

**Making a Living: A Framework for Community-Based Waste  
Management in Jamaica**

by

Kristina Bookall

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## **Abstract**

Jamaica has a history of resistance from tyrannical systems that no longer serve the vulnerable and oppressed. The uneven geographical development in Jamaica, influenced by Colonialism, and promulgated by Industrialization and rapid urbanization, has contributed to the expansion of slums, creating an outcast proletariat. This thesis investigates how Riverton City, an informal settlement overshadowed by the municipal city dump, can become a contemporary prototype for self-sufficiency in vulnerable communities by using strategies from our past and through Architectural interventions that support communal work. The principles of this thesis are based in the Marxist theory of base and superstructure. The base is a co-op system that activates the informal waste management in the community and is drawn from Jamaica's Maroon culture of self-sufficiency. The superstructure is Architecture and the work that it facilitates.

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The people of Jamaica.

### Disclaimer

Slavery is a sensitive subject.

This Thesis discusses Slavery as it manifested in Jamaica. The Author's intent is not to negate the experiences of persons whom descended from the Slavocracy, nor from descendants of the Enslaved, but to relate the events during the Transatlantic Slave Trade to the scope of this thesis.

The Author holds the Enslaved in extremely high regard, and they are addressed as such to remind the reader that slave is not an identifier, but a condition of unfortunate circumstance.

## Chapter 1: Introduction

Jamaica, like much of the world, operates under a Mode of Production based on wage-labour and private ownership. Karl Marx classifies this system as the *Capitalist Mode of Production* (Marx 1979), which thrives on laborers' alienation from it, and is dependent on a landscape that can be adapted for it.

Jamaica's history is steeped in resistance from oppressive economic systems such as the Plantocracy, that do not serve the vulnerable. *Maroons* self-extricated from the *Capitalist Enslaved Mode of Production* (or the *CEMP*) because it inhibited their autonomy and culture. Maroons were the Enslaved runaways who settled in harsh landscapes to evade slavery. Archaeological studies show that settlements most isolated from the CEMP had fewer artefacts, indicating a circular economy integral to their hinterland communities (Sayers 2014).

The CEMP thrived on the labour and alienation of the Enslaved, and was a system that consumed and discarded their bodies as the desire for profit increased. Anthropological studies demonstrate the ingenuity of the Enslaved in their resistance against an oppressive capitalist system on lands rejected by the system (Sayers 2014).

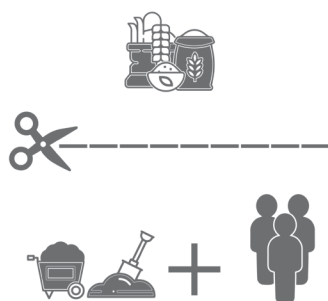


Diagram of Marx's alienation in labour - workers have little to no control and benefits of their labour (icons from The Noun Project n.d.).

Riverton City is the subject of research for this thesis. The community is favourably located near a municipal dump, a wastewater treatment facility, an industrial park, a rail line and a port, all of which can support a waste-to-energy system that can foster greater self-sufficiency. Despite the opportunities surrounding the community, residents currently live in deplorable conditions with little access to services.



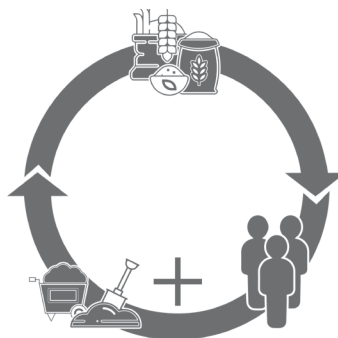


Diagram of Circular Economy - workers benefit from labour (icons from The Noun Project n.d.).

Residents can use the dump to provide jobs and steady income through community-owned organized waste management and power generation. This can be achieved through communal work, and as a result of said work, the land can be rehabilitated, wildlife can return to the area and the cultural perception of the community can improve. Riverton City can then serve as a prototype for self-sufficiency through waste management and communal work.

This project is based on a Marxist approach to significant change. First, a base structure is created through a Co-op to control the labour and its mode of production. Then the superstructure, a community-based waste management system, can contribute to changing the perception of the community and the adjoining landfill as a place of waste and a 'no-man's land', to a place of social and environmental stewardship.

Based on this theory, I propose a waste management system, organized through incremental Architectural interventions, that is entirely owned and operated by the residents of Riverton City as a Cooperative.

## **Chapter 2: Labour, Space, Nature, Waste**

Jamaica's history of exploitative labour and the racial divisions it has created, has resulted in the uneven geographical development of the Island, which created squatter communities in urban areas. Culturally, squatters are perceived as disposable in a capitalist system, in environmental pollution and social pathology. The low status of marginalized squatter communities is reinforced through neglect by government agencies that provide sanitation services. Members of these communities see opportunity for subsistence in their filthy surroundings through individual informal waste management efforts. There is opportunity to formalize and institutionalize existing individual informal waste management activities in order to benefit the community as a whole.

### **Labour In Jamaica**

The history of commodified labour in Jamaica began in the 1500s with the Spanish occupation of the Island. After the Island's 'discovery', the indigenous peoples, the *Tainos*, were enslaved by the Spanish and were effectively eradicated due to strenuous labour and exposure to foreign diseases. The English gained power of the Island in 1655 and developed lucrative sugarcane plantations that required a more sustainable source of labour. Displaced Africans forcibly transplanted in the New World provided the sustainable labour required to support the plantation system. This mode of production benefitted a few individuals and companies (typically established outside of the Island), and significantly altered the Island's landscape to support it.

The Enslaved were partially emancipated in 1834. Planter and slaveholder concerns about the continuation of labour on their estates spurned the establishment of an apprenticeship transitional period that remained in effect until 1838. The ruling class believed that apprenticeship would be 'a period of transition during which labourers would be guided along the paths of social and economic improvement' (Hall 1953, 142). The *Abolition Act* in Jamaica required that apprentices give 40 1/2 hours of free labour to their owners weekly, however, the newly Liberated would rather buy their freedom and some land, and labour for themselves.

Full Emancipation was granted in 1838. Social injustice and widespread poverty increased in the decades that followed, culminating in the Morant Bay Rebellion in 1865, when Freedmen and women protested the ever-worsening living conditions, high taxes and the lack of social and medical infrastructure following multiple epidemics among those of African descent.

The 1920s and 1930s brought more civil and labour unrest. The growth of Black nationalist movements revalorized Blackness and resulted in the attainment of universal suffrage and then Independence from British rule in 1962 (Jaffe 2016, 29).

By the 1940s, urban areas expanded rapidly with the immigration of the rural poor. These new migrants were impoverished and living in tenement yards, rife with high unemployment, social and political unrest, miserable living conditions, violent crime and overcrowding.

Overcrowded ghettos became associated with environmental pollution and social pathology. Despite the structural contributors to the phenomenon of squatting in marginal

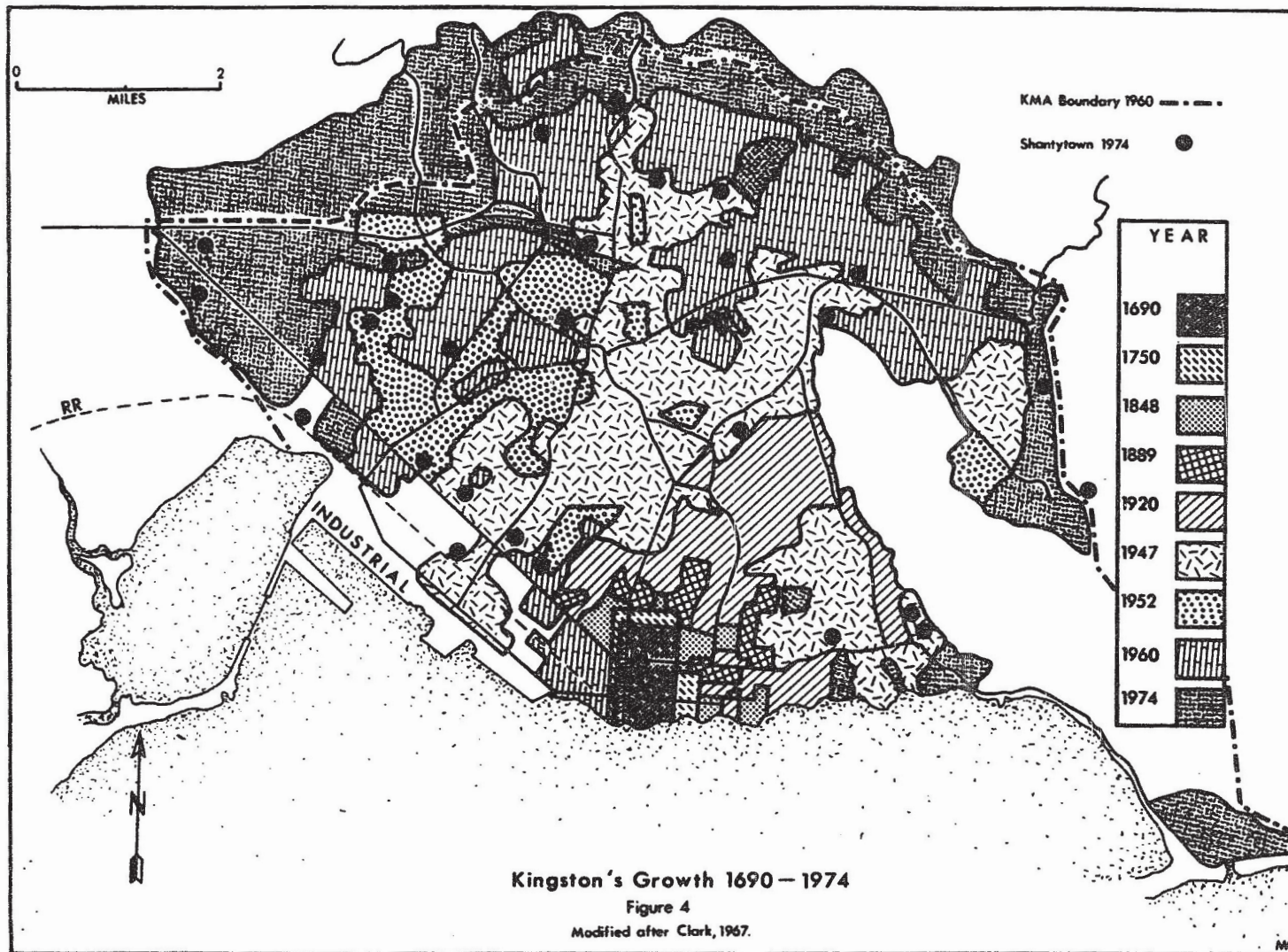


Diagram depicting the growth of the nation's capital, Kingston, from 1690 to 1974 (Hanson 1975, 42)

urban areas in Jamaica, the cultural narrative is that of blame and disgust towards squatters whom are symbolically and spatially relegated to filthy spaces. The visual pollution of the self-built ramshackle housing acts as a symbolic marker that threatens established urban orders, and is compounded by uncollected garbage, open sewers and nearby polluting industry. According to Dutch anthropologist Rivke Jaffe in her book *Concrete Jungles: Urban Pollution and the Politics of Difference in the Caribbean*, this 'symbolic pollution' that also becomes 'materialized and institutionalized through the actions of government agencies, such as when they consciously and unconsciously view these neighbourhoods as housing the undeserving poor and concentrate on providing services and infrastructure to populations seen as more deserving', makes tangible the cultural perception that squatters contribute to the pollution within which they must live (Jaffe 2016, 100).

### **Post-emancipation Space**

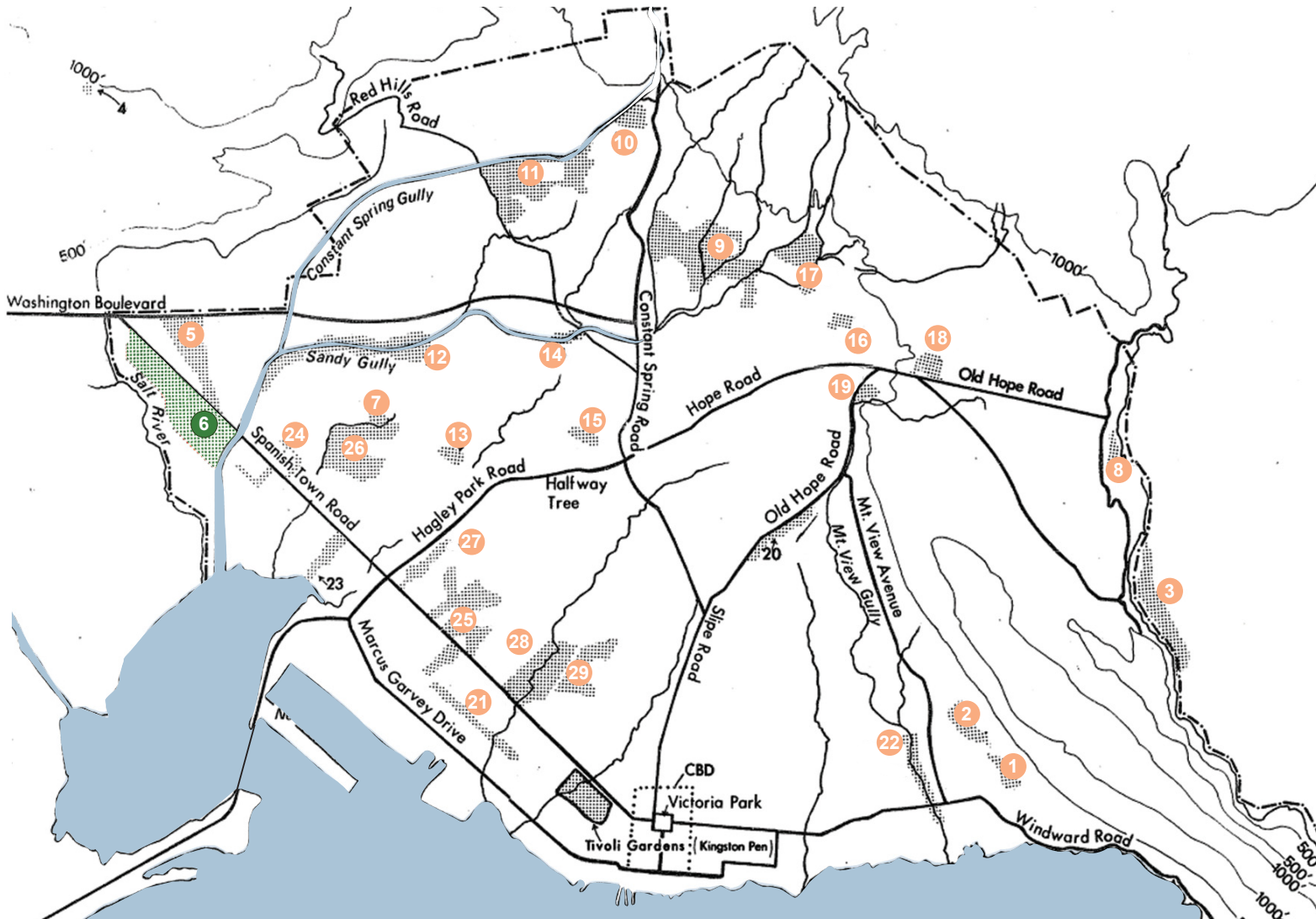
'Capitalism is a continuously changing set of complex social relationships that periodically experience periods of crisis and restructuring' (Delle 1998, 2). This restructuring often includes the shifting of the spaces that non-elites occupy and so 'alternative spaces will be defined, proactively and in direct resistance to the spatial definitions imposed by the elites (Delle 1998, 2), as a result of the 'societal division of black, coloured and whites' established during slavery (Hanson 1975, 31). These societal divisions and roles 'continued to be visible and viable' even after Emancipation in 1838 (Hanson 1975, 31).

Post-emancipation Jamaica saw the redefinition of class relationships, as many of the formerly Enslaved sought to be

materially independent from the economy controlled by the planters, causing tension between the typically White elite and the typically Afro-Jamaican non-elite. The ruling elite, now faced with a severe labor shortage after Emancipation developed either a 'push' or 'pull' strategy to 'stem the flow of labor from the plantations' (Delle et al. 2011, 246). The 'push' strategy involved charging high rents for houses in the plantation's slave village that up until Emancipation had been considered 'theirs' along with the adjoining provision gardens. This hostile move 'pushed' the formerly Enslaved out of plantations into less productive lands or urban slums across the Island in order to avoid returning to work on the plantation to cover the high cost to remain in 'their' homes. The 'pull' strategy involved charging low rents for houses in a plantation's slave village, acknowledging the desire for autonomy, and done in an attempt to lure the formerly Enslaved away from the Island's 'extensive mountains and hills, with many marginal or failing estates' upon which the formerly Enslaved could 'eke out a living squatting on abandoned or unoccupied land' (Delle, Hauser and Armstrong 2011, 246).

The uneven geographic development of Jamaica determined post-emancipation settlement patterns of the elite and the formerly Enslaved non-elite, contributing to the development of slums. Professor in the Department of Geography and Geology at the University of the West Indies, Jamaica, Elizabeth Thomas-Hope et al. outline these patterns in their report on *The Urban Food System of Kingston, Jamaica*:

...although some former slaves were in the urban centres, most were on sugar plantations and remained in rural areas, settling in villages in the forested hills. Migratory streams towards urban centres gradually increased in the late 1800s. By the early 1930s, there was embryonic evidence of informal settlements and the type of deprivation that would later



Map of informal settlements in Kingston, Jamaica. Riverton City (study site) highlighted in green. (Hanson, G. 1975). Note that settlements are located along the gully network in the city - land seen as unsafe and undesirable.

characterize settlements in several communities of Kingston... Higher-income residents originally settled within and on the outskirts of the urban core but later moved further north, as poor rural migrants occupied vacant lots outside the CBD (Central Business District)... (Thomas-Hope et al. 2017, 1)

People seeking opportunities in the city were largely from poor households and settled on marginal land on the outskirts of the CBD. These areas became the main sites of extensive squatter settlements characterized by urban blight and severe deprivation. (Thomas-Hope et al. 2017, 4)

The migration of wealthier Jamaicans to the cool, green hills overlooking Kingston has intimated that the poor should occupy the hot and dirty low-lying plains on the outskirts of the city. Jaffe also comments on the differences in spatial occupation in the post-slavery Caribbean :

“Nature” is produced through human physical and intellectual labour, not only materially, but socially and discursively as well. Nature is made and remade, produced and transformed, within a system of capitalism. The mechanisms of capitalism are complicit in the production of uneven geographical development through the production of socially unjust natures and, more broadly, the skewed distribution of resources (Smith 1990; Harvey 1996). In the non-urban Caribbean this has meant, historically and through the present, the politics of plantation agriculture and nature-based tourism have gone to local and foreign elites, leaving only marginal land for farming and residence by the Afro-Caribbean lower classes. Uneven development is equally evident in the urban areas, where the price of land and housing in cooler, greener neighbourhoods places them out of reach of the urban poor, who are consigned to hotter, more crowded, and more polluted sections. (Jaffe 2016, 13)

Capitalist systems in the post-slavery Caribbean dictates which economic group occupies what space. Occupation correlates to the cultural predilection to literally elevate one socioeconomic group above another. This cultural bias extends to the distribution of resources amongst the groups, reinforcing the existing perceptions of both. The disadvantaged squatter communities are culturally seen as dirty and dangerous, and meaningful contact with the meta-community is limited.



## **Uptown | Downtown Environmentalism**

The socio-geographical disparity between the classes also has a dividing effect on environmentalism in Jamaica. 'Green' environmentalism, charged by capitalist motivations, receives more funding and technical expertise in order to maintain the pristine quality of the Island, preserving its marketability, whereas less productive lands occupied by poorer, typically Afro-Jamaicans are omitted from 'green' environmentalism. To this, Jaffe notes:

The focus on green issues of diminishing biodiversity, deforestation, and degradation of the marine environment reflects the importance of tourism to governments and business elites. A range of stakeholders have a vested interest in the image of the Caribbean as a natural paradise. (Jaffe 2016, 115)

Residents of privileged urban areas physically lack exposure to pollution, which limits their engagement with 'brown' issues such as pollution as a result of nearby industry (Jaffe 2016, 121). This phenomenon is what Jaffe characterizes as *Uptown* Environmentalism. 'Brown' or *Downtown* environmentalism is focused primarily on pollution and waste management through grassroots mitigation schemes, and so, garners far less funding, research and support, despite the immediate dangers that pollution poses to the poor, and ultimately, to everyone.

## **The Human-as-Waste, and Waste**

Rapid urbanization has contributed to the expansion of urban slums and shantytowns, which indicates a permanent surplus in the labouring population that serves as a reserve labour force to be expelled and reabsorbed according to fluctuations in the economy (Yates 2011, 1679). Cultural Studies and Humanities scholar, Michelle Yates, discusses the plight of surplus populations in her article entitled

*The Human-As-Waste, the Labour Theory of Value and Disposability in Contemporary Capitalism:*

Without access to employment and wages, these surplus populations are left without the means to access subsistence, and many end up trying to survive through the black market or trash pick. The formation and growth of this kind of permanent surplus population can also be theorized as a kind of disposability and throwing away within capitalism. Once relegated as permanent surplus, meaning that capital no longer needs these populations as labor, these populations are little more than the human-as-waste, excreted from the capitalist system. (Yates 2011, 1680)

Yates draws a clear connection between those humans whom have been considered unproductive 'waste' to be expelled from the capitalist system, and their reliance on actual waste produced as a result of the system through informal waste management activities such as trash picking.

She goes on to say that waste exists as a by-product of capitalism because :

... a consumer society dominated by an ideological and material investment in disposability, throwing away, and consumption becomes necessary for continued capital accumulation. Furthermore, once the value of a commodity is realized through its purchase, capital no longer cares what happens to that item. It is indifferent to the spatiality of that item, or its effect on the physical environment. (Yates 2011, 1691)

The symbiosis of the human-as-waste and waste in disadvantaged squatter communities offer an opportunity to organize individual informal waste management efforts so that they benefit the community as a whole. Cultural Anthropologist and Professor, Peter, J. Nas, along with Jaffe, outlines the strategy by which to do so:

Developing countries often have a surplus of (cheap) labor, but are short of capital; integration of informal technology instead of adopting unsuitable and expensive foreign technology can be a step towards more cost-effective and sustainable waste management. (Nas and Jaffe 2004, 345)

Professor in Civil and Environmental Engineering, David C. Wilson et al. describe a methodology to organize and legitimize an informal waste management system by integrating the knowledge and experience of the participants from these marginalized communities:

The general characteristics of informal recycling are reviewed, highlighting both positive and negative aspects. Despite the health and social problems associated with informal recycling, it provides significant economic benefits that need to be retained. Experience shows that it can be highly counterproductive to establish new formal waste recycling systems without taking into account informal systems that already exist. The preferred option is to integrate the informal sector into waste management planning, building on their practices and experience, while working to improve efficiency and the living and working conditions of those involved. (Wilson, Velis and Cheeseman 2006)

This methodology however, does not indicate the autonomy that a marginalized community could attain through the organization of an existing waste management system, but instead insinuates that power be given to external entities to institutionalize and monetize existing waste management activities.

This thesis project proposes that a marginalized community takes full ownership of the institutionalization and monetization of existing individual waste management efforts through cooperative enterprise.

## **Chapter 3: The Maroon Prototype for Self-Sufficiency**

Marginalized squatter communities comprising a surplus 'disposable' population that finds subsistence in the waste that is a by-product of a capitalist system, may need to be reminded of the resourcefulness and resilience of our ancestors, the Maroons, whom sought autonomy from a Capitalist Enslaved Mode of Production (CEMP) despite the often mortal consequences of so doing. The Maroons abandoned the cultural, social and economic attachments they had grown accustomed to while enslaved, in order to self-isolate and create communities in the harsh lands beyond the reach of the CEMP. Their communal labour and their ability to discern value from the waste created in their hinterland communities were essential to their survival. There are parallels between the forced exclusion from the current Capitalist Mode of Production in squatter communities and the voluntary self-isolation of the Maroons from the Capitalist Enslaved Mode of Production, as both have used the materials available in their surroundings for subsistence. This project seeks to reintroduce the communal labour required for resiliency to marginalized squatter communities.

### **Alienation**

#### **The Capitalist Mode of Production**

Marx defines a Mode of Production as a system that comprises the interrelationship between the forces of production (the technology, buildings, tools, knowledge and labour required for producing commodities) and the relations of production (the social structures and rules that

define human cooperation and relationships). Changes in either can reconfigure how people live and relate to each other.

Anthropologist James Delle characterizes the development of Modes of Production as:

... a complex, historically contingent process through which humans organize labour and social relations, and develop tools and technologies, to transform what exists in nature that fulfill human needs. (Delle, 2014b)

The Capitalist Mode of Production is characterized by private ownership of the *means of production* (the non-human elements of the forces of production) and extraction of *surplus value* (the difference between the amount gained through sale of a commodity and the amount required to produce a commodity) in order to accrue wealth (Sayers 2014, 29).

### **The Landscape**

The CMP is a process that occurs in ground space (Sayers 2014, 64). The flow of capital determines that some terrains are easier to occupy than others and the ability to benefit from varying landscapes depends on the technology, organizational forms, divisions of labour, wants, needs, and cultural predilections surrounding that landscape (Sayers 2014, 62).

The plantation was an integral element of the means of production for the CEMP. Delle defines the plantation as:

A privately owned, capitalized operation, often using enslaved or other forms of coerced labor to maximize the profits realized by its proprietor. (Delle 2014b, 4)

The CEMP required landscape that was productive and could be economically controlled. Those lands impervious to control, were regarded as waste.

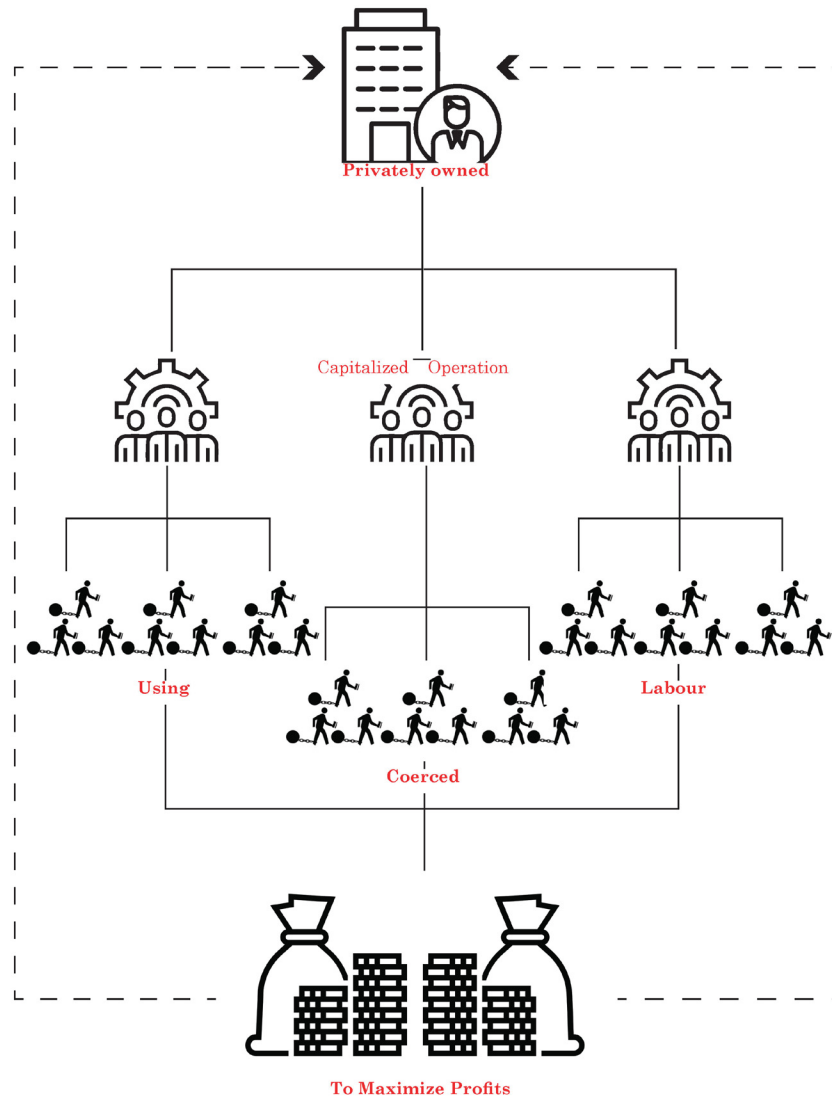


Diagram of James Delle's definition of a plantation, from his publication *Landscapes of Power in the Colonial Caribbean*. Contemporary icons have been used to illustrate that the plantation system may have not been eradicated, but has instead evolved and expanded (icons from The Noun Project n.d.)

## The People



Coerced labourer (icon from The Noun Project n.d.)

The Transatlantic Slave Trade displaced a people from non-capitalist modes of production into a capitalist society to labour tirelessly with little benefit from their commodified labour. They brought with them the knowledge of a division of labour suited to community organization determined by alternate means of production. The CEMP was an affront to

the culture of the Enslaved, their autonomy and their sense of community.

The Enslaved were unwilling participants in the CEMP, which thrived on their alienation from it and consumed and discarded their bodies as needed for profit. Those Enslaved whom could not provide adequate labour, were seen as valueless, were labelled invalid, and considered as waste (Delle 2014a, 62).

### **Resistance**

Unlike squatter communities similar to Riverton City that have been excluded from the current capitalist system, Maroons voluntarily resisted the CEMP through willful exile, despite the constant threat of mortal harm from their surroundings and their captors. Maroons had to consider new systems by which to survive in order to achieve and maintain autonomy. Squatter communities like Riverton City would do well to consider new systems to achieve resilience outside the current capitalist system.

### **Exile**

Exile causes a 'rupturing of people from their original places of familiarity, kinship, community, social routines and daily labour' (Sayers 2014, 78). Africans have a strong sense of community that is tied to individual identity. Historian Sylviane Diouf illustrates the severity of exile to displaced Africans in her book *Slavery's Exiles*:

For deported Africans to have been uprooted and separated from family and community was an immense, unfathomable loss; it tore apart the very core of their self-identification as human beings, because to be human was first and foremost to be part of the social fabric. (Diouf 2014, 49)

That the Enslaved willfully exiled themselves through Marronage, after being forcibly exiled from their homeland, shows the immensity of their need for agency and autonomy from an oppressive system. On self-exile Diouf notes that '*autonomy* was at the heart of their project and *exile* the means to realize it' (Diouf 2014, 2).

Squatter communities like Riverton City have already been forcibly exiled from the current capitalist system, and so it is incumbent on residents to realize full economic autonomy from a system that has rejected them.

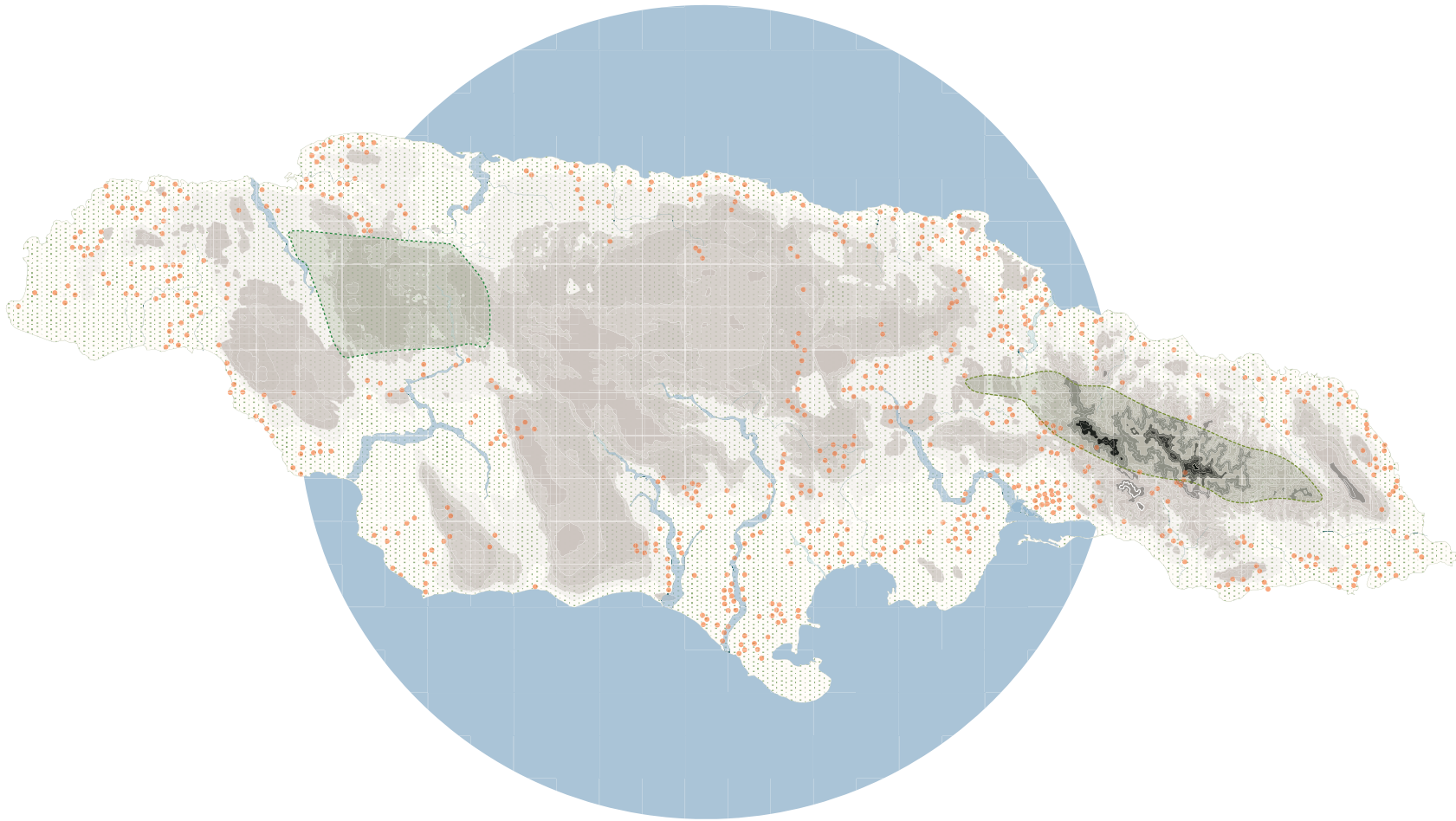
### **Settlement**

Marronage was the 'collectivity of individual acts of self-extrication from conditions of enslavement and the subsequent formation of various kinds of communities and economies' in landscapes rejected by the CEMP (Sayers 2014, 78).

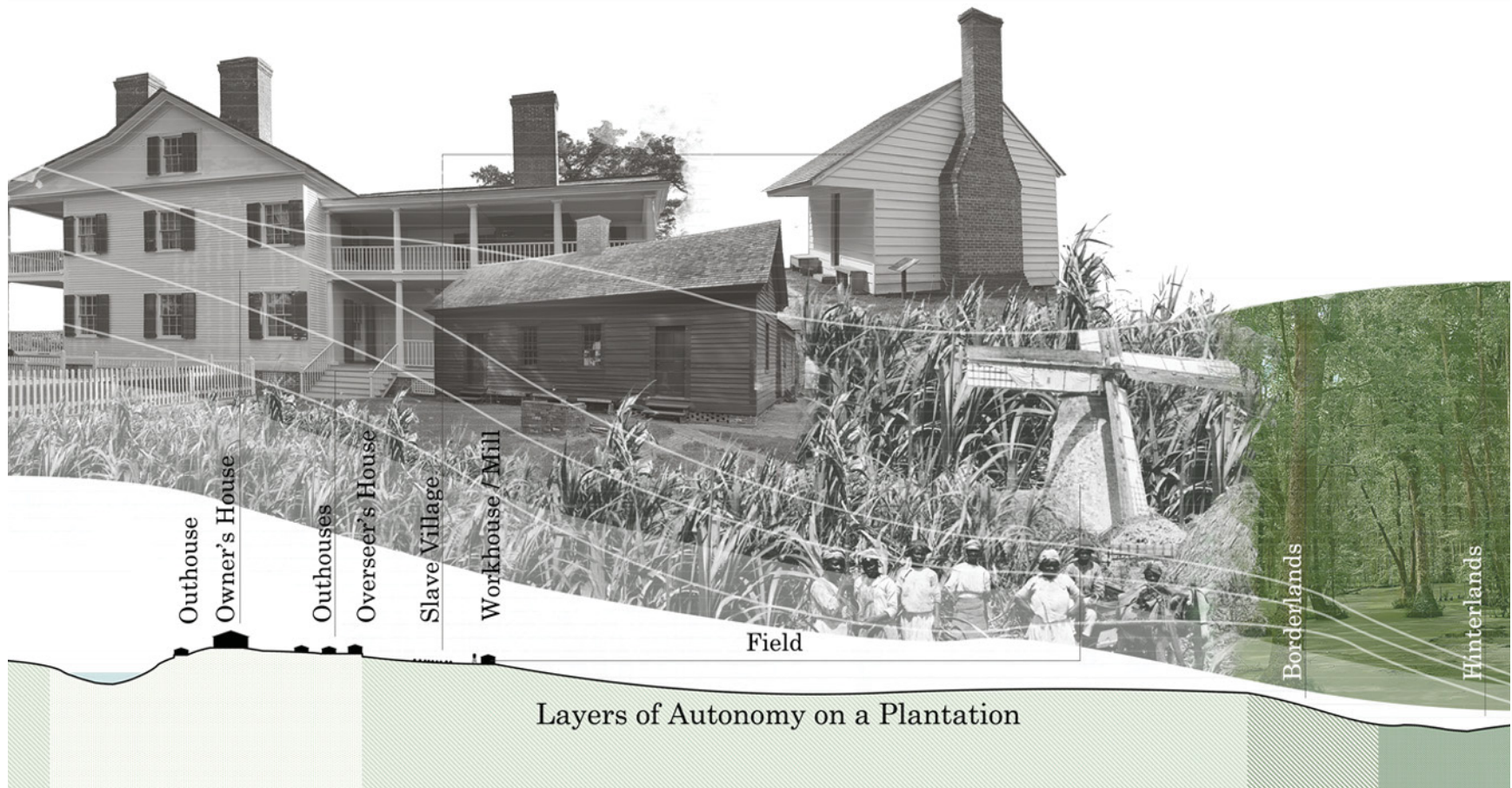
Two types of Maroons existed, characterized by their settlement patterns: *Borderland* and *Hinterland* Maroons. Borderland Maroons settled along the natural edges of lands perceived as waste, and comprised those runaways who had enslaved family members on plantations nearby. The borderlands were spaces of freedom that provided autonomy, mobility, enterprise and a sense of physical security, freedom from scrutiny and control over one's time and movement (Diouf 2016, 8).

Hinterland Maroons were typically cut off from their families and infrequently ventured outside of their isolated settlements. The hinterlands were places with topography that offered good cover, vantage points, accessibility to clean water, suitable soil to grow crops, with some accessibility to a





Map of Jamaica showing Maroon settlements (in green) in the steep mountains against plantations (in orange). The green areas also indicate the Island's more challenging terrain, creating hinterland islands of autonomy. (basemap: National Land Agency, 2014)



Section through a typical plantation, depicting the degrees of autonomy of the Enslaved. Greater autonomy was gained the further away the Enslaved were from the physical spaces the Plantocracy occupied.

plantation. Seclusion, and not distance, was the determining factor in the establishment of a hinterland settlement.

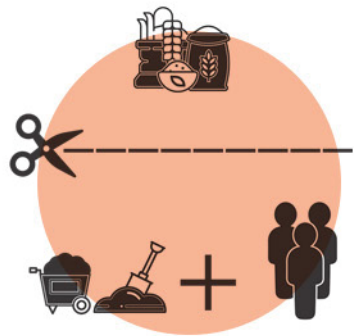
In fact, the word *Maroon* is derived from the Spanish word *cimarrón*, which means 'wild' or 'untamed', which would be a fitting description for the lands that they occupied.

### **Material Culture**

Those Enslaved whom lived in the hinterlands had a specific material culture that played a significant role in community structuring and ethos, individual identity and expression, and ideational systems (Sayers 2014, 155). Instruction, education and force were necessary for the reproduction of the knowledge of hinterland community culture. Cultural knowledge was integral to the self-sufficiency of the community. This self-sufficiency and sense of community as modelled by the Maroons, creates the base of cooperative enterprise upon which a community-based waste management system in Riverton City can be built.

The hinterland sites rarely had inorganic materials. The limited evidence of mass-produced articles that archaeologist Daniel Sayers uncovered at his dig sites in the Great Dismal Swamp in Virginia, indicates that mass-produced articles were recycled and repurposed so carefully that only shards remained. He determined that hinterland communities valued reciprocity of materials over control over access to materials (Sayers, 2014). Materials were 'circulated around the metacommunity with...each community responsible for the larger...' hinterland community network (Sayers, 2014).

Maroons built dwellings and community outhouses with materials available in the landscape within which they chose to settle. Archaeologists and Anthropologists extrapolate



Marx's Alienation in Labour :  
 we have little to no access  
 to benefits of labour we produce



Less Waste is produced the freer  
 we are from Capitalist Systems



Circular Economy : we benefit  
 from the labour we produce

Degrees of freedom from a capitalist system coincides with degrees of waste generated through capitalism (icons from The Noun Project n.d.).

that Maroon dwellings would be similar in construction to those in slave villages on plantations. Diouf theorizes on the construction of Maroon dwellings, based on archeological evidence:

First they drove posts into the ground upon which they would lay a foundation above the water, then with branches of trees skillfully and ingeniously woven together, they constructed the floor, roof and walls of their most rural habitation....they overlaid the whole with long marsh grass and the tough palmetto leaves till it was comfortable, even in the winter season. (Diouf 2014, 222)

African values around communal living indicate that Maroon communities were small and that their lives were fluid, adaptive and pragmatic. Maroons had to have a high degree of resourcefulness and organizational skills to achieve and maintain self-sufficiency in the hinterlands.

### **Networks and Economy**

Maroons formed chains of solidarity with the remaining Enslaved and the occasional White who was sympathetic to their plight. They devised clandestine methods of communication and had sinuous networks that included those whom were Enslaved that were predominantly transporters (for example coachmen and boatmen) (Diouf 2014).

Maroons established an underground economy to trade articles they grew or made to secure the items they needed. The ultimate goal of trade, regardless of the risk, was to acquire weapons with which they could defend themselves and hunt. The greatest defense, however, was self-sufficiency.

Though rejected by the current capitalist system in Jamaica, squatter communities like Riverton City cannot survive as

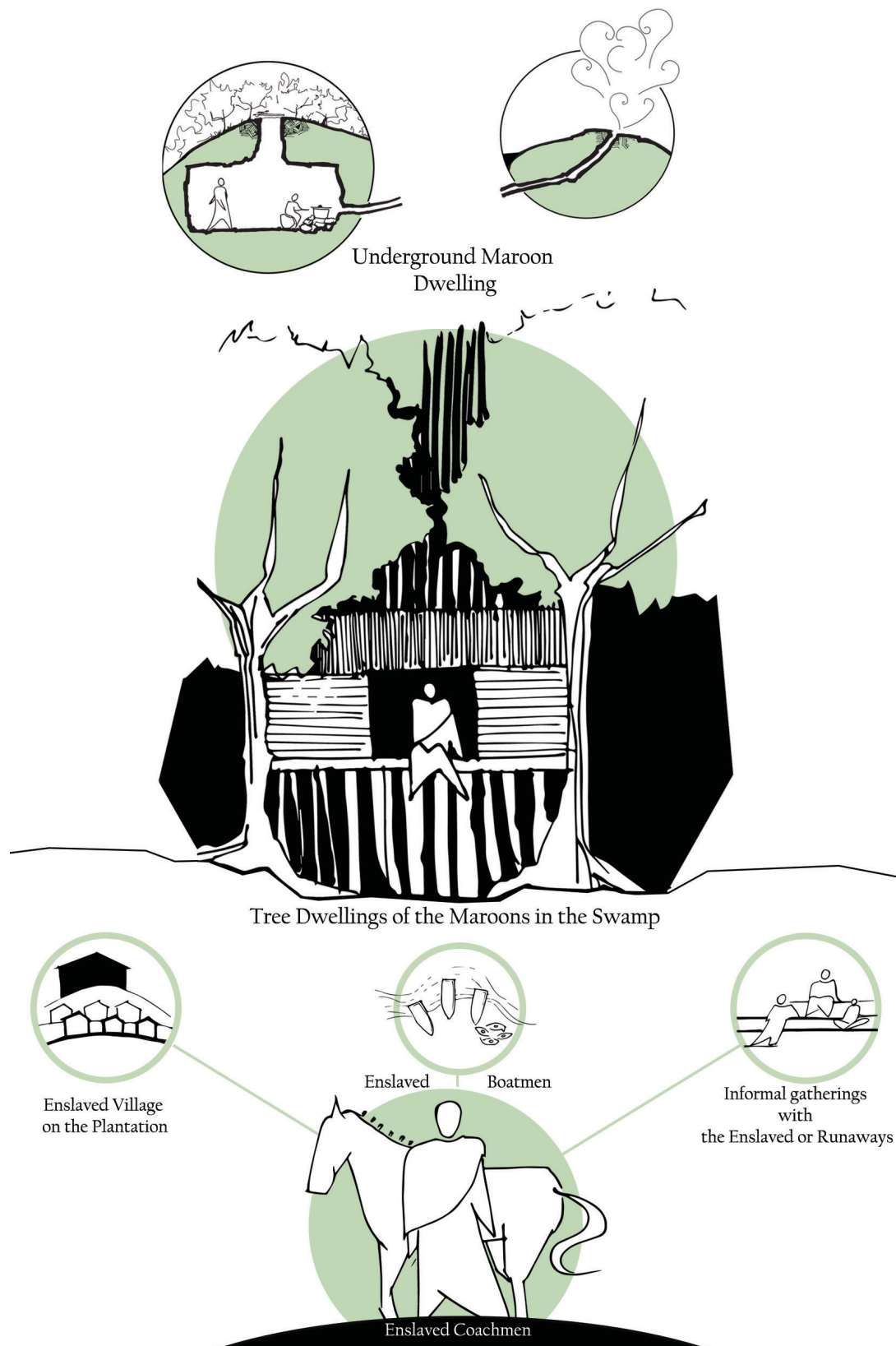


Diagram showing the networks in the enslaved African communities.

an island, and so must strategically and carefully make or maintain networks with those outside the community, in order to achieve the goal of self-sufficiency. Communities with a similar socio-economic demographic as Riverton City can eventually create an autonomous meta-community, similar to that of the Maroons in the Great Dismal Swamp in Virginia.

## Chapter 4: Context

### Riverton City Dump

The research of this thesis centres on Riverton City because the community is favourably located near a municipal dump, a wastewater treatment facility, a rail line, and industrial park and a seaport, all of which can support a system that derives value from waste, which can then foster self-sufficiency. The projected goal for the community is that they institutionalize a community-owned and operated waste management system, which could eventually evolve to include the management of a community-owned and operated energy from waste system.



From Top: Road infrastructure in Riverton City (Toth 2016). Lack of proper sewage in the community (Toth 2016). Smoke covering the dump (Mahfood 2015).

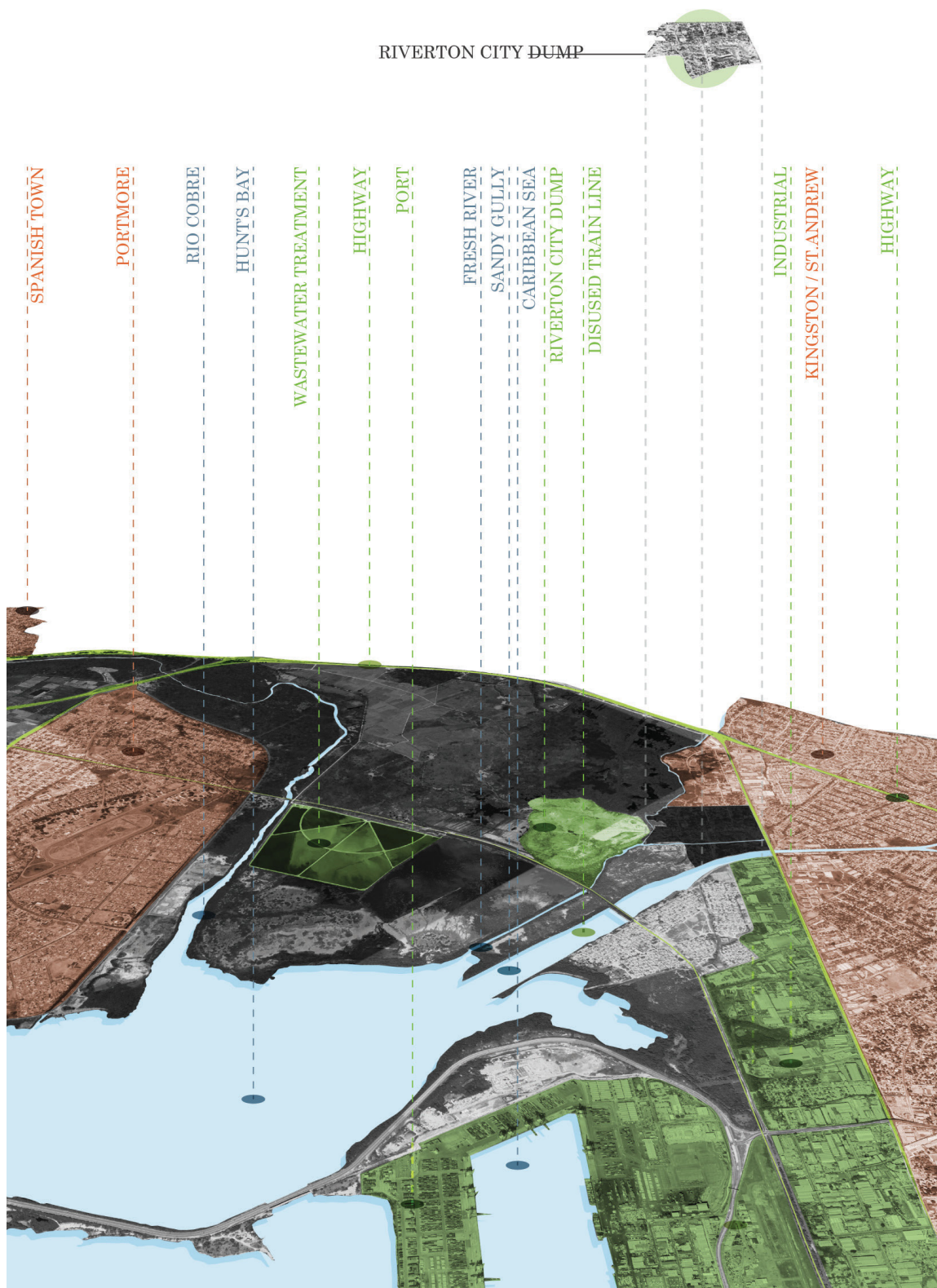
The community occupies a 255 acre site of poorly drained coastal lowland on the swampy outskirts of Kingston, and is overshadowed by the City Dump. Residents either work in low paying jobs or scavenge the dump for materials that can be resold to the industries that line the highway to Kingston.

The mismanagement of the neighbouring dump results in the constant burning of the landfill which exacerbates respiratory issues in the residents and the residents of neighbouring communities, and puts a strain on the underdeveloped health system. Every few years, the fire at the landfill grows to cover the entire dump site and the resulting noxious smoke debilitates Kingston.

### Cultural Perception

Since 1963, Riverton City has been classified as a shanty town. Squatting was encouraged by absentee ownership and vacant lands, and bolstered by the availability of some services (Hanson 1975, 79). Kingston's "Uptown" citizens





Riverton City in context (basemap Google 2019b). The community is favourably located near a municipal dump, a wastewater treatment facility, an industrial park and a port, all of which can support a system that derives value from waste.

regard informal squatter settlements as dangerous ghettos (Jaffe 2016,76).

Given the entanglement of race and class in Jamaica, being situated next to a waste disposal site, does little to establish a good perception of Riverton City. The residents' use of the dump to supplement their incomes worsens the cultural perception of the community. To this Jaffe writes:

The cultural framing of bodies as pollutants, as disposable waste - human refuse, vermin, scabs, or trash - is a common tool in the production of social hierarchies and in struggles over space and place between groups differentiated on the basis of, for instance, ethnicity, class, gender, or religion...In the Caribbean, lower-class Afro-Caribbean bodies are most likely to be classified as dirty and dangerous. (Jaffe 2016,97)

Members of the community whom are scavengers also suffer from poor self-image, despite the necessity of their labour. According to an article published by UNESCO entitled "Informal Waste Management" in their publication *Environment, Development and Sustainability*, Nas and Jaffe surmises that "Comparative research and experiences have shown that the scavengers consider themselves as a sort of

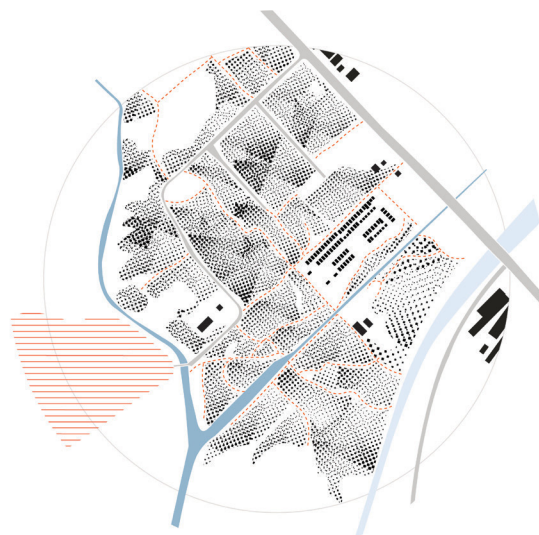


Diagram of Riverton City community features showing squatter homes and informal pathways.

social category associated with “sub-human characteristics” (Nas and Jaffe 2004, 345).

The ecological disasters currently present on lands surrounding the community, coupled with the perceived violence rampant in the community, renders it a no-go zone in the minds of the majority of Kingstonians.

### **Riverton City Dump**



Map of Jamaica showing the Island’s waste sheds. The Riverton City Dump is highlighted in green.

The Riverton City Dump receives 60 percent of the Island’s waste, receiving approximately 875,000 tonnes per annum, spread across 120 acres. The dump was to reach its capacity in 2014, yet it still is fully operational (Rodriguez 2011, 53).

Jamaica imports 91 percent of its petroleum-based energy. The Government of Jamaica (GoJ) has set a target that the Island generates 20 percent of its energy from renewable sources by 2030 (Rodriguez 2011, 54). The GoJ has also spearheaded research papers and feasibility studies on an energy from waste system but has yet to implement any cogent strategies in order to do so. A number of these research papers claim that an outside (typically foreign) investor would be the best fiscal option for an operation of this undertaking.

This thesis aims to demonstrate that incremental steps can be taken to responsibly reorganize the management of the dump without the intervention from an external investor.

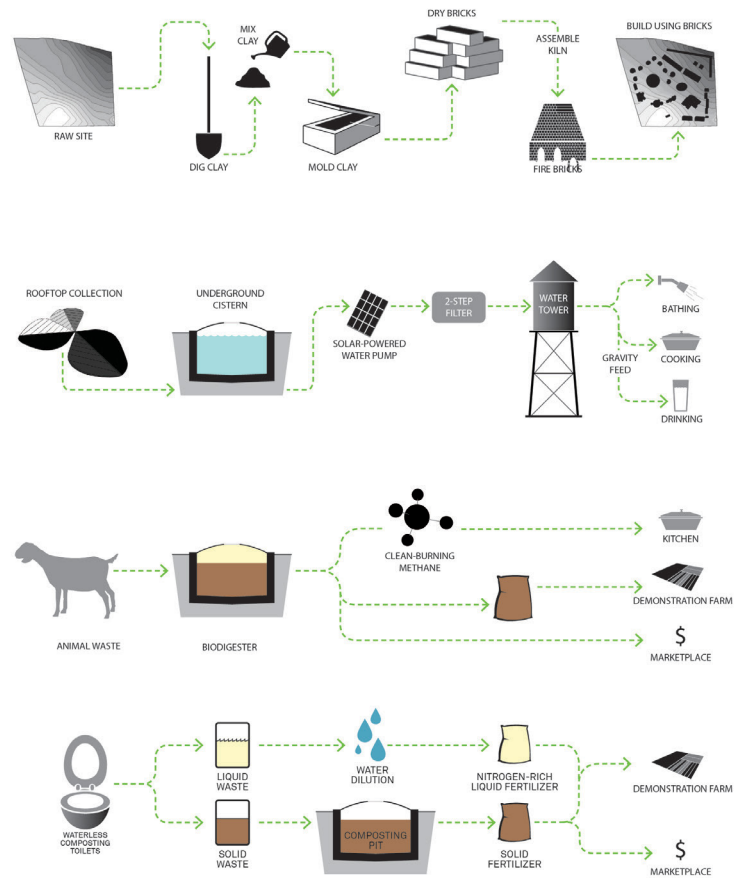
## Chapter 5: Methodology

### Case Studies

The Women's Opportunity Centre in Kayonza, Rwanda by Sharon Davis Design is a relevant example of Architecture supporting self-sufficiency. It employs a cradle-to-cradle system for waste generated, and empowers women by teaching them income-generating skills. Women are taught construction and farming techniques so that they can continue earning, and even go on to be employers. The Centre also has an accessible plaza in which the women can sell the items grown or made on site (Sharon Davis Design n.d.).



The Women's Opportunity Centre empowers women through education, farming and providing a space for the sale of items grown or made on site (Sharon Davis Design n.d., photography by Elizabeth Felicella)



Cradle-to-cradle system employed at the Women's Opportunity Centre (Sharon Davis Design n.d.).

Yasmeen Lari's Chulah Stoves in Pakistan also empowers women to be able to be self-sufficient through education. Women are taught how to construct stoves that would provide an avenue for the women to feed themselves and their families, and allow them to make items for sale with the stove. Lari utilized a network of 'stove sisters' trained by the Heritage Foundation of Pakistan, whom were rural master trainers to teach women construction methods as well as hygiene training. Students and their families pay a modest fee for this training, and building materials. The stoves also ignited the creativity of the women that used them. Some women started making tiles, clay products and textiles as

a result of access to a stove. Women have even decorated their stoves, imbuing them with a sense of identity and pride. The stoves started as a small intervention with a ripple effect that improved the quality and dignity of the lives of the women (Adnan 2018, 43).

From both case studies, it is clear that the methodology for establishing self-sufficiency through communal work in Riverton City, is to inject Architectural interventions that establishes networks, facilitates education and supports a circular economy.

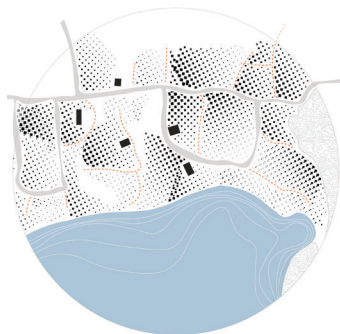
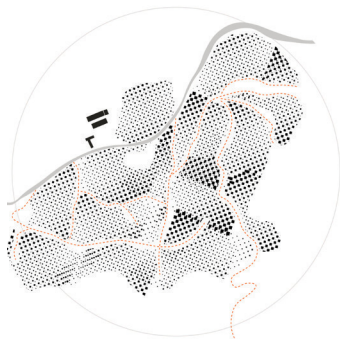


Diagram of Parrytown (Top) and Old Harbour Bay's community features, showing squatter homes and informal pathways.

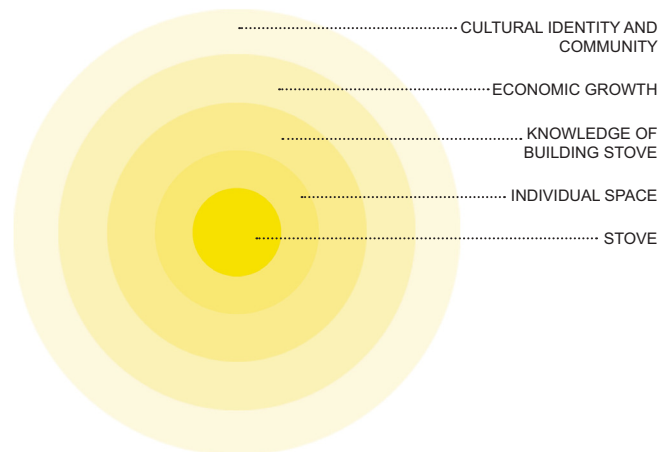
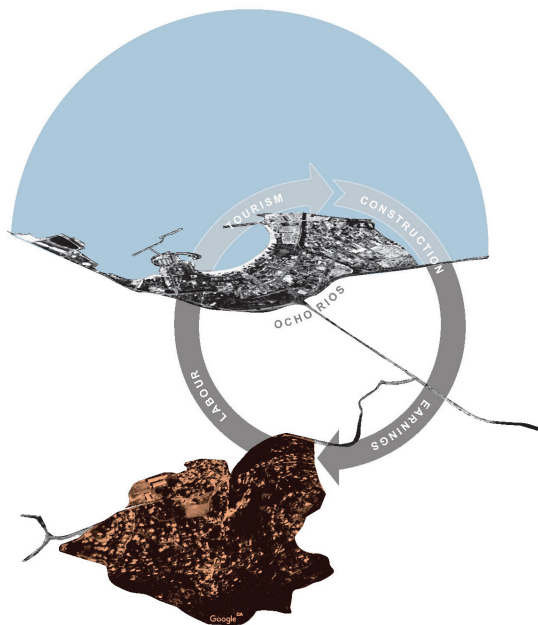


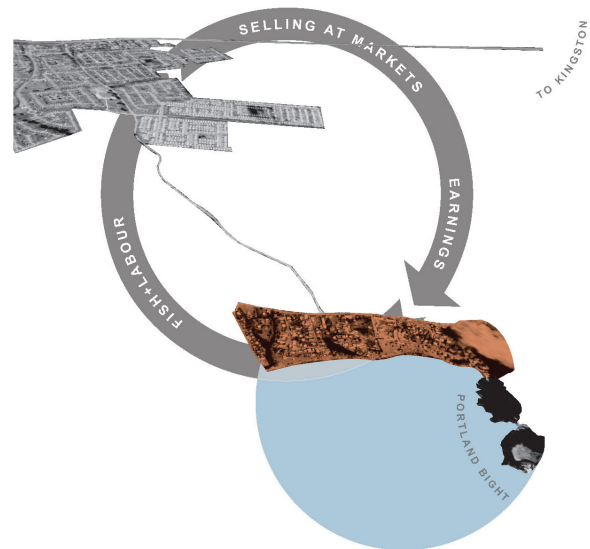
Diagram showing the cultural impact of the Chulah stove (Adnan 2018, 43)

## Test Sites

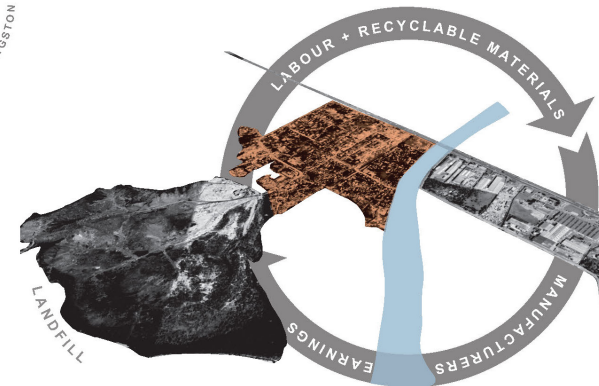
Two informal settlements with varying contexts were analysed to determine their existing economic patterns. Parrytown is a parasitic settlement that feeds on tourism on the north coast. Residents provide labour for tourist attractions and construction sites, with earnings returning to the community. Old Harbour Bay is a low-lying coastal fishing community that is a gateway to a natural reserve. Residents fish, then sell their catch at markets nearby. Those with transportation, can make the journey to Kingston.



Existing system of survival in Parry Town



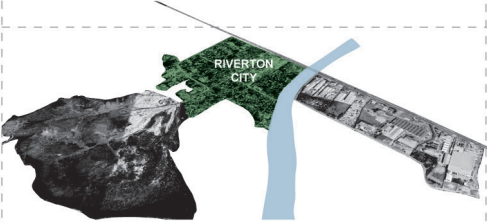
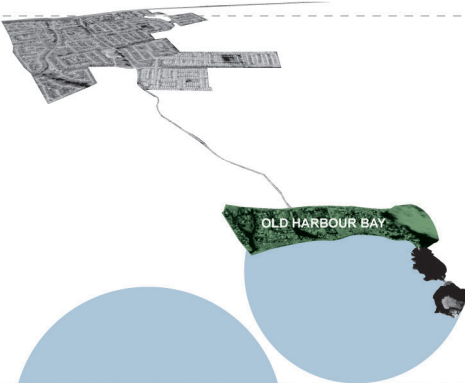

Existing system of survival in Old Harbour Bay



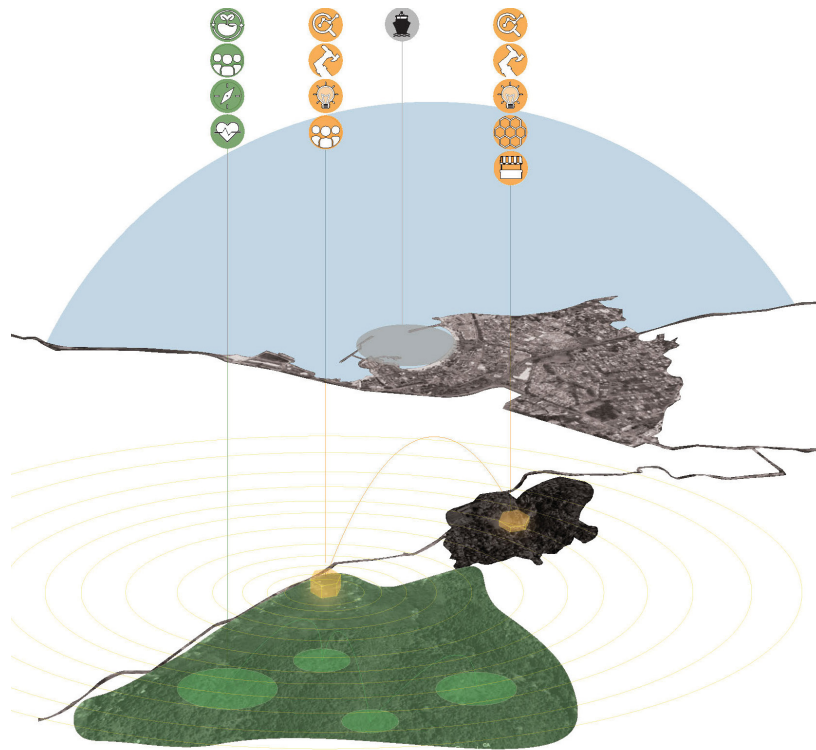
Existing system of survival in Riverton City

Diagrams exploring the test sites' existing economic patterns. Parrytown is a parasitic settlement that feeds on tourism on the north coast. Residents provide labour for tourist attractions and construction sites, with earnings returning to the community. Old Harbour Bay is a low-lying coastal fishing community that is a gateway to a natural reserve. Residents fish, then sell their catch at markets nearby. Those with transportation, can make the journey to Kingston. Residents in Riverton City either work in low paying jobs or scavenge the dump for materials that can be sold to back to the industries that line the highway to Kingston. (basemap Google 2019a)

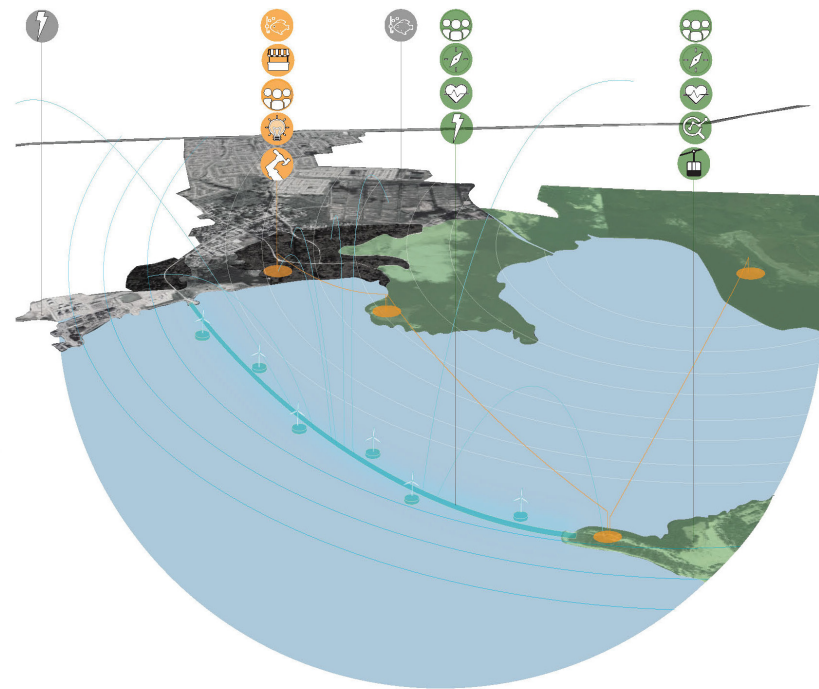


SITE	SURVEY	SOLUTION [program]														
		SORT	MANAGE	PRESERVE	MAKE	SELL	EXHIBIT	EXPLORE	RESEARCH	TEACH	BUILD	GROW	FISH	EXERCISE	GATHER	POWER
 <p>RIVERTON CITY</p>	<ul style="list-style-type: none"> <li>+ city landfill</li> <li>+ river</li> <li>+ gully</li> <li>+ bay</li> <li>+ industrial park</li> <li>+ makers</li> <li>+ road networks</li> <li>+ swamp</li> <li>+ port</li> <li>+ fort</li> </ul>	+	+		+	+	+	+	+	+	+		+	+	+	
 <p>OLD HARBOUR BAY</p>	<ul style="list-style-type: none"> <li>+ protected dry forest</li> <li>+ rare and endangered wildlife</li> <li>+ harbour</li> <li>+ fish farms</li> <li>+ fishermen and women</li> <li>+ road network</li> <li>+ power station (ageing)</li> <li>+ marsh</li> <li>+ mudflat</li> </ul>		+	+	+	+	+	+	+	+		+	+	+	+	
 <p>PARRY TOWN</p>	<ul style="list-style-type: none"> <li>+ cruise ship terminal</li> <li>+ builders</li> <li>+ farmland</li> <li>+ farmers</li> <li>+ dunn's river watershed</li> <li>+ forest</li> <li>+ road network</li> </ul>		+	+	+	+	+	+	+	+	+		+	+		

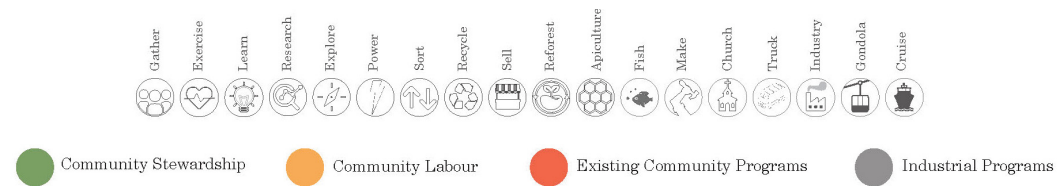
Analyzing the programs possible for self-sufficiency in each test site after considering the existing economic patterns and ecology of the site. (basemap Google 2019a)



Parry Town Program Proposal



Old Harbour Bay Program Proposal



Diagrams showing the possible program outcomes for self-sufficiency. Parrytown is in the Dunn's River Watershed, which requires reforestation. Reforestation efforts can be facilitated by a centre for education and research, accompanied by an apiculture facility owned and operated by the community. Old Harbour Bay requires flood mitigation. Points of flood mitigation infrastructure can support research, education and power generation and be connected by a light bridge joining the mainland to Goat Island, which is part of the natural reserve. (basemap Google 2019a; icons from The Noun Project n.d.)



Work already taking place in Riverton City. Residents already scavenge, sort, make and process (Toth 2016).

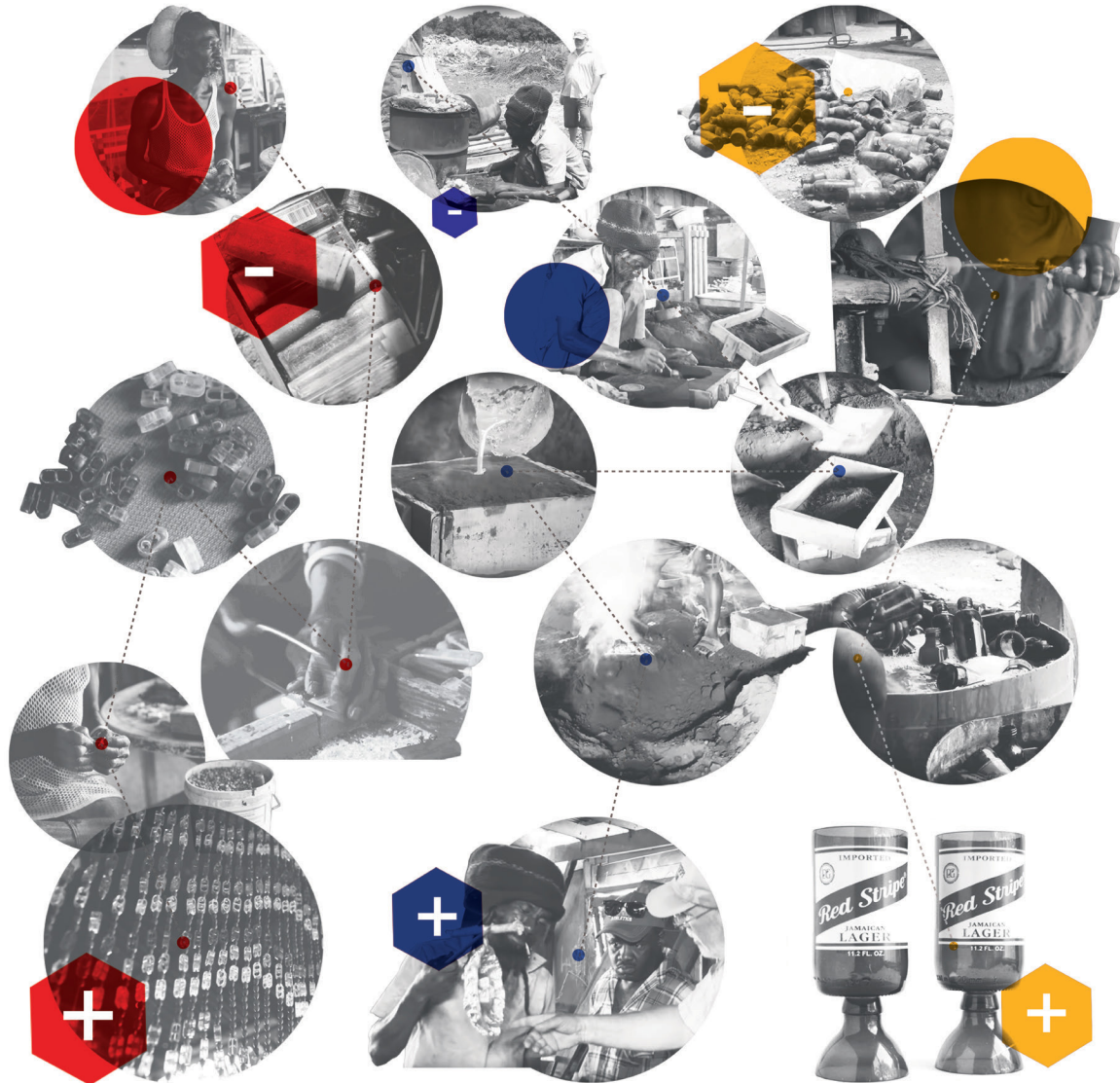
The ecology of each site was considered to determine programs possible for self-sufficiency. The same method of analysing existing economies and networks was applied to Riverton City. With the ecological conditions on site in mind, programs centred on communal works were generated.

### Existing Work in Riverton City

Garbage enters the dumpsite via trucks and is tipped directly in the dump without being sorted. Scavengers must risk their lives and limbs to pick through the dump for valuable materials. A persistent fire smolders below a layer of freshly tipped waste at all times in the dump. Scavengers run the risk of stepping into a 'sinkhole' to the fire below, risk lacerations from something sharp, or suffer skin disorders and infections from chemicals present in the dump. Even with these risks, scavengers are forced to work with very little resources and through middlemen, as picking through the dump is illegal. Having to work through middlemen also diminishes the benefits from their labour.

Regardless of the risks involved, residents find ingenious ways to make use of the materials found in the dump. Local artist, St. John, collects discarded lighters, cleans them, slices them into 'beads' and strings them together to make beaded curtains. Metal worker Tony scavenges the dump for aluminium and melts down scraps in a make-shift forge to create art and dutch pots. Single mother Pauline and her kids pick through the dump after school and work for glass bottles that can be cleaned in her yard and resold to artists or to the Red Stripe distillery just down the road.

The communal works will include making, repairing, exhibiting, selling, research, teaching, building, scavenging,



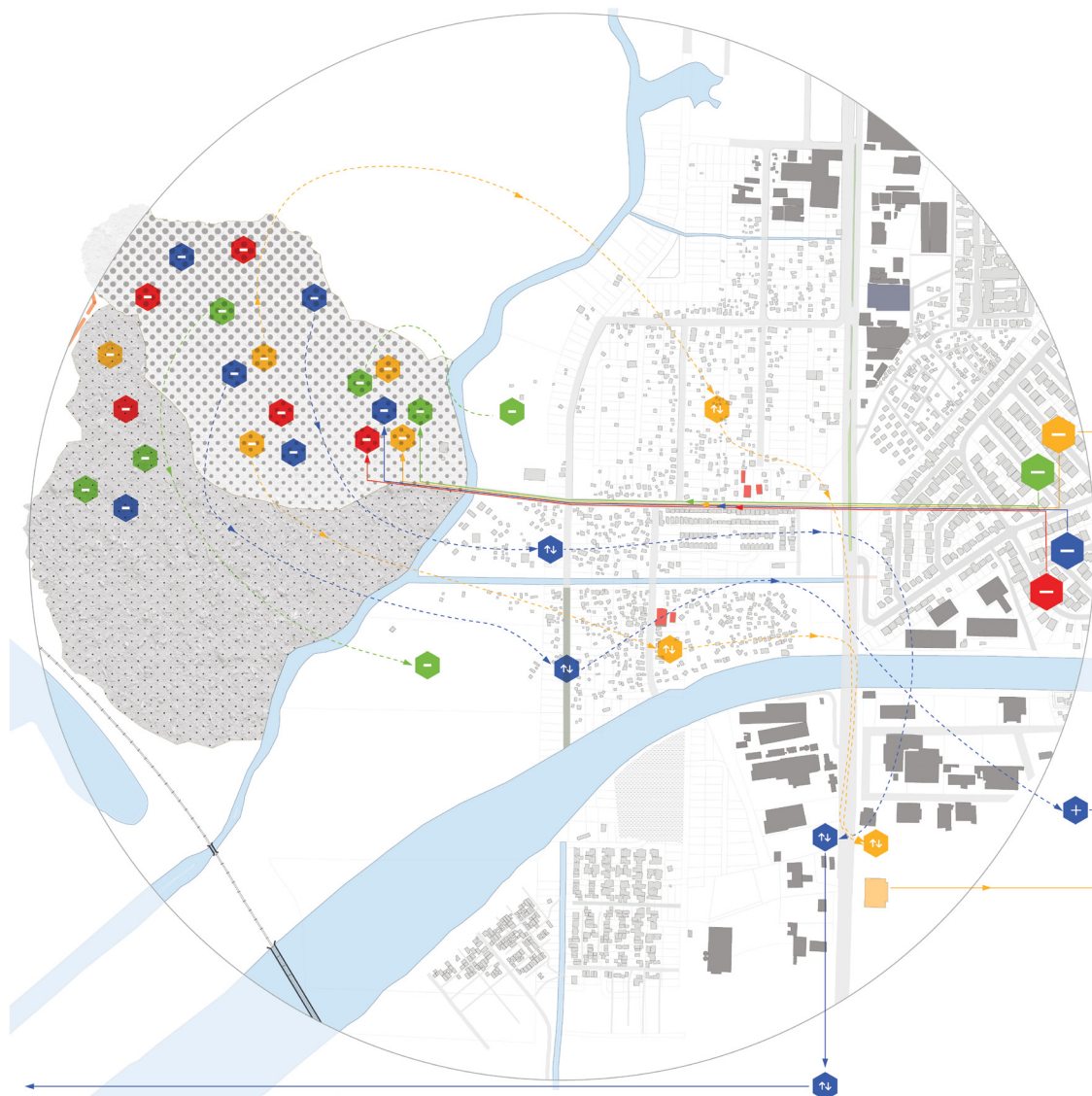
Existing work taking place in Riverton City. St. John's work, left; Tony's work, centre; Pauline's work, right. (Freer 2019; Toth 2016)

- Human Resource
- Material Resource
- Plastics, Styrofoam, Textiles, Rubber
- Ceramics
- Metals
- Waste
- + New

Diagram key

sorting, and processing waste in the dump. Residents already perform these duties. The architectural interventions will organize and formalize the work already taking place, in accordance with recommendations from Nas and Jaffe, and Wilson, Velis and Cheeseman et al.:

Developing countries often have a surplus of (cheap) labor, but are short of capital; integration of informal technology instead of adopting unsuitable and expensive foreign technology can be a step towards more cost-effective and sustainable waste management (Nas and Jaffe 2004, 345)



Existing movement of materials through Riverton City. Some materials are sold to external benefactors through middlemen, limiting the income of those who scavenge the dump. (basemap: National Land Agency, 2010; icons from The Noun Project n.d.)

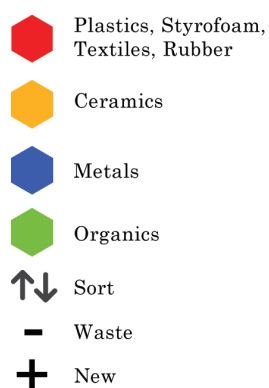


Diagram key (icons from The Noun Project n.d.)

The general characteristics of informal recycling are reviewed, highlighting both positive and negative aspects. Despite the health and social problems associated with informal recycling, it provides significant economic benefits that need to be retained. Experience shows that it can be highly counterproductive to establish new formal waste recycling systems without taking into account informal systems that already exist. The preferred option is to integrate the informal sector into waste management planning, building on their practices and experience, while working to improve efficiency and the living and working conditions of those involved (Wilson, Velis and Cheeseman 2006)

## Co-op System

A co-op system is a practical and realistic way to activate the work already taking place in Riverton City in order for residents to be able to eventually develop an energy from waste system. Nas and Jaffe laud the importance of bolstering existing informal waste management systems:

One way of tackling the ascribed as well as self-replicated low status of scavengers, whether or not related to ethnicity, is through the creation of co-operatives. Besides raising income, this form of grassroots development potentially can give scavengers a certain status; they are recognized as an accepted part of the waste management system that is beneficial to the whole population and their self-esteem grows with self-reliance. After all, 'small businessmen' and 'micro-enterprises' sound more modern and hygienic than 'rag pickers' or 'vultures'. (Nas and Jaffe 2004, 346)

Jamaica already has an informal financial system in place. The informal *partner* system is a Rotating Savings and Credit Association (ROSCA) that is an easily accessible means of subsistence for participants. Economics Professor at the University of the West Indies, Claremont Kirton outlines the benefits of informal financial systems in low income communities in his article *Rotating Savings and Credit Association in Jamaica: Some Empirical Findings on Partner*.

In developing countries, ROSCAs are characterized by certain institutional features which include their voluntary involvement, community orientation, organisational autonomy, and self-sufficiency. The operational frame work for ROSCAs is rooted in the close social links between members of the participating group, which may be the extended family, village, community, work place or some other social entity. The activities of ROSCAs in developing countries are fundamentally different from other types of financial associations; ROSCAs function not only as financial arrangements, but also provide for regular social interaction via meetings which are usually important social events. (Kirton 1996, 200)

The benefits of a ROSCA include the flexibility and adaptability 'rooted in the organizational autonomy and self-



Project timeline from present to 2060

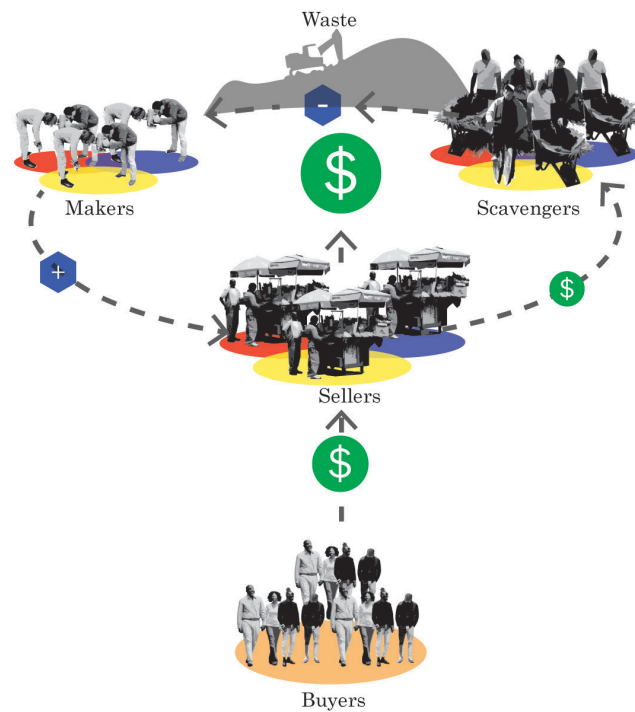
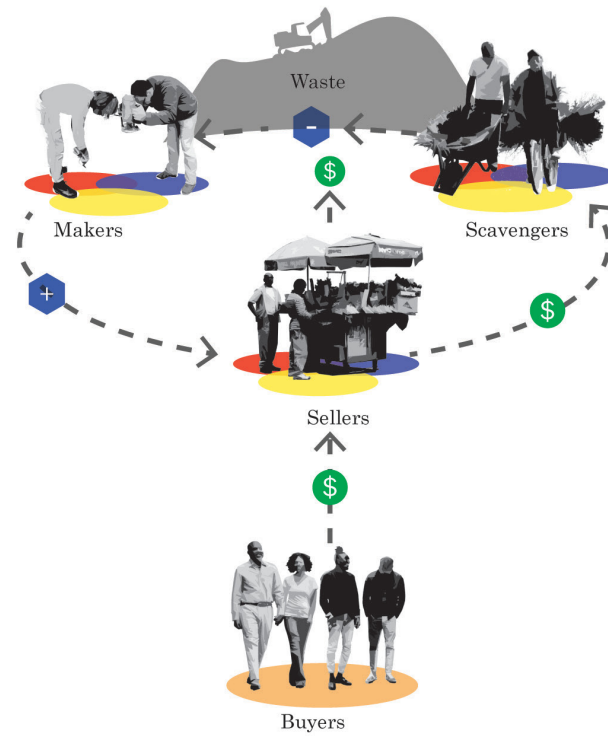


Diagram showing the proposed co-op system. Scavengers can supply makers with materials to make new items from waste materials or to repair damaged items for resale by the sellers, the proceeds of which will be directed to the co-op for further development of the community-run waste management system and to the development of the community itself. It will also help to raise the status of all members of the existing informal waste managements system, be responsible for education and skills-training, and provide financial autonomy for its participants. (icons from The Noun Project n.d.)

sufficiency' that satisfy the needs of the participants (Kirton 1996, 201).

The Co-op coupled with the existing culture of financing through a ROSCA will provide the residents of Riverton City with the economic autonomy required for self-sufficiency.

## Project Timeline

The communal work will stimulate incremental improvements through the community. By 2022 the community will have established sites for sorting waste, making and selling with supporting rudimentary facilities that reorganizes the way in which material moves through the community. While these activities take place, the Co-op can begin cleaning up the community and the surrounding swamp.

By 2025, the Co-op will have an established waste-management system with improved facilities to support its growth. The Co-op will have earned enough funds to incrementally purchase and import a containerized portable waste-to-energy system. The landfill can be closed as waste will be successfully diverted.



Containerized waste to energy system (Addfield Environmental System Limited, n.d.)

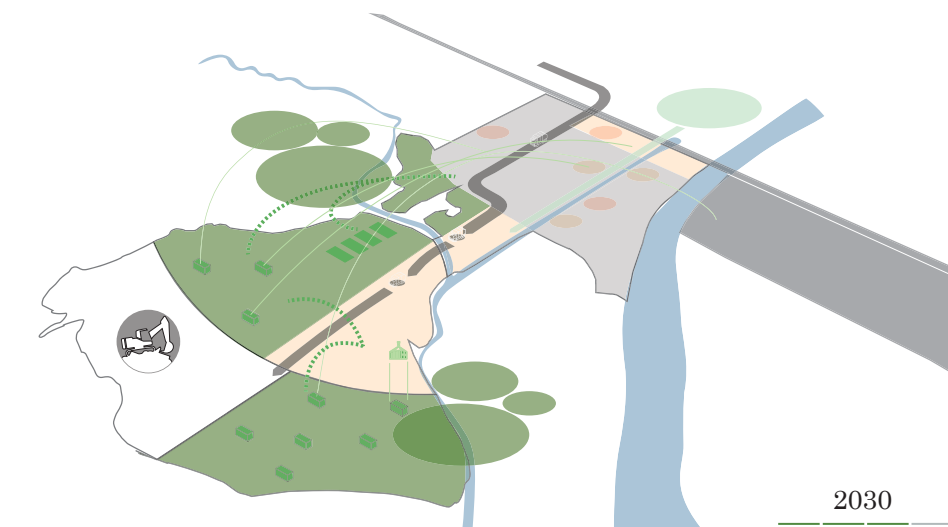
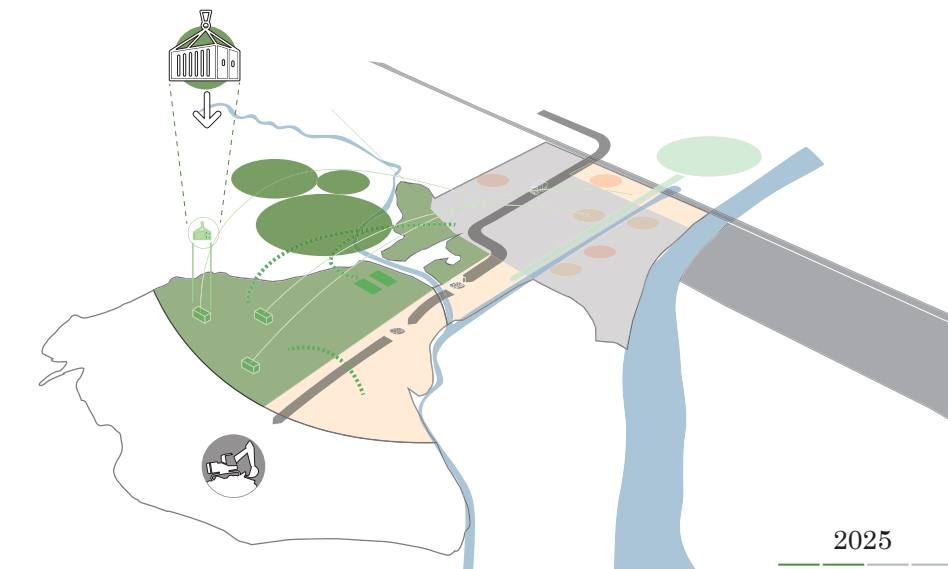
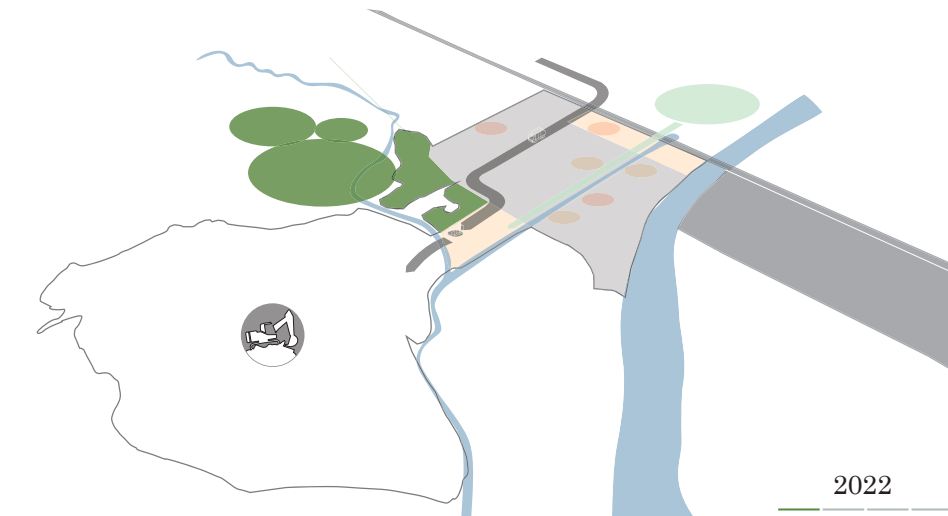
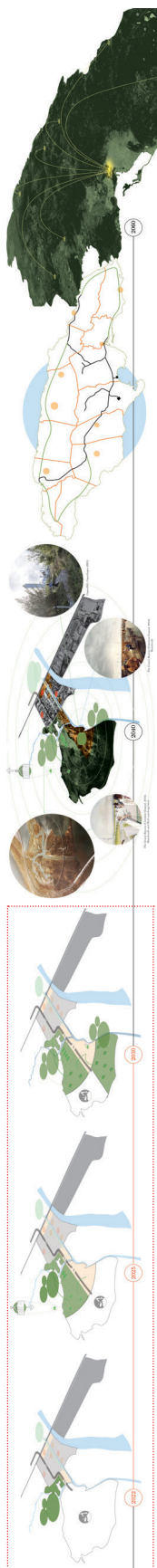


By 2030, the Co-op will have ownership of the waste that enters the community. It will have established a material recovery facility where sorters can determine the value of the materials entering the site, or to a municipal recycling centre where scavengers can collect and distribute materials to a workshop or a work lab for repurposing or repair. The Co-op will continue to add more portable waste to energy containers, enough to power the community. Rehabilitation of the landfill can begin.

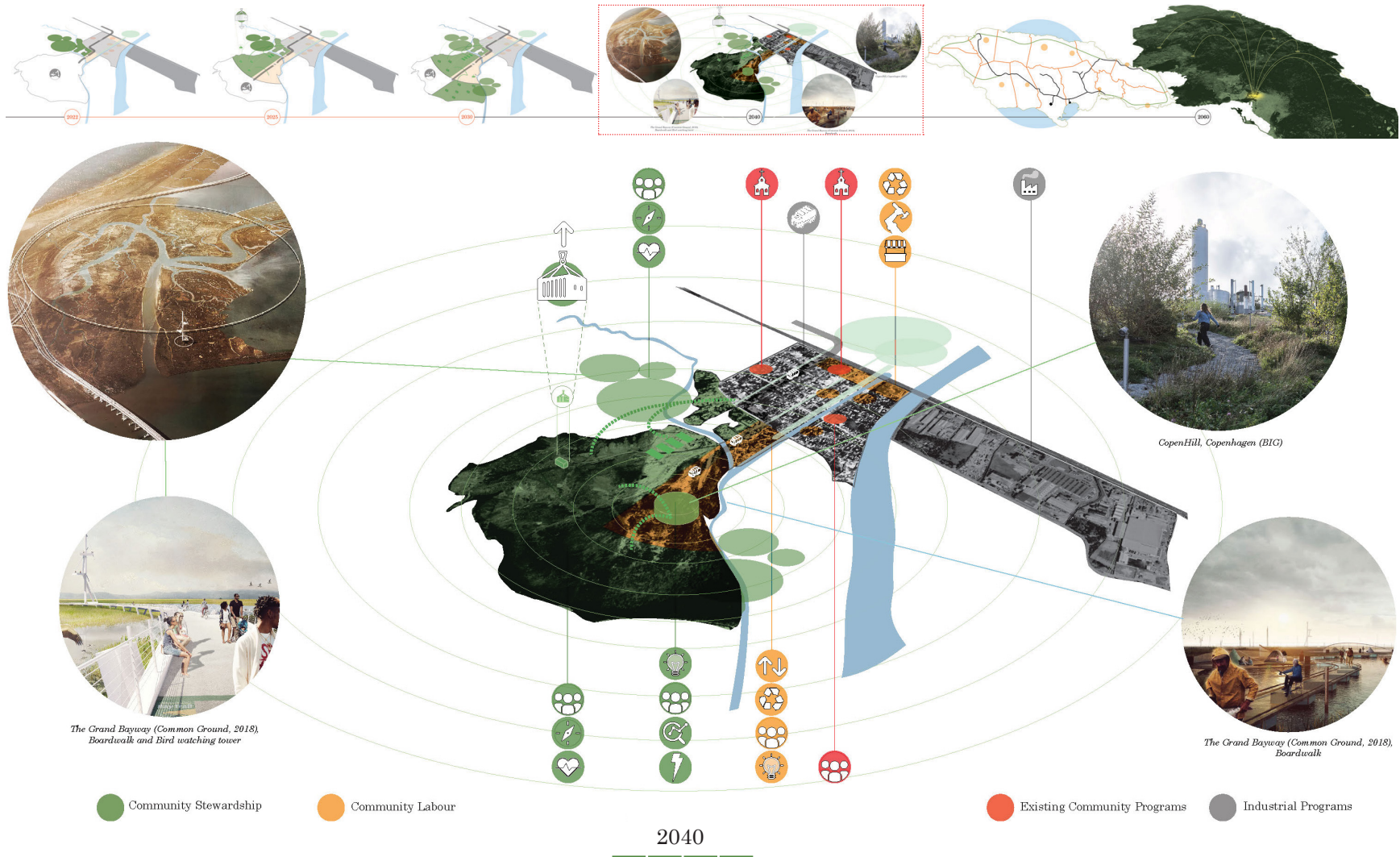
By 2040, Riverton City will become the island's hub for waste management. The Co-op will have enough waste to energy containers to sell power to the grid to add to the profits from the market and from services provided by Co-op Technicians. It can then extend its reach to other waste sheds in the island and teach their neighbouring communities how to create their own community-based waste management system. Rehabilitation of the landfill will almost be complete.

By 2060, all the waste sheds in the island will be connected by a continuous train line. The Riverton City Waste Management Co-op will be the island expert in community-based waste management and can add Parks Management to its purview as the landfill and surrounding swamp will be completely rehabilitated as a parkland for residents and Kingstonians to enjoy, and wildlife will have returned to the swamp. The Co-op can now collaborate with the operators of the nearby wastewater treatment facility to explore deriving energy from a new waste source.

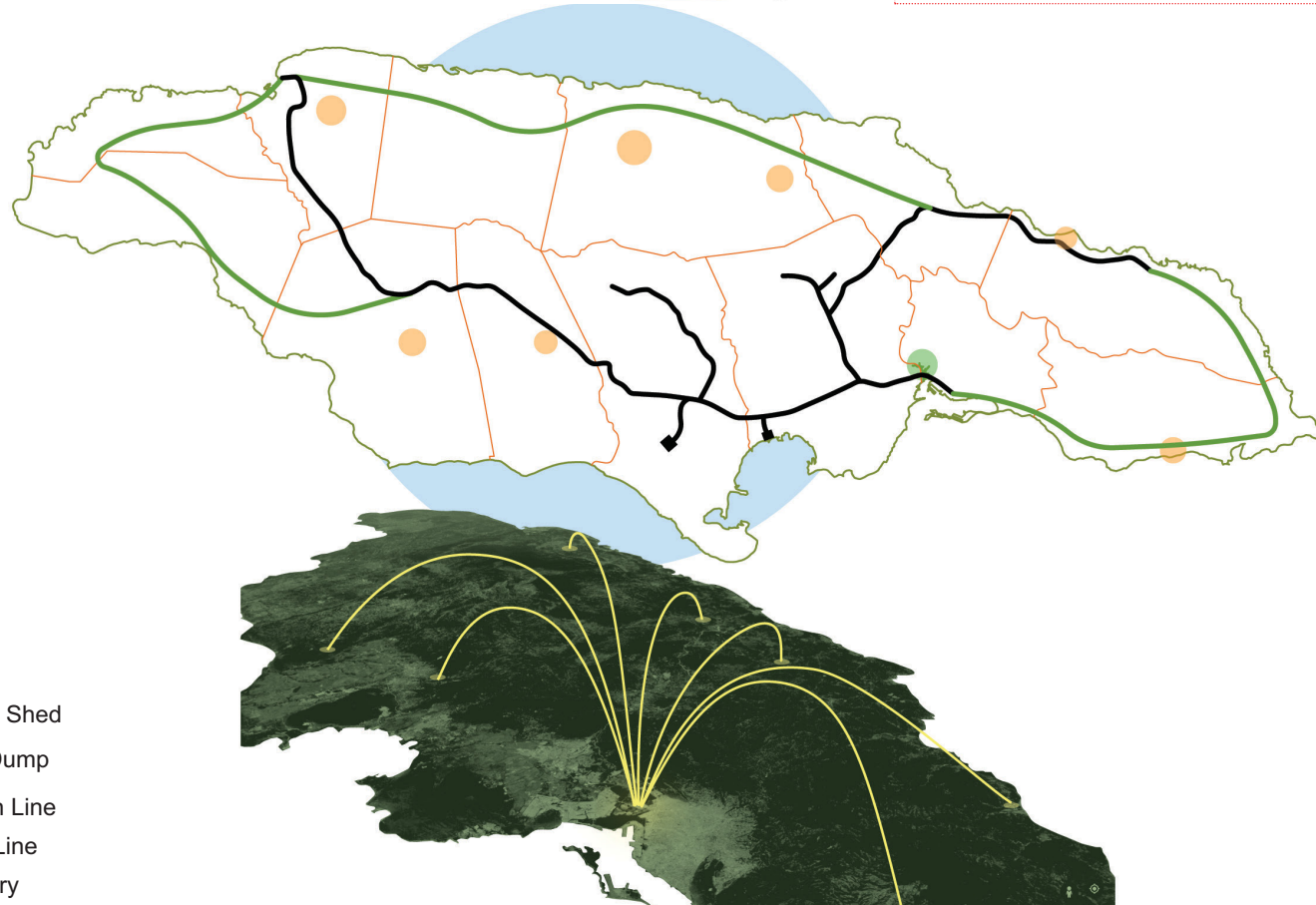
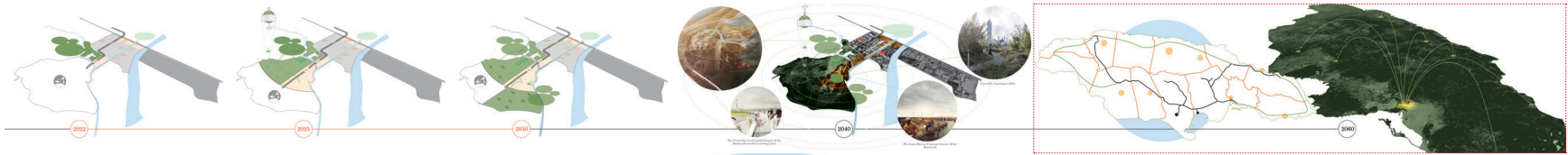
The scope of this thesis spans from the present to 2030.



Project timeline diagram from 2022 to 2030 (icons from The Noun Project n.d.)



Project timeline diagram at 2040. By now the landfill would be a parkland for residents and Kingstonians to enjoy, and wildlife will have returned to the swamp (basemap Google 2019b; icons from The Noun Project n.d.).



- Existing Waste Shed
- Riverton City Dump
- Proposed Train Line
- Existing Train Line
- Parish Boundary

Project timeline diagram at 2060. By now, all the waste sheds in the island will be connected by a continuous train line. Riverton City can become the island's hub for waste processing and can start the same bottom-up approach to waste management to other vulnerable communities (basemap Google 2019a).

## Chapter 6: Sites and System

There is opportunity for Architectural intervention in spaces where Kingston interfaces with Riverton City. The focus of this project is to determine the Architectural interventions to be dotted throughout the community that provides spaces where residents and nonresidents work, shop and train to become stewards of the waste the inhabitants produce, how to creatively repurpose waste and eventually, how to generate energy from it.

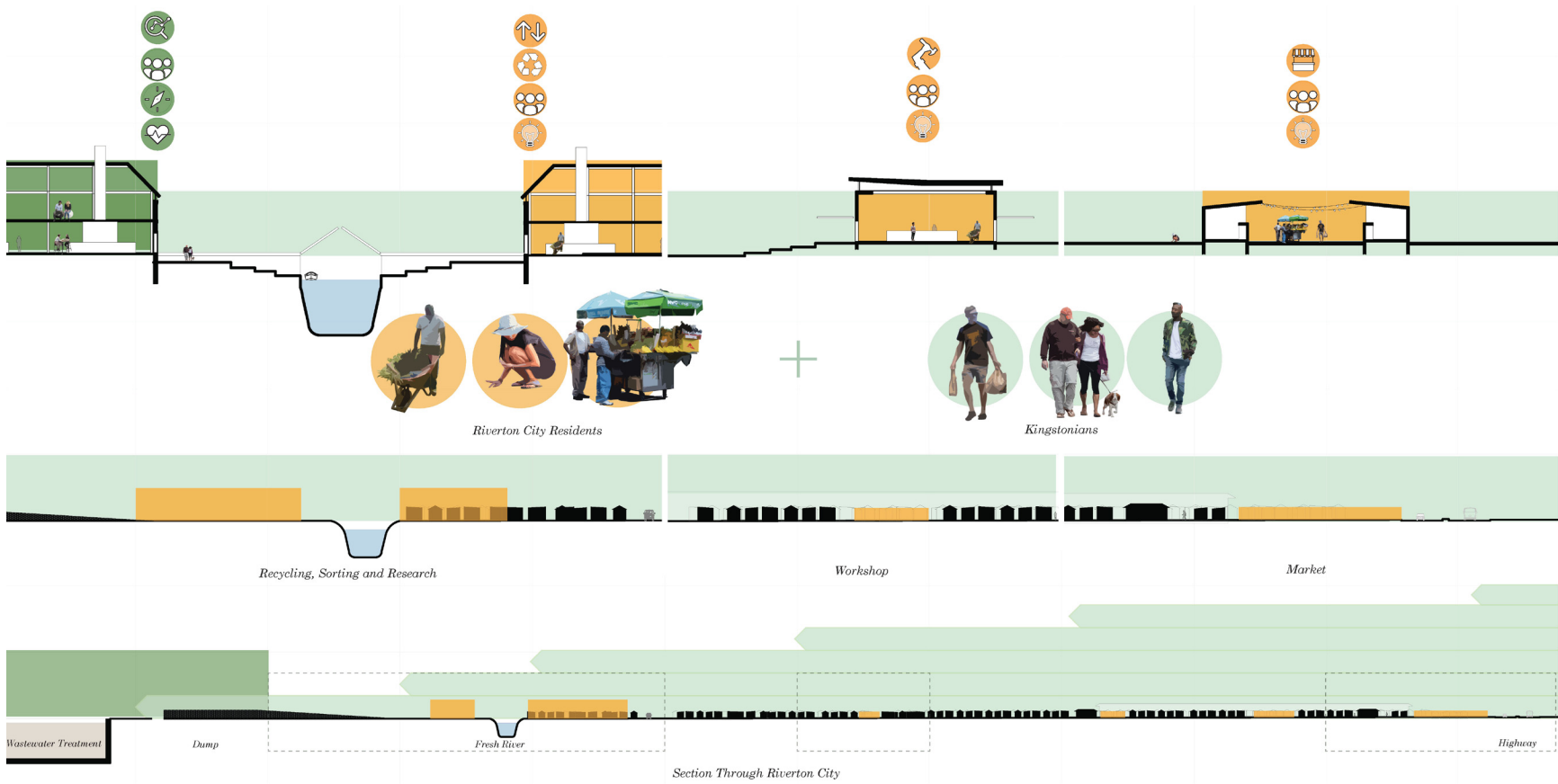
As a result of communal works, the dump site will be reclaimed and ecologically restored, welcoming wildlife back to the site. The restoration will allow the site to be used as a park, not just for the residents of Riverton City, but for all Kingstonians, inviting the rest of the city in, while improving the cultural perception of the community.

### Community Interventions

The Architectural interventions include the incremental implementation of Workshops, a Worklab, a Market, a Material Recovery Centre (MRC), and a Waste To Energy Facility (W2E). Each intervention incorporates its own circular economy, and is its own self-sufficient subsystem that works at the scale of the community and the city.

At the highway's edge, cars can slow down and persons can be welcomed to the community with a Market and Recycling Centre that invites Kingston and the rest of the Island to the community. The highway also connects to a Distribution Centre, for larger items that will need to be trucked away.

A pedestrian footbridge over the highway connects neighbouring communities to Riverton City. It also connects



Diagrammatic section through Riverton City, demonstrating initial ideas of program distribution and scale (icons from The Noun Project n.d.).



Community axonometric showing project sites and proposed interventions. (basemap: National Land Agency, 2010)

to a pedestrian path between the Market and the Recycling Centre along a canal that borders the site hosting Workshops, and continues on to border the site hosting the Worklab and terminates at a footbridge connecting pedestrians to what will be a parkland by 2040. Until 2040, the bridge connects pedestrians to the train line that shuttles waste in and valuable materials out of the community.

A new slow-traffic vehicular street parallels the pedestrian path on the opposite bank of the canal. Garbage trucks will maintain their current route along the street bordering the site hosting the Material Recovery Centre and terminates at vehicular bridge over the Fresh River, connecting to the dump.

### **Architectural Characteristics of the Sites**

The interventions at the community scale can be zoned according to the characteristics of a Jamaican vernacular house.

The Market and Distribution Centre are most where the Island interfaces with the community, acting like the community's verandah which is traditionally a place where one meets their neighbour. There outsiders are invited to meet, shop, play and learn with the community.

The Workshop and WorkLab are where work take place, and the pace is a little slower to allow for groups of persons to work together or independently much like one would do with one's family in a living room.

The Material Recovery Centre and the Recycling Centre are where sorting and processing of waste takes place and can be likened to a backyard where one can organize and work on large or messy projects.





Diagram of the architectural characteristics of the sites showing a plan of community overlaid with an axonometric diagram of a Jamaican vernacular house. (basemap: National Land Agency, 2010; icons from The Noun Project n.d.)

- Site
  - ↻ Work
  - ♻️ Recycle
  - ↕ Sort
  - 📦 Sell
  - ⚡ Power
  - 🚚 Distribute
  - 🔍 Experiment
  - ⚙️ Repair
  - ↙ Export
- Diagram key (icons from The Noun Project n.d.)

## Reorganizing The Movement Of Waste Through The Community

Waste will come into the Recycling Centre by private vehicle or the MRC by sanitation trucks to be sorted. Co-op Collectors transport materials to either the Workshop or the Work lab for processing. Repaired or new items then make their way to the Market or the Distribution Centre, depending

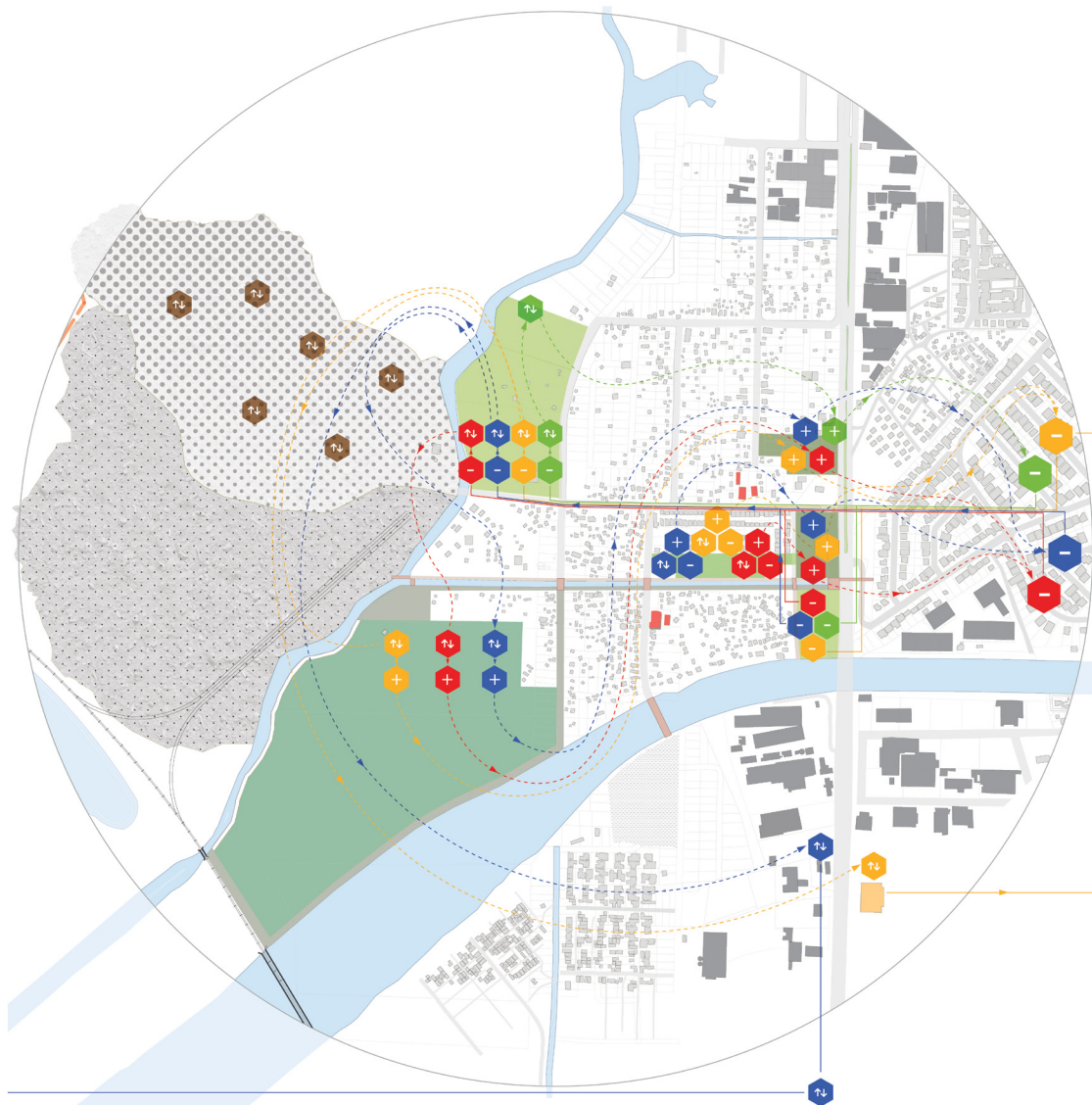


Diagram showing the proposed reorganization of materials through Riverton City. The project sites are highlighted in green. (basemap: National Land Agency, 2010; icons from The Noun Project n.d.)

- ⬢ Plastics, Styrofoam, Textiles, Rubber
- ⬢ Ceramics
- ⬢ Metals
- ⬢ Organics
- ⬢ Misc.
- ↕ Sort
- Waste
- + New

Diagram key (icons from The Noun Project n.d.)

on the scale of the item. The Co-op will also absorb existing business relationships with external benefactors, eliminating the need for middlemen and maximizing profits for the Co-op.

Materials being processed from waste to a new or repaired item can take a waste item through various routes across the community. For instance, if one has a small appliance like an iron in need of repair, it would be brought to the Workshop where the owner can leave it with a Co-op Technician, be

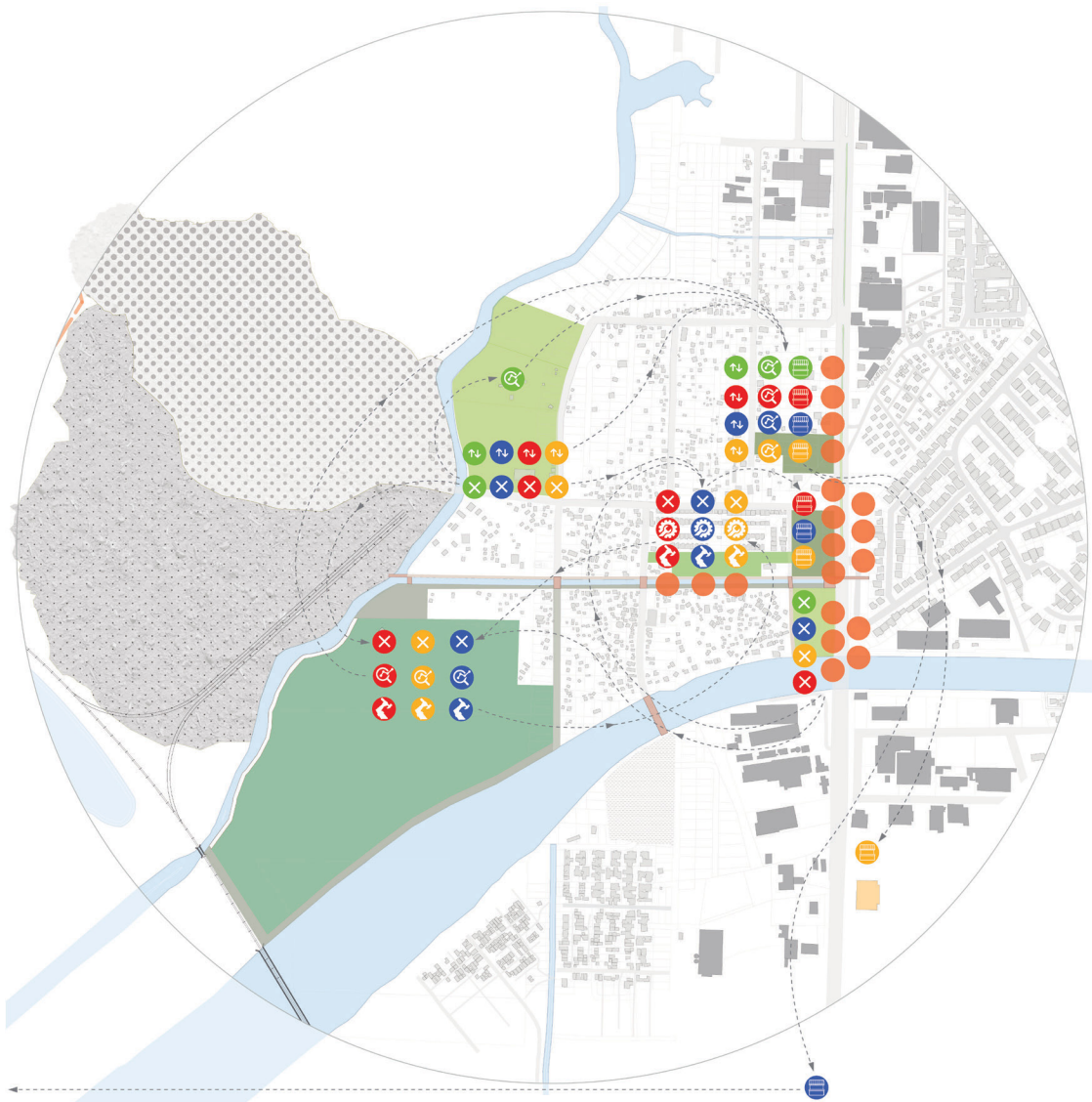


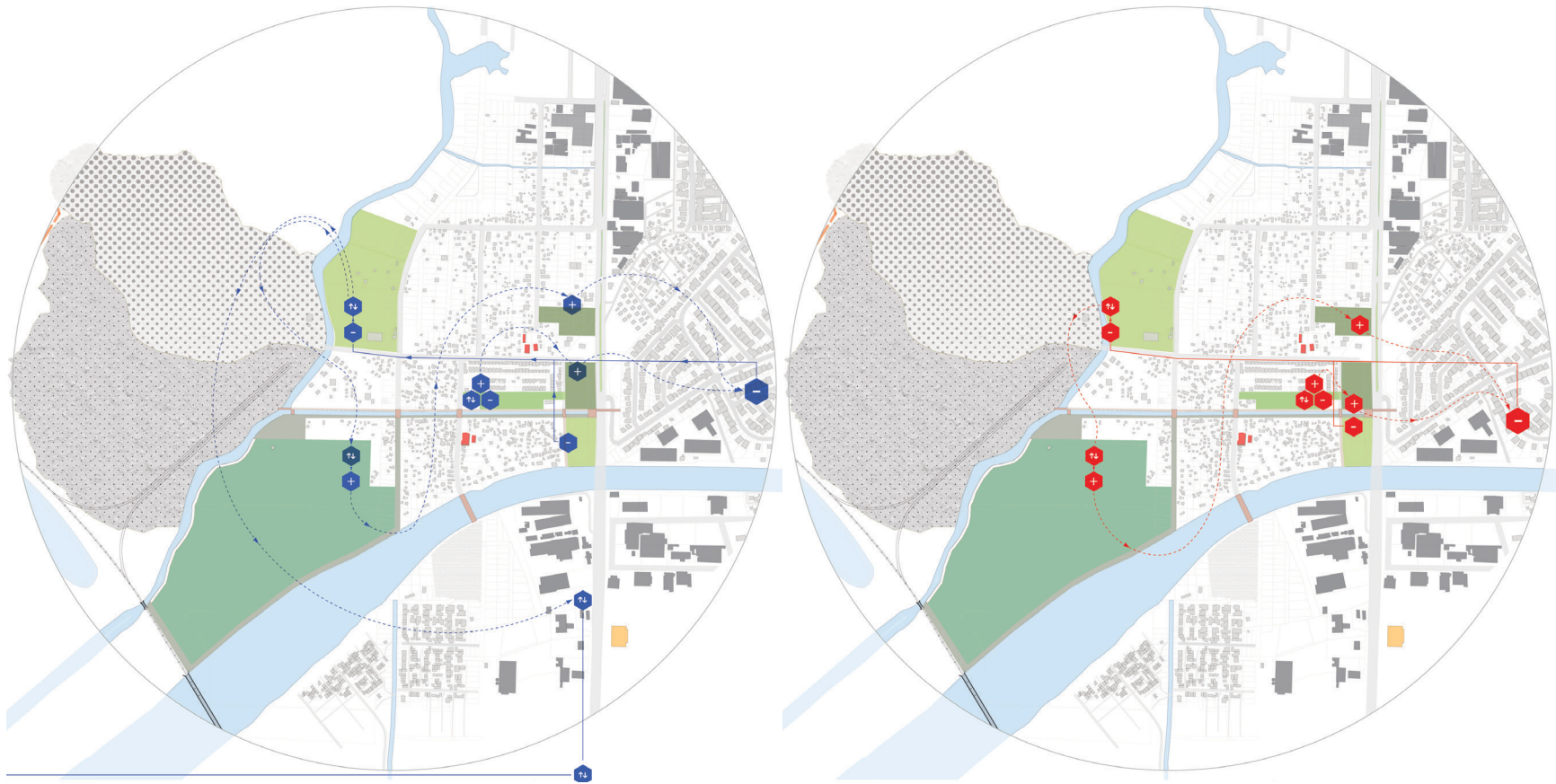
Diagram showing the reorganization of human resources through Riverton City. Visitors interact most with the community at the Distribution Centre, the Market, the Recycling Centre and the Workshops (visitors indicated in orange). (basemap: National Land Agency, 2010; icons from The Noun Project n.d.)

- Human Resource
- Visitor
- Plastics, etc.
- Ceramics
- Metals
- Organics
- X Scavenge
- ✋ Work
- ↕ Sort
- 📦 Sell
- 🔍 Experiment
- ⚙️ Repair

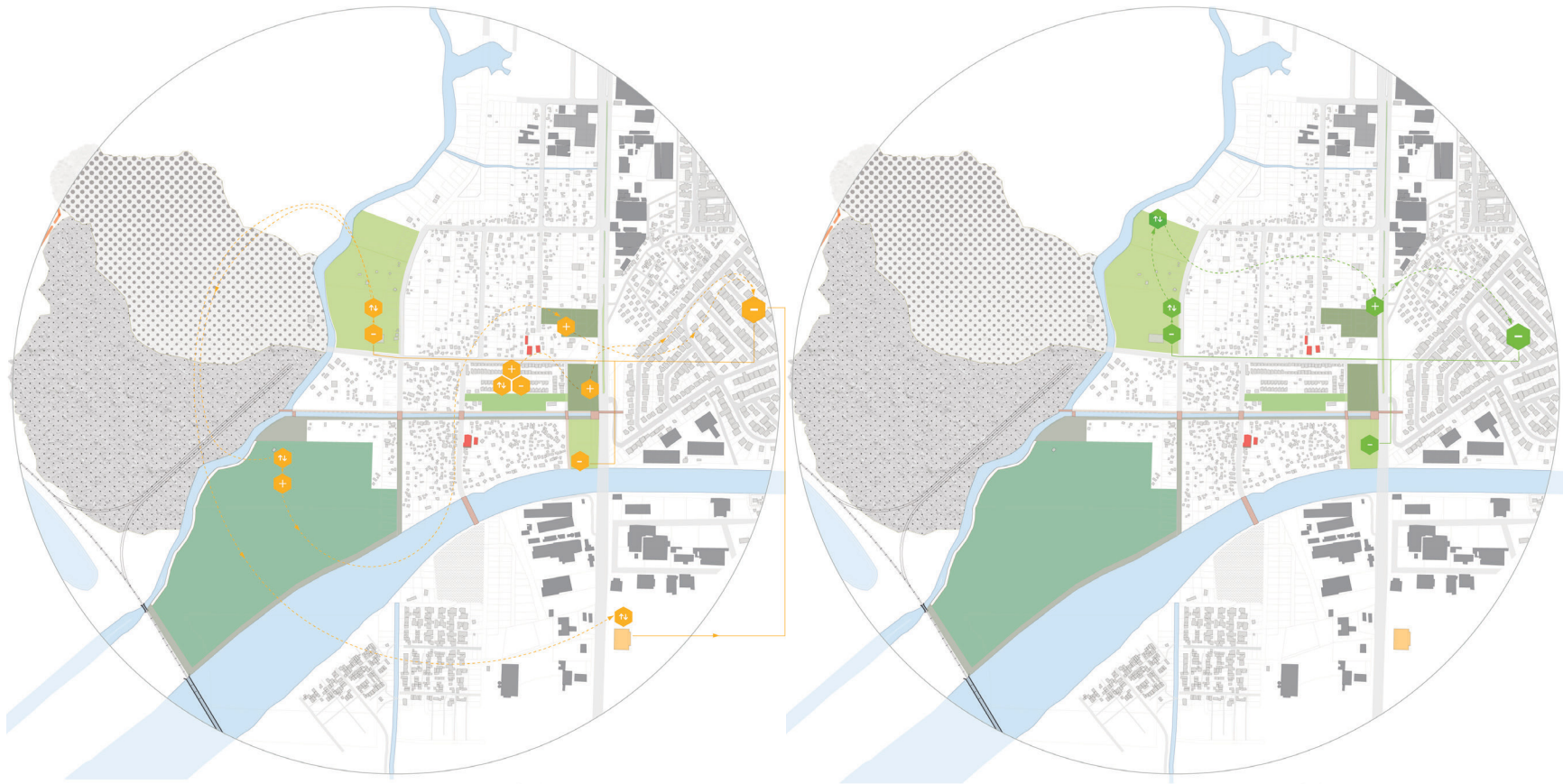
Diagram key (icons from The Noun Project n.d)

taught how to repair it or simply use the tool library and a workspace to repair it themself.

If the iron was beyond repair, it would be discarded at the Recycling Centre, where a Co-op Collector can locate and cart it to the Workshop to be disassembled, then reassembled into a new product, or its components used to repair other appliances, all of which could be for sale at the Market.



Diagrams showing the proposed reorganization of metals (left) and the proposed reorganization of plastics, textiles, rubber, foam, etc. (right). (basemap: National Land Agency, 2010; icons from The Noun Project n.d.)



Diagrams showing the proposed reorganization of glass and ceramics (left) and the proposed reorganization of organics (right). (basemap: National Land Agency, 2010; icons from The Noun Project n.d.)

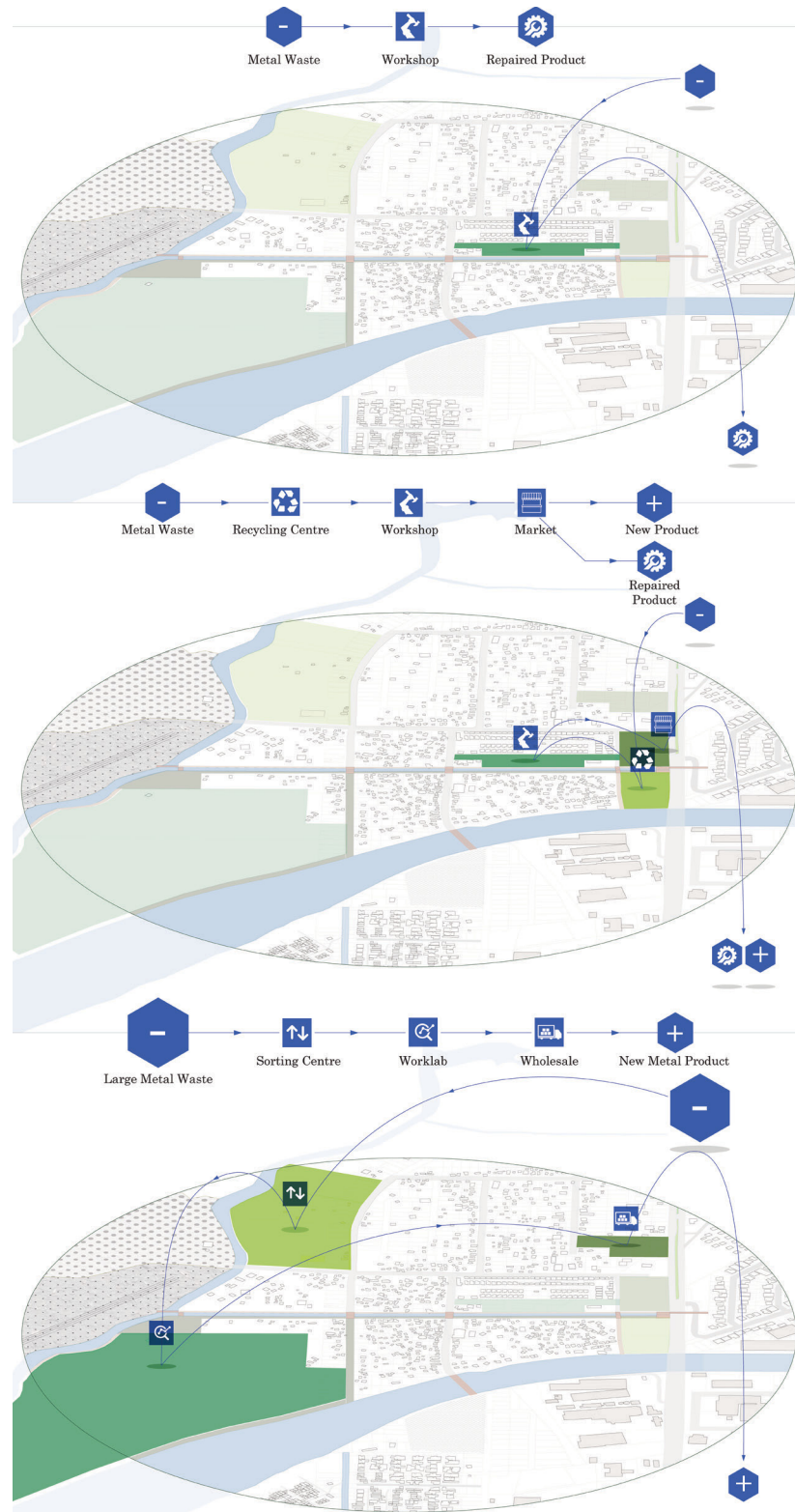


Diagram showing how metal waste moves through Riverton City. Top: the movement of an iron in need of repair. Middle: the movement of an iron beyond repair, to be disassembled to create something new to be sold at the Market. Bottom: the movement of a large appliance like an electric stove, to be disassembled into large-scale products for sale at the Distribution Centre. (basemap: National Land Agency, 2010; icons from The Noun Project n.d.)

If one needed to discard a larger appliance like an electronic stove, then it would be delivered to the Material Recovery Centre, disassembled for valuable components which go to the Worklab to be incorporated into new or improved larger-scaled products for sale at the Distribution Centre.

## Chapter 7: Design Principles

### Contemporary Adaptation of Traditional Design Principles

#### Material and Incremental Construction

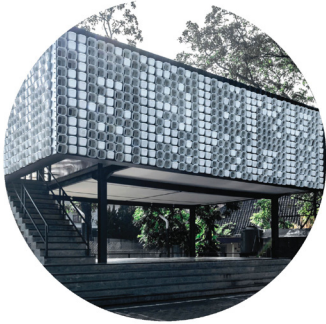
The characteristics of the Jamaican vernacular house addresses the material culture as well as the Colonial history of the Island.

Colonial dwellings were typically of *nog* construction, wherein solid timber frames were infilled with materials on hand, usually rocks, with readily available limestone as mortar. Nog construction was the precursor to the concrete blocks and cement and the antecedent to primitive huts made of timber posts, woven vines and mud (wattle and daub).

*Nogging* is a British term for a brickwork panel set in a timber frame. The essay '*Houses in the Caribbean*' by Brian J. Hudson describes the context in which this type of construction was made popular:

As the forests were cleared for agriculture and for timber, suitable accessible wood for construction became increasingly scarce, necessitating greater use of other materials. There was usually good building stone, commonly limestone or soft volcanic rock suitable for ashlar masonry, to be had, and bricks were imported and, in some places, locally made; but these materials were generally costly and thus not normally available to the poor. Throughout the Caribbean, however, there as plenty of limestone, coral rock, or seashell that could be burned to make lime for mortar, and which made possible the widespread use of small stones and rubble in the construction of humble cottages as well as more substantial houses. (Potter and Conway 1997, 20)

Riverton City residents already scavenge the dump and demolished building sites to gather materials to build their dwellings. The same strategy of using what is to hand is



Ideas of materiality, from top: Bricks made from recycled plastic (Valencia, 2017). Recycled wood cladding (Superuse Studios 2008). Ice cream tubs as cladding (Griffiths 2016) Terra Box (NUIT Architecture 2016)





Wattle and daub hutch with thatched roofing in Jamaica, 1890s, photographer unknown. (MonoVisions Black & White Photography Magazine 2017)

to be employed for the construction of the architectural interventions throughout Riverton City. Once enough of a material for frame-making has been gathered, then Co-op Contractors will see to it that sufficient amounts of appropriate infill are acquired to build in increments. The Worklab is where Contractors can develop creative ways to utilize the materials entering the community.

The incremental construction of each architectural intervention will begin with the secure storage, as the threat of loss by theft is great, and could be prohibitive

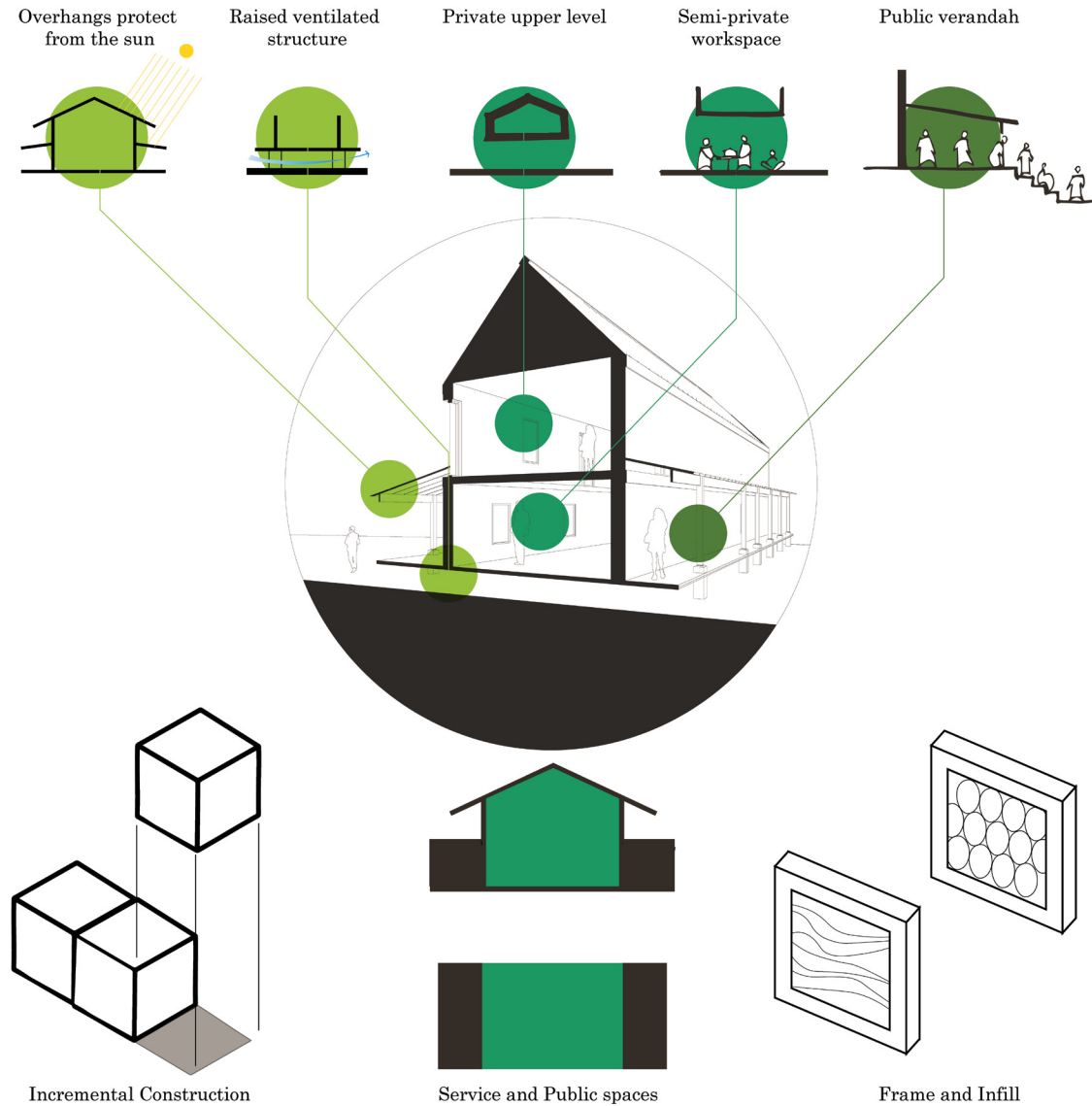


Diagram of the contemporary adaptation of traditional design principles indicating strategies for materials, construction, climate, and zoning.

to the development and growth of the Co-op. Social and collaborative work spaces will be housed under generous roofs that can be added later in the evolution of the project.

### Climate

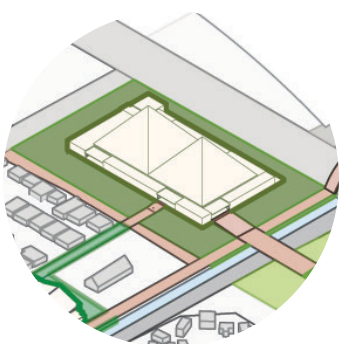
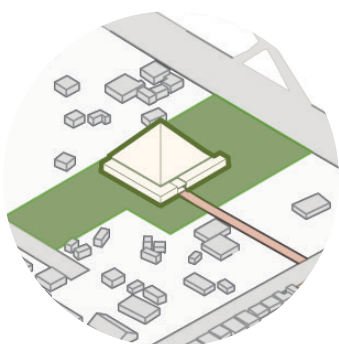
Jamaican vernacular houses have verandahs and overhangs to mitigate against the heat, and elevated floors to mitigate flooding, encourage ventilation, and protect the home from vermin. Verandahs also serve as a social

stimulus for residents to engage with their neighbours in the shade. They were lightly constructed and lightly attached to the house, so that in the event of a hurricane, the verandah can be devastated while the house remains intact.

The Market and Distribution Centre will act as the verandah of the community, inviting the island to engage with the community.

## Zoning

Vernacular houses were either 1- or 2-storeys, depending on the financial status of the owner. In both typologies, the living room was the space in which 'all members of the family can be occupied with various activities at the same time, but individual activities and people can also function together' (Gehl 1987, 109). Bedrooms were on an upper level, and more private. Architectural interventions across the community will adhere to similar principles, wherein 2-storeyed buildings will hold more private spaces on their upper levels. The Workshop and the Worklab will act as the community's living room wherein the persons can work on projects individually or in groups together.



The Distribution Centre (top)  
and Market (bottom)

## Building types

### *The Market and Distribution Centre*

Jamaican slave owners required that their Enslaved workers produce a part of their own subsistence during their spare time, using provision grounds adjacent to their houses or lands on the fringes of the plantations. Surplus provisions were sold in markets as 'a symbolic offensive against the established order' inhabited by itinerant traders called *higglers*, 'practising a nascent and alternate form of capitalism' (Dell, Hauser and Armstrong 2011, 12).



Higglers at the Market. 1890s, photographer unknown. (MonoVisions Black & White Photography Magazine 2017)

The importance of the market to the social structure and culture of the Enslaved can be summarized in James Delle et al's book *Out of Many, One People: The Historical Archaeology of Colonial Jamaica*:

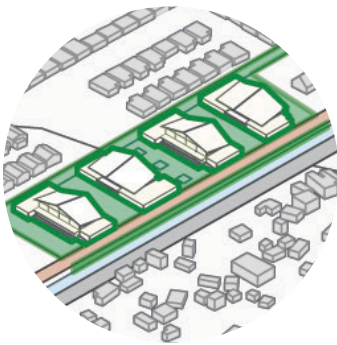
... markets can be viewed as a locus of interaction where the Enslaved could transgress the social and geographic boundaries imposed by the plantation.

... markets did not negate the economic structures with which they intersected. Rather the markets were a space where people caught in the indeterminacies of everyday life forged and broke friendships, created solidarities and expressed rivalries, and, on occasion, organized armed resistance to the inequities of the colonial system. (Delle, Hauser and Armstrong 2011, 12)

The Market in Riverton City is a space reminiscent markets past, where the community welcomes the Island to meet,

shop, learn and play together with the aim to dismantle the implicit social boundaries.

The Distribution Centre is a space where individuals and companies can purchase large new or repaired items that is a result of the work done in the Worklab. For instance, a contractor can purchase prefabricated wall panels made in the Worklab from recycled materials recovered from the dump or collected from the MRC.



The Workshop (top) and Worklab (bottom)

### ***The Workshop and Worklab***

The Workshop is a space that employs a sharing system not only of surplus material, but knowledge and experience. It encourages networking and the cross-pollination of ideas between Riverton City Residents and Kingstonians. The space encourages flexibility to maximize interaction with others.

Sociologist Richard Sennett writes in his book *Together: The Rituals, Pleasures and Politics of Co-operation* that the workshop is a 'model for sustained cooperation' occupied by craftsmen that both Plato and Confucius believed 'made good citizens' (Sennet 2012, 22). He goes on to laud the effects of the workshop on a community:

The workshop has been since ancient times a model for sustained cooperation. In the ancient world – in both China and Greece – the workshop appeared as the most important institution anchoring civic life, and as a productive site practised the division of labour to a far greater degree than farming. The complications of craft labour were joined to the family value of continuity across generations; sons worked alongside their fathers as potters, daughters alongside mothers as weavers. The workshop spawned an idea of justice, that the things people make cannot be seized from them arbitrarily, and it enjoyed a kind of political autonomy, at least in Greece, since artisans were allowed to make their own decisions about how best to practise their craft. As a cultural site, workshops from ancient times onwards developed elaborate social rituals. These were honour-code rituals, but, rather than being practised behind the scenes as

in political coalitions, these rituals publicly marked the mutual obligations between unequal partners – between masters, journeymen and apprentices within each workshop. (Sennet 2012, 57)

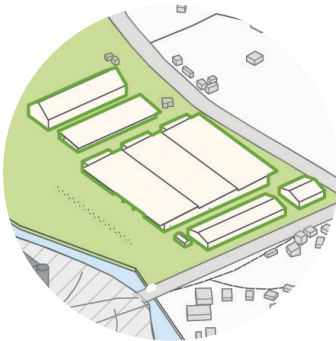
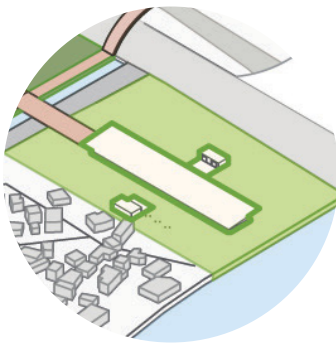
The Workshop acts as a laboratory for craftsmen to experiment with ways in which to utilize materials on site in creative and dynamic ways.

The Worklab shares the same ethos as the Workshop, however the scale of materials entering it and works carried out within the site are far greater.

### ***The Recycling and Material Recovery Centres***

The Recycling Centre is community space right at the 'gateway' to the community that furthers the intention of inviting Kingstonians and the rest of the Island into the community.

A good precedent is BIG's Synhavns Recycling Centre which is encased in a man-made hill for jogging and snowboarding in Copenhagen. The proposed Recycling Centre for Riverton City sits on a site with ample space for



The Recycling Centre (top)  
and MRF (bottom)



BIG's Synhavns Recycling Centre. (Rosenfield 2015)

a field where impromptu games of football, a national past-time, can occur.

Kingstonians can pull up to the Recycling Centre in their private vehicles to unload their recyclables. There is ample parking to be able to visit the Market afterward, making the act of recycling an event rather than a chore. Co-op Collectors can take materials to either the Workshop, MRC, or Worklab after ascertaining the value of the material collected and transport them via handcarts.

The Material Recovery Centre intercepts the existing route that garbage trucks take to the dump. Drivers will divert their trucks through the compound via a series of throughways that will allow them to tip their garbage and re-enter the city smoothly. Garbage will be unpacked and sorted into piles which are then fed into mechanical belts that take smaller metal, plastic, fabric and organics to Co-op Sorters. Co-op Collectors can then cart smaller items to the Workshop or truck larger ones to the Worklab.

## Chapter 8: Design

I developed the three buildings that encouraged maximum engagement with the City and the Island: the Recycling Centre, the Workshop and the Market. They also act as templates for the larger-scale buildings with similar programs. All three buildings can be built incrementally as the Co-op earns.

### The Recycling Centre

#### Program

Kingstonians can deposit their recycled waste at the Centre where Co-op Collectors can sort through and load the carts to be taken to the Workshop or Worklab for processing. A series of framed boxes with varying infill that can act as indicators as to the type of material each box receives. The roof has a deep overhang to protect participants from the rain as cars are loaded and unloaded. It is supported by a steel truss made from materials recovered from the MRC.

#### Incremental Implementation

Boxes are built incrementally as needed to support the amount of garbage coming to the site. In 2022 the framed boxes can be made from discarded timber telephone poles mounted on a footing made from a tire filled with cement. By 2025 the coop can use a gabion foundation made with rubble from construction site and insert cylindrical concrete posts on which telephone poles can be fastened. By 2030 the coop will have enough funds to provide cast concrete foundations, if required.



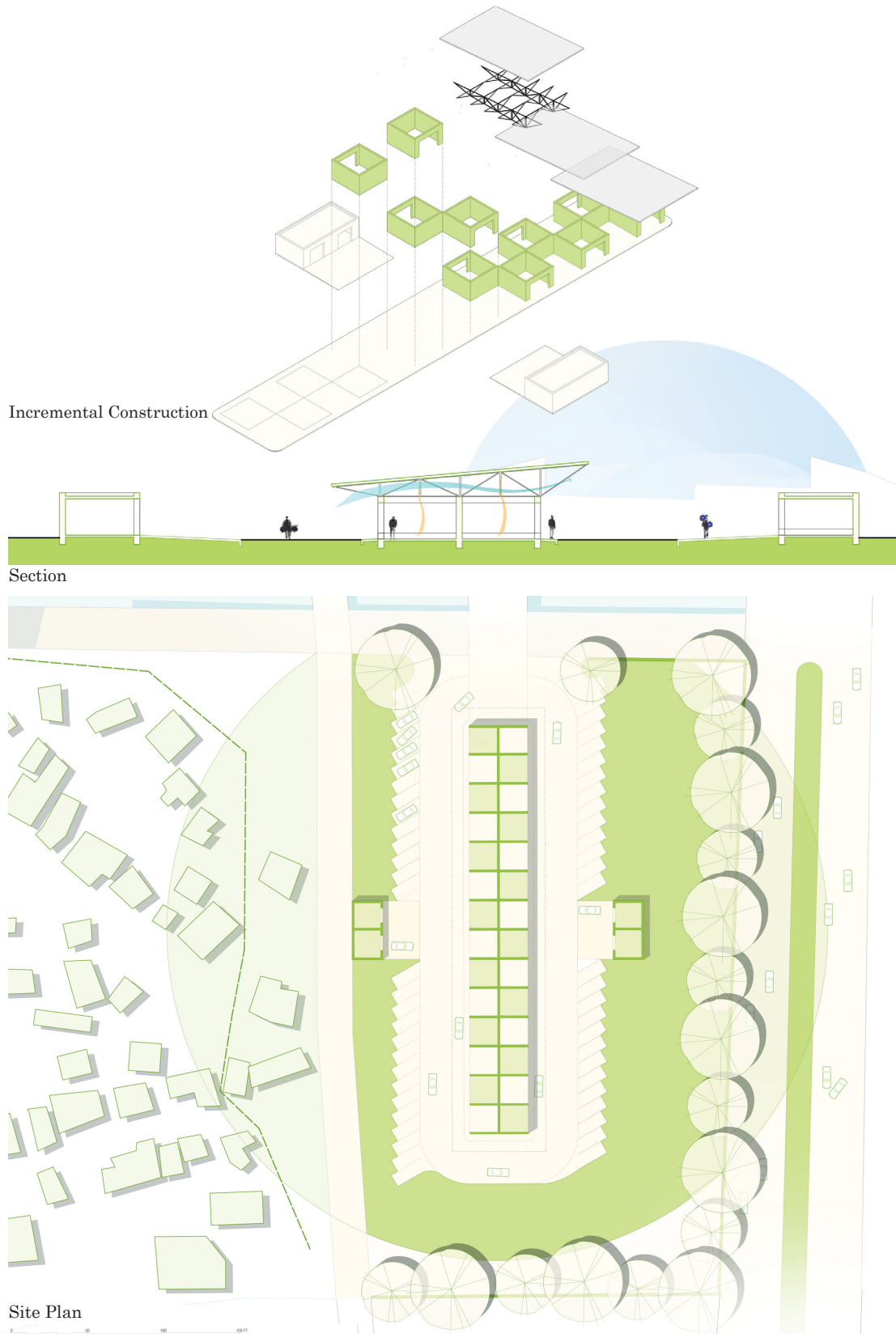


Diagram showing the incremental construction of the Recycling Centre (top), Section (centre), and Site plan (bottom)



Rendered view of the north corner of the Recycling Centre. Kingstonians can drop off their recyclables in the shaded boxes. Co-op Collectors then sort and distribute materials as they see fit. The Recycling Centre is represented as unfinished, with the foundation system drawn over the imagery and wall panels missing to indicate that ultimately, the Co-op is the designer and I only provide the framework within which they work.

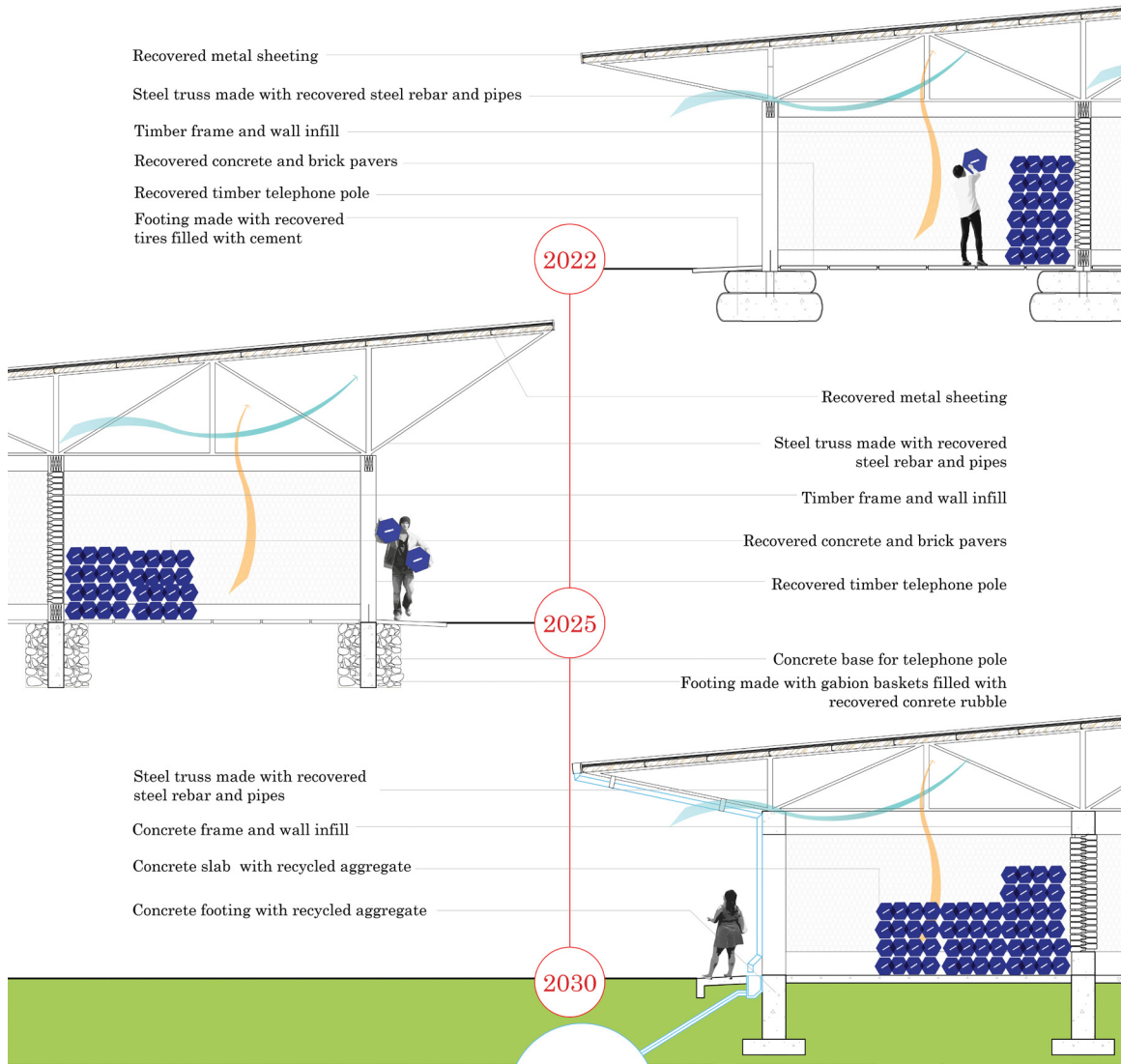


Diagram showing the evolution of the construction of the Recycling Centre from 2022 to 2030.

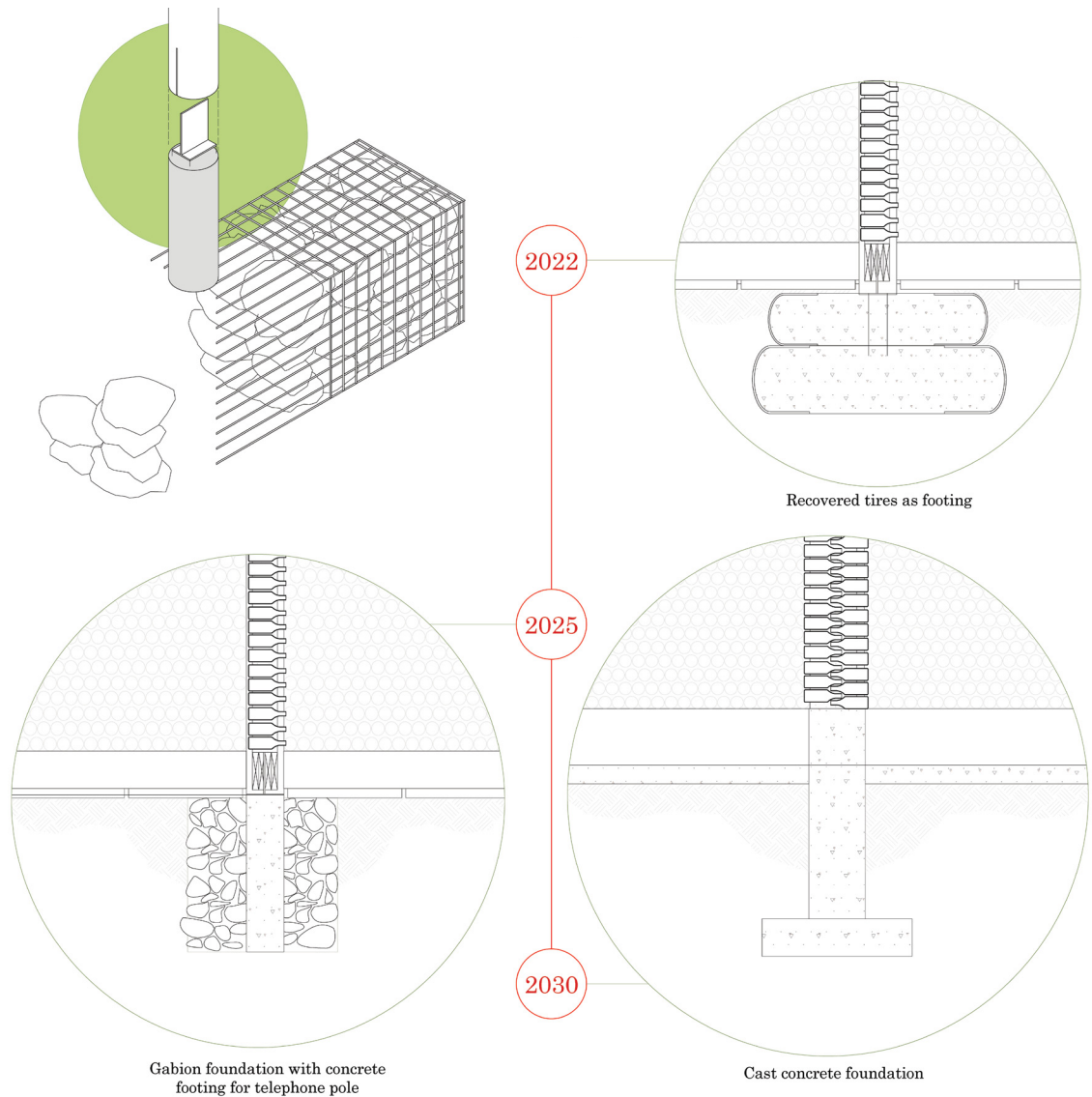


Diagram showing the evolution of the footing from 2022 to 2030. In 2022, the Co-op can repurpose tires as footings for reclaimed timber telephone posts. In 2025, the Co-op will have gathered enough construction debris to make gabion footings for reclaimed timber telephone posts. By 2030, the Co-op will be able to use standard cast concrete footings, if necessary.

## **The Workshop**

### **Program**

Co-op Technicians and artists use the Workshop to repair, teach or make items for sale in the Market. Kingstonians can bring broken items for repair and be taught how to care for their belongings by the Technicians. Artists like St. John can rent studio space in the upper level of the Workshop to continue making his beaded curtains from discarded lighters. The courtyards between the workshops are where demonstrations and gatherings can take place.

### **Incremental Implementation**

The Workshop will start with secure storage boxes that can be used to store surplus materials and a tool library. Temporary roofs can provide shade for technicians. Frames made from discarded timber or steel can be erected incrementally by 2025. By 2030 a permanent frame of either steel or concrete can be filled in with wall and floor panels as needed. Screen panels can be used as infill to provide shading. For instance, a halved bucket threaded on a dowel can provide flexible screening from the sun.

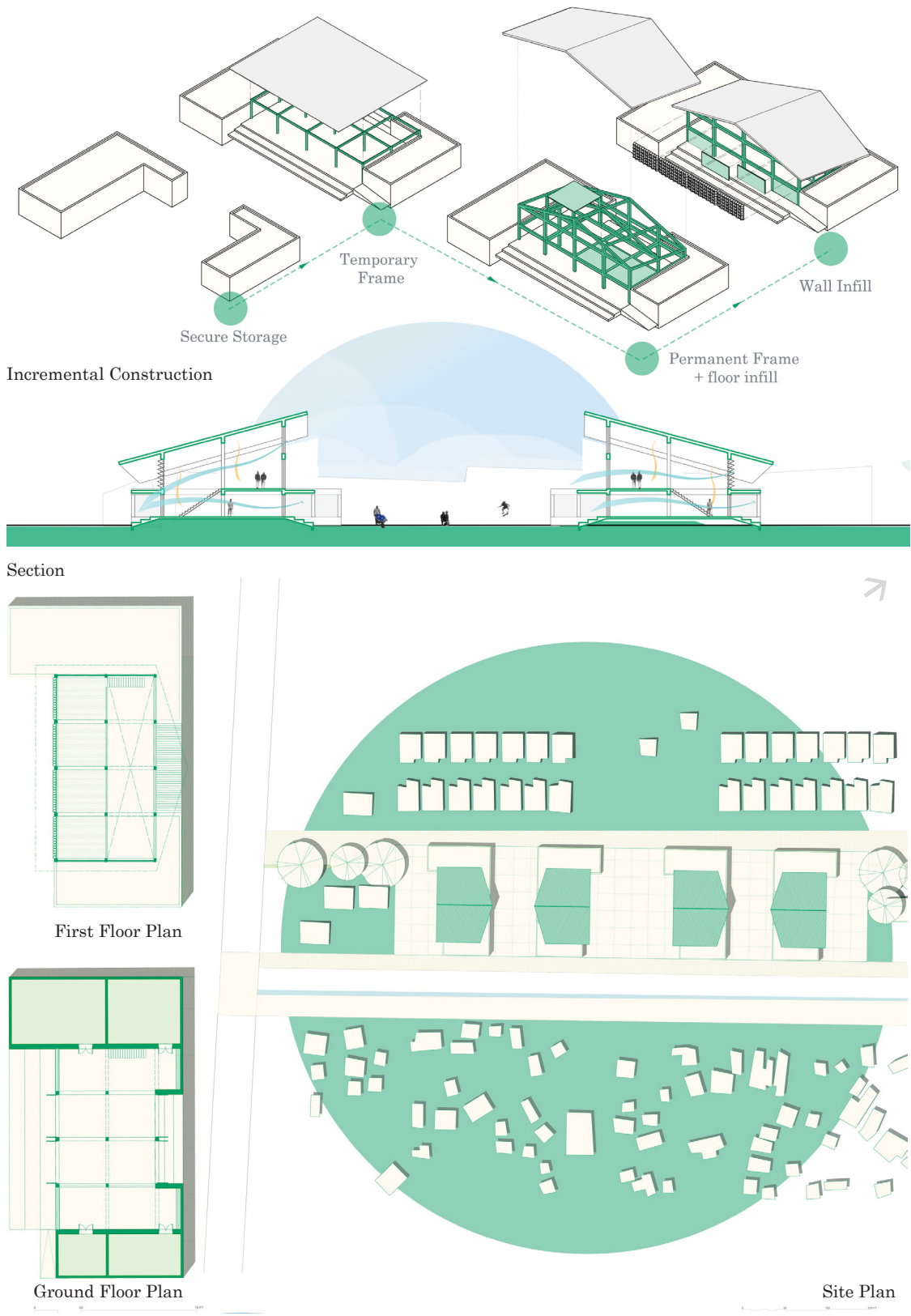


Diagram showing the incremental construction of the Workshop (top), Section (centre), and Site plan and plans (bottom).



Rendered view of the Workshop from the courtyard. Panel infill can comprise suitable materials that will allow for shading and ventilation. Shown on the upper level is an infill reclaimed halved buckets. The Workshop is represented as unfinished, with the framing system drawn over the imagery and with wall panels missing to indicate that ultimately, the Co-op is the designer and I only provide the framework within which they work.

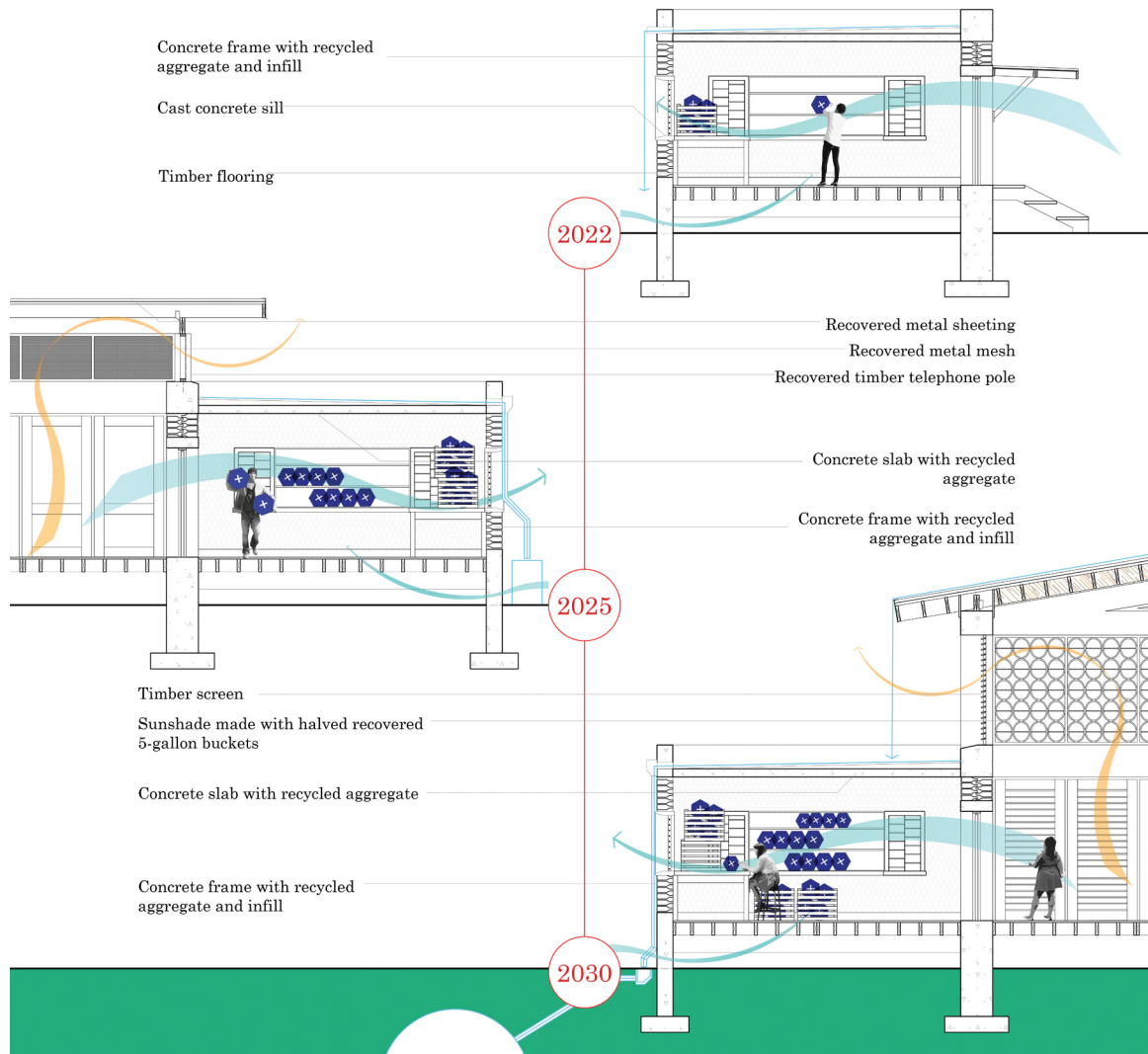


Diagram showing the evolution of the construction of the Workshop from 2022 to 2030.



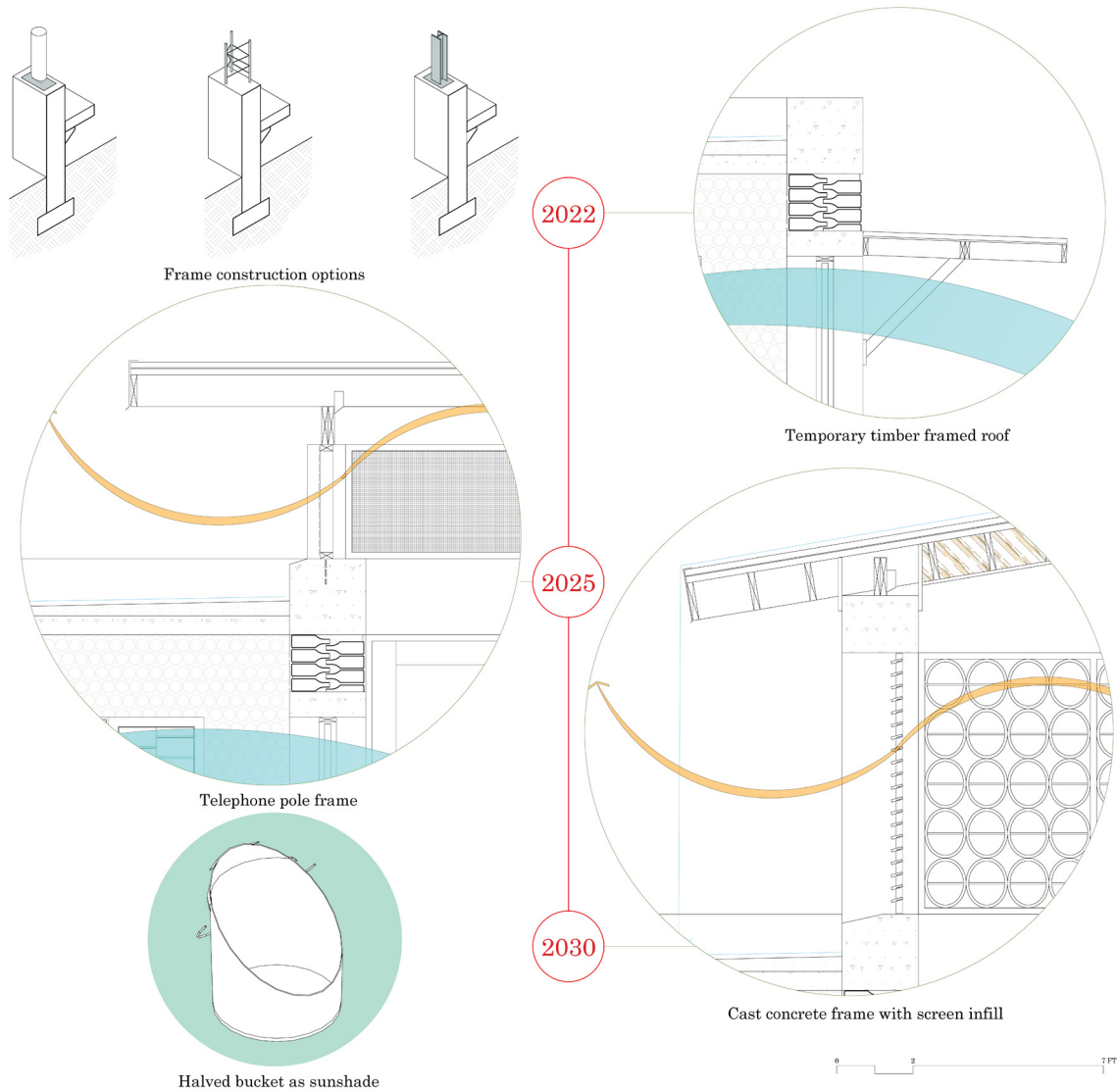


Diagram showing the evolution of the frame from 2022 to 2030. In 2022, the Co-op can erect temporary roofs to the secure storage to create shade for work that must be done outside. In 2025, the Co-op can use reclaimed timber telephone posts as support for a shed roof that covers the communal work space. By 2030, the Co-op can use metal or steel supports with wall panel infill that maximizes ventilation and shading.

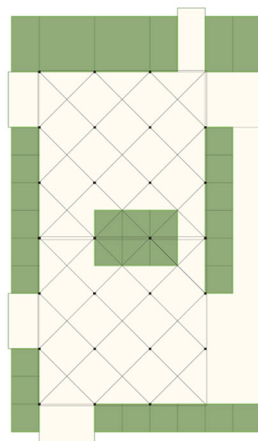
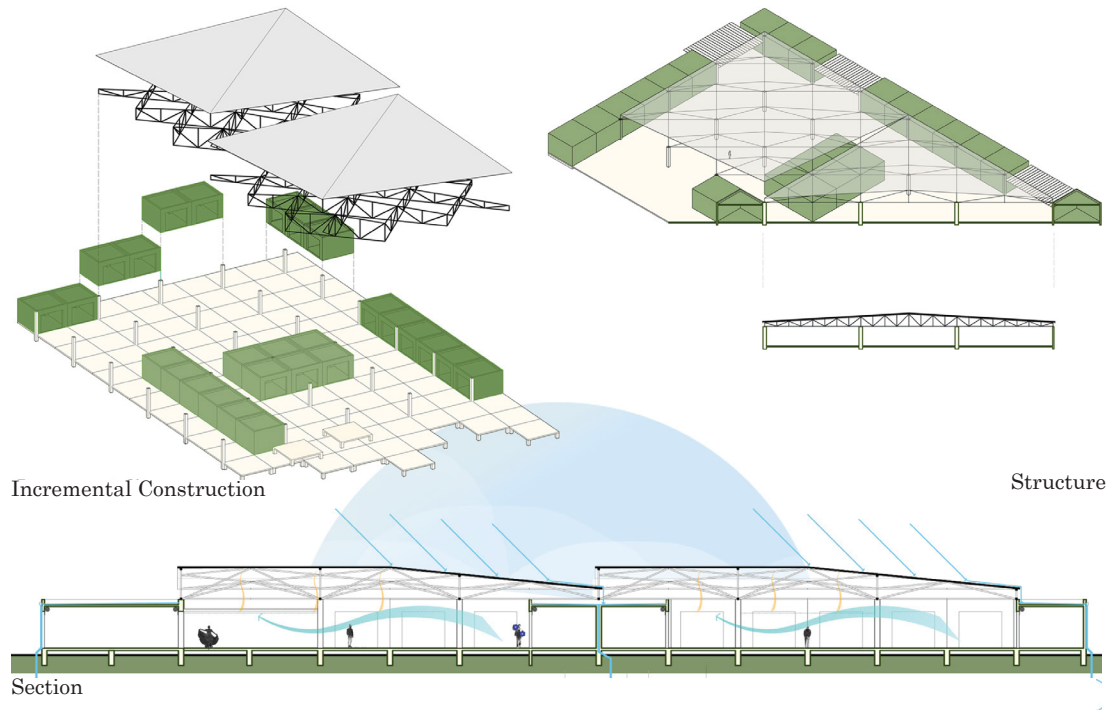
## **The Market**

### **Program**

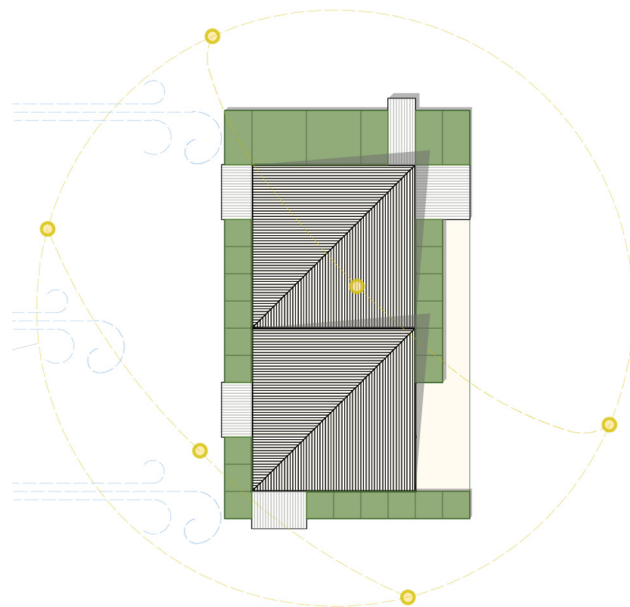
The Market is where Kingston and Riverton City can meet to shop, play and learn together. It comprises framed 20' by 20' secure boxes that can be used as secure storage by vendors. It has two 120 by 120 foot gathering spaces covered by a roof supported by steel trusses made from recovered material from the MRC made by construction and steel processing waste. The twin roofs are gable ends with the ridge oriented north to south and tilted up towards the north light while maximizing shading to the south.

### **Incremental Implementation**

By 2022, secured storage boxes with a light timber roof will be constructed. By 2025, the Co-op will have gathered enough recovered steel pipes and rebar to construct a roof truss with recovered metal sheeting. By 2030 an insulated roof will be installed with cellulose insulation derived from sugar cane or coconut waste. A timber screen will also be added to maximize shading and mitigate flooding from blowing rain.

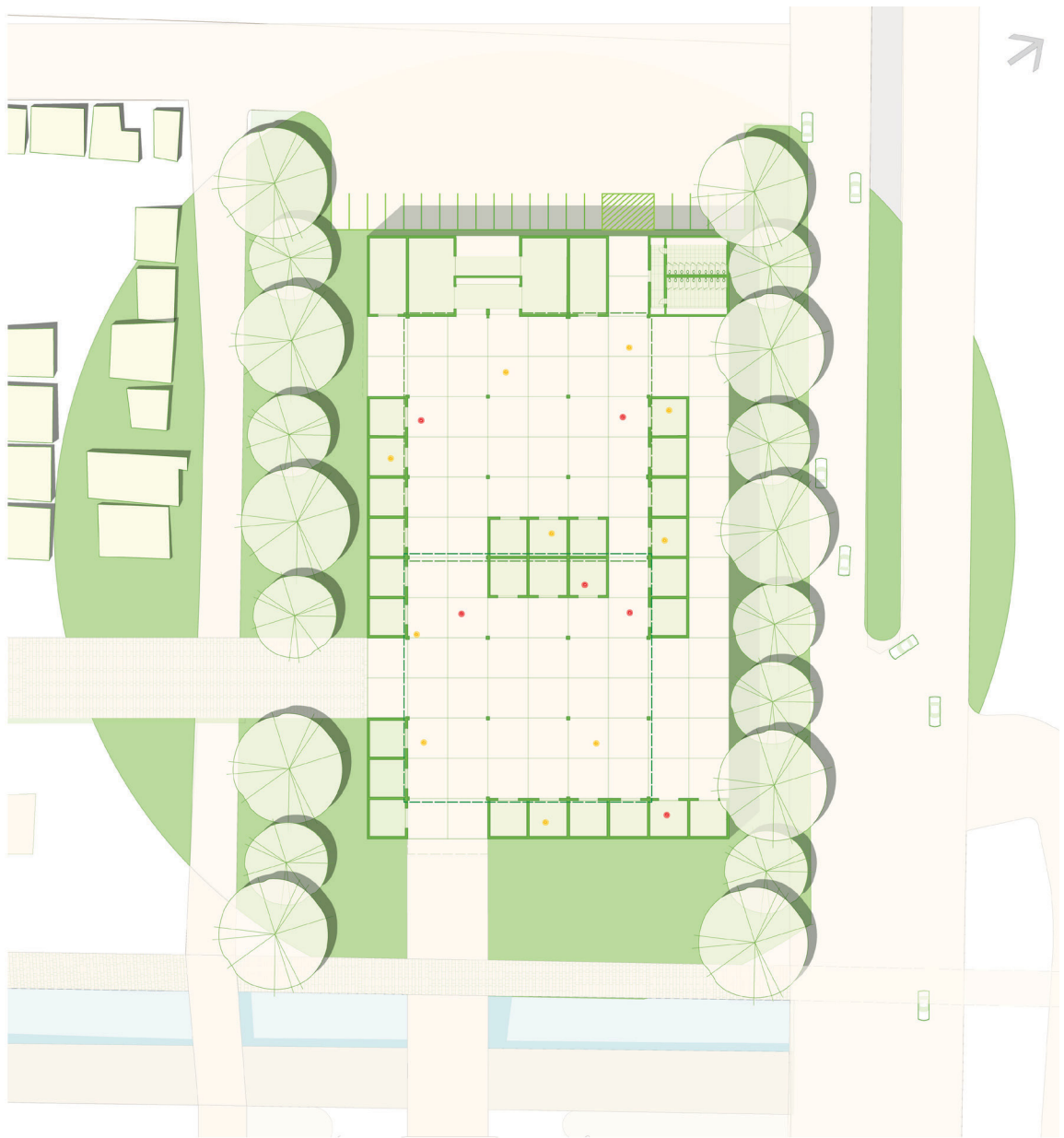


Structure

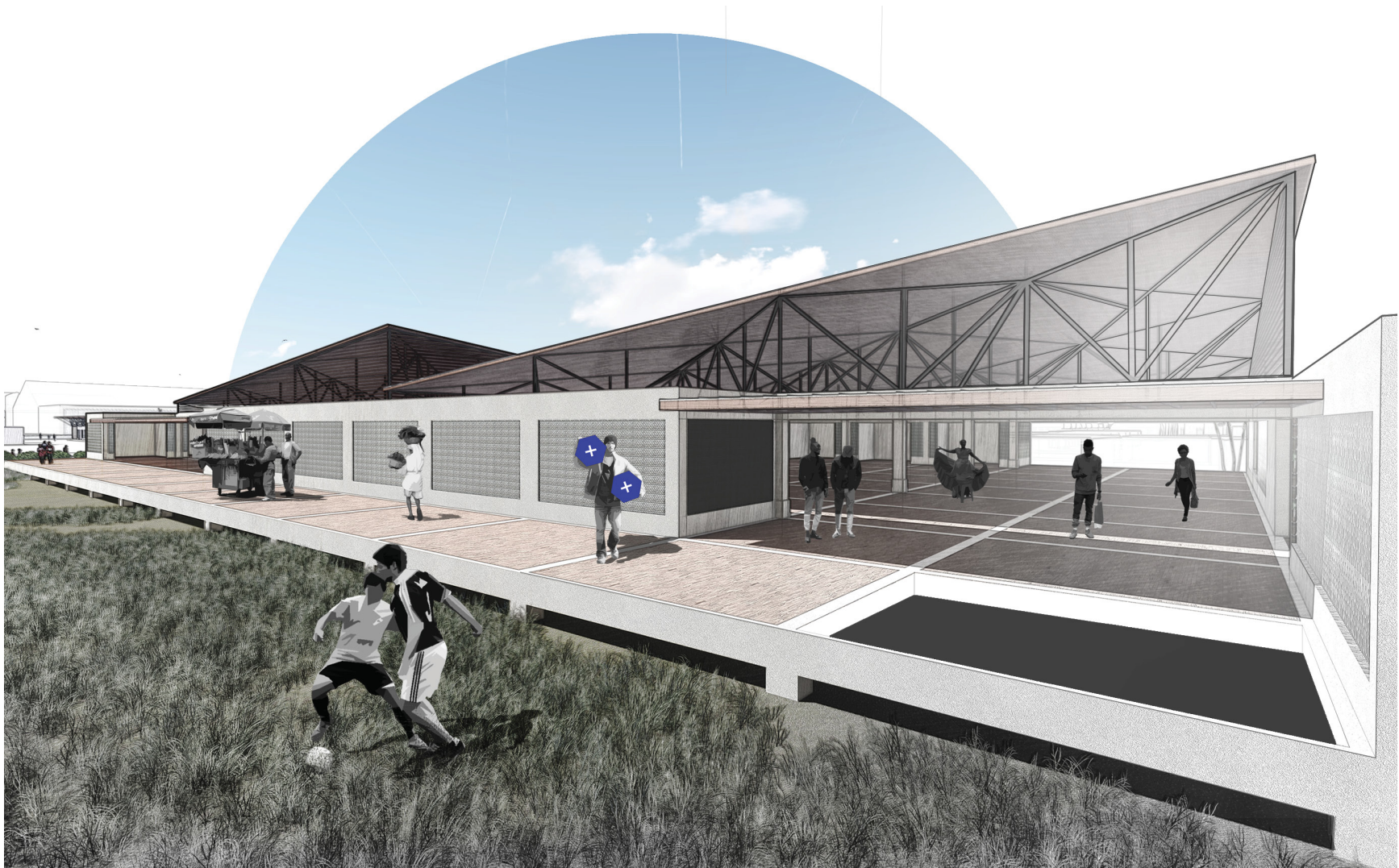


Climate

Diagram showing the incremental construction of the Market (top left), truss diagrammatic section (top right), section (centre), structural diagram (bottom left) and climate diagram (bottom right).



Site Plan



Rendered view of the Market from the north corner. The Market is represented as unfinished, with the truss system drawn over the imagery and wall and floor panels missing to indicate that ultimately, the Co-op is the designer and I only provide the framework within which they work.

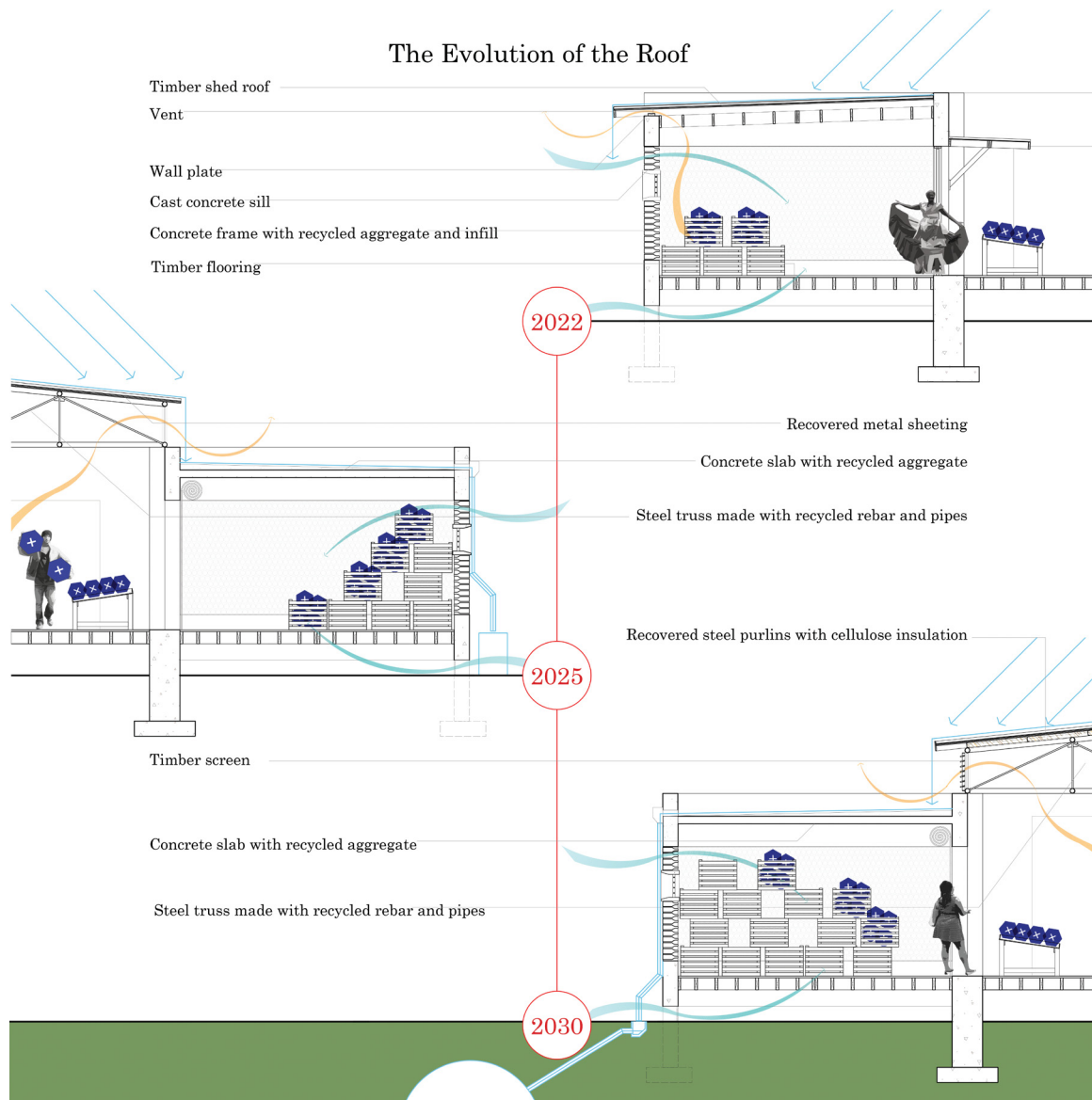


Diagram showing the evolution of the construction of the Market from 2022 to 2030.

## The Evolution of the Roof

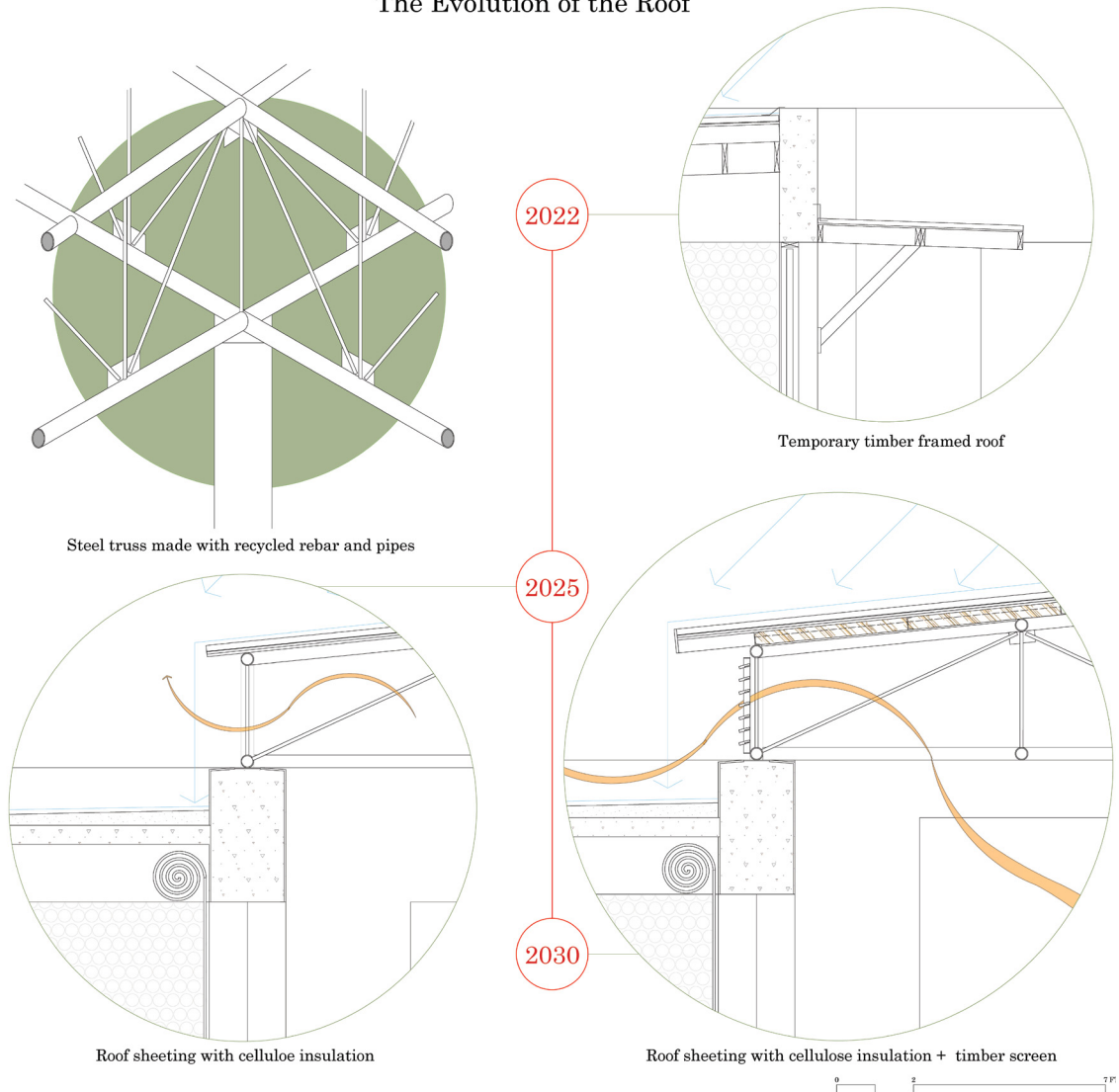


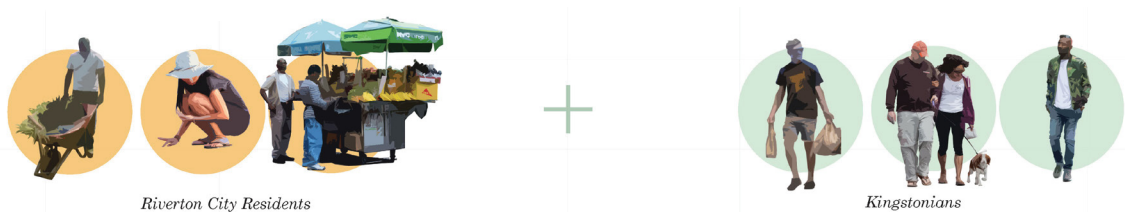
Diagram showing the evolution of the Market roof from 2022 to 2030. By 2022, secured storage boxes with a light timber roof will be constructed. By 2025, the Co-op will have gathered enough recovered steel pipes and rebar to construct a roof truss with recovered metal sheeting. By 2030 an insulated roof will be installed with cellulose insulation derived from sugar cane or coconut waste. A timber screen will also be added to maximize shading and mitigate flooding from blowing rain.

## Chapter 9: Conclusion

The Maroons are a historical prototype for self-sufficiency while willfully seeking exile from an oppressive capitalist system, despite the loss of family and community ties. They used the materials they found in their landscape, creating a new material culture, in order to maintain autonomy and create a new community. A circular economy and cultural education was integral in preserving the hinterland communities.

Strategies from the Maroons and case studies were tested on three informal settlements to determine how Riverton City, an informal settlement with ecological, economic and cultural challenges, can achieve self-sufficiency from a hostile capitalist system that had expelled it. A Co-op system activates existing communal works taking place in Riverton City, and architectural interventions organize them. The result of the communal work is that the land is rehabilitated, wildlife returns to the site and the cultural perception of the community improves.

Riverton City will invite Kingston and the rest of the Island in and serve as a contemporary prototype for self-sufficiency

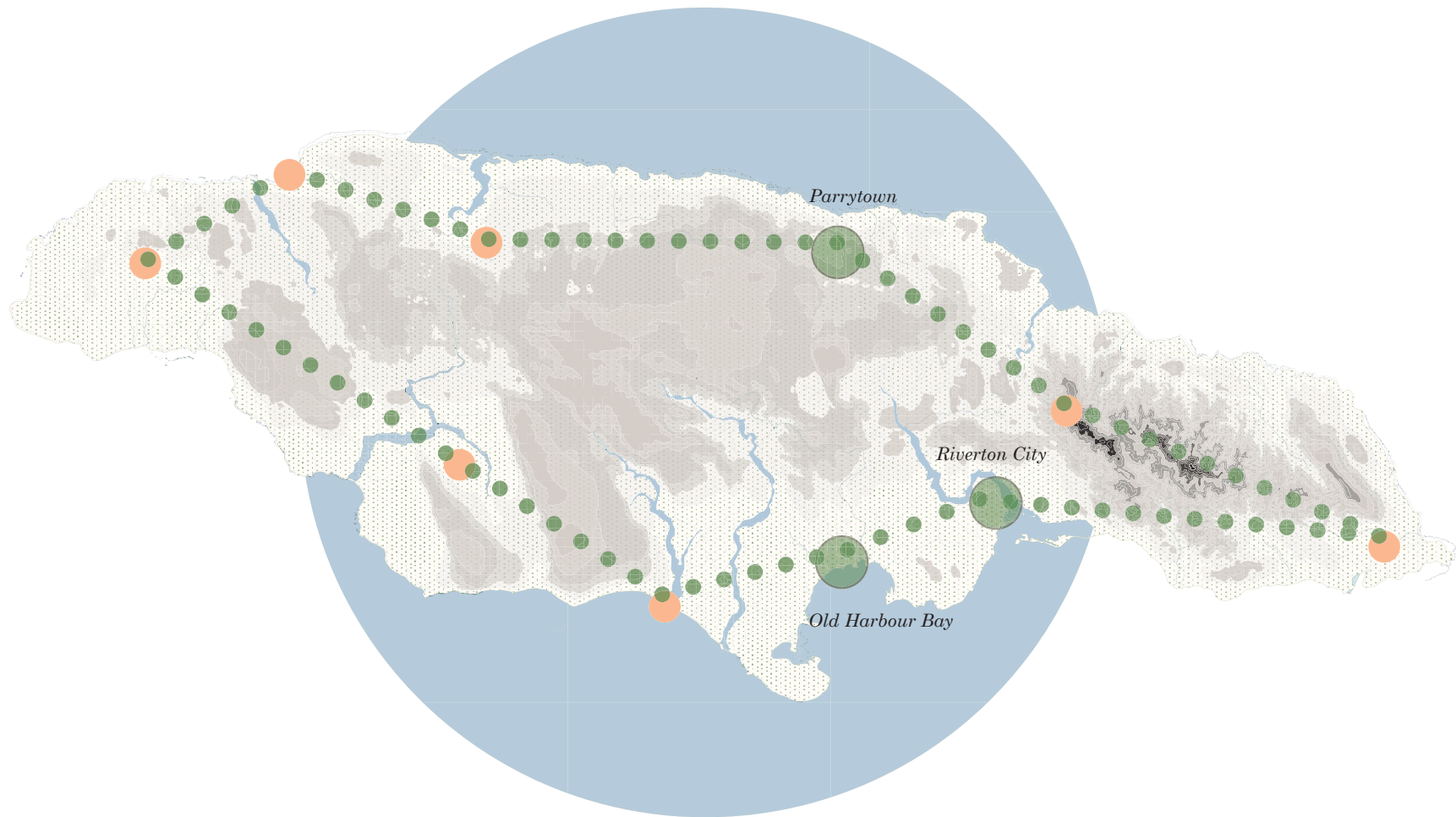


Riverton City Residents and Kingstonians reunited.



in vulnerable communities in Jamaica, through waste management and communal work.

The aim of this thesis is to demonstrate how a disadvantaged and vulnerable people can achieve self-sufficiency through communal work and establish a circular economy. By activating systems already in place in Riverton City, through a Co-op focused on waste management, the community can achieve self reliance outside of a capitalist system that alienates them.



What if vulnerable communities in Jamaica could achieve self-sufficiency through Architectural interventions dotted across the Island? (basemap: National Land Agency, 2014)

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