

MENDING DISUNITY

DUSTIN GALLEY
HONOR'S THESIS
ARCH 4216

Problem/Premise

This year's comprehensive architecture design project was a small fire station immediately adjacent to an informal settlement in Orlando West, South Africa, just south of Johannesburg. The goal of the project was to make a connection to the community both architecturally and functionally. The site is surrounded by an area filled with informal settlements that do not have the necessary utilities or appliances to live properly. The community does not see the government as a trustful institution, and those tasked with helping the area, like fire fighters, can become targets to the community. This revealed the need for a space that promotes overall health and wellness of the community. For this reason, the project entails a fire station with a community space that clearly communicates a statement of health and wellness towards the community and fire fighters. It was determined that a community kitchen and garden met this need, because it provides a safe place to harvest fresh produce, learn about healthy living, and practice fire safety in the kitchen.

Conceptual Approach

When looking at the larger context of the site, it is evident that the densely populated regions are all connected by natural green areas. The site sits at the center of where these zones of vegetation converge, and nature is commonly seen as a symbol of health and wellness. This creates an opportunity for the fire station to be an expression of healthy living to all surrounding communities, where people of all different backgrounds can come together to focus on a greater goal: health and wellness on an individual and communal level.

The design focuses on influencing the well-being of both fire fighters and users of the community. Communal oriented spaces, passive recreation spaces, strategic daylighting, and exterior patio spaces were implemented in the fire station to positively impact the overall health of fire fighters. These men and women can become a symbol to the community through the expression of these healthy values, and it alleviates the tension between the government and the community. The fire station creates a welcoming and inviting environment for the community to enjoy together. The addition of a community kitchen and demonstration space provides a safe place to learn about healthy living, learn about fire safety in the kitchen, and enjoy cooking with better appliances. A community garden allows users to harvest fresh produce with each other.

Form Development

There are four major components to the program: the community spaces, the administrative offices, the apparatus bay, and the fire fighter living quarters. Each use received a simple form, and these forms were placed in a linear fashion on the site. These forms were pushed as close as possible to the heavily traveled intersection, and the community form was rotated and extruded further. This creates engagement with community and allows for the building to become a symbol of wellness. The height of the community sector was lowered to bring hierarchy to the primary purpose of the building: the fire station. This also brings down the scale to invite the community into the building. The central lobby area was lowered further to create a more intimate and welcoming entrance.

Certain portions of the facade were pushed and pulled to bring importance to unique spaces within each form like the community kitchen and apparatus bay. A central tower element was created to provide a sense of monumentality to the building. A strong band was wrapped around the fire station form and community spaces to convey a sense of protection. These bands extend past the primary facades to create shading for exterior spaces. Furthermore, these overhangs reach out to further engage with the community. Strategic openings within these “protective” bands bring natural light into the living quarters atrium and central lobby. This emphasizes the importance of natural daylighting to the health and wellness of both the fire fighters and community users.

Building Materiality

The goal of the exterior material palette is to provide a familiar, warm, and welcoming set of materials to fire fighters and users from the community. It relates certain materials to what the community already knows and introduces innovative materiality. Each material was chosen to engage with the community and bring peace to the tension between them and the government. Materiality can play a huge part in creating a space that promotes the overall health and wellness of fire fighters and the community.

Corrugated steel, from Clotan Steel in Vanderbijlpark, South Africa, was utilized for the material wrapping the “protective bands.” This is a fitting exterior wall and roof material because of its relation back to the users of the space. The goal of the project is to engage with the community and provide a space they feel welcome and comfortable to use. Many of the settlements in the surrounding areas are made from corrugated steel, so this is a material they

associate with familiarity and protection. Utilizing this metal, especially for the community space, will create this familiar feeling of protection. Clotan Steel is a reputable corrugated sheeting supplier in South Africa, supplying construction companies and individuals on the African continent with quality steel building products. Along with that, the material is low in maintenance and affordable, and it creates an opportunity for use of local labor.

Yellowwood, from Rare Woods SA in Cape Town, South Africa, was implemented on the interior face of the entry points to the building. The use of wood in the fire station is key to create a warm contrast to the hard metal siding used throughout the exterior of the building. Using wood on the inside faces of the bands wrapping each form softens the experience of users as they make their way under the covers. The areas clad in wood will be less exposed to sun and rain, limiting the patina of the wood. However, even with some patina, it would complement the dark gray metal siding. The wood will create a softer, community oriented experience as they transition from exterior to interior. It will also aid in encouraging involvement to create wellness for the community. Yellowwood is an even-grained, lightweight South African wood that has been used historically for hundreds of years, and a variety of purposes, making it a great material for interior and exterior uses. Along with that, it is native to the region, so it is readily available for building purposes.

Composite metal paneling, from CEI Materials in Manchester, MI, is a great material for cladding the exterior of fire fighter living quarters to bring a sense of stability with sleek, contemporary characteristics. Panels can be cut to custom sizes, maintenance is low, and the material acts as an effective rainscreen. The innovative material is more expensive and would need to be imported into SA from the US, but it would be utilized for a good reason. The

community has a desire to grow together and look to the future, and this material represents this outlook. Users from the community are initially greeted with a familiar corrugated metal, and this composite metal siding pushes past what they have seen before. Thus, encouraging them with the possibility of innovation, along with indicating the notion that the fire fighters are here to meet them where they are and help them move towards a brighter future together.

Perforated metal panels, from Marco Specialty Steel in Houston, TX, will act as great shading system for the exterior patio spaces, along with highlighting the significance of structural expression in my project. Natural light within a space greatly enhances the overall health and wellness of users, and this material diffuses harsh light, creating pleasant indirect light on the interior. It would need to be imported into SA from the US. However, using a shading device that is just punctured sheet metal limits the cost needed for an extravagant shading system. This material offers the best combination of ease of manufacturing, low maintenance, and affordability. Along with that, it allows for potential reference to the culture of the community. The holes in the metal could be formed into artwork or symbolism important to the different regions of South Africa.

A structurally silicone glazing will aid in creating a statement towards innovation. The system would be a little more expensive, but it eliminates the bulkiness of face caps, creating a more seamless appearance. This clean glass facade goes well with the sleek composite metal paneling. The openings within the facade are extruded outwards with simple movements and limiting the obtrusiveness of exposed mullions helps keep a direct vision outward and inward. Along with that, using more reflective glass with low-E coatings can raise the overall R-value of

the walls. This seems to be the closest available glazing system of this type, so it would need to be imported into South Africa from the UK.

Interior Focus Space

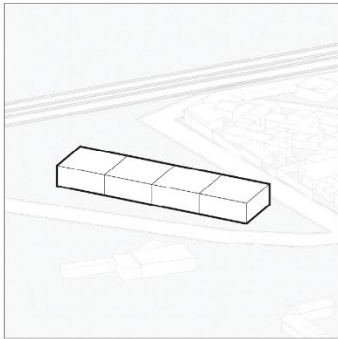
In order to fully understand the design of mechanical, structural, and lighting systems, we were tasked with fully designing and sizing members for each system for only one focus space within the building. The chosen focus space for my design was the fire fighter communal living area on the first level. We started with structure, and my design is a steel framed building with vertical bracing. The façade is then tied back to this steel superstructure. We sized certain integral members to our structural system. Next, we created an HVAC duct layout for the entire building while focusing on duct and diffuser sizes for the focus space. The final design had an HVAC system composed of three VAV central air units, a boiler, and a chiller providing air to the entire building. Finally, we focused on lighting design for the fire fighter living quarters. Natural daylight is an integral part to improving the health and wellness of individuals within a space. Thus, my design included a two-story atrium with a skylight bringing ample amounts of natural daylight into the focus space throughout the course of the entire day.

Conclusion

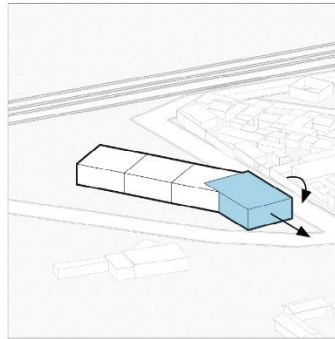
Upon final review, the goal of the project was to address the community both architecturally and functionally. This design seems to do that through the expression of protection with a monumental building that also welcomes and encourages community involvement. Form, materiality, and scale of this design express health and wellness to the community in an effort to mend the disconnect between the community and government agencies.



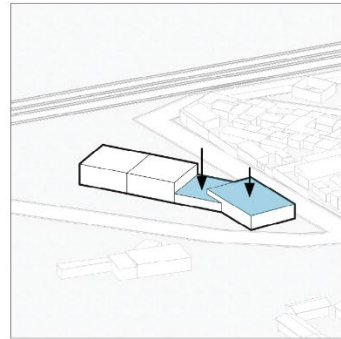
Form Development



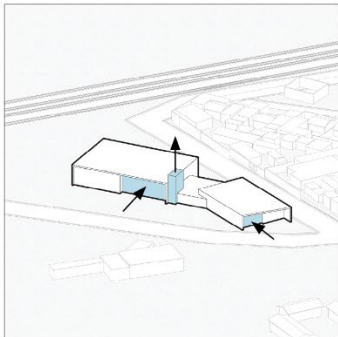
There are **four major components to the program**: the community spaces, the administrative offices, the apparatus bay, and the fire fighter living quarters. Each use received a simple form, and these **forms were placed in a linear fashion** on the site.



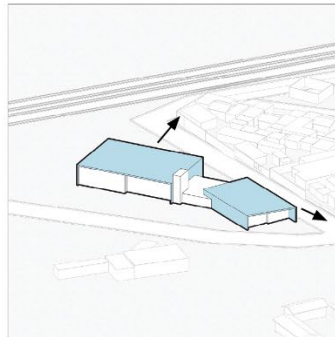
These forms were pushed as close as possible to the heavily traveled intersection, and the **community form was rotated and extruded further**. This creates **engagement with community** and allows for the building to become a symbol of wellness.



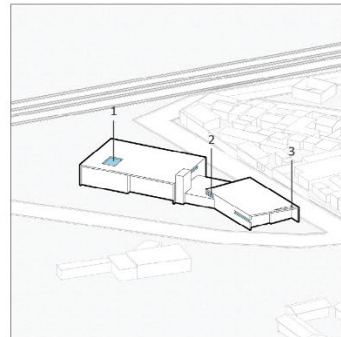
The height of the community sector was lowered to bring hierarchy to the primary purpose of the building: the fire station. This also **brings down the scale** to invite the community to use the space. The central lobby area was lowered further to **create a more intimate and welcoming entrance**.



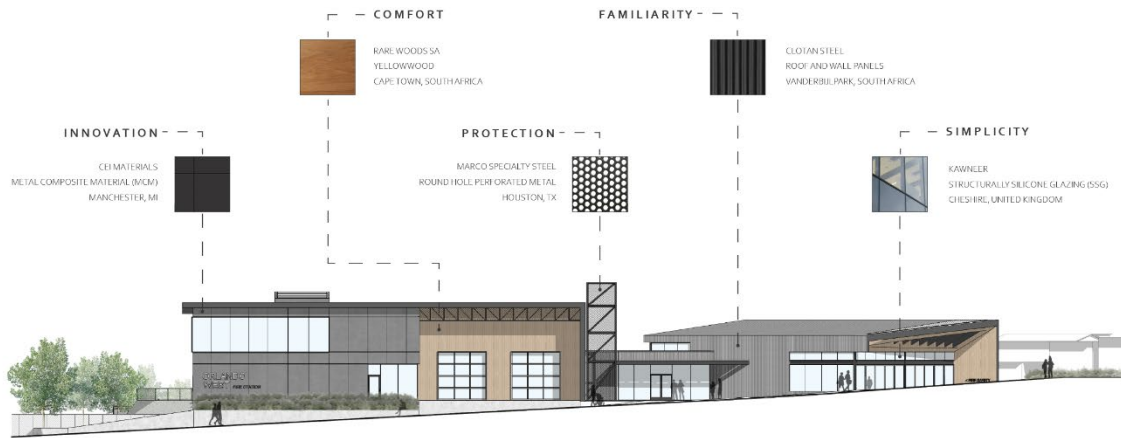
Certain **portions of the facade were pushed and pulled** to bring importance to unique spaces within each form like the community kitchen and apparatus bay. A central screen element was created to provide a sense of monumentality to the building.



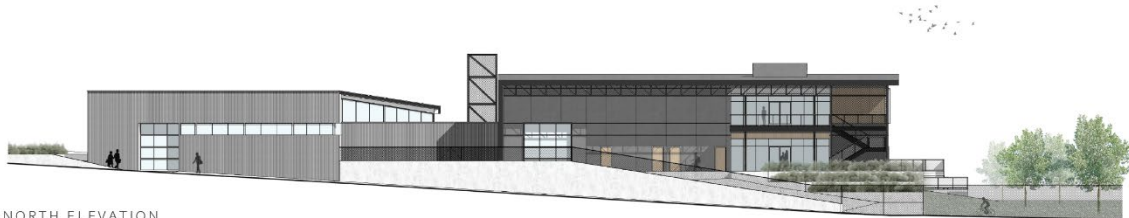
A **strong band** was wrapped around the fire station form and community spaces to **convey a sense of protection**. These bands extend past the primary facades to create shading for exterior spaces. Furthermore, these **overhangs reach out to further engage with the community**.



Strategic openings within these "protective" bands bring natural light into the living quarters atrium and central lobby. This **emphasizes the importance of natural daylighting** to the health and wellness of both the fire fighters and community users.



SOUTH ELEVATION



NORTH ELEVATION



Exterior Perspective



Interior Perspective