

**Tiny House Name:** The Nomad

**Team Name:** Team 4

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1. **Narrative:** [REFER TO APPENDIX FOR RENDERINGS AND SCHEMATICS]

In an effort to foster interdisciplinary collaboration at Temple University, we have designed a Tiny House that will be sited at Temple Community Gardens located at Carlisle and Diamond. The purpose of building the Tiny House is to demonstrate: sustainable development & living, environmentally sound design, use of recycled & renewable materials, net-zero energy (off the grid).

We want this to be a space where the Temple Community and surrounding neighborhoods can learn about healthy lifestyles and sustainability. The goals of our design project are to engage different departments on campus with our design. We want students to learn from working on authentic and relevant projects rather than studying intangible concepts from books. By designing the Tiny House, we will understand the process of design and the considerations – both environmental and financial – weighed in construction. We will investigate the local issues such as energy and water consumption (and conversation) that affect our lives and the environment. The fully operational Tiny House will be exhibited to the general public and Temple Community for the students to learn from.

The site is easily accessible through two main entrances, which invites the Temple Community and neighborhood to enjoy a green space in an urban setting while still allowing for some privacy and protection with a split fence and a living privacy fence using shrub hedges. The centralized location of the tiny house incorporates it into the garden. With our split rail fence we account for the possible moving of our tiny house from its current hypothetical location. The fence, when open would allow for a vehicle to get through and the house to be taken out without disturbing our design. Direct but meandering paths allow for direction. They also mimic the pre existing brick path that is already established and in use across the street at the Sonia Sanchez garden. We hope to acquire these by reclaiming them from local demolition jobs and by places such as RAIR, Revolution Recovery. We hope to light these with solar power lights.

Our tiny house design addresses Temple Community Gardens and their needs, and adhering to their wish list in addition to giving them even more innovative sustainable

teaching elements (aquaponics, an apiary, labyrinth etc.). We hope to engage the different departments of Temple and allowing for further enrichment regarding: other organizations, the health sciences campus, Tyler School of Art (art sculpture installations), landscape/architecture (garden design), biology (studies of aquaponics and apiary and vegetation), etc. The space would be common ground for interdisciplinary learning. The designed open green space and garden would allow us to bridge the gap between student and local and allow for park integration in an urban setting. Our design keeps in mind the likely expansion of surrounding Temple buildings by incorporating components that are removable, mobile etc. We would also like to connect this vegetable garden with the nearby Sonia Sanchez (flower garden) by keeping certain design components and flowers similar.

The structure demonstrates overall coherence among architectural, sustainable and site features and proposed programming by choosing incorporating ergonomic and minimalist designs, sustainable features, clean lines, maximizing light, efficient use of space etc. We integrated sustainable elements into the design by incorporating solar power, composting, stormwater reuse, recycled materials, high efficiency lighting into our design. The structure that we have designed takes an innovative approach to design and sustainability by upcycling a modular steel container for the basis of our tiny house. The real bonus to using a shipping container is the new green phrase "adaptive reuse." Our trade deficit with the rest of the world is causing these to pile up in our country. Modular component, is cheap (and easy to build if need by). Our marketing strategy is one that employs "off shelf" elements that are sturdy and already exist in the world thus making less material and working with what we already have. All that that would need to be focused on is the customization of the pre-existing object. We are also upcycling wood, barrels, water bottles etc. in addition to water reuse (stormwater capture and distribution to wall planters, as well as spigot for other water uses). Our design relies heavily on our innovative features that engage cross disciplinary engagement and promotes learning in all fields.

*Intermodal steel container for the basis of our tiny house (9 ½ feet tall and 8 feet wide, but shortened to 15 feet from the standard 20 foot length to conform to 120 square feet design constraint)*



**2. Site plan addressing the following elements:** access requirements, existing site features and relocation plan, building site placement, building relocation requirements and any new site features (paths, outdoor meeting space, fencing, etc.);

### *Access*

The house is located near the center of the site, allowing for access at multiple points, including truck access for house transportability. Primary walkways connect to Carlisle and Diamond Streets, with the main entrance on the westerly side of the house facing Carlisle Street. Since the site is very flat, walkways are easily compliant to ADA/ANSI width and slope requirements. The house will also include an ADA compliant ramp for wheelchair access, as well as for ease of ambulation.

### *Existing Site Features*

The existing site is a grass lot, accompanied by a partial chain link fence on the westerly side along Carlisle Street. TCG currently has a movable storage trailer as well as a shed

along the northern property line, both of which are movable. Additionally, raised garden beds are situated throughout the site.

### *Relocation plan*

As the house is built using a shipping container standard truck transportation methods can be employed making the process easy and cost effective. The plan is to leave the existing shed and trailer in place, and move the raised garden beds to allow for natural walkways to the proposed tiny house. [Refer to site plan]

### *Building site placement*

The proposed house will be situated near the center of the property, with meandering walkways stemming from both Diamond and Carlisle Streets. The proposed house will be situated in a location that is both easily accessible from both street by foot, as well as allowing space for truck access in the event the house needs to be moved.

Careful consideration was also given to which house elements would be exposed southerly to receive ample sunlight, including but not limited to: solar panels, wall planters, miniature greenhouse, windows for natural light.

### *New site features*

New site features, aside from the house, primarily include the walkways, raised garden bed relocations, rain barrels providing water for multiple uses. Additionally, the existing chain link fence along Carlisle will be replaced with short hedges, providing fence-like features. A split rail fence along the southerly portion of the site along Diamond will provide some protection and privacy for the garden without alienating nearby residents and passers-by. This split rail fence will be offset from the southerly property line roughly 1/3 of the length of the site to the north.

South of the fence (between the fence and Diamond) will be available as a public space, including a flower garden, apiary, and area for sculpture (as described below).

*Space Saver Table Bench for inside tiny house*



*Handy collapsible bucket for storage*



*Healthy air indoor plants*

10 HOUSEPLANTS THAT  
CLEAN INDOOR AIR



Aloe Vera



Areca Palm



Baby Rubber



Bamboo Palm



Boston Fern



Chinese Evergreen



Mass Cane



Pygmy Date Palm



Ficus alii



Gerbera Daisy



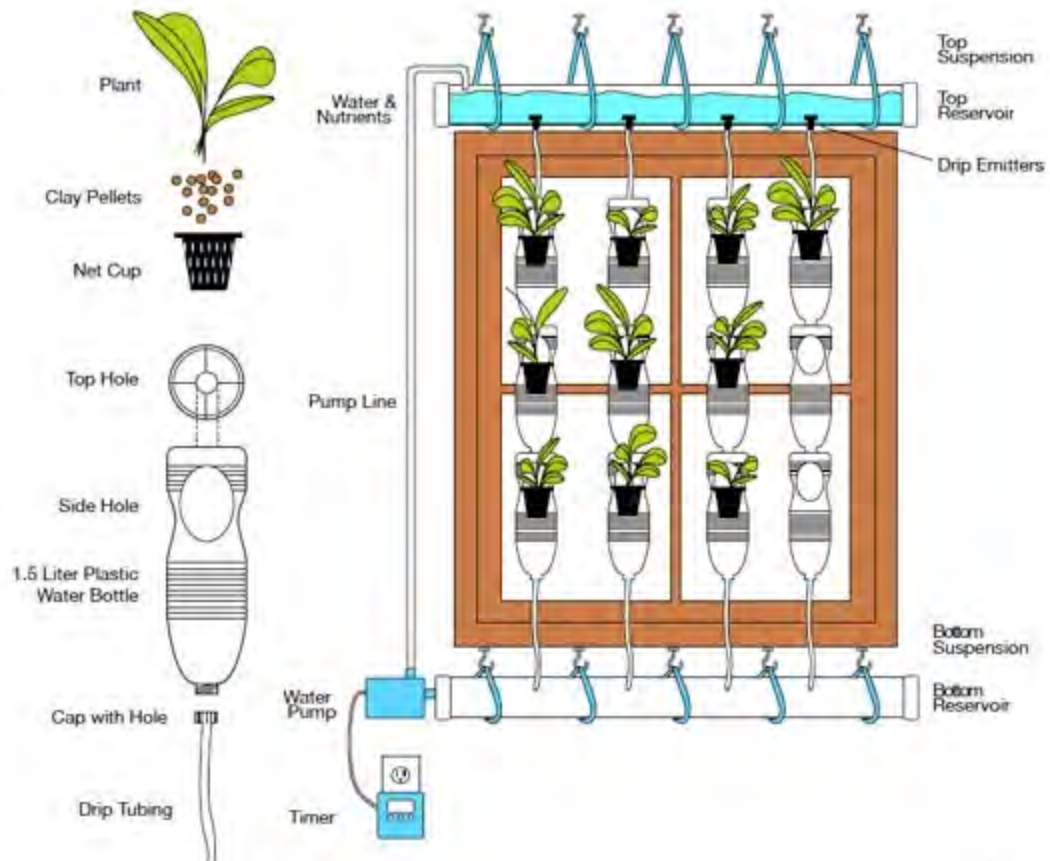
*Trap Door Storage*



*Window Farm for seedlings*

Indoor Planting Space



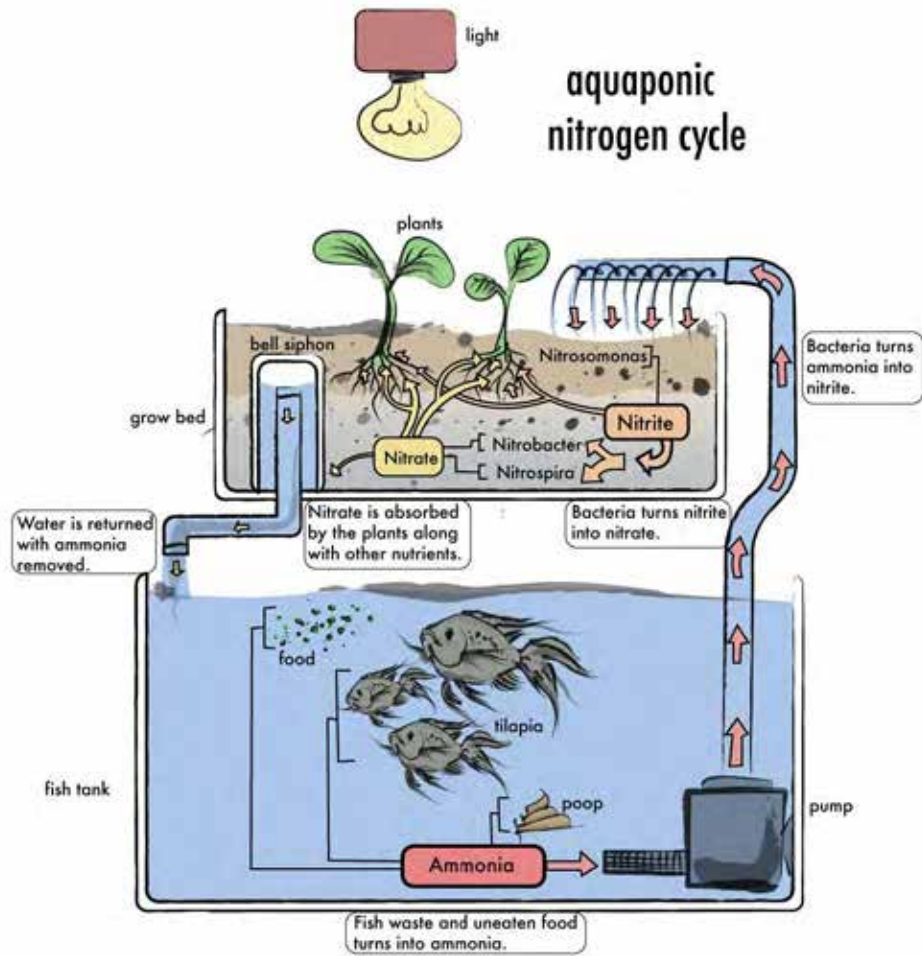


*Aquaponics*

Opportunity for collaboration with biology department







### Apiary

Production of honey allows for a possible revenue stream and another biology collaboration



*Sculpture garden*

Provides space for temporary or permanent installations from Tyler students



\*Village of Arts and Humanities

*Green space*

In conjunction with the sculpture garden a community friendly gathering place

*Vegetative fence*

Unobtrusive divisional boundary bordering Carlisle



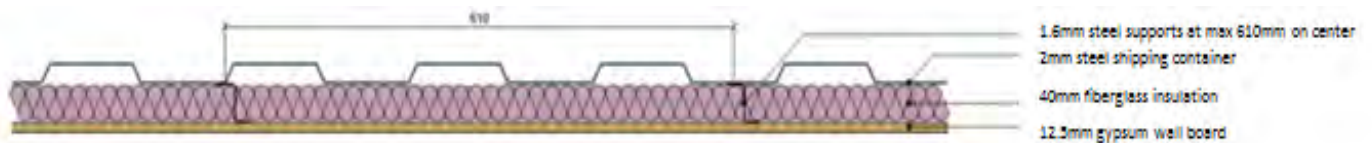
### *Split Rail Gate*

Running parallel to Diamond provides a division between community space and planting beds



Our plan is to keep using white shed for tool storage and to use the red shed as a Farmer's market stand and encourage community involvement.

3. **Site rendering** (at least one); \*
4. **Floor Plan** and at least one **interior rendering**; \*
5. **Elevation drawings of each structure side and at least one exterior building rendering**; \*
6. **Wall section**; \*



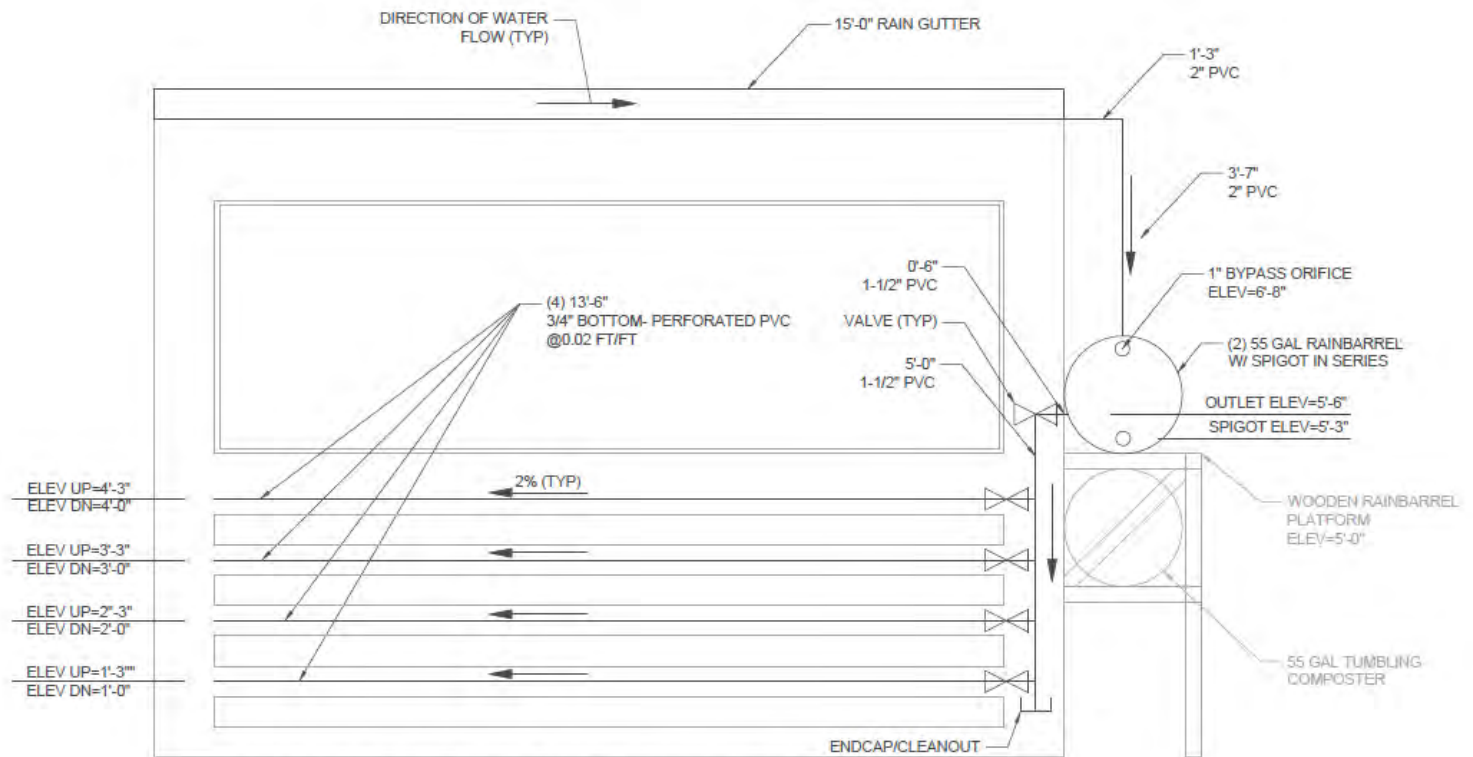
**Typical Wall Section**

### **7. Sustainable building components**

#### *Rain barrel stormwater irrigation system*

Stormwater system is designed to capture runoff from entire roof area (120 SF), and transport to two 55-gallon rain barrels, located in series. The rain barrel then has three (3) outlets: 1) Primary outlet (spigot) for draining barrel for water use, 2) secondary outlet draining to planter box irrigation, 3) tertiary outlet for bypass flow. [Refer to above schematic for detailed design elements]





### RAINBARREL IRRIGATION SYSTEM SCHEMATIC

NOT TO SCALE

#### NOTES:

1. ENTIRE ROOF DRAINS TO GUTTER, WHICH FLOWS INTO RAINBARREL.
2. WITH AN 8-FT X 15-FT (120 SF) ROOF, EACH INCH OF RAINFALL PRODUCES 10 CF (~75 GAL) OF RUNOFF. 55-GAL RAINBARREL INCLUDES BYPASS ORIFICE TO ALLEVIATE ISSUES OF EXCESS FLOW TO THE BARREL.
3. VALVES INCLUDED TO CONTROL FLOW TO THE LATERAL PLANTER BOX IRRIGATION AS WELL AS FLOW FROM THE RAINBARREL TO THE PLANTER BOX SYSTEM.
4. ENDCAP/CLEANOUT INCLUDED FOR PIP MAINTENANCE.
5. LATERAL PIPES TO PLANTER BOXES PERFORATED ON BOTTOM ONLY.

The planter box irrigation includes four (4) lateral pipes, sloped at 2% away from the rain barrel to provide adequate conveyance. These pipes are perforated at the bottom to provide drip-style watering for the planter boxes. Each of the lateral pipes includes a valve to control the water flow to the planter boxes (refer to below image).



A tertiary orifice is included near the top of the rain barrel for excess flows. With a 120 SF roof, each inch of runoff generates 10 cubic feet of runoff volume, or roughly 75 gallons. With a 55-gallon barrel, each inch of runoff generates 20-gallons of excess volume. At an intensity of 1.35 inches/hr (per PWD Management Guidance Manual) for a 2-yr storm, this generates a flow rate of less than 0.01 cfs (estimated using Rational Equation). The pipes in the system can handle this flow rate for bypass, so the the issue of excess stormwater is one of volume, not rate.

For this reason, we have included two (2) rain barrels in series to handle up to 110 gallons of runoff. For a 1-hour, 2-year storm (1.35 inches/hour), the roof will generate roughly 13.5 cubic feet of runoff, or roughly 100 gallons, which can be handled by a 110 gallon system. In short, the system can handle both a first flush scenario (1" of runoff), as well as a 2-year storm of a 1-hour duration. Events exceeding this will be handled by the bypass system.

#### *Tumbling composter*

A tumbling style composter will be included, and situated directly below the rainbarrel. The composter and the rain barrel will both be 55-gallon plastic drums. Situating the composter below the rain barrel will give easy access to both barrels, as well as utilizing the designated space at a higher capacity.







*Collapsible Greenhouse*

Lightweight, inexpensive solution to the desire for greenhouse space



### *Retractable Awning*

Allows for outdoor gathering space



### *Solar Panels*

A series of 300W solar panels will be installed on the roof, capturing energy for the little amount of electricity that the tiny house will require (e.g. interior/exterior lighting).



### **8. Description and plan addressing structure relocation;**

The two existing structures on site will remain, with slight relocation, as noted in plans. The white utility trailer will be used for tool storage. The red and white structure could be used as a part of a planned community-partnership farmers market program as an information/sales area.

### **9. Building cost estimate;**

#### ***MATERIAL COSTS:***

Container: \$3000

Structural Modifications to Container: \$4000

Exterior Decking: \$1400 (estimate for materials and labor for 150 sq ft of decking)  
Composting Toilet: \$750  
Solar Panels/Inverters/Batteries: \$500  
Framing for Rain Barrel Compost Tumbler: \$200  
Rain Barrel: \$100 (2 @ 50 EA)  
Tumbling composter: \$50  
Plumbing for Rain Barrel:\$130 [\$2/foot (average across all sizes) @ 65 LF]  
Valves for Rain Barrel: \$30 [6 valves \$ \$5 EA]  
Fittings for Rain Barrel: \$32 [8 connections @ \$4 EA]  
Gutter: \$35 (\$2.50/LF @ 13.5 LF)  
Compost Barrel (55gal steel drum): \$200 (used barrel+rod+bearings+handle+modification)  
Interior Walls: \$1200 (drywall material and labor estimate)  
LED Lighting/Wiring: \$200  
Bee Hive: \$50 (cost for materials and mounting. Beehive constructed via partnership)  
**TOTAL MATERIAL COST: \$24,000**  
**PROJECT COST (WITH LABOR/SITE PREP): \$36,000**

#### *COST OFFSETS:*

Philadelphia Stormwater Management Incentive Program (SMIP): \$275 (from roof @ \$100,000/acre, area added by overhang recovery could double available amount)  
Solar Lighting Tax Credit: 10% (\$50)  
Recycled Steel From Container: \$100  
**TOTAL COST OFFSETS: \$500-1,000**

#### *How cost effective is the team's design concept?*

In each element of design, careful consideration was given to material selection. Material selection takes into account cost and environment without compromising function. Additionally, priority was given to each design element's capacity to be transported. For instance, cheaper piping material could have been selected, however, PVC was chosen for its construction ease as well as being easily detachable and transportable.

#### **10. Marketing plan;**

To attract additional funding sources, the team sought opportunities to use the site and the structure to create natural partnerships with the community, as well as other Temple organizations. This design would provide vegetables and space to host a small farmers markets throughout the growing season. The incorporation of public art space could foster partnership with and contributions from the Tyler School of Art. The incorporation of the public flower gardens on the Diamond Street side of the site allows for partnerships and

funding from Landscape Architecture. The covered outdoor meeting space would provide potential partnerships with Campus Recreation as a site for outdoor yoga/fitness classes.

### **How well does the design offer TCG a safe, functional and comfortable space?**

The functionality of the house was of primary concern. In the small footprint it incorporates a demonstration/gathering space, a greenhouse, water reclamation, and composting. The convenience and comfort of storage, basic electricity, work areas, and bathroom facilities are also considered.

The balance between safety and community incorporation was a delicate issue. The site plan addresses this in a bilateral approach. In allowing access to a more public open green space, flower beds, and sculpture garden and unobtrusive fencing to create a boundary for the more private planting beds and structural components.

The house effectively addresses all of the requested features of TCG. Both the interior and exterior of the home incorporate green features. These seedling beds and planting areas create a continuity between garden and home. A collapsible greenhouse frame on the exterior of the building allows for the ground space adjacent to the house to become a viable planting bed before the weather would normally allow such an enterprise. The corrugated steel of the shipping container is finished with a natural “rust” patina. The rain and composting barrels painted in primary blue and red. The awning sheltering the demonstration/gathering space a vibrant green. The single door is a shock of yellow. The rear doors and window trim are flat white. This theme will reflect the tones of the earth and the flora of the garden creating a lively feel even during dormant winter months.

Additionally, the rear double doors are able to serve as a “screen” for projections during demonstrations.



A conscious effort has been made to use reclaimed materials in the construction of the house. A reclaimed shipping container functions as the primary structure. These containers are an overabundant commodity in the United States due to the trade deficit. Additionally, two 55 gallon steel drums are repurposed as water reclamation and composting containers. If possible, bricks from neighborhood demolitions will be used to pave paths throughout the garden. The use of the reclaimed materials listed above will serve both as a cost efficient method of construction and create a positive environmental impact. Modular standard size 8 foot

### **11. Programming plan;**

The physical space will be used to connect Temple Community Gardens members, Temple Students, and surrounding community members. Features include: Meditation labyrinth garden, Sculpture garden with rotating art from Tyler School of Art.

### **12. Innovation**

A large portion of our Tiny House project involves the innovation component. Regarding our business plan, we want to use the pre-existing red shed as a farmer's market. This could help with funding. We would borrow a business plan from Philadelphia Urban Creators.

Regarding the program evaluation tool, we see this space as an outdoor classroom to teach not only temple students but also surrounding community about healthy lifestyles and sustainability

#### *Interdisciplinary*

Regarding the public art pieces displayed in the space. We hope to engage Tyler School of Art Sculpture Students to contribute to an outdoor installation of their free standing sculptures that reflect the goals of the space (upcycling materials, sustainability).

#### *Outside innovations and detachables (Transportables):*

- Rain barrel irrigation system
- Porch
- Awning
- Walkway ramp
- Greenhouse
- Tumbling composter

#### *Inside innovations:*

- Composting toilet
- 300W solar panels (3-ft x 5-ft)
- Modular building\* size 8 feet wide, 15 feet long, height below 11 foot 6



*Site features:*

- Outdoor seating and meeting spaces, raised planting beds, physical
- Path networks ADA accessible, entrance experience, perimeter fencing
- Ramp site features
- Demountable element, outside 120 sq feet

*How well does the programming plan meet the future needs of an organization like TCG?*

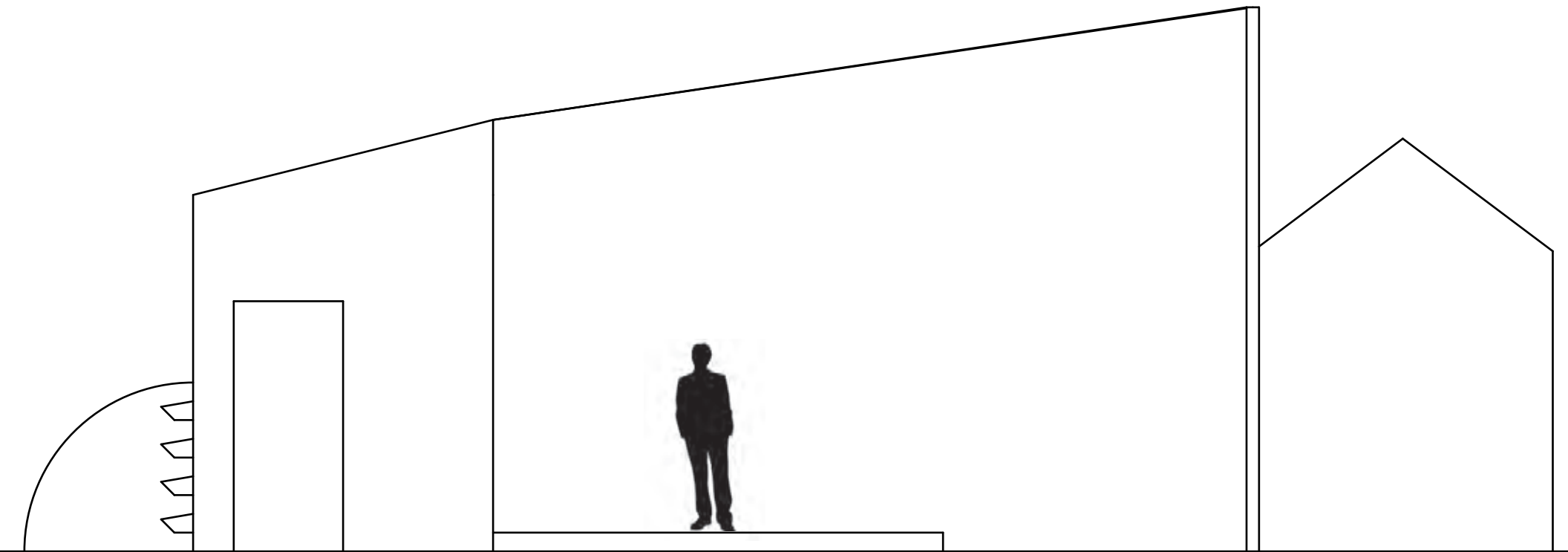
One key feature of the site and its layout is its flexibility. Adjacent development may force the site to be rearranged, and this design allows for that. The house itself is easily moved, as well are its exterior parts. The path networks also allow for various arrangements without having to redesign and re-evaluate ADA accessibility.

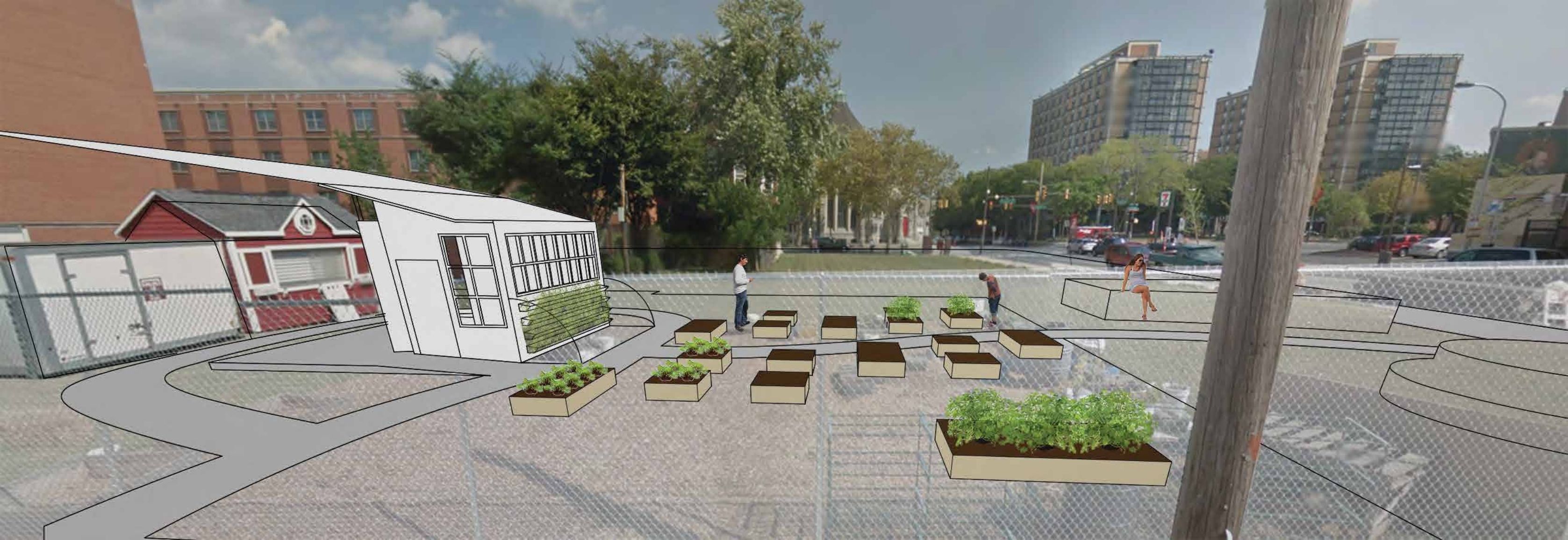
**Submission:**

- 5pm and teams will be required to provide digital media via Owlbox or TU
- Safe Send. Files should be shared/sent to [kelmhurst@temple.edu](mailto:kelmhurst@temple.edu). All files must be received by 5:30pm on 1/31

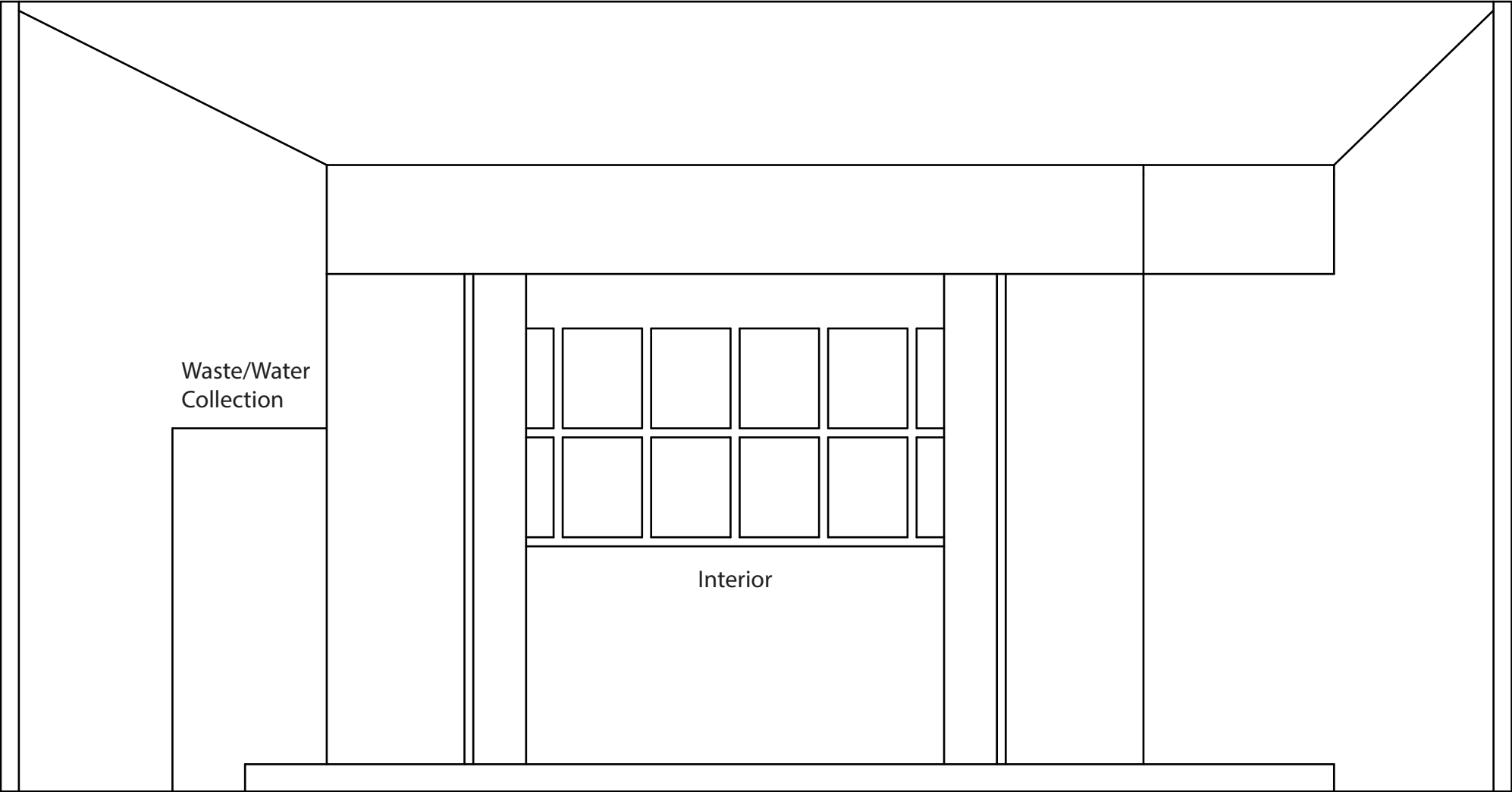
**References:**

- Philadelphia Urban Creators
- DIY 55 gallon compost tumbler  
<http://just-our-little-family.blogspot.com/2010/07/make-your-own-compost-tumbler.html>
- Will Allen Growing Power Urban Farm \*aquaponics research
- REsource Exchange <http://www.theresourceexchange.org> \*material sourcing research
- RAIR Recycled Artists in Residency <http://rairphilly.org/material-sourcing> \*material sourcing
- Revolution Recovery <http://www.revolutionrecovery.com> \*material sourcing
- \*storage container research <http://www.thefieldlab.org/work.html>
- Wall Section image modified from:  
<http://www.residentialshippingcontainerprimer.com/focus%20it>
- Philadelphia Water Department



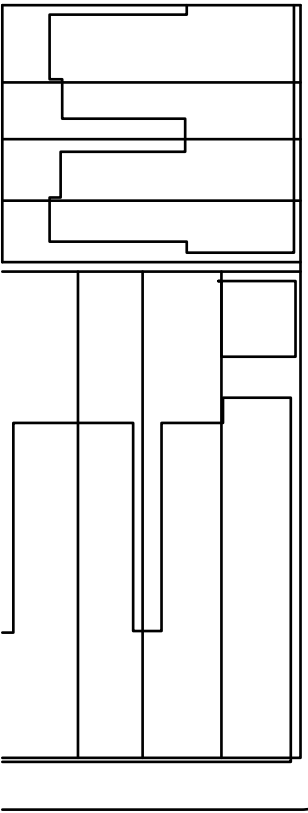


Canopy

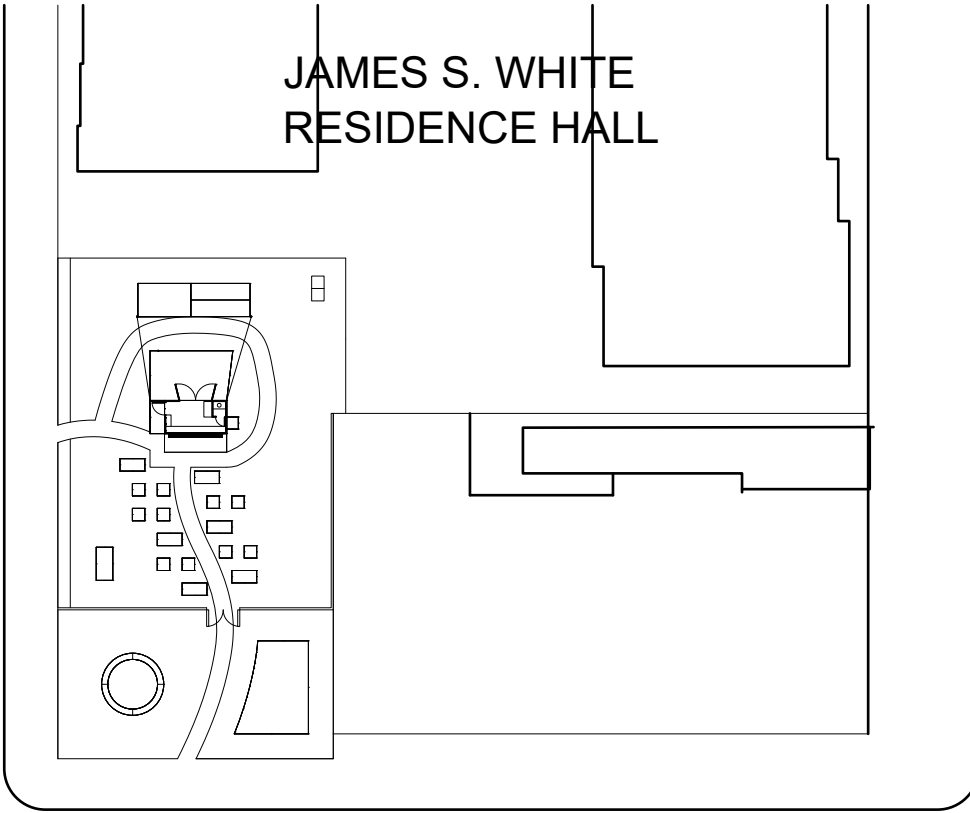


Waste/Water  
Collection

Interior

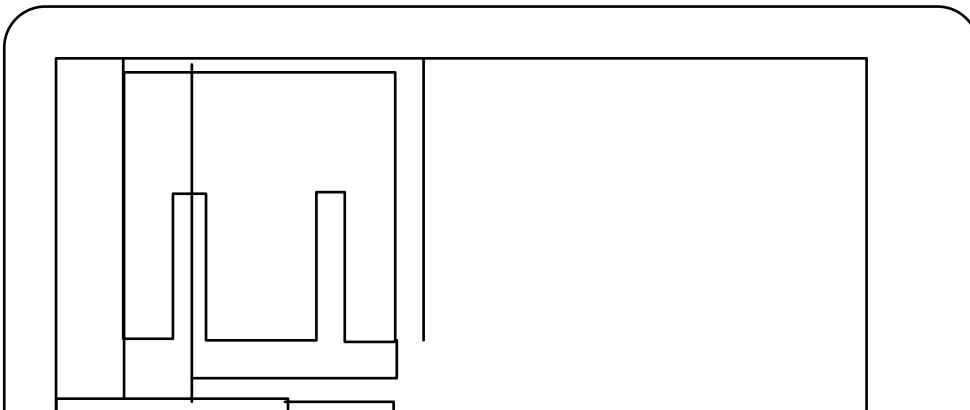
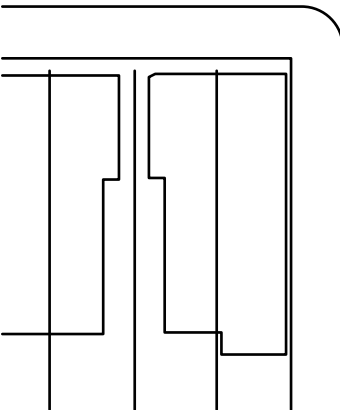


CARLISLE

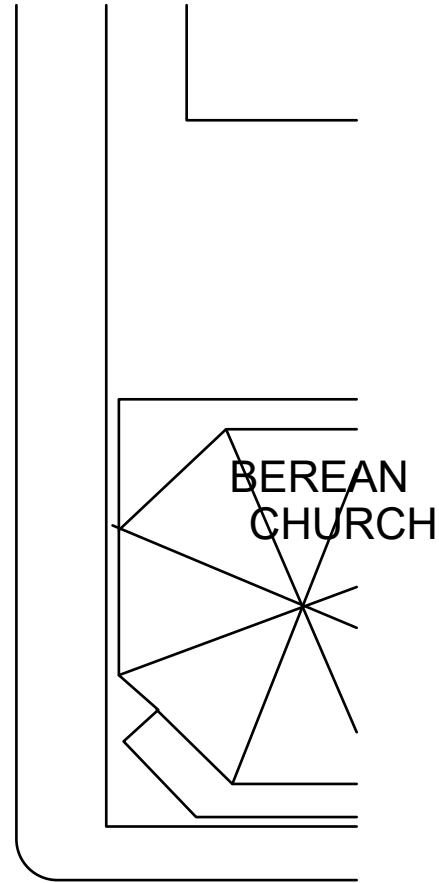


JAMES S. WHITE  
RESIDENCE HALL

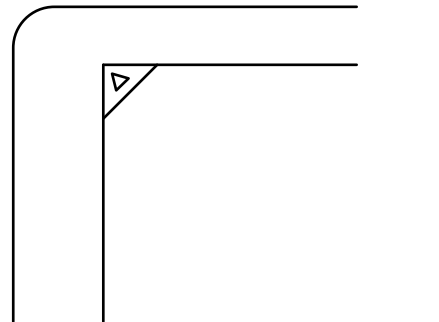
DIAMOND



BROAD

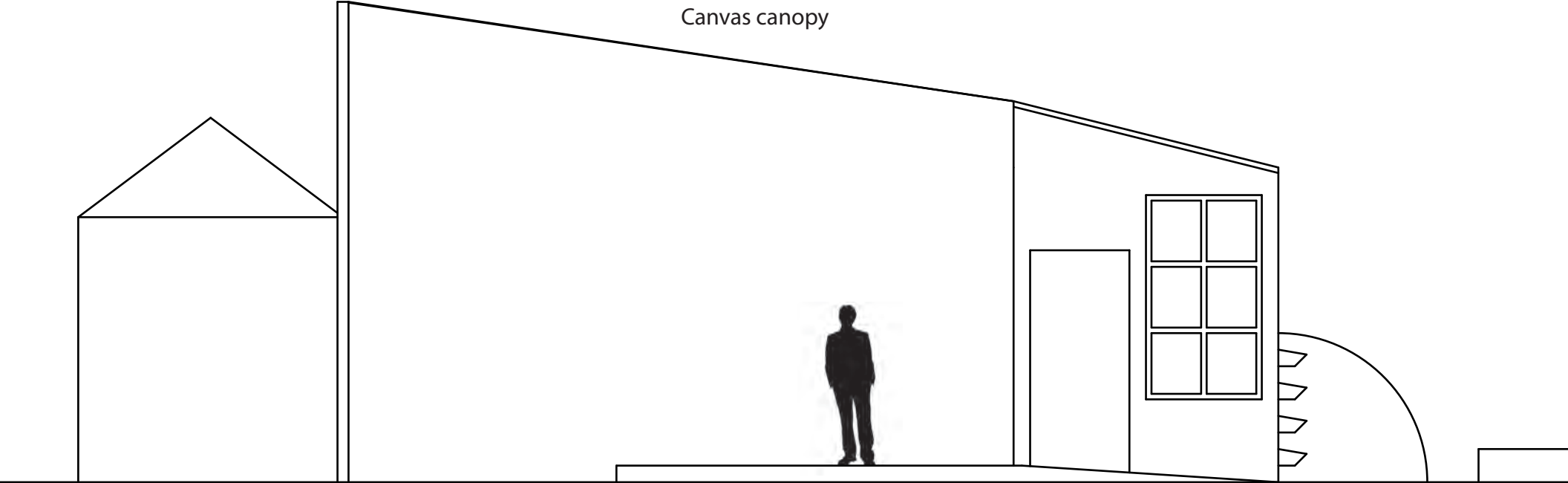


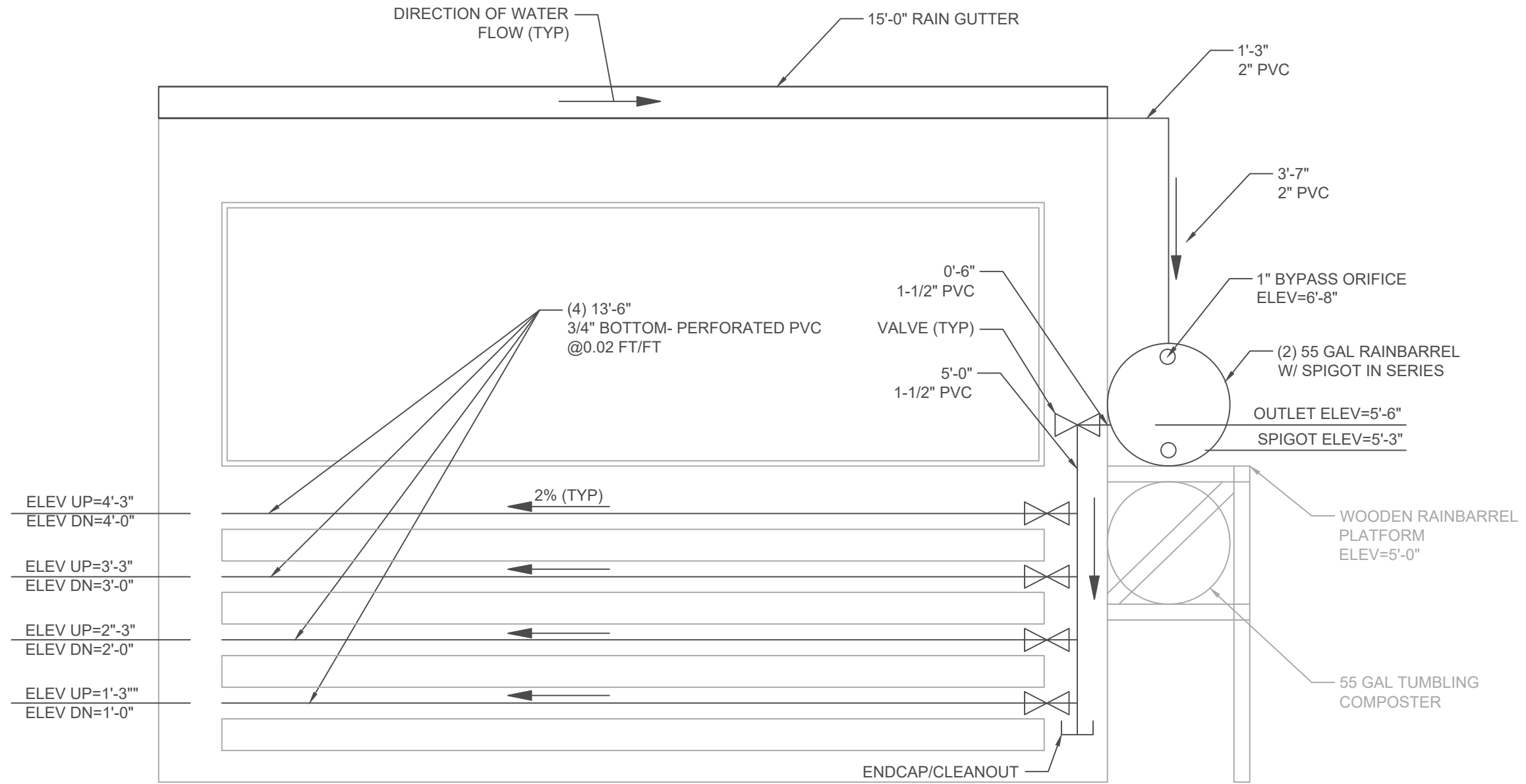
BEREAN  
CHURCH





Canvas canopy





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