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Spring 2019

# Urban Rangers: The Scope of Medellin through Informal Waste Collection

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# **Waste Collectors: Urban Rangers**

The Scope of Medellin through Informal Waste Collection

Christina M. Rubino  
Bachelor of Architecture Thesis

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# Contents

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## Thesis Claims

## Thesis Claims

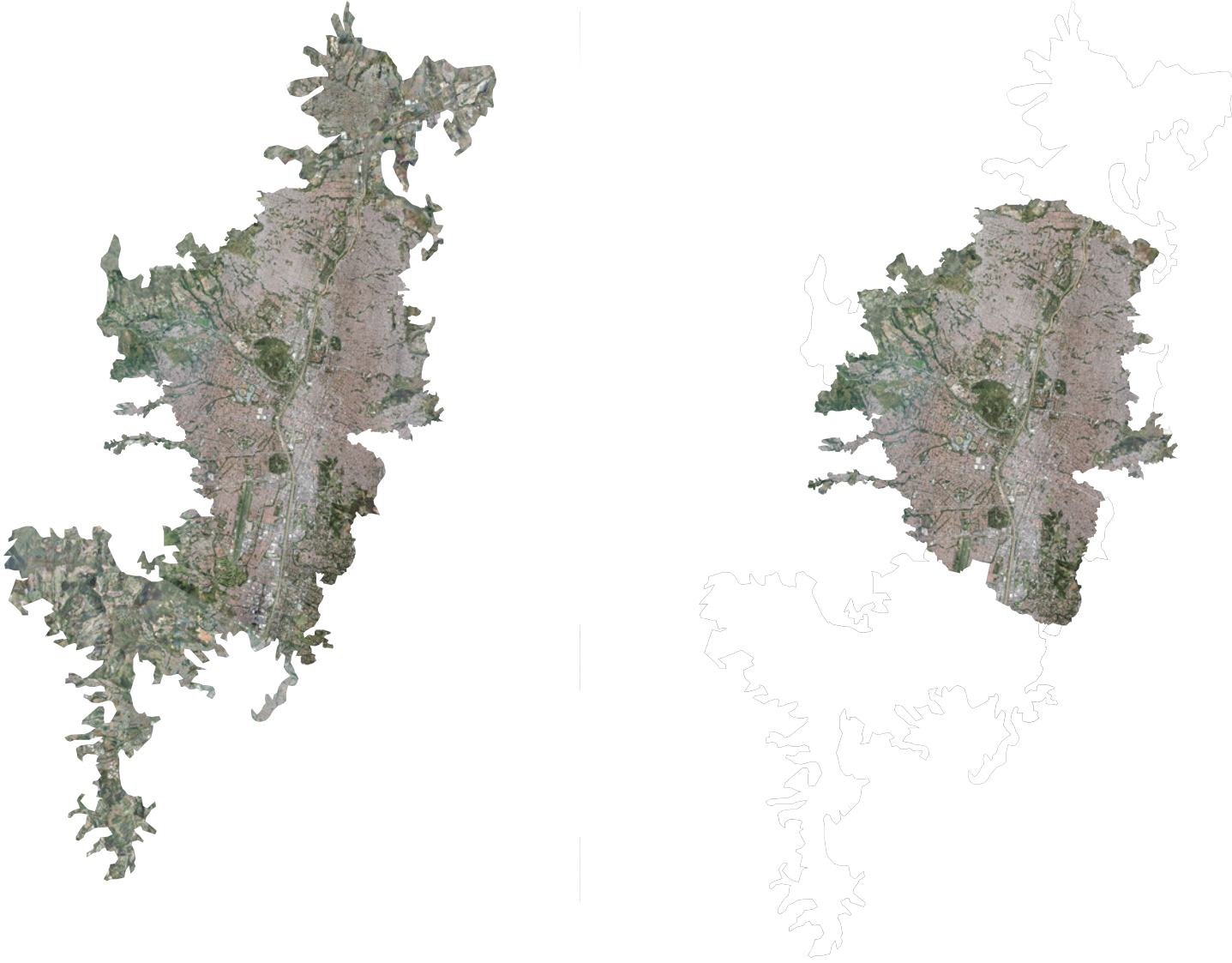
*Waste Collectors: Urban Rangers, The Scope of Medellin through Informal Waste Collection, critiques the city of Medellin, Colombia through the scope of an informal waste collector.*

*The design proposal incorporates the city's existing infrastructure and waste collection culture into a manifestation of working elements; these will function as a network to assert a new spatial agency with user specificity.*



# Context

# Context



*The territory of Medellín is distinct with extreme topography and a strict city cap that includes the informal.*

**Context**



1616

Medellin is colonized by the Spaniards



1980

Medellin becomes the cocaine capital of the world



1995

Medellin is voted "Most Dangerous City in the World"



2004

Sergio Fajardo is elected as mayor and appoints Jorge Perez and Alejandro Echeveria as urban planners  
  
The first Metrocable Line is constructed



2013

Medellin is voted "World's Most Innovative City"



2015

The Tram Line is constructed

**Context**

*Due to its location, Medellín became a hub for drug transportation and this industry ignited a culture of violence and a government that turned a blind eye towards organized crime. However, in the past 20 years and the election of a mayor who dedicated his effort towards infrastructural intervention, drastic improvements through architecture have transformed the city. Medellín went from the world's most dangerous city, to becoming the world's most innovative city.*



**Context**

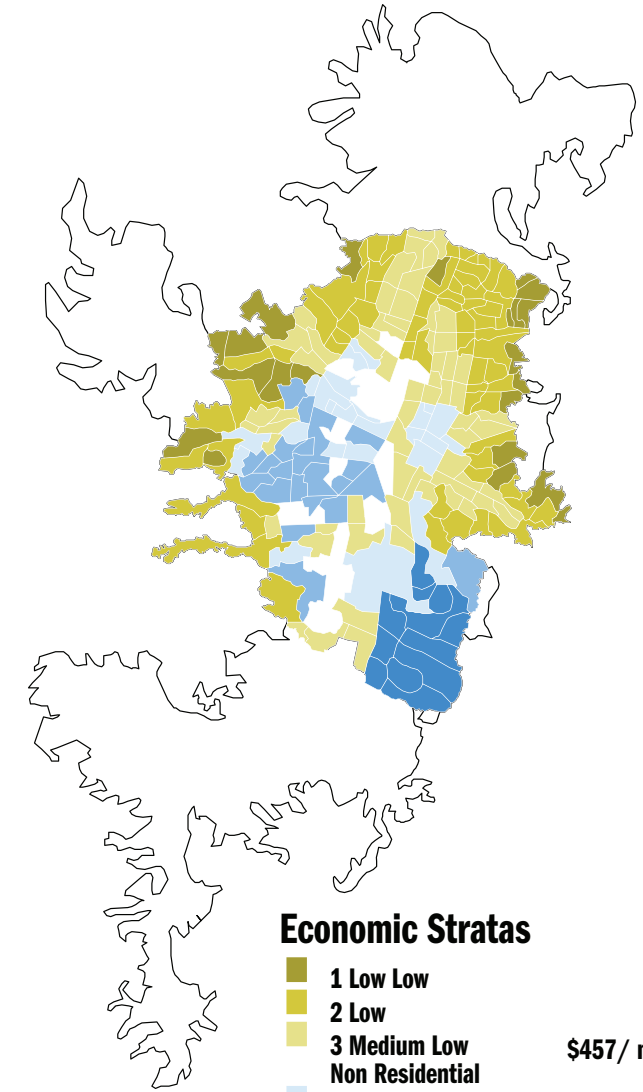


*Within the context there are undeniable differences between what is seen in the valley and the higher elevations of the Medellín.*

*More commonly, this is categorized as the formal and informal zones. The extreme topography divides this city into economic zones that are differentiated through their residents and their physical appearance.*

*Within the past decade this segregation of topography and strata economies have literally been stitched together through the metro cable system.*

**Context**



Economic Stratas	
1 Low Low	
2 Low	
3 Medium Low	\$457/ month
4 Medium High	
5 High	
6 High High	\$2,952/ month

*The extreme topography divides this city into economic zones that are differentiated through their residents and their physical appearance.*

## **Subject**

## **Subject**

*This research defines a waste collector as: a person who resides within informal settlements and relies on the disposed belongings of others as exchange for income.*

*A waste collector uses the city as a resource to collect income through strategic circulation that transcends both the formal and informal. Their actions are self-determined as a means of survival.*

*This differs from the role of a formal collector, who is a government employee with a prescribed route, tools, and resources.*



**Subject**

**Subject**



1997

First instance of organized waste collection unions in Medellín

2003

Social climate of Medellín begins to change with election of Sergio Fajardo

2005

Regional waste disposal sites are established throughout the city

2009

Sustainable Recycling is introduced to the legislation of Medellín

2017

New laws regarding waste collecting begin to slowly formalize the practice

*Within the context of Medellín, the informal waste collector is a role that is currently being questioned through legislative processes. This pushes the informal urban phenomenon towards strict rules and regulations that formalize and control the practice.*

*It is particularly paradoxical, as this non-tangible legislative process is ongoing amidst the physically changing narrative of the city.*

**Subject**



*Medellin is a city that has transformed its social, economic, and infrastructural climates from dangerous and undesirable to innovative and engineered to provide a symbiotic relationship between the formal city center and the informal living.*

**Subject**



Informal Waste Collector



## Subject



*In order to understand the means, methods, and actions of a waste collector one particular group of waste collectors who call themselves Campo Santo was studied.*



*Campo Santo is comprised of ex-gang members who were not able to find jobs and decided to provide their community with a service while also providing themselves with a needed income.*



*They have developed a system in which they collect recycled items by foot within the surrounding barrios.*



## Subject



*They sort their findings in a member's home that they call their workshop.*



*Once this is complete, they must bring their goods to the city center.*

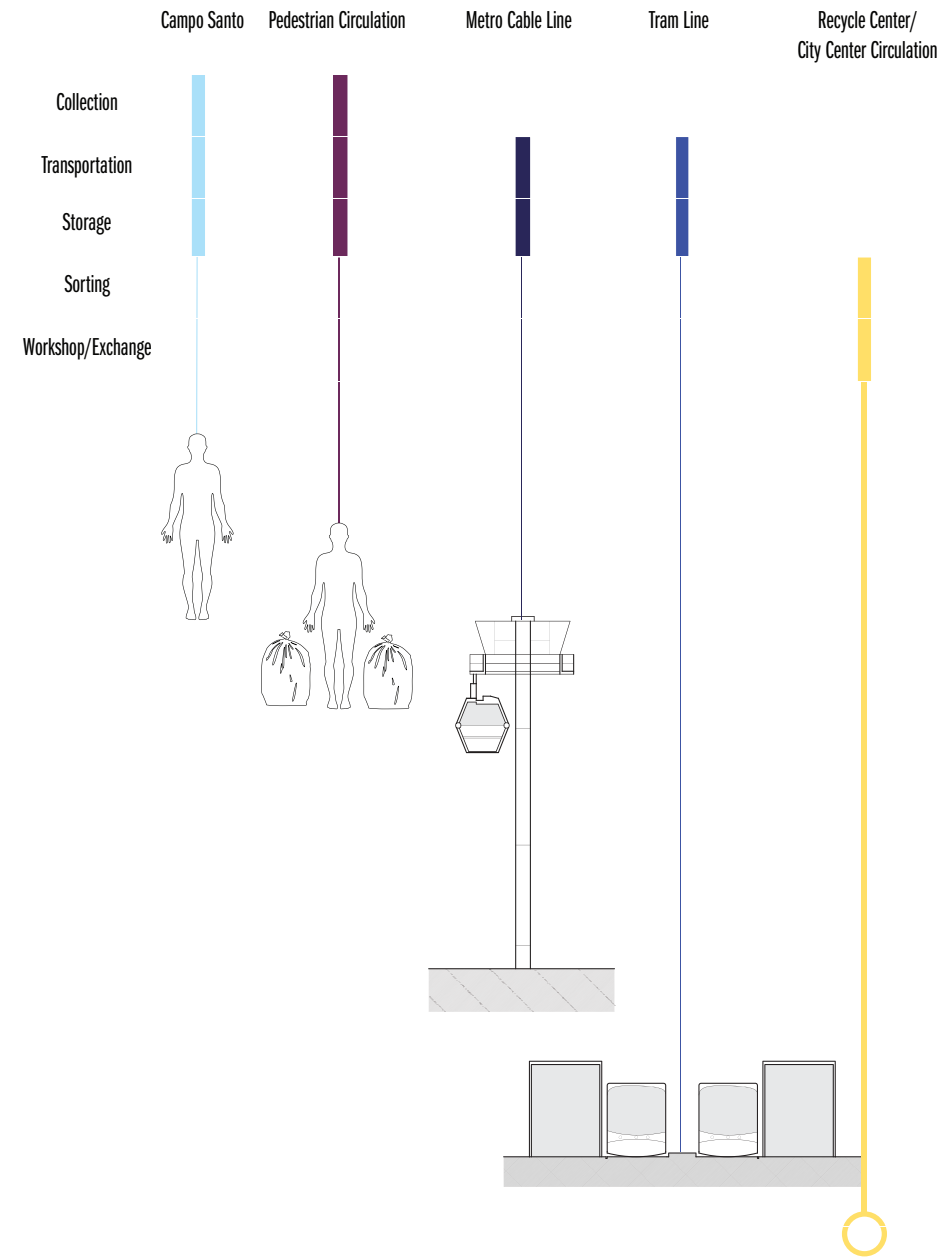


*This is where the recycle centers are located, in order for them to receive a cash exchange.*



## Subject

### Action of Subjects- Methods, Site, and Quantification



## Subject

With stolen resources, such as the cart, the optimal form of street collection is not accessible to Campo Santo collectors leaving collection to the body and bag.

This leaves many object left within the domestic zones of Campo Santo to have no value for collectors because of their inability to be transported.



12 gallons

**X 128**



**15,870 Colombian Pesos  
About \$5.00**



16 gallons

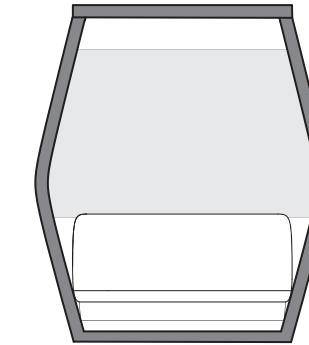
**X 120**



**19,044 Colombian Pesos  
About \$6**

Approximated value of return values per typical container size and contents

The scale of collection is limited to the dimensions of the smallest transportation vessel, the metro cable.



11'4"

9' 6"

4' 2"

2' 8"

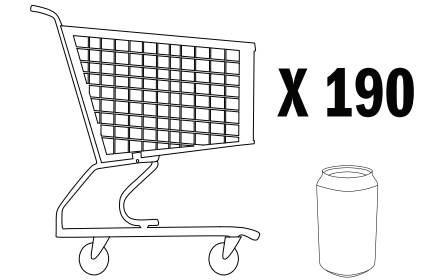
3' 8"

4' 9"

2" GAP

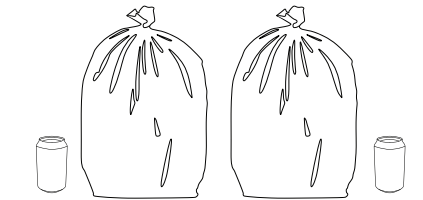
Metro cable dimensions

The scale of collection changes drastically at the scale of the city center, which allows for alternative forms of collection, upon availability.

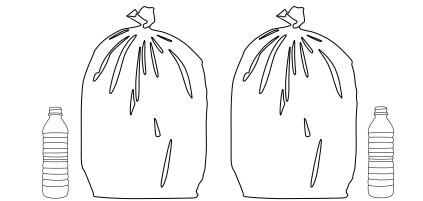


**X 190**

**22,218 Colombian Pesos  
Almost \$8**



**31,749 Colombian Pesos  
About \$10.00**

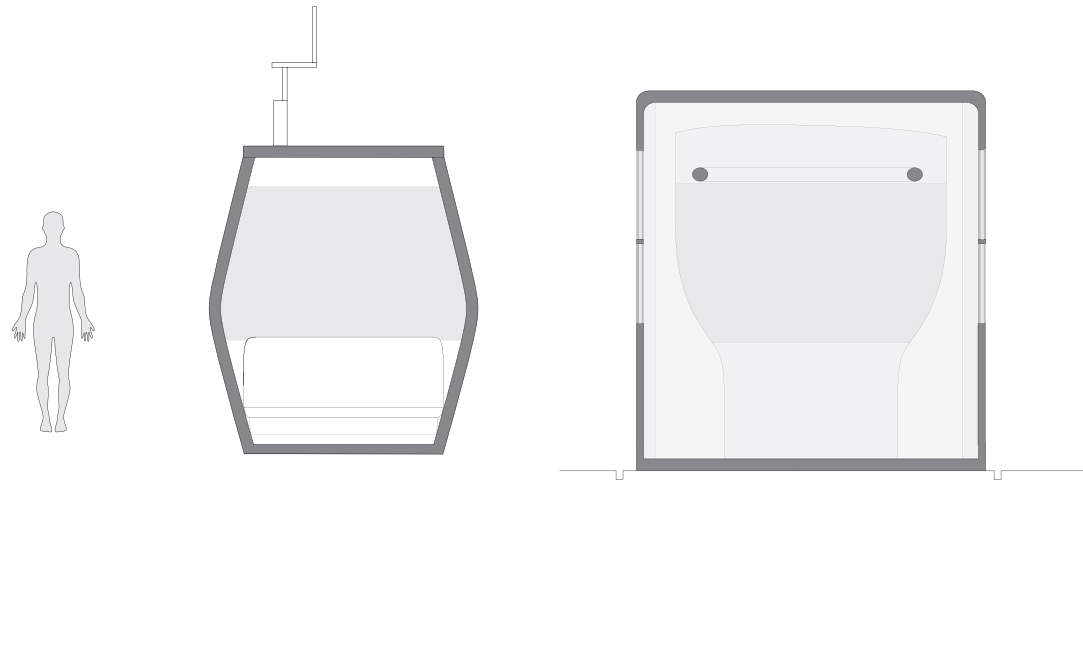


**38,088 Colombian Pesos  
About \$12**

Approximated return values per large collection quantities with external device



**Subject**



Body, Metro Cable, Tram, Formal City, Informal City

**Subject**

*Their income comes from a strategic circulation that utilizes pedestrian activity, metro cable, tram transportation, formal, and informal resources.*

**Condition**

**Condition**



**Residential Recycling**

64%

*The waste trends in Medellín have large quantities in residential zones.*



**Condition**

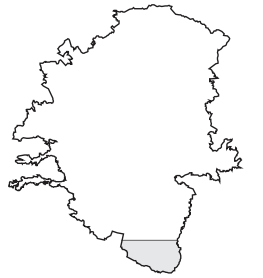


Collected by Waste Collectors

16%



**Condition**



Direct Repurpose of Residential

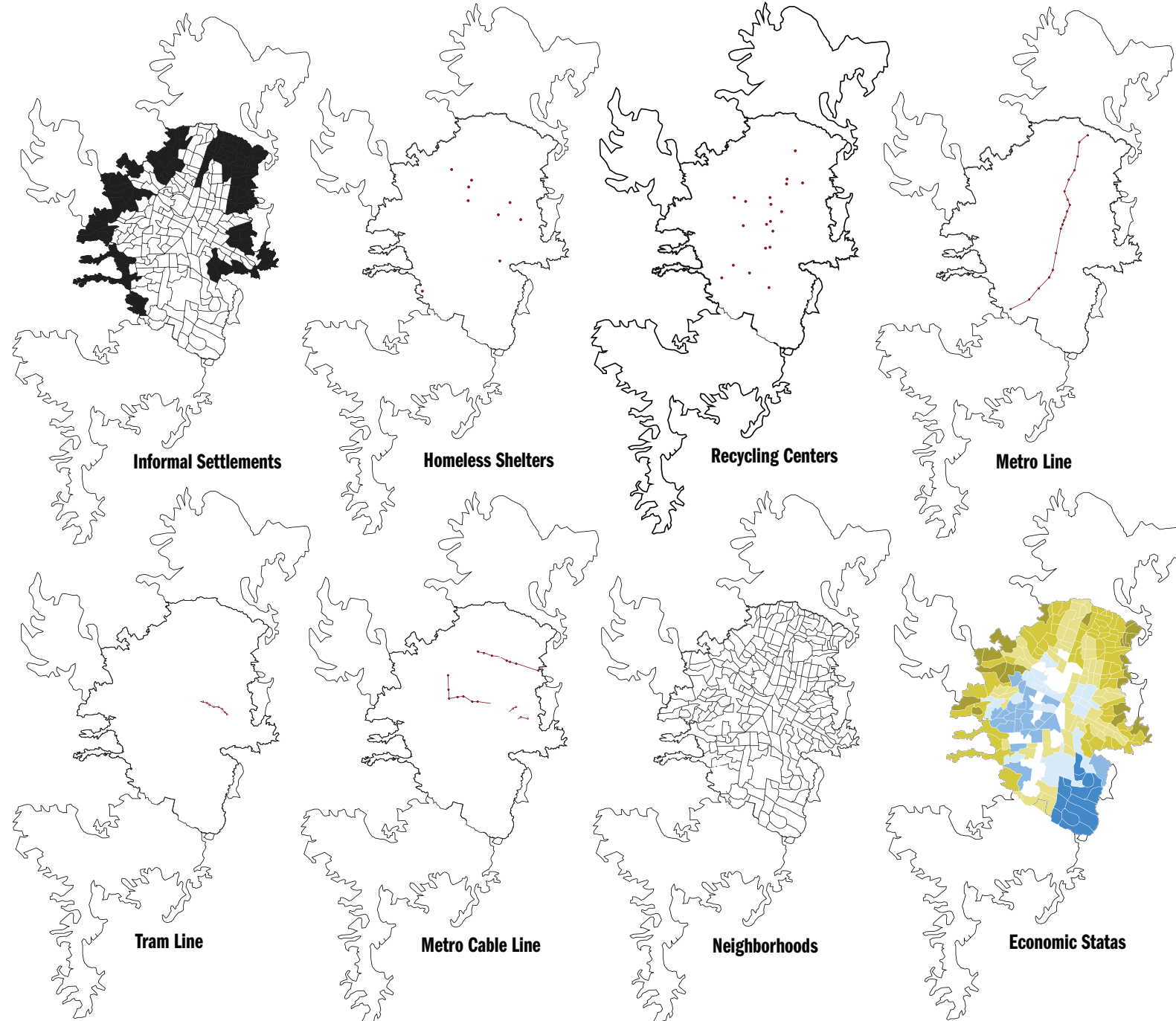
11%

*Walking through the Campo Santo's limited street view, which is mainly residential, the streets are not only storage for this waste but also, a resource for those to depend on it.*

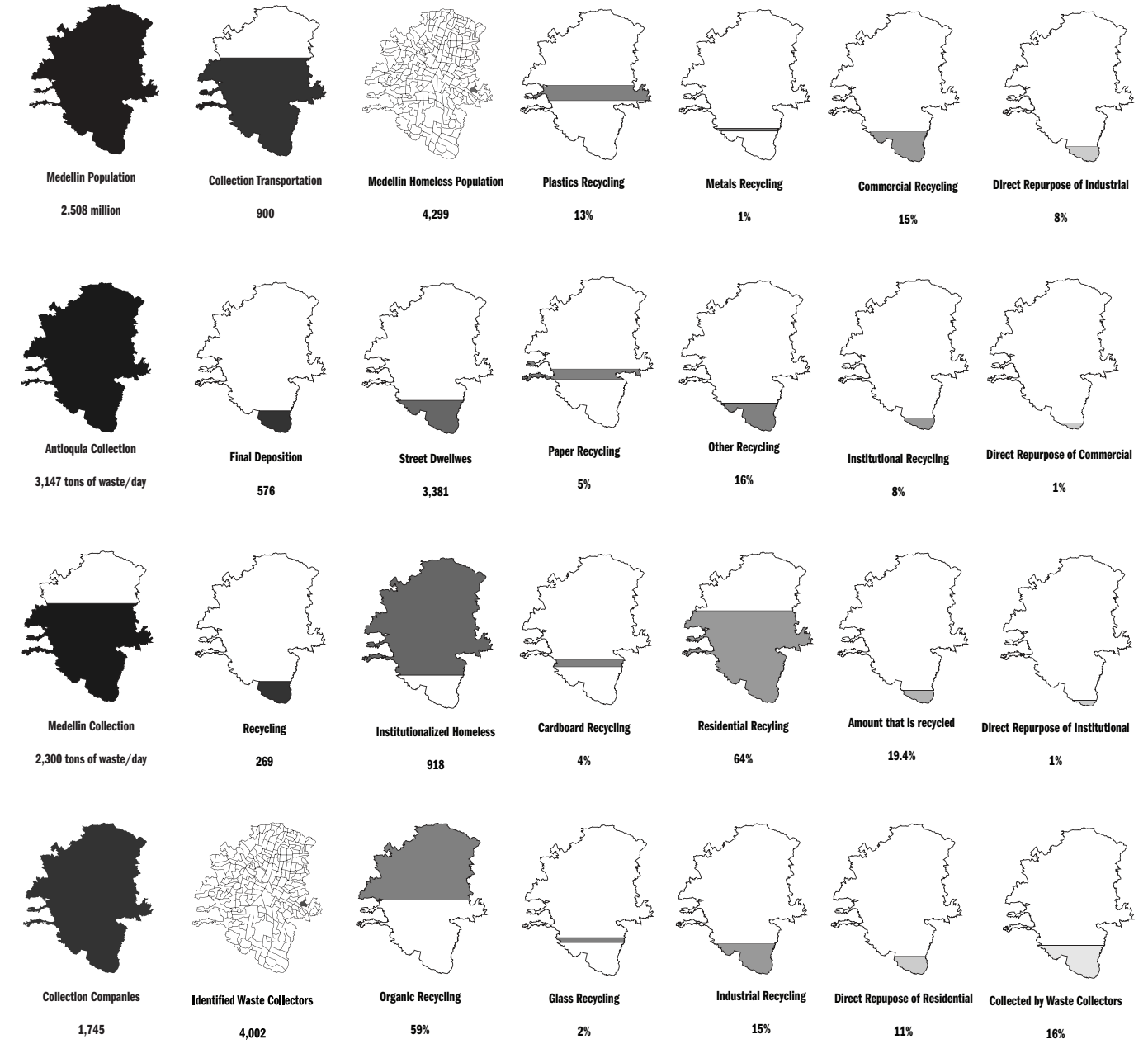
*The act of informal waste collection mostly occurs in residential communities, due to the fact that over half of Medellín's recycled material comes from residential zones with a decent amount being collected by informal collectors with purposeful reuse.*



## Condition



## Condition



*The majority of residential barrios are located within the informal along with a respectively large amount of waste and recycled material.*

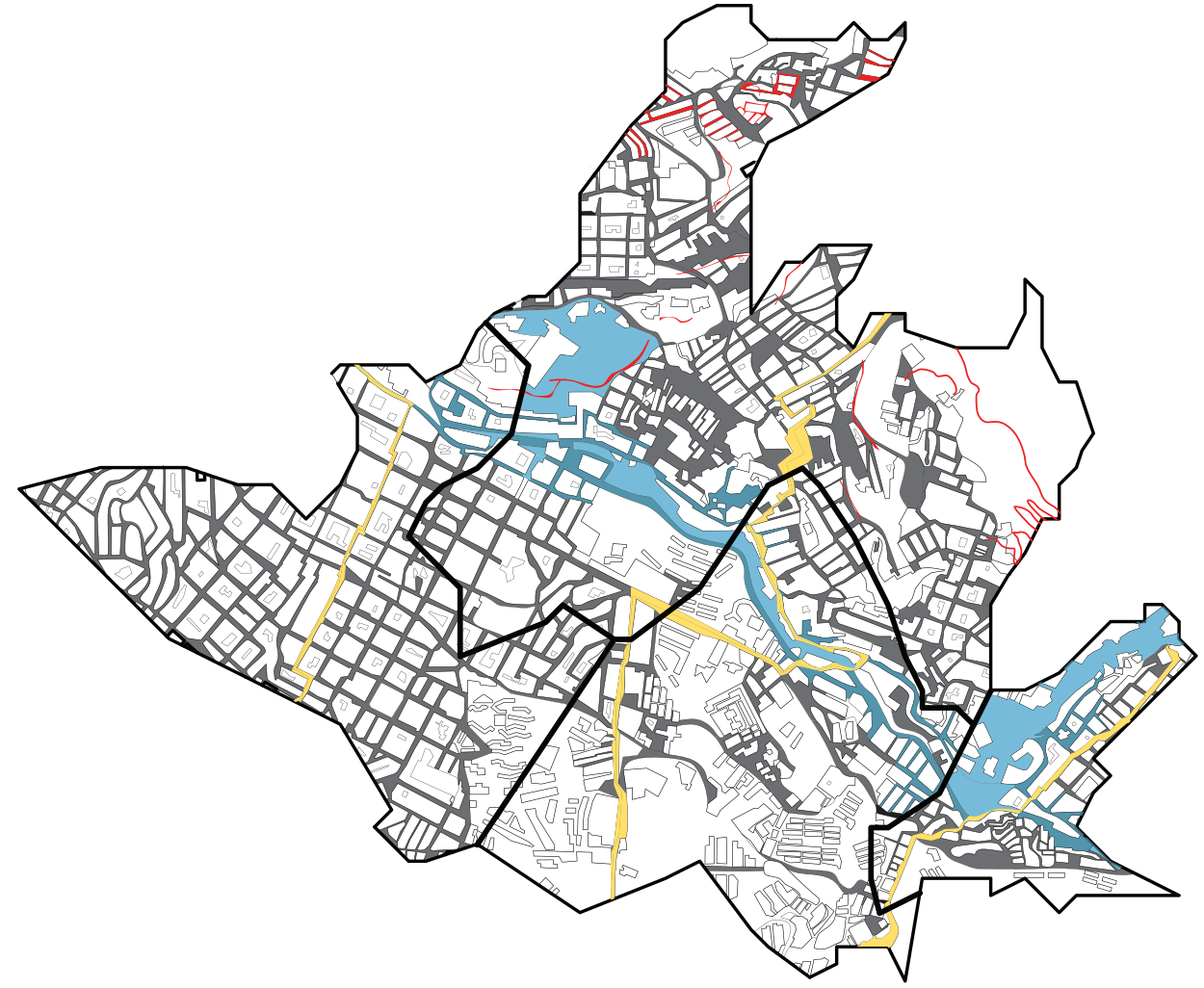
**Condition**



**Neighborhoods in Direct Relation to Campo Santo**

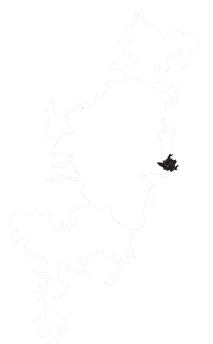


**Condition**



**Direct Routes Taken for Formal Collection**

**3x / Week**



**Condition**



Metro Cable Lines

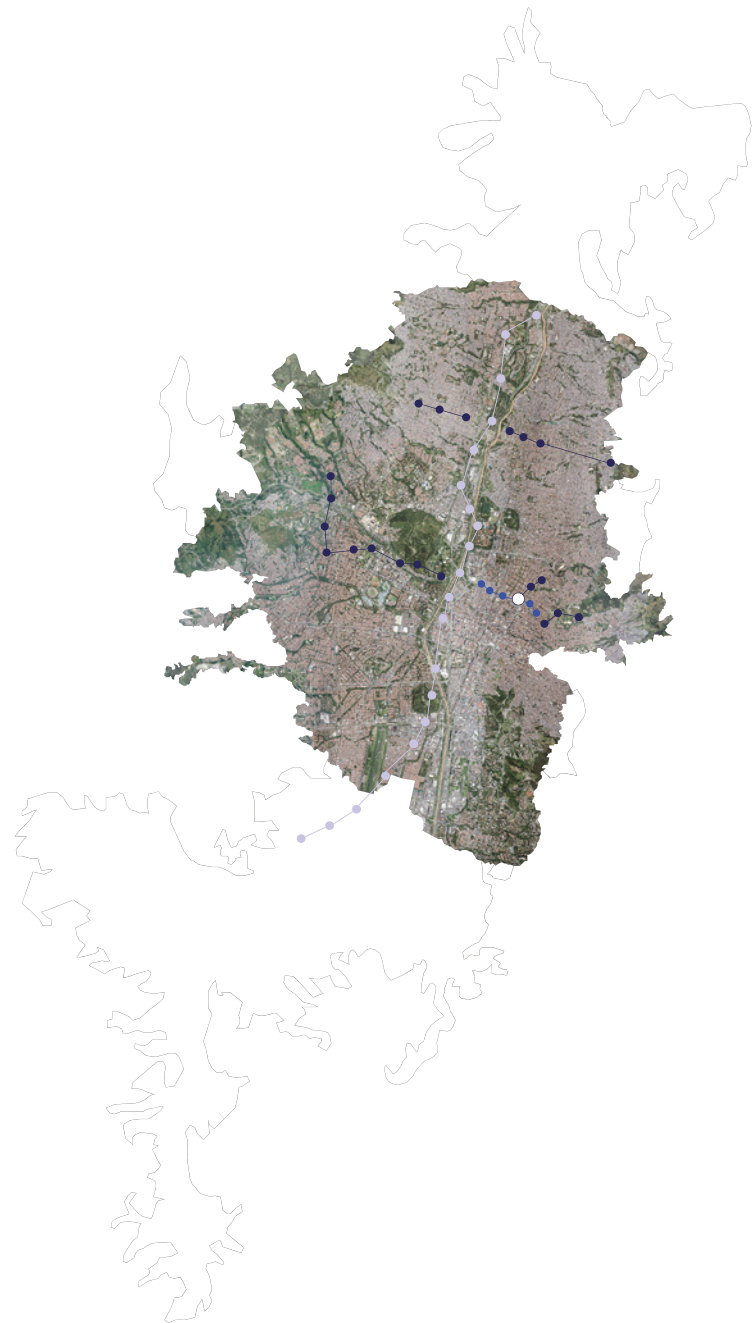
**Condition**



Metro Cable Lines, Tram Line



**Condition**



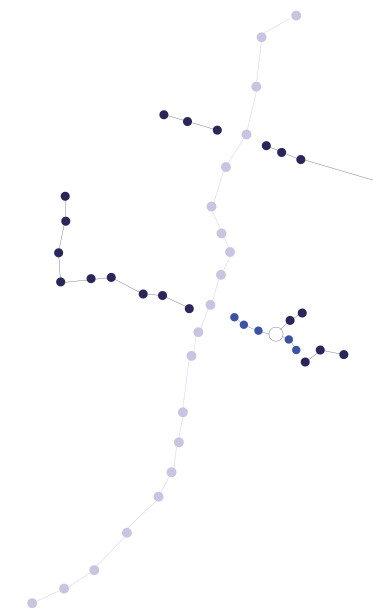
Metro Cable Lines, Tram Line, Metro Line

**Condition**



*The process of moving from the informal to the formal typically includes a descent on the metro cable lines, tram line, and the city metro line.*

*The process from moving from the informal to the formal, and specifically the barrio of Campo Santo, involves three metro cable stops, six tram stops, and either a metro stop or walk to a recycle center. Collectors then circulate this formal zone to find more items to bring to recycle centers.*



Campo Santo Commute Elements

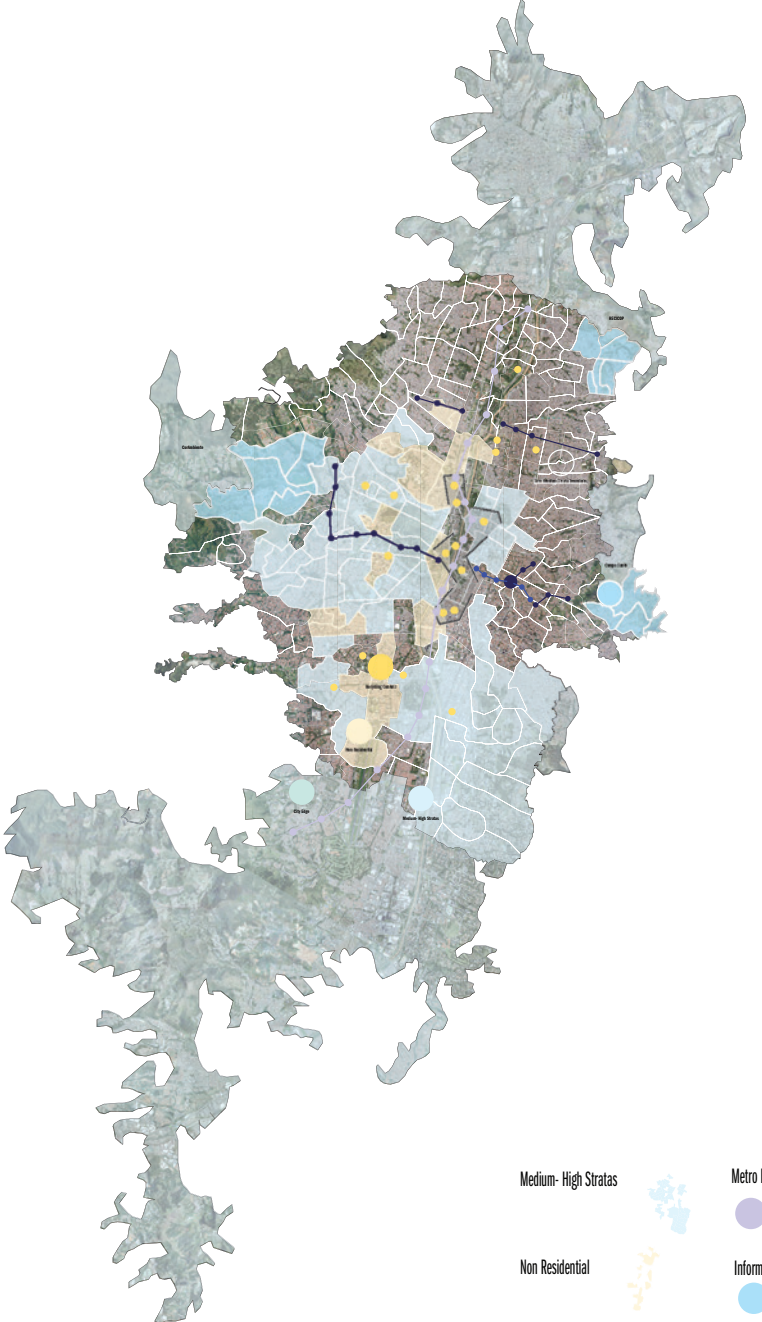
*2,550 Colombian Pesos for Day Pass  
Includes all public transit*



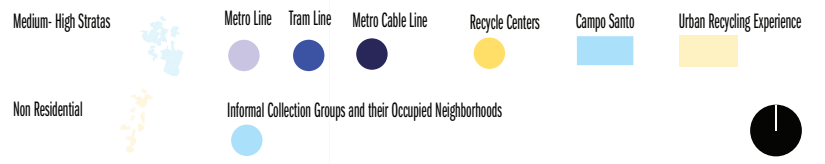
*Equivalent of  
16 Plastic Bottles*

# Critique

# Critique



# Territorial Reading





## Critique



*One of the largest problems found in the act of collection is the lack of transportation vessels available to the collectors. Many collectors voiced their struggles in having things like wheeled carts stolen, which is putting their body in a compromised position.*

## Critique



*Additionally, these vessels cannot be transported within the constraints of the public transportation vehicles, which provides an added obstacle to the circulation of waste.*

## **Intervention**

## **Intervention**

*Waste Collectors: Urban Rangers proposes a design intervention aimed to enhance the life of a waste collector in the form of a public program, positioned as an urban tool and effective at multiple scales.*

## Intervention



*The critique of this practice in relation to the legislation being imposed is one that promotes the use of Medellín's existing infrastructure with the integration of design tools that enhance and provide a more positive alternative to the daily life of a waste collector.*

*It provides a critique of current working elements with real values that could be designed to function as a network to assert a new spatial agency with user specificity.*

## Intervention



**X 120**

**16 gallons  
120 bottles**

**19,044 Colombian Pesos  
About \$6**

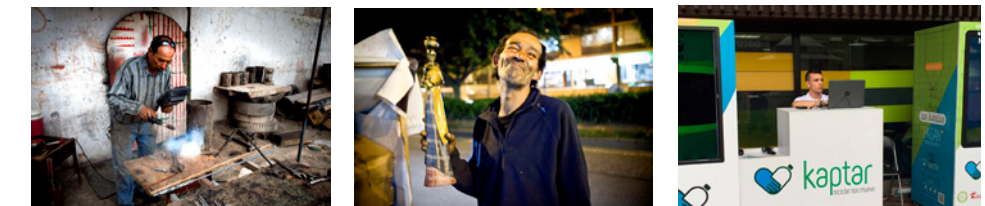
**X 170**

**12 gallons  
170 cans**

**15,870 Colombian Pesos  
About \$5.00**

**X 128**

**22,218 Colombian Pesos  
Almost \$7**

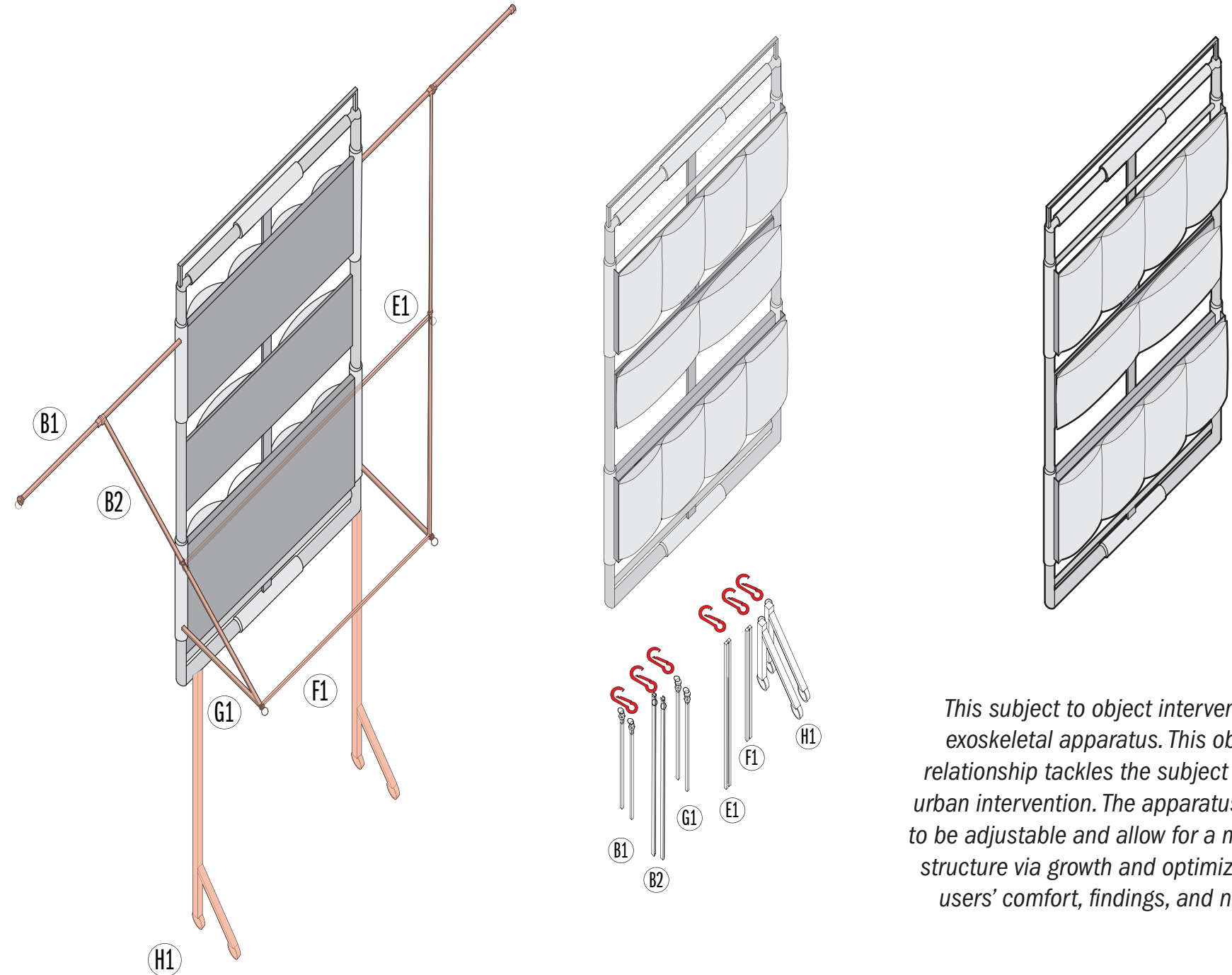


*The subjects, informal waste collectors, are traced in their everyday routes and urban experiences; their actions, means, and methods are then quantified in order to determine an algorithm for an optimized collection technique and performance.*

## Intervention at the Object Scale

43

## Intervention at the Object Scale

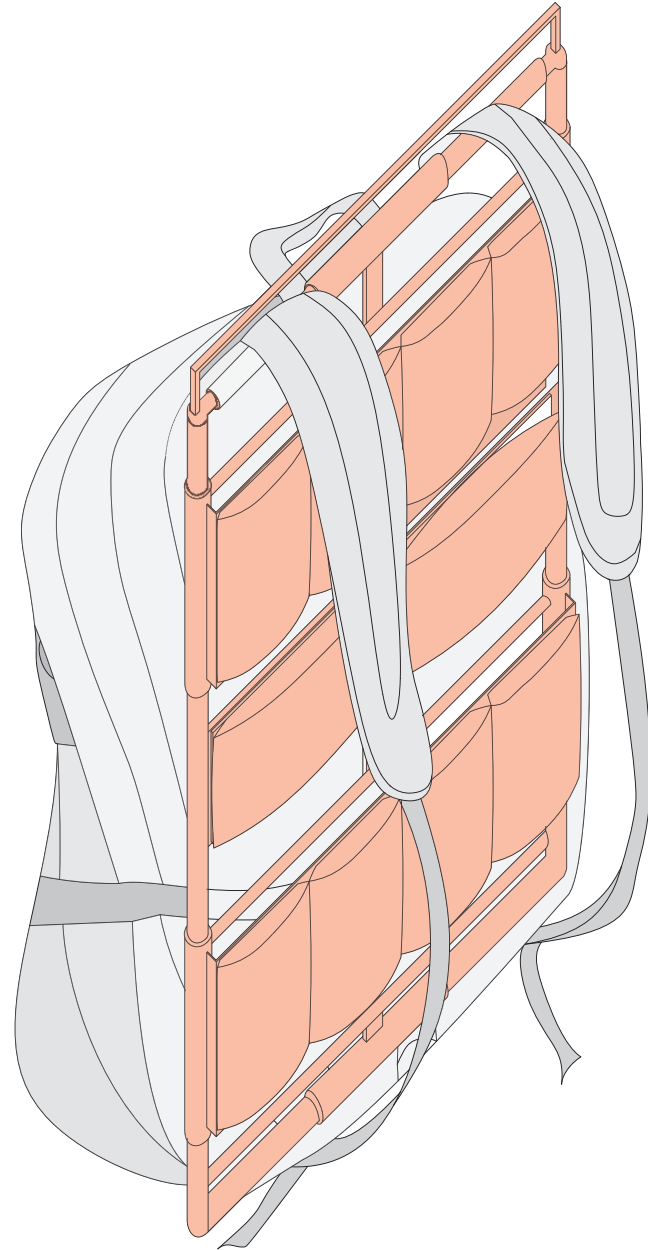


*This subject to object intervention is an exoskeletal apparatus. This object/user relationship tackles the subject scale of the urban intervention. The apparatus is designed to be adjustable and allow for a mutation of its structure via growth and optimization for the users' comfort, findings, and necessities.*

44

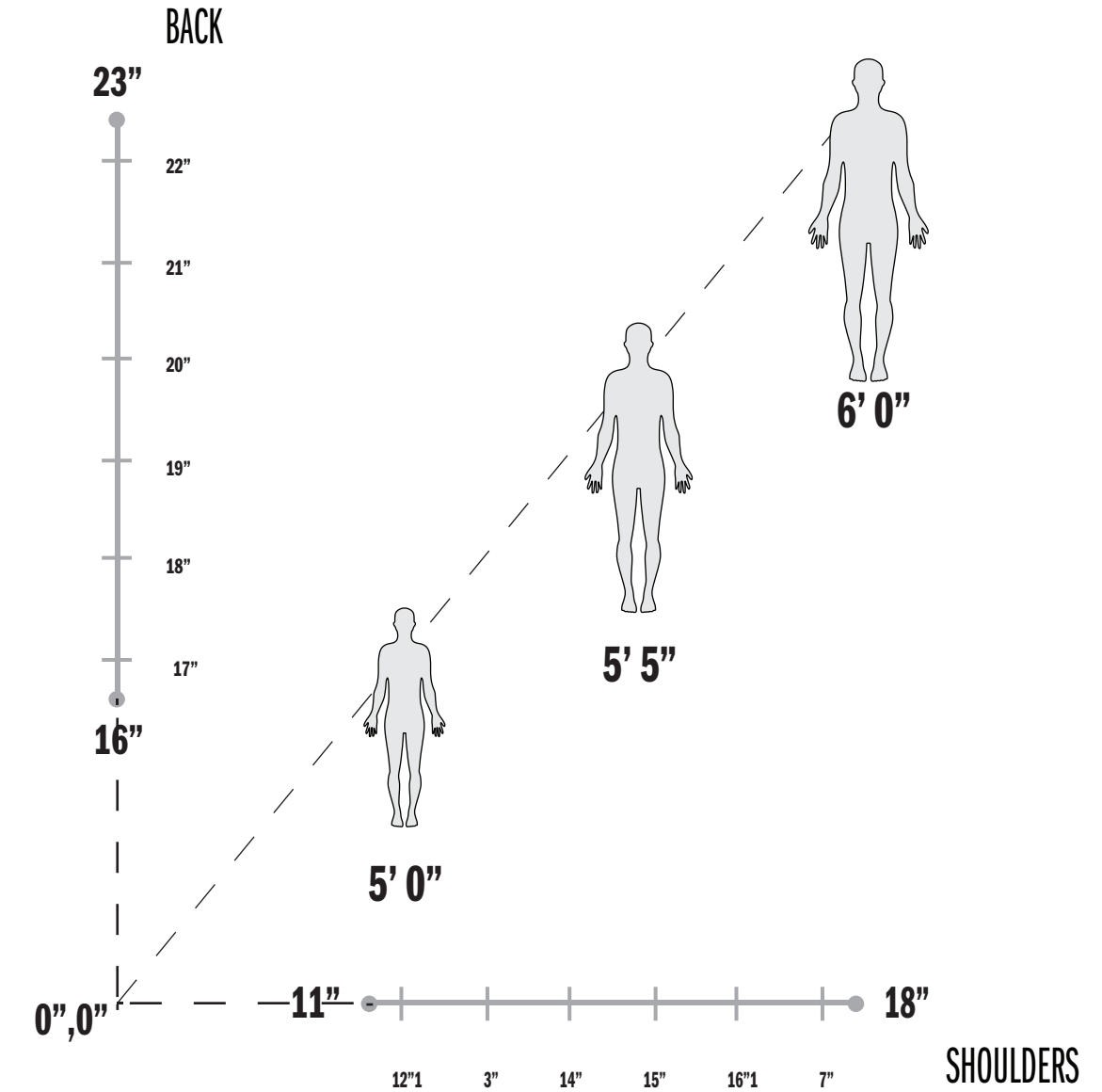


### Intervention at the Object Scale



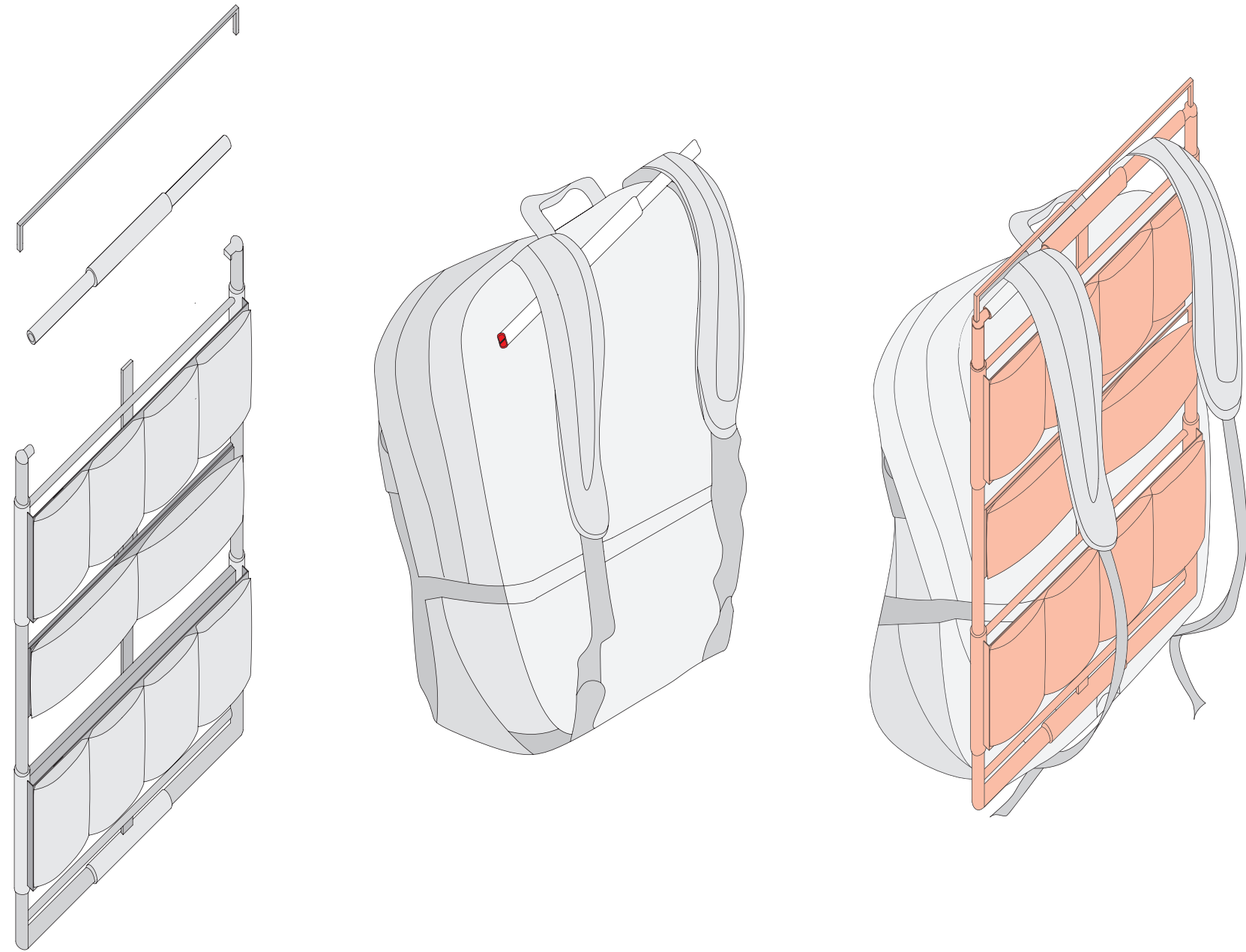
*When attached to a backpack, this apparatus optimizes physical, and in turn, monetary collection.*

### Intervention at the Object Scale



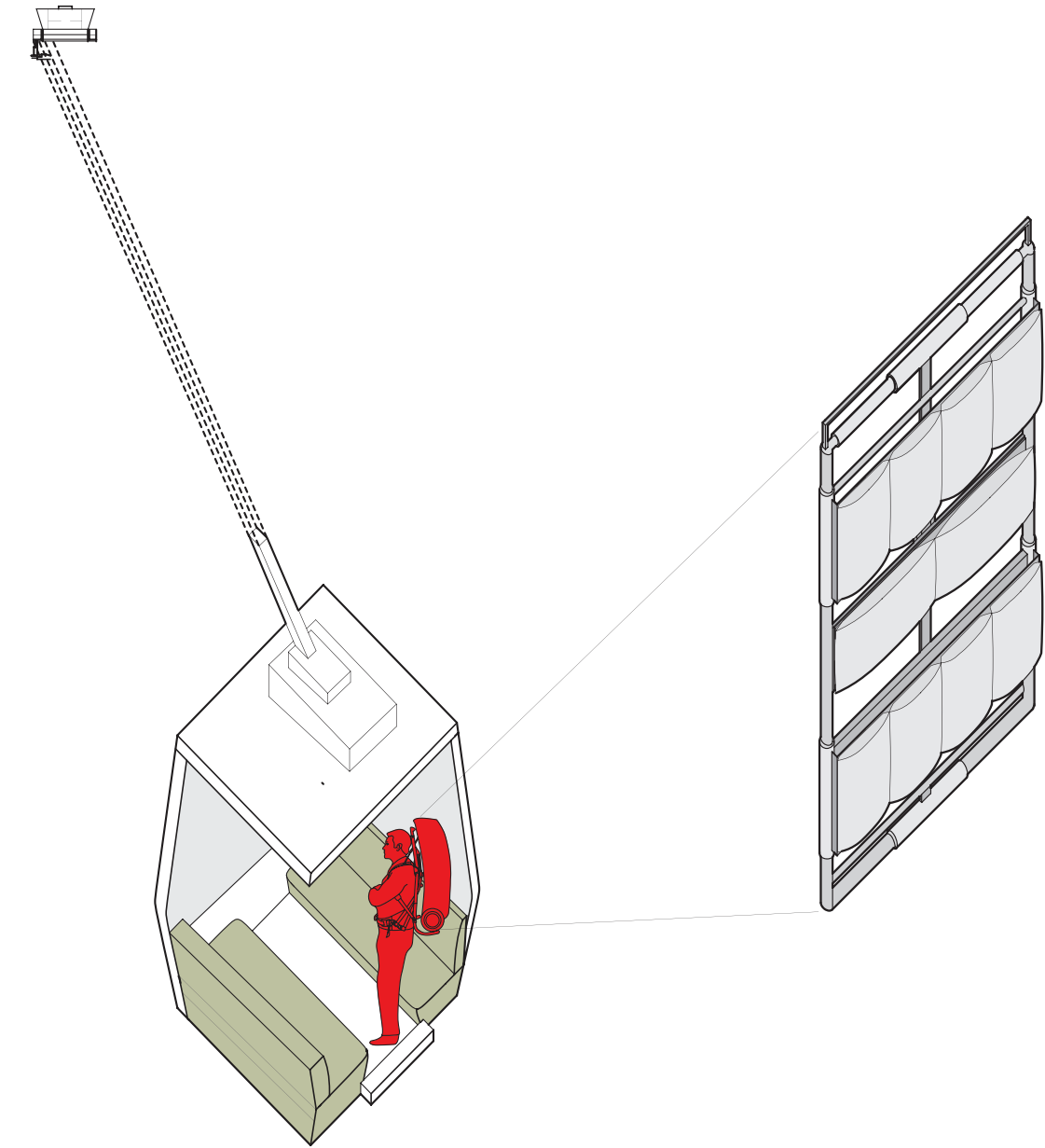
*These proportions were determined through ergonomic research and a survey of measurements taken from a large variety of body types. The adjustable design is meant to expand and contract horizontally and vertically in order to meet the proportions of any body type.*

### Intervention at the Object Scale



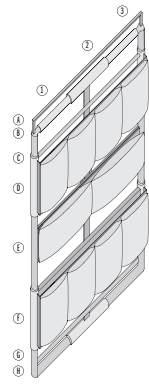
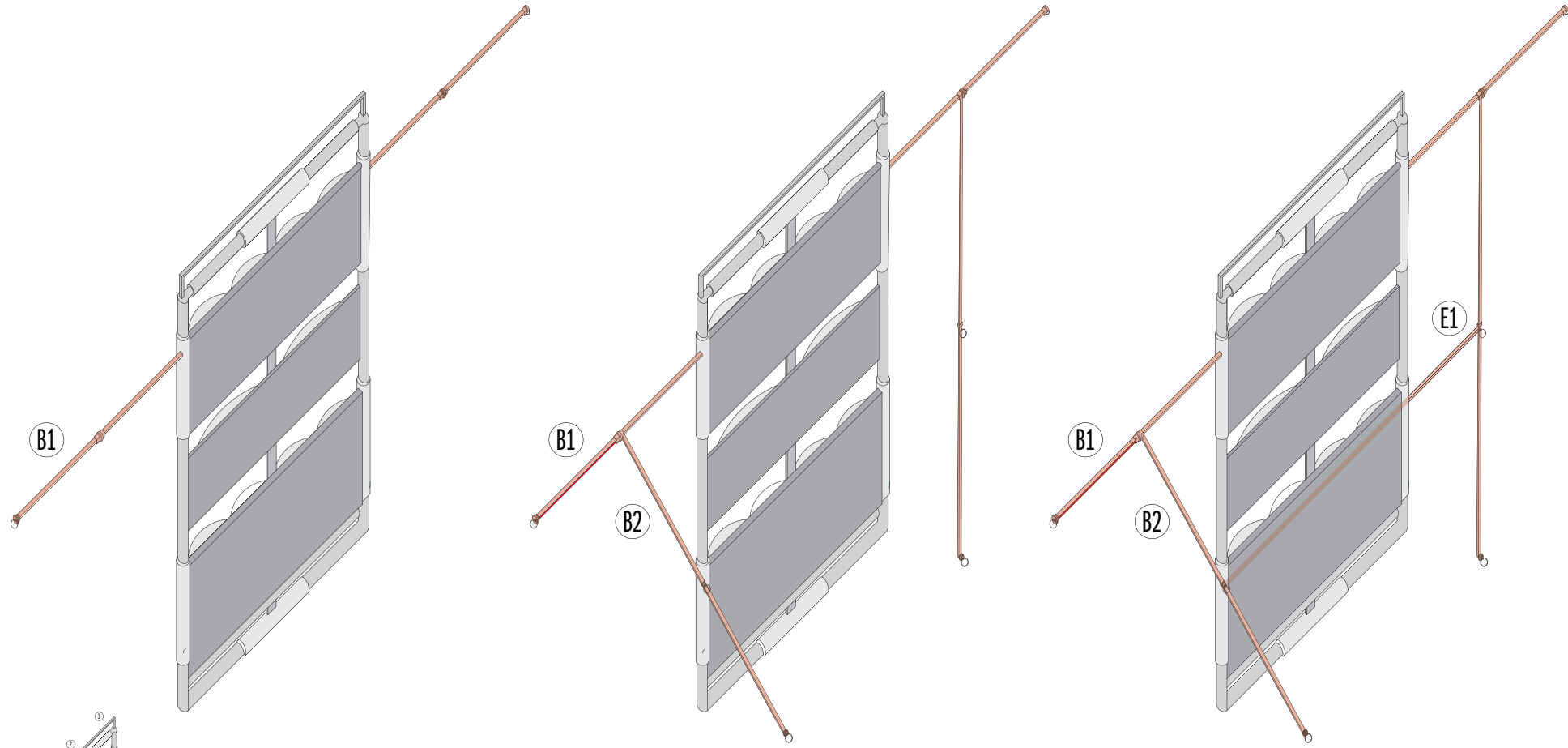
*A horizontal element of the apparatus is removed and then reattached once the backpack straps are fastened in the proper position.*

### Intervention at the Object Scale



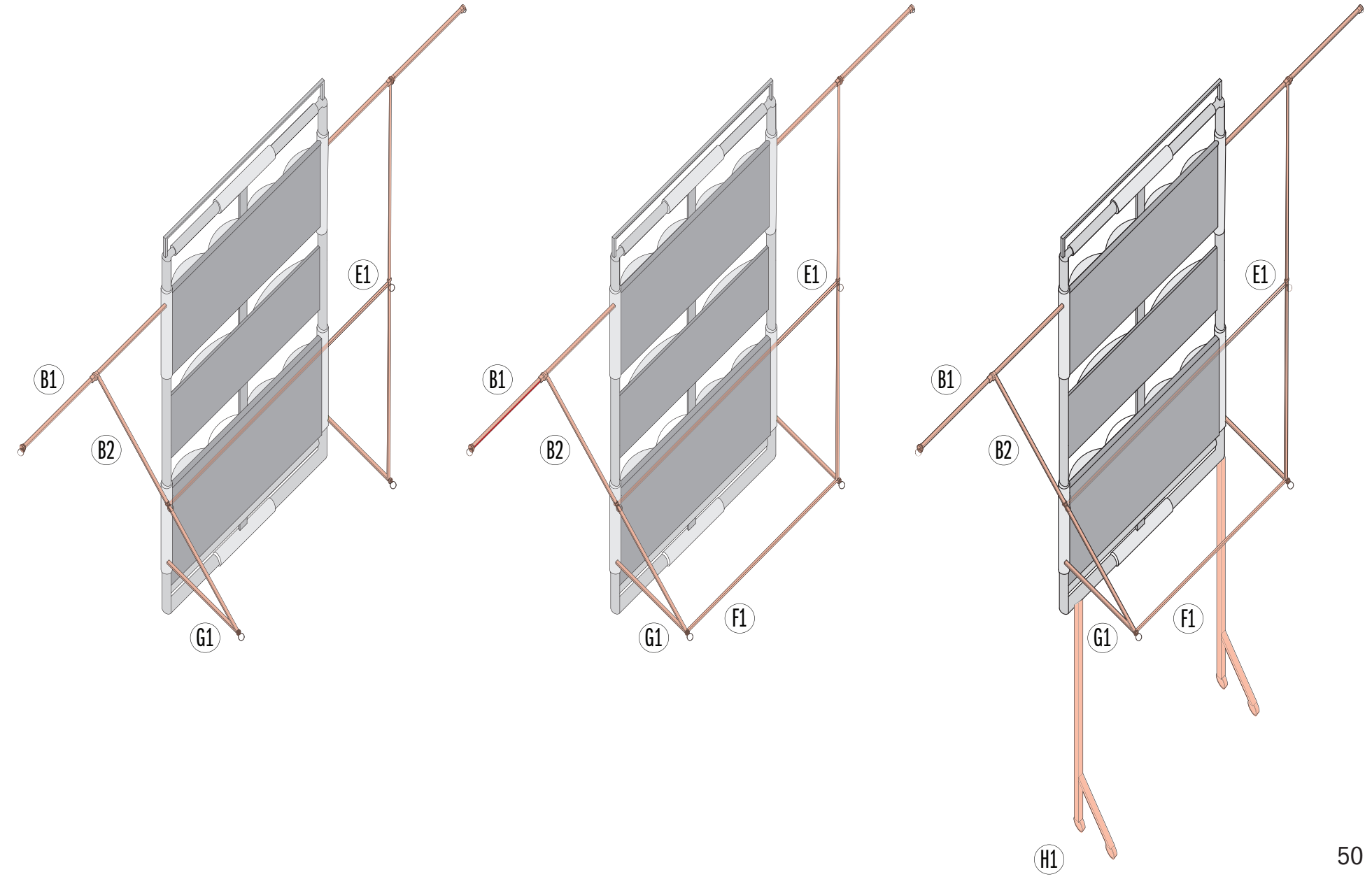
*The mutation of the device is designed around the constraints of the dimensions of the metro cable in order to meet the needs of the subject's daily activities and still be functional at the urban scale.*

## Intervention at the Object Scale

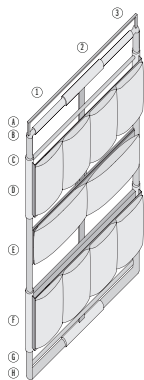
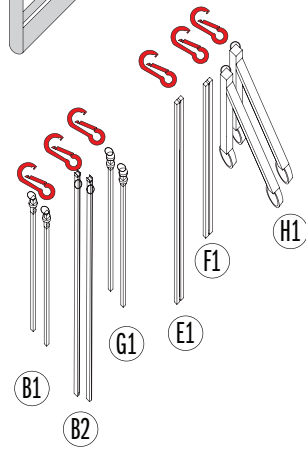
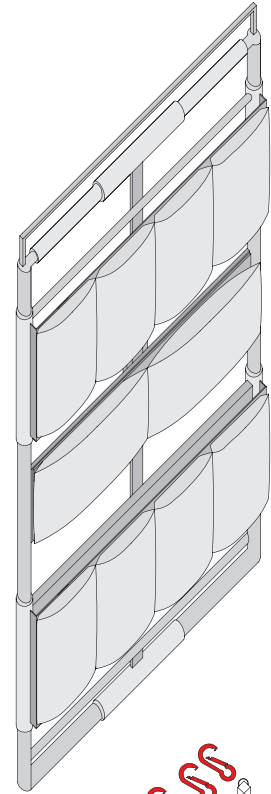


*The expansion occurs both horizontally and vertically with components that can be clipped to the apparatus at its smallest scale. The apparatus has the potential to turn from a bodily extension to a wheeled circulation and storage vessel.*

## Intervention at the Object Scale



## Intervention at the Object Scale

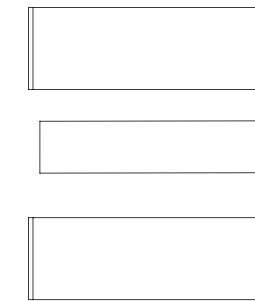


The mutation and optimization of the structure is currently being as represented by metal spring clasps as the accessory attachment. But there are several other possibilities. With this design, customization is key to adhering to user specificity.

## Intervention at the Object Scale



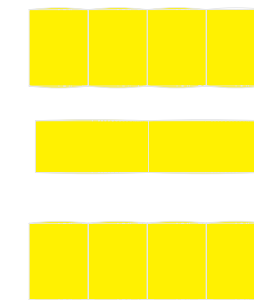
Titanium



Bendable Plastic Acrylic



Padded Titanium



Upholstery Foam

Due to the fact that most of the object is made of a lightweight metal, padding is added in order to allow for comfort and support of the user.



### Intervention at the Object Scale



*The metro cables are the most literal connection between the formal and informal zones of the city. For most, this is the only way to reach the city center. Due to the fact that informal waste collectors have large resources within the low-medium residential stratas this creates an obstacle in transporting goods to the recycling centers in the city center.*

Metro Cable with Intervention

### Intervention at the Object Scale



*The apparatus is designed to fit within this constraint of the transportation that includes the metro cable and the tram.*

Tram with Intervention



**Intervention at the Object Scale**



*The same type of mutation can now occur in the informal and the formal in order to equally utilize resources.*

**Campo Santo with Intervention**

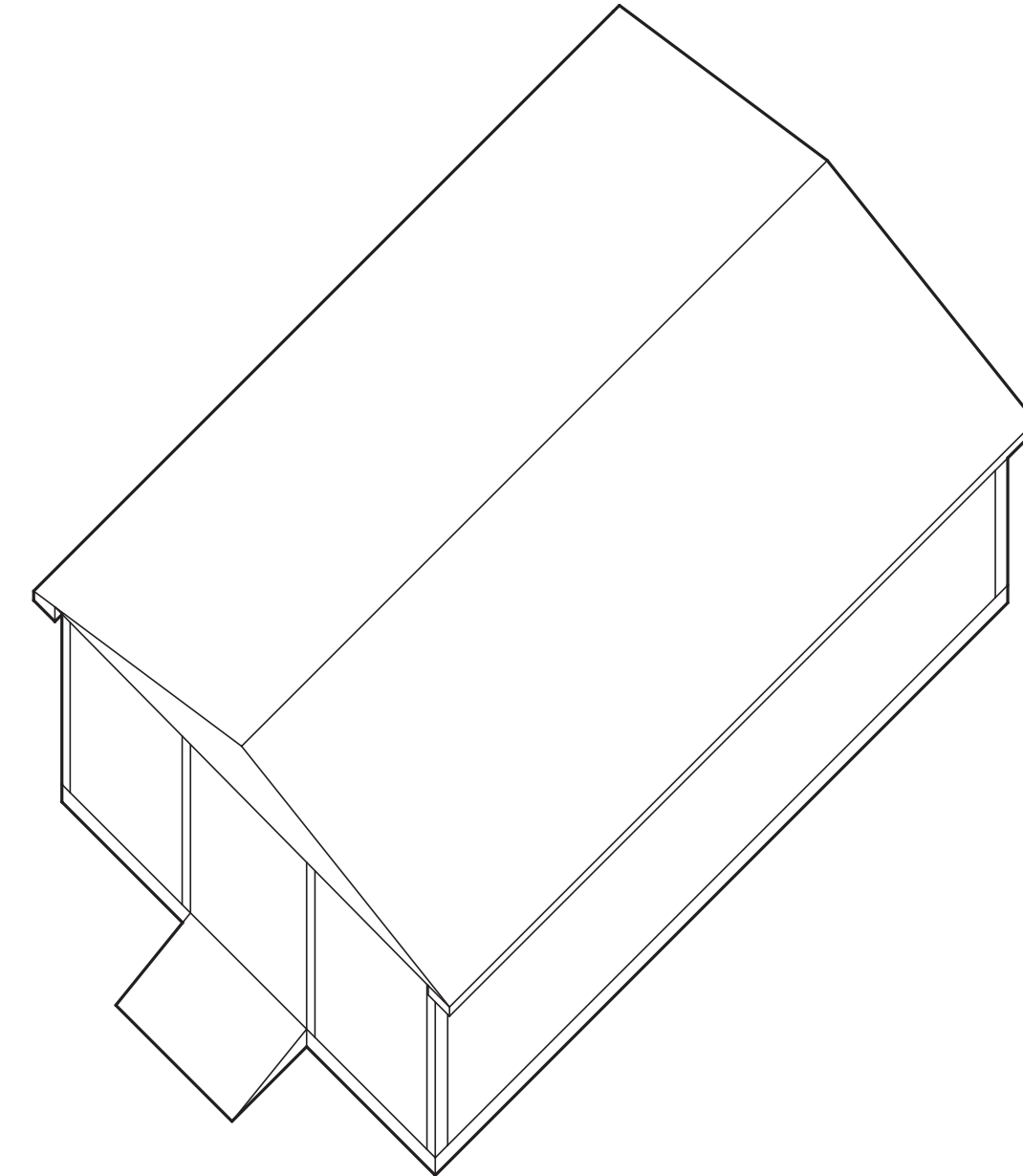
**Intervention at the Object Scale**



**City Center with Intervention**

## Intervention at the Barrio Scale

## Intervention at the Barrio Scale



*By using the body as site and the city as vessel, the physical backpack apparatus will be distributed at shelters located throughout informal residential neighborhoods.*

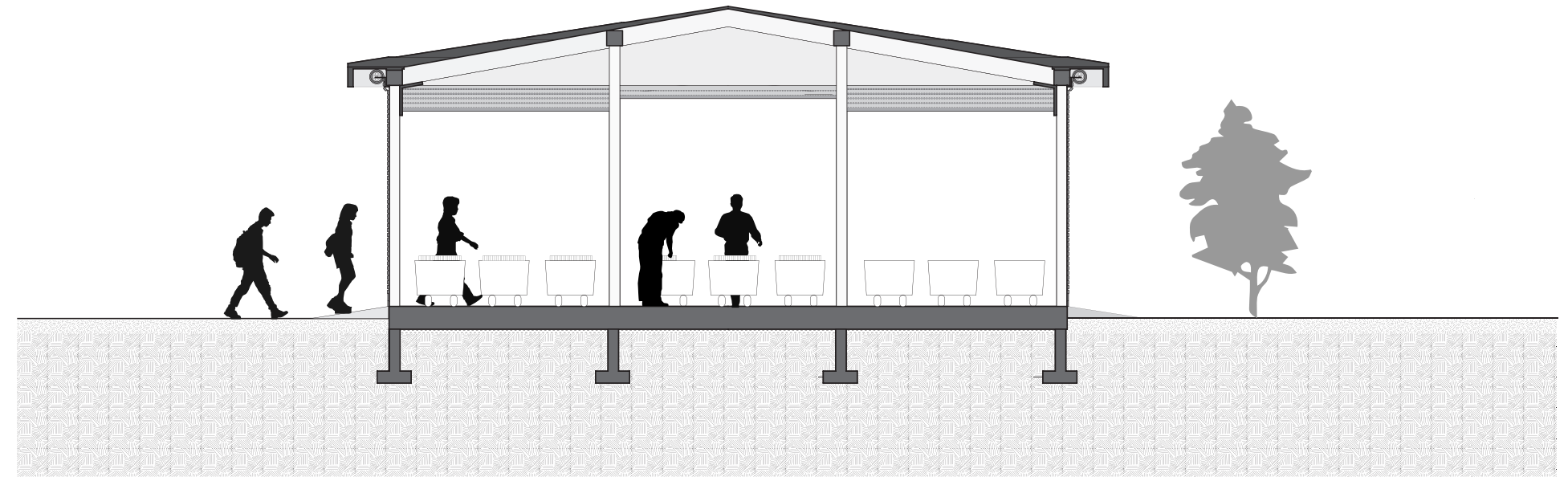


### Intervention at the Barrio Scale



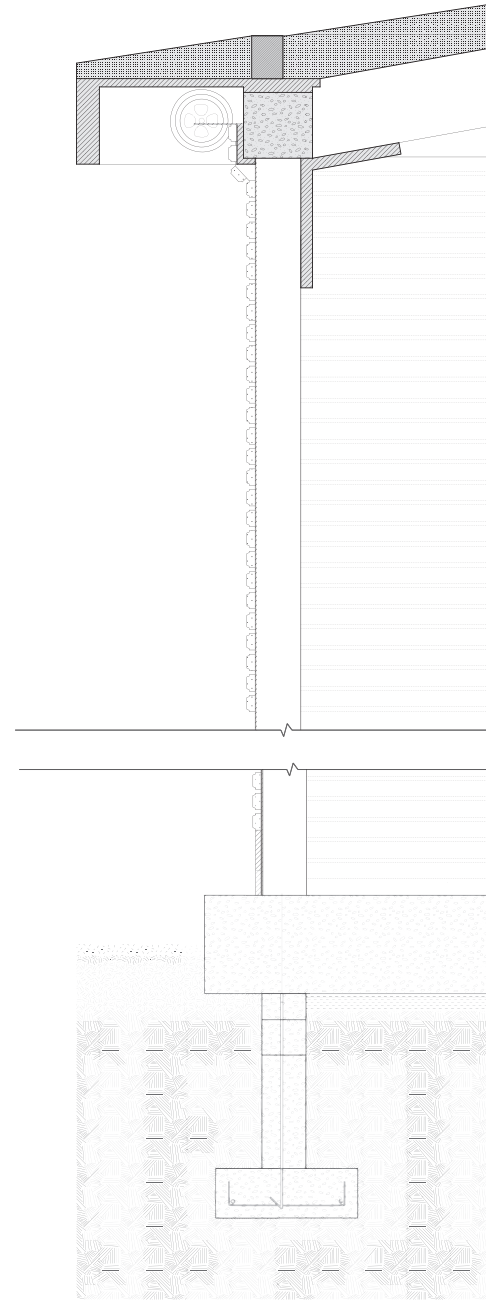
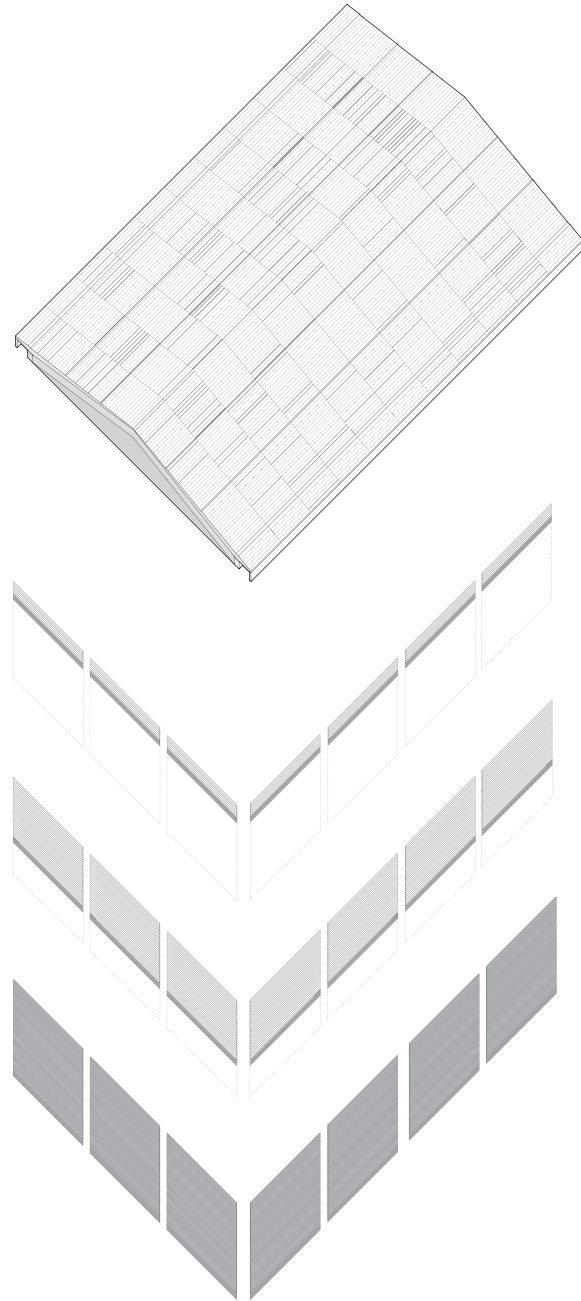
*In turn, this creates a network of tangible resources and gives spatial agency to the urban phenomenon of waste collection.*

### Intervention at the Barrio Scale



Shelter Section

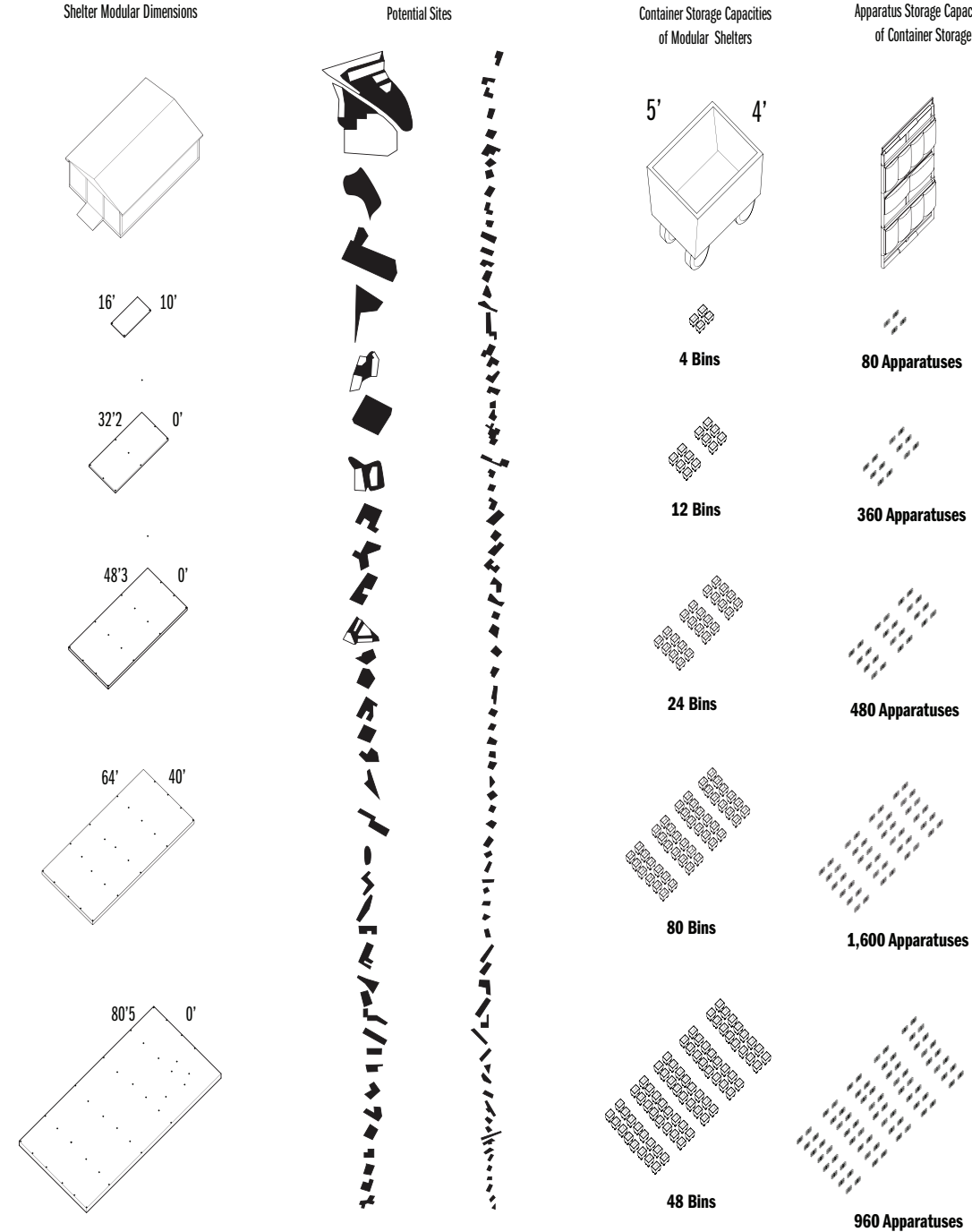
## Intervention at the Barrio Scale



Shelter Facade, Shelter Detail

*The intervention includes a neighborhood distribution center that has a simple construction; the main feature is a rolling shed like opening and closing system designed to satisfy different programmatic needs. This feature provides a familiar indoor/outdoor residential atmosphere often found in Latin American residential barrios.*

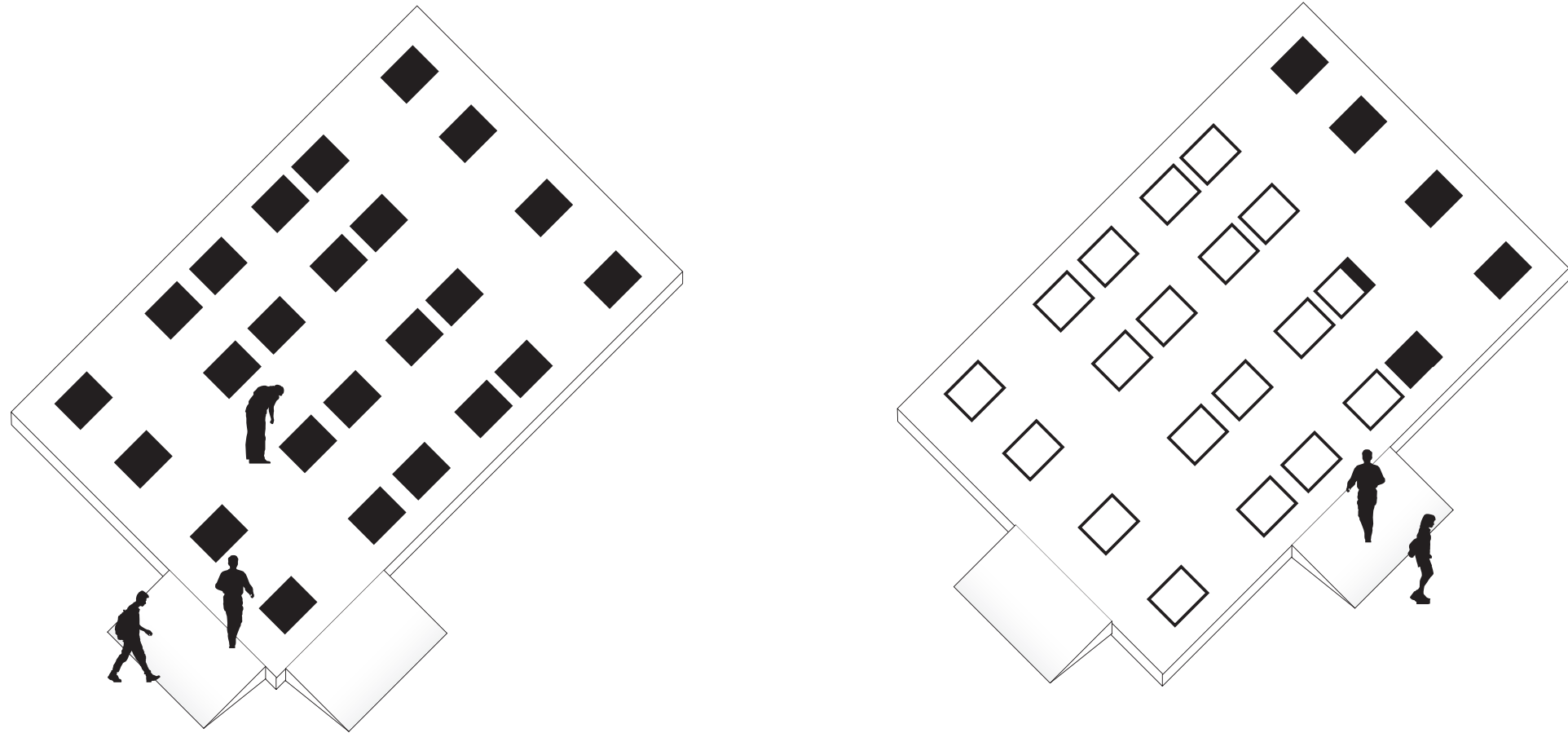
## Intervention at the Barrio Scale



*The storage space is designed in modular proportions in order to house large amounts of apparatuses and fill unused green spaces and empty lots within the residential Campo Santo zone.*



### Intervention at the Barrio Scale



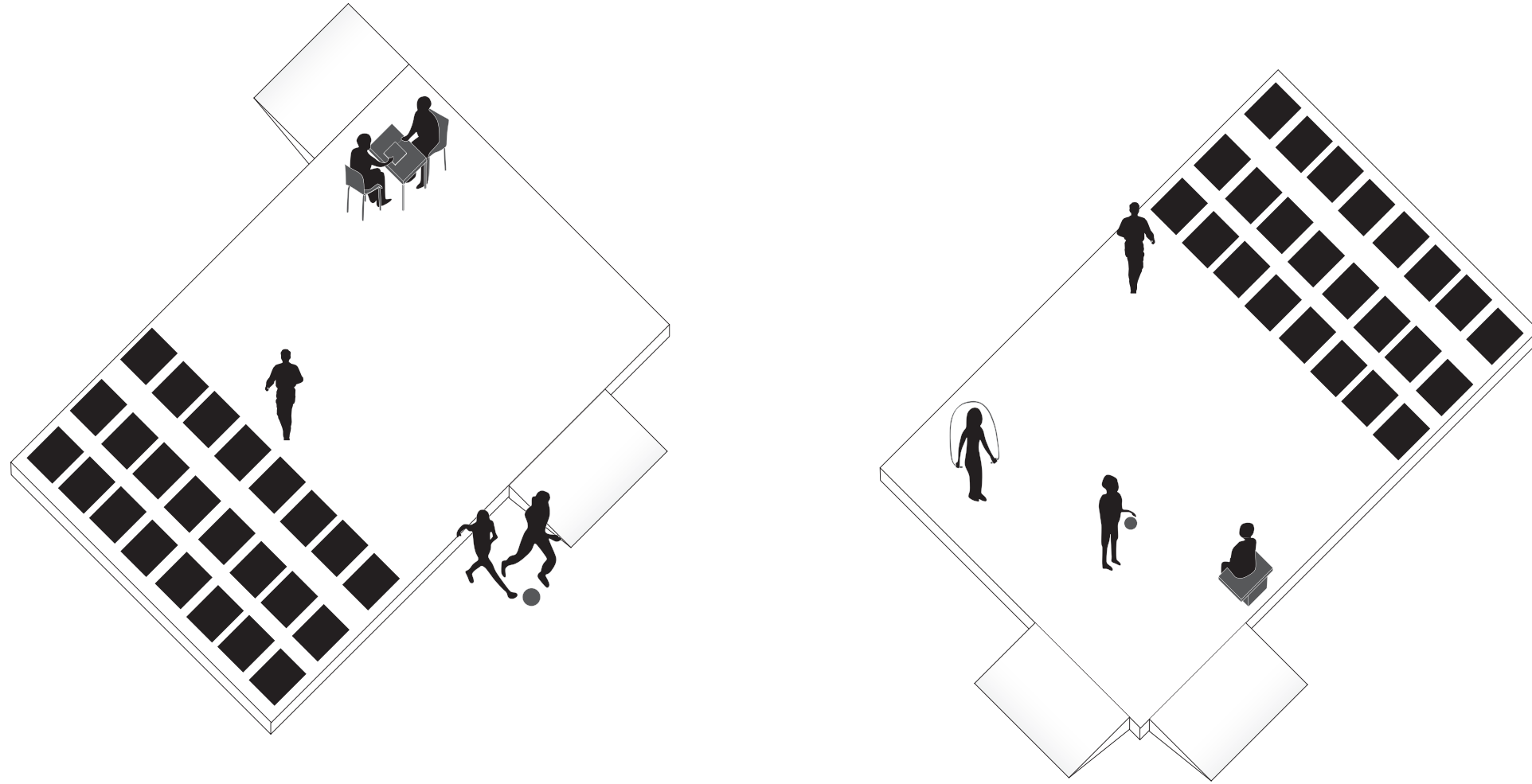
*The peak hours of distribution and return are assembled to satisfy large crowds designed around the act of supplying.*

### Intervention at the Barrio Scale



Shelter at Peak Hours

## Intervention at the Barrio Scale



*During non-peak hours, the storage system can be rearranged in order to serve as a community space that blends in with the neighborhood building vernacular.*

## Intervention at the Barrio Scale



*The street within the Medellín context is a definite social magnet within the city and the notion of dwelling within the street is an element of the city that transcends both the formal and informal zones.*

**Shelter at Non Peak Hours**

## Intervention at the City Scale

## Intervention at the City Scale



*These are calculated approximate collection values based on storage sizes and waste sizes.*



### Intervention at the City Scale



**Daily Total without Intervention: 32,789.375 Pesos**



**Daily Total with Intervention: 95,157.500 Pesos**

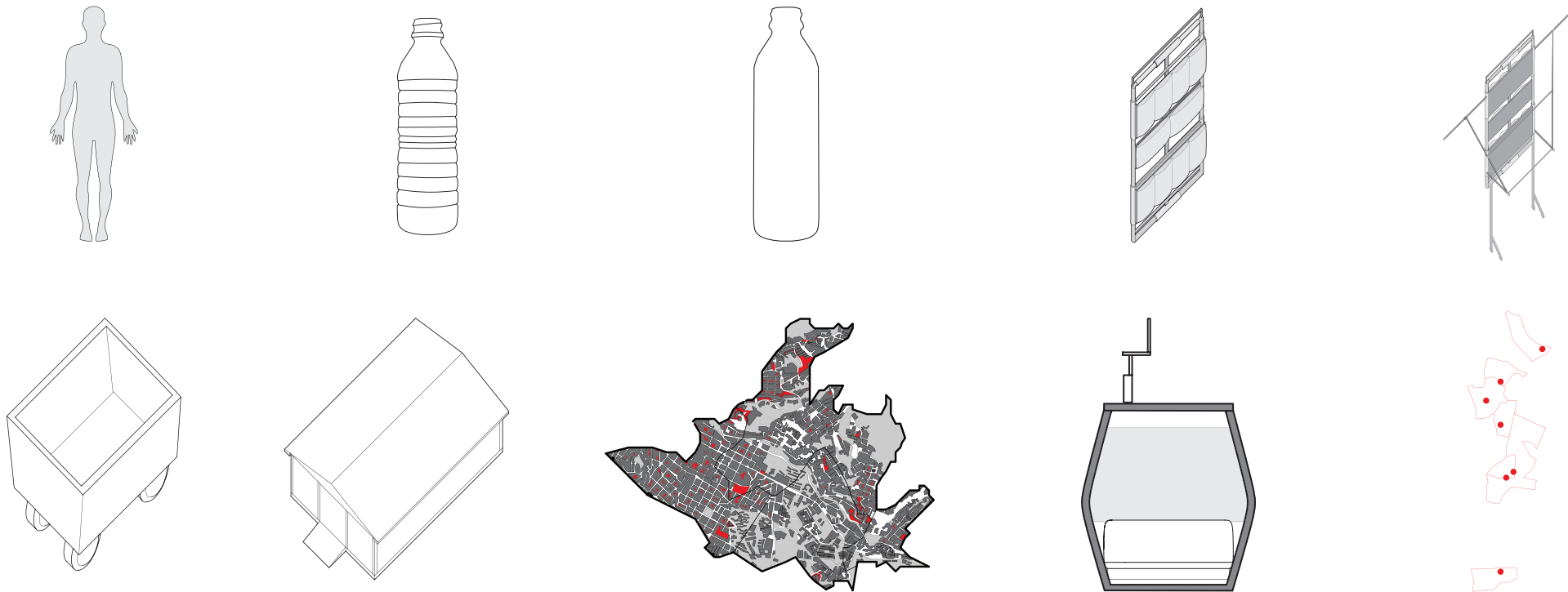
### Intervention at the City Scale



*This proposal for public programming via physical intervention is a viable option within Medellin. The city's narrative is part of an architectural and urban renewal consisting of infrastructure and public works that have significantly transformed the city's image and social climate.*

*Ultimately, the apparatus allows for optimal collection with higher value than the methods seen previously. In addition to this high value, the comfort and safety level also increases*

## Intervention at the City Scale



Subject, Existing Elements, Object Intervention, Barrio Intervention, Existing Urban Infrastructure

## Intervention at the City Scale

*Based Medellín's changing physical and social narrative and the waste collection culture in the city, this project proposes interventions regarding networks of waste collection apertures have the potential to benefit the user through collection optimization as displayed within the narratives depicted.*

*By understanding the user and their capacity to circulate the city and nodes of infrastructural framework for transportation, this network will inform the existing social construction of the waste collection practice and use urban experience to make design and planning decisions.*

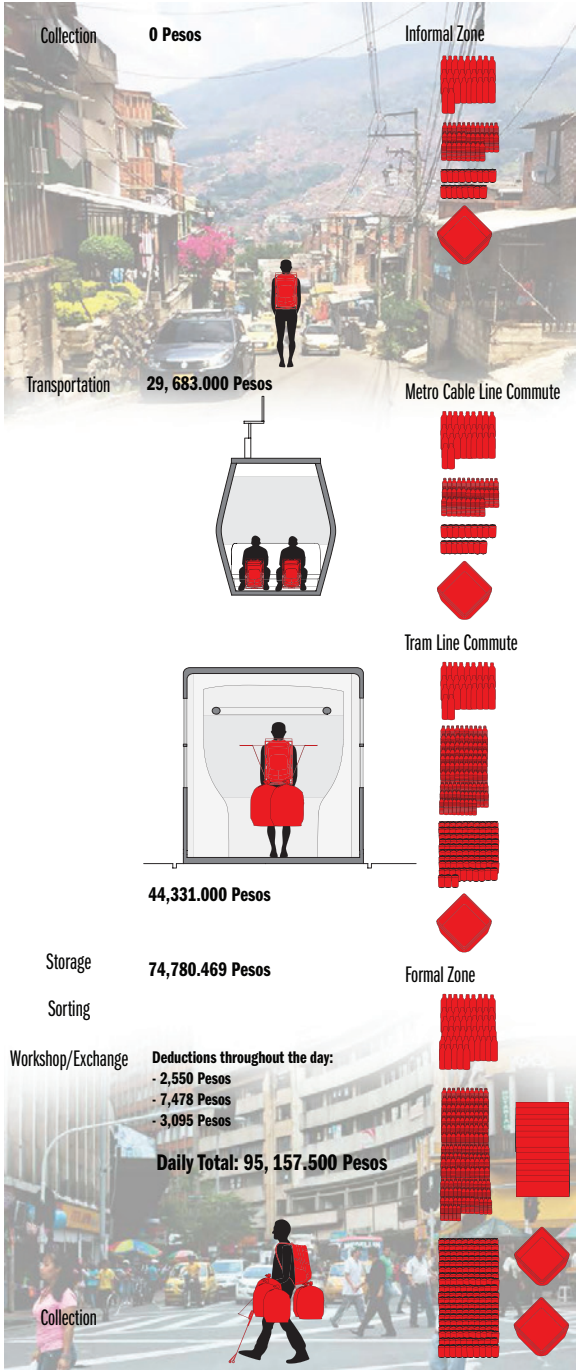
*This brings the scale from collected objects to a transportable storage, which mutates to satisfy the users' various needs.*

*These objects are then stored into shelters that have an ambiguous boundary in relation to the street.*

*The shelter then takes on the role of a site, which brings another scalar element to the urban conversation. In turn, this creates a network of tangible resources and gives spatial agency to the urban phenomenon of waste collection.*

*Ultimately, this network of objects and users will circulate the city as it was designed to function specifically within the transportation mode of the metro cable which brings the user and their objects to the city center destination.*

# Conclusion

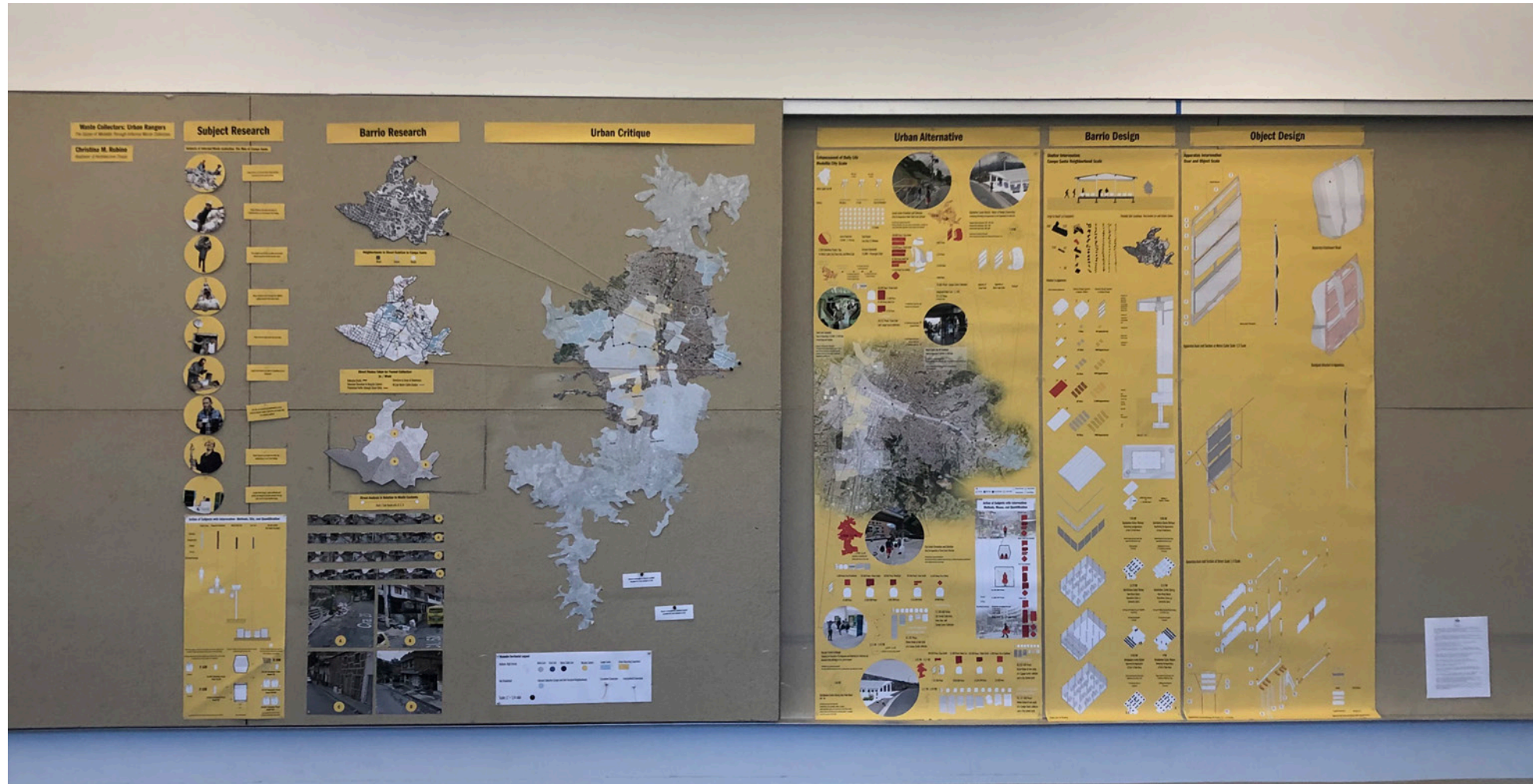


# Conclusion

The design- a public program consisting of two physical scales and one alternative experience- predicts how informal waste collectors can navigate the city with calculated spatial elements, designed to conform with the constraints of the body and urban elements specific to Medellin. The subject of informal waste collectors, object of the apparatus, informal neighborhood, city center, and their commensal relationships are compared through existing conditions and a designed alternative.

In a scalar method, the weight of the intervention shifts from a user to city and the effects between these bisect and are traced on the layout seen on the wall. Critiquing Medellin through the scope of an informal waste collector allows for an improved alternative to current collection methods and an improved user experience.





Final Pin Up for Review



Final Pin Up for Review



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