinklered, maximum distance depends on exit access travel distances

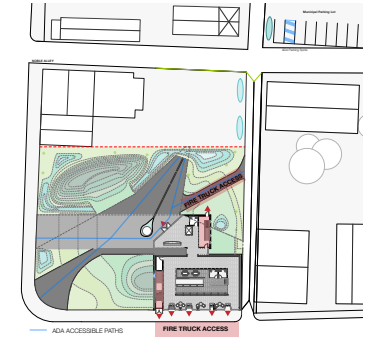
Occupancies A and E maximum travel **distance of 150 feet non-sprinkler, 200 feet sprinkler.**

CONSTRUCTION TYPE

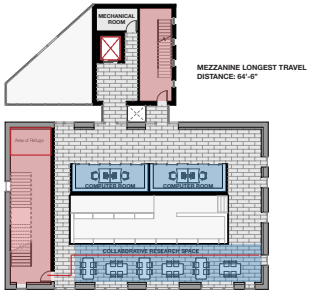
TYPE IV: exterior walls are made of non-combustible materials, interior elements are made of solid or laminated wood without concealed spaces.



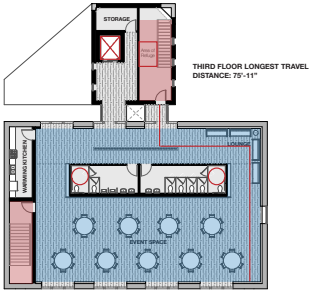
FIRST FLOOR EGRESS
SCALE 3/32" = 1'-0"



SITE EGRESS
SCALE 1/32" = 1'-0"



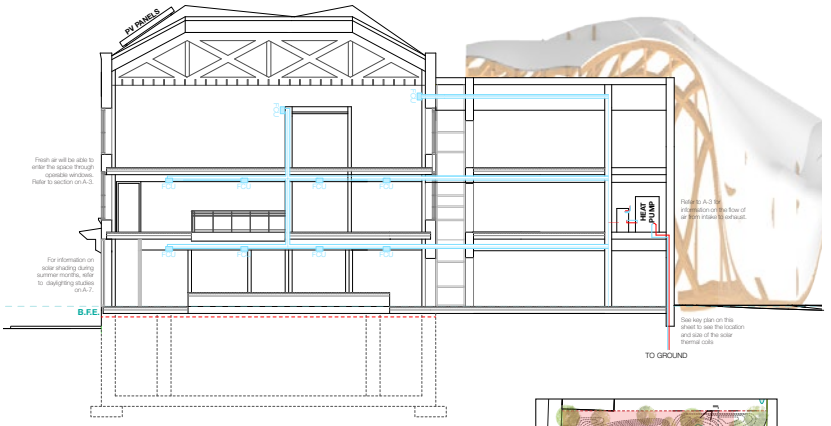
SECOND FLOOR EGRESS
SCALE 3/32" = 1'-0"



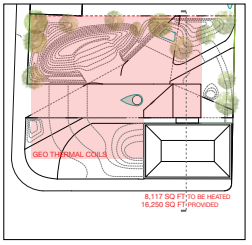
THIRD FLOOR EGRESS
SCALE 3/32" = 1'-0"

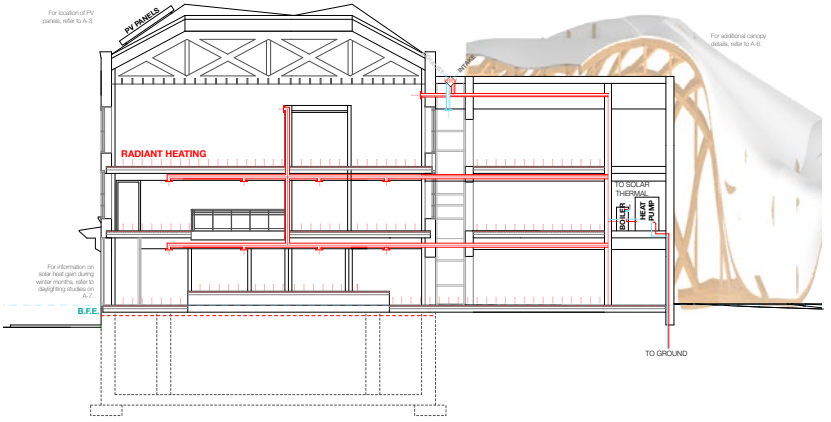
HVAC

M. SHROUT, C. DIFAZIO, & A. RABOLD



HVAC SECTION 1: SUMMER
SCALE 3/16" = 1'-0"





HVAC SECTION 1: WINTER
SCALE 3/16" = 1'-0"

A-5 HVAC

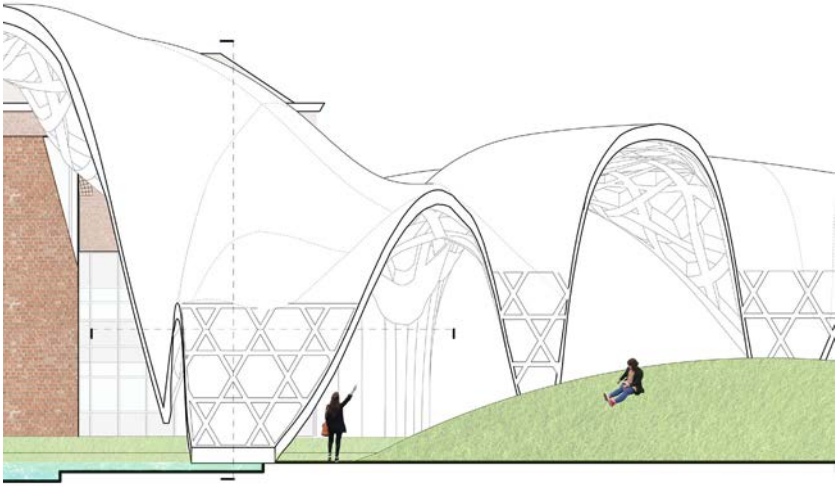
This assignment focused on the active energy systems that would be installed in our building to make it comfortable and efficient. The project utilizes geo-thermal coils along with radiant heating and fan coil units. Photovoltaic panels are also placed to help with providing energy.

A-6 Envelope

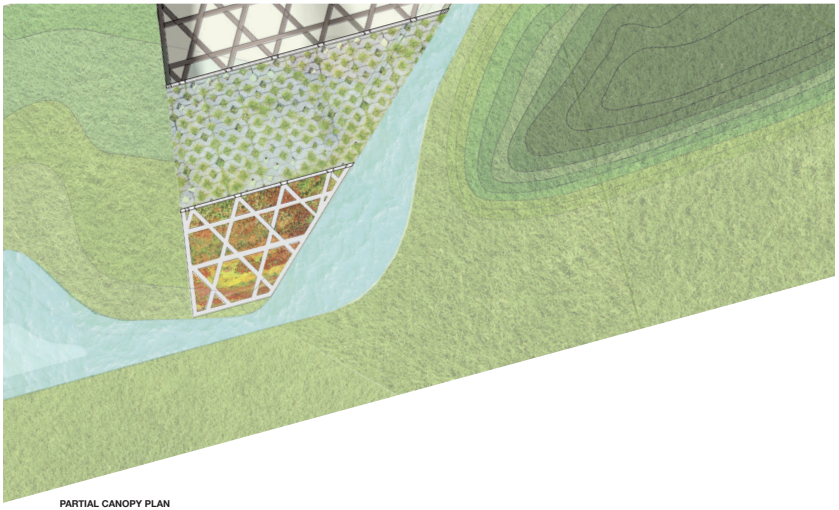
This assignment focused on a detailed area of our building envelope. Beacuse the canopy was the most dominant feature, detailed drawings were done for the canopy.

ENVELOPE

M. SHROUT, C. DIFAZIO, & A. RABOLD



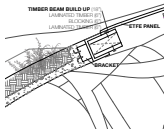
PARTIAL CANOPY ELEVATION
SCALE 1/4" = 1'-0"



PARTIAL CANOPY PLAN
SCALE 1/4" = 1'-0"

ENVELOPE

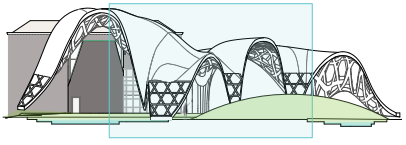
M. SHROUT, C. DIFAZIO, & A. RABOLD



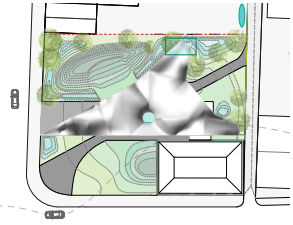
GREEN ROOF CANOPY CONNECTION
DETAIL 6.1 SCALE 1/2"=1'-0"

PARTIAL SECTION
SCALE 1/4" = 1'-0"

STRUCTURAL AXON
NO SCALE



KEY ELEVATION
SCALE 1/32" = 1'-0"



KEY PLAN
SCALE 1/64" = 1'-0"

A-7 Lighting

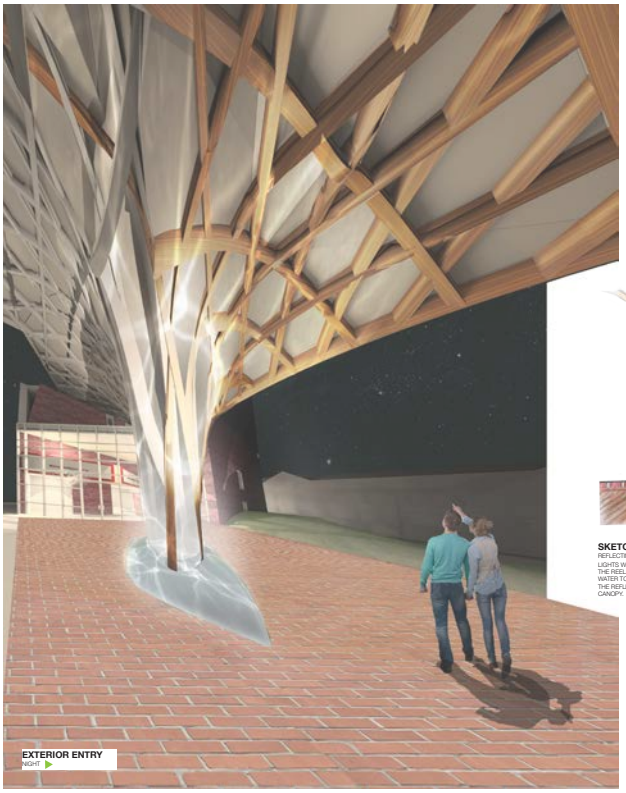
This assignment focused on a both the natural daylighting and artificial lighting schemes for our project.

LIGHTING

M. SHROUT, C. DIFAZIO, & A. RABOLD

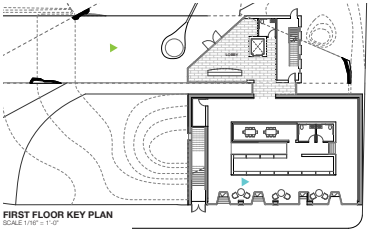
ARTIFICIAL LIGHTING

THE GOAL OF THE ARTIFICIAL LIGHTING ON THE EXTERIOR IS TO CREATE A SCHEME THAT CELEBRATES AND INTERACTS WITH OUR CANOPY. THE CANOPY SHOULD APPEAR LIGHT, AND NOT AS A HEAVY MASS INTRUDING ON THE SITE. THE INTERIOR ARTIFICIAL LIGHTING SHOULD ALLOW FOR NIGHT TIME USE OF ALL OUR SPACES. THE SPACES SHOULD BE CONSISTENTLY WELL LIT, SO THAT NO MATTER THE EVENT THE LIGHTING CAN WORK. IT SHOULD ENCOURAGE COLLABORATION AND CELEBRATION.

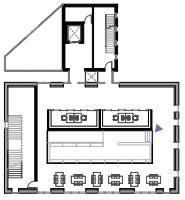


EXTERIOR ENTRY
NIGHT

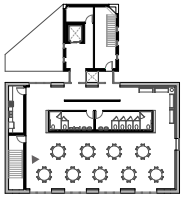
SKETCH DETAIL
REFLECTING POOL LIGHT
LIGHTS WILL BE INSTALLED AT THE BASE OF THE REELECTING POOL TO ALLOW FOR THE WATER TO REFRACT THE LIGHT AND CAST THE REFLECTION OF THE WATER ON TO THE CANOPY.



FIRST FLOOR KEY PLAN
SCALE 1/16" = 1'-0"



SECOND FLOOR KEY PLAN
SCALE 1/16" = 1'-0"



THIRD FLOOR KEY PLAN
SCALE 1/16" = 1'-0"

LIGHTING

M. SHROUT, C. DIFAZIO, & A. RABOLD

DAYLIGHTING

THE GOAL OF INTERIOR LIGHTING IS TO CREATE A SPACE THAT RELIES MORE ON NATURAL DAYLIGHTING DURING THE DAY, THAN ARTIFICIAL LIGHTING. DAYLIGHTING IS OPTIMIZED THROUGH WINDOWS THAT CAPTURE SUNLIGHT DURING THE WINTER MONTHS AND BLOCK SUNLIGHT DURING THE SUMMER MONTHS, AS SHOWN IN THE DIAGRAMS ON A-3.

FIRST FLOOR
SUMMER

SECOND FLOOR
SUMMER

THIRD FLOOR
SUMMER

FIRST FLOOR
WINTER

SECOND FLOOR
WINTER

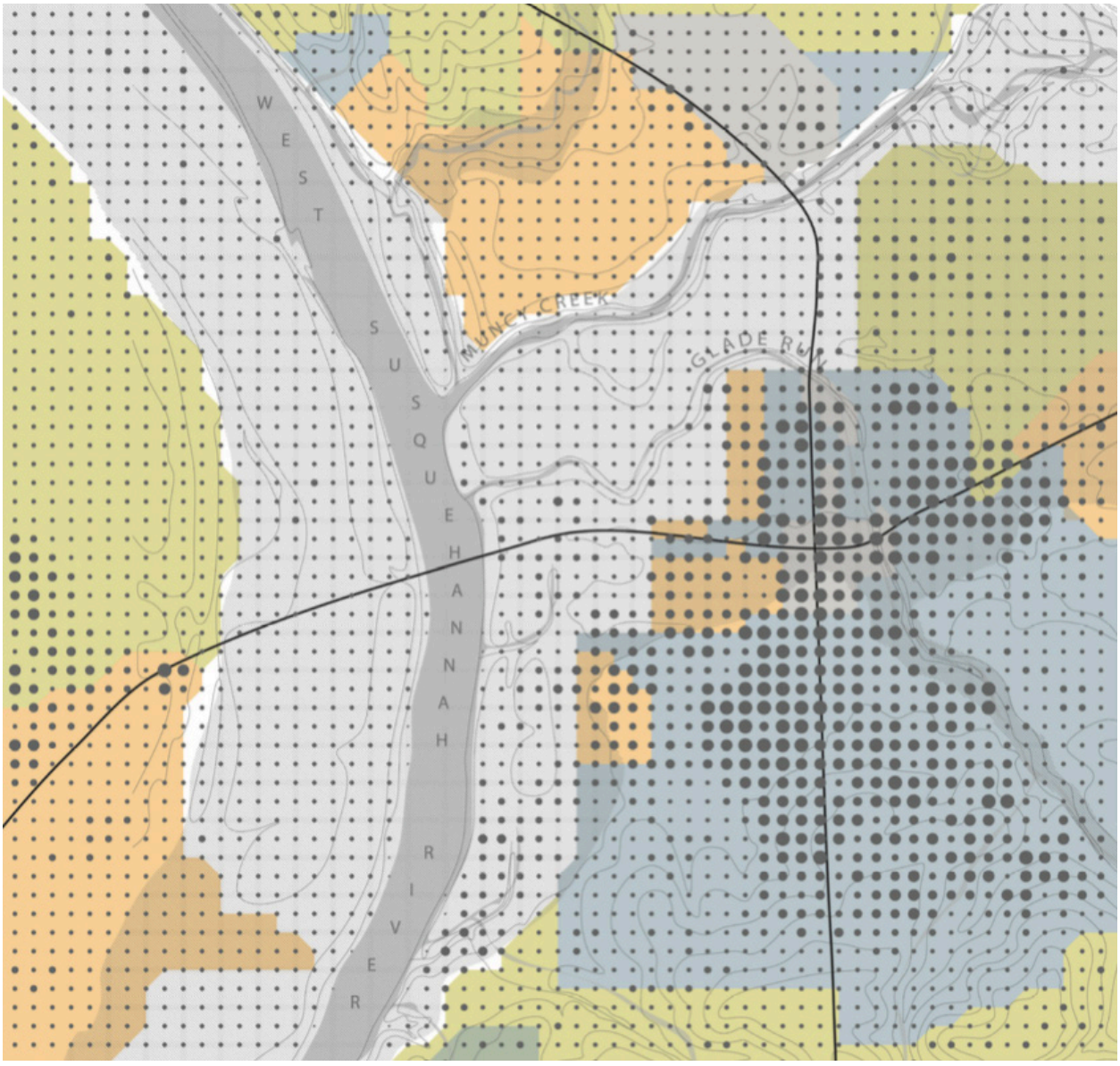
THIRD FLOOR
WINTER

MEZZANINE
NIGHT

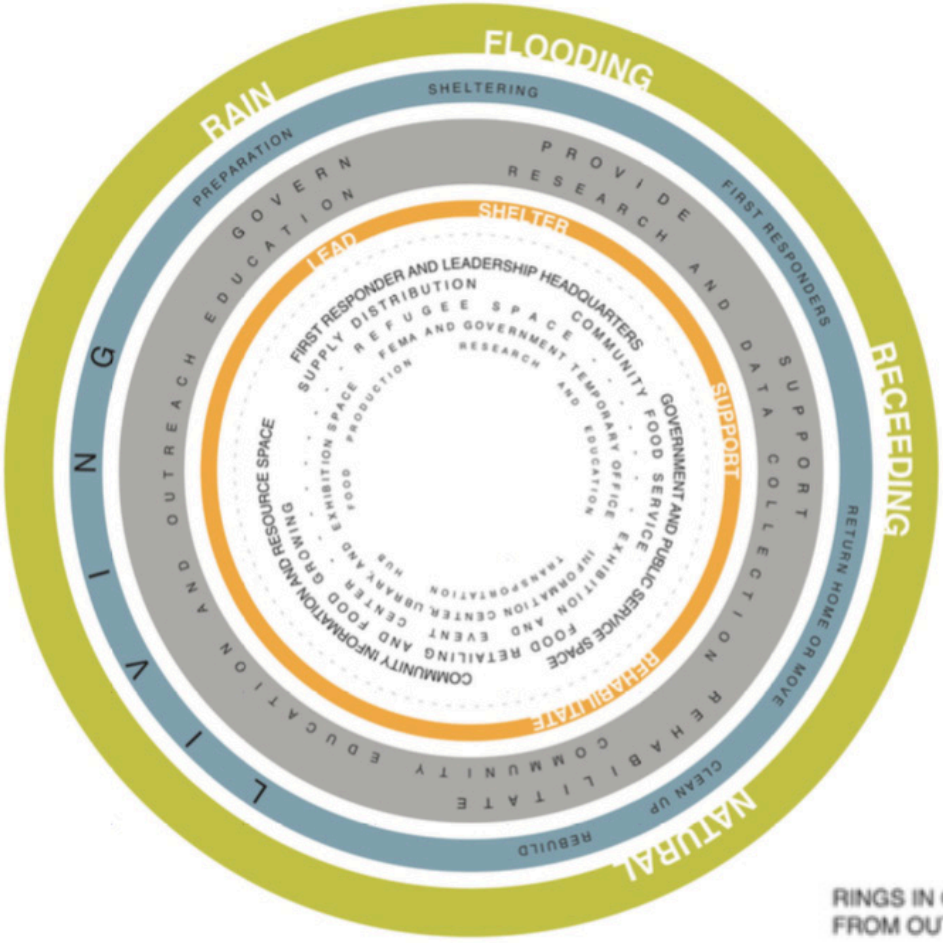
MUNCY FLOOD RESILIENCY CENTER

Andrew Barnett, Alexia Cavazos, Suheng Li

Resilient communities are exceptional models of adaptation and unity within a community. This project enables the natural and community cycles of the town of Muncy in a way that utilizes its resources and responds to Muncy's biggest community threat. The new Muncy Flood Resiliency Center reacts to the town's yearly flood conditions through reimagining the ground plane and insides of the historical opera house and Ritz Theater. New programmatic pieces are lifted off the ground above the 500-year floodplain allowing for the building to have yearlong safe activation. Spaces like government offices, a flood research lab, public lounge, and production greenhouse are lofted above public spaces that are transitional for the community, such as public exhibition, greenhouse selling, FEMA intake, and a large public gathering space. Through insetting and offsetting the new architecture to the existing historical structures, the building doubles its use of transitional spaces to be used as buffer spaces that gather light and air. This allows the building as a whole to function with extremely passive systems for heating and cooling— these systems are pivotal during times that the building must be resilient on its own. The Muncy Flood Resiliency Center is a model of old and new, lifted and grounded, natural and built that engenders a new space for the community of Muncy.



Map of Muncy + Surroundings
Floodplain (Hatched), Residential (Blue), Industrial (Orange), Agricutural (Green), Commercial (Brown).



RINGS IN ORDER
FROM OUTER IN:

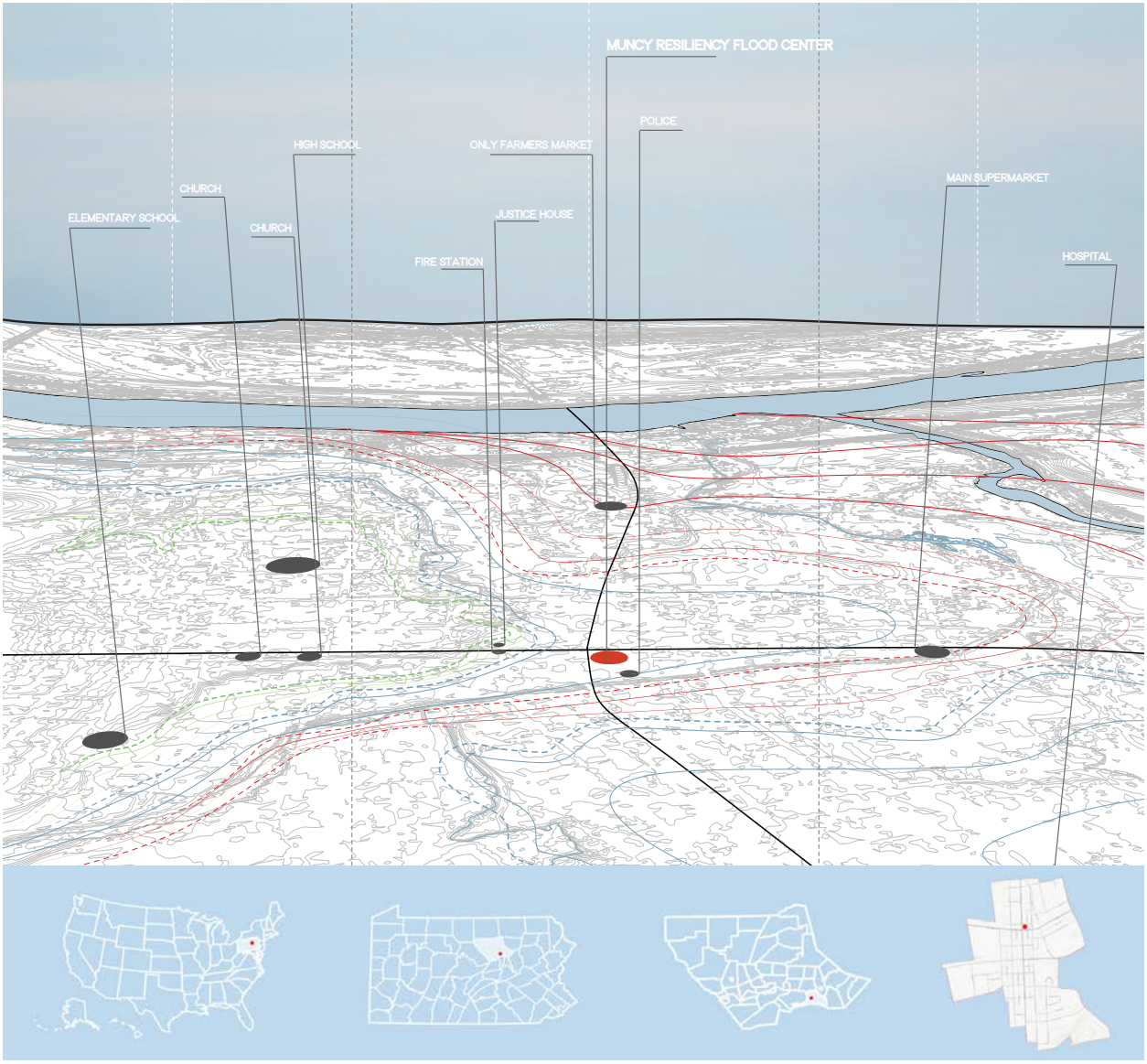
NATURAL CYCLE

HUMAN EXPERIENCE

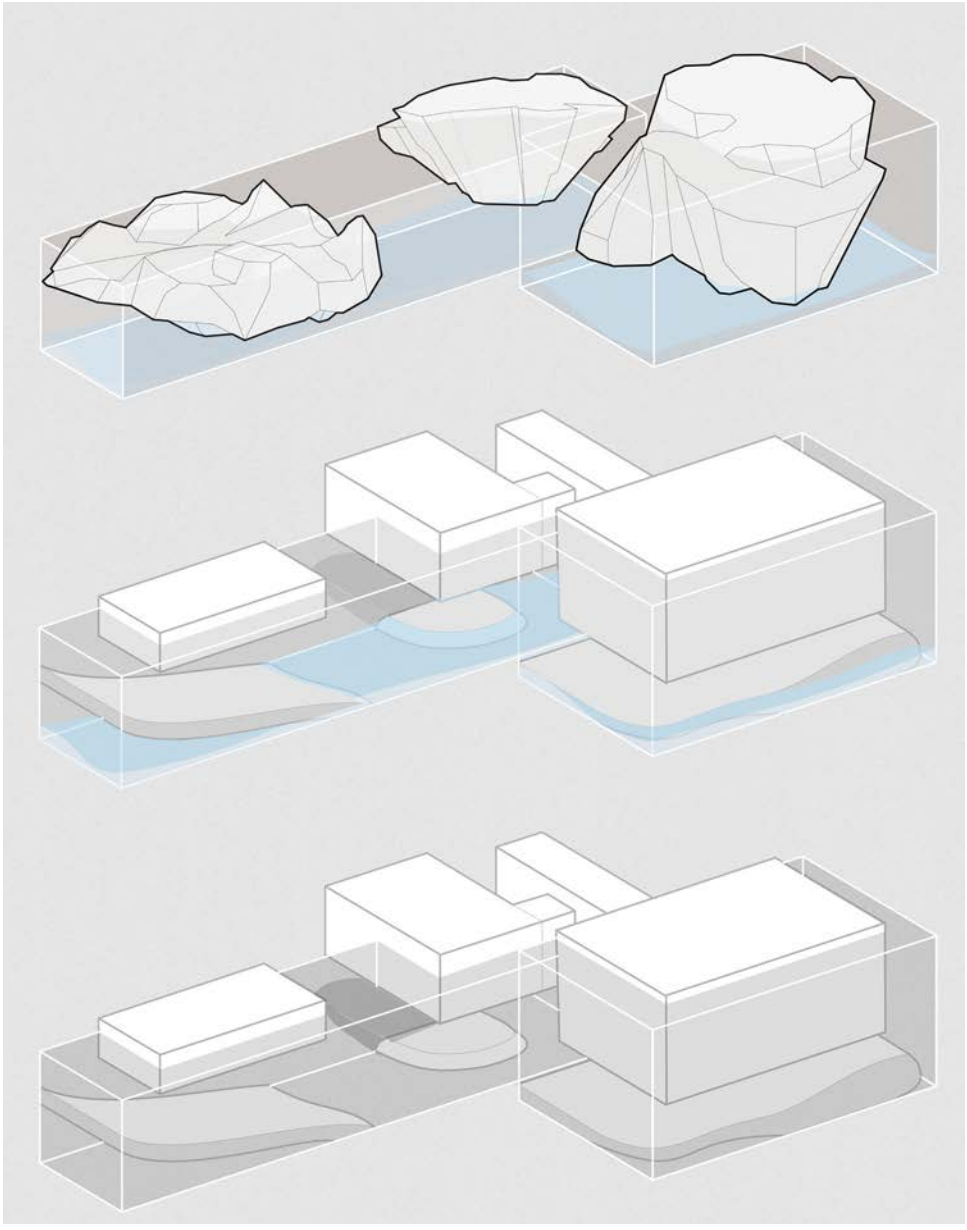
COMMUNITY GOALS

BUILDING INTENTIONS

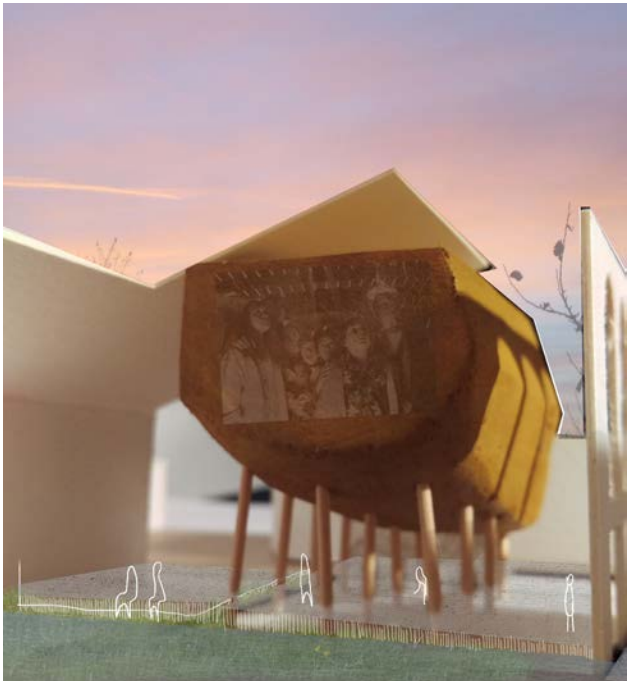
BUILDING PROGRAM OF SPACES



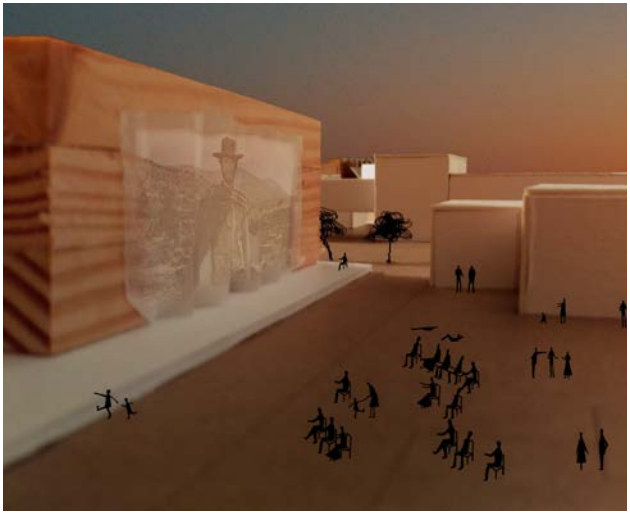
This map shows the major site surroundings, specifically those most activated and affected by flooding. The colored topography lines represent the most affected area (red), moderately affected area (blue), and safest area (green).



Diagrams showing ‘islands’ of program in existing buildings, lofted resiliency during a flood, and building usage relationships.

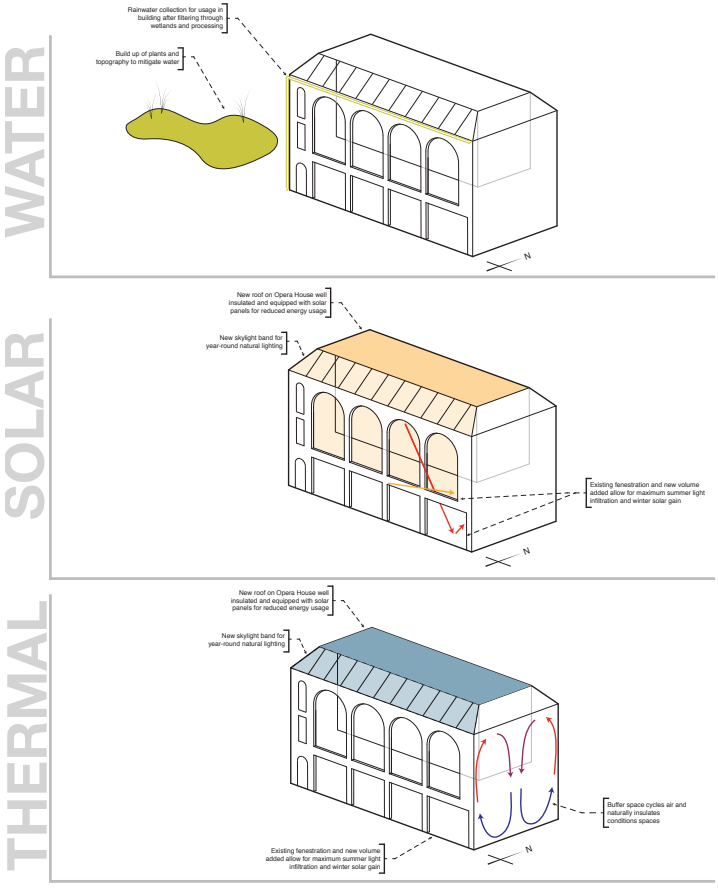


Study model

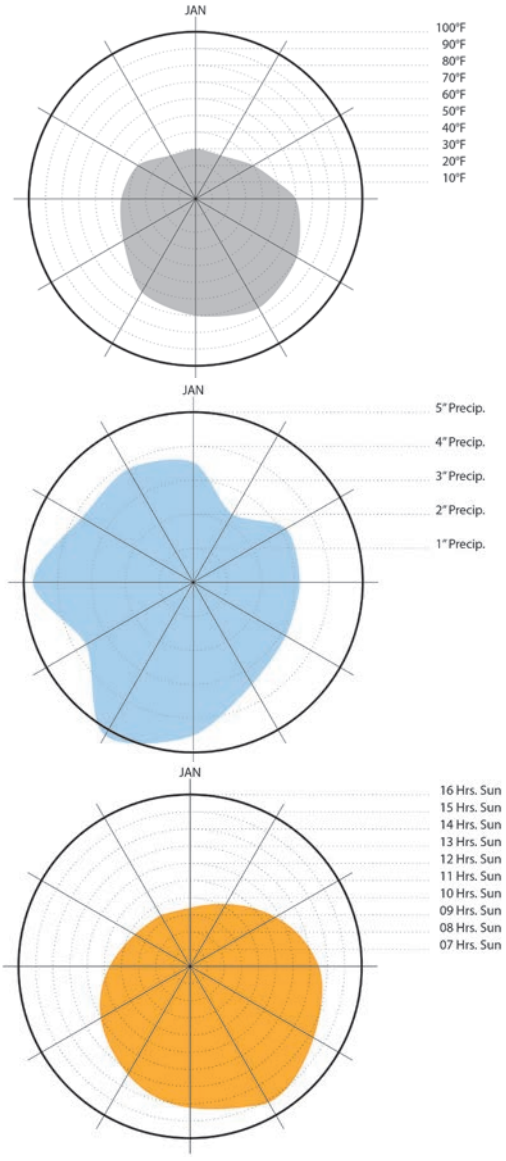


Study model showing community interaction with building

OPERA HOUSE

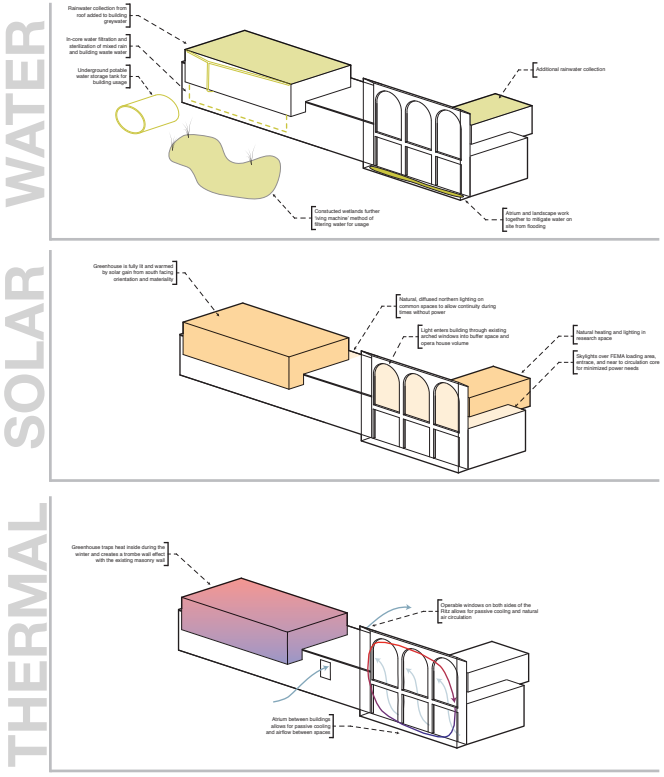


The natural resources available to and utilized by the Muncy Opera House.



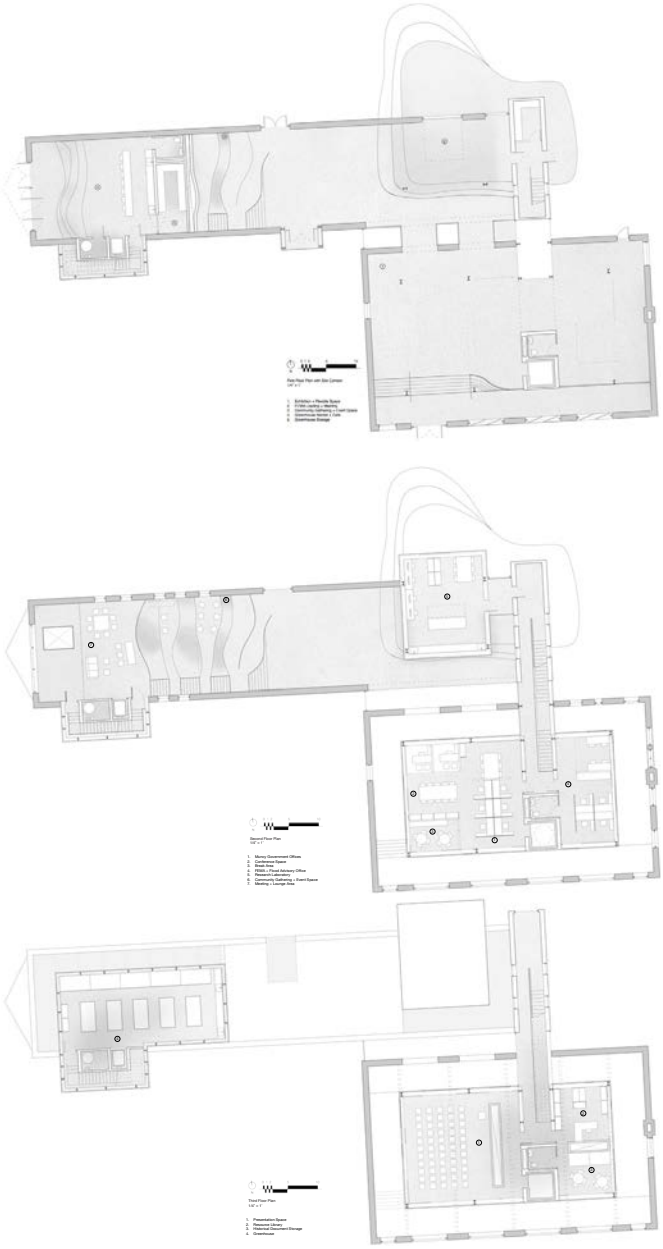
The annual temperature (grey), hours of sun (orange), and inches of rain (blue) by month.

RITZ THEATER



The natural resources available to and utilized by the Ritz Theater and Muncy Opera House.

Ground-floor plan in immediate site context



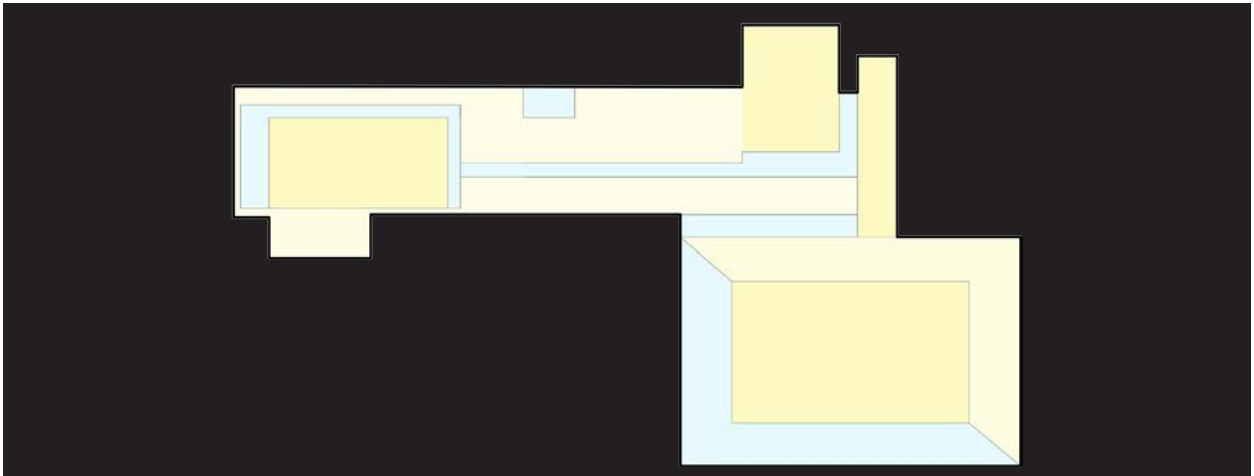
1. Exhibition + Flexible Space
2. Muncy Government Offices
3. Presentation Space
4. FEMA Loading + Meeting
5. Research Laboratory
6. Community Gathering + Event Space

Section through opera house exhibition space, offices, and research laboratory


④
①
②
500 Year
100 Year
1. FEMA Loading + Meeting
2. Community Gathering + Event Space
3. Greenhouse Market + Cafe
4. Research Laboratory
5. Meeting + Lounge Area
6. Greenhouse

Above: Northern elevation | Below: Section through core, lab, forum, and greenhouse

View of opera house at night from corner of Main Street and Water Street



This is a roof plan diagram showing the lighting of the spaces in the project — fully natural light from skylights (blue), mixed natural and artificial light (dark yellow), and fully artificial light (light yellow).

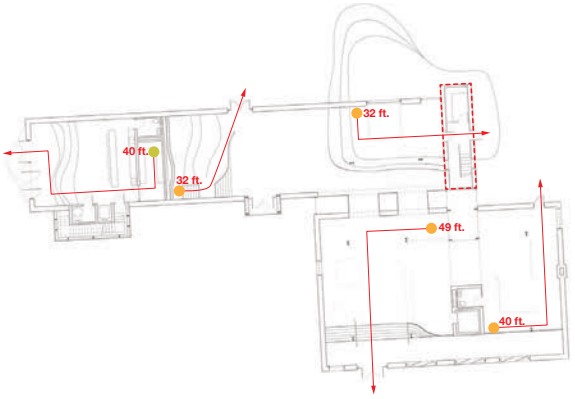
View of building at night from northwest corner

The lighting scheme is clearly presented through the juxtaposition of the existing brick skins of the opera house and Ritz Theater and the new Resiliency Center interventions. By offsetting and shifting these pieces from the existing shells, natural light shines down from skylights that bridge old and new structure. Natural light therefore falls down onto the public forum mound and shines in the three-story height buffer space between the opera facade and the government office building. Keeping these skins also allows for the sun to cast interesting shadows of the existing shells onto the new structures. During night hours, new building pieces become apparent and lantern-like through being inset and offset to the existing structure. This allows light to exude through the skins. These interventions illustrate a clear marker between the history of the old skins and the new symbols of resilience, flood-resilient raised buildings.

Retrofitted opera house, day and night

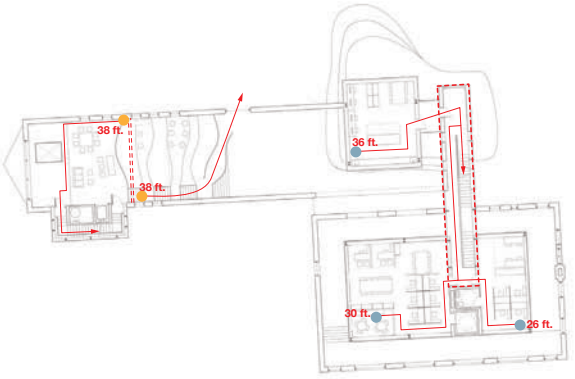
View from opera house ground floor

West elevation of Ritz and Opera House from Main Street



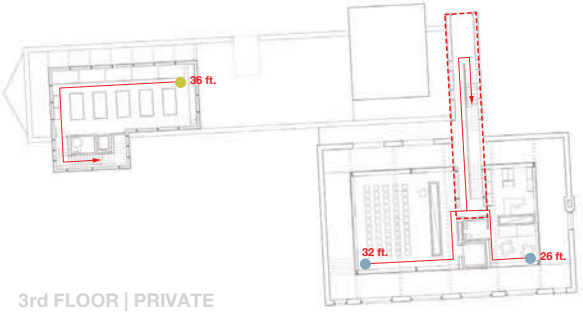
1st FLOOR | PUBLIC

- MARKETPLACE 50 PEOPLE
- GROUND FLOOR 198 PEOPLE



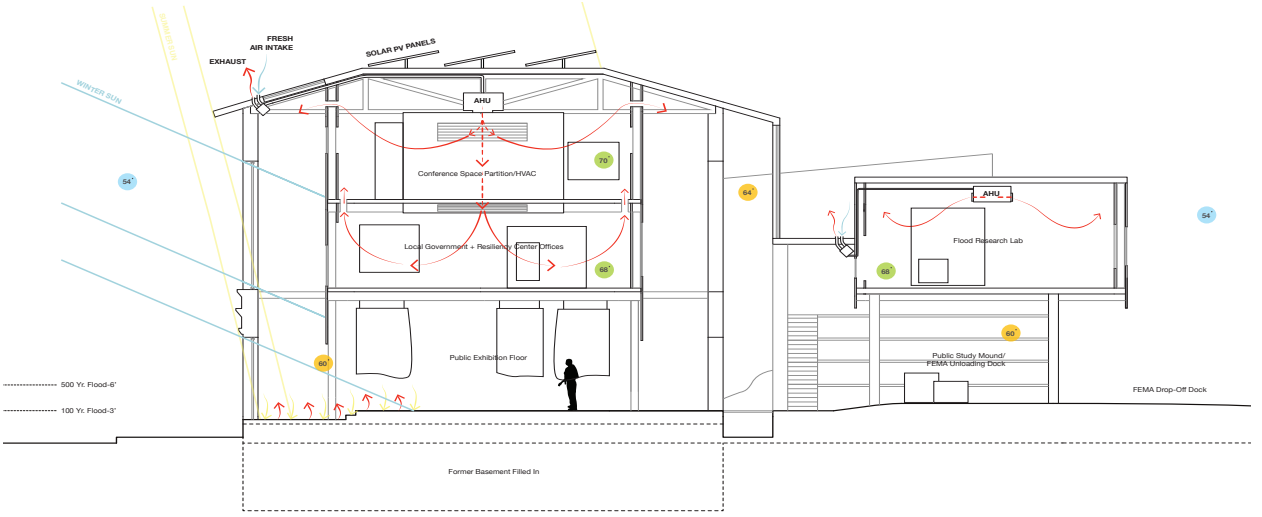
2nd FLOOR | PUBLIC & PRIVATE

- GREENHOUSE 25 PEOPLE
- PUBLIC MOUND LOUNGE 198 PEOPLE
- MEZZANINE 1 50 PEOPLE



3rd FLOOR | PRIVATE

- GREENHOUSE 25 PEOPLE
- MEZZANINE 2 50 PEOPLE



SYSTEMS EXPLAINED:

BUFFER SPACES

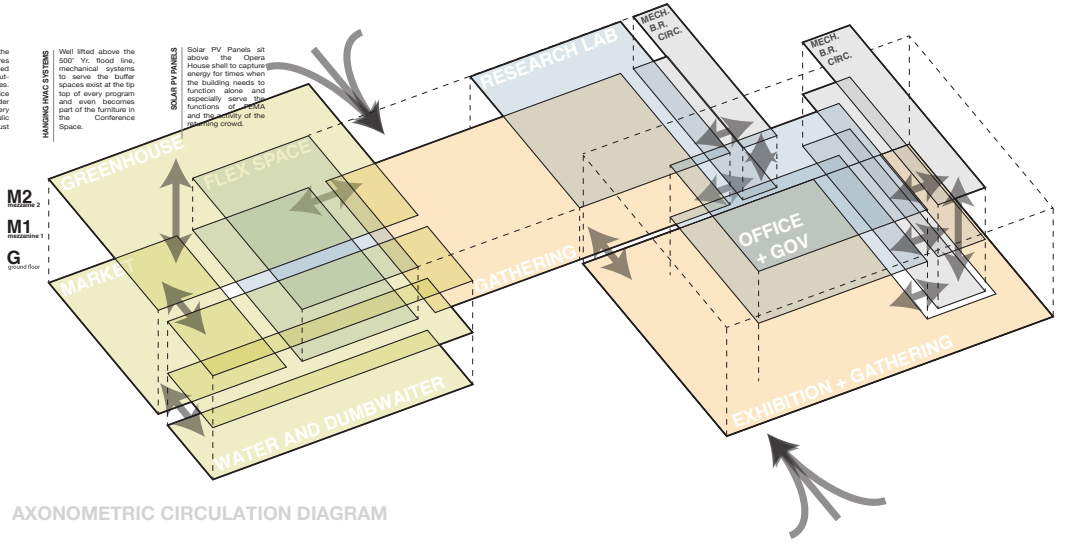
As a method of resilience, the existing Opera and Ritz structures are repurposed skins, now used in a way to buffer air between outside, old, and new structures. This is **highly efficient,** as service spaces work little to none in order to keep the private spaces very well conditioned while the pulic space benefits from the exhaust hot air.

HANGING HVAC SYSTEMS

Well lifted above the 500' Yr. flood line, mechanical systems to serve the buffer spaces exist at the tip top of every program and even becomes part of the furniture in the Conference Space.

SOLAR PV PANELS

Solar PV Panels sit above the Opera House shell to capture energy for times when the building needs to function alone and especially serve the functions of FEMA and the activity of the gathering crowd.



AXONOMETRIC CIRCULATION DIAGRAM

14,000 SF per Floor
3 Stories Maximum
42,000 SF projectitype maximum
4,660 SF maximum mazzanine

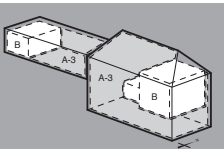
2 Hr Fire Wall Rating

Class III A Construction
602.3. Type III. Type III construction is that type of construction in wich the exterior walls are made of onncombustable materials and the interior building elements are of any material permitted by this code.

Type A-3 and B
Built to most stringent standards: A-3

Type A-3
303.4. Assembly Group A-3.
Assembly uses intended for worship, recreation or amusement and other assembly uses not classified elsewhere in Group A

Type B
304.1. Business Group B.
Buisness group B occupancy includes, among others, the use of a building or structure, or portion thereof, for office, profesional, or service-type-transactions, including storage of records and accounts.

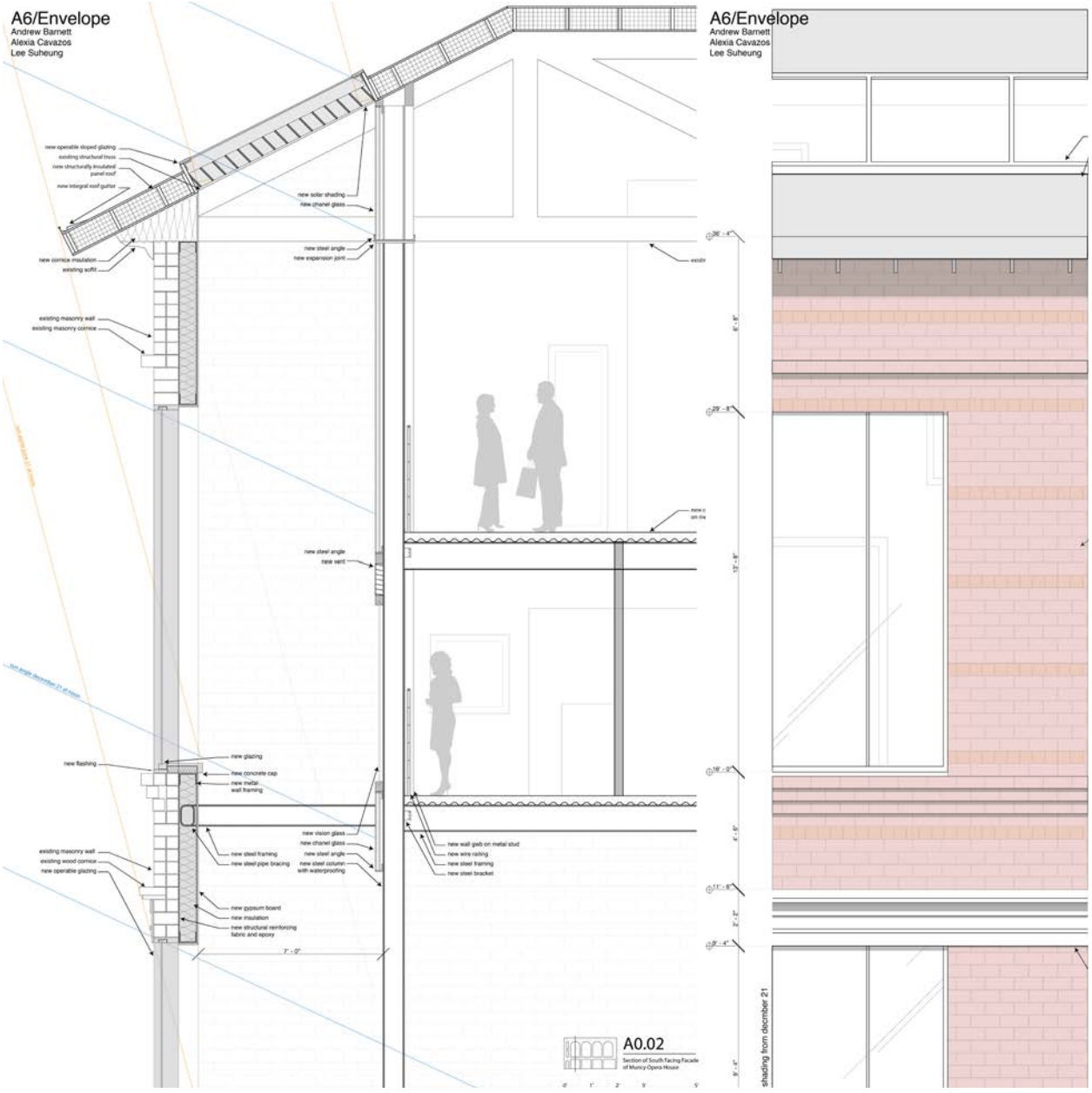


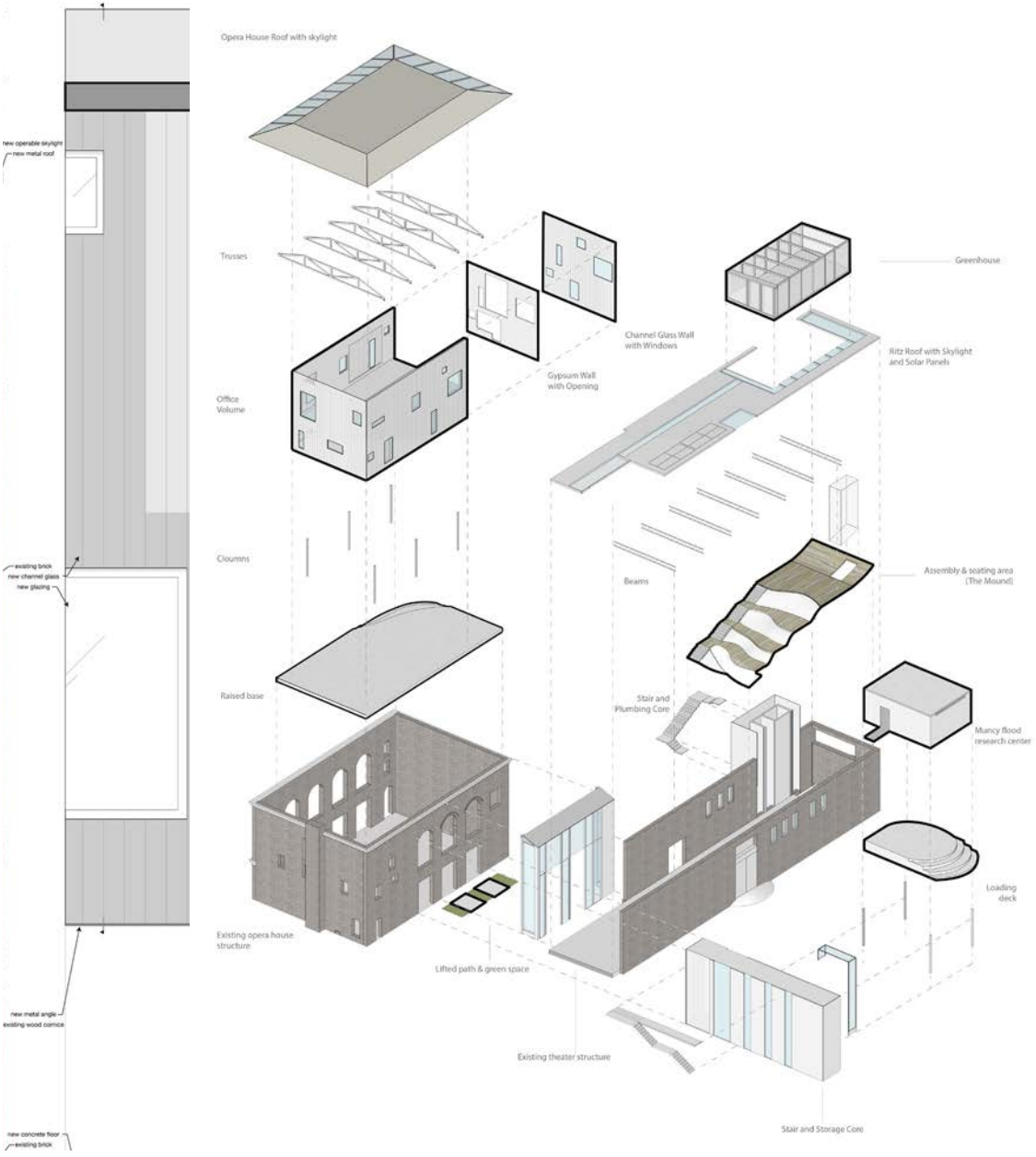
Occupancy Loads per Floor

Mezzanine 2	-	34 People
Mezzanine 1	-	50 People
Ground Floor	-	198 People
Total	-	282 People

Stair + Door Widths

Mezzanine 2	-	3' Stair and Door
Mezzanine 1	-	3' Stair and Door
Ground Floor	-	6' Stair and Door


A6/Envelope
Andrew Barnett
Alexia Cavazos
Lee Suheung
new operable sloped glazing
existing structural truss
new structurally insulated panel roof
new integral roof gutter
new cornice insulation
existing soffit
existing masonry wall
existing masonry cornice
new solar shading
new channel glass
new steel angle
new expansion joint
new steel angle
new vent
new flashing
new glazing
new concrete cap
new metal wall framing
new steel framing
new steel pipe bracing
existing masonry wall
existing wood cornice
new operable glazing
new vision glass
new channel glass
new steel angle
new steel column with waterproofing
new wall gwb on metal stud
new wire railing
new steel framing
new steel bracket
new gypsum board
new insulation
new structural reinforcing fabric and epoxy
A0.02
Section of South Facing Facade of Munich Opera House
A6/Envelope
Andrew Barnett
Alexia Cavazos
Lee Suheung
shading from december 21

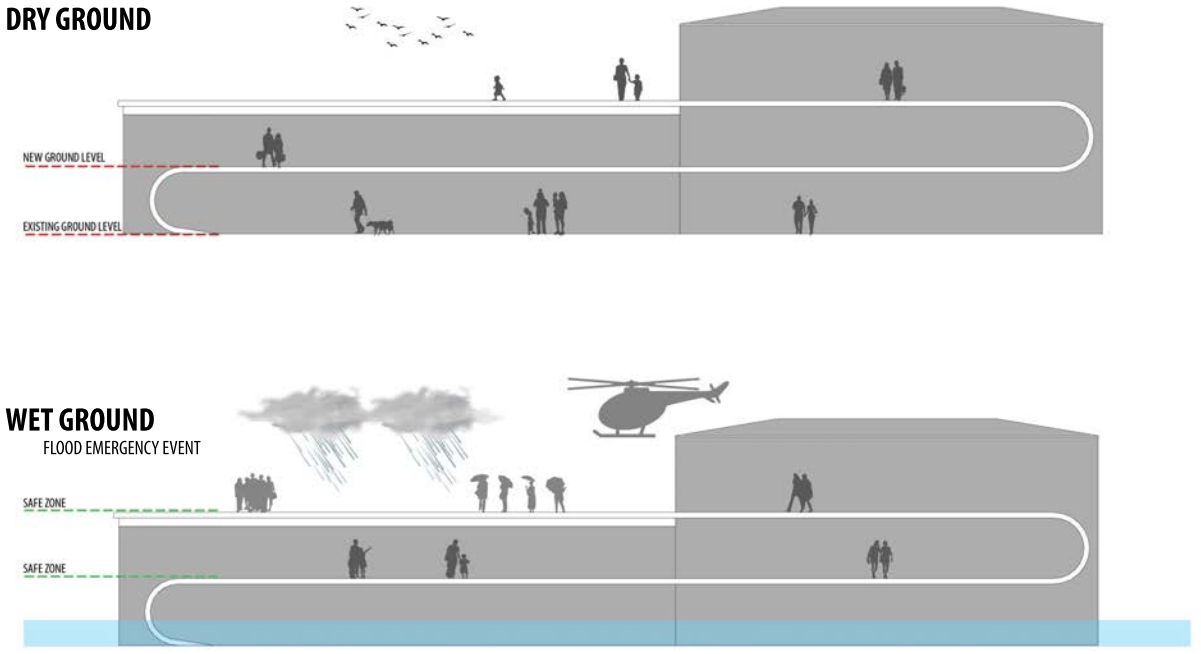

new operable skylight
new metal roof
existing brick
new channel glass
new glazing
new metal angle
existing wood cornice
new concrete floor
existing brick
Opera House Roof with skylight
Trusses
Office Volume
Cloumns
Raised base
Existing opera house structure
Gypsum Wall with Opening
Channel Glass Wall with Windows
Greenhouse
Ritz Roof with Skylight and Solar Panels
Beams
Assembly & seating area (The Mound)
Stair and Plumbing Core
Muncy flood research center
Loading deck
Lifted path & green space
Existing theater structure
Stair and Storage Core

ESCAPE [elevated sustainability center]

Justin Chen, Veronica Landron, Bridget Novielli

The Elevated Sustainability Center brings new life to the historic opera house and Ritz Theater of Muncy Borough. The elevated form promotes social interaction through the integration of community program. It brings life to the site.

A view of the proposed structure from a bird's eye view at the intersection of Water Street and Main Street



This diagram shows the everyday condition of the dry ground compared to the wet ground in a flood emergency event.

RESILIENCY

When a flood occurs and what is traditionally perceived as ground becomes irrelevant, the ESC provides a new ground level above water. This elevated social condenser stimulates the resiliency of Muncy Borough by creating a space for diverse interactions. Engaging the local community with strategies to tackle flooding, the ESC serves as a beacon of resiliency to Muncy and the Susquehanna region at large.

SITE ANALYSIS

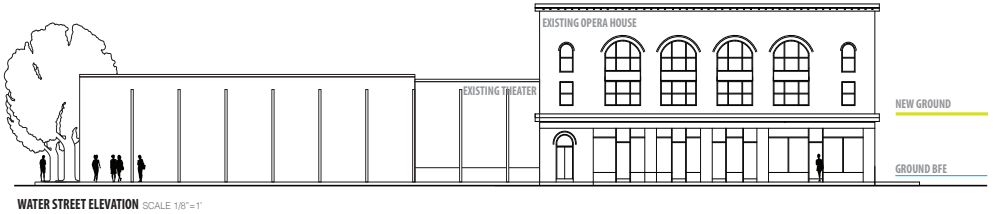
Our analysis of the site led us to interpret how long people experience the spaces within Muncy.

TIME OF EXPERIENCE

This graphic shows that the location of our site is central to the region and that people will experience the site for different lengths of time. We want to take advantage of this by providing educational opportunities for a semester, a day, or even a moment.

EXISTING OPERA HOUSE

The existing historic structures presented a challenge and opportunity for the site. Documenting the existing conditions of these structures prompted interaction between old and new.

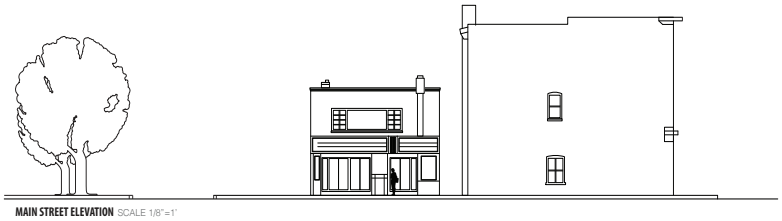


An elevation of the opera house from Water Street with the theater in the background.

A collection of images showing the exterior of the existing opera house.

EXISTING OPERA HOUSE

The elongated theater is significant to the community mainly because of its marquee. The signage is now upheld by the community as a symbol of its past.



An elevation of the Ritz Theater from Main Street with the opera house in the background.

A collection of images showing the exterior of the existing theater.

VIEWS

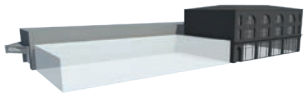
The beautiful views from atop the Ritz Theater inspired us to create a habitable roof so that Muncy residents could experience the natural beauty of their surroundings.

Popping out from the opera house, this view captures the forested mountains beyond Muncy.

CONCEPT

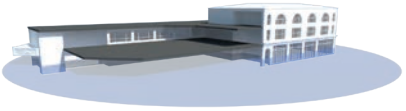
Our concept developed from the idea of varying time of experience.

+ZONED



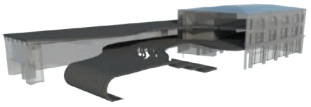
PERMANENT, TEMPORARY, AND MOMENTARY ZONES

+GROUNDED



NEW GROUND LEVEL ABOVE FLOOD

+CURVED

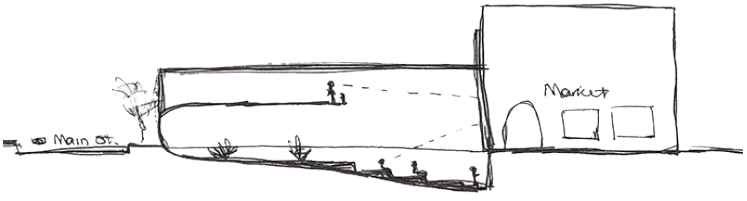


LOFT FLOWS THROUGH SITE WHILE RESPECTING EXISTING BOUNDARIES

We zoned the site into permanent, temporary, and momentary zones to capture the variety of time that people will experience our site. A new ground level above the floodplain intersects these zones, unifying the different conditions of time. The form flows through the site and the existing structures.

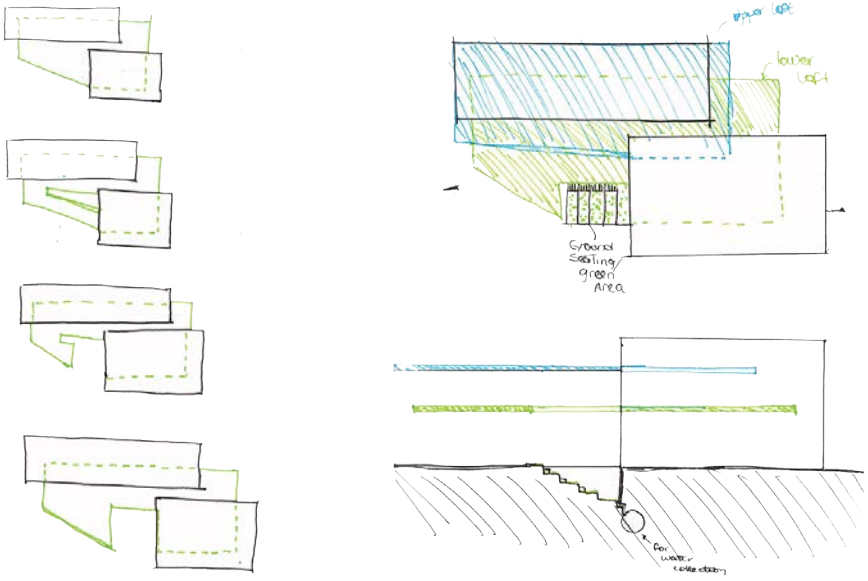
SKETCHES OF CONCEPT

Early sketches show our thoughts on how the new ground level would interact with existing structures.

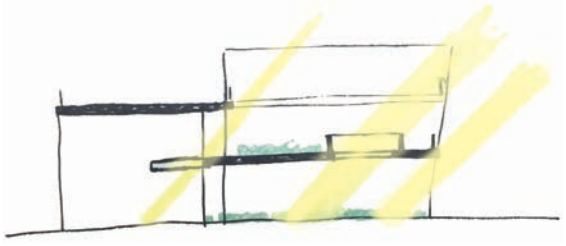


PROCESS

Our design for the elevated structure began with the idea of a raised deck over the corner of the site. We explored a variety of elevated shapes and forms.



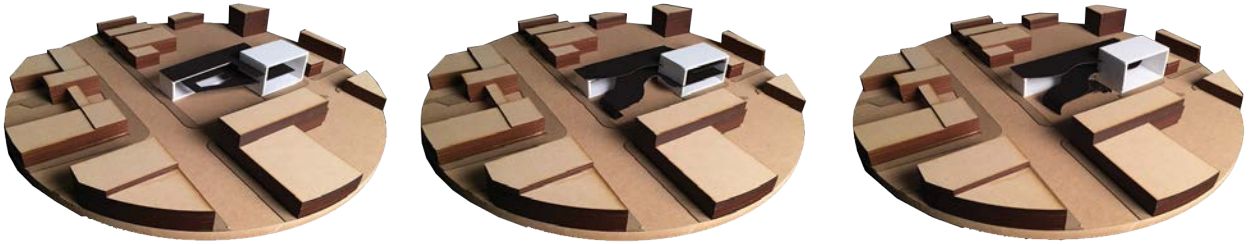
Sketches of the deck intersecting the three entities of opera house, theater, and corner.



A sketch of the light intended to penetrate through the deck.

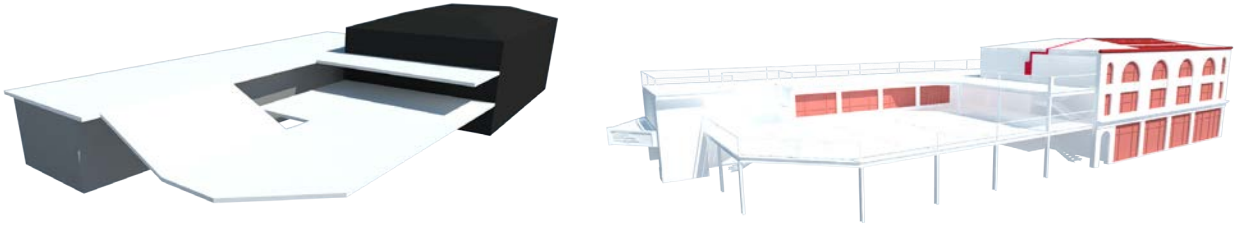
MODEL FORM

Physical models helped us explore the relationship between old and new.



DIGITAL FORM

Many model iterations helped determine the ESC's final form.



Early forms that show the deck within the corner site.

PROGRAM

With the new elevated surface, the ESC introduces program that promotes social interactions.

EXTERIOR PROGRAM

The outdoor form offers an educational tool for sustainability through exposed building strategies, activities for children through a playground rain garden, entertainment for a crowd with an outdoor theater, and a beer garden geared toward a younger demographic.The ample outdoor space offers flexibility for community needs. By adding these elements, we will engage the community with the site and provide fun and educational opportunities for the residents to learn about resiliency.

INTERIOR PROGRAM

The interior exhibition spaces are separated into permanent and rotating exhibits. Historic artifacts of Muncy and flood history will be within the permanent exhibit. Sustainable strategies such as solar panels and wet floodproofing would be exhibited in the rotating exhibit, in addition to conferences or events. The introduction of a research facility called for the development of resident research spaces. There are three resident spaces provided, along with a common area and kitchenette.

EXPOSED BUILDING STRATEGIES

Centre Georges Pompidou Renzo Piano

+

CHILDREN'S PLAYGROUND

Bespoke Mounds

+

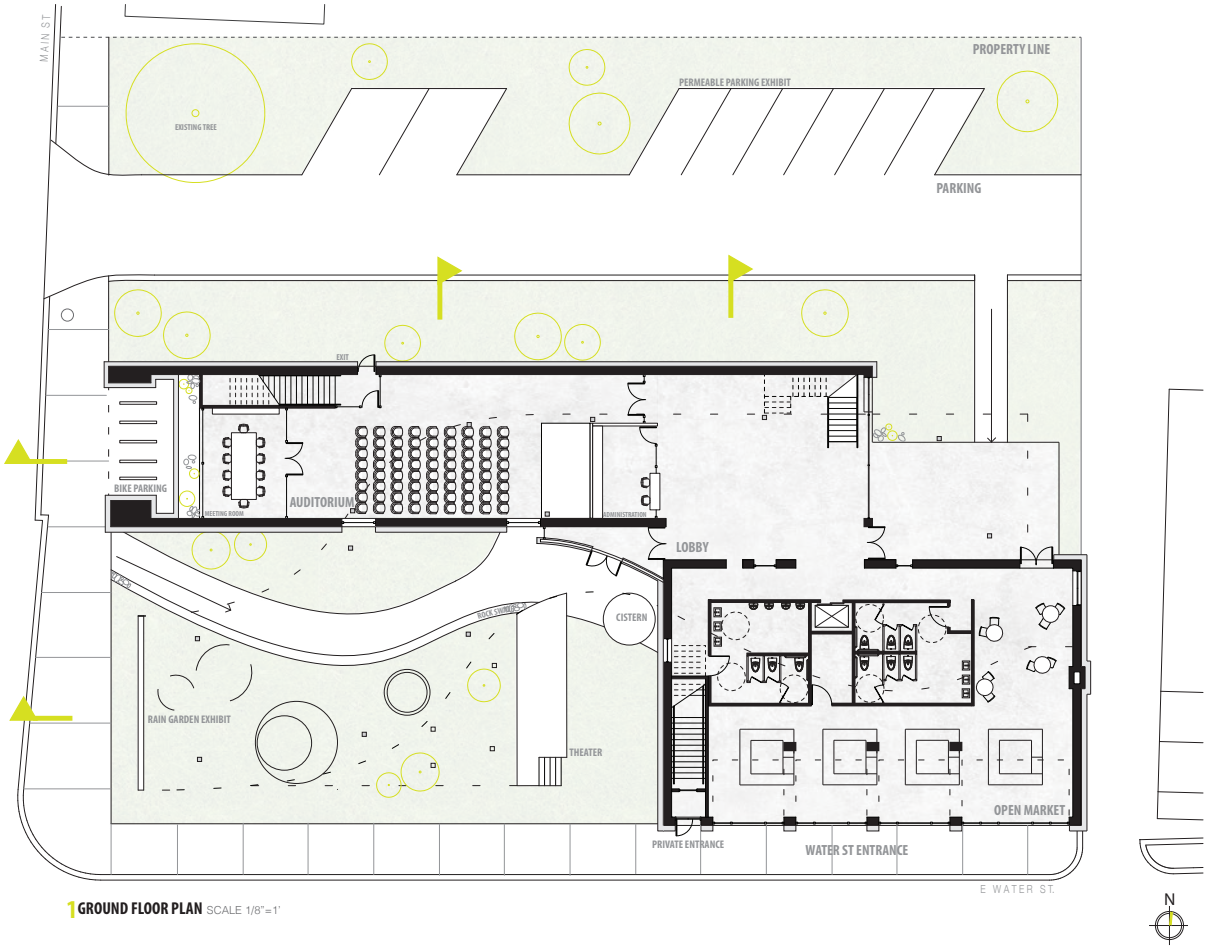
POP-UP MOVIE NIGHT

+

POP-UP BEER GARDEN

Pennsylvania Horticultural Society

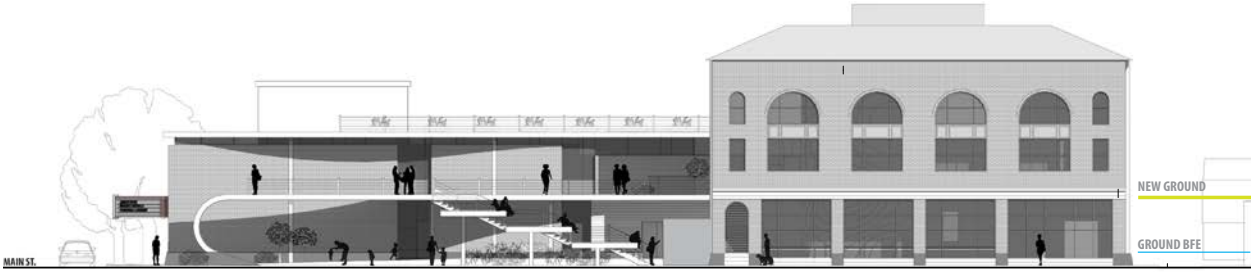
ENGAGEMENT WITH SITE

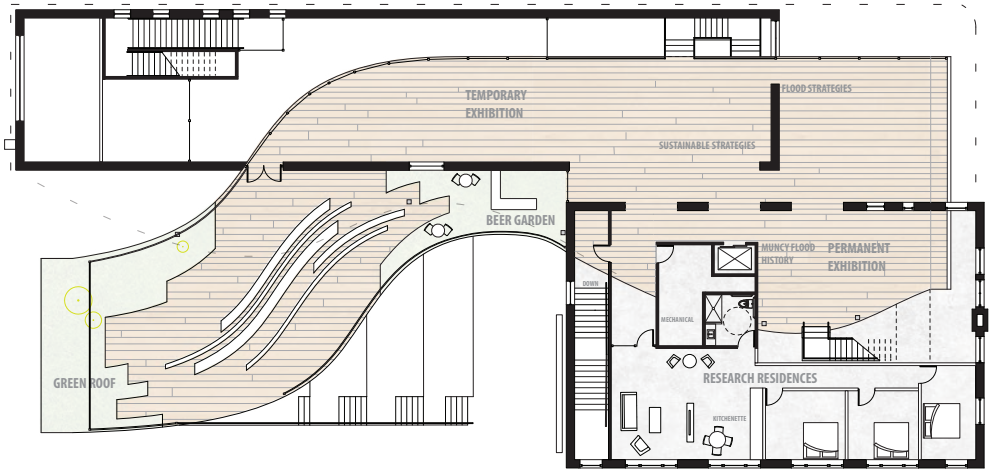


1 **GROUND FLOOR PLAN** SCALE 1/8"=1'

This image shows the ground-floor plan of the building. On the ground level, the community can gather in the corner site and young ones can play within the rain garden exhibit. The forum steps provide opportunity for lunch gatherings or performance viewing. Visitors work their way through the lobby to an auditorium and market.

ELEVATED EXPERIENCES

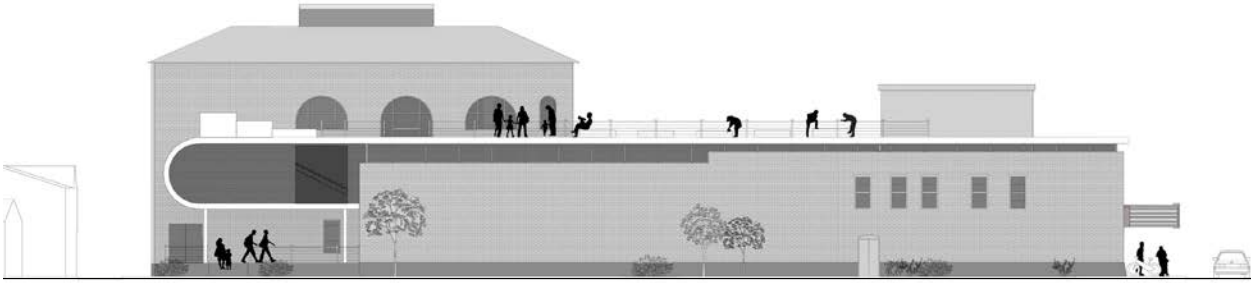


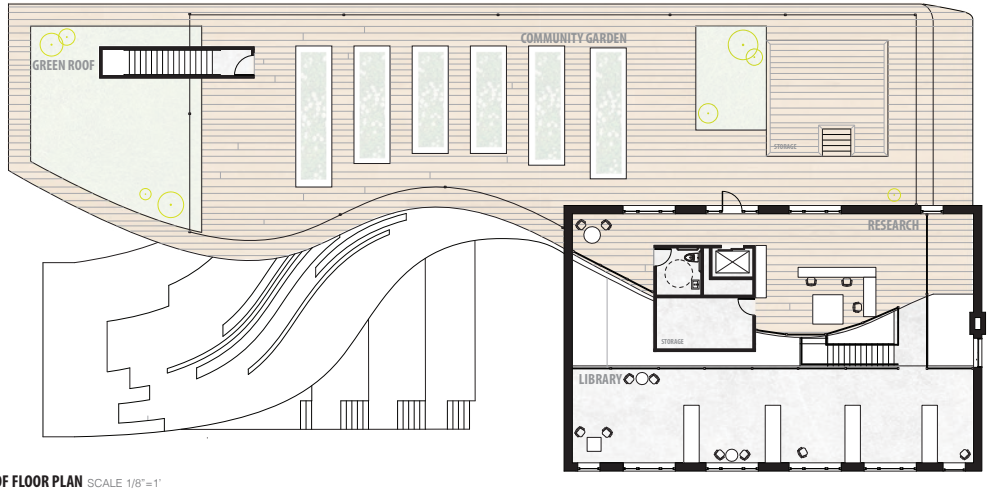


2 LOFT FLOOR PLAN SCALE 1/8"=1'

The ESC winds its way through the existing opera house and theater. Exhibition spaces and research residences are located on this level. The exterior space allows for formal or informal gathering at the beer garden.

NEW LIFE TO ROOF





3 ROOF FLOOR PLAN SCALE 1/8"=1'

The ESC winds once again to become the new roof of the existing Ritz Theater. This area provides flexible space for enjoying the surrounding views and viewing the culture of the town at a different level. A community garden is located between this new roof and existing structure.

TANGIBLE UNDERSTANDING

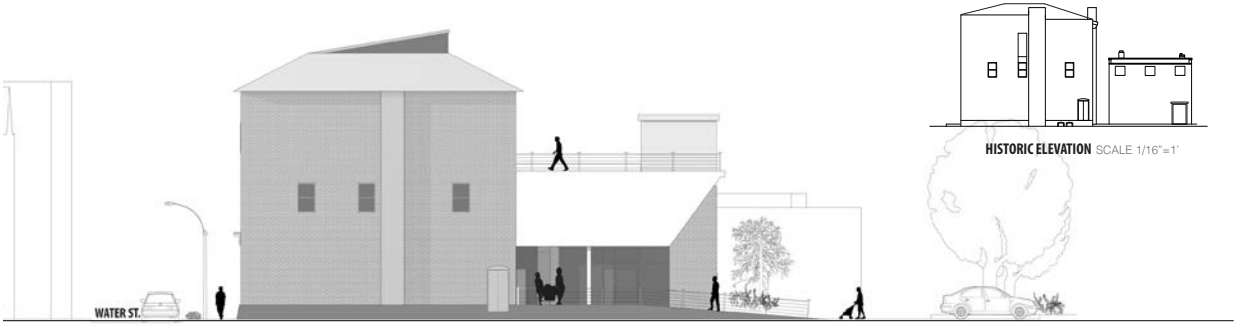
By creating a physical representation of the form, we explored materiality and the relationship between the new and existing conditions.

The existing opera house and Ritz Theater are represented in black in contrast to the flowing lightness of the new ESC.

Views of the model showing the curve folding up at the entrance, the cascading forum theater steps, and the curve folding up again to become the roof.

PERMANENT EXHIBIT

The ESC flows through the existing opera house to create this area for permanent exhibition of Muncy flood history. This area offers a view above to the beautiful historic brick structure.

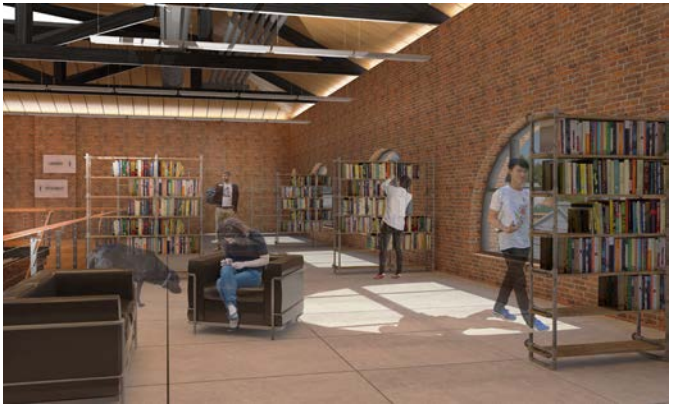


The form curves from the second-floor level to become the roof of the existing theater. This curve serves as the shelter over the northern entrance.

OUTDOOR THEATER

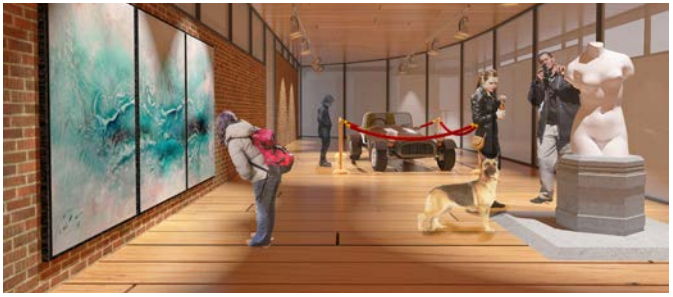
The forum seating provides a viewing area for film and performances.

The ESC continues through the existing theater, cutting the volume in half for an exhibit space and auditorium but allowing for moments of experiencing a double height space.

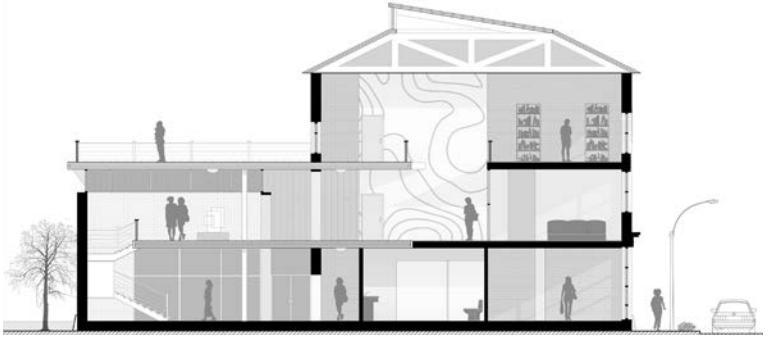


The library area within the third floor of the opera house gives the research residents an area for quiet reflection.

The entrance view allows visitors to meander through the site, engage with the rain garden, and enter to the lobby while experiencing the form of the ESC above them.



The temporary exhibit within the existing theater provides flexible space. The space can display sustainable strategies or hold tables for a party.

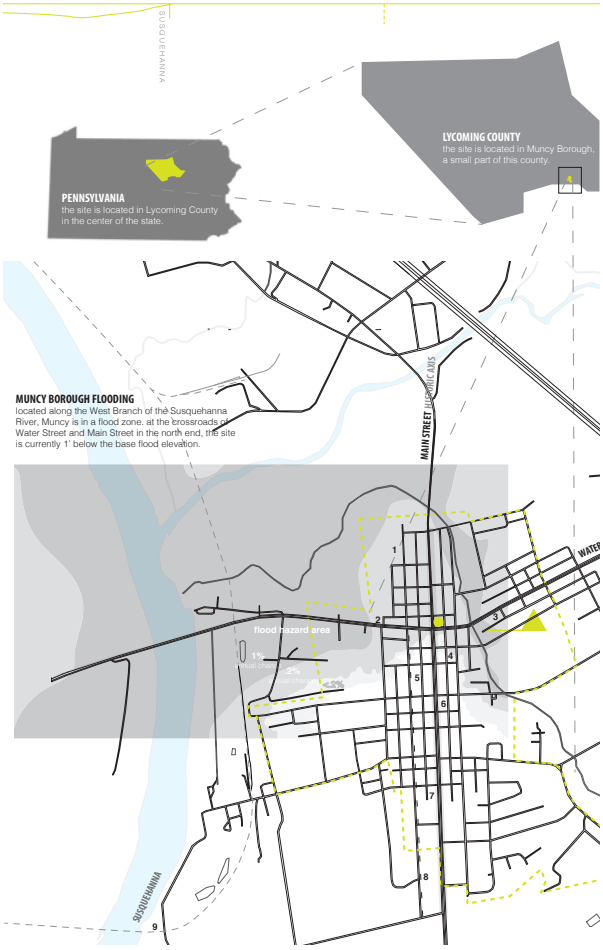


The roof of the opera house has been replaced to allow for new windows with northern light and natural ventilation.

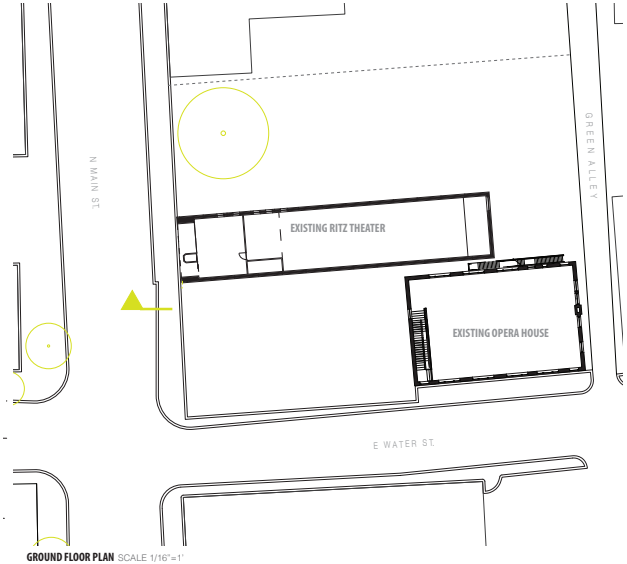

JUSTIN CHEN
BRIDGET NOVIELLI
VERONICA LANDRON


JUSTIN CHEN
BRIDGET NOVIELLI
VERONICA LANDRON
SAFETY ZONE
FLOOD ZONE

CONTEXT

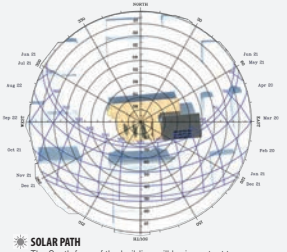

SUSQUEHANNA
LYCOMING COUNTY
the site is located in Muncy Borough, a small part of this county.
PENNSYLVANIA
the site is located in Lycoming County in the center of the state.
MUNCY BOROUGH FLOODING
located along the West Branch of the Susquehanna River, Muncy is in a flood zone. at the brossroads of Water Street and Main Street in the north end, the site is currently 1' below the base flood elevation.
MAIN STREET
flood hazard area
1%
2%
0.2%
WATER
SUSQUEHANNA
MAIN ST
bus stop
Paramedex
barber
Muncy bank annex
Muncy bank
theater
opera house
WATER STREET SECTION SCALE 1/32"=1'
WATER STREET ELEVATION SCALE 1/32"=1'


MAIN ST
WATER STREET ELEVATION SCALE 1/16"=1'


N MAIN ST.
GREEN ALLEY
EXISTING RITZ THEATER
EXISTING OPERA HOUSE
E WATER ST.
GROUND FLOOR PLAN SCALE 1/16"=1'

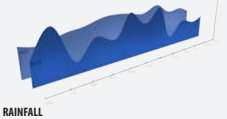
RESOURCES

The site provides opportunity for capturing solar energy for electricity and rain water for roof irrigation and the cistern. The natural temperature and wind on the site inspire design that promotes passive energy for part of the year.

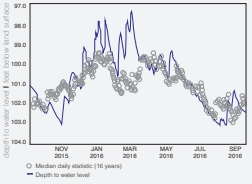


SOLAR PATH
The South face of the building will be important to capture energy in Winter and shade in Summer.

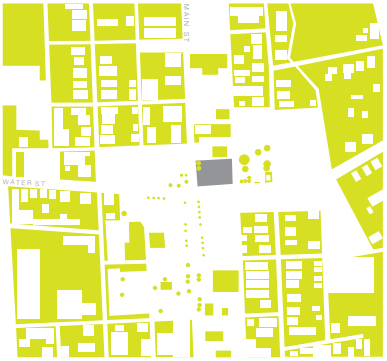
TEMPERATURE
The temperature in Muncy is moderate so we will rely solely on passive methods for the Spring and Fall.



RAINFALL
The stormwater systems will collect rainwater to be used as graywater in our building. We anticipate a maximum 5"

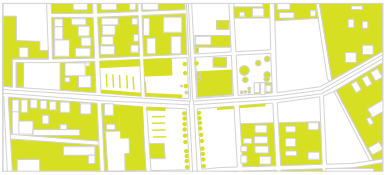


WATER LEVELS
Lycoming County Observation Well shoes that 2016 water levels are closer to the land surface, meaning more potential for flooding. These levels determine that historically, January and April will be most vulnerable to flooding.



CURRENT GREEN SPACE
the site is surrounded by pavement and it has potential to reduce heat island effect - energy demand due to warming - by adding green space

green space
paved area



PROPOSED GREEN SPACE
by adding green space on the site and its context, we intend to create a greater sense of community and wellbeing

RESOURCES
the use of local resources will reduce energy and support the local economy while saving money

technology
utilize the local manufacturing facility Andritz Inc, which produces feed & biofuel technologies. they supply hydraulic power generation, paper, metals and generate power from renewable resources.

material
purchase local lumber from lumber yards to minimize transportation costs and environmental effects. purchase interior products from koroseal, which has its manufacturing plant in Muncy.

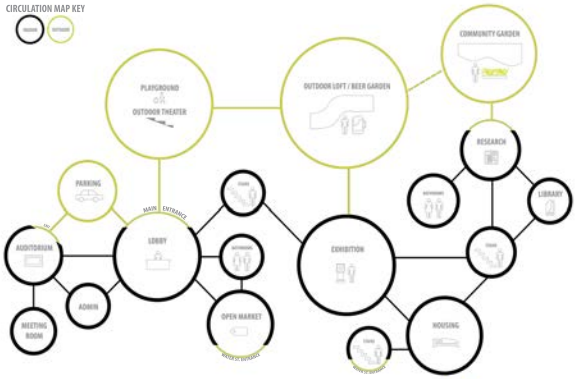
program
use programs like Solaire to help the local Muncy community capture its potential energy. this company provides renewable energy solutions, energy efficiency upgrades, and home energy audits for homes and businesses throughout North Central PA.

A2
+RESOURCES

JUSTIN CHEN | VERONICA LANDRON | BRIDGET NOVIELLI

CIRCULATION

The circulation on the site flows with the new form through the existing buildings. The preserved stairs within the opera house allows for private circulation to the research residences while the majority of the site is open to exploration by the public.



FIRE SAFETY

A Building Codes

IBC 2009 PA Edition
NEC 2011
NSPC 2009
Int. Energy Con. Code 2009
Int. Mech. Code 2009
Int. Fuel Gas Code 2009
PA Rehab Subcode
ANSI A117.1 2003
Barrier Free Subcode

B Means of Egress

1. Occupancy Groups
   - A-1 Theater
   - A-3 Exhibition Hall
   - M Market
   - R Residential
2. Occupant Load

Exhibit	Assembly	30 net
Auditorium	Assembly with fixed seats	per seat
Lobby	Assembly - standing space	5 net
Market	Grade floor	30 gross

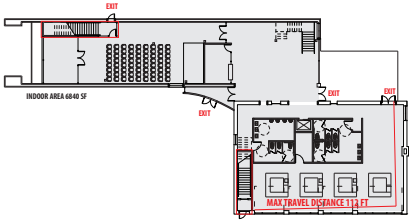
3. Minimum required stair and door widths
   - 32 inches
4. Exits and firestairs
   - 2 firestairs
5. Fire stairs and exits
   - Automated sprinkler system required
   - minimum allowable distance between stairs: 1/3 (53 ft) the length of the maximum overall diagonal dimension of the building or area to be served (160 ft)
   - maximum allowable distance between stairs: 200 ft

group A	200 ft
group M	200 ft
group R	325 ft

6. Max travel distances on each floor

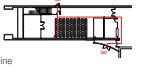
Floor 1	112 ft
Floor 2	88 ft
Floor 3	128 ft

GROUND FLOOR SCALE 1/16"=1'

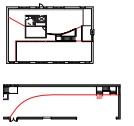


C Specific Areas

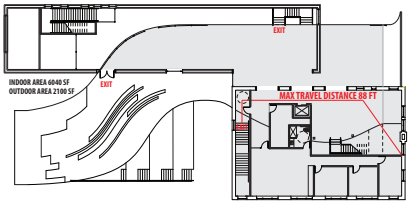
1. Auditorium



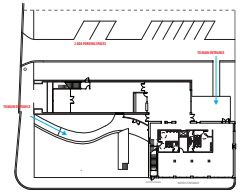
2. Mezzanine



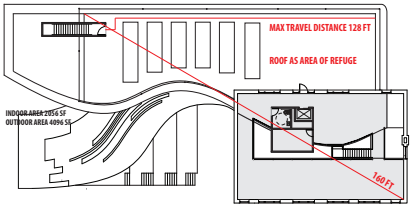
FIRSTFLOOR SCALE 1/16"=1'



SITE PLAN SCALE 1/32"=1'



TOP FLOOR SCALE 1/16"=1'



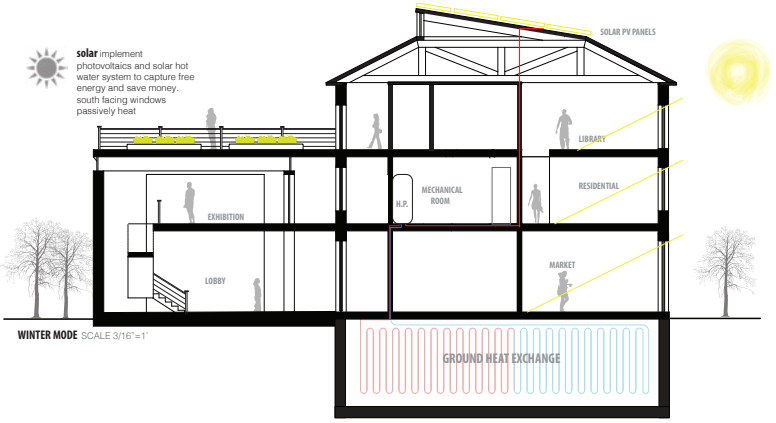
A4

+FIRE SAFETY | CIRCULATION

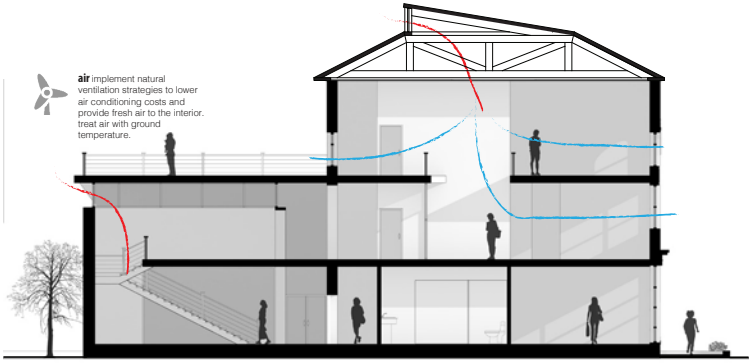
JUSTIN CHEN | VERONICA LANDRON | BRIDGET NOVIELLI

ENERGY SYSTEMS

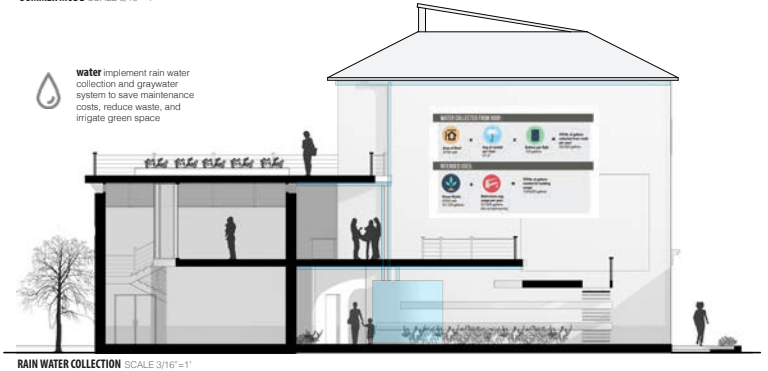
The design captures natural energy on site through a ground heat exchange and PV panels. A new clerestory in the existing theater and a new roof window in the existing opera house allow for both additional light and natural ventilation.



WINTER MODE SCALE 3/16"=1'



SUMMER MODE SCALE 3/16"=1'



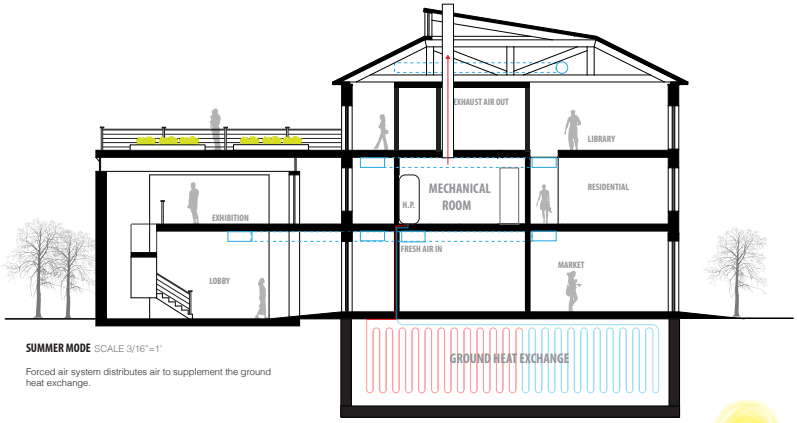
RAIN WATER COLLECTION SCALE 3/16"=1'

A3
+ENERGY SYSTEMS

JUSTIN CHEN | VERONICA LANDRON | BRIDGET NOVIELLI

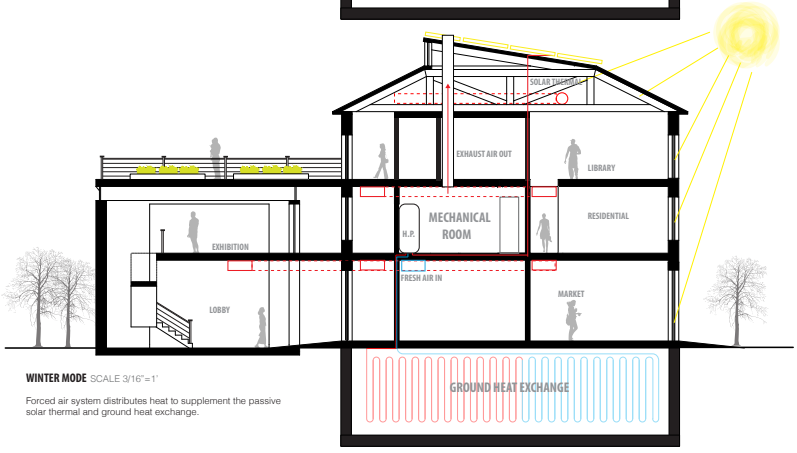
HVAC

The HVAC system complements the passive energy systems with minimal duct heating and cooling. The mechanical room on the second floor in the new core of the existing opera house provides this system.



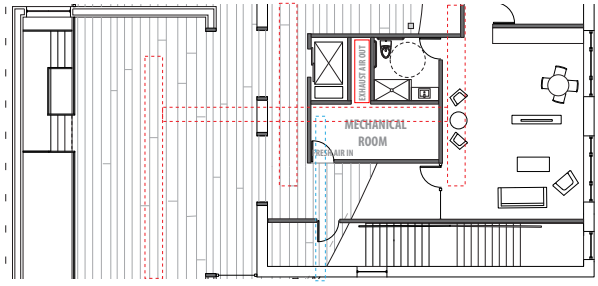
SUMMER MODE SCALE 3/16"=1'

Forced air system distributes air to supplement the ground heat exchange.

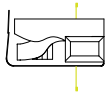


WINTER MODE SCALE 3/16"=1'

Forced air system distributes heat to supplement the passive solar thermal and ground heat exchange.



SECOND LEVEL FLOOR PLAN SCALE 3/16"=1'

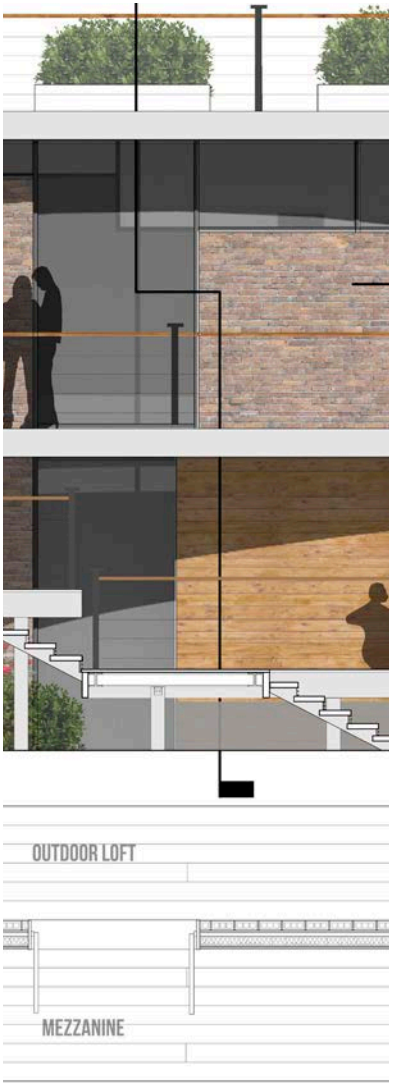


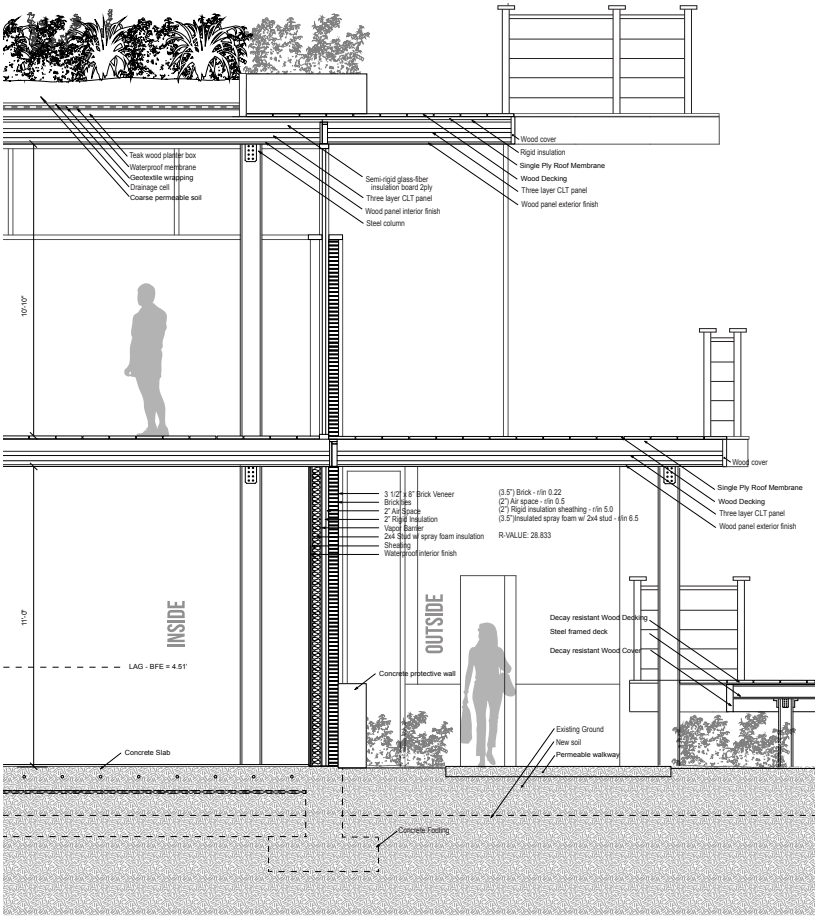
A5
+HVAC

JUSTIN CHEN | VERONICA LANDRON | BRIDGET NOVIELLI

ENVELOPE

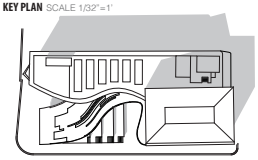
The envelope design helps continue the form of the ESC from exterior to interior.





WALL SECTION SCALE 3/4"=1'

KEY PLAN SCALE 1/32"=1'



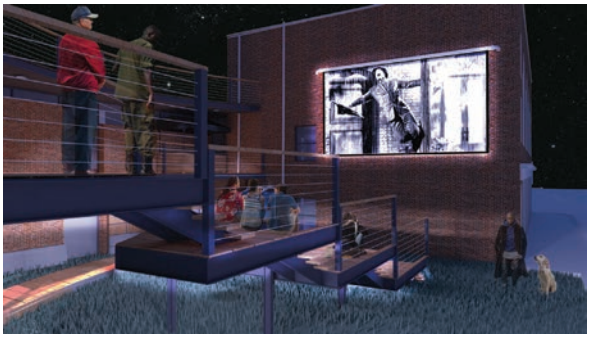
KEY ELEVATION SCALE 1/32"=1'

A6
+ENVELOPE

BRIDGET NOVIELLI | JUSTIN CHEN | VERONICA LANDRON

LIGHTING

The lighting design for each of the spaces promotes flexible and meaningful experiences.



NIGHTTIME VIEW OF THEATER
The lighting design for the outdoor theater space balances a level visibility for circulation and focus on the screen. Spot lights illuminate the flowing path located in the former brownfield site to guide visitors through the site and towards the lobby. Uplighting on the pre-existing brick facade emphasizes its age and respects the historic significance of the Ritz Theatre and Opera House. The lights around the theater screen itend to draw attention to the film of choice.

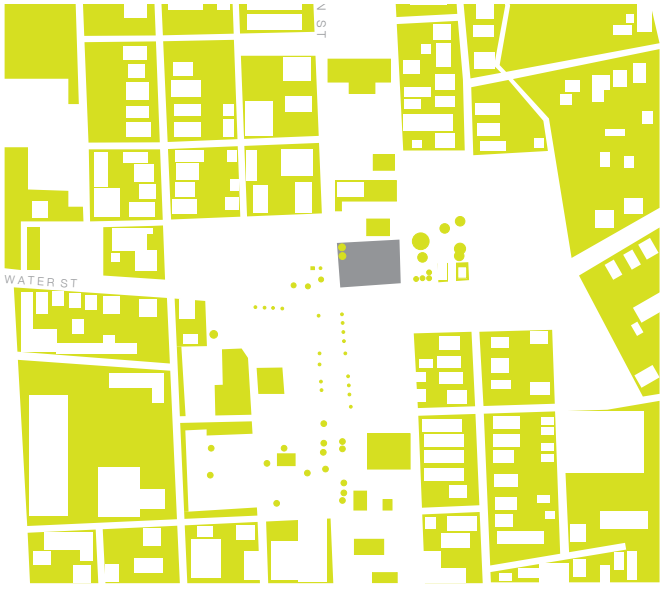
INTERIOR VIEW OF EXHIBIT
The lighting design for the interior exhibition space similarly balances circulation and focus. The temporary exhibition space features an array of ceiling mounted track lights, providing flexible, top-down illumination to any exhibit placed in the gallery. Visitors are guided through the exhibit by the uplit brick, emphasizing the relationship between the old and new.

DAYLIGHTING OF LIBRARY
The lighting design for the library compliments the natural daylighting it receives. A library as a place of study and reflection requires natural light. The historic arched windows of the Opera House allow southern light to illuminate the space, serving as a time clock as its shape changes throughout the day. The artificial lighting scheme provides evenly distributed task lighting for focus.

A7
+LIGHTING
JUSTIN CHEN | VERONICA LANDRON | BRIDGET NOVIELLI

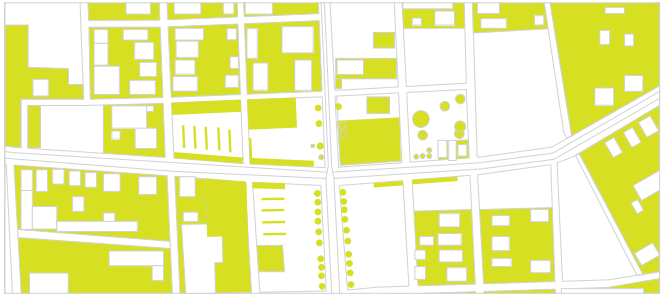
GREEN SPACE

Our recommendations for the site include adding green space and stormwater solutions to the surrounding area, which is dense with parking lots and paved surfaces. This encourages local solutions to take pressure off the stormwater system.



CURRENT GREEN SPACE
our site is surrounded by pavement and it has potential to reduce heat island effect - energy demand due to warming - by adding green space

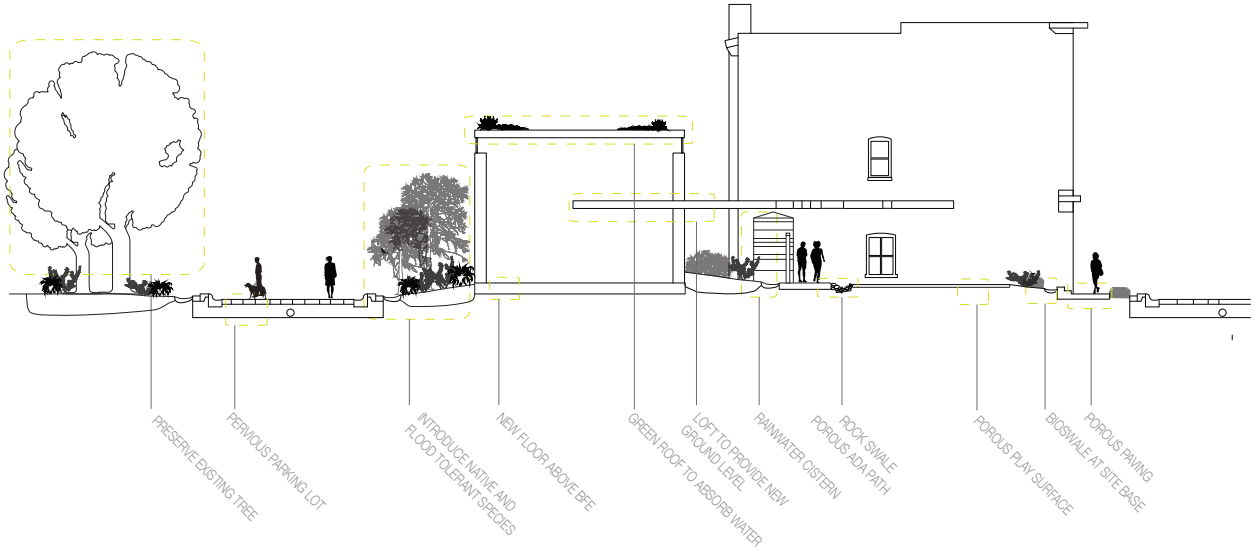
green space
paved area



PROPOSED GREEN SPACE
by adding green space on our site and its context, we intend to create a greater sense of community and wellbeing

FLORA AND SITE SURFACES

The surfaces of our site are important because they affect water drainage.



NATIVE SPECIES


MAIDENHAIR FERN


ROYAL FERN


WILD GINGER GROUND COVER


WHITE WOOD ASTER PERENNIAL


BLUEFALSE INDIGO PERENNIAL


ROSEBAY SHRUB


SERVICEBERRY SMALL TREE


WILD PLUM SMALL TREE

Specified native species will best complement the area and absorb waters. Some of these species are beneficial to flood prone areas. The surfaces and paths of the site will be porous so as to allow for natural drainage of water on site.

PRECEDENTS

We took inspiration from a variety of precedents that affected structure, preservation, form, and material.

Wild Beast
Craig Hodgetts and Hsinming Fung
Valencia, California

STRUCTURE

The Forum, a green-roofed multipurpose hall
D-LIM Architects
Jeju Island, South Korea

GREEN ROOF

Madrid Ware
Arturo Franco
Madrid, Spain

PRESERVATION

Van Dusen Botanical Garden
Busby, Perkins + Will
Vancouver, Canada

MATERIAL

HAVEN COMMAND CENTER

Marlene Sharp, Bernardo Almeida, Andrew Novillo

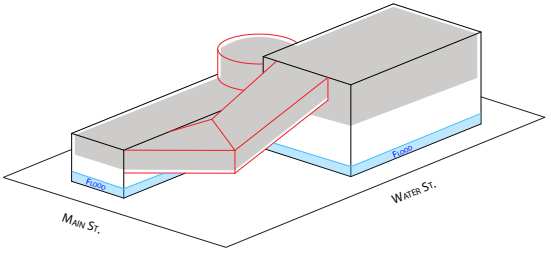
For our project, our focus is on how we can use the surrounding context as a Haven Command Center, both on a daily basis and in times of emergency for the Borough of Muncy. The Haven Command Center will act as a haven in times of natural disasters (floods), and provide shelter, protection and safety for the local community if displacement occurs. It will also act as a command center and base of operations for the government workers and officials to use in emergencies. An educational facility will house a library and archive for historical resources, as well as for educational purposes.

CONCEPT DESCRIPTION AND DIAGRAM

Resiliency is the ability for our project to evolve and withstand ever-changing conditions such as a natural disaster. The Haven Command Center demonstrates resiliency through two ideas.
Our first approach was to maintain the existing historical structures as support to hold up the new construction. Seeing how the existing historical society and borough offices were directly affected by flooding, we used that as our essential program.

This then created the archive, historical exhibition, research and command center in our design and was placed well above base flood elevation, allowing our building to function daily and during times of emergency. Our command center is not the only building to serve the Muncy community, as shelter can also be sought in the local elementary school or fire department.

Shelter Site Map



Concept Diagram

STREET CORNER PERSPECTIVE

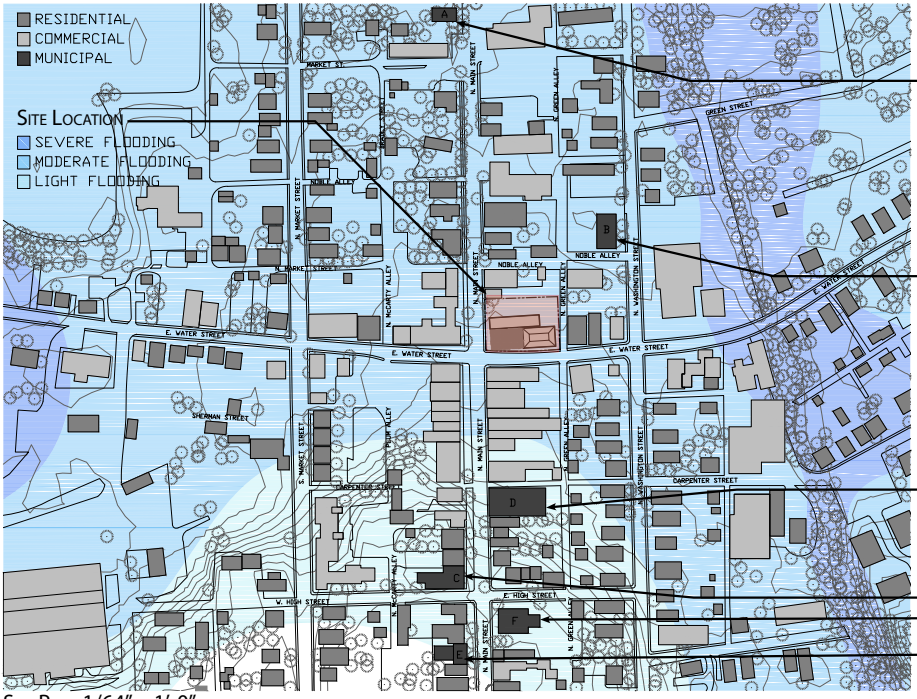
Every Day

Emergency

Every Day vs. Emergency (view from intersection of East Water Street and Main Street)

SITE ANALYSIS

Building Types



Site Plan 1/64" = 1'-0"

Where Is Muncy, Pennsylvania?

Site Location

Context (location and building types)

Municipal Buildings

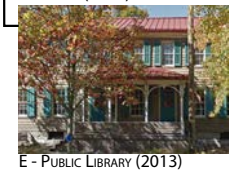
A - Historical Society (2013)

B - Borough Building (2013)

D - Fire Department (2013)

C - District of Justice (2009)

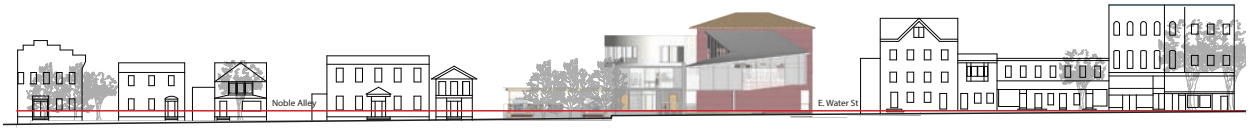
F - USPS (2009)



E - Public Library (2013)

URBAN ANALYSIS

ELEVATION ALONG E. WATER STREET, 1/16" = 1'



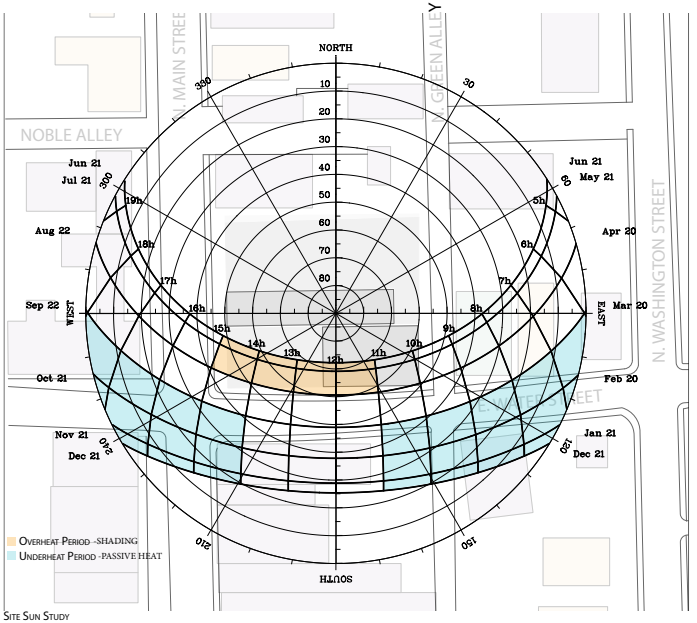
ELEVATION ALONG N. MAIN STREET, 1/16" = 1'

E. WATER STREET SECTION, 1/16" = 1'

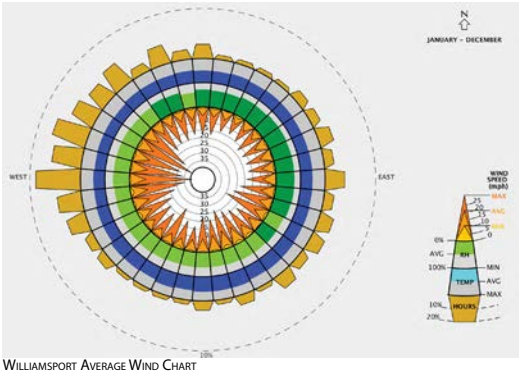
N. MAIN STREET SECTION, 1/16" = 1'

Site Elevations and Sections

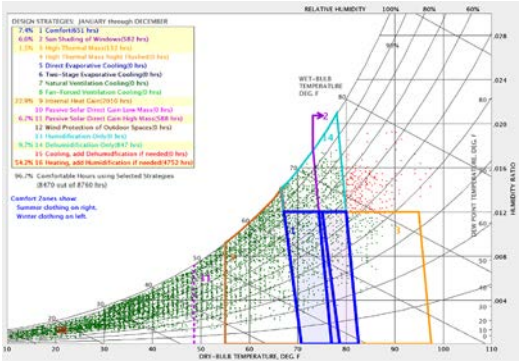
SITE RESOURCES



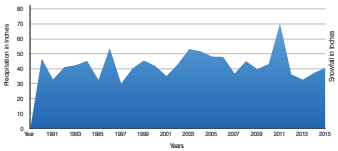
Site Sun Study



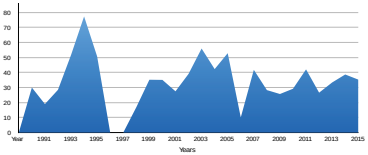
Williamsport Average Wind Chart



Psychometric Chart



Williamsport Liquid Precipitation



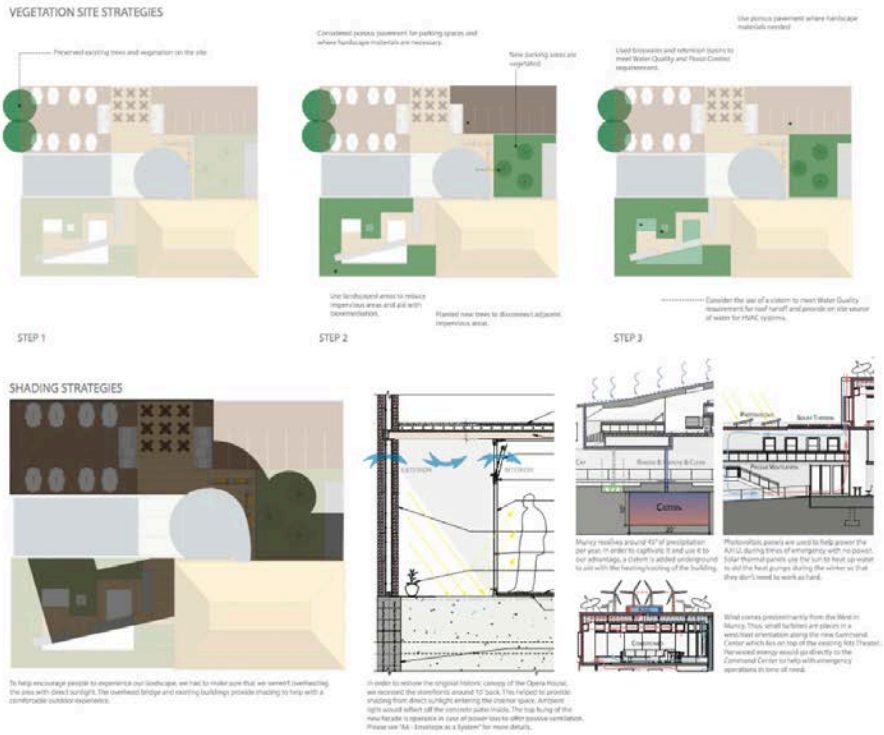
Williamsport Snowfall 1990-2015

Weather conditions in Muncy, PA

We analyzed the direct sunlight that our site would receive as well as how much precipitation and wind there was.

SITE RESOURCES

Greenscape Plan of Surrounding Context

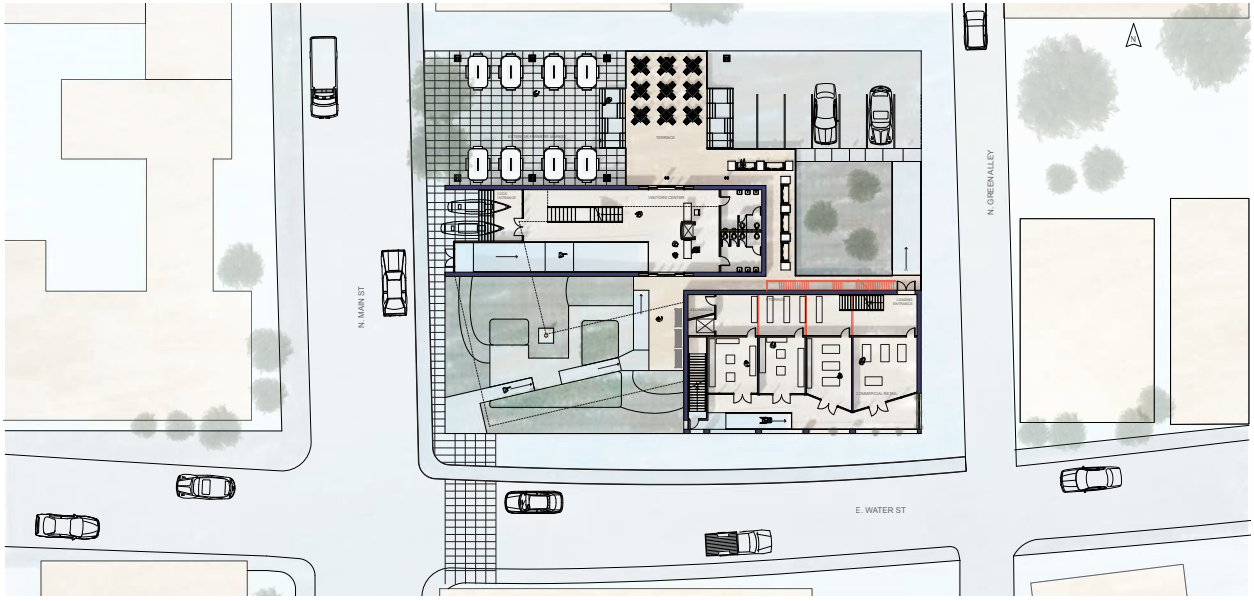


Based on our climate analysis, we were able to incorporate different techniques to efficiently utilize the free energy provided by the environment.

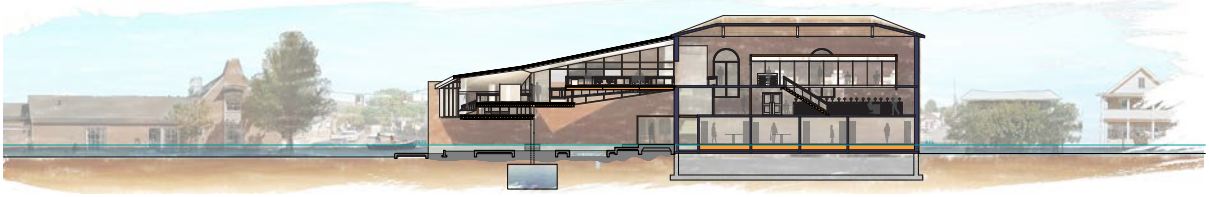
HISTORICAL CANOPY RESTORATION

In order to restore the historic canopy that once existed along the opera house, we recessed the storefront inward about 10' to recreate the facade. This also helps to provide more space for people waking by as the existing sidewalk is narrow.

MASTER PLAN AND SECTION



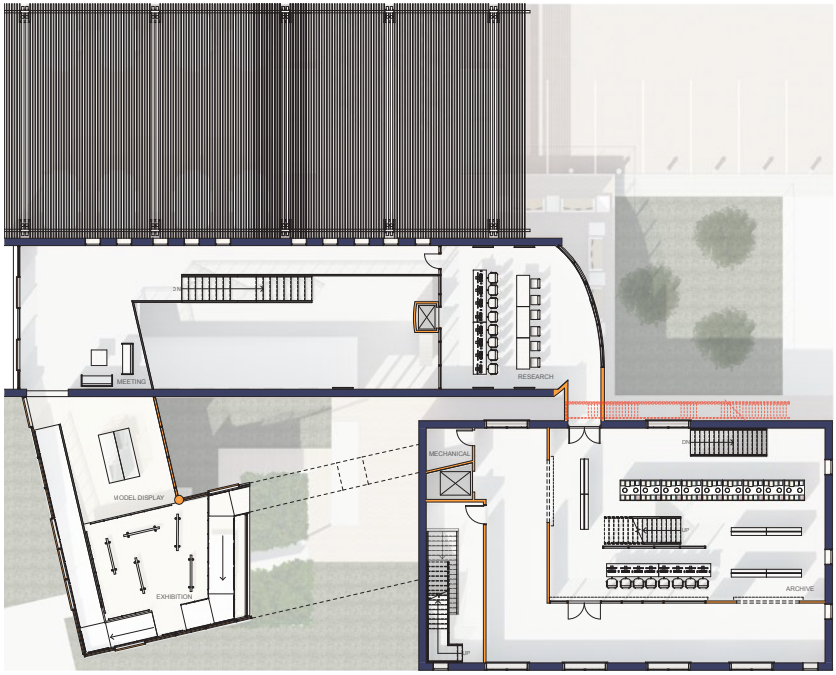
Ground-Floor Plan



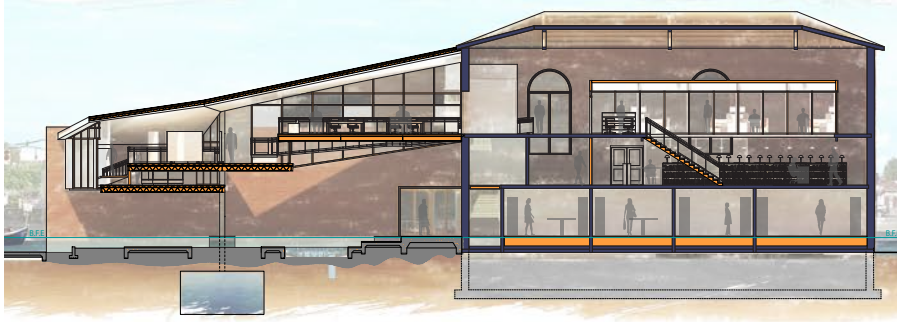
Longitudinal Section through Exhibition and Archive

Looking at an overall urban design, there was an older auto part store that was demolished leaving behind an empty site. In order to restore the street line, while addressing flood issues, the newly constructed bridge cantilevers off the existing buildings as a symbol of resiliency.

PLANS AND SECTIONS

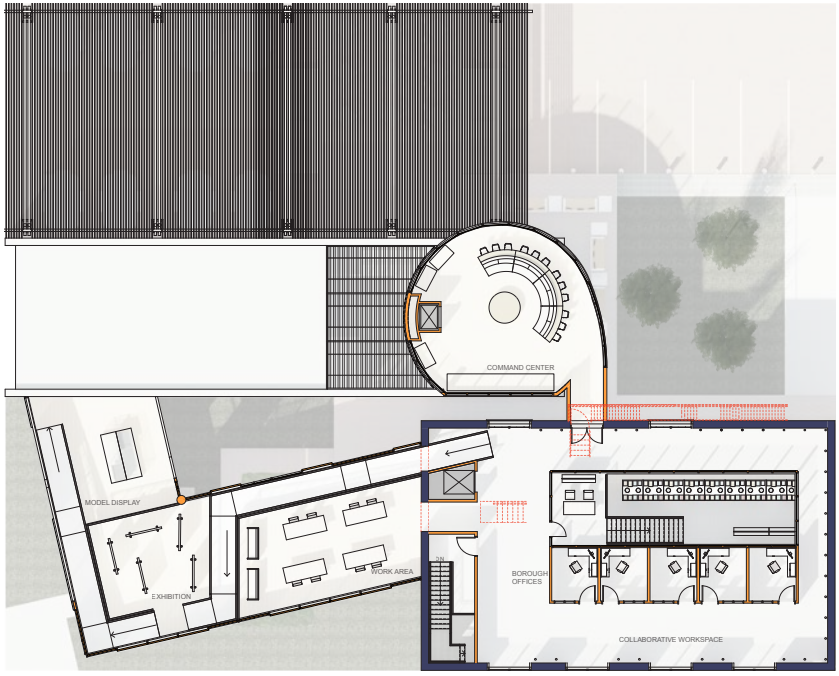


Second-Floor Plan

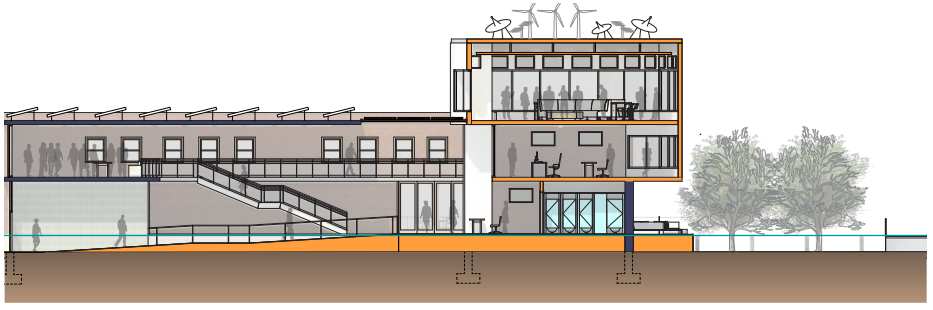


Longitudinal Section through Exhibition and Archive

PLANS AND SECTIONS



Third-Floor Plan

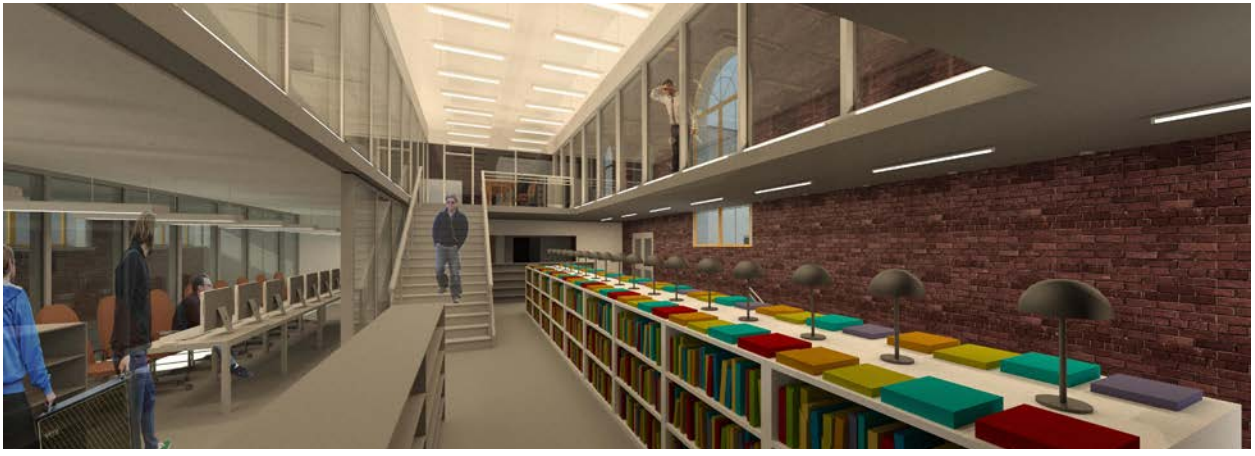


Longitudinal Section through Main Entrance and Command Center

EVER-GROWING ARCHIVE

Seeing how the existing historical society receives about 9’ of flood water, we decided to incorporate that program as a main idea for our project. The archive is a safe haven for historic documents, models, or any items. As time goes on, people can bring their own items to the archive that they would like to preserve, making this an evolving space.

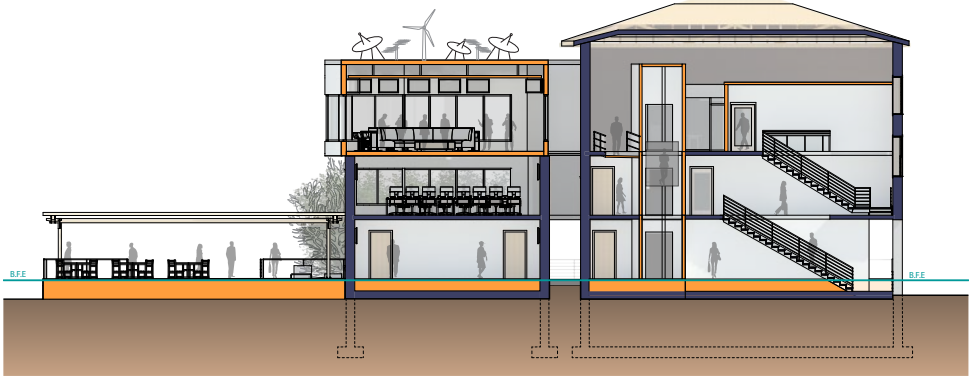
View from outside the archive



View from inside the archive

TRANSVERSE SECTION AND COMMAND CENTER

Government officials don't really have a place to gather and plan in Muncy. We added a command center on top of the existing Ritz Theater. The circular geometry helps provide views of the entire Muncy area as well as displaying critical information on TVs. Officials would be able to gather here in time of emergency with quick access to historical archives.

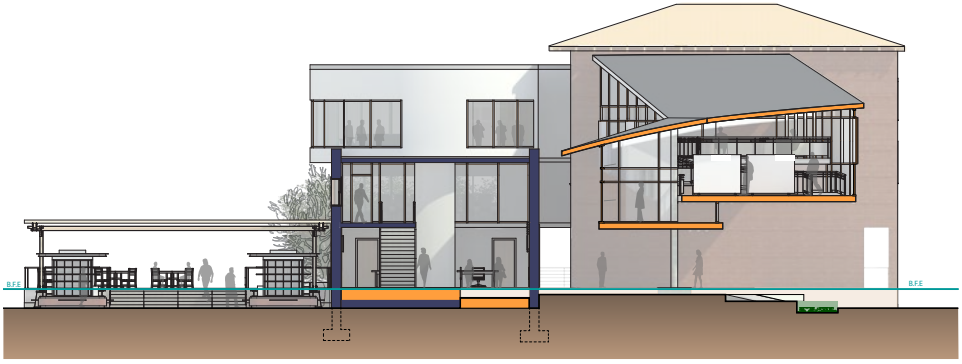


Transverse Section through Command Center and Farmers' Market

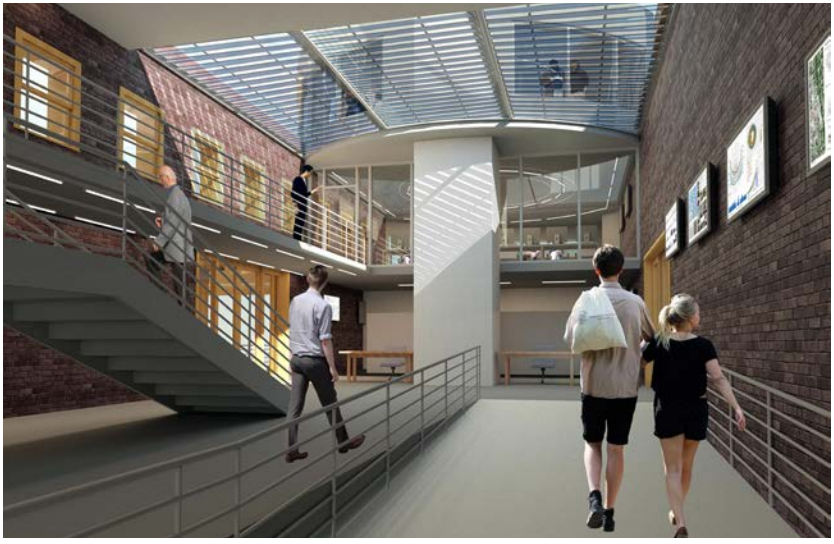
View from Command Center

TRANSVERSE SECTION AND MAIN ENTRANCE

The main entrance incorporates a long ramp to get you off the base flood elevation as quickly as possible. Along the existing walls of the Ritz Theater are TVs displaying daily information about Muncy. The theater becomes a circulation hub with access to the continuous loop and surrounding landscape. You can also view the new command center through the glass ceiling. Solar thermal panels on top of the glass help provide shading for the theater.



Transverse Section through Exhibition and Main Entrance



View from Main Entrance towards Command Center

FARMERS' MARKET AND EXHIBITION SPACE

To help encourage the growth of the community, we added a farmers' market on top of the existing parking lot (there is no local grocery store). Porous materials aid with drainage in the event of a flood.

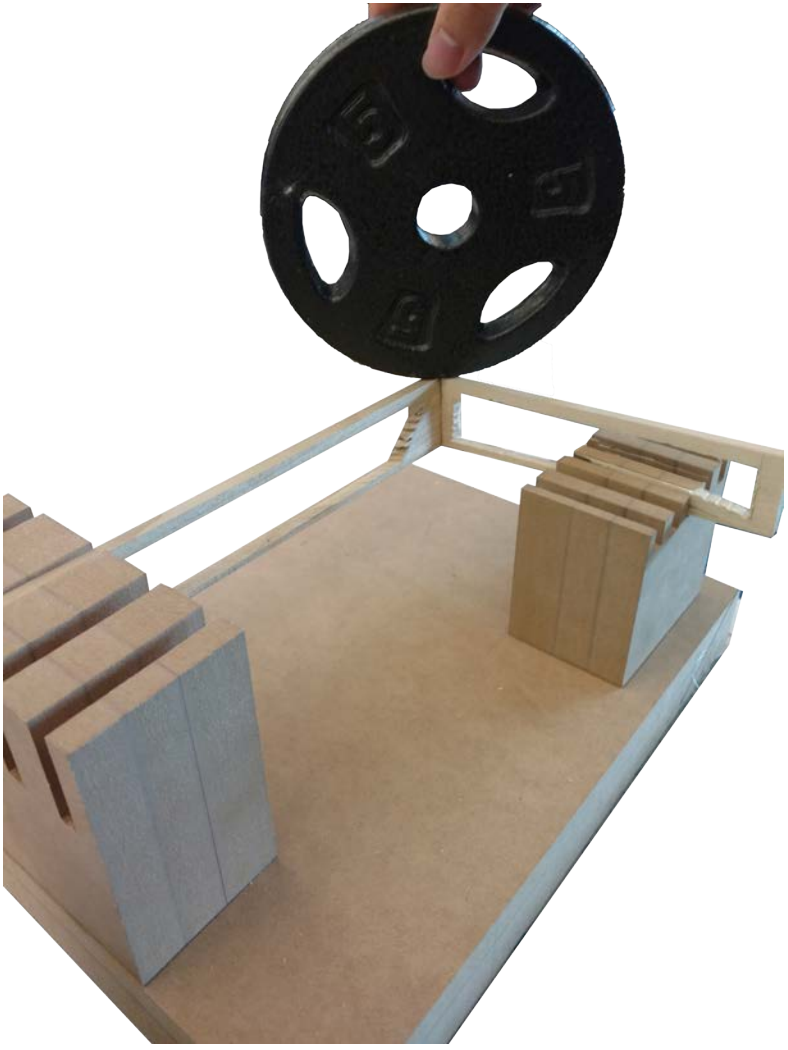
Looking down into the exhibition, you see the ramps divide the sublevels. Parts of the facade allow you to see clearly outside, while other parts allow only ambient lighting in.

View of Farmers' Market from Main Street

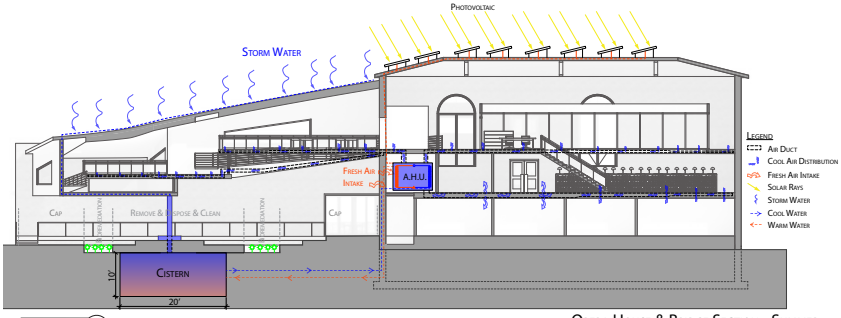
View from Exhibition

WILL IT STAND?

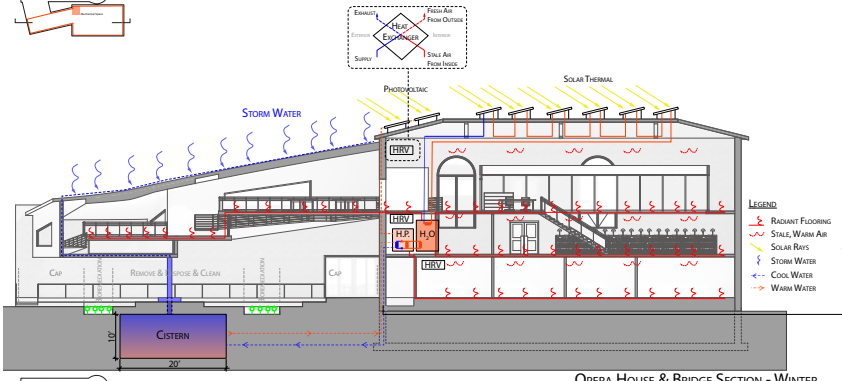
Studying if this project was structurally feasible, we used a box truss system spanning over the empty lot, using the existing buildings as anchors. Even without the column, the scaled model was able to support a weight on its own. Later a column was added for rigidity, doubling over as a storm drain pipe into the cistern below ground.



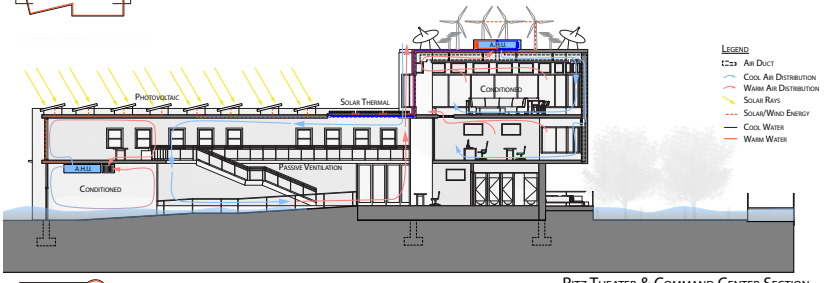
ENERGY SYSTEMS AND RESOURCES



Opera House & Bridge Section - Summer



Opera House & Bridge Section - Winter



Ritz Theater & Command Center Section

Landscape: Broken down into three different parts utilizing bioremediation, capping, and remove and disposal and clean.

Bioremediation: Using Biological life (plants) to clean up contaminated soil and groundwater.

Capping: Pouring a concrete slab on top of existing contaminated soil.

Remove and Disposal and Clean: Digging up the existing soil, cleaning it, and placing it back to original location.

Energy Systems: Utilizing the sun and stormwater in an effort to ventilate the building.

Stormwater: Fills the cistern, which becomes a ground source for the heat pump.

Photovoltaic: Helps power the heat pump in winter and air handling unit in the summer.

Solar Thermal: Helps heat the water as it passes through the radiant flooring.

HVAC: Creating a comfortable environment inside the building.

Summer: A water to air cooling system is utilized. Cool air gets distributed by air ducts by the air handling unit. Heat gets transferred into the cistern.

Winter: A water to water heating system is utilized. Heat gets dispersed by radiant flooring. The heat pump utilizes warmer water from the cistern and is powered by photovoltaic panels on the roof.

Landscape: Broken down into three different parts utilizing bioremediation, capping, and remove & disposal & clean.
Bioremediation: Using Biological life (Plants) to clean up contaminated soil and groundwater.
Capping: Pouring a concrete slab on top of existing contaminated soil.
Remove & Disposal & Cleanc: Digging up the existing soil, cleaning it, and placing it back to original location.

Energy Systems: Utilizing the sun and storm water in an effort to ventilate the building.
Storm Water: Fills the Cistern which becomes a ground source for the heat pump.
Photovoltaic: Helps power the heat pump in winter and air handling unit in the summer.
Solar Thermal: Helps heat the water as it passes through the radiant flooring.

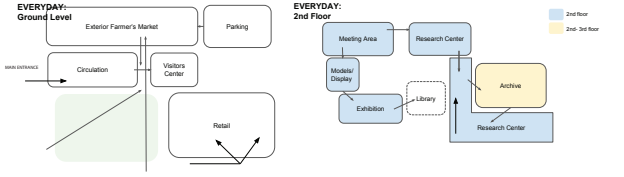
HVAC: Creating a comfortable environment inside the building.
Summer: A water to air cooling system is utilized. Cool air gets distributed by air ducts by the air handling unit. heat gets transferred into the cistern.
Winter: A water to water heating system is utilized. Heat gets dispersed by radiant flooring. The heat pump utilizes warmer water from the cistern and is powered by photovoltaic panels on the roof.

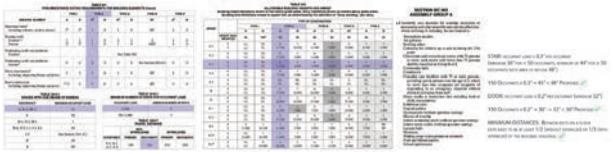
Cistern Sizing:
~2,000 sq. ft. Bridge Roof Catchment Area
~35" Precipitation Per Year
---> ~20 Gallons/sq. ft.
2,000 sq. ft. x 20 Gallons/sq.ft. = 40,000 Gallons
Tank Size = 20' x 10' x 36'

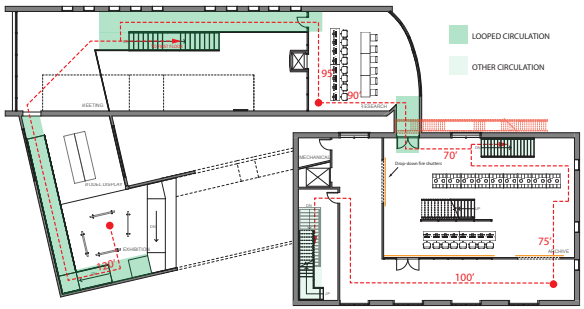
Ritz Theater:
Subdividing into three different zones, Air handling units control the Command Center and meeting spaces, both vital in times of emergency. Passive Ventilation controls the circulation part of the theater. Air travels through a vertical cavity behind the elevator, being moved around by blowers. In order to power the air handling units, photovoltaic panels and wind turbines supply energy in case of an emergency situation. As glass is used as a roof material, solar thermal panels help shade the space below, while aiding the A.H.U. above the Command Center.

FIRE SAFETY AND CIRCULATION

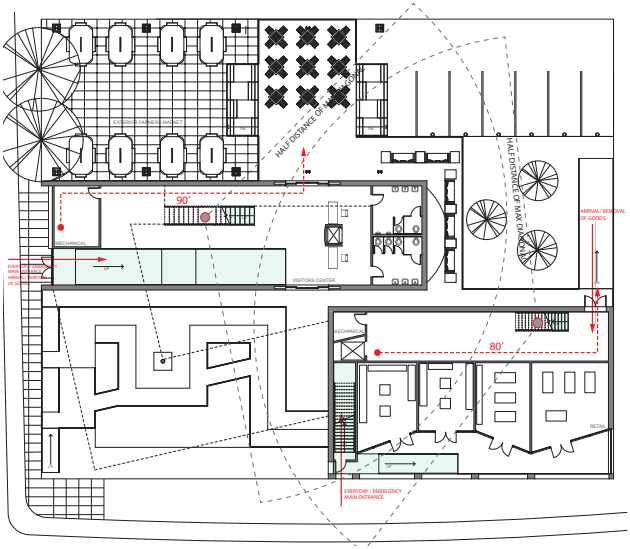
We created a circulation loop throughout the building using ramps and catwalks, allowing you to experience all the important programmatic spaces. In the event of a fire, shutters would drop down, sealing the archive as a safe box within the building. Referring to the building code, our project follows the requirements for travel distances in an emergency.



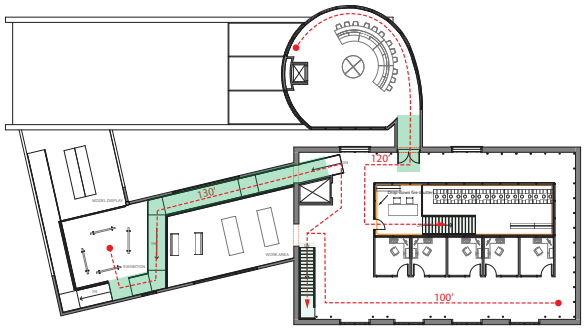




Second Floor Plan



First-Floor Plan

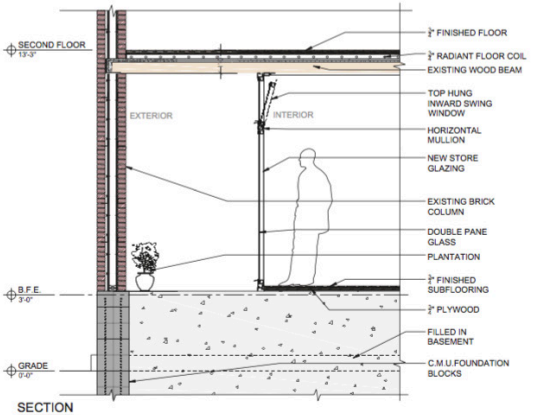


Third-Floor Plan

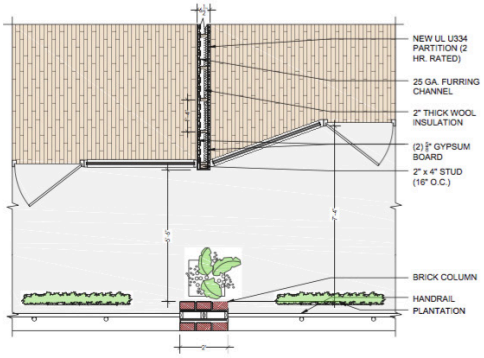
ENVELOPE AS A SYSTEM

As the original historical opera house included a canopy, we chose to restore that feature as a sign of resilience by pushing the first-floor storefront back. In order to deal with the base flood elevation, concrete would be used to fill in the existing basement up until 3’ above grade. The porous nature of concrete would withstand flooding by draining the water to the soil below. The existing brick columns will be kept in order to support the second floor above. Because the storefront is set back 10’ from the sidewalk, no direct sunlight would enter and overheat the space. Instead, ambient lighting would be provided by the reflection off the concrete patio. Interior partitions will be reconstructed to meet two-hour fire rating. In order to allow for natural ventilation in the case of power loss, the top hung of the storefront can be opened to allow for passive ventilation on the second floor.

ELEVATION
1-½" = 1'-0"



SECTION
1-½" = 1'-0"



PLAN

AS THE ORIGINAL HISTORICAL OPERA HOUSE INCLUDED A CANOPY, WE CHOSE TO RESTORE THAT FEATURE AS A SIGN OF RESILIENCE BY PUSHING THE FIRST FLOOR STORE FRONT BACK. IN ORDER TO DEAL WITH THE BASE FLOOD ELEVATION, CONCRETE WOULD BE USED TO FILL IN THE EXISTING BASEMENT UP UNTIL 3' ABOVE GRADE. THE POROUS NATURE OF CONCRETE WOULD WITHSTAND FLOODING, BY DRAINING THE WATER TO THE SOIL BELOW. THE EXISTING BRICK COLUMNS WILL BE KEPT IN ORDER TO SUPPORT THE SECOND FLOOR ABOVE.

SINCE THE STOREFRONT IS SET BACK 10' FROM THE SIDEWALK, NO DIRECT SUNLIGHT WOULD ENTER AND OVERHEAT THE SPACE. INSTEAD, AMBIENT LIGHTING WOULD BE PROVIDED BY THE REFLECTION OFF THE CONCRETE PATIO. INTERIOR PARTITIONS WILL BE RECONSTRUCTED TO MEET 2-HR FIRE RATING. IN ORDER TO ALLOW FOR NATURAL VENTILATION IN THE CASE OF POWER LOSS, THE TOP HUNG OF THE STORE FRONT CAN BE OPENED TO ALLOW FOR PASSIVE VENTILATION ON THE SECOND FLOOR. A LAYER OF RADIANT FLOORING WOULD BE APPLIED BELOW THE NEW FINISHED FLOOR TO PROVIDE HEATING DURING THE WINTER.

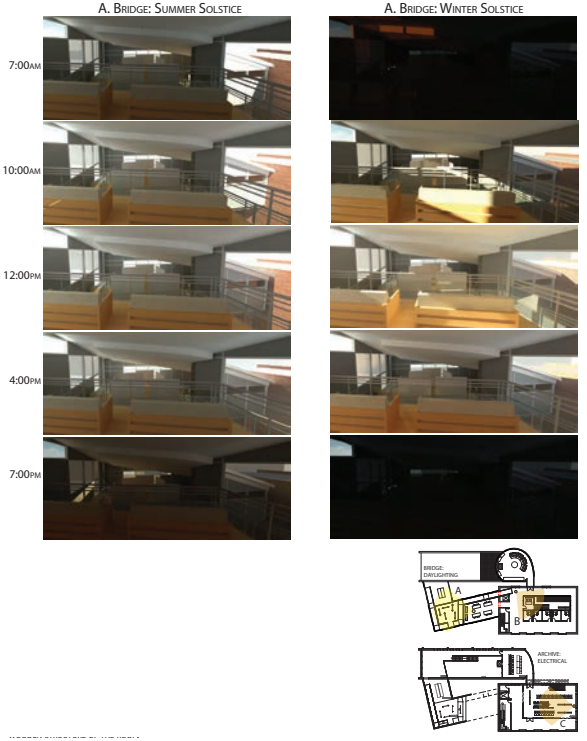
KEY ELEVATION

ARCHITECTURE AND LIGHT

With daylighting, we are trying to bring natural light into the main entrance lobby through the existing windows of the theater. By including a new partial glass roof, direct sunlight can hit the command center, highlighting it as a place of arrival once you enter the building. Because there are no southern windows along the theater, ambient lighting helps you see the ramp and lobby as well.

With electrical lighting, we are trying to highlight the archive and make it stand out as an important part of our program. The archive is designed to be a safe haven within the historical opera house, enclosed from exterior elements. As it is located at an intersection between the bridge's ramps and the command center, we wanted light to help highlight the space as you approach. The bright light from within the archive penetrates the glass walls and illuminates the bordering brick existing facade of the opera house. Uplights placed along the perimeter help to highlight the rough texture of the brick wall and the aged wooden structure of the roof.

Daylighting



Electrical Lighting

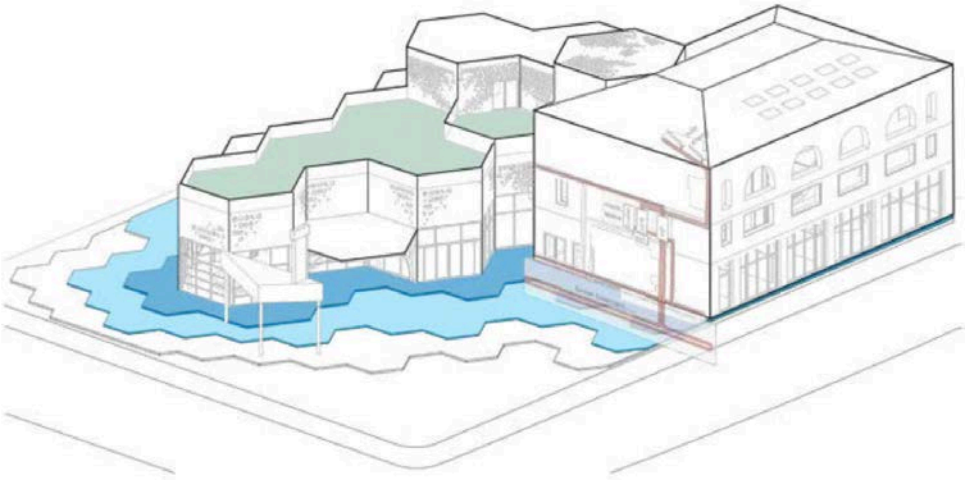
B. View from outside the Archive

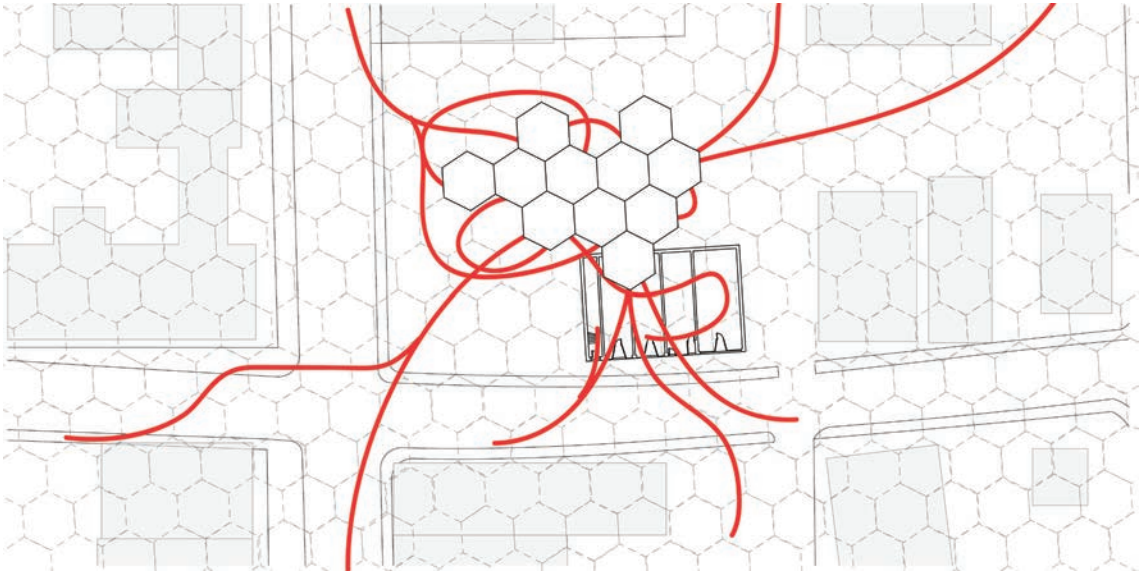
C. View from inside the Archive

HEXAGON

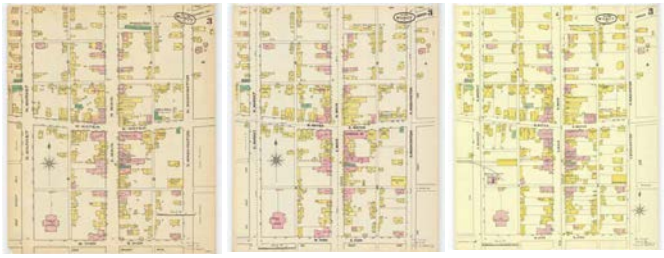
Lojean Alali, Christopher Scalzo, Savannah Cranford

The resilience of this project is grounded in the historical importance of the site to the community. We acknowledge the need for any structure at this location to withstand the ecological challenges that so often confront this community, flooding. Our strategy for resilience is to combine preservation of the opera house's exterior with retrofitting its interior into the Resiliency Center, housing the essential program for flood-resilience research and education. The site of the Ritz Theater respects the history of the site by providing a use of importance to the community - a new market space. To address flooding, the project uses are organized on vertical strata: classrooms, kitchens, mechanical spaces, and all sensitive materials and technologies are elevated to the second and third levels, 14' above grade, to be above all risk of flooding. The ground level is reserved for more flexible uses (such as exhibition and market) that are designed using 'wet-proof' flood strategies to withstand a potential flood. The landscape design, a series of hexagonal terraces, step up 21 inches, above the 100-year flood level, to minimize the effect of flooding. Consistent with Army Corp of Engineering recommendations, the existing opera house basement is to be filled in and replaced with a system of closed-loop coolant pipes that extract energy for use in the building's heating and cooling system. We are proposing a design reliant on passive and regenerative systems that best make use of the site's natural conditions and showcase measures for resilience.

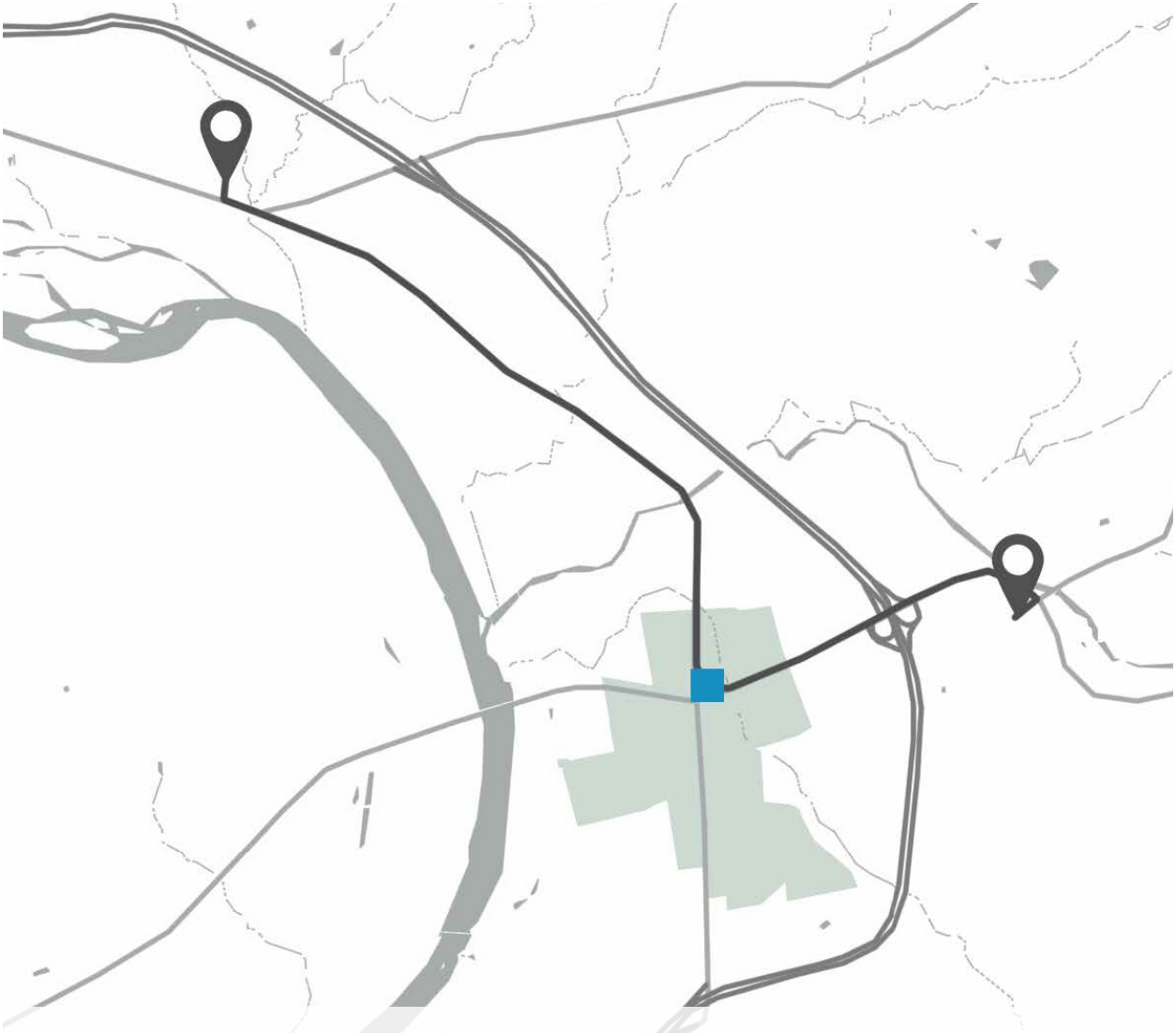




The project site is situated at Muncy's central intersection, defined by two important and historic streets and adjacent to the existing commercial strip. Despite the development of a commercial center, the town continues to lack a central public space. Moreover, there is no market or grocer within the city center, although historically a grocer existed at the location of the Ritz Theater. Thus, the location is ideal to provide the community with a central public space that will complement the commercial district and foster community activities such as the monthly "Fourth Friday" event. As our central idea, we are proposing marrying the program of the Resilience Center of Excellence with a new central public market.



Muncy's Fourth Friday is a monthly tradition that unites community members around their own artisans, craftsmen, restaurateurs, and other specialty tradesmen, and is therefore an appropriate social model to guide the development of this project.



Community history and need guided our decision to include a public market on the site to complement the resiliency center program, including (1) a grocer had historically existed the current site as archived by the 1885, 1890, and 1896 Sanborn Map records, and (2) that currently no market exists within the borough's limits.

We have concluded that the best design approach for a new addition to the historic Muncy Opera House and for a central architecture is one that contrasts with the existing formal and material languages of the surrounding context, so that it becomes the identifiable and iconic center. More importantly, the geometry of a hexagon allows for decentralization within the architecture, promoting connection between interior and exterior spaces on the site and connecting the physical community. Hexagons are the simplest non-quadrilateral geometric form that can be connected and multiplied outward, suggesting an infinite array. Furthermore, the multidirectional nature of the hexagon creates paths that encourage connection within the community and to natural and climatic features of the site.

Level-One Plan

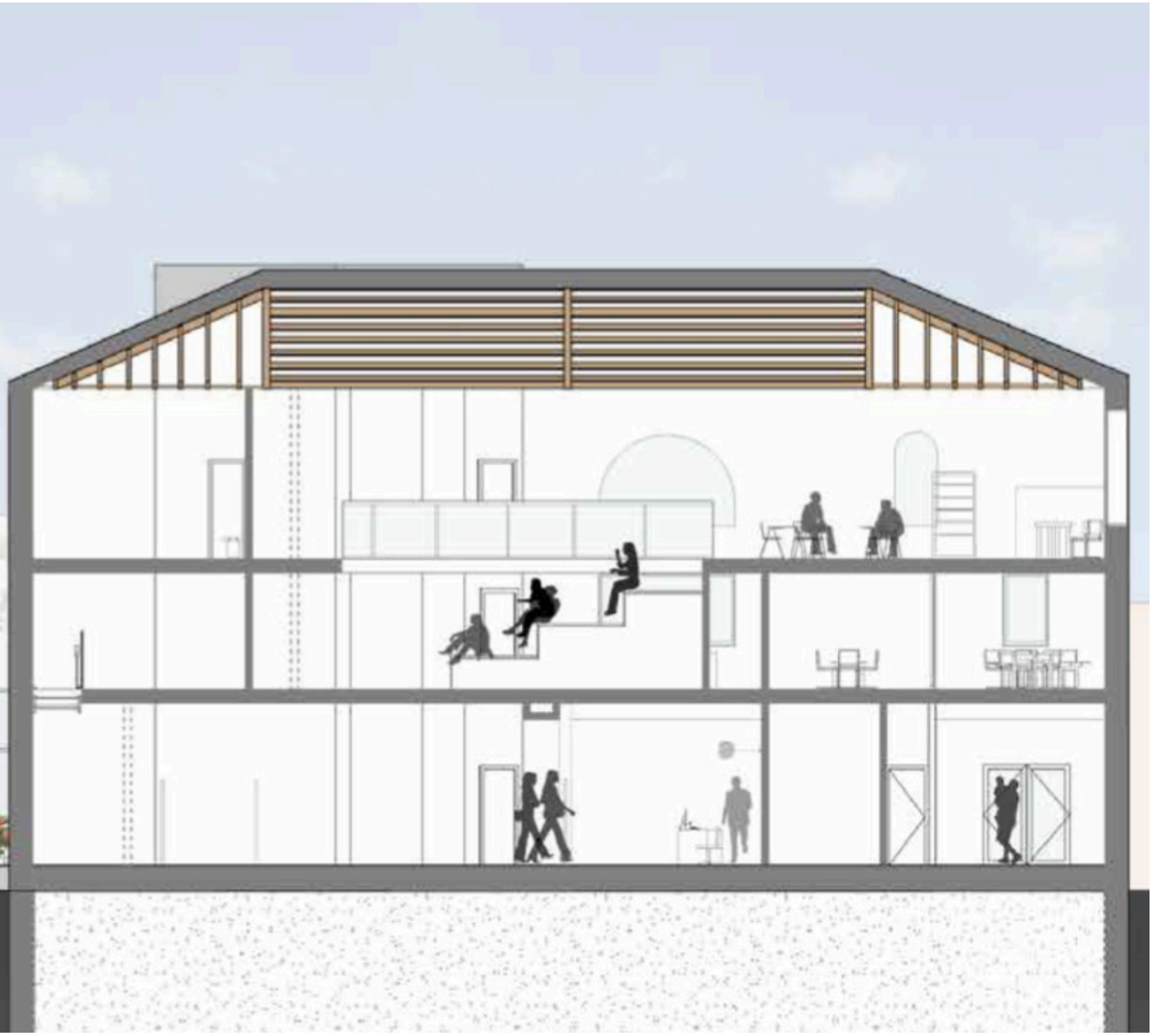
Level-Two Plan

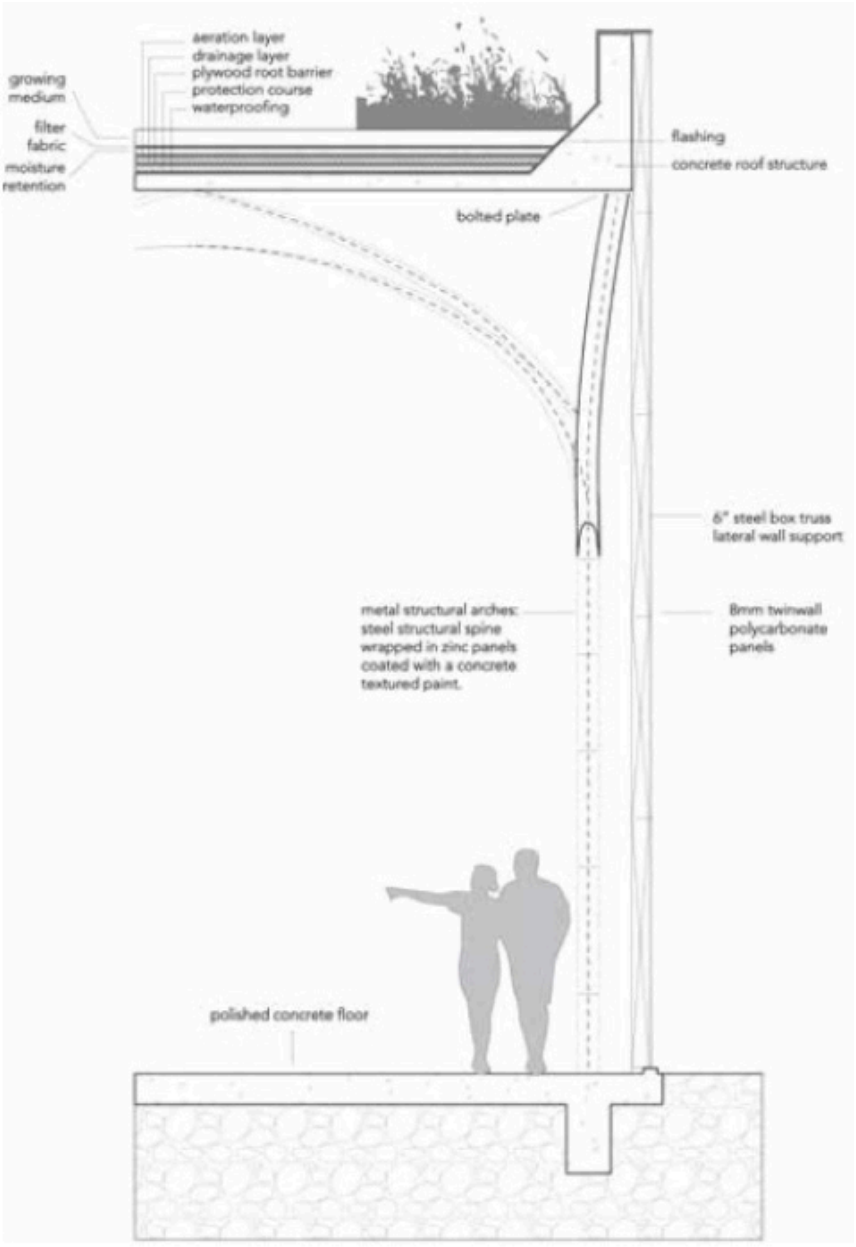
Level-Three Plan

Ornate structural columns were devised to maximize central space of each hexagonal unit, diverting structural load to the edge of the geometry. Translucent and flood-proof materials clad the exterior of the new market space.

Accessible Green roofs serve as another opportunity for community interaction providing small-scale gardening and basic harvesting adjacent to a community kitchen space on the upper level of the market.

Our proposal is divided into two horizontal zones, the Muncy Market at the intersection of the streets and the elevated Muncy Resiliency Center for Excellence. The Resiliency Center includes educational and civic spaces - libraries, computer and classroom spaces, community forums, galleries, archives, and Borough office space and meetings spaces – elevated above the danger of flooding. The Muncy Market provides a complementary program to benefit the community and demonstrate methods for building on a site at risk of flooding. Community spaces on the ground level - market stalls, exhibition spaces, and lobbies - can temporarily move or withstand flooding. Accepting the reality of Muncy's tendency for flooding, a successful design cannot resist such inevitability, but rather explore means to embrace it.

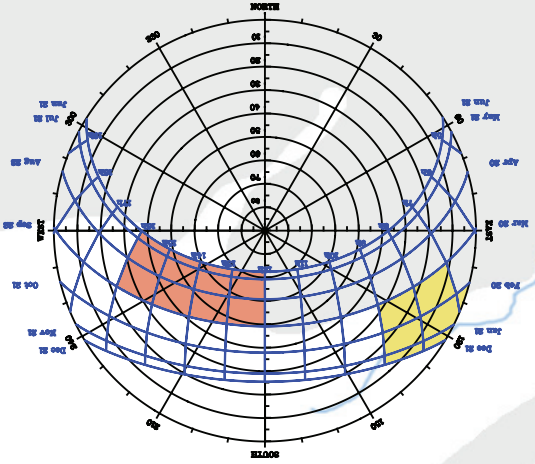



aeration layer
drainage layer
plywood root barrier
protection course
waterproofing
growing medium
filter fabric
moisture retention
flashing
concrete roof structure
bolted plate
6" steel box truss lateral wall support
metal structural arches: steel structural spine wrapped in zinc panels coated with a concrete textured paint.
8mm twinwall polycarbonate panels
polished concrete floor

SOLAR CHART

Need for heat gain, winter nights.

Avoid heat gain, summer afternoons.



MUNCY, PA

State College

Harrisburg

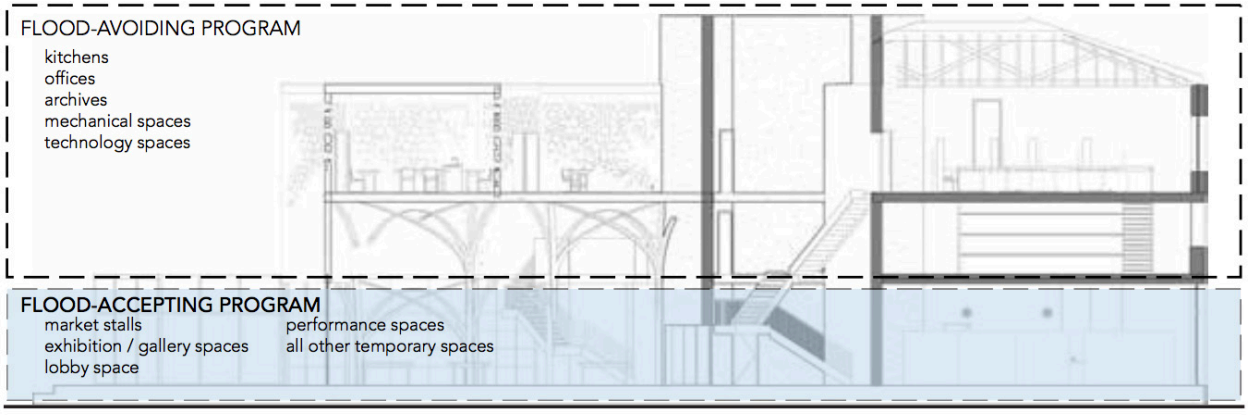
Ornately etched translucent cladding regulate sunlight in the market spaces, providing daylight without glare and assisting with temperature regulation on the interior of the market. The pattern of openings vary depending of the façade to address lighting and natural ventilation based on cardinal direction and seasonal climate conditions.

The Ritz Theater marquis, a symbol of Muncy's legacy through history, is preserved as an iconic, monumental sculpture on the site. It serves as an informational bulletin for upcoming community events at the market, resiliency center, or around town.

Open, delicate and light, the design for the Muncy Market strives to anchor the community's center geographically and socially. Largely open, spaces invite the community to explore and freely negotiate between the interior market and the generous plaza spaces outside.

Acknowledging the reality of Muncy's tendency for severe flooding, a successful design must not seek to resist such inevitability, but rather explore means to embrace it.

100-year floodplain

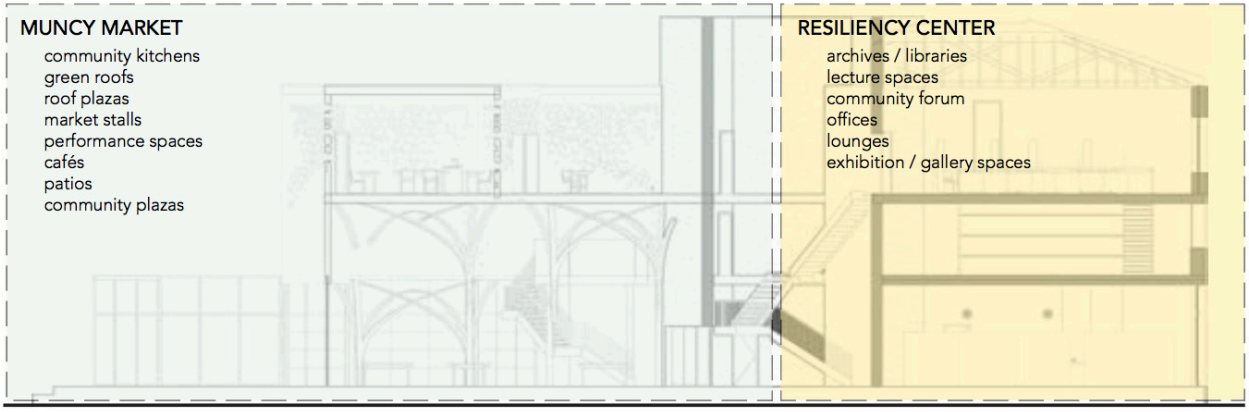


vertical strata

Anticipating future floods, the Muncy Market and Resiliency Center are organized on two axes of strata: vertical and horizontal. Our strategy for flood resilience exists in our approach of the vertical: all program and space hosting material and technology sensitive or endangered by the onset of floodwaters are merely reserved to the upper floors.

Mechanical spaces, computer spaces, kitchens, archives, etc., are found only above.

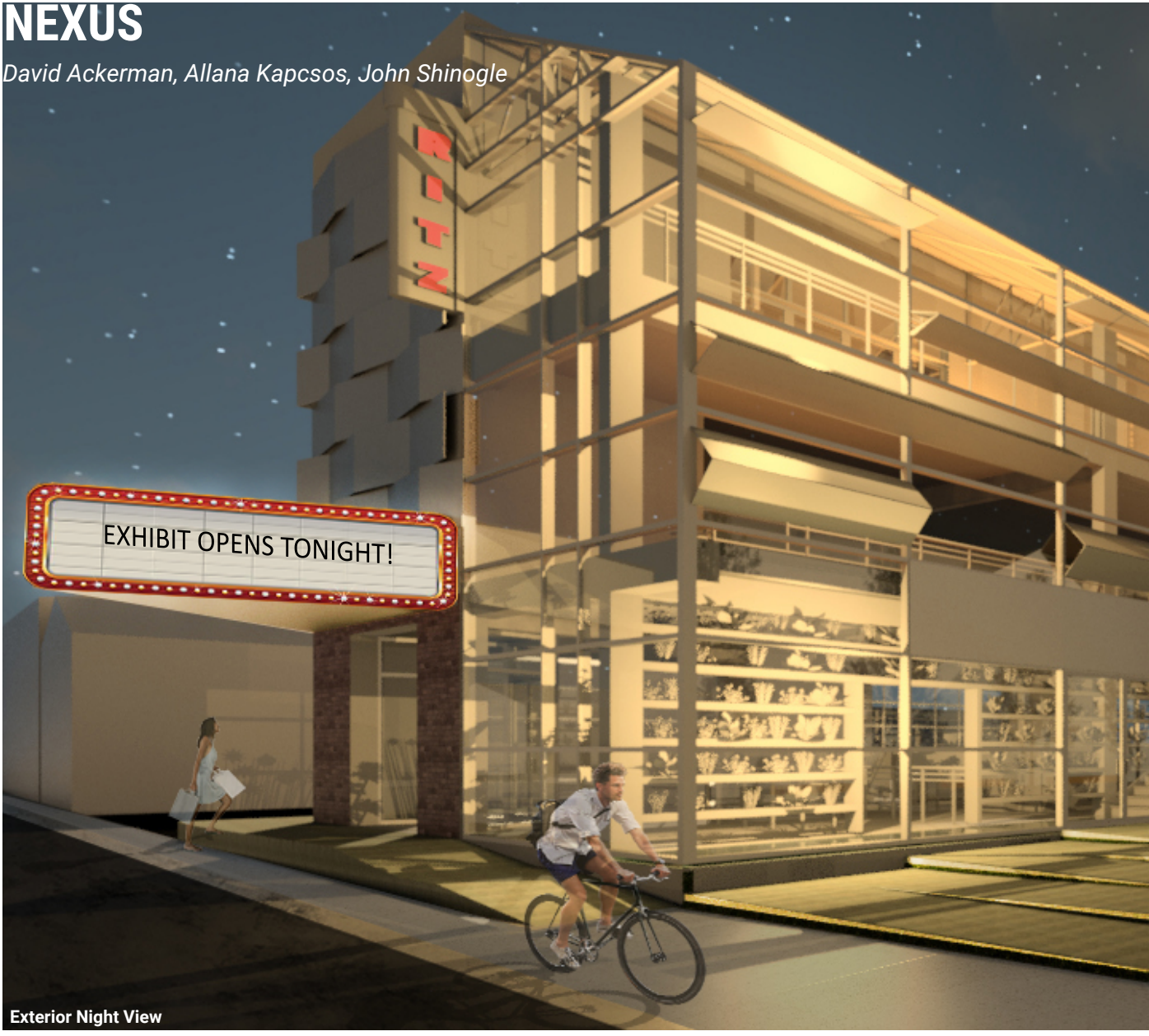
Reserved for the ground level are all spaces that are by some nature temporary, mobile, or accepting of future floodwaters: market stalls, gallery spaces, lobbies, etc.



horizontal strata

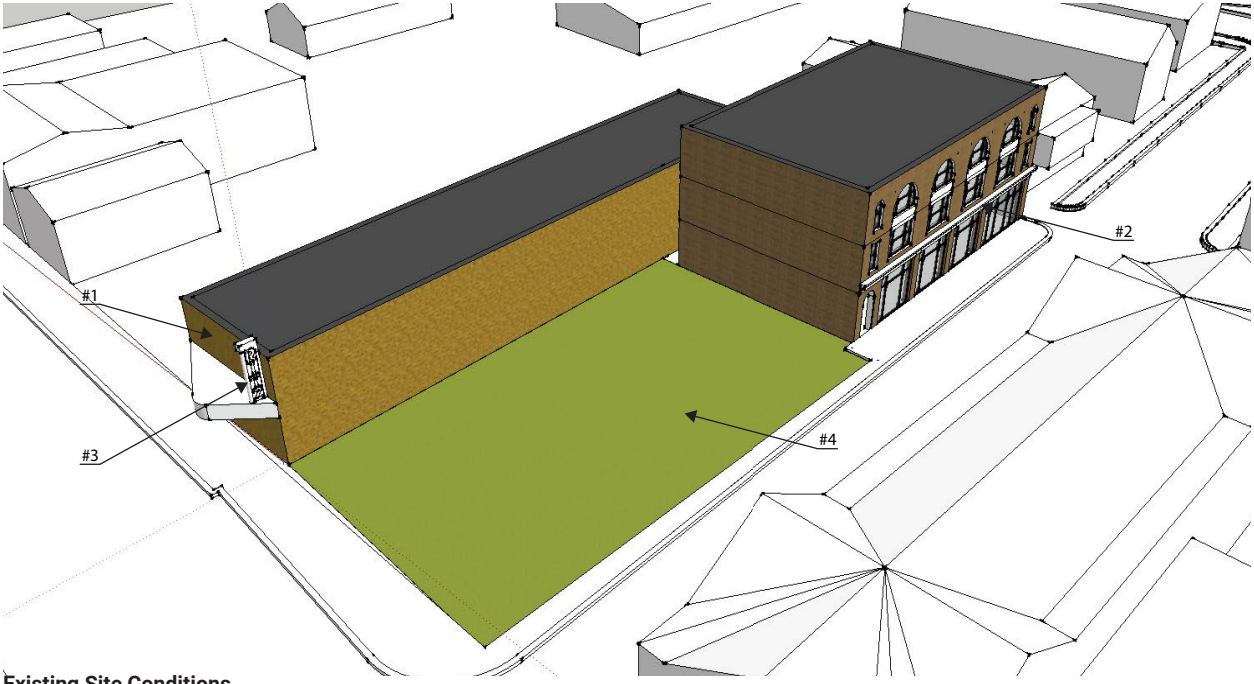
NEXUS

David Ackerman, Allana Kapcsos, John Shinogle



Exterior Night View

SITE RESOURCES



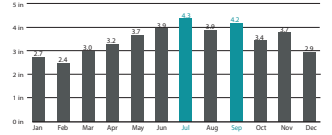
Existing Site Conditions

GRASSES + VEGETATION ON BROWNFIELD

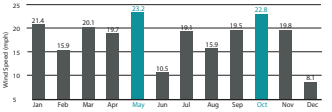
BRICK ON RITZ THEATRE + MOZELY's OPERA HOUSE

Existing Site Materials

AVERAGE RAINFALL & WIND SPEED



During the months of July and September when the precipitin is at its highest, the rainfall will be incorporated into efficient solutions and flood control.



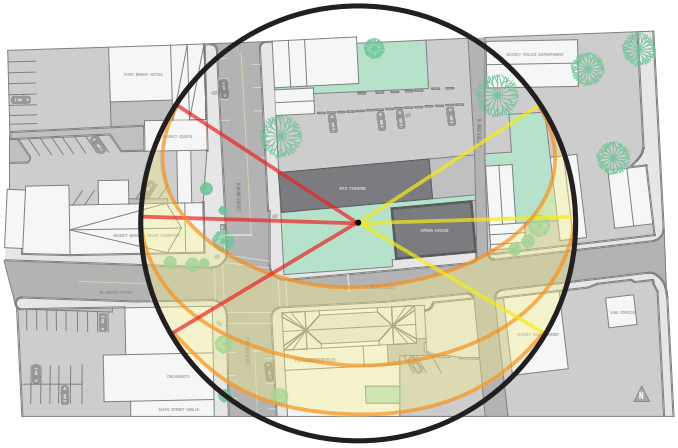
The annual average wind speed for Muncy, PA is 18.01 mph. With the highest wind speed in May at 23.2 mph and the lowest wind speed in December at 8.1 mph. Wind turbines need a minimum 5 mph winds to generate electricity, therefore all twelve months can be incorporated into wind efficiency systems.

Average Wind Speed and Temperatures

AVERAGE TEMPERATURE

MONTH	AVG. HI	AVG. LO
JAN	34.2	19.3
FEB	38.0	21.4
MAR	47.9	28.6
APR	60.9	38.9
MAY	71.5	47.9
JUN	79.7	57.6
JUL	83.6	61.9
AUG	81.6	60.7
SEP	73.5	53.1
OCT	62.0	41.5
NOV	49.9	33.3
DEC	38.1	24.3

While paying attention to the highest and lowest temperatures of Muncy, these are the specific months in which energy site resources will be incorporated to heating and cooling.



Seasonal Sun Path Diagram

FLOODPLAIN

100-YR FLOODPLAIN

SITE CONTEXT

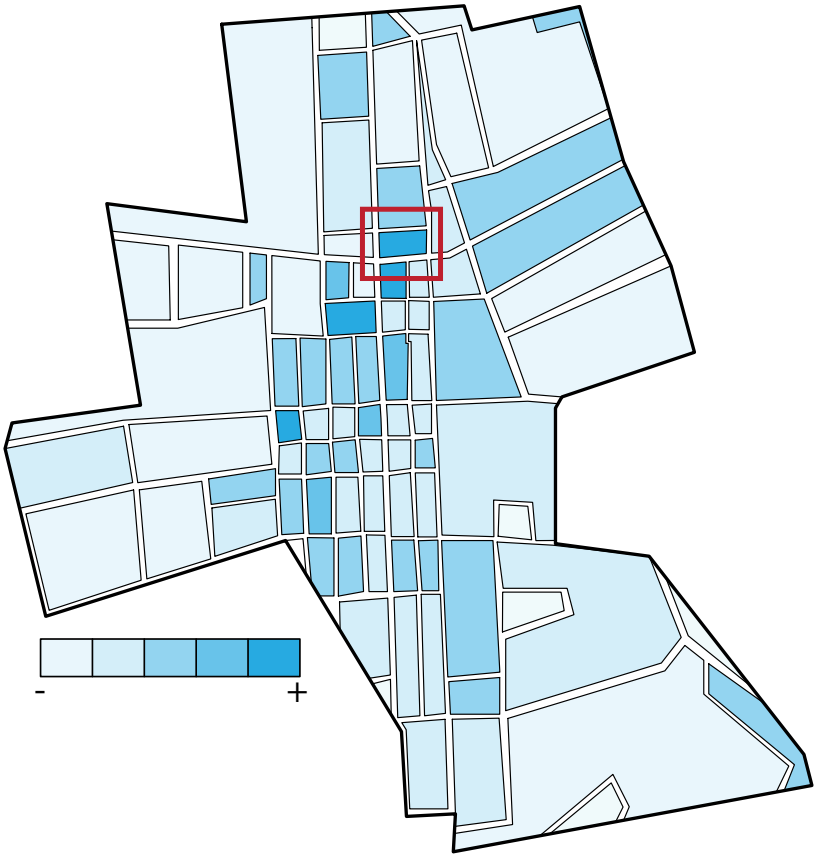
1873 Historical Map

YEAR	POP.	+ / -	
1850	901	12.1%	
1860	1,010	3.0%	
1870	1,040	12.9%	END OF RAPID GROWTH
1880	1,174	10.3%	
1890	1,295	49.3%	
1900	1,934	-1.6%	
1910	1,904	7.9%	
1920	2,054	17.5%	
1930	2,413	8.0%	
1940	2,606	5.8%	BEGINNING OF STAGNATION
1950	2,756	2.7%	
1960	2,830	1.5%	
1970	2,872	-6.0%	
1980	2,700	0.1%	
1990	2,702	-1.4%	NEW BEGINNINGS
2000	2,633	-7.0%	
2010	2,477	-1.8%	
2016	2,510	1.3%	

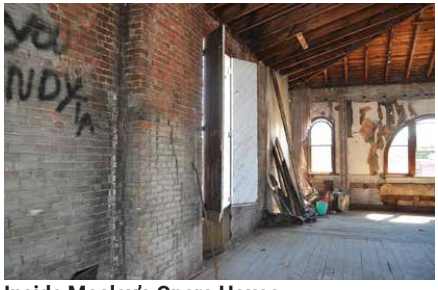
Muncy Population

Mosley's Opera House

Ritz Theater



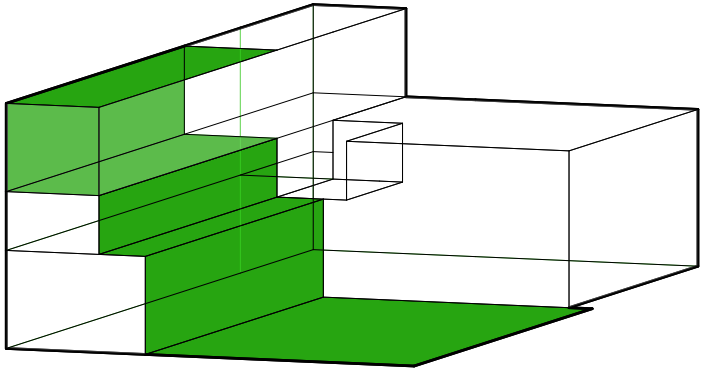
Population Density Map



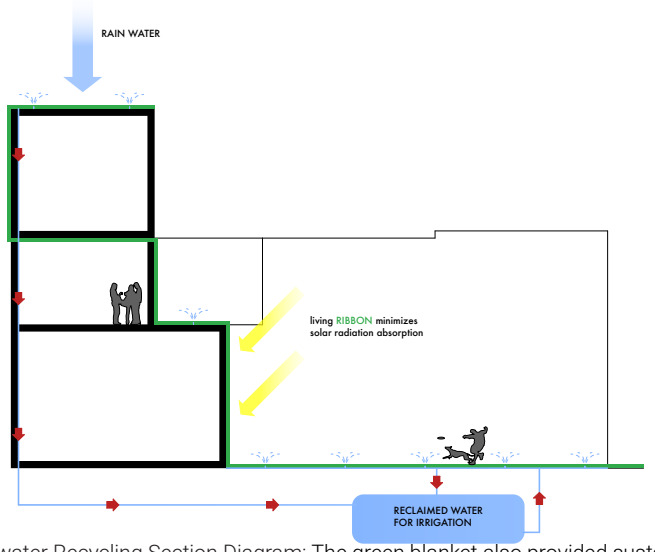
Inside Mosley's Opera House

Brownfield, Opera House, and Theater

EARLY PROCESS DIAGRAMS

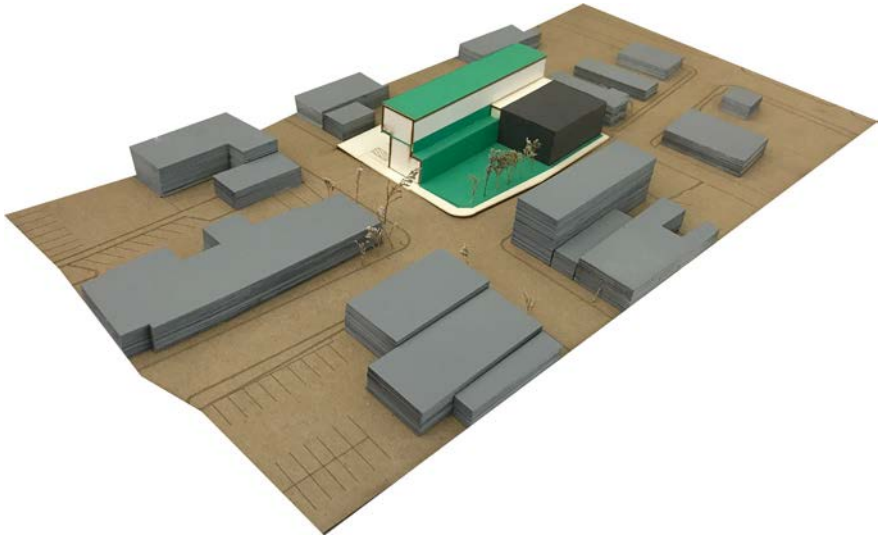


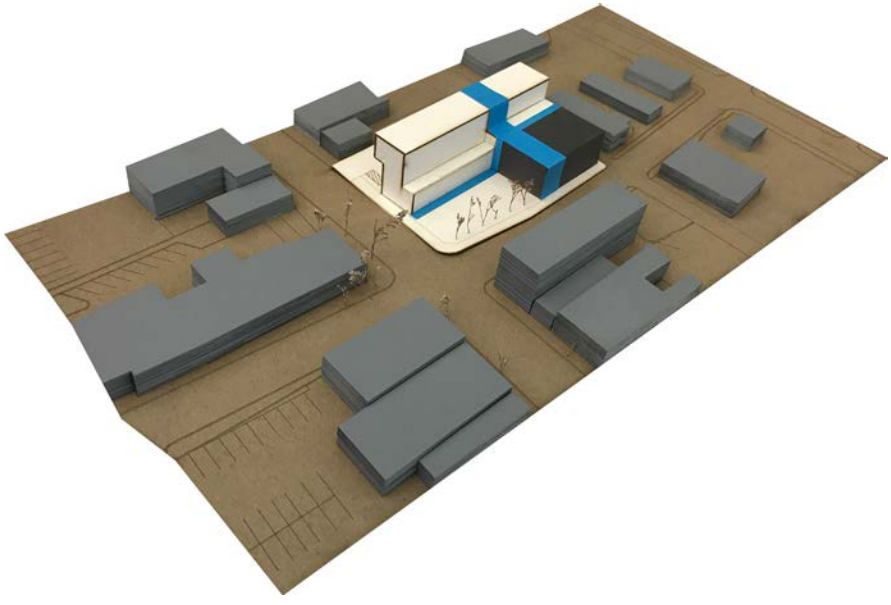
Original Concept Diagram: The original concept of the design incorporated a green blanket that wrapped along and throughout the building to create the progrommatic spaces inside.



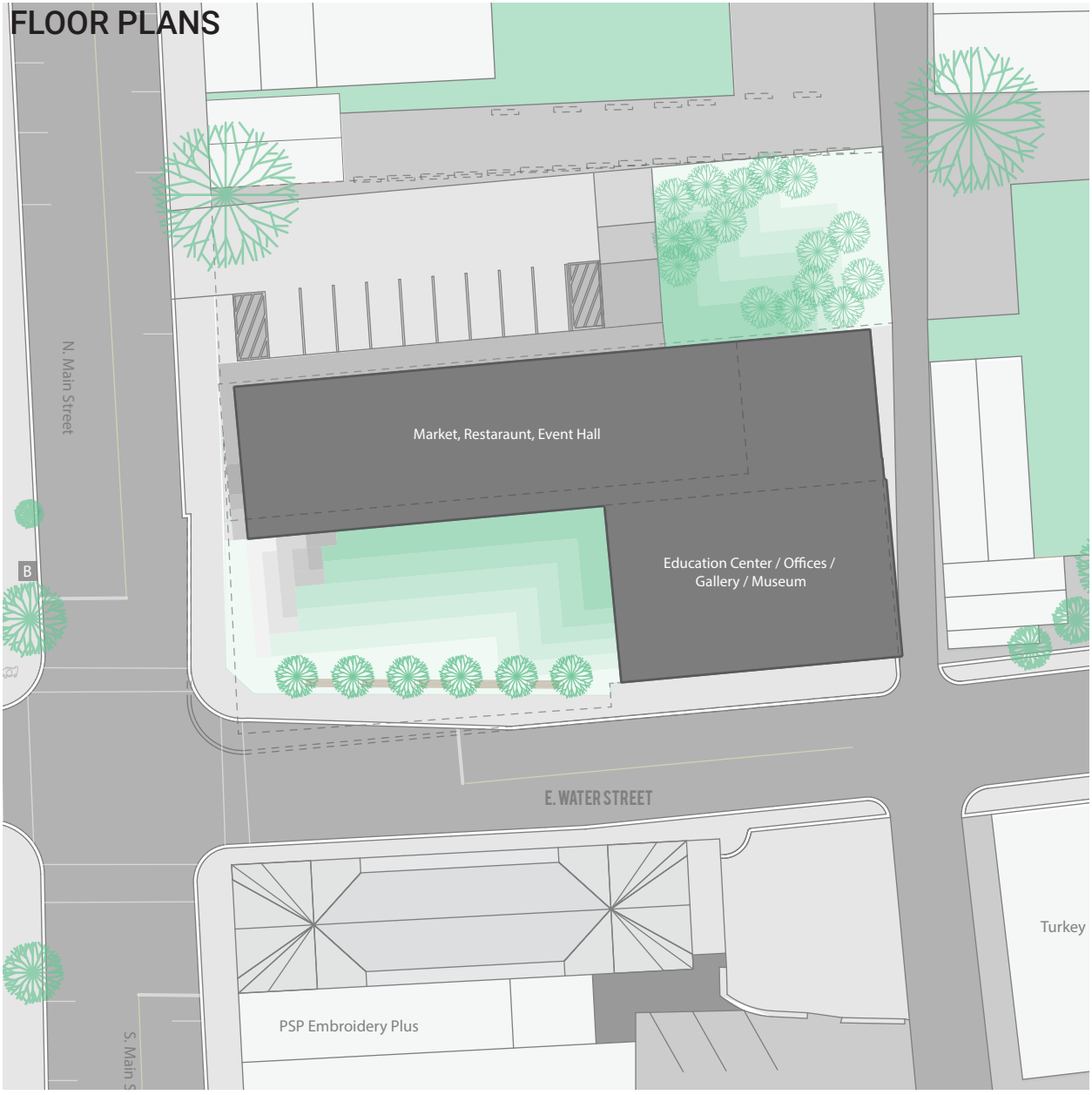
Rainwater Recycling Section Diagram: The green blanket also provided sustainable elements to the design such as rainwater recylcling and irrigation and protection from solar radiation and heat.

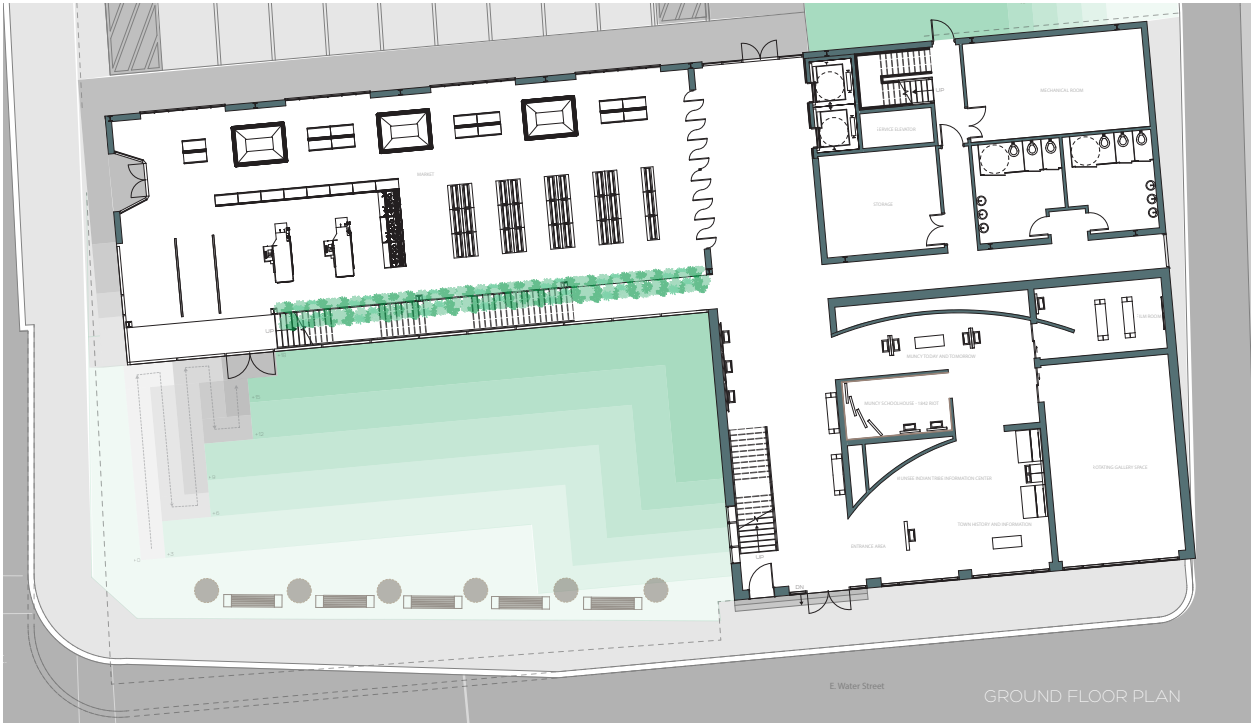
EARLY PROCESS MODELS



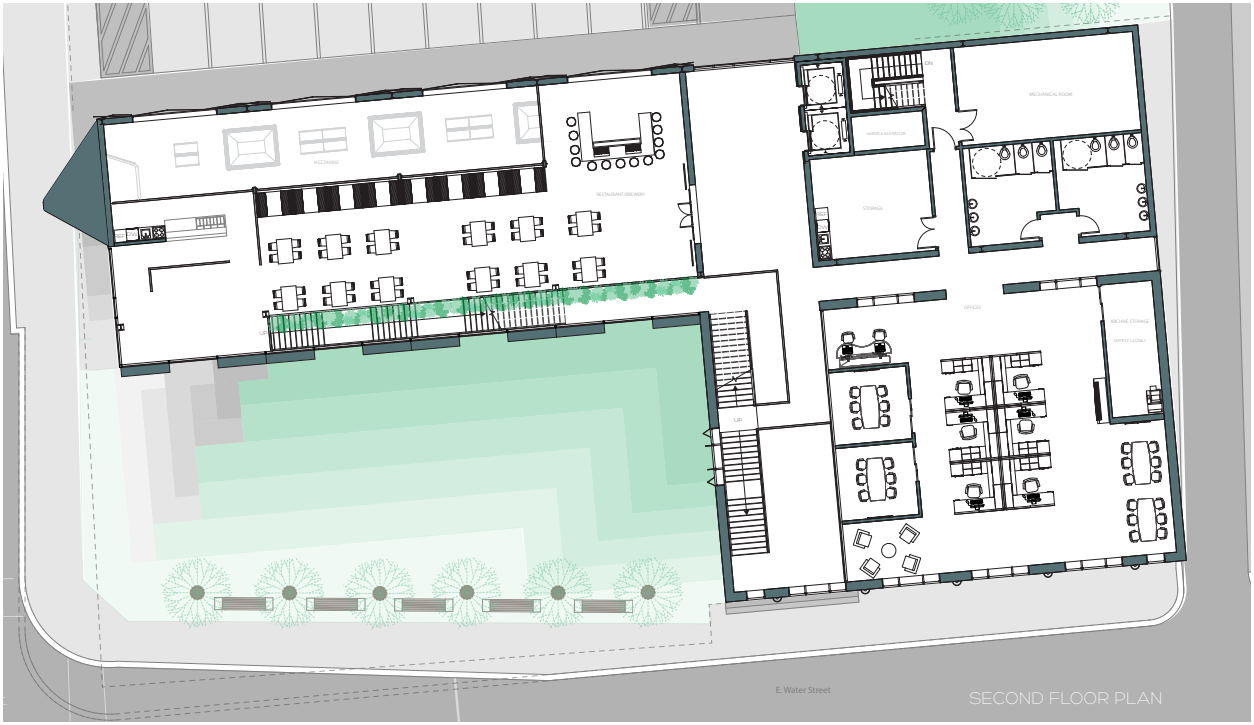


FLOOR PLANS


N. Main Street
B
Market, Restaraunt, Event Hall
Education Center / Offices /
Gallery / Museum
E. WATER STREET
PSP Embroidery Plus
Turkey

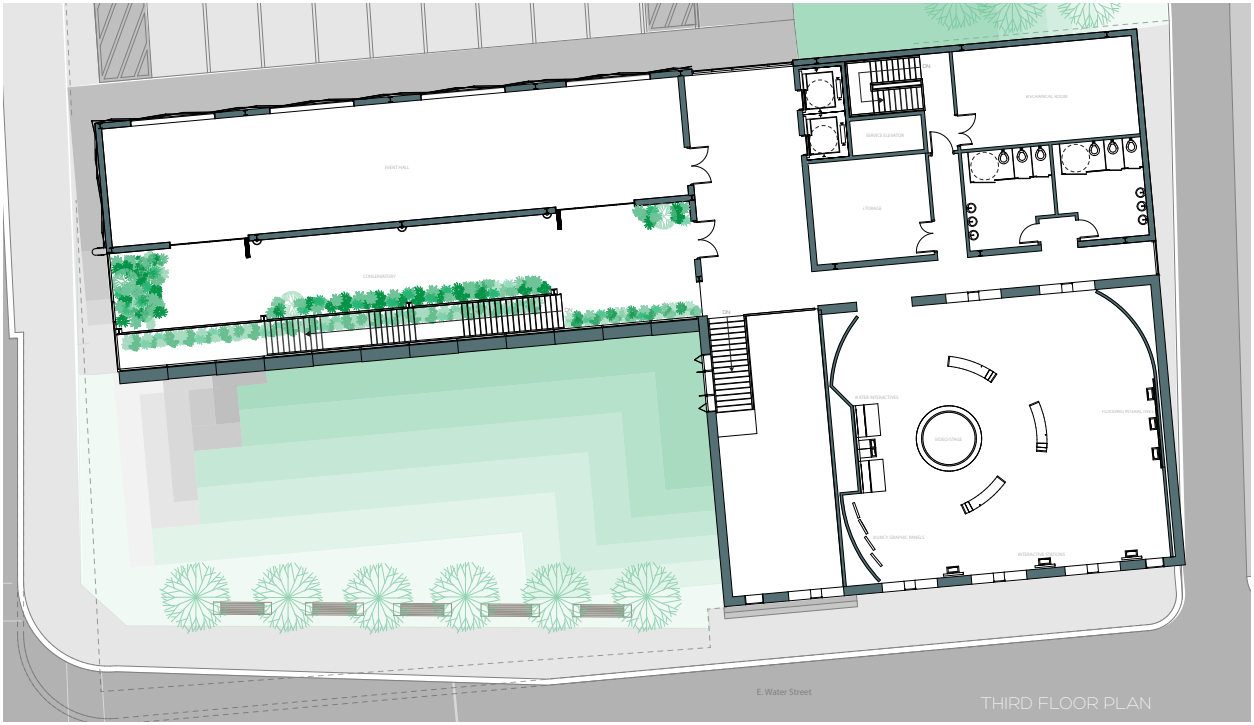


As visitors enter the Muncy Resiliency Center through the original front entrance of the opera house (Water Street), they will be immediately greeted with an educational center and accompanying exhibit to their right. This exhibit seeks to explore much of Muncy's unique history, and present-day Muncy. In addition, there will be rotating exhibit space and a videography room that will present visitors with a history of the Muncy Opera House, its significance to the town, and the renovation process that has transformed the architectural artifact into its current Center of Resilience. Opposite this educational space on the ground floor, visitors to the center will be able to shop at the Ritz Market, Cafe, and Brewery. (The name "Ritz" is a nod to the Ritz Movie Theater that previously occupied this space within downtown.) This part of the program will play an imperative role in the city because of Muncy's current lack of a grocery store. The ground floor will feature locally sourced foods and items. The market and cafe will also be able to grow their own products and ingredients within the adjacent greenhouse and conservatory. This greenhouse will also act as a heating element for the center in the winter months.



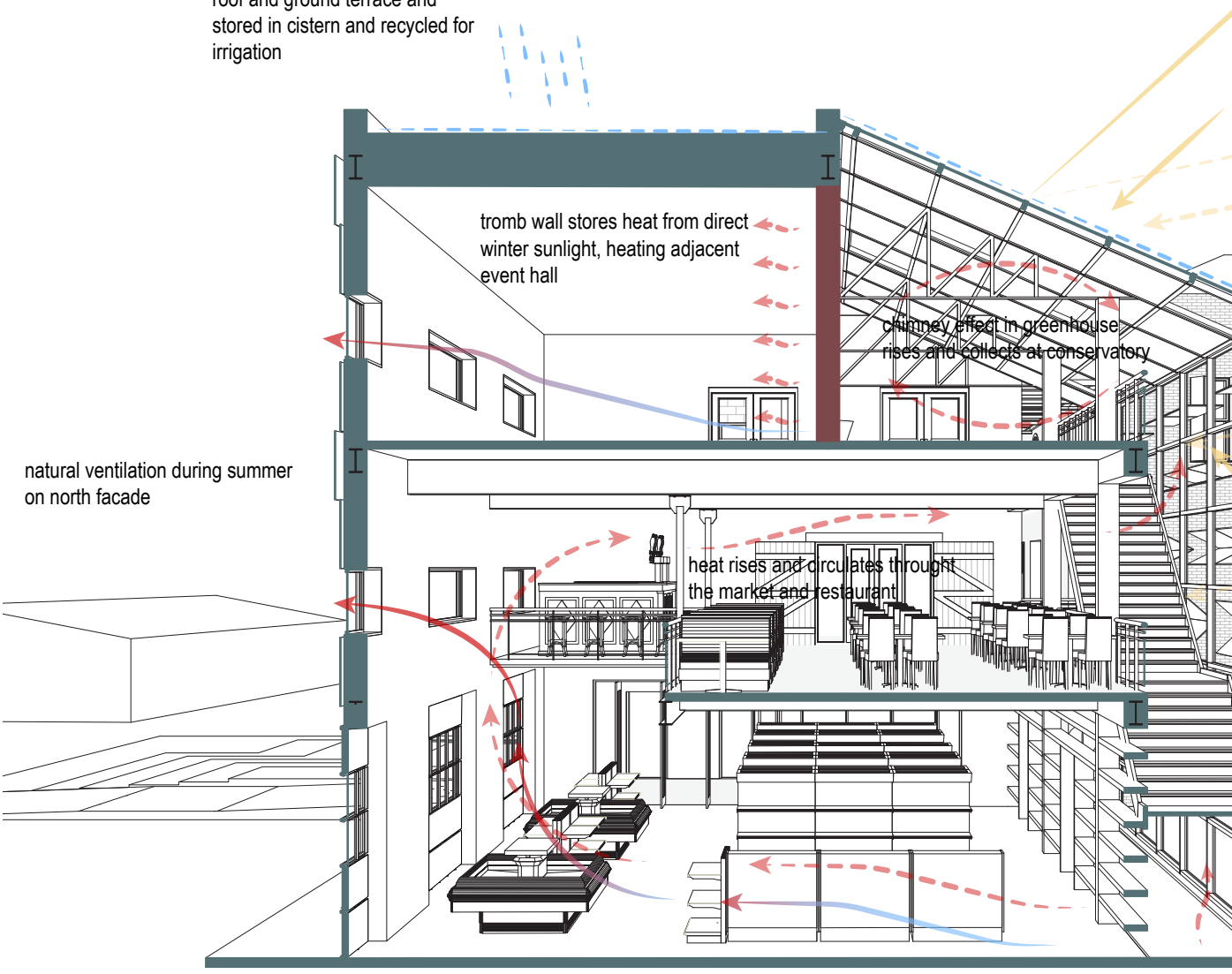
As visitors ascend one of the Muncy Resiliency Center's two main staircases, they will enter the cafe and brewery components of the Ritz Market, Cafe, and Brewery. I will be a place for visitors to Muncy and residents of the town to unwind and enjoy themselves.

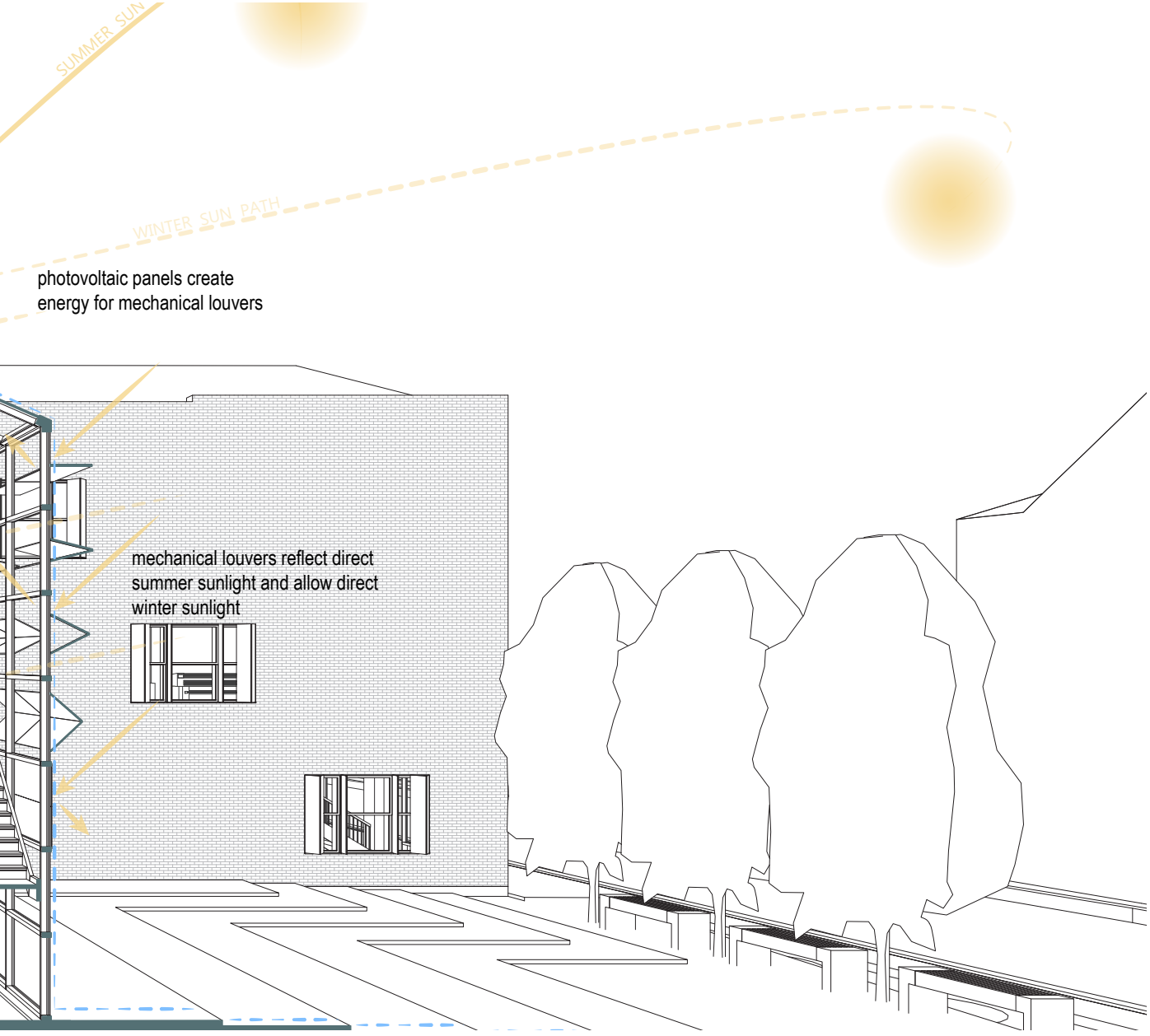
The adjacent office space, while off-limits to the general public, will provide the city of Muncy with meeting and collaborative working spaces in which to both operate the Muncy Resiliency Center and make important decisions for the future of the town. The office will consist of two meeting rooms, six cubicles, three collaborative working centers, table space for two rotating interns, and an archival room for documentation and storage purposes.



As visitors reach the third floor, they will be able to enter an exhibit that promotes scientific enrichment through the use of state-of-the-art technology. This exhibit will explore the solar system, renewable energy resources, and the earth and its oceans, forests, and geographic makeup. At the center of the exhibit exists a circular platform that can be used as a stage component for lecturers or timed educational presentations or demonstrations. When it is not being used for the aforementioned purposes, an interactive exhibit element can be placed on top of the platform. Touch tables, LED displays, videography, and graphic elements will make up much of this exhibit space, allowing the staff to easily update portions of the exhibit when new scientific discoveries are made. Opposite the science exhibit is a multi-purpose event hall. This space can be utilized for receptions, large town meetings, performances, and dinners, among other events. In the event of a 500-year flood, the open nature of the third-floor event hall can allow it to be transformed into a temporary refuge center for residents of the town. Immediately adjacent to the event hall will be a year-round conservatory for the purposes of growing flowers and food resources.

PASSIVE HEATING/COOLING SYSTEMS

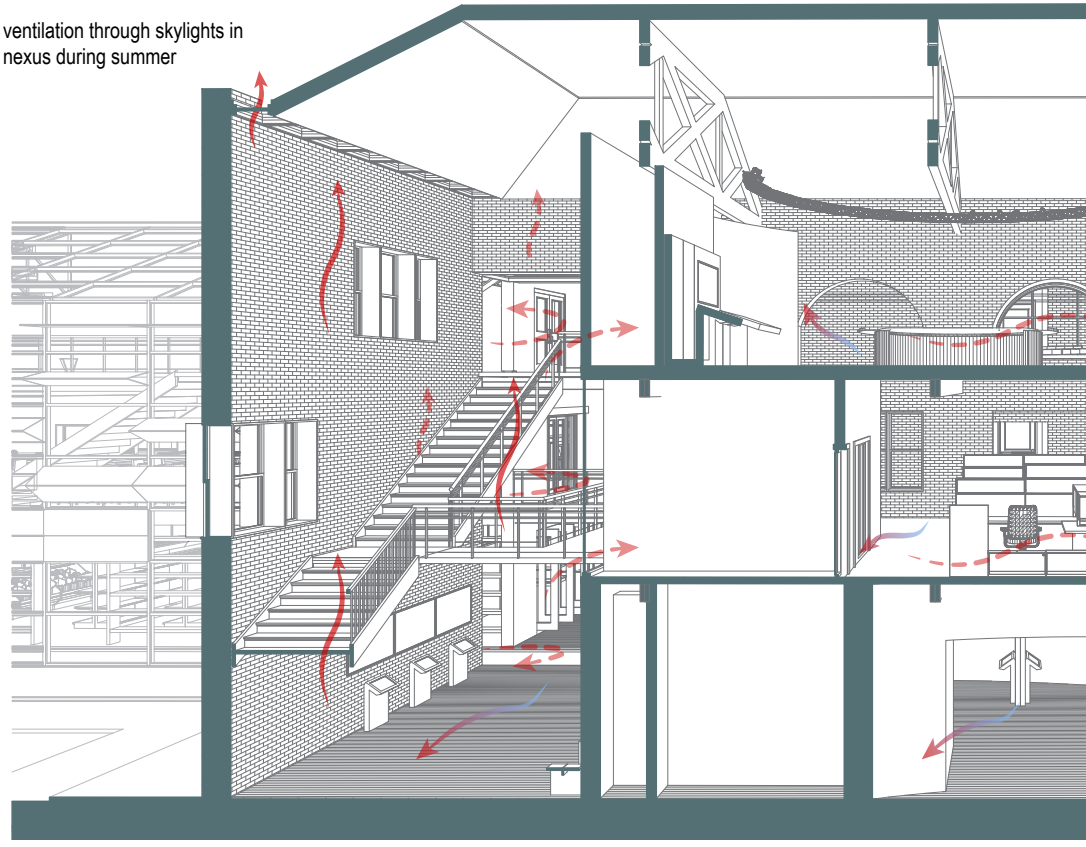


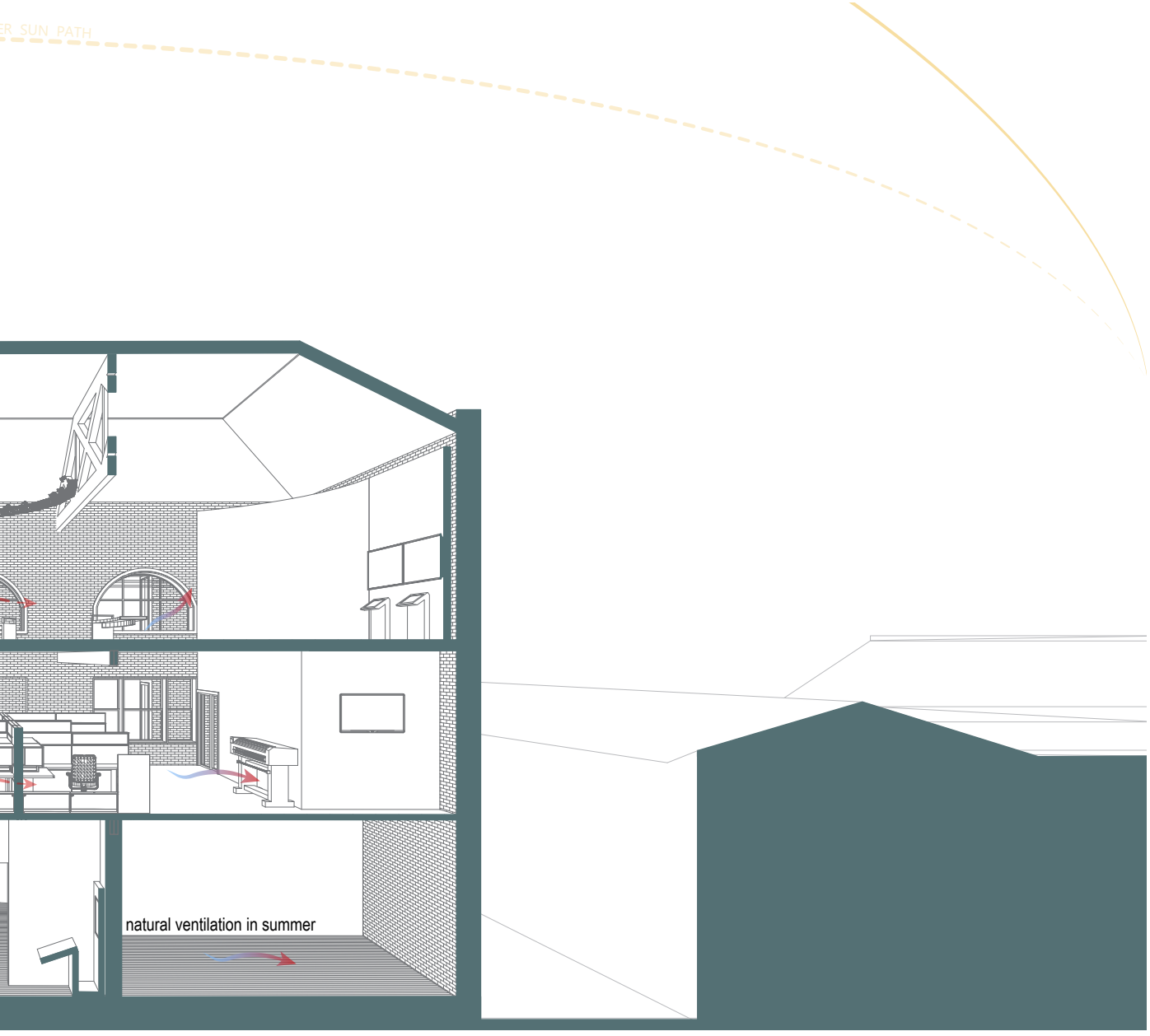

SUMMER SUN
WINTER SUN PATH
photovoltaic panels create
energy for mechanical louvers
mechanical louvers reflect direct
summer sunlight and allow direct
winter sunlight

ACTIVE HEATING/COOLING SYSTEMS

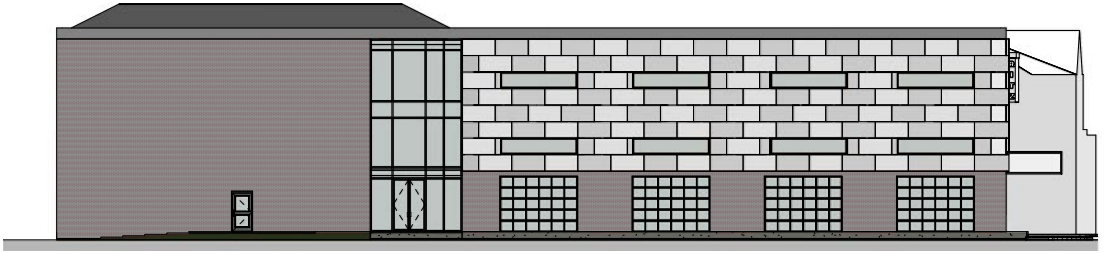
heat generated in greenhouse
during winter is redistributed into
opera house spaces

ventilation through skylights in
nexus during summer

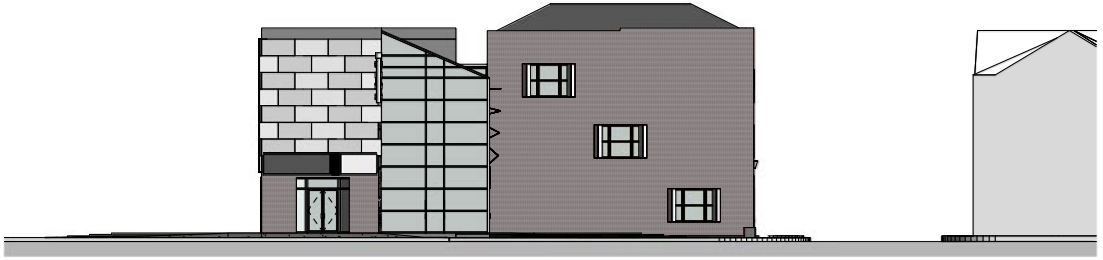



ER_SUN_PATH
natural ventilation in summer

South Elevation

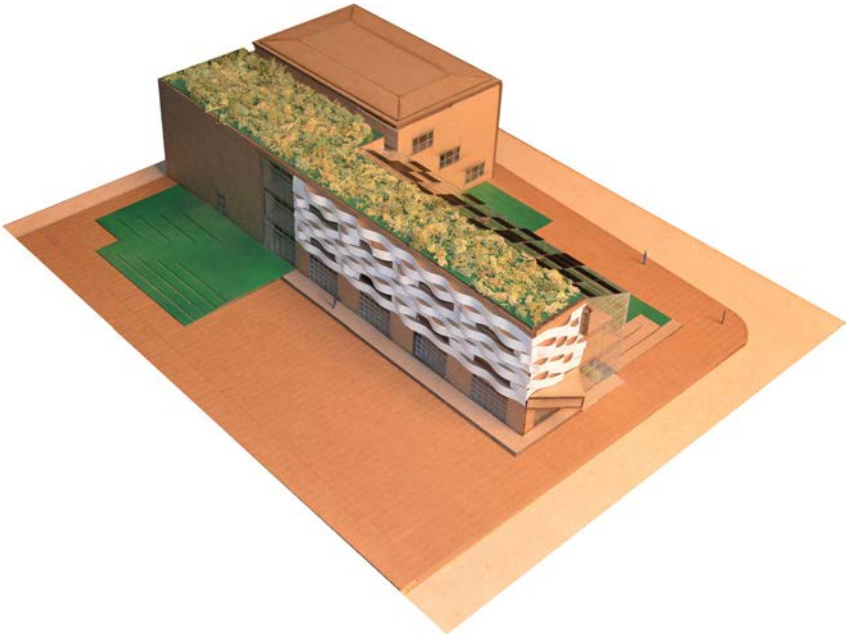


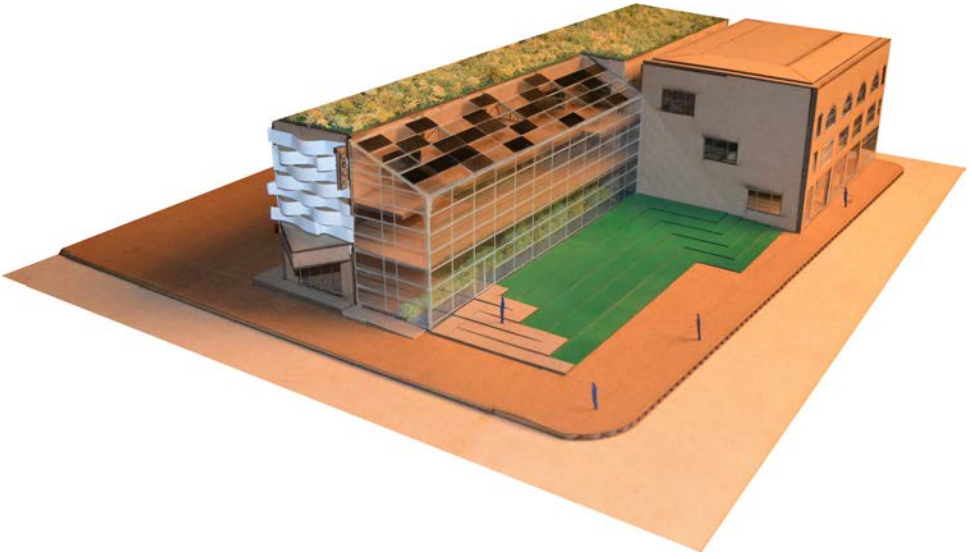
North Elevation



West Elevation

FINAL DESIGN MODEL





Main Entrance

Conservatory

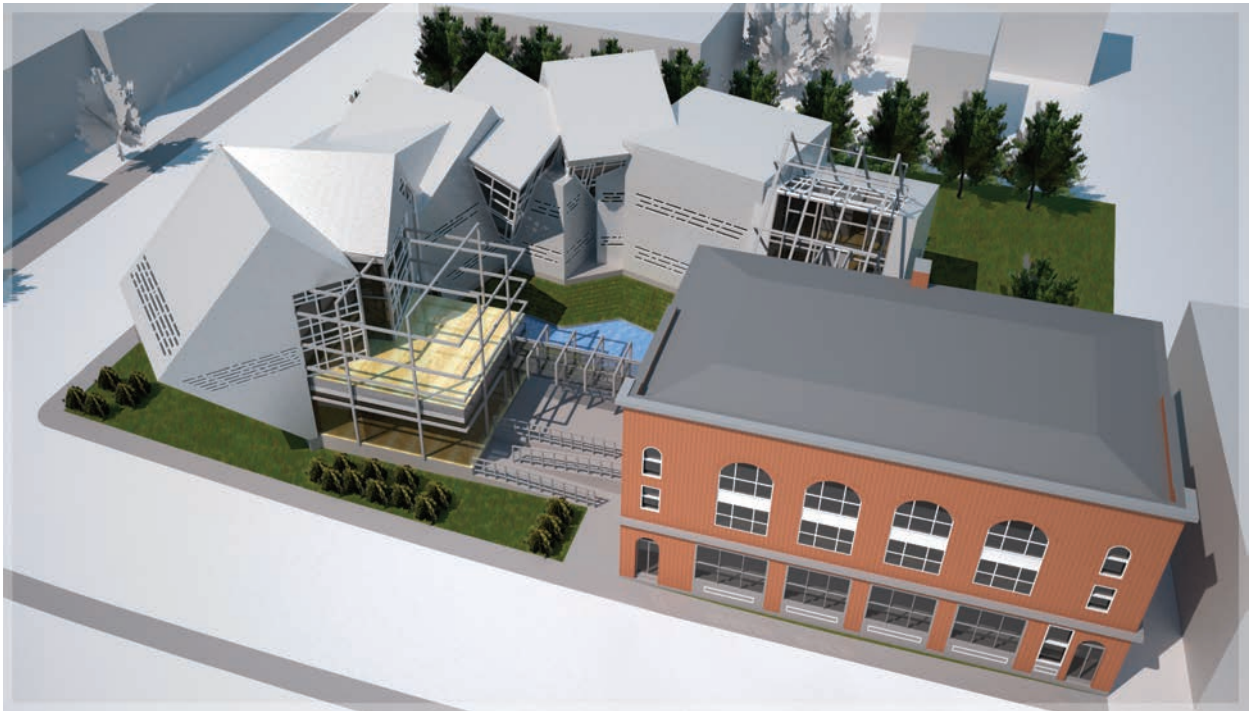
Visitors' Center

Third-Floor Exhibit

COHESIVE SYNERGY

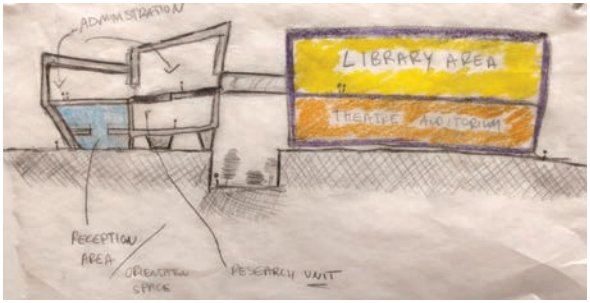
Darius Hopkins, Jomar Santiago

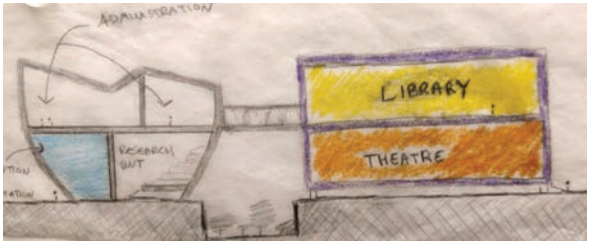
Combining the old and the new, the new Muncy, Pennsylvania Center for Resiliency is designed using the principles of cohesive synergy. The concept is a collection of independent modules, interlocked with one another, and lastly oriented in a curved format to create a circulatory stream that begins and ends at the restored Muncy Opera House. In designing this project, a question arose: "what does it mean to be resilient?" Does it mean to return restored or renovated in the same physical format, or can it mean to return in a completely new form, conditioned and sensible to its environment? The opera house will be aesthetically restored to its original form. The current abandoned apartments will be removed for rentable community space on the ground floor, while a double-height second floor begins the interior experience of the new Resiliency Center. A three-foot raise will occur for the floor of the opera house, alongside a three-foot plinth that lifts the steel-cladded Resiliency Center to prevent any flooding. A green, filtering staircase resides in the nucleus of the plot of land alongside a constructed rainwater catch-basin to intake and utilize any floodwater that infiltrates its center. Finally, a south and east entranceway opens the catch-basin to the public for leisure gatherings and organized events made available to the Muncy community.

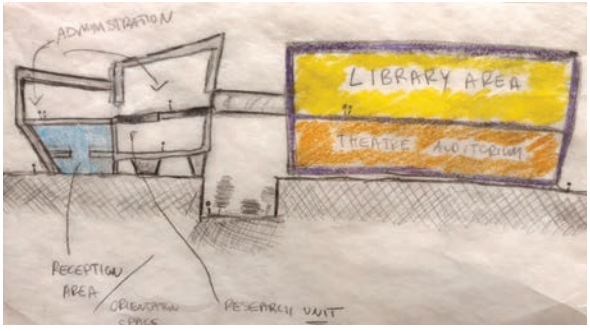


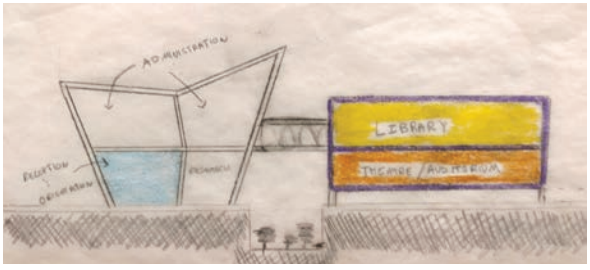
Borough of Muncy, Lycoming County, Pennsylvania

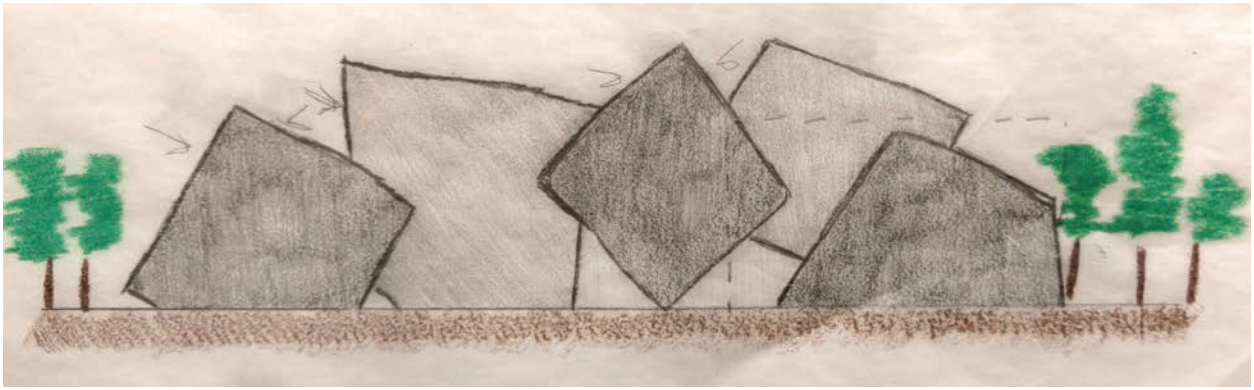
CONCEPTUAL DESIGN

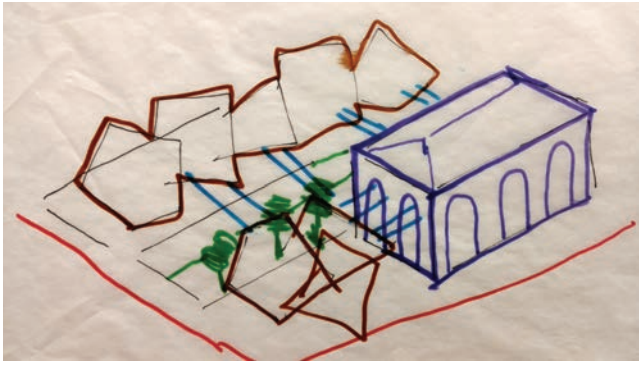


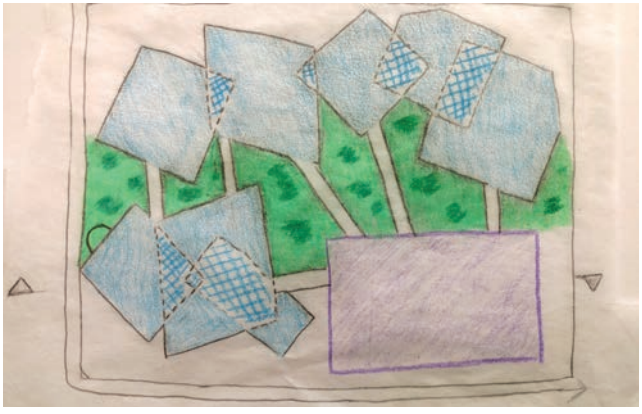










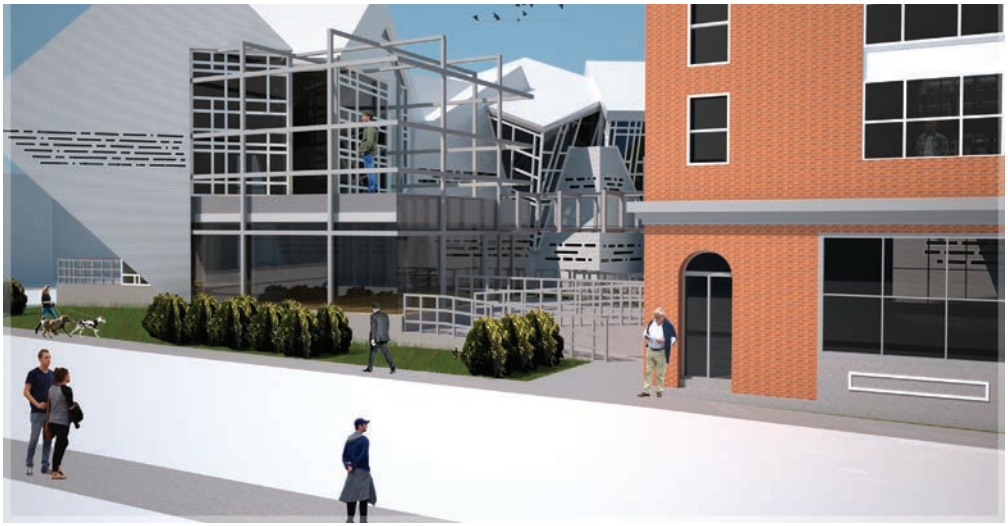


NORTH MAIN STREET PERSPECTIVES

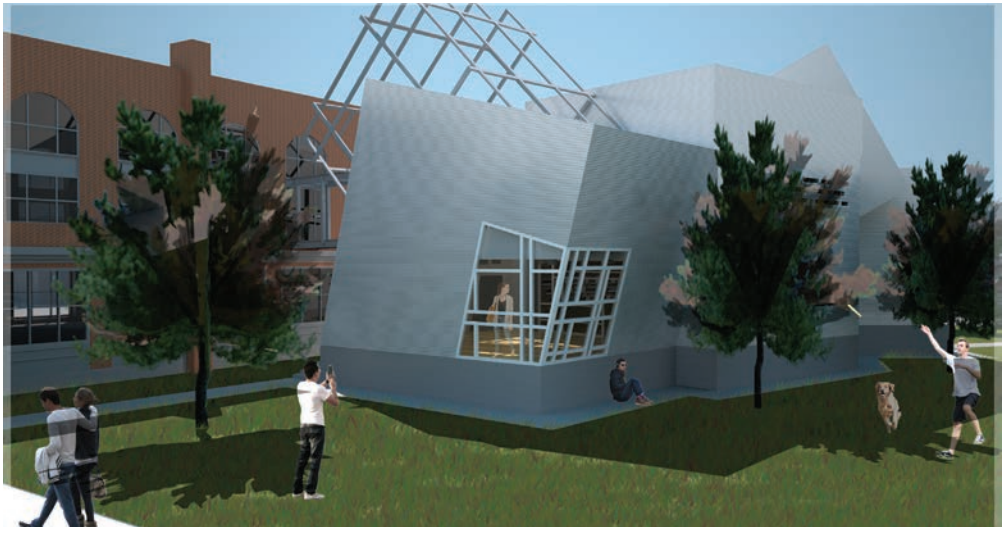
Aware of the pavement/greenery ratio, reintroducing green areas around the structure was essential. Noble Alley was replaced with open space ideal for recreational use.

Minimal glass placed on the rear modules emphasize their Deconstructivist-style geometries and scale. A secondary entraceway linked to the commercial area is shown.

EAST WATER STREET AND GREEN ALLEY PERSPECTIVES

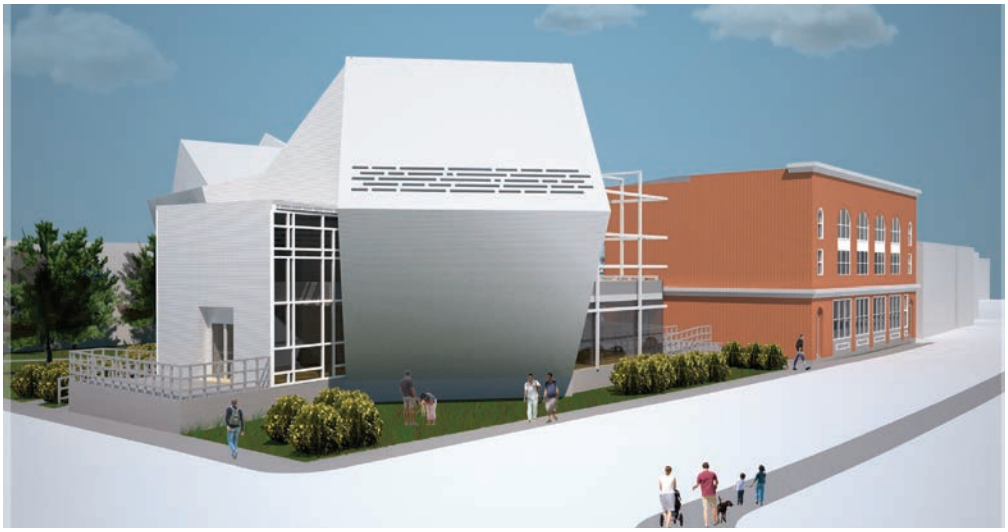


Clear physical connection between the old and new is shown. The roof of the beginning module also doubles as an outside eating area.

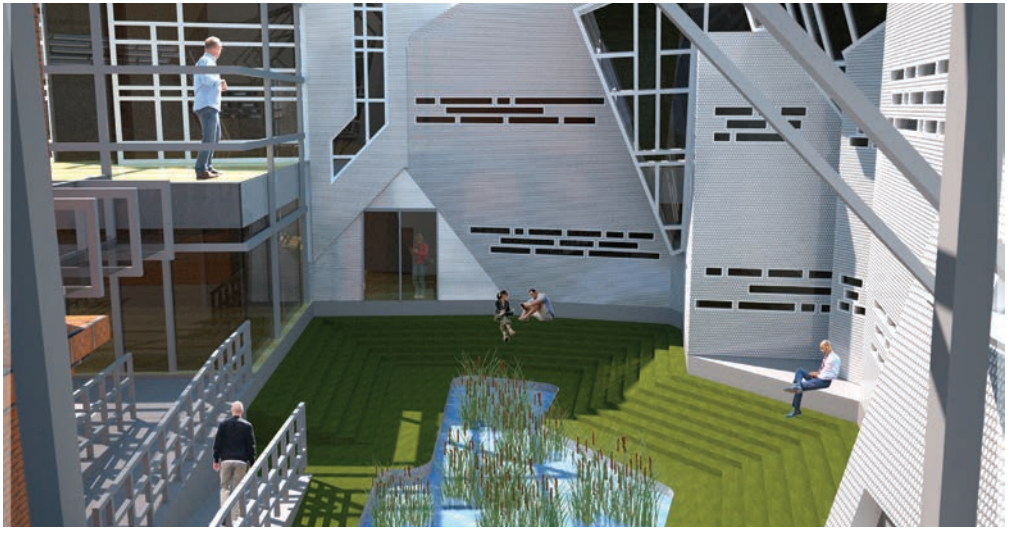


To counteract shadowing occuring inside the central courtyard, a cage-like module was attached. A wrap-around window creates viewpoints for the outside recreational area.

STREET INTERSECTION AND GREEN ALLEY BRIDGE PERSPECTIVES



Sharply angled module becomes the “master marquee” for the busy Main Street/Water Street intersection. Shredded windows on the roof allow passive solar intake.

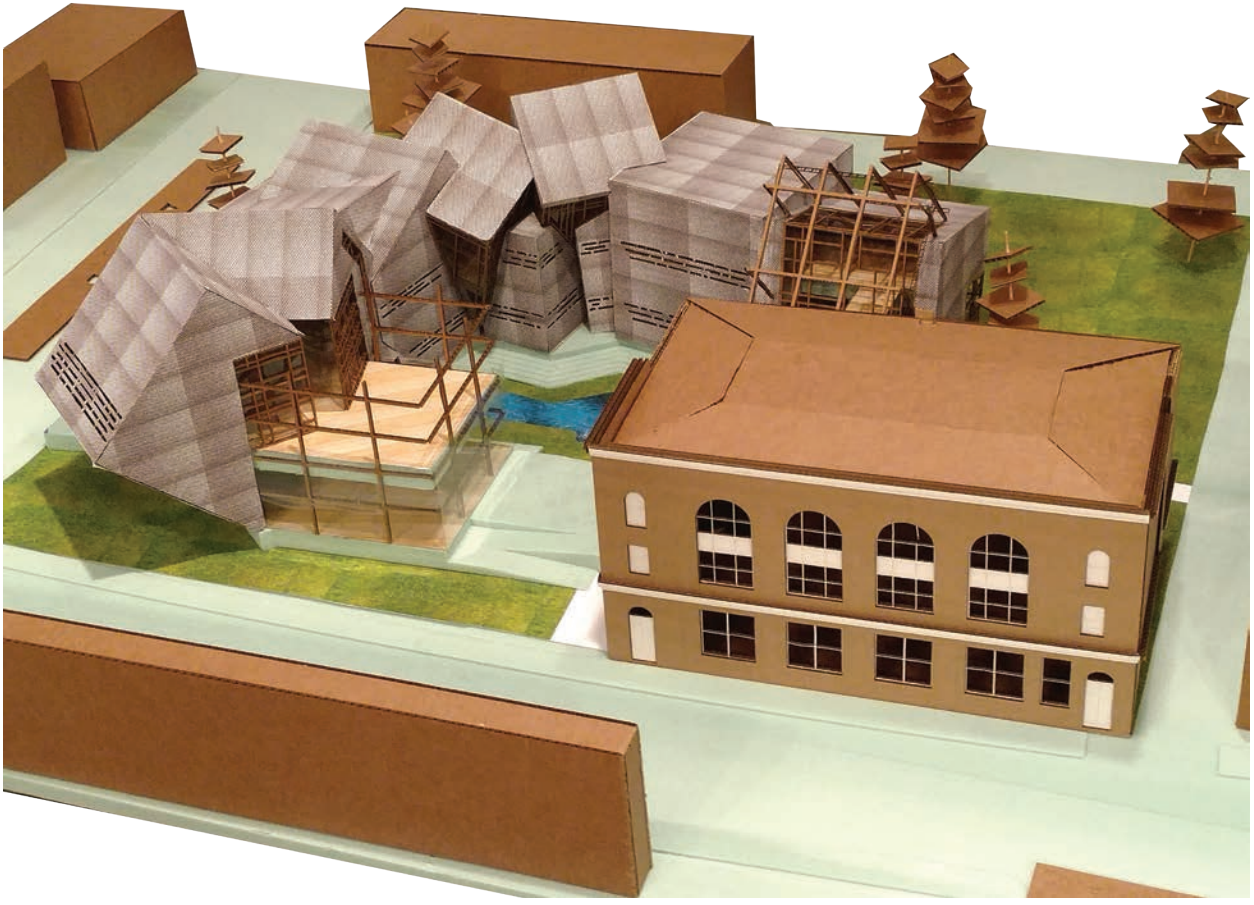


A stormwater catch-basin supported by wetland plants doubles as scenery for the gathering area. The terracing staircase filtrates tainted water to later be filtered for structural reuse.

OPERA HOUSE PERSPECTIVE

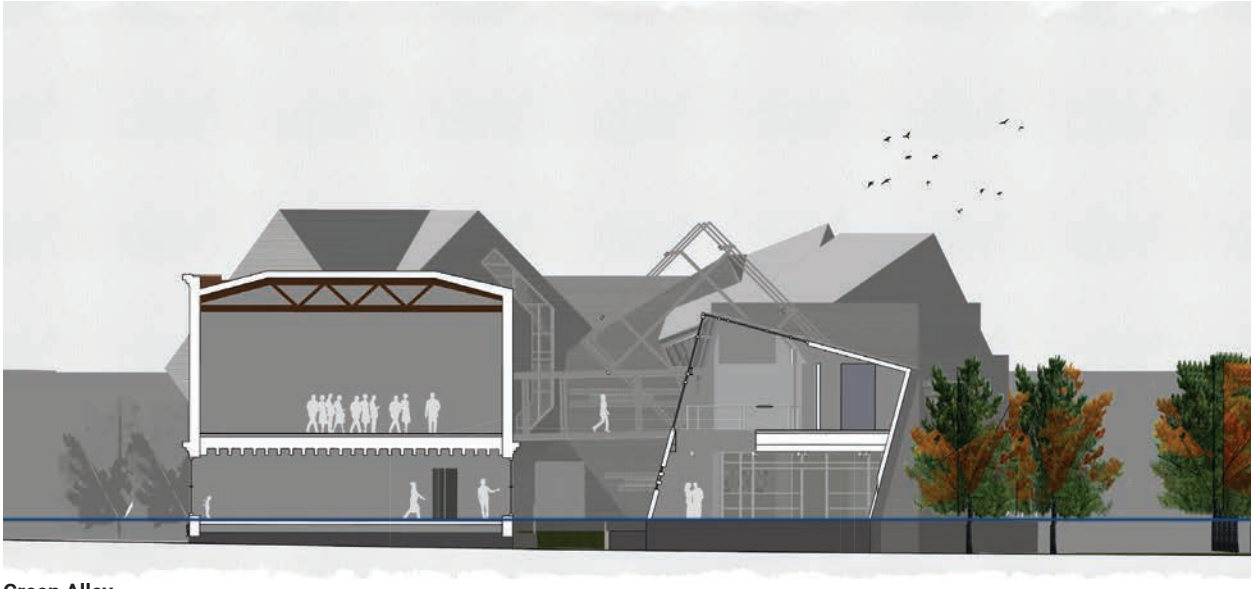
The double-height second floor of the opera house is restored and open for lectures and tour briefings. Exposed roof structure will return, while arched windows generate views of the new addition.

FINAL MODEL



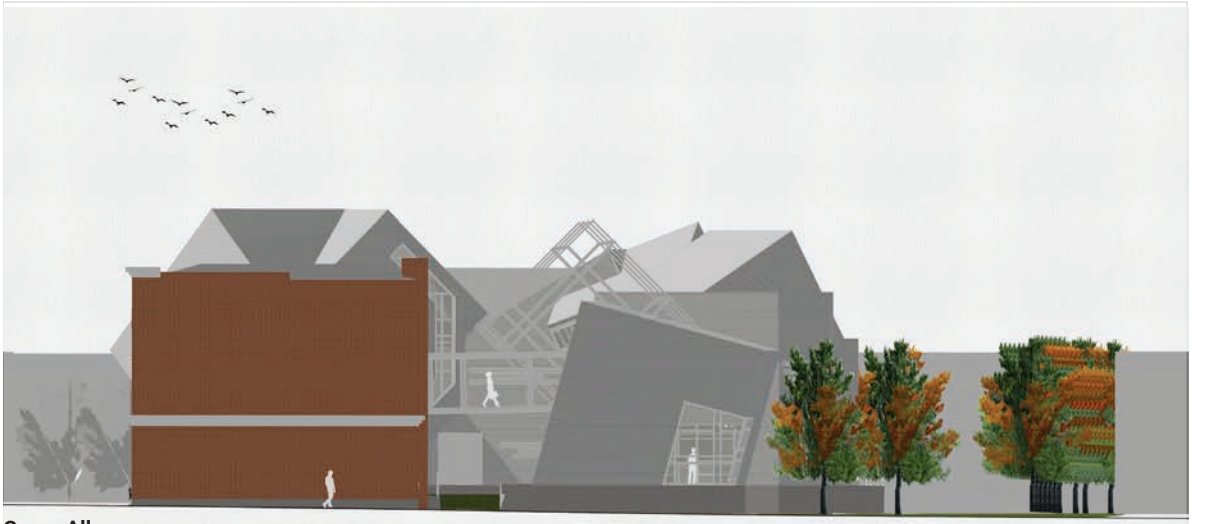
BUILDING SECTIONS

North Main Street



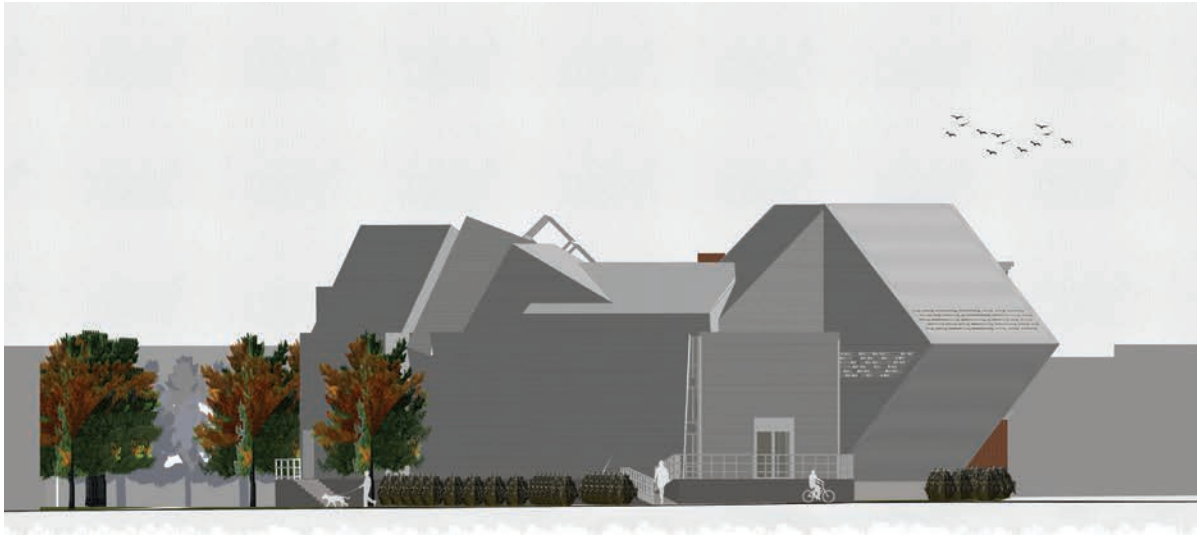
Green Alley

BUILDING ELEVATIONS



Green Alley

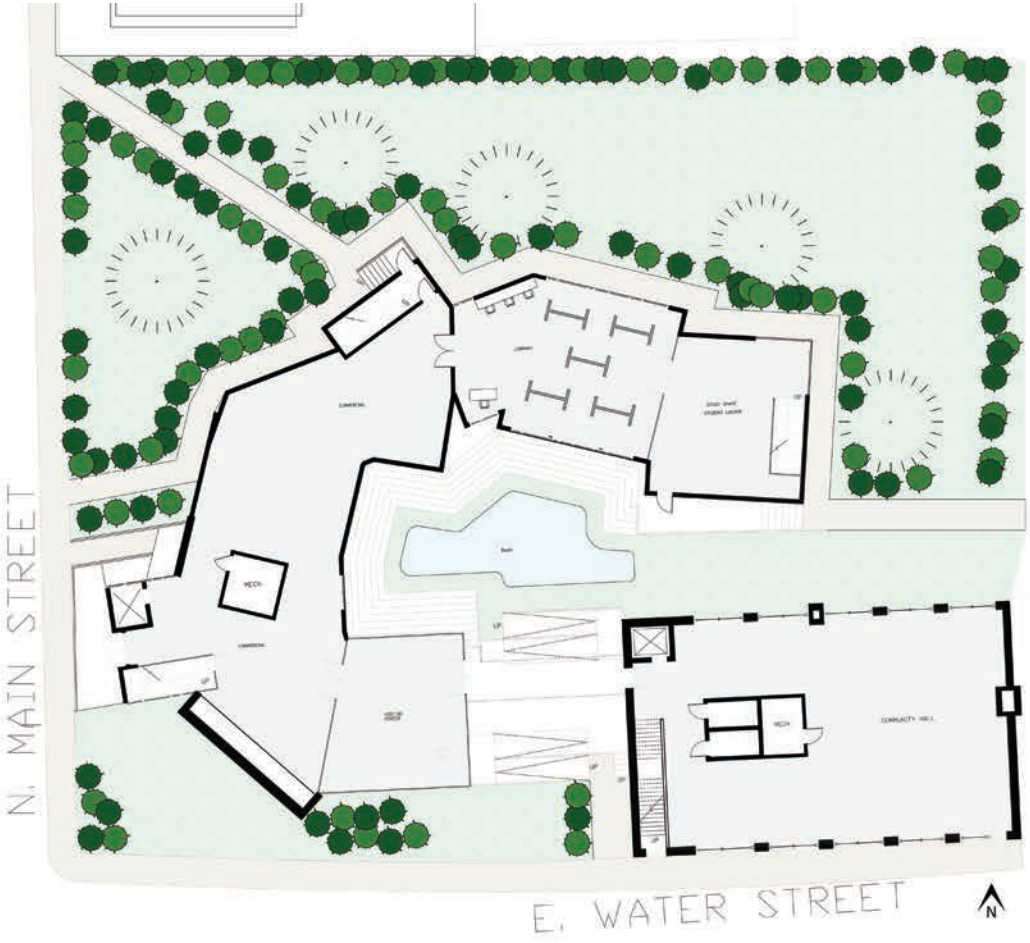
Noble Alley



North Main Street

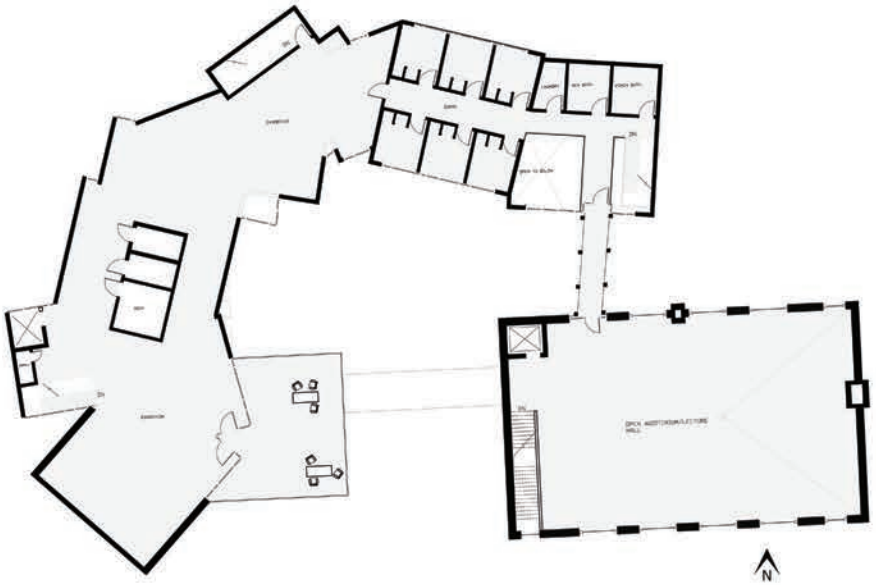
East Water Street

BUILDING FIRST-FLOOR PLAN



BUILDING SECOND-FLOOR PLAN

Cohesive synergy involves a platform that allows for two main objectives on the site. Firstly, it prevents the new building from encountering any floodwater. The platform will be set at three feet above grade where three entry points allow access onto the site. Secondly, to secure the opera house from major damage, the platform acts as a barrier that blocks water north and west side of the site. In the case of heavy rainfall and potential flooding, a proposed basin collects the water and disperses it towards the stormwater sewage line. The creation of the basin allows the collection and reuse of gray water and floodwater. Above ground, wetland plants in the platform clean and reduce waste that accompanies the waters. As water flows toward the basin, the waste is contained in a tank that is placed underground. The collected water is recirculated throughout a closed water loop. The water is filtered and pumped into the opera house and new building. Green spaces are increased to allow the regeneration of the aquifer, as well as the reduction of paved areas. An air-to-air system is powered by wind turbines or photovoltaic panels positioned on the roof of the buildings. Photovoltaics and wind turbines produce electricity that reduce the consumption of the grid system. In the case of an emergency, both buildings are not dependent on the grid ystem, thus creating a resilient center.

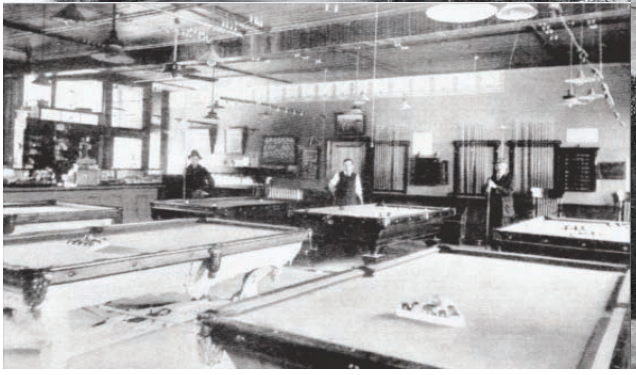


CONTEXT Site Location

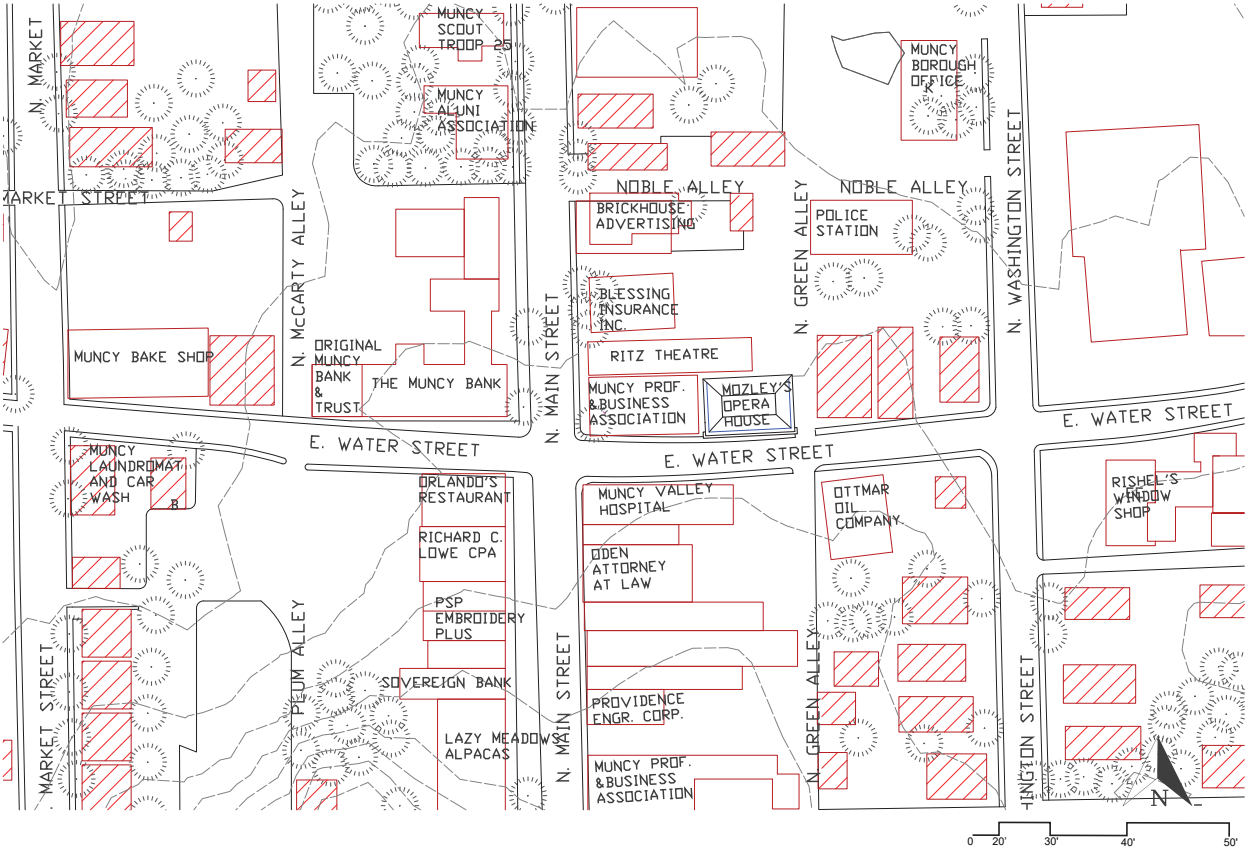
CONTEXT Original Opera House

1. Muncy, Pennsylvania is named after the Munsee Indians, or converted Christian Indians who first inhabitated the land.
2. Two prominent forts, Fort Brady and Fort Muncy, were built to keep out attacking Indians along the Susquehanna River.
3. Natives and squatters of the area suffered from smallpox and influenza.
4. First settled by Four Quaker brothers from Bucks County.
5. An abolitionist speech led to a riot in 1842 where a schoolhouse was destroyed.
6. The "Fair Play System" was integrated to stop illegal squatters in the 1770's.
7. Mozley's Opera House first opened in the early 1900's, and consecutively operated a billiard room on the ground floor and stage area on the upper floors.
8. Ritz Theater opened in the 1920's and was a single-screen movie theatre that has a lot of nostalgia for the community.
9. Muncy had crucial floods in 1889, 1936, and recently in 2011.

CONTEXT Muncy's History

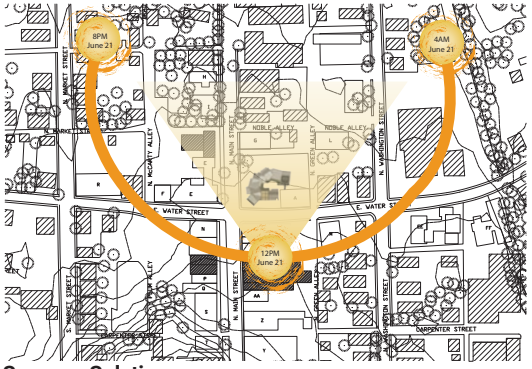


CONTEXT Map of Muncy and Historic Buildings

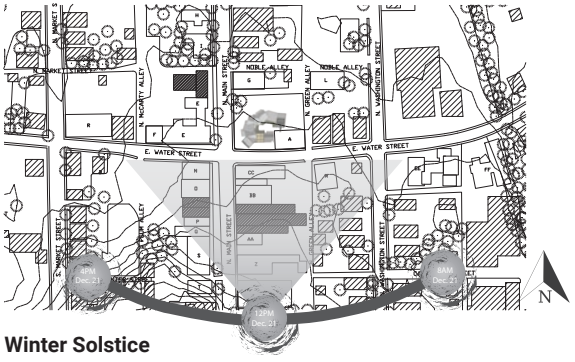


RESILIENCY STRATEGIES Solar Study

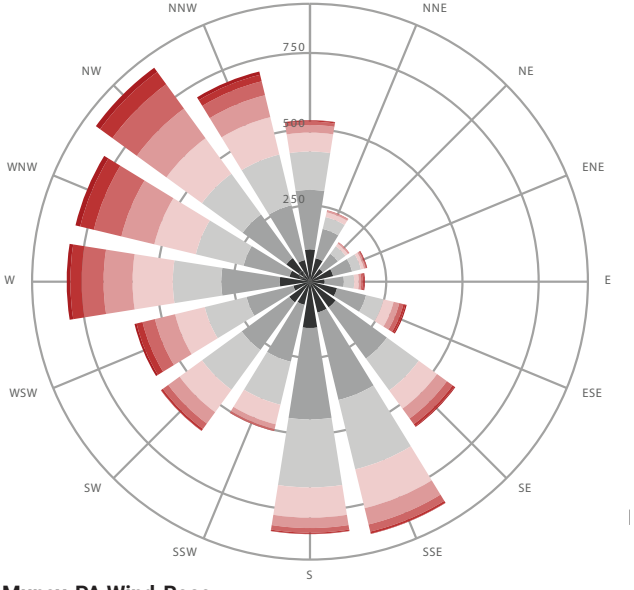
Equinox



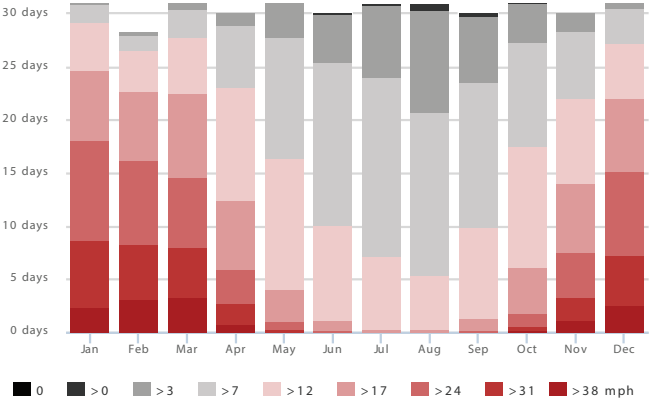
Summer Solstice



Winter Solstice

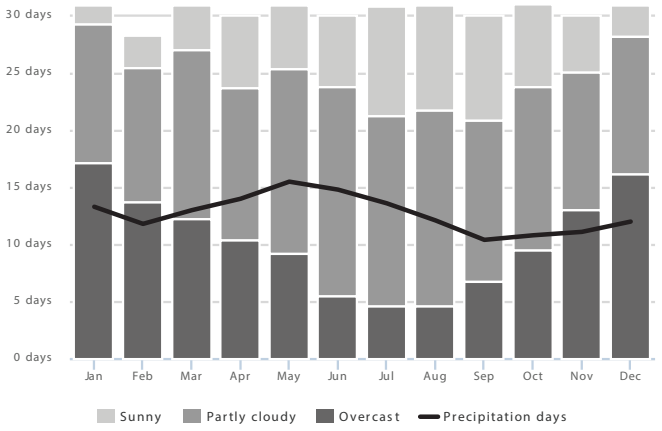


Muncy, PA Wind-Rose

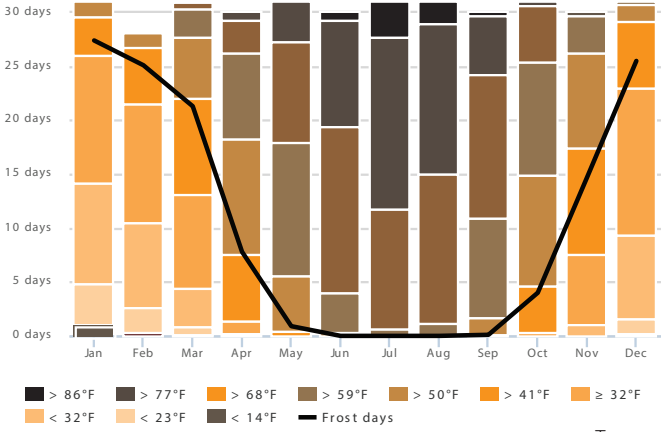


Wind Velocity

RESILIENCY STRATEGIES Rain and Heat Studies

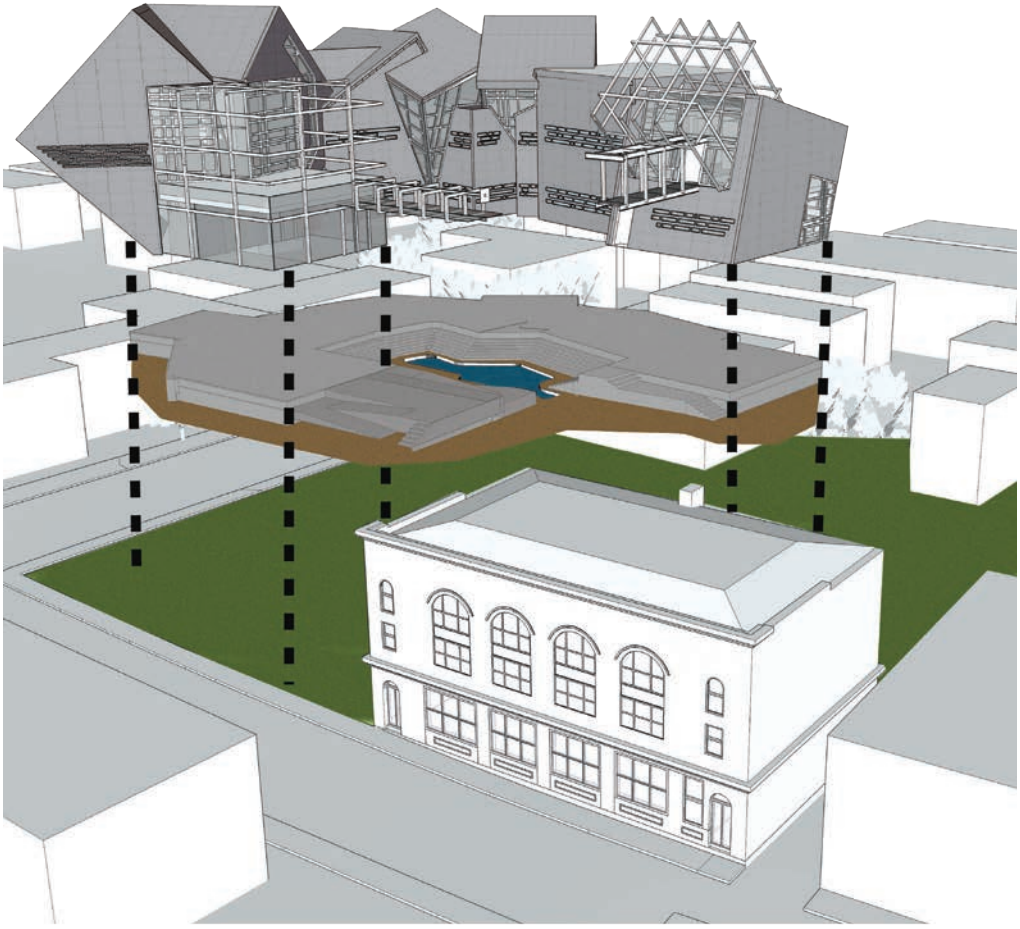


Precipitation Analysis

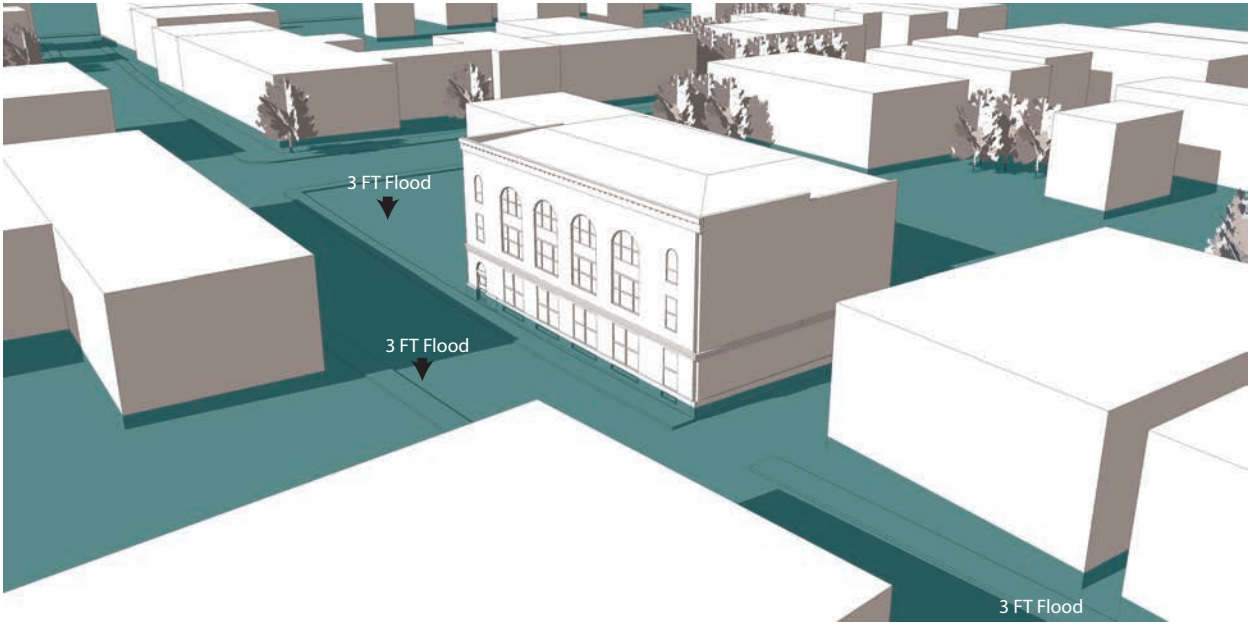


Temperature Analysis

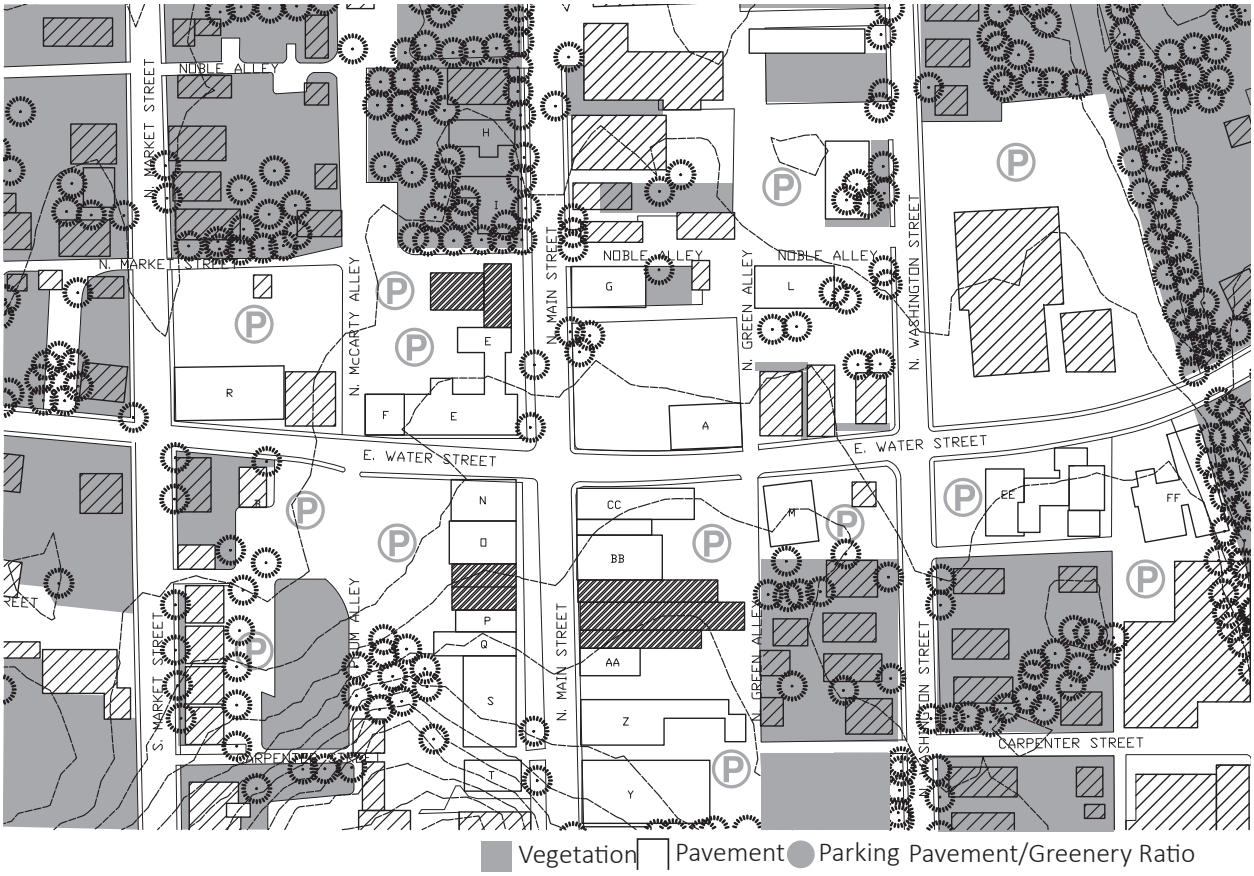
RESILIENCY STRATEGIES
Flood Prevention System | Exploded Axonometric Diagram



RESILIENCY STRATEGIES
100-Year Flood Level Study



RESILIENCY STRATEGIES Pavement/Greenery Ratio

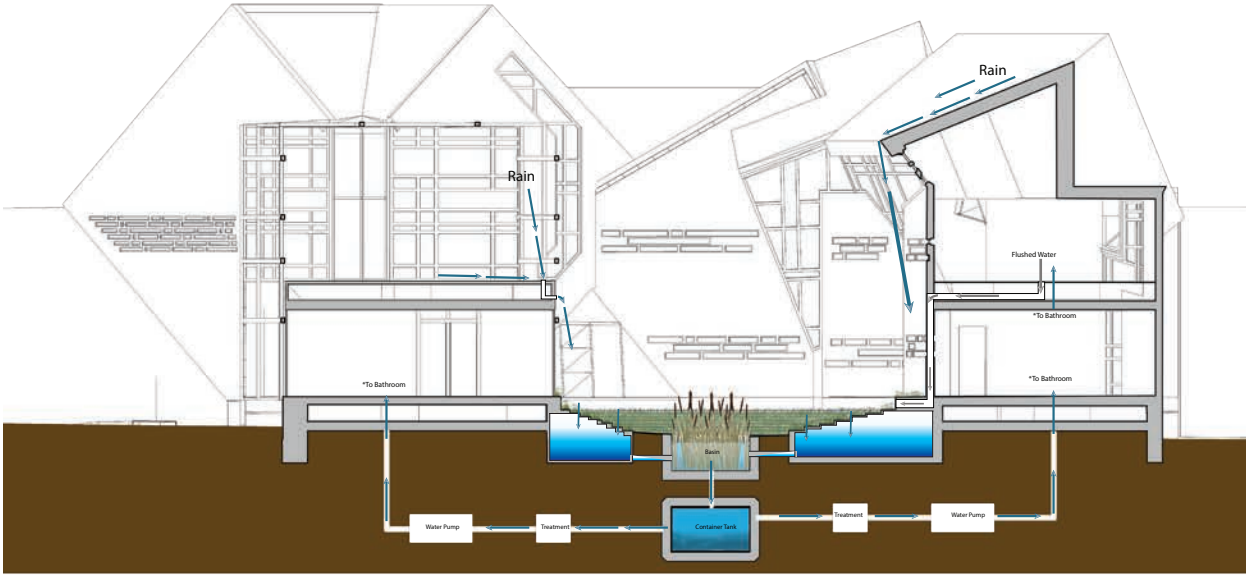


PA Native Plants and Trees

Bolboschoenus fluviatilis

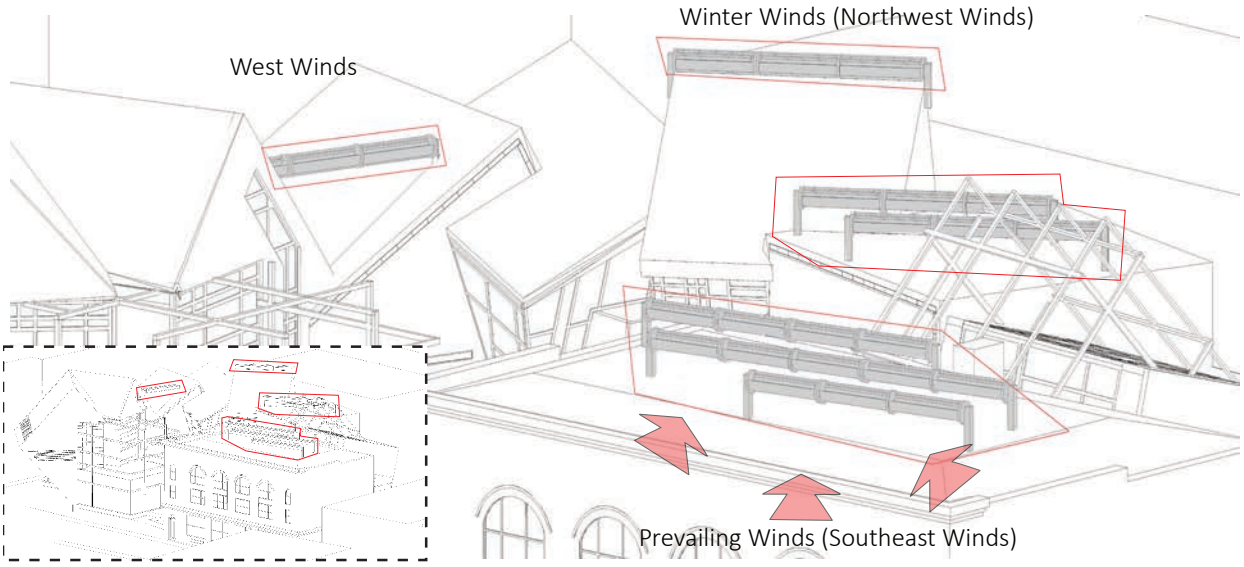
Red Oak Tree

RESILIENCY STRATEGIES Water Recirculation



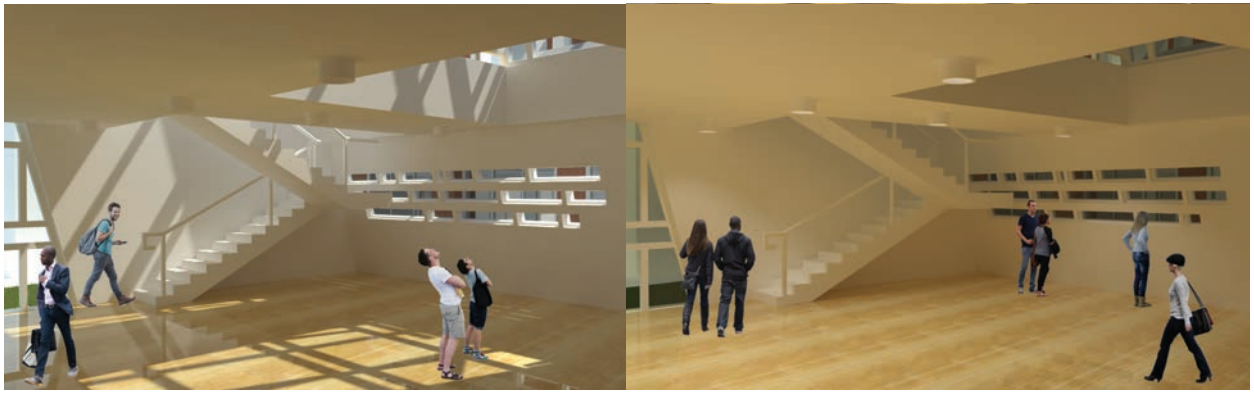
1. Water runs off roof
2. Filtrated down wetland stairs
3. Drains into basin
4. Collects inside container tank
5. Passes through treatment filter
6. Mechanically pumped into building
7. Reaches bathrooms (toilets)
8. Waste water drained, treated, and recirculated

RESILIENCY STRATEGIES Wind Turbine Location

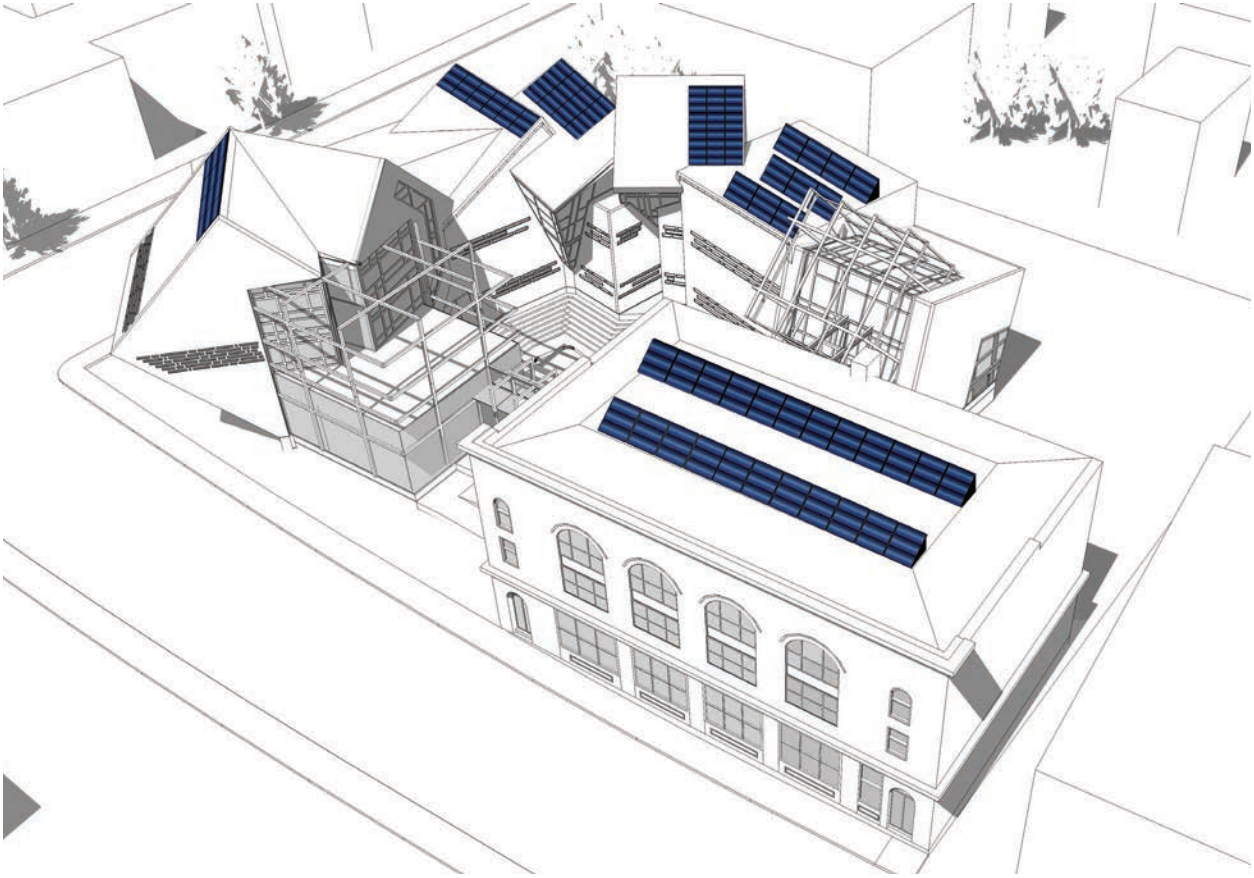


Northwest and southeast winds rotate turbines to generate energy for structures.

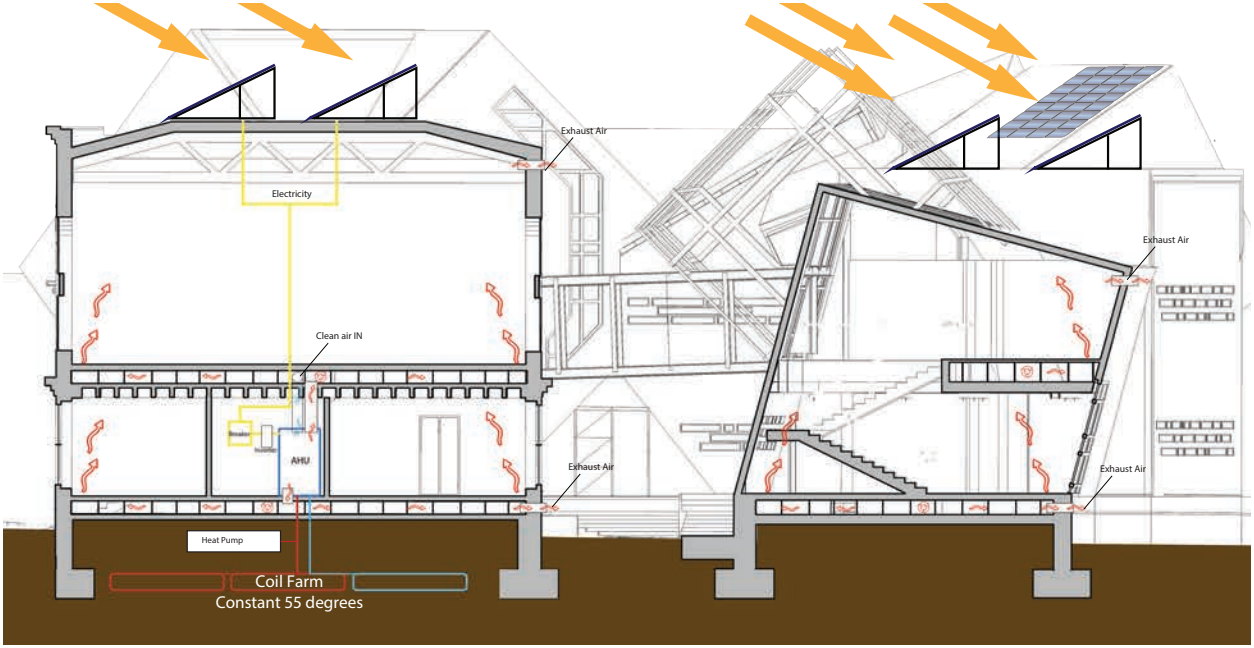
Interior Artificial Lighting Study



RESILIENCY STRATEGIES Photovoltaic Panels Strategic Locations

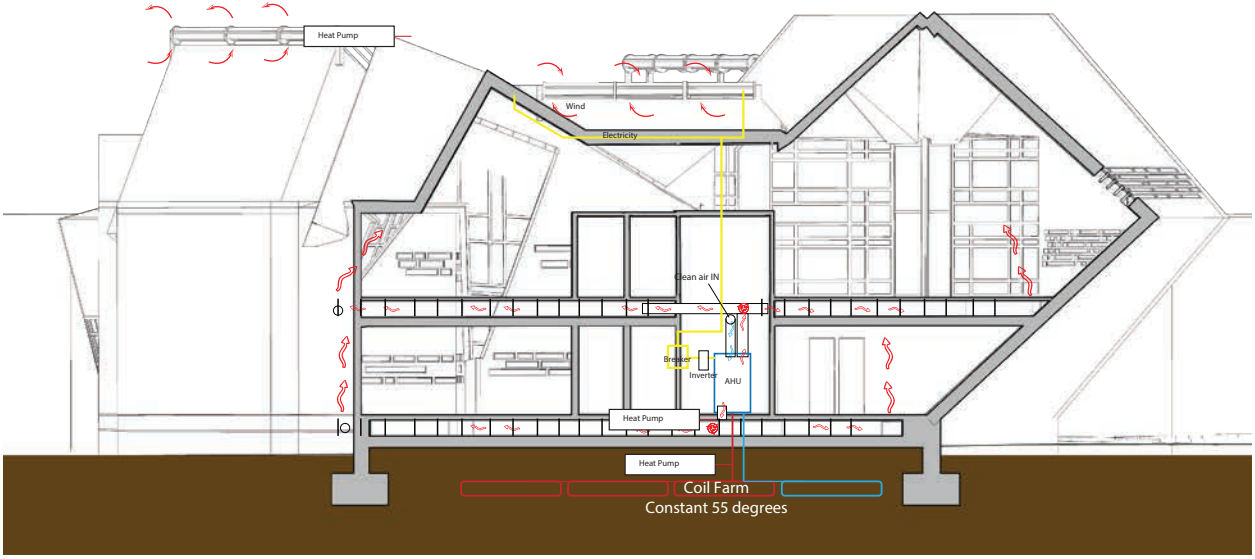


RESILIENCY STRATEGIES
Heating, Ventilation, and Air Conditioning, Photovoltaic Alternative

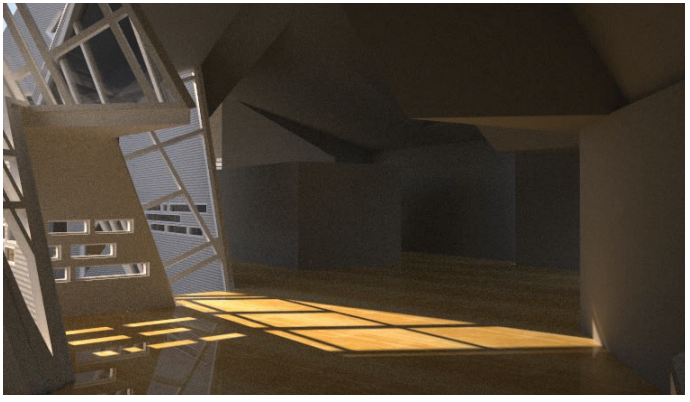


1. Sun rays contact photovlatic panels.
2. Photons from sun rays knock electrons loose from conductive material.
3. Conductors attached to positive and negative side of cells receive electrical circuit.
4. Captured electrons then create electrical current, which empowers air handling unit.
5. Unit diffuses treated air and releases exhaust air via raised floor system.
6. Underground coil farm minimizes air handling unit work (coils at a constant 55 degrees).

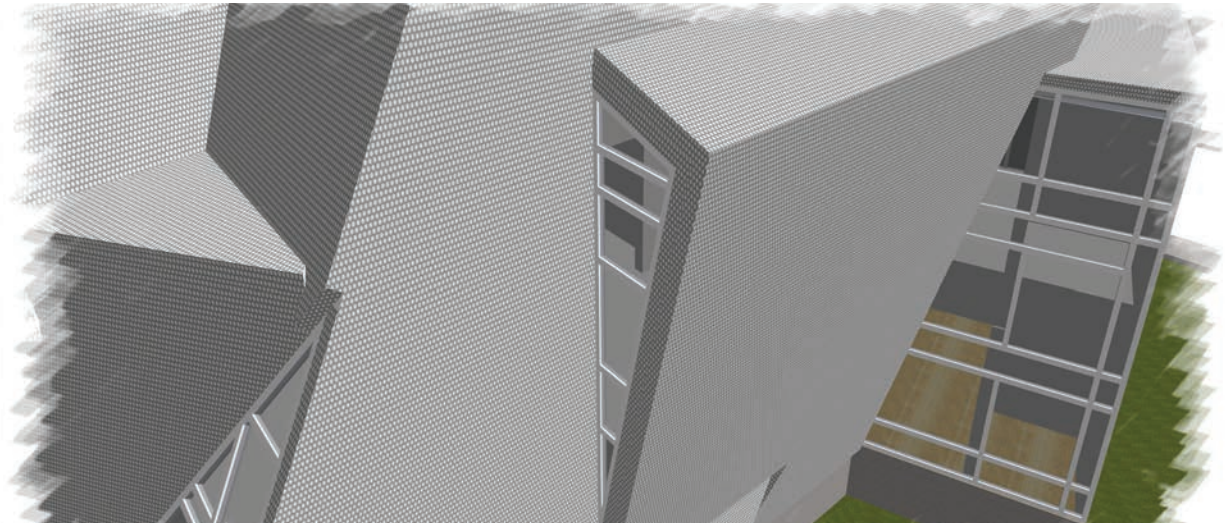
RESILIENCY STRATEGIES
Heating, Ventilation, and Air Conditioning, Wind Turbine Alternative

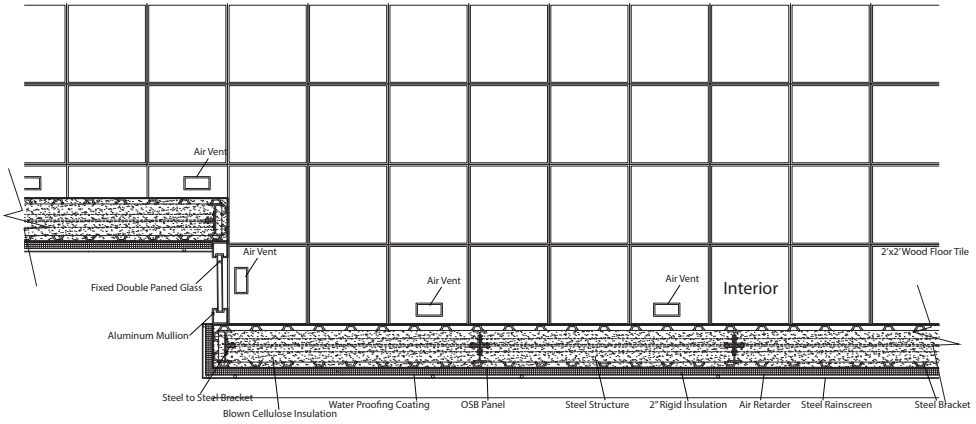


Interior Solar Study



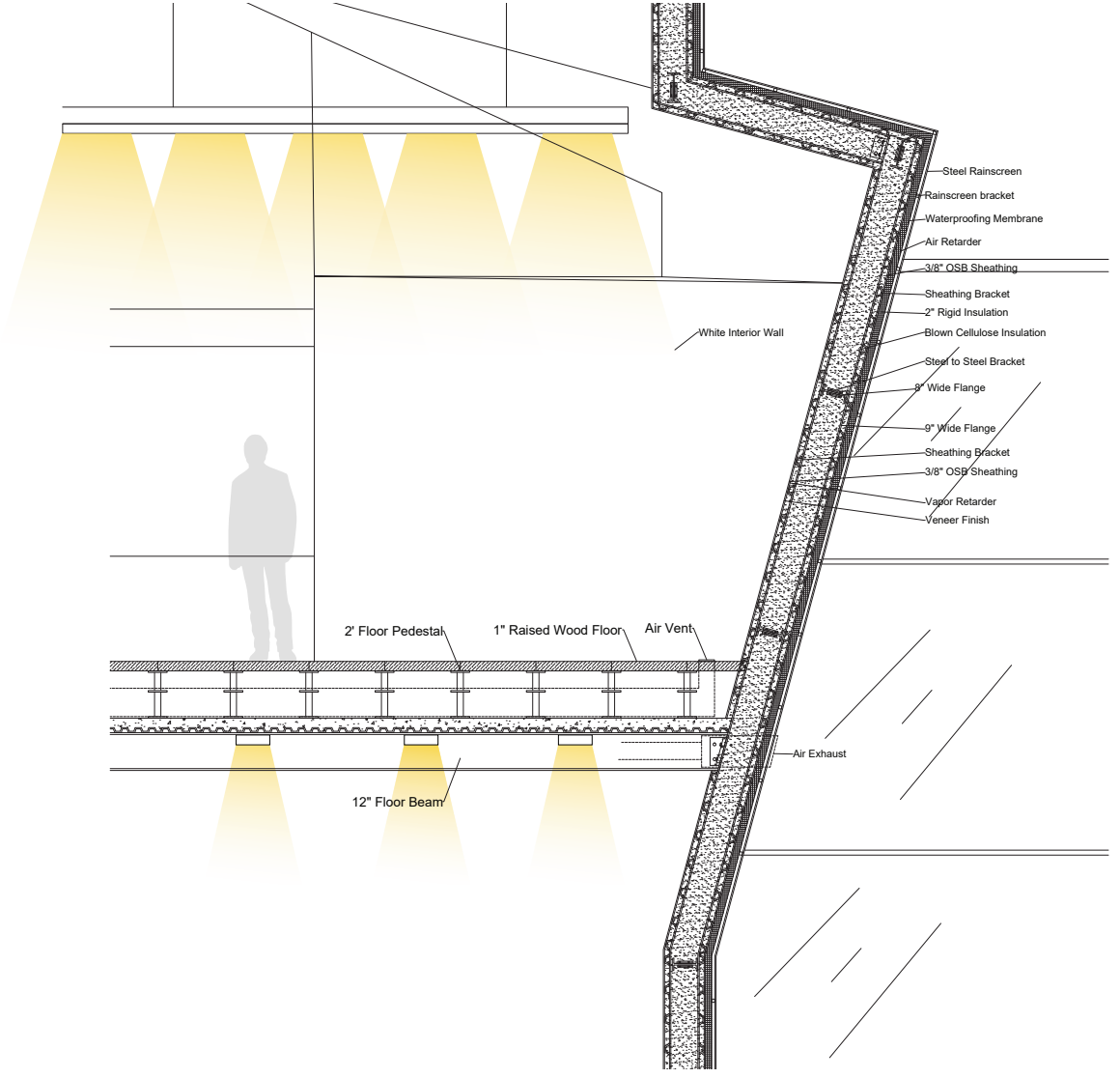
RESILIENCY STRATEGIES Facade System





Plan (A)

RESILIENCY STRATEGIES Facade System (Wall Section)



Resilient PA

Model Community and Resource Center:
Resilience Center of Excellence

This report is a result of a community-university initiative to address climate change impact and community degradation. A centrally located community threatened by recurring flooding was identified for a "Resilient Makeover." Partners include governmental organizations from state, county, and local levels and a Research and Land Grant university, Pennsylvania Department of Community and Economic Development (PA DCED), Lycoming County, Muncy Borough, The Hammer Center for Community Design, and Penn State. Design is at the center of this initiative, specifically Passive Low Energy Architecture retrofit and new construction combined with green and renewable energy infrastructure solutions.

The study is undertaken as an engaged scholarship project applying principles of Integrative Design. During the fall semester of 2016, teams of architecture students were challenged to research, program, and design a Resilience Center of Excellence (RCoE) through a process that included strong benefactor participation and workshops with sustainability specialists.

The resulting projects demonstrate innovative designs for flood protection and resilience that inform and are informed by the community.

PennState
College of Arts and Architecture

STUCKEMANSCHOOL

sustainable communities

HAMER CENTER
THE HAMER CENTER FOR COMMUNITY DESIGN

COUNTY OF LYCOMING PENNSYLVANIA

BOROUGH OF MUNCY, PENNSYLVANIA INCORPORATED 1826

PA pennsylvania
DEPARTMENT OF COMMUNITY & ECONOMIC DEVELOPMENT