

**Building for the Network Society:
Spaces of Information in a Newly Connected Havana**

by

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ABSTRACT

Since the Embargo of 1962, Cuba's information infrastructure has been frozen. While other countries switched from copper wire to fiber-optic cables linking to a globally connected network -- the Internet -- Cuba remained an island: an Intra-net. But this is changing. Since August of 2015, over 30 hot-spots have been established in public spaces throughout the country, and this number is growing. The challenge will be to avoid the *digital divide* that information technology tends to cause: How does a country prevent socio-economic disparities between the *connected* and the *disconnected*? The role of architecture in bridging the divide becomes complex: designers need to consider an urban fabric that can allow for the integration of information technology in the realm of the everyday, and across social groups. How can Havana's new network of information technology grow while serving the public good?

A primary intervention is presented in the civic heart of the city in the form of an open and responsive médiathèque. A second strategy is proposed in which new "hot-spots" are inserted within the existing network of public transportation, presenting information access as a public amenity dispersed throughout Havana's transit systems.

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My parents, and my brother.

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CHAPTER 1: INTRODUCTION

1. The Spread



“World Connectivity” and “World Connections” superimposed; original maps by Chris Harris.

Four in seven people have access to the Internet in the world.¹ Two decades after the hockey-stick growth curve of the World Wide Web, the majority of the world is still *disconnected*. A glance at a map of world connections divulges how flows of information roughly follow the trail of submarine and land cables laid over half a century ago, which roughly follow the trade routes leading the ships and steam engines of the First Machine Age. Strange to think that the world distribution model of the Industrial Revolution is still the spine of the flows of today’s goods and information, considering the cost of reproduction of the Digital Age. To *copy* and *distribute* anything in the Industrial era meant to *re-make* and *ship*. Mechanical reproduction inherently relied on machinery and its supporting human and natural resources, ideally all in the same physical location, most likely within propinquity of an engine that could never be moved once built. If we use the example of a book being reproduced from beginning to end (from resources to the hands of the reader), we can imagine the paper factory, the natural and human resources involved, the energy, the engines, the skills sets, the trains, the presses, the binding process, the packaging and

1. Rounded world population divided by world Internet users. World Population from Worldometer 2015. Internet users from InternetLiveStats 2015.

a multi-stage distribution system. Trade routes, as physical roads and rails, needed to be the most efficient shortcuts between economic nodes that could support the infrastructure of production and distribution. To have access to newly reproduced books, you needed to be served by this network. You had to be able to afford the *cost of reproduction*. But what happens when the cost of reproduction becomes virtually nothing, and shipments are physically weightless, and the time of distribution is null, and the trade network can be ubiquitous? Everything changes for everyone, for better for some, for worse for others.

Many people expected the democratization of information via the Internet to create a more level playing field, in their cities and in the world. The early stages of the web proved that people could share content that circumvented corporate hegemony and outdated inhibitory copyright laws. Co-founder of Reddit (which claims to be “the front page of the Internet”) Alexis Ohanian coined the phrase for this movement: “without *their* permission,” referring to the new possibilities and agency given to motivated individuals no longer inhibited by *them*. *They* insinuates the outdated bureaucracies, laws and bodies of power that once exploited their positions at the top of first world economies. Now *they* were decaying at the hand of creative individuals with better ideas. Examples include Napster and how file-sharing radically transformed the music distribution model, AirBnB threatening giant hotel corporations, Uber and the amelioration of taxi services for drivers and users, and other success stories of intelligent individuals that found a way to allow more people to benefit from organized information using the Internet as a platform. In 1985 Stewart Brand stated the underlying ideology of new generation of thought using an open-sourced model:

On the one hand information wants to be expensive, because it's so valuable. The right information in the right place just changes your life. On the other hand, information wants to be free, because the cost of getting it out is getting lower and lower all the time. So you have these two fighting against each other.²

Information wants to be free, but free information countered the previous paradigm of withholding bodies of intellectual properties and selling off pieces, not properly distributing wealth to content creators, and serving few at the expense of many. The culture of free information of the Internet allowed the best ideas to surface at unprecedented speeds. An upload by a single person could potentially immediately have a (connected)-world audi-

2. Stewart Brand, “Information Wants to be Free,” *Whole Earth Review* (1985): 49.

ence. In 2011, tech-entrepreneur and author Marc Andreessen wrote: “Software is eating the World.”³ This was a response to the new ease through which individuals could satisfy the market of increasingly digitized services. The effects were sudden in the connected world. The first noticeable phases in the physical fabric of our cities happened over a few years as music and movie stores disappeared from the streets. Youtube became the most popular cinema allowing people to watch anything uploaded at any time, wherever there was power and a connection. Public behaviours changed. People knew when the bus was coming and only cued at the last minute, and your food came to your fridge, but you didn’t need to the grocery store (but you could still go to the market for the “experience”). Everything left still *analogue* or *manual* is prospected for digitization by eager startups and Internet giants, from distribution of physical goods and driving, to sex, linguistics and surgery. Anyone with a connection could benefit from the fastest growing and changing revolution of civilization on the global scale. This brings us to *the spread*.

Co-authors of “The Second Machine Age,” Erik Brynjolfsson and Andrew McAfee refer to “the spread” as the disparities in economic classes as a result of the restructured world economy within the connected world. The authors compare the Industrial business model to the contemporary one using the example of digitization of photography for clarity.

The evolution of photography illustrates the bounty of the second machine age, the first great economic consequence of the exponential, digital, combinatorial progress taking place at a present. The second one, spread, means there are large and growing differences among people in income, wealth, and other circumstances of life.⁴

Kodak allowed its founder George Eastman to find fortune, but the company also employed up to 145 300 people involved in the process of developing and processing photos, creating a middle class economy (mostly in Rochester, New York) and an absolute distribution of wealth. But 132 years after its founding, “a few months before Instagram was sold to Facebook, Kodak filed for bankruptcy.”⁵ Photo-sharing is more accessible than ever,⁶ but Facebook does not need the volume of employees once required by Kodak, since the cost of digital replication is...Nothing. Facebook only needs a handful of the best engineers rather than an array of tradespeople with repeated skills. A small fraction

3. Marc Andreessen, The Wall Street Journal, Aug 20 2011

4. Erik Brynjolfsson and Andrew McAfee, *The Second Machine Age*, 127.

5. Ibid.

6. Ibid.

of the employees once required dominate the market on a global scale. Brynjolfssen and McAfee describe a massive accumulation of wealth at the top of “the best and the rest economy.” In the industrial model, if one tradesman was slightly better than another, he/she may have charged proportionally more for their service. In the digital model, if one service (program) is slightly better than the other it will completely dominate the market on a world scale.⁷ If you have instantaneous access to services independent of time and space, why not only use the best one? Who uses the second to Google Maps, Adobe Photoshop, Youtube, Facebook, Ebay? The difference between best and second-best is disproportionate when compared to services prior to the digital age. The best dominate the markets, and the others struggle to survive. Brynjolfssen and McAfee show this phenomenon at the top of the world economies, however this socio-economic chasm exists on multiple scales, all driven by technological advantages that create barriers between those served by -- and those pushed aside by -- information technology (IT).

Scholars Manuel Castells and William Mitchell refer to this phenomenon as the “digital divide,” in which the disconnected live in the same physical world as the connected, but are not presented the same opportunities and well-being. Technological advantages that may seem slight can polarize societies, even when the technology is as rudimentary as SMS messaging.

Text messages can radically change the economic structure of a community. For some Majority World fishing communities, texting has allowed fishermen to distribute their catch to sellers not yet saturated. This means the fishermen can sell more fish at a better price to remaining resellers, and the resellers can have the perfect amount of product to store and keep a steady and fresh inventory. Both waste less time, money and resources along the way and food waste is diminished. Fishermen without this tool, however, may end up wasting even more time and resources than trying to sell to resellers that already rely on a sure network of “connected” fishermen. It is foreseeable that the fishermen without the ability to text could end up at the bottom of the changed economy, while those who have adapted can thrive. One study shows that every ten additional mobile phones per one hundred people “increases the rate of growth of GDP-per-person by more than one

7. Ibid.

percentage point.”⁸

In a rich metropolitan example, the people most affected by the digital divide may be the generation not raised by the Internet and who have little education with IT. Someone who cannot use a word processing system might have more difficulty distributing resumes than someone that can. Unfortunately, the tradespeople whose skills are being automated (replaced by information and communication technology) are often the most vulnerable because their skill sets have not allowed for the adoption of IT. In wealthier societies, efforts to bridge the divide are induced by public institutions, such as libraries and community centers, providing services and assistance to people on the wrong side of the divide.

The digital divide is also noticeable at the urban scale. Techno-parks are usually situated in low-cost areas within a reasonable distance of a city-center. These parks create a tremendous amount of wealth, but as Erik Brynjolfsson and Andrew McAfee remind us, this wealth is not distributed within the place in which they operate. Internet-millionaires create their own gated communities. They work on laptops at home. They drive through worse-off neighbourhoods, seeing them only through luxury car windows. Their destination is a complex segregated from its surroundings.

On the global Scale, the digital divide is most manifested in the division of labour. Because digitized goods weigh nothing and travel at the speed of light through fiber-optic cable networks, labour can be distributed to the lowest bidder in the world. Night security video footage in New York can be monitored during a day shift in Mumbai. Factories in countries with low environmental regulations can be run from a laptop in a tropical tax haven. A call center in a Majority World city below the equator can service a larger, richer city in the same time zone. The labour class is offshore, servicing first-world cities. In turn, first-world cities become knowledge-work capitals, consolidated by the skills and infrastructure that ensure (universities and teaching, libraries and librarians, museums and curators, technology companies and their recruiting facilities, international firms and their architects..etc.). “Catching up” becomes an increasingly difficult task when labour and creation/management are geographically separated.

8. “Planet of the Phones,” in *The Economist*, Feb 28, 2015

On the one hand, the Internet has catalyzed the polarization of wealth. But there is no doubt that the Internet creates a immense amount of value for all of those connected. Long distance video calls become free, learning becomes extremely accessible, open-sourced projects like Wikipedia, wiki-house, OpenDesk, SketchUp, Arduino etc... give individuals the power to use -- and contribute to -- a global body of knowledge. The Internet is recognized as being so necessary in the 21st century that some groups advocate for an open Internet access to be ratified on the Charter of Human Rights, alongside access to clean water and freedom of religion. Currently, there are philanthropic efforts to connect the entire world. Google's Project Loon and Facebook's Drone prototypes are being designed to send the internet down to regions that do not have connections, sometimes referred to as "last mile" locations. The Internet's combinatorial paradigm gains exponential value with a linear addition of nodes. The more minds that are connected, the better the network works, and the more value it creates for all those connected.



Google X's "Project Loon" distributes the Internet via balloons that use wind currents in the atmosphere to float to destinations around the southern hemisphere, namely "last-mile" destinations that are the most difficult for network infrastructure to reach; image from Google Project Loon.

Across a spectrum ranging from Internet-giants to the disconnected, a global Internet access is a clear global objective. So why are billions still disconnected? In some cases, problems lie in policy. Cable needs to run across owned land. Who concedes? Who pays? In some cases, connection is undesirable for reasons of censorship and con-

trol. Other complications include logistics. A high level of organization is needed to align all of the actors/parties at work, from infrastructure, to distribution, maintenance, and viable financial models to ensure proper usage and network quality. It is projected that by 2020, 80 percent of the world will own a smartphone.⁹ Autonomous from grounded infrastructure, networks can flow through the waves of low-Earth satellites, balloons, drones, antennae and other devices. It is not difficult to imagine a completely connected world. It might be more difficult to imagine a reasonable distribution of wealth during the transition from *disconnected* to *connected*.

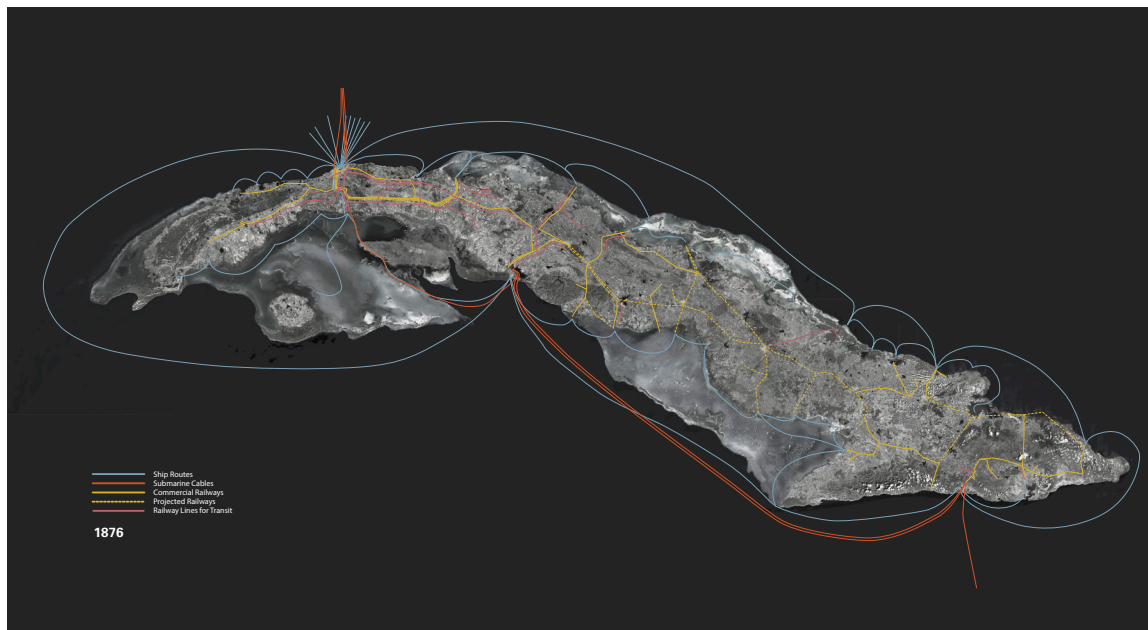
The role of architecture in bridging the divide is most relevant at the city scale. Castells writes about “Dual Cities,” in which “urban systems are spatially and socially polarized between high-value making groups and functions on the one hand, and devalued social groups and downgraded spaces on the other.”¹⁰ Social gaps become informed by the morphology of the city, and vice-versa. William Mitchell warns readers of an urban dystopia in which “dwindling opportunities for contact across the borders of more and more discrete units could certainly cause public life to atrophy, and we could eventually face the explosive combination of decay and derelict areas tinged by the territories of psychopathic survivalists barricaded in their isolated forts.”¹¹ As an intervention facing the divide, architecture should be used to create overlap across the borders. IT needs to be integrated, normalized in the everyday and exposed so that it is never alien to groups. The most relevant interventions will be in cities that are beginning to accommodate information technology. I have chosen to look at Havana, Cuba, since the country is now beginning to introduce public Internet hot-spots in its cities for the first time starting in 2015; it is the ideal case study to respond to the introduction of IT and to propose preventative measures against a potential divide. The way in which the network will grow and engage with the public will determine how the city will develop. To understand how to respond to a new network, it is important to understand the history Cuba’s networks.

9. “They [smartphones] have become the fastest-selling gadgets in history, outstripping the growth of the simple mobile phones that preceded them. They outsell personal computers four to one. Today about half the adult population owns a smartphone; by 2020, 80% will.” “Planet of the Phones,” in *The Economist*, Feb 28, 2015

10. Manuel Castells quoted in R. G. Baird et al, “High Technology and Low-income Communities”, 25-42

11. William Mitchell, *E-Topia*, 82.

2. A Curious Case of Networks: Cuba



2.1 Isolation

Base Map: Plano Telegrafico de la Ysla de Cuba (Habana, Cuba: D. Enrique de Arantave, 1876), Redrawn by Author.

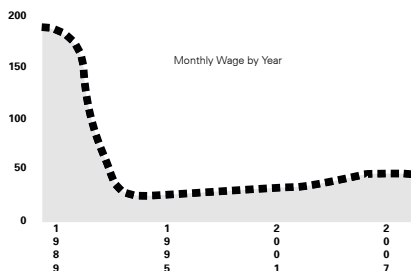
The paradigm of information network development has been halted, set back and frozen for Cuba over the course of the last half-century. Above is a redrawn map of Cuba showing the flows of goods and information in 1876. Flows of goods and flows of information are gathered throughout the island, mobilized through networks of railroads, submarine and telegraph cables, roads and ship-routes, to be sent, shipped, and transmitted into a world exchange network. Havana, the closest node to America, served as a launching point for these flows. The city was the primary communication and at the technological forefront of the First Machine Age during Spanish and American occupation. However, this network would be radically changed, twice. Cuba's unique historical trajectory would not make the transition to IT the way the rest of the world at the same level of development would by the mid 1990s.

The first of these radical changes in networks was caused by the American Em-

bargo implemented in 1960 and revised in 1962. The Cuban Revolution of 1959 not only cut commercial ties with the USA, but also nationalized previously American-owned refineries, reclaimed American land and infrastructure. In 1960, the USA established an Embargo, cutting all trade to Cuba except for medical supplies and food. By 1962, the Embargo halted almost all trade, and Cuba began to rely on its new relationship to Soviet Union for necessities. After the Cuban missile crisis, six statutes legally cut Cuba from any American trade.¹² For a ship to port in the USA, it could not have ported in Cuba. Submarine cables to Florida were cut, and any country reliant on American business could not trade with the newly declared American enemy. Cuba had to reconfigure its network ties to survive, relying on support and trade with the Soviet Union.

The second radical change in flows ensued the dissolution of the Soviet Union, which was already Cuba's last trading resort. The island could no longer rely on its main trading relationship. Fidel called this period "A Special Period in a Time of Peace." A shortage of oil and gasoline almost instantly re-structured Cuban life. Agriculture needed to become urban out of necessity, cars could no longer be used in the same leisurely way, and food became a scarcity. The average wage fell nine-fold, and the country found itself almost instantaneously in a state of emergency. Many talents and professionals, including many of Cuba's architects and engineers, left the country. For the remaining, an island most likely had never felt more isolated. The economy plummeted to its worst at the beginning of the 1990s, slowly rising throughout the decade. This is when a culture of material sustainability emerged from necessity. Items on the island needed to keep working, and a culture of problem solving and ingenuity took shape.

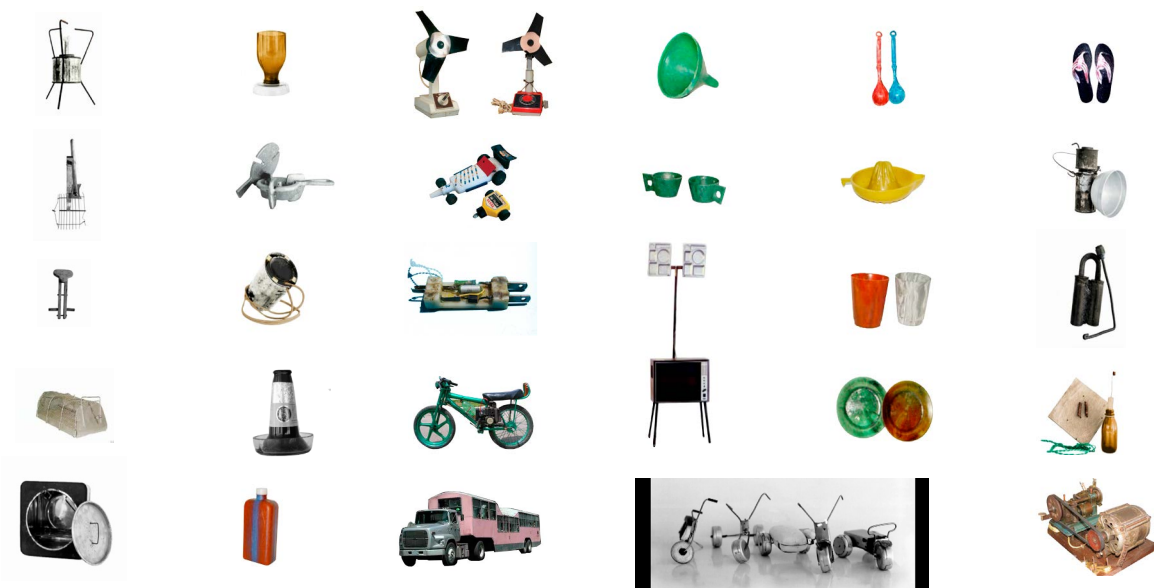
2.2 A Culture of Making Solutions



Graph showing the sudden drop of the Cuban economy during the "Special Period" through average monthly wage by year.

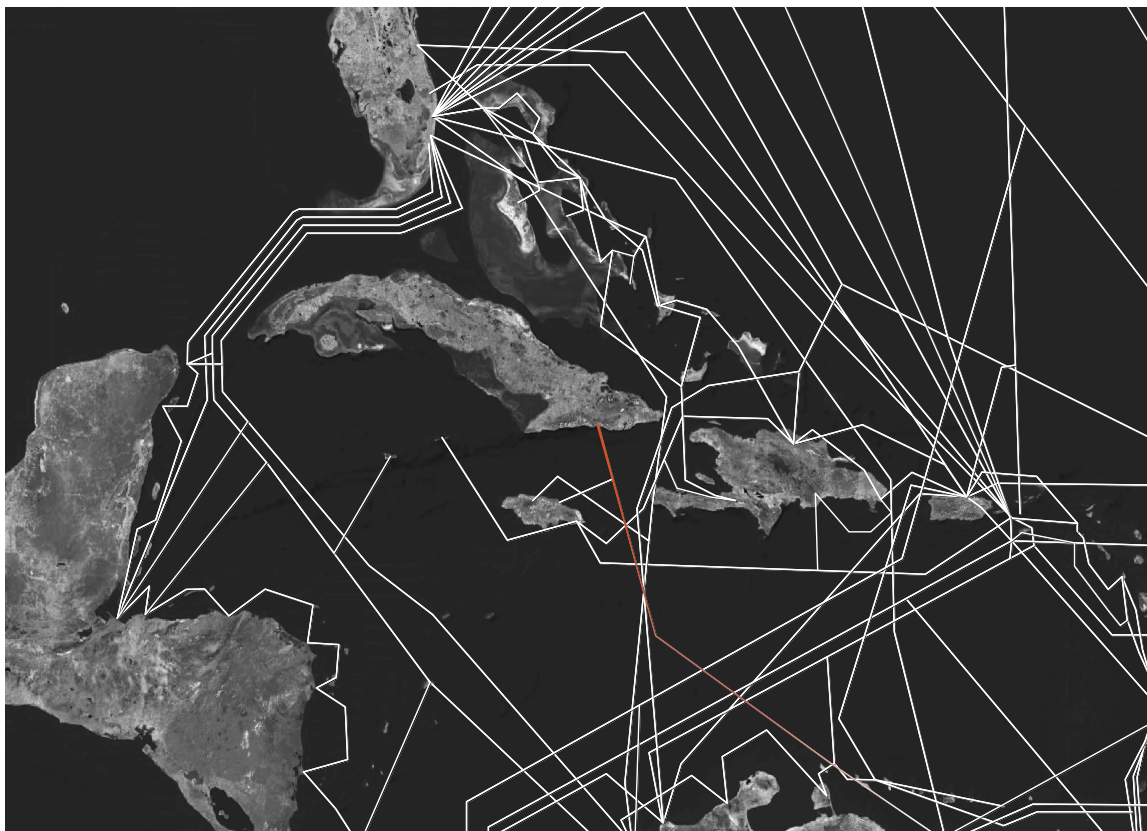
12. The Trading with the Enemy Act (1917), The Foreign Assistance Act (1961), The Cuban Assets Control Regulations (1963), The Cuban Democracy Act (1992), The Helms-Burton Act (1996), and The Trade Sanctions Reform and Export Enhancement Act (2000).

From this state of scarcity arose a new culture of solutions and making. People began recycling, combining, changing and transforming common objects to address health, protection, agriculture, mechanical, electrical and transportation needs. The best solutions were compiled and re-distributed by the military in a book called *Con Nuestros Propios Esfuerzos*, which translates to: "With Our Own Efforts."¹³ Pride was instilled in the creative and technical abilities of the individual, who took on the role of the engineer (since many engineers left the country). This new paradigm of making and sharing is what I understand to be the first large-scale open-sourced model of solutions through a collective intelligence. This pattern parallels the collective intelligence of the Internet, in which the most valuable ideas surface above a mass of solutions. However, this model is restricted to the communication networks of authority (curated by the military and contained by Cuba's borders).



Selected inventions created from the conditions of the Special Period. The result has been perhaps the strongest "do it yourself" (DIY) culture. In the connected world, DIY culture is symbiotic to the open-sourced nature of the Internet, allowing people to share their inventions, 3d print, CNC, laser, machine, etc so that anyone can use them. These technologies are often criticized in public institutions as being under-used (Library theorist Shannon Mattern refers to 3D printers as novel machines to make key-chains and "your own bust" with, but a society with a culture of making so strong could potentially use these technologies and extremely valuable ways, using the knowledge resources of the world.

13. Ernesto Oroza, "The Technological Disobedience of Ernesto Oroza." Video. VBS IPTV, LLC. 2010



Map of various fiber-optic cables in the Caribbean redrawn from a slide presented by professor Jorge Peña Diaz; CUJAE, Havana, 2014.

2.3 Still an Island

The map above illustrates how still today information networks circumvent Cuba, mainly as a result of the Embargo. The United States has invested in many of the cables that have been laid on the ocean floor. Only a single fiber-optic cable enters the country in Santiago from Venezuela (as of 2011),¹⁴ but the Internet that enters the country serves primarily the tourist economy and high positions in government, the military and education (although even this Internet is highly censored, has quotas and a bandwidth that is extremely slow). Other factors to consider in the scarcity of the Internet is the elevated cost of operating and servicing fiber-optic cables.

14. Anna Cristina Pertierra, *If They Show Prison Break in the United States on a Wednesday, by Thursday It Is Here: Mobile Media Networks in Twenty-First-Century Cuba*, 403.

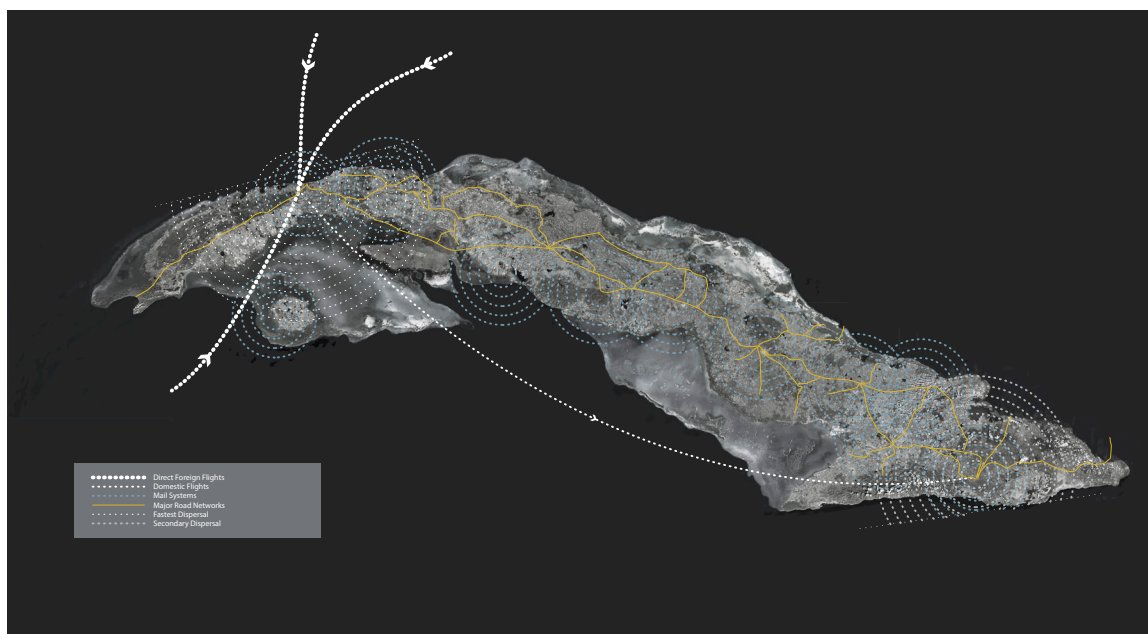
2.4 Out of Reach: The Separation of Cubans from Tourism

Cuba opened up to tourism in the early 1990's, facilitating a cultural exchange between the island and the world. However, there have been efforts to prevent relationships between visitors and Cubans. One measure was a law implemented by Fidel Castro (until 2008) making it illegal for Cubans to enter hotels.¹⁵ Another measure that hinders the relationship between foreigners and locals is the dual currency. Locals use the Cuban Peso, while tourists use the CUC (Cuban convertible peso) which amounts to roughly 26 times the value of the Cuban Peso. Tourists are charged more for the same products, since they are not subsidized by the state. Places of tourism charge more, and occasionally only accept and deal with CUC, not affordable for locals. Oppositely, tourists may not be likely to visit places that only use Cuban Pesos, since they might be uncomfortable with the exchange rate, or may not be able to use their change in Cuban Pesos in other places. The price discrepancies of different zones give locals and tourists access to different parts of the city, which do not overlap, but are rather superimposed. Many scams also tend to occur in the transactions between CUC and Cuban Pesos, since pocket-change for a tourist can make a significant change for a local in need. This creates prejudices on both sides of the economy: the naive tourist on one side, and the dishonest local on the other. The dual economy reinforces the separation of the city and hinders an exchange of information.

Without the Internet, Cuban culture takes time and an analogue selection process to be exported into the world. Musicians and artists do find fame abroad, but not as quickly as Internet stars. Conversely, world culture and events are viewed by Cubans in a much quicker process that is perhaps a lot faster than expected. This is the culture of "el Paquete."

15. "Raul Castro Lifts brother Fidel's Ban on Cuban's Staying in Tourist Hotels," *Dailymail.co.uk*, March 31, 2008, <http://www.dailymail.co.uk/news/article-551908/Raul-Castro-lifts-brother-Fidels-ban-Cubans-staying-tourist-hotels.html>

2.5 “El Paquete,” A Weekly Dose of Information



Speculative map of how physical hard-drives of information are dispersed throughout Cuba. Information may enter via plane in the Country’s only international airport in Havana then is distributed by physical networks, such as road and mail systems. The last step in dispersion is from person to person, copying and transferring files from one device to another; base map from Google Earth, 2016.

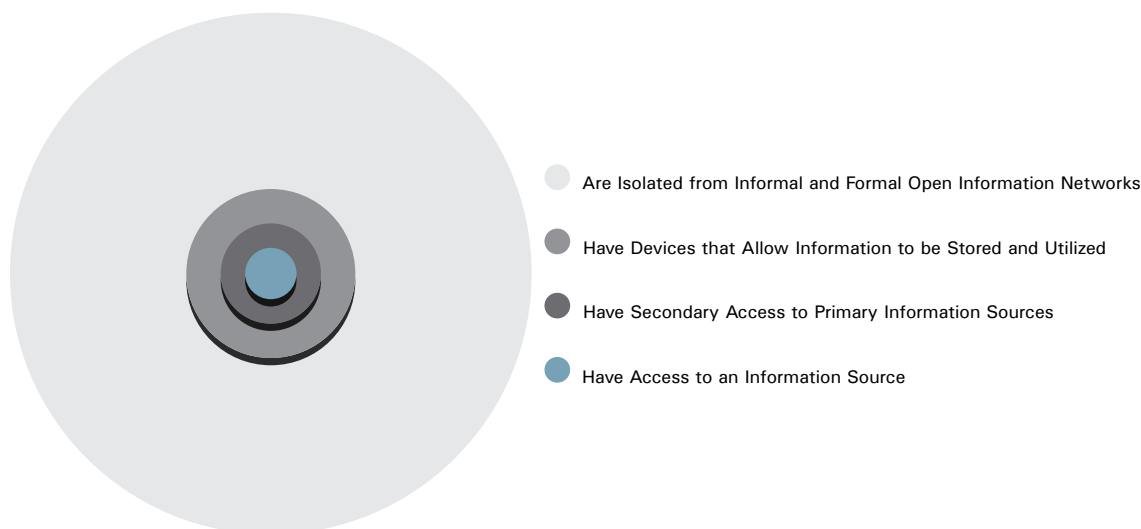
The media landscape of Cuba is characterized by a deep connection to transnational circuits of media consumption despite the official isolation of the Cuban media industries and the technological isolation that limits the everyday connectivity of most Cubans to new media and information technologies.¹⁶

One of the informal ways through which Cubans are able to obtain recent media is through what is referred to as “the paquet”: An imported hard-drive of information containing shows, news, magazines, books, movies, music and requests that usually appears once a week. Importers (people with access to a high-speed connection, most likely offshore) sell the content to a handful of distributors, who in turn charge a fee (usually 2 CUC). The transaction happens from device to USB port. Unlike downloading something on the web, the people involved in the transaction have to spend time together, in the same space, selecting and transferring files. A new release will have a high market value. People in good standing with those who import or purchase information can usually obtain content for free, and share it within their circles. The university students I have met in Cuba all had hundreds of gigabytes of information, none of which they had paid for.

16. Pertierra, 410.

This model creates a unique social dynamic concentric to bits of information. The students I had spoken to considered themselves open and progressive, since they would openly share information with whoever would ask for it, if they could copy files in return. According to them, most people are reluctant to share their information with just anyone. People begin to choose their friends and approach social circles with motives to obtain new information. Anthropologist Anna Cristina Pertierra describes three social circles created by this dynamic on the scale of the entire country.

In the inner circle are those who have direct access to downloading programs from the internet, which is largely undertaken for profit, but the contents of which is sufficiently low in value to be circulated for free among their friends. [...] The second circle of media users are those with a DVD player at home, who rent content on discs for which they pay by the program, or they may rent a hard drive, for which they pay by the gigabyte. A third circle of media users are the majority of the Cuban population who do not have a DVD player at home and therefore are excluded from everyday non broadcast media.¹⁷



Inside the country, the digital divide created by the paquete gives people with Internet access, or with family outside of Cuba an opportunity to make profit from their connection. Further down the lineage of information distribution the divide is manifest in how people withhold information, since files that cost nothing to replicate still have release value, or may be rare (until it is copied by someone who is willing to share). The final threshold is the divide is the mass of people without devices, who will not be able to access this flow of information unless they visit a relative or friend who has a device.

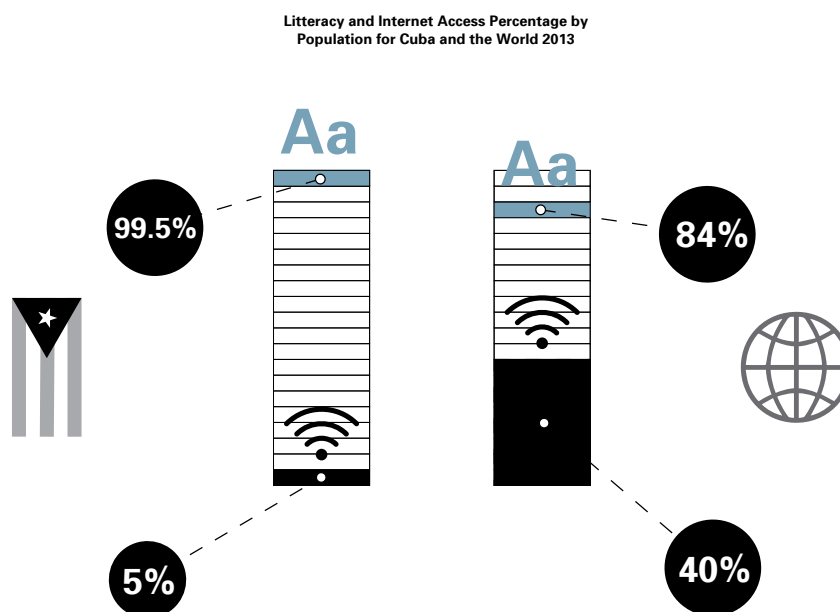
The paradigm of the “paquete” creates a unidirectional model of information distri-

17. Ibid., 409.

bution, a non-participatory exchange. End users can have access to current media content, but cannot enter into a dialogue with it. They can download, but not upload, content. This is perhaps why the grey market of hard-drives has been tolerated by the government.¹⁸ A new phenomenon has begun to take place in which artists and Cuban content creators upload their work onto the weekly edition of the Paquete. Fernando Martinera, an architecture student of the CUJAE, remarks:

If the internet stay inaccessible to Cubans, the paquete is going to become the institution which will start to rule the culture of [the] mass. Maybe there will be a time when if you are not in the paquete, you do not exist.¹⁹

2.6 A Knowledge-Work Economy Outside of the Web



Literacy percentages gathered from the World Bank International Communications Union. Percentage of Internet users in Cuba gathered from: Watts, Jonathan. "Cuba's Offline Internet: No Access, No Power, No Problem." *The Guardian*. December, 2014.

On the global scale, the digital divide separates countries into knowledge work capitals and labour forces servicing these capitals (as discussed in Section 1 "The Spread"). But Cuba is an exception to the rule. The country is outside of the world current of infor-

18. *Ibid.*, 404.

19. Fernando Martinera in discussion with the author, . December 2015.

mation networks, however it still exports knowledge-work. The level of education in the country is extremely high. Medical experts and technologies are a crucial exports for the island's unique economy. The literacy rate is atop the worlds most educated nations at 99.5%, but Internet access is amongst the lowest at 5%.²⁰ The arrival of the Internet could individualize the rewards of knowledge-work outside the body of the state, since highly educated people could provide a panoply of services to anyone, anywhere. Perhaps this is a fear of the state, to loose the rewards of the Cuban education system. But aside from speculation, there is a large pressure from the population to connect Cuba to the Internet. The people I have talked to in Cuba have expressed frustration towards the lack of connection available in their country. This movement has been the content of contemporary Cuban street-art and underground artistic expression.



This is a popular stencil that can I have first noticed in Vedado in my visit in 2014. This photograph was taken one year later, the same stencil but in a new location.

20. Carrie Kahn, "Internet Access Expands In Cuba — For Those Who Can Afford It", *NPR*, October 6 2015. <http://www.npr.org/>.

3. The Opening of the Embassies and the Arrival of an Accessible Internet



As the United States begins a new chapter in our relationship with Cuba, we hope it will create an environment that improves the lives of the Cuban people,” he told a civil society forum, including Cuban dissidents. “Not because it is imposed by us, the United States, but through the talent and ingenuity and aspirations, and the conversations among Cubans from all walks of life so they can decide what the best course is for their prosperity.

- President Obama, 2015

At the 2015 Summit of the Americas in Panama, Raul Castro and Obama shake hands and begin taking measures towards thawing the Embargo and opening the embassies between the two countries, presenting an opportunity to begin instating more accessible Internet connections in the county.

In August of 2015, ETECSA, a state-run telecommunications company, introduced a handful of public “hot-spots.” Anyone with their own device and \$2.00 CUC (equivalent to \$2.00 USD) could access the world wide web for one hour. For a Canadian, a directly proportional comparison would be someone spending \$80.00 for one hour of Internet.²¹ Only five years ago, one minute of slow bandwidth Internet would have cost \$45.00 CUC,²² making it impossible for anyone to use the web productively, if at all. This is the pattern of cost that has been seen in the USA and other connected nations in the early 1990’s that has become exponentially cheaper over the last two decades.

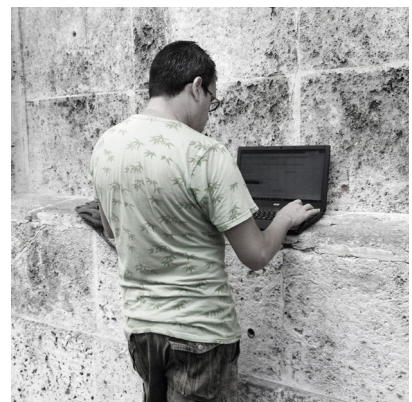
When connections are costly, only those who can afford connection can prosper from it, and the spread is amplified. In Havana, most public hot-spots are in front of banks and hotels in parts of the city served by the tourist economy. The connections are faster than before, but they are not entirely public yet. Who is this internet serving? For the Internet to bring value across all social groups, it will need to become more affordable and be introduced in systems independent of the tourist economy. Cubans are already using apps to split connections (but also splitting bandwidth) thus cutting the cost of connecting.

21. Statistics Canada 2015 and Dr. Jorge Peña, 2015.

22. Jorge Arail Diaz, a Cuban telecommunications employee in discussion with the author. October 2015.

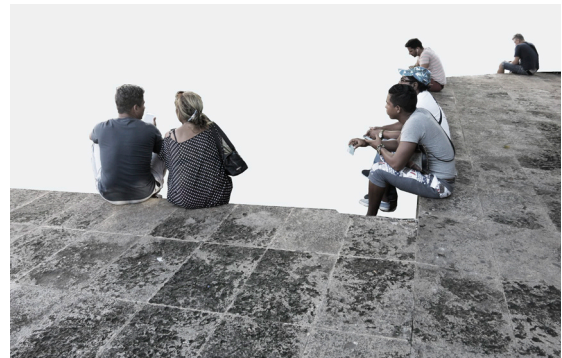
Hot-spots change the existing fabric of Havana. Where there is a connection, people crowd to use their devices, altering the functions of the original spaces. Walls become seating, facades become stand-up desks. Cars become small offices with comfortable seating, not yet offered by the city. In some cases, people bring their own transportable furniture to hot-spots for a more comfortable experience.

For the moment, the majority of these hot-spots are in front of banks and hotels, in the most well-off regions of the city.

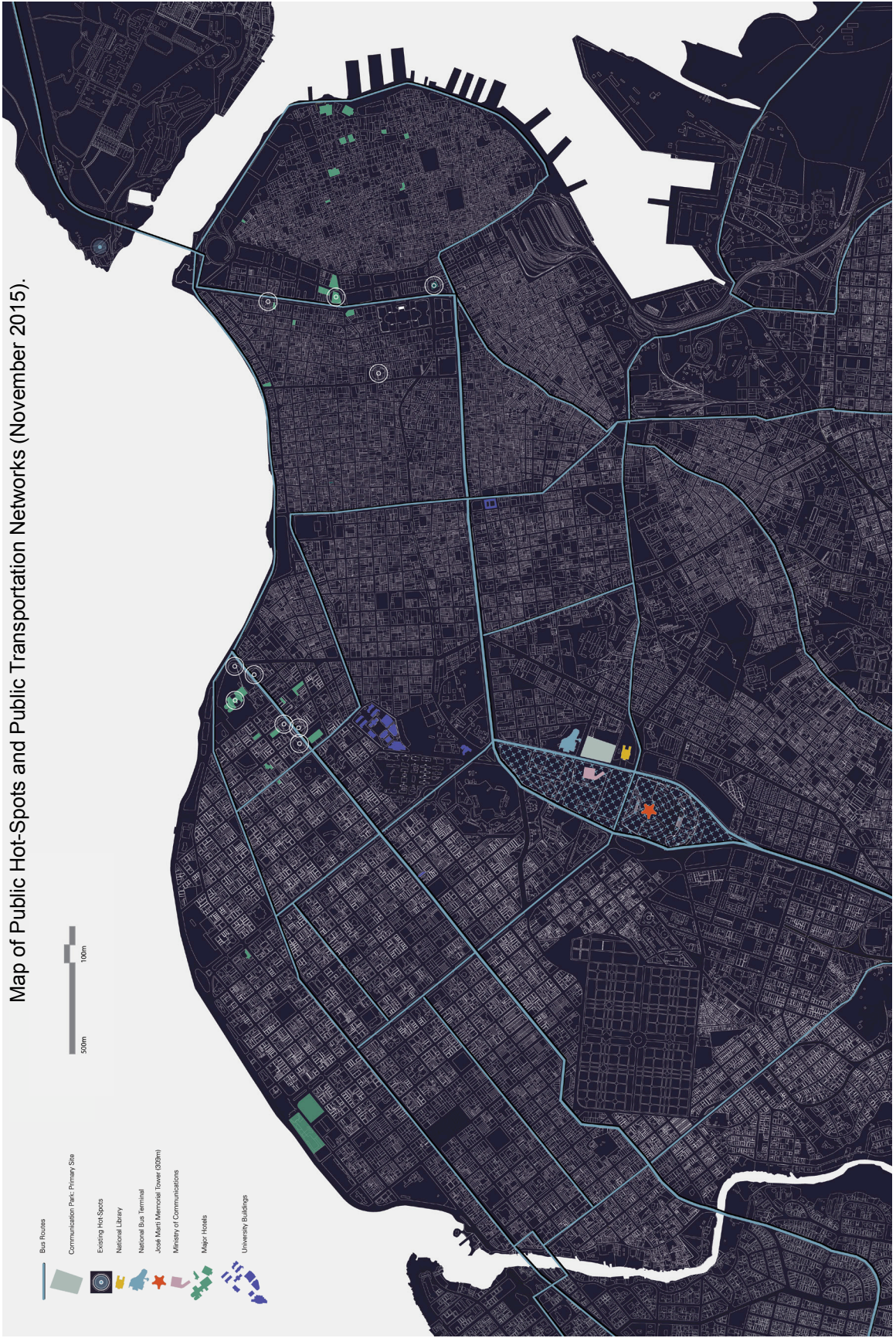




The users of hot-spots shape their environments, and use the architectural features around them to serve their needs. A staircase allows for a fluid view of one screen by many as well as a conviviality for Internet users. A bench-height zig-zagged terrace allows users to break into small groups or pairs away from others. The structural bays of a bank bellow allow for more private uses and an assurance that no one can peak onto your screen. Shade is necessary, as to avoid glare when using a screen outside. These hot-spots have higher numbers of users at night, and smaller numbers in the mid-day, when the city is warmest and brightest.



Map of Public Hot-Spots and Public Transportation Networks (November 2015).



According to one Cuban telecommunications employee, ETECSA intends to grow its network by adding between 150-200 new hot-spots in the city throughout the next few years, all in commercial nodes of the city.²³ This model has its merits and could present a viable plan for the expansion of the network, however it leaves information access in realm of the upper-class, and in the light of commercial Havana.

3.1 Foreign Investments Taking Connectivity into Account

The high level of education are a resource of high interest for foreign investors eager to find opportunities in Cuba after the thawing of the Embargo. These investments presuppose an internet connection, the mobilizer of the knowledge-work economy. The excerpt is presented by the Economist for the Cuba Summit in Washington, targeted at international investors.

To date, foreign businesses operating in Cuba have faced many restrictions, which have prevented them from responding quickly to emerging opportunities. Additionally, a shift in US-Cuban relations will give a further boost to Cuba's integration with the global economy, opening a new frontier for international companies.

With one of the best educational systems in Latin America, low crime rates and close relations with its Caribbean and Latin American neighbours, Cuba has a solid foundation for a knowledge economy and strong trade growth. How can it build upon this foundation to take advantage of new opportunities offered by foreign investment?²⁴

How Cubans are able to use IT will influence their power in this economy. People with better skills will find better positions and have more agency. Currently, solely positions in the military, in academia and people of affluence have Internet access. They are developing the necessary skills for a knowledge-work economy and culture. Most people are not.

23. Ibid.

24. Cuba Summit presented by The Economist in Washington, December 5 2015.
<http://www.economist.com/>.

4. Thesis Question

What can spaces in the city do to counter or attenuate a digital divide in a newly connected city? This question has lead me to investigate two sites; one concentrated, and one dispersed.

5. Concentrated Intervention

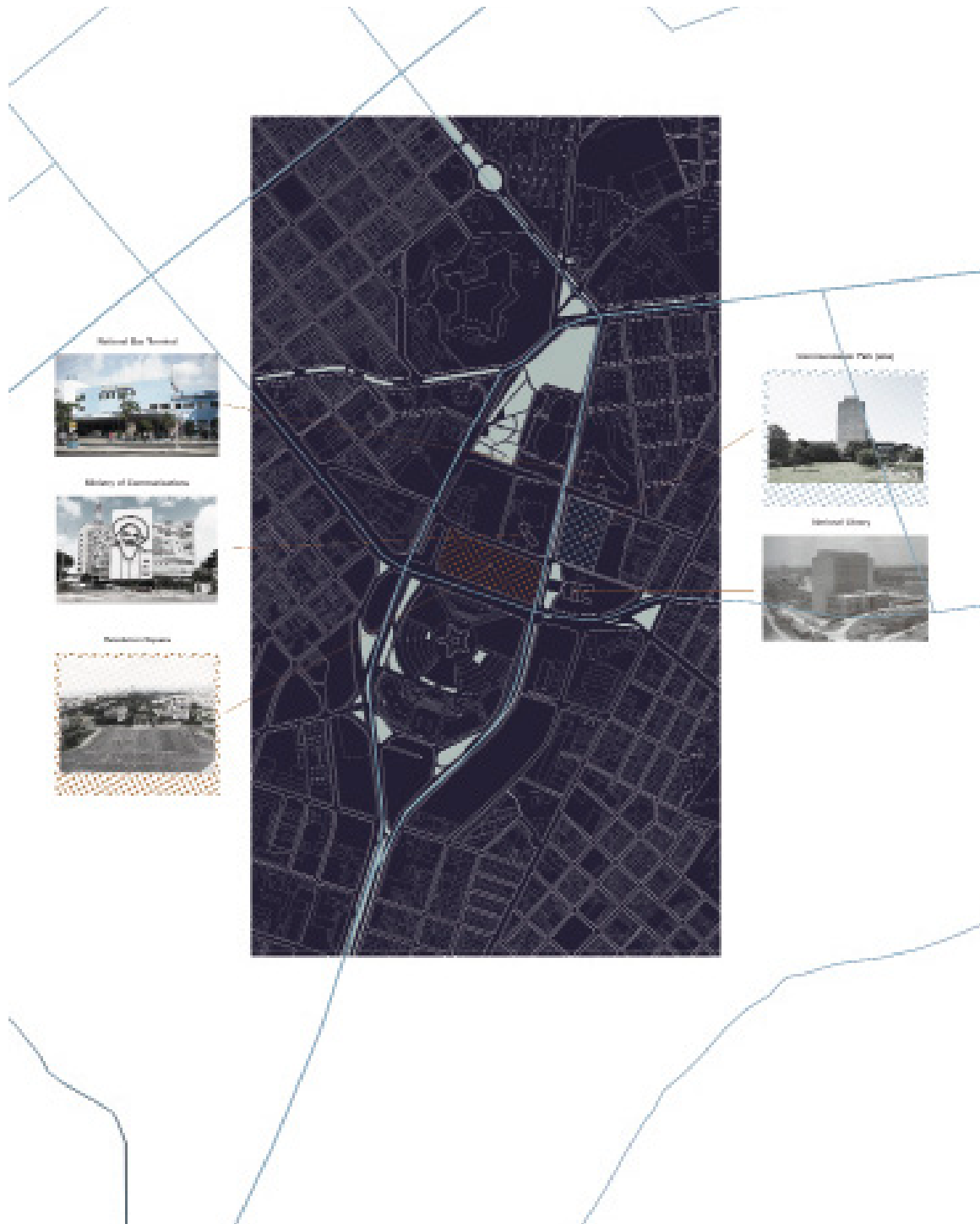


Junta Nacional de Planificación, Preliminary Land-Use Survey, circa 1956. Image from “5 Master Plans: The Retrospective Order of the Plan Piloto de la Habana,” in *Constitutional Modernism: Architecture and Civil Society in Cuba, 1933-1959*. Minneapolis: University of Minnesota Press, 2013.

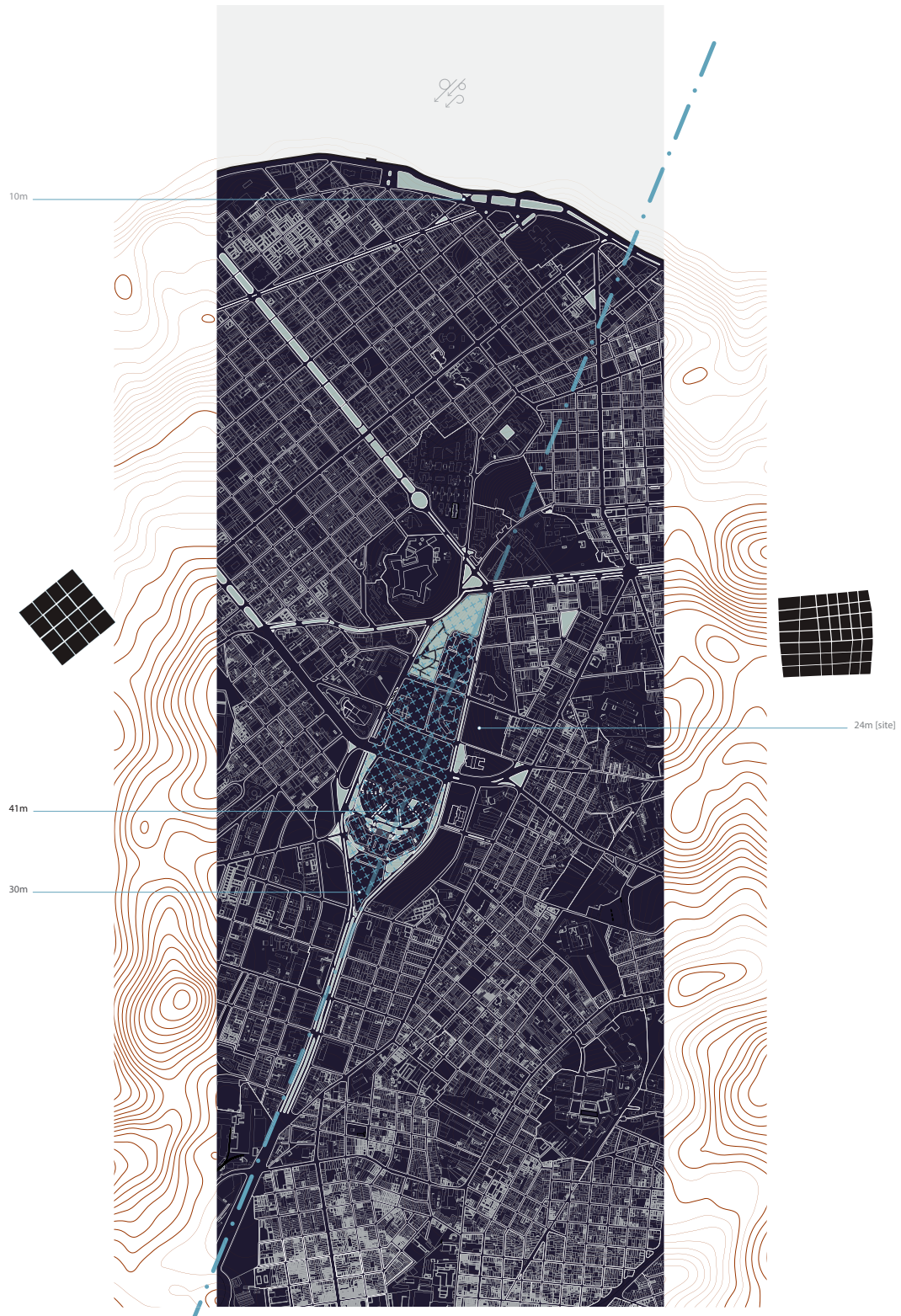
The “concentrated” intervention should be in the most accessible part of the city.

The civic heart of the city is marked by the iconic José Martí Memorial tower which rests on the highest topography of the city, and Revolution Square, where major gatherings and rallies take place. The tear-drop shape encompasses the civic programs of the city, and is very accessible via public transportation. The accessibility of this site was attractive for choosing a single concentrated site to provide the amenity of information and promote social overlap. Bus lines from all over the city service this heart because of the capacity of Revolution Square and the presence of the national bus terminal. A site currently called “Communication Park” exists in this civic heart, which holds the ideal place in the city for an architectural manifestation relating people to information. The site is an under-used park bordered by the Ministry of Communications, the National Bus Terminal, a residential neighborhood and most importantly the National Library (see map on following page).

Ideally, the public relationship to information and information technology could be included in the programming of libraries, and exemplified in a national library. However, this is not a plausible case for the National Library of Havana because of the way in which



Bus lines (shown in blue) stretching out to the extremities of the city converge and wrap the civic heart of Havana. These lines need to service Revolution Square and the national bus terminal. The Park (proposed site) is across from the Ministry of Communications, thus its name: Communication Park. The most important adjacency on the site is the José Martí National Library, just south of the park.



Map (NTS) showing the civic heart of the city as the hinge point between the Garden City fabric of Vedado (left of the dividing line) and the density of Centro (right of the dividing line). The star-shaped footprint of the José Martí Memorial occupies the highest elevation of the city, at 41 meters above sea level (height measured from Google Earth, 2015).

the building was conceived, built, and programmed. This existing building responds to the advent of print, not immaterial information. This is the most important relationship to be addressed on the site, relevant physically and symbolically.

5.1 The Present José Martí National Library



Photograph of National Library from Proyecto Habana, 1957.

The José Martí National Library (c1957) holds its name from the Cuban national hero and intellectual José Martí (1853-95). The iconography of José Martí can be found everywhere in the city, especially in educational institutions. Architects Evelio Govantes and Félix Cabarrocas thought a library to be an appropriate memorial to the intellectual, and this building could be seen as a showcase of Cuba's intellectual liberty, free from colonialism, consolidating a new public relationship to information and the power of knowledge.



1853-95

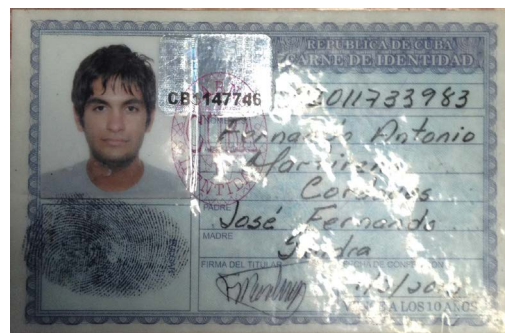
José Martí is a Cuban national hero who's short life is celebrated through the country's history and iconography. Martí committed his life to the independence of Cuba from Spanish and American annexation. Through his travels to South-America, Spain and America, he found followers and gained political momentum, which he would bring back to Cuba to form a rebellion. His followers fought Spanish Loyalists in hopes to abolish the Spanish regime through a series of wars. Martí died in battle at age 42. Cuba would gain its independence from Spain, but only in 1902. His views on Nationalism, Liberty and Democracy became a foundation for future revolutionaries. Martí's detest of foreign expansionism into Cuba would earn him the name of "The Apostle of the Revolution" and his quotes would later become the banners of the Revolution of 1953-59.

"Nationalism or Death" -José Martí

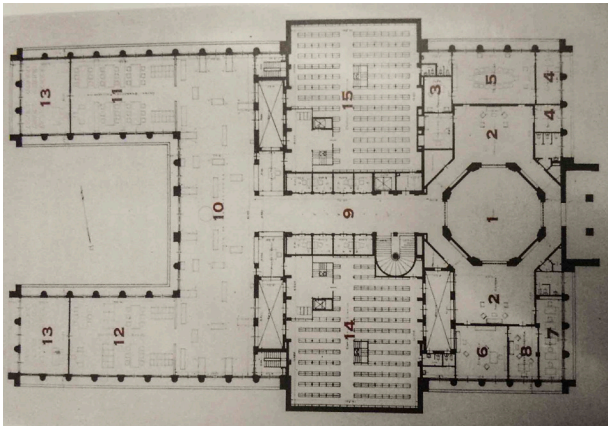
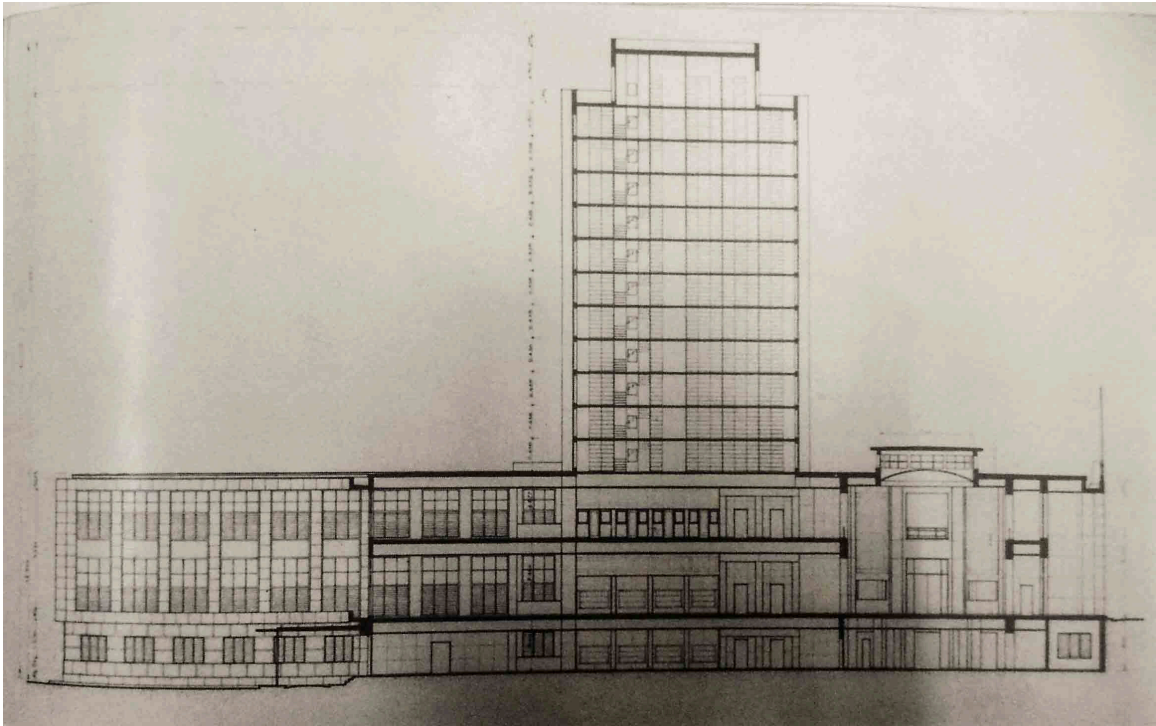


Inside the library on the ground floor, a giant bust of José Martí faces the main corridor, flanked by the index card stacks of the reading room. These cards are the main interface through which visitors can look up (up to) 1 250 000 physical volumes stored in the inaccessible tower of the library.

The representation of José Martí is somewhat paradoxical. The national hero gained support and agency through his travels and networks abroad (America, Spain, and Latin America), advocating for intellectual freedom. But the library does not present itself as platform for public engagement with information, especially not information outside of the Cuban network. Formally, the library is thick-walled and imposing tower with a single entrance facing the heavily guarded Revolution Square. Only the two floors that make up the pedestal of the tower are accessible by the public, but not to just anyone. To obtain a library card is an arduous process. I have documented the process of membership of my Cuban colleague Fernando, a Masters level student in Architecture. Fernando's national identification was not sufficient. He was required to provide two passport photos, a fingerprint, and, once this was gathered, file paperwork in a small room on the ground floor of the library.

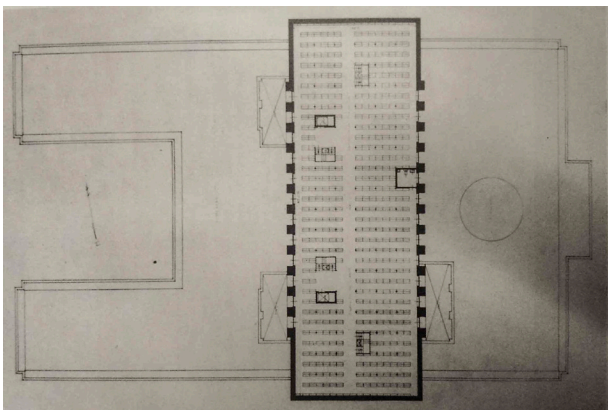


Process of acquiring a library card for a Cuban citizen in academia at the José National Library



(Above) Long section of the National Library through the center of the plan. Only the first floors of the Library hold reading rooms and public functions (Left). The tower holds solely stacks in a utilitarian fashion, only accessible by library personnel or people holding a special permission (Bottom).

These images have been photographed and emailed to me by Fernando Martinera via an academic Internet connection.



The library presents itself as an anti-public institution rather than facilitating public access to information, formally and programmatically. In terms of conserving physical archives, the form of the building is successful. Nine stories with minimal light penetration allow for an ideal storage of physical volumes. Informally, a process of digitization has begun. People in the library are currently using a hybrid analogue/digital system for research: some photograph index cards with their phones to recall references, or photograph map archives to use them at a later date in another location. The library is the process of digitizing its references, but this is an extremely slow process. IT does not require the same physical criteria for storage and preservation. The renewed version of a national should revisit the relationship of people and information given the introduction of the Internet in the country. This transition could allow for an extremely open access to information, since closed and guarded spacial requirements for immaterial information are not required. The role of the current national library is, and will continue to be, necessary for the preservation of physical volumes. The large and under-used adjacent Communication Park could be the ideal location for an addition, or sister building intervention that speaks to the advent of digitization and free-access, not the advent of print and safeguarding.



Photograph of Communication Park from the top of the José Martí Memorial. In this image, the site is flanked by the Ministry of Communications (left) and the National Library (right).

5.2 What Should it Do? The Role of the Library as a Space of Flows

Intuitively, to create social overlap, the intervention will not only need to present itself as open as a park, but also use its program to juxtapose and superimpose different activities and social groups. Paths need to introduce people to maker-spaces (rooted in the making culture of the Special Period), technology and cultural events, “rooms” (whatever form these may have) need to hold multiple functions so that no groups or activities are alien to each other, and so that IT is understood as a tool for public good that is accessible and clear. To begin to layout this program, it is necessary to understand the public functions recognized in libraries of the 21st century. Library theorist and teacher at the School of Media Studies (NY) Shannon Mattern has a body of work that speaks to the role of the library in society. In her essay *Library as Infrastructure*, Mattern describes the library as a “social platform” and as a “Technological-Intellectual Infrastructure.” This is a key piece of theory that I will attempt to synthesize architecturally in the context of Havana, (her examples are mostly in the canon of Modern Western architecture, but the applied principals are globally relevant). As a social platform, the library should provide services and amenities for those who have difficulties navigating in their present societies (such as classes, trained supportive staff, accessible technology, etc.). Mattern also stresses the importance of attracting the well-off:

The library should incorporate the “enfranchised” as a key public, both so that the institution can reinforce its mission as a social infrastructure for an inclusive public, and so that privileged, educated users can bring their knowledge and talents to the library and offer them up as social-infrastructure resources.²⁵

Rather than the library supporting solely those in need, the library should recruit the talents of the well-off to create a self-supportive and inherently education environment. In Cuba, this class would be those who are currently using the Internet from hotels and banks, those who are able to travel to places with access, and people with access to information in academia. Spaces with dual functions can potentially allow a mix of people (techno-savy and not) to gather, stay, and mingle in public spaces. Studying spaces and audience spaces will have to compete with the best in the country to attract the best in the country, or create partnerships for a fluid exchange with other cultural institutions. The idea is to create a network of knowledge creation and sharing that uses the infrastructure as a platform. Conferences with public sit-ins, concerts inside displayed on facades out-

25. Shannon Mattern, “Library as Infrastructure”, *Places Journal*, June 2014.

side, a ubiquitous Wi-Fi connection with optimal spaces to uses them (shaded, ventilated, ideal glare-free lighting, techno-ergonomic furnishings, individual/convivial/social spaces of production and consumption) are examples of democratizing knowledge through designed spaces. Mattern also speaks to the role of the library as a civic landmark:

[...] a symbol of what a community values highly enough to place on a prominent site, to materialize in dignified architecture that communicates its openness to everyone, and to support with sufficient public funding despite the fact that it'll never make a profit. A well-designed library — a contextually-designed library — can reflect a community's character back to itself, clarifying who it is, in all its multiplicity, and what it stands for.²⁶

The form of the new intervention will have to convey the technological and ideological change that is happening in Cuba in regards to IT, but also pay homage to a culture that was born out of the island's unique history of networks. The new intervention will have to be understood as being a continuation of the previous library (perhaps through materiality and critical formal qualities discussed in Chapter 2), but also accommodate the history of a nationwide network of making absolutely everything by reconfiguring and engineering everyday objects (born out of the Special Period). This will be manifested in the design of the maker-spaces intended to occupy the most accessible portion of Communication Park.

Finally, the author describes the role of the "Library as Technological-Intellectual Infrastructure," focusing on the technical role of the collection and its new set of challenges given the transition to "everything digital." Libraries are becoming a sort of digital literacy tutor, or consultants for a new complex economy. Some models approach start-up entrepreneurialism (think-tanks), while other models approach content creation. Although Mattern heavily criticizes the use of 3D printers and maker technologies in American libraries as a sort of ephemeral "boosterism," the use value rooted in Cuban culture could be much different. In Havana, the pre-existing open-sourced model of making (and the potential of new digitized solutions that can be compiled and replicated for virtually no cost) has the potential to create a rich bank of material knowledge, perhaps like no other place in the world. The high level of knowledge work already present in Cuba (see 2.6) could also use the library as an economic outlet.

Mattern's dissection the role of the library in achieving large cultural and intellec-

26. Ibid.

tual goals in the digital age clarifies the design goals for such an institution in Havana. It is important not to respond to every commercial technological advancement.

Each new Google product release, new mobile technology development, new e-reader launch brings new opportunities for the library to innovate in response. And while “keeping current” is a crucial goal, it’s important to place that pursuit in a larger cultural, political-economic and institutional context.²⁷

The renewal of the structure of a library for Havana is a response to the Second Machine Age, the age of digitization where the structure of the relationship between information and society has changed as described in Chapter 1.1. The design goals include showcasing technology as an available resource, cross-programming social groups in regards to the use of IT, and allowing for an outlet for the creation and consumption of information on the scale of the *connected world*. This allows for new national relationship to information that could be more accessible and useful on a global scale if properly introduced into the fabric of the city. Communication Park will be the launching point for such an intervention rooted in the civic, material and knowledge culture of Havana. The intervention is intended to spread along the most accessible existing network of physical spaces in the city: the public transit network.

27. Ibid.



6. Dispersion: Growing the New Network of Information on the Present Network of Public Transportation

The last meeting held by Cuba's Council of Ministers publicly recognized that the country's transportation system 'has been unstable, inadequate and low-quality for years.' The common Cuban who 'hops on a bus' every day has something similar to say, albeit with far less refined words.²⁸

One problem rooted in the Special Period that continues to persist in daily lives of Cubans (outside of the elite class) is the plight of transportation. The network of public transportation has well distributed routes and stops, however the frequency of busses is unpredictable and unstable, and busses are often too full to accommodate everyone waiting at one stop. Those who can afford to pay more can use the services of a taxi servicing busy roads, but this is not an affordable option for everyone. The result is that people

28. Fernando Ravsberg, *Havana Times*, July 4, 2013.

spend a lot of time just waiting. Up to three hours wasted to -- and from -- work, according to my colleagues in Havana. Crowds form at infrastructure not designed for the large number of people, transforming the use of the street and sidewalk that become more difficult to navigate. Vendors are often found at peak hours of the day, offering their services for the regular crowds. People seek shade and a way to pass the time.

These are the ideal places to introduce hot-spots. Growing the information network along the network of public transportation solves an array of problems. The first problem being the underlying social issue of this thesis: the digital divide. The users of public transit are most exposed to the new network, now incorporated into the fabric of the everyday. The second targeted issue is waiting, which has the potential to be spent in a productive way if the infrastructure of the bus stops was designed to accommodate postures and environments conducive to Internet use. If one added cell-phone per 100 inhabitants of a town grows GDP by 10% (page 6), how much value does a superimposed network of hot-spots add once overlaid onto the network of public transportation in a city where there is 1 car per 100 people?

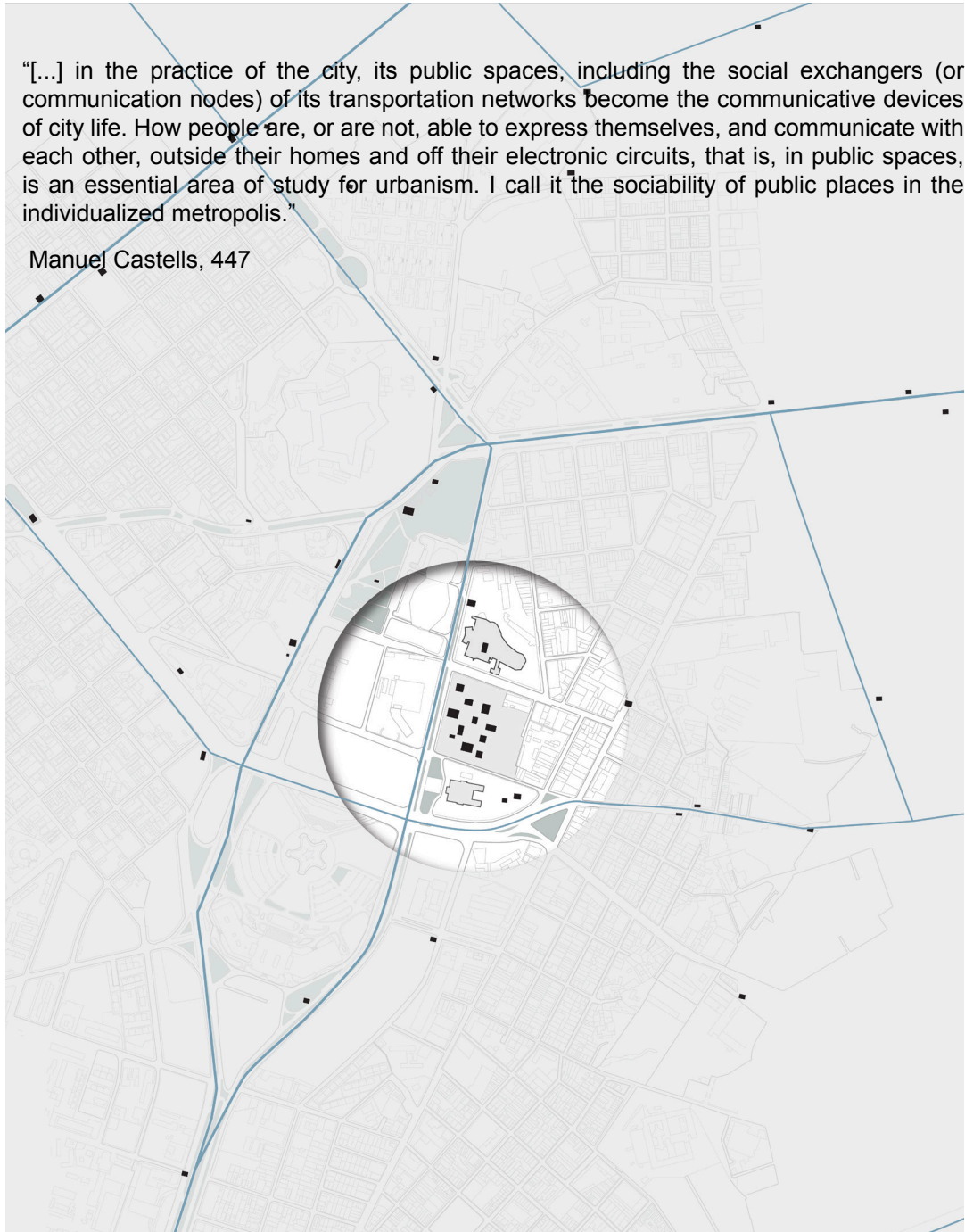
7. General Design Strategy

1. Design a language of building for the Internet in the Civic Heart of the City, in Communication Park, rooted in accessibility and a relationship to the National Library.
2. Using this language, create architectural guidelines for the piecemeal expansion of the new network of hot-spots superimposed over the network of Public Transportation.
3. Findings in 2 should inform 1, and in turn revise 2 in a cyclical manner.

CHAPTER 2: DESIGN

"[...] in the practice of the city, its public spaces, including the social exchangers (or communication nodes) of its transportation networks become the communicative devices of city life. How people are, or are not, able to express themselves, and communicate with each other, outside their homes and off their electronic circuits, that is, in public spaces, is an essential area of study for urbanism. I call it the sociability of public places in the individualized metropolis."

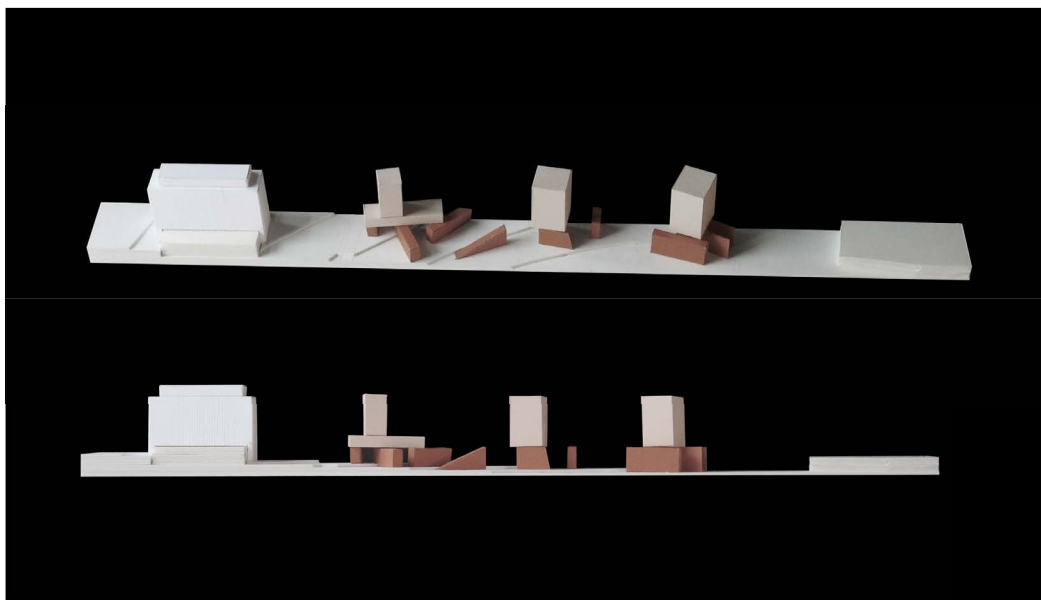
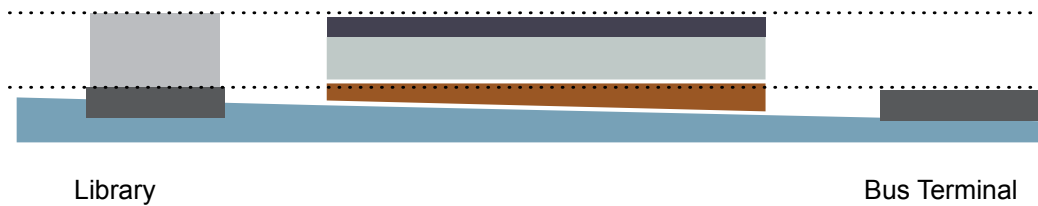
Manuel Castells, 447



1. Visualization of a Pattern for Growth

The map behind the text shows the intervention as components that cluster and disperse throughout the city. This is a pattern relevant to the decentralization of information. From Communication Park, Internet bus-stops and spaces of information shoot outwards into the city using the lines of public transportation as a framework for dispersal.

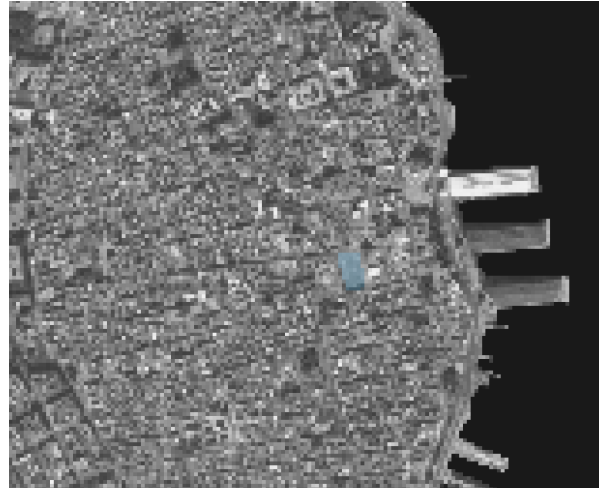
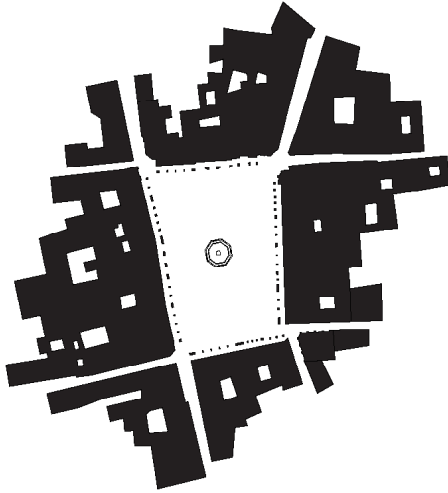
2. Slices and Ideas of Critical Heights in Communication Park



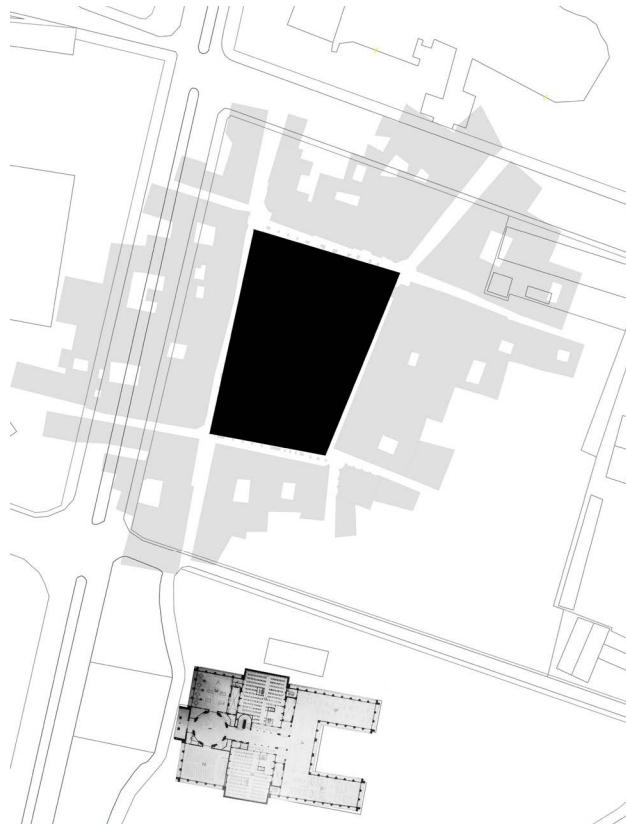
Matching the heights of the “podium” of the Library makes the intervention too heavy for the site. The relationship to the library will have to be found through other strategies. The scale of the intervention will mediate the height of the library to the residential heights of the surrounding neighbourhood and bus terminal (the two-storey building opposite the library).

3. A Familiar Public Space Placed onto the Site:

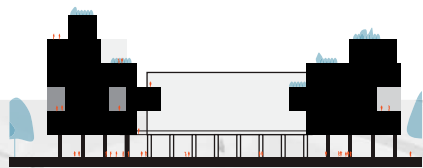
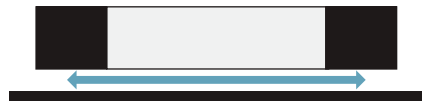
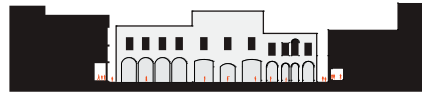
Plaza Habana Vieja in Communication Park



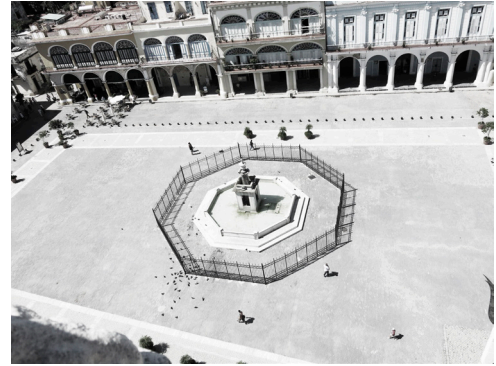
To help understand the scale of the site, I have cut-out the famous Plaza Vieja Square, and pasted it into the middle of communication park. This typology speaks to the colonial development of Habana Vieja, but not to the more recent morphologies of the density of Centro or Le Forestier's Garden City layout of Vedado. Should there be a center for this intervention? The scale works well, however the typology of the square speaks to gathering and a shared viewing of a single event, not the individualization introduced by information technology. It could serve both.



4. Explored Schemes & Studies

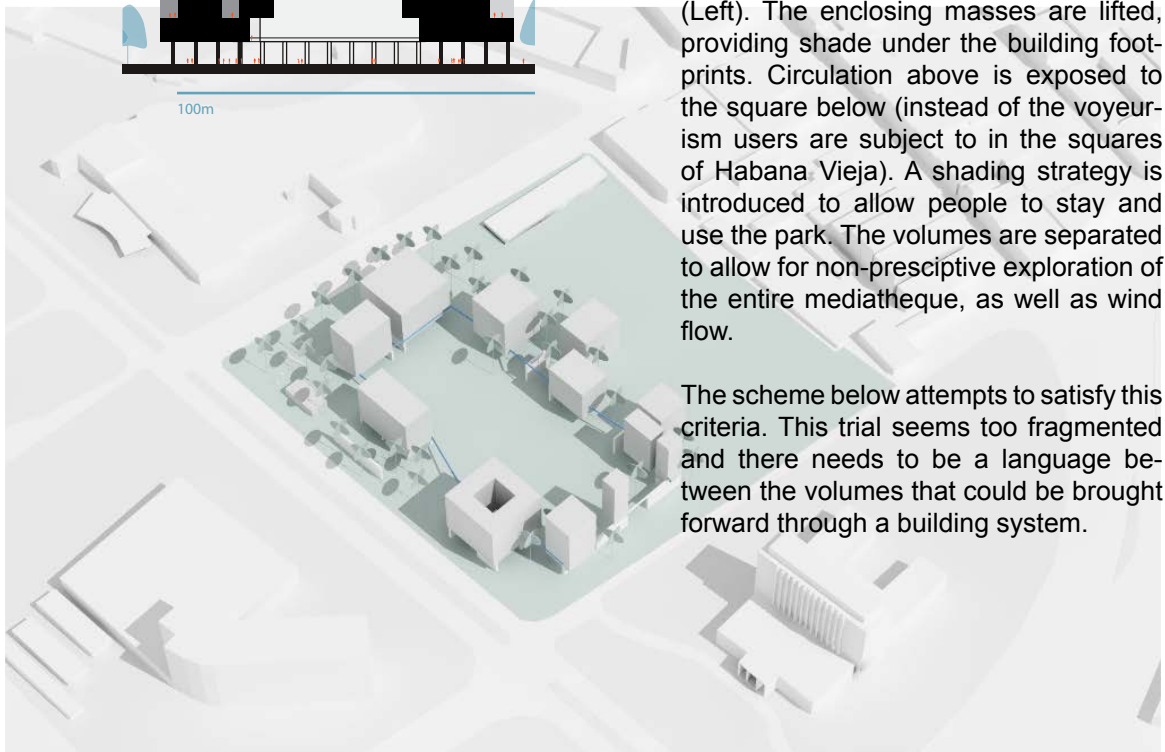


100m



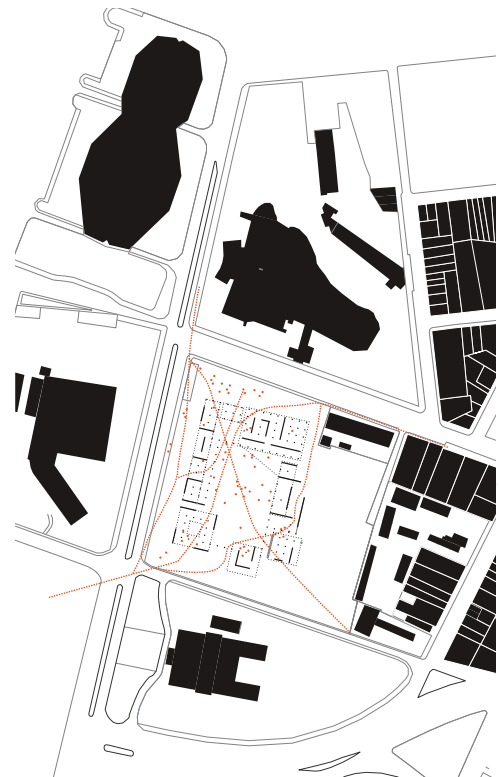
Habana Vieja Square is a reaction to density. The colonnade is the only shaded portion, the only portion useable during the day, but it is a place of circulation. This is problematic for a destination: there is no comfortable space. Other squares manage this better, such as Plaza des Armes, which has a garden in the middle and the shade of trees. The mathematics faculty building is another example of a successful courtyards. One large tree shades the square, and vines grow along the exterior walls. But because I am using Plaza Vieja as a scale reference, I have made a diagram of how it could be modified to be used on my site (Left). The enclosing masses are lifted, providing shade under the building footprints. Circulation above is exposed to the square below (instead of the voyeurism users are subject to in the squares of Habana Vieja). A shading strategy is introduced to allow people to stay and use the park. The volumes are separated to allow for non-prescriptive exploration of the entire mediatheque, as well as wind flow.

The scheme below attempts to satisfy this criteria. This trial seems too fragmented and there needs to be a language between the volumes that could be brought forward through a building system.

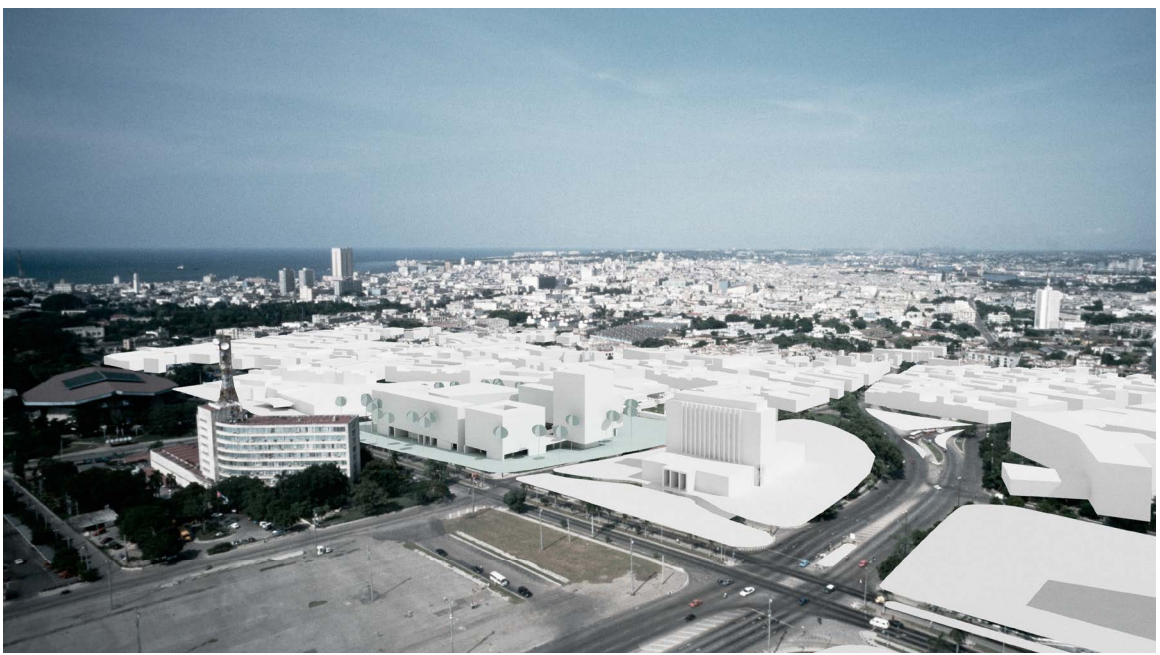
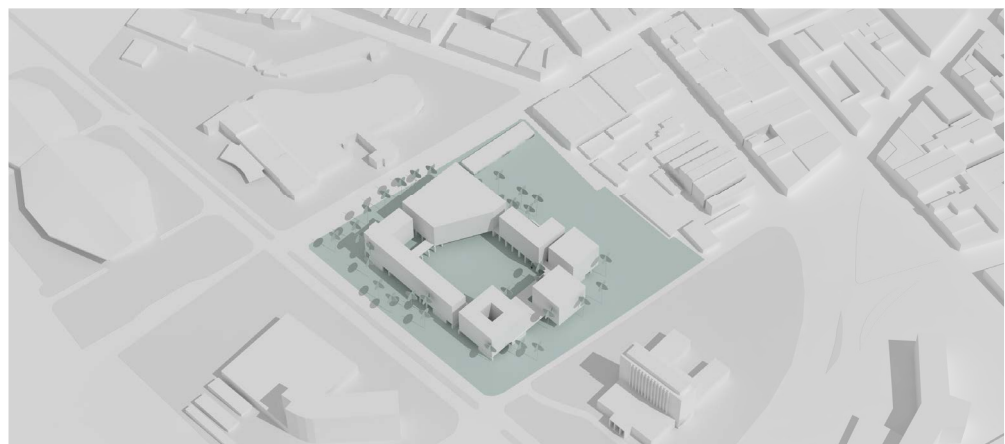
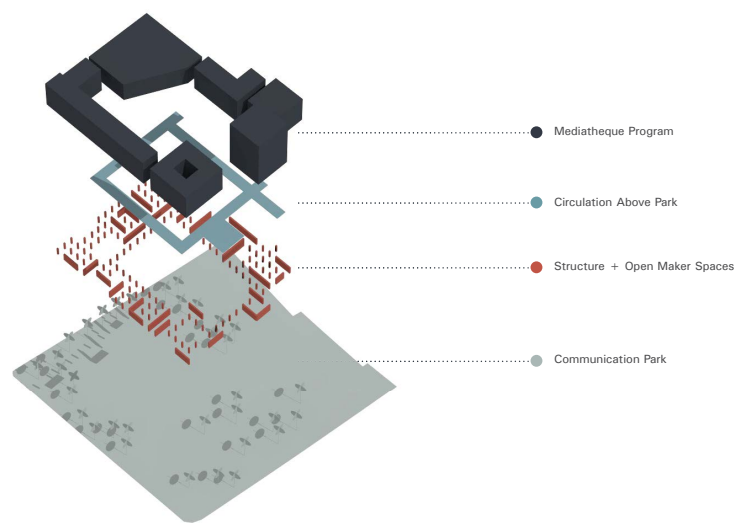




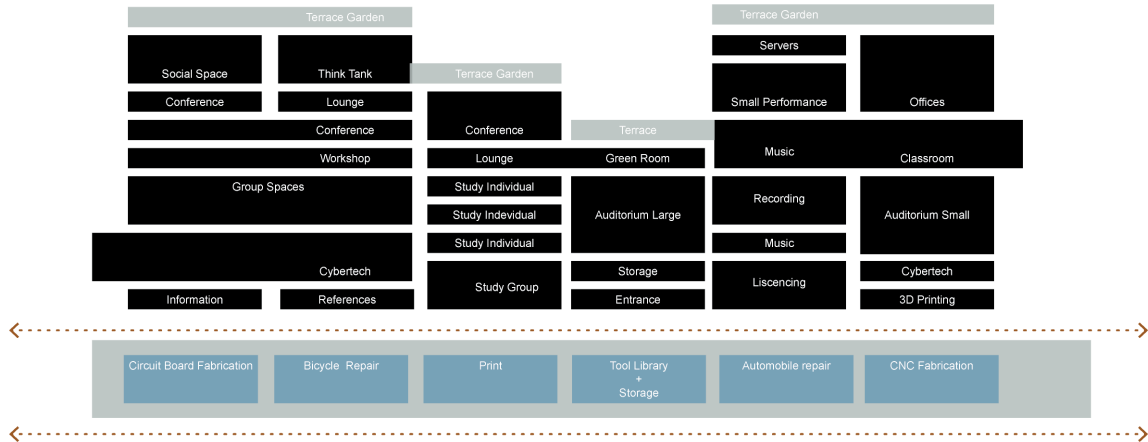
A second Scheme is proposed. The intention is to show use, add enclosure and clearly show circulation above the structure at the ground level. The structure is still unclear, the form seems too enclosed for an intervention that champions openness. Although accessibility and “transparency” are not the same thing. Something that is inviting does not need to be transparent. I need to get out of the digital and begin a working model. I will CNC a 1:500 Connect model and make sketch models in the immediate site.



Second Scheme Modeled



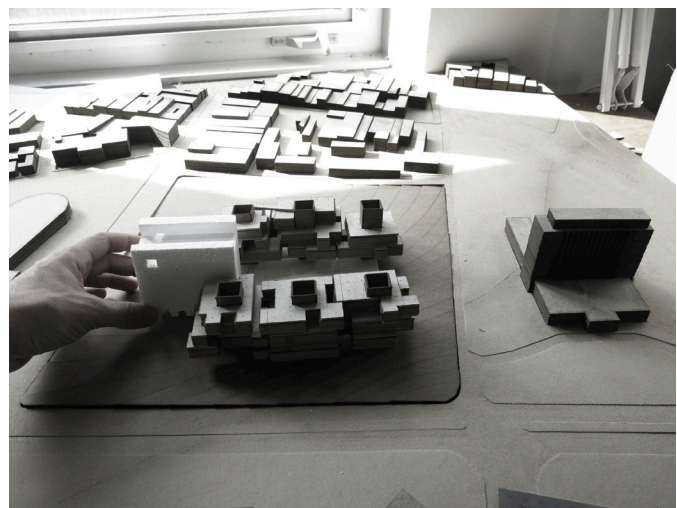
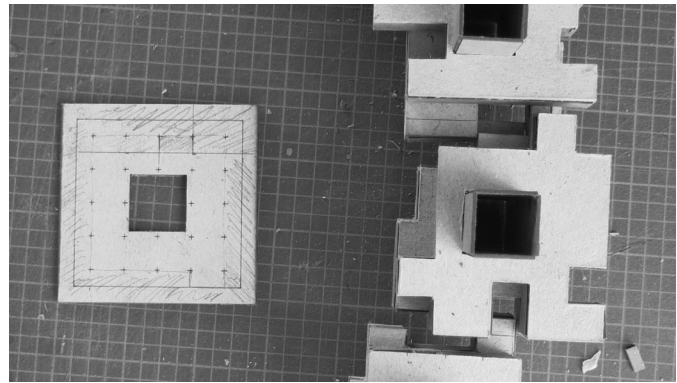
Program for Overlap



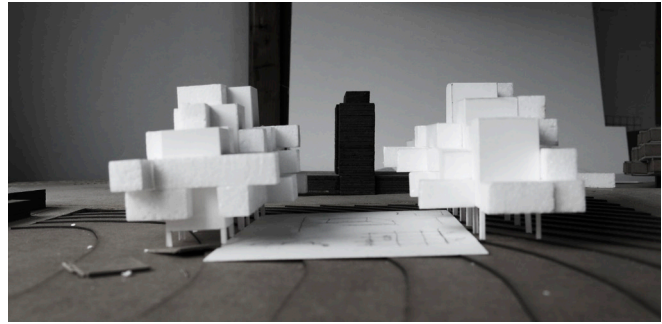
I have been clustering media-theque and maker-space program in section with the idea to make many buildings, creating rooms between them to immerse them into the park and the public. The ground floor is elevated to expose the maker-spaces to the street and encourage the passerby to wonder in. This layout is criticized for being too sectional, and there is no overlap in program between the “buildings.” Moving on to physical models and building systems that could allow for pushing, pulling and overlapping program.

Structure, Pushing and Pulling

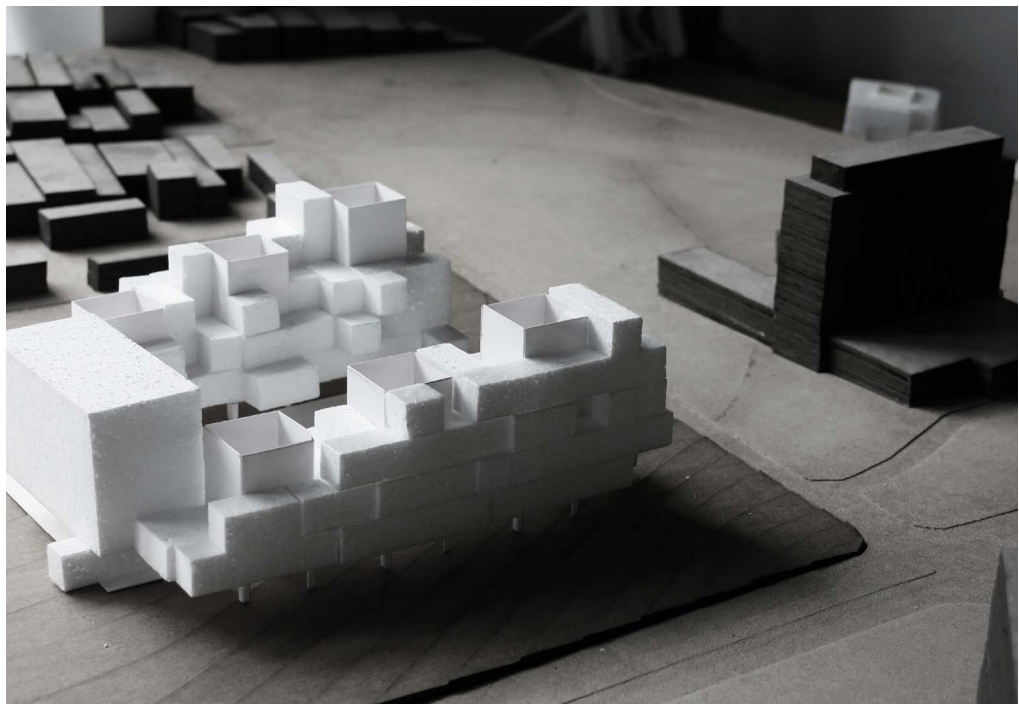
This model is built around “patios,” or courtyards familiar to the urban fabric of Hbana Vieja and Centro as spaces of wind circulation and general circulation. These are much bigger (10m by 10m) and are nested in a 6 meter grid, suitable for concrete construction. Cutting and adding to the floor-plates allows for some overlap and occupiable outdoor spaces between the buildings. The thresholds between inside and outside have to potential to be completely blurred, especially if the circulation of the park climbs and traverses the intervention. I would like to place an auditorium at the bottom of the site, to cap the square and create a symmetry with the existing library. Projection could take place on this large surface, the only one not fragmented. This could make a public space that is constantly updated by its users, opposite of the thousands of sculptures of José Marti and busts of figures of the Revolution.



Response to Library and Placement on site



This model is more fluid in its expression of overlap. The library is framed by two sister buildings, which descend from the scale of the Library's tower to the scale of the city. The exterior is more subtle to respect the street, and to consolidate the shape of the civic heart. The auditorium sits at the base as a large volume amongst smaller volumes, directly opposite the National Library.

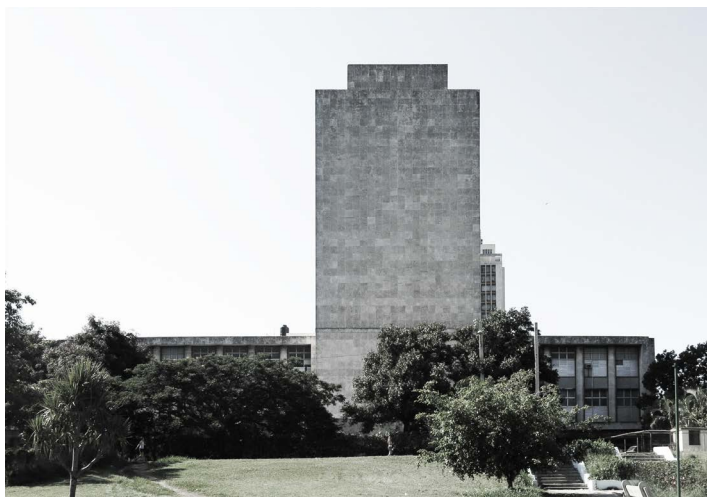


1:500 Site Model
Communication Park and surrounding buildings



Material Study and Dialogue

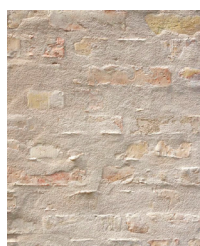
Although Cuba's building culture has been significantly halted by political events, namely the trade embargo of the early 1960's and the economic recession following the dissolution of the Soviet Union, the country continues to export building materials, namely travertine, marble, and limestone. The thesis presupposes that the recent opening of the embassies would allow for the use of Cuba's stone for its new architecture.



Brick, limestone and travertine are considered. Brick must be covered by a (lime-based) plaster to avoid erosion from salt [1]. Limestone is also considered as a cladding for its quality of patina over duration, shown on the facade of the National Library facing the primary site [2]. Both limestone and travertine are considered for non-marring surfaces that will not damage electronics and could easily be maintained and cleaned if treated with a fill for outdoor use [3].



1



2



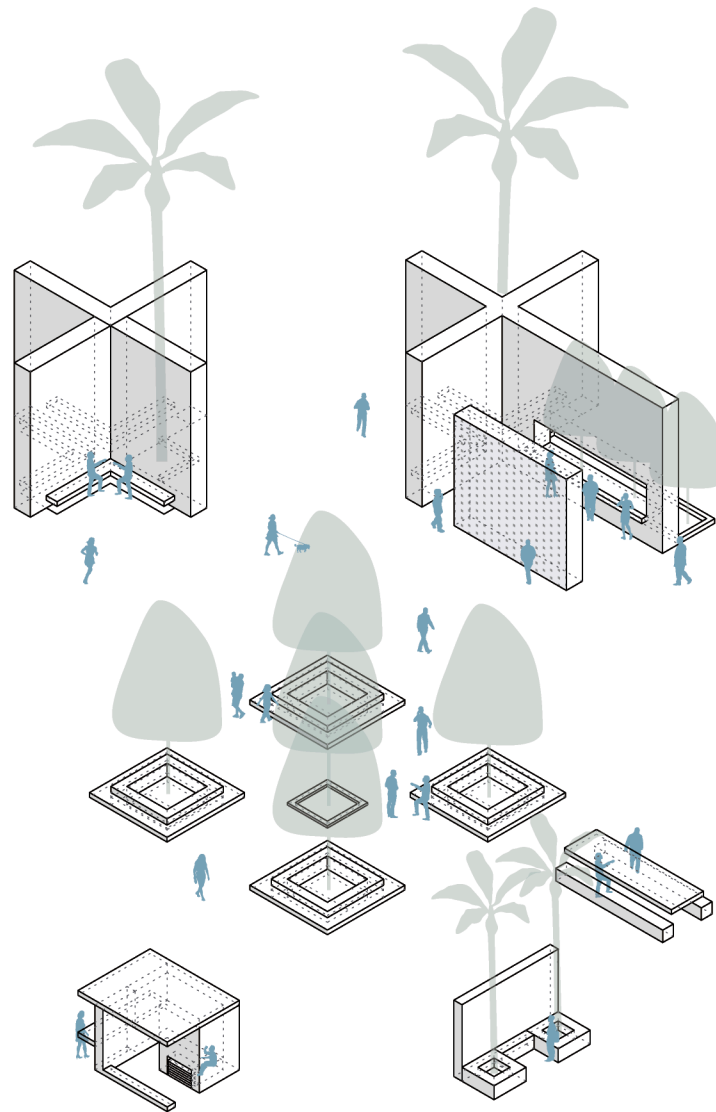
3

The atmosphere below expresses an incision of stone [travertine is drawn] into a plastered brick wall. Staggered brick stacking allows for an irregular removal of the material to create a quality of light conducive to reading [below, right wall]. Integrated stand-up desks are tested on the opposite wall. The limestone facade of the library is repeated on higher volumes and the ground, conveying a material dialogue with the existing library, but also used as a tested material that has aged beautifully (image top right).





Ideas of overlap in the potential material palette of construction. Travertine lodges into brick to create furnishing for work and bays for privacy. A larger volume sits on walls in the background. This language will be used to draw the public into Communication Park.

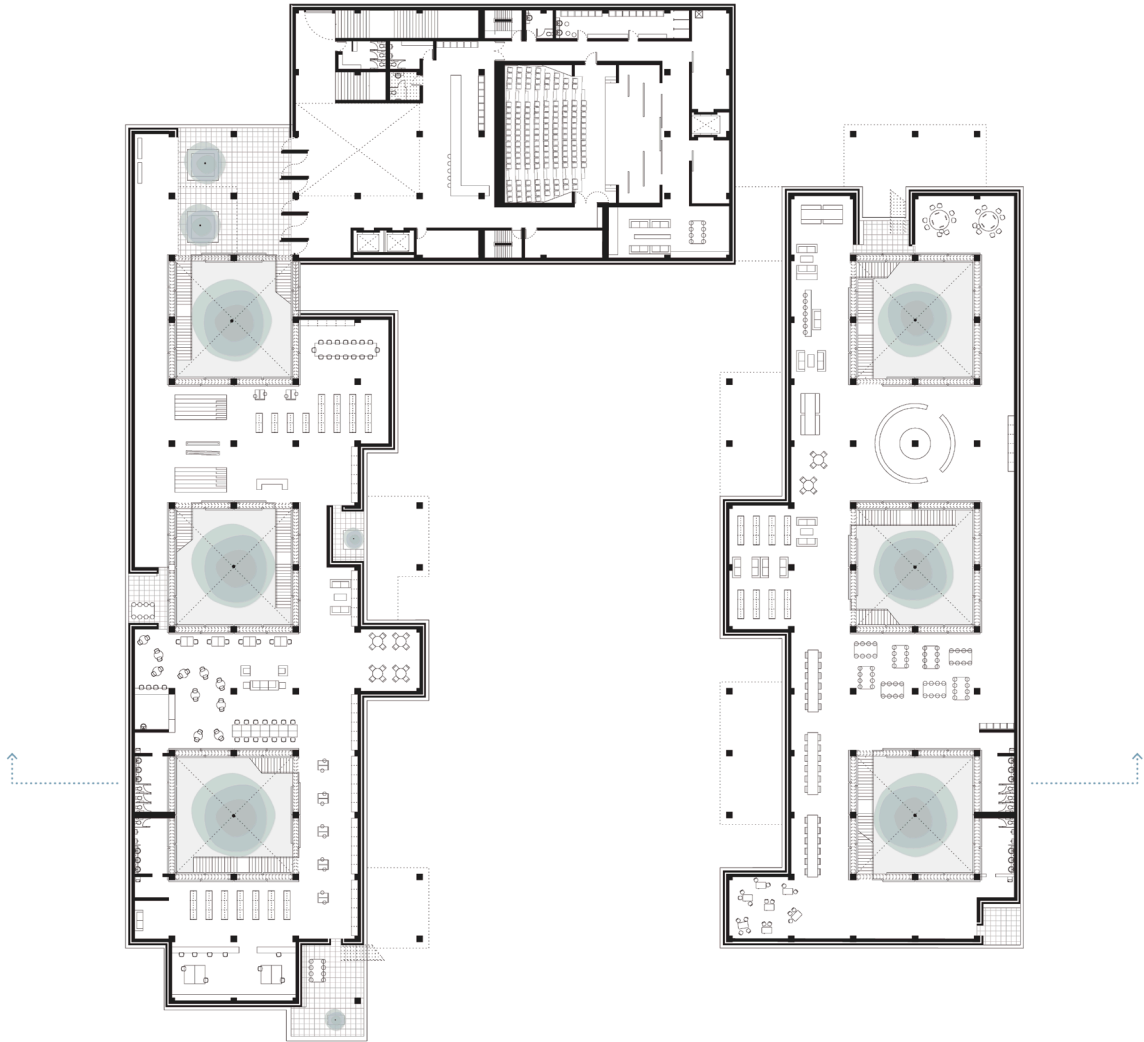


Elements in the landscape will follow the aforementioned construction language, conducive to the use of IT, but primarily shading and social use.



Site Plan. NTS.

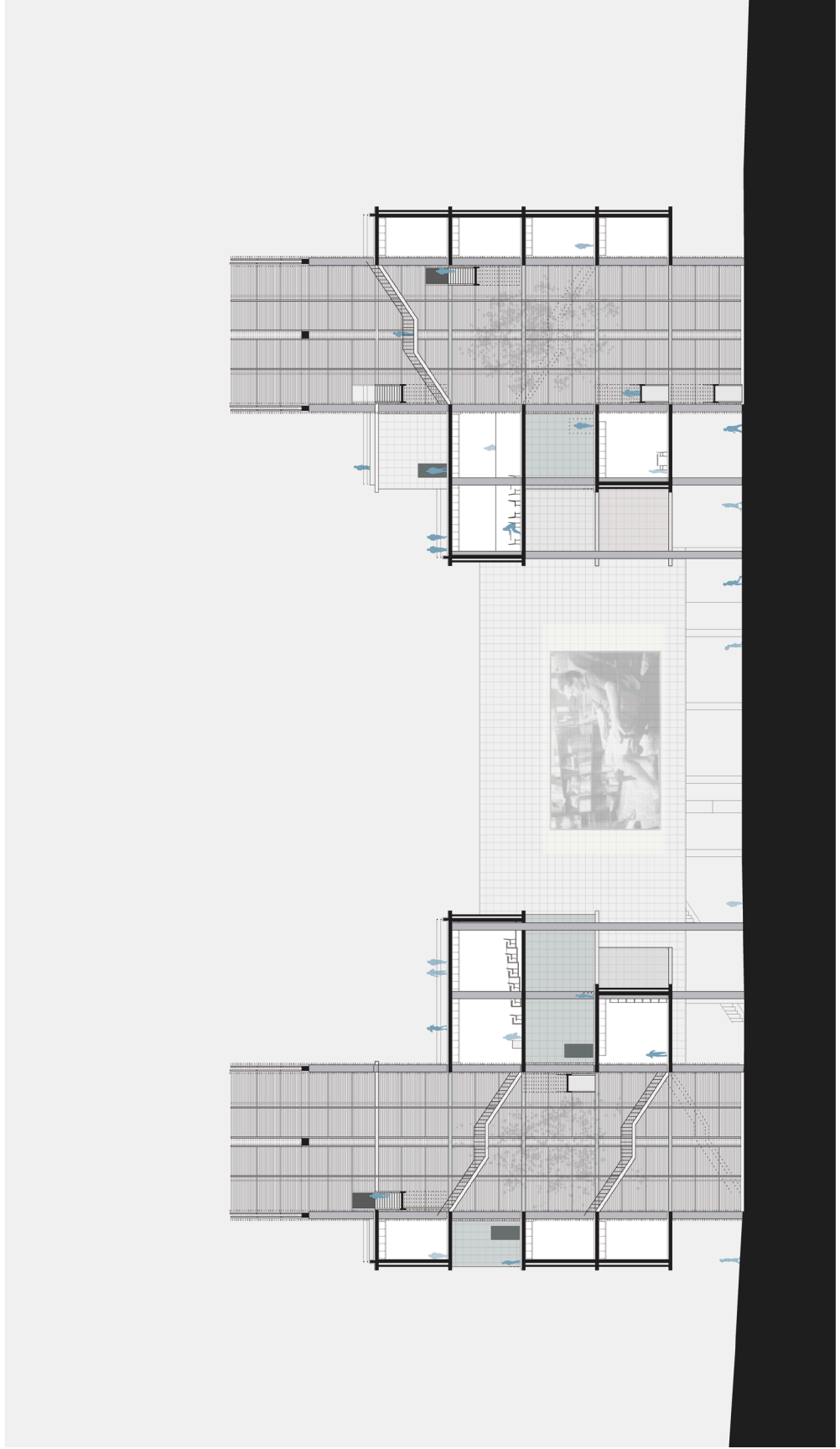
The entire ground floor is open, creating a footprint of shade in the park, and exposing the “hard” maker spaces (e.g. bicycle repair, tool libraries, trade work) existing in the material culture of the city.



Second Level. NTS.

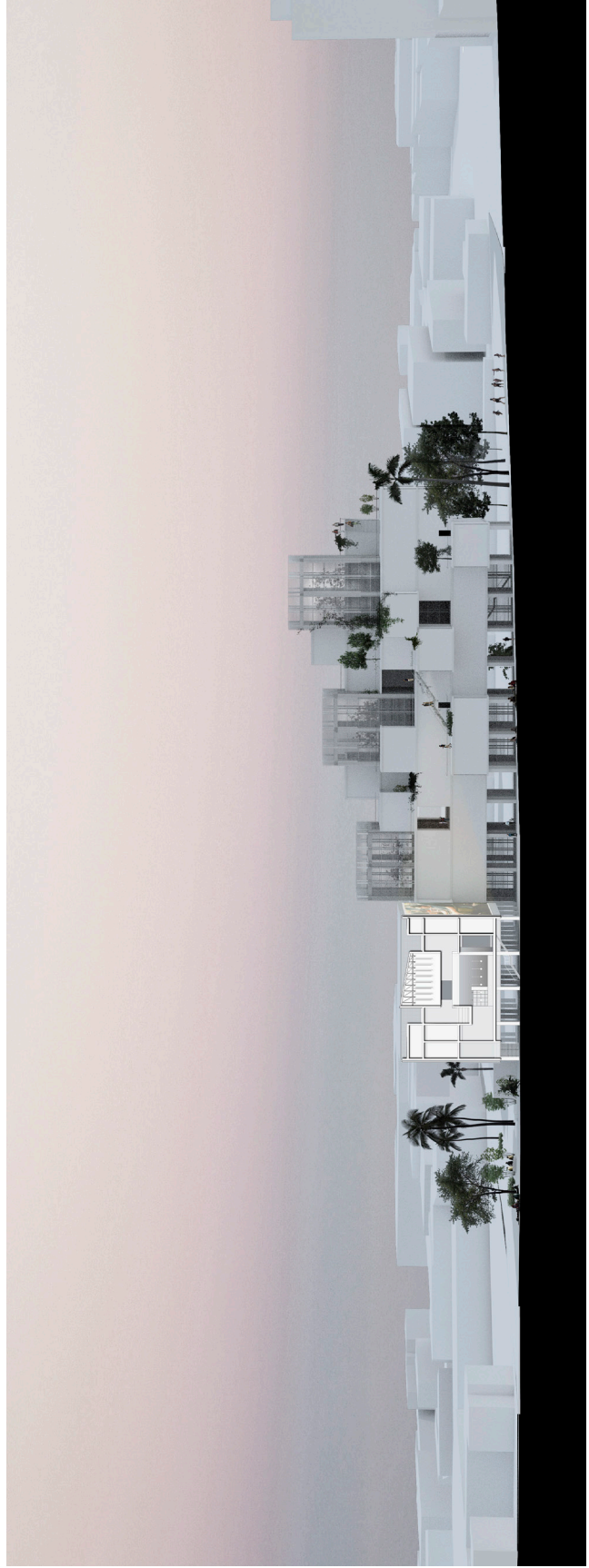
Levels above are reserved for mediatheque program, malleable group spaces, terraces, classes and the auditorium.

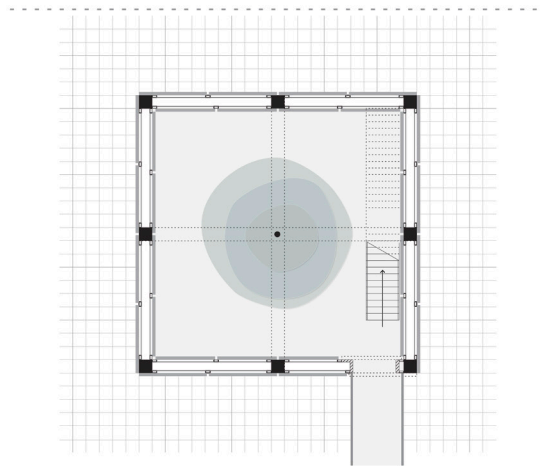
Cross Section. NTS.
This section shows the staircases running through the atriums, and the view of a projection on the blank facade of the atrium.



Long Section. NTS.

This section shows how the levels push and pull into the courtyard of the intervention, extending the park onto the building. The site naturally creates a rake conducive to viewing projections on the face of the auditorium. The sloping shape of the building mediates the scale of the Library (furthest right in the image) and the urban scale (buildings left of the image).



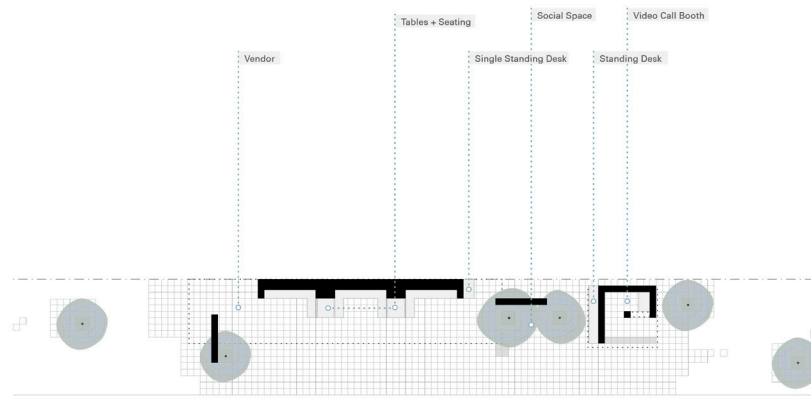


Atrium Detail + View (NTS)

Louver-wrapped atriums meet the ground. One tree per atrium provides shade within the vertical circulation.

Perspective
Aside from a mediation of scale, the stepped volume allows more views of the ocean from the terraces.





Bus Stop #1

The materiality of the mediatheque reappears along the public transit lines in the form of bus stops and furniture scattered throughout the city. These environments are conducive to the use of IT, but also have double functions (places to sit, a place for a vendor, gathering places etc..) normalizing itself into the realm of the everyday.

Bus Stop #2
This perspective shows uses of “connected” bus at night, completely normalized in the fabric of the city.



CHAPTER 3: CONCLUSION

Ultimately it comes down to a basic social and political choice. What we will use the multifaceted and sometimes contradictory affordances of digital technology *for*? Will we employ them -- as seems possible -- to help revitalize small-scale neighbourhoods and to strengthen interconnections and social interactions? Or will they become a means for the affluent and elite to flee the problems of the cities and create isolated, privileged enclaves while leaving the less fortunate to their fates? Though our options are certainly not unconstrained, the outcome isn't technologically predetermined. Nor is it categorically given by existing geographic patterns and the legacies of our history.²⁹

What will the information divide in Cuba look like in the next decade? Will foreign investment push for a technological dependence serving the Majority World? Is the danger of an information overflow going to prevent information from being used in valuable ways? Will policies bridge the divide beyond just "connectivity," emphasizing the role of public agency in versing the public in new ideas of ownership, intellectual property, global dialogue and a new set of skills for a radically different economy? Policy will have to mediate the opposing agendas of bridging the divide: on the one hand, the market pushes for maximum users for economic gain (bridging for profit), on the other hand, the "left" side of the this motive pushes for equal opportunity and denounces existing class inequalities.³⁰ The policies ratified by the Cuban government, or not ratified, will trickle down and be expressed in the new forms of urbanism. Will the *information rich* keep to their homes and workplaces? Will the *information deprived* continue to live in a disconnected world? Or, will public spaces become platforms for knowledge sharing and social overlap? Will IT be integrated into the everyday as a proponent to social overlap rather than a divider? Designers, will have to make decisions about the uses of public spaces, transit flows, and redefine "normal" spaces, down to bus stops and public furniture. The built environment has the potential to be a platform for information access and exchange, valuable and effective within a specific culture.

29. Mitchell, 82.

30. Liangzhi Yu, "Understanding information inequality: Making sense of the literature of the information and digital divides", 241-3.

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