Walmart 2.0

by

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I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

Processes of industry and economic exchange have significantly and continually defined the underlying structure and formal characteristics of the American city. Contemporary 'distributed' systems of economy and industry rely on the movement of goods produced in distant locations (often overseas) to their eventual point of consumption. This has created a fundamental spatial disconnect between production, manufacturing, and consumption within the city; where local economies often have no relationship with the production or subsequent economic benefit of the goods they consume. As these contemporary systems of industrial production are often reliant on Just-In-Time operational models, the speed and turnover of consumption have become the dominant metrics of economic success. Productive industrial entities and territory, once ingrained in the inhabited city fabric have gradually disappeared; leaving behind smooth, frictionless surfaces of retail, logistics, and service, lacking a social viscosity, and consideration for the public dimension of the city.

This thesis argues that Walmart, the archetypal big-box retailer, forms today's dominant industrial actor; significantly influencing the socio-economic, cultural, and physical configurations of the American city. First, Walmart's current distributed operational model is analyzed to better understand and contextualize the connections between industry, production, consumption, and urbanization. The next sections speculate upon the long-term social, economic, and environmental sustainability of Walmart's strategy; while examining the links between social interaction, idea exchange, innovation, and physical proximity within the city. As a result of many factors, including rising energy costs, this project predicts, and then explores a future where distributed operational models are no longer viable. This thesis predicts a subsequent transformation in manufacturing and consumption within the United States; linked to a resurgence in domestic production, by emerging micro-production formats. This scenario, coupled with a stated goal or mandate by Walmart to reduce overall supply chain energy expenditure, presents a

unique opportunity for a speculative, opportunistic architecture within the American city.

Walmart 2.0 radically reconsiders Walmart's existing operational model and related built infrastructures, in the creation of a new industrial system that seeks to re-inject systems of consumption, production, and exchange, back into the urban fabric. Walmart becomes an 'open', 'for-hire' underlying facilitator for the production, consumption, and movement of goods between local nodes of economy, using their existing expertise in logistical, territorial, and data management. As such, Walmart 2.0 acts as a physical and systemic platform for self-organising production and market exchanges that are facilitated, but not controlled by Walmart. A redevelopment of the generic Walmart Supercenter creates a system of participation; where local communities of Walmart 2.0 users both create and consume the content flowing through the Walmart 2.0 system; allowing these communities to engage in the economies of their own locale.

Broadly, Walmart 2.0 seeks to provoke the emergence of an urban fabric with an engrained sensitivity towards human interactions in relation to systems of production, consumption and exchange. Further, the project seeks to illustrate a method of operation, through which architects may gain an increased agency within the powerful industrial systems shaping the underlying structure of the contemporary city; a method based on the analysis of existing industrial actors, and speculating upon their future transformations with a heightened social consideration. ■

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Opte Project, *Map Of One Day Of The Internet (Connections Between Routers) From The Opte Project*., 2004,
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By Author

walmart 2.0


WAL★MART
SUPERCENTER
Food Center
Pharmacy • Optical
1-Hr. Photo
Tire & Lube Express
Open 24 Hours
LONDON
EAGLETON

introduction

Throughout history, the embodied[1] processes of industry and economic exchange have significantly defined the underlying structure and formal characteristics of the city.[2] As the nature of these economic and industrial processes have undergone significant transformations, driven by emerging technologies, changing management models, and evolving logistics strategies; so too have the specific territories of industry, their surrounding urban form, and an era's less tangible socio-economic and cultural terrain. According to David Harvey, the influence of industrialization and capitalism on physical territory is both natural and unavoidable; as capitalism perpetually strives "to create a social and physical landscape in its own image and requisite to its own needs at a particular point in time."[3]

Despite the development of new industrial and economic systems forming fluid evolutionary processes; over time distinct eras can be defined by specific operational models, developed by primary actors. Described in ecological terms as 'keystone species', these system defining actors are organisms that have a disproportionate impact on a given ecosystem.[4] While in the early 20th century, the Ford Motor Company ('Ford') exemplified this notion, exuding a disproportionate agency within industrial, economic, urban, social and cultural ecosystems; it can be argued that the Walmart Corporation ('Walmart' or 'Retailer'), today's dominant industrial actor, forms a contemporary keystone species, exhibiting an influence comparable to that of Ford.[5]

Walmart is as much the product of the contemporary horizontal city as it is a generator. Early outlets developed in the height of mid-century American decentrist urban planning were located along busy roadways, surrounded by strip malls, parking lots and suburban housing; a context in which Walmart thrived. Growing, store-by-store, the Retailer strategically avoided traditional downtown economic centers, preferring new locations in rural and suburban markets, building their retail outlets in the image of auto-centric, low rise, horizontal urbanity.[6] This preference

fig. 001. far left
Walmart Supercenter
As seen from major vehicular artery.

fig. 002. far right
Walmart Supercenter
Main public entrance as seen from the parking lot.

The Space of Flow
In the era of Walmart Industrialism, the contemporary urban fabric increasingly represents Castells' 'Space of Flow;' smooth, horizontal, programmatically segregated frictionless surfaces of spatial products, service and logistics.

fig. 003. top left
Highway #1
Los Angeles, California.

fig. 004. top right
Industrial Park
North Las Vegas, Nevada.

fig. 005. bottom left
Suburbs # 1
North Las Vegas, Nevada, 2007.

fig. 006. bottom right
Breezewood. Breezewood,
Pennsylvania. 2008.

for the urban periphery afforded Walmart inexpensive property and straightforward linkages to vehicular arteries; facilitating both their truck-based distribution system, as well as providing access to consumers from surrounding residential packages. Once the Retailer reached a certain size, it began to develop new outlets on green-field sites, adhering to its established geospatial strategies; speculating upon, and simultaneously provoking the growth of urbanized territory in the United States.

As Walmart expanded and opened new sites within the urban periphery, urban territory within the United States has grown, stretched, and developed. Despite an overall growth in the American population of 42 percent between 1960 and 1990, American urban population density dropped by 28 percent. This pattern has continued to accelerate; between 1982 and 1992, green-field territory within the United States was converted to urban territory at a rate of 1.4 million acres per year, but between 1992 and 1997, this rate increased to 2.2 million acres per year. As early as 1970, these new urban zones became the home of the majority of the U.S. population; a figure currently estimated at 62 percent. As these new urban territories form the native habitat of Walmart, the Retailer exudes a direct spatial agency over a constantly growing contemporary urban fabric within which the majority of Americans live.[7] ■

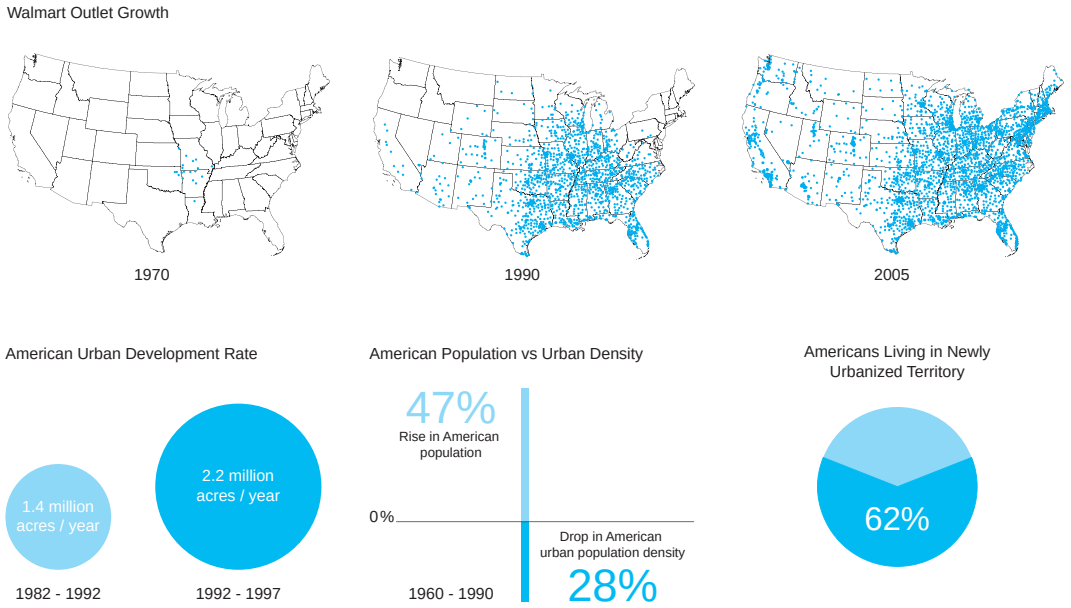


fig. 007. above
Walmart Growth vs. Contemporary American Urbanization

PRODUCTION CONSUMPTION AND EXCHANGE

Focusing on the United States, the birthplace of Walmart, this project examines how the Retailer has both actively participated in, and accelerated the spatial separation of production from consumption processes; and increased the distances involved in their separation. Walmart has created an industrial system where the majority of goods consumed in American cities must travel incredibly long distances from where they are produced; and where the speed and turnover of consumption becomes the dominant metric of success over material and product quality, durability, and effectiveness.

The contemporary urban landscape that evolved in this era of Walmart industrialism can be described as smooth and frictionless;[8] characterized by the malleable[9] surfaces of service and logistics built to the specifications of the automobile and eighteen-wheeler. The contemporary city has become deficient in the spaces of manufacturing, production and social exchange: fundamentally linked programs, once woven into the urban fabric. Parking Lots and retail corridors dotted with generic Big Box structures not only form conduit[10] infrastructures servicing an era of Just-In-Time industry, they act as the supersized primary public terrain of the contemporary city. As a result, the public zones of the contemporary city are increasingly configured more to amplify high velocity distribution and consumption than to foster the links between social and economic exchange and innovation.

While many are critical of Walmart's current operational format, the Retailer has undoubtedly created the most intricate, and effective logistics network and supply chain the world has ever seen. Constantly investing in emerging information technology and developing new physical retail outlets, the Retailer has excelled at efficiently moving material goods throughout the world. The Retailer's fundamental operation now lies in choreographing the transmission of products produced by third parties, to the linked network of Walmart developed retail territory; where goods are then sold to the consumer. The creation of a logistics system connecting physical market places throughout the United States where goods created by a third party can be sold is the Retailer's greatest underlying strength. It is this strength that this project seeks to leverage in the reintroduction and re-mixing of manufacturing processes, once consciously exiled, zoned, and segregated from the city, back into the contemporary American urban landscape.

The Walmart 2.0 project speculates upon both the future of manufacturing processes as well as the potential evolution of the logistical strategies inherent in Walmart's industrial model - the systems that dictate the configurations of the physical nodes in the Retailer's network of distribution and consumption. The recent period of global economic downturn, coupled with rising fuel costs and overseas wages has seen the certainty of industrial models reliant on the movement of goods produced overseas

and shipped long distances to American consumers called into question. Walmart's stated mandate to reduce the energy embodied and consumed within its own supply chain further indicates there is potential for systemic transformations within the Retailer's operational model. Furthermore, advances in various manufacturing technologies and processes, including rapid prototyping, 3D printing, and networked collaborative product development has triggered the emergence of small, agile, and innovative manufacturing formats within the United States.

Currently, the majority of smaller, domestic start-up manufacturing enterprises have been facilitated by the ethereal infrastructures of the internet to both collaborate and market their products, and assisted by the availability of 'for-hire' distributers such as UPS to move physical goods and products. These systems, however, lack infrastructures which promote physical connections, social interactions and exchanges between producers and consumers within the city. While these infrastructures have proven particularly effective in facilitating the emergence of new producers, new products, and new organizational formats, neither acts to amplify or explore the potential for heightened innovation through the densification, layering and the physical proximal concentration important in what Castells describes as "milieus of innovation"[11]

As the Retailer's current operational models have been called into question, could the Retailer acts as an ally in the re-industrialization of the city and an amplification of its programmatic diversity? Could the Retailer aid in the re-emergence of urban based production, facilitating local scale, start-up manufacturers and help drive innovation while cultivating the physical and social exchange of produced goods? ■

WALMART 2.0

The term Walmart 2.0 references web 2.0, the online phenomenon which has emerged over the last 10 years, where developers have moved away from the static publication of fixed content, towards the development of open forums or platforms, (such as Twitter and YouTube), which actively cultivate and facilitate user participation and interaction to generate their content. In effect, instead of prescribing what is to be consumed by the user, users themselves generate the content within a social infrastructure or platform managed by the online developer; thus facilitating a direct social connection between the production and consumption of content.

What if Walmart 2.0 represented a physical incarnation of these principals? What if instead of exhibiting total control over what goods were consumed and exchanged throughout the Walmart network, the Retailer instead acted as an infrastructural reef, or logistical platform upon which local innovation, production and exchange could occur and grow; re-engaging the city with those producing the goods they consume in a new environment of social and economic exchange? What if instead of acting as a conduit, facilitating the one-way flow of material through their network to the consumer, the Retailer actively participated in a two-way flow of materials through their sites; facilitating the breakdown of used goods back into sub-components or their more basic materials, tightening the consumptive loops within their own supply chain as well as granting both consumers and producers continued access to the materials necessary for the generation of content exchanged throughout the Walmart system? Beyond an overall systems speculation the core of the Walmart 2.0 project is a radical reconsideration and redevelopment of the Walmart Supercenter; the primary public interface of the Retailer. ■

THE WALMART 2.0 SUPERCENTER

The Walmart 2.0 Supercenter pulls apart, remixes or tweaks pre-existing programs within the Walmart supply chain. It is reprogrammed to accommodate access to leasable advanced tools of manufacturing, studio, workshop, and commercial spaces, as well as provide market spaces for the exchange of goods. These linked spaces connect with a network of other similar nodes through a distribution and logistics underbelly managed by the Walmart Corporation. Walmart 2.0 seeks to reboot local systems of production through accommodating emergent systems of social collaboration and exchange. Thus while each node acts to foster local generated content, the logistics underbelly allows access to a much larger, national scaled network of similar Walmart 2.0 nodes. Thus, the Walmart 2.0 Supercenter acts as a soft system – developed infrastructural nodes or anchors which influence the mutable, self organizing, programmatic re-hybridization of the city fabric, reintegrating programs of manufacturing, production, and the social settings of innovation and exchange. ■

fig. 008. above
Walmart Supercenter 2.0

STRUCTURE

The Walmart 2.0 project is structured into three parts: Part 01: Contexts, Part 02: Futures, and Part 03: Projections.

Part 01: Contexts is divided into three chapters; *01.1 A National Commons*, *01.2 Industry and the City,* and *01.3 Network Logistics*. *A National Commons* seeks to critically analyze Walmart in terms of its size, scale, reach, and influence the Retailer maintains within the social and economic structures of the contemporary American City. *Industry and the City* attempts to theoretically contextualize the relationship between an era's dominant industrial entity, its subsequent socio-economic influence, and the material transformations of territory, urban form and cultural production that occur within it. In an era where Kazyz Varnelis argues that networked systems increasingly exhibit pre-eminence over built structures in the contemporary city, Network Logistics acts as a case study, exploring the mechanics of Walmart's logistics network.[12] Through an examination of Walmart's distribution system, store placement, overall geostrategy, information technology development and other operational innovations, an understanding is gained into the actual processes and underlying logic of one of the most powerful forces shaping contemporary American urbanity.

Broken into the chapters *02.1 A Shifting* Model and *02.2 The Future of Manufacturing, Part 02: Futures*, examines recent socio-economic factors influencing the potential evolution and future mutations of the Walmart industrial model. *A Shifting Model* highlights some of these factors the Retailer is already considering by creating new sustainability policies and initiatives to monitor the distance goods travel through their supply chain, while speculating upon further evolutions based on the contemporary industrial trends of moving manufacturing and production processes back to the United States. *The Future of Manufacturing* looks specifically at evolving and developing formats for the creation, production, and manufacture of goods, as emerging technologies are facilitating the emergence of smaller, more agile, research and development, and manufacturing firms. It is these emerging formats that inform this project's architectural proposals.

Part 03: Speculations examines the link between social connection, idea exchange, innovation, production and physical proximity; and proposes the new Walmart 2.0 Supercenter typology. *03.1 The Space of Innovation* discusses the preconditions, organization formats, and actual spaces that have historically acted as incubators of innovation and production, with both physical, digital, and hybrid precedents. *03.2 Walmart 2.0* presents the Walmart 2.0 Supercenter, which acts as an open platform for networked, yet local manufacturing, material breakdown, and for the exchange of goods within the contemporary urban fabric. The proposed Supercenter is tested on a specific site within the Dallas/Fort Worth region. ■

NOTES: INTRODUCTION

1 In this context, the author uses embodied to describe the nature in which urbanism, industry, and economy form fundamentally linked phenomena. Thus, the city embodies, and makes physical, the processes industry and economy.

2 C. Waldheim and A. Berger, “Logistics Landscape,” *Landscape Journal* 27, no. 2 (January 1, 2008): 219-246, 219

3 David Harvey, cited in David Karjanen, “The Wal-Mart Effect And The New Face Of Capitalism: Labor Market And Community Impacts Of The Megaretailer,” *Wal-Mart: The Face Of Twenty-First Century Capitalism,* 143-162. (The New Press, 2006),146.

4 S. Johnson, “Where Good Ideas Come From: The Natural History Of Innovation” (Riverhead Books, 2010), 182.

5 David Karjanen, 153.

6 M. Zook and M. Graham, “Wal-Mart Nation: Mapping The Reach Of A Retail Colossus,” *Wal-Mart World: The World’s Biggest Corporation In The Global Economy.* ed. Stanley D. Brunn, 15-25 (New York: Routledge January 1, 2006).

7 Alan Berger, *Drosscape: Wasting Land Urban America* (Princeton Architectural Pr, 2007), 18.

8 Throughout this work, the author uses the frictionless in an urban context to refer to the intentional smoothing of movement, primarily by vehicles throughout physical world. This may include the widening of arterial roads, or construction of dedicated off ramps to help reduce the slowing of movement as a result of intersections or congestion.

9 The author uses the term malleable in an urban context to refer to the development of the built fabric with a heightened importance placed upon short-term flexibility over permanence. For example, this may include the construction of buildings with very short intended life spans (5-10 years), or the construction of sheds such as those discussed by Robert Venturi, designed to accommodate shifting program and usage with new signage and adjustable façade treatment.

10 The Author uses the term conduit to describe infrastructures in the built environment designed to facilitate amplified movement in the flow of material, vehicles, or people; rather than places of pause. These may include distribution centers, fast food drive-throughs, retail corridors, highway service stations etc.

11 Taken from Castells’ work sited below, the author uses the term milieu of innovation to describe the connection between physical proximity and innovation.
Manuel Castells, *The Rise Of The Network Society (The Information Age: Economy, Society And Culture, Volume 1) (Vol 1)*, 2nd ed. (Wiley-Blackwell, 2000), 419.

12 K. Varnelis, “Programming After Program: Archizoom’s No-Stop City,” *Praxis: Journal Of Writing And Building, V8* (January 1, 2006). 83.

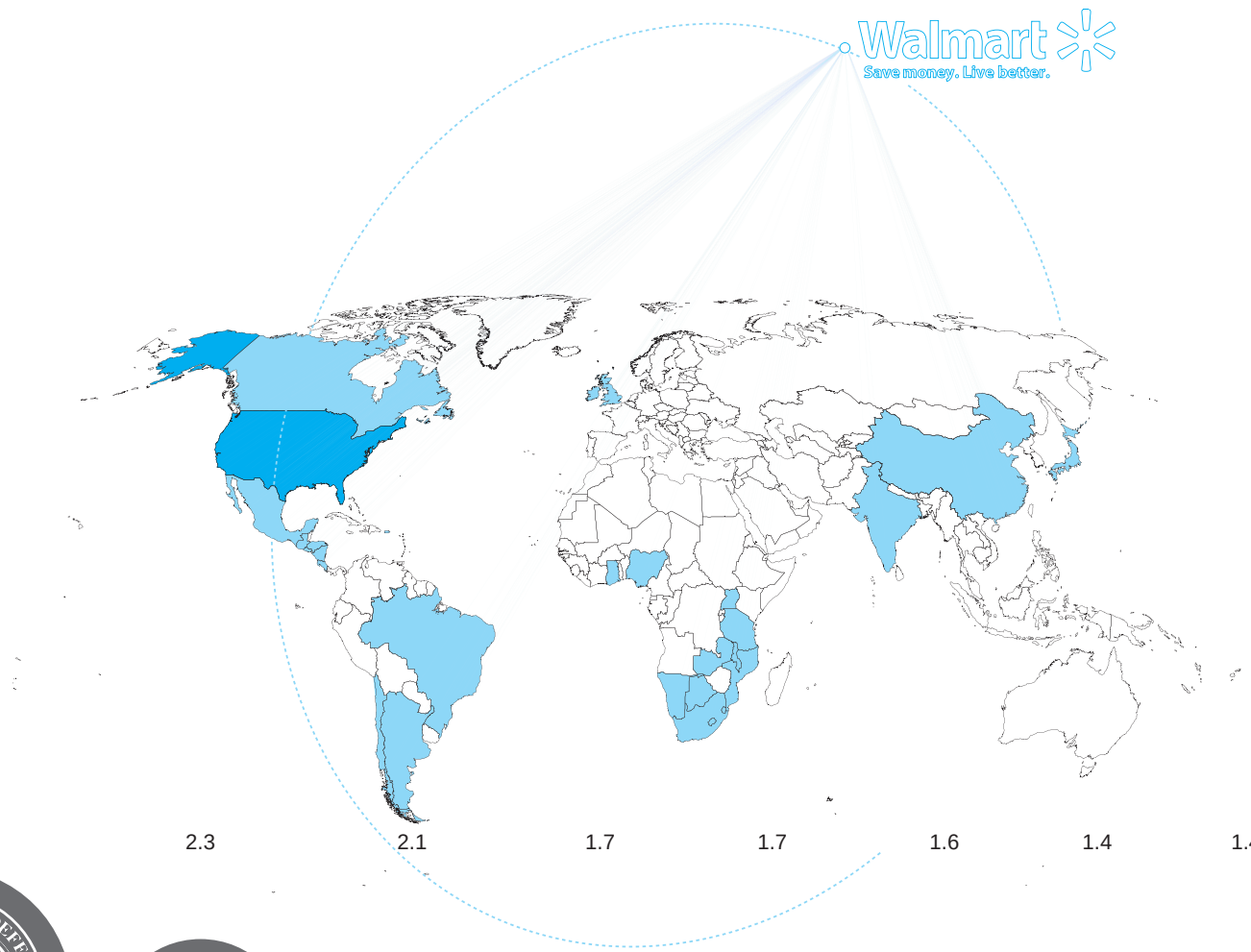
PART 01: contexts


Low prices.
Every day.
On everything.
Walmart
Walmart
Save money. Live better.

a national commons 01.1

Walmart today has become a primary infrastructure in the economic function of millions of Americans' daily and weekly lives, or as Charles Fishman, author of The Walmart Effect describes "Walmart is not just unavoidable; it has become a kind of national commons."[1] More than 30 percent of the population of the United States makes at least one shopping trip to a Walmart retail outlet each week; across the span of a year, more than 90 percent of the country makes this same trip.[2] Considering the frequency and ubiquity with which the American public interacts with the Retailer, it is no surprise that Walmart is the domestic leader in sales in nearly every consumer product sub category within the United States. For example, of all the toys, health, beauty products, and housewares bought in the United States, Walmart retains a respective market share of 21, 23, and 27 percent.[3] These market share figures remain consistent across the board, as approximately one fifth or 20 percent of all consumer products purchased in the United States flow through the Retailer's distribution network and off of its shelves.[4] ■

fig. 009. far left
A National Commons
Maintaining a one fifth market share of all consumer goods purchased in the United States, and acting as the largest grocer in the country, Walmart forms the dominant space of economic exchange, consumption, and sustenance in the country.



3.2	2.3	2.1	1.7	1.7	1.6	1.4	1.4	0.9	0.8
US Department of Defense	Chinese People's Liberation Army	Walmart	McDonald's	China National Petroleum Corp.	State Grid Corp. of China	National Health Service (UK)	Indian Railways	China Post Group	Hon Hai Precision Ind.

emplolyees (millions)

A NEW SOVEREIGN:

The scale of Walmart as a corporation and employer is truly staggering. Maintaining a retail presence in 26 countries[5], as of 2005, Walmart stood as the largest company to ever exist. Adjusted for inflation, it had become larger economically than any exploration company (such as the Dutch East India Company), oil, railway, utility, or software company.[6] When its comparison is limited strictly to other retailers, Walmart's 2005 sales were higher than the next five largest firms combined within the United States: Home Depot, Kroger, Sears Holding Company (including both Sears Retail and Kmart) Costco, and Target.[7] Globally, Walmart's sales exceeded the next three largest competitors combined: the French firm Carrefour, the American firm Home Depot, and the German firm Metro.[8]

Between 2001 and 2011, Walmart topped the Fortune 500 list seven times, losing out to perennial contender ExxonMobil only three times, in 2001, 2006, and 2009.[9] As of 2005, Walmart's direct employees accounted for approximately 9 percent of all retail workers in America,[10] and as of 2010, Walmart employed approximately 2.1 million "associates."[11] Domestically, the size of this workforce is second only to the United States Department of Defense; and globally, the Retailer falls only to third, behind another state military, the Chinese People's Liberation Army.[12] If one were to consider Walmart a nation, its annual revenue generation of $401 billion would find it worth the same as oil rich Nigeria in terms of GDP as of 2010.[13]

Hardt and Negri describe the emergence of a new global order, logic, structure of rule, or new sovereignty in the context of global markets and circuits of production which have emerged in the wake of the collapse of colonial regimes and the Soviet Union.[14] The Walmart Corporation exemplifies this new sovereignty; a company which exudes the same scale, scope, and influence as a traditional sovereign state, yet exists as a shadow, overlapping traditional national and state territory.[15] According to the Los Angeles Times, the power the Retailer exudes throughout the developing world frequently prompts developing nations to send diplomatic emissaries not to Washington D.C., or even to Little Rock (Arkansas' sate capital), but directly to Walmart's capital, Bentonville, Arkansas.[16] Within this context, historian Nelson Lichtenstein notes, "In an era of waning governmental regulation, Walmart management may well have more power than any other entity to legislate key components of American social and industrial policy."[17] ■

fig. 010. far left top
Walmart Global Presence
As of 2012, the retailer maintained operations in the following countries: Argentina, Botswana, Brazil, Canada, Chile, China, Costa Rica, El Salvador, Ghana, Guatemala, Honduras, India, Japan, Lesotho, Malawi, Mexico, Mozambique, Namibia, Nicaragua, Nigeria, South Africa, Swaziland, Tanzania, Uganda, United Kingdom, and Zambia.

fig. 011. far left bottom
World's Largest Employers
According to *The Economist,* as of 2010.

ALWAYS LOW PRICES:

The core of Walmart's business model is high volume sales of the lowest possible priced consumer goods, or the provision of "Always Low Prices." While there has existed significant debate as to whether the savings afforded customers justifies all of the Retailer's actions, this simple assertion of "Always Low Prices" drives every decision and innovation within the Corporation. In this quest to lower prices, Walmart has fundamentally restructured relationships between Retailer's, distributers, and suppliers within North American supply chains. It has cut out traditional distributers and warehousing, embracing Just-In-Time (JIT) retailing, and created their own tightly knit distribution system with a private truck fleet that interfaces directly with suppliers and manufacturers.

These operational tactics, however, have not come free of social, political, and cultural side effects. The same low cost pressure and resultant operational supply chain innovations which have enabled the Retailer to create savings for their customers, have also seen Walmart play a significant role in the disappearance of domestic manufacturing infrastructures and employment, while substantially increasing the United States' dependency on foreign labour, primarily sourced in China. Walmart has also influenced the reduction of both traditional retail typologies and retail jobs; those retail jobs they have replaced remain low benefit and low wage in nature. In this light, while certainly not solely responsible, Walmart has played a significant role in the gradual transition towards the service based economy now seen within the United States – a transition many argue to be both socially and economically detrimental in the long term.

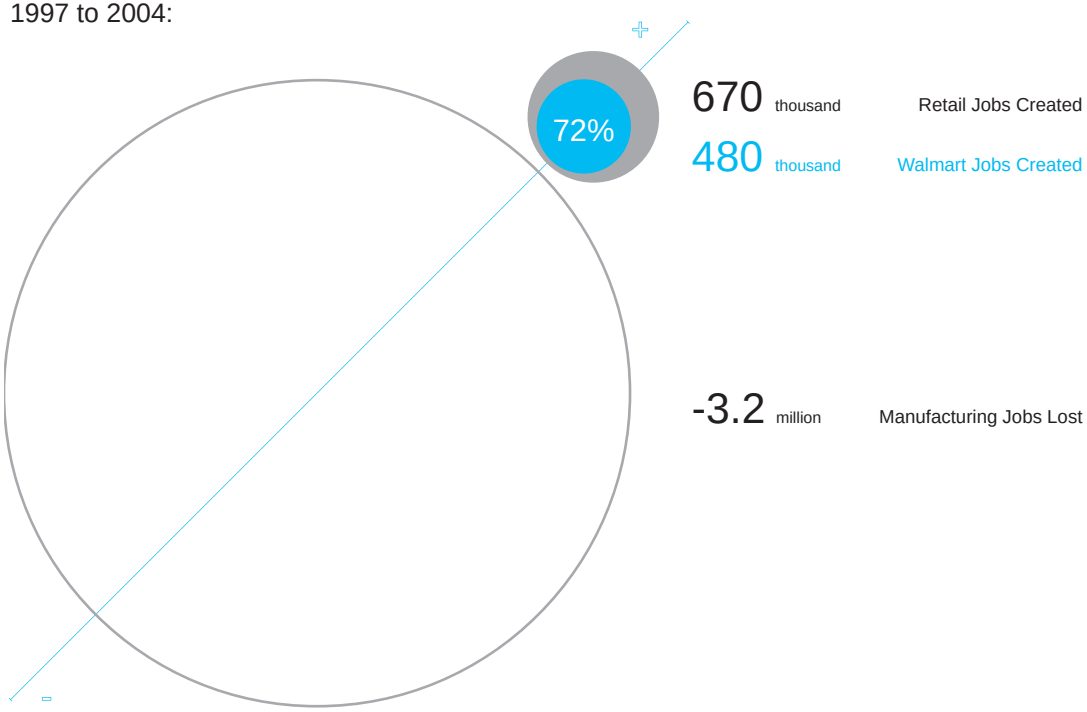
Over the last 40 years, Thomas Friedman argues, the United States has relied too heavily upon the cultivation of this service economy, narrowing the range of industries functioning within the country.[18] Likewise, the spectrum of programs occupying the American city has narrowed to those that facilitate service consumption, without an integration of the spaces of manufacturing and production, which have been exiled from the contemporary urban landscape, and the country as a whole. This condition creates one dimensional environments that lack the programmatic diversity necessary to foster economy, and sustainable symbiotic relationships between production and consumption within a given territory. In a recent interview, former Michigan Governor Jennifer Granholm reflected upon this notion: "… no nation can be successful without making things. We can't be a nation that only teaches each other to dance, or does each other's hair. […] If we want to be strong from a research, development, innovation standpoint – if we want to have engineering, we have to have manufacturing […] So when you lose manufacturing, you then loose research, development, and engineering. […] You are left with service jobs […] It's a terrible strategy as a nation to give up on industry – to give up

on manufacturing."[19] Furthermore, the emergence of this one dimensional urban landscape of service and consumption necessarily correlates with the loss of manufacturing employment within the United States, which also represents a gradual loss of a certain knowledge and skill base necessary to manufacture goods. This can be described as a systemic reduction of **innovative** capacity – proving problematic should manufacturing industry ever return to the United States or reintegrate into the city.

The same price point pressure that caused Walmart's suppliers to move manufacturing offshore has also coincided with a drop in the material quality, durability, and reparability of the goods produced for, and sold in their stores.[20] The market, at a national scale continually adjusts, and our expectation for product quality synchronously drops, for all consumable goods. Low cost items eliminate the need for repair when replacement costs are virtually the same if not less; consumer goods in the Walmart age, and their engrained material, have become disposable.[21] In a sense, Walmart has played a role in the de-materialization and transformation of consumer goods from physical commodities to disposable vehicles of an intended service. In other words, the goods Walmart sells are composed of various physical materials, but their value lies in the temporary use for which they were purchased, (be it to project movies or toast bread), rather than in the materials they contain. Goods rarely cycle back up the supply chain for re-manufacture or repair, further contributing to a reduced manufacturing capability in the United States.

Furthermore, Walmart prefers to purchase goods in large volumes, requiring producers and suppliers to deliver products on short notice and in large quantities. This limits the scale and type of suppliers interacting with the Walmart economic engine to those capable of filling high volume, short lead time orders; often precluding start-up or entrepreneurial scaled ventures. While established suppliers or producers often are capable of meeting these orders, smaller start-up entities are significantly strained, or simply unable to cope with the financial burden inherent in producing the initial batches of high volume orders Walmart requires. As mentioned earlier, in many regions, the arrival of Walmart retail outlets displaces many small, and more often independent, pre-existing retail businesses. Thus, the Retailer has helped create an environment whereupon small or start-up firms both find it difficult to market and sell their products in their own locales through disappearing traditionally scaled retail typologies, but also unable to meet the volume demands required to sell their goods through Walmart. While certainly some new or small companies manage to overcome these obstacles, landing their products on Walmart's shelves, the bulk of these producers are forced to pursue alternative business models, those void of a physical place of commerce or retail (facilitated by the digital marketplaces of the internet, and for-hire distributers, such as UPS). "The company has driven small businesses out of business, destroying Main Street in the words of some critics."[22] Thus, for decades Walmart has played a role in stifling localized entrepreneurial activity and innovation in

1997 to 2004:


72%
670 thousand
Retail Jobs Created
480 thousand
Walmart Jobs Created
-3.2 million
Manufacturing Jobs Lost
-20%
200%
Loss of Manufacturing Jobs
Increase in Walmart Imports from China

14.9 million

Americans Employed in *Retail* as of 2003

14.5 million

Americans Employed in *Factories* as of 2003

thousands of communities across the United States, while reducing the capability of the nation to replace lost manufacturing industries with new start-ups.

The Walmart Corporation does not seem oblivious to these socio-economic ripples emanating from their own industrial operations, as Walmart CEO, H. Lee Scott Jr. once voiced a similar concern to that of Granholm, arguing, "with the manufacturing out of this country, one day we'll all be selling hamburgers to each other."[23] However, any significant reaction to these long term trends from Walmart remains unseen, despite the fact that at some level, the Retailer depends upon a certain economic strength within the communities they operate; as the buying power of their customers depends upon their ability to secure a certain level of employment. In other words, the scale and reach of the Retailer has allowed Walmart to play a significant role in the emergence of the low wage, low benefit, service based edge city economy. The Retailer has played a role in hollowing out the long term entrepreneurial, innovative, and economic strength of their customers. ■

fig. 013. above
Retail vs. Manufacturing Employment
In 2003, for the first time, more Americans were employed in the retail services sector than those in manufacturing.

fig. 012. far left
U.S. Manufacturing Trends 1997 - 2004
The United States manufacturing industry exhibited continual decline between 1997 and 2004, coinciding with both a significant rise in Chinese manufacturing figures and American retail employment (the majority of which can be attributed directly to Walmart Corporation)

TERRITORY – NETWORKED PUBLIC SPACE:

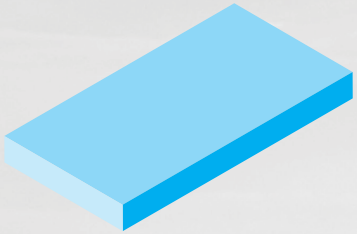
If one were to combine the floor area of all the Walmart's retail outlets, (not including surrounding parking lots) it would cover approximately 15,500 acres of land – more than the total land area of Manhattan Island (14,694 acres).[24] For further context, it is estimated the retail space of the entire globe would only cover the island an additional thirty-two times.[25]

While immense when described as a total, in these abstracted metrics, it is also important to understand the physical reality of Walmart; a densely distributed nodal mesh of highly specific territorial bits, of which, the Walmart Supercenter (the Retailer's preferred retail format), forms perhaps the most significant logistical threshold of consumption and economic exchange in the United States. The Supercenter represents a study in the ruthless deployment of generic building typology: simple shed-type structures that more closely resemble warehouses than traditional retail spaces.[26] In terms of scale, the average Supercenter in the United States compares more closely to four adjacent football fields, or a downtown New York City block, than other retail types. As described by urban theorist Kerrie Jacobs, "Walmart easily dominates the landscape that most Americans call home. The biggest buildings most people routinely visit are not Skidmore, Owings & Merill skyscrapers; they're Walmart's."[27] However, the generic Walmart retail outlet represents a modesty or simplicity in architectural and urban ambition. While developing the Supercenter, the Retailer has broadened their programmatic offerings to include fast food restaurants, auto servicing, and optical and hearing loss clinics, etc., Walmart's big box outlets are nearly exclusively retail and service destinations; forming smooth, frictionless surfaces of movement and distribution, stoic, programmatically limited territorial devices produced in complete service of mass retail.

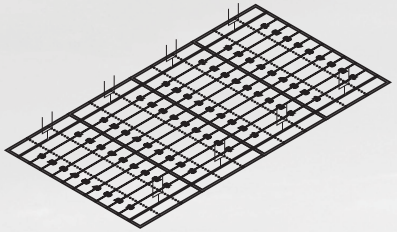
Typical Walmart outlets epitomize contemporary urbanization (zones, enclaves, smooth, and programmatically segregated), and what Keller Eastering describes as a "spatial product." Spatial products operate under a differing set of motivations than the historic or semiotic city; those which "substitute spin, logistics, and management styles for considerations of location,

fig. 014. above right
Walmart Supercenter 2978
Fort Worth, Texas

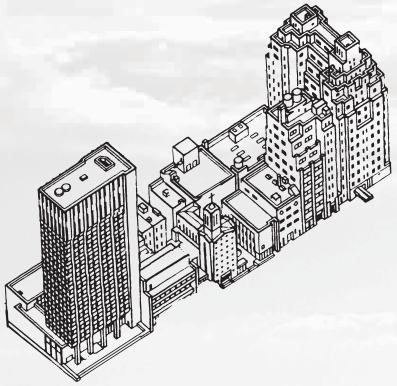
fig. 015. opposite right
Walmart Retail Territory
Scalar context



Walmart Supercenter Avg: 18 301 sq. m



American Football Field X 4: 21 560 sq. m



Manhattan City Block Typ: 21 600 sq. m

The Total Walmart Retail Footprint Equals the Approximate Area of Manhattan Island

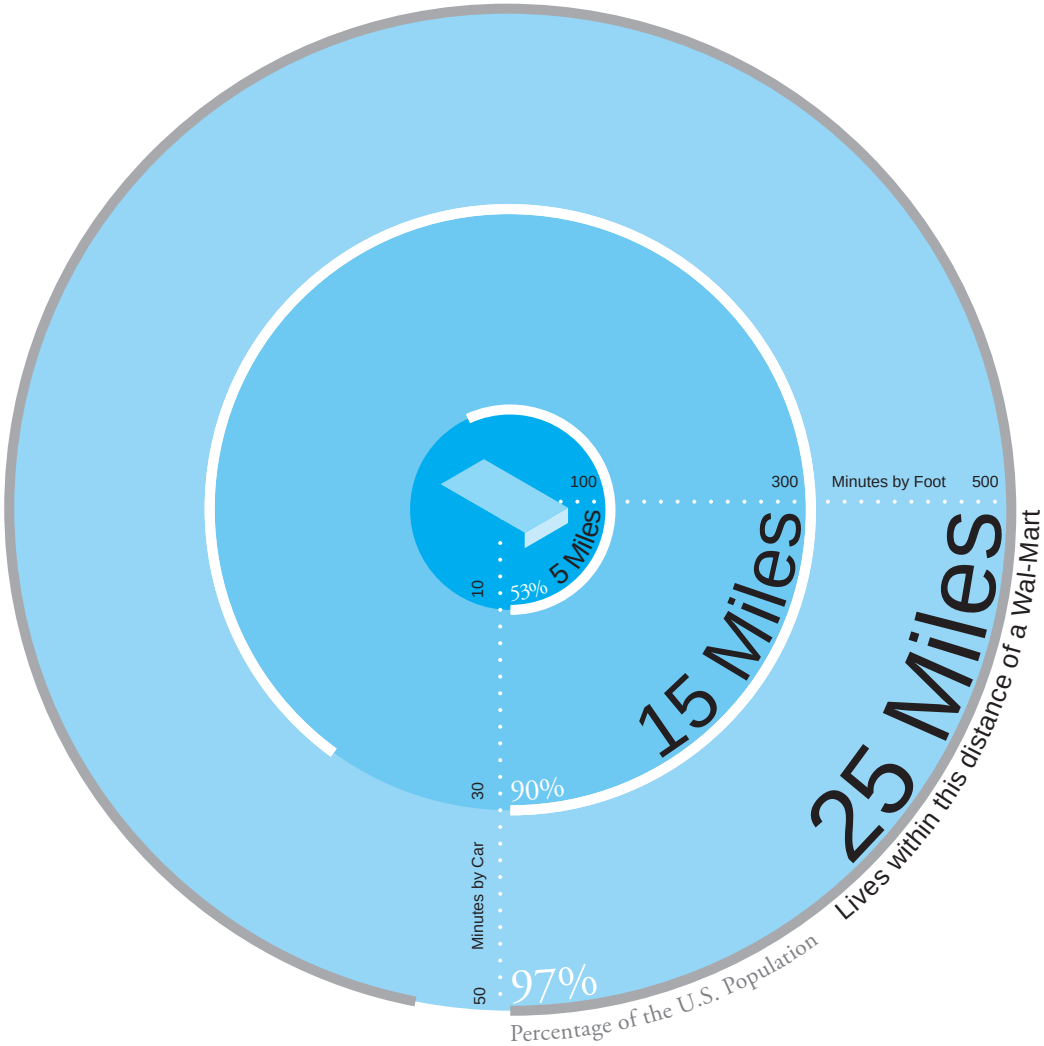


fig. 016. above
Walmart Saturation vs. Population

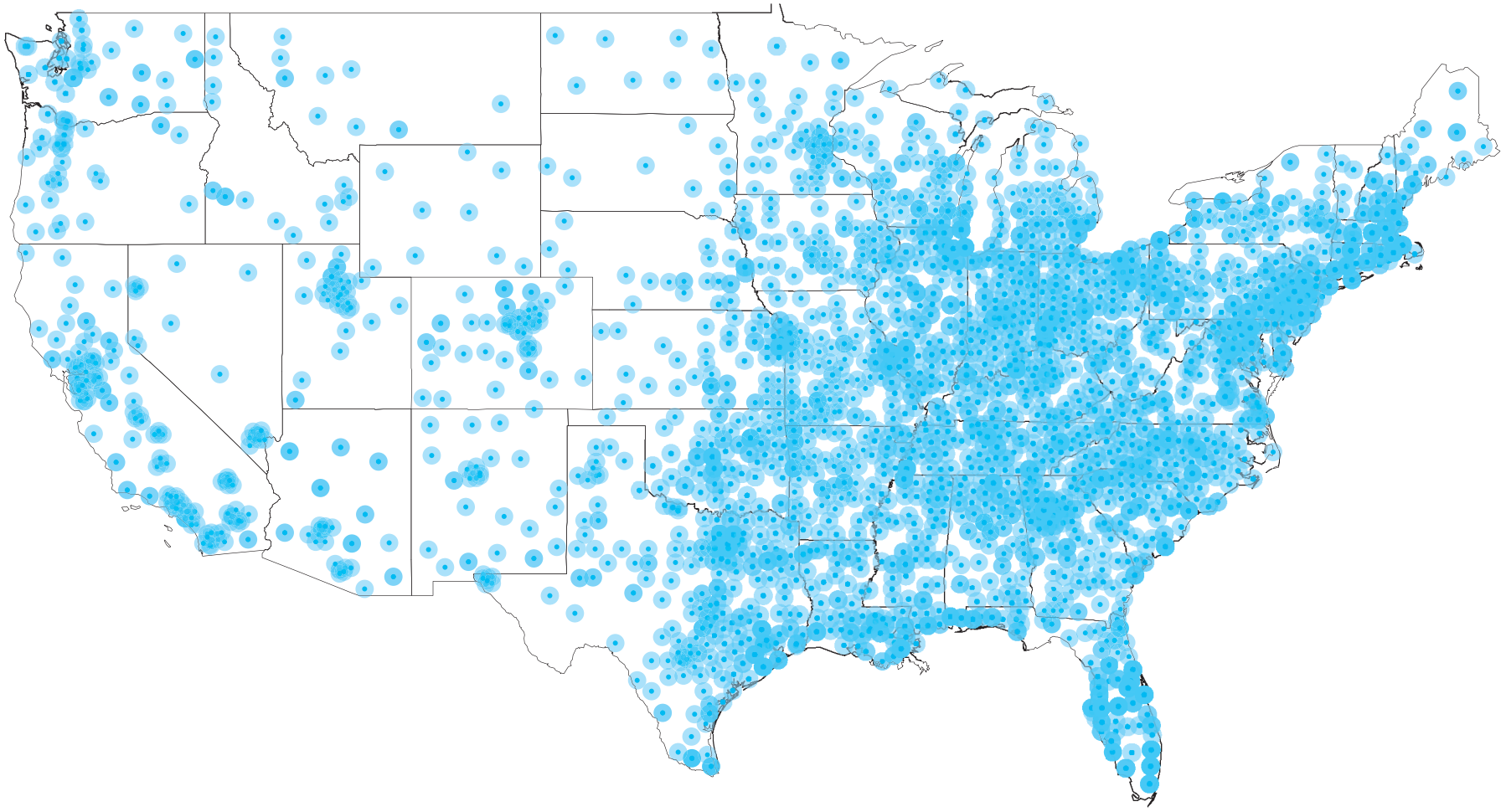


fig. 017. above
Walmart Outlet Distribution

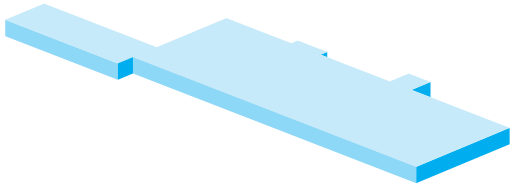
geometry, or enclosure." Walmart retail outlets form focused logistical nodes, lacking an urban, architectural, or programmatic connection or acknowledgement of local context; despite operational site specificity, dictated by a relationship with both population centres and arterial road networks – linking consumers to a globally scaled supply-chain of production.

Importantly, no individual store can, or does operate in isolation. They are the 'bits' of a much larger organism, carefully placed to interact with both a consumer base and the Retailer's distribution network. In a sense, it is this development and maintenance of a dense web of specific and calculated retail outlets, operating in symphony, which manifests the public face of Walmart's most significant, product – the networking of specific, physical, 'bits' of territory to support a sophisticated system of retail and distribution. As described by Thomas Friedman, "Walmart today is the biggest retail company in the world, and it does not make a single thing - what it 'makes,' is a hyper-efficient supply chain."[28] Nearly every item sold in a Walmart was produced elsewhere and by a third party. The value Walmart adds to a product, is its skill in moving items from producers to consumers, distributing information between all parties along a products supply chain, and the development of retail outlets. Thus, while in economic terms, the Retailer forms the largest corporation of our time, Walmart amazingly does not exist as a either a producer, or manufacturer, but rather simply a conduit in Castells' space of flows.[29]

As of April 2011, the Retailer operated more than 3 800 individual retail outlets (excluding Sam's Club) within the United States. As such, many observers have noted the nation has reached a level of Walmart saturation.[30] Already, nearly every American lives within a short drive of these outlets, as "53 percent of the U.S. population lives within five miles of a Walmart; 90 percent of the U.S. population lives within fifteen miles of a Walmart; (and) 97 percent of the U.S. population lives within twenty-five miles of a Walmart."[31] These outlets have become so wide, and so numerous, that in a sense, Walmart has become "a mass retailer of architecture."[32] This architecture, however, has not been funded exclusively through the spoils of the Retailer's capitalistic pursuits.

For a number of reasons, within the United States, countless municipalities have actively sought the construction of a Walmart retail outlet or distribution center in their own community; believing that a Walmart store creates hundreds of new jobs, and increases local sales and property tax revenue.[33] Whether or not the arrival of a Walmart outlet or distribution centre in a community actually creates these jobs and tax revenues or simply displaces those already existing within a community remains subject to debate,[34] yet the active courtship conducted by municipalities to lure the corporation into their region has certainly placed the Retailer in a position of power. For instance, while developing new stores, the Retailer is often able to command the provision of public assistance, typically

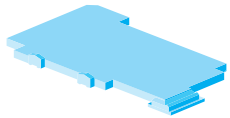
Public Subsidy:



$48 million
Max

$7.4 million
Avg

Distribution Centres



$12 million
Max

$2.8 million
Avg

Retail Outlets

35

Number of states granting individual subsidies to construct Walmart infrastructure:

Distribution Centres to Recive Public Funding

fig. 018. above
Government Subsidies / Public Economic Support for Walmart Infrastructural Development

arriving in the form of local "tax breaks, low-cost financing, land write-downs, land transfers, site assembly, fee reductions or waivers, and infrastructure improvements"[35] (including widened roads and new off-ramp construction). As highlighted by David Karjanen, anthropologist and professor of American studies at the University of Minnesota, as of 2004, "more than 90 percent of the company's ninety-one extant distribution centres had received some form of economic development subsidy. The values of these state and local subsidy deals for individual Walmart distribution centers were as high as $48 million (with an average of $7.4 million), while for retail outlets the largest was $12 million (with an average of $2.8 million). Additionally, state subsidies for Walmart were found in thirty-five states, with the largest number in California, Illinois, Missouri, Texas, and Mississippi." [36] Further, this political influence extends through the building and planning departments of countless municipalities, as Walmart is often able to "rezone our cities" to provide advantageous conditions for their own retail and distribution infrastructures.[37]

As purported in the Harvard Project on the City, "shopping is arguably the last remaining form of public activity."[38] If one subscribes to this notion, Walmart's territorial domain now acts as the de facto and primary public forum in the contemporary horizontal city, and the United States as a whole. However, in its relentless pursuit of efficiency and establishment of an intricate logistical network; the Retailer has ignored a broader

architectural engagement between its public consumerist functions, its global relationships with production, the movement of material goods, and its growing function as both a locust and primary element of American edge city urbanism. Instead, during this most recent era of late capital, the era of Walmart's industrial dominance, the Retailer has influenced both the creation of an urban landscape and social fabric in the image of its own industrial model - oversized, flexible, fluid, and territorially specialized. It has played a major role in the spatial and functional separation of production from consumption, the departure of manufacturing industry from the edge city, and the rise of the service economy, all while constructing 'public space' which amplifies speed, and prioritizes the constant frictionless flow of consumer goods over social interaction – trends this thesis argue are systemically linked.

In addition to the profits earned by the Retailer each time an American swipes their credit card at a Walmart retail outlet, the economic subsidies granted to the world's largest company represents a blurring of the boundary between public and private infrastructures and development. In an era of privatization as noted in Hardt and Negri's Empire, the Walmart retail outlets have come to represent subsidized city centers within the contemporary American urban landscape. While the Retailer may have been able to develop these sites independent of government support, the fact it does receive such extensive public funding furthers the notion that the greater public forms a significant stakeholder in the territorial development of the Walmart Corporation. This notion raises questions as to the social, cultural, and economic returns a region or even the nation receives as a result of these types of developments. Has this scenario, as Friedman describes, created a situation where Walmart is actively "privatizing gains and socializing losses?"[39] ■

fig. 019. far left
Walmart Supercenter 1120
Gladstone, Missouri
The Walmart Supercenter forms the de facto primary public space of thousands of communities throughout the United States.

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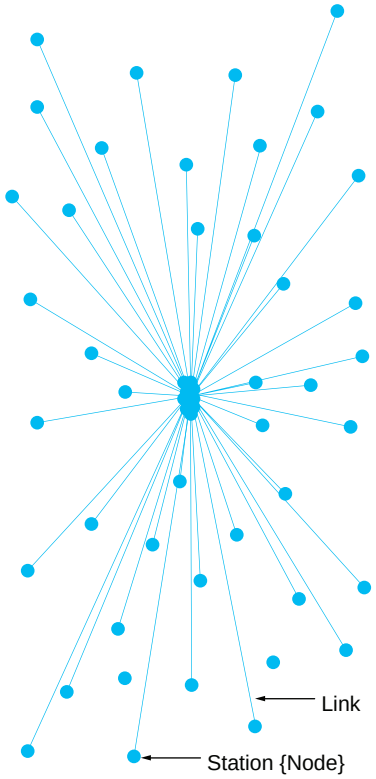
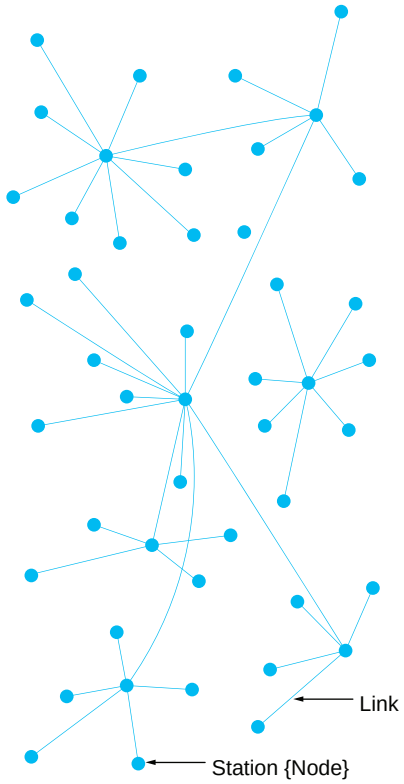
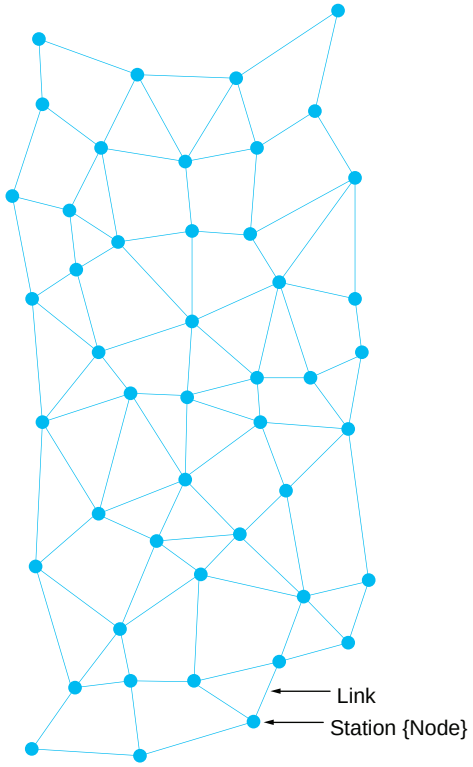


Centralized



Decentralized



Distributed

industry and the city 01.2

Throughout time, transformations in the nature of capitalism, fundamentally linked to an era's dominant industrial model, have corresponded with equally distinct cultural and economic shifts. Combinations of these evolving economic, cultural, and industrial parameters have continually informed the program, grain, and shape of the city, carving into its landscape.

In the past, a particular industrial era could last over a hundred years, yet in recent times, these shifts have become accelerated. As argued by Alan Berger and Charles Waldheim, North America has witnessed three of these distinct shifts since the late 19th century. Reflecting their resultant territorial composition, these periods of industrialism can be described as Concentrated, Decentralized, and Distributed.[1]

fig. 021. above right
Urbanizing Landscape 01

fig. 022. bottom right
Urbanizing Landscape 02

fig. 020. far left
Network Typologies
Produced in 1961 for the U.S. Department of Defense by engineer Paul Baran describing telecommunication networks, the diagrams to the left show the structural node and link hierarchies of centralized, decentralized, and distributed typologies. These diagrams have come to form useful descriptors of node and link hierarchies within many kinds of networks, including industrial territorial configurations and patterns of urbanization.


1000 LBS

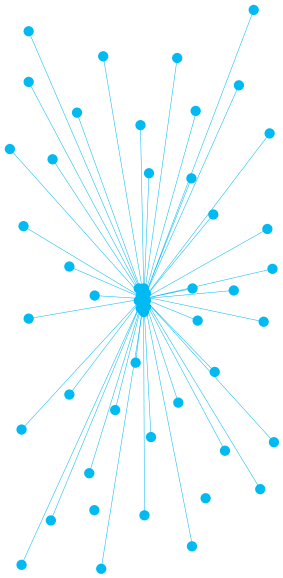
CONCENTRATED – EARLY FORDISM

Following the advent of the industrial revolution, North America witnessed a mass shift from local, man-powered production at the scale of artisanal workshops; to large, concentrated, and importantly, externally (predominantly steam or hydrologic) powered industrial typologies. These new manufacturing typologies required significant capital backing and corporate stability to finance the purchase, and implementation of expensive custom built machinery. As a result, large, vertically integrated firms thrived within this era of industrialization David Karjanen describes this period as one which witnessed "the rise of the giant corporation and the emergence of an industrialism based upon both mass production and mass consumption."[2] Due to many factors, including the proximal access an available work force, raw materials, power sources, and concentrated rail and water-based distribution infrastructures; early industrial producers were typically geographically concentrated around nourishing attractors.[3]

As perhaps the most significant actor associated with the refinement of this concentrated industrial configuration, Henry Ford developed the Ford Production System for the mass manufacture of automobiles. Ford sought to increase the volume of automobiles he was able to sell or 'push' on to consumers through "demand stimulation;" employing several tactics, including the provision of high wages to his employees encouraging their own consumption, and significantly, reducing the unit cost of the automobiles he was producing.[4] To lower unit costs, the Ford Production System placed a high importance on economies of scale achieved through the mass production of identical, standardized goods; built along highly specialized manufacturing lines, within highly specialized factories. This specialization required the factories of any given product be fairly unique - custom built to the exact specifications required to maximize this desired bulk production. In other words, it was the era of specialized spaces uniquely calibrated to increase volume, or mass production capabilities.[5]

Working with architect Albert Kahn, Ford spatially re-conceptualized his own factory layout, constructing the Highland Park production facility in 1909. This facility integrated the Kahn

Form:



Reach:

Regional

Keywords: specialization, functionalism, 'mass'-ization, centrality, state regulation, the welfare state, keynesian economics, spatio-economic stability, efficiency, planned territory, programmatic stratification and segregation, territorial 'enclavization', the machine, modernism, fordism, taylorism, complete production, commodified territory, spatial product, suburbanism.

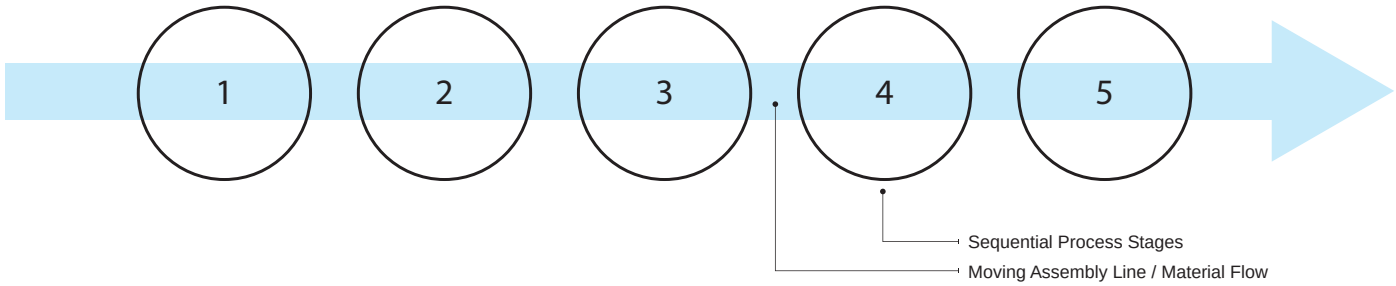
fig. 023. above
Concentrated Structure
Nodes are concentrated, with all sub-nodes linking through the primary central cluster.

fig. 024. far left
Ford Model-T Moving Assembly Line, 1924

fig. 025. above
Highland Park Production Facility
Designed by architect Albert Kahn and constructed in 1909

System of Reinforced Concrete, allowing for the creation of large, stacked, expansive manufacturing spaces, freed of structure; thus allowing "the unconstrained organization of various production cycles, each on its (own) floor."[6] Thus, large assembly tasks or production cycles were rationalized, standardized, broken down into smaller tasks and spatially separated into specialized departments.[7] The moving assembly line linked these vertically stacked, discrete zones housing the various processes of final assembly; bringing the product to stationary workers along a fixed path with minimal pause.[8] This configuration reflected the standardization of assembly processes as well as the removal of sub-component production from final product assembly. Mass quantities of sub-components were produced and stockpiled within zones spatially segregated from final assembly processes.

These assembly line configurations were not built with flexibility or agility in mind. Retooling to produce alternative models of a product was both expensive, time consuming, and sometimes required days or even weeks to accomplish. Goods therefore, were manufactured in long production runs and large volumes to justify the reconfiguration of the assembly line. Mass produced inventory was moved into warehouses, where it was stored before its eventual movement or push on to the consumer.[9] As overall production volume and flow took precedence



within this model; once a product run began, stopping the assembly line was avoided at all costs. Manufacturing errors often flowed through the entire production line; and defective products, if discovered during random spot checks at the end of the assembly, were once again warehoused before their individual repaired in workshops separate from the production line.[10]

Such was the influence of Ford's production theories; they significantly affected the entire socio-economic climate during the first half of the twentieth century within the industrializing world.[11] Within the United States, Ford's concept of demand stimulation can be closely linked to the era's prevailing macro-economic theories developed by John Maynard Keynes, advocating direct market manipulation through state regulation to influence aggregate demand within a productive economy.[12] This state manipulation of markets through fiscal policy, government expenditures, interest rate, and credit supply manipulation, (often described as the welfare state) can be seen as an attempt to abstractly quantify, calculate, regulate and control the entire American socio-economic fabric from the top down. The ideal Fordist world was discretely planned and predictable; thus required little engrained or designed flexibility, adaptability, or evolutionary means. ■

fig. 026. Above
The Ford Production System Flow Diagram
Within the Ford's System, each process forms its own specialised and centralised unit along the assembly line. As each process stage cannot begin until the previous stage has been completed, the Ford System avoids stopping the line at all costs. Furthermore, as the unstoppable assembly line flows directly through each process stage, the Ford system struggles to accommodate maintenance, fine-tuning, or evolution to any individual process.

THE FACTORY TOWN AND FUNCTIONAL SEGREGATION

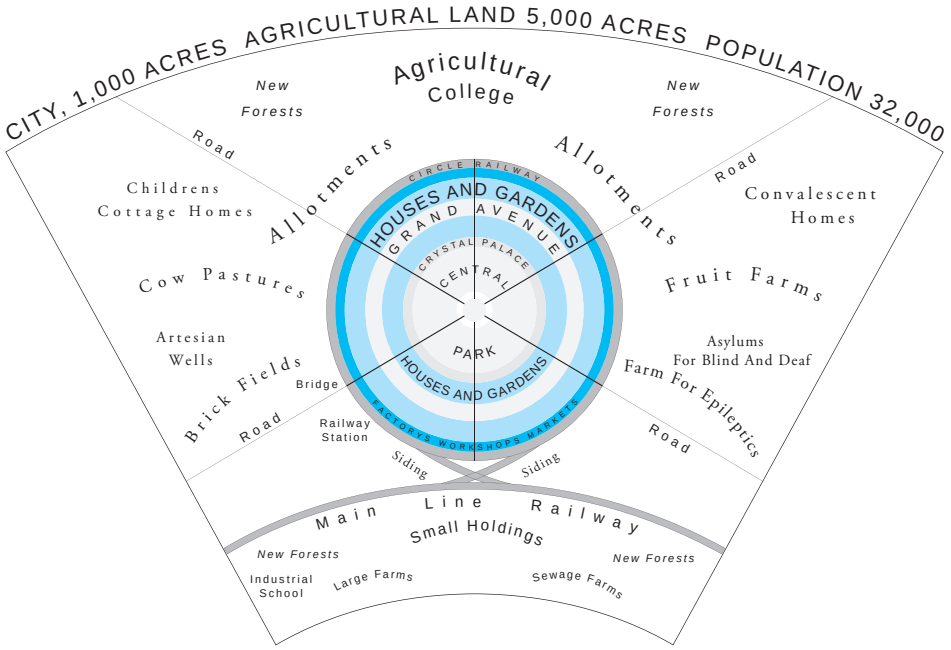
Outside the factory walls, in the cities host to prominent Fordist entities, this period of industrialism can be linked to the rise of the mono-industry factory town; "cities like Detroit, Pittsburgh, Bridgeport, Akron, and Winston-Salem," some of the most economically prosperous cities in the United States at the time, could all be associated with the "mass production of a single product."[13] This geographic concentration of capital in specialized manufacturing facilities located within these cities saw a territorial overlap in the stakes and interests of both a city's dominant industrial entity and its encompassing social prosperity. From the vantage point of the producer, a socially stable community provided a stable workforce which could optimize overall production; the city as a whole benefited both from the economic activity generated by the producer, the jobs they created, and reinvestment in the local community as this social stability was actively sought. Corporations frequently contributed heavily to the local civic and social infrastructures of their host cities, funding schools, universities, charities and museums, establishing a "'social contract' between business and labor which ensured a family wage for white male workers." As such, "during the early twentieth century there was a clear spatial dimension to the economy of places: proximity between consumers, producers, and distributers (which) was critical to an expanding regional economy and a well integrated civic life."[14]

From a broader viewpoint, a relationship between the ideologies developed within the operational models of concentrated, Fordist industrialism can be seen within the era's contemporary architectural discourse. As this era of industrialism propagated geographic concentration, the dense, programmatically layered, newly industrialized city began to be seen by architects and urban theorists as an unhealthy and decaying environment. As Harvey writes, it was in response to this "profound crisis of urban organization, impoverishment, and congestion that a whole wing of modernist practice and thinking was directly shaped."[15] This modernist wing sought to rationalize the built environment; give it the same rational, mechanical clarity, and efficiency seen in the operational configuration of the modern industrialized factory as it carried out the mass fabrication of standardized products. Harvey argues these ideals form a connecting thread through the work of many early modernist designers including Haussman's "Paris" (1860), Ebenezer Howard's "Garden City" (1898), and Le Corbusier's "Plan Voisin" for Paris (1924).[16]

A seminal figure in the creation of the planned, spatially specialized, and programmatically segregated suburban community; Ebenezer Howard saw the city (London) of the late 19th century as a socially unhealthy and unnatural environment. In his eyes, the city formed a dirty, overcrowded, irrational, and incompatible amalgam of industrial, commercial, residential and recreational territories. Howard proposed the abandonment

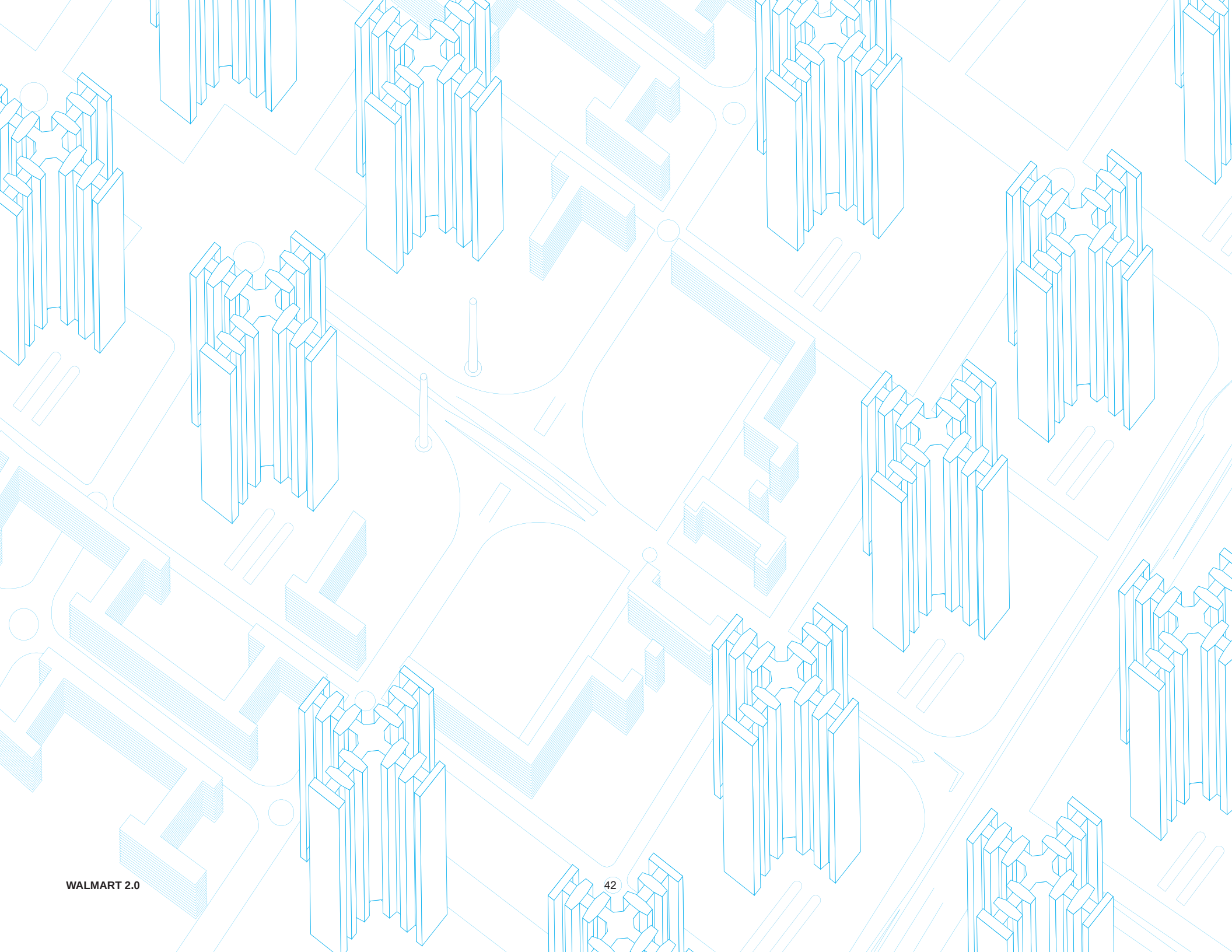
— Nº2 —

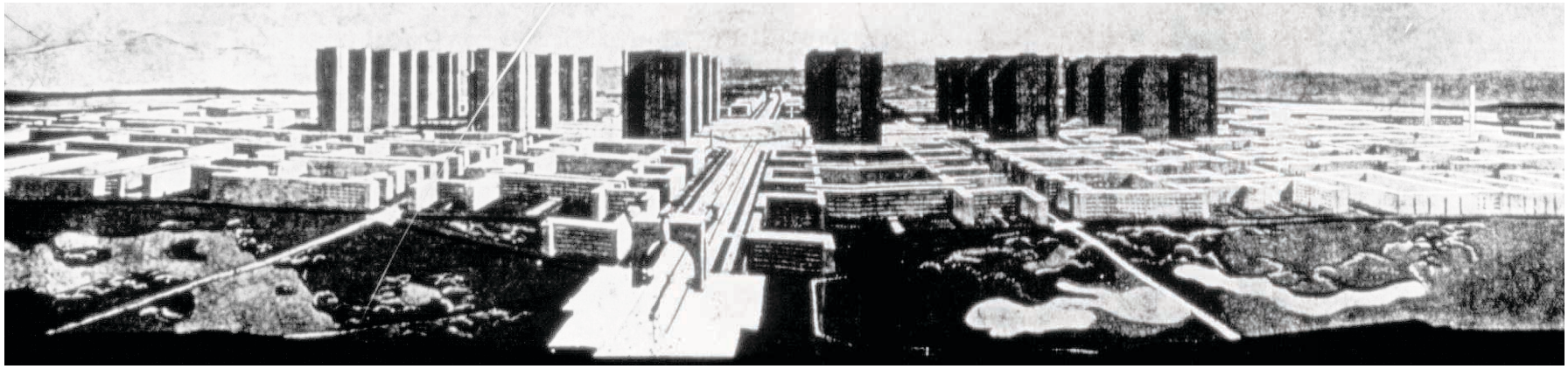
GARDEN - CITY



of the archaic city in favor of discretely zoned and planned towns or "Garden Cities" built outside the historic city. Not intended as commuter villages, rather as self-sufficient towns, Howard imagined communities where the functions of a city would be split apart and separated from inhabited zones, freeing residential areas from industrial and even recreational spaces; eliminating programmatic conflict, collision or overlap. The outer ring of Garden City was formed by a definitive industrial zone, separated from a broader agricultural belt by a rail line or transportation zone. Within this urban scaled enclave, shielded from industrial territory by green veils of trees and vegetation, people would live in harmony with nature in housing estates within parks, or gardens – themselves isolated from cultural, commercial, and community amenities, which would be placed in the center of the town. These communities would be strictly controlled from the top down by "public authority to prevent speculation or supposedly irrational changes in land use and also do away with temptations to increase its density…"[17] In essence, Howard's Garden City of the future would be calculated, controlled, predictable, standardized, and programmatically segregated; conceived as a manufactured product and managed absolutely.

fig. 027. above
The Garden City
Howard's Garden City forms an early example of the rationalization and spatial segregation of program, seen in the industrialized factory, applied at an urban scale. Many of Howard's ideals can still be seen in the underlying logic of the contemporary horizontal American city.





While the bulk of Howard's work took place before the time of Ford's true industrial dominance, the influence of the automobile manufacturer's rationalized and standardized production methods, and obsession with mass efficiency were broadly felt within the architectural practice in the early 20th century; admired by the generation's modern movement, and notably developed within the work of Le Corbusier. Within in his 1923 polemic text, *Towards a New Architecture*, Le Corbusier articulated his deep admiration for the technological advancements seen within the factories of Fordist industrialism. Like Howard before, Le Corbusier began to conceptualize the built environment as a product, which could be rationalized, defined, calculated and standardized. Through this standardization of the built environment Le Corbusier believed society could achieve a greater state of being; streamlining ones public, or 'exterior' life, to allow more time for the 'self-defining,' contemplative, and humanistic pursuits of one's 'interior' or private life, blending a social rhetoric with the spatial logic developed within industry.[18]

In the Late 1920's, Le Corbusier played an instrumental role in the formation of the Congrès International d'Architecture Moderne (CIAM). Signed by 24 architects representing various European nations in 1928 at La Sarraz, Switzerland, the original CIAM declaration formed a significant manifesto formalizing the beliefs and ambitions of the modernist movement within the architectural practice. Many of the ideals of the group were built upon an underlying ethic which sought to create an architecture which interacted closely with economic, political, and industrial currents; to create a smoother, more efficient economy, as a means to a greater societal existence. Within this theoretical framework developed by CIAM's founding members, "the mixing of uses was considered to be an anathema,"[19] as they believed in the creation of distinctly separate and isolated programmatic territories within the city; essentially advocating an urbanism which produced generic and repeatable spatial packages. CIAM believed the creation and implementation of this standardized, repeatable, generic urbanism was the only way to achieve a certain territorial stability, or cohesive relationship between political, economic and social actors within the built environment. ■

fig. 028. above
Plan For a City of Three Million Inhabitants, Le Corbusier, 1922
Typical of Le Corbusier's urbanism, both the image above and two the left feature the eradication of the existing built fabric in favour of one which formally and programmatically rationalizes the built environment, reflecting both the processes of fabrication within the Fordist factory as well as the products they produced en masse.

fig. 029. far left
Plan Voisin, Le Corbusier, 1923-25
A complete redevelopment of Paris' historic Le Marais district, Corbusier's Plan Voisin was not only influenced by the eras industrial systems, but directly funded by the French automobile manufacturer and industrialist Gabriel Voisin.

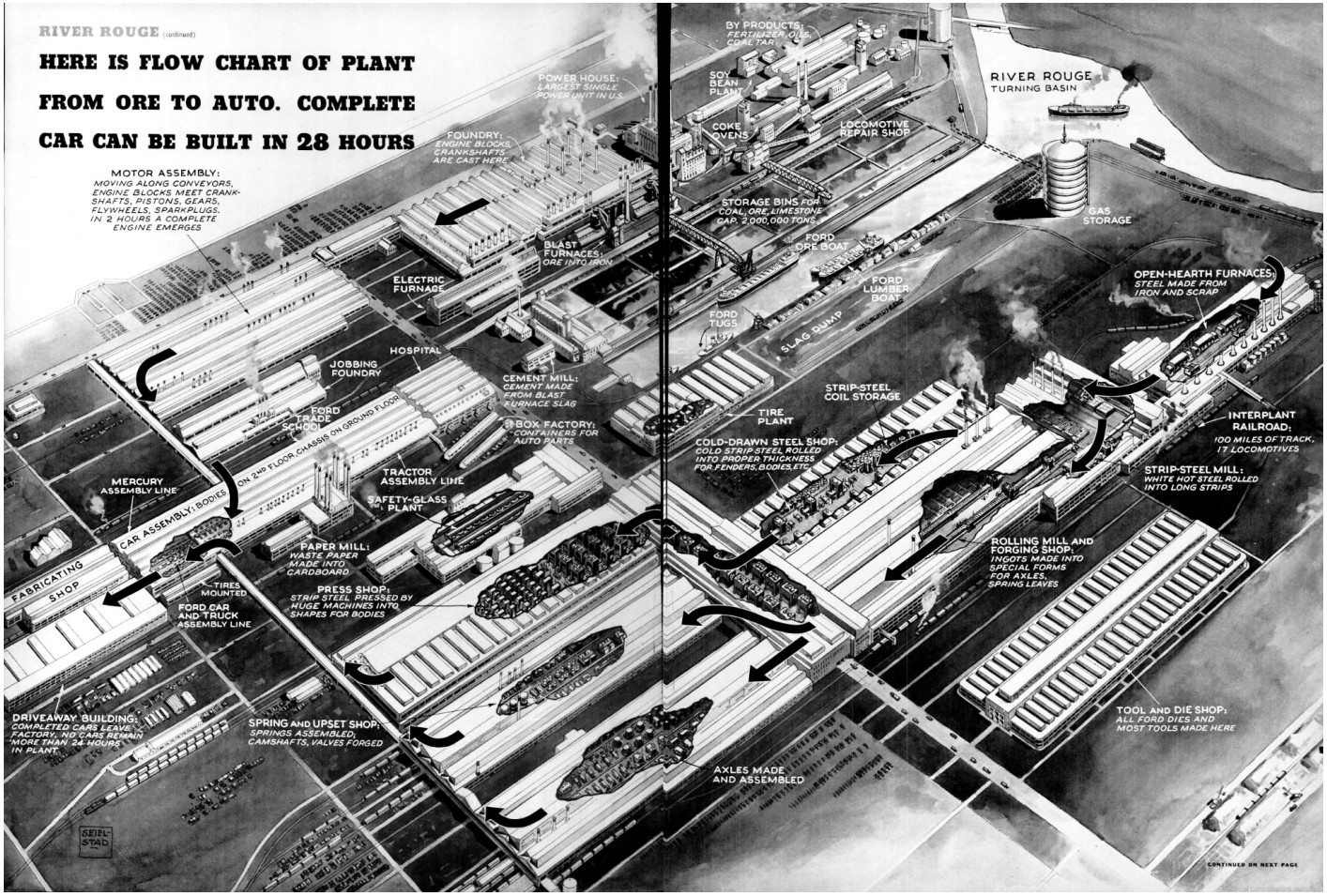
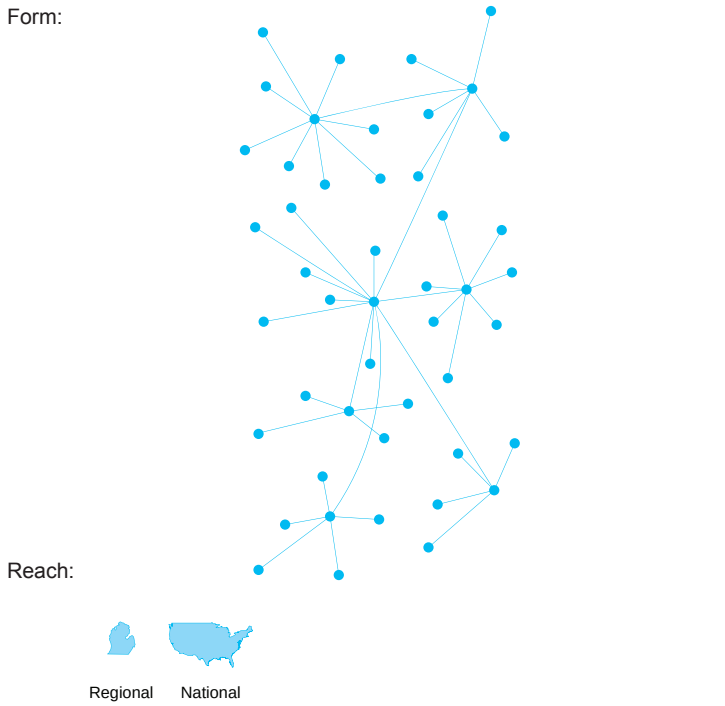


fig. 030. right
River Rouge Ford Manufacturing Complex, Dearborn, Michigan
Constructed 1917 - 1928
As diagrammed in 1951 in Life Magazine, the River Rouge Facility signalled a significant paradigm shift in Fordist Industrialism. While at the River Rouge plant, separate manufacturing processes were still contained within one facility, they took on an urban scale, with separate process stages housed in separate buildings as opposed to separate floors. Once this manufacturing model took on an urban scale, individual process buildings gradually spread away from centralised production facilities, influencing the emergence of decentralized urbanism.

DECENTRALIZATION – LATE FORDISM

Foreshadowing a general era of industrial decentralization, in 1917 Ford began construction of the River Rouge production complex in Dearborn, Michigan. Again employing architect Albert Kahn, initial construction of the River Rouge facility was completed in 1928 and signaled a shift in the basic spatialization of Ford's production system. Instead of the vertically stacked, single building typology employed at the Highland Park facility, the River Rouge complex completely atomized production processes and embraced an urban scaled horizontality. As described by Patrick Schumacher and Christian Rogner, the River Rouge complex saw a superseding of the notion of a factory under one roof. Within this complex, sub-processes were grafted, stretched, and pulled apart. Where distinct processes once defined floors of the Highland Park factory, they now defined entire low rise buildings, linked in sequence, each extruded to their necessary length. The River Rouge complex formed a holistic, self contained, vertically integrated complex, capable of carrying out the entire industrial production of automobiles and the other vehicles produced by Ford, from raw material through finished product. The River Rouge complex required significant infrastructural investment and development at a grand scale. The plant was serviced directly by ships through the enlargement and dredging of the River Rouge and linked to surrounding rail lines. Once operational, the River Rouge facility truly came to resemble the "city as machine," where "…the flow of materials and sub-components determined the overall 'urban' layout."[20]

While this decentralization of industrial processes began within the grounds of the industrial complex as illustrated by the River Rouge facility, North American industrial production became increasingly decentralized at a regional and national scale throughout the mid nineteen hundreds. This decentralization can be linked to the American federal government's advocacy for the "dispersal of new industry" as a defence against the threat of a nuclear attack targeting concentrated industrialized urban centers[21]. However, this policy followed trends already occurring within the Ford production system, as once the Fordist production model mutated to accommodate the



Keywords: dispersal, cold war, defensive urbanism, highway infrastructure, national hydro-electric grid, sub component production, telecommunications, decompression, sprawl, post-war, baby boom.

fig. 031. above
Decentralized Structure
Within a decentralized structure, primary nodes are scattered within a locale, yet still act as the hubs which link sub-nodes to other primary nodes.

atomization of sub-processes beyond one factory roof within its own facilities, there remained few limitations to spreading these individual, sub-process buildings beyond the localized industrial campus in search of ideal specific, local attractors relating to each sub-process.

The advent of the ever-developing national highway system, networked hydro/electric power grid, and access to relatively inexpensive fuel (oil), allowed industrial entities to be free of the historic centralized sources of power and transportation infrastructure which characterized operational models in the United States. Networked highway infrastructure superseded the inflexible rail line, while the power grid made proximity to rivers, lakes, and streams no longer an industrial requirement. Industry readily embraced the opportunity to distribute sub-production facilities throughout the country, taking advantage of raw material availability and access to the labour pools required to suit the needs of each sub process. This era of industrialization however, did not represent a complete departure from Fordist ideals, more a typological mutation: "Although decentralized from traditional urban centers, this period was (still) characterized by national markets, heavily regulated economies, and relatively stable labor relations."[22]

As argued by Waldheim and Berger, this shift from "the dense concentrated industrial model to a decentralized model"

fig. 032. far left
Post-war Urbanization.
Levittown, New York 01.
Constructed 1947 - 1951.
The first of four large suburbs developed by the Levitt & Sons company, Levittown, New York was constructed to meet the demand for post-war housing for returning veterans. Influenced by both Howard and Corbusier's city, Levittown was comprised of large, horizontal parcels of mono-programmatic residential fabric. Formally, Levittown relates to the separation of individual processes into their own buildings within Ford's evolved industrial model, as multi-unit apartment blocks disappear from the city, atomized into single family homes. Further, the actual production of Levittown reflects Fordist systems of mass production, as the city itself formed a privately developed mass produced consumer good. With an emphasis on speed of construction to ensure a rapid turn around and quick recuperation of development costs instead of considerations for long term community and urban vitality, individual houses were built en masse much like Ford's Model-T's, in an assembly line fashion. Levittown can be considered the archetypal post-war American suburb.

fig. 033. far right
Levittown, New York. 02

can also be "closely associated with the decentralization of urban form in the second half of the 20th century."[23] This national dispersal of industry coincided with the considerable postwar housing boom in the United States, predicating an era of significantly rapid urbanization. Unlike the earlier era of Fordist industrialism, modernism and functionalism had moved away from the avant-garde periphery of architectural discourse, and taken centre stage as the accepted paradigm or approach to contemporary urban and architectural development in postwar America. As discussed by Hilde Heynen: "For this generation functionalism was an evident requirement. They accepted the need for an enrichment of life through 'good design;' their notion of design, however, was dominated by the needs of industry and mass production."[24] Heynen continues, "As in design, the prevailing trend in postwar modernist architecture no longer had much in common with an avant-garde idea: functionalism was now smoothly incorporated into the logic of postwar reconstruction that had as its program the speedy and efficient production of a large number of dwellings. The socially critical position that modern architecture had stood for in years between the wars was thus replaced by an institutionalized and officially recognized approach."[25] Thus, while early modernists maintained a social and arguably utopian agenda fuelling their vision of the ideal modern city; functionalism within this era of

fig. 034. top left
Levittown, New York. 03

fig. 035. top right
Levittown, New York. 04

decentralization became more simply an industrial solution to the need for the rapid and mass construction of postwar housing and new urban territory.

Within this context, the postwar urbanization of the mid nineteen hundreds witnessed the heightened commoditization and standardization of built form, aiding in the efficient conversion of large swathes of green-field land into built *product*. Developed under the stewardship of private enterprise, the shape of this urbanization shared many primary spatial attractors to industrial decentralization (an expanding highway infrastructure, automobile advancement, and accessible and affordable fuel). Like the factory, denser urban typologies which contained multiple units and programmatic functions under one roof became atomized and programmatically segregated. The standardized single family dwelling built for standard the nuclear family became the new measure of the city; defining the grain of a horizontal, decentralized urbanism. ■

fig. 036. far left
Levittown, New York. 05.
The single family dwelling developed for the nuclear family formed the basic unit of post-war urbanization

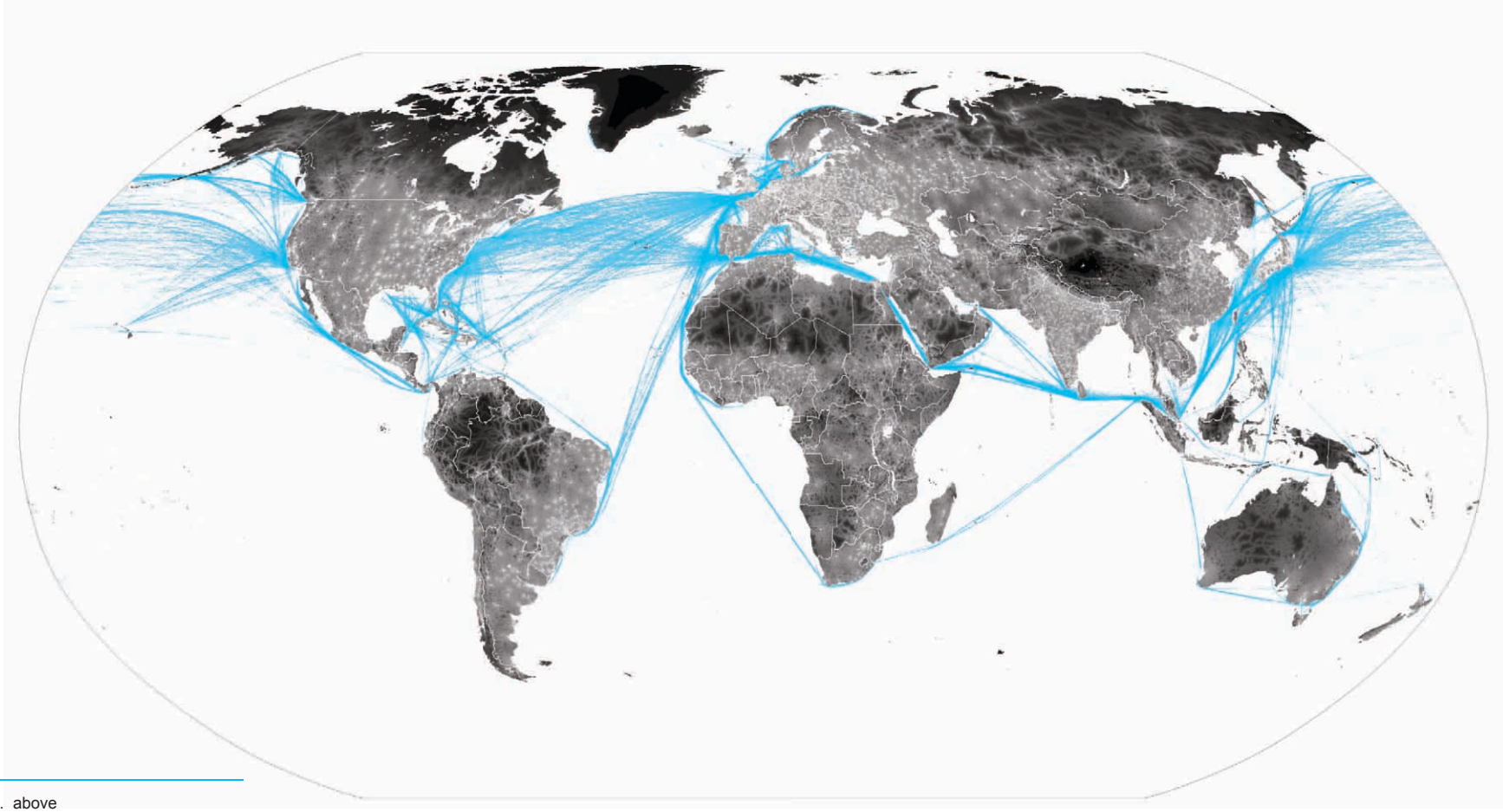


fig. 037. above
Global Travel Access Map
Produced for the World Bank's *World Developmnet Report 2009*, the diagram above depicts travel distance to major cities in hours (grey scale,) and shipping lane density (colour).

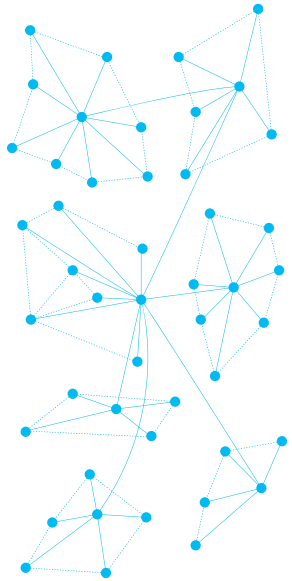
DISTRIBUTED – FREE TRADE AND FLEXIBLE ACCUMULATION

Following the boom years of postwar reconstruction, the mid 20th century witnessed a considerable shift in the political climate within the United States and throughout the industrial world; moving away from Keynesian economic policy and the welfare state, towards one characterized by substantial deregulation and neo-liberalism. With the constant development of the ever-improving telecommunication and transportation technology seen during this period, industrial and economic actors gained increased access to international markets. As such, the ability to regulate a nationally contained marketplace through federal fiscal policy and the mechanisms of the welfare state became ever more difficult, as these global markets increasingly operated outside the sphere of state control or influence.

Beyond simply facilitating the emergence of a truly global marketplace, the increased speed in the flow of information and capital mobility witnessed during this period resulting from developing telecommunication channels, facilitated the increased speed of market fluctuations and economic volatility. These rapid market fluctuations became particularly amplified by the period of global, socio-political instability seen in the early nineteen-seventies - highlighted by the 1973 oil crisis and subsequent periods of economic recession, whereupon the price of oil quadrupled in the wake of the Arab-Israeli war.

Increasingly, the discreetly planned and rigidly controlled Fordist world, one built upon industrial production and regulated domestic markets; was seen as overly ridged, burdensome, and incapable of keeping pace with an increasingly volatile and dynamic market based global economy. Thus, governments began to give up on the "dream of the planned welfare-state."[26] Instead, governmental economic and trade regulation became increasingly lax, allowing for a greater degree of industrial sovereignty through the reduction of international trade barriers, and encouragement of the privatization of state controlled infrastructures and services to corporate, entrepreneurial actors – all in the pursuit of more flexible formats of economy and capital accumulation.[27] As this form of governance encouraged market self-organization and self-regulation,

Form:



Reach:

Keywords: flexible specialization, neo-liberalism, free markets, free trade, space of flow, empire, multi-national, niche markets, mass customization, fluctuation, fluidity, liquidification, horizontality, mutability, service industry, post-modernism, privatization, deregulation, network, self-organization, data collection, digitization, personal computing, globalization, outsourcing, off-shoring, just-in-time, post-fordism, post-modernism, exurbanism

fig. 038. above
Distributed Structure
Differing slightly from Baran's depiction of a distributed network topology in which every node is capable of full inter-node interaction; within contemporary industrial, economic, and urban structures, primary nodes still control most interaction (Distribution Centers for example) with sub-nodes however, afforded a slightly increased capacity for direct inter-node interaction with other sub-nodes

it contrasted starkly with previous Fordist economic models; thus, sociologists and economists have termed this period of industrialization - which the majority of the capitalist world currently operates within - 'post-Fordism'.[28] "Unlike the discretely planned Fordist world, the programmed post-Fordist world exists under constant modulation."[29] Thus a post-Fordist paradigm is one based more on monitoring, management, and flexibility as opposed to discrete planning.

These paradigmatic shifts towards flexible methods of capital accumulation played a significant role in the transformation of industrial logistics, and operational models; as well as their territorial deployment, occupation, and configurations. The relaxation of international trade barriers seen in the 1970's (accelerated in the 1980's and 90's) saw the decentralization of industrial processes seen at the height of postwar modernism continue, and then move across national borders as companies pursued new markets and territory privy to advantageous labour, wage, and regulatory conditions at a global scale.[30]

The mechanisms of the welfare state have gradually experienced a reduced agency in the ability to influence, control, and guarantee an economic climate of constant, predictable, and level, consumer demand within the era of post-Fordist industrialism; elements necessary within the productivist economic models of both Ford and Keynes.. Thus, within the liberalized free markets of this post-Fordist era, there was a gradual shift in power away from producers towards consumers; a shift which Beaudrillard connects to a broader, systematic cultural transformation – the rise of the consumer society.[31] Within the consumer society, industrial fortitude and viability could be measured not in an actors' ability to achieve the greatest volume of produced goods, but rather to their ability to adapt their production to better suit the whims of the market or consumer with effective agility and flexibility.[32] This attitude now pervades all aspects of post-Fordist industrial operations, from distribution logistics and supplier relationships, to a company's own territorial occupation and employment policies. "For the post-Fordist corporation, niche marketing and flexible production, once the purview of the hip boutique, replace mass marketing and mass production."[33]

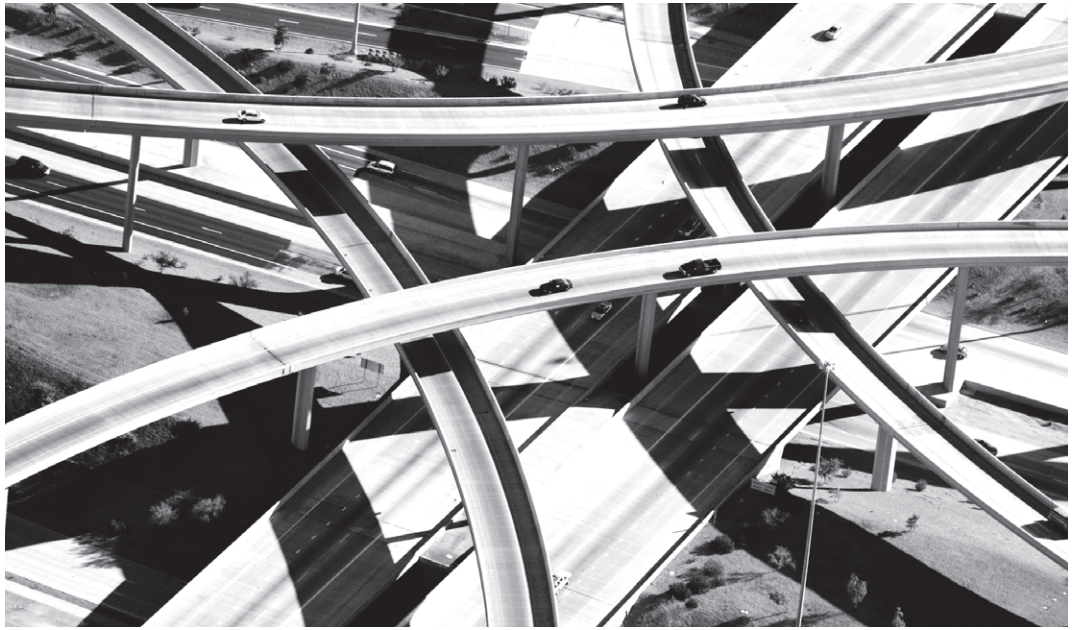
Territorially, within the post-Fordist world, manufacturers in developed nations have increasingly grown the scale of their logistics networks, moving factories offshore; but also, searched for increased operational flexibility. These actors have gradually become divested in actual processes of production; moving beyond offshoring to a culture of complete contracted outsourcing. As Kazys Vernelis writes, this represents a shift in the goals of production within the industrialized world. "No longer do advanced economies pursue the production of physical objects. On the contrary, developed countries specialize in services, information, and media while outsourcing industrial production to the developing world."[34] Avoiding the financial risk and burden inherent in maintaining one's own manufacturing facilities, producers have contracted out significant portions of their operations; buying the products they used to produce

fig. 039. far top
Traffic Landscape.
Stack Interchange I -17 and RT 101.
Phoenix, Arizona. 2004

fig. 040. far bottom
Retail Landscape.
Desert Ridge Marketplace - Outdoor Shopping Mall.
Phoenix, Arizona. 2004

themselves from offshore factories at a fraction of the cost – all in the interest of short term flexibility and capital agility gained as a result of having goods produced by third party manufacturers on short-term contracts.[35] Post-Fordist producers act more as mangers, coordinators of production and logistics as opposed to the superseded, direct operator of vertically integrated industrial facilities seen in the eras of centralized and decentralized industrialism. It is within this climate, one in which companies are increasingly geared to react with speed, agility and efficiency to volatile consumer demand, that Ford's operational successor, the Just-In-Time (JIT) industrial model has emerged.

These trends have resulted in a marked territorial disconnection in the relationship between manufacturing and services within the United States. As argued by Dieter Lapple, "…the urban service economy is becoming increasingly independent from the industrial development of a region. There are indications that globalization, and the shift from an industrial to a knowledge-based economy, weaken the spatial ties between manufacturing production and services…"[36] As industrial production increasingly vacates urban settings within the developed world, what remains is an ultra-smooth landscape of service and logistics, built to manage and lubricate the will of flexible post-Fordist industrial models, while reducing the spaces friction one can associate with social collision, interaction, and exchange.[37]

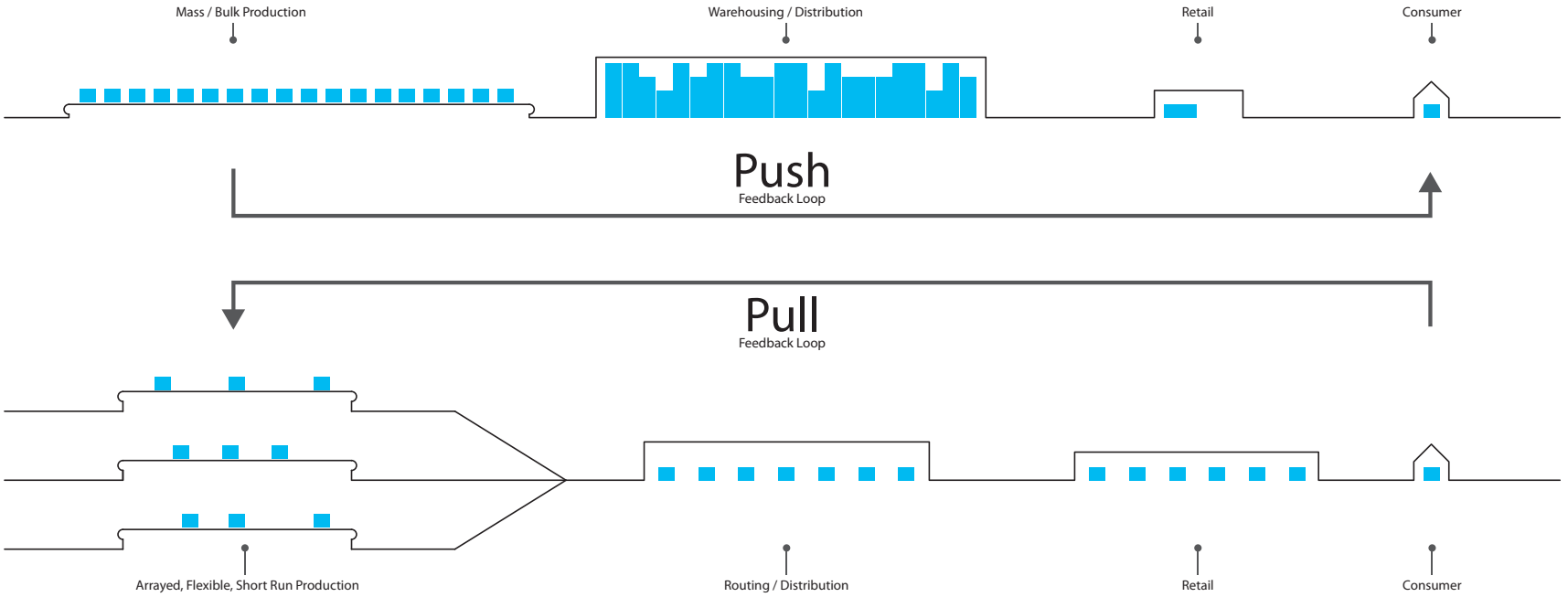


JUST-IN-TIME AND THE TOYOTA PRODUCTION SYSTEM

While the JIT method has existed in various forms over the last 40 years, many credit the Toyota Motor Corporation with its creation, implementing the Toyota Production System ('TPS') at their Japanese facilities following the Second World War. Unlike the United States, the postwar economic climate in Japan was one of stagnation, recession, and inconsistent demand. The island nation's economy provided a much smaller consumer base, as such, "…in Japan, production volumes were miniscule compared with automotive output in the U.S."[38] Summarized by systems and manufacturing design engineers Black and Hunter, "small production volumes did not allow Japanese automakers the luxury of using specialized equipment for each model. Nor did they allow for stocking huge inventories of parts. Automakers in Japan thus needed to develop flexible methods for adapting the same machines to different vehicle models. And they needed to find ways to ensure reliable supplies of needed parts without maintaining large inventories."[39] Thus, where Ford's economic model and industrial system grew from, and reacted to an era which attempted to achieve a planned economic and social stability, the TPS grew from era where this planned, stable, and predictable condition was in disarray following the Second World War, and no longer seen as an achievable reality. Thus, agility, flexibility, and an evolutionary capacity needed to be designed and integrated into their systems.

Rather than inventing a completely new product to compete with American car makers, Toyota sought to create a complete *system* that produced goods manufactured at a higher quality, produced with less waste, sold at a lower price, and significantly, linked more closely to actual real-time consumer demand. Instead of accumulating massive amounts of goods as a result of bulk production runs (based on demand *estimations*), warehousing them, and finally pushing what they could on towards the consumer; the Toyota Production System took advantage of the eras developing communications speed, allowing for the rapid spread of tracked consumer demand throughout the entire supply chain, allowing consumer demand to pull the production of goods through the manufacturing process.[40] The production of anything, including final products, sub-component production, and raw material ordering, was delayed until it was absolutely necessary to fulfill orders already placed by the consumer, forming the basic premise of what has come to be referred to as a 'pull' production feedback loop as opposed to the 'push' model employed by Ford.[41]

In addition to a reduction in the significant architectural resources deployed in the warehousing and storage of inventory once required in superseded industrial models; the Toyota Production System significantly differed structurally, spatially,



and logistically, from that of Ford.

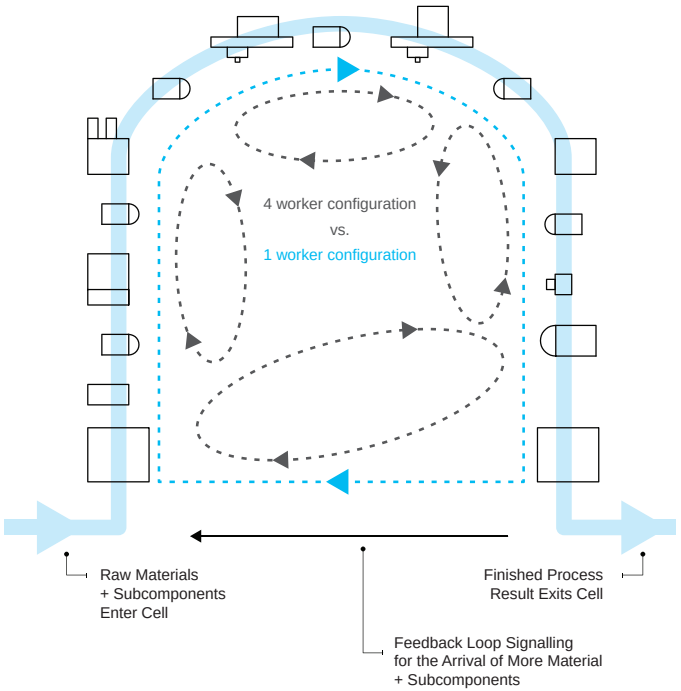
As the Toyota system required their production facilities to maintain the ability to produce more than one product model or type simultaneously as required, the highly customized linear moving assembly line of Ford's plants lacked the necessary agility. The factory customized to a single product disappeared, and Toyota willingly ceded the production efficiencies one can gain through mass fabrication along specialized production lines, to achieve a greater level of functional agility, and systemic efficiency. Referred to today as 'flexible specialization,' manufacturing firms may still specialize within a certain category or niche, but operate facilities capable of producing many different products simultaneously; contrasting the prototypical Ford production line, highly calibrated to the mass production of a single standardized automobile type lacking any variation. [42]

Rather than constructing factories based upon a discrete, linear moving assembly line along which one complete automobile is built, moving sequentially, station to station without

fig. 041. above
Push vs. Pull Feedback Loops in Production Systems
Where the Push system produces large volumes of goods to maximize the efficiencies gained from mass production, then stockpiling inventory, and pushing it on to the consumer; the Pull system responds to consumer demand, only producing goods when needed.

deviation, lean manufacturing facilities are composed of linked production cells. 'Linked-cell' production allows for a much higher degree of structural and systemic flexibility. Cells within this system often behave like shrunken models of the overall TPS. Individual processes within the production system split into repetitive cells, and are placed adjacent to, but not directly along the assembly line. In essence, each cell behaves as an independent micro assembly line for the manufacture of a given component. As often cells carrying out the same process along the assembly line may be repeated, they may act as a sort of designed operational redundancy, as a means to achieve greater overall systemic efficiency and leanness.

Disruptions within any individual cell generally do not affect the overall assembly line. Individual cells can pause to repair defective items are required on the spot, as the TPS relies on frequent testing of products within each cell manufacturing that good, facilitating tight feedback loops and the ability to quickly address problems. As the overall assembly process line is not reliant on a fixed sequential path with each stage always functioning in the exact same way to make the overall manufacturing line function, individual cells can be turned off, operated with reduced staffing, or retooled to accommodate shifting product demand and manufacturing speeds. Overly ridged and calibrated only to maximum production volumes, Fordist assembly sequences struggle to adjust to variable speeds, product lines, and staffing through its organizational composition. Conversely, the TPS facilitates systemic evolutionary capacity, as



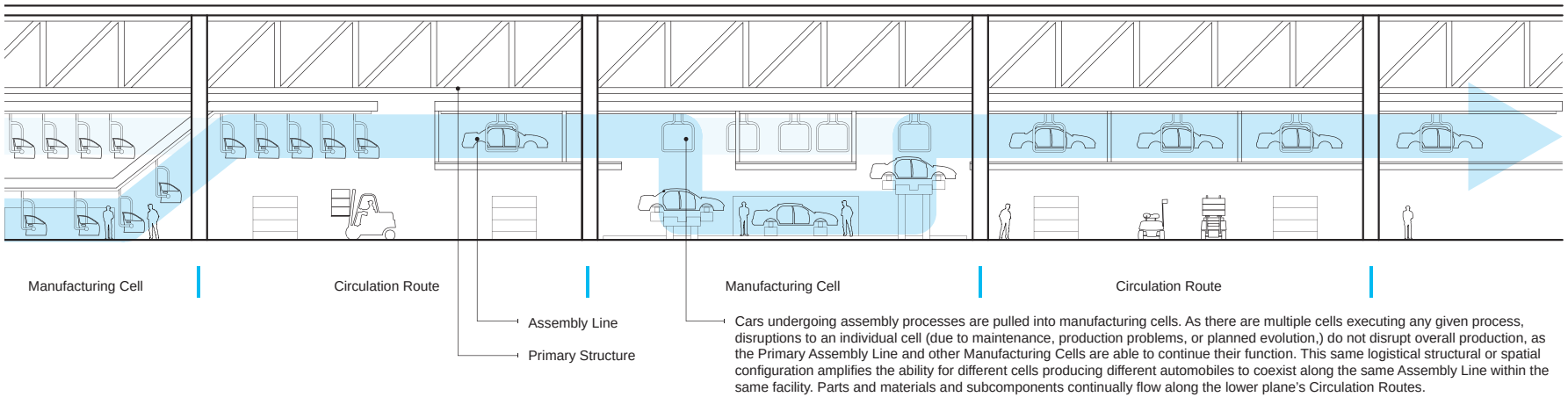
individual cells are ever flexible, constantly evolving, mutation and improving; capable of adjustment based on the feedback of the workers actually operating a given cell.

Each cell is calibrated such that the time necessary to complete its intended process or task is synchronized to the time it takes to complete a final good, known as a facility's 'takt time.' For example, if in Toyota's case, a new, complete automobile rolls off the assembly line every 2.5 minutes, the facility's takt

fig. 042. top
Individual Cell.
Diagrammatic showing material flow and operational flexibility in terms of staffing or workers required to operate the cell. As Takt time shifts, the cell can be re-staffed as needed to accommodate fluctuating demand.

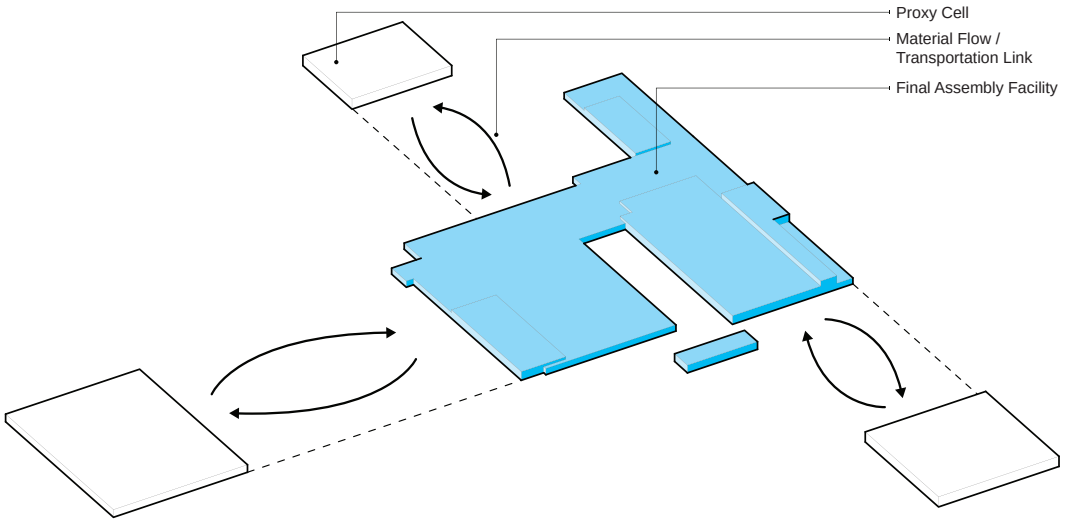
fig. 043. far top
Toyota Production Facility.
Diagrammatic Section, depicting manufacturing cells, internal circulation, and assembly line flow - based on author's observation during Toyota Facility site visit in Cambridge Ontario.

fig. 044. far bottom
Proxy Cells.
The Toyota Production system is composed of an almost fractal array of cells, all linked to downstream demand, and co-ordinated to overall takt time. For example, external facilities, be they Totoya or third party run within the Toyota Production System, are viewed as proxy production cells - extensions of the final assembly plant. Each of these proxy cells are themselves made up of array of conventional production cells. As this forms a distribution network of production, the Toyota Production System appropriates the territory of highways and other transportation infrastructure, as they become vital extensions of the overall system assembly and production line.



time would be 2.5 minutes; every cell within the manufacturing system would be synchronized to complete their task within 2.5 minutes, a cardiac rhythm of simultaneous production. Like the overall system, each cell produces goods based only on upstream demand, within the factory; this demand comes from adjacent cells in the production sequence. Calibration to the overall takt rhythm of the manufacturing process forms a fundamental tool to increase systemic responsiveness and avoid inventory build-up within the supply chain, thus the movement and sharing of information both up and downstream throughout the supply chain is critical to the Toyota Production System.

If a problem arises within the assembly process, the TPS reaction differs greatly from the Ford system, with the entire line put on warning; if the problem has not been solved before



the end of the next takt cycle, the entire line freezes in unison, preventing the stockpiling of inventory if sub-processes were to continue. While this frequently prevents the achievement of maximum output volumes, it prevents the need to store inventory within the supply chain, or warehouse defective inventory or testing and repair in separate facilities, as done in the Ford System. In order to achieve the overall systemic calibration to the takt time, demand information is shared and calibrated between the final assembly facilities and external, and sometimes third-party, sub-component producers, who are viewed simply as proxy production cells in the linked system. While it is impossible to ensure sub components flow individually from these proxy cells to final assembly facilities, they are still produced on takt time. Bulk shipments or even daily shipments by truck or other distribution means are avoided, as a sub-component producer making engines or seat upholstery might ship upstream in the supply chain hourly, regardless of whether the truck was full or not, in order to maintain takt time calibration. In effect, more frequent trips of lighter loads create value in their agility and flexibility.

As the Toyota Production System views every sub production facility as a proxy cell, in effect, it extends production lines and sequences into the built environment, at the urban, national, and global scale. Transportation infrastructure and territory, roads and highways act as extensions of the Toyota Production System's manufacturing spaces. In an effort to streamline these linkages between proxy cells, Toyota Production System or JIT producers construct their own physical territory to smooth inter-cell movement, but also powerfully lobby the construction and calibration of the broader built environment to aid in and maintain their takt time and rhythm. Urban territory is increasingly zoned to ensure varying program mixture does not interfere with these industrial pulses, while the new construction or amendment of existing highway infrastructure, constructing new dedicated off ramps or widening adjacent arterial roads is not uncommon. Conversely, JIT industrial actors actively seek out available territory adjacent to infrastructures which facilitate these smooth, synchronized, calibrated, and nationally or internationally scaled industrial systems. These contemporary territories of industry form morphological units independent of the urban spaces that house its workers, and consumers of its manufactured goods, frequently separated by scale, distance or both, amplified further by the trends of outsourcing and off shoring seen over the last 20 years.

WALMART AND THE LANDSCAPE OF LOGISTICS

As seen in the Toyota Production System, the successful operation of a JIT model relies heavily upon on the manufacturer's ability to rapidly manufacture and transport an order after it is received with as few "stoppings, scrap, and backflows" as possible.[43] Oftentimes, when applied to systems procuring and retailing consumer goods such as Walmart's particular strain of Just-In-Time operations, success is measured in the rapid one-way flow of goods to the consumer, superseding concerns of material durability. The less time a producer or retailer spends in possession of any given good, the less time, money, and space is wasted on surplus inventory storage. Surplus goods, returned goods, or those needing repair often fall outside of the direct sphere of concern for the JIT actor: preferring instead to manage only the swift, one-way flow of goods through their conduit infrastructures and on to the consumer. The importance of this efficiency and maintaining a continual network of flow has seen this industrial era revolve significantly around the logistics of distribution as the movement of material goods and information are coordinated across increasingly global supply chains.[44] As such, sociologists Edna Bonacich and Khaleelah Hardi describe this era of industrialization over the last 30 years as the "logistics revolution."[45]

The subsequent physical traces of this revolution have been described by Berger and Waldheim as a "new form of landscape" dubbed the "Landscape of Logistics." Within the contemporary city, productive industrial entities and territory ingrained in the publicly inhabited urban fabric have disappeared, leaving in its place the conduit nodes of globally scaled JIT industrial models, simply streamlining the movement of goods, as vast territories are given over to the narrow industrial spectrum; the infrastructures of distribution, supply chain management, and "those accommodating the shipment, staging, and delivery of goods."[46] Sociologists Bonacich and Wilson credit Walmart as both a key actor and instigator in this logistics revolution and the broad adoption of many of the JIT tactics developed by the Toyota Corporation outside of the direct spheres of industrial manufacturing, a mutation focused on the procurement, distribution, and retail of consumer goods. Due to its size, scale, and scope, the Walmart Corporation shares a similar influence today over the social and urban landscape of the United States to that of Ford at the turn of the century, an agency described by David Karjanen:

"Wal-Mart did not create the post-Fordist world, but it clearly embodies the contradictions and dichotomies of that new stage in the history of capitalist development. (…) Walmart is a reflection of a new form of capital accumulation, a global company that now functions not so much as a producer or manufacturer, but instead as a global commodity chain and logistics operation. In contrast to the

fig. 045. opposite
Just-In-Time Network of Flow.
Territorially, within a just-in-time system; the nodes, transportation device (eg. trucks) and the space between nodes (roads and highways), all become vital components of overall production processes, forming a complete network of flow.

large enterprises of the Fordist era, which required, or at least tolerated, the regulatory hand of an intrusive welfare state, Wal-Mart and other labour-intensive retailers have abandoned the Keynesian project and now seek complete flexibility to employ labour and source their product within a highly segmented and inequitable market. Bypassed in this process are the cumulative effects of economic development we have witnessed over the previous century, a spatial environment, both political and economic, that puts workers, consumers, and capitalists in contact, producing both conflict and community." (Karjanen, in Walmart the Face, pg 162)

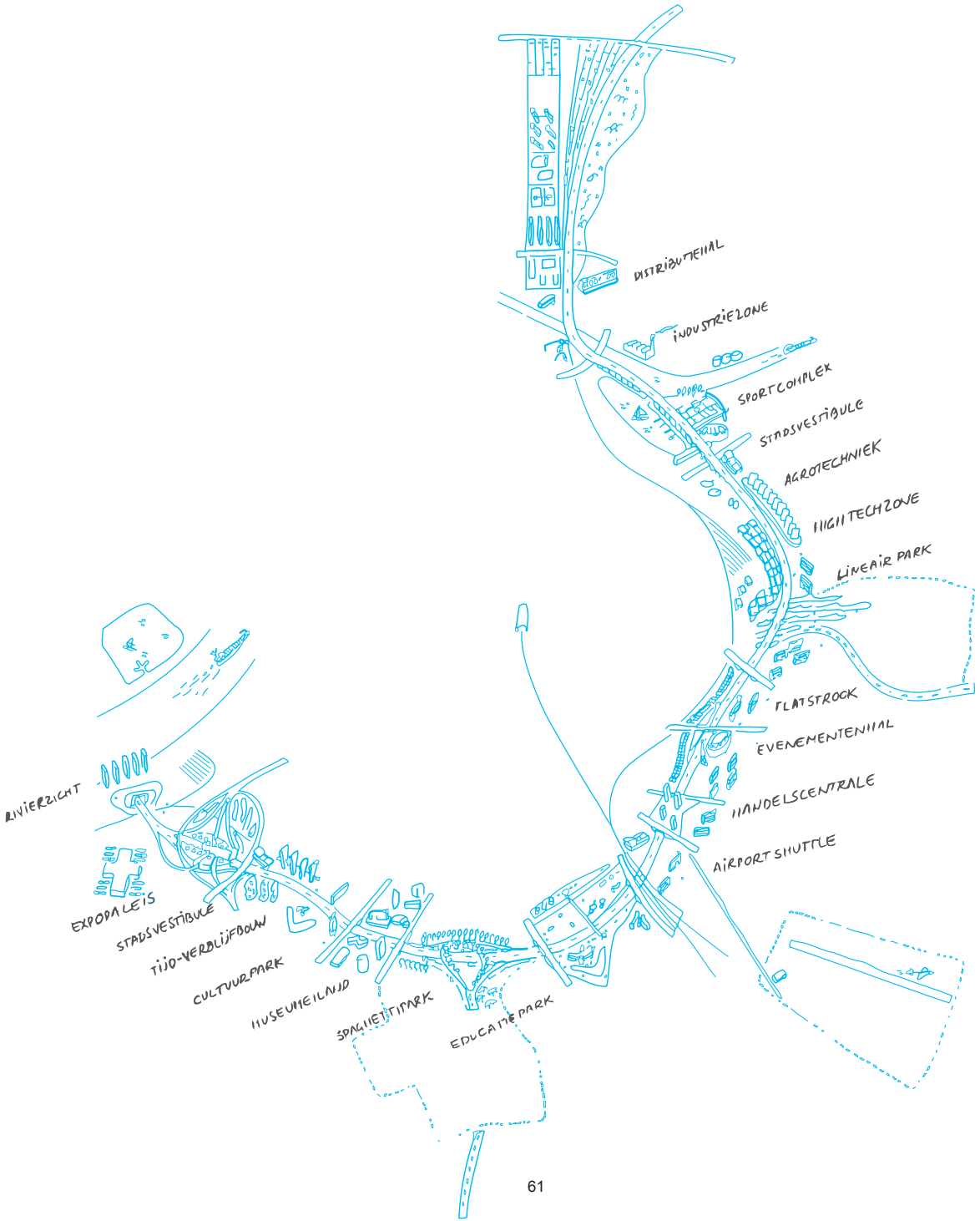
The influence of this logistics revolution and its subsequent landscapes can be felt broadly and fully in the proliferation of the contemporary American urban landscape as it unfolds "according to the logic of short-term efficiencies: agility, turnover, and scale" developed within the Walmart Corporation and other JIT actors' industrial models.[47] As described by architectural theorists Kwinter and Fabricius, "The result is that pure movement of resources becomes the central, spontaneously defined goal, without any of the limiting viscosity of social forces, traditions, or the specificities of place, time or context. [48]

Even more so than within previous periods of industrially effected urbanization, the contemporary city contains an engrained concern for time based synchronization to large industrial processes. In essence, the grain of the public terrain within the contemporary urban fabric is calibrated to the rhythm or takt time of the industrial scaled processes of distribution, service, and logistics. As such, the contemporary city exhibits a preference for the enabling technologies of the JIT model; tending towards an auto-centricity which creates a smoothing of movement, and preference towards mobility at the sacrifice of specificity, social interaction and sense of place.

The dictating logic of operational agility and flexibility has seen the gradual diminishment of contextuality and spatial stability within the public spheres of the city in favour of the decorated shed. "Boxes – or 'buildings without qualities' – proliferate along American freeways and feeder roads as if generated by the same mathematical DNA that engineered the arterial infrastructure itself. This new building logic, like a virus jumping the species barrier, generates not buildings at all but pure generic infrastructures. At once uncommitted and totally flexible they re-conform like a floating currency to any temporary use: from storage facilities to doctors' offices, insurance headquarters or car showrooms."[49]

The development of rationalized, standardized, and repeatable residential fabric developed during the height of the postwar urbanization has continued, if not become amplified within an industrial climate of short term holdings, and speed as opposed to long-term invested interest. Large swathes of land surrounding the industrially calibrated arteries and corridors of retail, service, and logistics have continually been converted to enclaves, generic, easily repeated single-family residential fabric at a more rapid and larger scale than ever before, to be rapidly flipped or pre sold to the consumer with little regard for social

fig. 046. top
Flow Urbanism
Willam Jan Neuitlings 'Ring van Antwerpen', developmental model produced in 1986, reflects a developmental zeitgeist which placed an elevated importance on urban artefacts and primary elements relationship to flow infrastructure instead over a relationship with their own given site and local context.


DISTRIBUTIEHAL
INDUSTRIEZONE
SPORTCOMPLEX
STADSVESTIBULE
AGROTECHNIEK
HIGHTECHZONE
LINEAIR PARK
FLATSTROOK
EVENEMENTENHAL
HANDELSCENTRALE
AIRPORTSHUTTLE
RIVIERZICHT
EXPOPALEIS
STADSVESTIBULE
TIJD-VERBLIJFDOUW
CULTUURPARK
MUSEUMEILAND
SPAGHETTIPARK
EDUCATIEPARK


Walmart
Market & Pharmacy
NO PARKING FIRE LANE
Enter
FIRE LANE

interaction, connection, or the productive mixture of program and function.

While Walmart's strain of JIT operations have been grafted and mutated from the Toyota Production System, and calibrated towards speed and the rapid frictionless movement of goods, can its original Toyota developed incarnation (which accepted reduced speed in certain circumstance where it benefitted the overall system, and recognized the importance of human interaction with the production process in order to cultivate and ingrain systems of knowledge and innovation cultivation and continued systemic evolution and renewal) trigger future mutations to the overall Walmart system? Could a spatial hybridization, layering spaces and zones of increased friction, and human interaction over those which service the logistical connections to industrial supply systems provoke the emergence of new formats and scales of industry, both encouraging the emergence and participation of productive local economies, re-establishing the spatial connection between production, consumption, and human scaled exchange, yet maintain the ability to interact with the contemporary networked economy? Could increasing the inputs flowing through the Walmart system to actively facilitate a two-way flow of material, including used and broken down goods serve as nourishment for the cultivation of localized production at many different scales? Could the reprogramming and rewiring of the Walmart operational system, taking advantage of their existing strengths influence a rewiring, or mutating the underlying logic dictating the configurations of the contemporary urban landscape, to one which reintroduced the dimension of considered and intentional spaces of social exchange and interaction?

As Walmart forms today's dominant industrial entity, a primary actor in the logistics revolution and proliferation of logistics based spatial packages; it broadly influences many of the underlying systems defining the spatial logic of the contemporary American City. An understanding of the Retailer's foundational logic and systems are therefore necessary to inform reclamation of these territories for consideration within the architectural practice; a consideration which recognizes these spaces dictatorial influence over the cultural, social, and physical fabric of the contemporary city. ■

fig. 047. opposite
Walmart Retail Outlet Exterior.
Gladstone, Missouri.

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5-10
WALTON'S
5-10
Opening
May 21
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network logistics 01.3

Born on a farm in rural Oklahoma in 1918, Samuel Walton acquired his first retail and managerial experience when in 1940; he began working for JC Penny within their management trainee program. Following the Second World War, Walton made his first foray into independent business ownership, opening a variety store in Newport, Arkansas.[1] After failing to renew the store's lease, in 1951, Walton opened another variety store named "Walton's Five and Dime" in Bentonville, Arkansas – the town where the Walmart Corporation's headquarters remain to this day. Dissatisfied with the limitations of the variety store format, Walton opened his first Walmart Discount Store in nearby Rogers, Arkansas on July 2, 1962.[2]

Early on, Walton expanded his operations to several locations; these locations however, faced a difficult task of gaining competitive advantage in the discount market, one based entirely on the sale of items at the lowest possible price point. At the time, all discount retailers purchased their items from the same wholesalers, thus, each retailer offered the same items at the virtually the same price. As a discount retailer, Walmart was simply one of many.[3]

A significant operational development occurred when Walton realized the only way to gain a significant unit cost advantage over the competition was to bypass the wholesalers altogether. While purchasing items directly from a manufacturer offered considerable savings, most manufacturers at the time were unwilling to deliver products directly to retailers; preferring to consolidate their shipping burden by delivering only to wholesalers. These wholesalers in turn would act as distributers, making deliveries to many individual stores that stocked their products. Walmart's solution was to create distribution centres where manufacturers could deliver their products; allowing Walmart to become its own wholesaler. This vertical integration required Walmart to facilitate the movement of goods to each of their stores; prompting the creation of Walmart's truck fleet. While this transportation burden cost the Retailer an extra 3 cents on the dollar, purchasing products directly from the manufacturer saved on average 5 cents, thus creating a 2 cent

fig. 048. far left
Original Walton's Five and Dime
Bentonville, Arkansas
Image of restored building, now acting as a Walmart museum

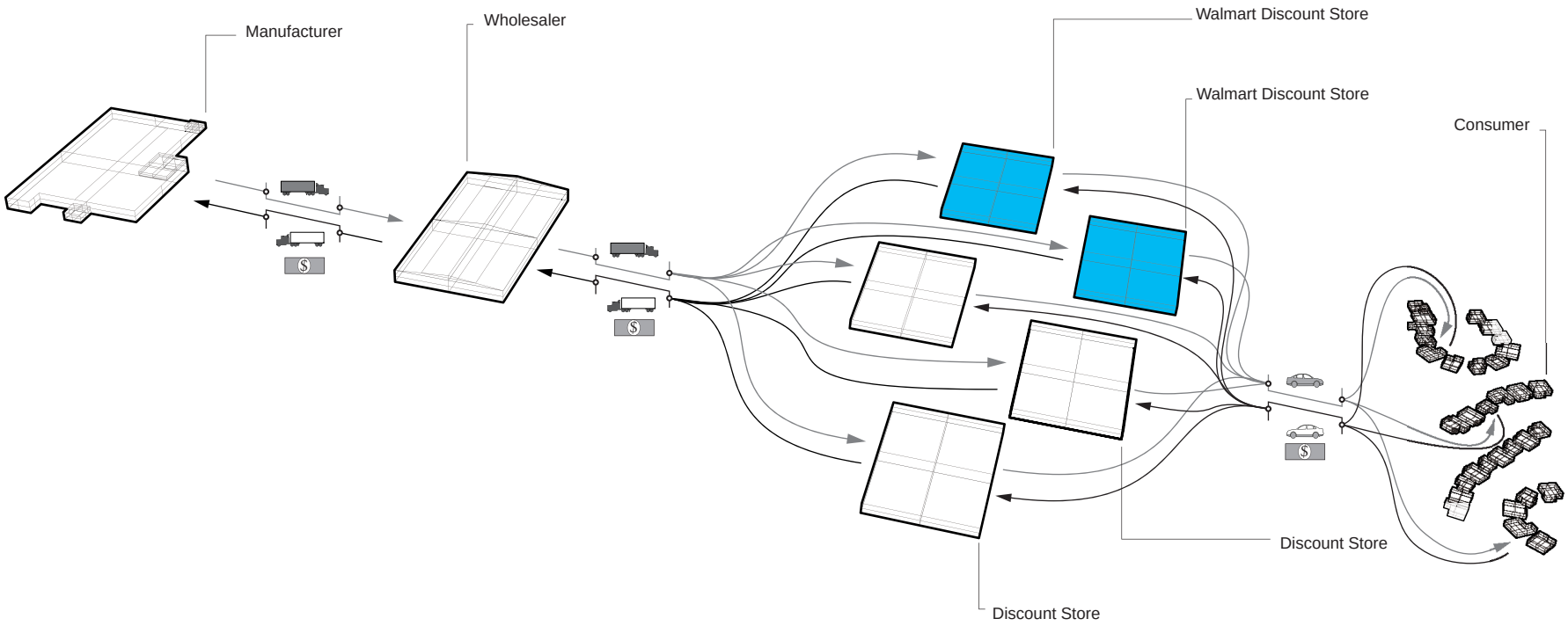


fig. 049. above
Supply Chain Evolution - Discount Retail Flow
When Walmart began it had no competitive advantage over other discount retailers, as they , along with all other discount retailers bought their merchandise through the same wholesalers. Manufacturers would deliver products to a wholesaler; the wholesaler would then act as a distributer, delivering products to every store. Thus the prices Walmart offered customers were no different than any other discount retailer.

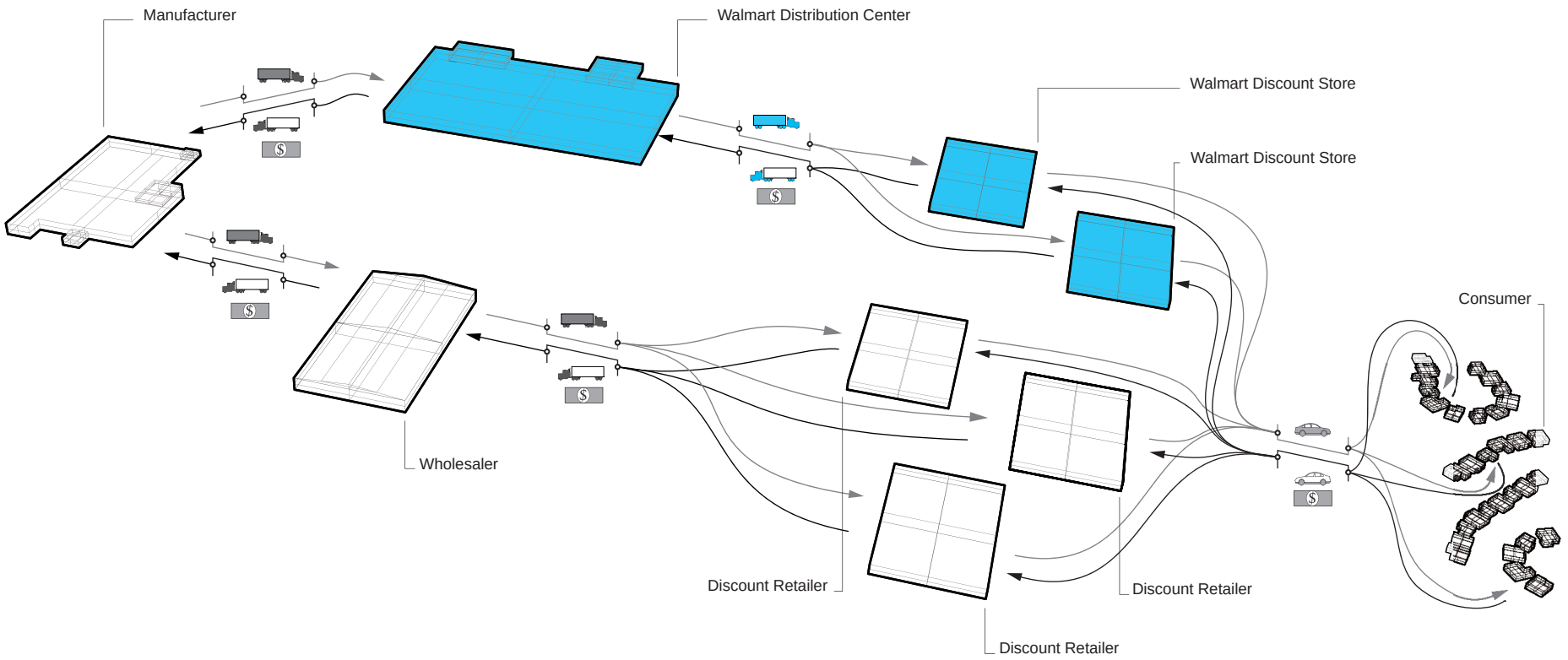


fig. 050. above
Supply Chain Evolution - Creation of Distribution Center
The key to Walmart's early supply chain innovation and development was the creation of the distribution center. The only way to gain a competitive price advantage over its discount retail competitors was to purchase their products directly from the manufacturer, however, the manufacturer was unwilling to deliver to every Walmart outlet. Walmart's solution was the creation of their own distribution centre to which all manufacturers could deliver their products. Walmart would then facilitate the movement of goods to each site with their own truck fleet.

saving to be passed along to the customer. This slim advantage was enough to allow the Retailer to guarantee lower prices on their products than their competitors.[4]

The creation of the distribution centre signalled Walmart's embracement of distribution and logistical innovation as essential elements of their business model. It also foreshadowed the Corporation's contemporary mastery of supply-chain management, as over time, the Retailer has created an incredibly sophisticated and complete network of flow - not only for data or information, but material goods. Below, Thomas Friedman describes the supply chain network which forms the heart of the Walmart ecosystem after visiting the Retailer's home town distribution centre.

I had never seen what a supply chain looked like in action until I visited Wal-Mart headquarters in Bentonville, Arkansas. My Wal-Mart hosts took me over to the 1.2 million-square-foot distribution center, where we climbed up to a viewing perch and watched the show. On one side of the building, scores of white Wal-Mart trailer trucks were dropping off boxes of merchandise from thousands of different suppliers. Boxes large and small were fed up a conveyor belt at each loading dock. These little conveyor belts fed into a bigger belt, like streams feeding into a powerful river. Twenty-four hours a day, seven days a week, the suppliers trucks feed the twelve miles of conveyor streams, and the conveyor streams feed into a huge Walmart river of boxed products. But that is just half the show. As the Walmart river flows along, an electric eye reads the bar codes on each box on its way to the other side of the building. There, the river parts again into a hundred streams. Electric arms from each stream reach out and guide the boxes-ordered by particular Walmart stores – off the main river and down its stream, where another conveyor belt sweeps them into a waiting Walmart truck, which will then rush these particular products onto the shelves of a particular Walmart store somewhere in the country. There a consumer will lift one of these products off the shelf, and the cashier will scan it in, and the moment that happens, a signal will be generated. That signal will go out across the Walmart network to the supplier of that product – whether that supplier's factory in coastal China or coastal Maine. That signal will pop up on the supplier's computer screen and prompt him to make another of that item and ship it via the Walmart supply chain, and the whole cycle will start anew. No sooner does your arm lift a product off the local Walmart's shelf and onto the checkout counter than another mechanical arm starts making another one somewhere in the world. Call it "the Walmart symphony" in multiple movements – with no finale. It just plays over and over 24/7/365: delivery, sorting, packing, distribution, buying, manufacturing, reordering, delivery, sorting, packing…"[5]

At its core, supply chain management strives to "minimize margins and maximize returns" through a network that

fig. 051. far right
Typical Walmart Supercenter.
As seen from parking lot

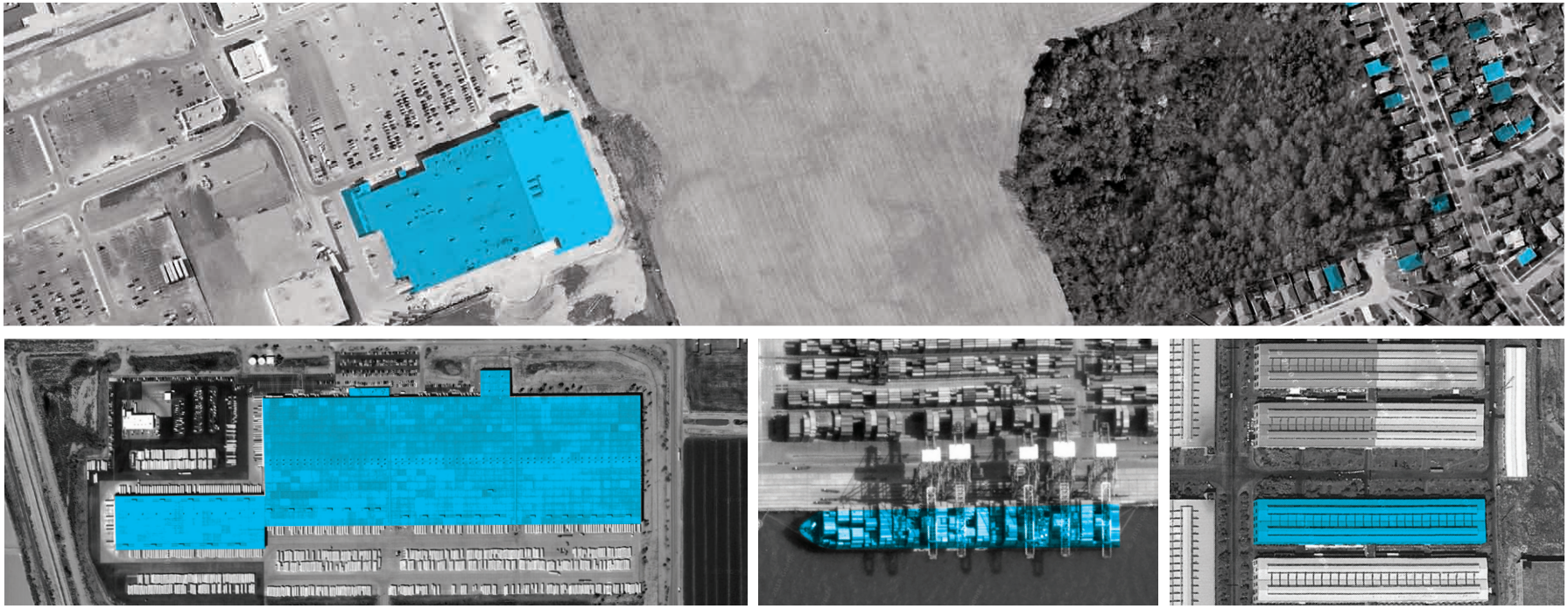

WAL★MART
SUPERCENTER
FOOD CENTER
WE SELL FOR LESS
1-HR. PHOTO
PHARMACY
VISION CENTER
OPTOMETRIST

The Back of the Computer
The Walmart Retail Outlet (front of the computer) is merely the end point, or faucet of a globally scaled pipeline of consumer goods production, distribution and logistics (the back of the computer). The figures, both above and to the right depict significant nodes in this network.

fig. 052. above
Typical Walmart Supercenter
Back of house: shipping, loading, and logistics access.

"emphasizes the speed with which goods move through the store over the profit it makes per unit".[6] Constantly evolving their distribution and procurement strategies, today, "Walmart is considered to be the leading corporation in terms of logistics innovation and efficiency."[7] In fact, many of the techniques employed by Walmart have been adopted for use by other non-retail industries; with logistics textbooks crediting the Retailer for the creation of at least four key concepts. Among these concepts were the creation of the "big-box-store", expanding around distribution centers, creating electronic data interchanges with suppliers and smoothing product demand through the creation of "every-day low prices" instead of periodic discounts and sales.

The traces of these logistical strategies reverberate throughout the physical infrastructure of the Retailer, as the entire Walmart ecosystem is built and calibrated to reduce friction and improve efficiency. As argued by Jesse LeCavalier, the need to handle material and information



efficiently "dictates the location of distribution centers, the location of retail outlets, the traffic patterns in the parking lot, the interior layout, the aisle widths, etc."[8] If Walmart stores form what Keller Easterling refers to as "the front of the computer", the following sections (focusing primarily on the United States) outline their interaction with "the back of the computer," the vast infrastructures, networks, and logistical innovations moving millions of containers of inexpensive goods throughout the world each day. ■

Significant Walmart Production, Distribution, and Logistics Nodes / Stages
Typical examples; shown at comparable scale.

fig. 053. above top
Walmart Supercenter

fig. 054. above, bottom left
Walmart Distribution Center
Buckeye, Arizona

fig. 055. above, bottom centre
Transoceanic Cargo Ship
Shown at port. Shenzhen, China

fig. 056. above, bottom right
Manufacturing Facility
Cankun Factory, Zhangzhou, Fujian Province, China.
Producer of household appliances (coffeemakers and irons).
Highlighted building part of larger complex of approx. 30.

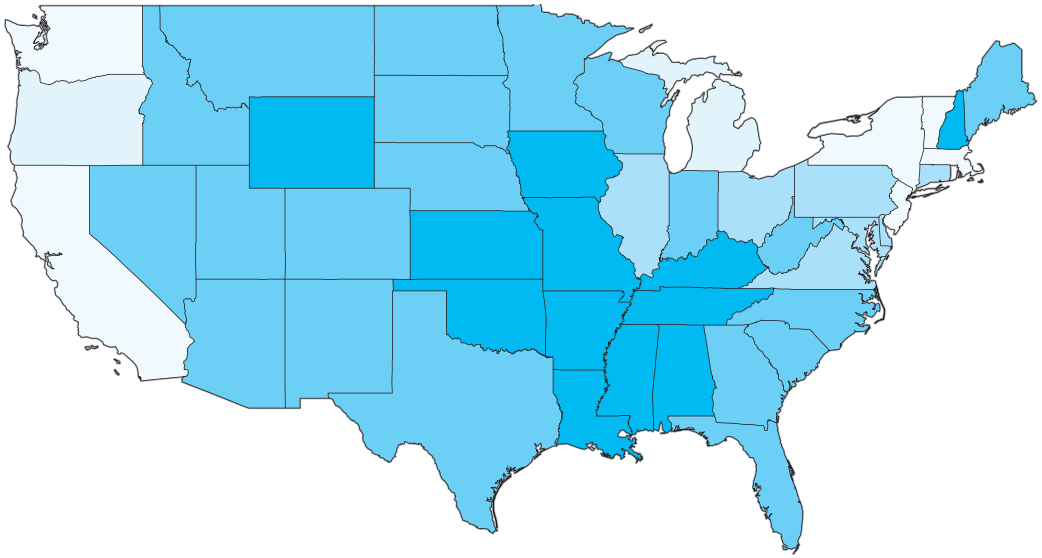
DOMESTIC GEOSTRATEGY

Over time, two significant territorial trends have emerged throughout the growth of Walmart's retail network. While concerns over local market demographics including age, population density, income etc undoubtedly play a role in Walmart's site selection process, these factors appear to have been overridden by a potential location's spatial and territorial proximity to existing stores and distribution centers, and access to highways and major arterial roads, smoothing theses sites serviceability by Walmart's global supply chain; favouring sites within the urban fringe of small and mid-sized communities.

By placing an overriding importance on a new sites proximity to existing Walmart infrastructure, the Retailer has slowly expanded from a fairly central location in the United States (Arkansas) in a radial growth pattern, much like the creeping growth of a bacterial culture in a Petri dish. As described in a 2011 study by economist Thomas Holmes, "store openings radiated from the inside out. Wal-Mart never jumped to some far-off location to later fill in the area in between. With the exception of store number 1 at the very beginning, Wal-Mart always placed new stores close to where it already had store density. This process was repeated in 1988 when Wal-Mart introduced the supercenter format."[9]

Despite the potential to cannibalize existing stores sales in any given market, Walmart placed a greater importance on retaining a certain distribution density. According to his own biography, Walton made an effort to ensure each new Walmart location was within one day's drive of a Walmart distribution centre.[10] This proximity to a distribution centre was always ensured, as the Retailer generally used this building type as the preliminary architecture of expansion, first building a distribution centre on the periphery of existing Walmart territory facilitating the growth of new retail outlets around it at little additional cost.[11] Today nearly every Walmart retail location in the United States falls within a 250 mile radius of a distribution centre (one day's drive). According to Holmes' estimate, each additional mile a retail outlet is closer to a distribution centre, Walmart saves approximately $3 500 a year. Similarly, a dense proximity between retail outlets further tightens distribution channels; shortening the distance Walmart trucks need to drive. Perhaps more valuable than the transportation savings incurred, this close territorial distribution network offers the Retailer the ability to rapidly respond to shocks and fluctuations in consumer demand within their JIT model. "Wal-Mart famously was able to restock its shelves with American Flags on the very day of 9/11."[12]

This radial growth pattern meant that contrary to conventional wisdom at the time, as Walmart grew, Walton avoided expanding his retail empire simply in relation to American



population density and distribution. But even within the growth range of the Walmart retail network, Walton actively avoided dense urban areas; exhibiting a preference for sites within small to mid-size urban centers. Furthermore, within these communities, Walmart has continually preferred sites located within the urban fringe, as 2006 study found it possible to note "49 percent of Walmart locations are within 500 meters of a city boundary, and an impressive 18 percent of stores are within 100 meters of a city boundary.[13]

These locations offered the Retailer a myriad of attractors;

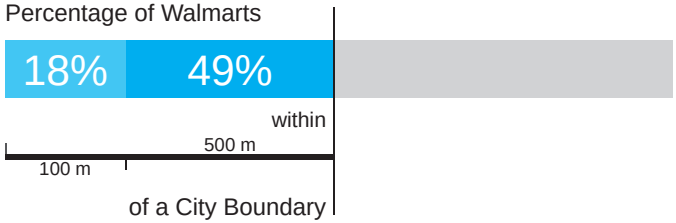
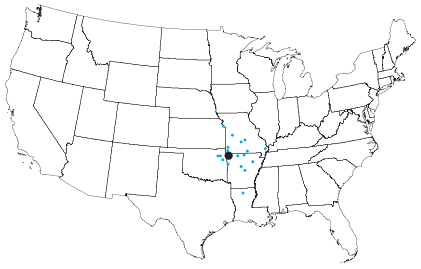


fig. 057. top
Population Density Per Walmart Retail Outlet
Illustrates Walmart's concentric growth pattern from its first location and world headquarters in Bentonville, Arkansas.

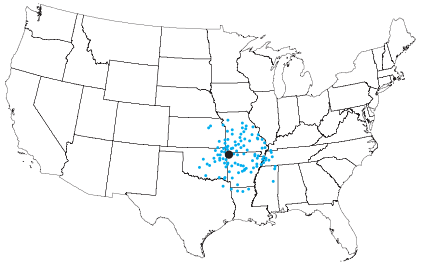
fig. 058. left
Walmart Retail Outlets as Related to City Boundaries in the United States
18% of all locations are within 100m of a city boundary, 49% are within 500m.

Walmart Discount Stores

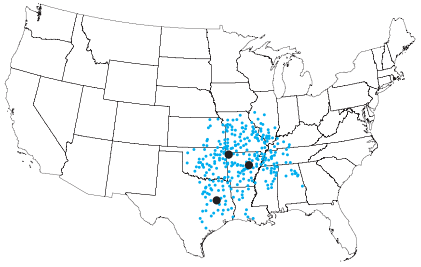
1970



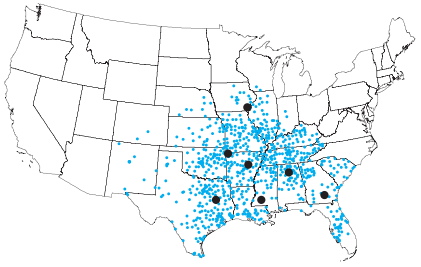
1975



1980



1985

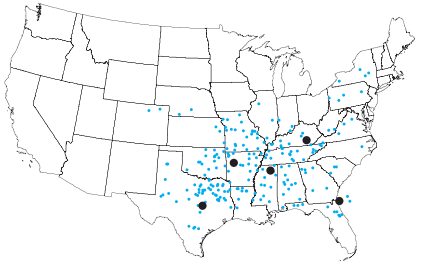


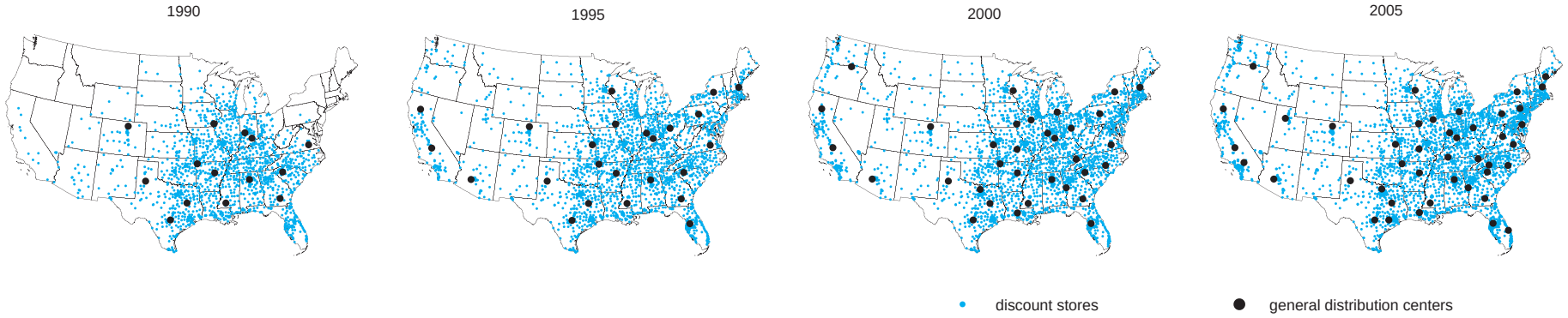
Walmart Supercenters

1990

1992

1995





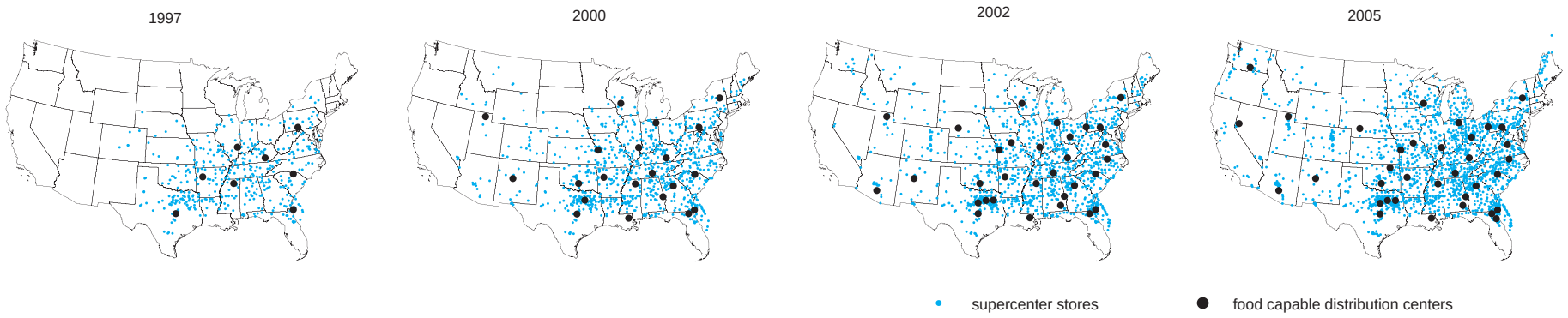
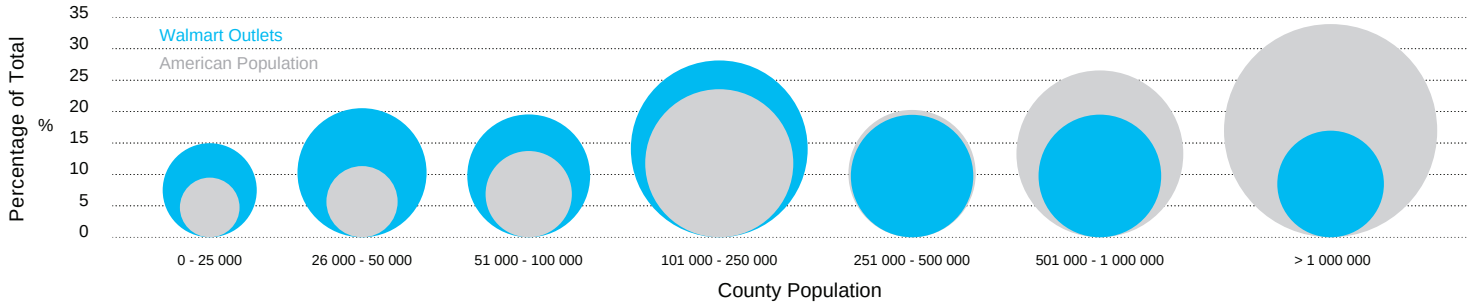


fig. 059. top
Walmart Discount Store Growth Pattern
Shown in five year increments.

fig. 060. bottom
Walmart Supercenter Growth Pattern
Shown in two - three year increments.



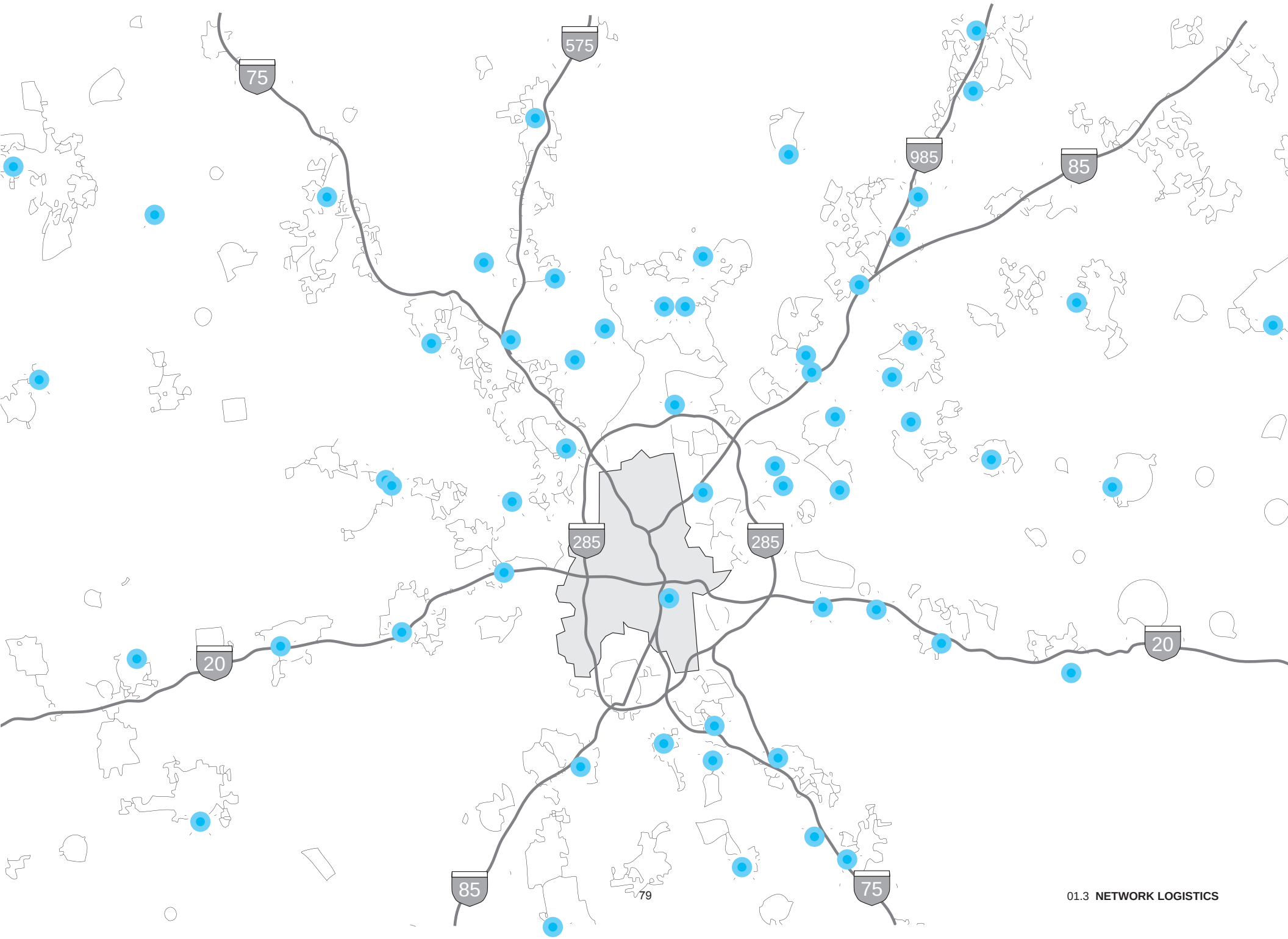
Distribution of Walmart Outlets and American Population by County Size

fig. 061. top
Population vs. Walmart Retail Outlet Distribution Within the United States
While the largest percentage groups of the United States population is distributed between counties with 501 000 - 1 000 000 or more than a 1 000 000 inhabitants, the group with the highest percentage of Walmarts is 101 000 - 250 000, demonstrating a a geospatial strategy not soley tied to population distribution.

fig. 062. far right
Walmart Distribution in the Atlanta Region
Demonstrates a high corelation between Walmart Retail Outlet placement and serviceablity by major vehicular arteries, avoiding potential speed reductions in delivery and distributions from congestion within denser urban areas roadways, or from their slower speed limits.

the more attractive of which many observers predict to be comprised of a combination of a specific captive market (often Walmart instantly became the largest Retailer in any given town), local economic (tax) incentives offered by small communities to lure the giant Retailer, lower land cost, and especially the increased ease of vehicular access, both for Walmart's truck fleet and its customers.[14] This ease of vehicular site access stemmed from these sites typical adjacency to highways or major feeder arteries. This trend can clearly be seen in Matthew Zook and Mark Graham's 2006 mapping analysis of Walmart locations in the Atlanta metropolitan Area.[15] However, as population centers grow in size, they often envelop Walmart's retail locations, leaving them as the central commercial and social spaces of an expanded edge city.

These examples speak to reinforce the importance of spatial and territorial policy to the Retailer. Furthermore, it highlights the notion that each retail site within the Walmart organism maintains an equal, if not stronger relationship with its overall logistical network then it does with the specific community it interacts with. Thus, as these sites frequently form primary elements in subsequent surrounding urban growth, they also inform an urbanism which, at the sacrifice of localism, forms strong spatial, economic, social, and cultural relationships with globally scaled supply chains. ■


75
575
985
85
285
285
20
20
85
75

Neighborhood Market

Offers a complete selection of groceries, pharmaceuticals, health and beauty products, and limited general merchandise.
First Location: Bentonville, Arkansas - 1998

Discount Center

Offers general merchandise and limited groceries.
First Location: Rogers, Arkansas - 1962

Supercenter

Offers all general merchandise that a discount store does plus full groceries, including meat, poultry, deli, sea foods and other frozen foods.
First Location: Washington, Missouri - 1988

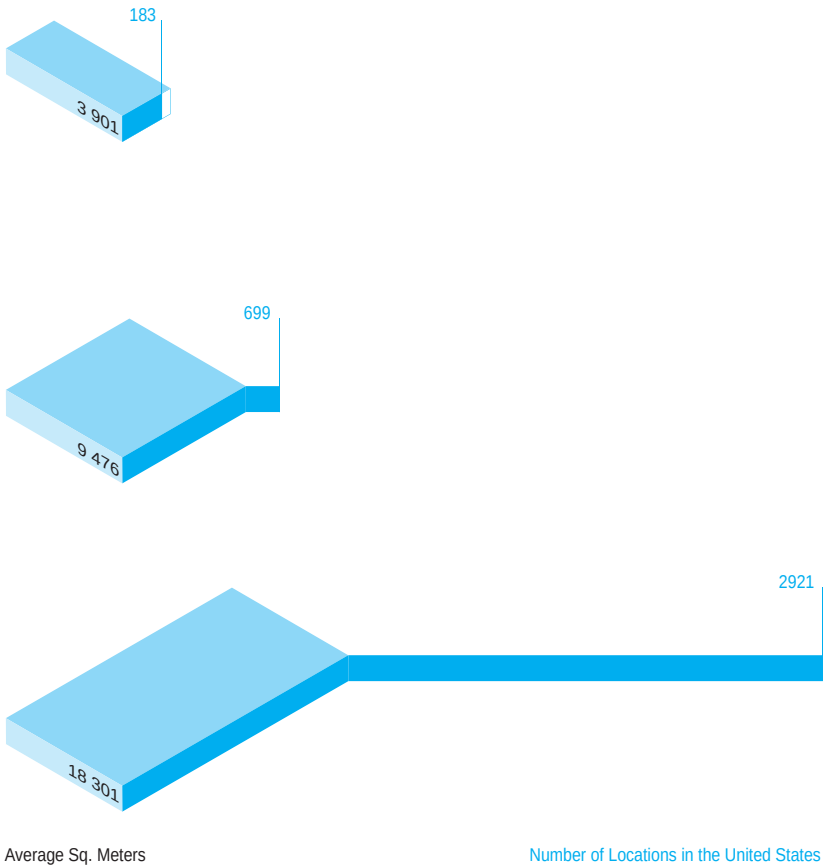


fig. 063. above
Walmart Retail Outlet Typologies

THE BIG BOX

Today, the big box format is employed by many retailers, but Walmart is generally credited with its creation and continued development from the early 1960's onwards. While the definition of the big box typology varies, in a general sense, they can be described as warehouse-like commercial spaces occupied by a single retailer and surrounded by extensive surface parking.[16] As described in a Columbia University Study, big box architecture is defined as "large windowless, rectangular single story buildings with standardized facades that seem to be everywhere and unique to no place be it rural town or urban neighborhood."[17] In many constituencies, classification as a big-box store is largely dependent on size alone, relative to other retail spaces in a given market, and can be anywhere from 30 000 to 100 000 square feet and larger.[18]

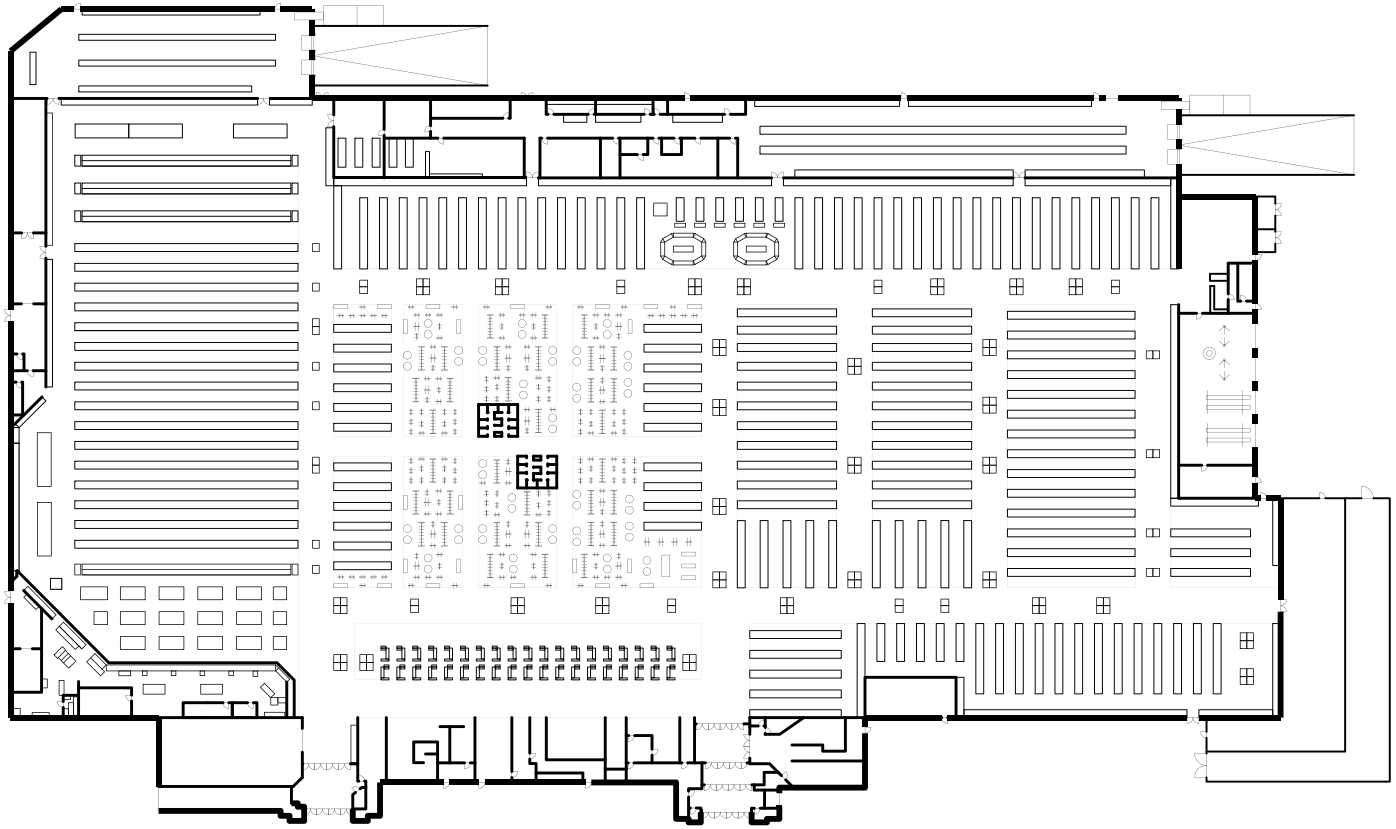
Throughout its history, Walmart has developed several store formats which fall within the big box typology; the most prominent being the Discount Store, the Neighborhood Market, and the Supercenter.[19] While each of these store types has been used extensively within the United States, according to lobby group Walmart Watch, the Retailer has built Supercenters (stores that sell both general goods and full grocery services along with various other services including tire and auto, pharmacy etc) at a much higher rate than it has any other outlet type over the last twenty years, while converting significant numbers of existing Discount Stores into Supercenters.[20] Thus, the Retailer has shown a gradual preference for this format.

Typical of big box architecture, Supercenters generally exist as extremely cheap constructions of light frame steel and concrete block; intentionally conceived as generic, temporary, and deployable logistical devices. Configured to reduce frictions and smooth the movement of people and goods throughout the site, the Supercenter can be understood as a spatial product - the urban and architectural type Keller Easterling describes as the "Teflon formats of neoliberal enterprises."[21]

The generic Supercenter mirrors typical ex-urban development; large, programmatically segregated constructions, stretching horizontally over several acres of space, surrounded by acres of land devoted to parking and distribution servicing zones. Designed centrally by a team of in-house architects, Walmart uses approximately ten prototype Supercenter store designs which it copies, mirrors, reflects, and rotates across the country with only slight site modifications.[22]

The generic Supercenter is comprised of five distinct zones: vestibule, grocery, general merchandise, auto care, and garden centre. These general spaces can be subdivided further into product areas, carefully and rationally distributed in relationship to one another, with service type programs generally forming a perimeter surrounding general merchandise products, including pharmacy, auto/tire/lube, and photo services. The vestibule zone comprised of small, externally leasable commercial spaces


Tire & Lube
Express
Garden Center
WAL★MART
SUPERCENTER
Always
Low Prices
Always
Food Center



1 : 1 000

0 5 10 50 m

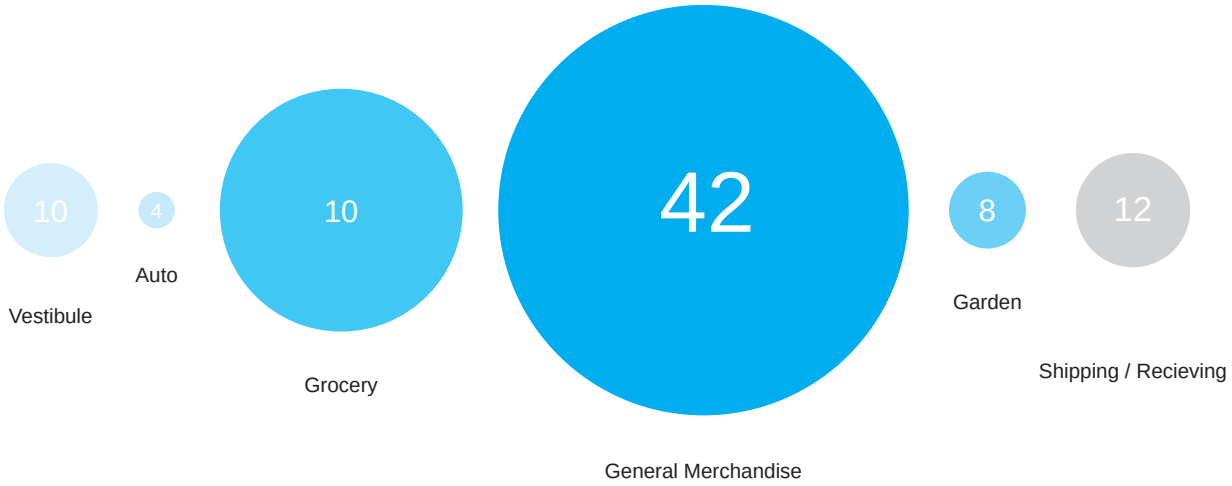


fig. 064. previous far left
Typical Walmart Supercenter Siting As Seen From Above.
Buckeye, Arizona.

fig. 065. previous right top
Generic Walmart Supercenter Floorplan
Depicting typical configuration as opposed to a specific outlet. The figures 065 - 067 refer to the same Generic Supercenter

fig. 066. previous right bottom
Generic Walmart Supercenter Section

fig. 067. above
Generic Walmart Supercenter Program Distribution

at the entrance to a Supercenter often contain further services capitalizing on Walmart's consumer traffic, including credit unions, hair dressers, beauty salons, smoke shops, fast food outlets, dentists, and opticians. This formula is apparent in nearly every Walmart Supercenter, with vestibule tenants framing the stores entrance, grocery occupying one wing, the auto and garden centre occupying the opposite wing and sandwiching general merchandise, with a small, linear service/storage zone forming the rear elevation with two shipping docks servicing the grocery zone and two others servicing the remaining zones.

With an average size of 18 301 square meters or 196 990 square feet,[23] these outlets exist at a scale that both reflect and service the Retailer's reliance on the mass movement of goods. The fact that this scale causes the Supercenter to appear more like a warehouse for consumer goods than a traditional retail environment forms a significant and deliberate aspect to the big box format. Operationally, the big box format couples the space of retail and that of storage. Furthermore, the Retailer's ability to stock only the required volume of inventory to meet consumer demand facilitates the near elimination of dedicated stock or storage space within any given store, the generic Supercenter dedicates approximately 12% of its footprint to storage and back of house functions - significantly undersized compared to traditional retail formats.

This re-conceptualization of retail space and warehousing as a single unit of program also typifies Walmart's strategy of selling low cost items by offloading or shifting the responsibilities that were traditionally carried out by retailers. For example, by combining the retail and warehouse facilities for its merchandise, inventory no longer needs to be taken from warehouses to main street storefronts. This distribution burden is passed along to the customer who is willing to drive to a big box location to

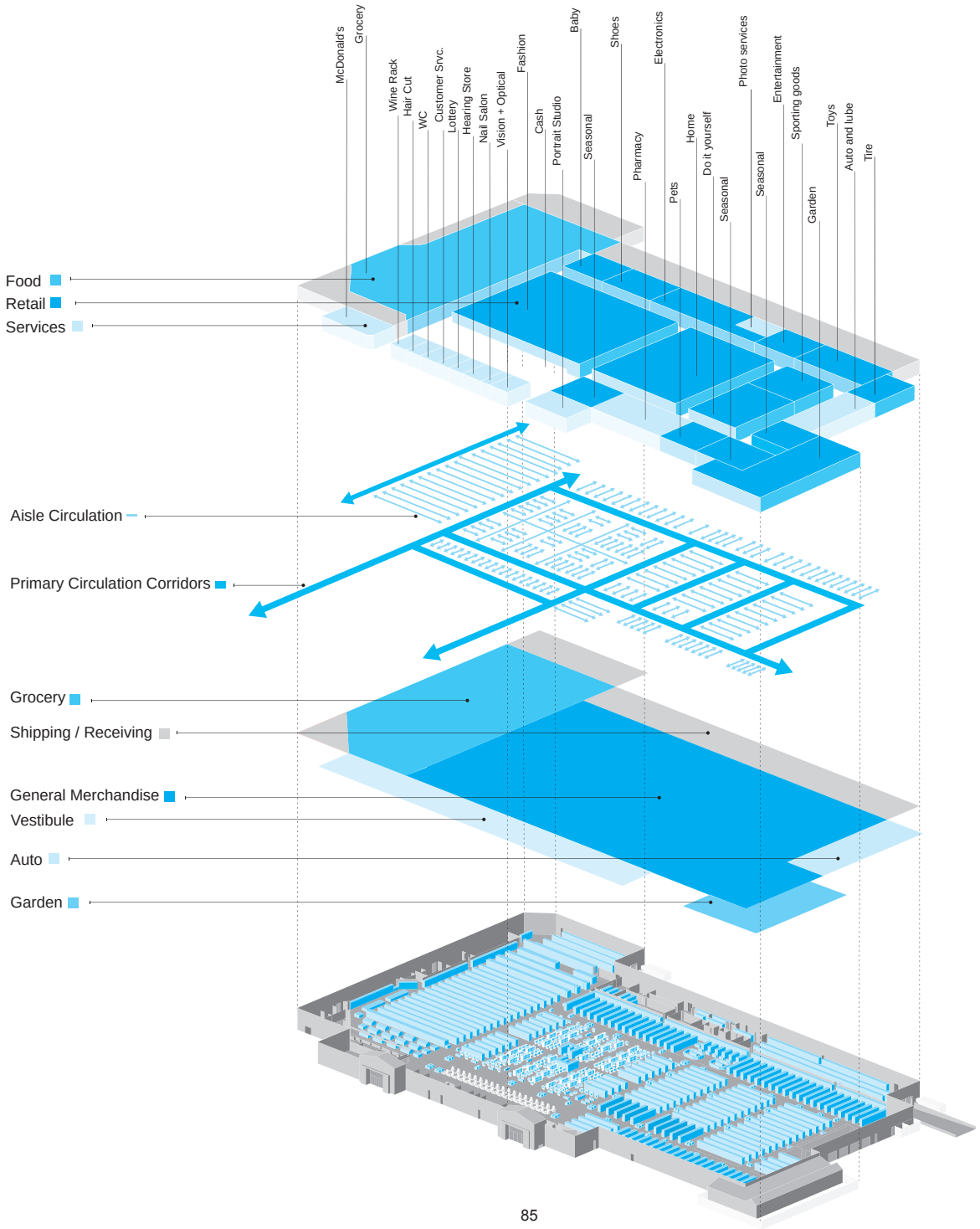


fig. 068. same left
Generic Walmart Supercenter
Exploded Program and
Circulation Axo

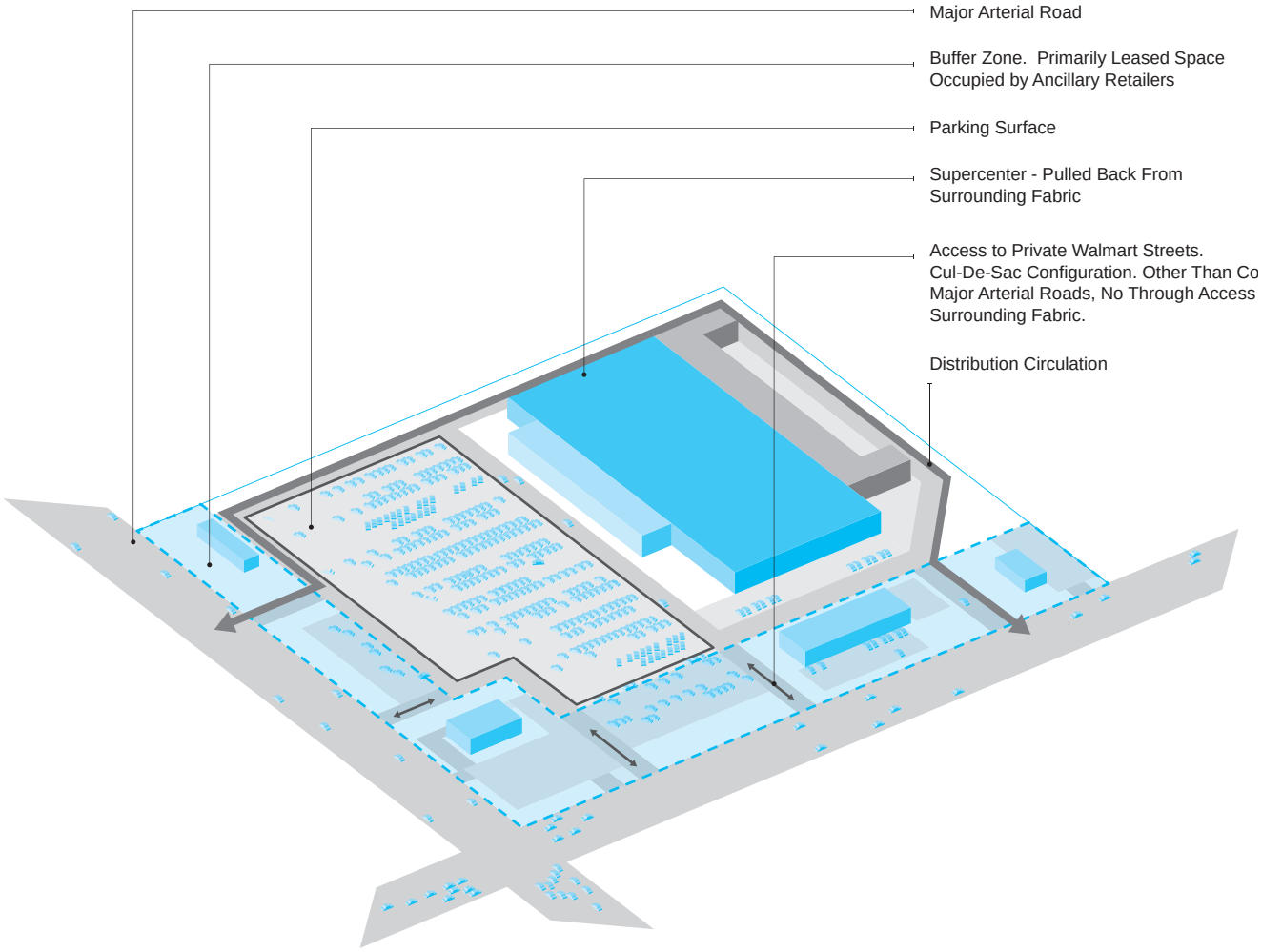
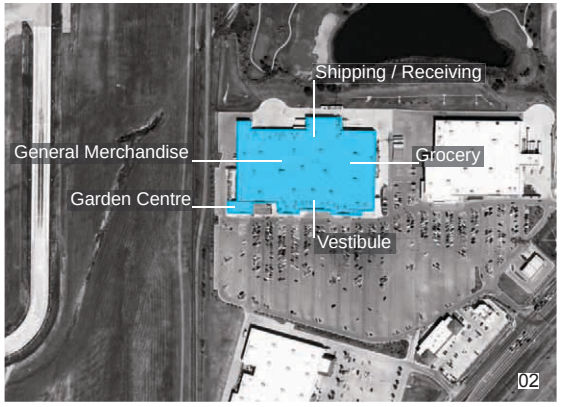
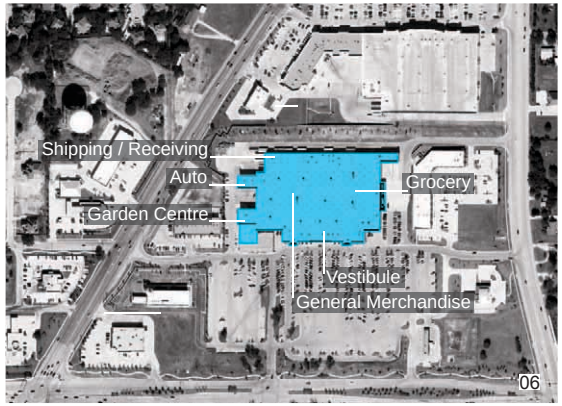
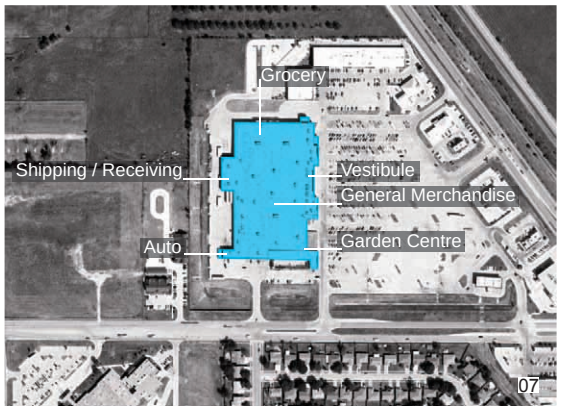


fig. 069. same right
Typical Supercenter Siting
Based on Supercenter # 2978.
Fort Worth, Texas

fig. 070. far right
Walmart Supercenter - Cloned and Multiplied Building Type.
At any given time Walmart uses approximately 10 store prototypes which are then multiplied across the country with slight variation and adjustment as per site. The image to the right depicts an array of 9 Supercenters in the Dallas / Fort Worth Region.







1 : 10 000

0 50 100 500 m

access lower prices.[24]

Included in Walmart's retraction of services and amenities from traditional retail spaces has been the elimination of the store clerk, pioneering the treatment of these spaces as self serve warehouses.[25] Within the typical Supercenter, individuals circulate through oversized primary corridors, the width of two lane streets, which service grid like aisles - all facilitating a high turnover of consumers while limiting interpersonal friction and collision. It is entirely possible for a consumer to speak or interact with no other individual while filling their cart with goods in a Walmart Supercenter. The contemporary generic Supercenter presents itself as a "one-stop-shopping" outlet, servicing destination bulk shopping – acting as a personal warehouse wholesaler. They are not conceived as social spaces within which one shops, but rather corridors of movement where one efficiently consumes and restocks; all distant from contemporary spaces of manufacturing and production.

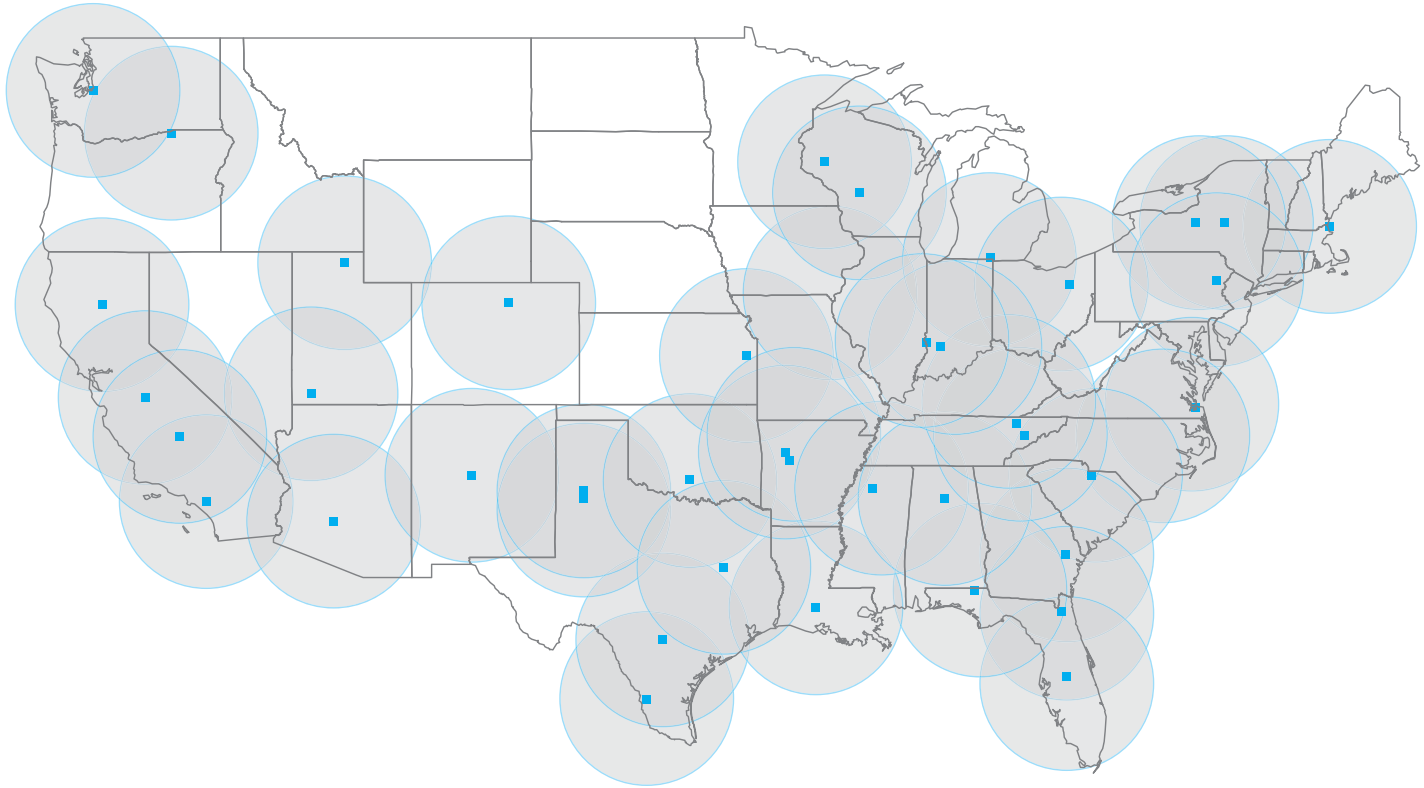
Beyond the shell of the store itself, these big box nodes include expansive surrounds of asphalt surface parking; sized to accommodate the Retailer's peak periods of flow and occupancy, the back to school season and the Christmas season, which account for a significant percentage of the Retailer's yearly business. At a truly urban scale, (often covering several acres) this surface smoothes both the consumer's arrival to the site by automobile and the frequent restocking of merchandise to the rear of the generic Supercenter via frequent eighteen wheeler deliveries. Much like a blown up version of the store layout itself, the generic Walmart site is surrounded by a buffer zone of leased ancillary retail spaces, similar to the vestibule zone in the store itself. Private or Walmart developed streets provide big box locations with vehicular circulation routes, linking the supercenter (pulled back and isolated from the urban fabric) with its surrounding major vehicular arteries in few concentrated access points. These streets do not generally provide through access to the secondary road networks and neighbourhoods surrounding the site.

It is clear the Supercenter represents a high degree of spatial and functional efficiency, representing a kind of conduit urbanism. However, from a standpoint that acknowledges the Walmart outlet as a primal public space and node of economic function within the contemporary American city, it lacks the programmatic variation and connection (be it scalar or physical) to the surrounding fabric needed to form a dynamic, and engaging urban place. Programmatically, traditional market spaces acted as a fertile urban place of economic, social and cultural interaction with frequent exchanges between producers and consumers occurring in a public setting, facilitating a proximal economic vitality and balance. Walmart urbanism essentially removes the social and cultural; facilitating only impersonal mass economic exchanges between consumers and distant producers within a highly calculated and controlled space. ■

fig. 071. far left
Walmart Supercenter Interior
Kewanee, Illinois.
The Walmart Supercenter is not conveived as a social space of shopping, rather a frictionless space one consumes and restocks.

fig. 072. far right
Walmart Supercenter Interior
Main Circulation Aisle


Cookies
Chips
Cookies
Unbeatable
$3.94
Unbeatable
2 $5



THE DISTRIBUTION CENTRE

In terms of network and ecosystem hierarchy, the Distribution Center sits one level or holon higher than Walmart's retail outlets. Within its current operational format, The Walmart Distribution Center acts as a critical threshold between the Retailer's global network of producers, manufacturers, and suppliers, and the final movement of goods into the urban fabric, and their eventual point of sale. As previously discussed, the Distribution Center forms the Retailer's frontline infrastructure; a colonizing architectural outpost put into place before any retail outlets as Walmart expands their networked territory. The Distribution Center is often sited in smaller rural communities based predominately on a given location's relationship with highway transportation networks.

According to Walmart, the average Distribution Center employs between 500 and 1000 associates. These associates manage the movement of goods to between 75 and 100 stores located within their 250 mile radius of service.[26] While within Walmart's current retail outlet formats, the space dedicated to shipping and logistics remains undersized compared to conventional retail formats, it is in effect due to the centralization of the bulk of the Retailer's distribution facilities within their Distribution Centers.

The typical Walmart Distribution Center is immensely scaled, averaging over 1 million square feet or 90 thousand square meters. [27] Yet, much like the retail outlets, minimal space is dedicated to warehousing or storage, as within the Retailer's Just-In-Time logistical model, goods arrive only as needed. As such, the Distribution Center is finely calibrated and significantly automated to rapidly move arriving merchandise out to its intended retail location with as little delay possible. For example, DC 6094 in Bentonville Arkansas, an approximately 1.2 million square foot (111 thousand square meter) Distribution Center turns over approximately 90% of its contents every 24 hours.[28] Internally, the bulk of this movement takes place along a web of automated systems and conveyor belts – as published by the Retailer, a regional Distribution Center

fig. 073. far left
Walmart Distribution Center Map
Shown with approximate 250 mile radius.

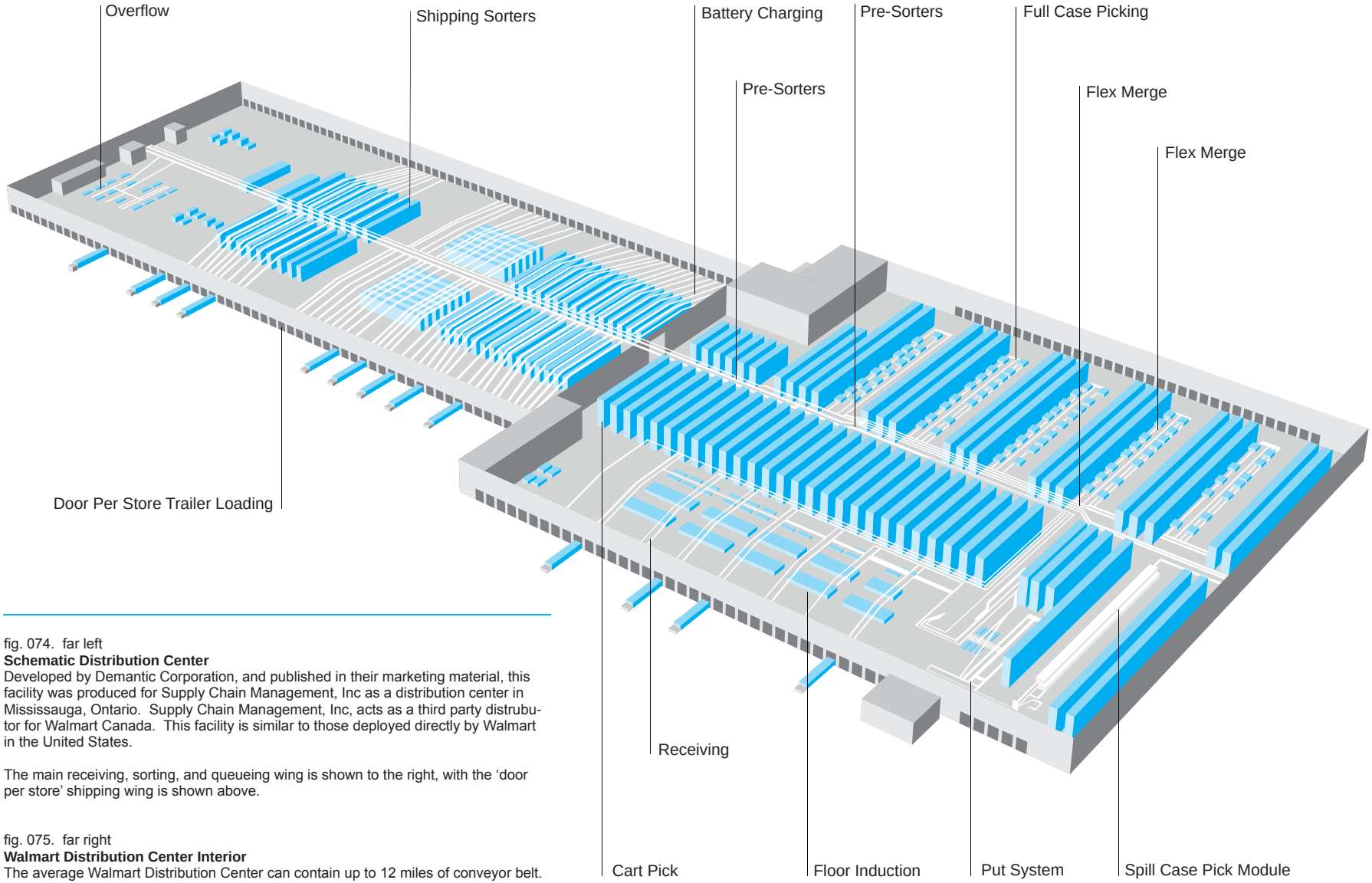


fig. 074. far left
Schematic Distribution Center
Developed by Demantic Corporation, and published in their marketing material, this facility was produced for Supply Chain Management, Inc as a distribution center in Mississauga, Ontario. Supply Chain Management, Inc, acts as a third party distrubutor for Walmart Canada. This facility is similar to those deployed directly by Walmart in the United States.

The main receiving, sorting, and queueing wing is shown to the right, with the 'door per store' shipping wing is shown above.

fig. 075. far right
Walmart Distribution Center Interior
The average Walmart Distribution Center can contain up to 12 miles of conveyor belt.


WAL-MART
WAL-MART
WAL-MART
WAL-MART


25
126
127
128
130
131
STERINO FARMS
BONIPAK
Fresh Premium Broccoli
CROWN PACK
PRODUCE OF USA
www.bonipak.com
BROCCOLI
FRESH BROCCOLI

can contain up to 12 miles or approximately 20 kilometers of conveyor.[29] In a single day, a Distribution Center can load or unload over 500 trailers of merchandise.[30]

While for the most part, there remains few published details of Walmart's Distribution Center's internal configuration, as their exact function is seen as extremely valuable and proprietary; through an examination of similar facilities built by Supply Chain Management Inc, a third party logistics company who works in partnership with the Retailer in Canada, combined with known details of Walmart's innovative development of cross docking techniques, a basic understanding of their spatial logic can be hypothesized.[31]

As the speed with which Walmart could replenish their stores became an important facet of the Retailer's operations in their growth and development, Walmart is credited by some with the creation and innovation of cross-docking.[32] Cross-docking is a distribution technique, where goods arriving in one truck are unpacked and directly loaded into outbound vehicles without entering storage, warehousing, or inventory depots.[33] While this paints an image of goods arriving in one truck, moving across the floor in a linear fashion, directly into another outbound truck, The Walmart Distribution Center operates with a higher level of sophistication. Goods arrive to the main body of the distribution center from either Walmart trucks, or deliveries from external manufacturers and producers, at one of what can be more than 100 loading docks. Goods are then sorted, moved to stacks of temporary storage / queuing space, or moved directly into the adjoining wing, lined on either side with shipping docks. Within this second wing, each dock is dedicated to a different retail outlet within that Distribution Center's service radius, further smoothing the movement of goods through Walmart's retail network.

At a site level, surrounding each distribution center is significant space dedicated to the queuing of trucks and trailers, pausing as they wait between deliveries. This effectively acts as a shipping yard, employing the Trailer as a moveable storage system in a strategy which can be described as 'storage in motion.'

fig. 076. previous left
Fresh Produce in Walmart Distribution Center Interior

fig. 077. previous right
Walmart Distribution Center Interior
Temple, Texas. 2004

fig. 078. left
Walmart Distribution Center
Buckeye, Arizona
The approx. 1.2 million sq. ft. facility located just outside Phoenix, shown in its siting, surrounding by queuing trucks and trailers.

fig. 079. right
Walmart Trailer Fleet as Compared to Central Park, New York City
The total Walmart trailer fleet in the United States is approximately equal to 100 additional Supercenters in area, continually moving goods throughout the Country.

STORAGE IN MOTION

Significant to Walmart's territorial assets are the thousands of standardized shipping containers holding Walmart merchandise flowing between nodes in the Retailer's empire at any given moment in time. The JIT operation of Walmart facilitates the elimination of the bulk of its geographically fixed storage needs. Instead, Walmart maintains one of the largest private trucking fleets in the United States operated by 7 950 drivers;[34] in a sense, Walmart appropriates the space of flow between the fixed territorial nodes in their supply chain, (their retail outlets and distribution centers) for inventory storage. In 2009, Walmart had maintained either the second or third largest truck fleet compared to both the largest private and for hire American distribution companies over the previous ten years.[35]

It is significant to note that while Walmart's truck or tractor fleet (actual vehicles), is not the largest on the list, the number of trailers (the containers transported by these trucks) the Retailer maintains, approximately 55 000, is more than five times larger than any other trailer fleet within the top five private carriers - this fleet remains sizeable even when compared to the largest 'for hire' truck fleet, United Parcel Service (UPS).[36]

As trailers are detachable from the tractors that haul them, they act as flexible bits of storage territory, deployable across the United States. While it is difficult to estimate the total amount of mobile storage Walmart maintains throughout their entire supply chain, assuming an average size of 45 X 8 X 8 feet[37] their trailer fleet alone amounts to approximately 454 acres of mobile Walmart territory. Applying the average Supercenter store size of approximately 4.5 acres (18 301 square meters or 196 990 square feet)[38], the total Walmart trailer fleet equates to approximately 100 additional Supercenter sized storage facilities in continual flow, overlapping the territory of the American highway and road infrastructure. ■

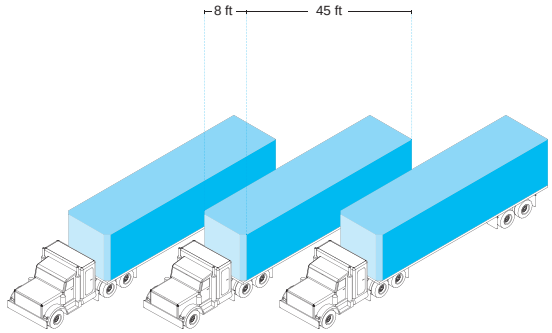


fig. 080. left
Typical Trailer Dimension

fig. 081. next
Transportation Fleet Comparison. Top Five American Private Truck Fleets and Top American For Hire Truck Fleet (2009)
By comparison, Walmart maintains a significantly higher number of trailers within their fleet - flexible bits of storage in their distribution network

Beverage

1. Coca-Cola Enterprises Inc.

Primarily a producer and distributer of soft drinks, and other beverages

Food

2. Sysco Corp.

Distributer of fresh and frozen foods, paper and disposable products, sanitary products, beverages, kitchen and tabletop equipment, medical and surgical supplies, and hotel operating supplies

Mxd. Retail

3. Walmart Stores Inc.

Operator of discount retail chain, vending general consumer merchandise, food and groceries, auto and pharmacy services etc

Revenue:	21.8 Billion	37.5 Billion	401 Billion
			
	7 900 Tractors	7 491 Tractors	6 751 Tractors
			
	9 500 Straight Trucks and Vans	1 353 Straight Trucks and Vans	20 Straight Trucks and Vans
	10 000 Trailers	19 505 Trailers	55 045 Trailers
			

Top 5 American Private Truck Fleets

Top American For Hire Truck Fleet

4. U.S. Foodservice

Distributer of food and related products to restaurants, hotels, healthcare facilities, cafeterias and schools

Food

19 Billion

5 171 Tractors

637 Straight Trucks and Vans

6 084 Trailers

5. Pepsi Bottling Group

Primarily a producer and distributer of soft drinks and beverages

Beverage

13.8 Billion

4 800 Tractors

1 100 Straight Trucks and Vans

7 900 Trailers

1. UPS Inc.

Mail, freight, delivery and supply chain management services

*37 000 Air Cargo Containers

*263 Aircraft

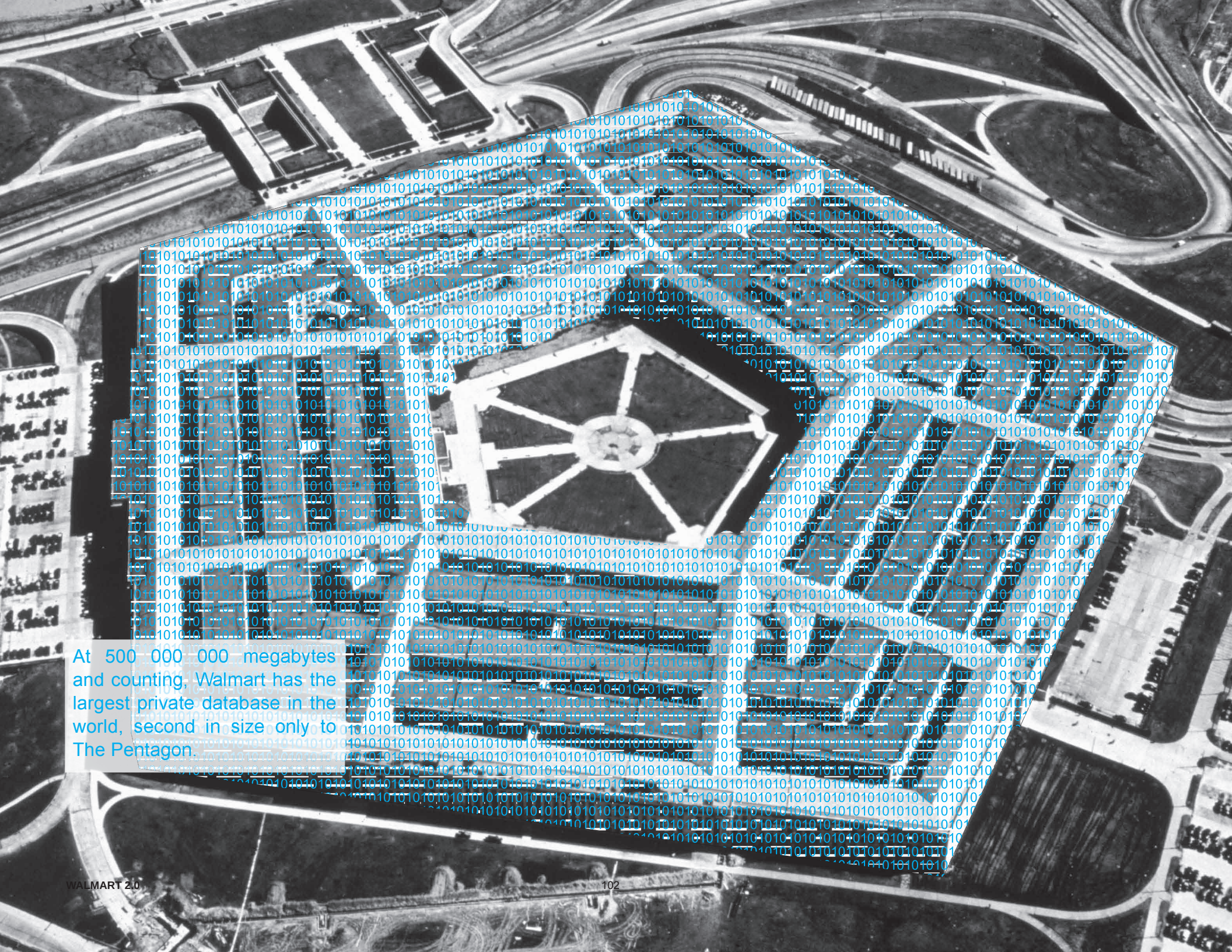
Mail + Delivery

51.5 Billion

18 470 Tractors

73 222 Straight Trucks and Vans, Motorcycles, and Package Cars

21 246 Trailers



At 500 000 000 megabytes and counting, Walmart has the largest private database in the world, second in size only to The Pentagon.

INFORMATION TECHNOLOGY

In order to coordinate the movement of material goods throughout the Walmart supply chain, the Retailer has invested considerably in the integration of information and communication technologies into their operational model. Installing a computer in their first distribution centre in 1969,[39] Walmart began relentlessly tracking sales and distribution data to aid in product demand predictions, as well as to further streamline distribution; gradually providing the Retailer a substantial competitive advantage over other retailers.[40] By the late 1970's, Walmart had expanded this computerization, and networked all of its stores, distribution centers, and company headquarters, further facilitating the collection and increased communication of data throughout its operational system.[41]

As an early adopter of bar code, or UPC technology ("a binary code that can be quickly scanned and entered into a database"[42]), Walmart had "installed barcode readers in all distribution centers by the late 1980's, reducing by half the labor cost of processing shipments."[43] Because of the Retailer's scale, and its requirement that its suppliers incorporate UPC codes into their product packaging, Walmart played a significant role in the systemic adoption of UPC technology within the retail industry. Gradually, barcode reading technology was incorporated at all significant nodes within the Walmart supply chain, scanning products as they flowed from production to their final sale point.[44]

In 1987, the Retailer installed a large private satellite system linking all of its stores "to company headquarters, giving Wal-Mart's central computer system real-time inventory."[45] By 1988, Walmart maintained the largest private satellite network in the United States; which, in addition to enabling the flow of point-of-sale data within the Retailer's supply chain, also importantly facilitated interpersonal communications between nodes in Walmart's network.[46] In the words of Thomas Freidman, this incorporation of evolving technology into the entire Walmart ecosystem helped create "a supply chain greased by information and humming down to the last atom of efficiency."[47]

Today, "few retailers gather data with the microscopic diligence, or the speed, of Walmart."[48] Testament to this notion is the sheer size of the Walmart's private database; mirroring the incredible scale of the Retailer's territorial and economic attributes. It has been predicted that at 500 000 000 megabytes or five hundred terabytes, the Walmart Corporation maintains the largest private database in the world recording 20 million customer transactions a day.[49] So large is this figure, it has been predicted that this amounts to "more bits of data than is represented by the entire Internet worldwide."[50]

As is often the case within a JIT operation model, Walmart has continually sought to share much of this collected data with their suppliers, allowing them access to data highlighting which products were succeeding, which were failing, and vitally, when

fig. 082. far left
Walmart vs. Pentagon
Database Scale

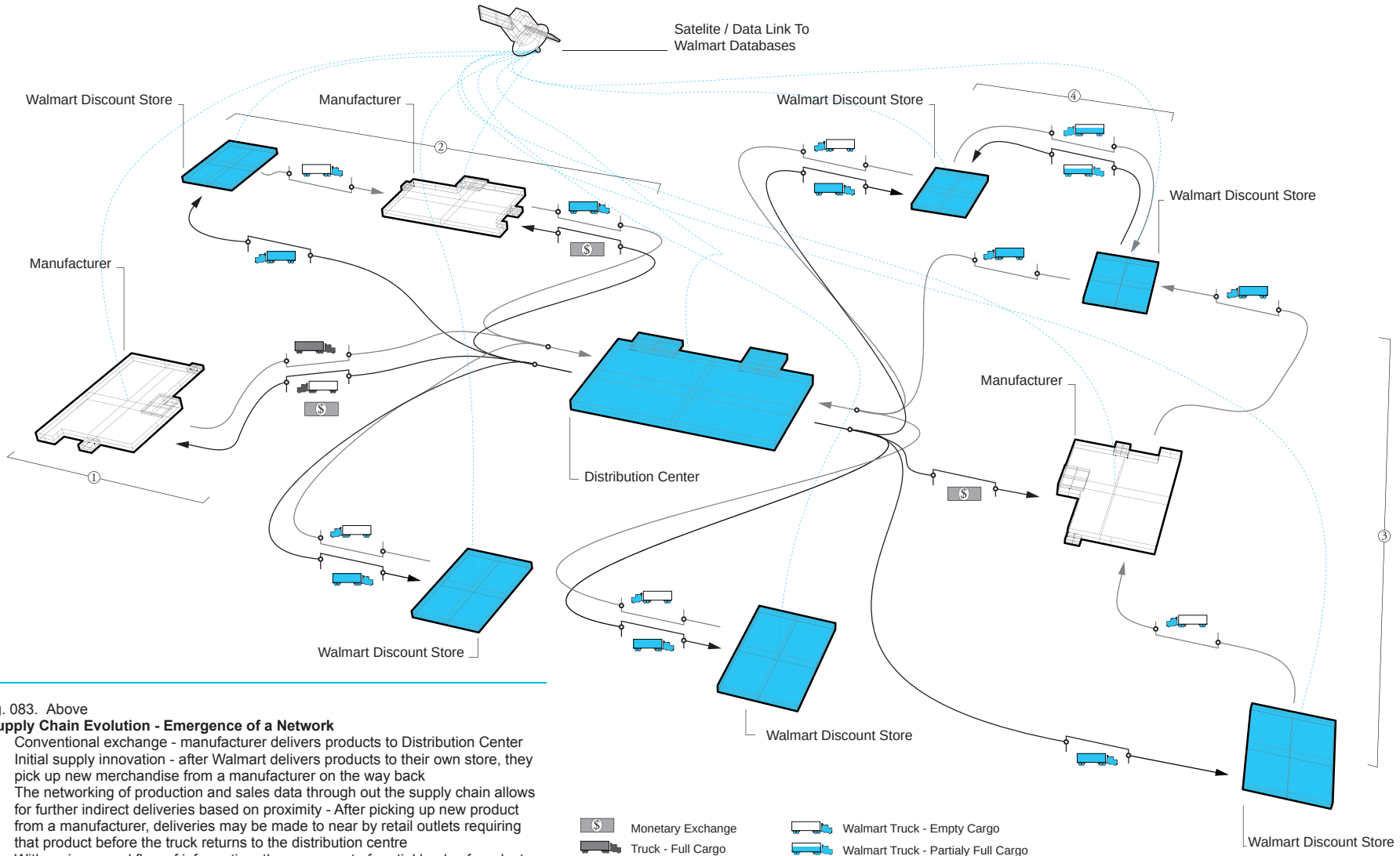


fig. 083. Above

Supply Chain Evolution - Emergence of a Network

1. Conventional exchange - manufacturer delivers products to Distribution Center
2. Initial supply innovation - after Walmart delivers products to their own store, they pick up new merchandise from a manufacturer on the way back
3. The networking of production and sales data through out the supply chain allows for further indirect deliveries based on proximity - After picking up new product from a manufacturer, deliveries may be made to near by retail outlets requiring that product before the truck returns to the distribution centre
4. With an increased flow of information, the movement of partial loads of products between stores themselves is also facilitated. Outlets can act as temporary product waiting zones, before moving to their final destination.

shelves require replenishing, signaling the need for a new round of production to begin. Walmart's theory, as developed by other JIT operators, was that by improving the efficiency of their supplier's production and supply methods, it would grant that supplier an increase in efficiency and facilitate a drop in the unit cost of a given product.[51] For example, the ability to produce any product and resupply it to Walmart on short notice, greatly decreased lead times and eliminated the necessity to stockpile inventory throughout the supply chain, creating efficiencies and savings to pass along to the consumer.

In addition to helping streamline the operations of its suppliers, this increase in the flow of information facilitated structural shifts in Walmart's distribution methods. Walmart's early significant distribution and logistical innovation involved creating their own distribution centers, facilitating the direct purchase of products from their suppliers. Previously, Walmart's private trucking fleet delivered small volume batches of these products from their distribution centres to their own stores, returning empty to their distribution centers upon completion of their deliveries. Aided by the rapid flow of re-supply orders and stocking information communicated by satellite and aided by investments in radio technology, Walmart was able to communicate re-stocking orders to truck drivers after they had made their intended delivery at a certain Walmart store, enabling them to pick up newly manufactured goods at proximate production facilities prior to returning to a distribution centre.[52]

Not only did this allow Walmart to save on the delivery charges from a manufacturer, it also facilitated the emergence of a distribution web which saw the Retailer move beyond simply facilitating the one way flow of final products from their distribution centers to their stores. They began to gain further efficiencies by ensuring their truck fleets carry products in both directions. This shift allowed the Retailer to facilitate the simultaneous, multi-directional movement of smaller bits, rather than the bulk mass movement of goods. In essence, the Retailer traded the economies of scale in distribution (as seen in rail), for an economy of density and proximity, facilitated by information technology.

As explored in the research of Jesse LeCavalier,[53] the relentless collection, storage, and distribution of data by the Retailer has resulted in a certain amount of abstraction in the very materials they distribute and sell. As each item is scanned through various steps in the Walmart supply chain, its material identity is scanned, digitized, and transmitted as data through the Retailer's digital infrastructure. These products become "registered and tracked as numbers rather than things"[54] "Because the goal of the market-driven corporation is always profit, the specifics of the items for sale are important only insofar as they can be strategically distributed to maximize that profit - commodities are abstracted in the pursuit of profit."[55] As such, it can be argued that the integration of information technology into Walmart's physical infrastructure has approached such sophistication that the Retailer is able to achieve a harmony between digital and physical space, wherein Walmart's supply chain mirrors

their digital network - transmitting material goods as if it itself was data, trailing the transmission of their binary counterpart through Walmart's network of flow. In this light, Kazys Varnelis compares the challenges in creating the physical infrastructure of entities such as Walmart to that of chip designers, "it is all about queuing and flow control." Varnelis continues: "And of course, if you see the big box from above, it's just a giant micro-chip."[56]

It is difficult to predict how the Retailer will incorporate future technologies, which they undoubtedly will, but for now, it appears Radio Frequency Identification (RFID) tags represent the next evolution in Walmart's data tracking ability, a technology that Walmart's scale is helping to rapidly develop.[57] As of January 1, 2005, Walmart required its top twenty suppliers to place RFID tags on each pallet shipped.[58] What separates these tags from UPC codes is their ability to be passively scanned within a certain range. As opposed to the laser scanners which need to be held against a UPC code to read its digital signal, a radio transponder wirelessly reads all RFID tags within range. The ability to passively scan all individual products within the range of a radio receiver, will allow in the future nearly every product to be digitally tracked through physical territory, granting new credence to the settlement that these spaces of capital are already shaped through the tracking of data and information. In the future, Walmart will continue to approach a remarkable simultaneity between their digital and material worlds. ■

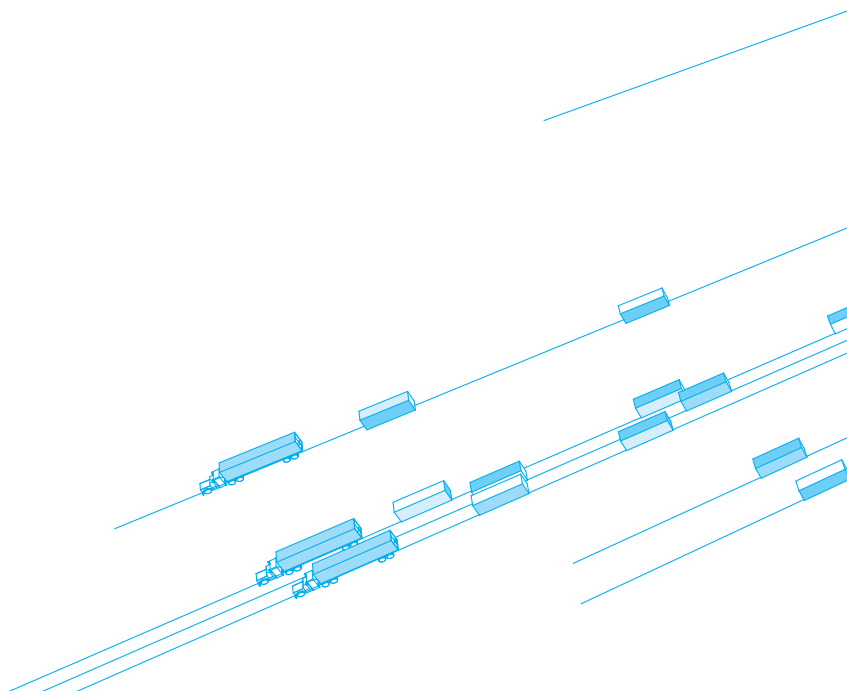
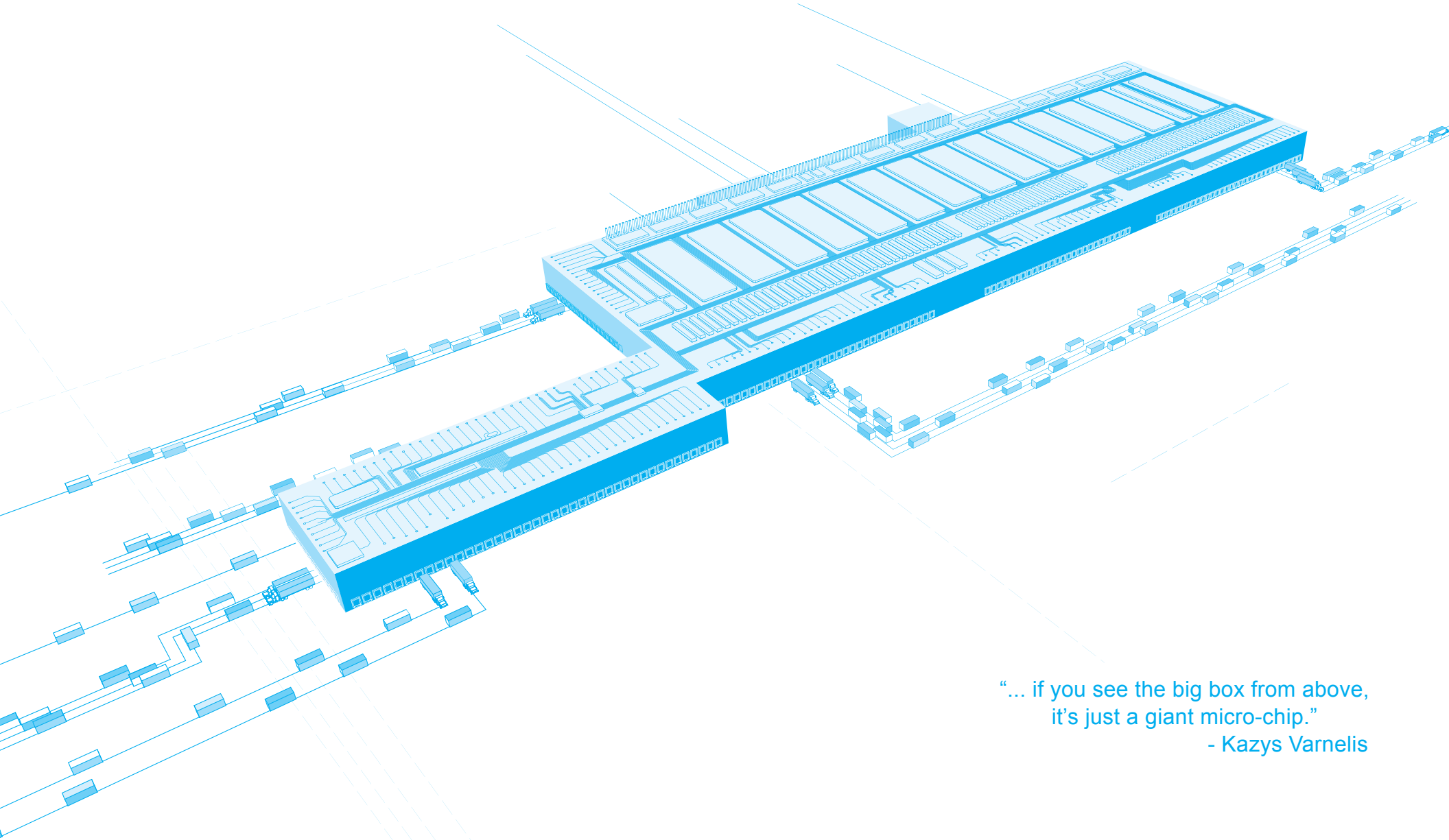


fig. 084. right
Walmart As Computer Chip.



"... if you see the big box from above,
it's just a giant micro-chip."
- Kazys Varnelis


MAERSK
SEALAND
MAERSK
SEALAND
MAERSK
SEALAND
MAERSK
CHASTINE MÆRSK
HELLERUP
ODJ

COST PRESSURE, FLEXIBILITY, and OFFSHORING

The ability of Walmart to collect such vast amounts of sales data on the thousands of products they stock has significantly transformed the traditional relationship between a retailer and its suppliers. In most cases, Walmart views their suppliers more as 'partners' in production - essentially treating them as extended cells within their lean or JIT retailing system. Despite having little to no actual stake in the ownership of these suppliers, armed with collected data, Walmart wields the purchasing power inherent in its scale to effect the internal operations within any given supplier's manufacturing and production processes. As many of these suppliers adjust to conform to the Retailer's re-stocking and re-supply demands, and at the high volumes required by Walmart, these companies come to entirely rely on the point-of-sale data provided by Walmart, as real time feedback on the consumer demand that powers the entire flow of goods. This places the Retailer in a position of power unique to an era that functions within a 'pull' operational model; reliant on the information collected and at the end of the supply chain - at Walmart's checkout counters.

Walmart operates from a position that allows it to control nearly the entire digital space of flow within its supply chain, dictating not only what a supplier should produce, and on what schedule, but also at what price.[59] As suppliers become completely intertwined in the Walmart supply chain, they live off of its data, volume, and scale - they become completely reliant. Walmart often treats their suppliers as replaceable contractors, reflecting an industrial era that values flexibility. Frequently, the Retailer offers their vendors "take-it-or-leave-it-deals," which dependant suppliers have no choice but to accept, as no competing retailer can replace the scale and valuable data provided by Walmart.[60] These deals however generally place ever increasing pressure on suppliers to drop their own prices as the Retailer pursues its never ending goal to provide consumers with the lowest possible priced items. It has been documented "for basic consumer products that don't change year after year, Walmart is well known for insisting that the price drop 5 percent a year".[61]

Within the fluctuating instability of the post-Fordist economy, Walmart's suppliers behave much like the Retailer itself; they become procurement specialists managing the supply chain of their own products, while avoiding the capital investment and overhead of maintaining a factory themselves. In essence, many suppliers have found the only way to survive within the constantly squeezed Walmart supply chain, is to contract out significant portions of their own production processes, employing what has been called 'flexible production.'[62]

Once Walmart's suppliers have transitioned to flexible production, contracting out the actual product manufacturing, there remains little incentive to maintain geographic proximity

fig. 085. far left
Chastine Maersk
Transoceanic cargo ship operated by A.P. Moller-Maersk. Approx. dimensions: 347m X 42m

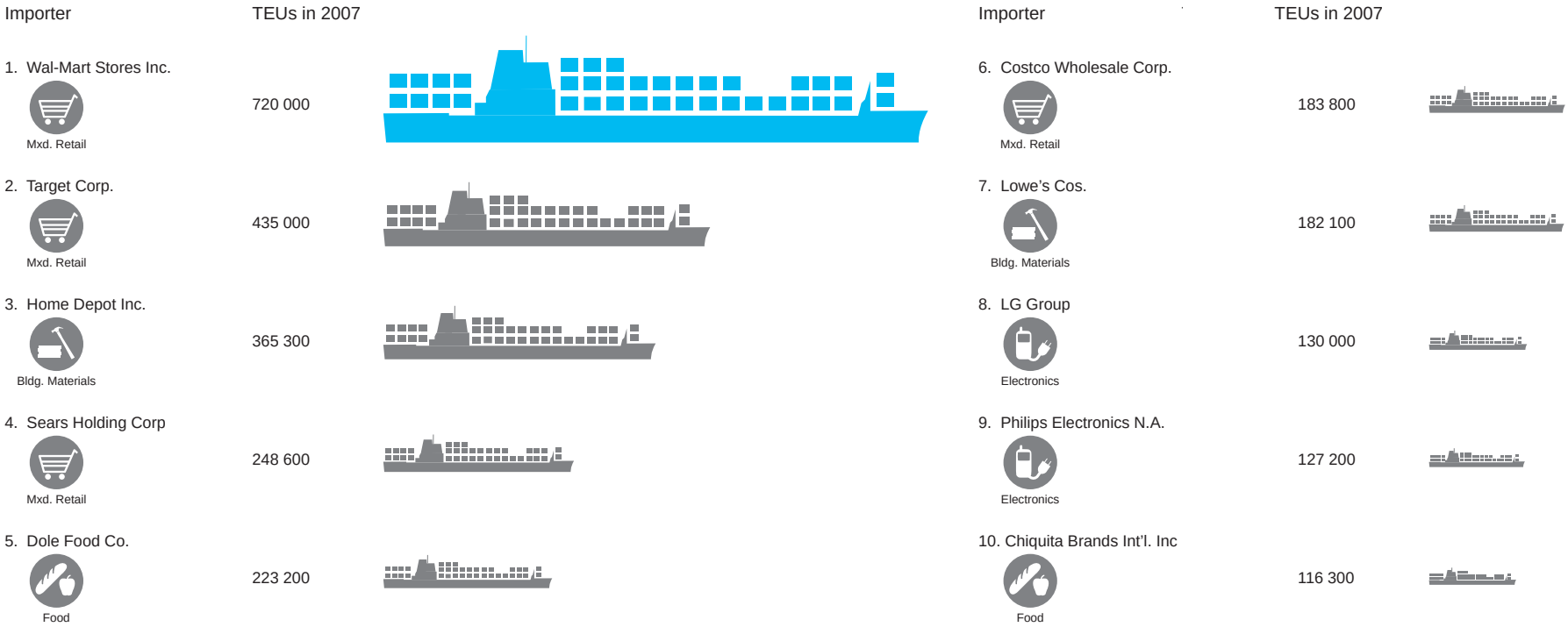
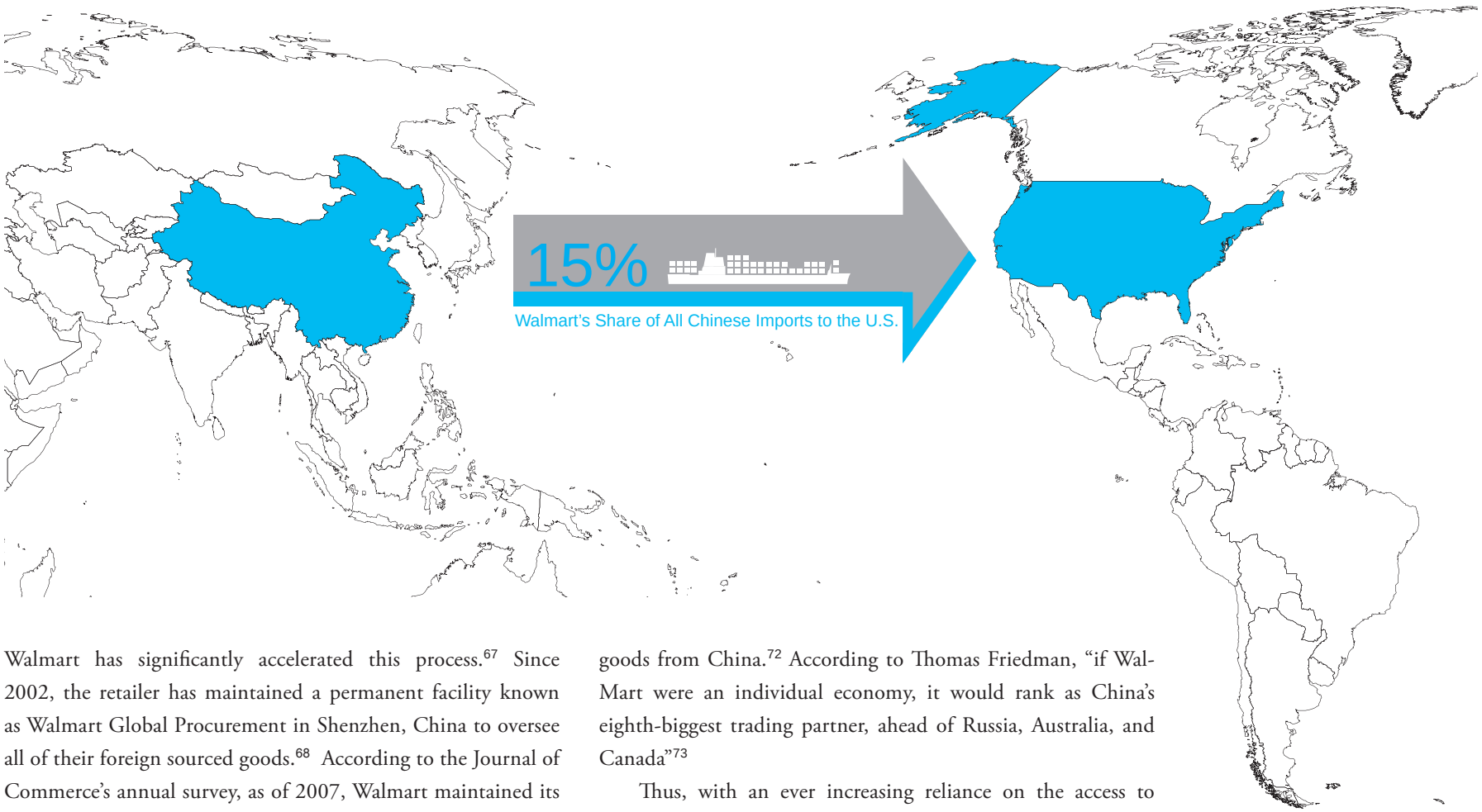


fig. 086. above
Top Ten U.S. Importers - 2007
Compared in Twenty-Foot Shipping Container Equivalent Units (TEUs) imported per year

to their headquarters; instead, production location becomes entirely based upon where a product can be manufactured for the lowest amount of money.[63] "Eventually the only way to lower costs is to manufacture products outside the U.S., in countries with lower labor costs, fewer regulations, less overhead." [64] Even producers that continue to maintain their own manufacturing facilities have found it necessary to move their production lines to low wage nations.

While items are constantly being produced to be sold in Walmart outlets in many nations across the globe, flexible, specialized factories in China remain by far the leading foreign suppliers of these consumer goods, in fact, of the Retailer's 6 000 approximate suppliers, 80% are located in China.[65] Furthermore, as this phenomenon has sparked the creation a significant industry of flexible, specialized factories in China, Walmart's suppliers have felt forced to move or contract their production offshore. If they don't, Walmart possesses the scale to justify approaching these factories themselves and directly source a similar product under a private Walmart label.[66]

The phenomenon of offshoring production to developing nations began well before Walmart reached the scale and scope of influence it sees today, however, as Charles Fishman argues,



Walmart has significantly accelerated this process.[67] Since 2002, the retailer has maintained a permanent facility known as Walmart Global Procurement in Shenzhen, China to oversee all of their foreign sourced goods.[68] According to the Journal of Commerce's annual survey, as of 2007, Walmart maintained its position as the number one firm in the United States in terms of total imported twenty foot equivalent (TEU) shipping containers by sea.[69] The Retailer sources 100 percent of its private label apparel from low-cost countries,[70] manufactured in an estimated 48 different countries.[71] As of 2005, Walmart astonishingly accounted for over 15 percent of total U.S. imports of consumer goods from China.[72] According to Thomas Friedman, "if Wal-Mart were an individual economy, it would rank as China's eighth-biggest trading partner, ahead of Russia, Australia, and Canada"[73]

Thus, with an ever increasing reliance on the access to low cost goods produced in depressed overseas wage markets, transoceanic shipping has come to play not only a significant, but essential role in the Retailers current operations, as Walmart maintains and conducts a truly global system of production and consumption. ■

fig. 087. above
Walmart's Share of Total Imports to the United States
15% of all imports from China to the United States are by Walmart

NOTES: 01.3 NETWORK LOGISTICS

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PART 02: futures


Food Center
Meat

a shifting model 02.1

Recent socio-political and economic instability, sparked by the sub-prime derivative crisis of late 2008 (characterized by market volatility, foreclosures, corporate bailouts and collapsing financial institutions) has significantly affected the contemporary social, political, cultural and industrial climate. It is this climate, however, which provides the context for an investigation into the mechanisms of the Walmart Corporation, to be brought into the realm of operational speculation and architectural or urban intervention.

For a variety of reasons, the Walmart Corporation has not been immune to this recent period of instability. In August of 2011, Walmart announced a 0.9 percent drop in same-quarter sales at American retail outlets which had been open at least one year – a ninth consecutive quarter of negative growth.[1] The Retailer claims, with some merit, that they have experienced a difficult period of sales due to the fact that lower income households represent a significant portion of their clientele – the same population demographic likely to face economic strain in a period of recession.

This decline in Walmart's sales, is not an entirely new phenomenon, and appears to represent a larger trend then can merely be attributed to a loss of low-income customers in a period of recession. As written by Charles Fishman as long ago as 2006, "Walmart's same-store sales figures show that, hard as it is to believe, the power of 'always low prices' is waning. In the calendar year 1998, Walmart's same store sales rose 9 percent. In the calendar year 1999, they rose 8%. In 2001, they rose 6 percent. Since then it's been 5% (2002), 4% (2003), and 3.3% (2004). In the first half of 2005, same-store sales were up just 3.2%."[2] These figures suggest that at a certain point, influences external to low cost alone, are gradually influencing the preferred shopping destinations of Walmart's customers; influences which may form less quantifiable attributes, such as shopping atmosphere and perceived product style and quality. While competitors such as Target have often sought to meet some of these criteria, Walmart has relied nearly exclusively on their

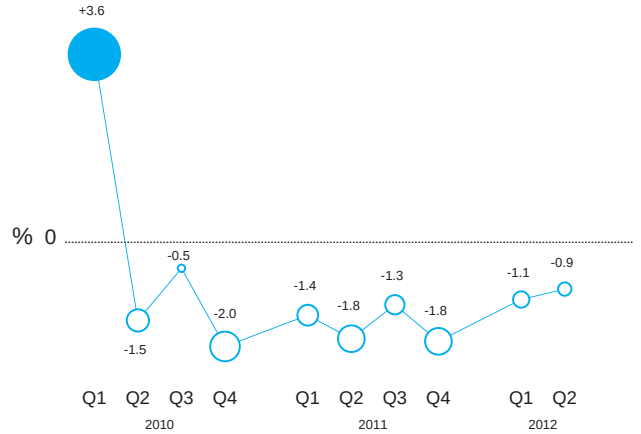


fig. 088. far left
Experimental Sustainable Supercenter - Aurora, Colorado
One of two experimental sustainable outlets opened by the retailer in 2005, designed to reduce the buildings overall embodied energy and continual energy consumption

fig. 089. far right
Experimental Sustainable Supercenter - Aurora Colorado, Roof View
The Experimental outlet in Aurora features light capturing skylights, which pivot mirrors to catch the sun, and solar panels (seen in the background). Despite these adjustments to address individual outlet's energy consumption, they do not address the Walmart industrial models systemic sustainability, dependant on moving goods incredibly long distances

fig. 090. above
Walmart Same Store Sales Figures 2010 Q1 - 2012 Q2
For Stores Open For One Year or More (United States) - Nine consecutive quarters of negative growth

ability to provide the lowest priced goods at the sacrifice of traditional retail amenities and high quality good provision.

Traditional methods employed by Walmart to achieve continual price reductions to keep ahead of the market in terms of price have become increasingly difficult. It is hard to imagine a more streamlined distribution system; nearly every product is already produced within a just-in-time manufacturing model, and a significant amount of their suppliers' production and manufacturing has already been out-sourced and offshored to take advantage of low labour costs in developing nations. In other words, Walmart is increasingly losing the ability to guarantee they are the sole provider of the lowest price of any given product, suggesting the potential and possible imminent systemic shift in the Retailer's strategic operations and functions within the city and the American economy.

Compounding the economic difficulties facing the Retailer is the inevitable rise in the price of energy, be it electricity or fossil fuels, to power Walmart's mega-infrastructures.[3] While undoubtedly a component of a PR campaign to improve the image of the Retailer in the public eye, yet likely also driven by economics and cost savings, Walmart unveiled a sustainability initiative to reduce energy consumption throughout their retail network in 2005. Both audacious and ambitious, this sustainability initiative declared three broad goals or targets for the Walmart Corporation: to be supplied 100% by renewable energy, to create zero waste, and to sell products that sustain people and the environment.[4] Jesse LeCavalier notes: "Walmart

has approached this challenge with its characteristic rationalism, discipline and zeal; it has understood that given the sheer size and scale of the enterprise, small improvements would have big impacts."[5] To date, however, Walmart's energy saving or sustainability innovations have been just that, small improvements, which do admittedly make a difference at the scale of the Retailer, yet only skim the surface of their projected goals. While positives can be seen in the construction of 'experimental' sustainable retail outlets, complete with permeably paved parking lots, skylights and low energy LED lighting; the integration of hybrid vehicles into their trucking fleet, and redesigning packaging to create less waste, they fall far short of the kind of systemic logistical overhaul the Retailer would require to move beyond positive bullet points on an energy saving checklist, towards the kind of sustainability described in their 2005 report.[6]

Signalling a different approach towards these sustainability challenges, in July of 2009, Walmart unveiled a three step plan to create a Sustainability Product Index ('SPI') – essentially a database to take better stock of sustainability and energy consumption efforts throughout Walmart's entire supply chain. Noted by Walmart's President and CEO, Mike Duke: "Customers want products that are more efficient, that last longer and perform better" furthermore, they increasingly "want information about the entire lifecycle of a product so they can feel good about buying it. They want to know that the materials in the product are safe, that it was made well and that it was produced in a responsible way." [7] According to the Retailer, the first phase in the creation of the SPI will consist of a survey to be filled out by each of Walmart's more than 100 000 suppliers as "a key first step toward establishing real transparency in our (Walmart's) supply chain." Taking this initiative further, the second phase of the Sustainable Product Index plan involves Walmart creating and providing initial funding for a "consortium of universities that will collaborate with suppliers, retailers, NGOs and government to develop a global database of information on the lifecycle of products – from raw materials to disposal." [8] Finally, phase three of the plan involves the creation of a simple rating system or production information sheet, similar to nutritional information labels of food items, describing the sustainability and embodied energy of any given product, granting consumers "transparency into the quality and history of products." [9] It is not Walmart's intention to solely "create or own this index," states Duke, "We want to spur the development of a common database that will allow the consortium to collect and analyze the knowledge of the global supply chain. We think this shared database will generate opportunities to be more innovative and to improve the sustainability of products and processes."[10]

Like all organisms and entities of big business, Walmart's scale affords them a degree of stability; however, operating off slim profit margins, slight fluctuations in operating and overhead costs can truly become significant when multiplied across

fig. 091. above left
Walmart Disaster Response Coordination Vehicle
Shown during Hurricane Irene deployment, 2011

fig. 092. above right
Walmart Trucks Delivering Hurricane Katrina Releif Aid

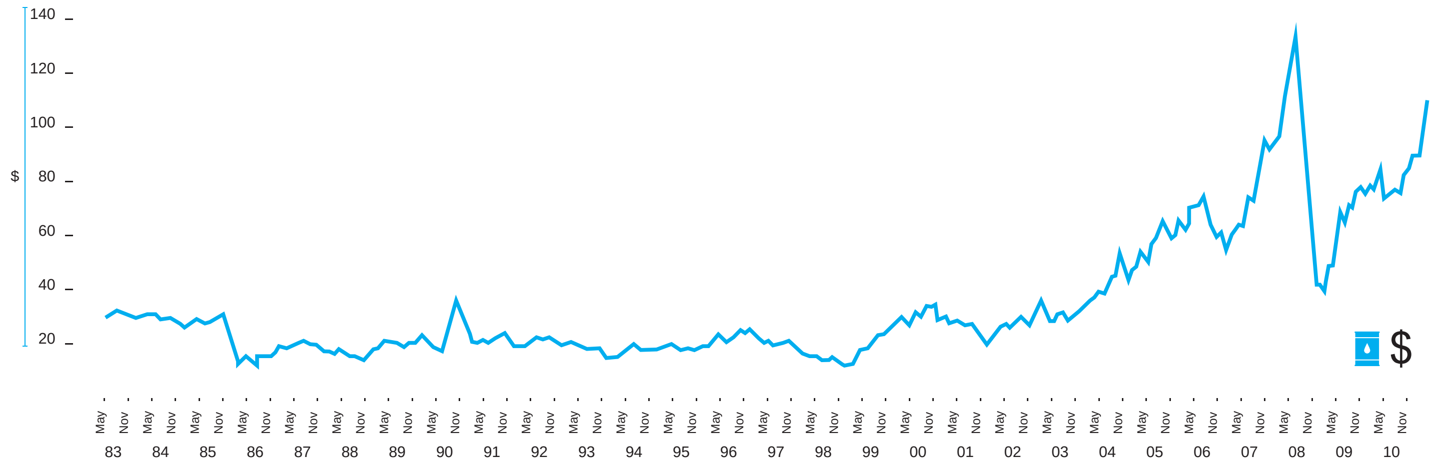
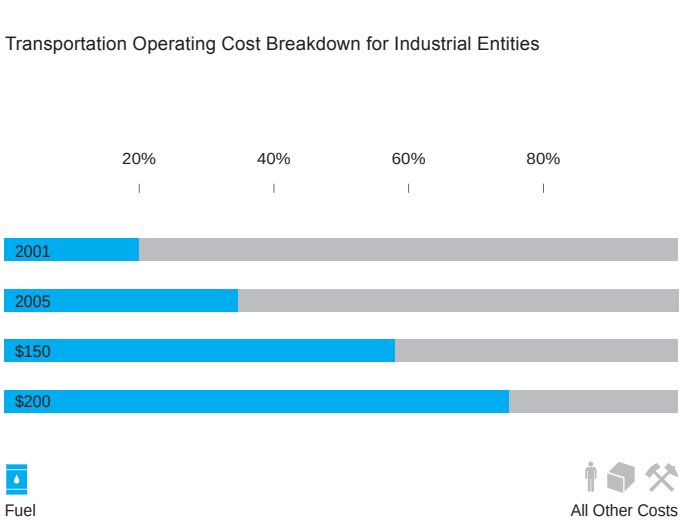


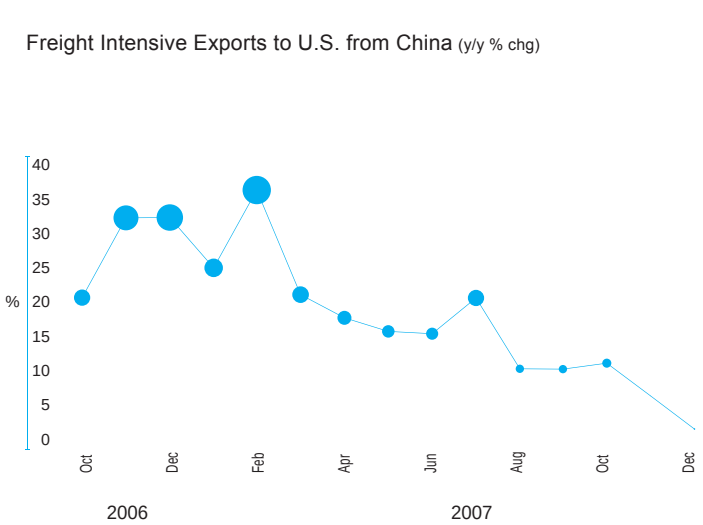
fig. 093. above
Price of Crude Oil in U.S. Dollars 1983-2010
Despite the temporary drop in price which can be associated with the 2008 gloabl recession, the long term price of oil trend has been a consist and accelerating climb.

fig. 094. opposite left
Transportation Operating Cost Breakdown for Industrial Entities
The Continued rise in the price of oil has both a signifficant effect on overall transportation costs for industrial actors, but also the overall precentage of these operating costs are directly associated wit hthe price of fuel. The figure procets this relationship at oil prices that have already been reached, as well as projected prices.

the Retailers entire supply chain. While certainly the initiatives announced by the Retailer which seek to modify their business model to achieve a broader sustainability model beyond focusing simply on overall energy reduction (one that is also concerned with product lifecycles and material quality and overall effectiveness) can be interpreted as a positive development, Walmart also appears motivated by pure economic survival, granting a certain credence to their proposals. As both a voracious and effective capitalistic organism, it can only be assumed the Walmart Corporation would mutate or evolve its role, place and identity within the United States to ensure its own survival. As argued by architectural theorist Jesse LeCavalier, the Walmart Sustainability Product Index signals the active exploration of such evolutionary transformations by the Retailer. "Given the intent to create the index in the public eye and with the cooperation of NGOs and universities, Walmart seems here to be positioning itself not simply as a discount retailer but also as a kind of de facto regulatory agency"[11]

LeCavalier describes these sorts of programs, plans or initiatives outside the traditional role of a private retailer, as "extra-commercial activities," exemplified by the Retailer's involvement in disaster relief. "In the aftermath of Hurricane Katrina, the Retailer mobilized its logistics expertise to facilitate relief efforts in the Gulf Coast region. Even before the storm made landfall, the company had anticipated shortages and had trailers loaded and ready in their Brookhaven, Mississippi





distribution center. Right after the storm, Walmart dispatched trucks stocked with supplies to affected areas in Louisiana and Mississippi – often ahead of the National Guard." [12] Additionally, in the hurricane's aftermath, Walmart converted its various retail outlet parking lots in the Gulf Region to a networked series of disaster relief shelters or camps. Since Katrina, Walmart has established itself as a private disaster relief agency, built upon its logistics system, maintaining "nine disaster distribution centers strategically located across the country stocked with relief supplies needed to assist communities recover in the event of a disaster."[13]

These extra-commercial activities, including the creation of a sustainability database and disaster relief logistical safety net, not only highlights the Retailer's ability, but willingness and desire to mutate and evolve to secure their position as a vital infrastructure in the mechanisms of the American economy. The bulk of these extra commercial initiatives, however, highlight the true spheres of the Retailer's expertise: logistical, territorial, data management. It is expertise in these spheres which both allows the Retailer to exhibit a considerable influence over public policy, urban development, and socio-economic landscape of the United States, but also to demonstrate a potential which Jared Diamond describes as the ability for entities of Big Business to tackle some of society's larger and pressing problems.[14] ■

fig. 095. above middle
Freight Intensive Eports to the U.S. from China
(year to year percent change)
Illustrates a signifficant drop in goods being shipped from China to the United States during the period of rapid acceleration in the price of oil in 2006 and 2007

fig. 096. above right
Cost of Shipping 40' Container From China to U.S. (200-2007)
Between 2000 and 2007, as a result of climing fuel costs, the price of shipping a 40' container from China to the United States nearly trippled, signifficantly straining industrial models dependent on the volume movement of inexpensive goods overseas.

INDUSTRIAL RE-LOCALIZATION

The writing of Jeff Rubin presents a very possible future scenario and context whereupon Walmart's current operational model could be significantly threatened, but also a theoretical context within the designed speculation of this project pushes the Retailer's inherent ability to act as a facilitator of an industrial, cultural, and social evolution to a new systemic level. As argued by Rubin, former chief economist of the Canadian Imperial Bank of Commerce (CIBC) World Markets, no longer can the long term economic viability of oil as an affordable fuel source be guaranteed. Beyond the potential constraints on American urban structures accustomed to status quo personal vehicular ownership, this notion poses significant challenges to the country's global leaning economic structures, so dependent on overseas trade via trans-oceanic shipping. In fact, Rubin predicts a not too distant future whereupon the price of oil, linked to the price of transportation, negates the wage advantage gained from the manufacture and shipment of certain products, and certainly the majority of light weight, low mark-up consumer goods from overseas.[15] Between 2000 and 2008, due to the rising price of oil and more energy consumptive bulk shipping methods, the price of shipping a standard forty foot shipping container from East Asia to the United State's eastern seaboard tripled.[16] Chief among those actors who would experience this strain stands the Walmart Corporation; as the Retailer depends so heavily on the importation of inexpensive goods produced overseas.

Rubin predicts that in the future, in addition to overall energy use, the distance between the production of goods and its eventual consumption will become much more important. In other words, a distance economy will be born which will spur a reorganization of global industrial networks and organizational patterns, fundamentally linked to our urban structures and systems. He predicts that this distance economy will force the emergence of more localized production and consumption systems, with manufacturing, food production, distribution of goods, transportation, and living experiencing a correlated territorial compression. Could this scenario not only predicate, but necessitate the re-emergence of manufacturing industries within the United States? While for the bulk of the industrial era, technological innovation and advancement was in part facilitated by the ability to easily move products across long distances, allowing producers to specialise on certain goods, what will happen to these industrial structures when the ability to transport products becomes increasingly difficult? While playing a significant role in the evolution of contemporary economic systems, could Walmart play a role in the facilitation of this re-localization of productive processes? Could the Retailer act as a catalyst for the integration of new and emerging forms of production back into a local scaled urban fabric? Certainly such possibilities invite architectural analysis and speculation in a consideration of such futures. ■

NOTES: 02.1 A SHIFTING MODEL

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2 Charles Fishman, *The Wal-Mart Effect: How the World’s Most Powerful Company Really Works--And How it’s Transforming the American Economy* (Penguin (Non-Classics), 2006), 212.

3 Jeff Rubin, *Why Your World Is About To Get A Whole Lot Smaller*, First Edition. (Random House Canada, 2009).

4 Walmart Corporate, “Walmart 2010 Global Sustainability Report,” *Walmartstores.Com*, 2010, http://cdn.walmartstores.com/sites/sustainabilityreport/2010/WMT2010GlobalSustainabilityReport.pdf. (accessed, April 2011)

5 Jesse LeCalvalier, “All Those Numbers,” *Designobserver.Com*, Logistics, Territory And Walmart, May 24, 2010, http://places.designobserver.com/feature/walmart-logistics/13598/. (accessed August 25, 2010)

6 Charles Fishman, 269.

7 Walmart Corporate, “Sustainability Product Index Press Release,” *Walmartstores.Com*, 2010, http://walmartstores.com/pressroom/news/9277.aspx. (accessed, October 2010)

8 Walmart Corporate, “Sustainability Product Index Press Release,” *Walmartstores.Com*, 2010, http://walmartstores.com/pressroom/news/9277.aspx. (accessed, October 2010)

9 Walmart Corporate, “Sustainability Product Index Press Release,” *Walmartstores.Com*, 2010, http://walmartstores.com/pressroom/news/9277.aspx. (accessed, October 2010)

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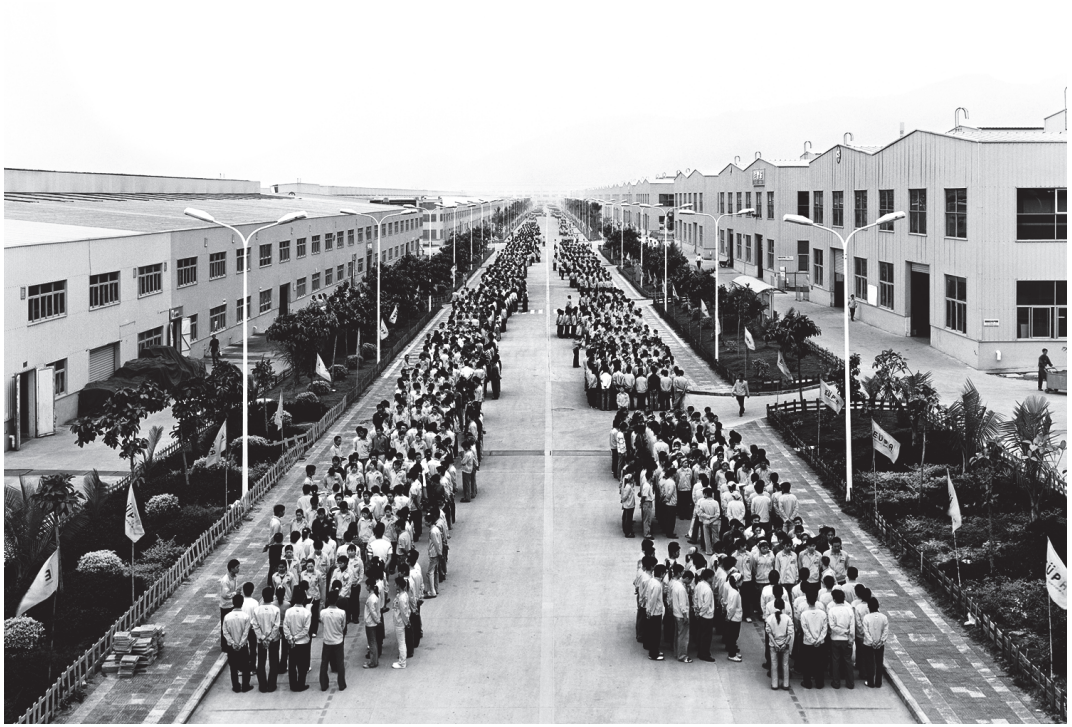
12 Jesse LeCalvalier, “All Those Numbers.”

13 Walmart Corporation, “Logistics Fact-Sheet”. *Walmartstores.Com,* http://www.walmartstores.com/pressroom/factsheets/ (accessed May, 2011).

14 Jared Diamond, “OP-ED CONTRIBUTOR; Will Big Business Save The Earth?,” *The New York Times*, December 6, 2009, http://www.nytimes.com/2009/12/06/opinion/06diamond.html. (accessed september, 2010)

15 Jeff Rubin, *Why Your World Is About To Get A Whole Lot Smaller*.

16 J. Rubin, “The New Inflation,” *CIBC World Markets* 1 (May 27, 2008), http://research.cibcwm.com/economic_public/download/smay08.pdf.



the future of manufacturing 02.2

During Walmart's rise to commercial and economic dominance within the world of consumer goods procurement, distribution, and sales, the Retailer has played an active role in the establishment of globally scaled systems of production, favouring interactions with large scaled enterprises capable of supplying large quantities of goods on short order. However, many large producers and manufacturing firms have struggled in recent years to effectively navigate a period of economic instability with the agility of a giant. In contrast, many of the most fertile emerging systems of production and manufacturing within the United States are moving away from this global scaled production within large firms, embracing much smaller 'micro-factory' typologies.

While at times these micro-factories may be loosely associated with a larger producer, often times they form independent operations at an entrepreneurial scale, with typically composed of less than fifty employees, often times, less than five employees, or even a lone individual; producing goods from furniture to electronics, bicycles, to clothing and textiles. Utilizing new tools that are democratizing product prototype and development processes; employing new organizational methods, harnessing the power of online, open source, collaborative communities; and taking advantage of a growing bandwidth within existing large scale contract factories; many small or micro manufacturers have exhibited the ability to not only survive, but grow within the strained contemporary economic climate. In the future, "analysts expect almost all new manufacturing jobs in the US will come from small companies."[1] ■

fig. 097. far left
Manufacturing Campus
Cankun Factory, Zhangzhou, Fujian Province, China.
Producer of household appliances (coffeemakers and irons).

fig. 098. far right
Electronics Manufacturing Facility Interior
Bird Mobile, Ningbo, Zhejiang Province, 2005

TOOLS OF THE TRADE

Since the era of industrial centralization, many of the tools of industry, including those involved in product design, prototyping, and fabrication processes remained prohibitively expensive. Recently, many of the contemporary tools associated with these processes including software, laser cutters, and CNC routers have become much more accessible to start-up producers. As described by *The Economist*, the recent emergence of desktop 3D printing technology, in particular, as an affordable prototyping tool is dramatically enabling the emergence of the micro-factory as a strong incubator of product design and development.[2]

Predominantly employed in the prototyping of products and components, 3D printers have made it possible to rapidly move from a three dimensional digital model to an accurate physical object; stacking thin layers of material through a computer controlled additive process. The increasing speed at which 3D printers can fabricate prototype components facilitates rapid feedback loops within design processes, as prototypes can quickly, and repetitively be evaluated and fine-tuned in both physical and digital environments before scaling up for final production. 3D scanners have made it possible to pull existing parts and components into this hybrid process of digital and physical design.

Once too expensive for many small or start-up producers, the price of these devices has continually dropped in recent years

making them more and more accessible to micro-producers. In fact, the Brooklyn based makers of the MakerBot, themselves a start-up team of hardware engineers employing micro-factory principles have recently developed a 3D printer that retails for less than $1 000 and is intended for rapid prototyping. The open-source design of the desktop MakerBot device operates with the same production capabilities of equipment that only five years ago cost $125 000.[3] While it is important to note this shift in the affordability of the actual printing device, the more significant effect this technology is having on the economics of new product manufacturing lies in the time and money producers now save compared to custom prototype fabrication

fig. 099. same above right
The MakerBot
Founded in 2009, MakerBot Industries produces affordable, open source desktop 3D printers ideal for small scale rapid prototyping. Technology of this sort was previously only availableto large scale producers, but is increasingly accessible to small and or start-up producers with limited capital support.

through traditional subtractive milling processes; economic burdens which effectively limited speculation and risk taking for all but the largest producers in the past. Money invested in these expensive development and prototyping processes would effectively dictate the subsequent volume required in final production to recoup ones costs. The 3D printer is freeing micro-producers from expensive and slow historic models of research, design, and development processes which then required the economies of scale seen in mass production for operational viability.[4]

With an aim to increase the accessibility of advanced manufacturing tools to micro-producers, we are now seeing the emergence of infrastructures and spaces specifically supporting social or collaborative use of industrial fabrication and prototyping equipment, much like membership based auto-share organizations. Originating in San Francisco, currently operating 4 locations in California, and plans to open a further 20 throughout the United States, TechShop, offers access for small producers to workshop space, meeting rooms, and storage lockers in addition to specialized prototyping tools and advanced manufacturing equipment (such as laser cutters, milling machines, vacuum formers, injection molders, electronic and circuitry tools, and welding equipment) for a monthly fee.[5] While certainly TechShop is home to the production of many common and established product types, their workshop and studio spaces have also fostered the development of highly sophisticated, complex and innovative projects. For example, at one time in 2009, the Menlo Park TechShop outside San Francisco was home to the development and machining of a vapour-deposition chamber, a device used to produce synthetic colorless diamonds; the production of rocket-lander modules, developed to compete in the Google Lunar X prize ($30 million prize for the first private team to send a robot to the moon); and the production of advanced circuit boards by a micro-producer

fig. 100. above
TechShop
Marketing images from TechShop, the company founded in the San Francisco Region offering membership based open access to advanced manufacturing equipment and workshop space.

for the management of electric grids for utility companies, later distributed under the name of the giant engineering firm ABB, lending credibility to fabrication in the micro-factory setting.[6]

COLLABORATIVE CO-CREATION

In addition to the increased innovative capacity seen within these micro-production setups as they have gained access to advanced manufacturing tools and equipment; the emergence of collaborative online communities supporting the development of open-source, creative commons licensed products has further allowed this emerging industrial typology to act as a hotbed for manufacturing and product innovation.[7]

Since the online, user contributed development of the Apache Server, a foundational piece of software which much of the internet itself is built upon in the early 1990s, self organizing, online collaborations have proven capable of remarkable innovation and product development in a digital environment within the spheres of software and application design (such as the Linux operating system and OpenOffice suite).[8] Where these open-source models succeed is in harnessing the power of a much larger brain trust then if a product were being developed in isolation; actively cultivating the participation of more voices in a design process within self-forming communities, without working out of traditional hierarchical corporate or institutional configurations. They allow for product design, research, and manufacturing forming a bottom up, non-hierarchical processes.

To a large degree, what has made these collaborative communities, once only seen in academic settings, form not only strong incubators of innovation, but also viable approaches to research and development within commercial enterprises, lies

in the evolution of the underlying legal framework protecting intellectual property. During the collaborative open-source development of the Apache web server, IBM was developing a similar competing product. They soon realized both the speed at which the Apache server was being developed, and the quality of the continually updated product, outpaced what they were developing by traditional means in their own research and development labs. Instead of continuing to compete with Apache, IBM dedicated a legal team to create a framework whereupon they both could contribute and gain from the development of this foundational server software. The resultant legal framework allowed IBM to devote teams of engineers to contribute to Apaches development, participating under the accepted premise that the software source code remained open-source, and any further development of that foundational code must be shared back with the collaborative community, yet traditionally patented commercial products could be built upon the developed software, provided the Apache community was cited in the patent. [9]

Building upon this premise, the Creative Commons nonprofit organization was founded in 2001 with the explicit goal of further developing this legal framework to encourage the universal access to research, education, and full participation in culture while driving a new era of development, growth, and productivity. As stated by the organization, copyright laws were created much before the digital age of rapid copying, pasting, and reused web page source code, which historic laws make difficult to legally engage in, as by default, they require an author's permission before repurposing, reproduction or remixing of original material.[10] In response, the organization has created an array of free, and publicly accessible legal tools for users to change the default "all rights reserved" of pre-existing copy right laws, to "some rights reserved;" establishing product licenses which are globally accessible, enforceable, and adaptive to user needs. As such, the organization has encouraged the emergence of a "growing digital commons, a pool of content that can be copied, distributed, edited, remixed, and built upon, all within the boundaries of copyright law;" maximizing "digital creativity, sharing and innovation."[11] It is now common to see the utilization of Creative Commons licenses and the CC symbol in place of a traditional copyright, as seen in the offering CC licensing to its users of online platforms such as: Flickr, Google Picsa, MIT Open Courseware, and the web presence of the United States Government, Whitehouse.gov.[12]

In essence, the emergence of these innovative licensing frameworks have fostered the alignment of incentives for both development communities and commercial participants to contribute to innovative product development, as certain elements of a given problem can be developed as a community without limiting the potential for the subsequent commercialization of goods built upon intellectual property developed within these open-source communities.

Where these new legal frameworks hold particular promise and potential within future industrial systems and their

fig. 101. far top left
TechShop San Francisco (SF) Exterior

fig. 102. far bottom left
TechShop SF Workshop Space

fig. 103. far right
TechShop SF Workshop Space 02

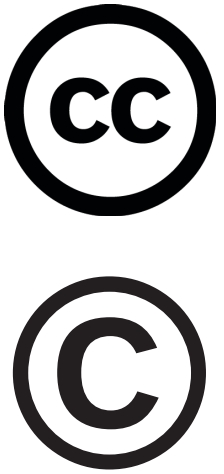


fig. 104. above
Creative Commons vs. Copyright

subsequent territorial configurations is in their application to the innovation and production of material products and consumer goods. As described by technology theorist Chris Anderson, the utilization and success of "post-institutional social models" as a catalyst for innovation on the Web have acted as a proof on concept, and these organizational models are now spilling over into the world of physical product design and manufacturing.[13] It not only demonstrates the power of human or social connection as an incubator of innovation, but also the ability for small, independent, start up manufacturers to design and produce goods when in the past only large companies had the resources to bring products to market. ■

CONTRACT FACTORY BANDWIDTH

At one time, the leap from independent product development to full-scale factory production required considerable resources, financing, and time to set up manufacturing and distribution systems. Working with contract factories, which emerged in the era of late capitalism, required a certain scale or volume, and the low quantity production runs desired by many micro-producers were far less than what these larger contract factories were willing to accommodate. The recent global period of economic uncertainty has prompted these factories to begin to welcome small-batch work. While these smaller orders provide lower overall volume, they allow contract factories a much higher profit margin; thus batch work for micro-producers is increasingly filling in the gaps within these factories production schedules; gaps left by larger firms reducing mass production runs amidst a period of greater consumer instability. In essence, a new and increased bandwidth has emerged within these factories, opening the door for entrepreneurial, start-up scaled micro-producers to take independently developed products to full, large scale production runs.[14] ■

THIRD PARTY LOGISTICS

Today, companies such as UPS, FedEx, and DHL no longer act solely as mail and package delivery services; but have increasingly begun to offer a much wider array of services to both large and well established companies as well as small businesses. This wider service array can be described as a complete third party 'for-hire' logistics management. These companies can be contracted to coordinate ones distribution needs, but also hired as a complete supply chain manager; overseeing inventory, storage, product packaging, reverse logistics and even repair services for a producer. The availability of these services providers lowers the barriers for start-up and micro producers and allows them to act like a much larger company.

In many cases, the presence of this third party logistics management may operate outside of consumer perception. The services of UPS can deviate greatly from their traditional mail and parcel distribution activities expected by consumers. The courier's increased foray into reverse logistics, product maintenance, and repair, is evidenced by the services provided to Toshiba, for example. As described by Thomas Friedman: "If you own a Toshiba laptop computer that is under warranty and it breaks and you call Toshiba to have it repaired, Toshiba will tell you to drop it off at a UPS store and have it shipped to Toshiba, and it will get repaired and then be shipped back to you." However, "UPS doesn't just pick up and deliver your Toshiba laptop. UPS actually repairs the computer in its own UPS-run workshop dedicated to computer and printer repairs at its Louisville hub. I went to tour that hub expecting to see only packages moving around, and instead I found myself dressed in a blue smock, in a special clean room, watching UPS employees replacing motherboards in broken Toshiba laptops."[15]

The transformation of the role being played by third party logistics contractors is playing a central role in the evolution of industrial typologies in several distinct ways. Firstly, the ability for companies of various scales to offload the spatial and operational obligations inherent in maintaining independent distribution and logistics systems has freed primary producers

fig. 105. above
UPS 757 Cargo Plane
As seen at UPS Worldport
Louisville, Kentucky

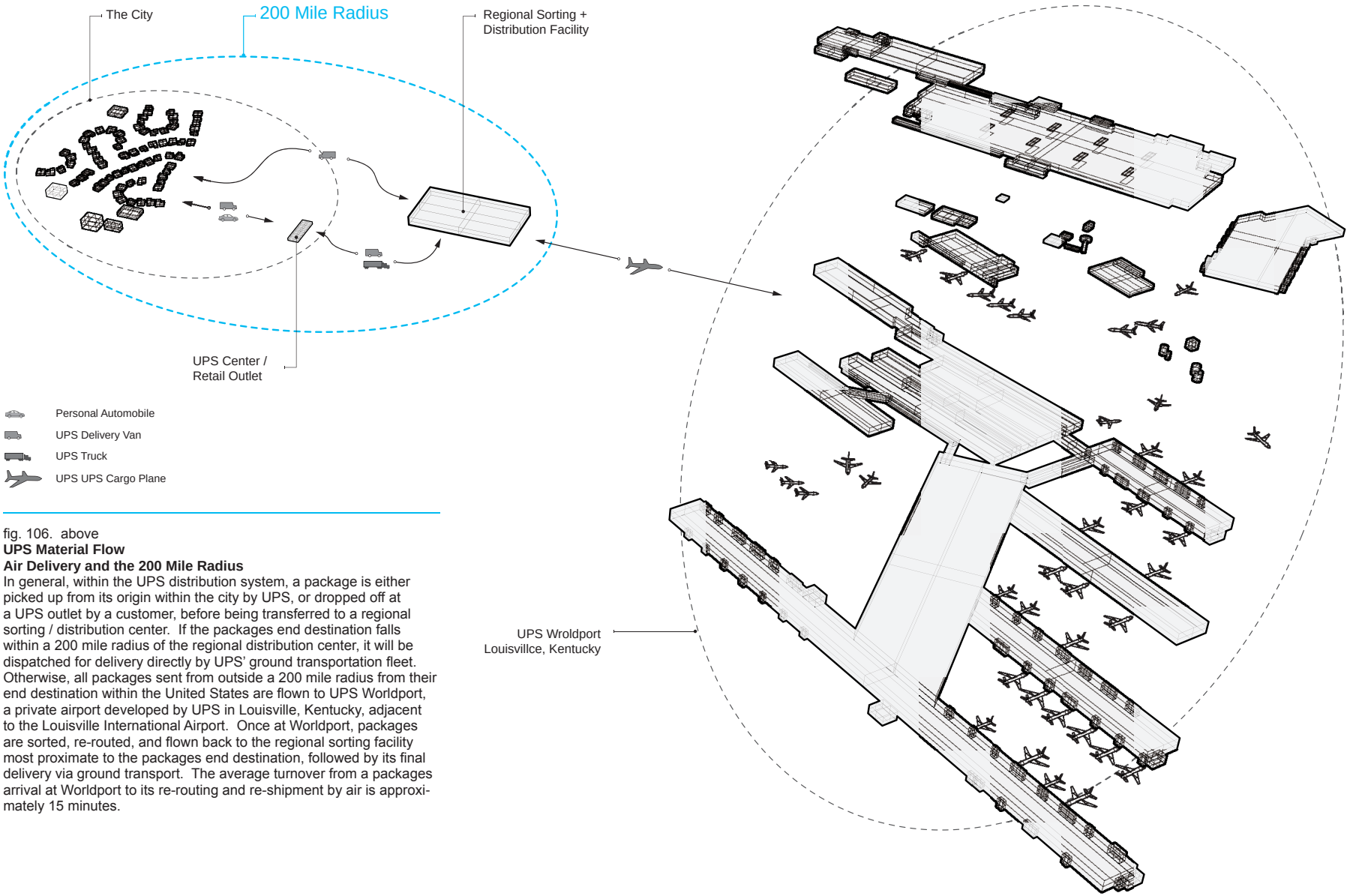


fig. 106. above
UPS Material Flow
Air Delivery and the 200 Mile Radius
In general, within the UPS distribution system, a package is either picked up from its origin within the city by UPS, or dropped off at a UPS outlet by a customer, before being transferred to a regional sorting / distribution center. If the packages end destination falls within a 200 mile radius of the regional distribution center, it will be dispatched for delivery directly by UPS' ground transportation fleet. Otherwise, all packages sent from outside a 200 mile radius from their end destination within the United States are flown to UPS Worldport, a private airport developed by UPS in Louisville, Kentucky, adjacent to the Louisville International Airport. Once at Worldport, packages are sorted, re-routed, and flown back to the regional sorting facility most proximate to the packages end destination, followed by its final delivery via ground transport. The average turnover from a packages arrival at Worldport to its re-routing and re-shipment by air is approximately 15 minutes.

from traditional industrial building typologies and spaces within the city. Without the need to maintain large amounts of inventory in-house, producers are able to become much more flexible and occupy a wider range of building typologies within a wider range of settings within the city. In a sense, third party logistics has enabled both a scalar and territorial atomization of producers within the United States. This development has spatially enabled the emergence of the micro-producer, one able to interact with large, even global, supply chains as they operate from their own home, garage, or other atypical industrial settings.[16]

Secondly, the more centralized distribution network used by UPS has informed the development of extremely large, programmatically hybridized industrial architectures, housing an increased territorial layering of activates associated with multiple stages of a product lifespan (such as storage, reverse logistics, maintenance, repair), yet also highly centralized. While this typology, exemplified by UPS' main distribution hub, World Port, houses the spatial overlap of products, components, and materials flowing both up and downstream through industrial supply chains, they form vast logistical agglomerations, spatially separated from urban territories, eliminating the potential interactions with emerging micro producers, manufacturers and end users or consumers with these product flows. In other words, these vast logistics agglomerations, lynchpins in contemporary systems of distribution, exchange, production and economy remain spatially isolated and closed off from the urban territories they support. ■

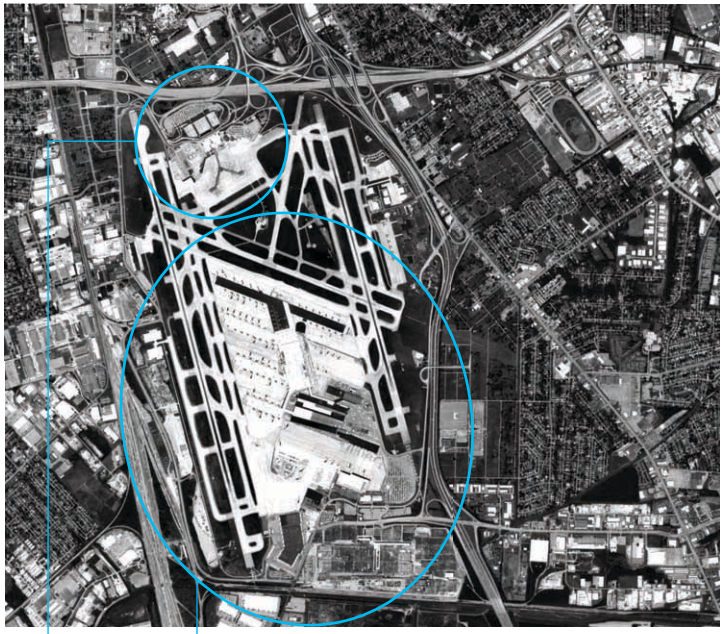
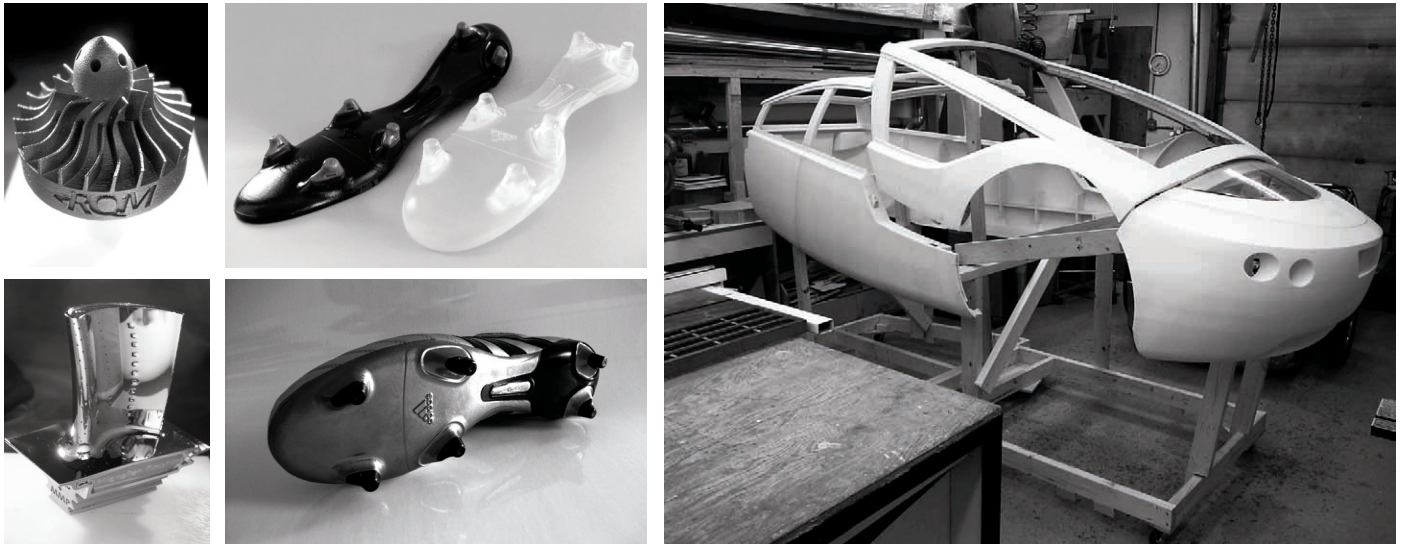


fig. 107. above
UPS Worldport - Industrial Agglomeration
UPS has played a role in the emergence of small scale producers and alternative manufacturing formats within the United States, yet their own geo-spatial strategy sees the bulk of their logistical services infrastructure, (composed of spaces dealing and interacting with a wide range of stages in the supply chain of countless companies in the United States), form highly concentrated industrial agglomerations.

These agglomerations, best represented by the incredibly large UPS Worldport shown above dwarfing Louisville International Airport, latch on to infrastructures which service the national or globally scaled movement of goods within distinct landscapes of logistics; morphological units segregated and separated from the inhabited city.



The Final Print
The following are goods produced using final quality 3D printing technology in a variety of materials.

FINAL QUALITY PRINTING

As previously discussed, the development of 3D printing technology is already affecting the product design, development, and prototyping processes. This technology's overall impact on both industrial manufacturing systems and their logistical relationship to territory may become much more significant with recent developments in the technology's capabilities.

While common desktop 3D printers such as the MakerBot are generally only capable of prototype fabrication due to the limits in the quality and durability of the plastics these machines are capable of working with. Advanced printers are beginning to be capable of working with a much broader range of materials, such as production grade plastics, metals, and other materials (including stainless steel, glass, and sandstone). 3D printers are gradually being employed beyond the fabrication of prototypes within the manufacturing industry, and instead, to produce *finished quality* products and components.[17]

While the equipment used in printing these finished quality goods currently exists only within the domain of specialized additive and 3D printing manufacturers, their capabilities have recently come online, accessible to many scales of producers similar to other flexible contract manufacturers. Pioneers in what is essentially a brand new and burgeoning industry, companies such as Shapeways, a New York based subsidiary of Phillips electronics, and Rapid Quality Manufacturing, a spinoff

fig. 108. top left
Metal Turbine
Produced by Rapid Quality Manufacturing (RQM)

fig. 109. bottom left
Complex Airfoil Assembly in Metal
Produced by RQM

fig. 110. top middle
Football / Soccer Shoe in Plastics
Produced by Adidas

fig. 111. bottom middle
Football / Soccer Shoe in Plastics 02
Produced by Adidas

fig. 112. right
Body of Urbee Hybrid Car in Plastics
Produced by Stratasys and Kor Ecologic

of Cincinnati based Morris Technologies both already offer customized, contract 3D printing production services in final grade materials; behaving as some have termed "Digital Production Plants," specializing in the additive materialization of digital models.[18]

Given that virtually no retooling is required between prints of different products or components within these devices, 3D printers significantly decrease the time it takes to bring digital models to final quality products. Often, these products can now move through this production process in a matter of "hours or days, rather than weeks or months with old systems." Analysts have predicted the time delay in bringing designs from digital concept to full production will drop by 50 to 80 percent in the near future.[19] As the 3D printing of finished quality goods is an additive process, using this technology significantly cuts down on the amount of material wasted in traditional subtractive manufacturing methods where parts are cut from solid blocks of material; the production of printed components often requires 90% less raw materials.[20]

The wider integration of this form of additive manufacturing has the potential to significantly affect the territorial, logistical, and architectural systems that compose contemporary industrial supply chains. While the ability to rapidly bring a product from ether to material reality will undoubtedly serve to tighten existing feedback loops of manufacturers and Retailers operating within JIT models, replacement or revised products can be ordered and printed without retooling lag, this will likely also enable an increased leanness in terms of the space required to warehouse or store inventory throughout manufacturing supply chains, including raw materials compared to those already operating under JIT models.

The most transformative outcome of an increased prevalence in final product 3D printing on contemporary manufacturing supply chains was posed as a question, and formed the main focus of a conference organized by DHL, the shipping and logistics giant in 2010. If a company could have customized parts, components, and products printed locally, why would they continue to ship those same goods from overseas? While at present, the facilities of contractors offering these printing services remain highly centralized, one can imagine the implication of the creation of a much wider territorial array or physical network of locations capable of this rapid transformation of ether into matter – it is much easier to ship ether than matter. With such immense resources and an already established territorial network, proximal to population bases within the American landscape, could 3D printing be the next technology brought into Walmart's logistical system as a component of the reprogrammed Supercenter; seeing the Retailer facilitate the digital movement of goods throughout the United States, acting like a 'digital production plant' in addition to their existing distribution methods?

Much as the ability to rapidly prototype products has reduced initial research and design costs, allowing producers to be more flexible with final production volumes; the reduction of product line retooling times removes many of the logistical incentives for mass production runs in previous industrial models. Without needing the financing to support mass product runs, this manufacturing system will be much more accessible

to start-up enterprises and speculative product development. As described by *The Economist,* this industrial future would suggest that infrastructures supporting innovation will become much more important, as "success in manufacturing will depend less on scale and more on quality of *ideas*."[21] Infrastructures that support the logistical requirements of conventional industrial operation will remain important, but those which foster *idea development* and *innovation* will become both increasingly valuable and essential. ■

NETWORK OVERLAP AND HYBRIDIZATION

Exemplifying the development of alternative operational models for collaborative production, design, innovation, and manufacturing, yet with a physical presence, is the Local Motors Corporation, launched in 2008. Released under a creative-commons license, Local Motors unveiled its first crowd source, user designed car, the Rally Fighter, in November of 2010.[22] The Rally Fighter's initial design was the result of an open design competition followed by a collaborative peer-development process, and combines mainly off the shelf components with

bespoke parts developed within this same online community.

Importantly, Local Motors's development network was not conceived as purely digital. The company's operational model specifically sought to harness direct user or consumer interaction throughout the entire design, development, consumption, and repair processes through a network of physical Local Motors outlets. The Rally Fighter is assembled in local micro-factory outlets, gradually opening throughout the United States; nodes in a Local Motors assembly grid. As such, the company is conceived as a physically decentralized yet highly connected network of facilities engaging in the final production of automobiles, the designs of which were developed in a much larger digital network. This allows for final production to take place both on demand, but also within a close proximity of their final market, with the end user often taking part in the assembly. As described by Tapscott and Williams, authors of *Macrowikinomics*, Local Motors' customers "design, buy, service, and even recycle their vehicle at a Local Motors factory in their region. It's a radical new model that combines hyperlocalism, customer engagement, and online collaboration to build cars that meet the needs and tastes of the local market."[23]

Already maintaining a dense array of physical territory

fig. 113. top left
Rally Fighter Mock-up
John Rogers Jr, Local Motors CEO with Rally Fighter mock-up during design development.

fig. 114. top middle
Local Motors Workshop Exterior

fig. 115. top right
Completed Local Motors Rally Fighter

which relates to urban populations, could Walmart sites support this kind of networked, localized industrial hybridization? Could these sites seek to re-establish localized domestic production processes, narrowing the spatial gap within the feedback and distribution loops of production and consumption within the contemporary city through an applied and conscious facilitation of these emerging start-up or small independent scaled manufacturers, developing localized nodes to accommodate social places of physical market space, for hire access to advanced fabrication and manufacturing equipment? Could such a reprogramming facilitate these emerging, social formats of *innovation* and production? Due to already engrained qualities of the Walmart territorial grid, a reprogrammed Walmart Supercenter could facilitate both physical and digital networking to other like nodes of localized production while allowing a simultaneous participation of local communities with their own economies. In effect, a reprogrammed Walmart Supercenter could foster and strengthen local economies and innovation; still allowing for, considering, and facilitating, broad networked production and collaboration; while simultaneously cohabitating and mixing with those actors solely local in nature. ■

NOTES: 02.2 THE FUTURE OF MANUFACTURING

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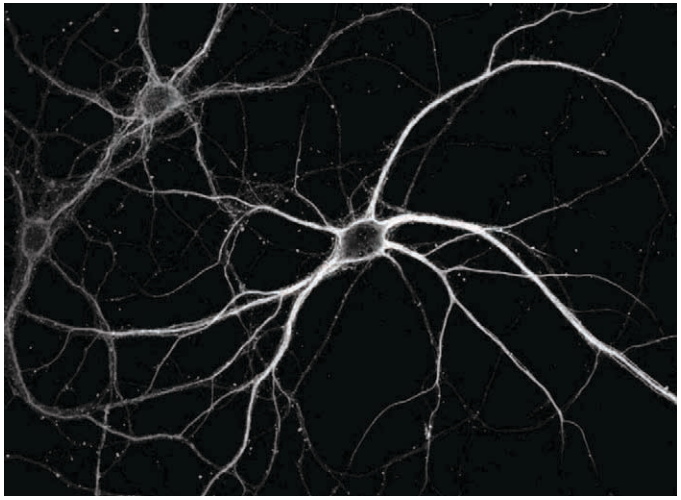
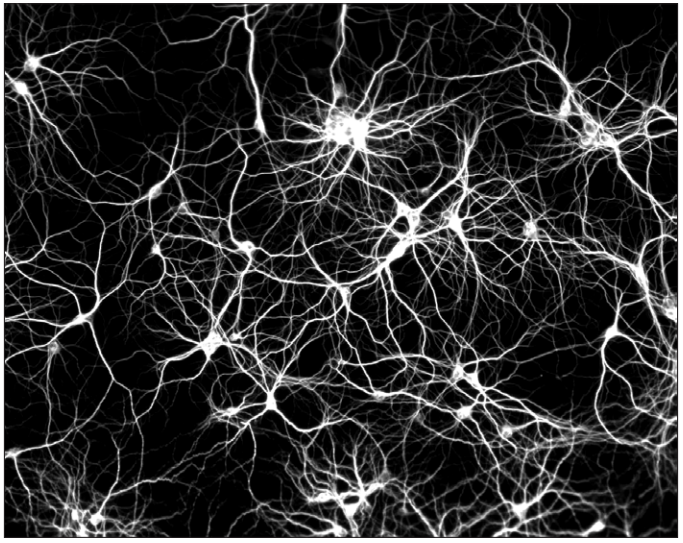
PART 03: projections





the space of innovation 03.1

If, as predicted, the future of manufacturing and production systems increasingly shifts to place value upon idea creation and innovation over 'mass' economies, it is important to consider the actual preconditions, and spaces which have historically incubated fertile environments of innovation. Frequently drawing from theories surrounding the mechanisms of evolutionary ecology, in his book, *Where Good Ideas Come From*, Steven Johnson explores these spaces and mechanisms of innovation within both physical and digital contexts. According to Johnson, several similarities or trends exist, and can be found common throughout many systems from which amplified innovative creation emerges, including theories such as 'the adjacent possible', exaptation, serendipity, fluid networks, and open platforms.

The term 'adjacent possible,' developed by theoretical biologist Stuart Kauffman, describes both the creative *potential* and *limits* to cycles of innovation. In natural systems, evolutionary innovation generally results from the re-mixing, re-combining, and cobbling together of existing parts; slowly building upon what has developed up to that point. Likewise, innovation and *idea development* throughout human history has not materialized out of thin air, and instead, nearly always emerges from new ways of assembling a constantly evolving set of existing parts; whether these parts are conceptual, or literally material components. The adjacent possible describes a certain natural creative inevitability that can occur once a necessary set of 'parts' has emerged through previous cycles of evolution, yet was not possible without these previous cycles of development and innovation.[1]

While the adjacent possible describes the basic or fundamental context from which innovation occurs, both exaptation and serendipity describe more specifically the phenomena that encourage or accelerate these innovative processes. Another term borrowed from evolutionary biology, exaptation refers to the appropriation of an existing mature or optimized trait, part, or technology and repurposing it for the creation of something new or to tackle a new problem

Idea as a Network
Creation, innovation, and new ideas, like synapsis in the brain can be seen as the result of connections between different materials or parts in a constantly fluctuating dynamic field

fig. 116. far top left
Synapsis 01

fig. 117. far bottom left
Synapsis 02

fig. 118. far right
Synapsis 03

different from its original intended purpose.[2] Serendipity in innovation refers to the emergence of a concept or idea through seemingly random or coincidental collisions and interactions. Thus, good ideas benefit from unintended influences; and the ability to tangentially grow into something valuable, yet originally unintended.

Gutenberg's printing press exemplifies these phenomena. At the time of his discovery, moveable typesetting was a four hundred year old technology developed by a Chinese blacksmith, yet was limited in its output as text was still hand rubbed onto paper surfaces. Concurrently, the screw press had become a ubiquitous piece of technology for the pressing of grapes in Gutenberg's native Rhineland. Though not a blacksmith, or a vintner, Gutenberg's *serendipitous* interaction and familiarity with each technology led to an innovative exaptation of the wine making equipment to rapidly press moveable typesetting onto pieces of paper, making mass printing possible.[3]

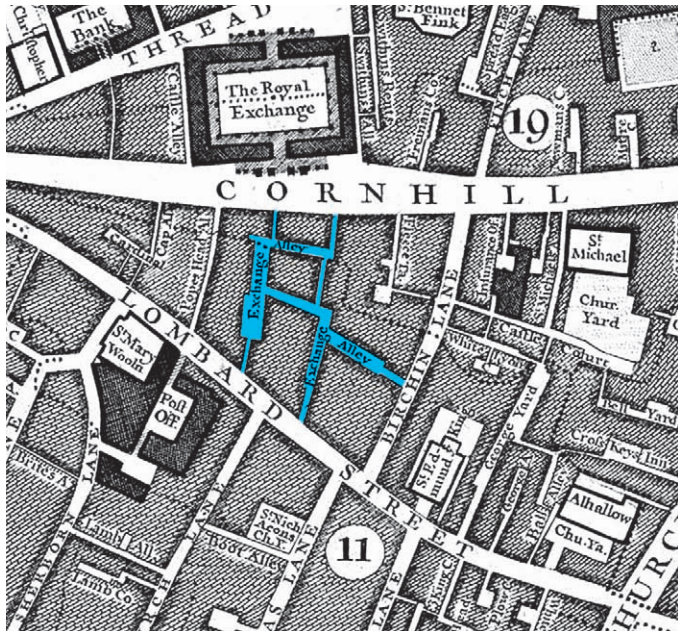
Thus, as Johnson argues, innovation occurs best within contexts that increase the density, movement and interchange of parts. The more parts one comes across, the greater the capacity, and opportunity for exaptation and serendipity to aid in the exploration of the adjacent possible as parts connect, breed, and hybridize. In this light, whether they are social, spatial or logistical; networks and their relative openness and plasticity act as critical enablers of innovative creation; the most effective are liquid, malleable, and adaptable to emergent conditions, users and stakeholders. Furthermore, particularly innovative environments see fluid networks interact with open infrastructures or *platforms* which specifically enable and support the development of these part collisions into new ideas, concepts, or products; providing an environment within which these parts can stick and grow. ■

fig. 119. opposite
Depiction of Guttenberg's Printing Press
A device resulting from the serendipity and exaptation, when Guttenberg borrowed from mature wine making technology (the screw press) allowing for the mass production of printed material

THE URBAN PLATFORM AND THE MESSY ENVIRONMENT OF COLLISION

In terms of physical environments, the urban condition has proven effectual for the cultivation and creation of innovation and exchange of new ideas over time. In a sense, this has historically formed a primary function and characteristic of the city. As argued by sociologist Henri Lefebre. "Urban is, therefore, pure form: a place of encounter, assembly, simultaneity. This form has no specific content, but is a center of attraction and life. It is an abstraction, associated with practice. What does the city create? Nothing. It centralizes creation. And yet, it creates everything. Nothing exists without exchange, without union, without proximity, that is, without relationships. The city creates a situation where different things occur one after another and do not exist separately but according to their differences. The urban, which is indifferent to each difference it creates…. itself unites them."[4]

A fundamental characteristic of the city is its role as an underlying framework supporting the coming together or physical concentration of people and goods. Due to this concentration, the city is an environment that increases the possible interactions and collisions between material or conceptual parts. However, fundamental to the city's historic ability to create an environment, which fostered innovative systems, was its assemblage of smaller incubators of exchange and interaction: public spaces and traditional market spaces foster unplanned



interpersonal exchange, or 'third-places' which cultivate unpredictable interactions and collisions with a social dimension.

The coffee houses of 17th century London exemplify this notion of a space of innovation as an incubator of creation within the larger framework of the city. As the importation of coffee from the new world spurred the emergence of houses for its public consumption beginning in the mid 1600's, the coffee houses of London began to act as social condensers, behaving as forums for unpredictable social interactions between patrons, functioning as "information exchanges for writers, politicians,

fig. 120. above right
Exchange Alley, London
Site of Jonathan's and Garraway's Coffee Houses.

businessmen and scientists." As described by *The Economist,* because these environments fostered social connection and exchange, they became the centers of informal "education, literary and philosophical speculation (and) commercial innovation." [5]

Existing in a time before street numbering or modern postal services, it became common for these coffee houses to act as patron's mailing address.[6] They became logistical hubs of local, interpersonal interaction and exchange, yet also maintained connections to the rest of world at large, and links to a larger network of coffee houses operating in a similar manner through the mail. They acted as relatively un-programmed public spaces or platforms within which their patrons could interact in an unplanned, non-choreographed fashion, allowing for social self organization of various groups. As a result, these spaces allowed for a sort of emergent programming often seen in public spaces, which could be directly associated with various examples of social, scientific, cultural, political, and technological innovation.

For example in the late 1680's, Edward Lloyd opened Lloyd's Coffee House, which was frequented by a sea based commerce and distribution community. Ship's captains and merchants would gather at Lloyd's to exchange the latest maritime news, gossip, and information, or attend ship or cargo auctions hosted on site. Through a collection of this information and other news learned through a broader network of correspondents, Lloyd began to publish these stories as a newsletter. Acting as a news exchange hub, Lloyd's became popular with shipping insurers or underwriters, to whom having access to the latest industry information was invaluable. In 1771, 79 of these insurer's and underwriters formed the Society of Lloyd's, known better today as Lloyds of London, essentially giving birth to the modern insurance industry, emergent from a platform or environment which fostered unplanned self-organizing social exchanges. A similar story describes the creation of The London Stock Exchange, formed out of two coffee houses, Jonathan's and Garraway's, located near London's Royal Exchange, frequented

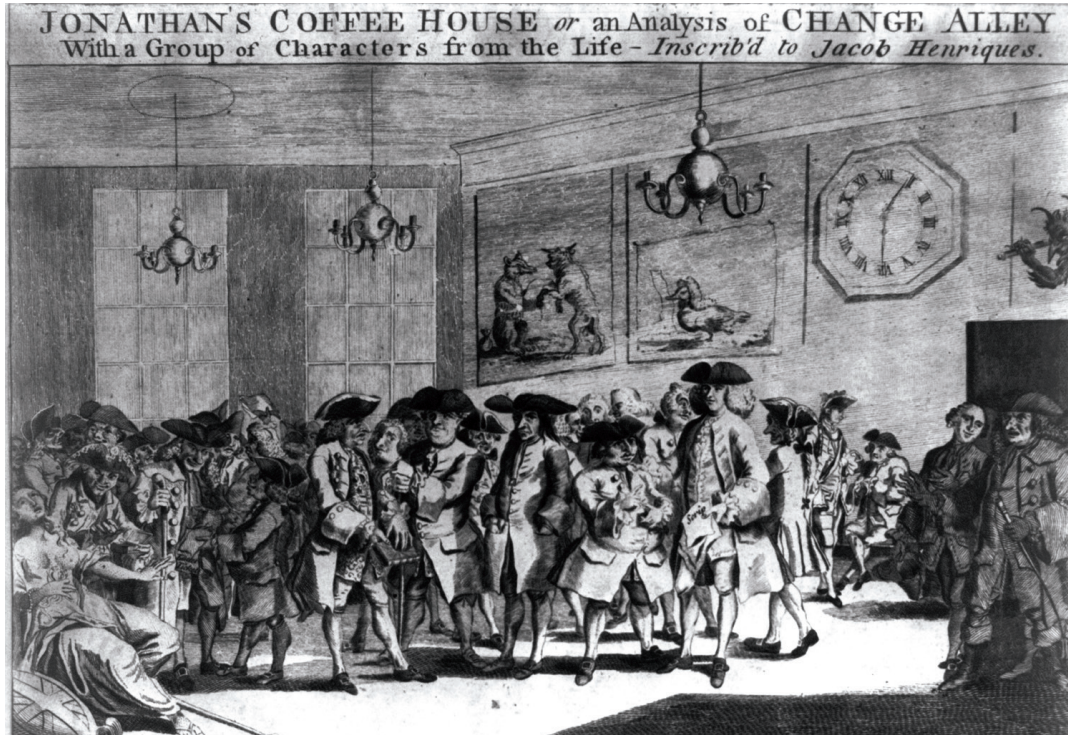


fig. 121. above
Jonathan's Coffee House Interior
A public 'third place' of messy , unpredictable social collission and interaction
- Jonathan's Coffee House which along with Garraway's would evolve into the London Stock Exchange.

by stockbrokers and jobbers.

A coffee house near St Paul's cathedral called The Marine, like Lloyd's, was gradually frequented by sailors, navigators and a maritime community. Gradually, The Marine began to host scientific lectures and forums once seamen and merchants realized advancements in science could improve their navigational technology thus improve their commercial fortunes. Through the use of the coffee house as a social platform, this marine community formed a mutually beneficial programmatic coupling, as scientists were equally eager to prove the practical effectiveness of their technologies or techniques. Thus, "it was in coffee-houses that commerce and new technology first became intertwined."[7]

These types of stories are not uncommon in the history of coffee-houses, as similar phenomenon could be seen in these spaces in regards to innovation in a wide variety of fields, be it technological or organizational, due largely to their ability to act as a hub of both local and global information or 'parts'-exchange in a social environment. Importantly, these spaces were messy, noisy, chaotic, unplanned, un-organized - fertile and alive. While they attracted emergent social groups, they were not pre-prescribed – they were allowed to grow, occupy, and innovate within these spatial platforms built on information connectivity.

As argued by Johnson: "A good idea has to be correct on some basic level, and we value good ideas because they tend to have a high signal-to-noise ratio. But that doesn't mean you want to cultivate those ideas in noise-free environments, because noise-free environments end up being too sterile and predictable in their output. The best innovation labs are always a little contaminated. […] Without noise, evolution would stagnate, an endless series of perfect copies, incapable of change."[8] However, the spaces, territory, environments, and organizational configurations playing out within the contemporary American urban fabric have been developed upon logics which have actively avoided the emergence of unpredictability, layering, overlap and interchange, creating a urban platform which struggles to facilitate the concentrated exchange and creation of a fertile urban condition described by Lefebre.

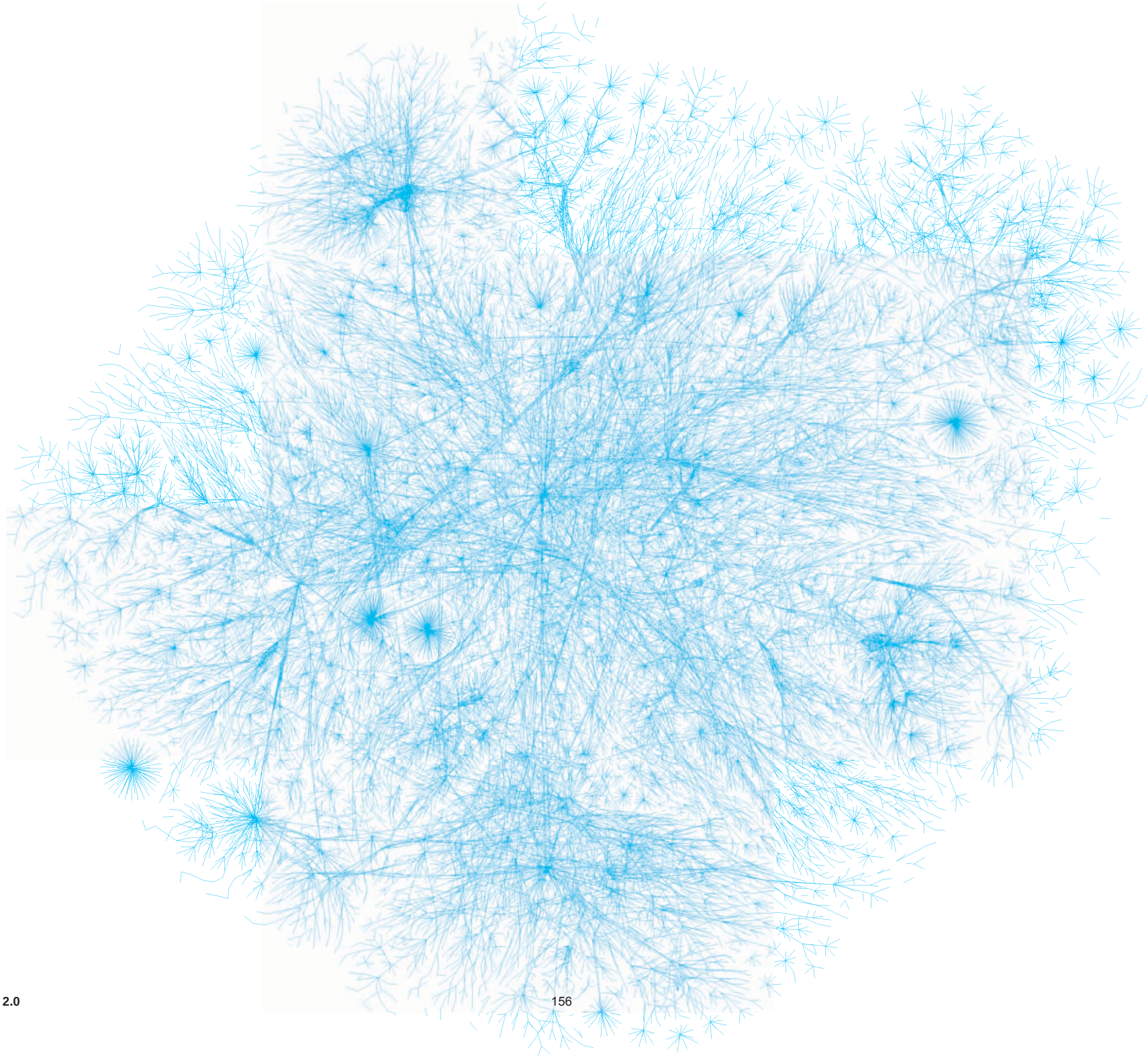
While the contemporary urban fabric exhibits a lack of platforms which facilitate these systems of social exchange, production and heightened innovation, within an online or internet based context, the emergence in recent years of what has been called 'Web 2.0' highlights the ability of effective networks and platforms to serve as incubators of innovation in contemporary society. ■

WEB 2.0

Originally described by network technology and media theorist Tim O'Reilly, the emergence of Web 2.0 infrastructures in the early 2000's represented a distinct paradigm shift in regards to online content creation, publication, distribution and development. In a physical sense, within its existing operational model, Walmart acts like the developers and actors that were involved in Web 1.0 content production and delivery. While both of these models have exhibited an effective responsiveness to consumer demand, they act as regulators of relatively fixed inventories of content, forming a one directional, top-controlled flow of products, be it text, images, news, or material goods. The Web 2.0 paradigm shift emerged as select online developers began to recognize the potential of harnessing the Internet's true network capabilities, and allow for a more multi-directional flow of goods and content within a developed platform. In essence, Web 2.0 entities by step back from the actual creation of content, and instead create the infrastructural platform that facilitates the creation, distribution, and consumption of content by the platforms users. As such, this shift by online developers can be described as a movement from publication to participation, or as described by O'Reilly, facilitating the development of a digital "architecture of participation"[9]

Where Web 2.0 has proven particularly effective in the cultivation of social interaction, and exchange between users has been its ability to connect with what technology theorist Chris Anderson refers to as "the long tail," or fringe users of the internet. Where Web 1.0 developers *controlled* the publication of online content creating an overall flattening or reduction in content diversity to appeal to an 'average' user by creating a platform for user participation, Web 2.0 developers not only narrowed the feedback loops between producers and consumers, it outright connected the two groups, reflecting more traditional or historic fora for the exchange of goods. These fundamental Web 2.0 operational models can be seen applied highly functioning online platforms as Twitter, Google, YouTube, and eBay.

As a successful commercial model of the Web 2.0 paradigm shift, eBay has monetized the creation of an infrastructure facilitating either producers of new content or providers of used goods to connect with consumers in a self organizing fashion. As a result, eBay has created a truly networked, social environment for multi-directional flow. As opposed to more traditional retailers, eBay's value and business is the facilitation of connecting goods and users by providing an underlying logistical support. Through cultivating and facilitating this direct exchange between users, eBay has managed to grow their user base, thus "eBay's competitive advantage comes almost entirely from the critical mass of buyers and sellers" it facilitates.[10] The more users they gain, the stronger their service becomes. While eBay and many other Web 2.0 platforms rely on advertising revenue, for-hire, or fee for service infrastructures can also form



viable scenarios for commercialization of these platforms of user participation. In a similar vein, YouTube, another prominent Web 2.0 developer, also effectively facilitates a social environment of user participation and exchange to create content.

Where once video production and distribution were very much controlled by large production firms and studios, YouTube has "allowed ordinary enthusiasts to effectively program their own private television networks, stitching together video clips from all across the planet."[11] This has dramatically revolutionized and narrowed the gap between video production and consumption circuits – on YouTube – they can occur within the same forum. By not only engaging the 'center' but also the long tail of the internet, it increases overall usership, thus increasing potential creators and exchangers of content, thus further incubating an environment where serendipity, exaptation, and the adjacent possible can flourish.[12]

This sort of operational paradigm has also been core to the growth of the Google Corporation. Today, Google forms one of the most valuable companies both on the internet and in the world as a whole, but similar to eBay, its value stems not from content creation or publication, but from an underlying logistical management of the internet. Described by O'Reilly: "Google's service is not a server – though it is delivered by a massive collection of internet servers – nor a browser – though it is experienced by the user within the browser. Nor does its flagship search service even host the content that it enables users to find. Much like a phone call, which happens not just on the phones at either end of the call, but on the network in between, Google happens in the space between browser and search engine and destination content server, as an enabler or middleman between user and his or her online experience."[13]

The ability to create value from this type of operational paradigm, facilitating and enabling user contributed content can be seen in Google's Google Earth and Google Maps products. In 1995, MapQuest pioneered the development of internet based atlas and map platforms, building navigational tools for using and exploring content licensed from digital mapping provider Navteq. However, this represented the extent of MapQuest's services, thus behaving more like a Web 1.0 developer and publisher of fixed and controlled content. As any developer or publisher could license the same digital content from Navteq, Microsoft and Google where not far behind in unrolling their own online map platforms; today, despite creating and once dominating this product category, MapQuest has been reduced to a fringe actor in the online mapping market. While ease of navigation and user interface certainly play a role Google's rise to prominence within this category, their application of a Web 2.0 developmental approach to online mapping allowed for users to contribute, develop, annotate and add content as additional layers of information on top of licensed Navteq maps, thus adding value to their platform over competitors purely through enabling the direct involvement of their community of users with both the consumption *and* production of content.[14] Through this approach, Google has provided a general

fig. 122. far left
Map of One Day of Internet Router Connections - 2003
Produced by the Opte Project

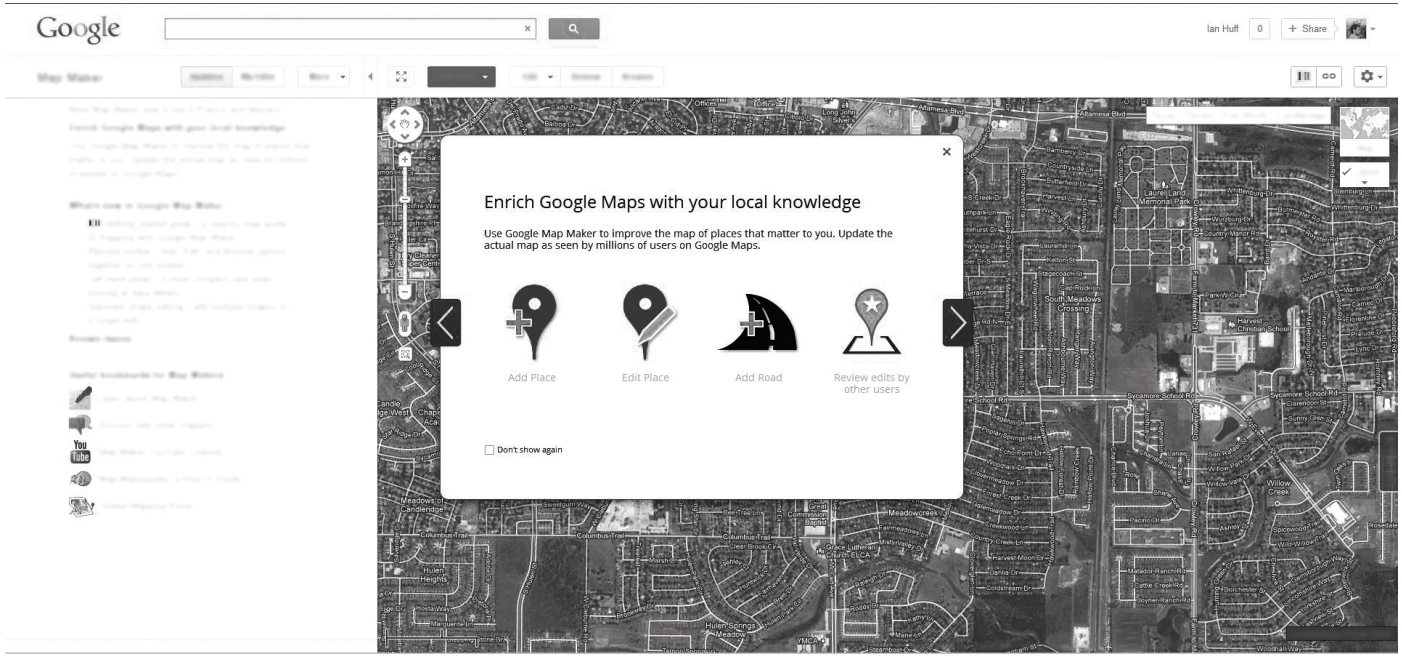
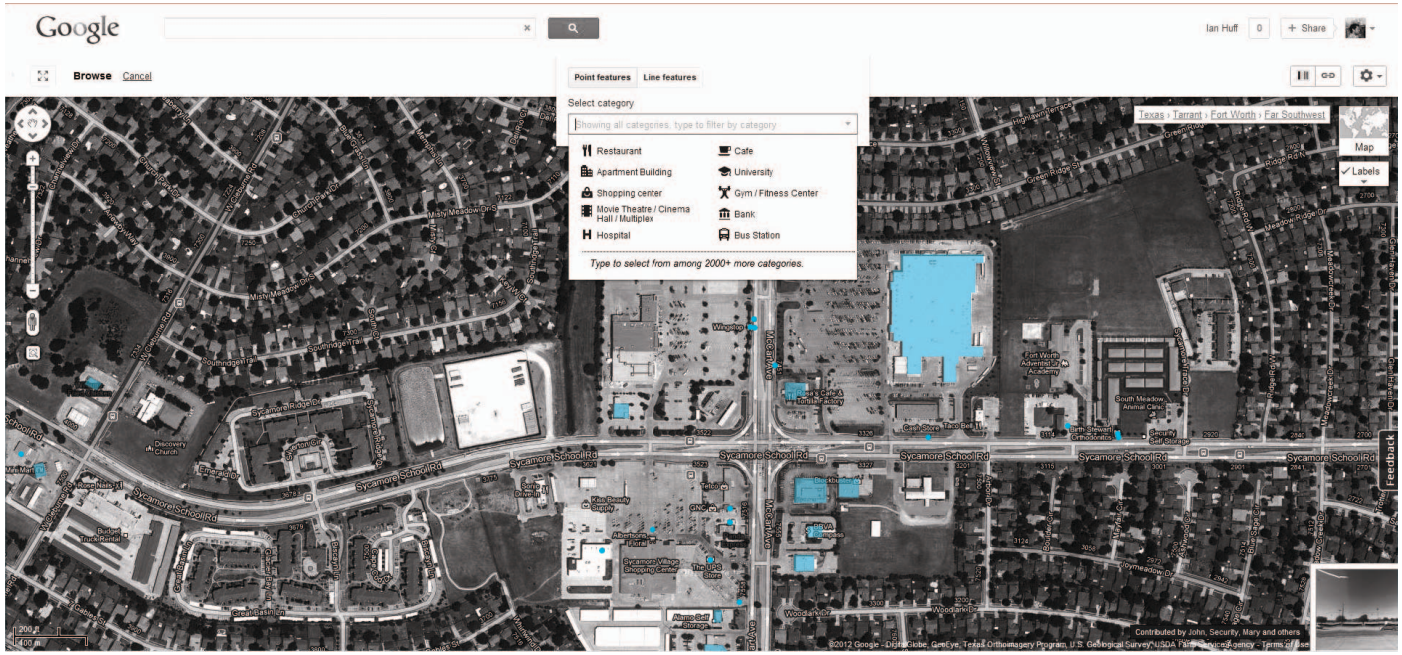


fig. 123. above, same
Google Maps - User Contributed Data (Screen Capture)
Google thrives on the creation of 'infrastructures of participation;' platforms which facilitate the creation and contribution of content by users, benefitting both Google, and the broader community of users. The more users participate, the system as a whole benefits. This forms a bottom up system, enabling participation, and the direct creation of content by the community of users, rather than a top-down publication of content.

social benefit, in the provision of mapping and satellite information to their users which was once difficult to navigate or inaccessible to a layman general public, yet add further value to their own platform from the same users continually evolving and strengthening the provided content.[15] Furthermore, by incorporating deliberate system hack-ability and re-mixablity of provided content, key Web 2.0 principles, it allows for the creation of new, unpredictable products and content. Third parties, or users, are free to develop, hack, and interact with Google's mapping logistical base, creating value added mash-ups or applications; housingmaps.com, for example, displays craigslist postings, or mappedometer.com, which allows users to track, plot, and measure running routes; both using Google maps as a platform. ■

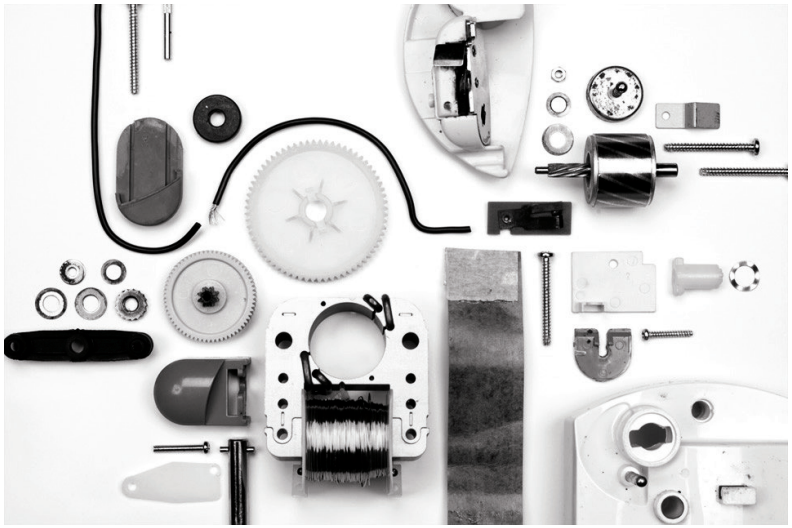


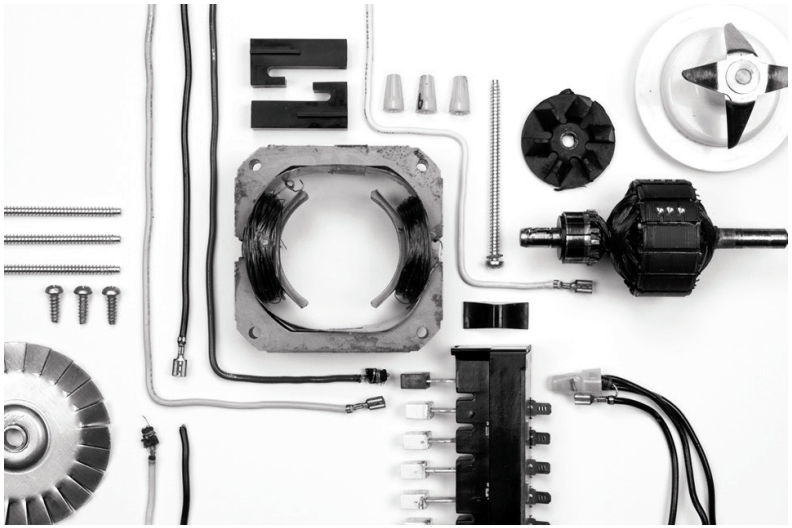
INNOVATION IN ASSEMBLY

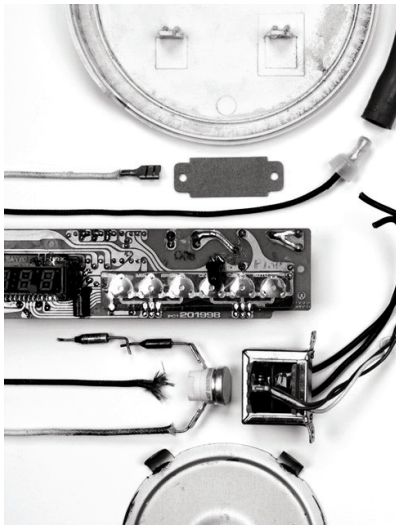
Through the creation of a platform that allows users access to the 'parts' of online mapping, Google has become the de facto source of digital mapping content, by simply acting as a facilitator of interaction, use, and distribution of licensed Navteq or other digital map companies source data. By developing platforms that activate unplanned interaction by a wide array of content users and providers, Google has allowed the creation of new and innovative products by users without controlling what is done with the provided data; all while simultaneously solidifying their position as the logistical manager of these services.

This touches upon what O'Reilly calls 'innovation in assembly.' Similar to Johnsons' argument, O'Reilly writes: "When commodity components are abundant, you can create value simply by assembling them in novel or effective ways."[16] By building a system that allows users access to a wide array of 'parts' and the ability to socially connect with other users and

fig. 124. above, same
Google Maps - User Contributed Data 02 (Screen Capture)
User contributed data, augmenting the Google Map product with value adding content, shown in cyan.



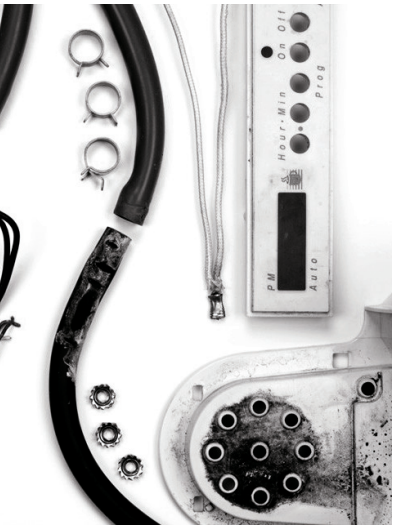


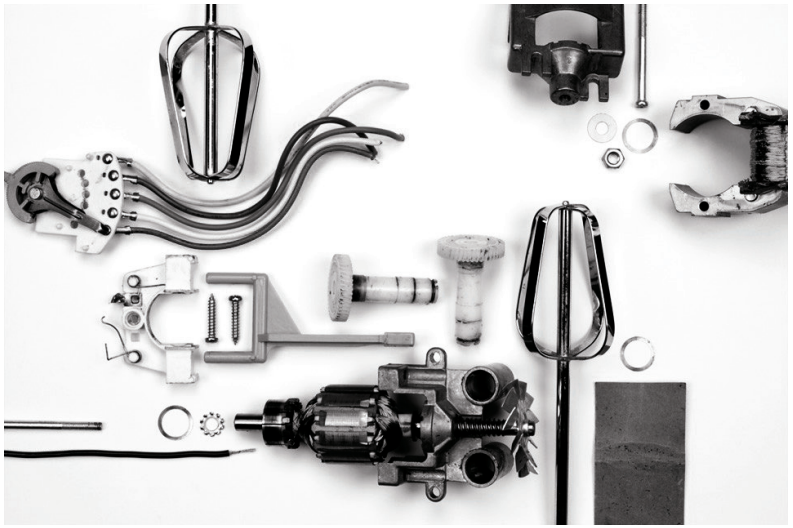


producers, Web 2.0 infrastructures can foster incredibly innovative environments and ideas.

An approach to system design and development within this paradigm can clearly been seen in Twitter's recent rise to digital prominence. One of the critical components or parts which allows for the further development of products built on top of Google's map platform is the release of its API (application programming interface), essentially "a set of standardized rules and definitions that allow programmers to build new tools on top of another platform, or to weave together information from multiple platforms."[17] Often times a web developer designs a specific online tool or application, and then creates their API - perhaps only releasing a portion of their source code. In a deliberate move to foster collaborative and open third-party, user product development, Twitter created a completely open and easily navigable API first, and then built their own site twitter.com on top of the same foundational code and tools made publicly available. As a result, the platform is used in many different ways outside of what was conceived by Twitter's creators, and through hundreds of different community developed apps and

Innovation in Assembly
"When commodity components are abundant, you can create value simply by assembling them in novel or effective ways." - Tim O'Reilly





software. Even some of the platforms basic conventions now core to its operational strength, including adding the @ symbol to direct messages to specific users or the hash tag to allow for later sorting and searching of messages based on user defined key words, were developed and emerged not from Twitter's creators, but as community developed innovation. Similar to the operational approach of Google, "Twitter's creators recognized that there was another kind of competitive advantage that came from complete openness: the advantage that comes from having the largest and most diverse ecosystem of software applications being built on your platform. Call it cooperative advantage. The burden of coming up with good ideas for the product is no longer shouldered exclusively by the company itself. On an open platform, good ideas can come from anywhere."[18] ■

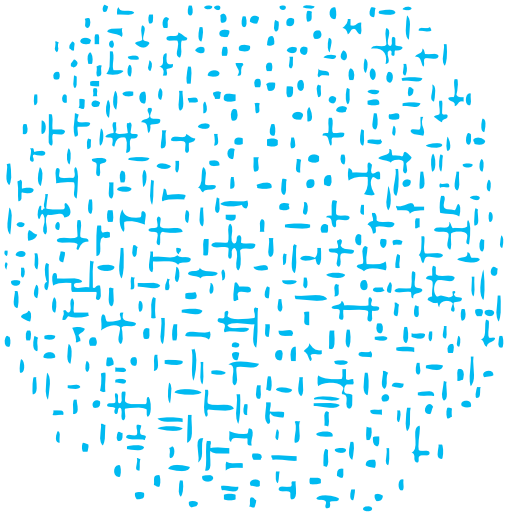
fig. 125. far left
Parts 01

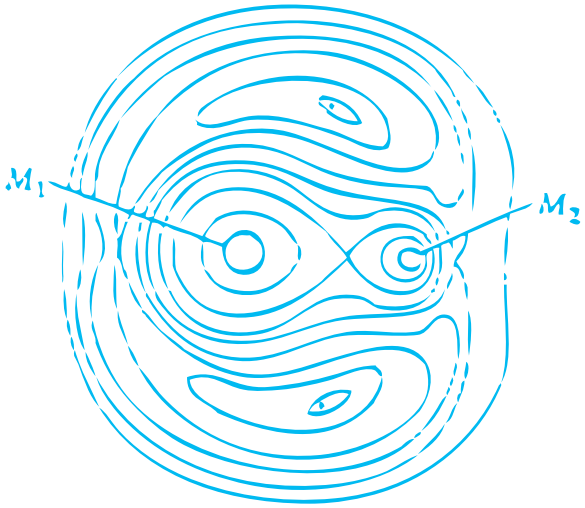
fig. 126. middle left
Parts 02

fig. 127. middle
Parts 03

fig. 128. middle right
Parts 04

fig. 129. right
Parts 05




M_1
M_2

PROCESS URBANISM – AN INFRASTRUCTURAL APPROACH

In his 1999 essay *Infrastructural Urbanism,* Stan Allen advocates a shifted paradigm in architectural development and contextual engagement within the built environment, and in a way, articulates an approach which mirrors the Web 2.0 paradigm within the physical built environment. Allen argues for a recognition of urbanism, within the architectural practice, as a continual process, as opposed to a static realizable project or condition; thus operating as a "practice engaged in time and process – a practice not devoted to the production of autonomous objects, but rather to the production of directed fields in which program, event, and activity can play themselves out."[19] Thus, 'Infrastructural Urbanism' engages not so much in the proposal of "specific buildings on given sites, but to construct the site itself. Infrastructure prepares the ground for future building and creates the conditions for future events. Its primary modes of operation are: the division, allocation, and construction of surfaces; the provision of services to support future programs; and the establishment of networks for movement, communication, and exchange." [20] Furthermore, Allen argues that "Infrastructural work recognizes the collective nature of the city and allows for the participation of multiple authors. Infrastructures give direction to future work in the city not by the establishment of rules or codes (top-down), but by fixing points of service, access, and structure (bottom-up). Infrastructure creates a directed field…" [21]

It is from this design paradigm, or conceptual platform from which the Walmart 2.0 project engages the contemporary urban fabric, seeking to reinvigorate and fertilize its urban condition through the reintegration of production and manufacturing into the city with an engrained social dimension. Drawing from the organizational, operational, and spatial models described within this chapter, Walmart 2.0 seeks to facilitate the emergence of a new industrial logic, one which fosters serendipity, exaptation, and the chance collision. Like Google, the Walmart 2.0 model sees the Retailer retreat from its role as a retailer; instead acting as a designed platform; fostering user contributed, built, designed, and produced content; and its subsequent sales or exchanges within localized nodes - built upon an inter-node logistics and distribution underbelly, allowing access to a national network of constantly moving and colliding 'parts'. ■

fig. 130. left
Stan Allen - Object to Field

NOTES: 03.1 THE SPACE OF INNOVATION

1 S. Johnson, *Where Good Ideas Come From: The Natural History Of Innovation* (ePenguin, 2010). 31-35.

2 S. Johnson, 153.

3 S. Johnson, *Where Good Ideas Come From: The Natural History Of Innovation* (ePenguin, 2010).

4 Henri Lefebvre, *The Urban Revolution*, Robert Bononno-trans. 1st ed. (Univ Of Minnesota Press, 2003), 118.

5 Economist Staff, "Coffee-Houses: The Internet In A Cup," The Economist. *Economist.Com*, Coffee Fuelled The Information Exchanges Of The 17Th And 18Th Centuries, December 18, 2003, http://www.economist.com/node/2281736.

6 Economist Staff, "Coffee-Houses: The Internet In A Cup," The Economist. *Economist.Com*, Coffee Fuelled The Information Exchanges Of The 17Th And 18Th Centuries, December 18, 2003, http://www.economist.com/node/2281736.

7 Economist Staff, "Coffee-Houses: The Internet In A Cup," The Economist. *Economist.Com*, Coffee Fuelled The Information Exchanges Of The 17Th And 18Th Centuries, December 18, 2003, http://www.economist.com/node/2281736.

8 S. Johnson, 142.

9 T. OReilly, "What Is Web 2.0: Design Patterns And Business Models For The Next Generation Of Software," *Communications & Strategies* (January 1, 2007): 17-27, http://ssrn.com/abstract=1008839. 17.

10 T. OReilly, 23.

11 S. Johnson, 13.

12 T. OReilly, 21.

13 T. OReilly, 20.

14 T. OReilly, 28.

15 Don Tapscott and Anthony D. Williams, *Macrowikinomics* (Penguin Books, 2010), 81.

16 T. OReilly, 33.

17 S. Johnson, 194.

18 S. Johnson, 193.

19 Stan Allen, *Points + Lines: Diagrams And Projects For The City*, 1st ed. (Princeton Architectural Press, 1999), 52.

20 Stan Allen, 55.

21 Stan Allen, 55.

walmart 2.0 02.1

As described in previous chapters, subtle socio-economic shifts; including increasing fuel costs, fluctuations in the price of offshore labour, and emergent formats of manufacturing and production; are influencing the evolution of contemporary industrial operational models. Those models reliant on the movement of high volumes of goods produced overseas and distribution to the disparate consumer through mass retailing and service mechanisms can no longer be seen as sustainable in the long term.

These operational models have created a contemporary urban landscape where the mechanisms of industry and production operate within distinct, and largely separate morphological units built to the scale of global industry, isolated and removed from the fabric of a city's inhabitants. These industrial systems then interface with local populations through generic retail corridors (anchored by Walmart Supercenters) in the programmatically segregated contemporary horizontal city – a linked system of frictionless spaces of service and logistics.[1] In the contemporary American city, there remains little spatial connection between the consumption of goods and their production, maintenance, repair, and eventual waste processing. Its fabric is one that mirrors contemporary industrial strategy and prioritizes movement and flow at the sacrifice of social connection, interaction, and exchange.

As discussed in the New York Times, a shift in industrial systems away from globalized production will require significant territorial and operational evolutions within our contemporary supply chains, productive systems and built form. According to Jeffrey E. Garten, former dean of the Yale School of Management, companies "cannot take a risk that the just-in-time system won't function, because the whole global trading system is based on that notion." As a result, he said, "they are going to have redundancies in the supply chain, like more warehousing and multiple sources of supply and even production."[2] Further, as noted by Business Journalist Larry Rohter, a likely outcome of high transportation costs is the strengthening of a 'neighbourhood effect.'

"Instead of seeking supplies wherever they can be bought most cheaply, regardless of location, and outsourcing the assembly of products all over the world, manufacturers (will) instead concentrate on performing those activities as close to home as possible."[3] Could these reconfigurations represent an opportunity to re-weave productive processes into the contemporary city with an engrained social dimension?

The possibility of manufacturing processes moving back to North America, coupled with Walmart's stated mandate to reduce overall supply chain energy expenditure, presents a unique opportunity for a speculative, opportunistic architecture within the American city – one which interacts with contemporary industry's keystone species. Considering Walmart both as an ally and potential urban catalyst, the Walmart 2.0 project seeks to re-inject what are currently spatially disparate and segregated systems of consumption, production, and exchange, back into the urban fabric, with a heightened concern for the relationship between these systems and the human scale, and the inhabitants of the city. Could a mutation to Walmart's operational models, including a complete reconsideration and reconfiguration of the Supercenter node facilitate the re-emergence of domestic, production and manufacturing? It is from this context that the Walmart 2.0 emmerges; equal parts systems, operational, and network logic speculation; and architectural proposition.

As argued in previous chapters; the future of manufacturing, embracing advancing digital production technologies including rapid prototyping, final good 3D printing, and collaborative co-development of products within smaller, more agile organizational formats; suggests the future of productive industry will rely more on tightened feedback loops between producers and consumers than it will on advantages gained through bulk overseas production of goods at reduced labour costs. These advancing technologies and organizational formats, facilitated by web based market places and collaborative environments, and serviced by third–party logistics providers, are freeing these smaller actors from the mechanisms of production which have dictated a certain size and scale for producers in industrial models over the last one hundred and fifty years. Increasingly these micro-production formats appear to form viable design, research, and production models, at a scale that accommodates a higher degree of product flexibility and customization. Given the relative speed and agility with which these micro producers operate, start-up, and evolve, perhaps they are the key to a rapid and dynamic reindustrialization – an attractive prospect to Walmart (the projects proposed developmental ally), an actor which favours rapid systemic innovation and evolution. From an urbanistic perspective, this scale of producer also can be seen as an ideal format for creating co-habitive landscapes which reconnect manufacturing processes with the social terrain of the inhabited city.

While most of Walmart's industrial prowess comes from engaging with globally scaled, high volume discount producers in contemporary industry's distributed format; in the process, they have constructed a dense network of linked physical

territory which proximally relates to specific locales of urban populations across the country. It is a combination of the intentional construction of these retail spaces situated to relate to a broader transportation infrastructure, and Walmart's expertise in the management of material flow, that form fundamental building blocks in the Walmart 2.0 scheme. What if instead of encouraging the growth of domestic manufacturing in a similar image of contemporary industrial formats, Walmart took advantage of their existing operational and territorial assets to encourage and catalyze the emergence of a new industrial system - one based on self-organizing, smaller, more agile producers; operating within a local context, yet able to lease bandwidth in Walmart's logistics and distribution system. These smaller producers would then interact with each other and their consumers within their local setting invigorating the urban fabric with a genuinely hybridized program; and also allow them to interact with a broader network of producers and consumers via the Walmart logistical network. Thus the Walmart 2.0 scheme facilitates the emergence of producers operating in a similar fashion to those thriving within digital space, yet with a physical dimension for social production, consumption and market exchange.

With the operational formats displayed within the Web 2.0 paradigm as a functional example of concept, the Walmart 2.0 scheme proposes a shift in Walmart's service provision, to act more as an open logistical reef, latticework to be used and populated by producers, consumers, and exchangers in a social and urban setting. Currently, the bulk of Walmart's core operations are concerned with the management of a sophisticated, yet closed logistics system for the distribution and subsequent sale of third party goods at a Walmart managed retail (or market) outlet. The Walmart 2.0 scheme proposes an operational mutation, whereby Walmart largely becomes an open, 'for-hire,' logistics and distribution manager of goods between market places selling third party produced goods. In a sense, within the Walmart 2.0 scheme (like Google in the digital realm,) Walmart 2.0 becomes an underlying facilitator of production, consumption, and the movement of goods, built upon their existing spheres of expertise in logistical, territorial, and data management. Instead of controlling what is being exchanged through their marketplace, system usage and that exchange in itself is occurring, become Walmart's primary concern. In effect, the Walmart 2.0 scheme acts as a platform for user contributed production, consumption, and exchange that is comprised of locally related, self organizing systems, that are facilitated, but not controlled by Walmart. Thus local communities surrounding Walmart 2.0 Supercenters may engage in the economic systems of their own locale, facilitated and encouraged by Walmart as opposed to competitively stifled. ■

TWO-WAY FLOW, A MATERIAL ECOSYSTEM

Each individual node or Supercenter outlet within the Walmart 2.0 scheme becomes layered with additional functional programs directly supporting on-site, third-party start-up manufacturers and producers within the United States, but also includes facilities for the breakdown of used goods or products back into their sub-components or back to a re-useable raw material state. The Walmart 2.0 system embraces and facilitates the two-way flow of material through their logistics network, reducing overall primary resource consumption (a stated goal of Walmart, and socially beneficial ambition); but also shifting the emphasis to material use and re-use. With each node in the Walmart 2.0 system shifting to foster networked localized production, emerging manufacturing typologies exist within a direct spatial proximity to this two-way material flow. This significantly increases access to a wide array of materials or 'parts' at various stages in their lifespan, mirroring innovative digital platforms which amplify the adjacent possible and facilitate physical 'innovation in assembly' by granting users access to a wide array of materials and parts. Producers and manufacturers, coupled with this Material Cycle program act as symbiotic organisms, as the conventionally disparate programs of manufacturing, and material waste, salvage, re-use, and recycling experience a territorial compression; they will feed off one another, allowing for increased lateral movement between various stages of a products breakdown, and dynamic re-use.

Walmart 2.0 shifts the Retailer to act as a material flow manager, their skills in supply chain efficiency may be applied to material consumption, incentivizing an investment in and development of materials designed for optimal re-use and breakdown ability. Within Walmart's current operational model materials used in the production of goods are chosen with little consideration beyond their base cost and fabrication speed. Many materials and products maintain an engrained non-reparability or non-recyclability reflective of a one-way flow operational model.

A shift to a two-way flow operational model would allow the Walmart system to more closely reflect the metabolic cycles of natural ecosystems. The production and circulation of materials with an engrained recyclability and reparability would not only allow for Walmart to provide a constantly cycling array of materials to local producers, amplifying an environment that facilitates innovation in assembly; it would also gradually shift the public's approach to consumer goods away from one-way primary resource consumption towards one of temporal material usage.

Amplification of onsite distribution or logistics capabilities at each Supercenter allows each node to interact directly with any other, without requiring the hierarchical intermediary of the Distribution Center; thus fostering the emergence of a truly distributed network, or 'mesh topology,' creating a national array of

productive locales.

To a degree, the ability for production, consumption, exchange, and material salvage to function within a node's locale greatly reduces overall distances traveled by material goods within the Walmart 2.0 system. This proposal is further amplified by the prospect of loose networks of micro producers, exchanging ideas and designs digitally over longer distances and then producing items within a local proximity to their end consumer, similar to the Local Motors operational model. As Walmart has exhibited proactive investment in developing transportation technology, trucks and fuel systems which reduce overall energy consumption, and an ability to manage the efficient movement of goods, the Walmart 2.0 scheme takes advantage of this operational expertise, imagining any inter-node material movement to be largely managed and operated by Walmart, reducing overall supply chain energy consumption and increasing the sustainability of production, exchange, and consumption systems within North America, as they once again embrace a relationship with locale.

In essence, the Walmart 2.0 scheme seeks to facilitate the resurgence in domestic manufacturing, by facilitating start-up and small scale production and direct market exchange. As a reconsidered primary urban element, It also seeks to create a more true urban condition as described by Lefebre – one which centralizes creation, overlaps program, increases the flow of 'parts,' and engages and invites both a spatial and programmatic connection with a given site and context.[4] As the Walmart 2.0 Scheme is conceived as a 'for-hire' yet open system, its marketplace, and logistics services are available to users and actors in the locale, beyond those directly producing goods on site. As a result, the reconfigured Walmart operational model is able to influence a more subtle secondary reprogramming within the contemporary city, facilitating a broader programmatic diversity operating within the existing fabric – a soft system or mutable field of evolving programmatic diversity, productivity, creation, innovation, and urban configuration anchored by the logistical platform of the Walmart 2.0 Supercenter. ■

WALMART 2.0 TEST SITE AND PROPOSAL

The Walmart 2.0 scheme is explored and tested on an existing Supercenter site within the Dallas / Fort Worth region. Both the specific test site and the broader context of the Dallas / Fort Worth region have been chosen for their typification of Walmart's geo-locational strategy, (siting logic, outlet configuration,) and broader material summations of contemporary urban landscapes in relation to contemporary globally scaled, distributed industrial systems.

The Walmart Supercenter 2.0 is completely reconfigured to accommodate the shifted operational mutation of the Walmart system. The new program of the proposed Supercenter is composed of four basic or primary groupings: Logistics, Material Cycle, Manufacturing, and Exchange. On-site, these programs mix and cross yet form distinct interwoven spatial systems.

To a degree, much of the underlying spatial logic inherent in the existing Walmart Supercenter site remains, but is evolved. As in existing configurations, the center of the site is seen as the primary zone of market Exchange. The site perimeter is seen as a zone composed of leasable un-programmed spaces, much like an amplified and denser mutation to the ancillary buildings on existing Walmart sites. These un-programmed leasable spaces are then layered above by the newly integrated spaces of Manufacturing and Material Cycle. Distribution at the scale of the eighteen-wheeler still flows in a continuous loop at the rear of the site, still linking to the adjacent major vehicular arteries, but instead the connection is below grade. Primary parking is also pushed below grade, allowing the bulk of the ground plane to be scaled for pedestrian occupation and circulation. The following describes these primary program groupings in further detail. ■

LOGISTICS

The Walmart 2.0 system, to a large degree, is less predictable than Walmart's current JIT operations, the base, or underbelly of the Walmart 2.0 scheme is the significantly amplified on-site spaces of logistics: distribution, shipping, sorting, and material storage. While the repetition of these services at each Walmart 2.0 site creates redundancy throughout its network, it allows for a significantly higher degree of responsiveness to fluctuating local conditions, without relying on a centralized Distribution Center. The increased space and facilities for the on-site handling of distribution and logistics also account for the unpredictable system demand as logistics services become open, and for-hire. These services may be used by on site exchangers and producers, but also hired by external start-up or pre-existing manufacturers or producers within a locale. Where a typical existing Distribution Center might have well over 200 separate loading docks, and a generic existing Supercenter four, the Walmart 2.0 Supercenter's distribution facilities are comprised of 40 loading docks; with additional space allotted for trailer queuing, material and product sorting, and material storage. The main Logistics and distribution zone is pushed below grade, freeing the ground plane for more human scaled movement, occupation, and urban interaction. While forming a more open system, the logistics and distribution underbelly exist as Walmart managed facilities, not directly accessible to the public, yet sharing a visual connection through glazed light wells and open cutaways between the public parking layer and the public space above.

The larger public or system users interface with this logistics system at several primary points. Located between the distribution layer and the ground plane is a below grade parking surface. At-each primary core intersects with the parking layer, there exist facilities for public vehicular pick-up, drop-off, and exchange of goods entering either the Logistics system or the Material Cycle system. A second level with similar program scaled and configured to service pedestrian based exchange on the ground plane, also connects to these primary cores. ■

MATERIAL CYCLE

Linked directly to the logistics and distribution underbelly through four primary cores are the Material Cycle facilities. Lifted above the ground plane, the Material Cycle contains the facilities for used material collection, breakdown, salvage, recirculation as new raw materials, or reforming within final good 3D printing facilities back into new components (based on local producer demand). At designate points, (in relation to these primary cores,) this material cycle zone projects down to the ground plane, the primary surface of exchange; forming interfaces between this Material Cycle program and public producers or users at various stages of a materials breakdown. For example, one interface location or Material Cycle access point acts as the entry point for used products and materials into the breakdown cycle, located below testing facilities to determine a used products relative merits. Another primary interface exists below the zone in the Material Cycle process where subcomponents have been separated from discarded products; another in relation to the final stages of product separation and breakdown back into primary raw materials. While final quality 3D printed goods may not be directly ready for sale and market exchange, this stage of the Material Cycle relates to the primary core linked to a general merchandise market space.

The zone around each primary core acts as an exchange point, enabling user's access to materials at various stages in their lifespan for variable prices. For example, producers may be looking for particular used components for repurposing, without requiring them to flow through a complete cycle of material breakdown. They may find materials commonly reused and resold at this stage of the Material Cycle in a store type space, a queuing or staging zone for material goods waiting to begin their breakdown. Or, utilizing Walmart's prowess for data and material tracking, orders may be placed for particular used goods; as they re-enter the Material Cycle system anywhere within the larger Walmart network, they may be rerouted and available for pickup and exchange at a local Supercenter 2.0's used product exchange point. Further, shortcuts in material exchange may occur through informal social interactions in the public spaces surrounding the used material exchange zone. Each of the other primary exchange points would function in a similar capacity, differing in relation to their respective relationship with the Material Cycle system. ■

MANUFACTURING

The dedicated Manufacturing spaces in the Walmart 2.0 Supercenter are housed within a larger, industrial scaled space wrapping around the Material Cycle zone. The Manufacturing system is conceived of as a linked chain of workshops, labs containing advanced manufacturing equipment, leasable studio spaces for smaller or start-up manufacturers, presentation / meeting spaces, and more flexible co-working spaces. As movement of larger freight throughout the site is shared and overlaps around the same four primary cores described earlier, the movement of freight to service the raised, dedicated Manufacturing spaces are connected to an elevated public terrace, that either link manufacturing spaces directly to these freight movement zones if at the same level, or to an array of secondary cores, which both subdivide the manufacturing space into a series of linked bays or cells, and also service the vertical movement of people and goods.

These subdivided cells or bays between cores are equipped for a wide array of productive activities; for example, one bay may be predominantly composed of equipment for sewing and textile production, while another with more tools for metal working, or another with more tools for electronics fabrication in addition to more general purpose equipment and facilities throughout all bays. Further, these varied bays remain flexible, and able to be reconfigured by Walmart with differing equipment based on local emergent production requirements, and not fixed in their specialization.

These larger manufacturing bays, containing specialized manufacturing equipment, would be publicly accessible in a membership or fee based on usage system. While much of the on-site manufacturing spaces are geared towards start-up, or smaller scale, micro-producers, these facilities may be accessed by new or existing off-site producers as well. For example, the primary manufacturing facilities may be used by either producers based primarily on site, or those based in other locations, including live work / home business configurations within the site's broader context, or larger formats operating out of existing industrial spaces, requiring access to advanced manufacturing equipment. Within these larger workshops or manufacturing bays, leasable storage spaces would be available for off site-users, similar to TechShop's operational model in the United States, but at a much larger scale.

Layered above these larger manufacturing cells or bays in the Walmart 2.0 scheme are leasable, dedicated start-up / small producer studio spaces, flexible co-working spaces, hireable meeting and presentation rooms, and other shared workplace facilities such as kitchenettes and lounges; all in a mezzanine format within the larger manufacturing bar. These facilities are geared towards the facilitation of social collaboration, interaction and fostering new innovation in product design and development by micro-producers or start-up manufacturers. The ability for this

scale of producer to lease dedicated space in close proximity to both advanced manufacturing tools and equipment as well as a source of material, in a social setting connected to other similar producers is intended to amplify the knowledge spill-over, serendipity, and the adjacent possible. This layout also facilitates the frequent testing and fabrication of ideas, moving back and forth from studio to manufacturing shops, narrowing feedback loops in the design and production processes.

As the primary structure of the Manufacturing bar surrounding the Material Cycle zone is separated from the studio spaces and meeting rooms, these spaces are able to adapt and reconfigure based on shifting local needs, or to accommodate specific start-up's or micro producers. Studios may stretch horizontally; moving separating partitions, or grow vertically, occupying stacked spaces. Once a producer grows or moves beyond this scale, they would either have to move to other larger leasable spaces outside the manufacturing bar within the Supercenter 2.0 Site, or completely off site, into the surrounding fabric, making room for new start-ups and micro-producers.

The manufacturing bar is directly serviced by a plug-in storage and shipping system, positioned to always relate to the Manufacturing bar at Lvl +2, regardless of whether this level aligns with studio spaces or main manufacturing bays depending on sectional variation. Within Walmart's current operations, as discussed in *01.3 Network Logistics*, shipping containers or trailers are treated as mobile bits of storage or warehousing territory in motion. As the Walmart 2.0 scheme relies less on the frequent and constant movement of goods as seen in Just-In-Time systems, these surplus containers, and flexible warehousing systems instead operate within each Supercenter 2.0 site. The plug-in storage system allows for shipping cranes to move containers vertically from the logistics and distribution zone below grade, and transversely along the Manufacturing bar, to plug right in to either a larger manufacturing bay, or studio space, providing both additional storage and inventory warehousing, or direct loading for finished goods to be moved below grade for shipping. The open cores for these containers to move vertically are located within the primary freight movement or core zones, and are able to pause in a fixed position for loading and unloading access either at grade, within the parking level for inventory transfer to smaller, local scaled shipment and delivery, or below grade, where the complete container can be loaded onto a truck for inter-node travel and distribution. ■

EXCHANGE

While the notion of social, interpersonal connection permeates much of the Walmart 2.0 scheme, there exists several spaces within the reconfigured Supercenter site specifically intended designed to facilitate social models of exchange. Surrounded by the elevated Material Cycle and Manufacturing zones, the central space of the scheme is composed of two Market buildings, linked by an open, un-programmed outdoor public space.

The first of these two structures is conceived of as a hybrid of a traditional grocery space and independent market stall space for predominantly food related exchange. As discussed in a 2010 article in *the Atlantic*, since Walmart's truck fleet continually traverses the country with such a high density and frequency, what were once empty truck miles, as the distribution fleet returned after completed deliveries are increasingly being filled by produce grown and processed at small and independent farms located on the way back to the Distribution Centers. By coupling this already functioning distribution network with independent farmers, Walmart is able to grant these smaller producers access to a large network of consumers previously out of their reach without the support of a corporate food or industrial food producer and distributer's logistical support. In a mutually beneficial arrangement, the money saved by avoiding the food wholesaler middle man allows these farms to operate competitively as independents (often producing organic food) without reverting to industrial farming strategies of bulk production; but also allows Walmart to sell this local and or organic produce at a market leading price.[5] As this coupling is a valuable and productive element of Walmart's existing operations, the grocery facilities in the Walmart 2.0 scheme survive as the only remaining retail function of Walmart, as their primary role shifts to that of material manager and logistical platform. This more traditional grocery space would be shared with leasable market space, populated by local food producers.

The second Exchange space in the Walmart 2.0 scheme houses the leasable market spaces for the exchange of general merchandise and non-food related goods. As these spaces are designed to accommodate market style exchange, they encourage tighter feedback loops between producers and consumers within a given locale. While a certain percentage of the occupants of these market spaces may be reserved for micro or start up producers, for the most part, they are not predetermined. The spaces allow for the exchange of goods by an emergent base of larger producers, smaller micro producers, or start-ups within the same space - mirroring effective open digital marketplaces, but adding a physical and social dimension. Thus, the scale or type of user or exchanger is not limited or predetermined; only facilitated.

The Walmart 2.0 scheme is not conceived as altruistic, rather a mutually beneficial coupling of interests with a greater public or social good. As such, in exchange for their facilitation,

Walmart 2.0 may charge market vendors for their leased space, or take a percentage of each sale. Conversely, market vendors or exchangers, (composed of either on site producers, those primarily producing off-site but within that local, or loosely organized networked producers, selling goods at more than one Supercenter 2.0), gain access to a larger physical consumer base, which may overlap and coexist with any existing digital enterprise.

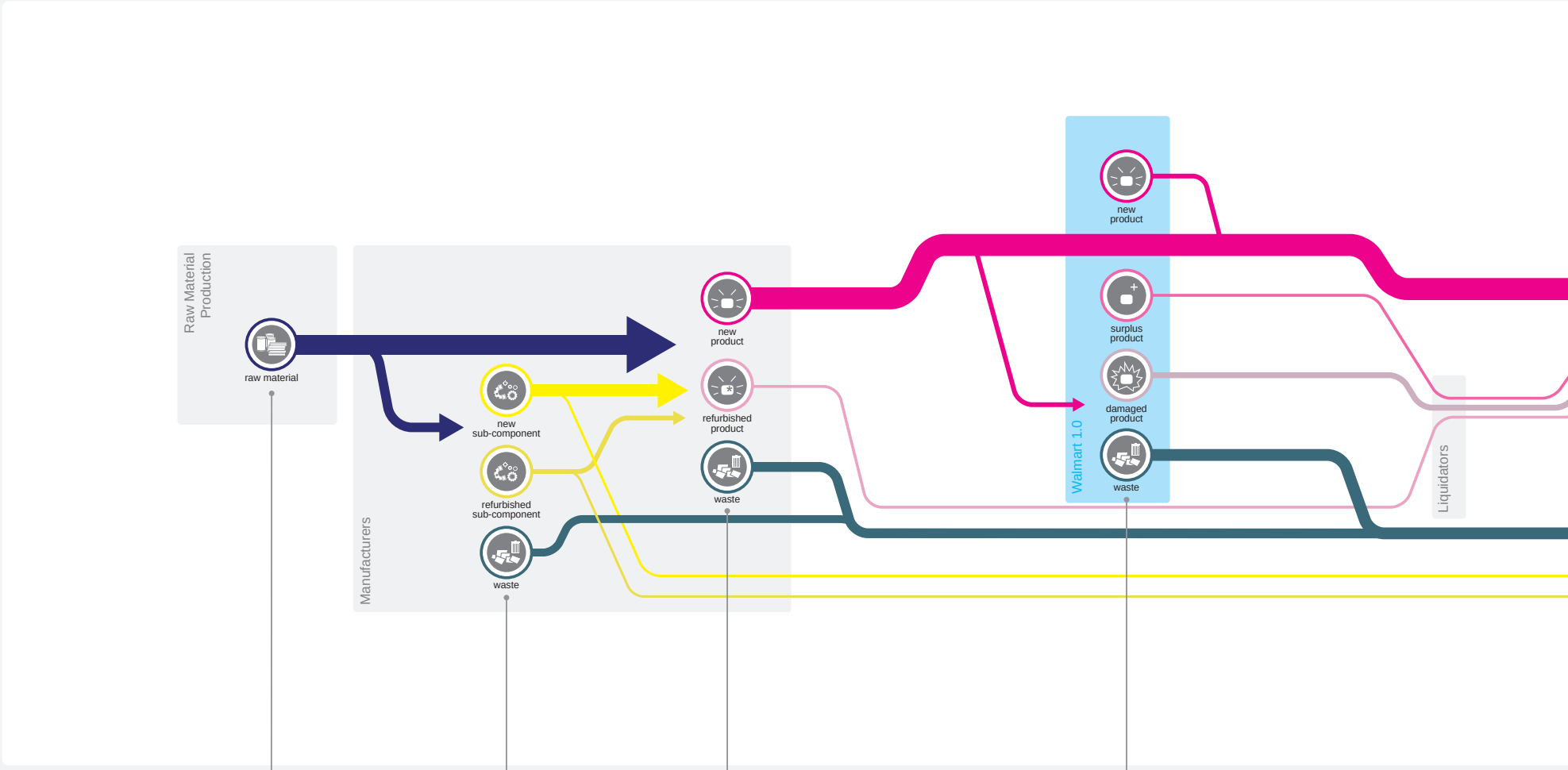
The un-programmed exterior public space acts as a social and spatial connector between various elements in the Walmart 2.0 scheme, and is primarily framed by the two Exchange buildings. This space is conceived as flexible, a hard surface, able to support a wide array of functions. Both Exchange buildings are able to partially open up, either extending the public space into the Exchange halls, or allowing for the market exchange to grow and spill out into the space between the two buildings at times. The space is also able to support larger temporary programs, including concerts, performances, outdoor trade shows, circuses etc. Thus, the Walmart 2.0 scheme recognizes the connection between functioning multi-use and flexible public spaces allowing for un-programmed, emergent social activity, exchange and interaction; and creative production and innovation.

Where on the existing site, ancillary buildings (such as banks, fast food or other retail units) are currently located, the Walmart 2.0 scheme places programmatically flexible leasable spaces, weaving between and filling the gaps left where the Manufacturing and Material Cycle programs are lifted above the ground plane. From a program and massing standpoint, these leasable spaces form a perimeter, buffer, or filter, surrounding the central Exchange zone, allowing emergent programmatic occupation to enhance contextual relationships with existing or future surrounding urban fabric. This buffer zone allows for a gradient scale and speed of flow transition; from the existing surrounding vehicle dominated arterial fabric, to the redeveloped ground plane which places a heightened importance on pedestrian circulation and interaction. Thus, the Manufacturing, Material Cycle, and Logistics programs act as the on-site programmatic anchors, allowing for a mutable field of emergent occupation to occur around them.

The Walmart 2.0 scheme deliberately moves away from a morphological grain which favours vehicular circulation at the sacrifice of the human scale within the urban environment. Instead, vehicular circulation is seen as necessary, but playing more of a supportive role. Surface level vehicular circulation is configured such that it invites connection with existing or future secondary or tertiary surrounding streets, inviting both a recognition of and connection to the contextual fabric beyond the sites primary relationship with major vehicular arteries. Surface parking within the site is limited to curb-side parallel parking and loading zones, with the vehicular surfaces expansion into parking pushed below grade. Direct servicing of ground level leasable space occurs on a surface shard with pedestrians, accessible only by service vehicles, thus, traditional loading zones or back of house conditions are brought back from their screened

siting behind typical retail artery shed buildings, into a multi-functional urban space. These pedestrian / service surfaces act as a secondary circulation system, overlapping and weaving between the primary vehicular circulation routes, creating a linked network of varied-scale public spaces.

A condition where users enter below grade parking facilities, then move directly into the internal spaces of the Exchange buildings or Manufacturing bars using concentrated entry points without engaging with, and activating the urban pedestrian circulation routes are avoided. Frequent secondary cores linking the parking level with the ground plane, emerging within the sites shared surface pedestrian routes within the un-programmed perimeter zone encourages lateral pedestrian movement through public spaces, avoiding continuous internal circulation systems. ■



> Raw rescources are processed into useable raw materials.

IN: > raw resources
> recovered raw materials

OUT: > raw materials

> Raw materials and damaged subcomponents are processed into new or refurbished subcomponents.

> Industrial scrap / waste produced as a by product.

IN: > raw materials
> damaged sub-components

OUT: > new sub-components
> refurbished sub-components
> waste

> Raw materials, sub-components (new or refurbished), or damaged products are manufactured into new or refurbished products.

> Industrial scrap / waste produced as a by-product

IN: > raw materials
> new sub-components
> refurbished sub-components
> damaged products

OUT: > new products
> refurbished products
> waste

> New products flow through Walmart, or exit as surplus or waste to avoid inventory accumulation.

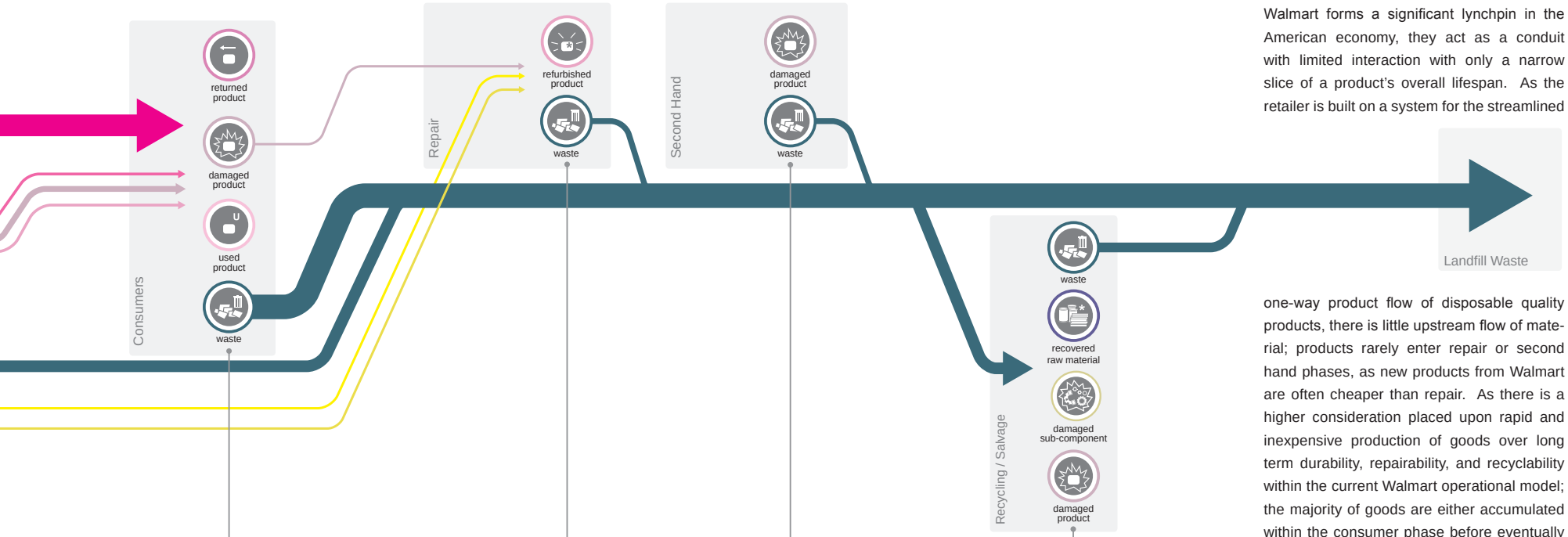
> Returned products are resold as new, depending on their condition, or moved on a damaged, surplus, or waste goods.

IN: > new products
> returned products

OUT: > surplus products
> damaged products
> waste

Product Lifecycle Flow

The diagram below forms an estimated flow chart for the movement of Walmart products as they move between various process phases along their material lifespan. While Walmart forms a significant lynchpin in the American economy, they act as a conduit with limited interaction with only a narrow slice of a product's overall lifespan. As the retailer is built on a system for the streamlined



one-way product flow of disposable quality products, there is little upstream flow of material; products rarely enter repair or second hand phases, as new products from Walmart are often cheaper than repair. As there is a higher consideration placed upon rapid and inexpensive production of goods over long term durability, repairability, and recyclability within the current Walmart operational model; the majority of goods are either accumulated within the consumer phase before eventually becoming landfill waste.

fig. 131. Product Life Cycle Flow

> Goods and products enter in similar forms yet differing phases in their lifespan. Due to the disposability of Walmart goods, the majority of products leave the consumption phase as waste instead of being repaired or resold and cycled back upstream.

IN: > new products
> refurbished products
> surplus products
> damaged products
> used products

OUT: > returned products
> damaged products
> used products
> waste products

> The limited volume of goods within the lifespan of Walmart's products are combined with new or refurbished parts or sub-components into refurbised products. Unrepairable products, damaged and replaced damaged components become waste products.

IN: > damaged products
> newsub-components
> damaged sub-components

OUT: > refurbished products
> waste products

> Used products are tested, and move through the second hand phase as used products. Damaged or defective products are either cycled upstream for repair, or become waste products.

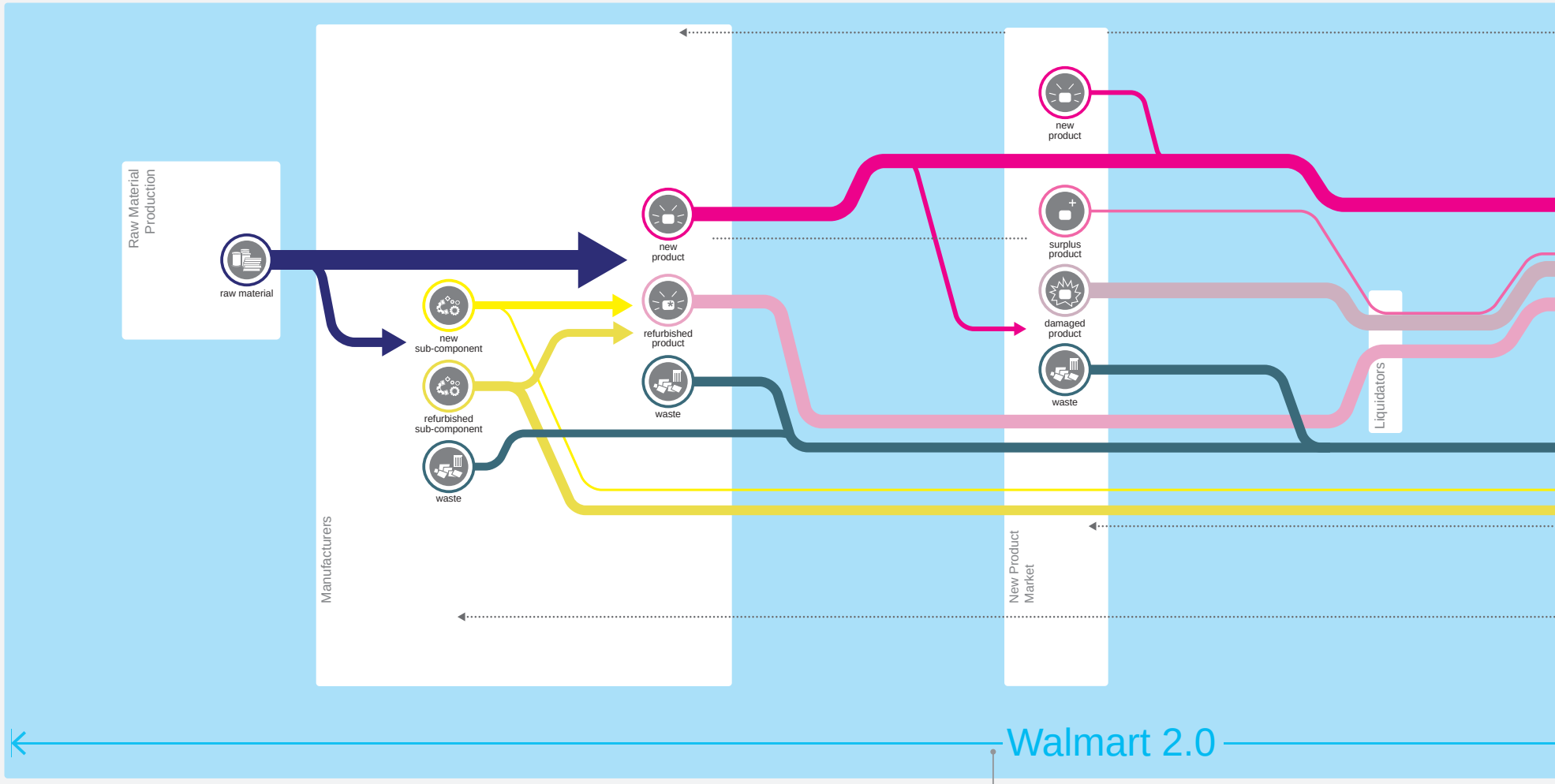
IN: > used products
> waste products

OUT: > used products
> damaged products
> waste products

> Products are tested and sorted. Salvageable damaged products are moved back upstream, while others are broken back down into subcomponents, or recoverable materials for recycling, and unuseable products move through to landfill as waste.

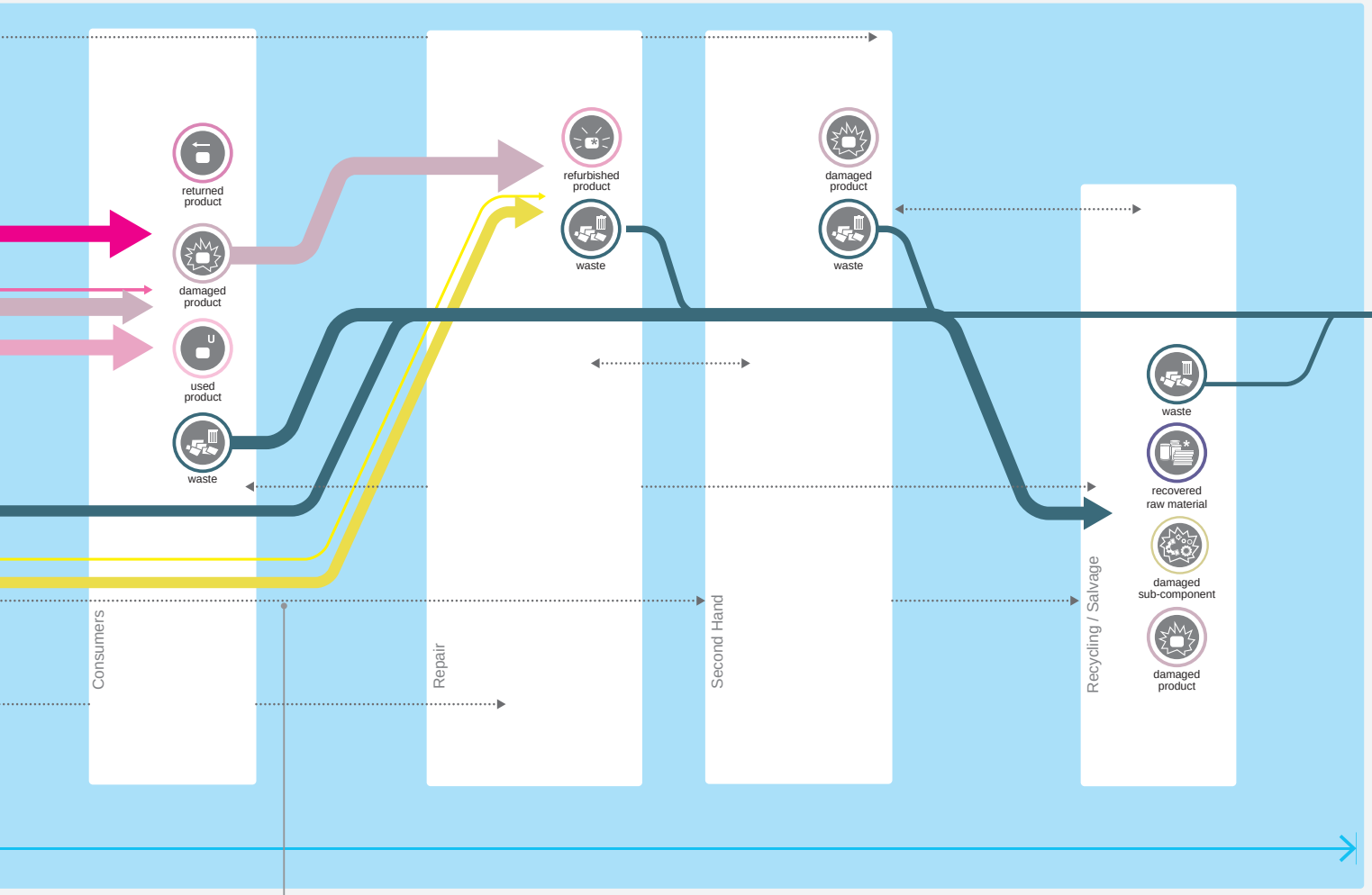
IN: > waste products

OUT: > waste products
> damaged products
> used products
> waste products



> Expanded territory of Walmart Logistics Services. Walmart 2.0 acts as a developmental platform populated by third party actors generating user contributed content within a hybrid, networked Local Production Local Consumption (LPLC) paradigm.

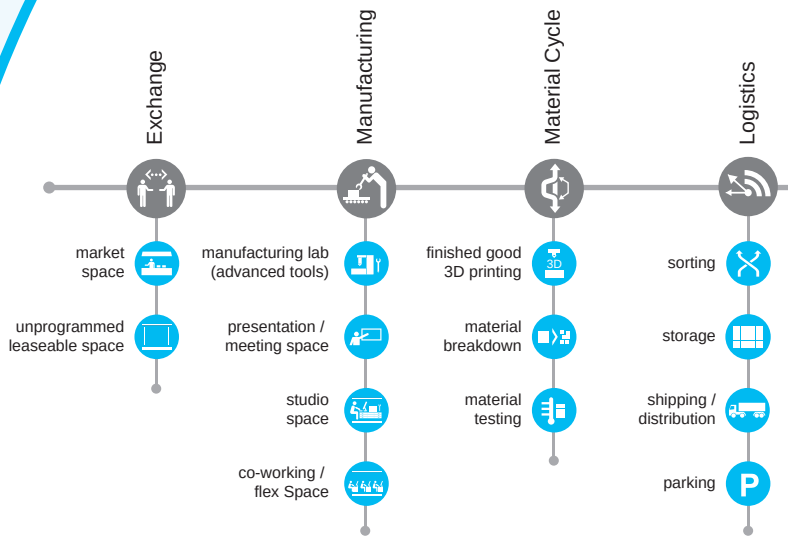
Rewired Material Flow



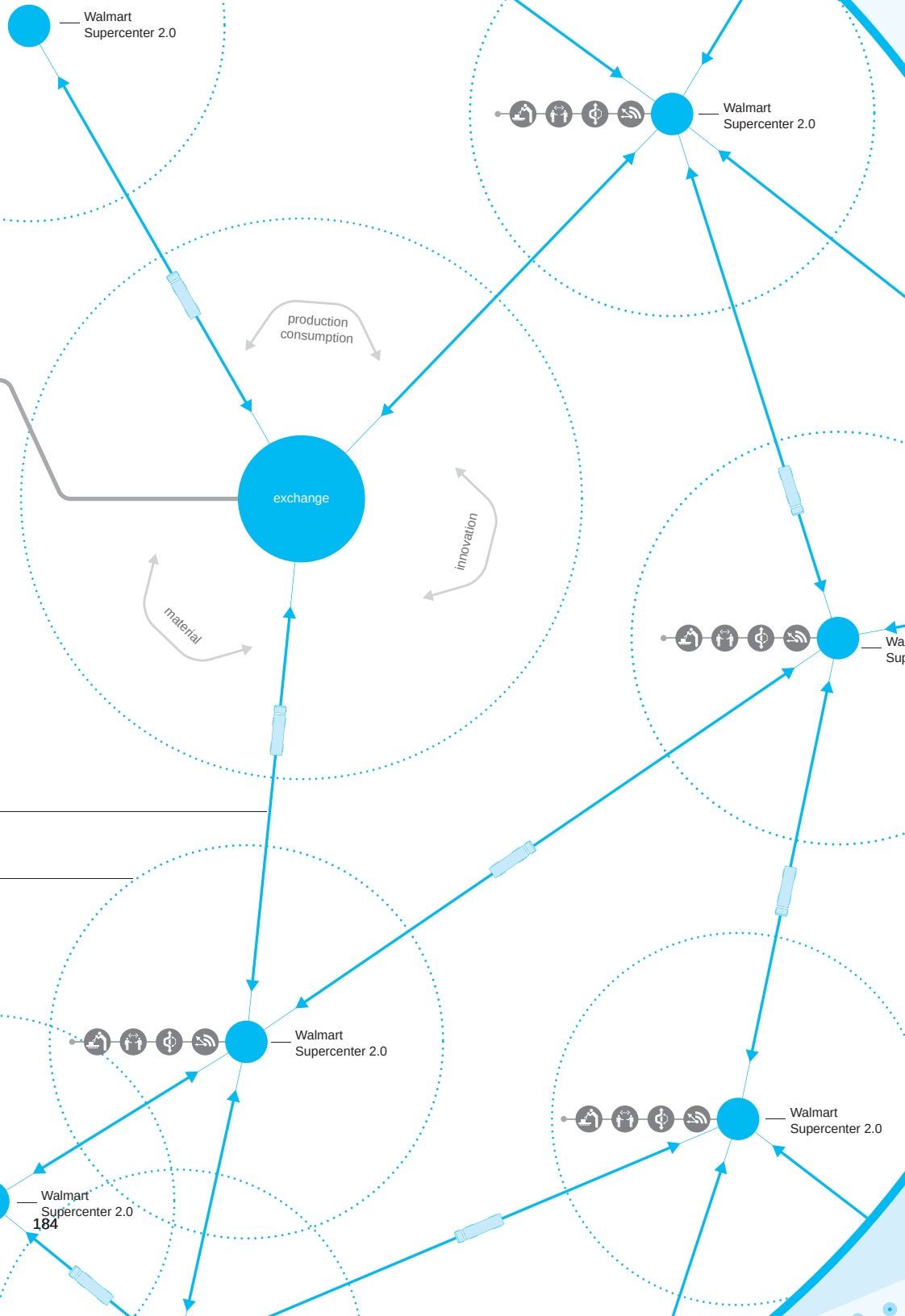
> The thickened spectrum of materials flowing through the Walmart 2.0 network grants increased access to a wide variety of parts at different stages in their lifespan, creating a fertile environment for innovative production. With parts, producers, and various supply chain actors spatially condensing and compressing at Supercenter 2.0 nodes, it not only amplifies possible collisions and unexpected combinations but also allows for parts and goods to move laterally, more freely, in an unpredictable manner between various stages in the supply chain, bypassing unnecessary phases if a part or good is required several phases up or downstream, allowing for overall supply chain travel distances to shorten, and the flexibily to adapt to varying conditions

The basic rewiring of the Walmart system within the Walmart 2.0 scheme is a stretching and expansion of the corporation's logistical reach, to support a thickening bandwidth within their operations for backflow, recirculation, and recycling of material. In effect, the Walmart 2.0 system becomes an underlying platform for the multidirectional movement of parts and goods throughout their logistical network. The increased flow of goods, parts, and materials within the Walmart 2.0 system creates a networked condition which amplifies the adjacent possible, serendipity, and importantly, innovation in assembly, granting a wider spectrum of actors access to a wider array of parts. Within this new operational paradigm, the retailer acts as a material database manager, supporting emergent innovation, production and exchange, as opposed to their Walmart 1.0 paradigm operating as a retailer. Within this paradigm, Walmart directly becomes involved in the breakdown and recirculation of waste materials back into a usable state, and recirculating them throughout their network. Thus, the Walmart 2.0 scheme represents a shift in the interests of the corporation to support the development and circulation of materials containing an engrained propensity for durability, repairability, breakdown and reusability. Not only does this rewiring amplify the volume and type of goods and parts flowing through walmart's logistical network, their flow through the Supercenter 2.0 creates a nodal compression for an amplified collision of parts, allowing for goods and products to move laterally; making unpredictable systemic shortcuts between consumption, production, repair, and second hand phases without necessarily passing through a formal recycle / salvage process.

fig. 132. Rewired Material Flow



Walmart Supercenter 2.0



Walmart 2.0

Linked Network

Catalyzing a re-emergence of manufacturing industries into the urban fabric of the contemporary American city, the Walmart 2.0 Supercenter acts as an infrastructural platform and nodal hub fostering a local spatial tightening of production/consumption, material flow, and innovation systems within a social environment of exchange. As each of the Supercenter 2.0 nodes interacts with a nationally scaled array of other nodes functioning in a similar manner, it both facilitates the emergence of local economies of production, consumption, innovation and exchange, yet also strengthens their ability to network with other locales.

The primary spatial and functional latticework of each node is comprised of 4 main program groupings which would be managed and developed by Walmart within the 2.0 system: Manufacturing, Material Cycle, Logistics, and Exchange. Logistics is mainly comprised of the elements which support the inter-node movement of physical goods and material. Material Cycle is made up of elements which involved in the collection, breakdown, salvage, and recirculation and reforming of parts and materials on each site. The Manufacturing grouping is comprised of facilities supporting emergent forms of manufacturing at a variety of scales and in a variety of spatial configurations including manufacturing labs / workshop spaces providing access to advanced prototyping and manufacturing equipment. The Exchange grouping is mainly comprised of elements which support direct, social formats of economy and exchange, including market space and unprogrammed leasable space (which may be occupied by larger producers, or other emergent or ancillary programs).

fig. 133. Linked Network

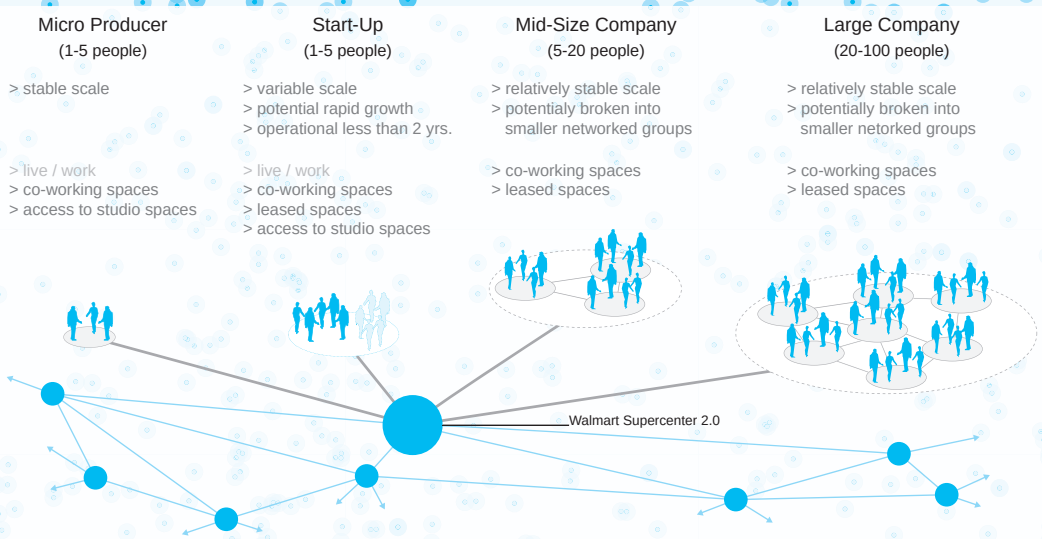


fig. 134. Walmart 2.0 Producer Typologies.
The Walmart 2.0 scheme is conceived to support a gradient of actor scales and organisational types, both new and existing, within a given locale. Leasable studio units facilitate micro and start-up producers while larger unprogrammed leasable space facilitates larger operations. As the Supercenter 2.0 scheme is built upon the networked logistical foundation of Walmart, it also supports the emergence of loose, networked organisational typologies, with cells operating out of distal Supercenter 2.0 nodes or locales.

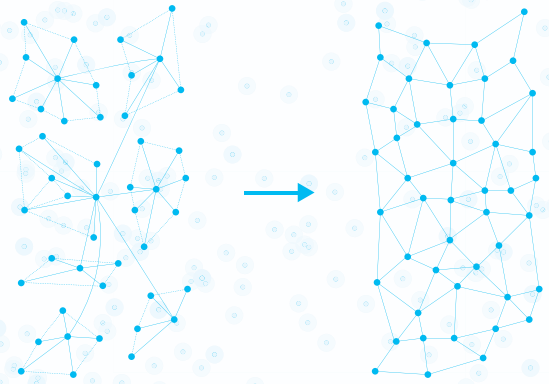


fig. 135. Network Type Shift
An amplification of the distribution capacity within each Supercenter 2.0 not only increases its logistical bandwidth, supporting for-hire services to a wider and unpredictable field of local producers and actors, but also fosters the creation of non-hierarchical distributed network topology. As the Walmart 2.0 system is comprised of less predictable production and consumption cycles than a JIT system, the Supercenter 2.0 acts more as a flexibile, self-sufficient node, no longer reliant on distribution center hubs; they are freed to act as true cells in a larger organism, able to interact and move goods directly between any node, allowing production and consumption processes a greater degree of 'bottom up,' self organisation as opposed to controlled hierarchical determination.

fig. 136. Dallas City Center - Trinity Corridor in Foreground

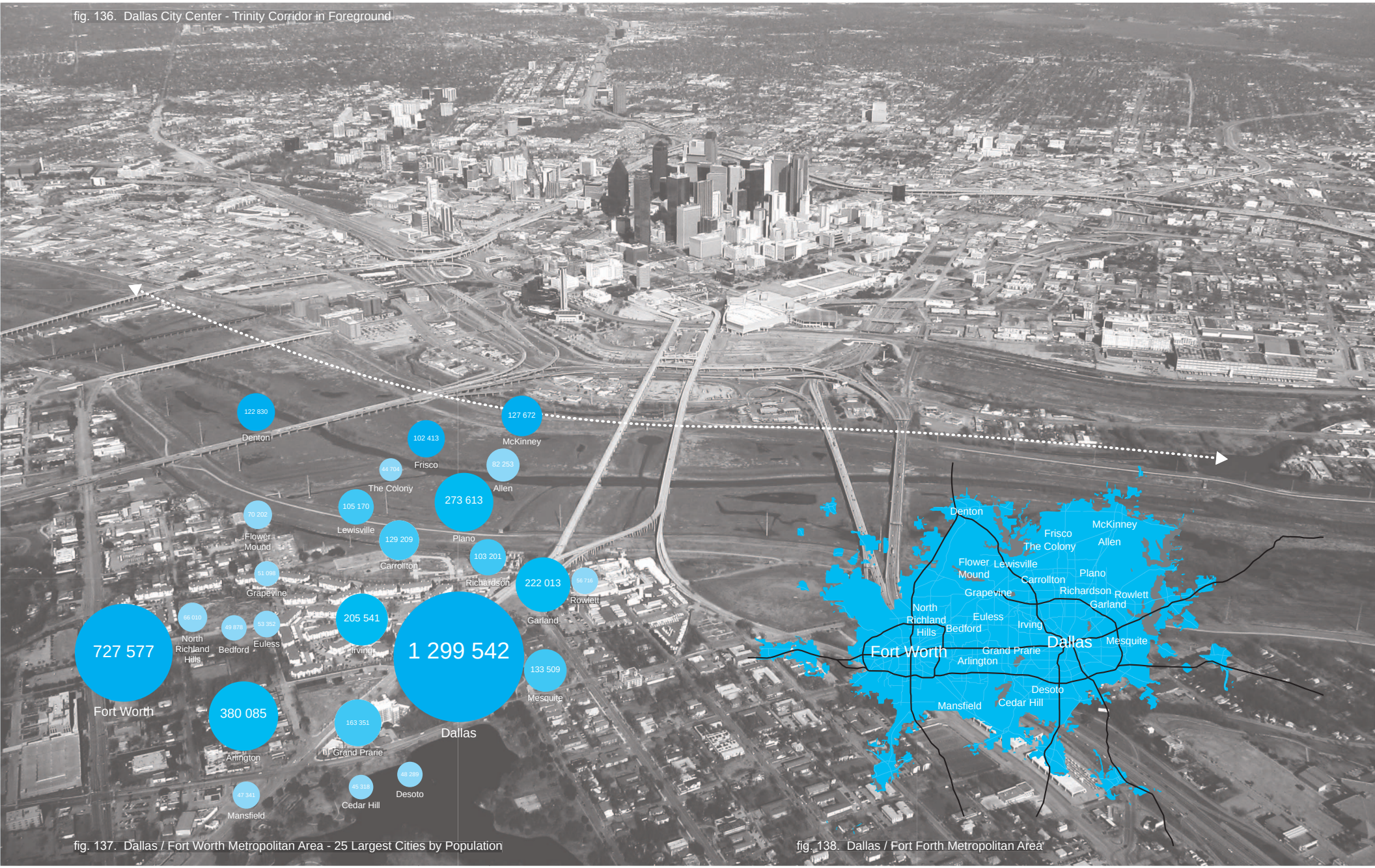


fig. 137. Dallas / Fort Worth Metropolitan Area - 25 Largest Cities by Population

fig. 138. Dallas / Fort Forth Metropolitan Area

Walmart Supercenter 2.0 Test Site (XL)

Dallas / Fort Worth

Population: 6 371 773

Density: 275.56 ppl/km^2

The Dallas / Fort Worth Region is the fourth largest metropolitan area in the United States according to the United States Census Bureau, yet retains the second lowest population density compared to the other top ten largest regions. The region is an urban agglomeration of 12 counties, and includes 13 cities with a population of over 100 000 and more than 100 smaller cities and towns. The agglomeration is formed around the two principle city centers; Dallas and Fort Worth, located approx. 30 miles apart. Growing in population by 23.4% since 2000 alone, the territory between these principal centers has gradually urbanized over the last 30 years, and the peripheral development of each city has increasingly merged.[1] As such, the region can be described as two denser traditional city centers surrounded and connected by the low rise development which characterizes and epitomizes contemporary horizontal urbanization and the space of flow. Thus the Dallas / Fort Worth region provides an ideal case site for the development and testing of the Walmart Supercenter 2.0

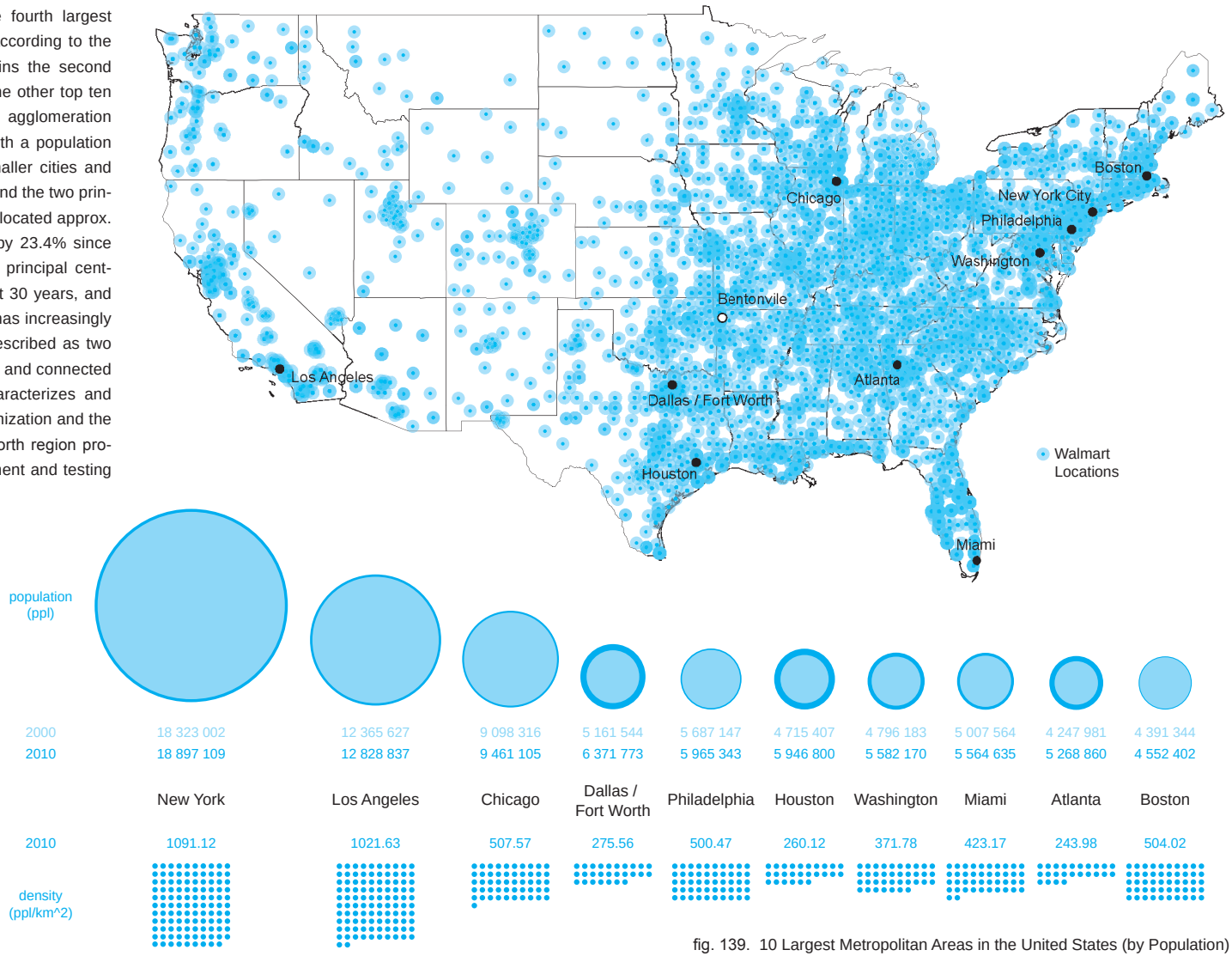


fig. 139. 10 Largest Metropolitan Areas in the United States (by Population)

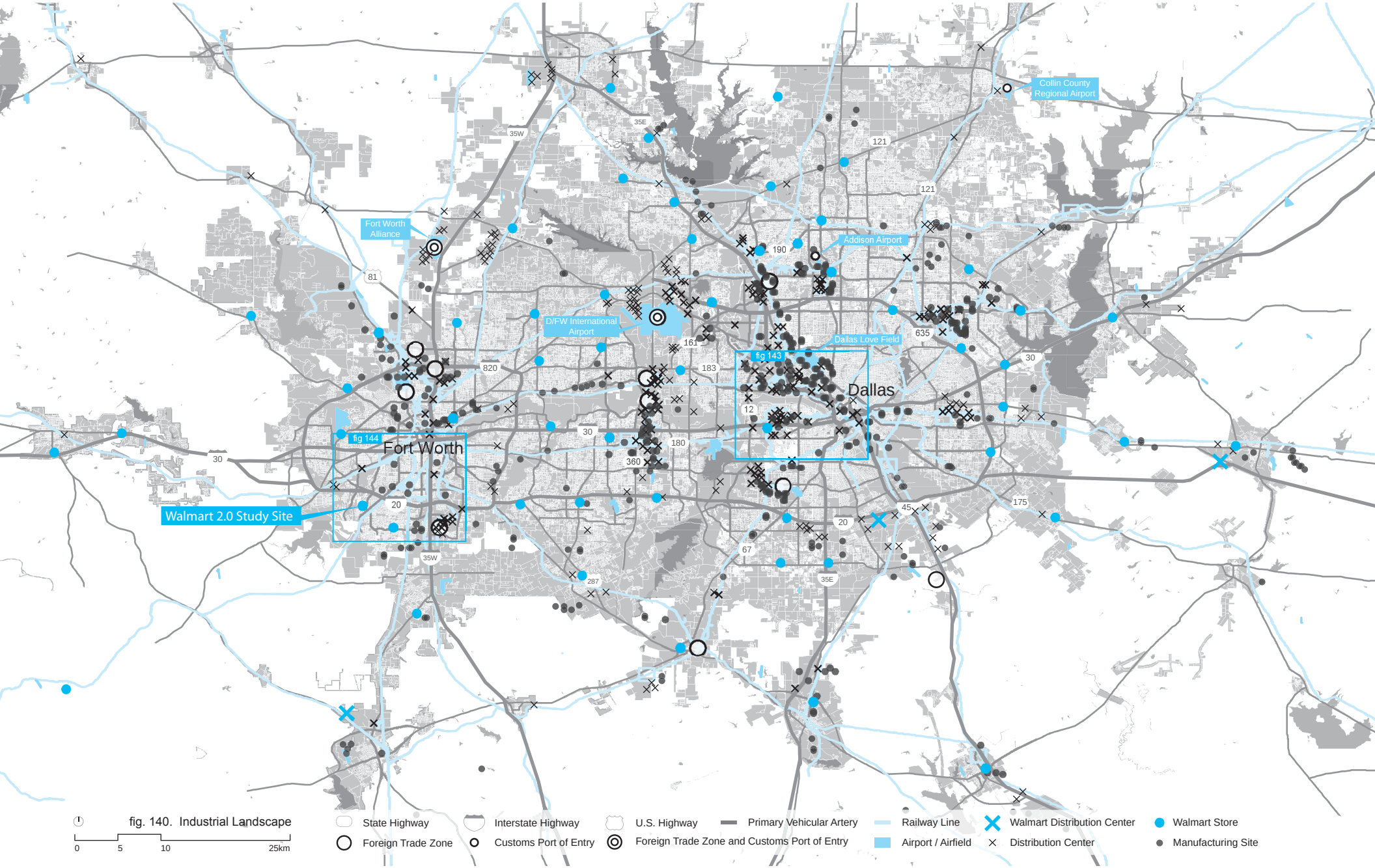


fig. 140. Industrial Landscape

Site XL

Industrial Landscape

The Dallas Fort Worth region is home to many companies' headquarters, manufacturing facilities, or both - such as the aerospace giant Lockheed Martin, but also of those manufacturing consumer goods, such as Texas Instruments, or others producing clothing, footwear, and plastics. The region forms one of the largest manufacturing clusters in the United States, and the largest in Texas, with manufacturing accounting for 10% of the regional economy. As the region maintains a long tradition of industrial and manufacturing activity, it reflects an amplified relationship between industrial operational models and its urban morphology.

Home to several large airports, including the world's first exclusively cargo and freight airport (Fort Worth Alliance[2]), major rail line connectivity, several customs import and foreign trade zones, and accessibility to 93% of the American population by truck within 48 hours, the Dallas / Fort Worth region has remained a significant industrial hub within the current era of distributed, JIT industry; with manufacturers, distributers, warehousers and supply chain operators clustering in large territorial agglomerations and corridors along these nourishing attractors of contemporary, globally scaled industry.[3]

Despite the continued national relevance of the Dallas / Fort Worth area within the spheres of manufacturing, these productive sectors now lag behind service and retail industries; chief among them is the region's largest employer, Walmart. At an urban scale, Walmart's distributed territorial deployment stands in stark contrast to the regions clustered and agglomerated industrial actors.

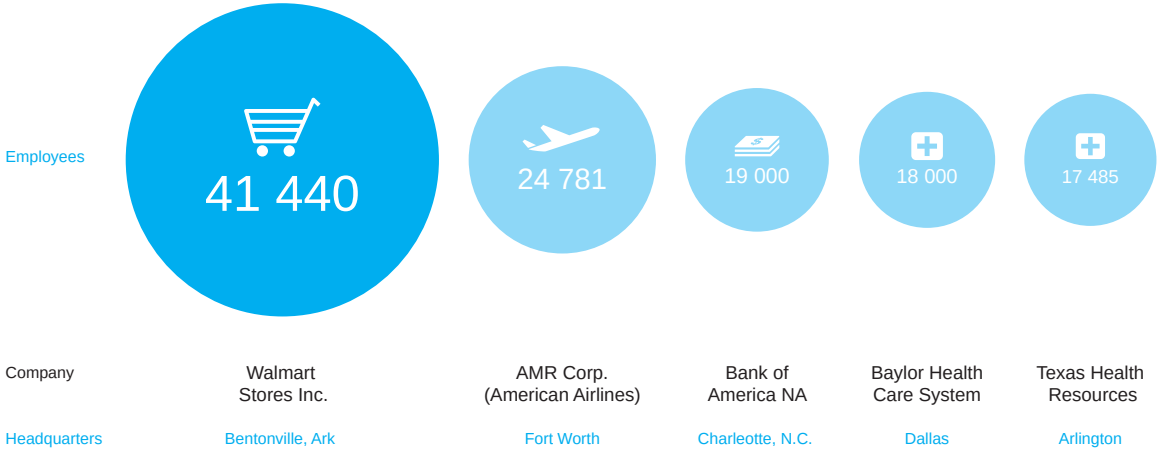


fig. 141. Top Five Employers in the Dallas / Fort Worth Region (2009)

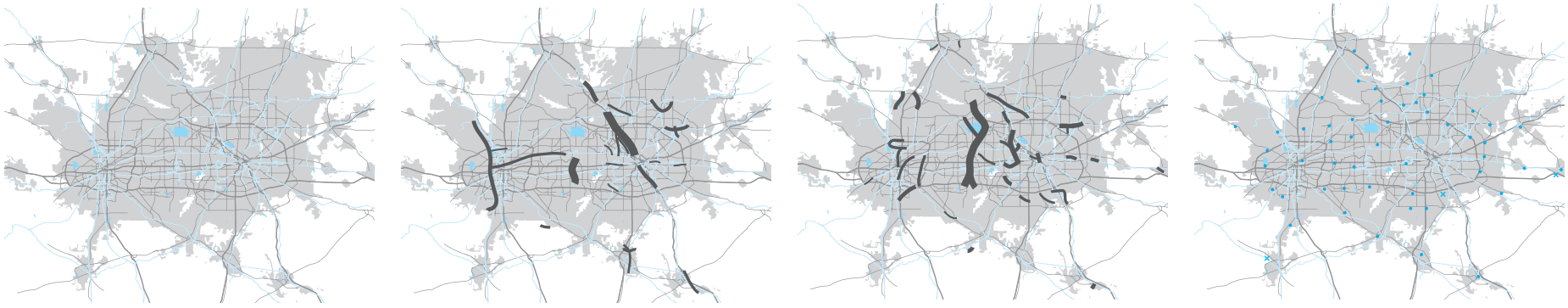


fig. 142. Walmart Dispersal vs. Industrial Agglomerations and Corridors

Site XL

Industrial Agglomeration

The Trinity River Industrial Corridor epitomises the contemporary urban industrial configurations; segregated urban systems clustered around the nourishing attractors of globally scaled industry (airports, highways, customs points of entry, and foreign trade zones.) These corridors form morphological units independent from those which support specific local urban populations.

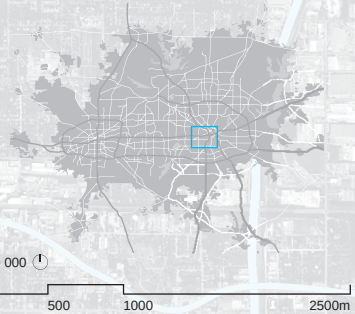


fig. 143. XL Urban Context - Trinity Corridor

Site XL

Walmart Dispersal

While Walmart store locations still maintain strong deliberate relationships with primary, road based transportation infrastructures, supporting their globally scaled logistics system, it is important to note that from an urban scale, individual locations also maintain strong proximal relationships with urban populations within the contemporary horizontal city fabric.

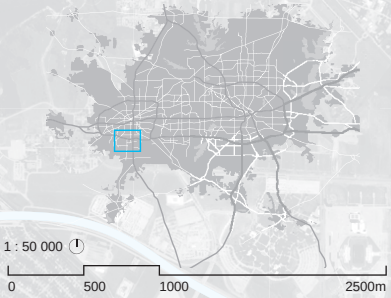


fig. 144. XL Urban Context - Walmart 2.0 Site

Industrial Agglomeration:
Distribution Manufacturing + Material Breakdown

Walmart
Supercenter #590

fig 145

fig 146

Walmart 2.0
Study Site

Walmart
Supercenter #2978

Carter Industrial Park - Distribution
and Manufacturing Agglomeration

Foriegn Trade Zone

20

35W

287

Existing Context - Site L

Walmart Supercenter 2.0 Test Site vs. Industrial Park

The Walmart Supercenter 2.0 Test Site, the existing location of Walmart Supercenter 2978 in South Fort Worth is shown to the near right, juxtaposed with the nearby Carter Industrial Park, which exemplifies the territorial configurations of contemporary industry - distinctly segregated from the residential fabric.

fig. 145. L Urban Context - Walmart 2.0 Site

Program / Land Use Index

01	Alcon Medical Products Manufacturing	16	Ball Corporation (Packing)
02	Smurfit-Stone Container Corp. (Packaging)	17	Wesco Aircraft Hardware Corp.
03	Miller Brewing Facility	18	Essner Custom Metals Manufacturing
04	Mrs. Baird's Bakeries Inc.	19	Distribution Center
05	Green Bay Packaging	20	Distribution Center
06	Manufacturing Facility	21	Bunge Foods
07	Whirlpool Corporation	22	Chicken E. Food Services
08	Mother Parker's Tea & Coffee	23	Bimbo Bakeries Warehouse + Dist. Ctr.
09	Xerox Distribution Center	24	Bedroom Distributors
10	Ben E. Keith Food Service Distribution	25	Capitol Lighting
11	Tyson Foods	26	RTP Plastics Manufacturing
12	Meadow Burke Concrete Products	27	Associated Wholesale Grocers Dist. Ctr.
13	Ben E Keith Beers (Budweiser)	28	Save-a-Lot Distribution Center
14	Alcon Medical Products Manufacturing	29	National Archives Storage
15	Schwan Foods	30	FedEx Home Delivery Distribution Center

fig 146

Altamesa Blvd

Crowley Rd

Walmart 2.0 Study Site
Approx. Area: 86 771 m²

Sycamore School Rd

Walmart
Supercenter #2978

McCart Ave

Allen St


Carter Industrial Park
Primay Uses: Manufacturing and Distribution
Foreign Trade Zone
Approx. Area: 5 787 160 m²
35W
Carter Industrial Park
Primay Uses: Light Manufacturing and Bulk Distribution
(under development)
Approx. Area: 3 520 513 m²
01
02
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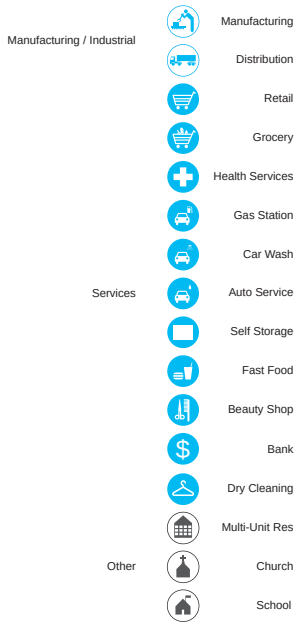
Existing Context - Site M

Service + Retail Corridor

The fabric surrounding the existing Walmart 2.0 test site and its ingrained program typify the Retailer's existing outlet sites. The site is at the intersection of two main arterial roads, McCart Ave. and Sycamore Rd., and surrounded by typical retail corridor service and shopping programs, housed in shed like buildings. This existing retail morphology is scaled to the automobile, with minimal pedestrian or linked fabric relationships established between stores. Further, the retail corridors maintain little relationship to their surrounding residential fabric, linking only to the major vehicular arteries, forming programmatically segregated islands



1 : 20 000

0 50 100 500 m

fig. 146. Service + Retail Corridor

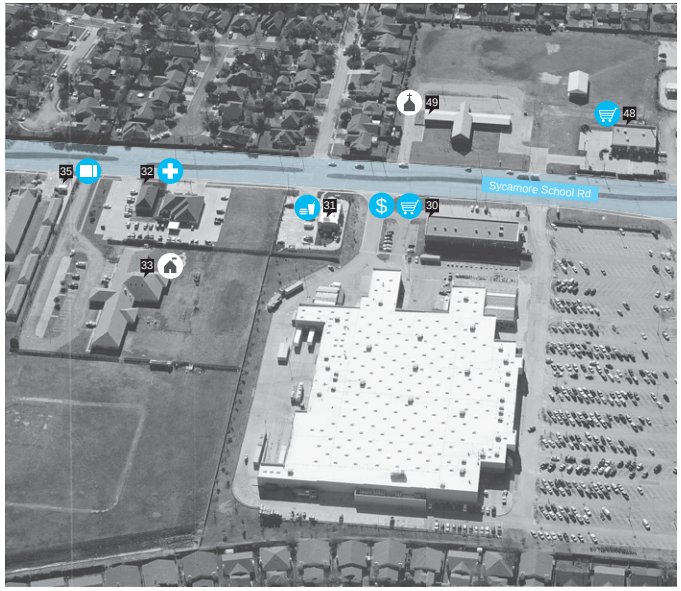


fig. 147. Walmart Supercenter 2978, Aerial View Looking South

fig. 148. Walmart Supercenter 2978, Aerial View Looking East

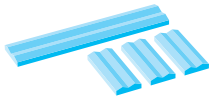
Program / Land Use Index

01 Pep Auto Parts Maker
02 Natural Gas Drilling Site
03 Mixed Commercial: Fish World, Magnolia Dental
04 New Start Health Services
05 McCart Family Dentistry
06 Mixed Commercial: Food, Beauty, Medical
07 ACL Distribution + Manufacturing Scrapbook and Baby Supplies
08 McCart Self Storage
09 Mixed Commercial: Dollar General, Insurance, Dental, Health Care, Beauty
10 Fort Worth First SDA Church
11 O'Reilly Autoparts
12 Aaron's Furniture Rental
13 Cowtown Self Serve Carwash
14 Edmondson's Fried Chicken
15 Discover Christian Pre-School
16 Texaco Gas Station
17 Auto Excel Lube
18 Gas + Mini-mart
19 Gas Station
20 City of Fort Worth Equipment + Vehicles Service Center
21 All Storage - Self Storage
22 Mixed Commercial: Beauty Supply, Fast Food
23 Legacy Seniors Residence
24 Legacy Seniors Residence
25 Bank
26 Mixed Commercial: Dollar Tree
27 Care Now - Urgent Care
28 Gas Station
29 Rosa's Cafe + Tortilla Factory
30 Mixed Commercial: Payless Shoes, Cash Store
31 Taco Bell
32 Professional Smiles
33 Fort Worth Adventist Jr. Academy
34 South Meadow Animal Clinic
35 Security Storage 24 Hour Access
36 Sycamore Trace Apartments
37 Sports Field
38 Murphy USA Gas
39 Sonic Drive Through - Fast Food
40 Albertson's Gas + Convenience
41 Papa Murphy's Take 'N' Bake Pizza Restaurant
42 Albertsons Grocery + Pharmacy
43 Tetco Gas + Convenience
44 Panda Express - Fast Food
45 Mixed Commercial: Subway, Beauty Supply, UPS Store
46 Super Dry Clean City
47 BBVA Compass - Bank
48 Walgreens - Pharmacy
49 Blockbuster
50 Christ United Methodist Church
51 Alamo Self Storage
52 Mixed Commercial: Dominos, Beauty Salon, Chase Bank
53 Great Commission Baptist Church
54 Grace Lutheran Church
55 Meadow Creek Elementary School
56 Candle Ridge Park
57 Trinity Cumberland Presbyterian Church

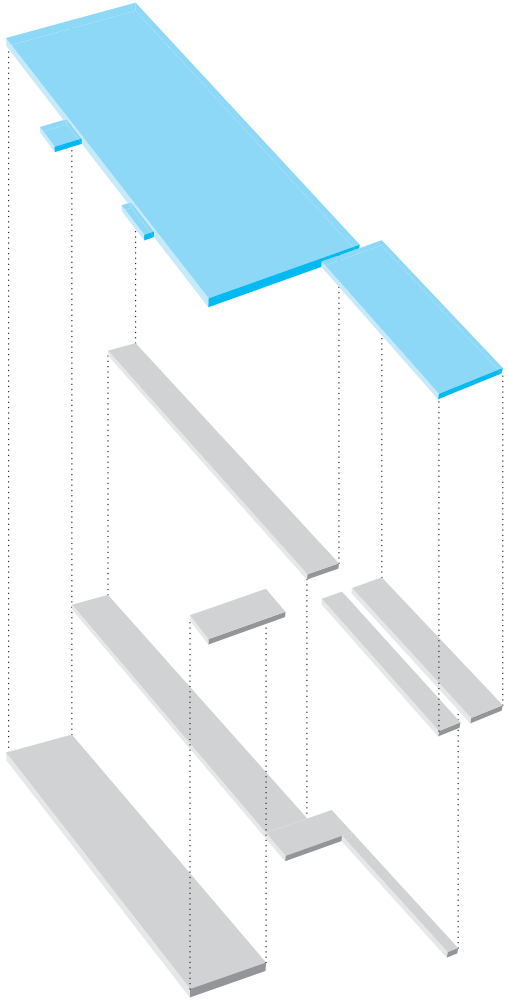
Site L

Walmart Scale - Production Network vs. Site Context

The scale of the existing Walmart Supercenter, at the Walmart 2.0 test site reflects its relationship with a global industrial scale. As the current store houses all programs within a closed shed, it does not allow for a relationship with a broader city fabric; even for the leasable vestibule spaces, accessible only through concentrated building entries, relating only to the sites parking surface.



Manufacturing
appr. footprint small: 4 000 m²
appr. footprint large: 12 500 m²
note: part of a much larger complex of approx. 33 similar buildings in Fujian Province, China.

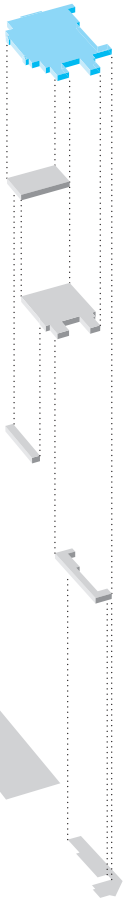


Walmart Distribution Centre 6299
Buckeye, Arizona
appr. footprint 163 100 m²

Shipping
appr. 250 truck capacity
appr. footprint: 63 000 m²

Sorting + Routing
appr. footprint: 43 800 m²

Storage
appr. footprint: 63 000 m²



Walmart Supercenter 2978
Fort Worth, Texas
appr. footprint: 16 700 m²

Grocery
appr. footprint: 4 100 m²

General Merchandise
appr. footprint: 8 100 m²

Vestibule Retail
Leased Space
appr. footprint: 1 200 m²

Shipping / Storage / Receiving
4 truck capacity
appr. footprint: 2 000 m²

Parking
appr. footprint: 27 800 m²

Loading Zone
appr. footprint: 4 600 m²

School
appr. footprint: 7 100 m²

Self Storage
appr. total footprint: 5 000m²

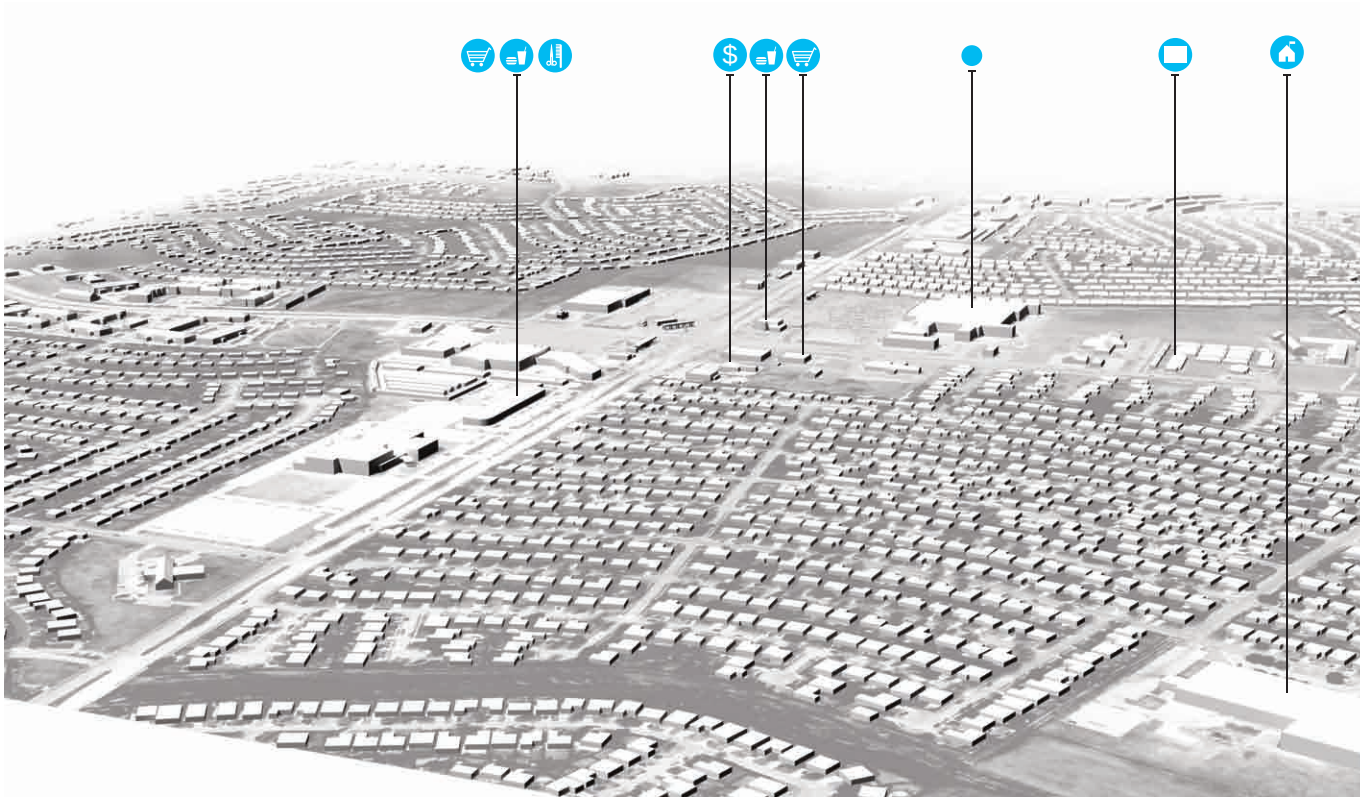
Mixed Comm. / Retail
appr. footprint: 3 100 m²

Fast Food Restaurant
appr. footprint: 710 m²

Single Retail Unit
appr. footprint: 600 m²

Bank
appr. footprint: 400 m²

fig. 149. Walmart Scale - Production Network vs Site Context



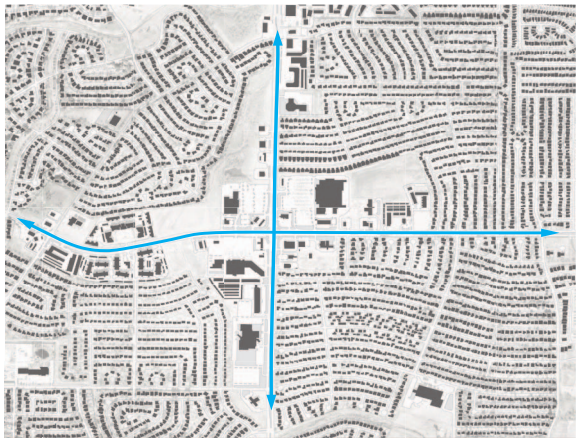
Site L

Typical Walmart Context

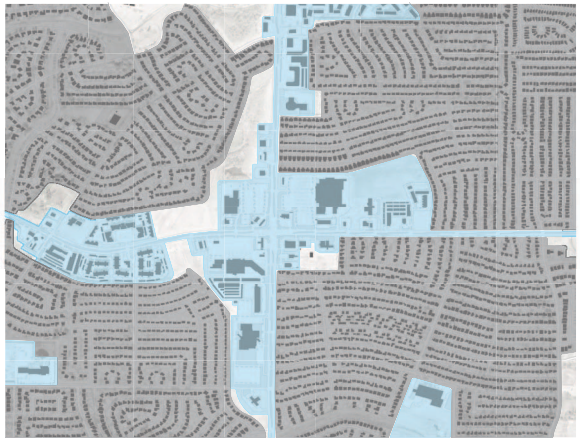
The Walmart 2.0 test site sits at the intersection of two major vehicular arteries and typifies the spatial packages located along these retail corridors in the contemporary city. The surrounding context maintains a limited spectrum of program variation, housing only end of supply chain service or retail outlets and suburban residential fabric.

fig. 150. left: Walmart 2.0 Study Site
Retail Corridor Context

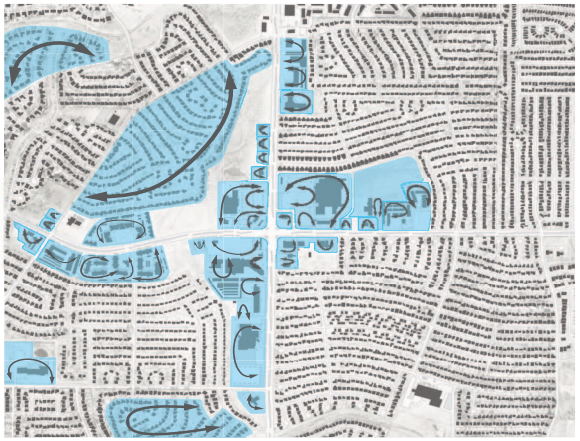
fig. 151. below: Walmart 2.0 Study Site
Existing Morphological Conditions



Major Vehicular Arteries



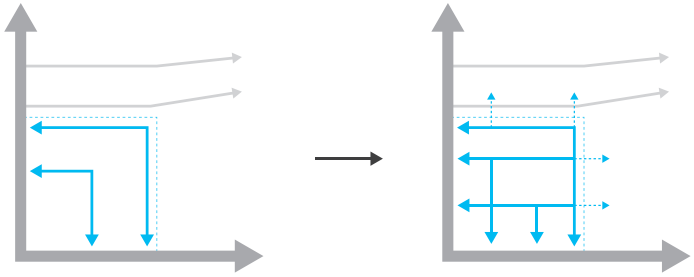
Programmatic Islands



Traffic / Flow Islands

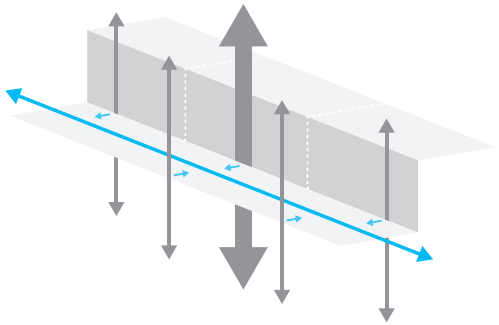
Proposed Supercenter 2.0

Site Approach and Design Strategies



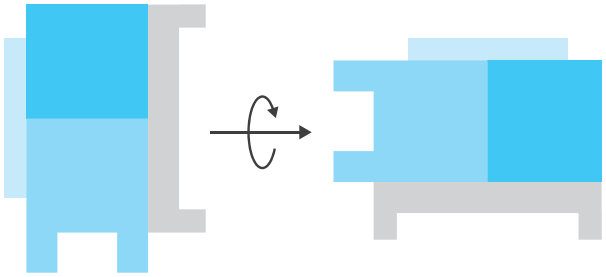
Site Permeability

The site is arranged to invite permeability and connectivity to either existing or future urban fabric. Internal streets invite further connectivity to secondary or tertiary streets; avoiding the formation of a cul-de-sac or island condition, where access is only from the surrounding primary arterial roads.



Urban Circulation

The Supercenter 2.0 scheme seeks to encourage intra-site circulation through the spaces of the city. Where freight cores concentrate users and interactions, secondary cores are utilised at a frequency which breaks the scheme into smaller chunks of vertical circulation, avoiding long internal corridors, pushing lateral circulation back into the space of the city.



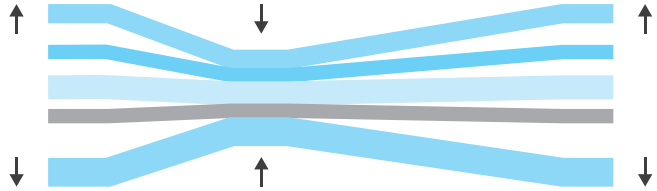
plan section

Vertical Layering

The existing Walmart retail site aligns and extrudes spaces horizontally from back of house to front of house. The Supercenter 2.0 rotates this logic, provoking overlap or stacking relationships between varying programmatic elements; facilitating interactions between different uses within a close vertical spatial proximity, layered upon a logistics platform.

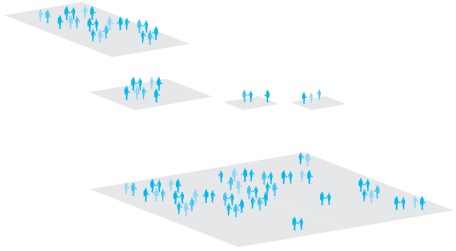
Ground Plane + Public Space

The Supercenter 2.0 scheme recognizes the ground plane as the primary surface of public and human occupation in the city, thus larger industrial spaces, and those servicing vehicular distribution are pulled apart and either buried or raised, freeing the ground plane for public space, social exchange, and human scaled programs - reintegrating a friction or viscosity to this plane of the city.



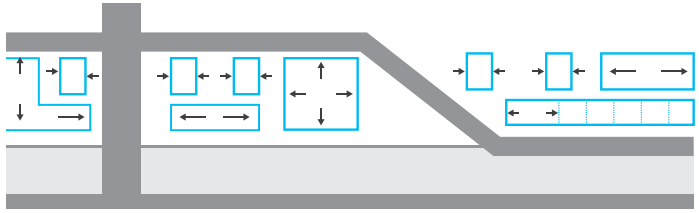
Delamination + Compression

In general, the Walmart 2.0 scheme radically delaminates the big box typology, pulling at and stretching apart varying programs allowing for gaps where the space of the city filters in. In other places, however, these spaces are compressed, pinched, crossed or woven, amplifying connectivity between spatially or pragmatically disparate elements.



Spatial Specificity + Grain Variation

While compositionaly the Walmart 2.0 forms a significant structure, it contains spaces at many different grains, supporting a gradient of human occupation, from large public spaces, to smaller public terraces, to intimate corridors and overlooks. Likewise, the project's leasable spaces, workshops, studio spaces, co-working spaces, market spaces and meeting / exhibition spaces provide a wide spatial spectrum and variation in occupation grain supporting many simultaneous scales of production, consumption and exchange.



Adaptability

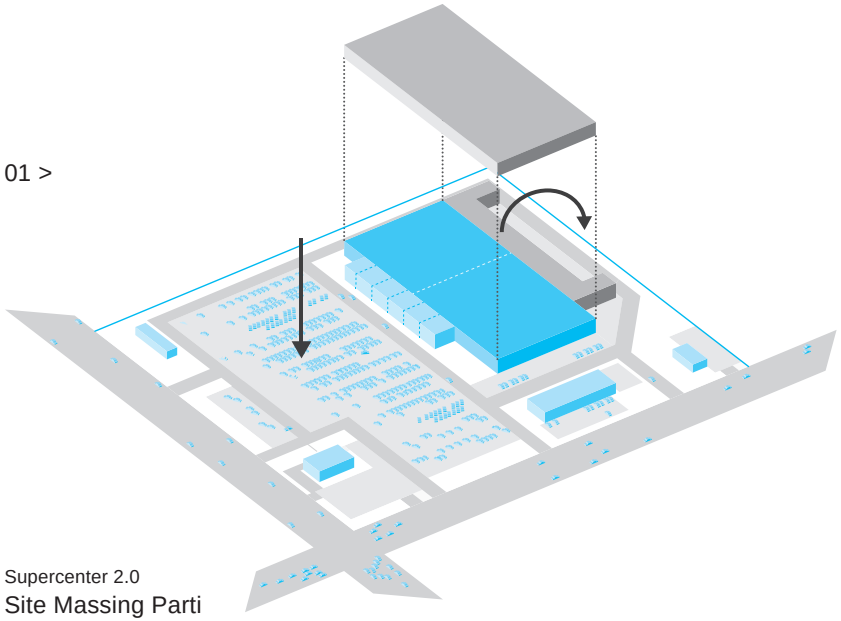
The Walmart Supercentre 2.0 is conceived as a logistical and infrastructural lattice with certain fixed anchor points, planes, or surfaces that then allow for a degree of programmatic, or spatial flexibility.

Transparancy + Translucency

Through a variation in translucency and transparency throughout the project, the Supercenter 2.0 scheme seeks to make visible many stages of consumption, production, and material breakdown industrial systems, strengthening the connection between these systems and the city fabric.

fig. 152. Site approach + design strategies

01 >



Supercenter 2.0
Site Massing Parti

01 > With the addition of Material Cycle and Manufacturing facilities to the Walmart site, coupled with an increase in distribution capacity, territory supporting primarily vehicle based programs (parking, and distribution logistics) are pushed below grade, freeing the ground plane for re-configuration with an increased consideration for the human scale. The liberated ground plane - the urban plane - deliberately moves away from cul-de-sac / island spatial package typologies towards one which invites and provokes the stitching together of the urban fabric at a social scale.

02 > The leasable vestibule space from the Walmart 1.0 format is significantly increased and forms a scaler buffer at the periphery of the site, re-calibrating the fabric from the surrounding 8 lane vehicular arteries to one of human scale movement and social interaction. A reduced scale market / exchange space is pulled apart, creating a versatile, unprogrammed public space within this buffer zone, relating to both the surrounding leasable spaces and market spaces.

03 > The Manufacturing and Material Cycle layer is stretched and pulled apart, creating two bars. The inner Material Cycle houses the breakdown of material from used goods to sub-components, to useable materials. Likewise, the Manufacturing bar houses the programs supporting the production of goods, while allowing for interaction with the material breakdown process. Both spaces are pushed above the leasable zone, granting these industrial spaces ample access to light, and logistics serviceability from below.

04 > Material Cycle and Manufacturing zones are pushed, pulled, and stretched in the vertical dimension, creating spatial overlap and collision between varying programs. Further, In places, the Manufacturing zone projects down, allowing for direct grade access, or double height spaces, while stretching of the Material Cycle zone creates the spaces of interchange between the Material Cycle process and users, producers, and consumers.

02 >

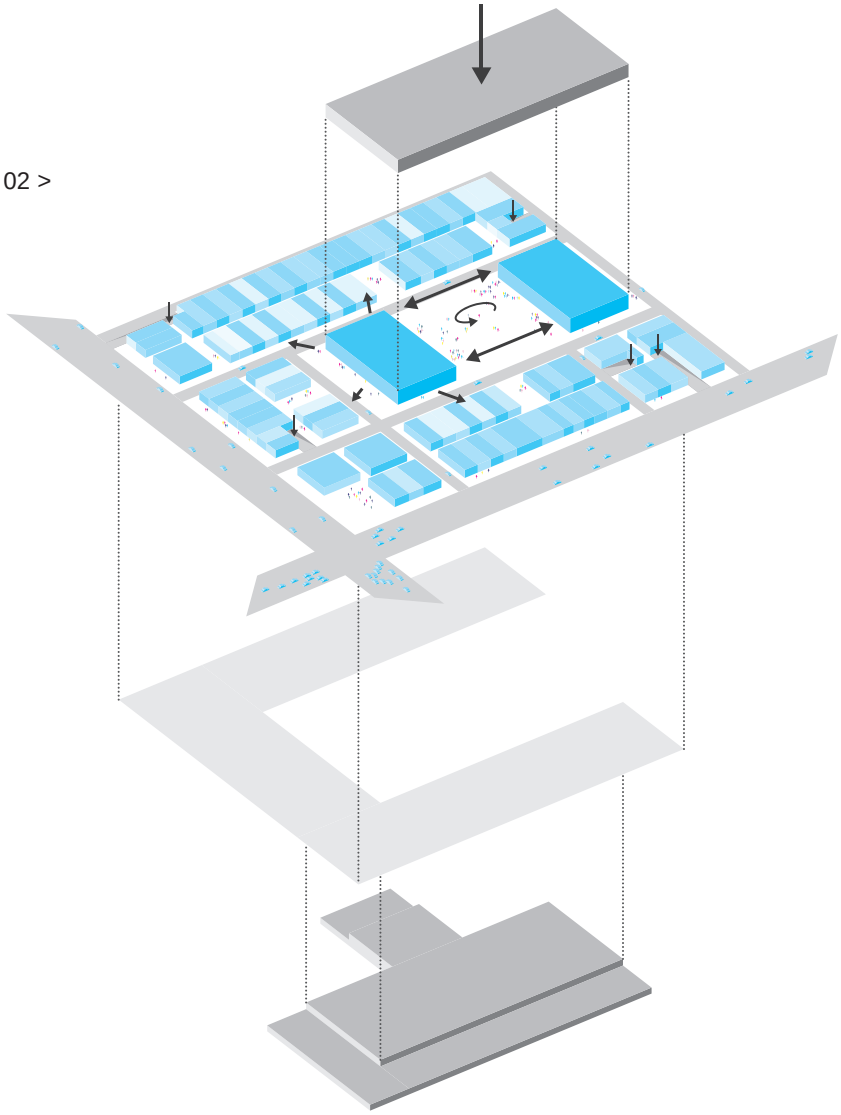
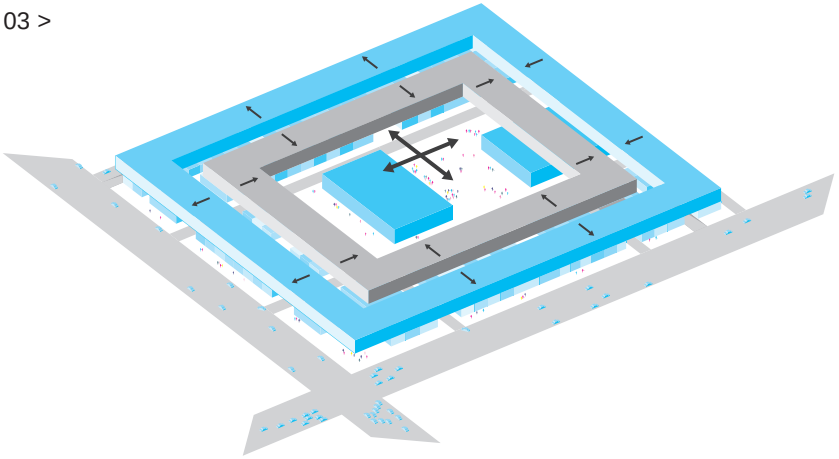


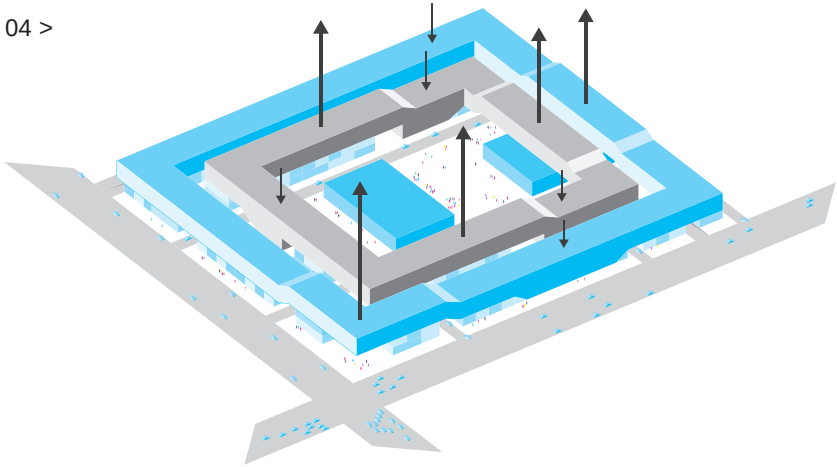
fig. 153. above
Schematic Massing Parti

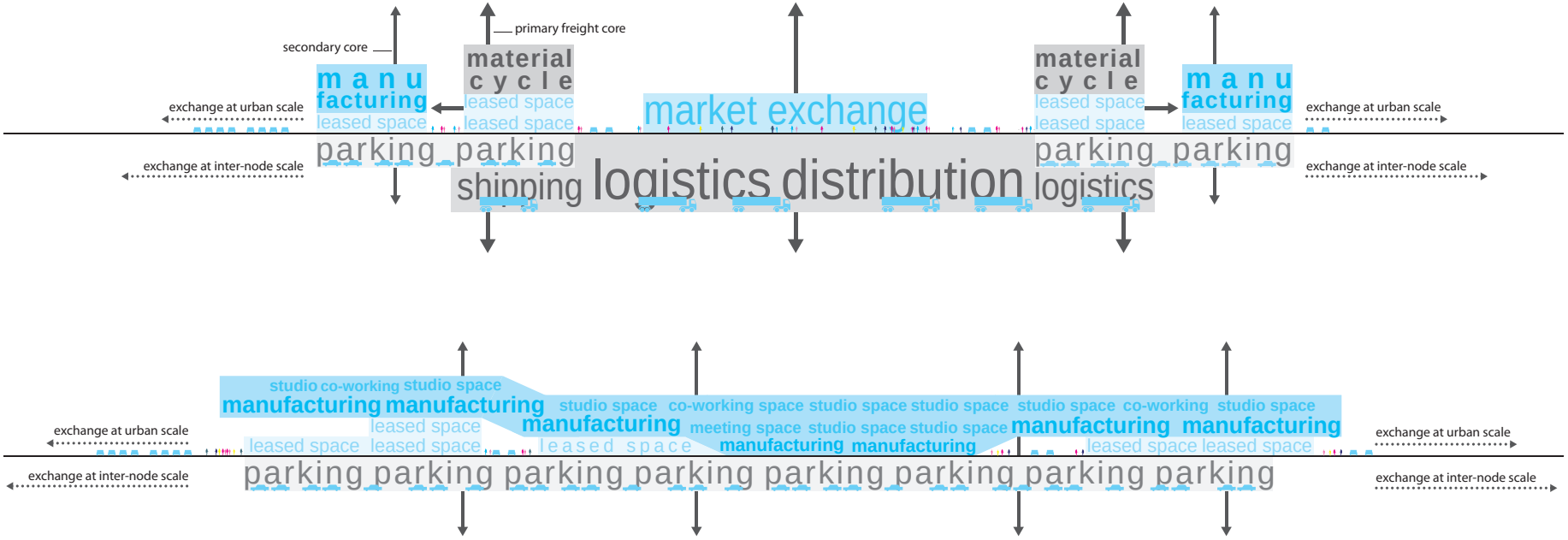
fig. 154. right
Schematic Program Sections
Showing layering of primary programs, linked vertically through primary freight, and secondary cores.

03 >



04 >




secondary core
primary freight core
manufacturing
leased space
material cycle
leased space
market exchange
material cycle
leased space
manufacturing
leased space
exchange at urban scale
exchange at urban scale
parking parking
parking parking
exchange at inter-node scale
exchange at inter-node scale
shipping logistics distribution logistics

studio co-working studio space
manufacturing manufacturing
studio space co-working space studio space studio space studio space co-working studio space
leased space
manufacturing
meeting space studio space studio space
manufacturing manufacturing
exchange at urban scale
leased space leased space
leased space
manufacturing manufacturing
leased space leased space
exchange at urban scale
exchange at inter-node scale
parking parking parking parking parking parking parking parking
exchange at inter-node scale

fig. 155. Walmart 2.0 Supercenter - Massing In Context

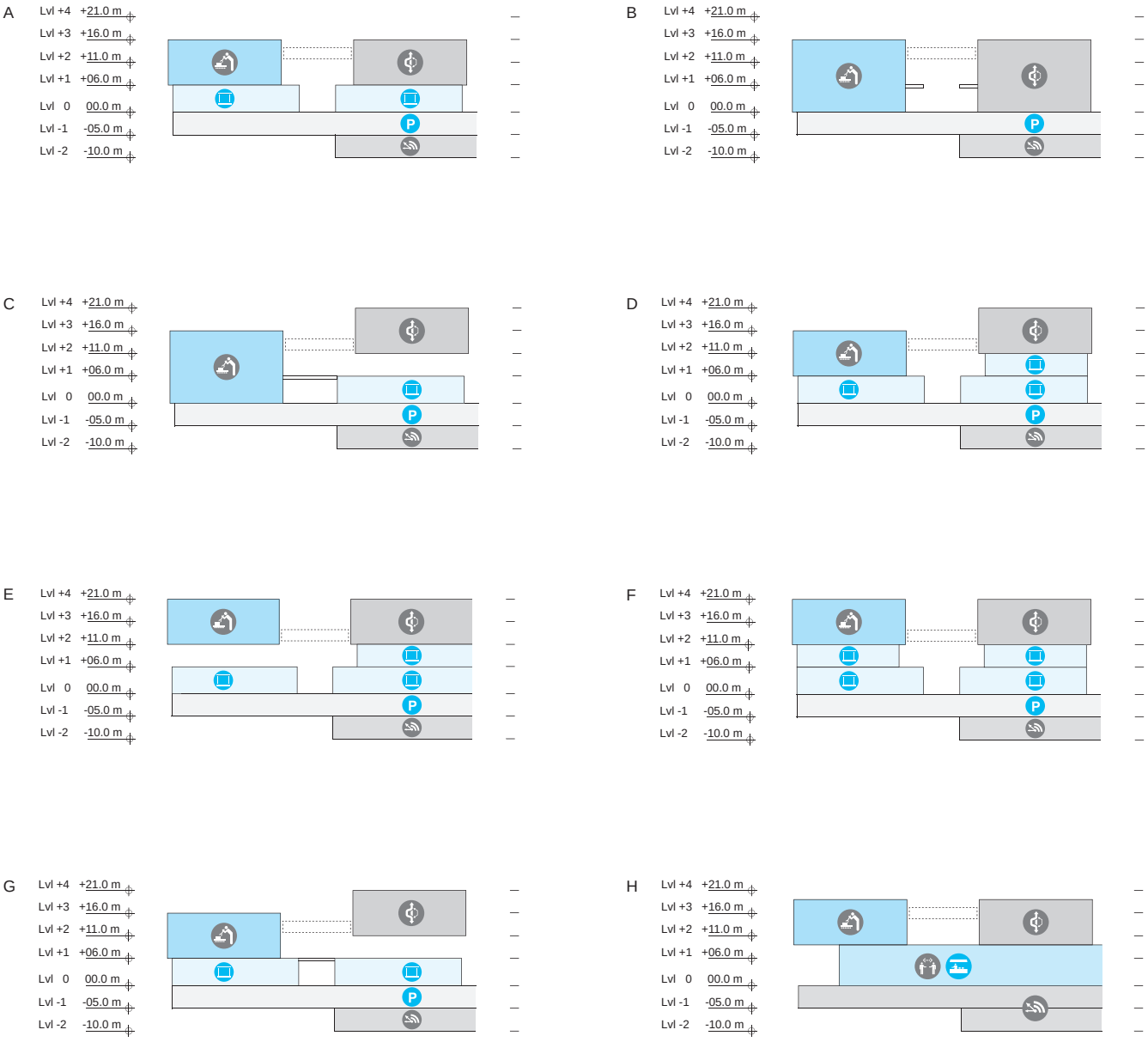
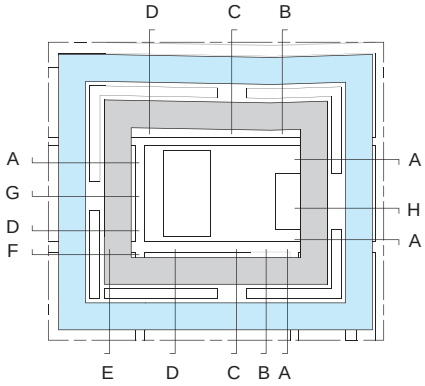


fig. 156. Variable Section Typologies

Variable Section Typologies

The basic section of the Walmart 2.0 scheme allows for a great deal of flexibility in deployment, both in terms of its ability to adjust to specific site conditions, and its ability re-configure and adapt to provide ideal or varied sectional relationships between primary functional spaces. Where need be, or in response to site context, Manufacturing and Material Cycle bars may stretch, interfacing with the ground plane or stretch vertically, allowing for greater amounts of flexible leased space. The plug-in storage system is designed so that it connects to the Manufacturing or Material Cycle space within any sectional variation. The diagram to the left describes these variations as deployed in the Supercenter 2.0 test scheme.



Walmart 2.0
Exploded Axo - Below Grade

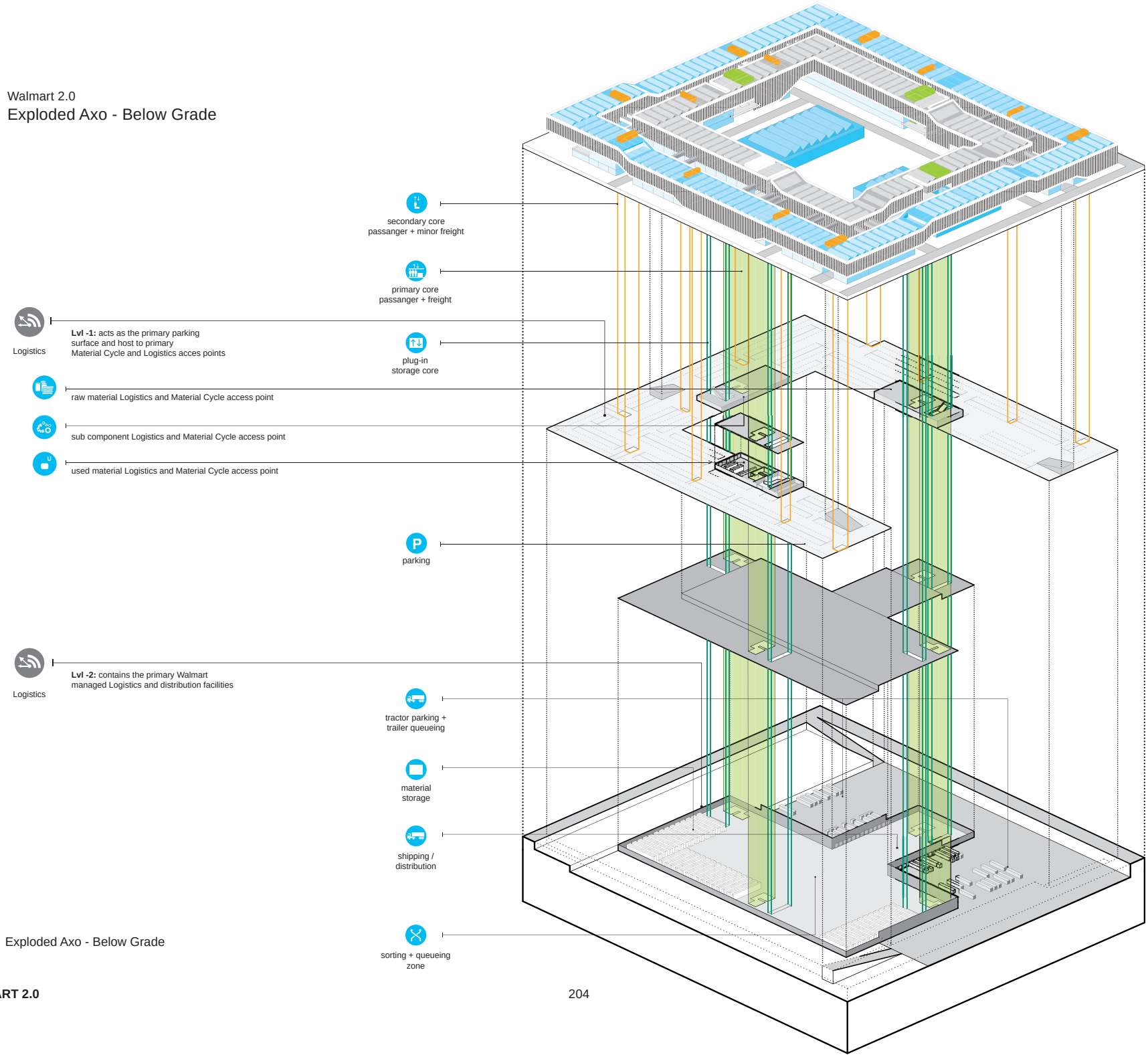


fig. 157. Exploded Axo - Below Grade

Walmart 2.0

Exploded Axo - Above Grade

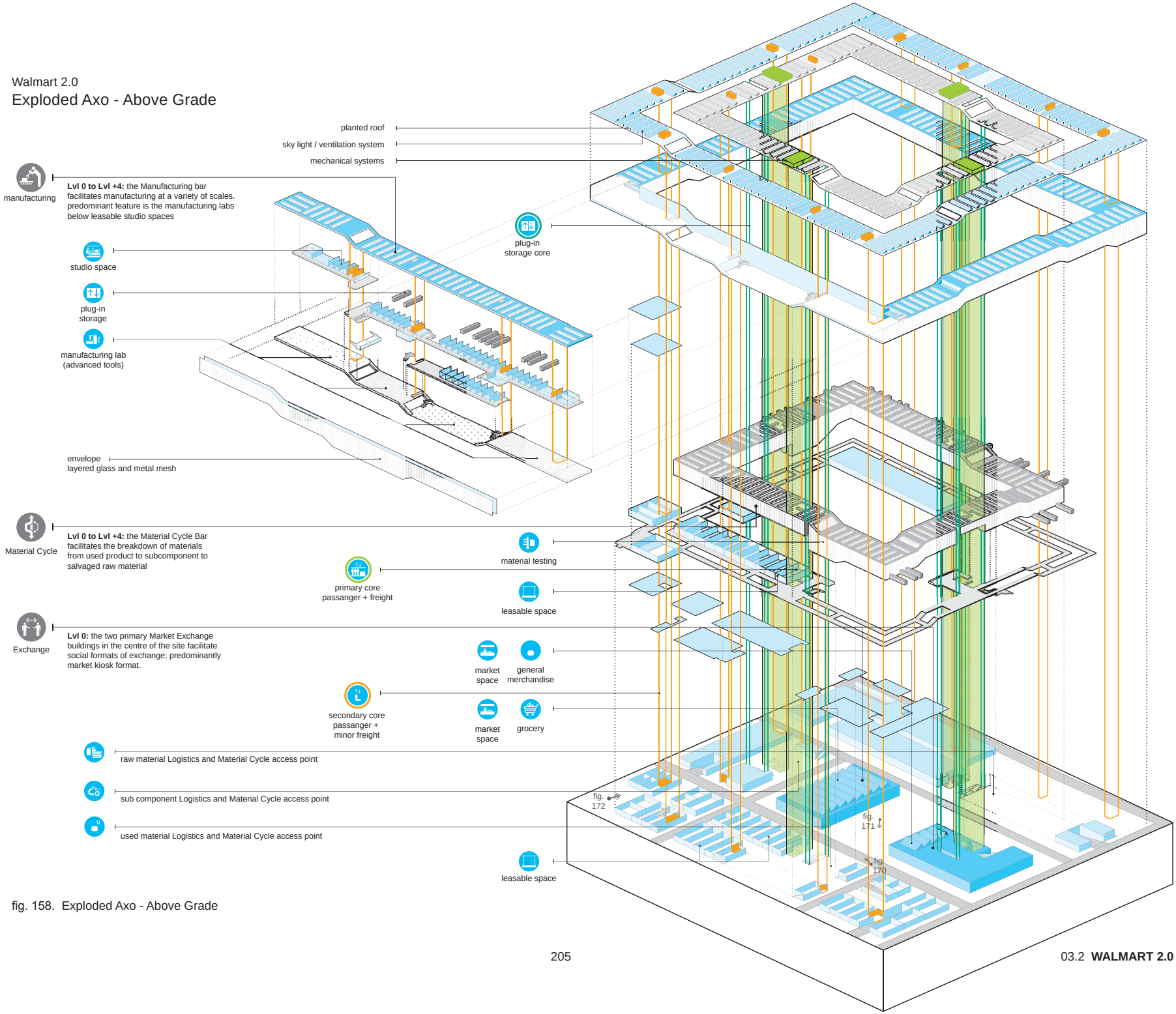
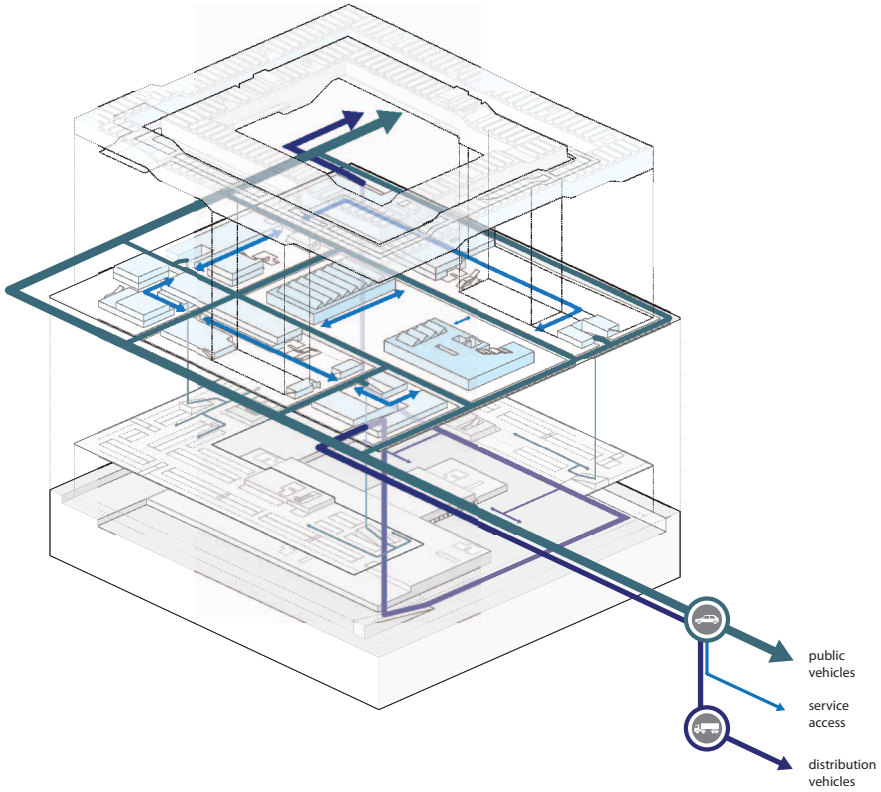


fig. 158. Exploded Axo - Above Grade

Walmart Supercenter 2.0

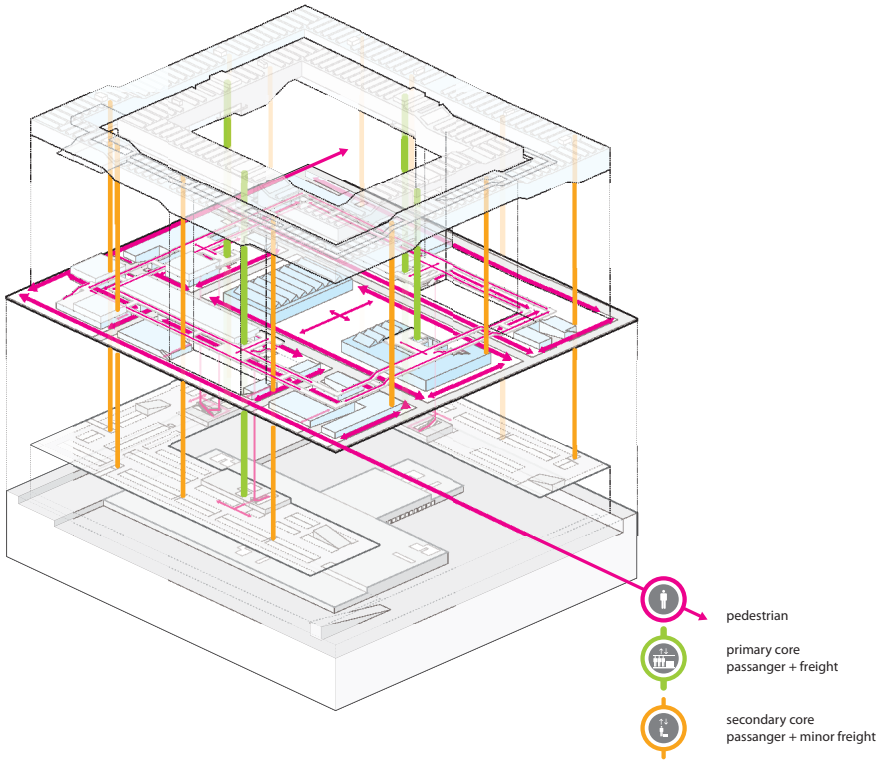
Site Flow

The Walmart 2.0 proposal allows for a programmatically hybridized site occupation, where industrial scaled distribution, material cycle, and manufacturing programs cohabitate. The flow of goods, materials, people, and vehicles are accommodated within vertically stratified space. The lowest level houses flow at the scale of internode distribution (the eighteen wheeler). Above, the parking level is pushed below grade. The ground plane acts as a shared surface, favouring a more pedestrian scale, accommodating only street parking and loading/unloading zones. The Manufacturing bar and Material Cycle bar lift off the ground plane, serviced through an array of Primary and Secondary cores, forming an underlying logistics armature.

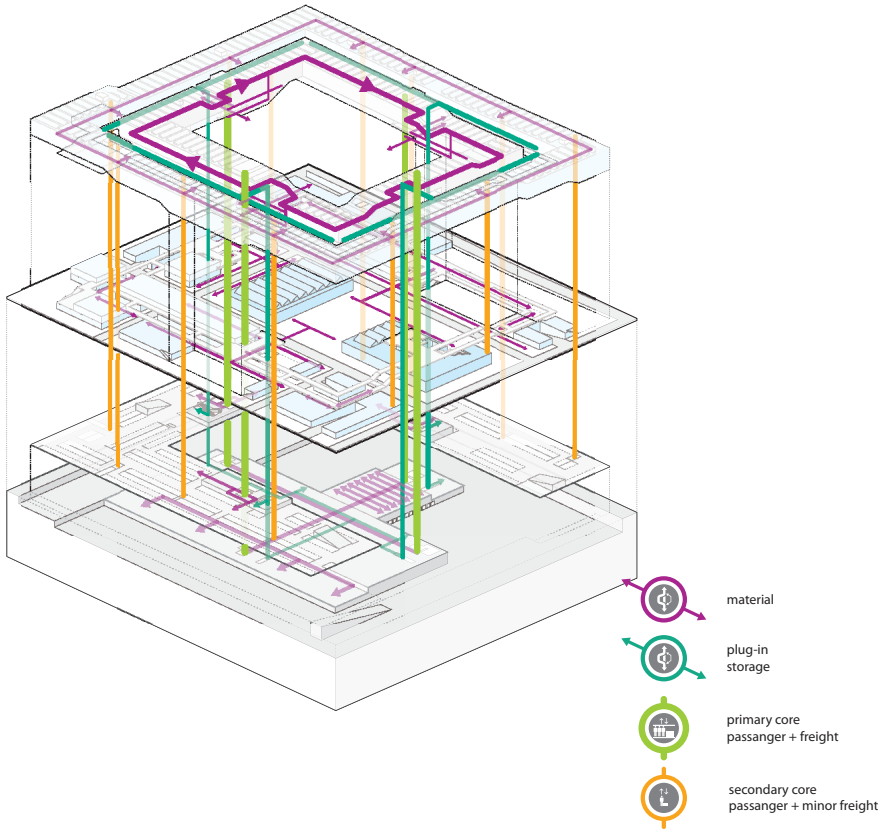


>01 Vehicular Flow

fig. 159. Walmart 2.0 Site Level Vehicular Flow
fig. 160. Walmart 2.0 Site Level Pedestrian Flow
fig. 161. Walmart 2.0 Site Level Material Flow



>02 Pedestrian Flow

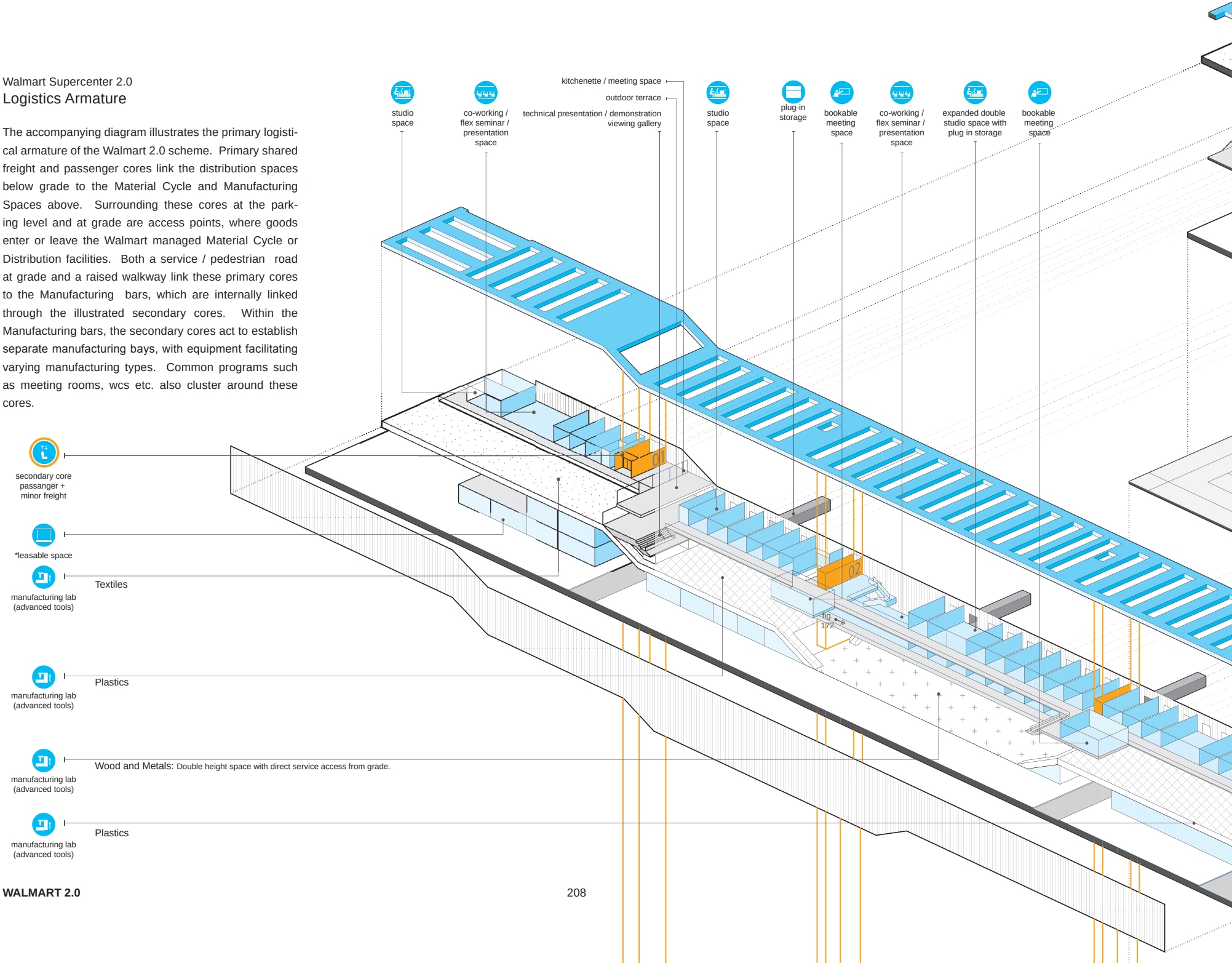


>03 Material Flow

Walmart Supercenter 2.0

Logistics Armature

The accompanying diagram illustrates the primary logistical armature of the Walmart 2.0 scheme. Primary shared freight and passenger cores link the distribution spaces below grade to the Material Cycle and Manufacturing Spaces above. Surrounding these cores at the parking level and at grade are access points, where goods enter or leave the Walmart managed Material Cycle or Distribution facilities. Both a service / pedestrian road at grade and a raised walkway link these primary cores to the Manufacturing bars, which are internally linked through the illustrated secondary cores. Within the Manufacturing bars, the secondary cores act to establish separate manufacturing bays, with equipment facilitating varying manufacturing types. Common programs such as meeting rooms, wcs etc. also cluster around these cores.



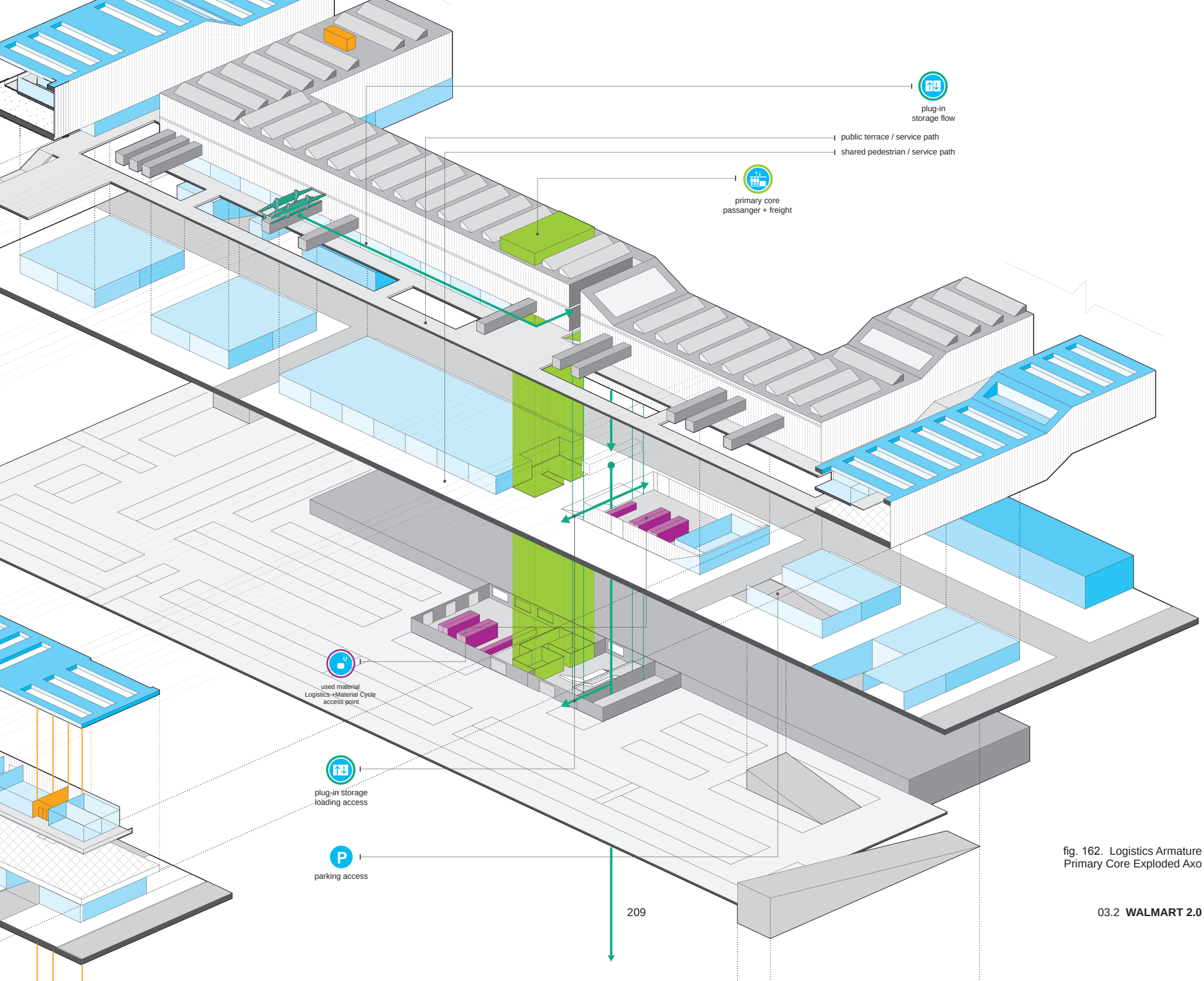
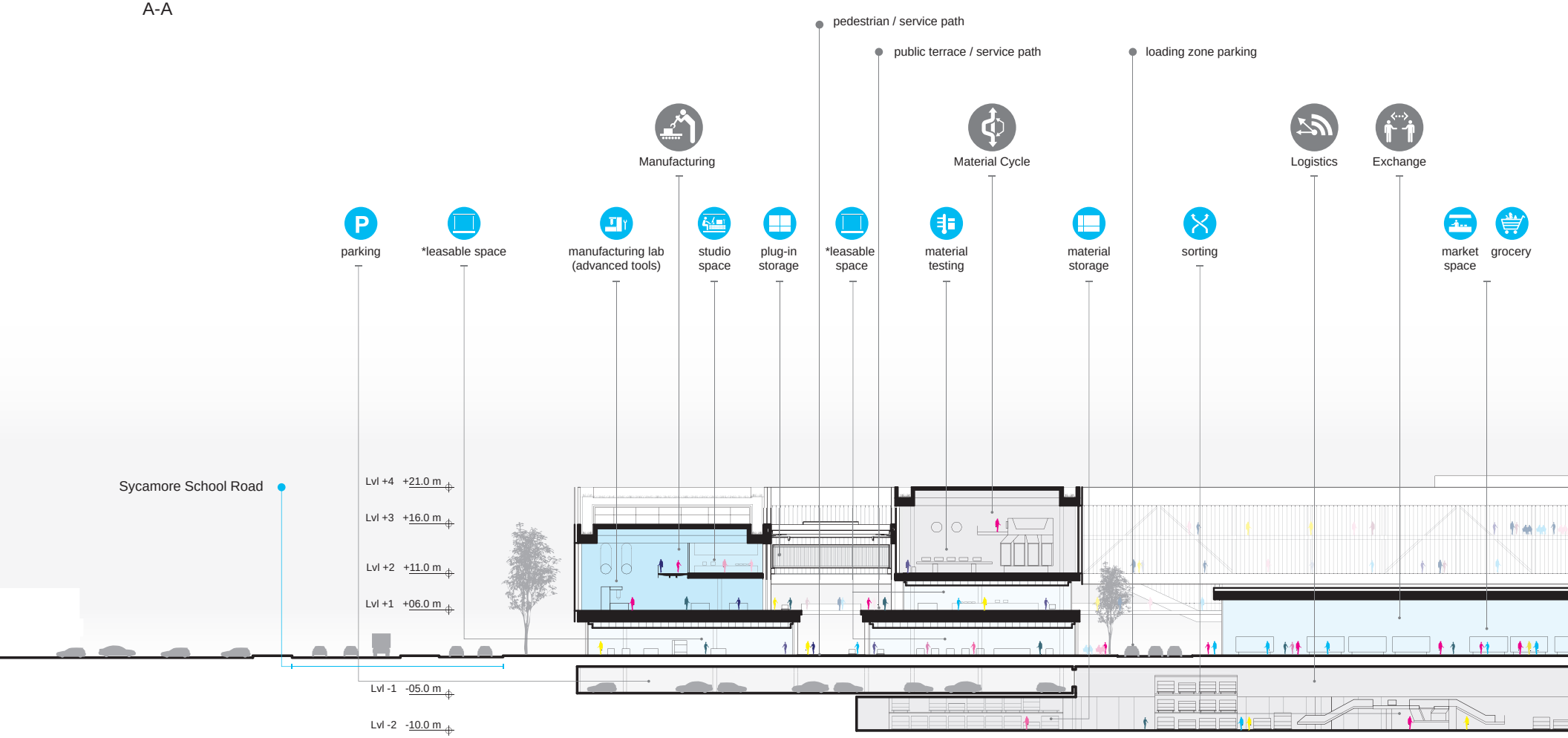


fig. 162. Logistics Armature
Primary Core Exploded Axo

Building Section
A-A



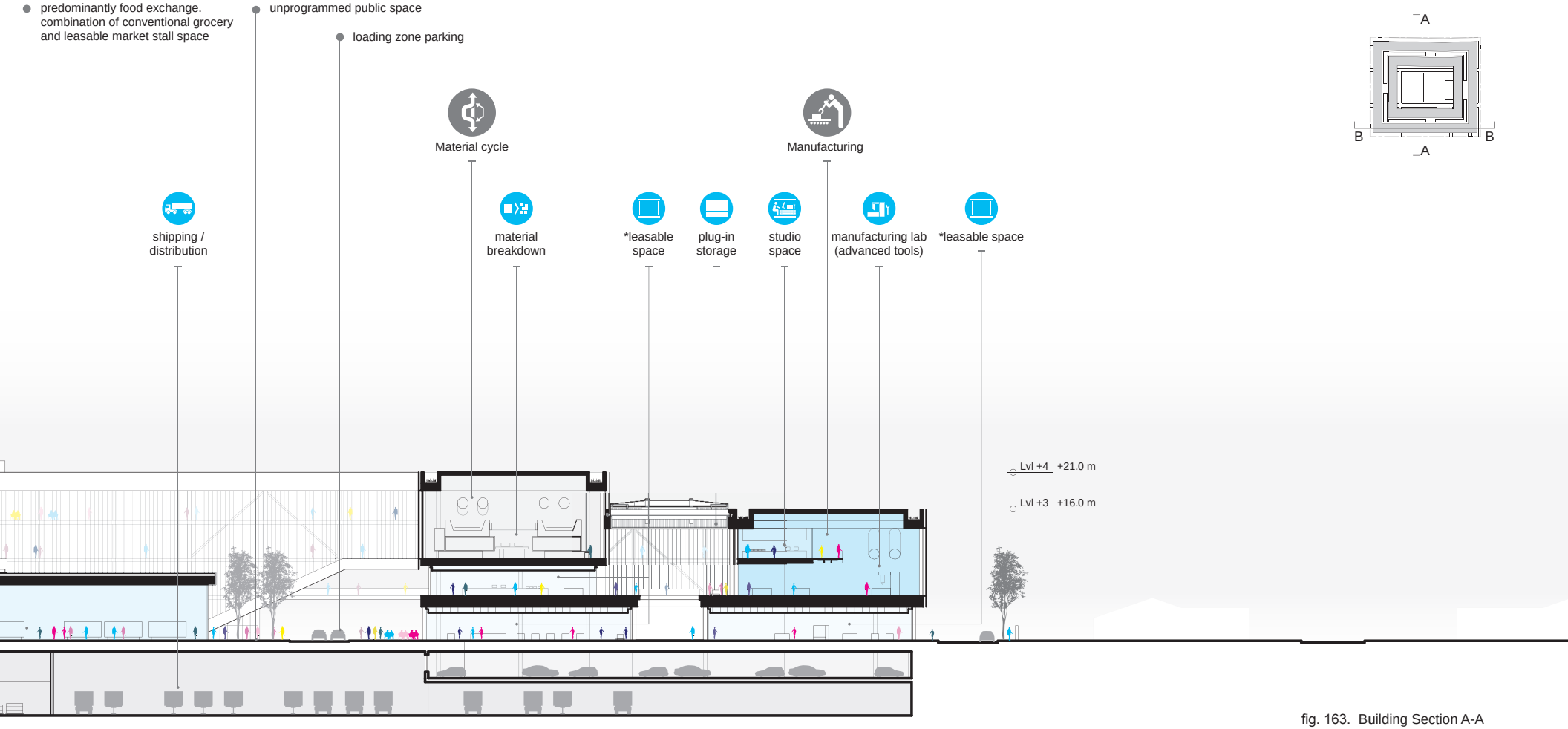
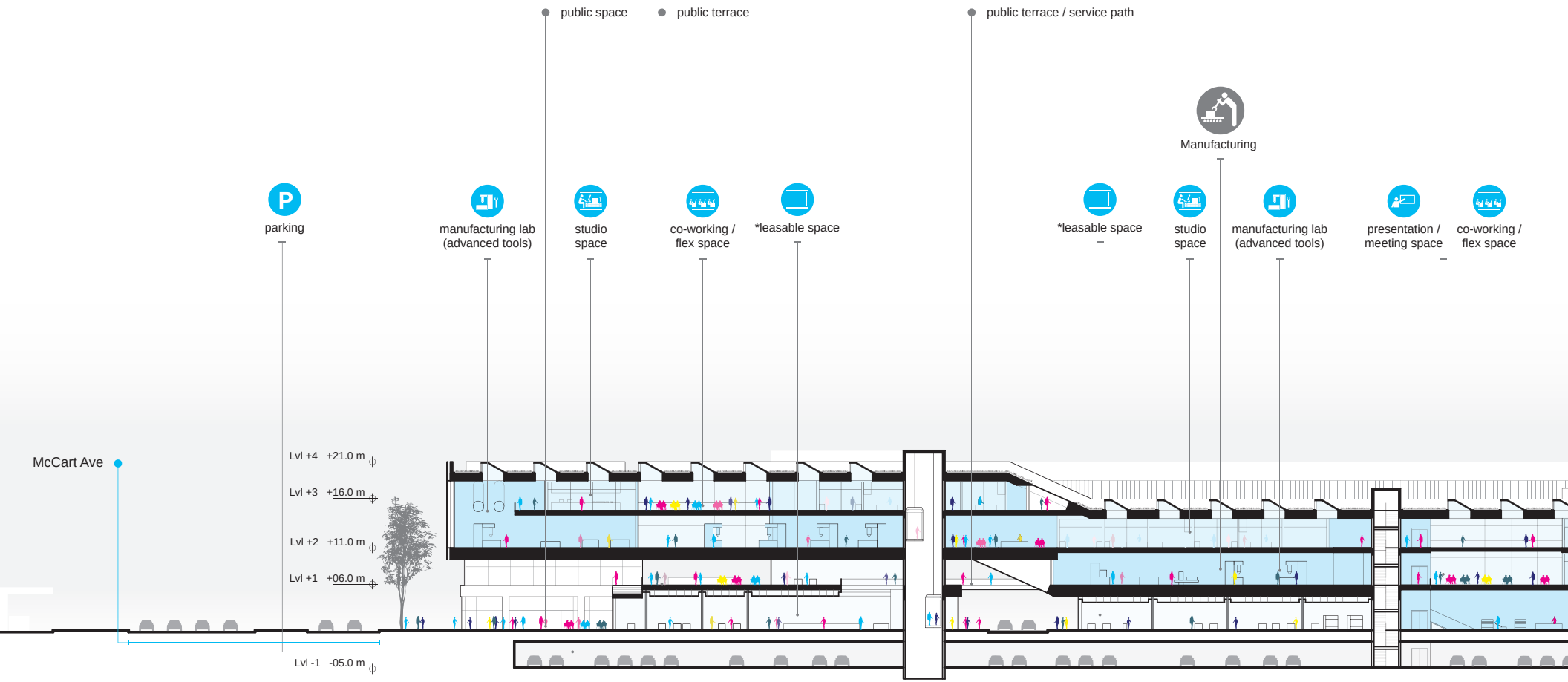


fig. 163. Building Section A-A

1 : 1 000

0 5 10 37.5 m

Building Section
B-B



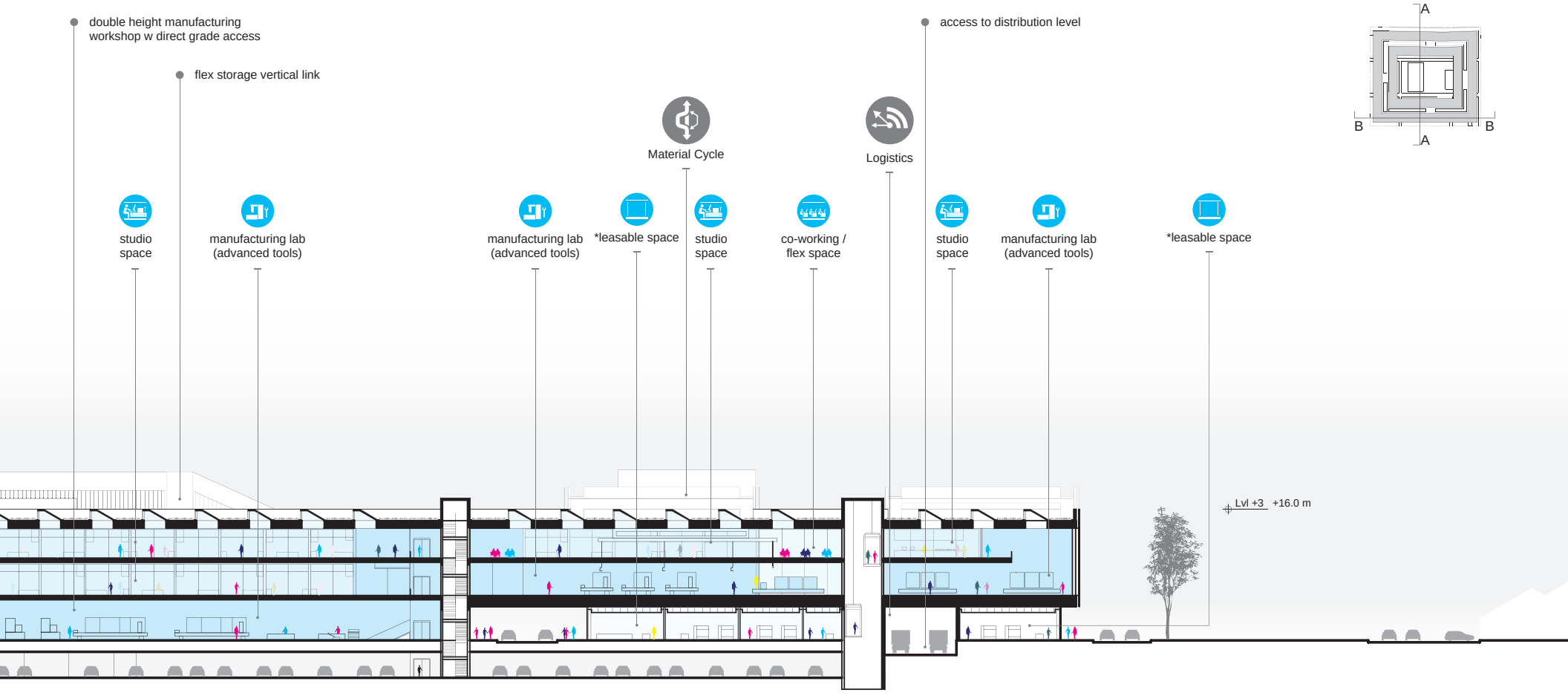


fig. 164. Building Section B-B

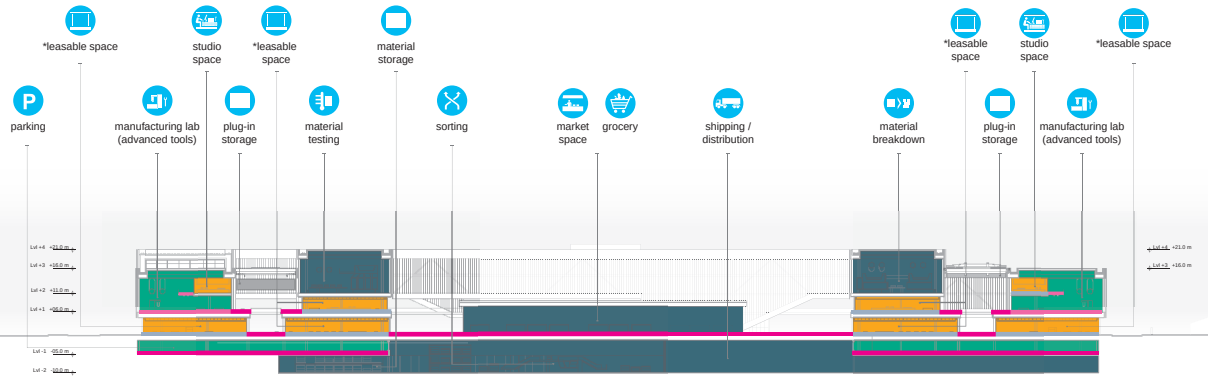
1 : 750

0 5 10 37.5 m

A-A

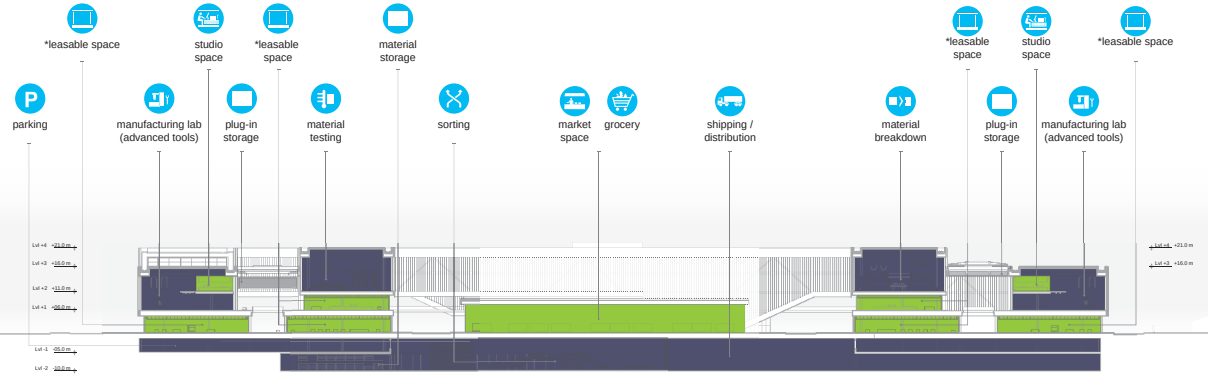
- Walmar ControlledTerritory
  Private
- Walmart Managed Territory
  Public / Open Access
- Leased Space
  Emergent Access as per User / Tenant

- Public Surface
- Semi-Public Surface
- Emmergent as per User / Tenant

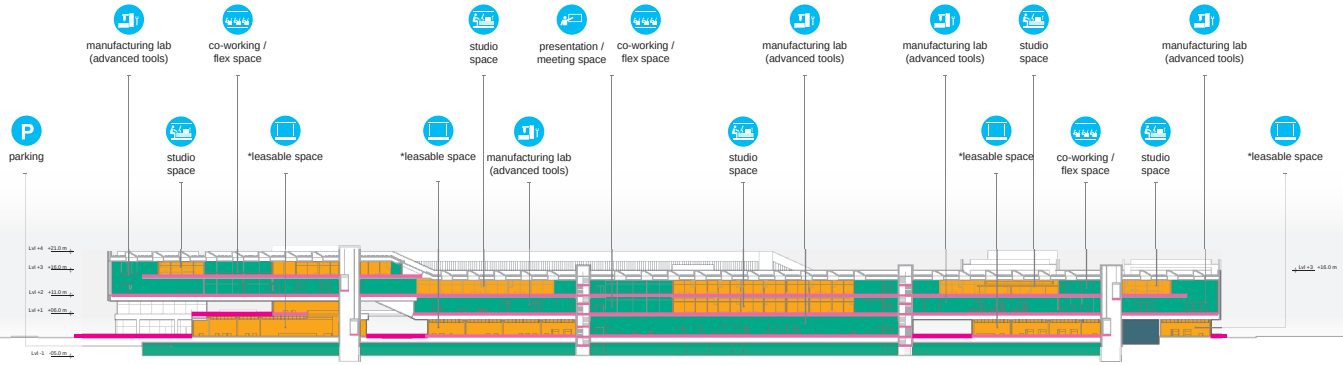


A-A

- Fixed Space
  spaces with less structural and/or programmatic flexibility
- Flexible Space
  spaces with greater structural and/or programmatic flexibility



B-B



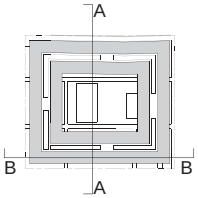


fig. 165. Walmart Controlled Private Space vs. Walmart Managed Public / Open Access Space vs. Leased Space

B-B

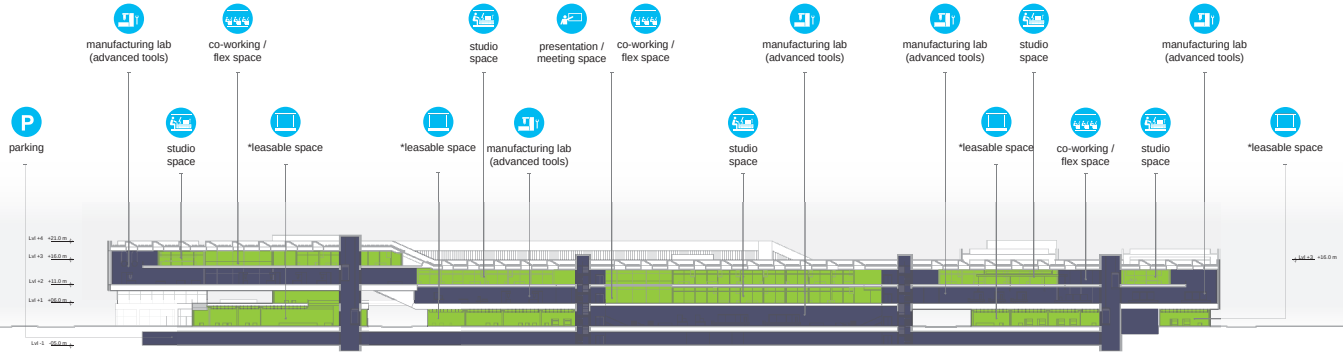


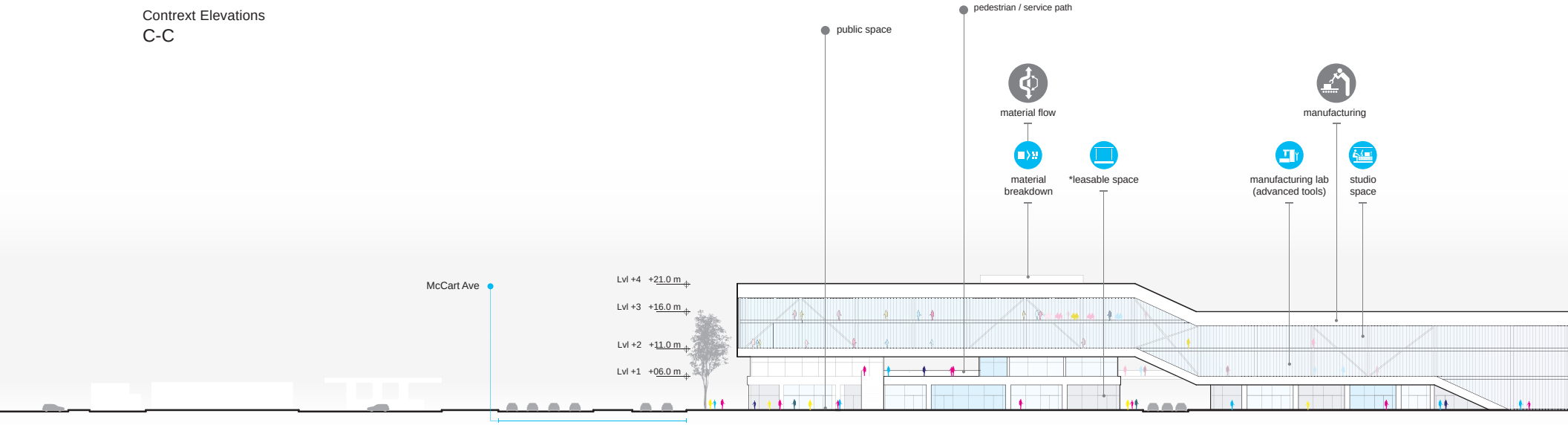
fig. 166. Fixed vs. Flexible Space

1 : 1 000

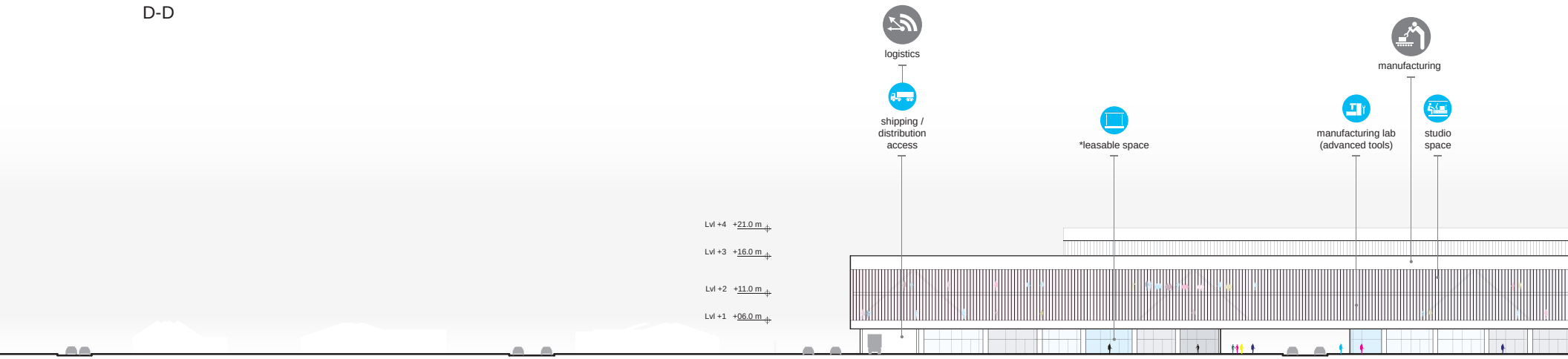
0 5 10 50 m

Contrext Elevations

C-C



D-D



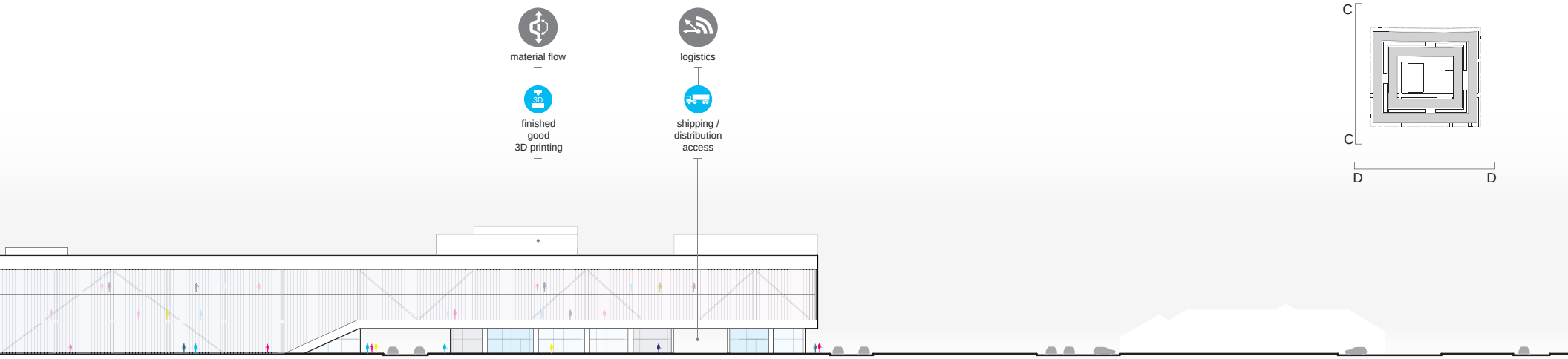


fig. 167. Site Section / Building Elevation C-C

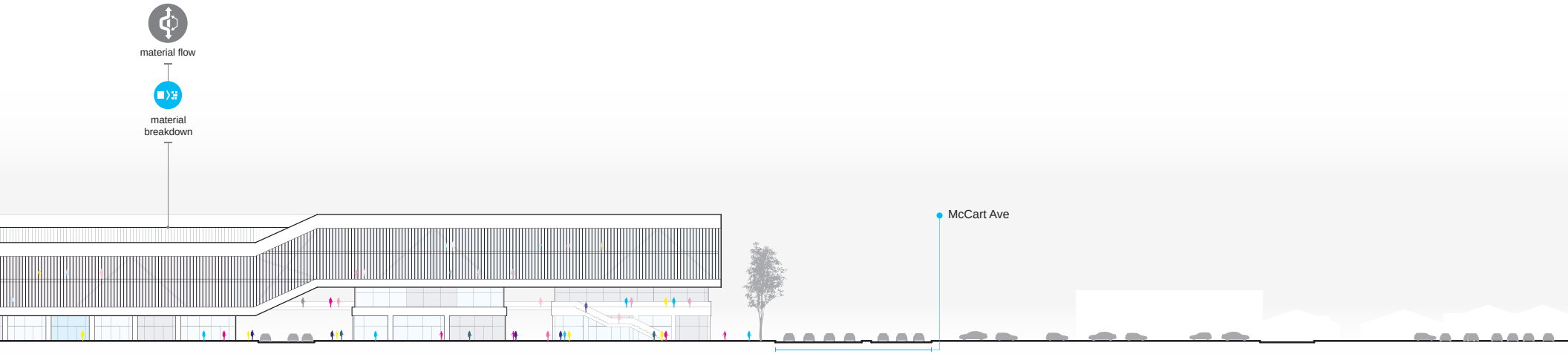


fig. 168. Site Section / Building Elevation D-D

1 : 1 000

0 5 10 50 m


walmart 2.0
production center
electronics
CUSTOM
TAILORING

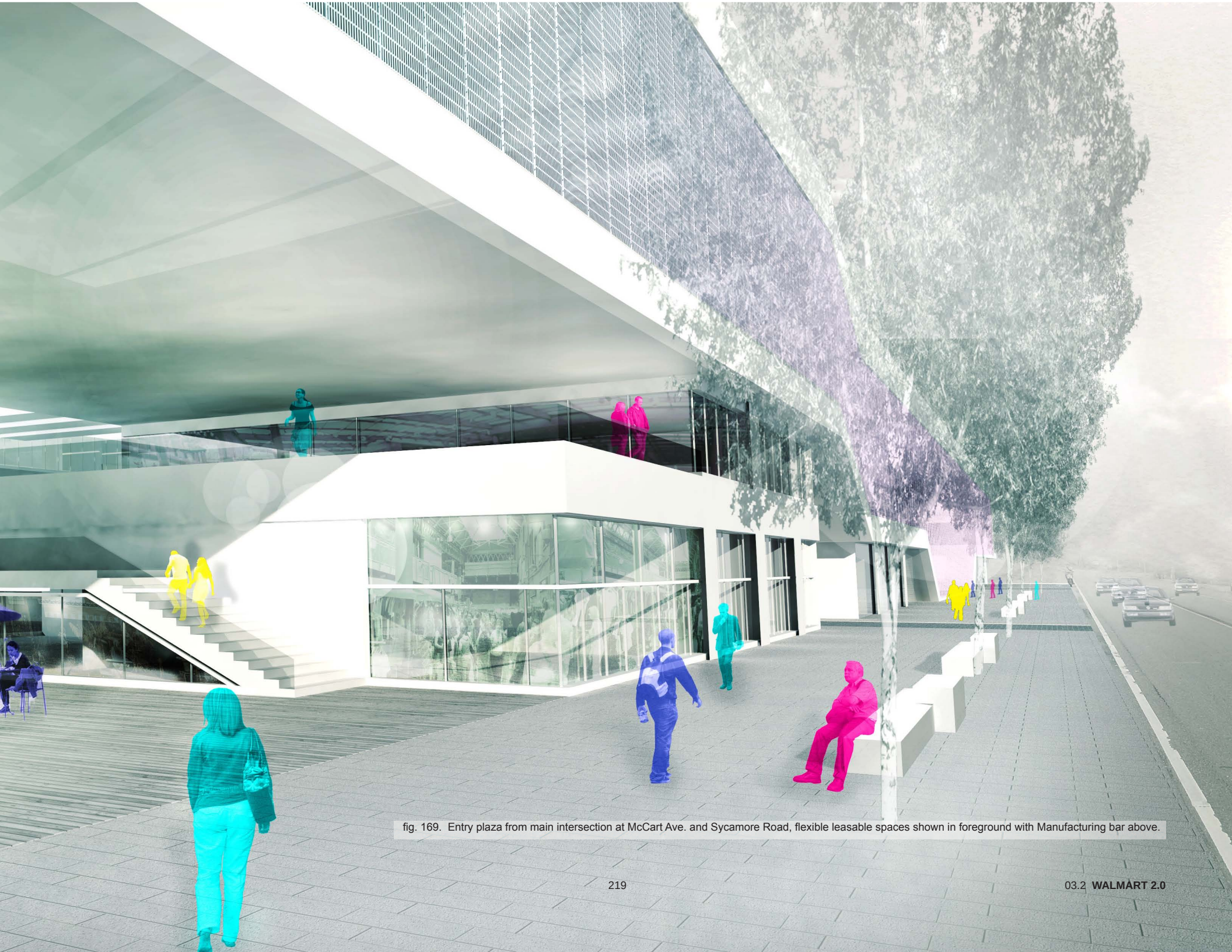


fig. 169. Entry plaza from main intersection at McCart Ave. and Sycamore Road, flexible leasable spaces shown in foreground with Manufacturing bar above.

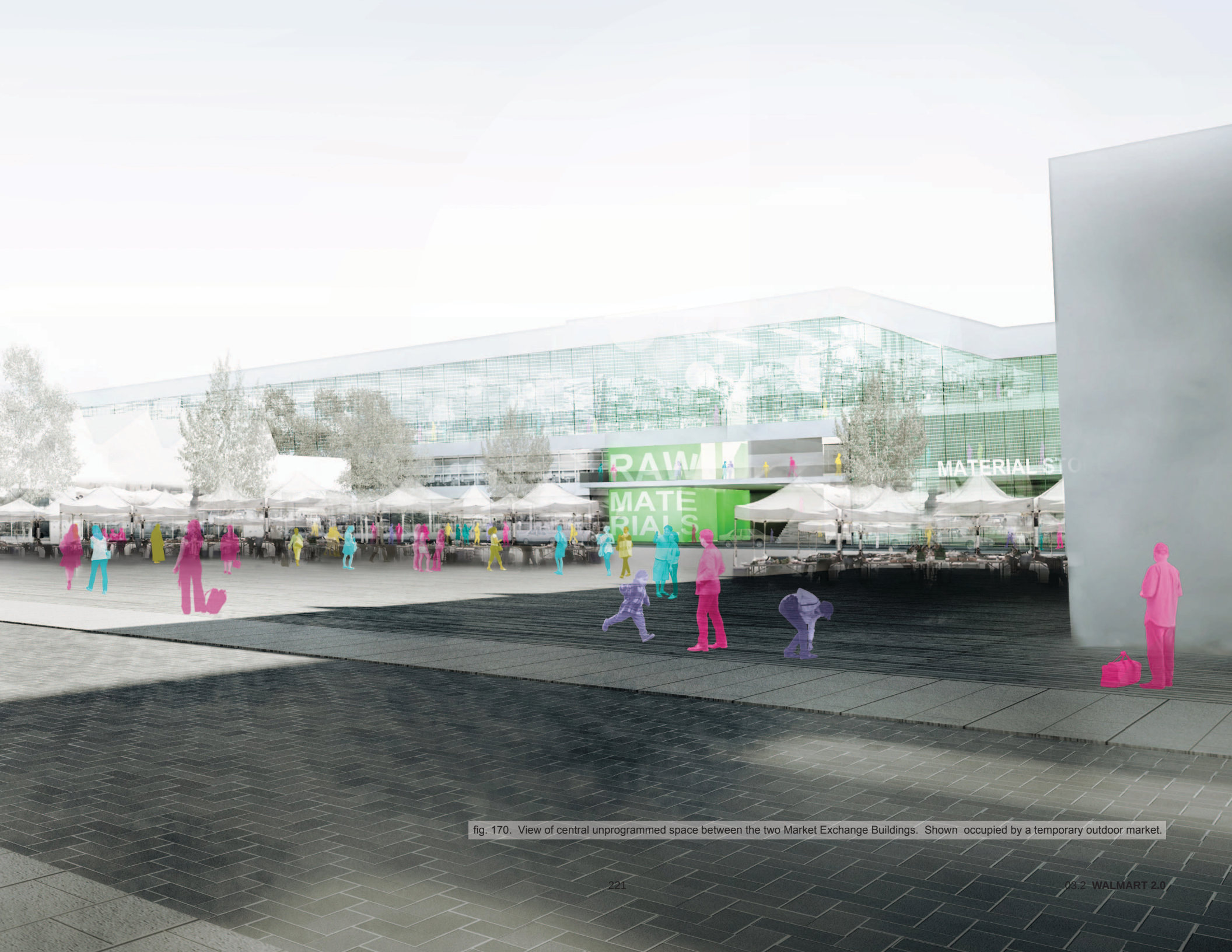


fig. 170. View of central unprogrammed space between the two Market Exchange Buildings. Shown occupied by a temporary outdoor market.

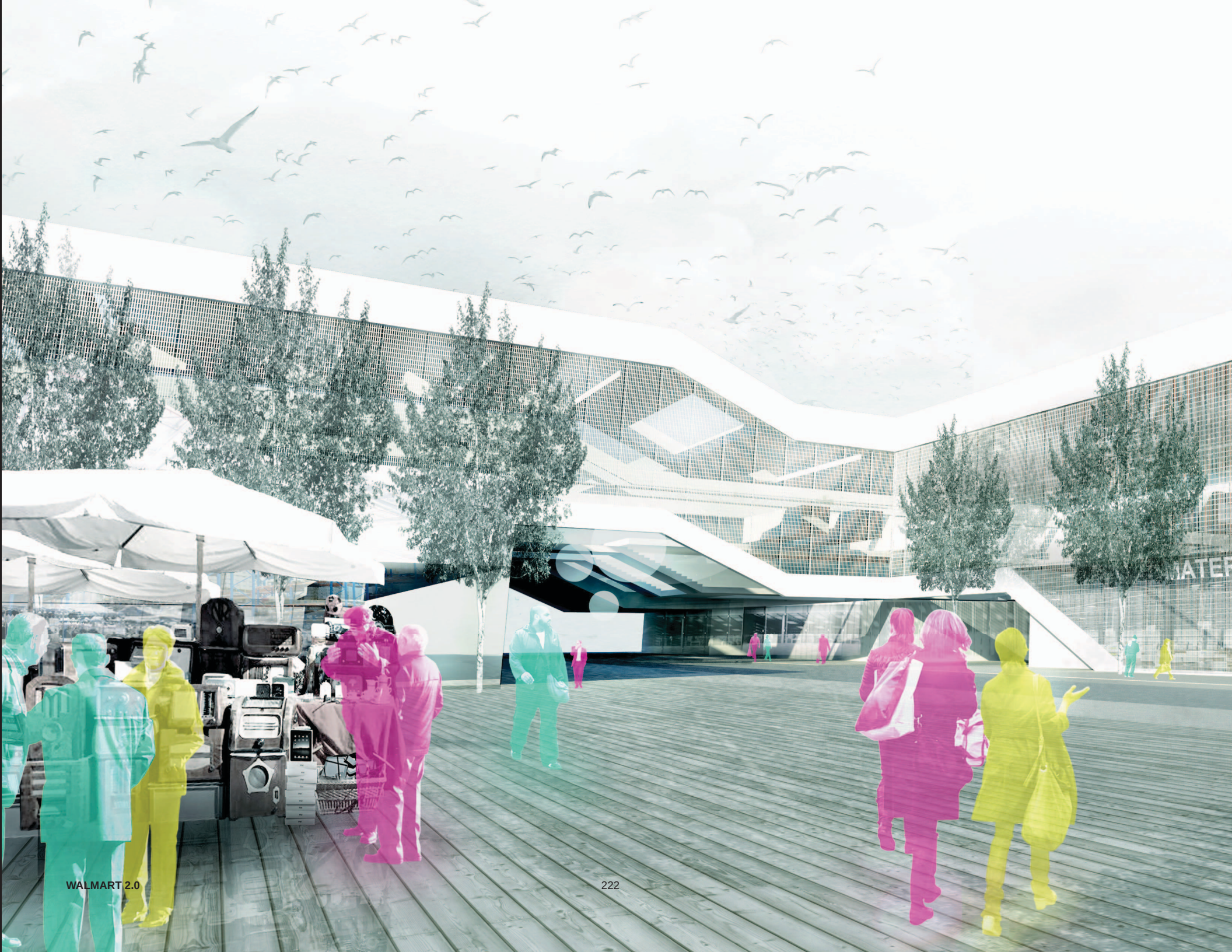


fig. 171. View of Primary Core for Used Product Exchange point, with Market Exchange space to the left

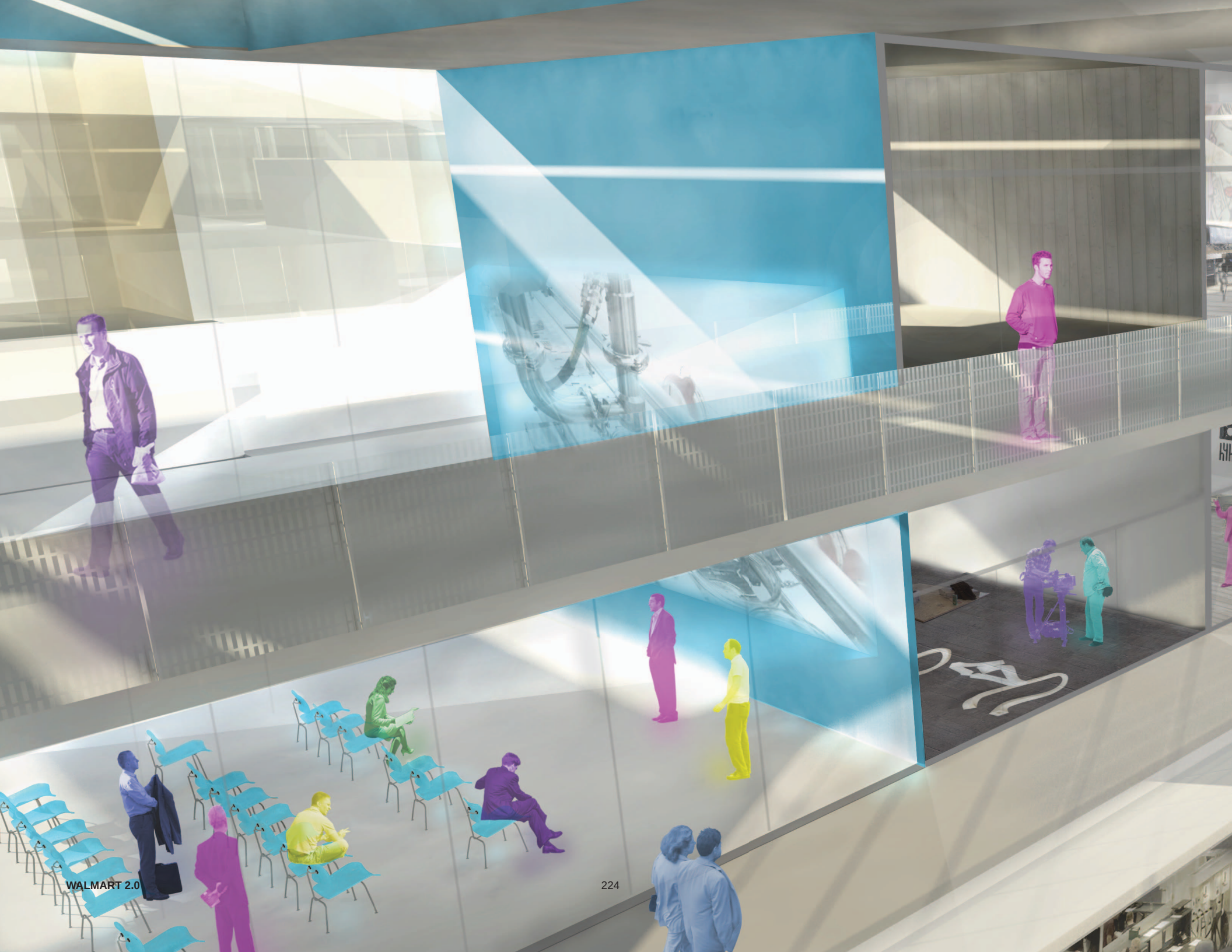
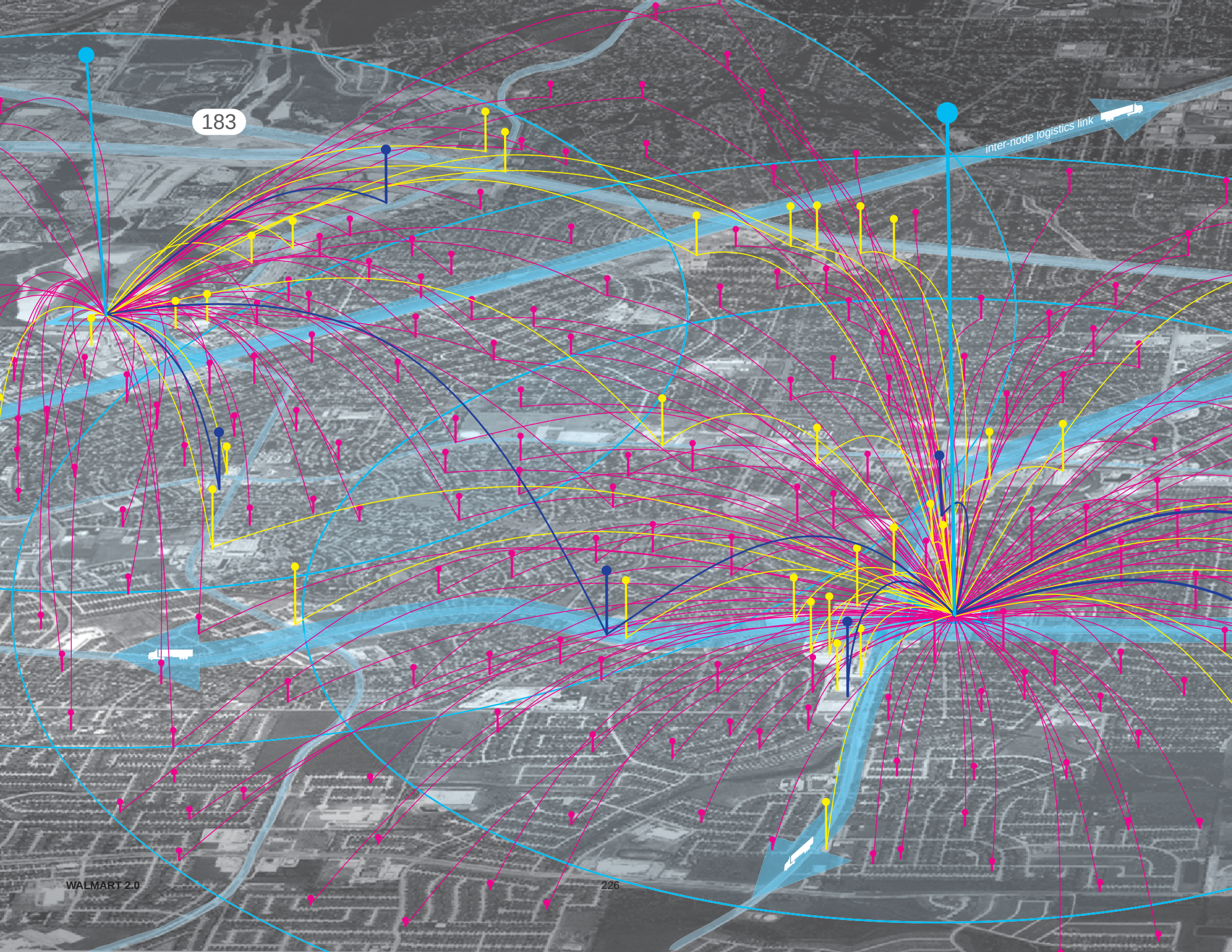


fig. 172. View of Manufacturing Lab below with flexible studio spaces and seminar room shown to the left. As the Studio spaces are structurally separate from the primary structure of the Manufacturing zone, allowing for movement of partitions and reconfiguration by the occupant.


183
inter-node logistics link

Walmart 2.0

Open System + the reIndustrialised Locale

Like Ford's original Highland Park production facility, the Walmart 2.0 Supercenter creates proximal relationships with a given locale. However, unlike Ford's plant and industrial model, which acted as a closed system, producing a given product in a top-down, controlled system, the Walmart 2.0 Supercenter seeks to facilitate emergent local manufacturing processes, create new productive entities and spur a gradual reprogramming in the contemporary city. As users begin to engage with the Walmart 2.0 system, it acts as a logistical anchor and infrastructural node within a mutable field. The accompanying diagram depicts small scale producers, based with the existing residential fabric engaging in the Walmart 2.0 system. The yellow pins depict emergent manufacturing spaces within existing retail spaces, as producers that grow beyond the scale of the onsite studio spaces move offsite, yet still utilize the Walmart 2.0 Manufacturing equipment and logistical services. The purple pins depict flexible factories, similar to those currently located offshore, capable to bringing goods to larger production runs, now moving within the Walmart 2.0 locale, taking advantage of a new productive population base, and utilizing Walmart 2.0's logistical services.

The Walmart 2.0 scheme is seen as an open and ongoing process as opposed to a static, fixed proposal, as it facilitates an emergent, genuinely mixed use urban fabric; re-establishing a proximal relationship with production, consumption and exchange.

- Walmart 2.0 Supercenter
- Micro-producer
- Mid-Size Producer (operating off site)
- Flexible Manufacturer

fig. 173. Open System

NOTES: 03.2 WALMART 2.0

1 Manuel Castells, *The Rise Of The Network Society (The Information Age: Economy, Society And Culture, Volume 1) (Vol 1)*, 2nd ed. (Wiley-Blackwell, 2000), 419.

2 Jeffrey E. Garten, cited in Larry Rohter, “Shipping Costs Start To Crimp Globalization,” *The New York Times*, August 3, 2008, http://www.nytimes.com/2008/08/03/business/worldbusiness/03global.html. (accessed November, 2009)

3 Larry Rohter, “Shipping Costs Start To Crimp Globalization,” *The New York Times*, August 3, 2008, http://www.nytimes.com/2008/08/03/business/worldbusiness/03global.html. (accessed November, 2009)

4 Henri Lefebvre, *The Urban Revolution*, Robert Bononno-trans. 1st ed. (Univ Of Minnesota Press, 2003), 118.

5 Corby Kummer, “The Great Grocery Smackdown,” *Theatlantic.Com*, Will Walmart, Not Whole Foods, Save The Small Farm And Make America Healthy?, March 1, 2010, http://www.theatlantic.com/magazine/archive/2010/03/the-great-grocery-smackdown/7904/. (accessed July 2010)

As configurations and structures within urbanized territory throughout the United States act as a register of continually superseded industrial operational models, they often struggle to adapt to evolving economic systems. While important for any proposal within the architectural practice to closely examine, understand, and consider existing context within the built fabric, it is also important to understand the underlying logic, industrial model, and economic systems that continually influence the fabric of the city. As economic activity, industrial models, and urbanization are ongoing processes and continually shifting, it is also important the architect understand or speculate on the future direction of these dynamic and intertwined systems if they are to gain increased agency within the evolutionary processes of the built fabric. Without an understanding of these forces operating within and shaping the city, the architect risks developing proposals ignorant of shifting industrial or economic systems and their accompanying territorial logic.

Too often within contemporary practice the architect is merely involved with industrial landscapes once they have already become post-industrial landscapes; retroactively seeking to infuse these spaces in the city with social or cultural program. By the time the architect is involved with the revitalization of these territories, they have already become deeply engrained with a logic based on industrial or economic factors with little regard for the human scale, social program, and the fabric of the inhabited territory of the city. As the creation of post-industrial landscapes is inherently tied to the creation of new industrial landscapes, this sequence of creation, abandonment, salvage, and revitalization forms an ongoing process. While the re-occupation of these industrial landscapes and their subsequent reclamation as urban territory with an added social dimension can certainly be seen as a valuable continual system of renewal, the Walmart 2.0 project seeks to proactively speculate upon future industrial configurations and systems.

Although the Walmart 2.0 project interacts with a pre-existing industrial actor, it speculates upon a possible future or direction this system may take, as opposed to re-occupying its

conclusion 03.2

sites post abandonment. Walmart 2.0 actively retains these sites productive capacity, embracing their potential for innovative economic and industrial activity within an amplified social and cultural context. The Walmart 2.0 serves as a provocation, recognizing the connections between a genuinely mixed use, productive urban fabric, human interaction, public space, and a city's social terrain, with sustainable industrial systems. Further, the project suggests the possibility for these sites to influence the grain and subsequent development of the city surrounding pre-existing industrial sites through a consideration of, and interaction with their underlying operational logic.

While proposing Walmart as an ideal entity for study, due to its status as contemporary industry's keystone species, it is merely one of many influential industrial actors affecting the shape of the contemporary city. A deeper understanding of the operations of specific dominant industrial actors and their accompanying ecosystems not only allows architects to better understand the forces shaping contemporary urbanization, but also highlights potential allies in the creation of new, mutually beneficial couplings, combinations, and configurations with a consideration for the social within the city.

While the Walmart 2.0 Supercenter is presented as proposal in an already mature Walmart 2.0 system, a shift towards this notion of locally related re-industrialization of the urban fabric would require a considered phasing. For example, a shift in Walmart's built infrastructure to accommodate the Walmart 2.0 system may be the last phase in this transition to accommodate and facilitate local production, preceded by the simple opening of their logistics network, making it for hire within their existing site typologies. Before the construction of the Walmart 2.0 Supercenter, there may even be a period of coexisting systems, where sites adjacent to the existing Walmart 1.0 sites accommodate the additional program of the Walmart 2.0 scheme in a looser agglomeration or cluster of these hybridized programs. This in a sense highlights the wide array of directions the Walmart 2.0 system could be taken within the built fabric. The Walmart 2.0

Supercenter acts as one proposal integrating the Walmart 2.0 principals on one site, but the gap and phases between Walmart 1.0 and 2.0 provides significant fertile territory for further architectural speculation. It is in this sense, the Walmart 2.0 scheme, as an overall system, acts more as an open urban and architectural question.

The Walmart 2.0 project necessarily involves a strong connection and interaction with the notion of the local economy, however, it would be valuable to further speculate upon the new systems of economy the Walmart 2.0 scheme may facilitate or produce. How would the actual goods produced and exchanged through the Walmart 2.0 system evolve shift, and change? How would an economy based more upon innovation and social interaction than on the distant movement of physical goods behave? A more in-depth consideration of the potential effects of this predicted shifted production paradigm on the broader local and national economy may further inform the future shape of the American city. ■

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