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Addressing Fashion and Clothing Waste

and to the Faculty of the Department of Architecture College of Architecture and Construction Management

In partial fulfillment of the requirements for the Degree

Kennesaw State University, Marietta, Georgia

SKINS & FABRICATION

Request for Approval of Thesis Research Project Book Presented to:

Michael Carroll

By

Renee Palmer

Bachelor of Architecture

May 9, 2022

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	Clothing: /ˈklō- <u>t</u> hi ŋ / n.
	1. items designed to be worn to cover the body to protect from
	external elements.
	Draping:/dreyp-ing/ v.
	1. loosely place or cover a surface with a light sheet with intention.
	Fabric: /fab-rik/ n.
	1. cloth or other material produced by weaving or knitting fibers.
40 41	Fabrications:/fab-ri-key-shuhn/ n.
60-61	1. the manufacturing or mass production of an item.
	Fashion: /ˈfaSHən/ n.
	1.a construct of art and design with techniques and materiality on a
	form to create a garment.
	Fast Fashion:/ˈfast/ /ˈfa-shən/ n.
	1. an approach to the design, creation, and marketing of clothing
	fashions that emphasizes making fashion trends quickly and cheap
62-63	available to consumers.
02-03	Outsource: /'out,sôrs/ v.
	1. obtain (goods or a service) from an outside or foreign supplier,
	especially in place of an internal source.
64-65	Product: //prä-(,)dəkt/ n.
07-03	1. an object that is made or grown to be sold or used.
	Recycle: / ()rē-ˈsī-kəl/ v.
	1. to adapt to a new use
	Season:/ˈsē-zən/ n.
66-67	1. a period of the year characterized by or associated with a
	particular activity or phenomenon.
69	(a) the period normally characterized by a particular kind or
	weather.
	(b) a period marked by special activity especially in some
	field.

Sewing:/soh-ing/v.

1. to unite or fasten by stitches.

Shading:/shey-ding/ n.

1.protection from the sun.

Skin: /'skin/ n.

1.a barrier that protect and insulate interior components to the elements.

Stitching:/stich-ing/ n.

1. weaving together to items.

- 2. connecting but not fully joining of two or more items.
- **Sustainable:** /sə-'stā-nə-bəl/ a.
 - 1. of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged.
- 2. of or relating to a lifestyle involving the use of sustainable methods

Sweatshop: /'swet-shäp/ n.

1.a shop of factory in which employees work for long hours at low wages and under unsafe conditions.

Trend:/'trend/ n.

1. a current style or preference.

Upcycling:/uhp-sahy-kuhl-ing/ v.

1. taking existing items subject to landfill that are changed and given a new function.

GLOSSANY



Abstract

Articles of clothing; they are the second organ, the Second Skin. Their functions are to protect the body from the harsh external elements and create a sense of design with Fashion–the same as exterior facades on a building. However, where architecture and Fashion differ is sustainability.

The Global fashion industry contributes 10% of greenhouse emissions. From that 10%, about 13 million tonnes of clothing waste ends up in landfills or burned. Most of the waste comes from the Fast Fashion Industry, which sees cheap labor from underdeveloped countries to maximize profits. These companies will spend a good portion of their funding promoting sales with trends and new collections every two weeks. What happens is the loss of value allows consumers to purchase clothing cheap enough to through away without second thoughts.

Compared to American homeownership, the value and appreciation for giving architecture allow for a system of upkeep and recycling. So why not the same be said about Fashion? The amount of natural resources used in creating new clothing causes a strain on the environment. So the narrative is developing a system in place in sustainable Fashion with architecture.

Location plays a vital role in design; statistically, America, Europe, China, and India see the most clothing consumption. The thesis looks at redeveloping an existing site in a redeveloping neighborhood due to a Graduate thesis of the Atlanta Beltline. It sets a precedent for sustainability and challenges the use of interconnected Urban space. With the location, the program's innovation utilizes the development of sustainable spaces with the placement of different fabrication rooms. Only when the clothing is fully decaying can the use of a tectonic facade occur. In doing so, the thesis must investigate Clothing material to find the conclusion to the thesis statement.

Thesis Statement

Through innovative design solutions, this thesis sees to the re-imagination of architecture as a sustainable, programmatic, and computational tool to addressing fashion waste.

Thesis Proposal

This Thesis aims to glimpse the damaging impact fast fashion and the fashion industry have on the environment, natural resources, and physical health. The task is to investigate how waste in fashion can utilize architecture to develop sustainable fashion. In doing so this project seeks to develop a programmatic Innovation, and fabric tectonic. While at the same time the adaptive reuse of an industrial building in West End, Atlanta, Georgia. In the adaptive reuse of Industrial building, there is the connection of the site to its existing and active redevelopment of the Historic neighborhood based upon the Atlanta Beltline program of Subarea 1.

)1 Research

Introduction

Growing up, I was not too fond of Shopping, yet I loved glimpsing at fashion. The shopping ordeal consisted of entering ten stores and trying loads of clothing only to put some or all of them back because of pricing/styling. Then we– My Family – will annually clear out our closet into a keep and to-go pile. Each of us filling a big black bag with clothing to be dropoff at Goodwill. Thus a cycle starts of buying, wearing, and throwing away clothing. Though what happens to the clothing we toss away?

To Americans, the idea of waste would not cause a stir in apparel coming and going, nor are they cautious about its influence on its surroundings. Americans will contribute 90% of their clothing to incineration or landfills, which correlates to 81 pounds per American, or overall 13 million tons a year. In the last decade, the Fast Fashion industry has seen success in sales with low prices and fast changes in styles. The once Dual Seasonal fashion has transformed into 52 Seasons a year. Fast fashion companies Forever 21, H&M, Zara, and Shein, introduce a new collection every 14 days at meager prices. As prices are meager, consumers are more likely to buy more clothing cheaply and keep it for less time. In a The Daily show Clip with Stephen Colbert, he quotes,

> "The global marketplace is somewhere we export work to have happened in whatever conditions we want, and then the products come back to me, cheap enough to throw away without thinking about it." (Morgan, 2016)

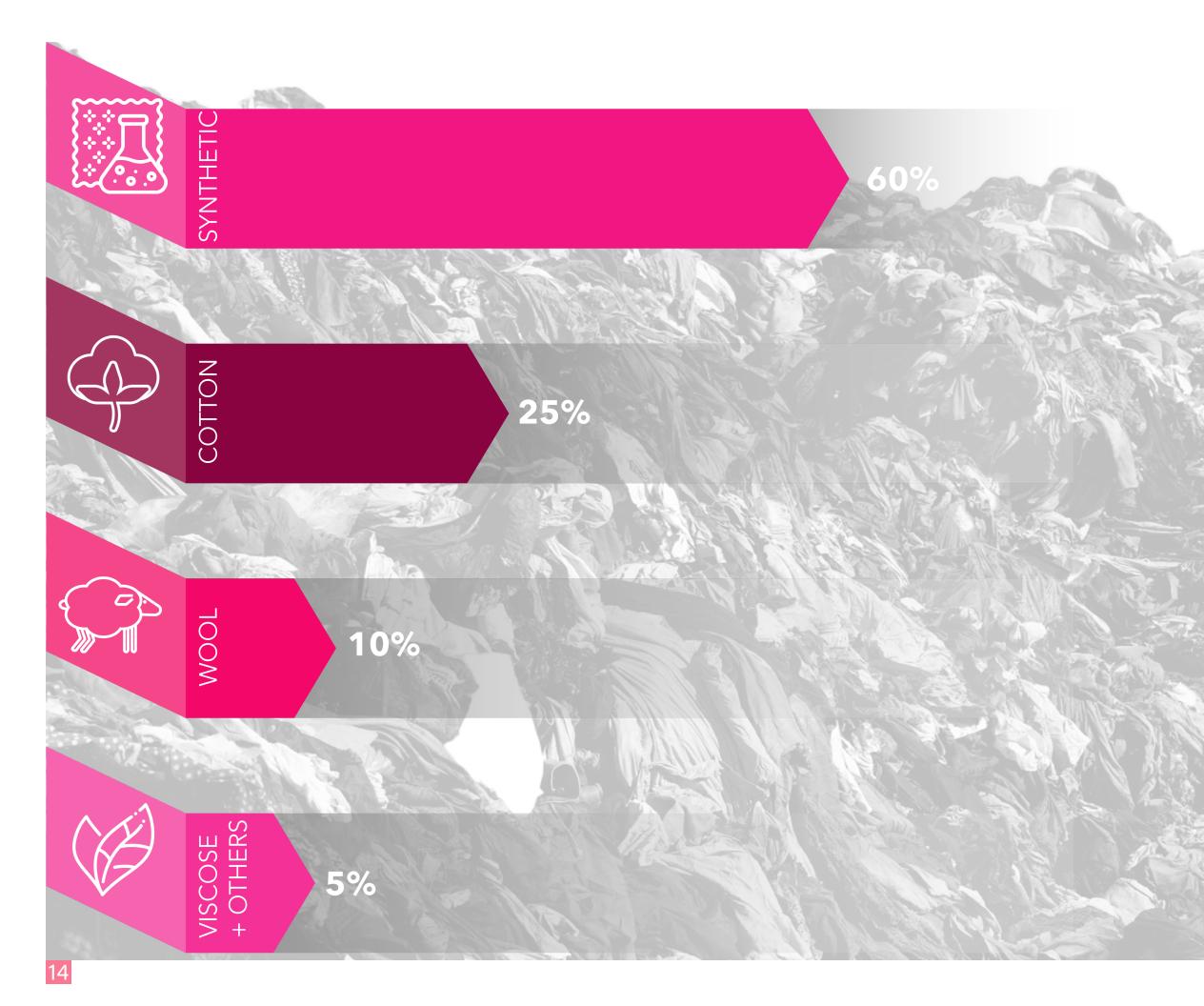
Labor

With only 1% of clothing manufactured in the United States, the Fashion industry turns the rest of production to low economic countries with low-wage labor. Author Jacometti quotes the industry's difficulty in control by stating

"Thefashionindustrycreatesglobalvaluechains where the various stages of production take placeindifferentcountries..."(Jacometti,2019).

Bangladesh, the leader in clothing production, sees the highest amount of textile export over China, as paid workers see two dollars a day in labor. As no direct clothing brand holds any rights to the factories, the elimination of supervised safety and fair wages, in favor of competitions in commission with the clothing brands, persisted for cheap labor. As a result, an eight-story clothing factory in Dhaka, Bangladesh, collapsed in 2013, killing 1,134 people. After multiple reports of compromised building integrity, workers were forced to continue working; This demonstrates how little control the Fashion Industry has on production.





1.2|Chart of Fabric Material



When it comes to the composition of materials in textile, about 60% of materials are Synthetic while 40% are Natural Resources. Polyester and Cotton are examples of the two most used materials–nevertheless, the production of Cotton sees a strenuous amount of water consumption.

The Human Body on Avg. needs 3L of water a day. In comparison, a t-shirt requires 2,700L of water.

Though the most natural material, Cotton also requires ten months to harvest and demands numerous pesticides that have reports of leaving back micro-bacterial in soils and causing health risks to farmers. As a faster synthetic product, Polyester produces an annual 706 GHGS (Greenhouse gas emission). That is equivalent to 185 Coal-power Plants emissions. Later dyed clothing can see consumption of 95-114L of Water per Two pounds of fabric.

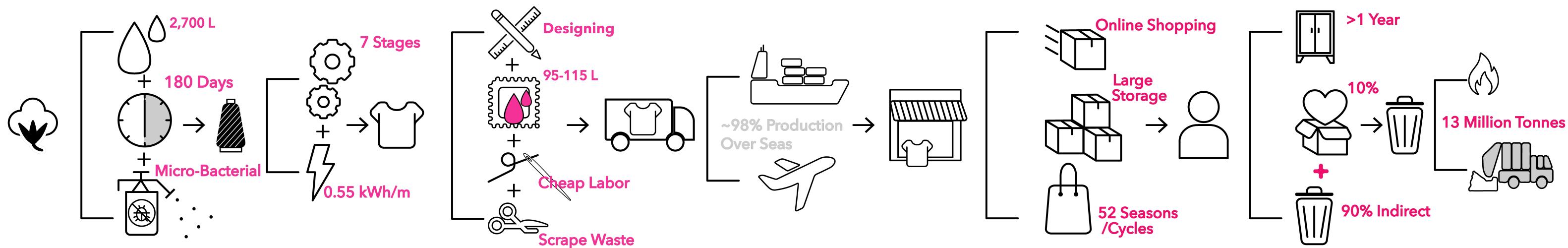
Donations

Many people believe that donations are the only option in getting rid of clothing, and believe that everything they donated will be reused and resold to others. That is never the case; donations will only reuse 10% of the given, while shipping remaining clothing in bundles to developing countries of Haiti, Sudan, and other African countries. The influx of second-hand clothing begins to demolish the local textile economy in the countries. An example is Haiti; once a tailor culture becomes snuffed out as the increased shipping of clothing eliminates the need for sewing skills and artistry.

Health

A report in consumption predicts that by 2030, the avg–sales of clothing will double, glimpsing 26 million tons of waste in landfills. What effects will this have on the environment and surrounding health of people? First, water sources' high consumption and pollution will cause unsafe drinking water that becomes contaminated with toxic chemicals from bleaching, dyeing, and textile manufacturing to exist in waterways and increase the levels of micro-plastics. Subsequently, the copious amount of pesticide in Cotton farming has seen paralysis, memory loss, immune systems deficiency, and even death. Ultimately, the toxicity of soils due to landfills has resulted in congenital disabilities and mutations.

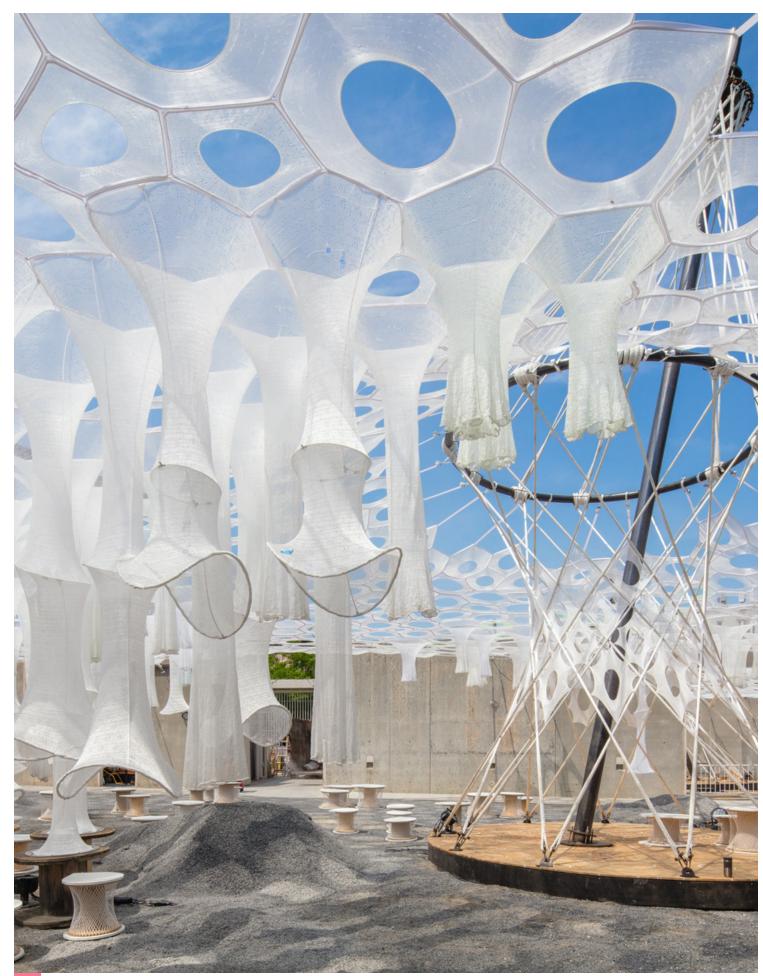
FABRICATION





02 Case Studies

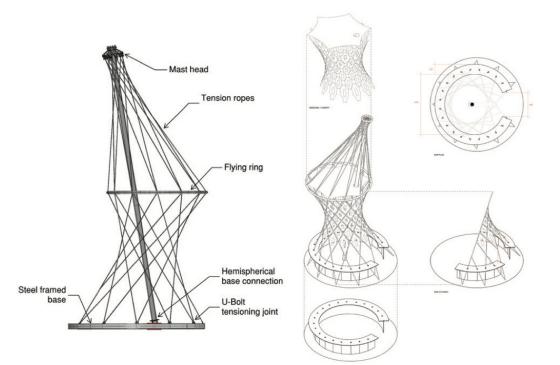
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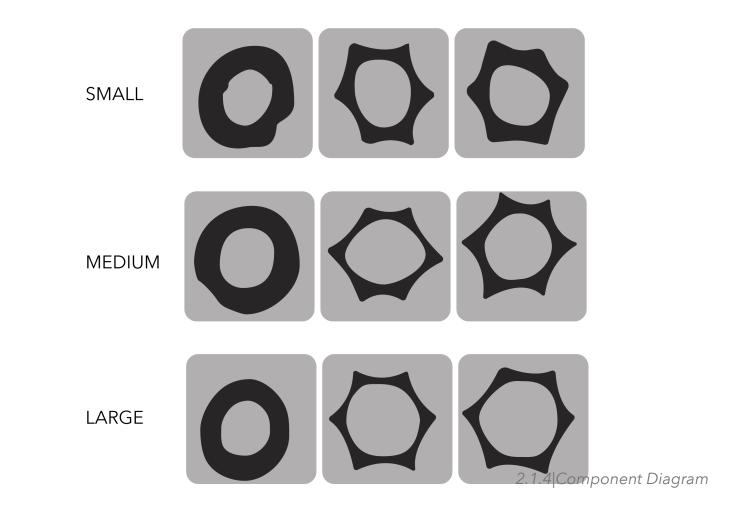


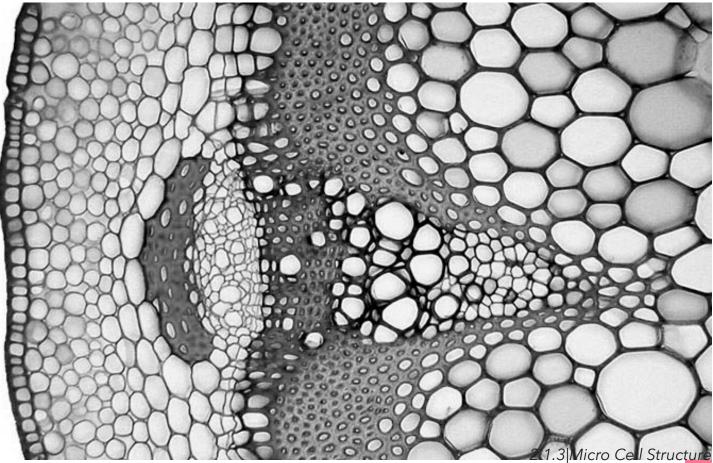
Lumen Jenny Sabin Installation MoMA PS1, New York, USA 2017

The Lumen installation is an interactive experience with assisting shading system from New York summer heat. The materiality of engineered yarn with a Photoluminescence that glows at night. The Design applies insight to theories from biology, mathematics, engineering, and material science. All of which creates a micro-climate for the space.

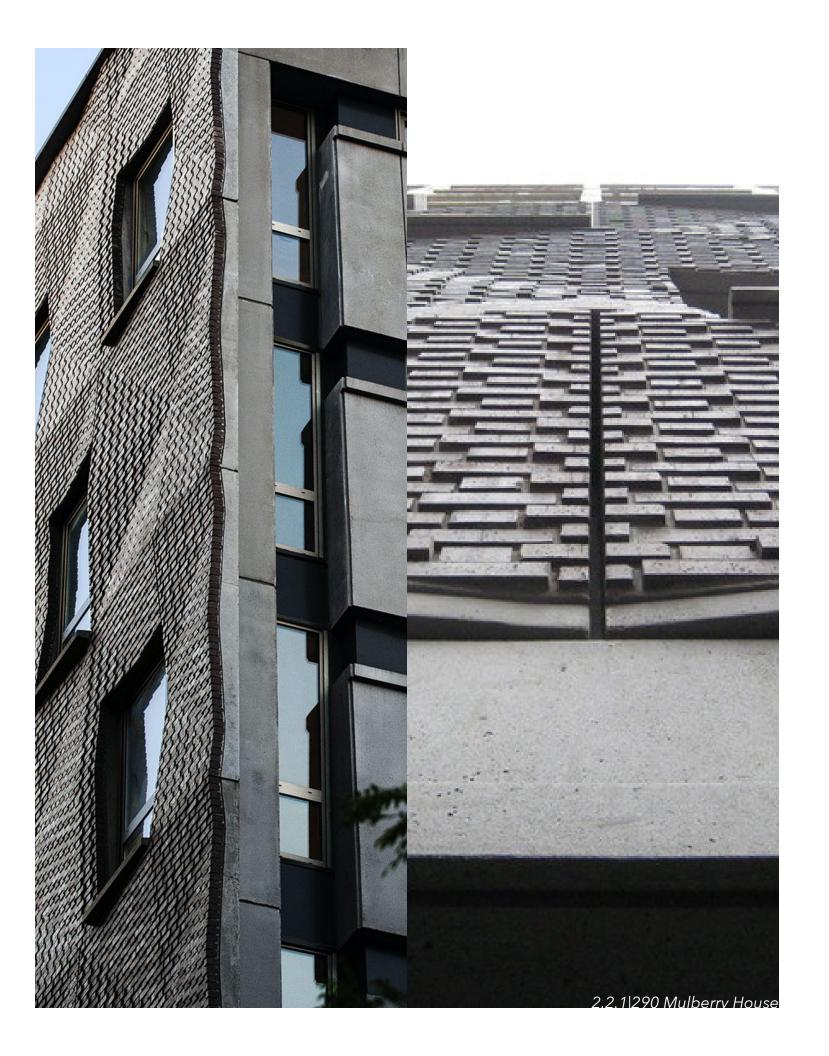


2.1.2| Lumen Structure Diagram



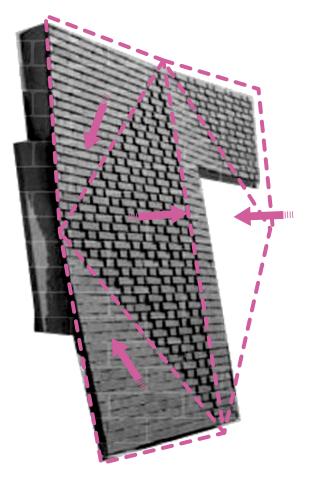




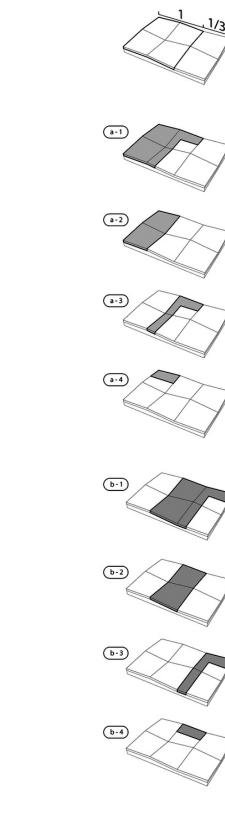


290 Mulberry House SHoP Architects Multifamily Residential Nolita, New York, USA 2013 25,000-100,000 ft²

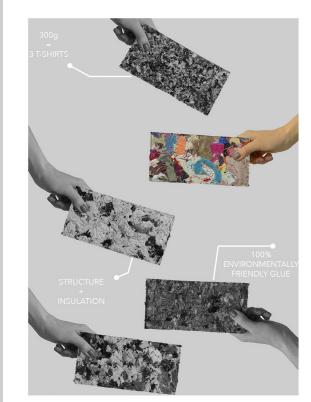
The Mulberry House set a precedent in modern Masonry detail, as for the fact the zoning of the project is in located the Historical Mulberry District. As well as the proximity to Puck Building, a historical Architecture known for its detailed red brick facade. In order to complete the project articulating the facade system, SHoP Architects designed a precast Brick panel system for efficiency. The parallel Masonry combines a French Student Thesis project called FabBRICK, which utilized recycled clothing into shredded condense brick. Suggesting the idea of creating a modular facade system is possible using Textile waste.



2.2.2|Facade Diagram

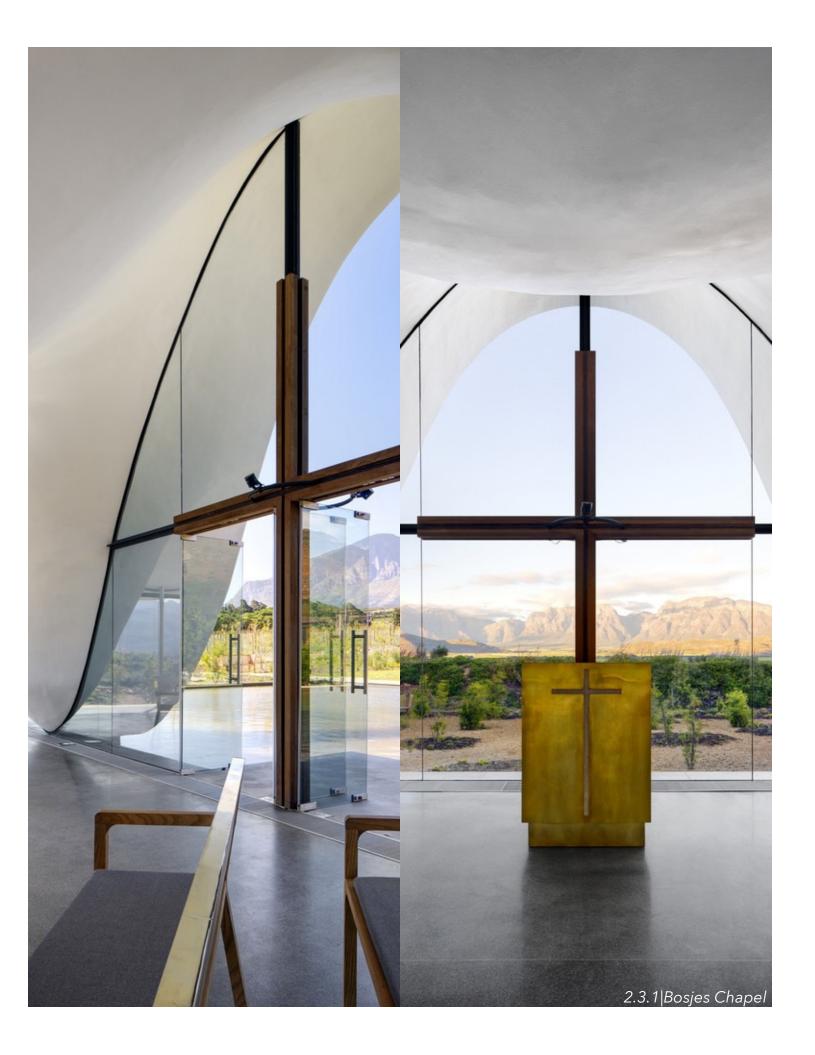


FabBRICK By Clarisse Merlet



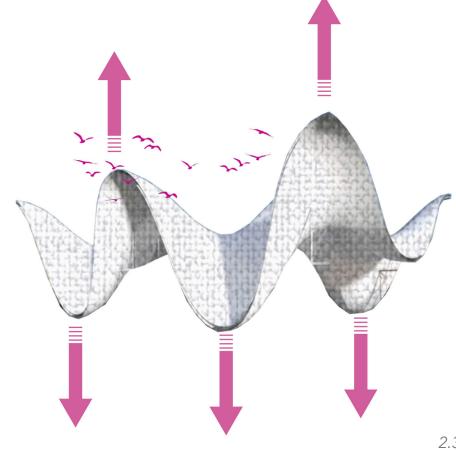
2.2.4|fabBRICK Diagram





Bosjes Chapel Steyn Studio Chapel South Africa 2016 430 m²

Bosjes Chapel emulates the silhouettes of the surrounding landscape. Steyn Studio achieves this construction with a slim concrete cast shell that structurally supports itself. In order to accomplish self-structure, the density in its peaks and valleys is thinner to thicker in casting. Concerning Bosjes Chapel, *Skin + Bones: Parallel Practices in Fashion and Architecture* by Brooke Hodge demonstrate the relation of fashion to architecture and vice versa. The Ashi Studio Collection 17-18 #11-03 is a Fashion Parallel to the Bosjes Chapel; both represent clean white draping of folds and swoops to create undulating forms.

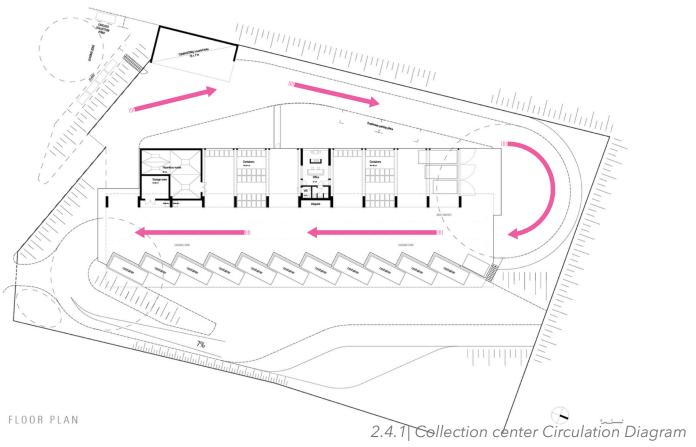


2.3.2|Geometry Diagram



Collection Center for Recyclable Materials RUHM Architekten Distribution Center Schweizern, Austria 2019 1880 m²

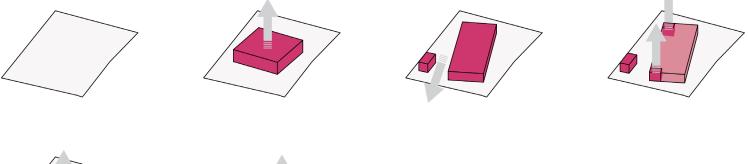
Collection Center of Recyclable looks at promoting recycling. The building itself is a drive-thru to promote easy access. The location surrounding is bare, apart from the surrounding structure. This has to do with possible smell, which all contributes to the Design, that being the non-fully enclosed structure that invites air circulation, sunlight, and direction. Materiality consists of wood and steel structures with concrete bases and walls. The use of the wood creates warmth in a cold location as well as lighting luminance during the night.



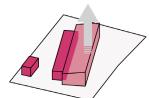


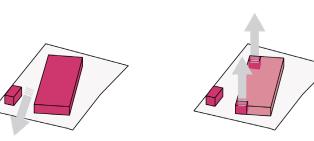


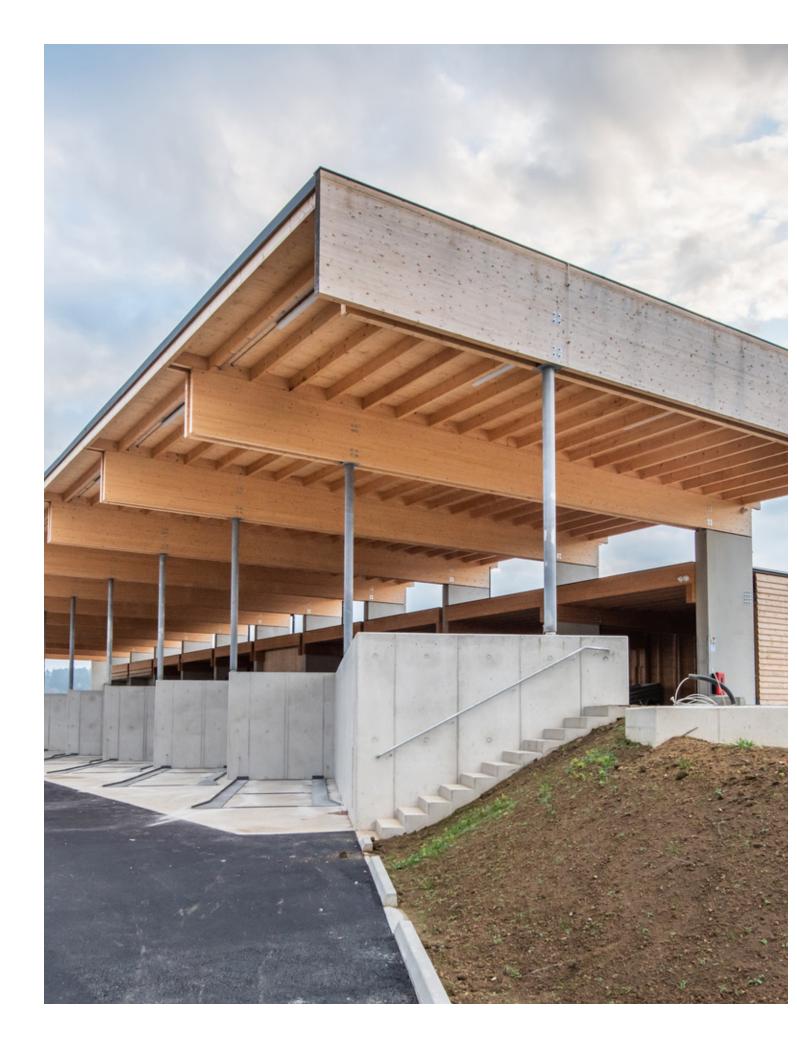








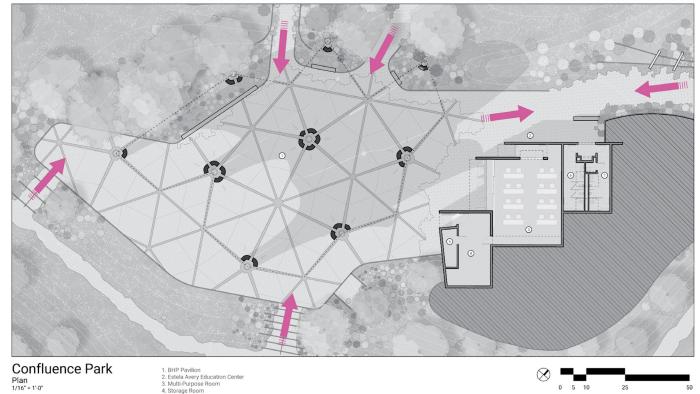






Confluence Park Lake| Flato Architects, Matsys Design Park, Pavilion , San Antonio, USA 2018 900 ft²

Confluence Park, though only 900 ft², makes up for it by its surrounding vegetation. The purpose of Confluence park is to create a connection to the surrounding parks with a general usage Pavilion for the public. Along with its water filtration system being part of the Design, the Pavilion. With the Pavilion, there is also a classroom for learning for the park. The primary material of concrete is used to form a petals cantilever structure that shades defined spaces. As well as allow the feeling of a heavy blanking over a space, yet breakage illustrates the illusion of flotation.



Confluence Park Plan 1/16" = 1:0"

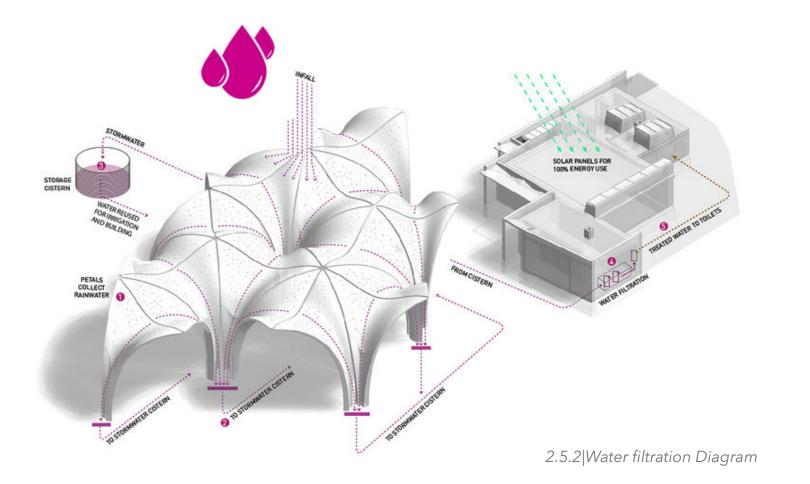
1. BHP Pavilion 2. Estela Avery Education 3. Multi-Purpose Room 4. Storage Room 5. Equipment Room 6. Female Restroom 7. Male Restroom









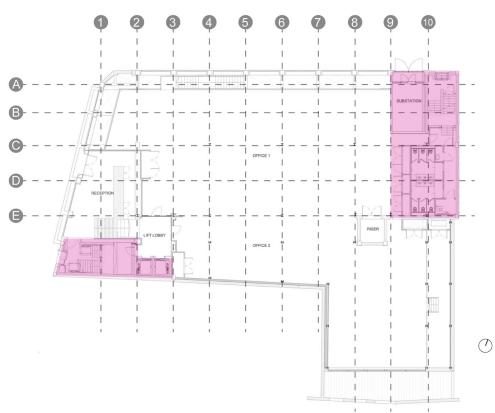


2.4.1 | Collection center Geometry Diagram



Harella House Piercy & Company Office Building, Renovation United Kingdom 2020 42000 ft²

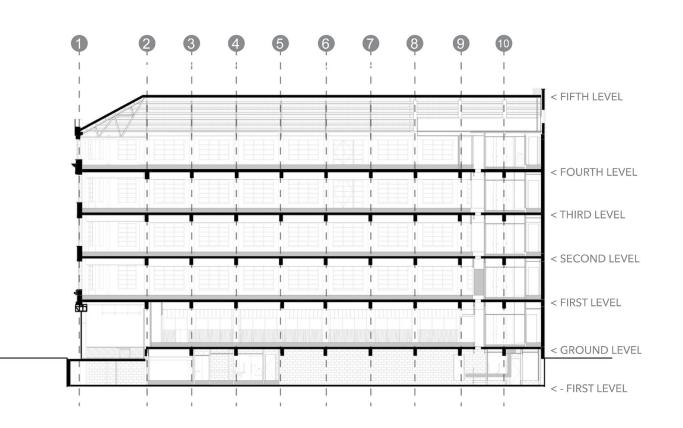
Harella House is a renovated clothing factory turned office. What is interesting about it is its Historic use of it being a factory accented with modern material and lighting. Piercy & Company does a great job of highlighting the old material, including the usage of the large factory windows for lighting. The sense of space reflects the amount used previously in building usages based on the spacing of steel structures that are non-proportional in distances. However, it is surrounded by neighboring structures, and the exterior Brick Column takes way from the heavy massing on the inside.



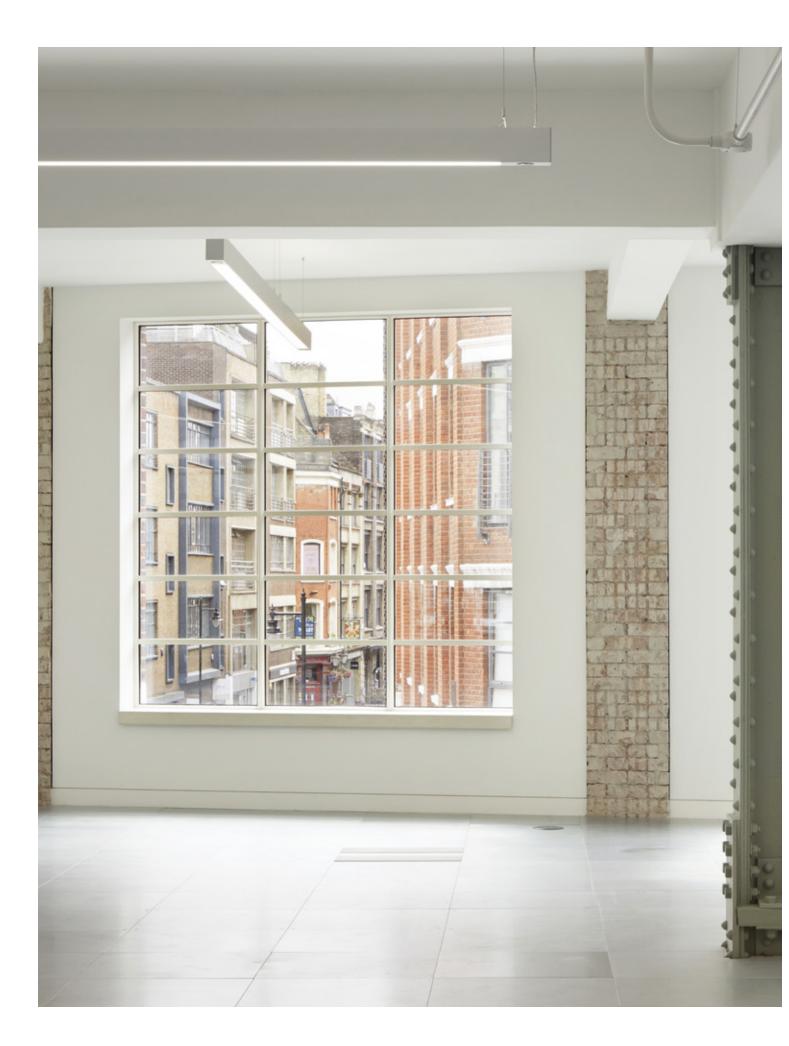








2.6.1 | Harella House Structural Floor Plan

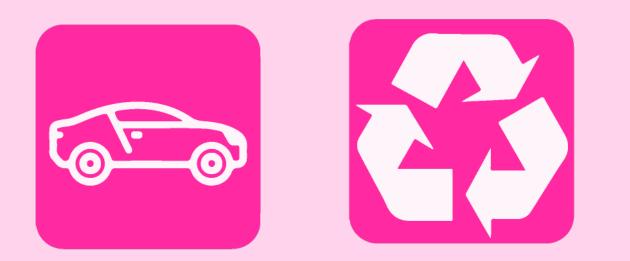




Conclusion

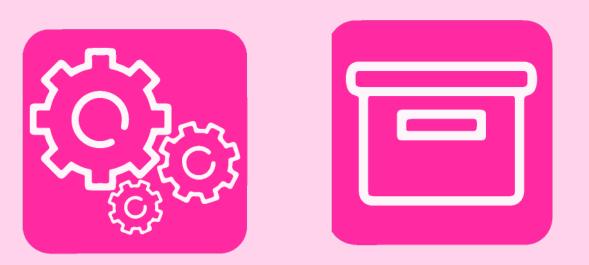
The Case studies above showcase two aspects this Thesis seeks to achieve. The first is the ability to connect architecture with the beauty of fashion by using fashion techniques in the architecture façade system. The second is utilizing the programmatic system seen in the last three case studies to develop a new clothing cycle that helps address the problems of fashion waste.













03 Site Analysis

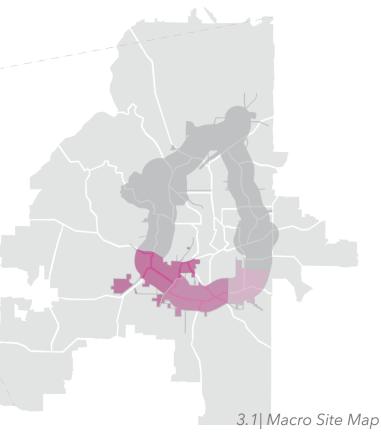
SUBAREA 01

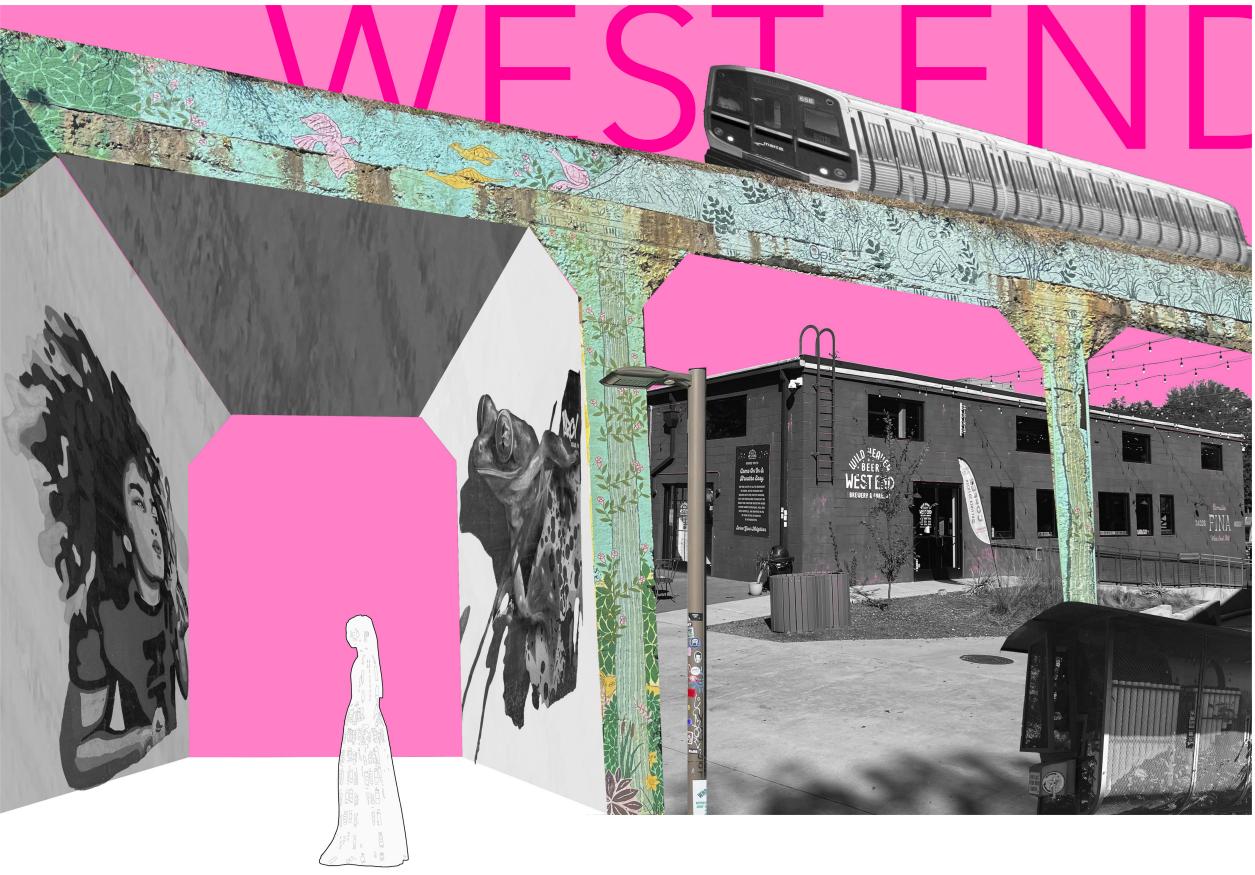
SUBAREA 02

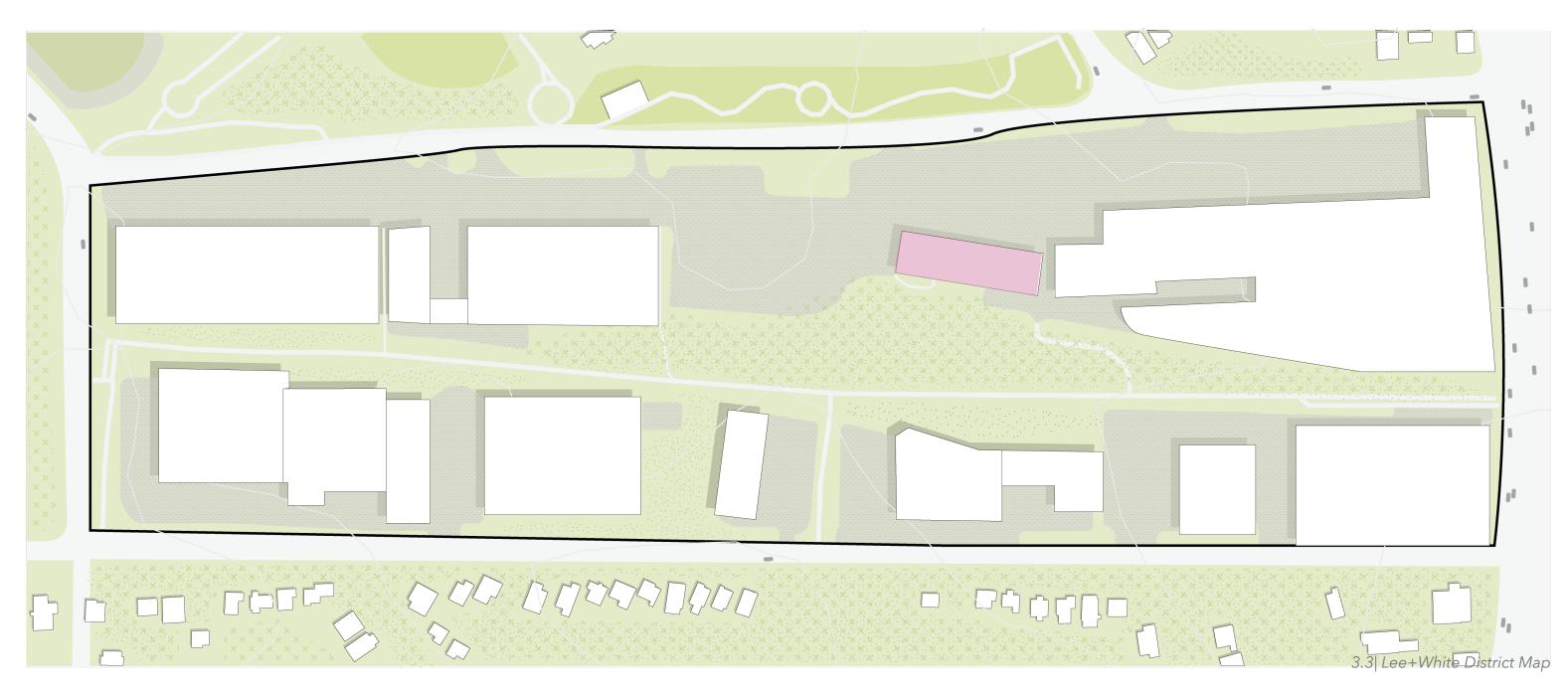
SUBAREA 03

Site

Reflecting Upon the case studies presented, the idea of the location follows the programs and design aspects analyzed in each study. That of community, gathering, renovation, wellness, and storage. The keyword that constantly popped up was renovations, completing a space by integrating existing or surrounding spaces provided to the community. What that result led to was the Atlanta beltline project. At first, the knowledge of the Beltline became limited to the populated areas of Midtown. Upon discovery, the acknowledgment of different subareas in the Beltline emerged. Subarea 1, 2, and 3 looked at the lower have of Atlanta, which were in the process of completing their proposed project.

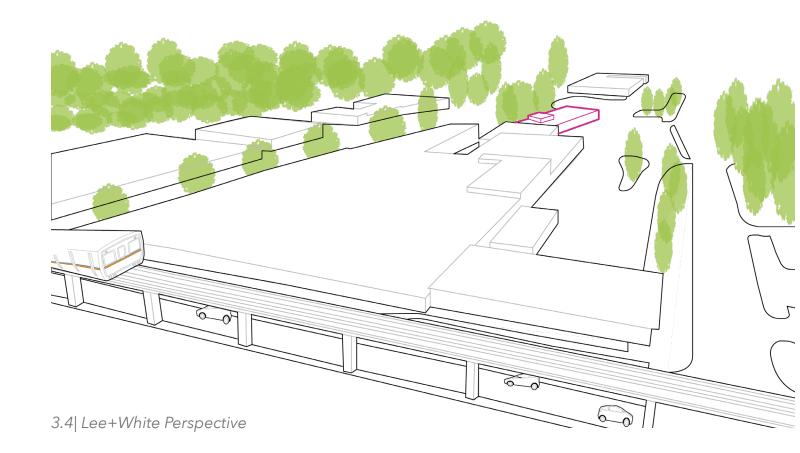






The closest in completion was Subarea 1 in the West End Neighborhood, where 1/3 of the Beltline resided in a development project Called Lee+White. The construction utilized several abandoned factories to connect to the Beltline into retails, breweries, and restaurants.

West End Neighborhood Population of 2018 **4,895**



City of Atlanta Population of 2019 **488,800**

> 18-24 years 13.9%

15-44 years **51.3%**

Demographics

Who is the demographic? The area attracts more mature audiences with several breweries and universities' proximity based upon copious visitation. With the predicted development of the site, the future of nightlife becomes prominent. What happens to the building during the day? The goal of adaptive reuse is not only to appease the adult population but to utilize the space for the community of West End.

Map Summary

The site's location attests to its durability as its surrounding building gives the way of easy transportation into and out of the site through many transportations options. Ensue, the site's zoning presents a way to satisfy needs-based single-family homes as neighboring resources become strenuous on personal resources. As such, neighboring landmarks and places with a two-mile radius also affect the project's programming.



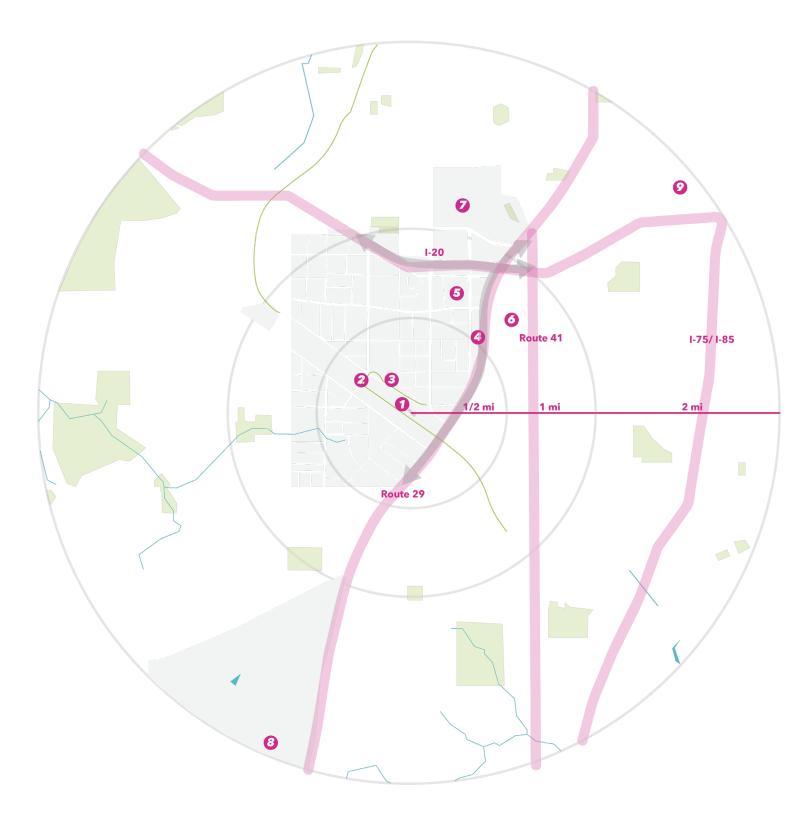
Atlanta beltline

Train line







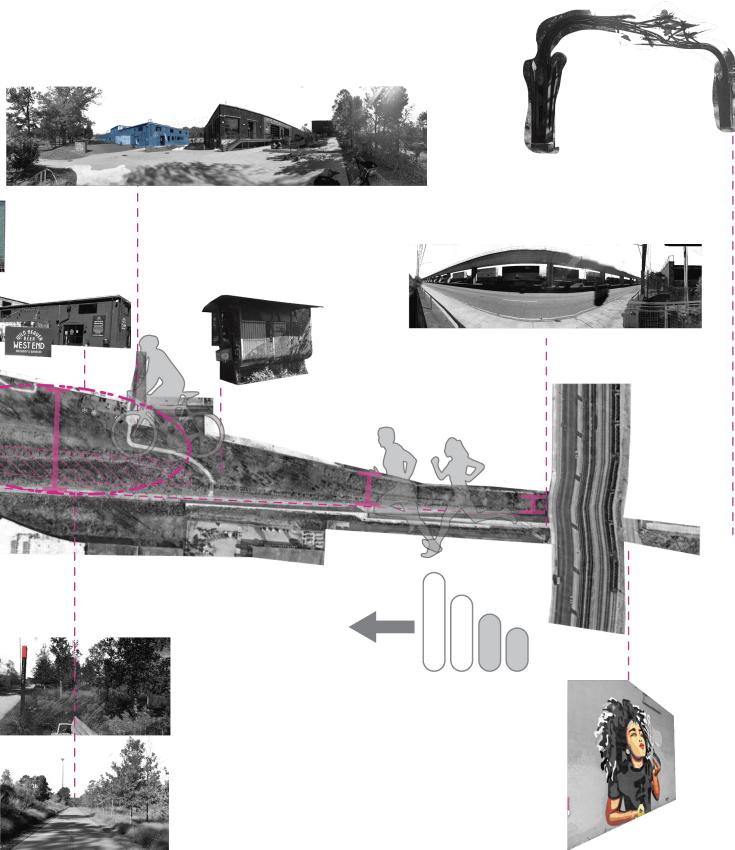


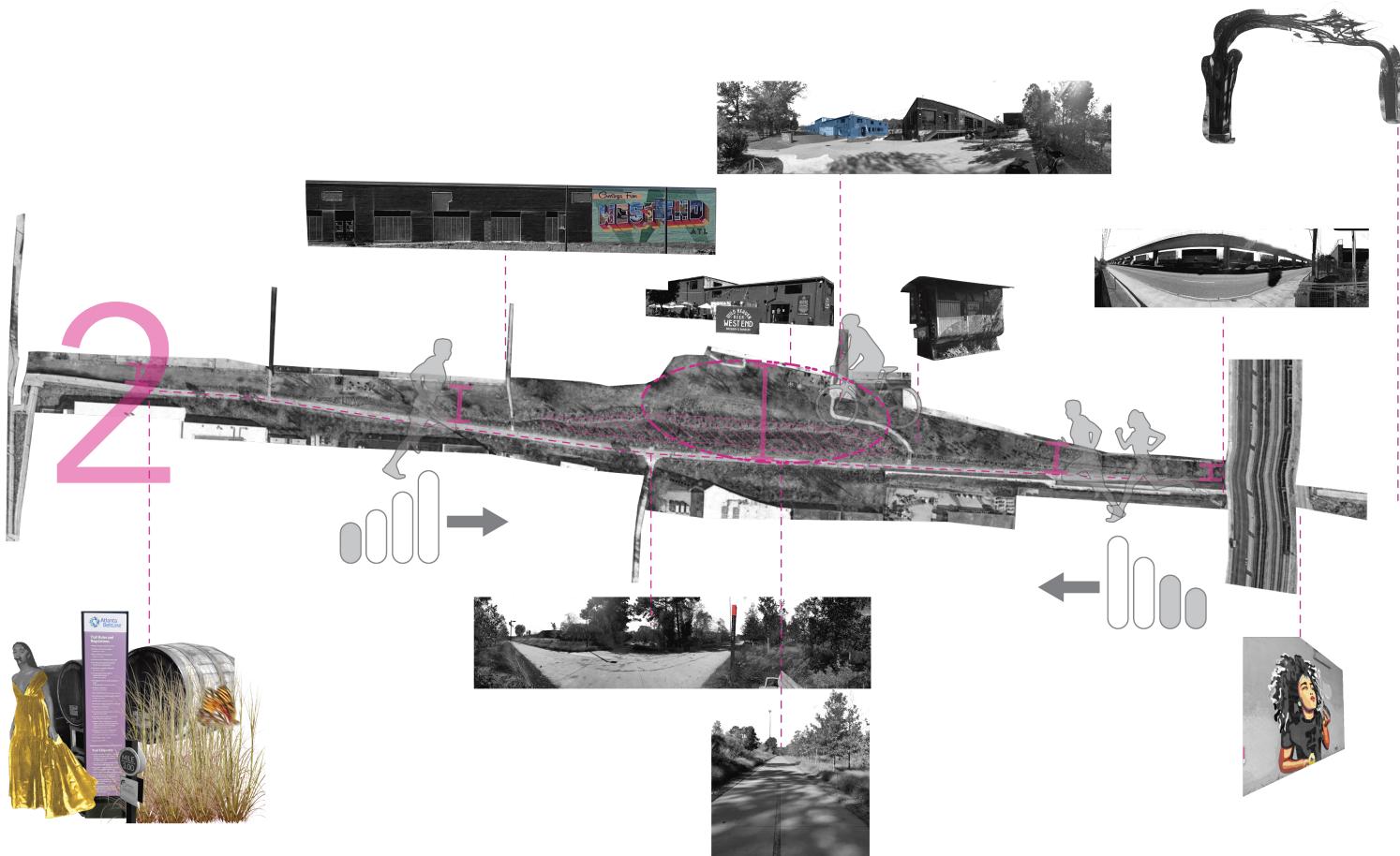
1-Lee + White 2- Atlanta BeltLine 3-Rose Circle Park 4- West End Station 5- The Mall West End 6- MET Atlanta 7- Spelman College 8-Tyler Perry Studio 9- Georgia Capitol









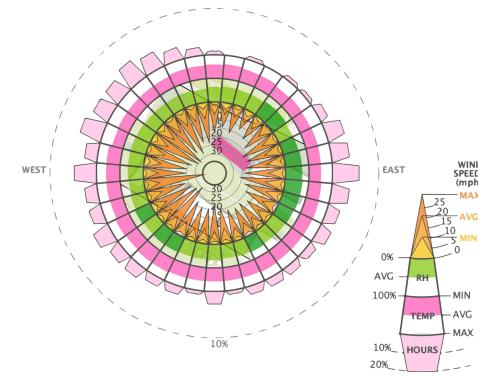




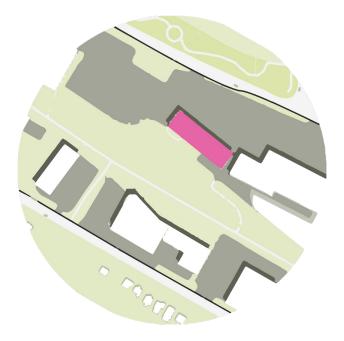
A big part of the programs relates to the utilization of the Atlanta beltline, as it is an infrastructure for pedestrian travel; the idea becomes that the Beltline is the street and the building. Facing toward the Beltline becomes the new storefront. An example, diagram, and maps show how close the industrial buildings are to the Beltline rather than the street.

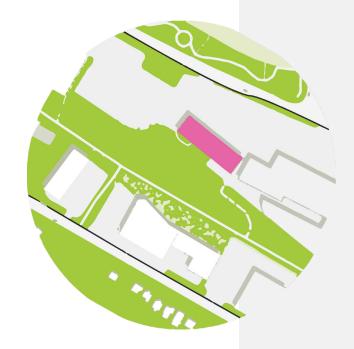
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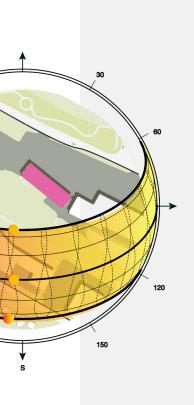


3.9|Wind Rose Diagram





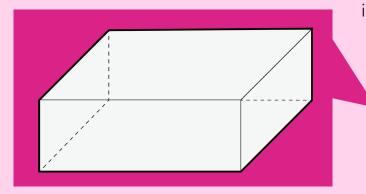
3.11|Grayscale Diagram¹



3.10|Sun-path Diagram

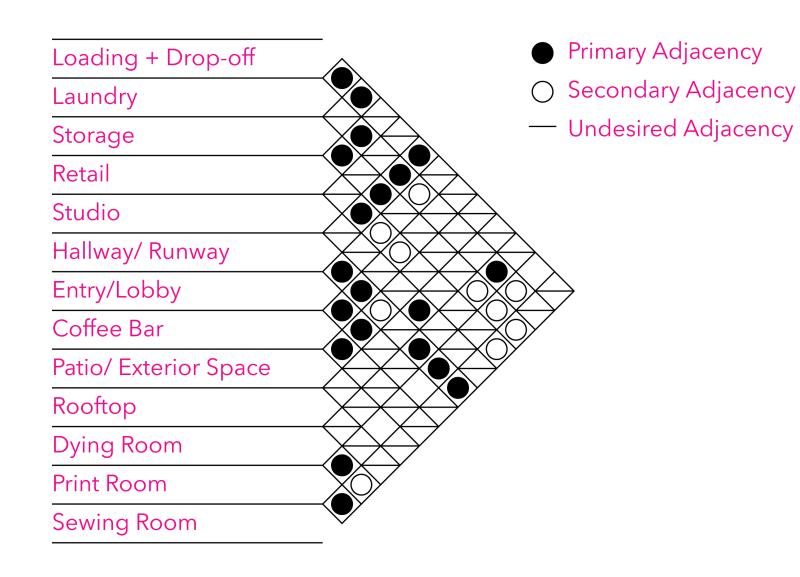
¹ Grayscale is used to measure the heat island effect 'caused by asphalt.

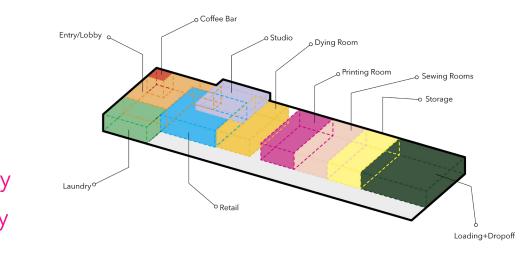
NA Progran



Program

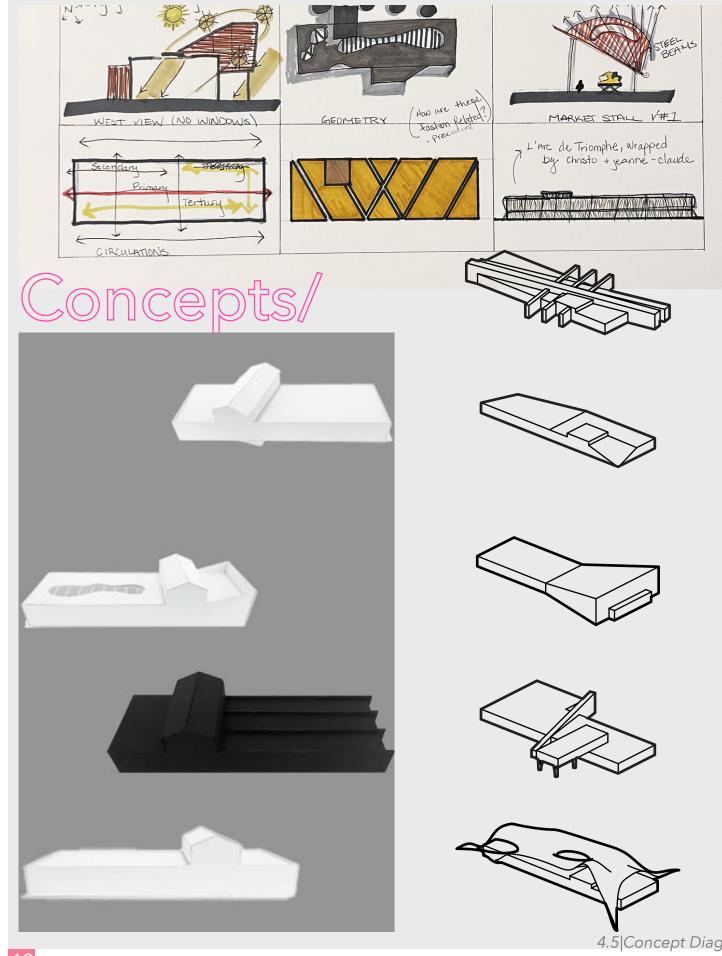
With the site, the adaptation use of an existing wild heaven's brewery building will become renovated into a sustainable clothing recycling center and clothing repair. Currently, the site is a 23,000 square ft structure about 230' x 85' maximum height of 21'. The program aspires to create several instances of re-creating or developing new clothes and a place to recycle and collect clothing for those who could either sell it into something new; what the program creates is a new typology that sees the closing of the clothing cycle rather than buying new. We see the upholding and repurposing of clothing and maintaining of clothing as well most of the programs that become used. Six to benefit the clothing aspect, whether it is retiring printing T-shirts, sewing, or washing clothing correctly, we also see the need for space and create an environment for learning.

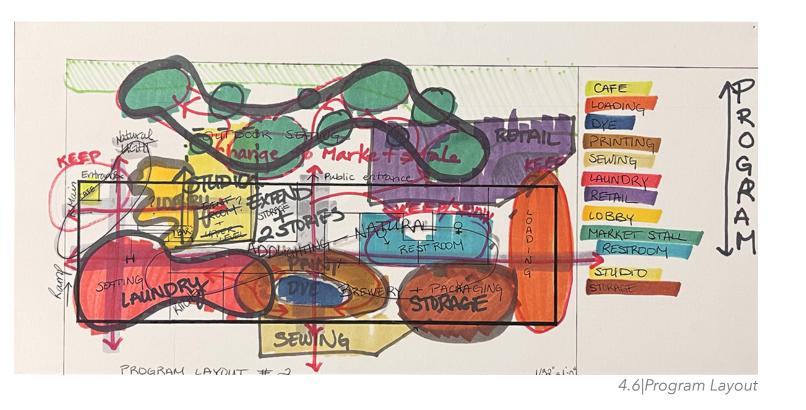




4.3 Program System Diagram 1







The Program begins by actively looking at the current space and the progression of circulation through that space. In the first program layout, an overlay of the existing Program with a new program seized the development of a new clothing cycle. Doing so approaches new aspects in room layouts and necessity. What is noteworthy about this is that the design looks first at the idea of the façade front. With this Thesis, the one front addresses the street, and the other front addresses the Beltline. So, constantly thinking of each room as an accessible space to the public results in making the central hallway an intersection with the parallel fronts. Two programs shown and mentioned throughout the book are the idea of the temporary and the long-term retail spaces, which give the community the right to engage locally and allow for new designers.

4.5|Concept Diagram



TEXTILE BUILDING SEWING ROOM FACE VJEST SEMI ACTIE CORNER SEWING ROOM LONG TERM TRADITIONAL RETAIL OPEN SPALE LOBR PIMENT ! STORAGE + SOKTI ACTIVE CORNER DOUBLE THE PARKING FOR PROPOFF ROMNDRIES TO 401 03/16 2/3 REVIEW PROGRAMS 10 LOADING + DROPOTTY (15) GALLERY STORE FRONT (G)CLABSROOM STORAGE & RETAL DID DHALLWAY OBATHROOM 5 3.25 DENTRY/LOEBY (8) COFTEE BAR/STARBUCKS DPATTO/URBANSPACE (10) ROOFTOP DIE ROOM D PRINT ROOM 5.5 = 15 2.5+ 25 K BSEWING ROOM (F) MARKET 1.7948

4.7|Final Program Layout

05 Material Investigation

Material research

The dichotomy of a Cotton T-shirt showcase detail and aspect of fashion with architecture. These intertwining of ideas in the dissection of the said T-shirt. How the stitching is the fastening of two materials is similar to nailing to the material. Whereas the t-shirt also represents a facade to the human body. What also is apparent is that clothing becomes a decomposition of time. Through the study, the material became limited yet flexible. This project or overall research aimed to see how a T-shirt could become transformed into, say, a soundproofing material or barrier. What became difficult was insulation and then stitching of the material. What evolved shown as it was difficult to utilize its selling machine either due to poor knowledge of the equipment or the material being too thick.









Plaster Brick

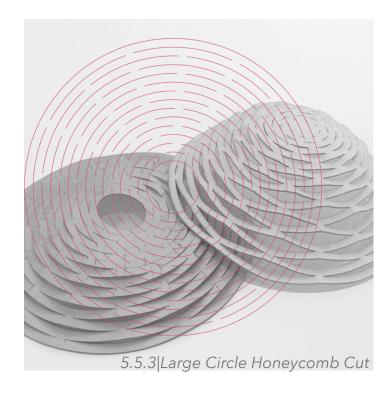
Looking back at Clarissa Merlet and her Thesis on fabBRICK, The Thesis offers a new perspective that challenges her idea of Fashion waste. With Plaster Brick, the notion challenges the construction of fabBRICK and sees if different materials can make the Brick structural and Exterior resistant. Version three and version two look at introducing and subtraction of liquefied paper and fabric to a 3:1:1 ratio of plaster and water. The result was two different products that had different weights and volumes. In Version three, the weight of the mixture with that of the unlisted Version one saw a height weight with a smaller volume. Reasons for it, Version Three, had been the production of Three consisted with sole plaster, fabric, and water. In contrast, Version one consisted of liquefied Paper, Plaster, and Water. Nevertheless, Version One was twice the volume of Version Three.

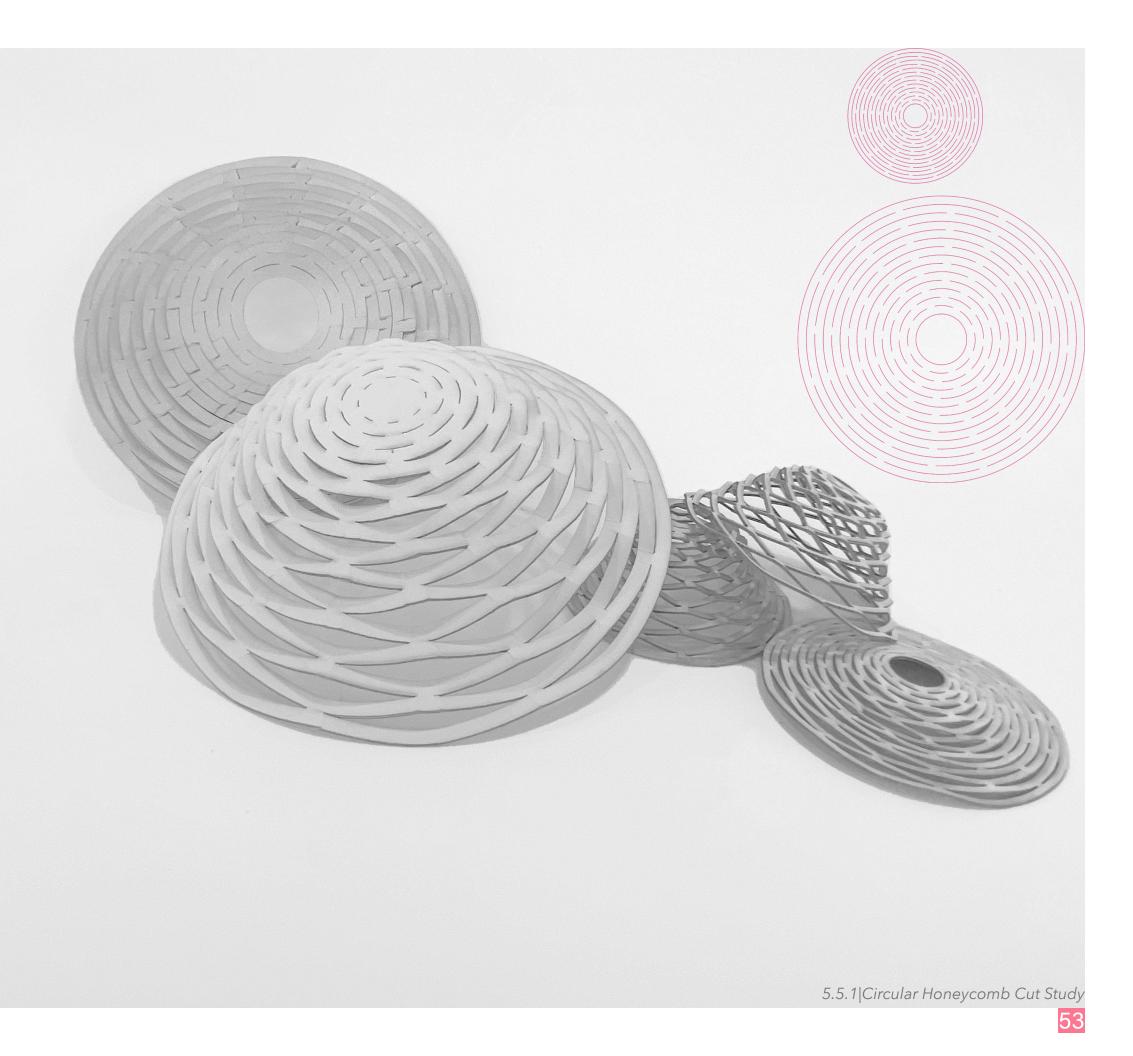


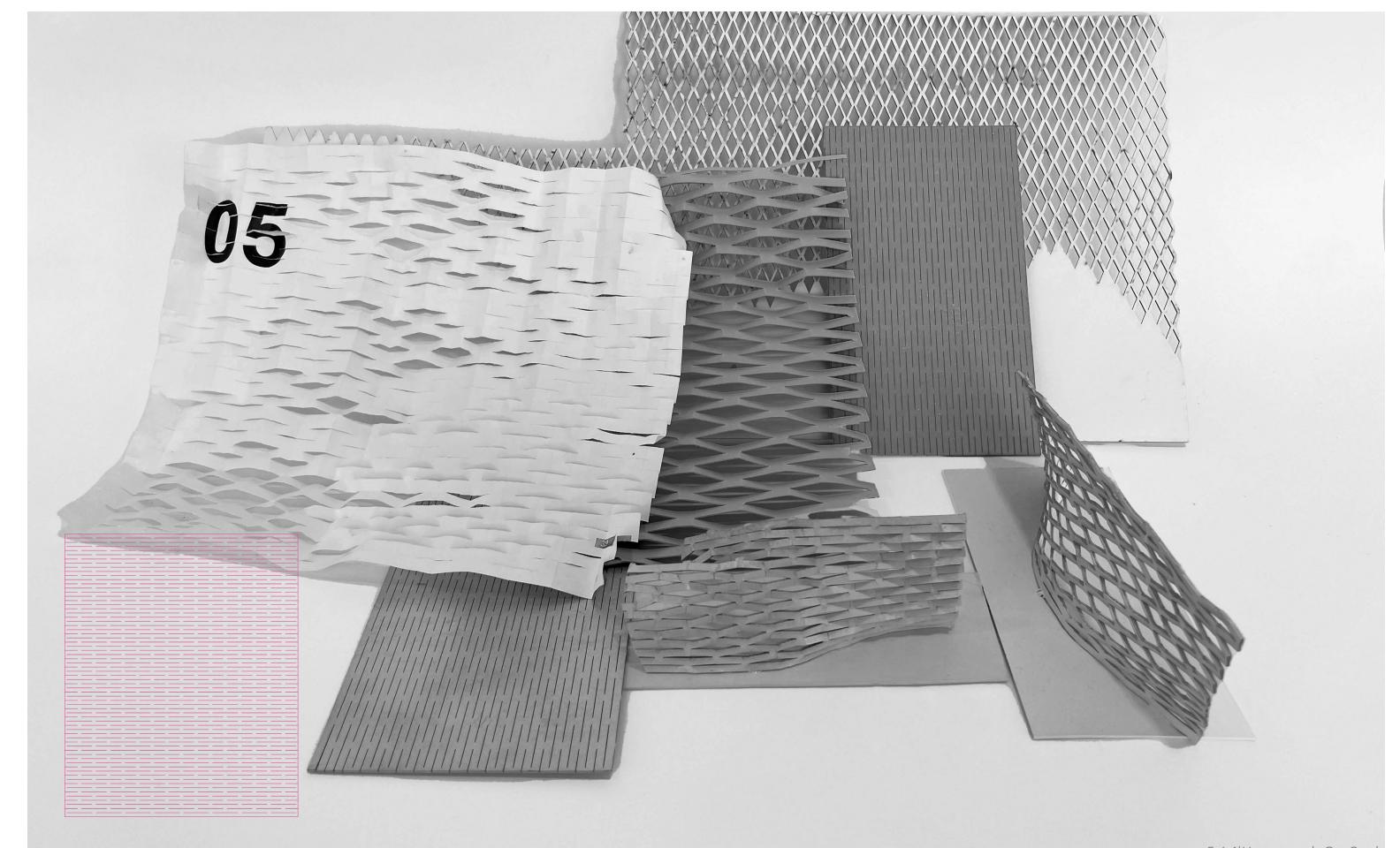


5.5.2| Small Circle Honeycomb Model

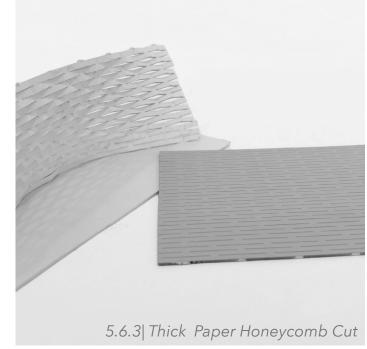






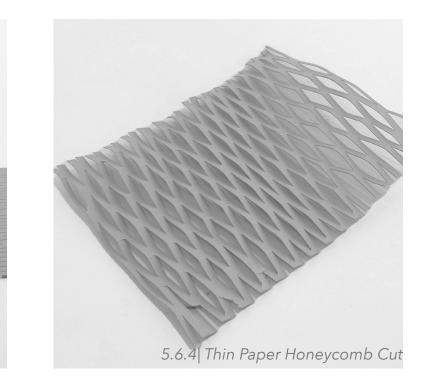


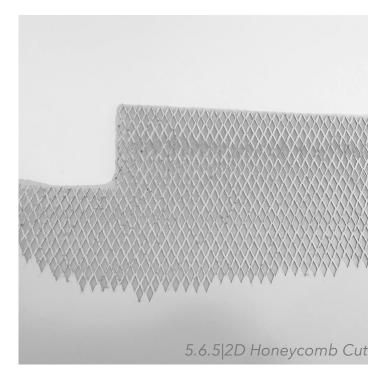


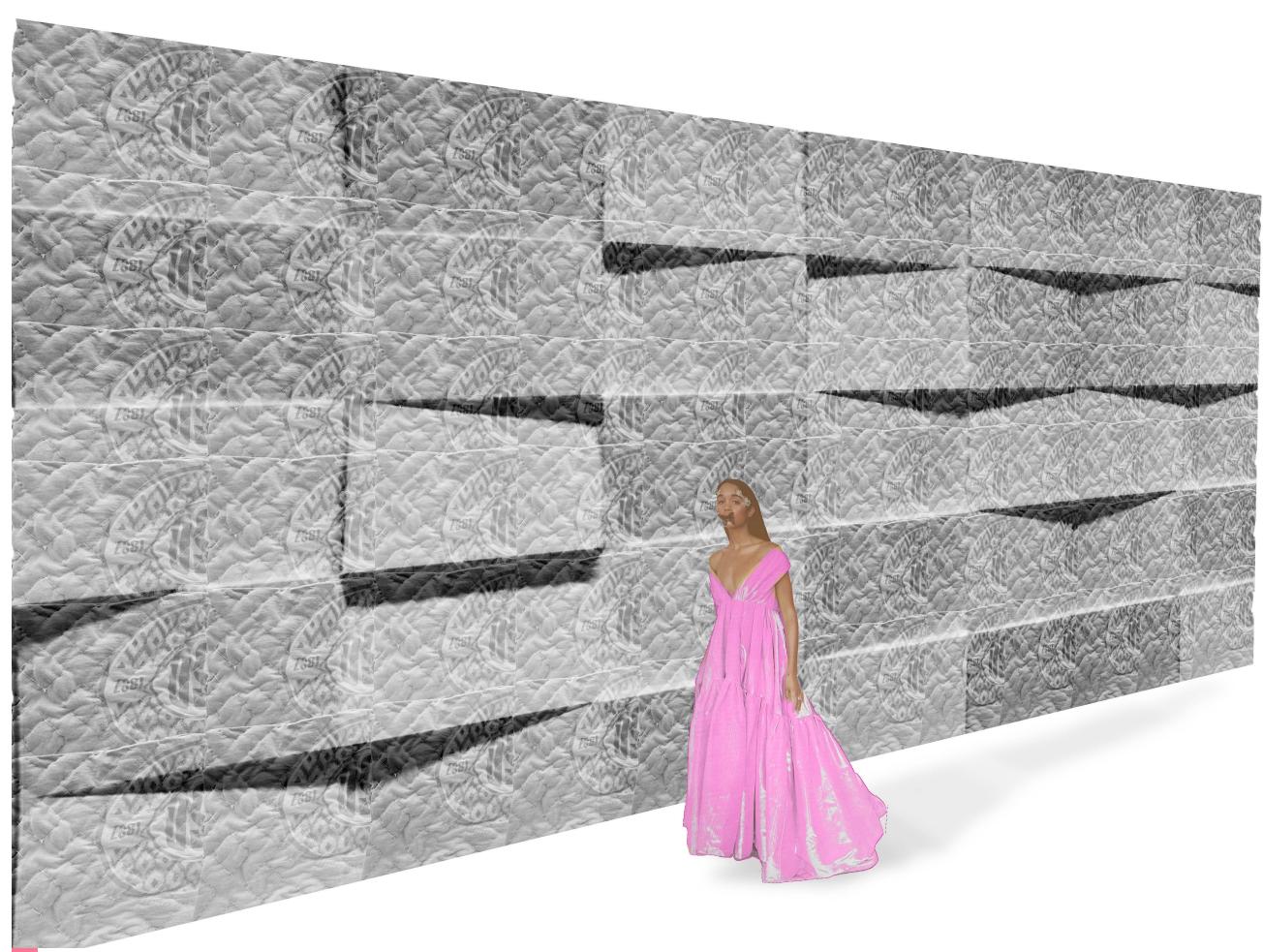


Honeycombs Cut

The honeycomb cut study seeks to understand and find a solution to making stiff materials like aluminum wood or concrete appear fluent and fabric-like. In doing so, the idea of the Honeycomb appeared, and henceforth the studies of its size, shape, and appearance are necessary to understand its use and technique better.







57

06 New Cycle

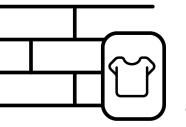
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Once again, the goal of this Thesis is to redesign a building to address the pollution of fashion. To which the current cycle of clothing sees a linear progression from manufacturing clothing to throwing clothing away. While focusing on the programmatic system and fashion in architectural detailing, the result sees a new cycle of clothing that utilizes three aspects–one the public, two the exterior appearance, and three the interior circulation.

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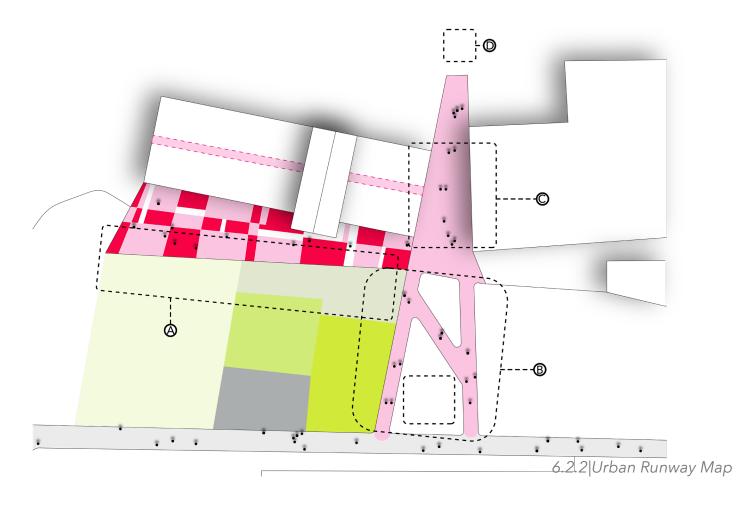




6.1.1 | A New Cycle Diagram

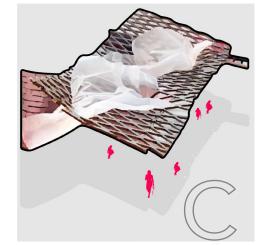
6.1.2| Exterior Rendering of the New Cycle





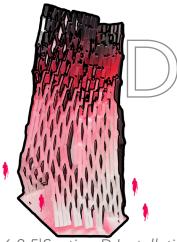
Urban Runway

With the current location of the site, it initially excluded pedestrians. A location between a busy road and an off-ramp to interstate 20 offers little to no safe pathway to the site. However, with the development of the Beltline, pedestrian access became easier. However, now the problem lies in visibility. In figure 6.2.8, the picture shows a wall of vegetation in which, if looking closely, only a flag indicates the pathway to the Lee and white plaza. Suggested is a redesigning of the connection of the Beltline to the site. In doing so, the connection becomes a runway that offers the ability to host runway shows and the opportunity to engage the community in festival celebrations and events. Material-wise, the use of the Honeycomb cut study material serves to create an installation and shading for the space to engage and highlight the point of access to the sites. Since the urban space represents the public space, it was only beneficial to include the temporary retail space as it contributes to and actively engages the community.



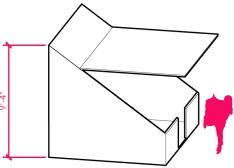
6.2.3|Section C Installation

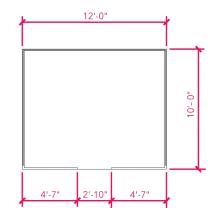




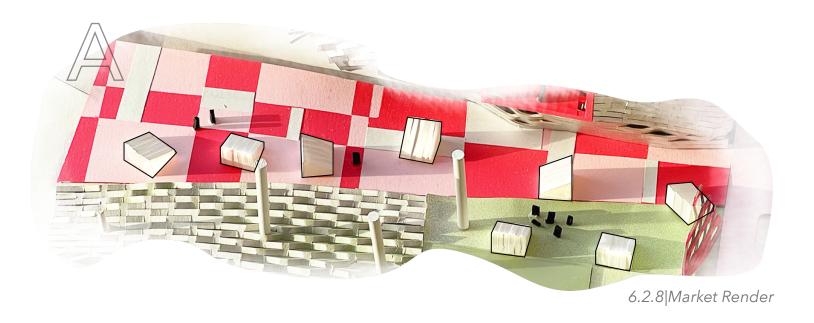
6.2.5 Section D Installation

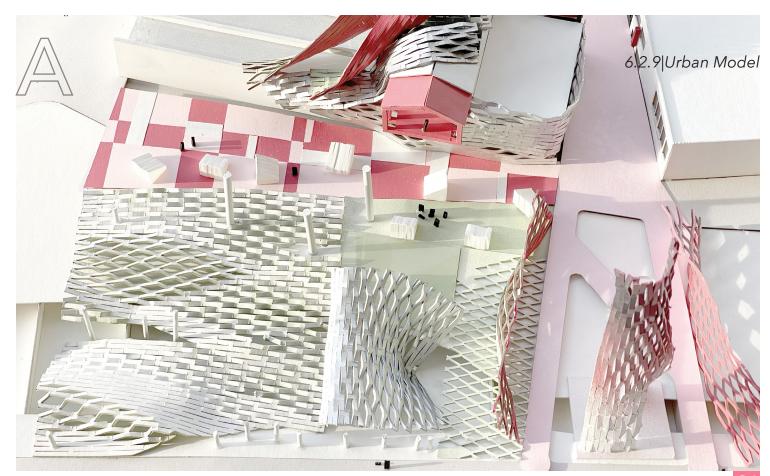




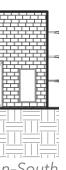


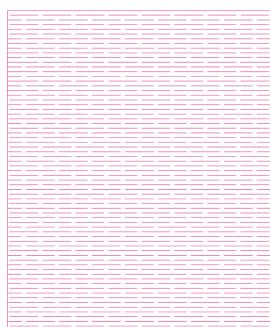
6.2.7|Temporary Retail Dimension

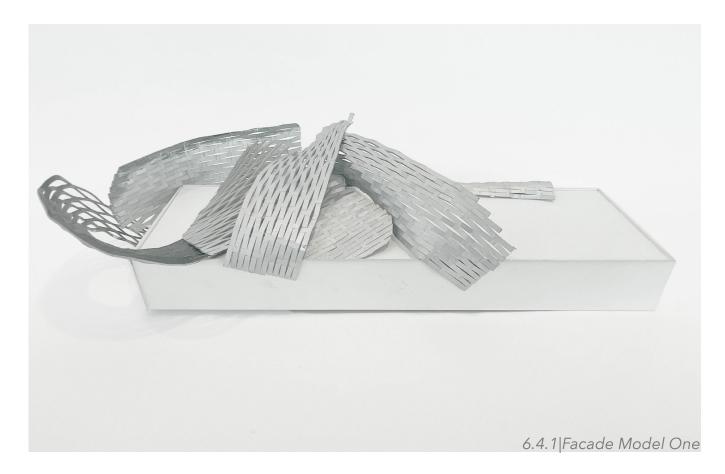














6.4.2 Facade Model Two

Exterior Facade

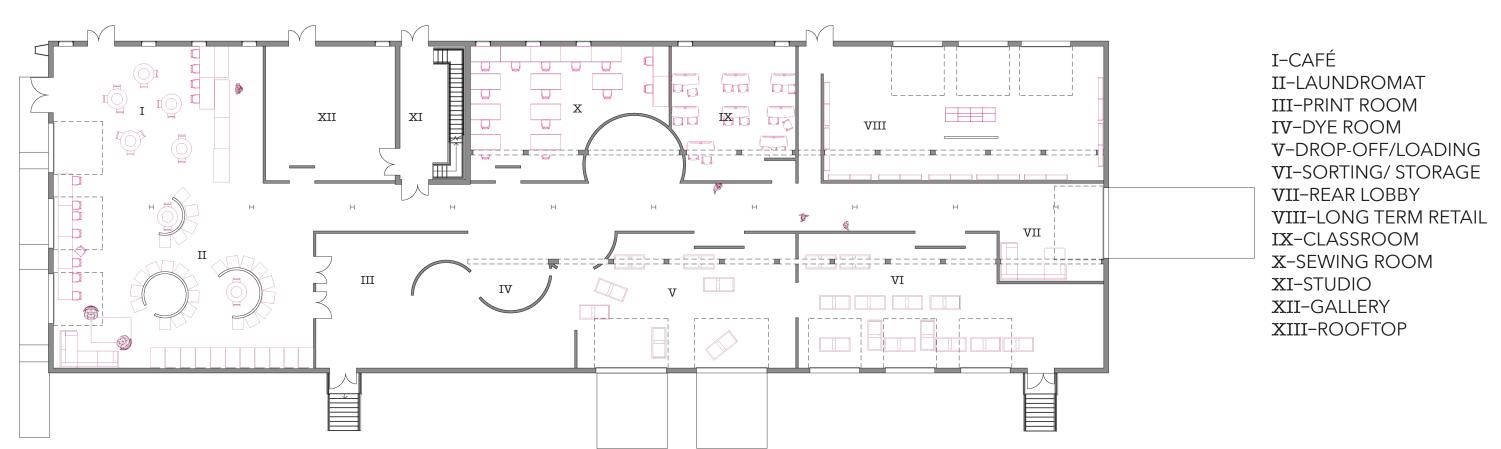
With the exterior façade, utilizing models offered the ability to create a sculpture and traits like façades similar to a fashion designer dripping clothing on a mannequin. The initial thought of doing so was to create an ecstatically pleasing façade that was similar to a dress, then reject the notion of creating a more conceptual installation.







6.6.2| Second Floor Plan

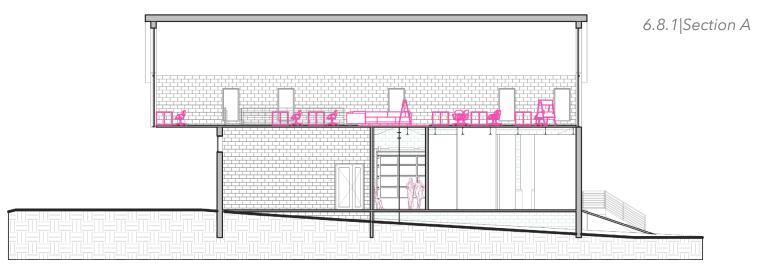


Interior Circulation

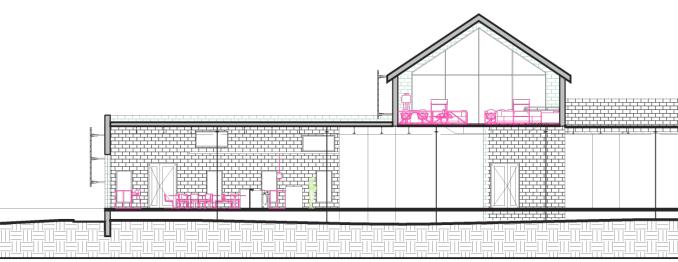
The interior circulation heavily utilized and design-wise promotes the open flow and the creativity of the news cycle, what with the open floor plans and the lack of doors on the interior express its ability to allow for creativity for the exploring of different rooms. From finding old T-shirts to quickly running into the sewing room to stitch a pant together. The concept and idea that each space could be an exhibition space and on to it a runway, it could be a moment to express oneself, a gallery it is a review. It is a pin-up space. To keep the wall blank was intentional. The hope is that the space would progress with the users, the consumers, the community, the neighborhood Atlanta students, and more.

6.6.1 First Floor Plan











6.8.2|Section B

07 Reflection

Now that we have come to the end of this thesis Journey, hopefully, it is not the end. There are some things that I would like to reflect on. Skins and fabrication was initially an idea that had so many issues that contributed to it that I could not solve in one Thesis. The challenging part about this Thesis was finding something and taking that one aspect and going with it. I knew I wanted to talk about fashion as my Thesis in the third year after watching a documentary that I mentioned a lot called the True Cost by Director Andrew Morgan in 2017. After watching the documentary, I started thinking about fashion more closely, and then I thought back to this musical with Audrey Hepburn called Funny Face. In the opening scene, there was a song called Think Pink. The Fashion editor was telling people what to buy, what to wear, what was in the trend, and too light to throw everything, burn everything, and destroy destroyed. The question is, how does this relate to architecture? How is fashion architecture? I think that fashion and architecture culture-wise were hand and hand; both reflecting the time period. Yet as we progress into the ready-to-wear industrial revolution. Fashion starts to progress faster than Architecture.

Things that I would like to continue working on if I had the opportunity or time to is incorporating more of the fashion aspect into the design. I did have a sewing machine, but it was challenging for me to use because every time I used it, the thread would bunch up and jam the sewing machine until very recently, I got it working.



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