

## ABSTRACT

Title of Thesis: POST-INDUSTRIAL LANDSCAPES:  
AMPLIFYING EXISTING FOOD SYSTEMS  
IN CHICAGO'S CHINATOWN

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Master of Architecture, 2021

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Cities have long grappled with how to feed their populations, globalization being a key tool for supplying food and enabling city growth beyond ecological limits.

Outside the agro-industrial complex, the Chinese diaspora in the United States built an efficient, biodiverse and global food system to satisfy cultural yearnings. At the local level, residents in Chicago's Chinatown have adapted private and public space to meet food needs in creative ways as a complementary system. These adaptive strategies allow Chinatown to be food rich while also experiencing high rates of poverty. Looking forward, new urban developments should support and sustain these activities as vital elements of urban food systems to complement conventional large scale agriculture. Incorporating multiple strategies to amplify the food system in Chinatown can serve as a model for diverse urban food system strategies at multiple scales.

POST-INDUSTRIAL LANDSCAPES: AMPLIFYING EXISTING FOOD  
SYSTEMS IN CHICAGO'S CHINATOWN

by

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Thesis submitted to the Faculty of the Graduate School of the  
University of Maryland, College Park, in partial fulfillment  
of the requirements for the degree of  
Master of Architecture  
2021

Advisory Committee:  
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## Dedication

For Mom, for being the best back up possible when we needed you.

For Dad, I miss you. Thank you for all the neighborhood walks, touching every material in sight, and finding good when it seemed there was none.

For Edward, who fed me, championed me, and loved me through this process.

To Owen and Julia, may you boldly follow God where He takes you on your life journey.

## Acknowledgements

I want to thank my professors and cohort who have been on my three-and-a-half year Path B journey. My experience was enriched by every conversation, from initial questions of “what’s a concept?” to “but how does this choice support the concept?” Particularly to Studio GEJ. We rocked it!

I also want to acknowledge Brittany, who as thesis chair seemed to perceive every moment I needed a redirect. Thank you for keeping me focused on what was important, reminding me to zoom out and consider the whole picture, and for appreciating the fullness of my thesis ambitions. Your mentorship was invaluable.

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## Chapter 1: Introduction

This thesis attempts to bring together multiple story-lines through the lens of envisioning the future of our cities. As initial explorations into food systems became more people, place and site specific, the questions expanded to how can design address a complex set of needs and cultural assets for both the people and the city? In cities with large populations of immigrants, what does that mean? How is food, the craft, consumption, and cultivation of food related to a place and that place's context within a larger city?

This thesis seeks to propose a contextual response for envisioning more productive uses for post-industrial urban sites, which are increasingly prevalent in U.S. cities.<sup>1</sup> The contextual response will be drawn from an historical review of rail's influence on Chicago's development, Chinatown's place in Chicago's history, and a typological analysis of the present food system. Initial background on the history of food systems and its significance for the Chinese diaspora in the US serves as context for understanding the strength of the food system found in Chicago's Chinatown. The response will propose an urban ecological strategy to weave experiences for production and consumption, innovation and education. The goal was to consider how to find the cultural assets of a neighborhood and bring them into the forefront in developing a site that currently creates spatial division.

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<sup>1</sup> Florida, "America's Most Post-Industrial Metros: The Cities That Lead America's Transition from a Goods-Producing to Service Economy."

## Chapter 2: Food Globalization and the Chinese Diaspora

### City Limits and Local Agriculture

Food. It is a fundamental human need, a need that has shaped social structures, driven political agendas, and required much ingenuity to ensure production, distribution, consumption, and disposal is efficient and abundant. The development of agriculture fundamentally shifted the course of humanity and allowed the development of cities, as fewer people were required to work the land to feed the population. Agrarian peoples were called “civilized”, while their nomadic herder counterparts were “barbarians.”<sup>2</sup> Since the earliest established cities from 8000 BCE, urban dwellers have depended upon their rural counterparts to supply and satisfy their appetites. This relationship largely bounded the size of a city, as the surrounding farmland had to produce enough food to feed the immediate city, and the ruling class of the city had to wield enough power to manage this relationship.<sup>3</sup> Keeping people fed has been a central issue for political activity since the earliest civilizations, and access to food was even defined by these social hierarchies.

### Growing Cities and Globalization

The idea of a subsistence city being fully bound to the immediate countryside has not been reality for millennia. As civilizations like the Greeks developed their maritime capabilities, they discovered that transport over sea was much less costly in time and

---

<sup>2</sup> Pilcher, *Food in World History*, 4. The “civilized” and “barbarian” distinction also highlighted differences in diet, sedentary v. active, and the group social hierarchy.

<sup>3</sup> Steel, *Hungry City*, 7.

energy than over land. The Greeks and Phoenicians traded both staples and luxury items, including wine, grain, oil, honey, spices, and a fermented fish and herb sauce called garum.<sup>4</sup>

As the Roman Empire began their ascendancy and expanded through the first and second century CE, Rome grew to accommodate 1 million people along with their import capabilities across the Mediterranean and Black Sea. As Rome's appetite for a cosmopolitan diet grew, port cities grew to accommodate trade activities from Spain to Gaza. Yet this trade was at odds with the Greco-Roman ideal of the self-reliant soldier-farmer, who wrested a frugal existence from the land and fought to protect it. That ideal was in tension with other civic activities, such as feasting where excessive consumption was the norm.<sup>5</sup> The expansion of the Roman Empire was as much about feeding its citizenry as it was about expanding its power base, war as the tool of conquest.<sup>6</sup>

In the Muslim Empire, trade of goods was significant, but the period was more known as a period of expansive people and food migration from Spain to India. Oranges, peaches, rice, wheat, rice, watermelons, spinach – a stable empire that held traders in high regard witnessed the flow of foods and proliferation of new cultivation methods across thousands of miles.<sup>7,8</sup> Although Islamic dietary law defined food limitations

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<sup>4</sup> Pilcher, *Food in World History*, 11.

<sup>5</sup> Pilcher, 12.

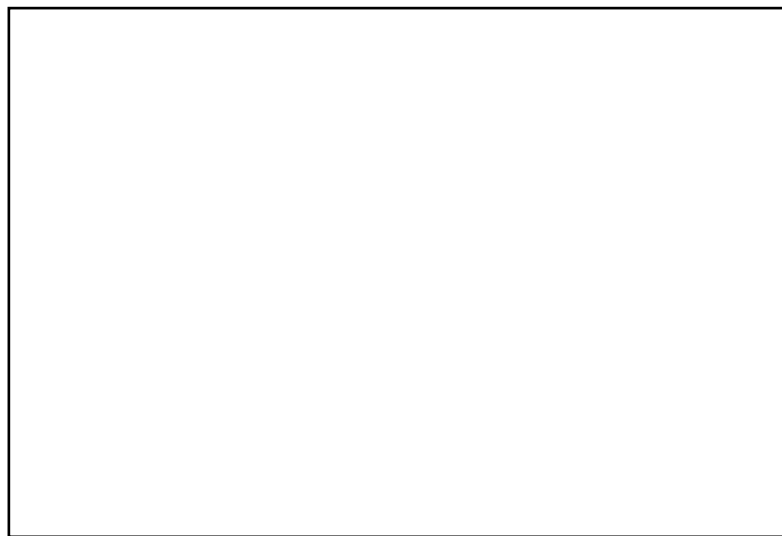
<sup>6</sup> Steel, *Hungry City*, 75.

<sup>7</sup> Pilcher, *Food in World History*, 13.

<sup>8</sup> Haddad, "Food Production and Food Security Management in Muslim Civilization."



*Figure 1: Diagram of global trade networks during the Middle Ages. Many networks were based upon established routes hundreds of years old.*



*Figure 2: Pages from an Arabic text showing an eggplant, onion, and other plants.*

and practices, Muslims were known for synthesizing cultural traditions across the empire into new cuisines. The specificity of food practices led to the creation of manuals and cookbooks, known to Medieval Christians and the Song Dynasty in

China alike.<sup>9</sup> While regional cuisines developed with distinctive features, sweet meats and use of spices became ubiquitous.<sup>10</sup>

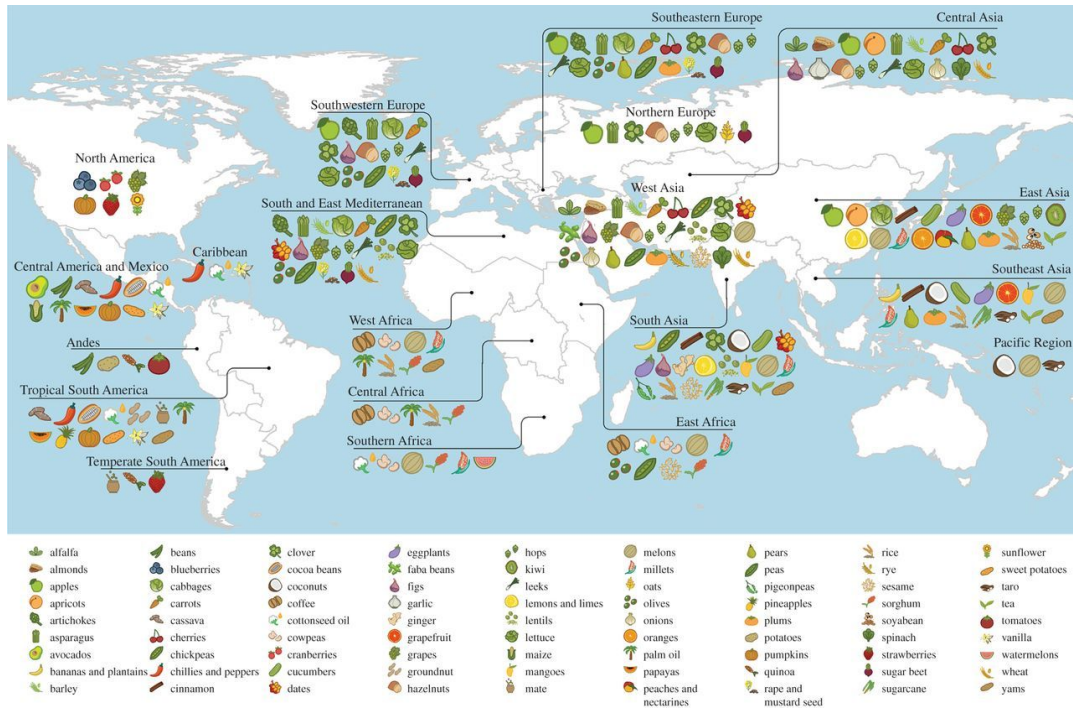


Figure 3: Origin of Food Plants.

The love for spices and sugar was not a unique feature of the Muslim Empire. The insatiable cosmopolitan diet for spices in Europe, along with a taste for silk, was a key motivator for discovering a sea route to China, eventually leading to the

<sup>9</sup> Tayob, “Muslim Food Culture.”

<sup>10</sup> Pilcher, *Food in World History*, 14.

colonization of the Americas.<sup>11</sup> Again, the fortunes of an expanding empire was entwined with the trade of food. The Portuguese first established sugar plantations in Brazil, and the sugar economy spread to other colonies of the British and French.<sup>12</sup> The British developed a collective sweet tooth, initially fed by the sugar plantations in Jamaica. Cacao, corn, potatoes, and tomatoes migrated into European diets from the Americas as well.<sup>13</sup>

As the seemingly endless vastness of the Americas were able to supply cheap food for the European cities off the backs of slave labor<sup>14</sup>, trade, whether controlled by an empire or a corporation, continued to drive globalization and the growth of cities. All the agricultural production needed a market to consume the supply, and production was increasingly systematized on plantations. London grew as its ability to import food grew, and cities in Europe were increasingly untethered from the ability of the surrounding farmland to supply its food. After slave labor gave way to industrialized processes, increased productivity only accelerated the separation of city and farmland. Today, the area of required farmland to feed London is 100 times the size of the city.<sup>15</sup> Ecological limits are real. In the waning days of the Ming Empire (1368 –

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<sup>11</sup> Northrup, *Encyclopedia of World Trade*.

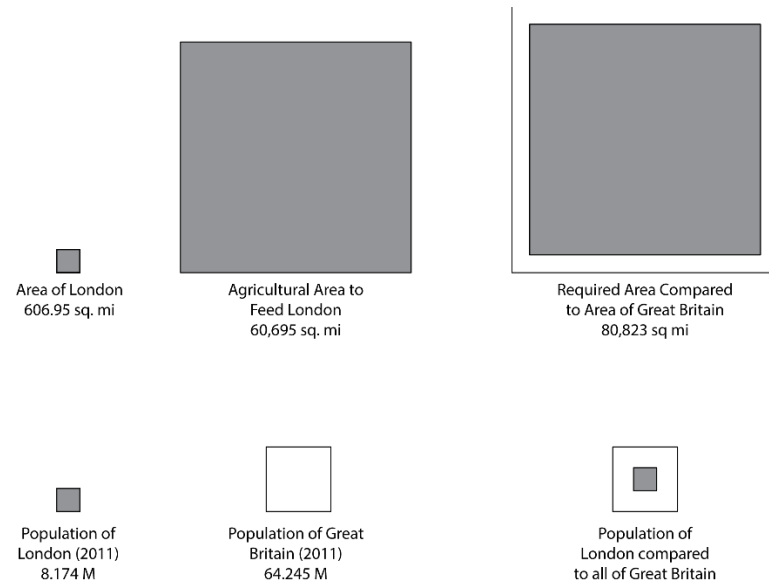
<sup>12</sup> Pilcher, *Food in World History*, 27.

<sup>13</sup> Romer, "History of World Food."

<sup>14</sup> Steel, *Hungry City*, 85.

<sup>15</sup> Steel, 7.

1644), China reached its ecological limit to feed the population and adopted the [American] sweet potato to stave off famine.<sup>16</sup>

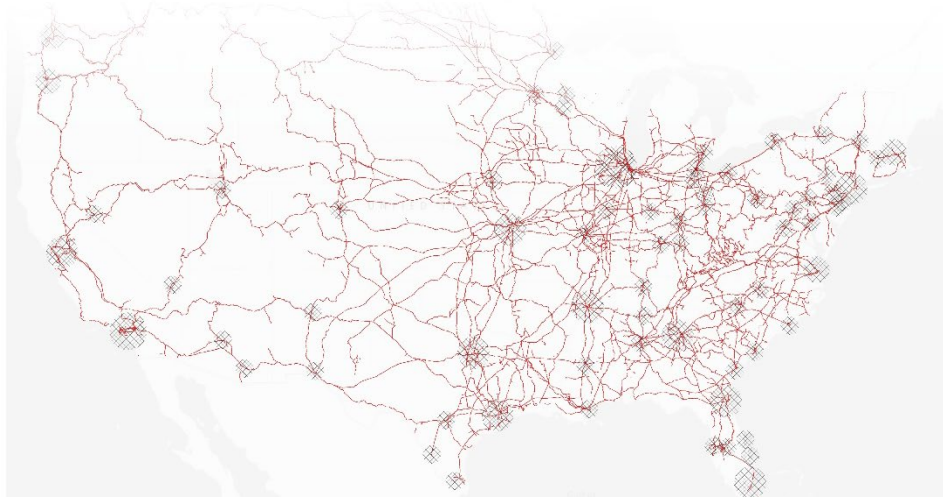


*Figure 4: Comparisons of London's population and area to Great Britain. Population growth is only possible due to the importation of food.*

Global trade networks have only continued to expand with the continual evolution of technologies. The land and sea transport in the Age of Empires gave way to rail networks, increasing the speed and reach of trade over land. This process exacerbated eroding relationship between city centers and its surrounding agricultural land.

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<sup>16</sup> Pilcher, *Food in World History*, 24.



*Figure 5: US rail network, with intermodal transport locations hatched in grey. Relative circle sizes represent the relative scale and importance of the location. Intermodal transportation methods include rail, sea, longshore transport, and air.*

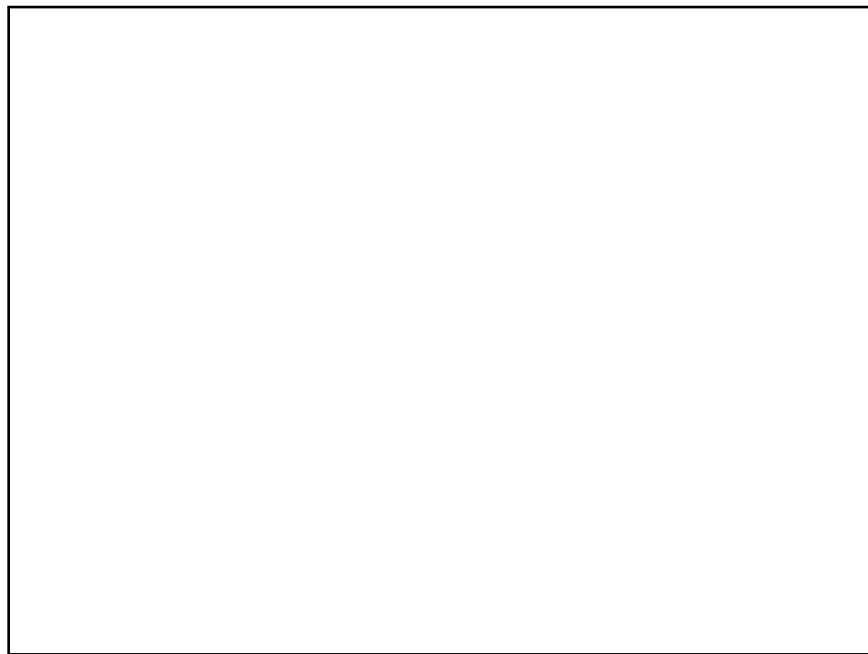
The story of urban growth is intimately tied with the processes of food production, trade, and globalization. In the current age, food production is increasingly a corporate enterprise and commodified, as corporations seek to predict farm productivity and economic returns.<sup>17</sup> Agricultural monoculture in the US, supported by cheap oil, a global export market, and industrially produced fertilizers, may be the dominant story of city and agriculture, but it exists on a historical continuum. Even so the conception of normative agricultural products and what we eat has been shifting for millennia. Population shifts are part of that story of urban growth, as well as the relationship between food and city.

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<sup>17</sup> Steel, *Hungry City*, 97.

*The Chinese Diaspora's Food Network in Manhattan's Chinatown*

The story of Manhattan's Chinatown in some ways is not so different from the rest of New York City. People migrated in search of economic opportunities. People needed to eat. They looked for ways to get food. They looked for ways to eat foods familiar to them and also adapted. While Chinese populations settled in a diverse set of landscapes<sup>18</sup> (my own grandfather roamed as far as Alaska as part of a migrant labor force), Manhattan's Chinatown is unique in part due to the size of the population and how essential its brokers and social networks are in the development and maintenance of the fruit and vegetable supply for Chinese communities from Detroit to Washington DC.<sup>19</sup>



*Figure 6: The Chinese Population in the U.S. in 1880.*

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<sup>18</sup> Rose and Kennedy, *Chinese Diaspora Archaeology in North America*.

<sup>19</sup> Imbruce, *From Farm to Canal Street*.

In the second half of the 19<sup>th</sup> century, 2.5 million Chinese people migrated from China, overburdened by the effects of famine, poor economic conditions, internal political instability, and the results of European colonialism and the British Opium Wars. Like in the time of the Ming dynasty, China during the Qing dynasty had reached its ecological limit. Stability and more productive agriculture allowed the population to triple, until again the available farmland could not support the population. Approximately 400,000 Chinese settled in North America during this period<sup>20</sup>, and Manhattan's Chinatown became the largest concentration of Chinese in the United States through continued migration in the early 1900s, despite limitations on immigration by the Chinese Exclusion Act in 1882.<sup>21</sup> A good portion of the Chinese migrants were farmers and fisherman from the southern Guangdong Province, a subtropical region part of the Pearl River Delta. Along with the people, social structures centered on extended kin ties and family clans were also brought over. In rural China, clan villages were integral to the “creation of clan markets, schools, hospitals, and other infrastructure.”<sup>22</sup>

These kin structures became integral for establishing infrastructural support for the Chinese diaspora in the United States, including the food network. Seeking to recreate some cultural comforts of home, Chinese migrants established farms outside of

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<sup>20</sup> Rose and Kennedy, *Chinese Diaspora Archaeology in North America*.

<sup>21</sup> Imbruce, *From Farm to Canal Street*, ix. Rose and Kennedy, *Chinese Diaspora Archaeology in North America*.

<sup>22</sup> Rose and Kennedy, *Chinese Diaspora Archaeology in North America*, 3.

Manhattan to supply Chinese vegetables with records as far back as 1894.<sup>23</sup>

Replicating the kin networks central to Chinese social life, wholesale produce brokers became the essential link between farm and market. Brokers would look for people willing to establish farms on Long Island and later New Jersey and work in an exclusive relationship to supply the broker with produce. In return, the broker would look out for the interests of the farmer, providing services from market advice and training to seed funds, loans for equipment, and even accepting a loss by giving a better price to ensure loyalty and satisfaction.<sup>24</sup> Brokers negotiated transport and coordinated distribution from New York to other cities with smaller Chinatowns such as Boston, Philadelphia, and Washington DC.

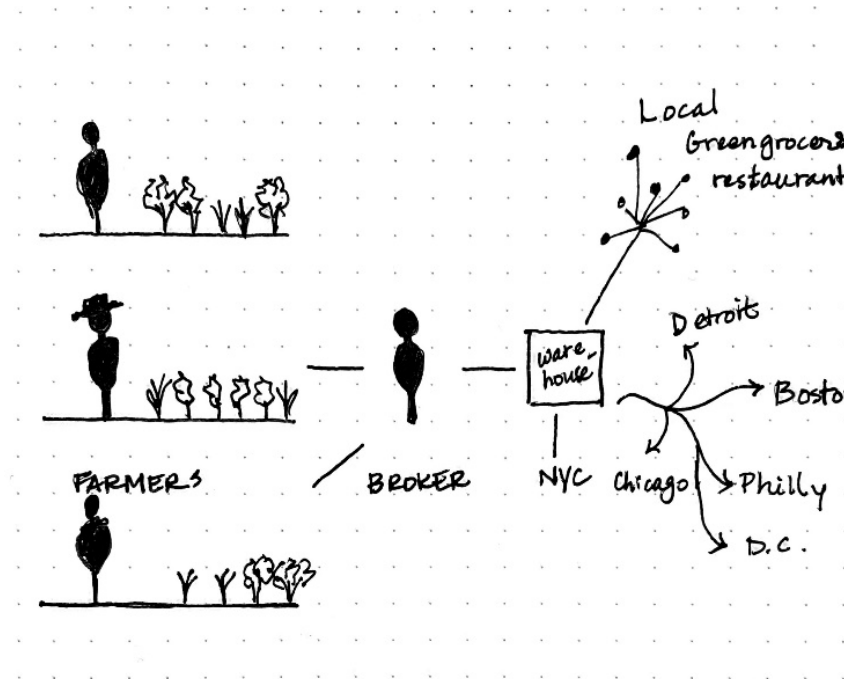


Figure 7: Relationship of the broker to farms and cities in the New York Chinatown food system.

<sup>23</sup> Imbruce, From Farm to Canal Street, 21.

<sup>24</sup> Imbruce, 46.

This localized relationship of farm and city had limitations though that required adaptation. The growing season in New York and New Jersey was limited and the full range of the subtropical culinary appetite was not sated. As agricultural practices were transforming in the broader Post-WWII United States, Chinese farmers were also adapting by expanding operations to Florida and Central America to provide year-round fruits and vegetables for the growing Asian and Southeast Asian communities up North. Southeast Asian immigrants brought farming models from their home countries such as the home garden to supply high value tropical fruits and herbs. Using the same cool-chain technologies the agro-industrial complex uses to distribute food via a global network, over time the Chinatown brokers created a supply chain that offered an abundance of diverse fruit and vegetables for its community with contracts across Central and South America. Currently, the Asian Vegetable market offers the most stability for farmers in Honduras due to the growing demand and ability of farmers to plant a rotation of diverse vegetables. Added by cheap oil, free trade, and low cost labor, Chinese wholesale brokers are able to provide a year-round supply of fruits and vegetables, the biodiversity surveyed at 209 distinct types across a year.<sup>25</sup> While the reach is global, the Chinese food network is distinctly not monoculture nor is it the vertically integrated Wal-Mart model.

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<sup>25</sup> Imbruce, 33.

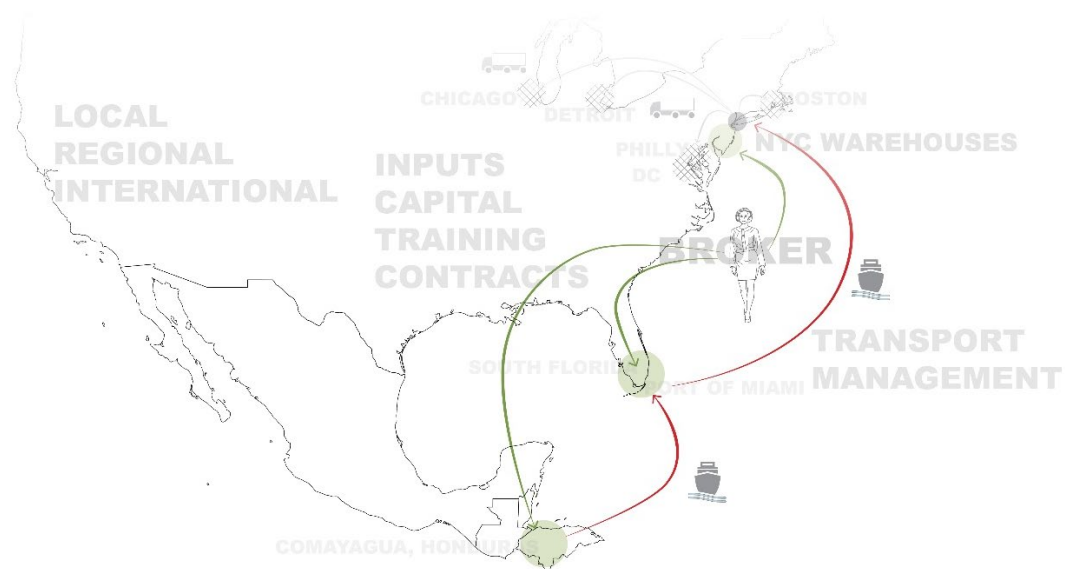


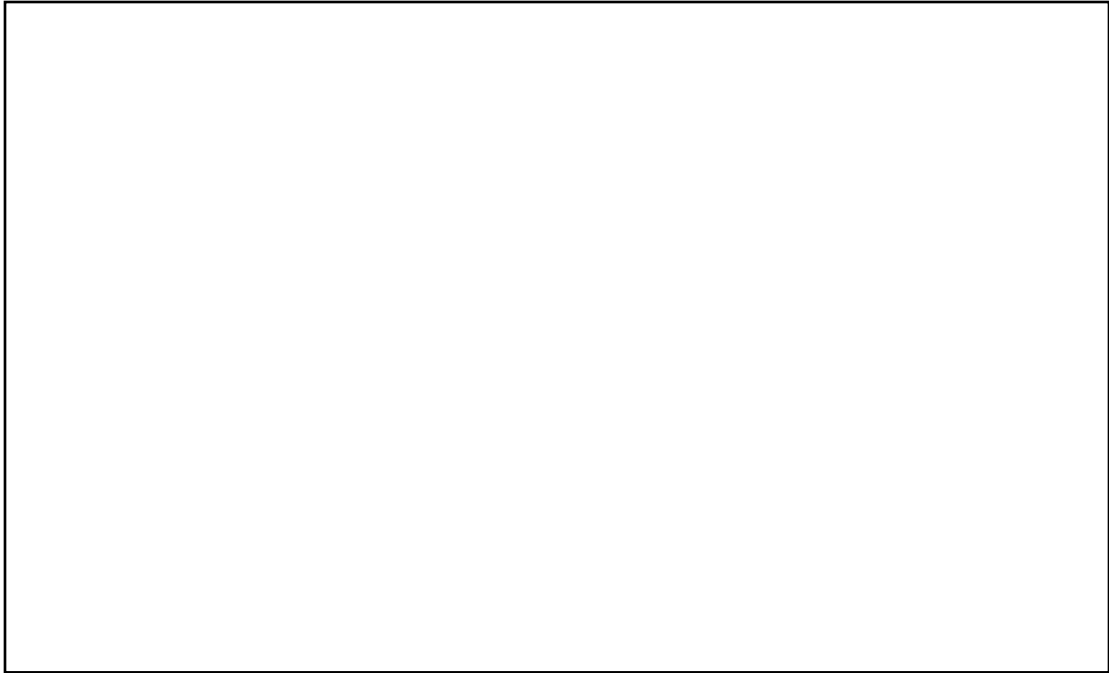
Figure 8: Food flows from farm to NYC's Chinatown. From there, food is distributed along the East Coast and to the Midwest.

### The Centrality of the Warehouse

For all the ingenuity of the Chinese food supply chain, the warehouse is central to how food makes its way to market and then table. Green grocers in Chinatown have no to limited refrigeration to maximize space for produce, made possible by a regular circulation of delivery trucks from the wholesale warehouses. These warehouses are located within blocks of the accounted 85 Manhattan Chinatown green grocers, this proximity key to the success of this model. Unlike the 329-acre consolidated Hunts Point terminal that serves the rest of New York City wholesalers, there are multiple, relatively small scale warehouses, each owned and controlled by a different broker.<sup>26</sup>

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<sup>26</sup> Imbruce, 145.



*Figure 9: The produce markets of Chinatown. Map created by Brian Morgan.*

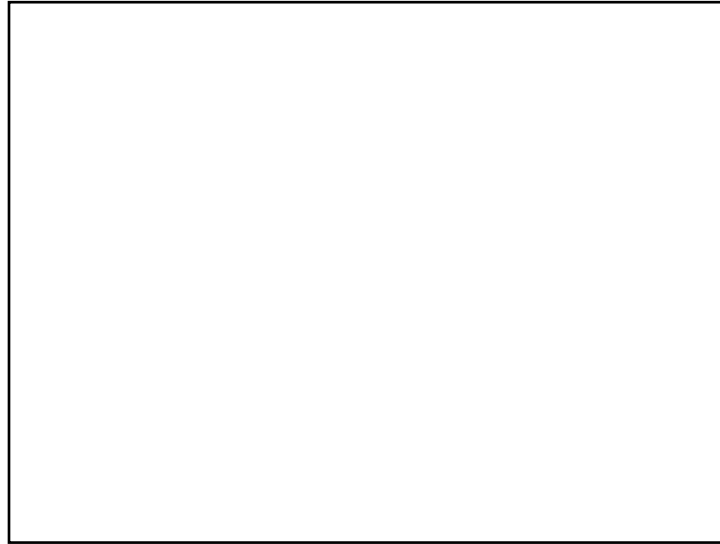
As Chinatown has faced gentrification pressures, the wholesale warehouses have become contested space. Changes in zoning have made the practices of double-parking and idling trucks problematic, and newer neighbors have complained about the constant fork lift activity on the sidewalks being a danger and hazard despite evidence that vehicular incidents are the main issue.<sup>27,28</sup> While the geographic urban clustering of food-related businesses is essential to the Chinatown model, the urban structure, lack of public space, and different cultural perceptions of sidewalk activities has made some business practices contentious. These issues, compounded by the gentrification pressures, has caused some wholesale warehouses to close or

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<sup>27</sup> Imbruce, 18.

<sup>28</sup> Abello, "Why Chinatown Is So Delicious, and Why It Might Not Be So Forever."

relocate with three still remaining in 2019, threatening the viability of the network structure.



*Figure 10: Finest Produce, a wholesaler in Chinatown.*

### *A Dispersing Diaspora and the Rise of the Asian Supermarket*

Chinatowns perpetuate due in part to a steady influx of newer immigrants, and many of the Chinese residents of Chinatowns are first and second generation immigrants. Chinatown populations have declined from Honolulu<sup>29</sup> and Vancouver<sup>30</sup> to Washington, D.C.<sup>31</sup> as residents have moved out, and place-preservation manifests in gates, signs, and other architectural elements. Gentrification places pressure on housing costs, and local residents owning property resist gentrification by

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<sup>29</sup> Jin, Huang, and Geng, "Preserving the Historical Memory of Honolulu's Chinatown."

<sup>30</sup> Li and Li, "Vancouver Chinatown in Transition."

<sup>31</sup> Jia Lou, "Chinatown Transformed."

maintaining ownership or selling to others in the Chinatown community.<sup>32</sup> “New Chinatowns” may be established in less expensive parts of the city, with less homogeneity. They may have a plurality of Chinese residents, but the new neighborhoods are more integrated with other immigrant populations.<sup>33</sup>

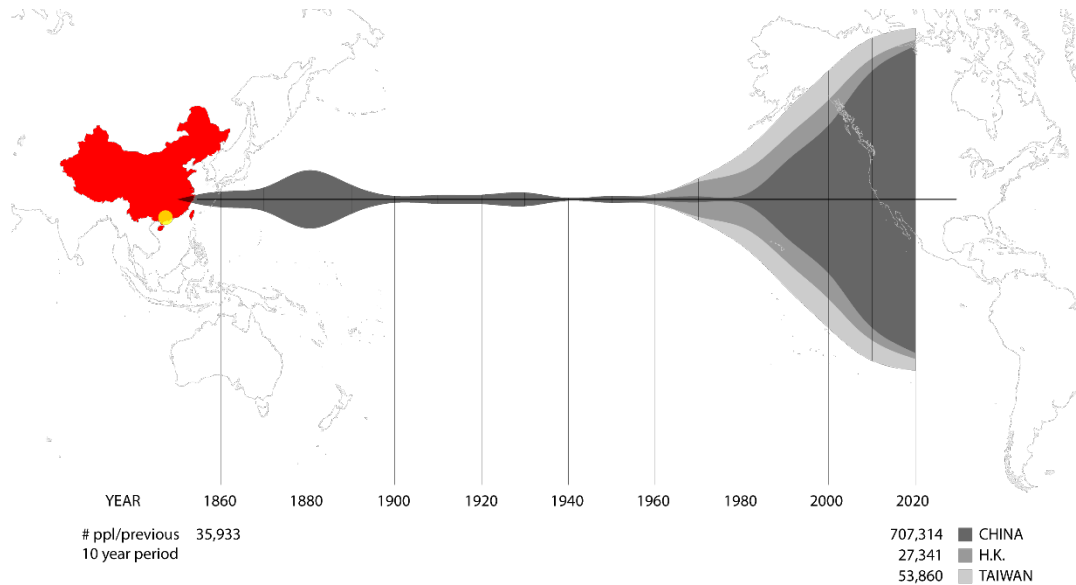


Figure 11: Flows of Immigrants from China, Hong Kong, and Taiwan to the U.S. since 1850.<sup>34</sup>

While much energy and study has focused on the decline of the old Chinatowns and their gentrification<sup>35</sup>, the reality is that the Chinese diaspora in North America has always been dispersed.<sup>36</sup> Just as a globalized food network has been embedded in the history of cities, the dispersion of the Chinese population is also embedded in North

<sup>32</sup> Wong, “Shop Talk and Everyday Sites of Resistance to Gentrification in Manhattan’s Chinatown.”

<sup>33</sup> Laguerre, “The Globalization of a Panethnopolis.”

<sup>34</sup> Data from: United States Department of Homeland Security, “2018 Yearbook of Immigration Statistics”; US Department of Homeland Security, Office of Immigration Statistics, “Yearbook of Immigration Statistics 2019.”

<sup>35</sup> Li et al., “Chinatown Then and Now.”

<sup>36</sup> KENNEDY and ROSE, “Charting a New Course for Chinese Diaspora Archaeology in North America.”

American history. Chinatowns experienced a steady decline in the early 1900s until the repeal of the Chinese Exclusion Act in 1965 reopened the U.S. to an influx of Chinese immigrants. Many of the newer immigrants generated a resurgence in the urban Chinatowns.<sup>37</sup> Often later generations would move out to the suburbs as their education and financial conditions improved, giving them little incentive to continue family businesses. Indeed, many of the aforementioned wholesale brokers do not live in Manhattan's Chinatown while they exert incredible influence over the operations and fortunes of Chinatown businesses.<sup>38</sup> Other immigrants with higher education levels and greater financial means moved to the suburbs. While the initial influx of Chinese immigrants mainly came from the Guangdong Province, more recent immigrants have migrated from across China.

As the Chinese population has continued to disperse across North America, another food system arose to accommodate the Chinese appetite. Compared to other immigrant populations, the Chinese are slow toward dietary acculturation when Asian vegetables are available.<sup>39</sup> The Asian supermarket began to take precedence in suburban contexts to meet the dietary desires of Asian ethnic groups, with stores like 99 Ranch established in 1984<sup>40</sup>, the Korean counterpart H Mart established in 1982<sup>41</sup>, and the Indian counterpart Patel Brothers established in 1974<sup>42</sup>. Where ethnic

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<sup>37</sup> Mendelson, Chow Chop Suey.

<sup>38</sup> Imbruce, *From Farm to Canal Street*, 39.

<sup>39</sup> Imbruce, *From Farm to Canal Street*.

<sup>40</sup> Lanyon, "The Story of 99 Ranch Market, Largest Asian Supermarket Chain in US"; Yuan, "99 Ranch Market Celebrating 35 Years in Business."

<sup>41</sup> Winkle, "HMart Opens First Austin Grocery Store, Debuting New Food Hall Concept."

<sup>42</sup> Chu, "Patel Brothers Market Opens in Niles."

population clusters arose across the U.S., these multicultural Asian grocery stores eventually followed. Not unlike the grocery giant Wal-Mart, the business owners created complex supply chains and sophisticated logistics operations, vertically integrated down to farm ownership in places as far as China to control quality and cost. These Asian grocery stores can offer over 15,000 unique products, as in the case of 99 Ranch, and have been considering other models to address cross-generational needs, from developing their e-commerce footprint to incorporating food halls.<sup>43</sup>



*Figure 12: A 99Ranch display shows the integration of shopping and dining and looks similar to other US grocery store signage.*

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<sup>43</sup> Lanyon, “The Story of 99 Ranch Market, Largest Asian Supermarket Chain in US”; Winkle, “HMart Opens First Austin Grocery Store, Debuting New Food Hall Concept.”

## Chapter 3: Chicago, Rail, and Chinatown

This story of food, city, and Chinatown also unfolded in Chicago. Unlike the story of Manhattan's Chinatown, Chicago's story is tied to rail and their concurrent growth and rise to prominence.

### Chicago's Birth as the Rail Center of the United States

The lands of Chicago have been known for hundreds of years as a place of travel, as it sits at the intersection of important waterways and Lake Michigan. Incorporated as the City of Chicago in 1837, soon after Chicago established itself as the transit hub,

trade center, and to

this day the most

important rail city in

the United States.<sup>44</sup>

By the 1850s (Figure

14), railroads

connected Chicago to

trade centers along

the East Coast and

into the developing

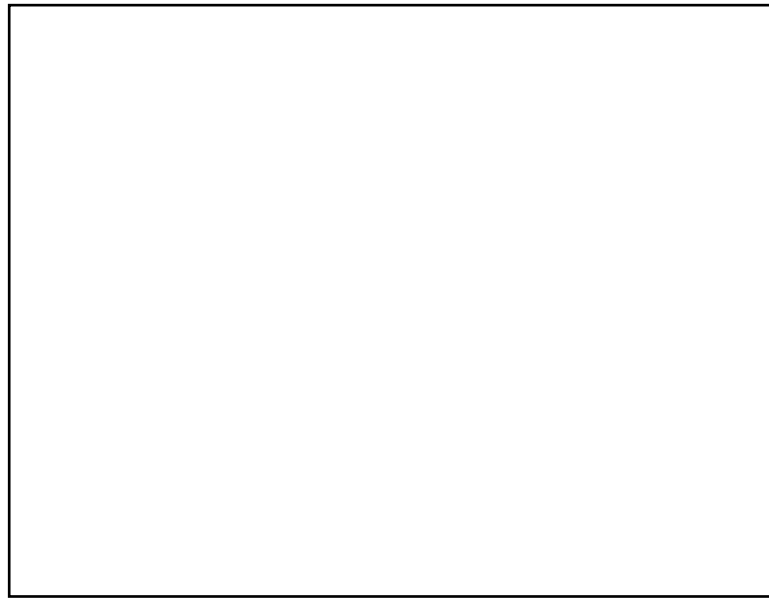


Figure 13: Aerial view of Union Stock Yards, Chicago, Illinois, October 9, 1947.

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<sup>44</sup> Chicago: An Official Website of the City of Chicago, "Chicago History."

West. Before the Transcontinental Railroad was completed in 1869, the Union Stockyards had opened in 1865 and was the transfer point for millions of heads of swine per year. Hundreds of acres in Chicago was dedicated to rail and the industries that were supported by the transit network that all passed through the city. Agriculture and rail grew and expanded in an interconnected relationship with the growth of Chicago. By the time the Union Stock Yards closed in 1971, a billion swine had passed through Chicago.<sup>45</sup>

### *The First Chinese in Chicago*

Rail is also the reason the first Chinese migrated to Chicago. After the Transcontinental Railroad was completed, Chinese railroad workers migrated to other cities in search of jobs and opportunity. The first Chinese arrived in Chicago in 1870. By the 1890s, the majority of Chinese in Chicago were concentrated in an area near by Chicago River along Clark St between Van Buren and Harrison. This first Chinatown numbered about 600 people, and the first Chinese there opened restaurants, grocers, and laundries, mostly avoiding labor competition with other nearby immigrant groups. Growth of the Chinatown was extremely limited at this time, due to limitations from the Chinese Exclusion Acts of 1882.<sup>46,47</sup>

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<sup>45</sup> Pacgya, "Union Stock Yard."

<sup>46</sup> Chicago Metropolitan Agency for Planning, "Chinatown Community Vision Plan Existing Conditions Report."

<sup>47</sup> Chinese American Museum of Chicago, "1889 The Clark Street Chinatown Reaches Maturity."

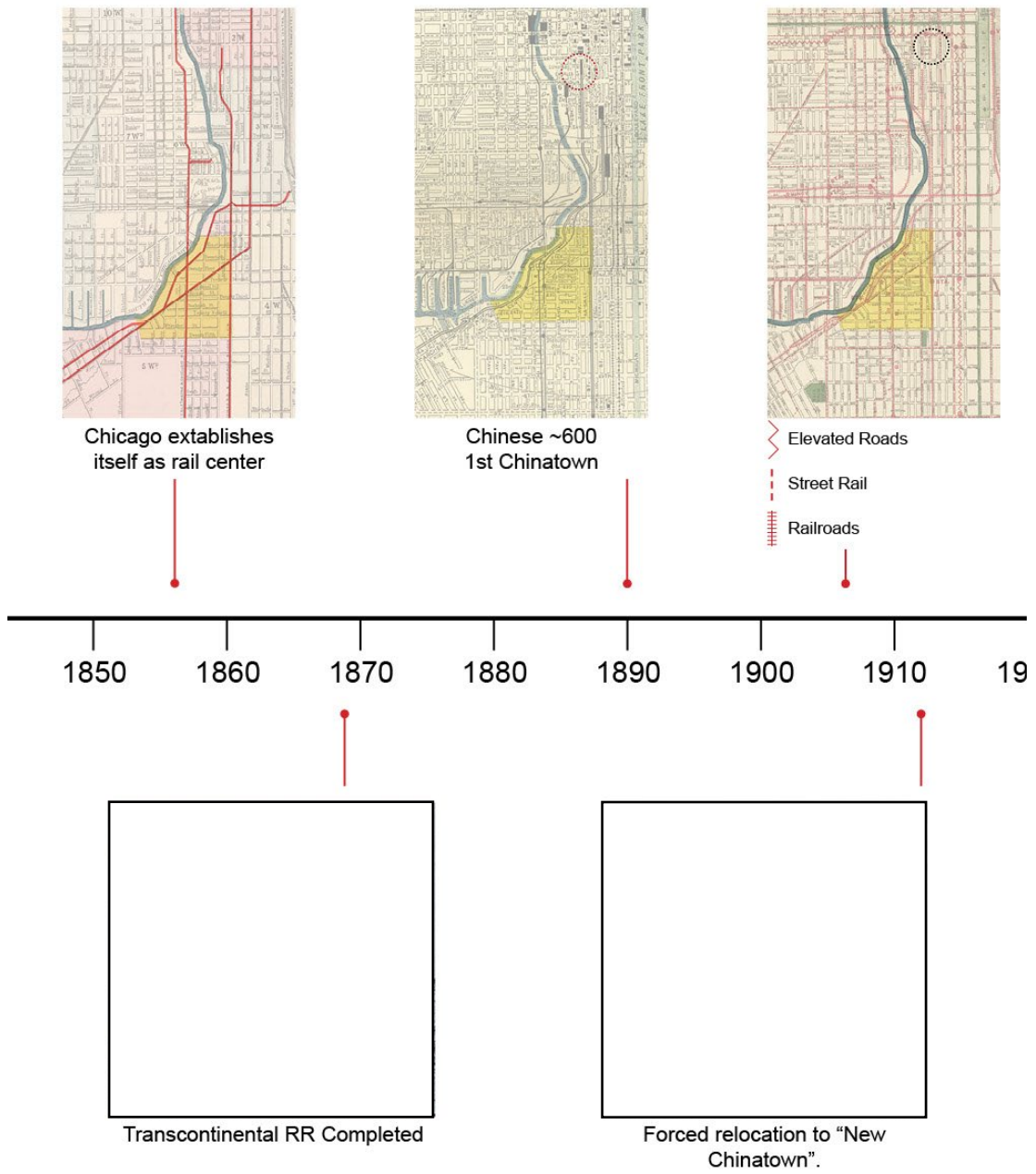
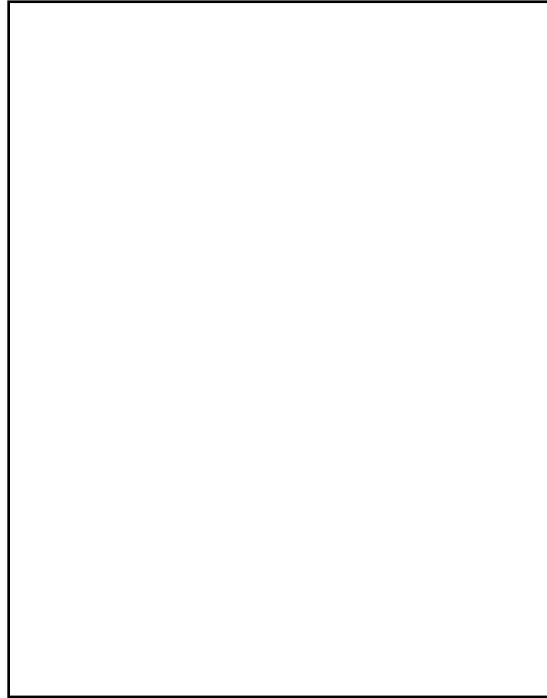


Figure 14: Timeline of Chicago Rail and Chinatown 1850 - 1912

### Rail Gets Elevated

By the late 1800s, Chicago's streets were congested with freight rail lines, street cars, and commuter rail lines. Hundreds of miles of track are indicated in maps, and Union Stock Yards had a significant presence in the industrialized areas in South Chicago. Road safety became an increasing issue, as pedestrians, horse-drawn carriages, and trains got into conflict.



*Figure 15: Elevated Train in Chicago's Loop, 1897.*

As in other industrialized cities, Chicago began to pass regulations that required rail to be elevated to improve street safety. Images from this era show that as the skyline of Chicago reach new heights, so did rail lines, both made possible by the expanding steel industry. To this day, Chicago is known for its "L" system of elevated trains.<sup>48</sup> While some of the rail lines were elevated on heavy steel structures, other rail lines were laid on large embankments, contained by thick walls of concrete. At some points spanning the width of a city block, the rail lines carved into Chicago's city grid.<sup>49</sup> Chicago's residents are accustomed to living in close proximity to multiple rail conditions.

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<sup>48</sup> Chicago: An Official Website of the City of Chicago, "Chicago History."

<sup>49</sup> Chrucky, "Grove Street."

### *A New Chinatown is Established*

Despite limits on Chinese immigration, the Chinese population in Chicago continued to grow for several reasons. First the Columbian Exposition of 1893 in Chicago incorporated some Chinese cultural displays, encouraging some Chinese to migrate to Chicago.<sup>50</sup> Second, the Great Fire of 1906 forced many people to relocate, including many of the Chinese living in San Francisco. The importance of kin ties drew the Chinese people together in Chicago, doubling the Chinese population.

While the Chinatown along Clark Street had been able to avoid intense conflict, by 1910, the situation had drastically changed. While restaurants built during this era were considered classy destinations with luxurious interiors and live music, the boom that began in 1901 started to wane.<sup>51</sup> Hostilities led landlords to raise rents in an effort to force the Chinese out of the area, and eventually the Federal government used eminent domain to complete the forced relocation. Further south near the intersection of Cermak Road and Wentworth Ave, a “New Chinatown” was quickly recognized as the new center of Chinese life in Chicago due to favorable rents.<sup>52,53</sup>

Interestingly, the rail lines in the area were built by the Pennsylvania Rail Road, New York Central Railroad, and Burlington & Quincy Railroad in the 1850s and 1860s (Figure 14), and the industrial character of the South Branch of the Chicago River had

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<sup>50</sup> Chinese American Museum of Chicago, “The Political Side of the Fair.”

<sup>51</sup> Chinese American Museum of Chicago, “Chinese Restaurants Move Down-Market, 1910s-1960s.”

<sup>52</sup> Chicago Metropolitan Agency for Planning, “Chinatown Community Vision Plan Existing Conditions Report.”

<sup>53</sup> Kiang, “Chinatown.”

been long established.<sup>54</sup> The nascent Chinatown had selected the area for lower rents, like due to the proximity to proliferating rail lines and its industrial nature. This relationship with rail continues to this day.

### *Chinatown Adapting and Evolving*

In the first few decades in the new location, Chinatown remained limited to a few blocks along Wentworth Ave. Businesses continued to be focused on restaurants, grocers, and laundries, with some restaurants trying to retain the luxurious flavor of the initial Chinatown along Clark Street. Some of the oldest surviving buildings in Chinatown were restaurants built in the 1920s with Art Deco flair and elaborate terra cotta details. Large dining rooms, dance floors, and live bands continued to make these Chinese restaurants destinations.<sup>55</sup> This relocation was not without strife, as Chinese businessmen were forced to work with brokers to establish leases for their



Figure 16: The Moy Association Building, 1928 & 1932.

<sup>54</sup> Chrucky, "Grove Street."

<sup>55</sup> Chinese American Museum of Chicago, "Chinese Restaurants Move Down-Market, 1910s-1960s."

businesses.<sup>56</sup> Powerful community organizations around the family kin structure were formed and an unofficial “mayor of Chinatown” sought business connections across the city to protect the neighborhood’s interests.

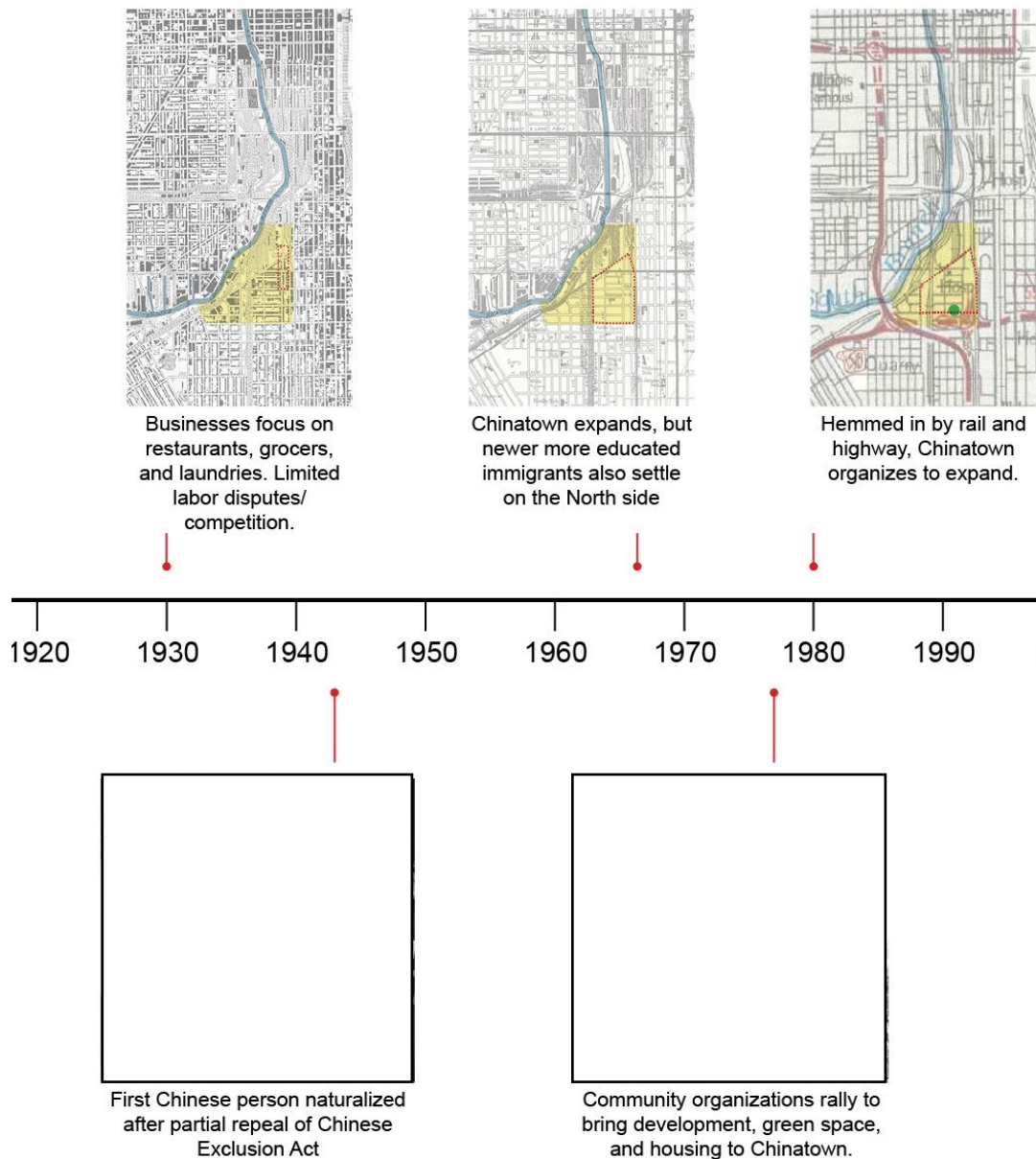


Figure 17: Timeline of Chicago Rail and Chinatown 1920 – 2000.

<sup>56</sup> Solzman, “Armour Square.”

The focus on restaurants, grocers, and laundries allowed the Chinese community to continue avoiding conflicts with other communities who were mainly employed in Chicago factories. To support the expanding food businesses, a food clustering with wholesalers developed in Chicago's Chinatown, similar to the network established in Manhattan.

Like in other cities, Chicago saw an influx of Chinese immigrants after the repeal of the Chinese Exclusion Acts, first with the partial repeal in 1943 and then the complete repeal in 1965. The footprint of Chinatown experienced rapid expansion, but it was greatly limited by the bounds of the existing rail lines. As rail began to decline, maps show how the interstate highways cutting through Chicago became new edges to the neighborhood (Figure 17). Also similar to other cities, newer Chinese immigrants had more education and settled in areas outside of Chinatown in other parts of Chicago, particularly in the North. Yet the businesses in the Chinatown Core continued to focus on restaurants and grocers, although the businesses began to cater more to the middle class and lost their high-end luster from the 1920s and 1930s.<sup>57</sup>

Chinatown continued to grow and adapt to these changing conditions. As railroad tracks and yards became abandoned and the community expanded beyond the rail boundaries, community groups organized efforts to bring open spaces to combat overcrowded conditions in Chinatown<sup>58</sup>, as well as more housing for its aging

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<sup>57</sup> Chinese American Museum of Chicago, "Chinese Restaurants Move Down-Market, 1910s-1960s."

<sup>58</sup> Kiang, "Chinatown."

population.<sup>59</sup> These efforts resulted in the establishment of Sun Yat-Sen Park abutting the Stevenson Expressway and the Ping-Tom Memorial Park on the side of the former Sante Fe Rail Yard.

To this day, Chicago’s Chinatown remains unique in that it continues to grow while other Chinatowns are experiencing decline. While the Chinese population has spread to many parts of Chicago, a good number have moved to adjacent neighborhoods (Figure 18), keeping strong ties with the core Chinatown neighborhood. The residents continue to live with the rail and highway fragmentation while seeking ways to bring more housing, job opportunities, open spaces, and better walkability to improve safety and community cohesion.<sup>60</sup>

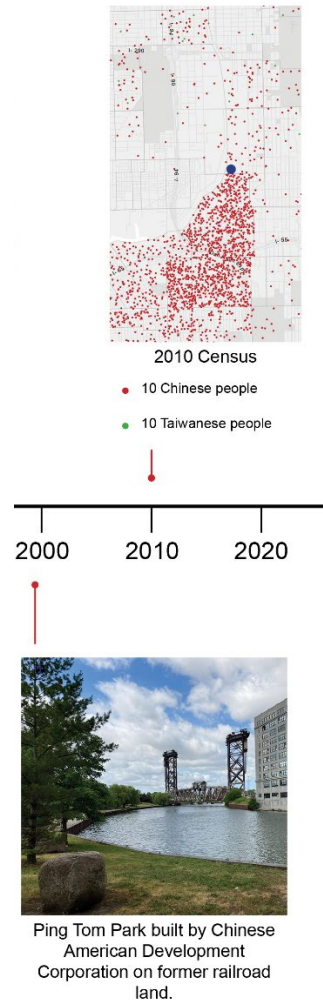


Figure 18: Timeline of Chicago Rail and Chinatown 2000-2020.

<sup>59</sup> Chicago Metropolitan Agency for Planning, “Chinatown Community Vision Plan Existing Conditions Report.”

<sup>60</sup> Coalition for a Better Chinese Community and Chicago Metropolitan Agency for Planning, “Chinatown Community Vision Plan.”

## Chapter 4: Site Analysis

### Chinatown's Context in Chicago

Chinatown is formally part of the Armour Square community area, adjacent to the South Loop neighborhood (Figure 19). Traditionally Armour Square has had a mixed population of African Americans, Italians, and Chinese residents, with growing numbers of Hispanic people.<sup>61</sup> Chinatown has expanded from the original concentration along Wentworth Ave to Chicago River, with growing numbers of Chinese people moving into Bridgeport (Figure 18). Although Chinatown enjoys proximity to neighborhoods with other ethnic populations, relationships have been uneasy and remain so.<sup>62</sup>

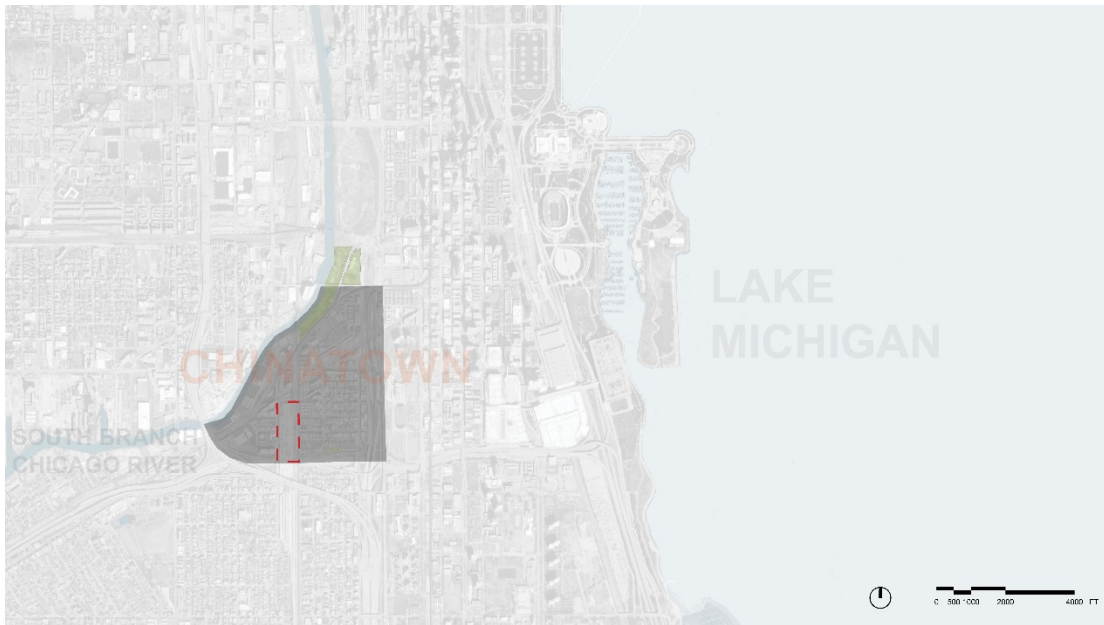


Figure 19: Chinatown and surrounding neighborhoods.

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<sup>61</sup> Solzman, "Armour Square."

<sup>62</sup> Kang, "The Killing Of Two Chinese Men Ignites An Anti-Black Sentiment In Chinatown."

While Chinatown is approximately two miles from the shores of Lake Michigan and significant landmarks such as McCormick Place, Soldier Field, the Museum Campus, and Grant Park (Figure 20), strong boundaries by rail and expressways with limited direct road access has kept Chinatown segregated from other parts of Chicago (Figure 21). The large open green space on the north end is Ping-Tom Memorial Park, on the grounds of the former Santa Fe Rain Yard. While this significant green space has been an important community amenity for Chinatown, it will also connect with a new development to the North, causing concerns of impending gentrification for residents and creating disagreements on what kind of growth is beneficial for Chinatown.<sup>63,64</sup> Despite the opening of this park, access to open space remains a concern.<sup>65</sup>

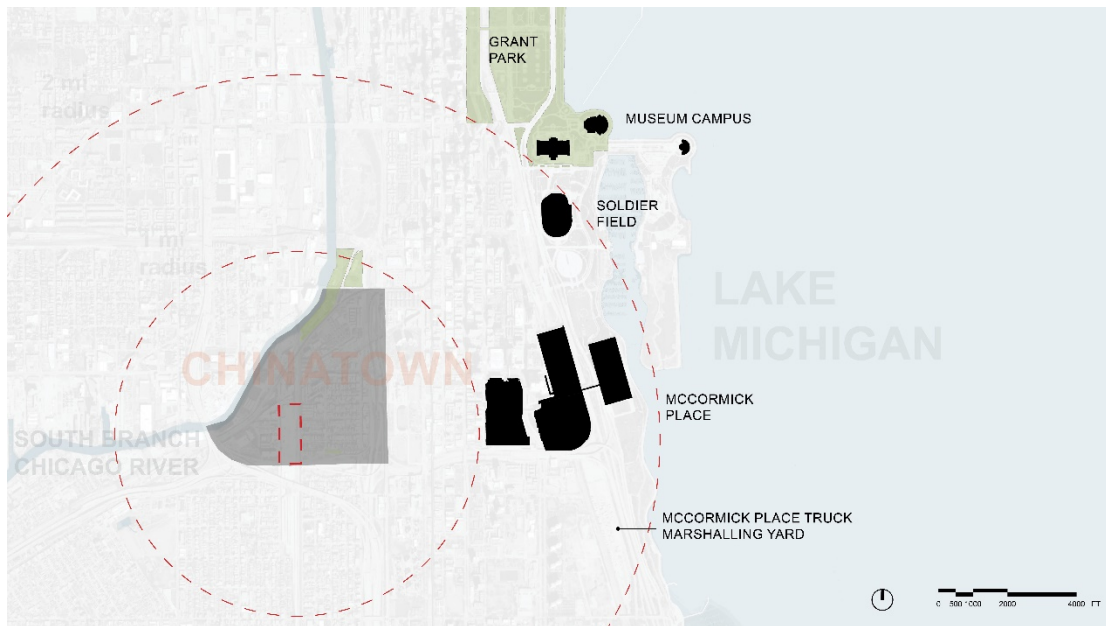


Figure 20: Chinatown proximity to nearby landmarks

<sup>63</sup> Kang, “Chinatown Residents Share Concerns About The 78 Megadevelopment.”

<sup>64</sup> Lu, “Chinatown: A Divided Growth Agenda.”

<sup>65</sup> Coalition for a Better Chinese Community and Chicago Metropolitan Agency for Planning, “Chinatown Community Vision Plan.”

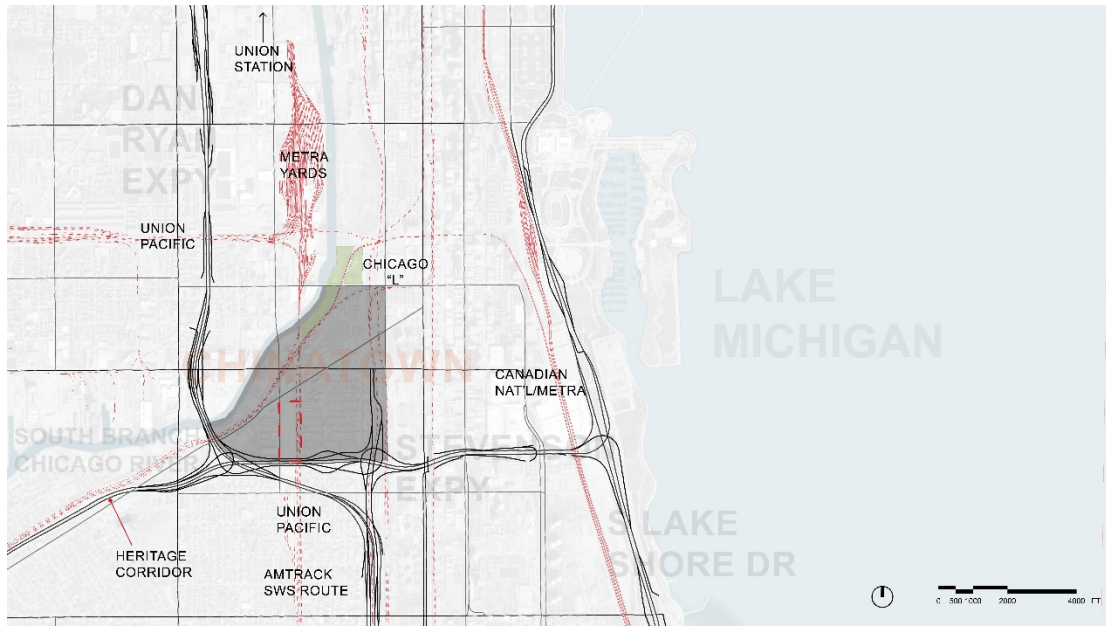


Figure 21: Chinatown bounded and fragmented by rail and expressways.

### Chinatown Analysis

What is considered the Chinatown Core is divided into three main areas (Figure 22). The “Old Core” remains the area concentrated along Wentworth Ave, the site of most of small grocers part of the food system cluster (Figure 23) south of Archer Ave and extending to the eastern edge of the Union Pacific container yard (currently closed)<sup>66</sup> at Stewart Ave. New Chinatown developed in 1993<sup>67</sup>, with the addition of a strip mall called Chinatown Square and housing. This development marked Chinatown’s expansion across Archer Ave, and current developments have been continuing southwest along Archer Ave.<sup>68</sup> The areas west of Canal Street toward the Chicago River are separated from the Old Core by the proposed site, the UP container yard.

<sup>66</sup> Load Match, “Chicago Area Intermodal Terminals & Map (61).”

<sup>67</sup> Yi, “Chinatown Chicago Neighborhood Guide.”

<sup>68</sup> Ward, “New Chinatown Retail Complex Coming To Archer And Canal.”

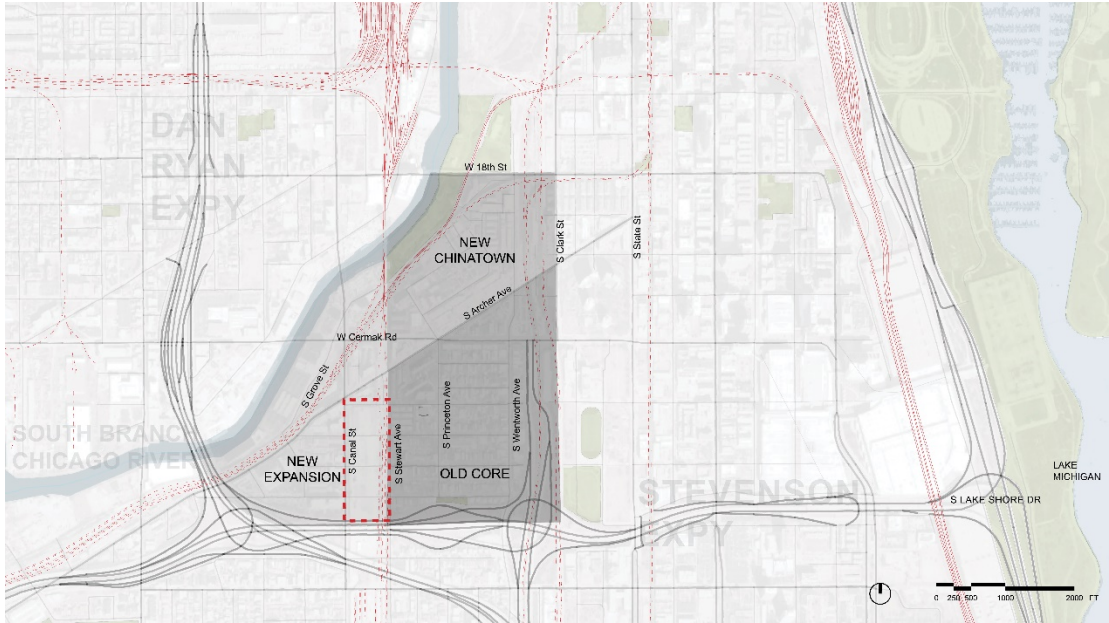


Figure 22: Chinatown subdivisions.

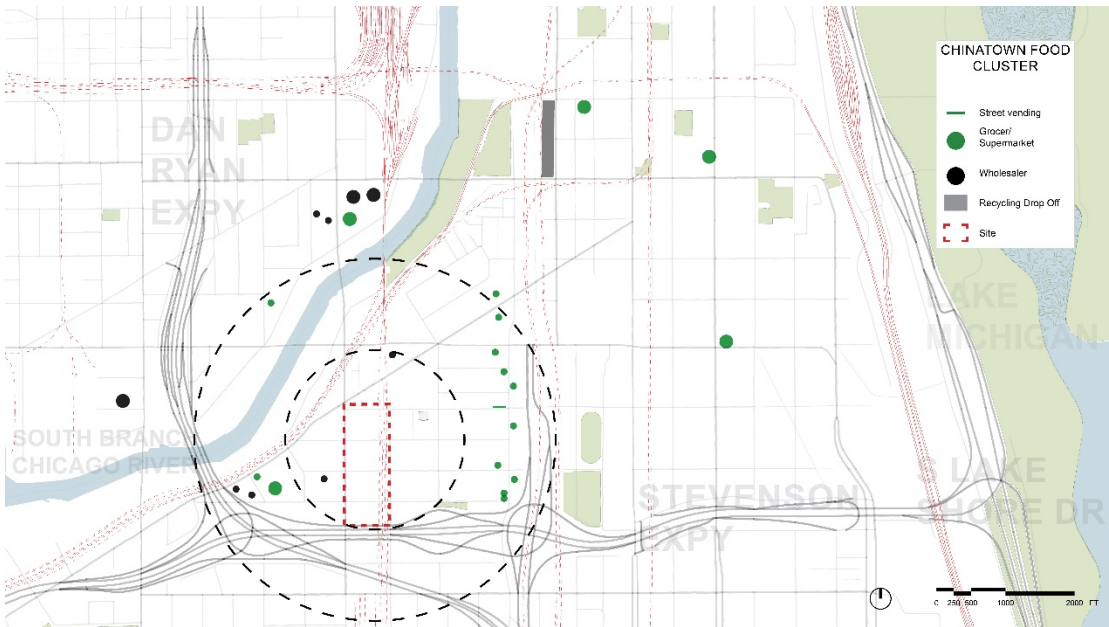


Figure 23: Food system cluster of Chicago's Chinatown.

Open space is lacking in Chinatown with 2 parks generously described as within a half-mile walk from the site (Figure 24). Sun Yat-Sen Park is more directly accessible to the neighborhood but is bounded on the south by significant elevated highway structures for the Dan Ryan and Stevenson Expressways. Entry conditions are particularly challenging for Ping Tom Memorial Park. While the park is a significant 12 acres, there is only one main access point from a residential area, and visitors must both pass under an elevated rail line and cross at-grade railroad tracks (Figure 25). While maps indicate potential access to a track and field and Park No. 540 just outside the Chinatown core, the route is indirect as navigation must go around elevated rail infrastructure. While all the rail lines through Chinatown are not at grade, a significant portion is elevated on embankments with viaducts up to 450 feet long. Commuter rail part of the Amtrack Metra system, CTA “L” lines, and freight rail all slice through Chinatown and create fragmentation (Figure 26).

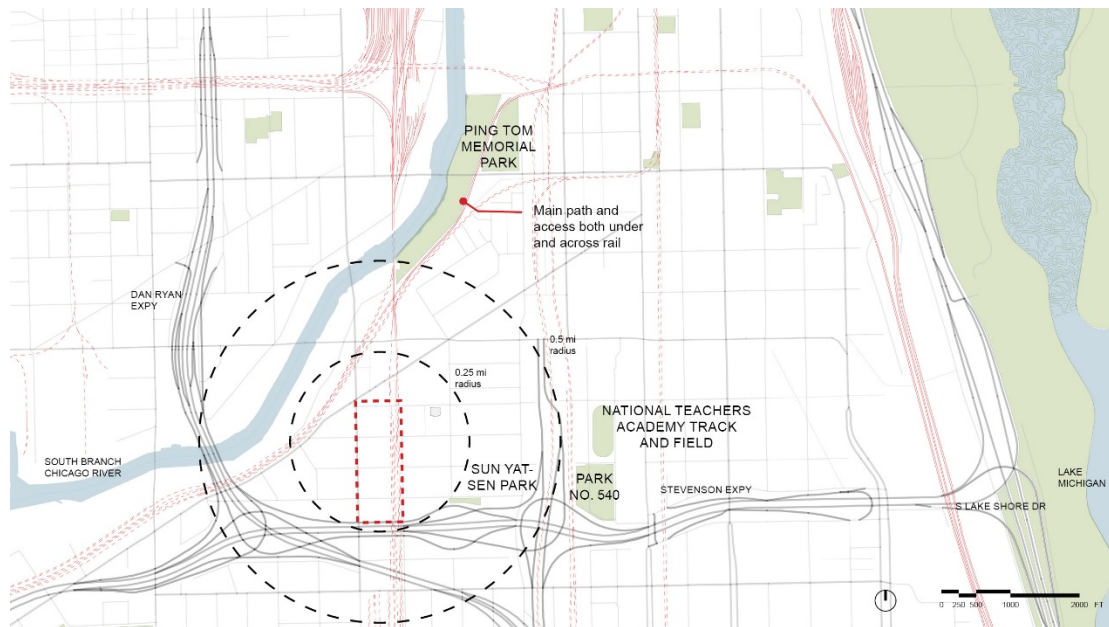


Figure 24: Proximity of closest green spaces in Chinatown.

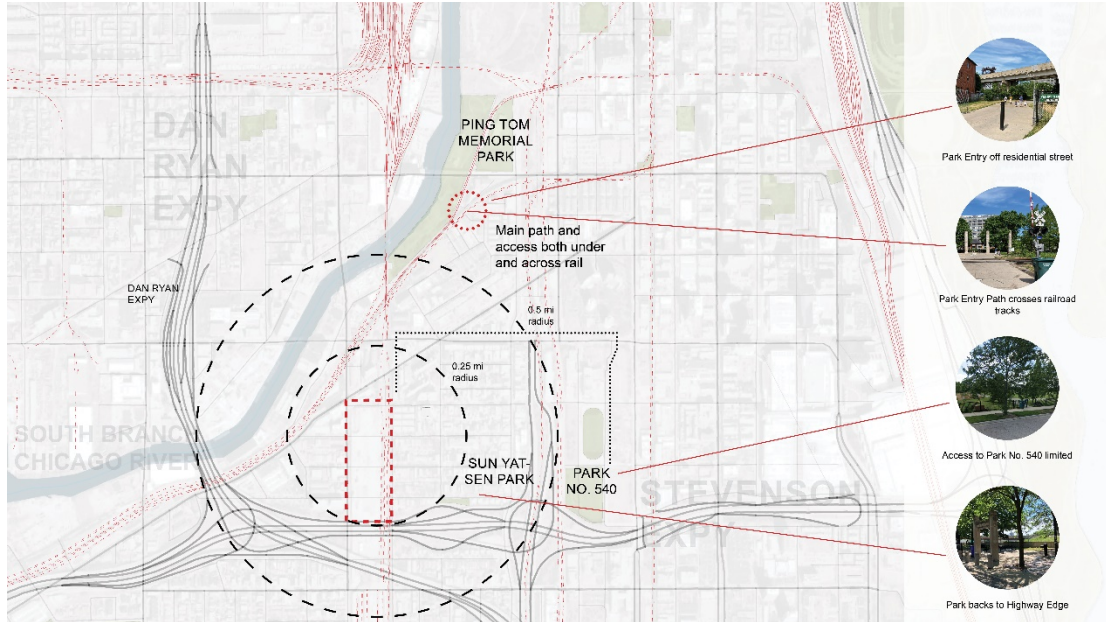


Figure 25: Edge and threshold conditions for Sun Yat-Sen Park and Ping Tom Memorial Park.



Figure 26: Rail lines through Chinatown.

Chinatown may have a reputation as a destination, but its proximity to industrial uses creates three distinct areas (Figure 27). A largely residential area surrounds the UP

container yard, flanked by a commercial area to the east and industrial area to the west. The industrial area west of the UP container yard on the east bank of the Chicago River has mostly lost its original industrial uses. Across the river are more active industrial uses with a concrete aggregate yard and CNG station. This industrial area concentrated around the Cermak Road Bridge has been designated a Chicago Landmark District, noted for its unique concentration of industrial buildings.<sup>69</sup> Concerns about gentrification may be warranted, as the vacant warehouse has been approved for conversion into a hotel.<sup>70</sup> Food warehouses are concentrated in the industrial zone mostly separated from the corridor of grocers along Wentworth Ave. Navigating the changes in land uses will be an important condition to address during the design process.



Figure 27: Land use activities in Chinatown

<sup>69</sup> Commission on Chicago Landmarks, “Cermak Road Bridge District.”

<sup>70</sup> Editor, “Another Chinatown Hotel on the Way.”



Figure 28: Industrial zones and relationship to food system in Chinatown.

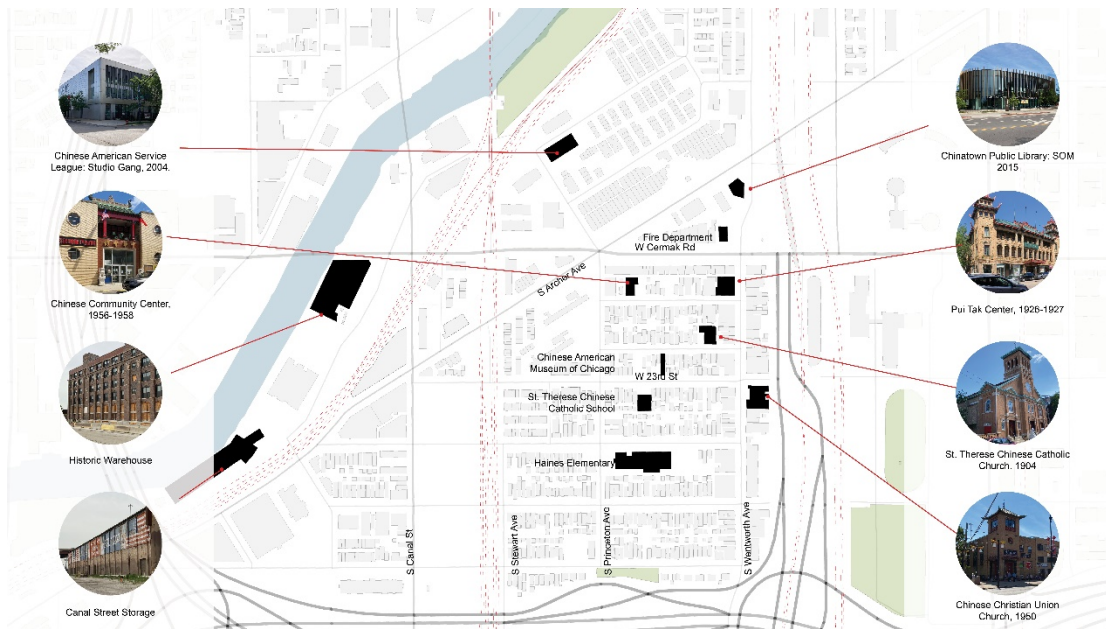


Figure 29: Chinatown landmarks

Significant landmarks in Chinatown were built during three main periods. Buildings such as the Pui Tak Center (formerly called the On Leong Association Building) were

built in the mid-to-late 1920s with more ornate and elaborate ornamentation. These older buildings are concentrated along Wentworth Ave. Another set of buildings were built in the 1950s and 60s during the newer waves of immigration after World War II. More recent landmarks like the Chinatown Public Library and Chinese American Service League headquarters reveal how Chinatown seeks to establish its importance to Chicago. These sleek buildings by Studio Gang and SOM are a marked contrast to the surrounding urban fabric. (Figure 29)

### Food System Observations

During the site visit, several key observations about the present food system were made that have implications for the thesis. As noted in Figure 28, small grocers are still embedded into the daily rhythms for the Chinatown residents. What was notable is that some grocers were not facing a main road and were on lower levels of residential or commercial buildings. Customers need to go down a set of stairs to enter the store from the



Figure 30: Basement level entry for small food market.

main street entrance. (Figure 30) Similar to Manhattan, a system of small warehouses and delivery trucks service the area. Some of the warehouses are in close proximity to

residences and quite small (Figure 31). Some trucks also served as informal markets, where residents would stop by for some low-cost produce (Figure 32). While there were no grocer stands/tables on the sidewalks in front of the green grocers, a corner on Wentworth Ave was used by a few local residents to sell produce (Figure 33, Figure 34). These observations align with the food system described by Imbruce in Manhattan. As she reported that brokers and warehouses in Manhattan would supply cities as far as Chicago, these elements are likely the extensions of that system.



*Figure 31: Neighborhood restaurant supply warehouse.*



*Figure 32: Residents purchasing produce from an informal market in the back of a delivery truck.*

What was most notable in Chinatown was the extensive use of both private and public land for vegetable gardens. Beyond rear yards along alleys (Figure 35), roadside planting strips (Figure 36), pavement adjacent to buildings (Figure 37), and accessible areas of the disused embankment (Figure 38) have been appropriated into

“community farming” plots. With space being at a premium, even easements are used to grow vegetables (Figure 39). Transforming the rail embankment into productive land is a viable post-industrial strategy that aligns with the activities already taking place in Chicago’s Chinatown. These gardens are summarized in an urban farming typology (Figure 40).



*Figure 33: Local residents take advantage of shade along a commercial building to sell vegetables off Wentworth Ave on a Saturday.*



*Figure 34: Buying vegetables from a street vendor on a Sunday.*



*Figure 35: Example of a rear yard turned into an extensive vegetable garden.*



*Figure 36: Public planting strips have been turned into community gardens, which is more productive than grass strips.*



*Figure 37: A fenced-in paved area adjacent to an apartment building is used for growing beans.*



*Figure 38: The entry area to the disused rail embankment has also been appropriate into vegetable gardens.*



*Figure 39: Residents make as much land productive as possible, using easements and setbacks as vegetable gardens.*



Figure 40: Urban farming typology observed in Chinatown. 9 types of gardens were found, each protected by fencing, blocked visibility, or distance from areas frequented by tourists/visitors.

### Site Conditions

The proposed site is the UP container storage yard between Canal St and Stewart Street from 23<sup>rd</sup> St on the north to the Stevenson Expressway to the south.

Dimensions (Figure 41) and the city grid indicate an area equivalent to about 4 city blocks. The 130' rail edge on the east creates challenging sight lines (Figure 42), which will need careful consideration while determining how to connect the proposed design with the old Chinatown core east of Stewart Ave. While the Dan Ryan does pass over the embankment (Figure 43), it is over 500 feet from the Chinatown edge, which minimizes meaningful visibility at the embankment ground plane. The tall condominium tower also obstructs most views of the embankment for cars on the Dan

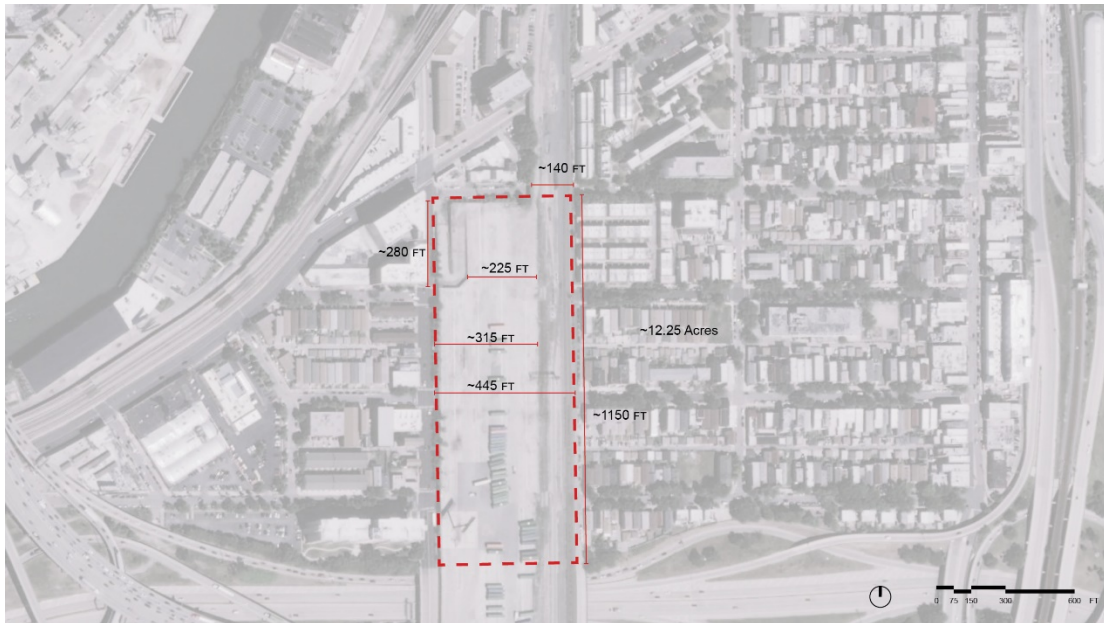


Figure 41: Site dimensions. The 130' rail edge on the east creates challenges for connecting the site with the rest of the neighborhood.

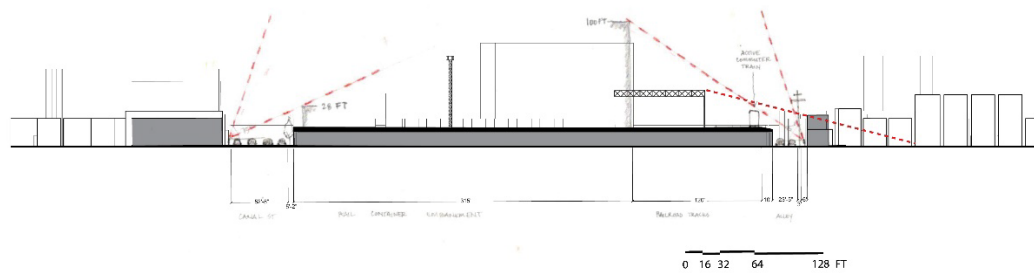


Figure 42: Site transverse section analyzing sight lines from adjacent streets.

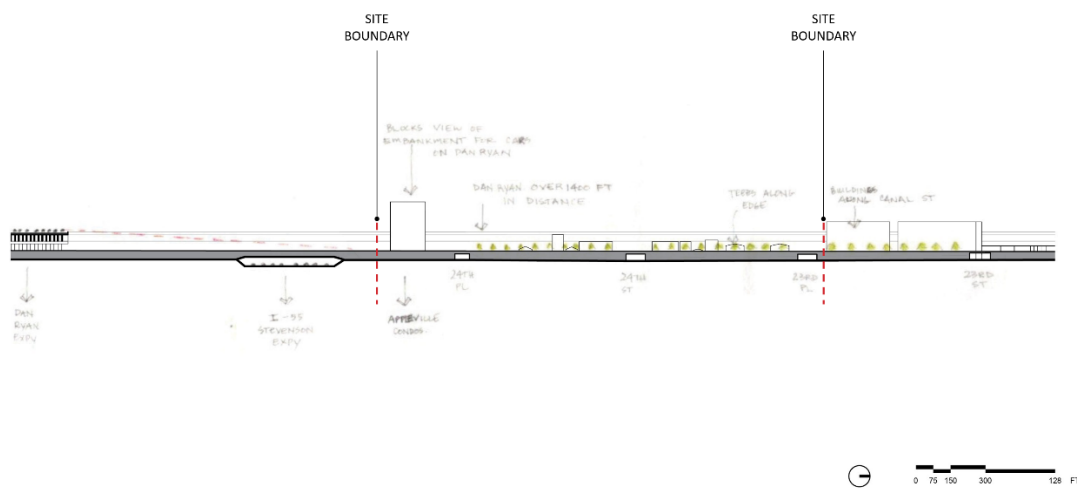


Figure 43: Longitudinal section through embankment showing relationship to Dan Ryan and Stevenson Expressways.

Ryan. Despite the Dan Ryan being 47' above the street ground plane, only the condo tower was a significant visual marker from the expressway, suggesting buildings would need to be 10-11 stories to be a visual landmark from the expressway. Views from Wentworth



Figure 44: View from Wentworth overpass toward the embankment. Stored rail cars are visible but other views are obstructed.

Ave across the Stevenson are obstructed by trees and expressway infrastructure. Not much of the embankment pass the I-55 overpass is visible (Figure 44).



Figure 45: Site and surrounding circulation

Circulation east-west through the site (Figure 45) is under the container yard embankments at widths of over 400 feet. Both pedestrians and cars have paths through these viaducts. Structure supporting the rail lines are significantly more robust with heavy steel structure, while the embankment is likely dirt contained by thick concrete walls. While the viaducts are lit, their depth creates a tunnel-like atmosphere. A unique feature of the yard is the ramp entry on the northwest corner of the embankment. (Figure 46) Beyond 23<sup>rd</sup> Street only the elevated rail lines continue toward Union Station.

Edge conditions are distinct around each ordinal edge. The east edge is mainly the concrete wall of the embankment abutting the residential alleys. Closer to the 23<sup>rd</sup> Street viaduct, Stewart Ave ends and an access road continues north underneath the rail structure. The view of the concrete embankment wall on the west edge is lined with trees, whereas the more residential east edge is not. The western edge accommodates a sidewalk and some of the buildings face the embankment, which may explain the necessity of camouflaging the concrete wall. There is also evidence of painted murals on parts of the western edge. The blocks to the east have no buildings facing the embankment (Figure 48) and there is no immediately adjacent sidewalk. On the north end, the edge is cluttered by electrical poles and other utility structures. Lastly, the south edge is weaker, marked by the expansive expressway

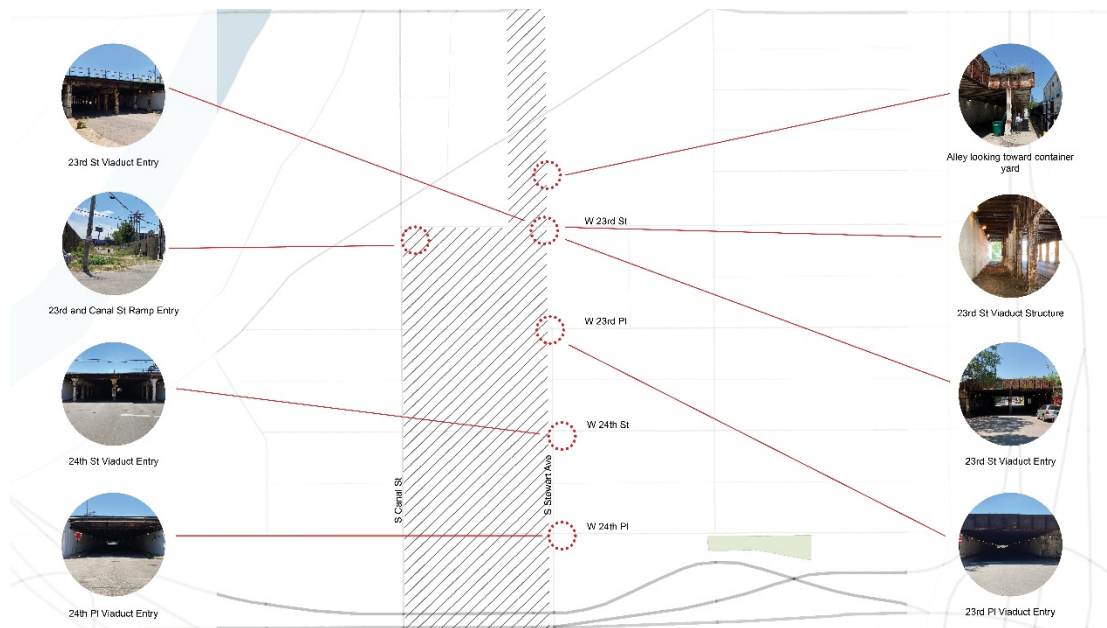


Figure 46: Site threshold conditions

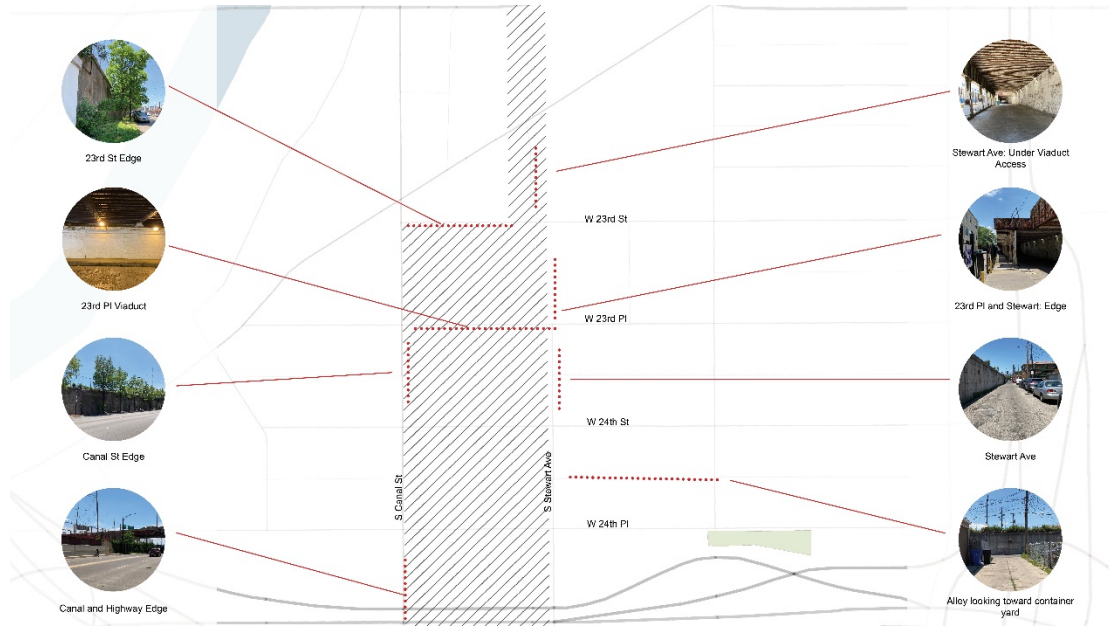


Figure 47: Site edge conditions

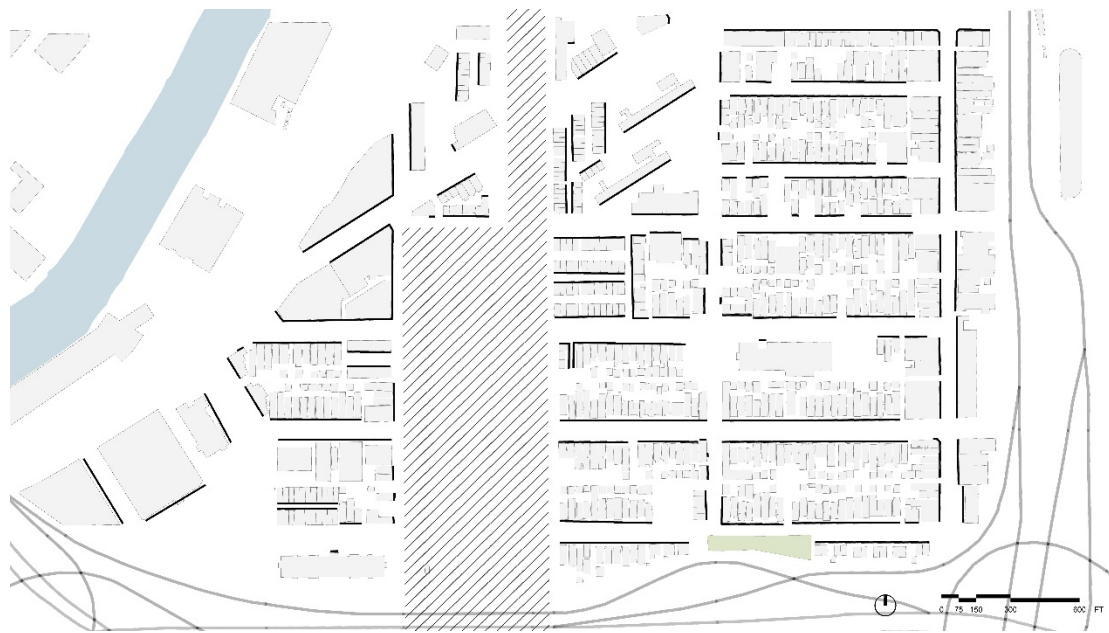


Figure 48: Frontages for surrounding blocks

lanes going under and above the rail embankment. Where buildings are close to the elevated rail lines, the backs of the buildings face the rail.

Climate Considerations

Chicago has a humid continental climate marked by extreme temperatures and significant precipitation. Snowfall in particular is a concern, with recent seasons reaching nearly 50 inches of snow and recent record of 82 inches. Spring and summer breezes come in from the northeast via Lake Michigan, and in other seasons significant winds come in from the southwest and west. In particular, these southern winds may offset heat gains from the southern sun exposure during the winter.

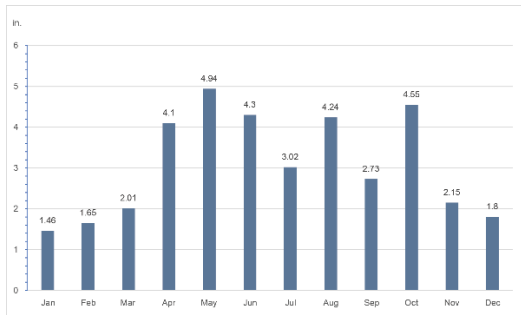


Figure 49: Average monthly precipitation 2011-2020.

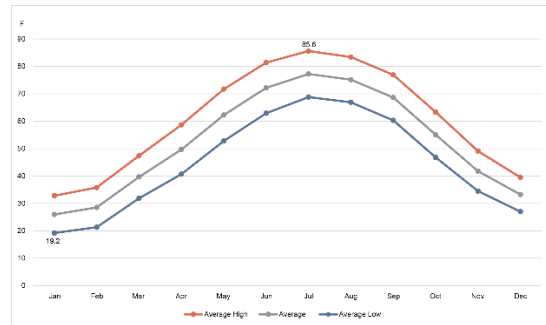


Figure 50: Average monthly temperatures 2011-2020.

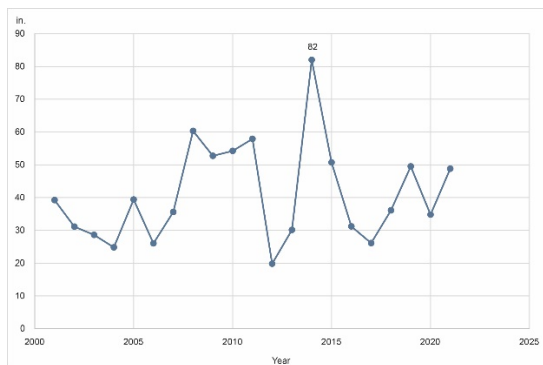


Figure 51: Annual snowfall totals for winters ending 2001-2021.

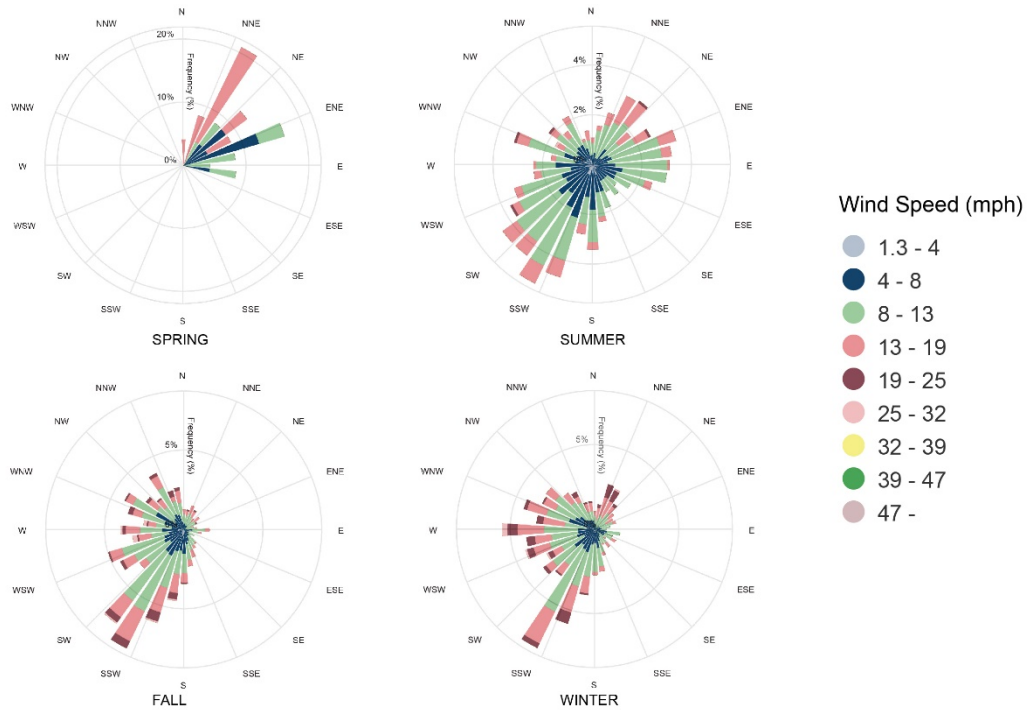


Figure 52: Chicago wind roses by season.

### Waste Considerations

As this thesis seeks to address the food system in Chinatown and design for circular economy potentials, the following diagrams extracted from information on the Department of Streets and Sanitation website<sup>71</sup> address some of the waste issues. A significant portion of waste collected is from construction and demolition (Figure 53), but C&D also has almost reach max potential for waste diversion (Figure 54), with approximately 90% of concrete, asphalt, and metal captured. There are lower rates of success with wood, brick, and gypsum waste diversion.

<sup>71</sup> CDM, “2009 Chicago Waste Characterization Study and Waste Diversion Study Results.”

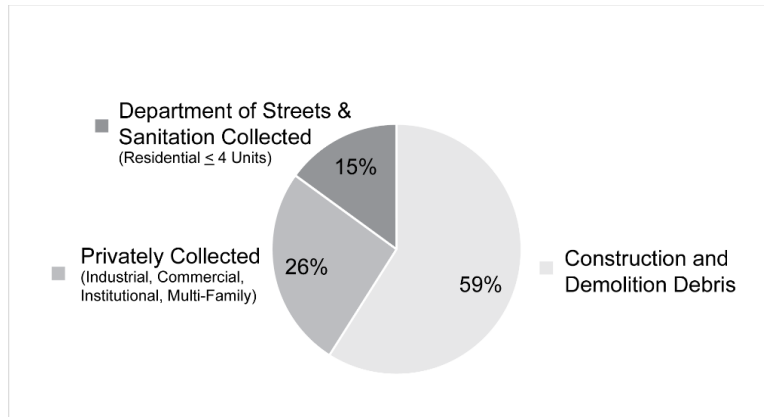


Figure 53: Sources of waste generation.

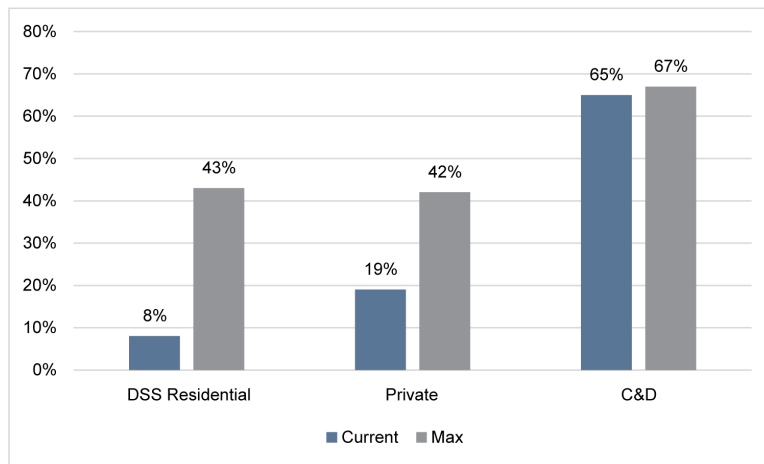


Figure 54: Waste diversion rates by source.

There is the greatest potential to improve the residential waste diversion rate. All of Chinatown is covered by the Blue Cart Recycling Program, with by-weekly pick-ups.<sup>72</sup> Chinatown is also in close proximity to a residential recycling drop-off center (Figure 23). Significant portions of household waste collected by DSS consists of organics and paper (Figure 55), which may be used in composting.

<sup>72</sup> Chicago Department of Streets and Sanitation, “Chicago’s Blue Cart Residential Recycling Program.”

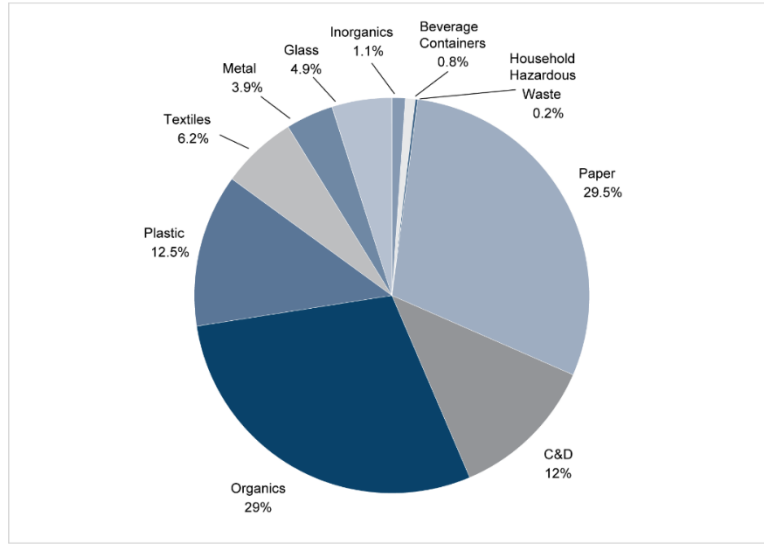


Figure 55: DSS collected waste composition.

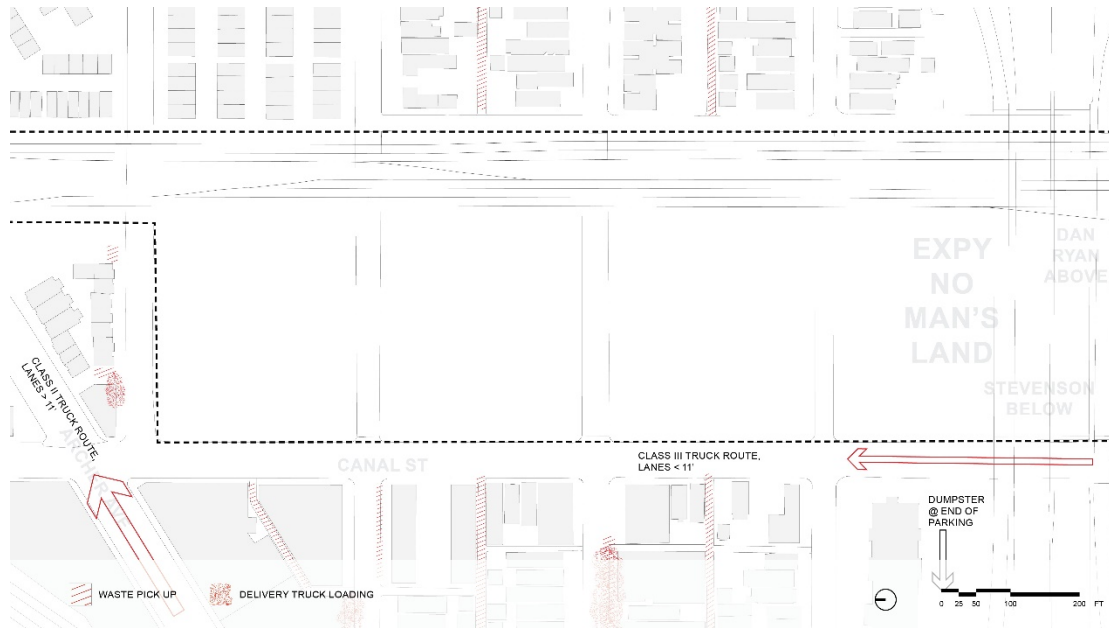


Figure 56: Identification of waste and transport routes around the site.

Spatially speaking, the height of the viaducts through the site do not allow for Class II or III truck routes, so sites for loading areas must be carefully chosen.

## Chapter 4: Precedents

Several issues must be considered to deal with the various site conditions. First, much of Chicago's rail history has slowly faded as more rail lines consolidate operations and tracks are abandoned. While rail is still a visible feature of Chicago's urban fabric, designs that maintain remnants of the industrial past while also balancing social and environmental sustainability must be studied. The challenging changes of ground plane also needed careful study. Precedents addressing urban agriculture in difficult climatic conditions will build a strong argument for complementing the existing food system in Chinatown with new typologies. Lastly, a brief overview of current approaches to post-industrial development in Chicago highlight the necessity for a contextually sensitive approach to the specific site in Chinatown.

### *Ordener-Poissonniers. Paris France*

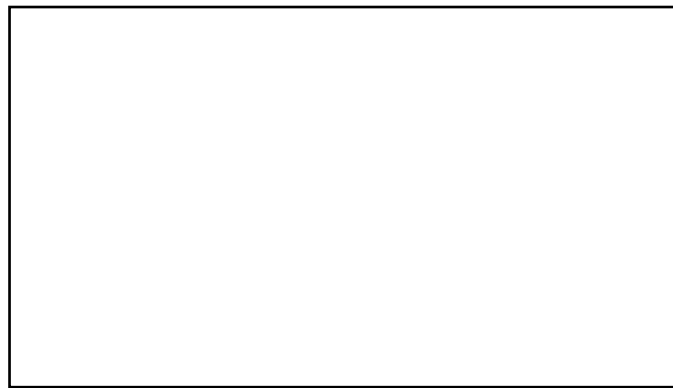
SLA, Biecher Architectes, Niney et Marca Architectes, Bourbouze & Graindorge,  
AAVP, OASIIS, Attitudes Urbaines and OTEIS  
Projected completion 2024

Ordener-Poissonniers is a 5 hectare project in the 18<sup>th</sup> arrondissement of Paris currently in development. As a post-industrial project on the site of a former railway, the project seeks to be both sustainable and celebrate industrial heritage.<sup>73</sup> By using a series of green spaces throughout the plan, residential and mixed-use areas are given

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<sup>73</sup> SLA, "Ordener-Poissonniers."

both unique characters while maintaining and connection to each other. Conceived as a socially and environmentally sustainable neighborhood, program elements include urban agriculture, residential, education, and a research incubator with a site plan that weaves together industrial heritage, Haussmannian Paris, and a public ecosystem.<sup>74</sup> Changes in topography are navigated with green terraced and building orientation on the rail side are relevant issues related to the Chinatown site.



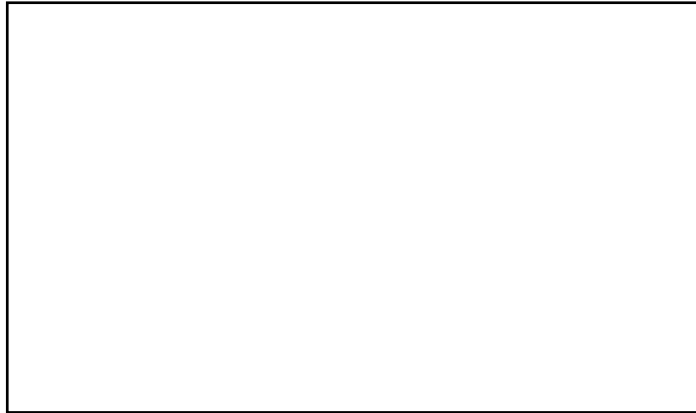
*Figure 57: Ordener-Poissonniers Site Plan.*



*Figure 58: Isometric Plan highlighting various green spaces.*

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<sup>74</sup> Harrouk, “Old Central Railway Transformed into Socially Sustainable Urban Development in Paris.”



*Zhongshan Shipyard, Zhongshan, Guangdong Province, China*

Kongjian Yu, Turenscape  
2001

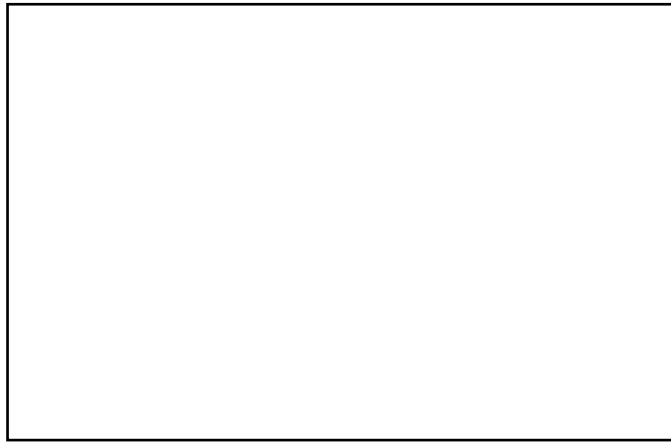
Kongjian Yu of Turenscape designed the Zhongshan Shipyard Park to remediate the contaminated land, reconnect the city with the water, and provide a public park while also integrating elements of the industrial past.<sup>75</sup> Completed in 2001, the park was designed to work with the fluctuating water levels and proved to be a catalyst of urban change. Steel structure from the shipyards was salvaged and reused in open and airy structures that frame different views. Industrial and nature are integrated in the landscape design.

Other projects by Turenscape that incorporated productive landscapes that served as inspiration were the Houtan Park in Shanghai China and Quzhou Luming Park in

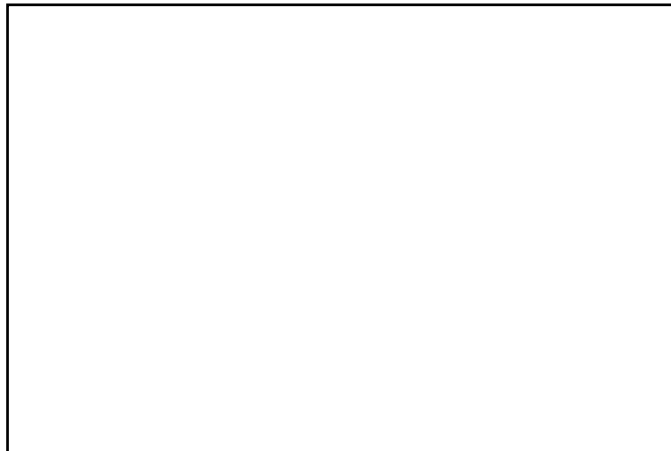
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<sup>75</sup> Saunders and Yu, *Designed Ecologies*.

Quzhou City, Zhejiang Province, China. The agricultural lands are divided into different thematic areas with elevated and ground-level paths for varying views and modes of participation in the productive landscapes.



*Figure 60: The beauty of the rustic and the messy: Native vegetation at the waterfront is associated with a reused look.*

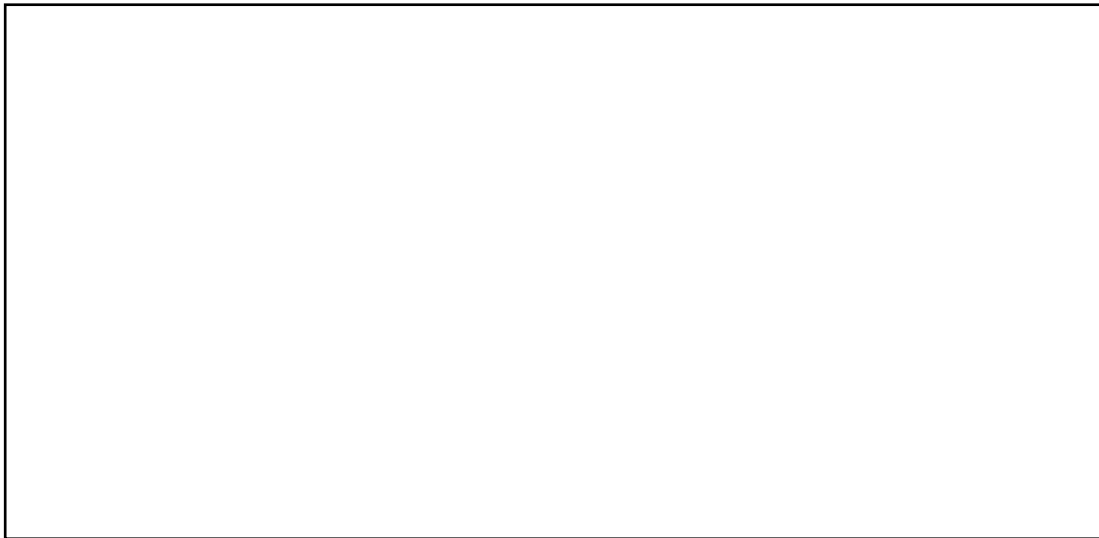


*Figure 61: At Quzhou Luming Park, the post-industrial land is converted into agricultural use. Ground level paths divide the land into plots that can be viewed from above.*

### *Rails to Trails Projects*

Conversion of former rail sites, in particular elevated rail structures, into green spaces and corridors has been a widely considered post-industrial strategy, especially since the success of New York's High Line.

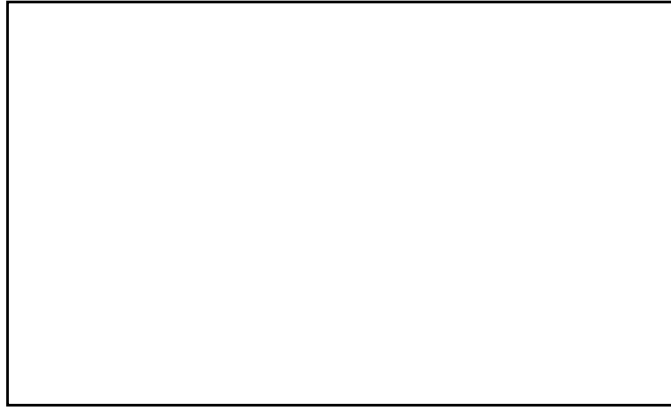
The Promenade Plantée in Paris was designed by Jacques Vergely and Phillippe Mathieux, and this conversion of the Vincennes Railway largely inspired the High Line project. Opened in 1993, the spaces underneath the structure were converted into shops and artist spaces, while the elevated spaces were crafted into a series of landscaped areas complete with pools of water. Access points connect the park to major destinations around Paris.<sup>76</sup> Using the structure below and the surface above for different functions is a productive design strategy to increase the productive value of the design proposal.



*Figure 62: Sketch of the path for La Coulée Verte René-Dumont.*

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<sup>76</sup> archibald, "Promenade Plantée."



*Figure 63: Aerial view of La Coulée Verte René-Dumont, otherwise known as Promenade Plantée.*

While there are lessons to draw from the many rails-to-trails projects that have been completed and in the planning phases, a typological analysis of these parks reveals that the form of the parks tend to be long and thin.<sup>77</sup> The dimensions of the chosen site would require adapting the rail-to-trails typology into a different form, but the idea of every part of the structure having a function is useful to carry forward.

*Arkadien Asperg, Stuttgart, Germany*

3.7 Acres

Ramboll Studio Dreiseitl, Jochim Eble Architects, Strenger Bauen und Wohnen

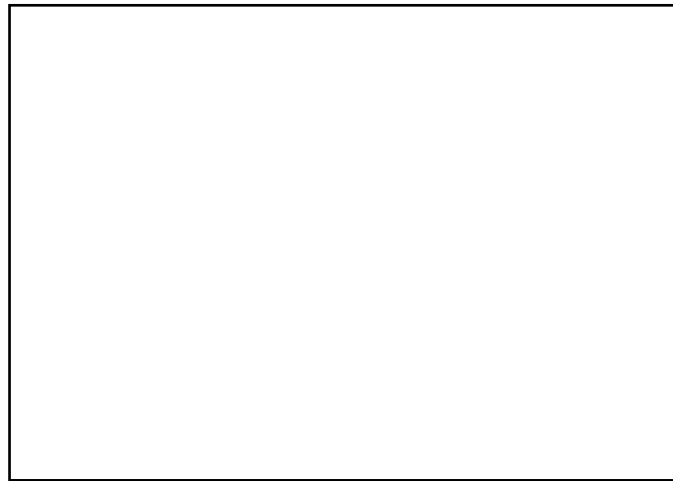
Completed 2002

This project highlights how Blue-Green infrastructure can be combined with dense low-income housing to create an urban village within the city of Stuttgart. Through

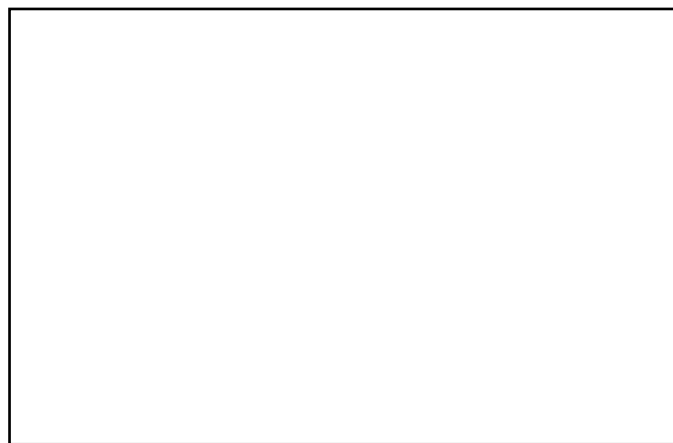
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<sup>77</sup> Kullmann, “Thin Parks / Thick Edges.”

the visibility and interactivity of the rainwater collection, residents can experience the Blue-Green infrastructure visually, tactilely, and kinetically. This post-industrial site was transformed from a former factory into an asset for the community.<sup>78</sup> The strategy of layering multiple ecological approaches becomes a central design principle for this thesis.



*Figure 64: Arkadien Asperg site plan.*



*Figure 65: Rainwater detention strategies at Arkadien Asperg.*

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<sup>78</sup> Dreiseitl Consulting, “Arkadien Asperg.”

Place to Plant, Chicago, IL

Speculative concept design by Lateral Office for the Chicago Architecture Club Competition, imagining McCormick Place turned into a 4 seasons system processing water, salt, sand, and organic matter taking city inputs and creating productive outputs.<sup>79</sup> The roof is turned into a public space, where visitors engage with the varying operations of the building.

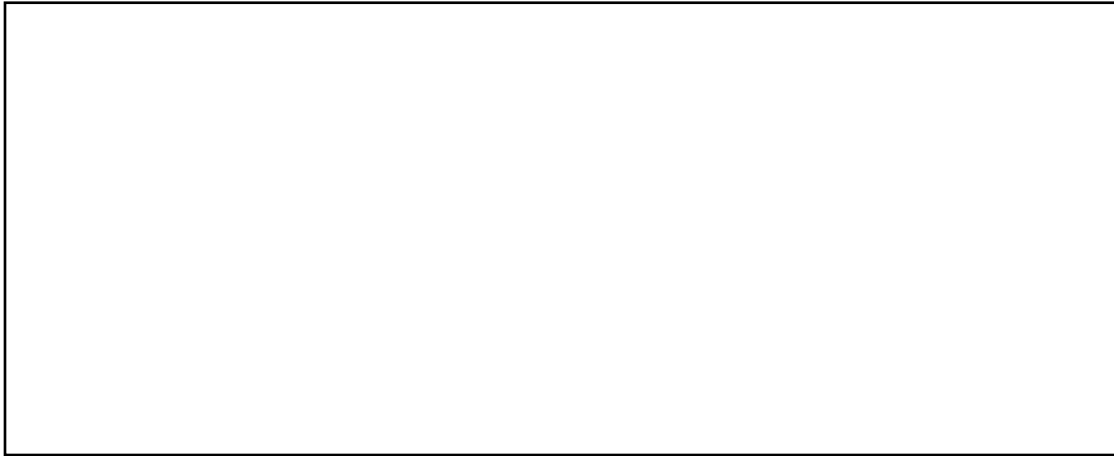
2011



*Figure 66: Diagrams showing the four seasons of inputs and outputs.*

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<sup>79</sup> Lateral Office, "From Place to Plant."



*Figure 67: Section diagram of public and operational interfaces.*

This project questions how the public can engage with different processes of a system, whether they are merely observing or are participants. The sectional idea that the entire building serves a systemic function can be expanded to an overall site strategy. Seasonal considerations is also important for ensuring a productive cycle for food systems.

### *The Plant, Chicago, IL*

The Plant was created to put into practice a circular economy for a community of food-related businesses. Urban farming, a brewery, water and carbon dioxide recovery, and anaerobic digester are conceived to create a cycle where no waste is possible.<sup>80</sup> Part research facility, part business, participants are seeking scalable and financially feasible solutions to close resource loops in the food system and improve

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<sup>80</sup> Vinnitskaya, “The Plant: An Old Chicago Factory Is Converted into a No-Waste Food Factory”; Fulton, “Food Scraps To Fuel Vertical Farming’s Rise In Chicago.”

urban sustainability systems.<sup>81</sup> Started in 2010 by John Edel of Bubbly Dynamics, The Plant seeks to achieve Net Zero Energy use once the main anaerobic digester comes online. Until then, a smaller anaerobic digester is used to test the efficiency of



Figure 68: The anaerobic digester at The Plant in Chicago, IL.



Figure 69: Rainwater capture and carbon dioxide capture and reuse put into practice at The Plant. Left: Rainwater capture systems feed underground cisterns that hold 9000 gallons of water. Right: Shown are the grey CO<sub>2</sub> lines that run throughout the building, supplying the excess CO<sub>2</sub> from The Whiner Brewery to use in the indoor farms.

<sup>81</sup> The Plant, “Research + Learning.”

inputs and outputs within the potential closed-loop system. One main issue cited is that the digester requires orders of magnitude more food scraps than is currently produced by the farm. A city-wide food scrap collection system would be needed to supply enough organic matter to the digester to make its use cost effective.

*Vertical Harvest, Jackson, WY*

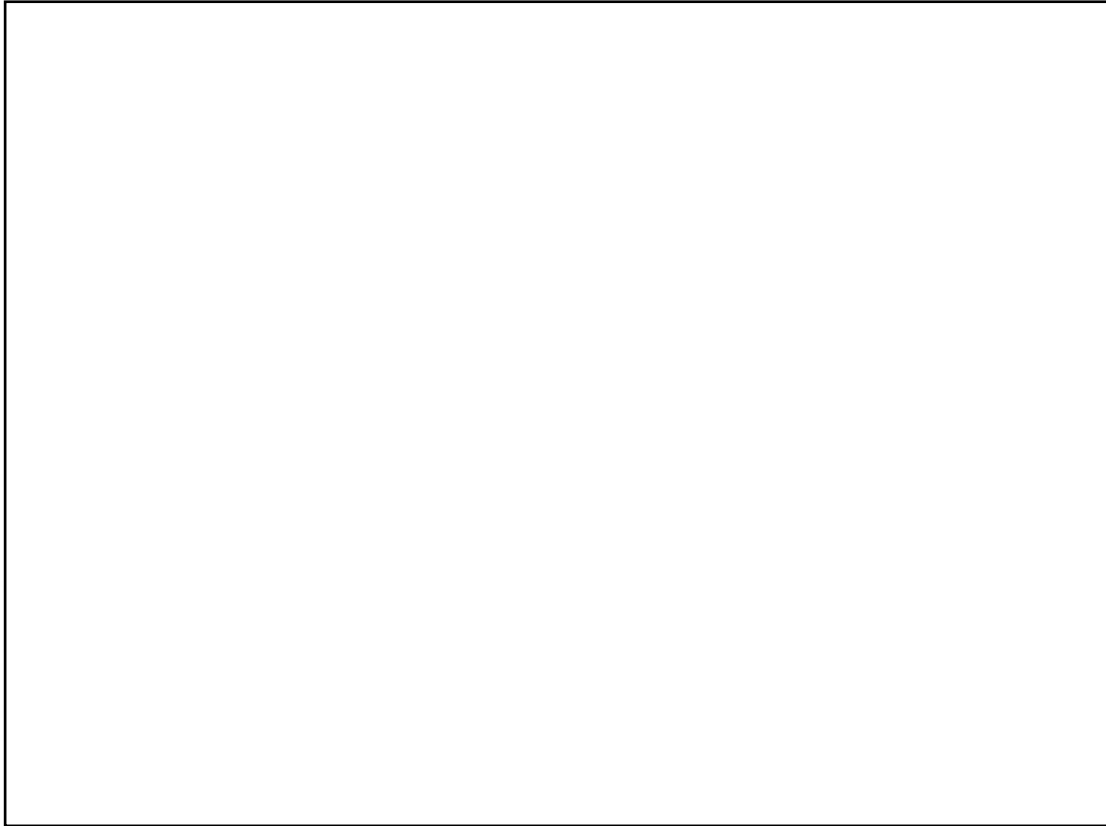
Architect: Nona Yehia, Yehia Design, LLC.

2016

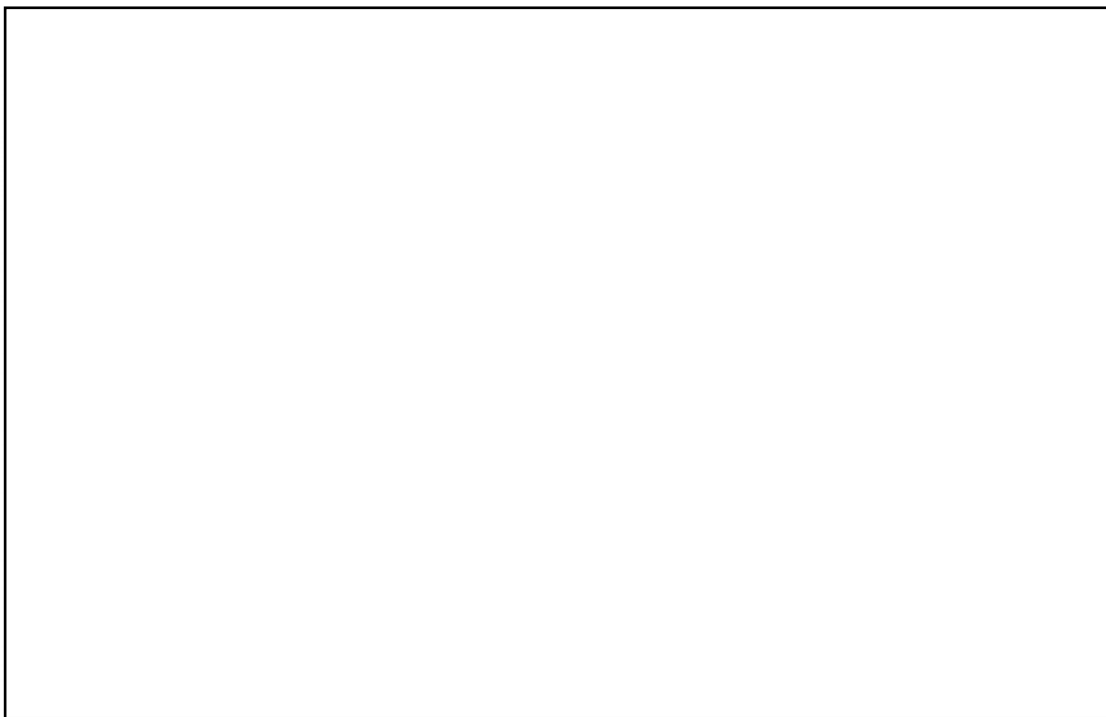
This 0.1 Acre 3, story vertical hydroponic farm (Controlled Environment Agriculture) is both urban farming and social justice initiative, employing people with Downs Syndrome to work in the farm. The farm operates 365 days/year in the frigid Wyoming climate, showing that vertical farming can be a viable business model even in northern climates. Expansion plans have been approved to build CEAs in Philadelphia and Portland, Maine.<sup>82</sup> The structure with glass roof in Jackson Hole faces south and is attached to a parking garage. The stairwells on the east and west make the building an essentially one-sided structure with glass roof. Sidedness of a vertical farm on the proposed site will be challenging as the Stevenson Expressway and Dan Ryan Expressway are to the south.

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<sup>82</sup> Vertical Harvest, "Vertical Harvest: About Us."



*Figure 70: Exploded isometric of the Vertical Harvest structure.*



*Figure 71: Rendered sections of Vertical Harvest.*

Post-Industrial Development in Chicago

There are three projects (Figure 72) within the vicinity of Chinatown on post-industrial sites that are of interest. They are The 78<sup>83</sup>, ONE Central<sup>84</sup>, and the Bronzeville Lakefront<sup>85</sup>. The three projects each have a distinct landscape plan with dedicated green space ranging from 14 – 34% of the total site. One wonders whether the density and scale of these projects are justified considering Chicago's population has been declining. While the population increased between the 2010 and 2020 censuses<sup>86</sup>, the population has not even recovered to 1990 levels<sup>87</sup>.

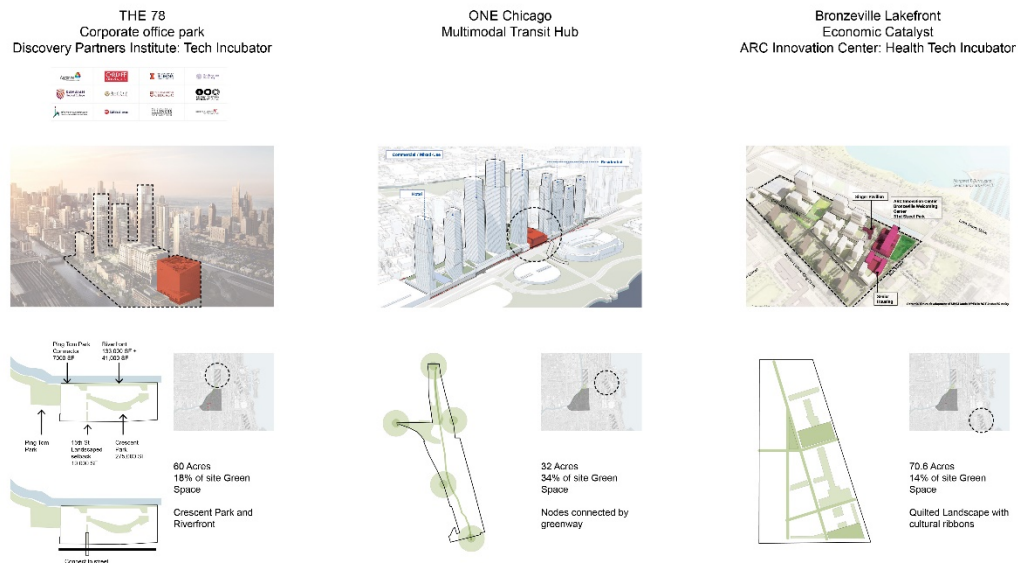


Figure 72: Summary of The 78, ONE Central, and Bronzeville Lakefront projects in Chicago.

<sup>83</sup> City of Chicago Department of Planning and Development, “The 78.”

<sup>84</sup> City of Chicago Department of Planning and Development, “ONE Central.”

<sup>85</sup> City of Chicago Department of Planning and Development, “Bronzeville Lakefront.”

<sup>86</sup> United States Census Bureau, “QuickFacts: Chicago City, Illinois.”

<sup>87</sup> Bartin, “The Decline of Chicago: The City That Doesn’t Work.”

## Chapter 5: The Program

New development in Chinatown is sorely needed to accommodate the neighborhood's growth and address housing shortages.<sup>88</sup> The program proposes a neighborhood cluster that blends currently present urban food system typologies with new urban farming typologies for an urban design approach that both preserves culture and allows the neighborhood to adapt in an ecologically responsible way.

### Site Program

At the site level, most of the land is preserved for productive landscapes to provide green space for the neighborhood and areas for them to occupy for individual and community level gardening. Introducing vertical farming is an extension of the urban farming present in Chinatown that provides an avenue for job diversification and introduction of high-value food production for distribution within the neighborhood and beyond. As Chinatown both desires to preserve its cultural uniqueness and better integrate with Chicago as a whole<sup>89</sup>, a food hall serves as both a cultural anchor and integrative ambassador, where new generations and visitors alike learn not only about different flavors but of the historical and medicinal significance of the food grown and consumed on site. These elements combine to address community cohesion, cultural heritage, urban ecological health, and individual physical well-being.

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<sup>88</sup> Lu, "Chinatown: A Divided Growth Agenda"; Cheng, "The Displacement of Chinatown's Low-Income Residents Is Aggravated by COVID-19."

<sup>89</sup> Clark, "The Unlikely Boom of Chicago's Chinatown."

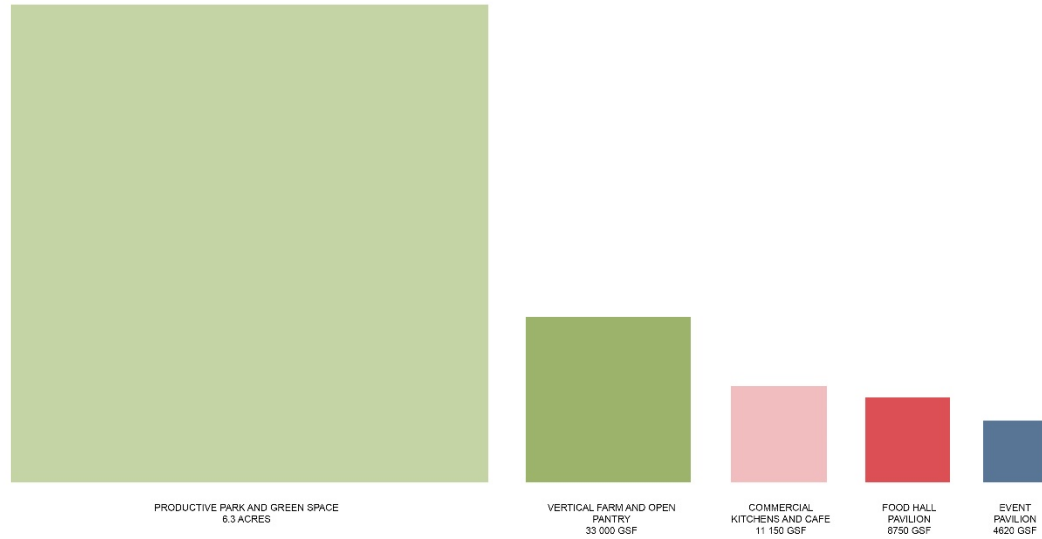


Figure 73: Site Program block diagram.

### Allocation of outdoor spaces

Community Gardens with storage sheds	1.24 Acres
Teaching Fields	1.25 Acres
(Educational pavilion	1290 SF)
Urban Apple Pear Tree Orchard	0.56 Acres
Public plazas and terraces	0.94 Acres
Public space for pop-up vegetable vendors	
Guerrilla Garden Edges	1.13 Acres
<u>Urban Canopy and Foraging Buffer</u>	<u>1.18 Acres</u>
<b>Total Green Spaces</b>	<b>6.3 Acres</b>
Vertical Farm	33,000 SF

## Building Program

The main building on the focus site houses the commercial kitchens and café, which serve as business incubator spaces, the food hall pavilion, and event pavilion. While the functions are defined separately for the purposes of clarifying the overall site program, they are spatially one integrated building.

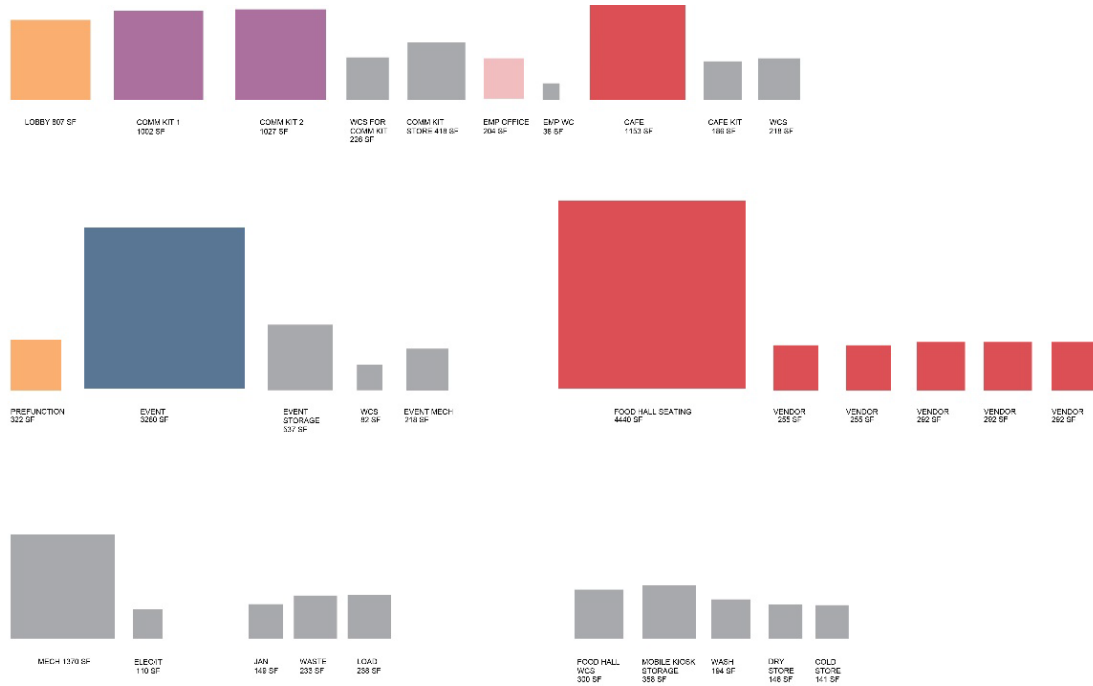


Figure 74: Building program block diagram

### Allocation of interior spaces

### Area (SF)

Lobby	807
Commercial Kitchen 1	1002
Commercial Kitchen 2	1027
Kitchen Storage	418
Kitchen WCs	226
Employee Office	204

Employee WC	36
Café	1153
Shared Café and Event kitchen	186
WCs	218
Event Prefunction	322
Event Hall	3260
Aggregated Event Storage	537
WCs	82
Food Hall Seating	4440
Vendor spaces	1386
(2) @ 255 SF	
(3) @ 292 SF	
Mobile Kiosk Storage	358
Wash Stations	194
Dry Storage	146
Cold Storage	141
Ground Level and Food Hall Mechanical	1370
Event Mechanical	218
Electrical/IT	110
Aggregated Janitorial	149
Waste/Recycling	233
<u>Loading</u>	<u>238</u>
Total Interior Programmed SF	18,461

## Chapter 6: The Design Process

Initial design explorations (Figure 76) centered on how to address the site context (Figure 75). The residential areas to the east abutting the rail lines would benefit from better connectivity and accessibility across the site to improve safety. Strategic tree plantings could buffer the site from the active rail lines, and unused line can be reclaimed to expand the usable site. The mixture of commercial, residential, industrial, and mixed-use buildings across Canal Street set up an argument for improving the street experience with storefronts for the proposed program.

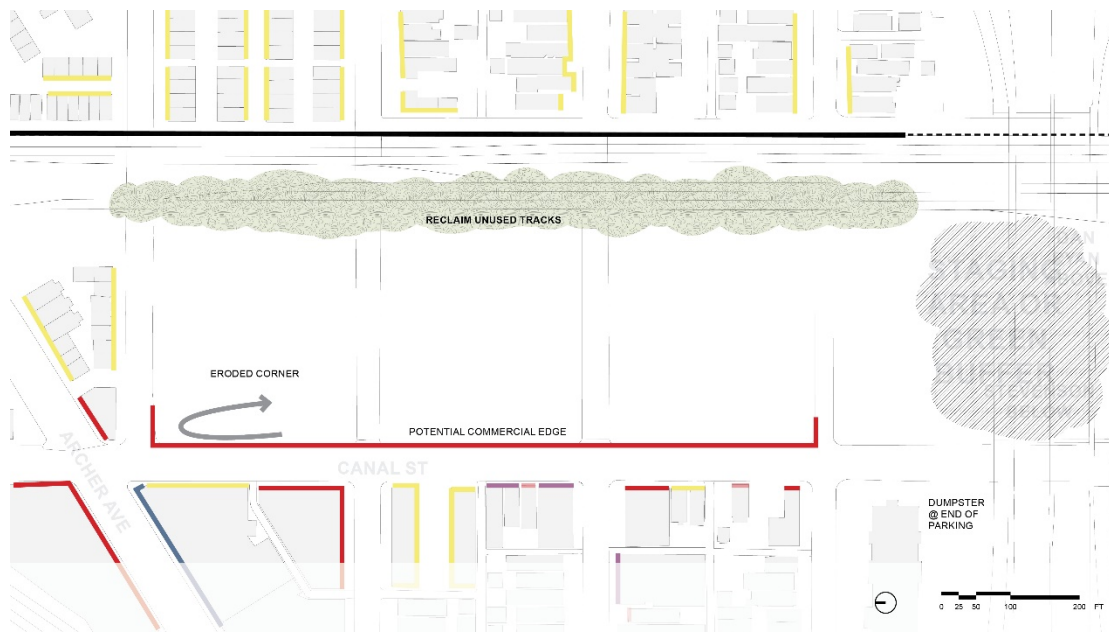
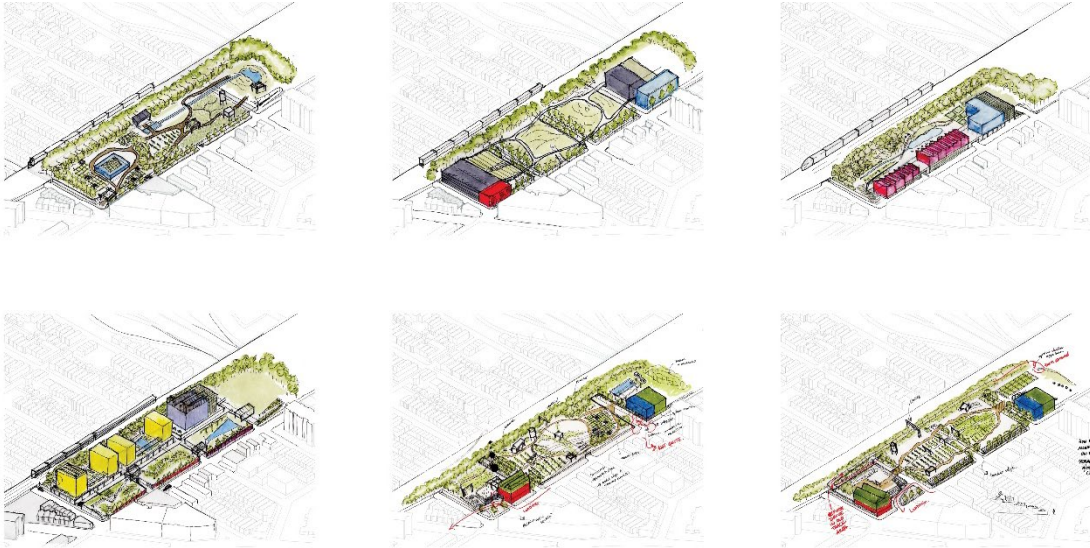


Figure 75: Diagram showing main responses to the contextual conditions.

A series of design iterations explored different approaches for addressing the accessibility, connectivity, and identity of the overall site proposal. Site explorations

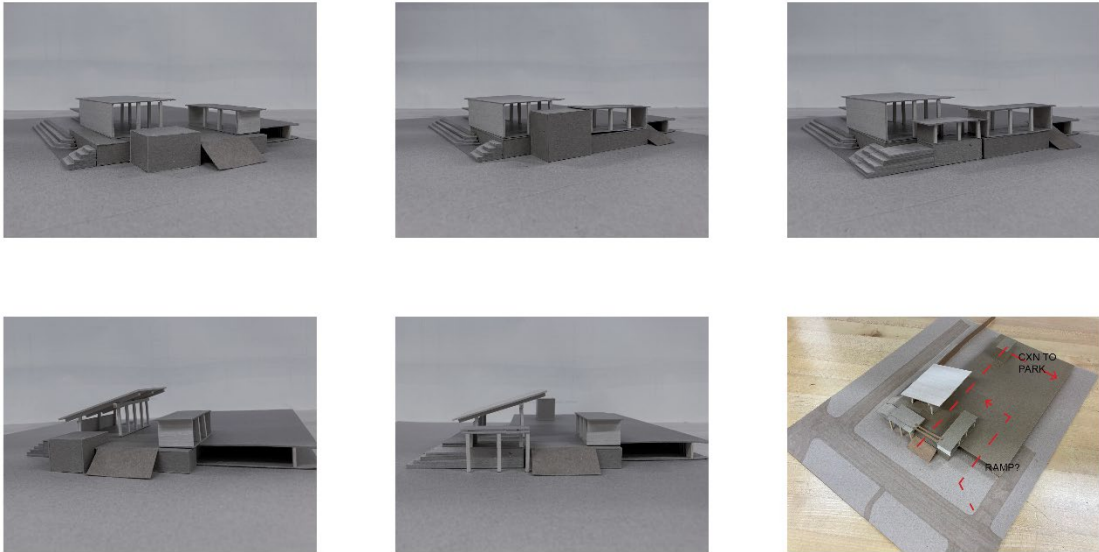
ranged from all green space with minimal built elements to a proposal with mixed use commercial and residential mid-rise buildings and large parking structures to maximize potential commercial activity. Elements of Chinese garden design and the incorporation of the existing gardening typologies were tested in different arrangements and hybridized. The design iterations that focused on amplifying the existing conditions to extend the food system in Chinatown were carried forward into the final design proposal.



*Figure 76: Design iterations for the overall site strategy.*

A physical model was built to test strategies for carving away the embankment edge to soften the experience of the 18-foot high concrete rail embankment. The model was also used to refine the architectural concept of an earthy plinth embedded into the embankment with pavilions resting on the embankment. Exterior circulation

strategies were also tested with the model to ensure accessibility was properly addressed.



*Figure 77: The physical model was used to test the embankment edge strategy and spatial relationships of the pavilions.*

The following sketches show initial design ideas on how to carve away at the embankment for both food production and loading and maintenance access. Incorporating different forms of urban production and where they would be located were also consistently considered in the design process.

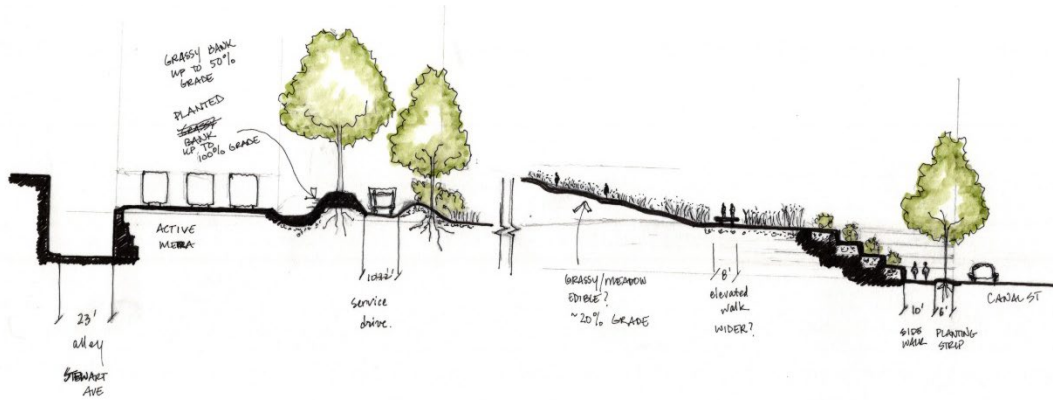


Figure 78: Study drawings exploring accessibility and the site edge conditions.

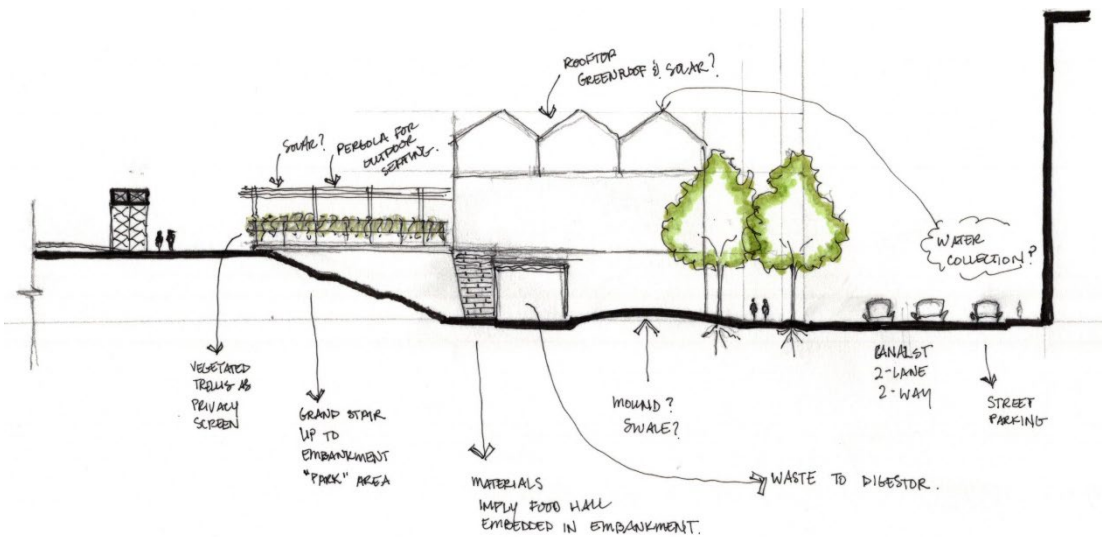


Figure 79: Initial sectional ideas about embankment accessibility and the building relationships to the street experience.

Local food halls were visited to study different spatial relationships between the vendors and visitors, the number of vendor stalls and their size, whether the vendors should share a kitchen. Back-of-house relationships to the public areas were also studied to determine a strategy for loading and the storefront street experience.



Figure 80: Diagrams and sketches from the local food hall study.

From these studies, schemes were developed to test the sizes of the different building programs, program adjacencies within the plinth and in spaces on the embankment, and different relationships of the building with the exterior spaces.

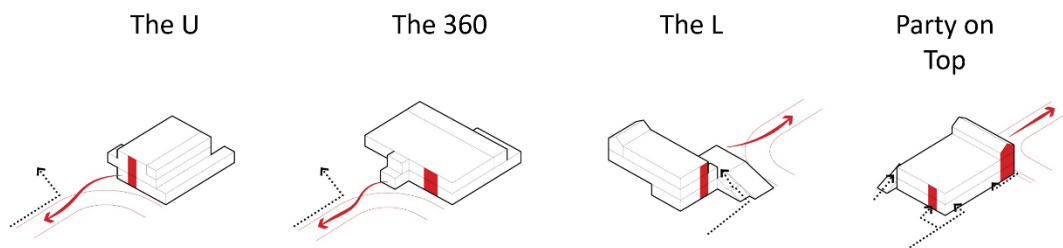


Figure 81: Initial food hall schemes with accessibility options.

## Chapter 7: Site Design

The challenging site conditions require a unique approach for productive transformation. To amplify the existing food system in Chinatown, this thesis aims to integrate multiple strategies to transform an 18-foot high concrete, post-industrial site that spans three and a half city blocks into a place of production and innovation, a place where Chinese food culture serves the neighborhood and broader community in multiple ways. Strategies are layered and integrated for a cohesive proposal that attempts to soften the presence of the embankment, allow multiple forms of food production, and create a series of connected but distinct participatory experiences.

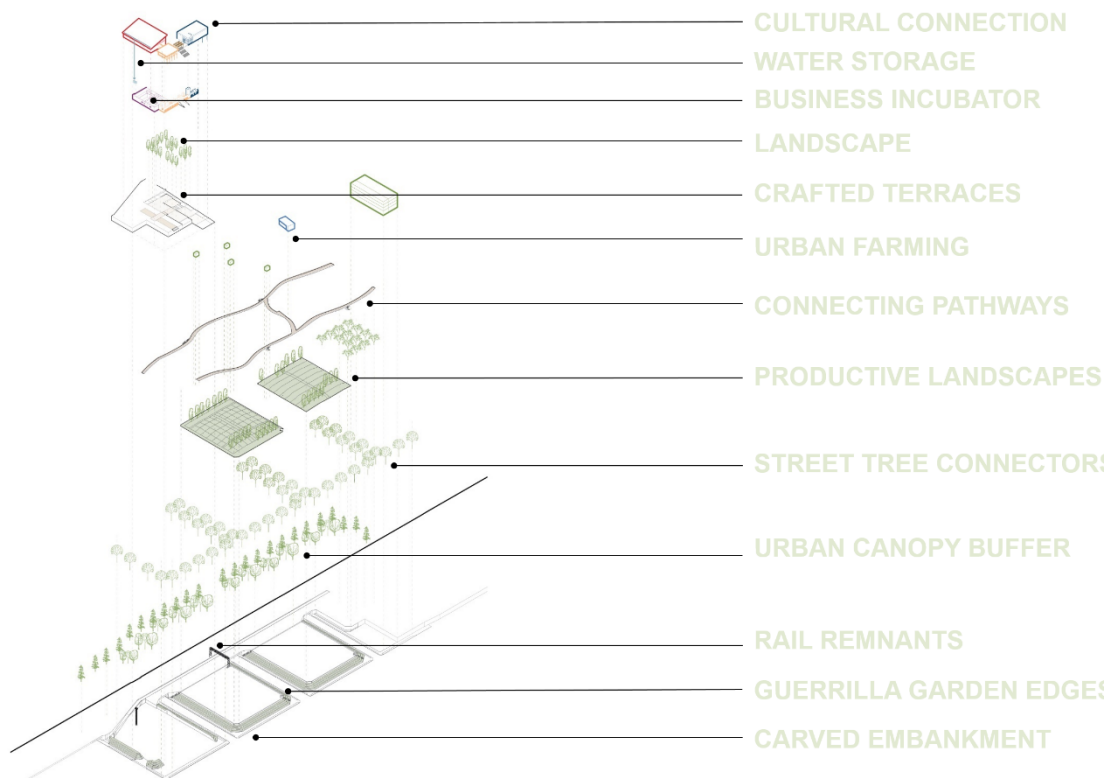
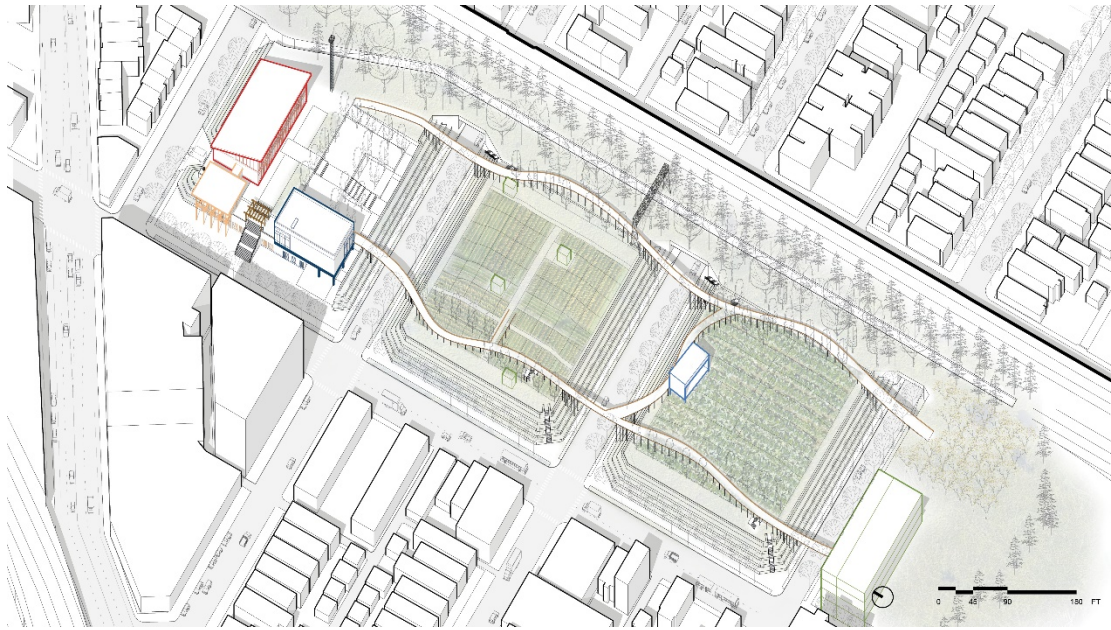


Figure 82: The layered and integrated strategies deployed in the overall site design.



*Figure 83: The final site plan.*

An initial design decision was made to retain as much of the embankment as possible to minimize disruption from removal. The viaducts were then mostly removed for daylighting, retaining viaducts to support the active rail lines and breaking the site into the distinct blocks. This move improves accessibility and connectivity between the two sides of Chinatown. People walking from one side of Chinatown to the other through the site would also feel safer with this improved visibility from one end to the other. This is particularly helpful to the large population of seniors residing in Chinatown, who greatly rely on walking as a main mode of transportation.

The edges of the blocks are then carved into stepped terraces. Site context of the guerrilla gardening and rail remnants are preserved to bring some familiar elements to the forefront. Children walking by the descaled edges may catch sight of gardeners harvesting veggies and herbs from the terraced guerrilla garden edges. The businesses

across Canal Street have an improved verdant view instead of a near continuous 18 foot-high embankment wall.

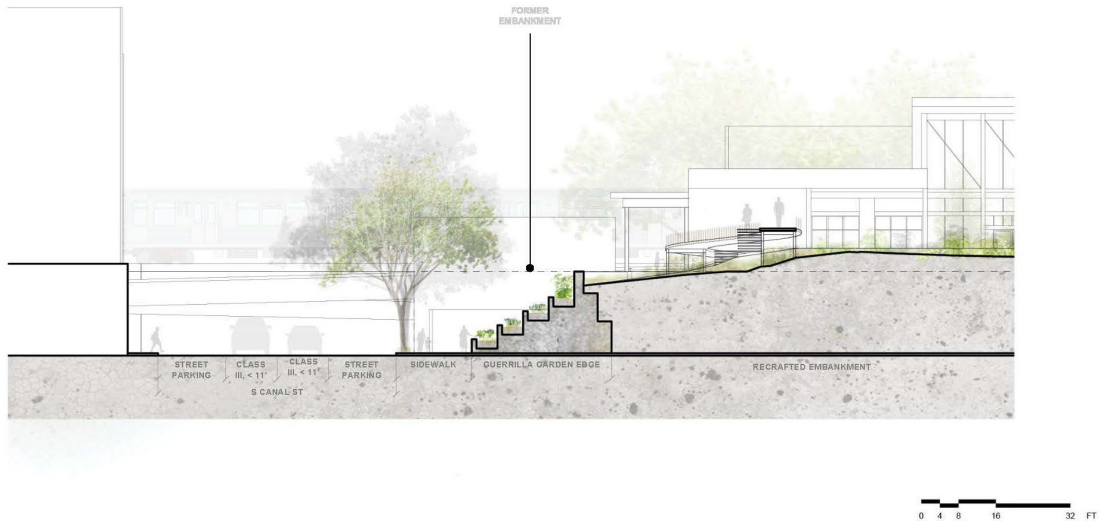


Figure 84: Section of the carved guerrilla garden edges along Canal Street.

To further soften the site edges, trees are used to create an urban canopy buffer from the busy street and active rail lines. The trees are planted on berms that shield the site from the active rail and carved service lane, which provides accessibility for maintenance and utility vehicles. Urban foragers are encouraged to gather berries, herbs, and nuts from plantings along the bermed edges. Trees are also used as street tree connectors, creating a more unified street experience from one side of the neighborhood to the other. As people walk along 23rd Place, the carved guerrilla garden edges, urban canopy buffer, and street tree connectors create a vibrant and vital environs, both amplifying the existing food system typology and improving neighborhood connectivity.

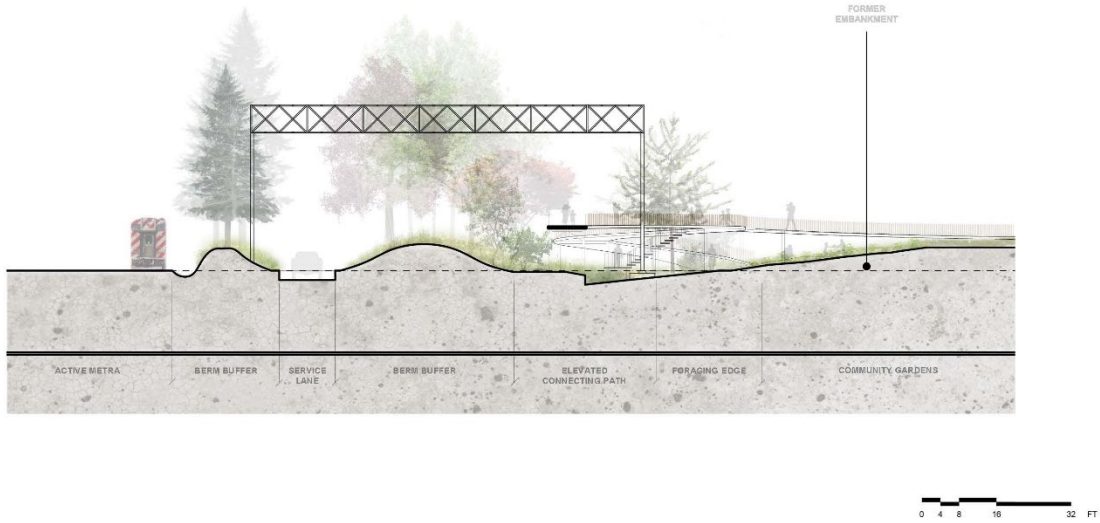


Figure 85: Section through the active rail lines and berms, showing how the trees serve to buffer the rail and service lane.

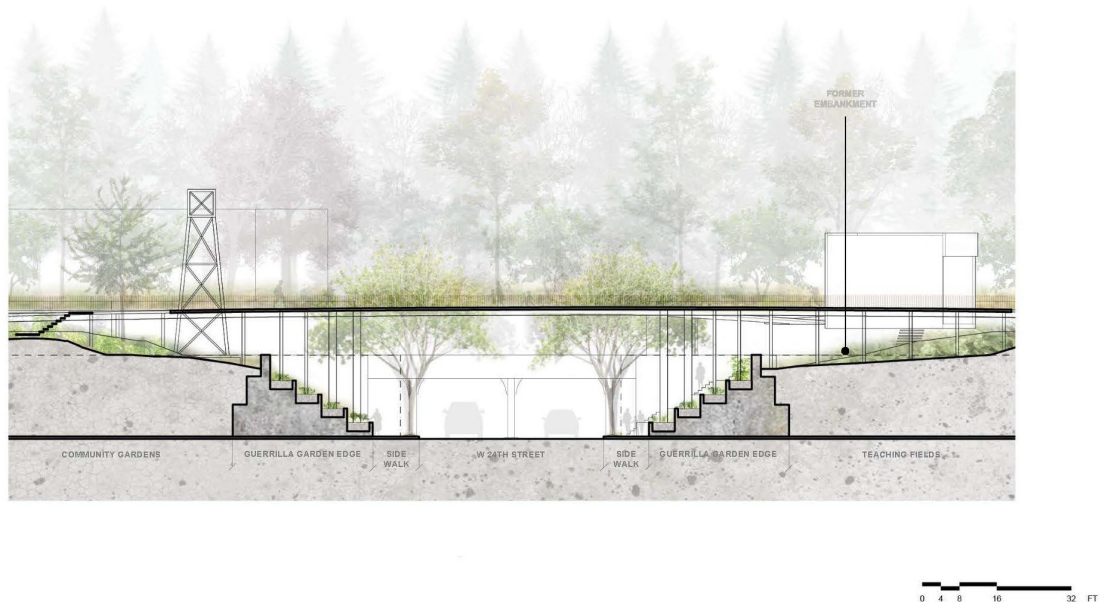


Figure 86: Section showing the street tree connectors and relationship to the guerrilla garden edges.

The design proposal then uses block identity and connecting pathways to create distinctions within a unified experience. The craft and communal nature of food is centered on the place of cultural connection. Neighborhood residents with limited

land access can establish a plot in the community gardens to grow herbs and vegetables. The teaching fields can be used to educate about seasonal growing practices. The brokers who manage the current Asian fruit and vegetable food system can expand their economic and employment options with the proposed vertical farm, investing in new and innovative urban production methods. The connecting pathways link the distinct blocks together.



Figure 87: Diagram of block identity strategy and connecting paths.

Families exploring the site on the elevated connecting paths have views of gardeners using the pathway structure to support vining gourds and beans. Stairs carved into the embankment corners improve site accessibility for gardeners. The educational pavilion anchors the teaching fields, providing a shaded respite and gathering spot for classes about the medicinal uses of vegetables, herbs, and roots or gardening. The building housing the vertical farm would also incorporate an open pantry, where low-income residents can access fresh produce for free. Another innovative practice

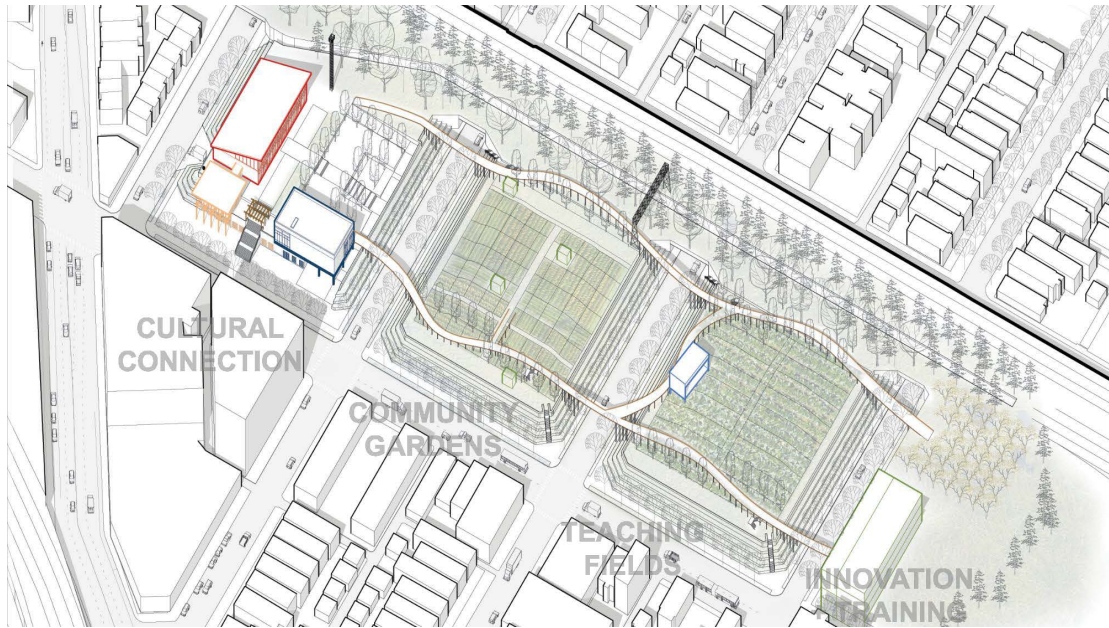


Figure 88: Axonometric view of overall site strategy and plan with block definitions.

brought on site is to plant a bosque of apple pear trees to experiment with urban orchards. Some vegetables and herbs cultivated on site and in the vertical farm supply the enterprises on the culminating focus site, where cultural connections are made through the craft of Chinese food. A sequence of crafted terraces sculpt the exterior experience. Interior spaces house different food craft related enterprises that provide business opportunities, places of social connection, and a point of cultural connection.

At the ground level plaza, a mother and child from the neighborhood buy produce at a farmer's market stand. The guerrilla garden edges wrap the ground level that is embedded into the embankment and broadcast the daikon and gai lan available for sale. A grand stair beckons pedestrians to move further to explore what's above. Brick references the context of Chicago warehouses and steel relates to the signal tower and

gantry rail remnants. The steel reaches down from the hovering roof as another hint to the experiences above.



*Figure 89: Perspective from connecting path with views of the guerrilla garden edges and focus site.*



*Figure 90: Perspective of the ground level plaza.*

## Chapter 8: Focus Site Design

The focus site of the design is centered on the northern-most block, the point of cultural connection. The design crafts a series of exterior and interior user experiences that weave together preserving the rail context, maximizing views to the productive landscapes, and different spaces for food-related enterprises.

### Exterior Experiences

The main building is designed as an earthy plinth embedded into the embankment with frame-like pavilions resting on the plinth. The terraced guerrilla garden edges are shaped to create access points for service vehicles, while the vegetation softens the harshness of the concrete embankment.

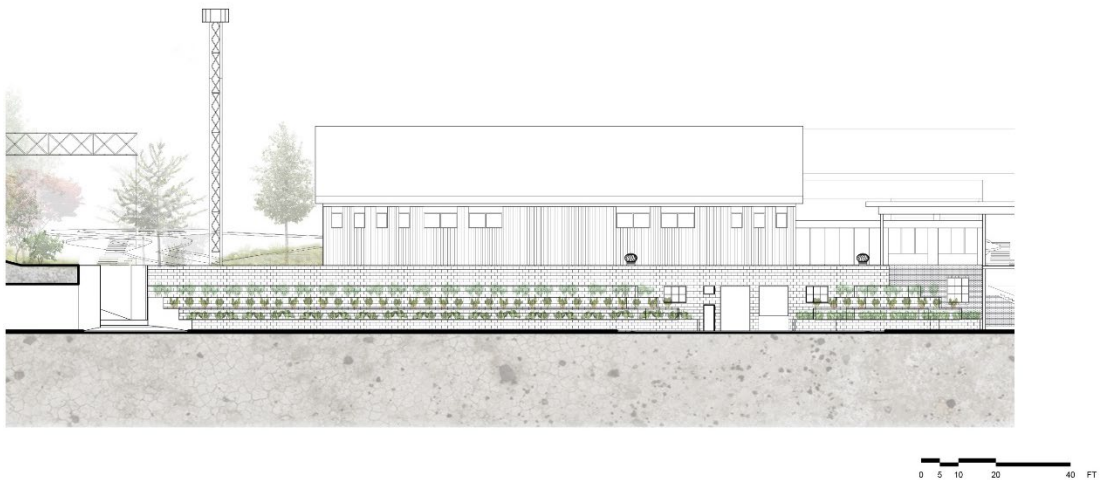


Figure 91: North Elevation with carved embankment edges for loading and utility access.

On the west elevation, the entry gate serves as a threshold between the grand stair and upper terraces and frames the relocated signal tower. The windows reference the historic warehouse typology in Chicago and strengthen the street experience in response to the commercial and mixed use buildings across Canal Street.



*Figure 92: West elevation showing entry gate threshold to upper terraces and relocated signal tower.*

The construction of the entry gate is a modern and abstracted version of traditional Chinese wood joinery. Created of dimensional lumber, dado joints and dowels ensure tight, interconnected joints, referencing the woven interconnection of productive landscape and cultural expression of the proposal.

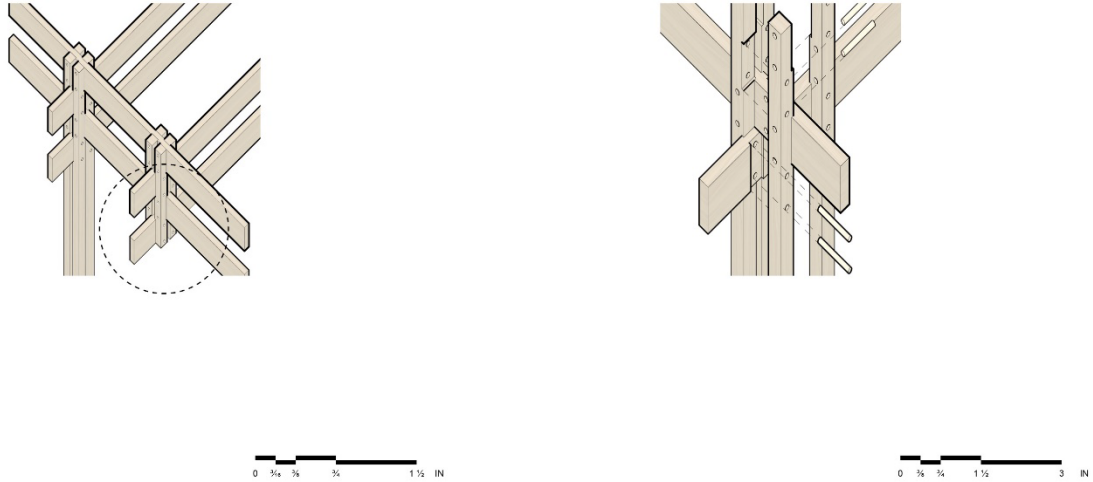


Figure 93: Construction details for entry gate.

Progression through the focus site begins at two points, one via the grand stair and the other by an accessible ramp, which circulates at the perimeter of the focus site with exit points at a series of landscaped terraces.

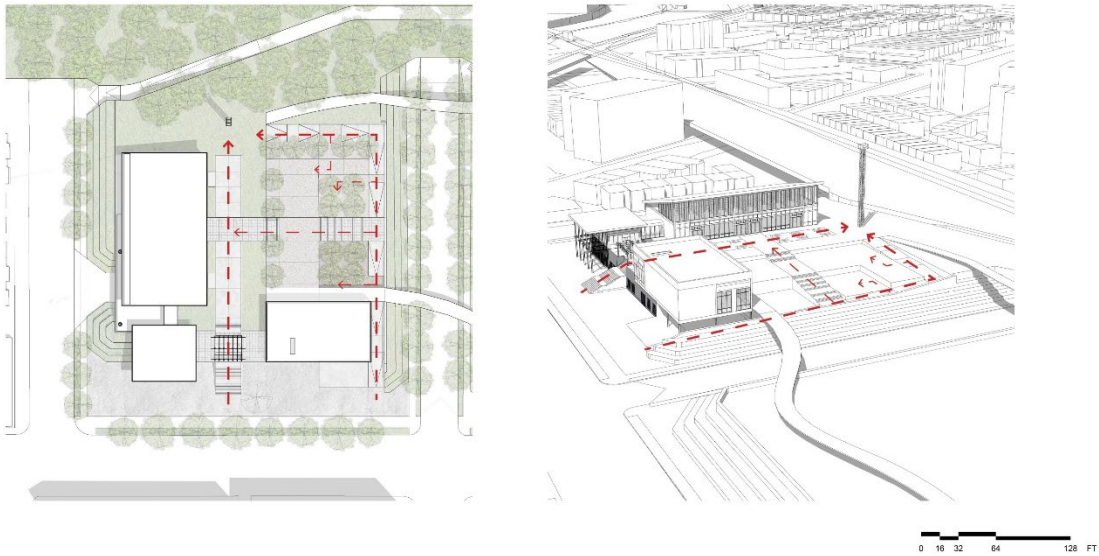


Figure 94: Focus site plan and bird's eye with diagram of terrace and ramp sequence.

The ramp passes by a sheltered area under the event pavilion, where residents can set up market spaces or have a sheltered group tai chi lesson. Seniors and families are

treated to an accessible path privileged with multiple resting points, trees providing shade for the landscaped terraces. The larger exterior courtyard spaces are enclosed by the event and food hall pavilions. Views of these terraces come into view from the connecting path, offering a welcome respite after exploring the community gardens and teaching fields.

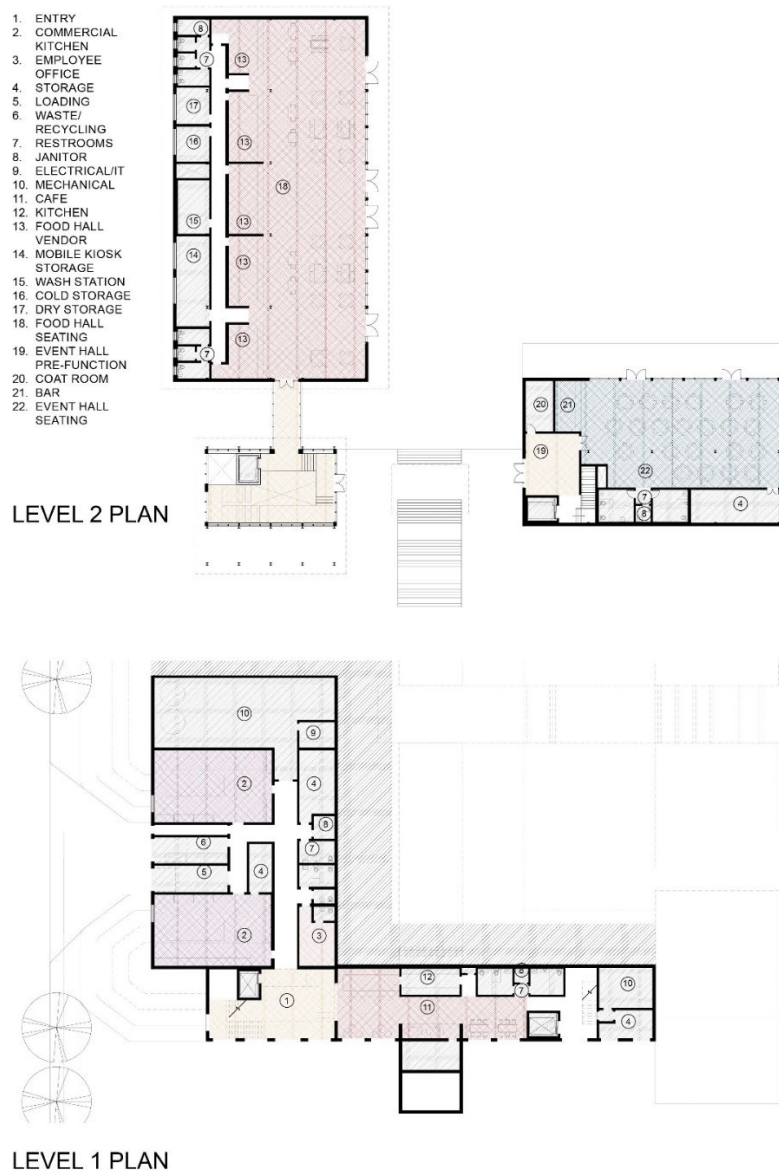
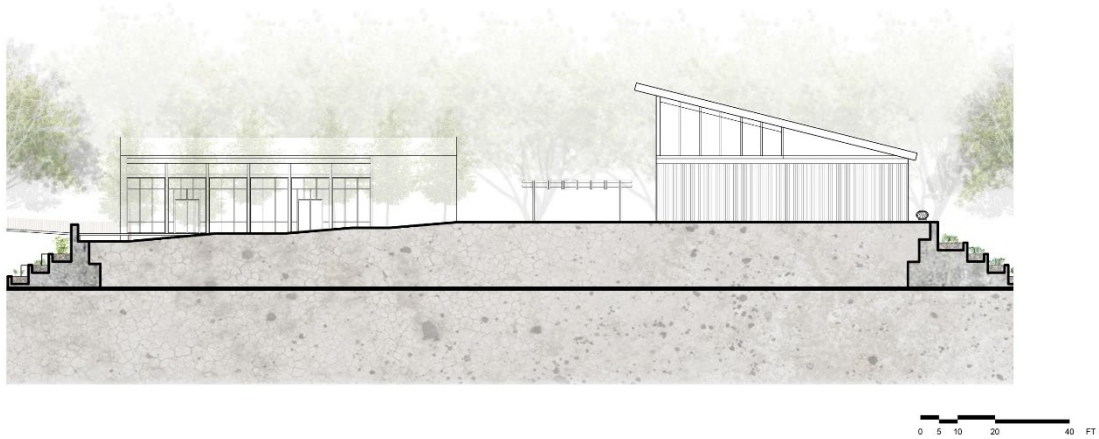


Figure 95: Plans for main building.

### Interior Experiences

The interior experience begins in the entry pavilion, which anchors the NW corner of the focus site. All main spaces radiate from the entry pavilion, which serves as the building's main hub. On the ground level, service areas line the edge adjacent to the embankment to maximize the store front experience along Canal Street. Casual visitors are greeted by a bubble tea and dessert café upon entry, where they can grab a quick snack of Hong Kong egg waffles if they choose not to continue to the food hall. New business owners can rent time in the commercial kitchens to the rear. These business incubator spaces can help locals launch new eateries and catering businesses with lower startup costs.

The second pavilion accessed from Canal Street is the event pavilion. This rentable gathering space has multiple points of entry and serves as an access point to the connecting pathways toward the productive landscapes. The doors on the east elevation connect the event pavilion to the courtyard spaces as well. Expansive glass gives views of the terraces landscaped with trees and meadow grasses and flowers. The event pavilion has a dedicated ground level entry adjacent to the café. The prep kitchen and one event storage space is also on the ground level, keeping some noise away from the festivities above. People arriving at the event space via the entry pavilion briefly step outside and pass through the entry gate. After depositing their things in the coat room off the pre-function space, they can order a drink at the bar in the event hall while they mingle before the main festivities. Others looking for a culinary experience find their way to the food hall.



*Figure 96: East elevation, showing connection of event pavilion doors to the connecting path access.*

The food hall pavilion is the culminating experience, where the craft, consumption, and cultivation of Chinese food are woven together experientially. On the exterior, a large courtyard with outdoor seating allows people to gather and socialize when the food hall is not open. Perhaps a family will use the tables to organize food they have gathered from the guerrilla garden or foraging edges. The connected courtyard spaces also allow for coordinated events between the food hall and event pavilions. Classes on the medicinal qualities in Chinese food may be followed by cooking demonstrations in the food hall using mobile kiosks.

Expansive glazing on the south elevation emphasize the connection between the productive landscapes in the community gardens and teaching fields with the food craft in the food hall.



*Figure 97: Perspective of the terraces enclosed by the event and food hall pavilions into a series of outdoor rooms.*



*Figure 98: South elevation of food hall and event pavilions. Glazing pattern is an abstraction of traditional Chinese screens.*

Expansive glazing on the south elevation emphasize the connection between the productive landscapes in the community gardens and teaching fields with the food craft in the food hall. Like with the entry gate, the architectural expression uses a

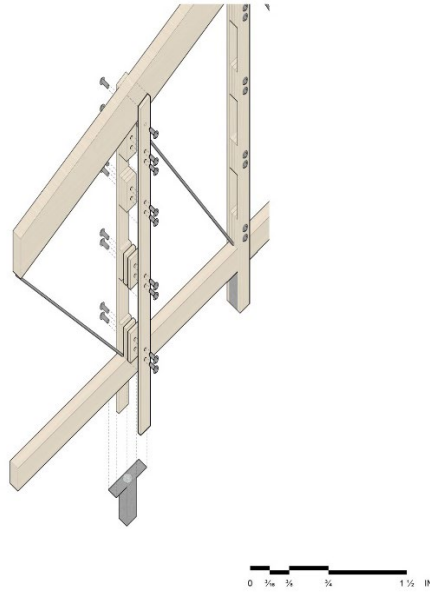
modern abstraction of wood joinery but in a different form. Trusses of dimension lumber braced with steel rods serving as a conduit for integrated lighting combine with steel timber bolts and steel columns. This combination both expresses the history as a rail site and the context of Chinatown, abstracting both traditional wood joinery and the steel rails and wood ties used to construct railroads.



*Figure 99: Interior view of food hall emphasizing connection to the productive landscapes.*

Chinatown visitors are invited to watch vendors making different Chinese foods, anticipating a feast of various dumplings, noodles, roasted meats, or baos complemented by fresh stir fried vegetables from the site. After greetings of "have you eaten", people can choose what foods will best nourish their bodies that day. It is in the food hall where people may reflect upon what they are consuming, how it has been lovingly crafted, and the land it was cultivated from. Elements of the food

system in Chinatown that were previously less visible have been amplified and extended across the site to transform a post-industrial site that created division into a place of connection and cultural expression.



*Figure 100: Construction detail of trusses.*



*Figure 101: Interior view of food hall with vendors making noodles, dumplings, and other Chinese foods.*



Figure 102: Section perspective of focus site design.

## Chapter 9: Final Presentation

Overall feedback for the proposal was positive, with reviewers noting the comprehensive nature of the design. Several issues were raised that could use more attention with further design iterations.

First, the terraced edges and their function did not seem fully considered, particularly the depth/proportion of them, access, and what happens with the edges on the North. A previous study actually showed that because the terrace edges were in sequences of 3 feet in height, the sun would not be blocked for growing. Adding that layer of sun study information would have been helpful for the presentation.



*Figure 103: Previous section study. Diagonal line is the noon sun angle for the winter solstice in Chicago.*

Another issue raised was the concern that “Chinatown” was not very evident in the design images. This may have been a matter of presentation, as the building analysis in the document was not part of the presentation due to time. In general, the question of who is at the table during the design process is important, and it was acknowledged that due to globalization, architecture may not identify with a place as strongly as in the past. The question also raises to the surface the tensions in defining whether ethnic enclaves are isolated places or part of the American urban fabric.

An effort was made during the design process to study precedents of modern Chinese, Japanese, and Korean architecture to see how traditional forms have been abstracted and reinterpreted. These were not included in the document as the focus of the thesis was on the connection between the craft, consumption, and cultivation of food within the context of Chinatown. A few that were important for developing the formal ideas were:

- The Renovation of Tianbao Cave District of Erlang Town by Jiakum Architects in Luzhou, China
- (Re)forming Duichuan Tea Yards by O-office Architects in Duichan Village, China
- Persimmon Garden by He Wei Studio in Weihai, China
- Tofu Factory by DnA in Lishui, China
- Value Farm by Thomas Chung in Shenzhen, China

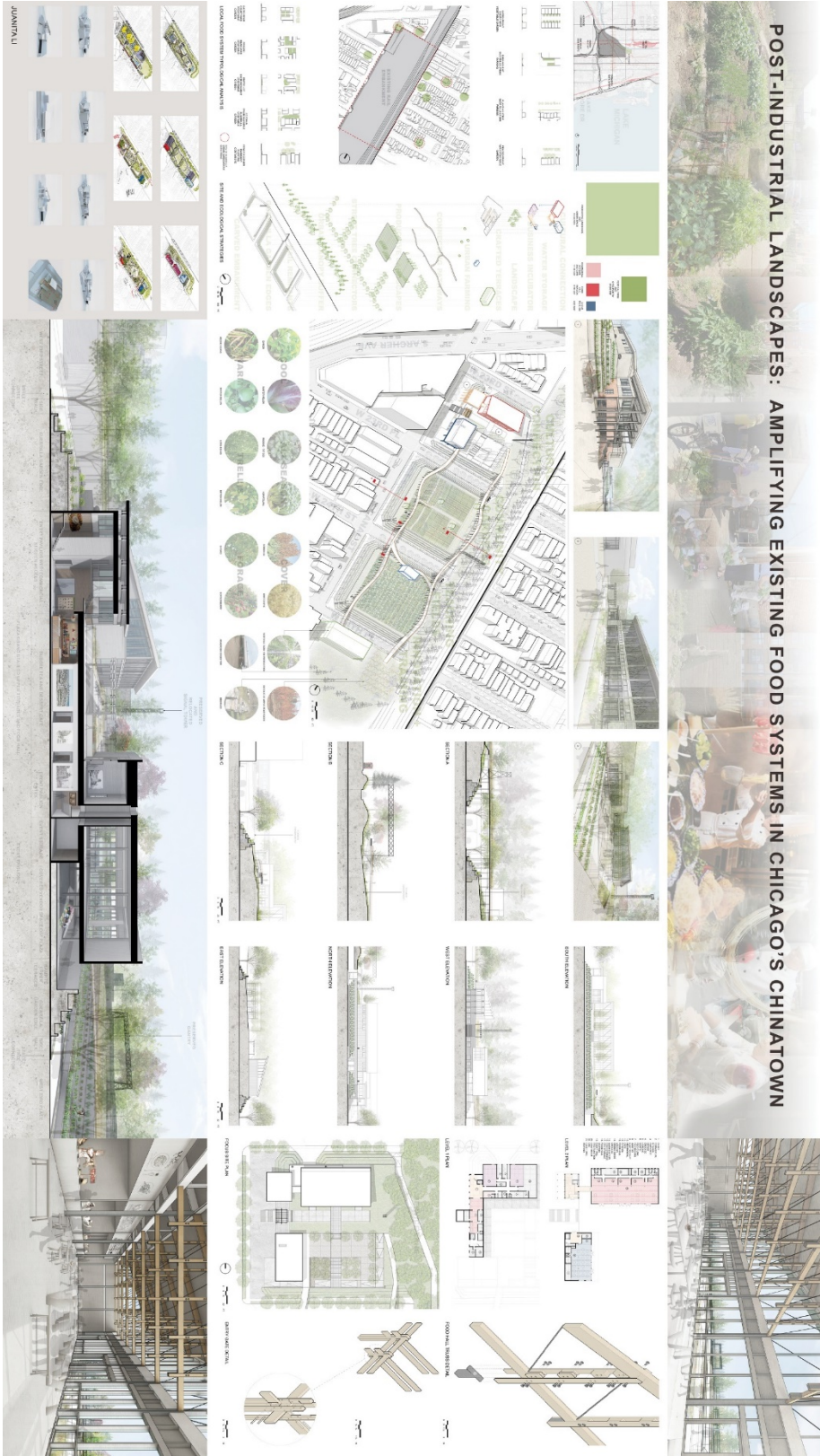


Figure 104: Final presentation boards.

## Appendices

### Image Credits

- Figure 1 *Roman food miles. The food supply routes of Ancient Rome.* (From Steel, Carolyn. *Hungry City: How Food Shapes Our Lives.* London: Vintage, 2013. p. 74)
- Figure 2 *Pages from an Arabic text showing an eggplant, onion, and other plants.* (From [Work on botany in Arabic], 1700. <https://dpul.princeton.edu/islamicmss/catalog/2801pg40q>.)
- Figure 3 *Primary regions of diversity of major agricultural crops worldwide.* (Figure 1 From Khoury, Colin K., Harold A. Achicanoy, Anne D. Bjorkman, Carlos Navarro-Racines, Luigi Guarino, Ximena Flores-Palacios, Johannes M. M. Engels, et al. 2016. “Origins of Food Crops Connect Countries Worldwide.” *Proceedings of the Royal Society B: Biological Sciences* 283 (1832): 20160792. <https://doi.org/10.1098/rspb.2016.0792>.)
- Figure 4 Image by Author
- Figure 5 Image by Author with data from <https://data-usdot.opendata.arcgis.com/datasets/usdot::north-american-rail-lines/about>
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- Figure 10 Abello, Oscar Perry. *Finest Produce, a wholesaler in Chinatown.* Accessed April 10, 2021. <https://nextcity.org/daily/entry/why-chinatown-is-so-delicious-and-why-it-might-not-be-so-forever>)
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- Figure 12 *A 99Ranch display shows the integration of shopping and dining and looks similar to other US grocery store signage.* Photo. Accessed April 10, 2021. <https://www.99ranch.com/about>.
- Figure 13 Gekler, Charles. *Aerial view of Union Stock Yards, Chicago, Illinois, October 9, 1947.* ST-17500946, Chicago Sun-Times

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<https://images.chicagohistory.org/>
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*Workers on Colorado railroad crew.* [https://library-artstor-org.proxy-um.researchport.umd.edu/asset/ARTSTOR\\_103\\_41822001763679](https://library-artstor-org.proxy-um.researchport.umd.edu/asset/ARTSTOR_103_41822001763679).  
*Secretary Charles Lau, from left, President Willie Lee, special director Jin Kit, and Vice President Wong Lock, pledge with other members of the Chinese-American Alliance located at 2223 Wentworth Ave. in Chinatown in 1928.* Chicago Tribune historical photo. <http://galleries.apps.chicagotribune.com/chi-081513-early-lives-of-chicago-chinese-chinatown-history-pictures/>
- Figure 15 Mellon Photo Company. *Elevated track and train in Chicago's Loop, looking east on Van Buren Street from Wabash Avenue, with A.M. Rothschild and Company building visible, Chicago, Illinois, 1897.* Chicago History Museum, ICHi-025312.  
<https://images.chicagohistory.org/>
- Figure 16 Author's own
- Figure 17 Image by Author with images from  
*Katherine Jane Lee, 15, center, the first Chinese woman to become an American citizen since the repeal of the Chinese Exclusion Act, pledges allegiance to the flag during a naturalization ceremony before federal Judge John P. Barnes in 1944. Her grandfather, Edward Kan, left, who was an interpreter for the Department of Naturalization, and her mother, Mrs. Esther Lee, right, were with her in court.* Chicago Tribune historical photo, Dec. 19, 1944.  
<http://galleries.apps.chicagotribune.com/chi-081513-early-lives-of-chicago-chinese-chinatown-history-pictures/>  
*Sun Yat-Sen Park was the first new green space created in Chinatown for many years.* Chicago Park District Special Collections, 1977. Accessed December 13, 2021.  
<https://www.chicagoparkdistrict.com/media/sun-yat-sen-park-sun-yat-sen-memorial/>
- Figures 18-56 Author's own.
- Figure 57 *Ordener-Poissonniers Site Plan* by SLA. 2019.  
<https://www.sla.dk/en/projects/ordener-poissonniers>
- Figure 58 *Isometric Render* by Luxigon, courtesy of SLA, Biecher Architects, Emergie, and Ogie. 2019.  
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- Figure 59 *Isometric Render* by Luxigon, courtesy of SLA, Biecher Architects, Emergie, and Ogic. 2019.  
<https://www.archdaily.com/924482/old-central-railway-transformed-into-socially-sustainable-urban-development-in-paris/5d762876284dd1fd290002c9-old-central-railway-transformed-into-socially-sustainable-urban-development-in-paris-image>
- Figure 60 *From* Saunders, William S., and Kongjian Yu, eds. *Designed Ecologies: The Landscape Architecture of Kongjian Yu*. Basel: Birkhäuser, 2012. p. 25
- Figure 61 Yu, Kongjian. *Quzhou Luming Park*. Turenscape, 2015. Photograph. Accessed December 13, 2021 <https://www.landscapearchitecturebuilt.com/quzhou-luming-park/>
- Figure 62 *This is a great illustration that shows the route of the promenade*. Digital Image. Accessed December 13, 2021. <https://roisingrace.com/2015/05/12/the-promenade-plantee-a-hidden-gem-of-paris/>
- Figure 63 Renault, Phillippe. *France, Paris, le Viaduc des arts, Parisian temple of arts and Crafts overlooked by the Promenade Plantee*. Paris, France. Photograph. Alamy.
- Figure 64 Ramboll Studio Dreiseitl, Jochim Eble Architects, Strenger Bauen und Wohnen. *Site Plan of Arkadien Asperg*. 2002. Digital image. Accessed December 17, 2021. <https://www.dreiseitlconsulting.com/arkadien-asperg>
- Figure 65 Ramboll Studio Dreiseitl, Jochim Eble Architects, Strenger Bauen und Wohnen. *Arkadien Asperg*. 2002. Digital image. Accessed December 17, 2021. <https://www.dreiseitlconsulting.com/arkadien-asperg>
- Figure 66 Lateral Office. *Seasonal Operations – Summer/Fall*. Digital Image. 2001. Accessed December 17, 2021. <http://lateraloffice.com/FROM-PLACE-TO-PLANT-2011>  
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- Figure 67 Lateral Office. *Animated operational section shows the choreography between the newly public roofscape and the bustling municipal interior*. Digital Image. 2011. Accessed December 17, 2021. <http://lateraloffice.com/FROM-PLACE-TO-PLANT-2011>
- Figure 68 *Author's own.*
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- Figure 70 E/Ye Design and Larssen Ltd. *Axonometric Display*. Digital Image. 2016. Accessed December 17, 2021. <https://www.metalocus.es/en/news/vertical-harvest>
- Figure 71 E/Ye Design and Larssen Ltd. *Rendered Section*. Digital Image. 2016. Accessed December 17, 2021. <https://www.metalocus.es/en/news/vertical-harvest>
- Figure 72 *Author's own* with images from public documents obtained from <https://www.chicago.gov/city/en/depts/dcd>
- Figures 73-104 *Author's own.*

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