

Staging Disassembly: Incubating Post-Industrial Renewal

by

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B.A., Architectural Studies, 2004
Connecticut College

Submitted to the Department of Architecture
in Partial Fulfillment of the Requirements for the Degree of

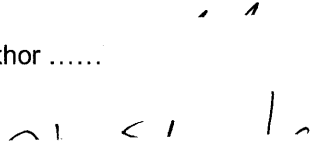
Master of Architecture
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Department of Architecture
February 6, 2009

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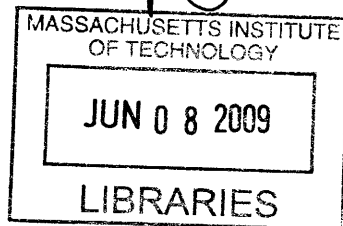


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ABSTRACT

Over the past five decades, the American urban industrial landscape has become marginalized as the expanding global economy has sought international markets for manufacturing. At the agency of the user-as-investor, this proposal seeks to re-manufacture the post-industrial site to explore the problem of how to effectively reclaim salvaged materials for on-site reuse.

As a critique of speculative, clean-slate development, the thesis will explore an incremental disassembly and phased reorganization of a site in Brooklyn at the material and urban scale. Through on-site implementation of manufacturers and automated tooling, this project will speculate on means of creating new value for salvaged materials. The resulting form is a vaulted roofscape that supports public access and leisure space while creating a local strategy for post-industrial renewal.

thesis supervisor: Sheila Kennedy

title: Professor of the Practice of Architecture

To my parents, brother, friends, and classmates for their unwavering support.

I would like to thank the members of my thesis committee, Sheila Kennedy and Rahul Mehrotra.

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staging disassembly

Over the past five decades, the American urban industrial landscape has become marginalized as the expanding global economy has sought international markets for manufacturing. At the agency of the user-as-investor, this proposal seeks to re-manufacture the post-industrial site to explore the problem of how to effectively reclaim salvaged materials for on-site reuse. As a critique of speculative, clean-slate development, the thesis will explore an incremental disassembly and phased reorganization of a site in Brooklyn at the material and urban scale. Through on-site implementation of manufacturers and automated tooling, this project will speculate on means of creating new value for salvaged materials.

The post-industrial site can typically be characterized as a commodified landscape that has been left in a fallow state of disinvestment. Often viewed as an obsolete by-product of industry, this architecture instead exhibits a quality of material permanence with the potential of exceeding the lifespan of the industry it once housed. “Under capitalism there is, then, a perpetual struggle in which capital builds a physical landscape appropriate to its own condition at a particular moment in time, only to have to destroy it...at a subsequent point in time”¹. These overlapping degrees of stability illustrate the industrial landscape as a dynamic system of capital, and the post-industrial ruin as a residual product of these markets. Based on the often indeterminate time of vacancy prior to reinvestment, can an architectural catalyst reoccupy these underutilized sites prior to, during, and after the process of reconstruction? This proposal seeks to utilize existing characteristics of post-industrial resources to reoccupy these margins. Through subtraction, an architectural insertion can be used

¹ Jake, John and Wilson, David

to re-cast new meaning into the post-industrial landscape that exceeds static preservation, instead embodying a flexible process of reprogramming by staging spatial and material reconfiguration.

As an alternative to building demolition and resulting clean-slate development, the architectural process of disassembly produces a selective removal of material that has the potential for salvage and reuse. This proposal seeks to internalize this cycle of disassembly and material salvage by locating these industries on-site. Through this proximity, the post-industrial building has the potential to simultaneously become the setting and source for its own reprocessing. By siting these processes at their source, salvaged material can either become distributed into the adjacent urban network or most efficiently be reinserted back into the building site from where it originally came. This proposal suggests a model for a renewed productive landscape, envisioning the post-industrial building as both quarry and reprogrammable artifact.

The post-industrial landscape can be understood beyond the autonomous factory building and more precisely as a network of infrastructure enabling the movement of people, waste, and goods. Although marginal in their relationship to new flows of capital, derelict sites of industry potentially retain strategic locations in the urban fabric that once made them so productive. How might a reoccupation of post-industrial landscapes utilize existing networks to connect to new surroundings, activities, and flows of capital? A reinvestment in these sites has the potential to exceed an autonomous architecture, instead intertwining renewal at urban, building, and material scales. Embracing such a multi-scaled approach, is it possible to generate new forms

of value through the on-site salvage and reuse of this post-industrial left-over?

In conjunction with material reclamation, the fallow nature of the post-industrial landscape has the potential to support a flexible appropriation of derelict spaces into the public sphere. Historically, Brooklyn's Gowanus canal was instituted as a public works project that was later privatized by industry along its edges. Following the relocation of this industry, the canal zone has the ability to be reoccupied for public use. Despite its marginalization through disuse, the Gowanus Canal exists as a prominent infrastructural backbone that has become increasingly urbanized as its residential surroundings have solidified. Unlike the common placement of industrial facilities on the periphery of urban centers, the strategic location of the post-industrial canal has the opportunity to be reclaimed as public amenity. The existing waterway and the industrial buildings along its edge can in turn become the register, or backdrop, for a sequential reprogramming of the site. Therefore, an opportunity exists for the insertion of an architecture that will once again facilitate the circulation of both people and salvaged materials within this residual environment.

Historically, industrial architecture has embodied a functional tradition in building based on ideals of permanence and efficiency. At its core, the industrial interior centers its organization around the sequencing of inputs and outputs, while the exterior has been known to represent an image of corporate identity (image 2). This is architecturally exemplified in manufacturing centers such as Erich Mendelsohn's Luckenwalde hat factory, and Claude-Nicolas Ledoux's Saline de Chaux. Today, disciplines in industrial archaeology have expanded the

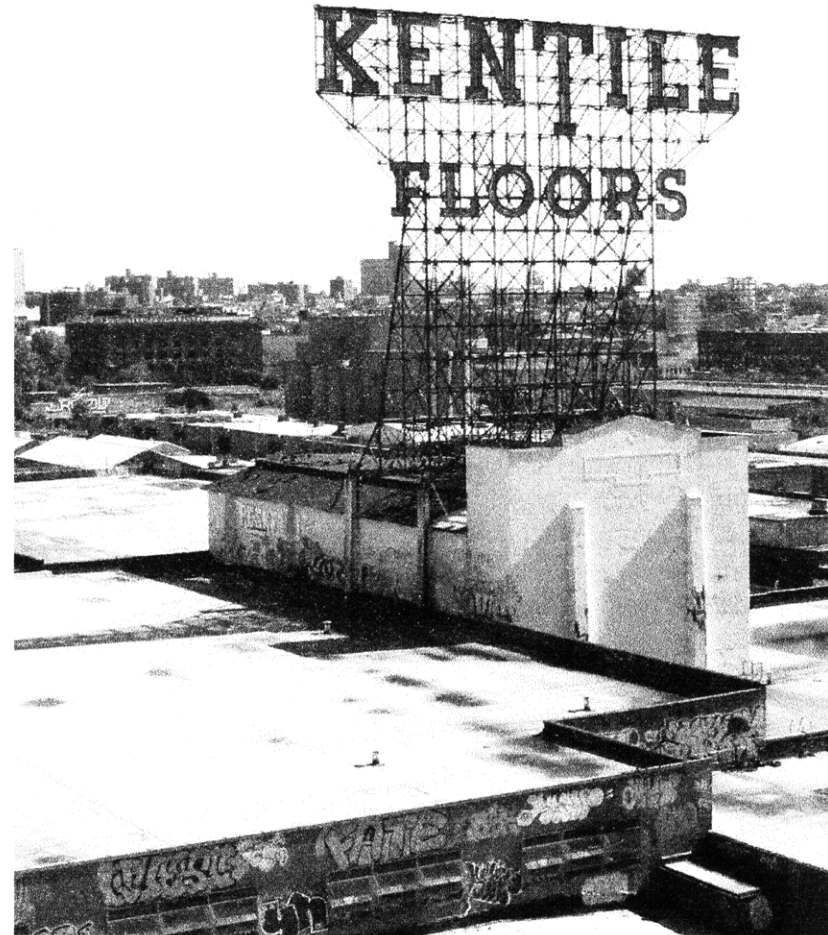


image 1 _ post-industrial Brooklyn

iconic image of the post-industrial landscape to include fascinations of nostalgia, ruination, and the effects of deterioration over time.

In this context of industrial iconography, can an architectural intervention embrace these natural processes instead of relying solely on preservation and mimicry of the old to preserve value and extend building shelf-life? As elements of the existing built environment are deemed 'historic' and worthy of representing a previous era, they are often "commodified, made an artifact capable of being marketed to escapist populations"². In contrast, treatment of these urban remnants could look beyond "re-cultivation, for this approach negates the qualities that they currently possess. The vision for a new landscape should seek justification exactly within the existing forms of demolition and exhaustion"³. In this case, an architecture of deconstruction can be applied as an alternative to the two extremes of clean-slate development and preservationist mimicry, instead occupying a middle-ground where the existing and the proposed co-exist.

In Brooklyn's dense urban setting, the process of post-industrial turn-over and demolition naturally becomes a publicly transparent process. This project examines how this typical act of clean-slate demolition can be replaced by strategic building disassembly, a phased process with the potential of re-marketing the post-industrial landscape. By inhabiting a building during its incremental transformation, there exists the opportunity to generate flexible, programmed space and to create an ever-changing backdrop to public environment. Ultimately, these residual buildings

"represent the most solid, capital-intensive, and slow changing of

² Jake, John and Wilson, David

³ Kirkwood, Niall

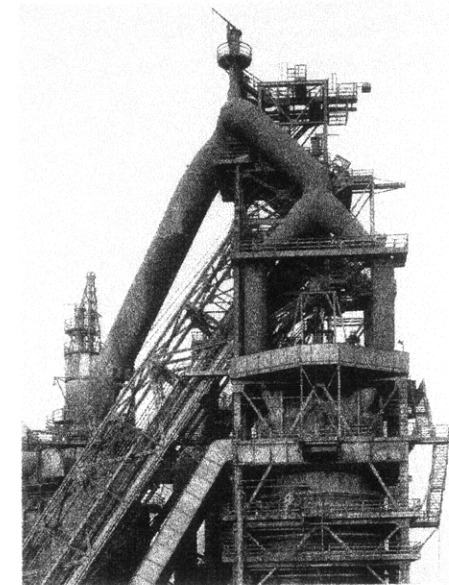
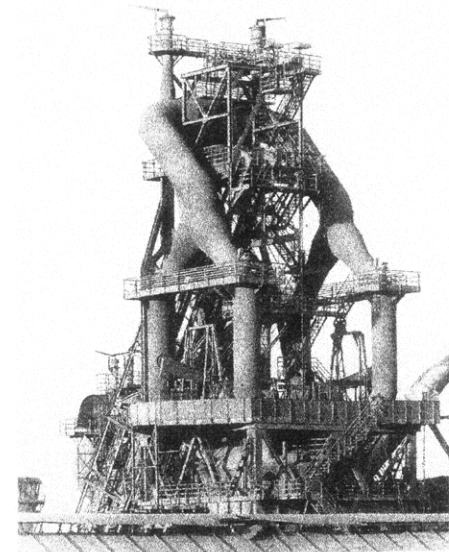


image 2 _ Bernd & Hilla Becher, steel mill icons, 1969

urban phenomena as well as the rapid changes of demolition and disaster, [and] are revealed to be implicated in a process of constant if erratic transformation, while their representations involve equal displacements or reiterations of priorities and interests”.⁴

Enhancing public proximity to these common practices of building transformation allows the traditionally private factory to engage public interests (image 3). Therefore, the industrial landscape has the ability to shift from a site of manufactured commodities to the subject where its transformation is commodified as mass spectacle (image 4).

“A curious spectacle, these open houses, with their floorboards suspended over the abyss, their colorful flowered wallpaper still showing the shape of the rooms, their staircases leading nowhere now, their cellars open to the sky, their bizarre collapsed interiors and battered ruins. It all resembles, though without the gloomy tone, those uninhabitable structures which Piranesi outlined with such feverish intensity in his etchings”.⁵

Given the urban proximity of the Gowanus Canal, can the industrial ruin act as a stage in which flexible program interacts with the permanence of industrial construction? Traditionally, the shell of the industrial building not only represented a corporate identity but also provided a concealment of flexible spaces within, central to the needs of the ever-transforming manufacturing process. This suggests the opportunity for an architecture of disassembly to reuse dominant components of industrial construction while blurring the boundaries between the post-industrial interior and its surroundings.

4 Crinson, Mark
5 Benjamin, Walter

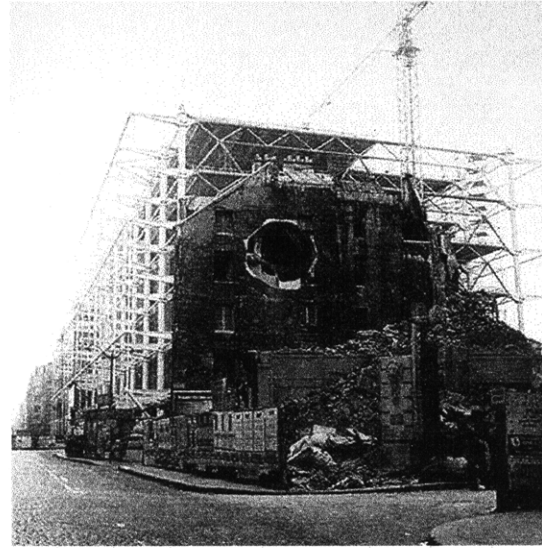


image 3 _ Gordon Matta-clark. “conical intersect”, 1975

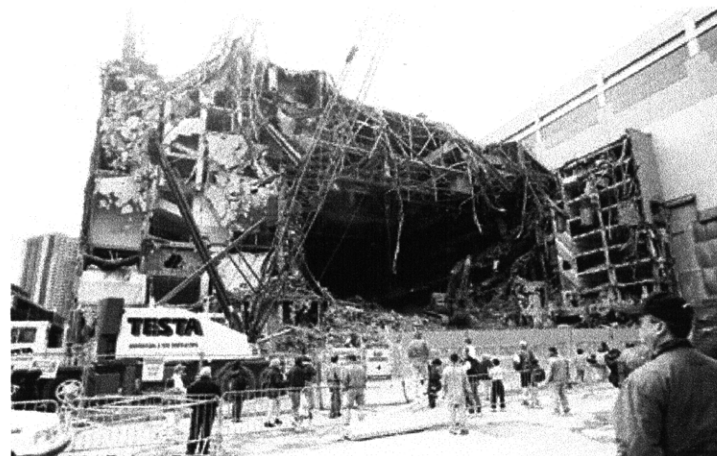


image 4 _ Boston Garden demolition

site

Gowanus Canal, Brooklyn, NY

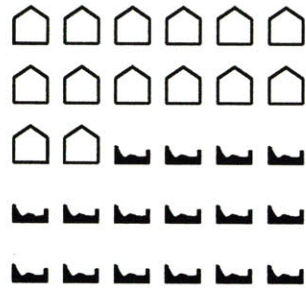
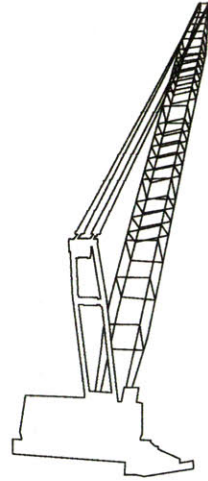
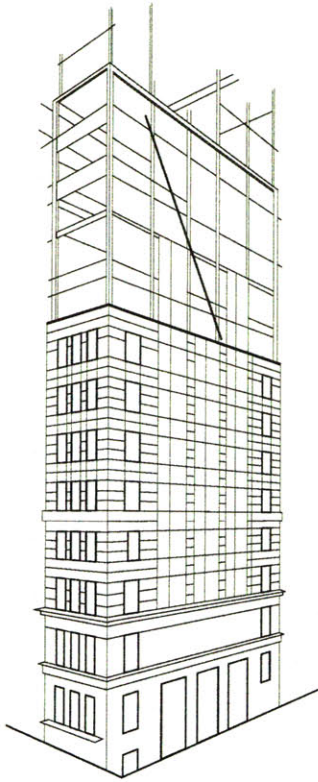
In 2005, 1,924 demolition permits were filed in Brooklyn, New York alone, accounting for 53% of all construction-related activity. In exceeding the construction of new buildings, the rapid deconstruction and turn-over of Brooklyn's built environment poses the question of how to address the instability of these fallow pockets in the borough's dense urban fabric. Based on the often indeterminate time of abandonment prior to reinvestment, can an architecture reoccupy these underutilized sites prior to, during, and after the process of site reclamation?

The Gowanus Canal exists as a swath of post-industrial left-over that penetrates Brooklyn's dense private residential and commercial fabric (image 5). Bordering the neighborhoods of Red Hook and South Brooklyn, the canal exists as a centrally networked, yet marginally neglected space. Constructed in 1848 on the site of a natural watershed, the canal formed a strategic link between Brooklyn's growing urban fabric, the Gowanus Bay, and ultimately the greater New York City harbor. The canal rapidly evolved into an industrial artery, attracting manufacturers of products such as coal, masonry, gas, and lumber to the infrastructural network of the waterway's edges⁶. In addition to facilitating the transfer of manufactured goods, the canal also provided a means of delivering building materials inland to fuel the rapid construction of its surrounding neighborhoods. Following the opening of the Verrazano Narrows bridge as a dominant trucking route to the south in the 1960's, the canal lost its significance as a strategic shipping route and manufacturing vein.

⁶ Balch and Baratloo

⁷ <http://www.brooklyn6.org>

Emblematic of Brooklyn's derelict industrial waterfront, the Gowanus Canal is currently composed of industrial detritus evidenced in fallow structures and polluted waters. Although minimal initiatives have been taken to reclaim this post-industrial landscape, some efforts include the refurbishment of a pumping station in 1999 to aid in flushing the canal's 'dirty' water⁷, and the limited reintegration of business to its banks. Due to its urban location and heavily industrialized history, the Gowanus canal has maintained acknowledgment regardless of its functional disuse. It has rooted itself as an element of Brooklyn's society, acting as an icon in Jonathan Lethem's novel *Motherless Brooklyn* as well as more recently the subject of Alison Pete's *Lavender Lake* documentary. However, despite minimal planning initiatives promoting the canal's refurbishment, it has failed to undergo any significant physical alterations. It remains, as a post-industrial relic, a highly networked urban artery with potential for a new form of urban occupation. Can an architecture of appropriation transform this post-industrial landscape from a location designed around the dispersal of goods to an attractor of reinvestment?



In Brooklyn, demolition permits account for **53%** of all construction-related activity.





image 5 _ industrial zoning of Brooklyn's waterfront

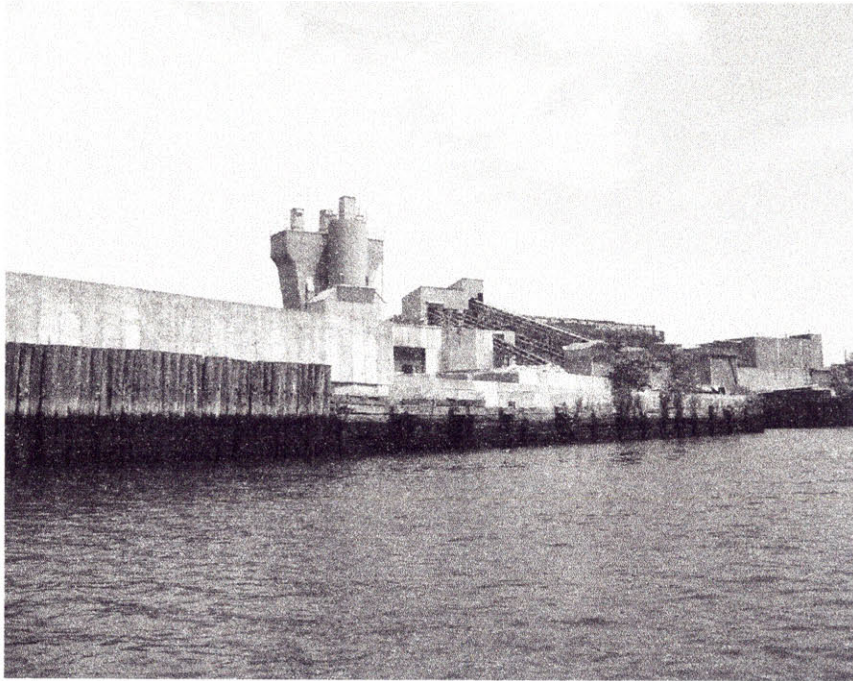
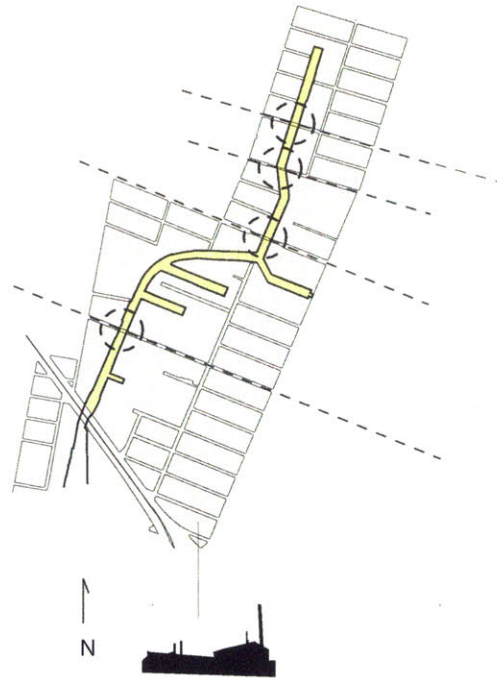
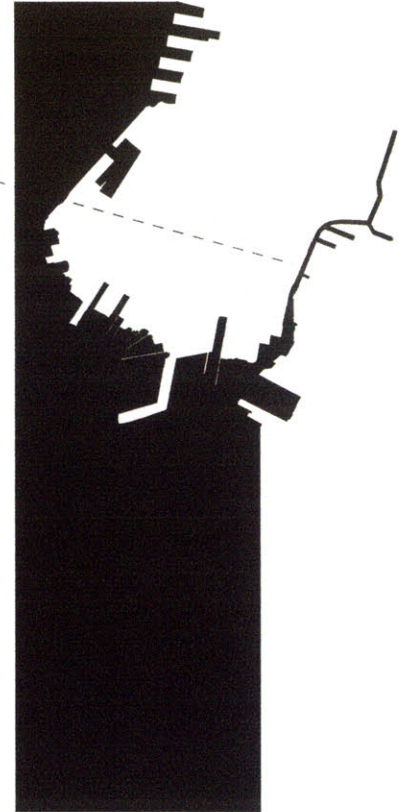


image 6 _ Gowanus canal industry

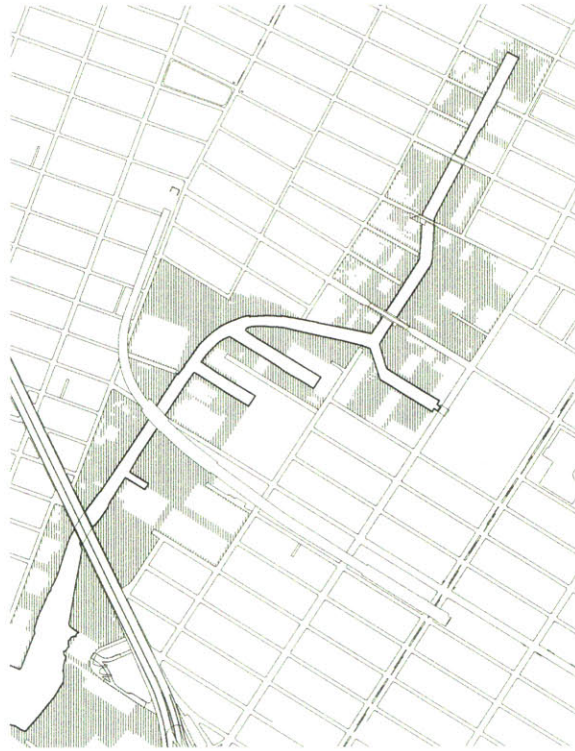


_ industrial zoning of canal edge
_ urban connectivity : public
infrastructure overlay

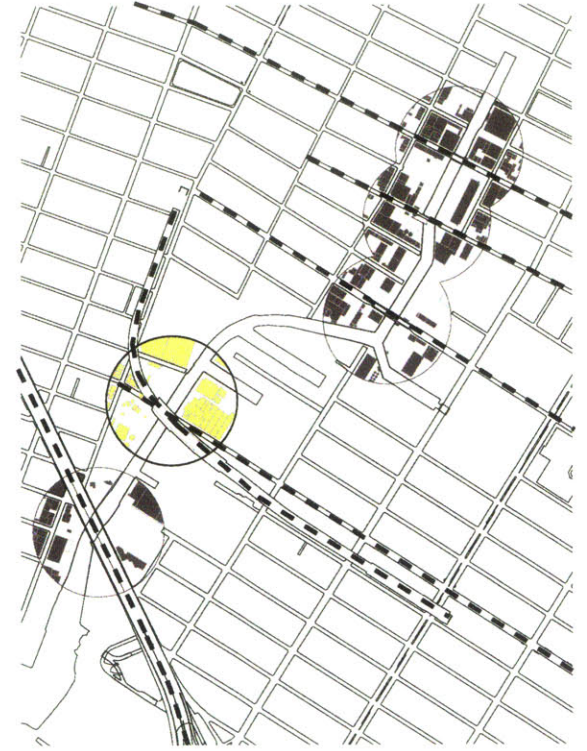




_ industrially zoned buildings

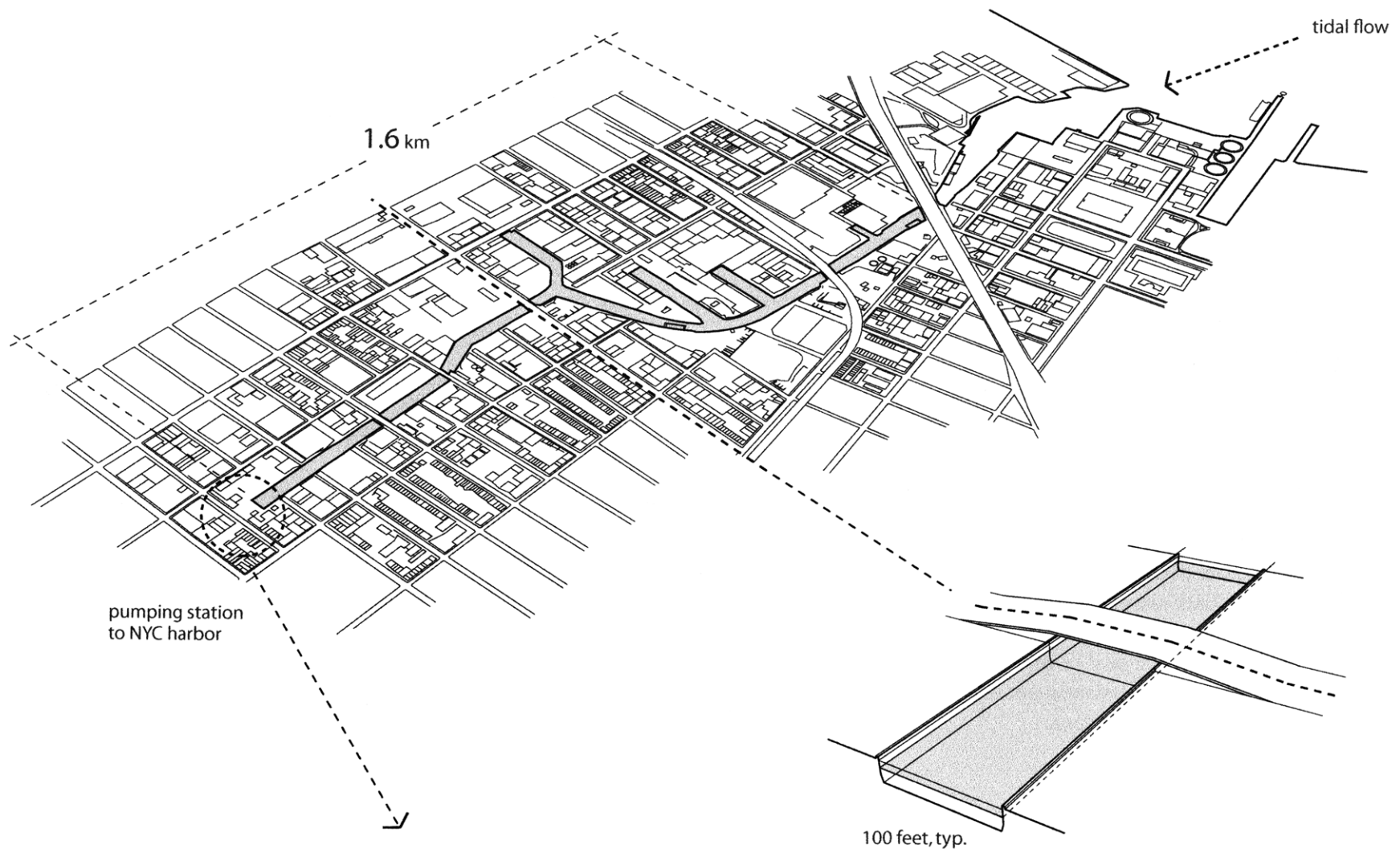


_ residual open space at canal edge



_ infrastructural crossings

Gowanus canal urban context



canal specifications

Despite the Gowanus canal's close proximity to its surrounding residential and commercial neighborhoods, its edges remain underutilized. The impermanence of industrial siting, often based on relocating to maximize proximity to labor and demand markets, has left many of the properties along the canal in a fallow state of disinvestment. This manufacturing-zoned area is currently characterized by vacant lots and buildings that lack an economic incentive for redevelopment. The building industry "functions not to produce human, durable environments, but only profitable ones. The shorter the cycle of investment and the more frequent the turnover of capital, the more potential profit there is to be made"⁸.

The lack of incentive to invest in Gowanus' properties can primarily be attributed to prohibitive costs associated with redevelopment. In addition to costly practices of demolition and renovation, the manufacturing classified zoning along the canal's edges prohibits an immediate appropriation of these properties for public-based residential and commercial use. As an alternative to costly demolition and clean-slate development procedures, can a strategy of phased reinvestment be used to promote a bottom-up re-use of the canal and its properties? This multi-faceted approach further necessitates a new form of agency, relying not on a single 'anonymous' developer, but instead on a group of investors whose direct, local involvement can re-establish these properties within Brooklyn's urban core.

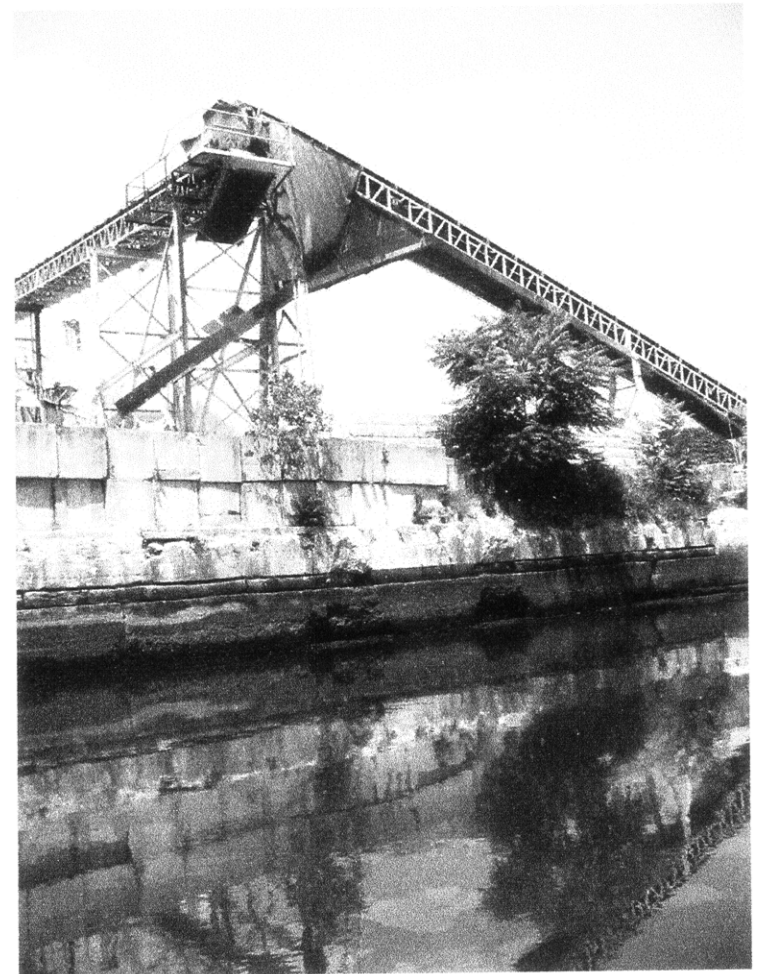
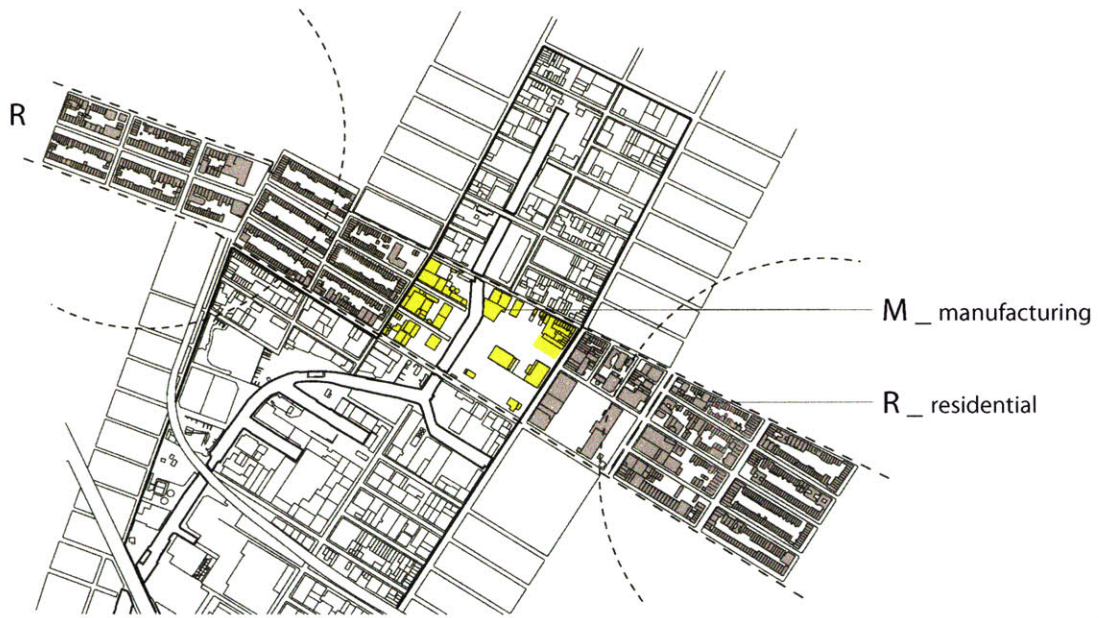
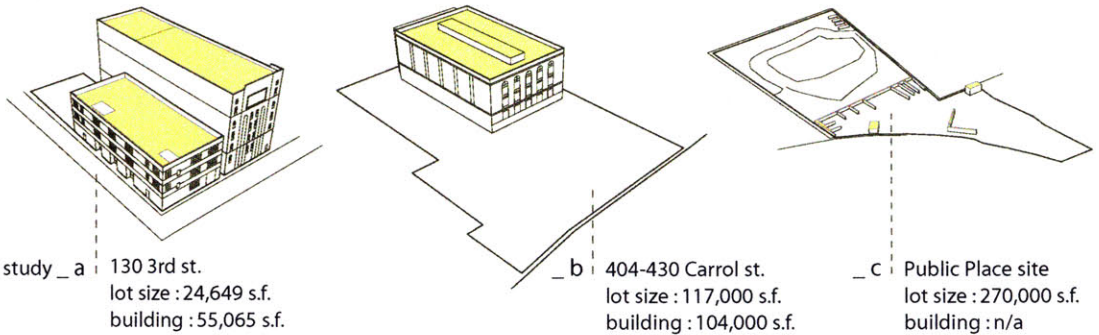


image 7 _ Gowanus canal edge

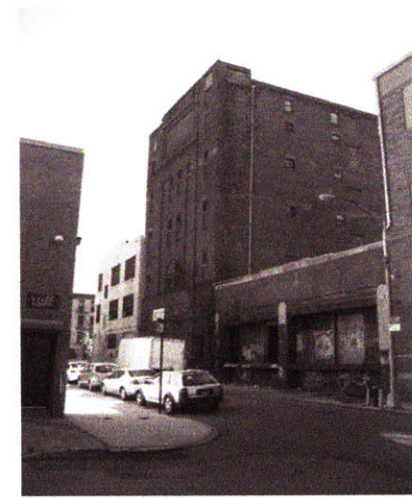
8 Jake, John and Wilson, David



existing zoning and urban grain



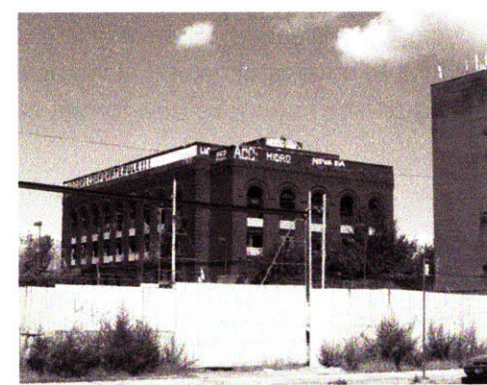
vacant lot case study



a



b



c

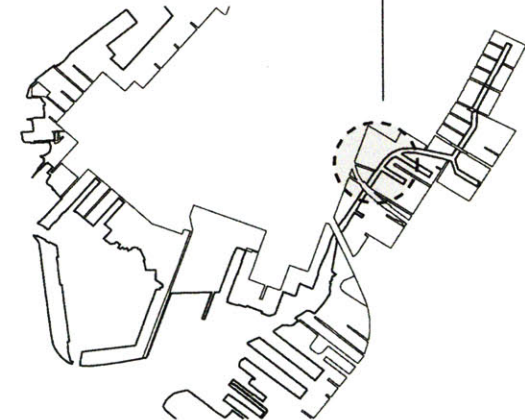
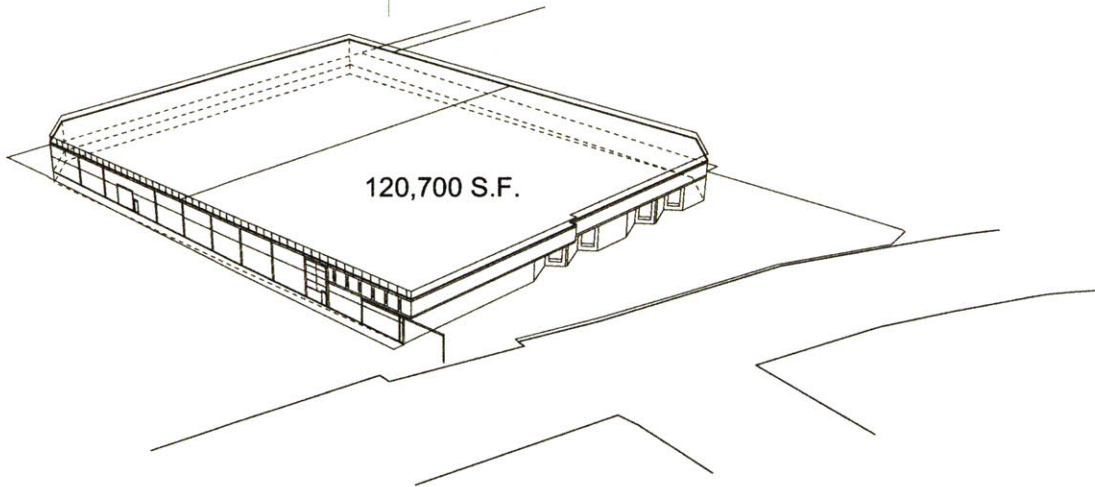
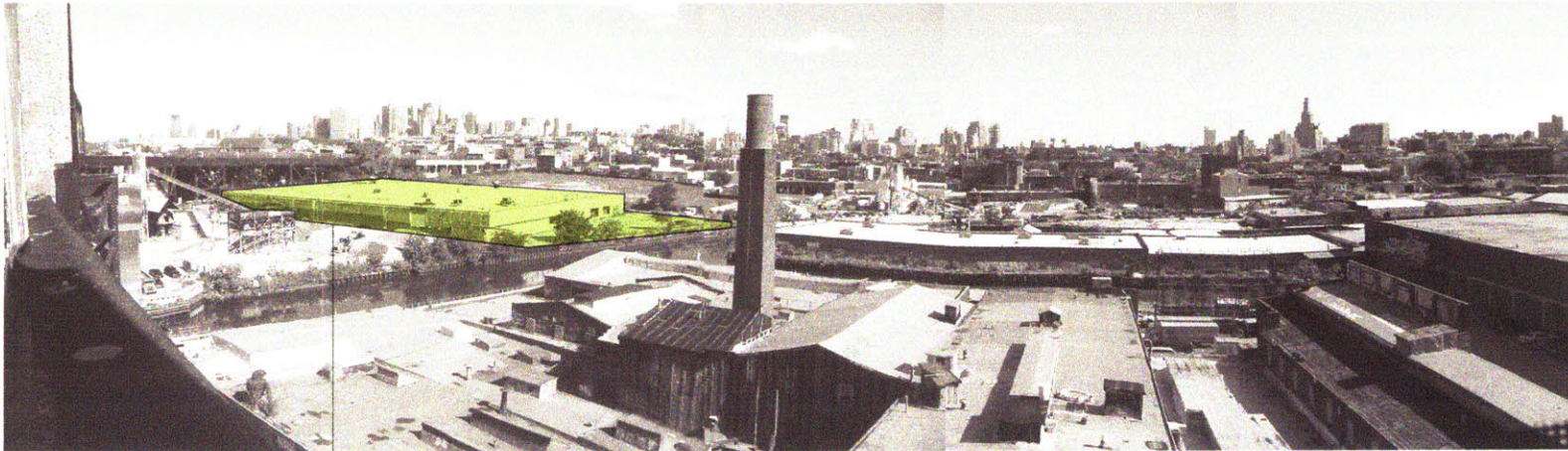
| disassembly

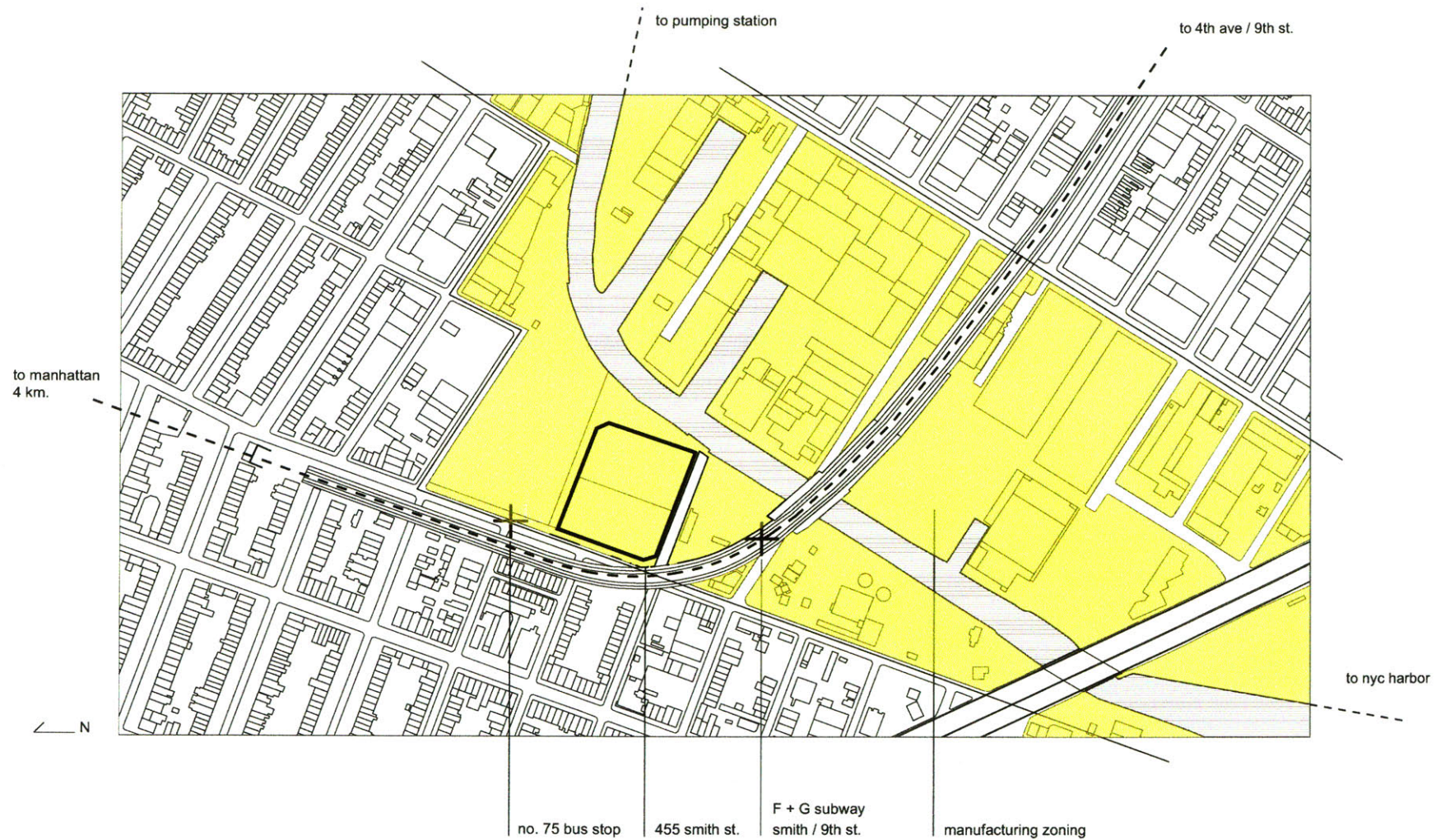
Given the predominance of vacant properties along the Gowanus corridor, this project situates itself on an underutilized site on the southwestern edge of the canal. The 455 Smith Street lot and adjacent properties are located at an infrastructural crossing, where the New York City F/G subway is elevated above ground as it bridges over the canal. This property sits on the western edge of the manufacturing-zoned canal corridor and abuts Brooklyn's dense residential fabric.

The property is characterized by a 120,700 square foot building that occupies approximately 80% of the site, aligning its western facade to neighboring Smith Street. As with similar post-industrial properties, the building exemplifies an ownership holding pattern, remaining vacant and underutilized until sparked by adjacent development potential. The existing open-plan, single-story building, approximately thirty feet in height, is constructed of a structural steel framework supporting masonry infill. The available quantity of these material resources poses the question of how the building can be materially and architecturally re-organized to instill new value into the site? As an alternative to simply reusing these materials in their existing formal and structural relationships, this project examines constructing a new relationship between the material parts and the whole. In the case of this building, a disassembly of the existing wall construction allows the masonry unit to once again stand alone as a building block and be re-aggregated on-site to acquire new formal value.

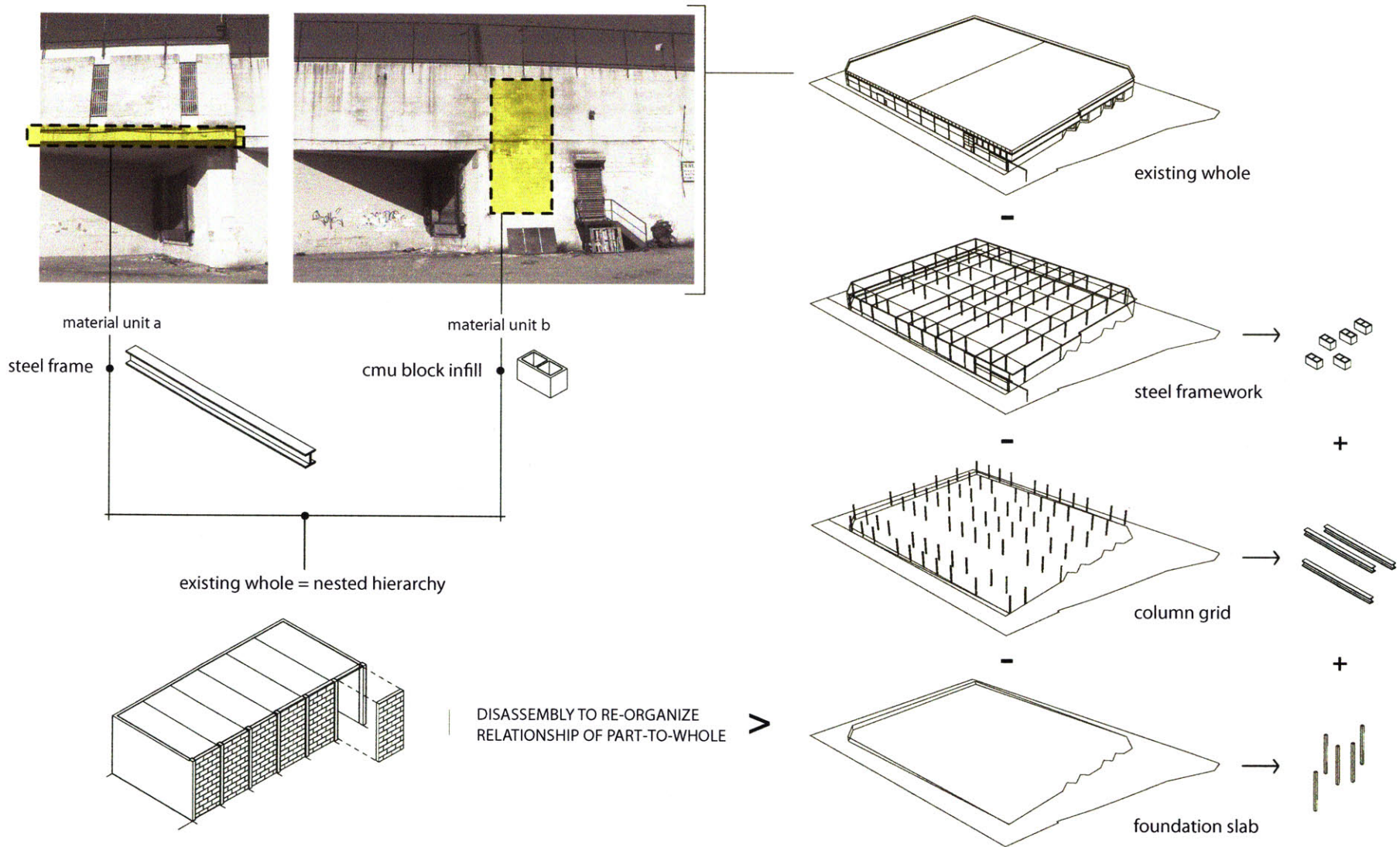


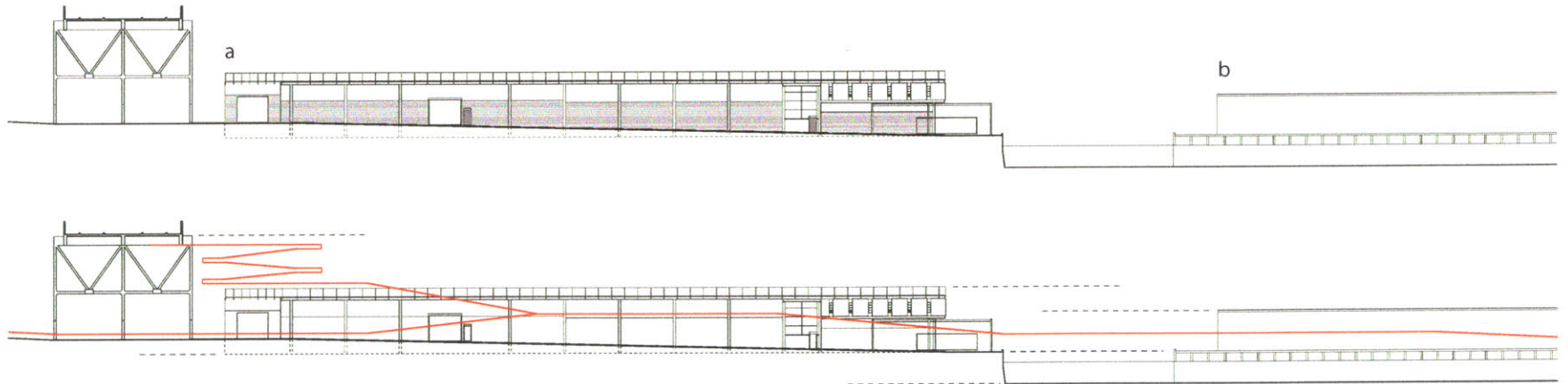
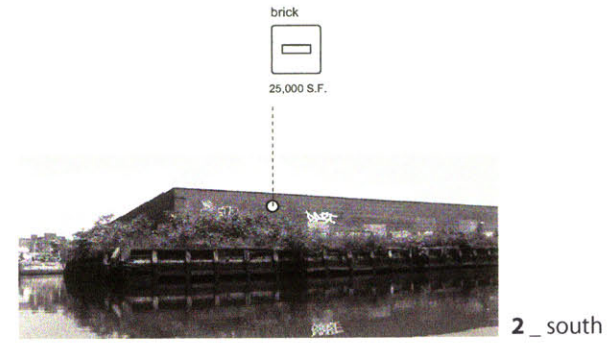
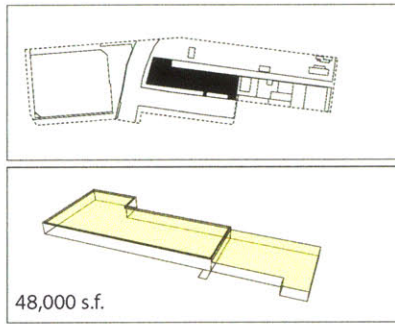
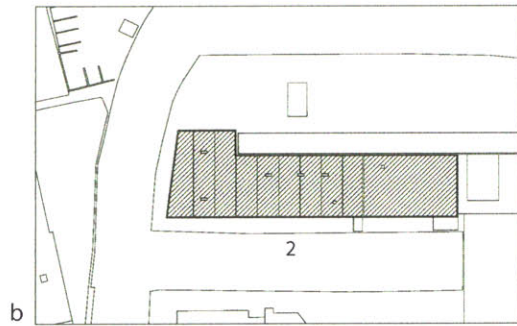
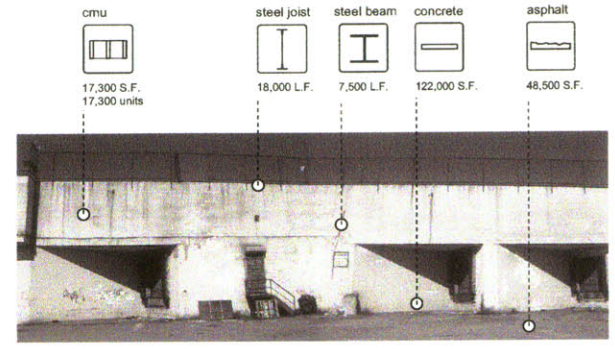
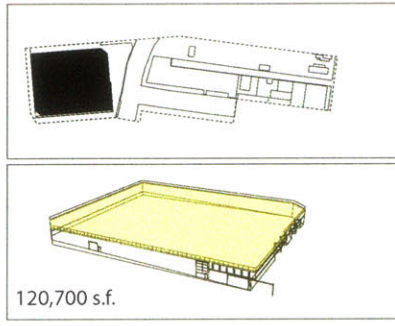
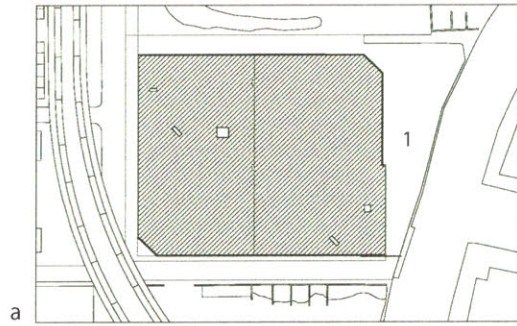
image 8 _ aerial view of site and NYC harbor



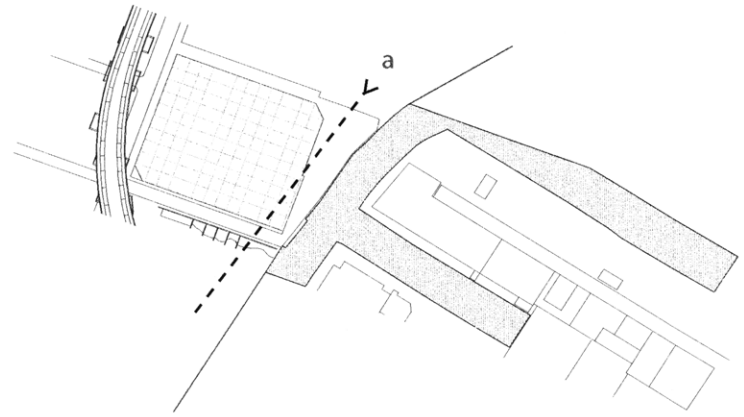


455 Smith Street site context

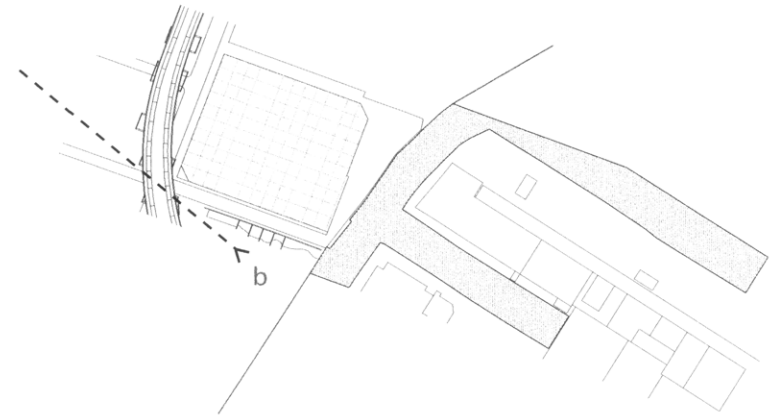




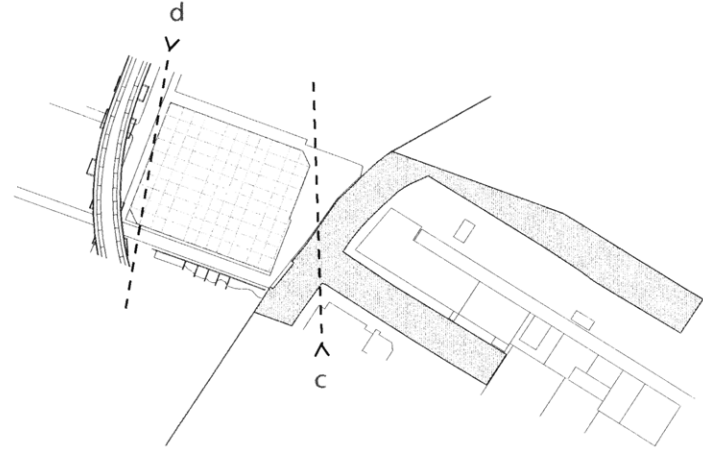
site analysis _ material cataloguing



existing site a _ canal edge



existing site b _ south street facade



existing site c _ east facade



existing site d _ west street facade

| reuse

As a means of investigating how to effectively provide new value for old materials, the project examined the precedent of the masonry vault. This form was researched in the context of the available materials on-site and with the constraint of minimal manufacturing processes. As a formal and structural precedent, the double-curvature vaults of Eladio Dieste became the starting point for devising a system for material reuse.

“Dieste also had a strong belief in the relationship between structure and architecture and its expression, this belief being legible throughout his work and his writings: ‘The resistant virtues of structures that we make depend on their form; it is through their form that they are stable and not because of an accumulation of materials. There is nothing more noble and elegant from an intellectual viewpoint than this; resistance through form’.”⁹

The form of the double-curvature, or gaussian vault is composed of varying catenary cross-sections (see pg.27) which act in compression to transfer loads to the edges of the vault. The vault’s double-curvature also helps to structurally resist buckling and collapse, and allows the vault to take on a shallow, and therefore occupiable, slope. This efficient structural form also allows for a material efficiency, as the thickness of the vault can be constructed with as little as one masonry unit in depth. Given these structural and formal advantages, this project examines how this system can be adapted to provide value for salvaged materials in Brooklyn’s post-industrial landscape.

⁹ Pedreschi and Theodossopoulos

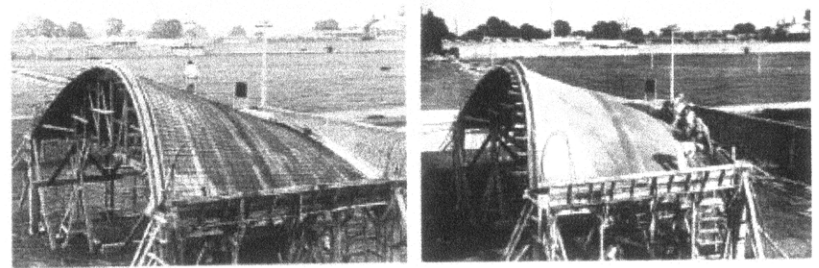
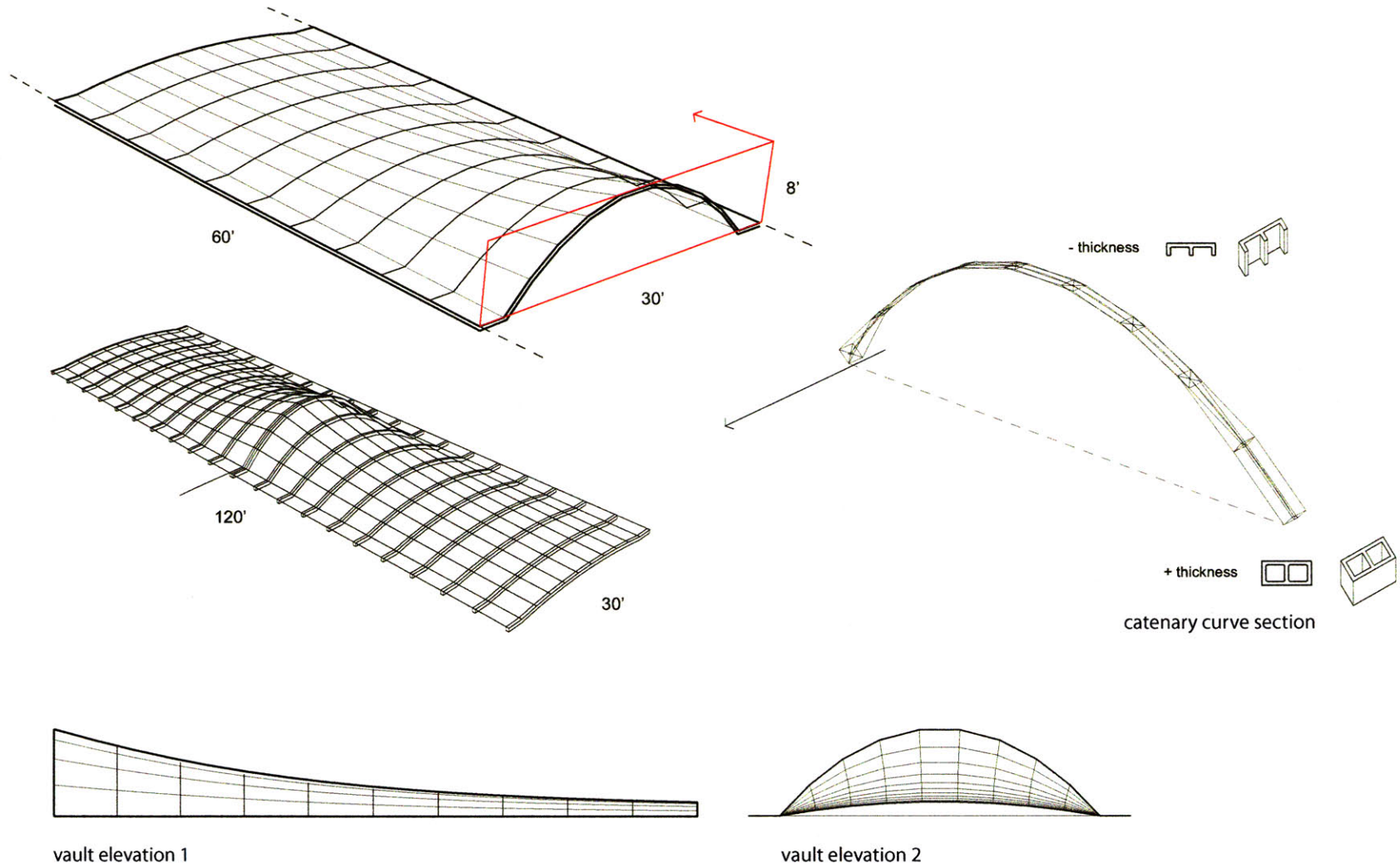
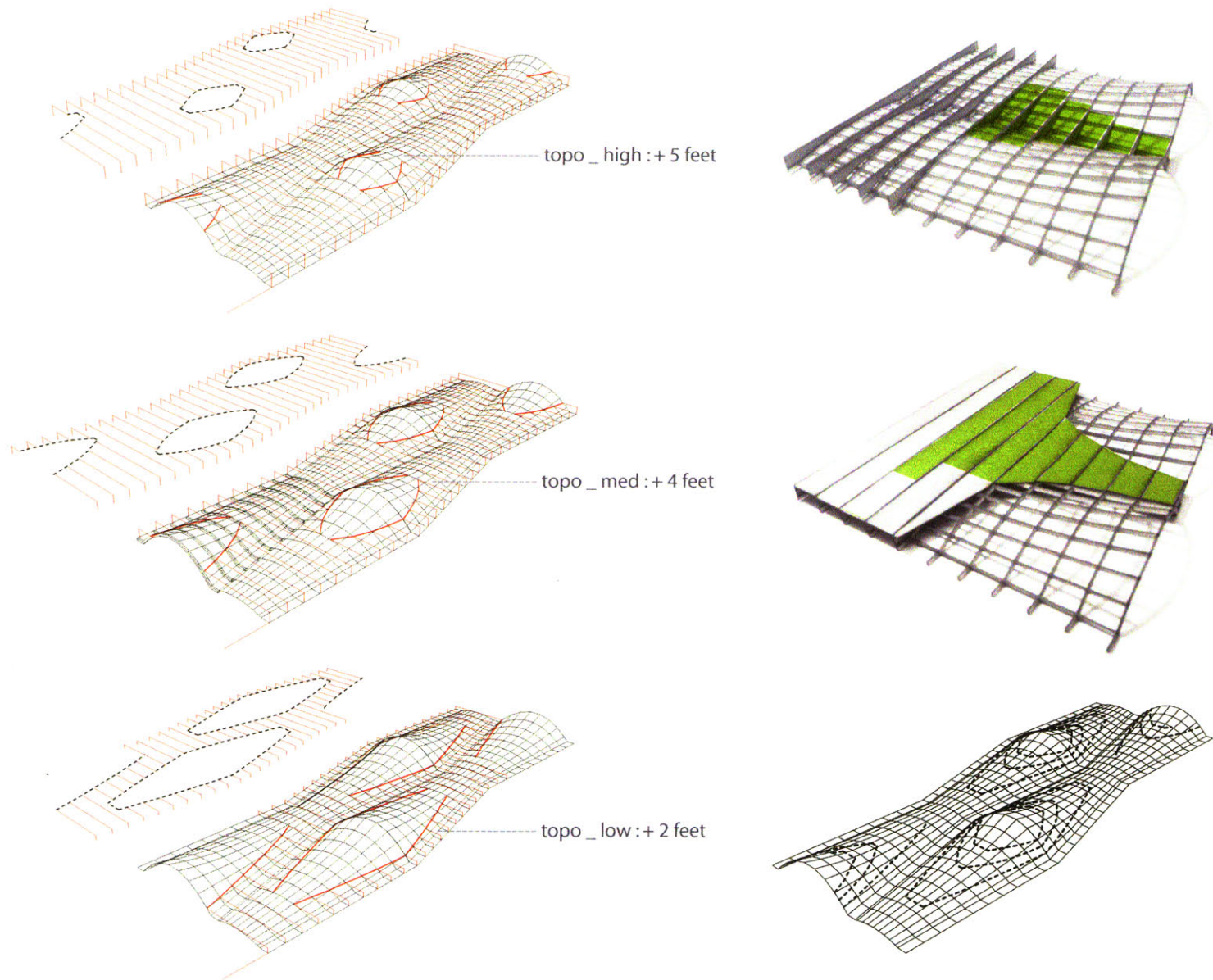


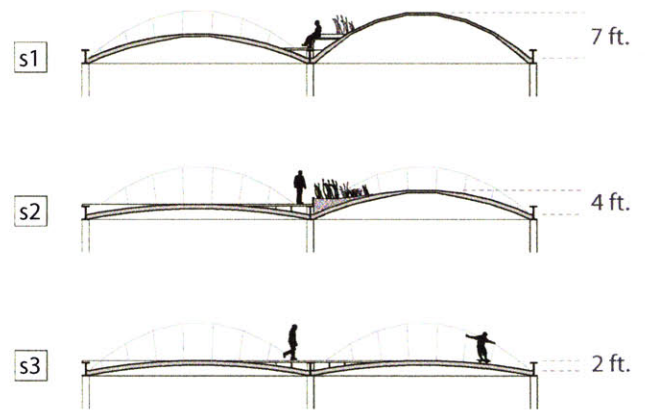
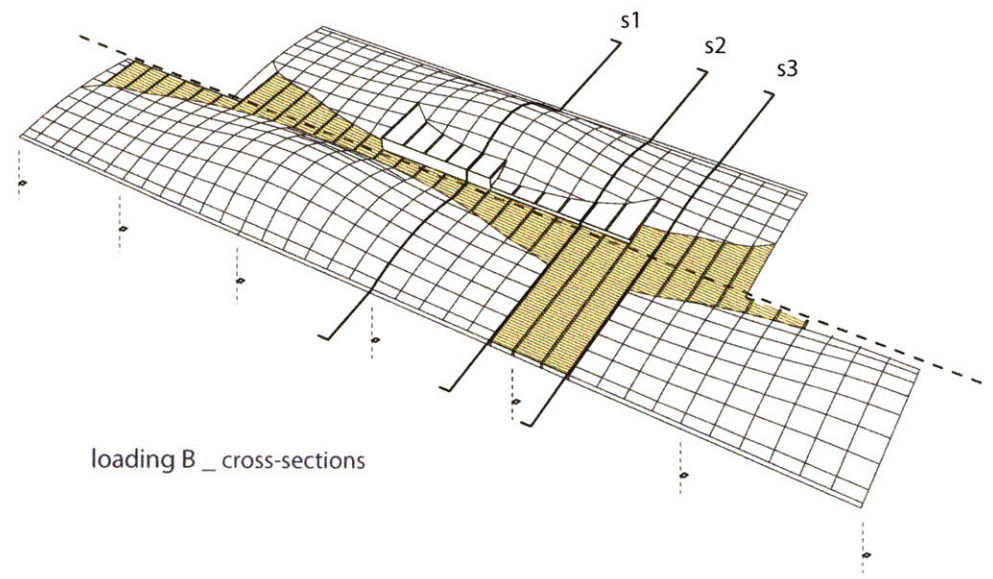
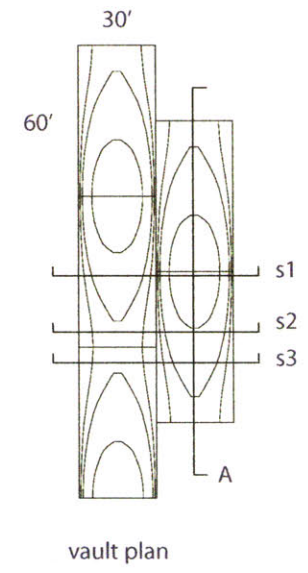
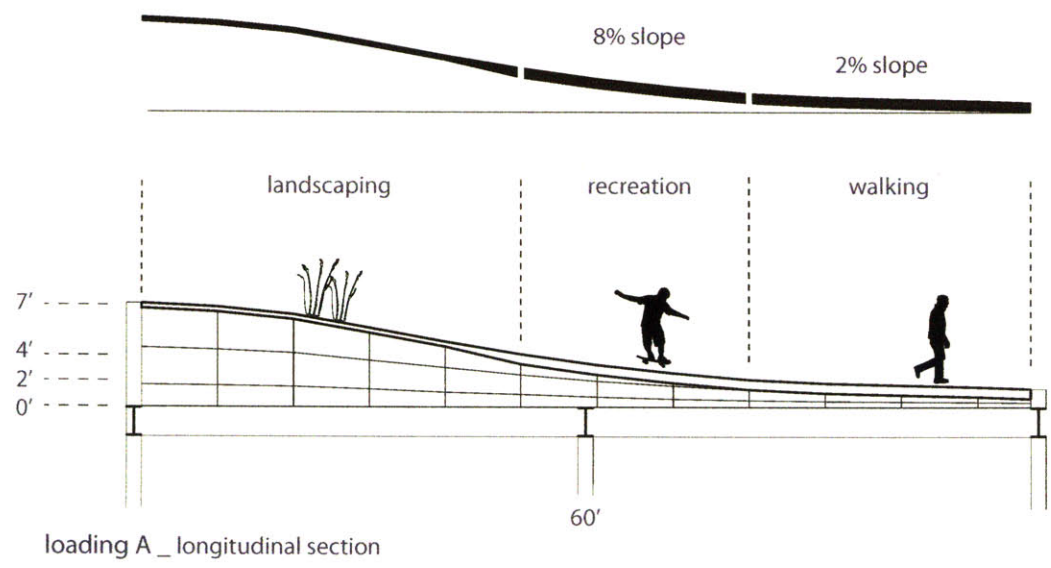
image 9 _ double-curvature vault precedent_Eladio Dieste



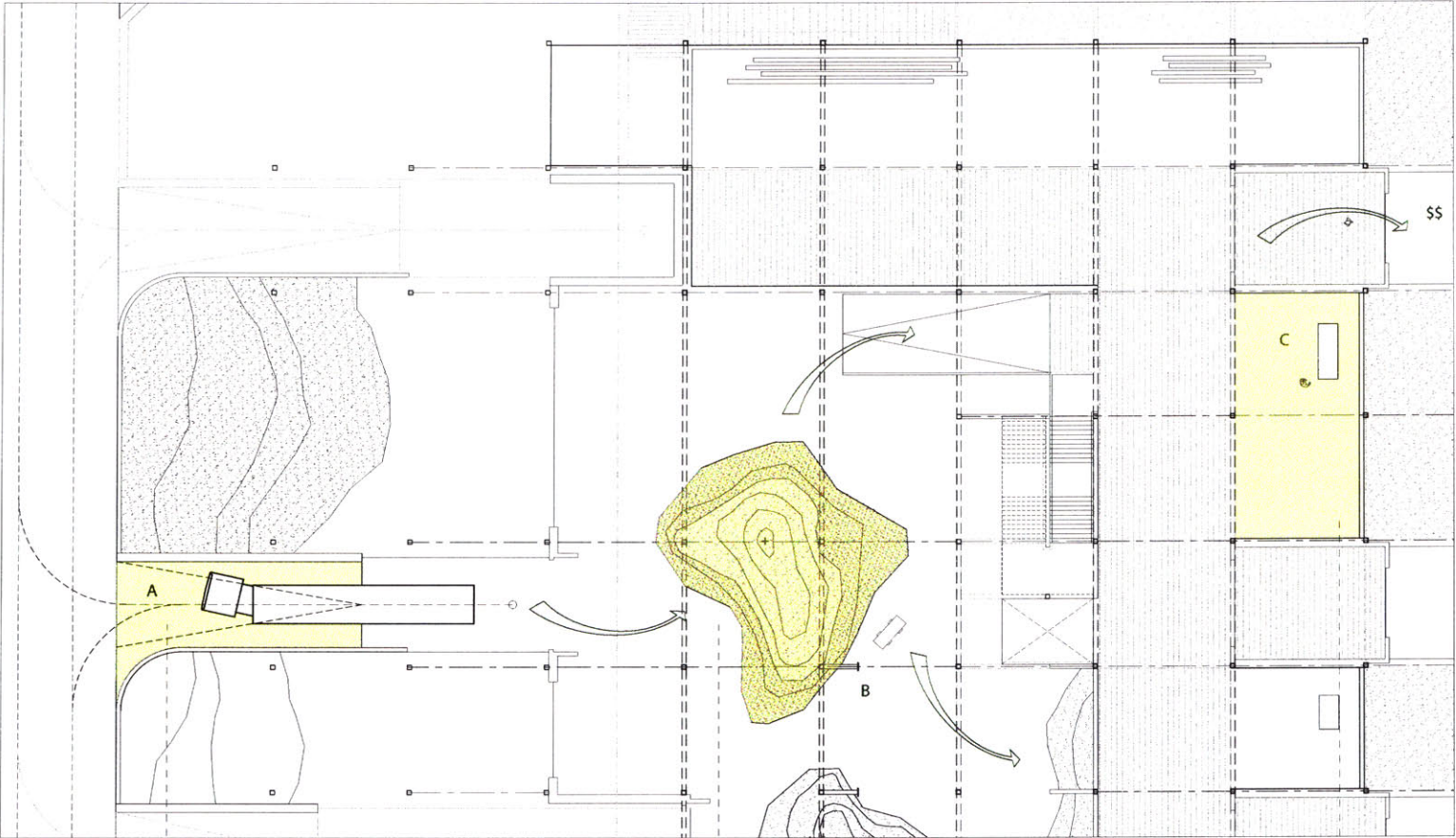
double-curvature vault analysis



vault design process _ vault accumulation and programmatic loading



salvaged materials IN |-----| re-tooled materials OUT



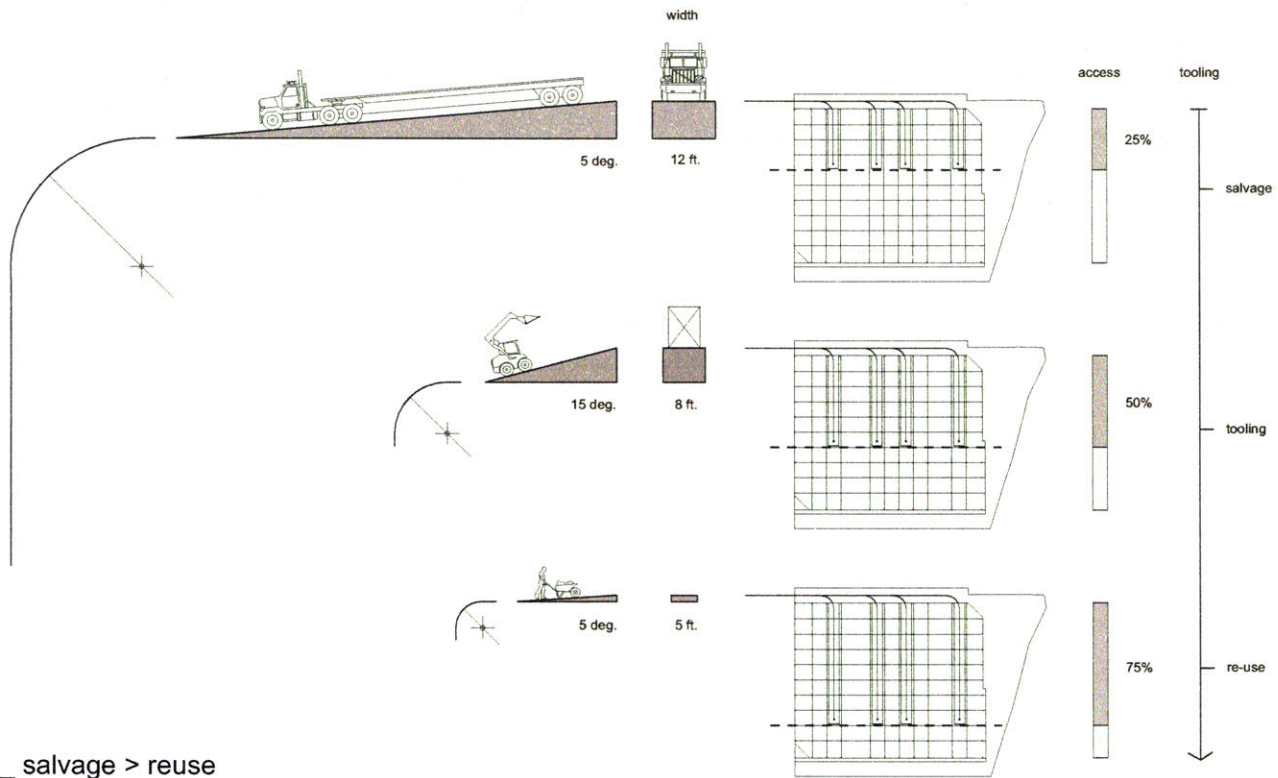
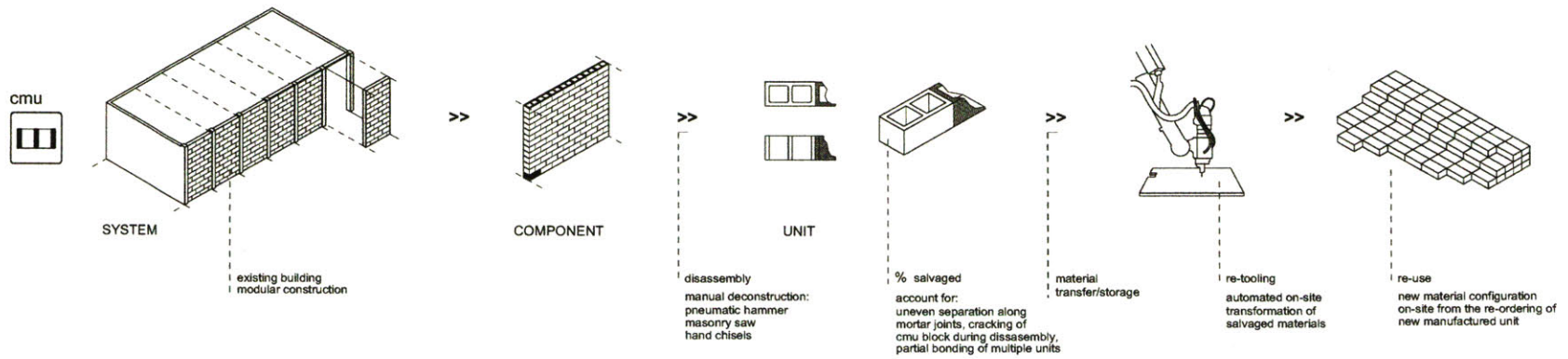
A _ MATERIAL DELIVERY
_ truck access ramp

B _ MATERIAL SORTING / MOBILE TOOLING
_ initial material cleaning + cutting

C _ MATERIAL STORAGE,
REFINEMENT, + RETAIL



material salvage diagram _ on-site material processing



material circulation _ salvage > reuse

urban phasing

This project seeks to transform the post-industrial site by staging an incremental reorganization at both the material and urban scale. Urbanistically, the proposal poses an alternative to typical developer-lead agency and anonymous user investment. As a means of facilitating a flexible method of reclaiming land, existing resources can be converted into assets at the hands of the user-as-investor. As described above (pg.18) the vacant 455 Smith Street site is located on the edge of the Gowanus manufacturing zone in close proximity to public transit and residential zoning. Due to the site's strategic location at this infrastructural crossing, there exists an opportunity to create new value for this property both locally and as a catalyst for development of similar properties along the canal. At both the urban and architectural scale, a phased development strategy can be used to convert the canal's existing resources into local assets.

phase 1_

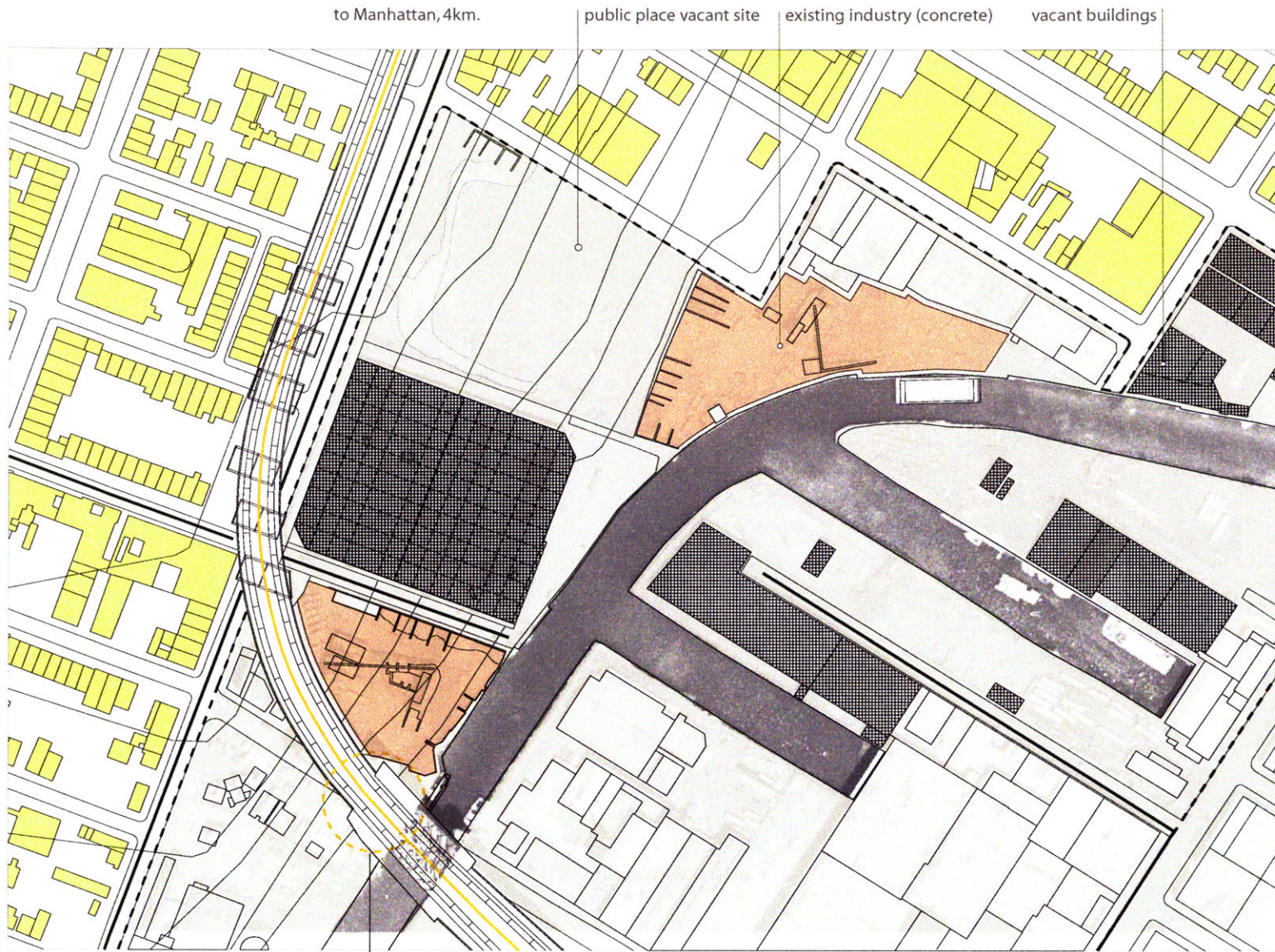
The initial phase of transforming the site seeks to simultaneously re-integrate the circulation of people and materials in the residual space along the canal (see pg.36). This phase proposes to shift the existing elevated subway stop approximately 150 meters to the north in an attempt to create a new transit hub at the west end of the site. A ramp is designed to negotiate the twenty foot height difference between the subway tracks and the roof of the existing 455 Smith Street warehouse. By utilizing the existing steel structure of the building, the ramp provides new functional value for these existing materials while facilitating public access to the previously unoccupied canal edge.

As the site becomes publicly occupied, phase one also

proposes a partial disassembly of the site's existing buildings. The southern masonry facade of the 455 Smith Street warehouse is disassembled from its steel structure and the salvaged materials are stored within the building's footprint for later re-tooling and reuse. The disassembly of the facade allows vehicular access into the building, providing access within the existing thirty foot wide structural steel bays. This phase further envisions the disassembly of a vacant building on the eastern edge of the canal, appropriating its footprint and adjacent dead-end street for the salvage and storage of these disassembled materials.

phase 2_

The second phase of the project, to occur within approximately ten years of phase one, envisions a transformation of the post-industrial landscape at the material, architectural, and urban scale (see pg.37). The primary goal of this phase is to create new value for the site through the processing and reuse of salvaged materials. The primary architectural element becomes a vaulted, public roofscape constructed from salvaged masonry units on the warehouse's existing steel structure. On the building's ground floor, the industry of salvaging the building's own material has expanded into a material processing hub for building resources from other post-industrial buildings. Additionally, the construction of a new vehicular and pedestrian bridge facilitates the circulation of both salvaged materials within the canal's new productive landscape.



└ N phasing _ **existing**

F + G subway
Smith / 9th St. station



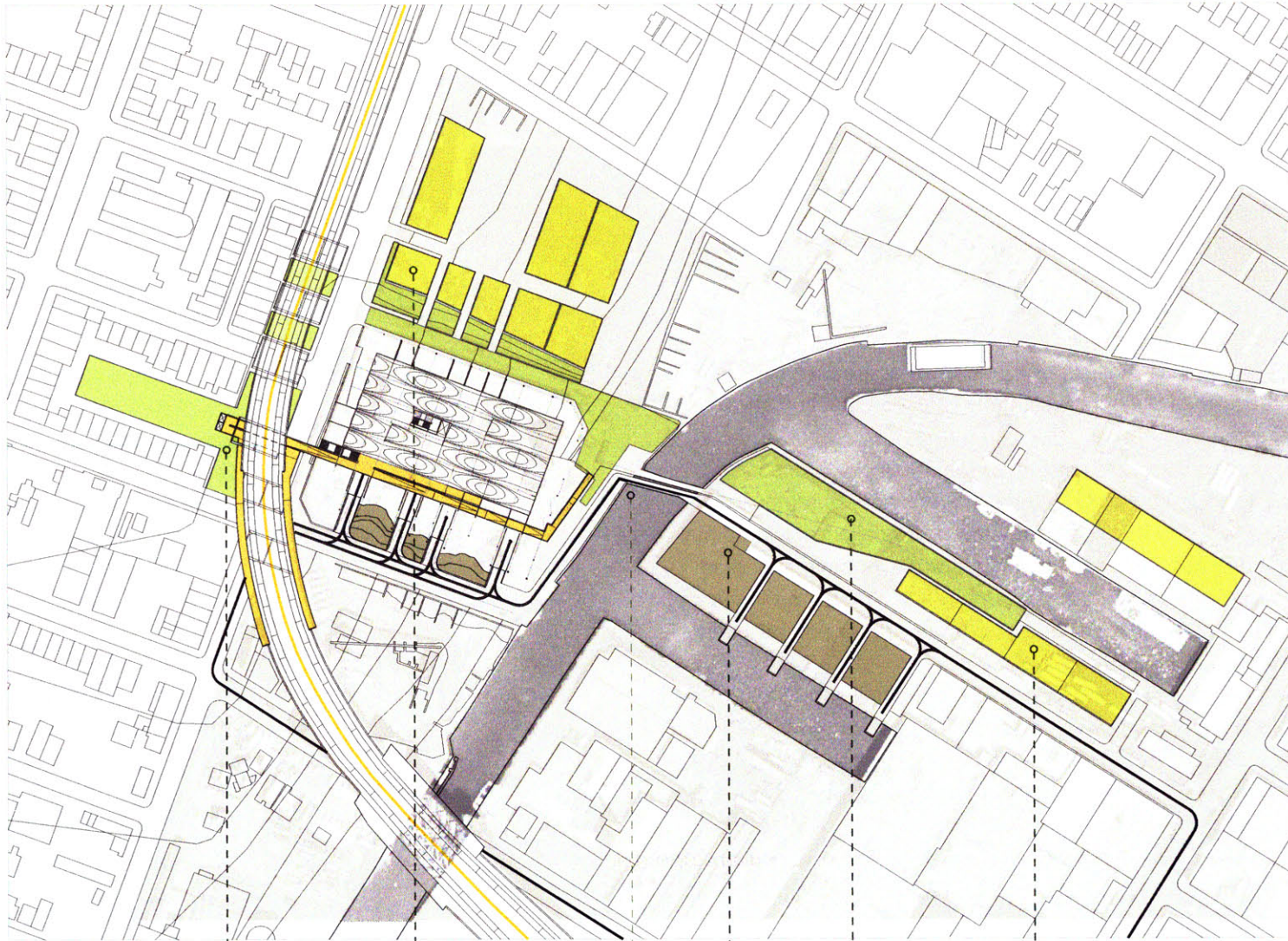
↑ N

phasing _ + 2 yrs.

proposed subway terminal

truck access for material salvage

salvaged material storage



phasing_ + 10 yrs.



subway terminal



residential/
commercial

vehicular +
pedest. bridge



material
storage



recreation
fields



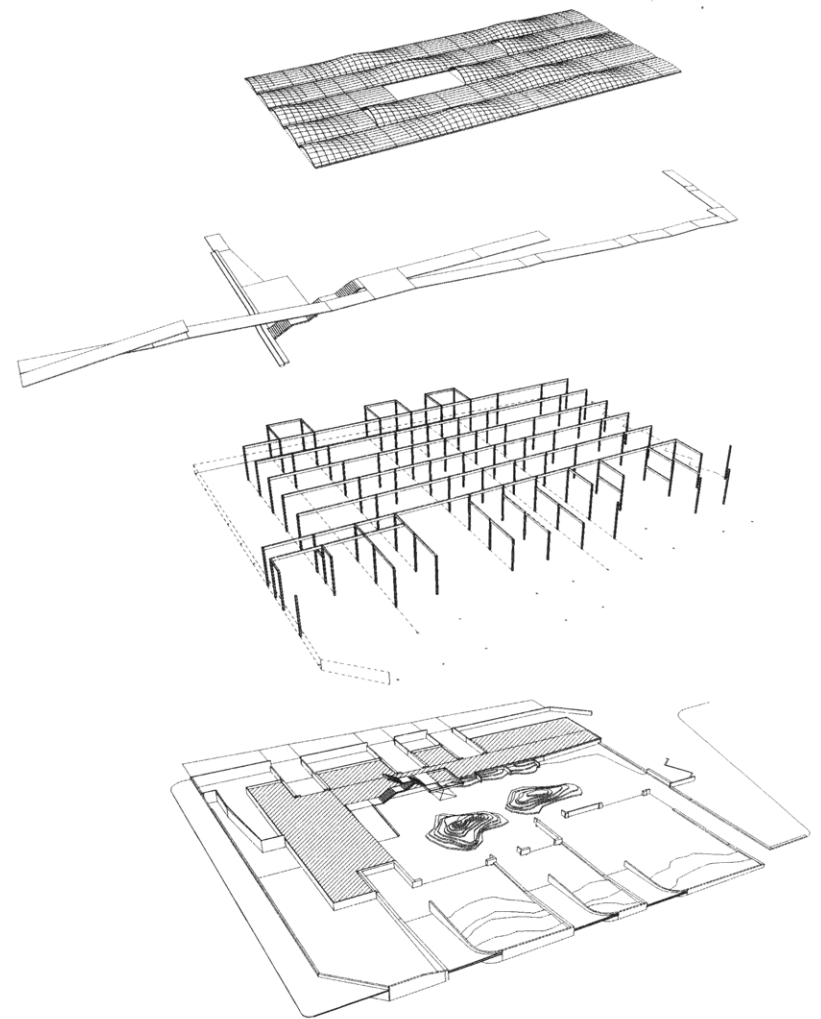
live / work

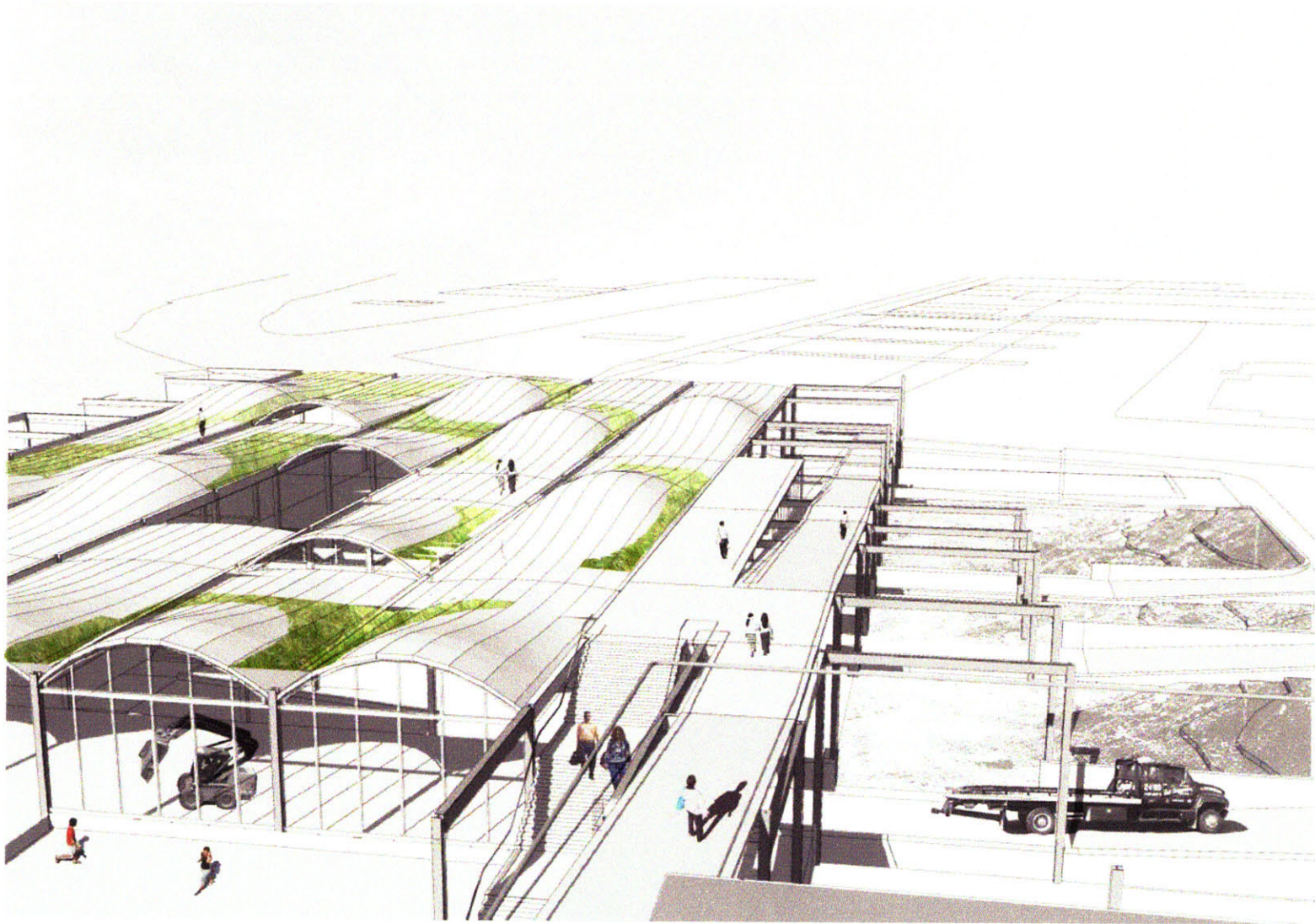
| proposal

This architectural proposal seeks to overlay public and private programs within the framework of on-site material salvage and reuse. As described above, the reorganization of the post-industrial warehouse relies on a strategic disassembly, attempting to assign new value to existing materials. The project's primary components (see pgs.40-41) consist of a ground floor material salvage and tooling industry, in-situ existing steel grid, public circulation and subway access ramp, and vaulted masonry roofscape. This proposal seeks to transform the existing steel grid by superimposing an aggregation of material, both in the form of a highly systematic vault construction above, and loose accumulation below.

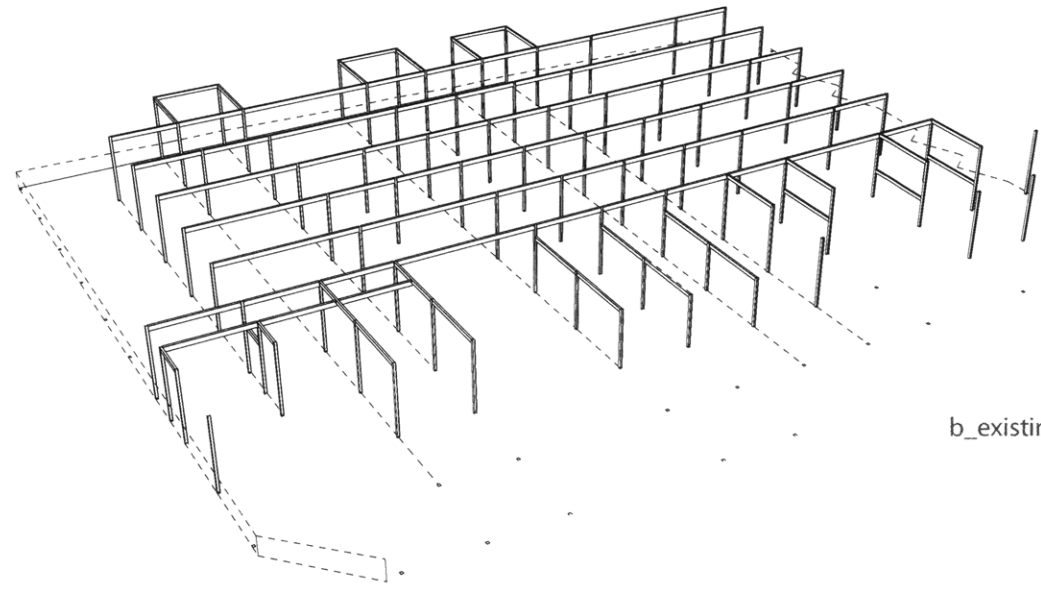
The ground floor is organized around the input, processing, and output of salvaged building materials. Truck access ramps and loading docks along the building's southern facade allow salvaged materials to enter the building and accumulate within an open floor plan. As materials are further sorted, tooled, and refined, they are moved toward the building's northern edge and showcased for potential sale within a series of elevated storefronts.

This salvage industry functions within the building's existing steel grid, which has been retained to support public programs above. A vaulted roofscape, constructed from the building's salvaged cmu blocks, spans between existing steel beams to create public space in close proximity to the industry below. A combination of pedestrian walkways and plantings are distributed across the roof, creating flexible public leisure spaces within an intermediary landscape found between the urban streetscape and elevated subway.

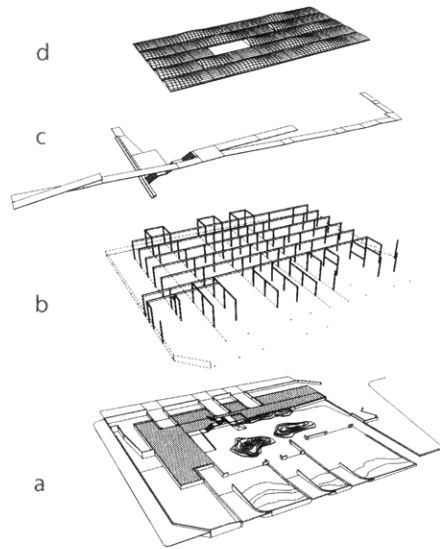




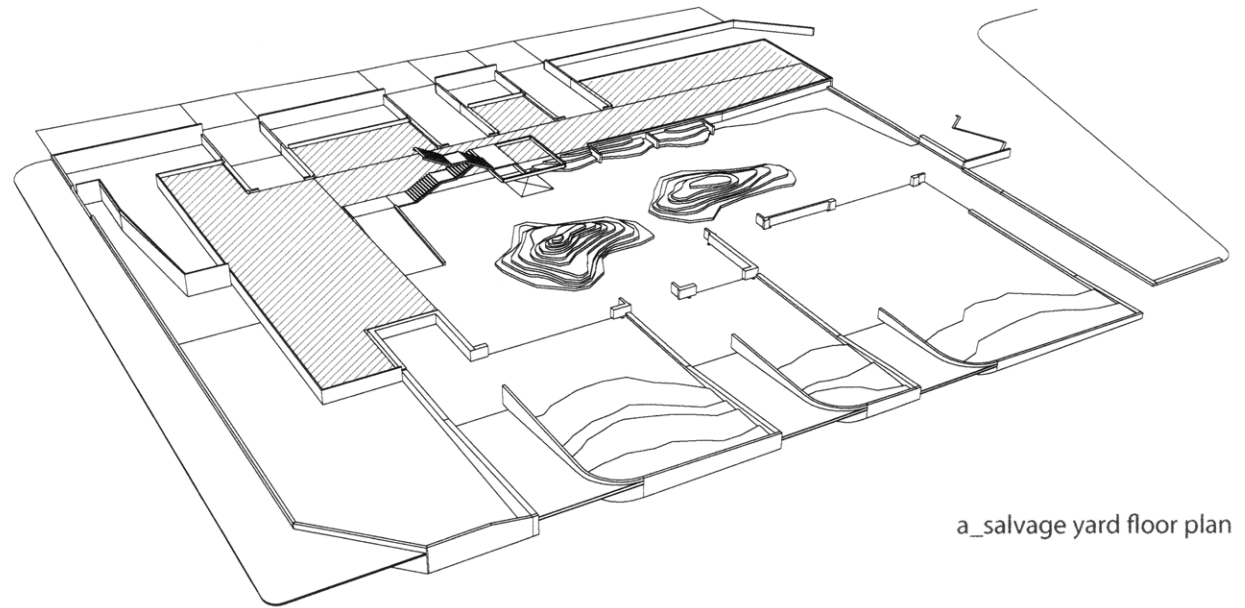
view from elevated subway



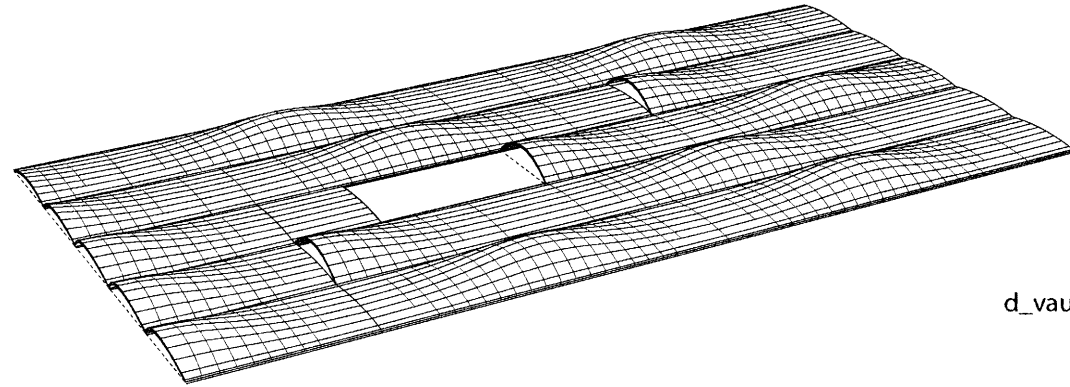
b_existing steel structure



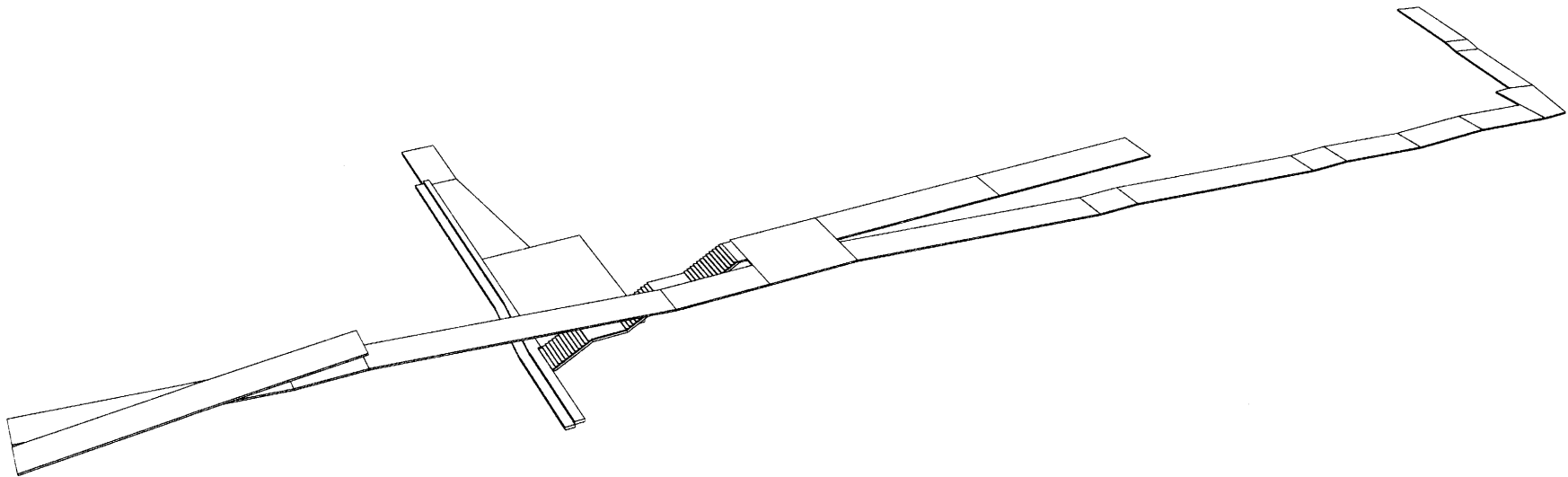
building exploded axonometric



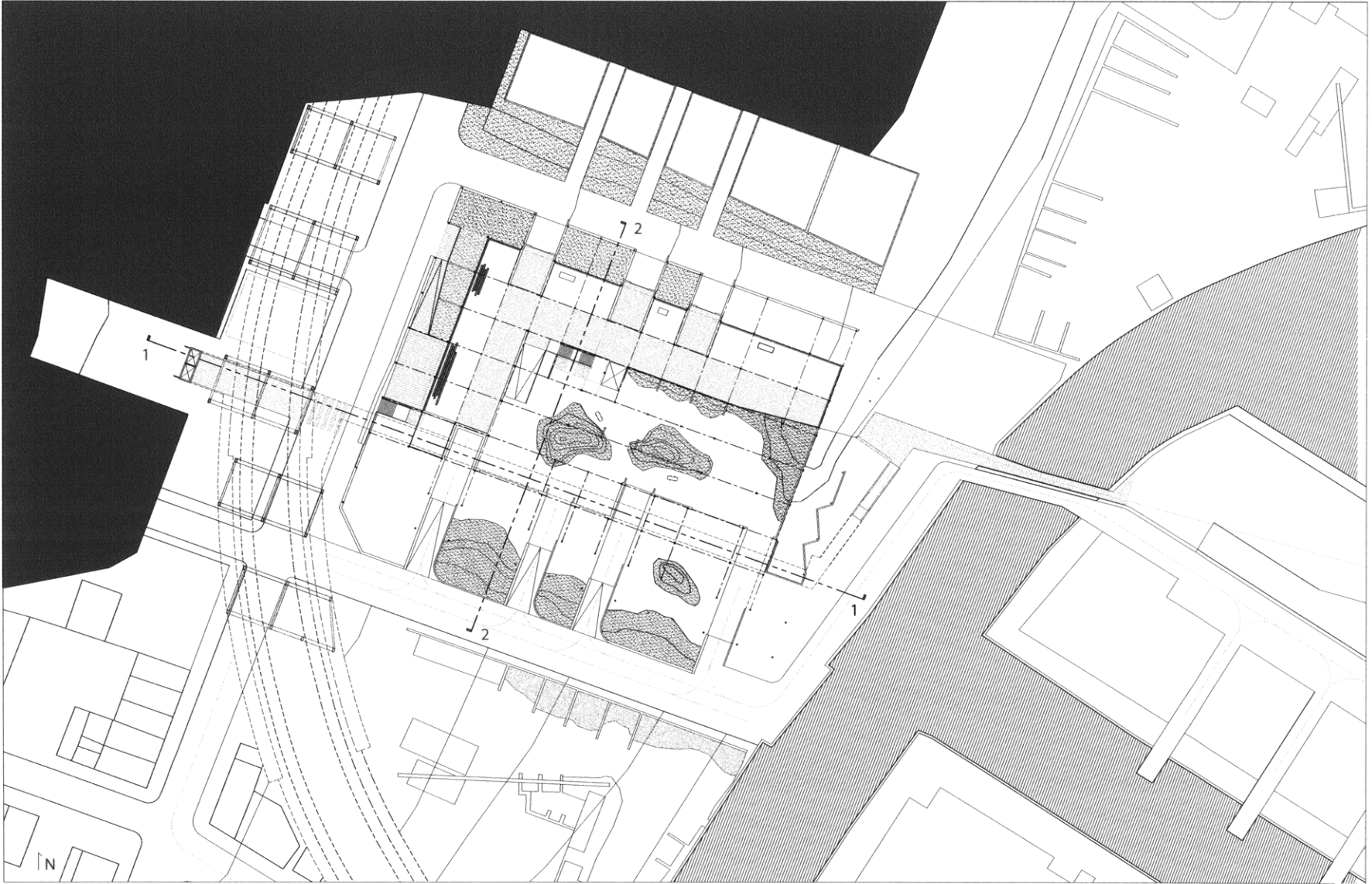
a_salvage yard floor plan



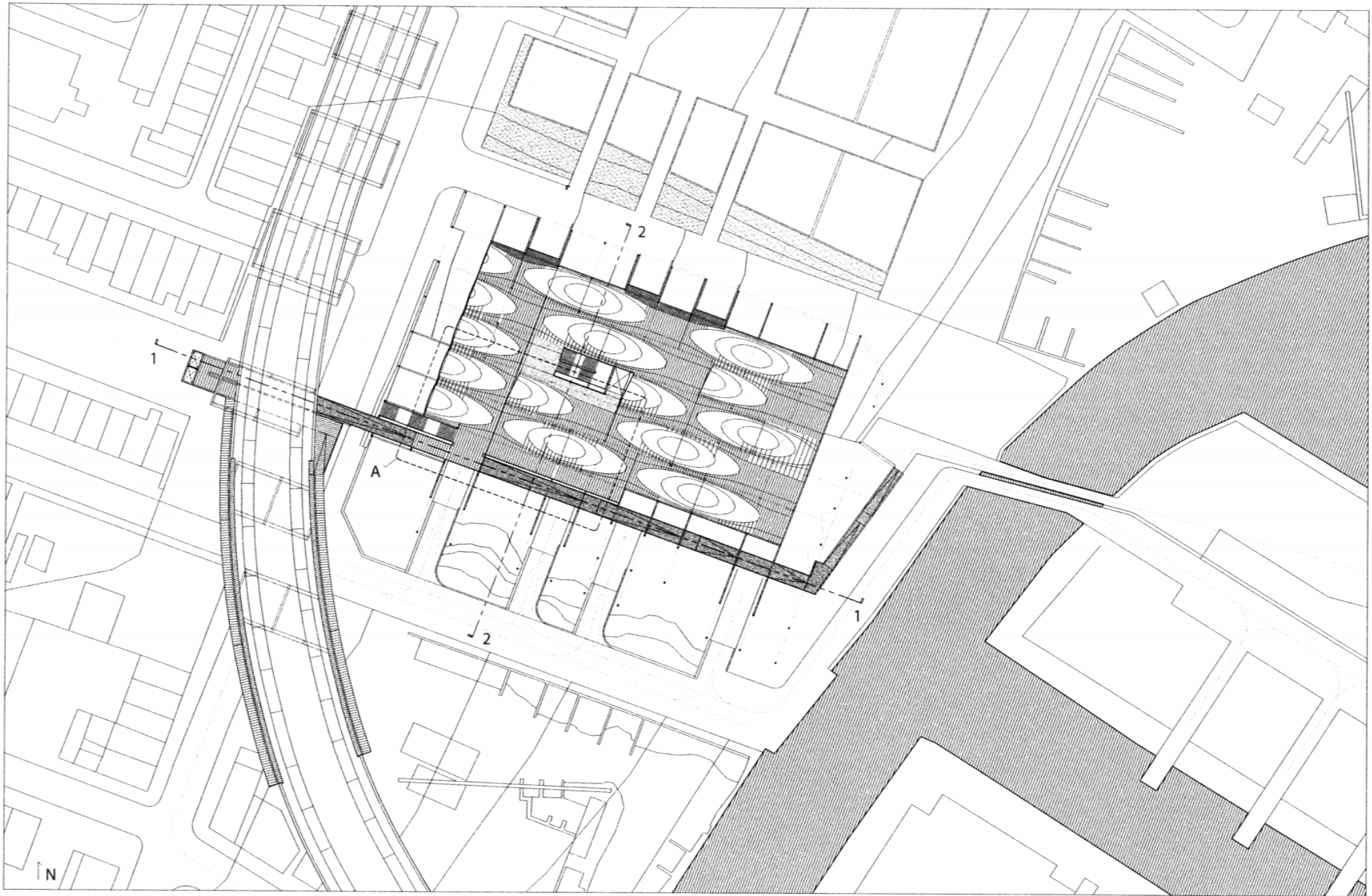
d_vaulted roofscape



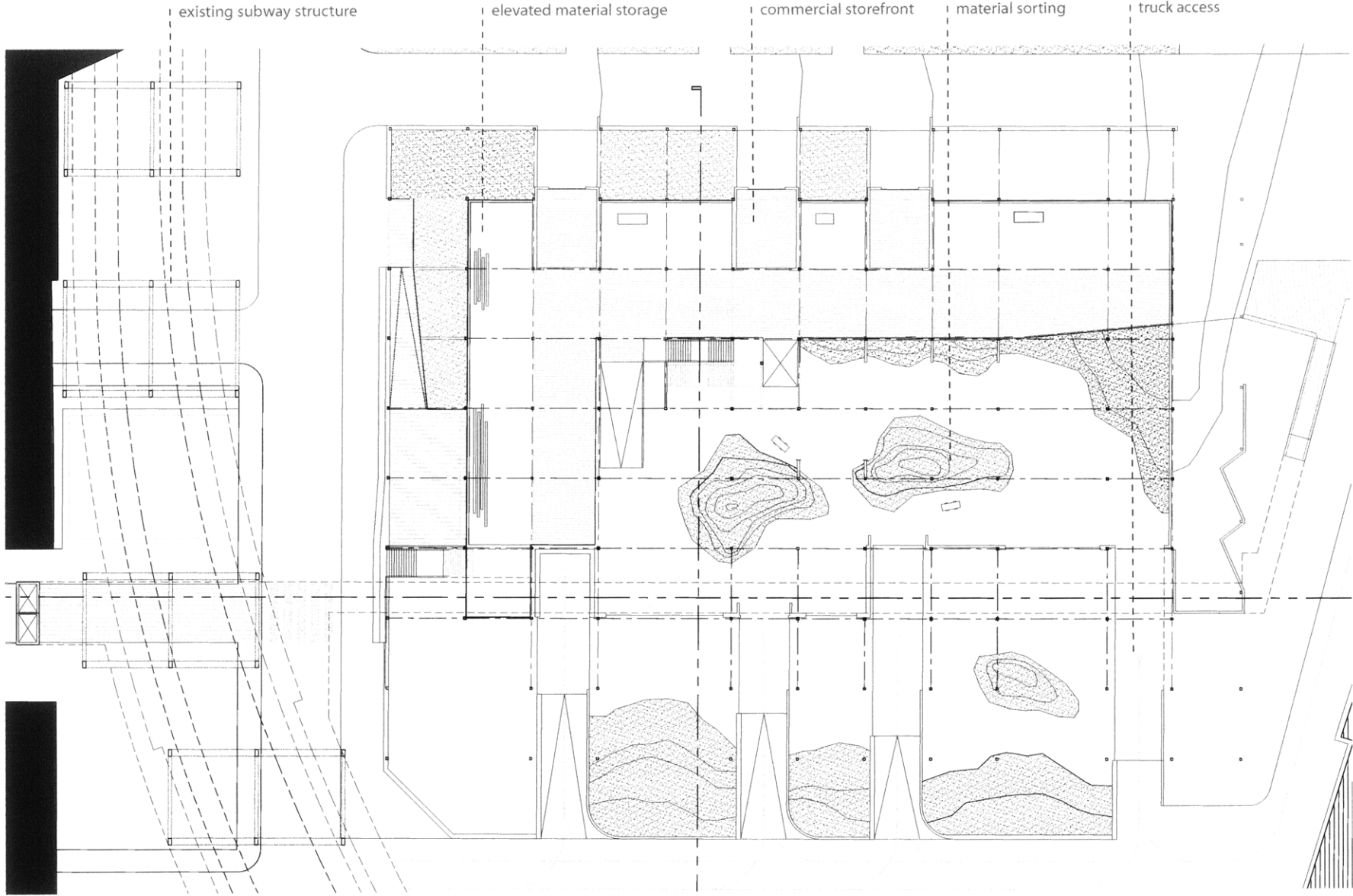
c_public circulation ramp



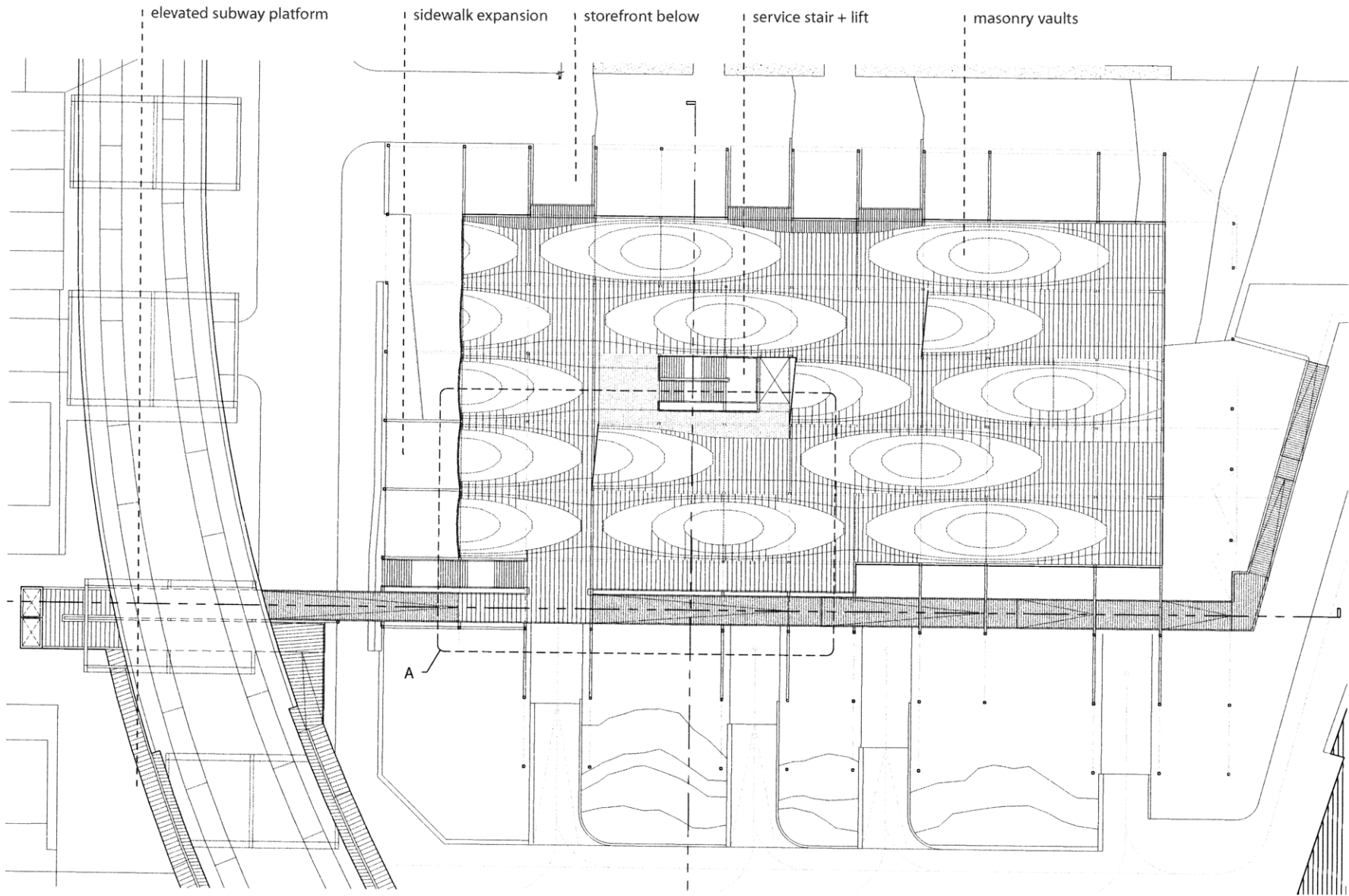
ground floor plan



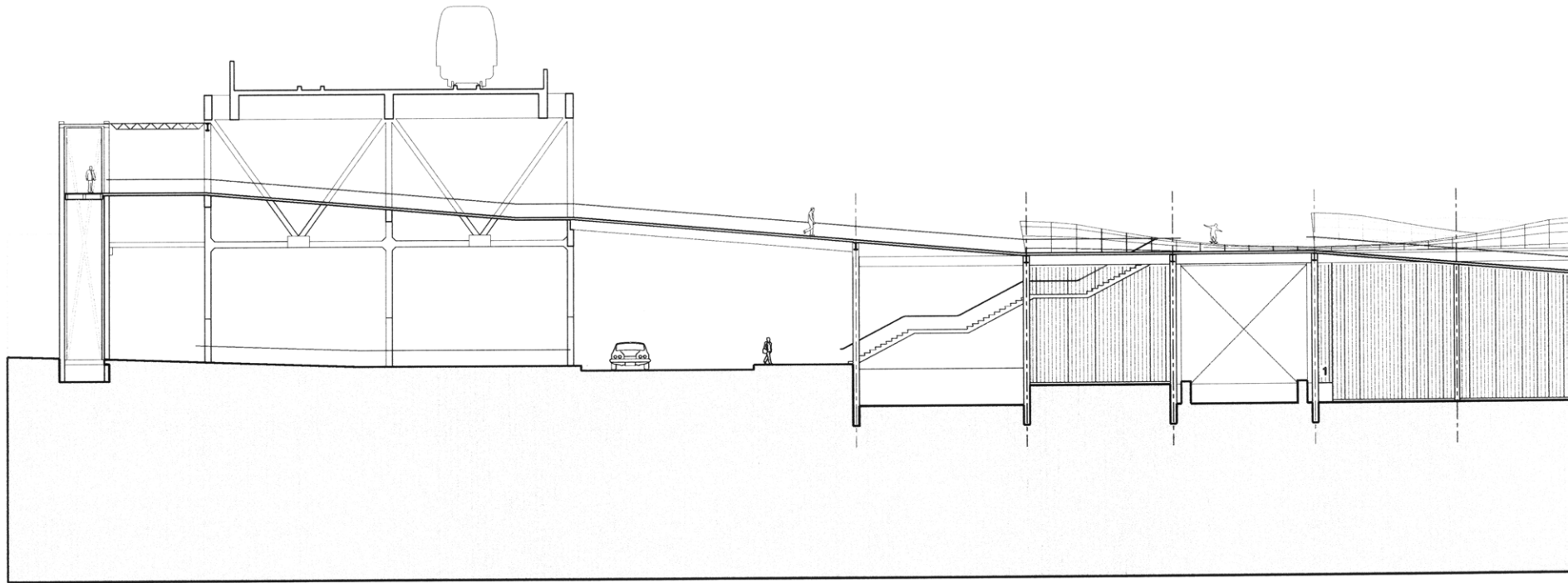
roof plan



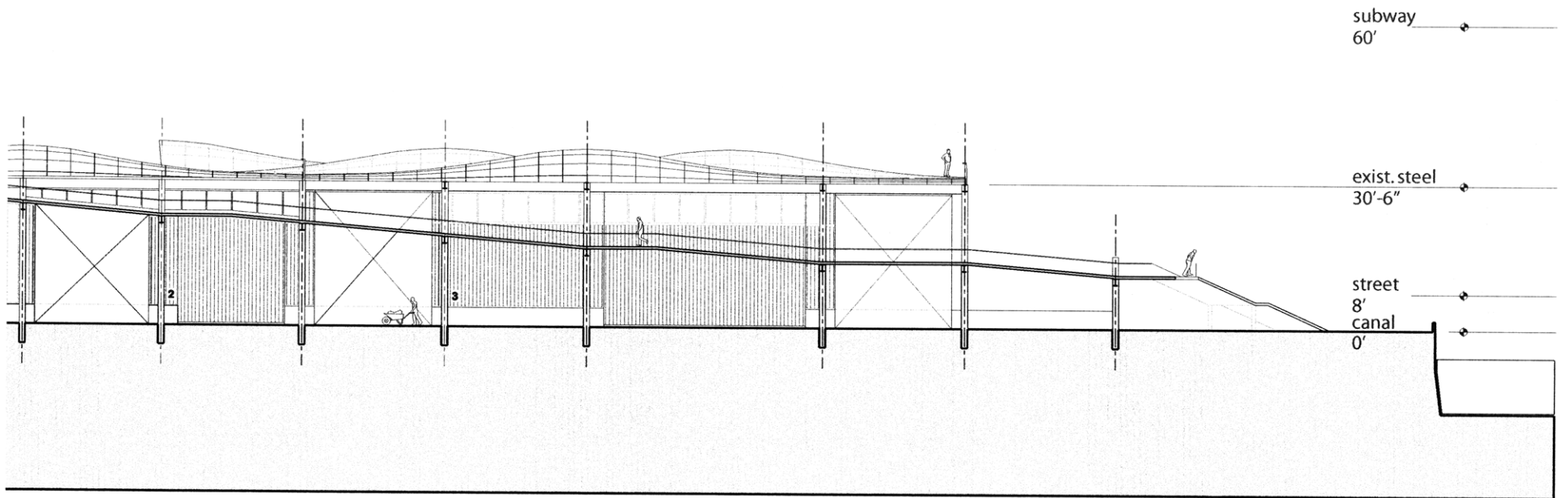
ground floor plan [enlarged]

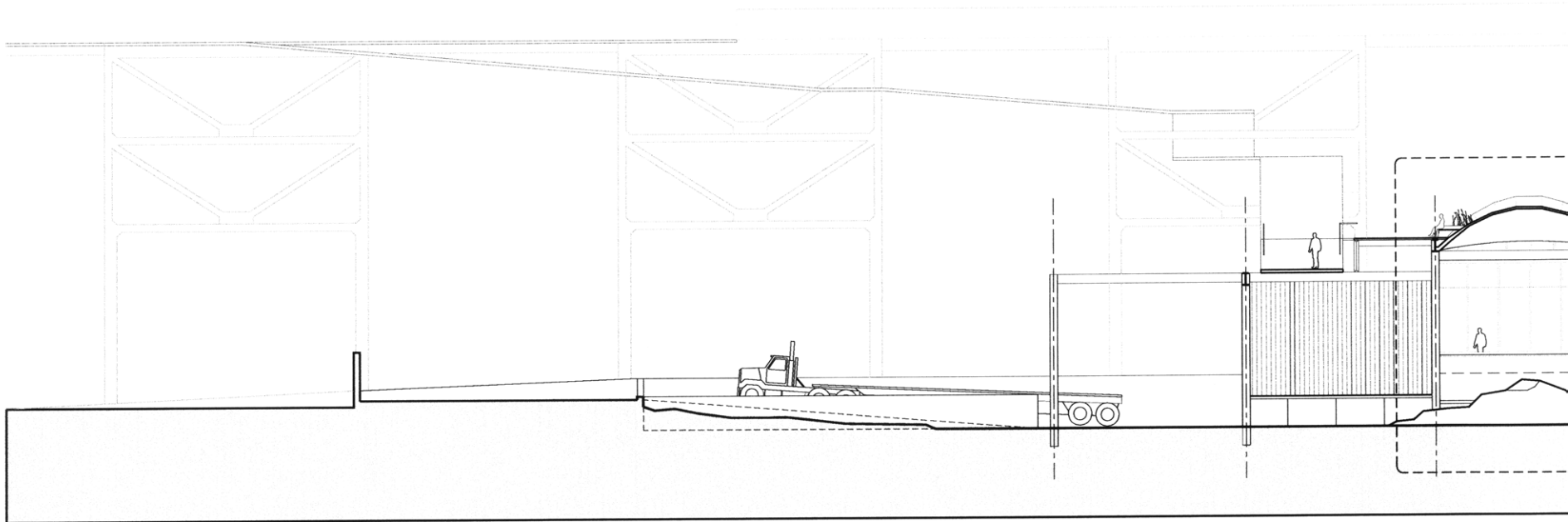


roof plan [enlarged]

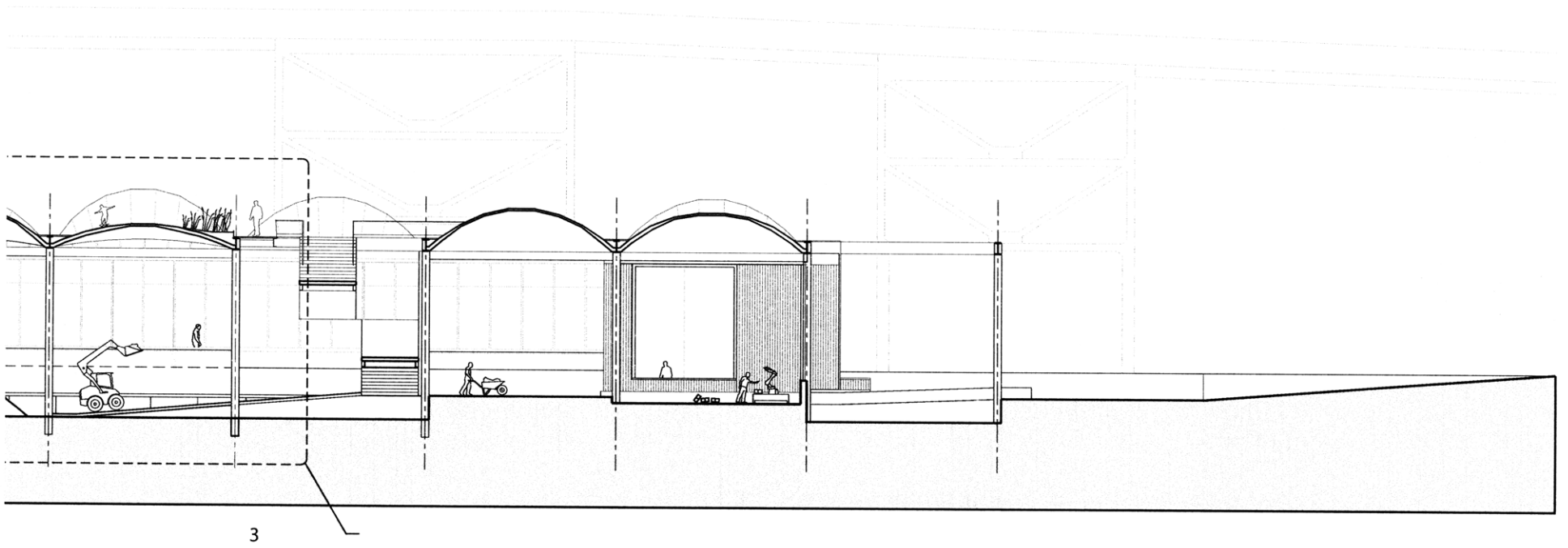


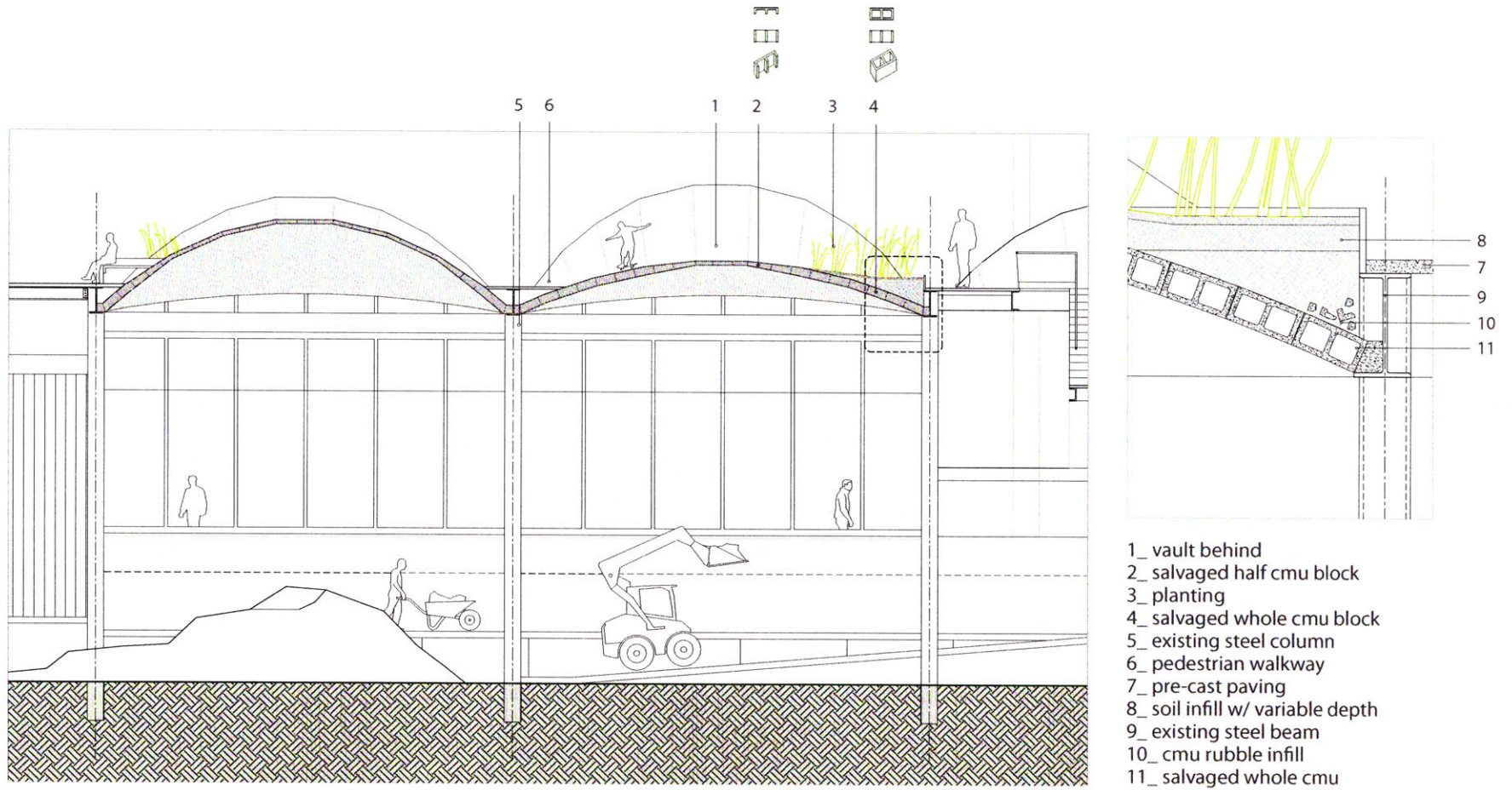
1_building section _ longitudinal



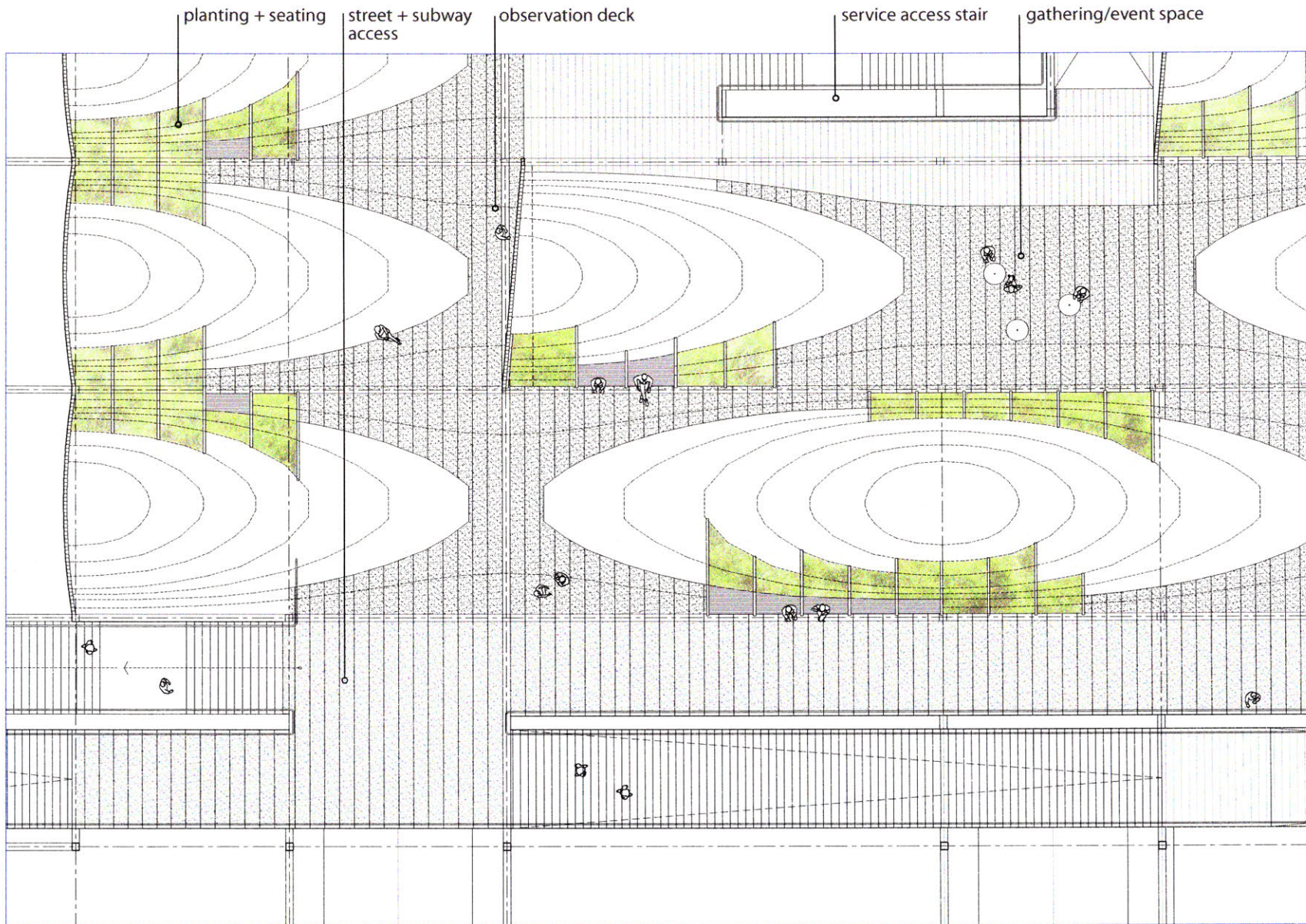


2_ building section _ transverse

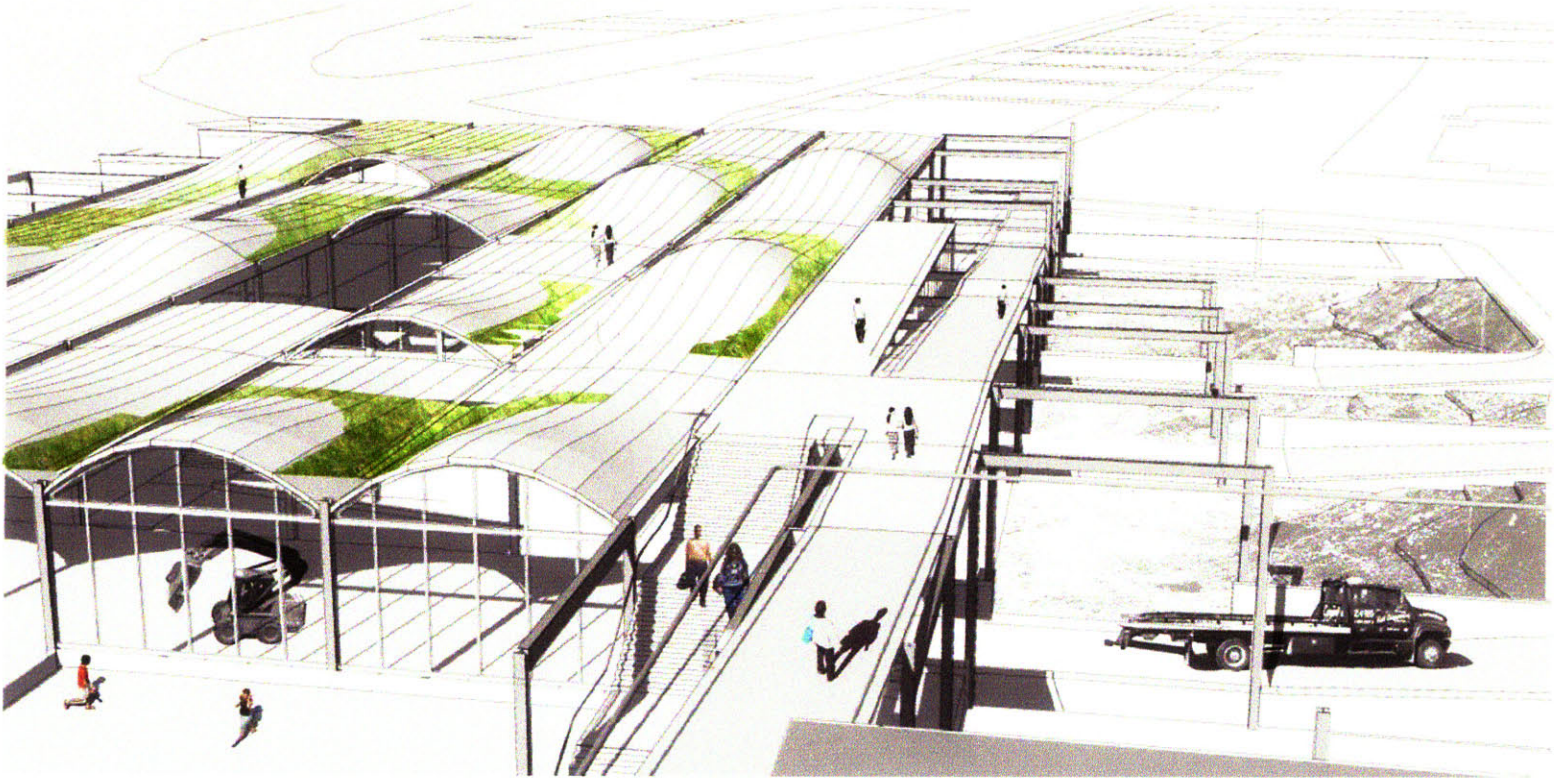




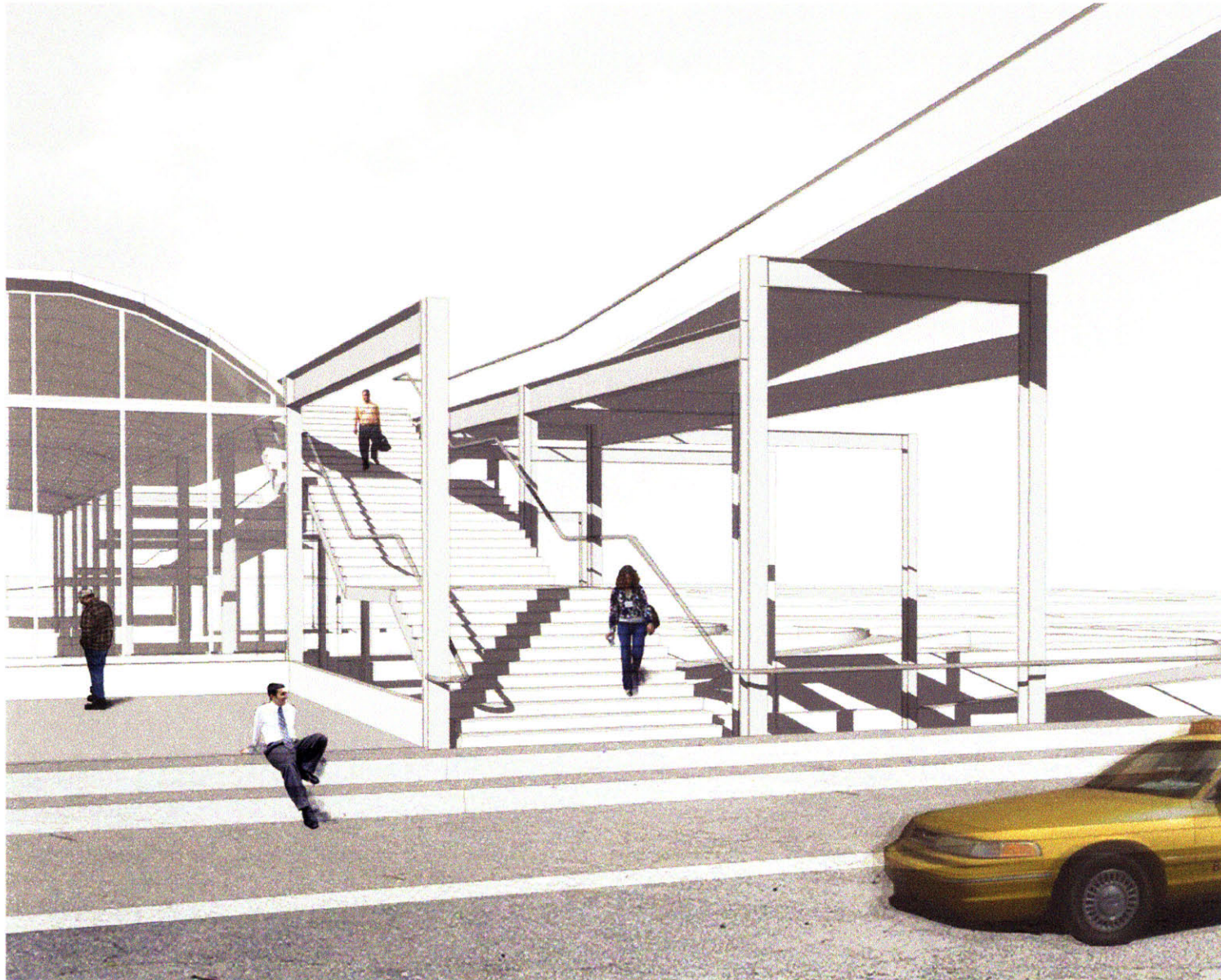
3_ building section and vault construction detail



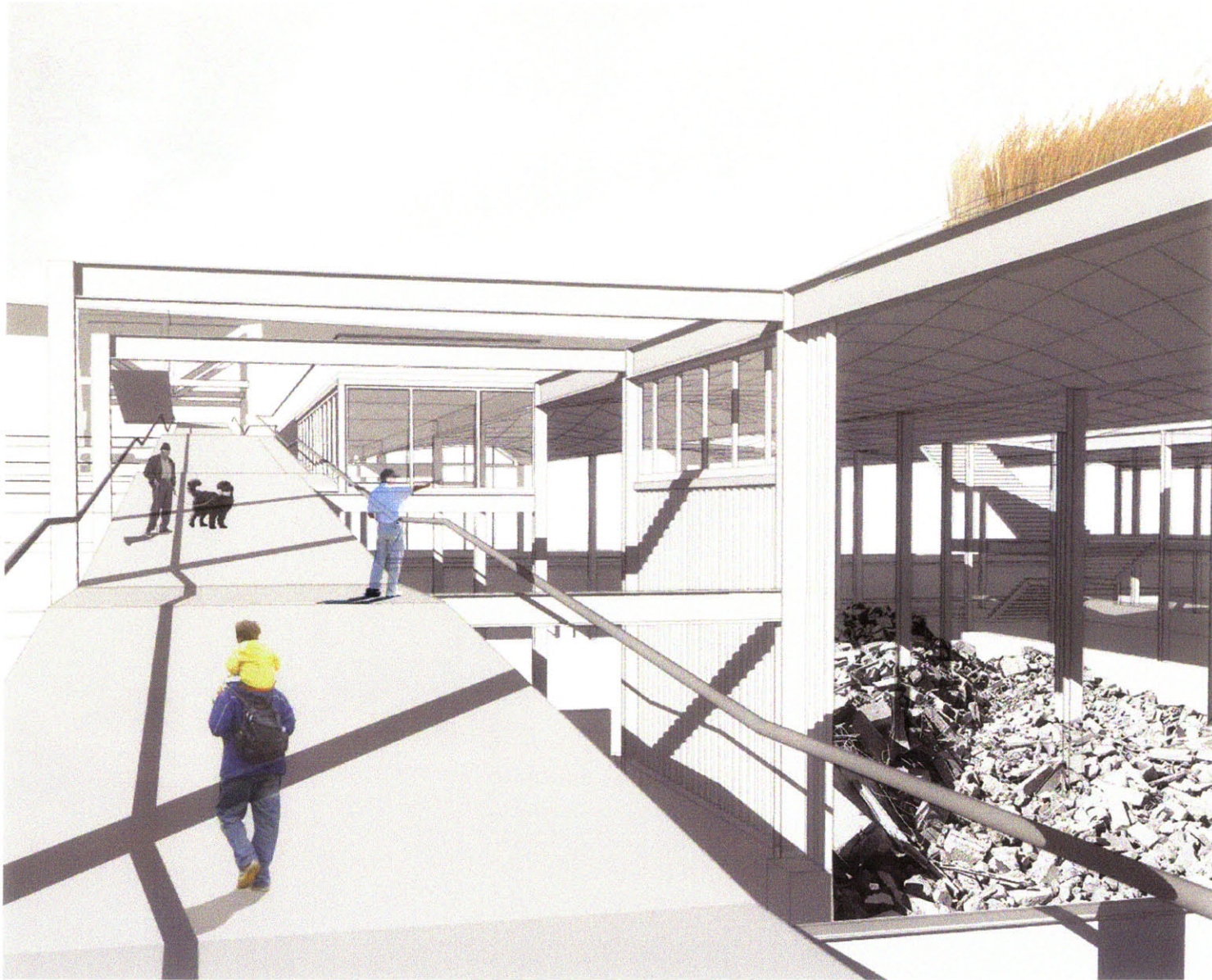
A_ roof plan detail



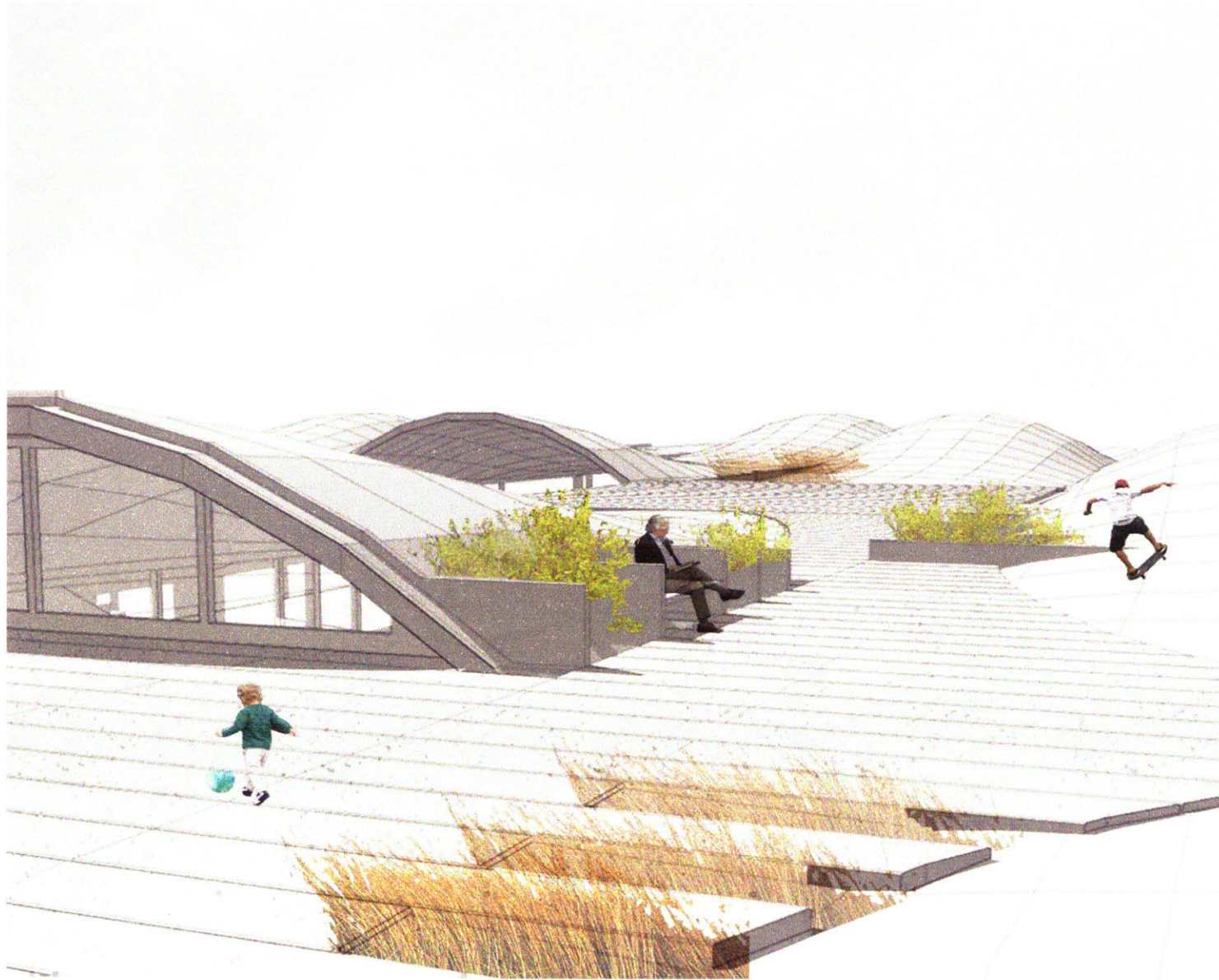
view of roofscape from subway platform



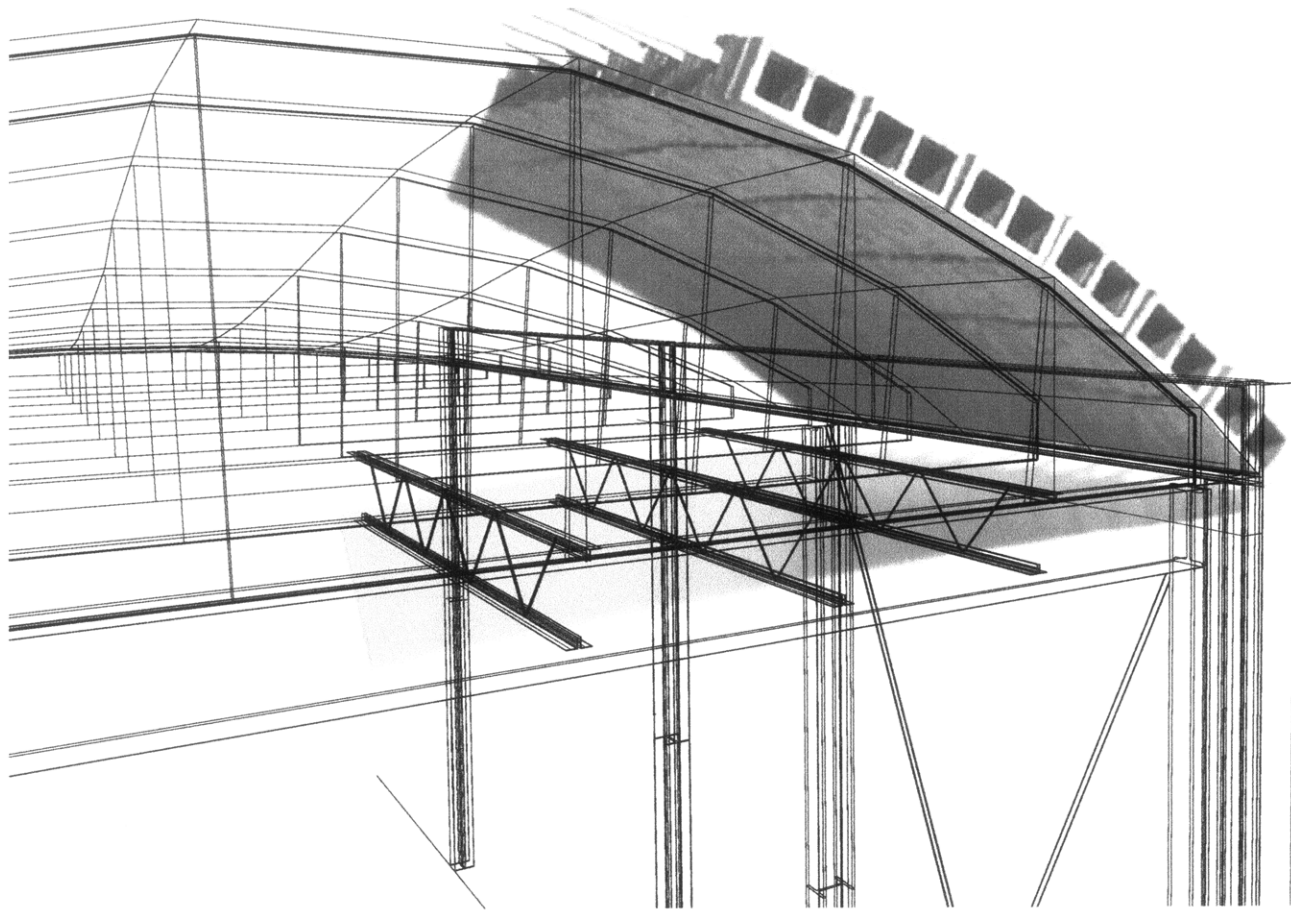
public access stair to street



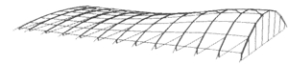
public access ramp connecting canal edge and roofscape



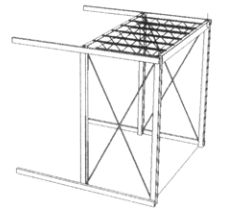
vaulted roofscape



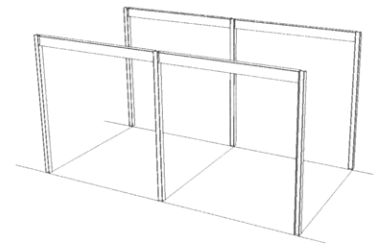
masonry vault construction



plywood vault formwork

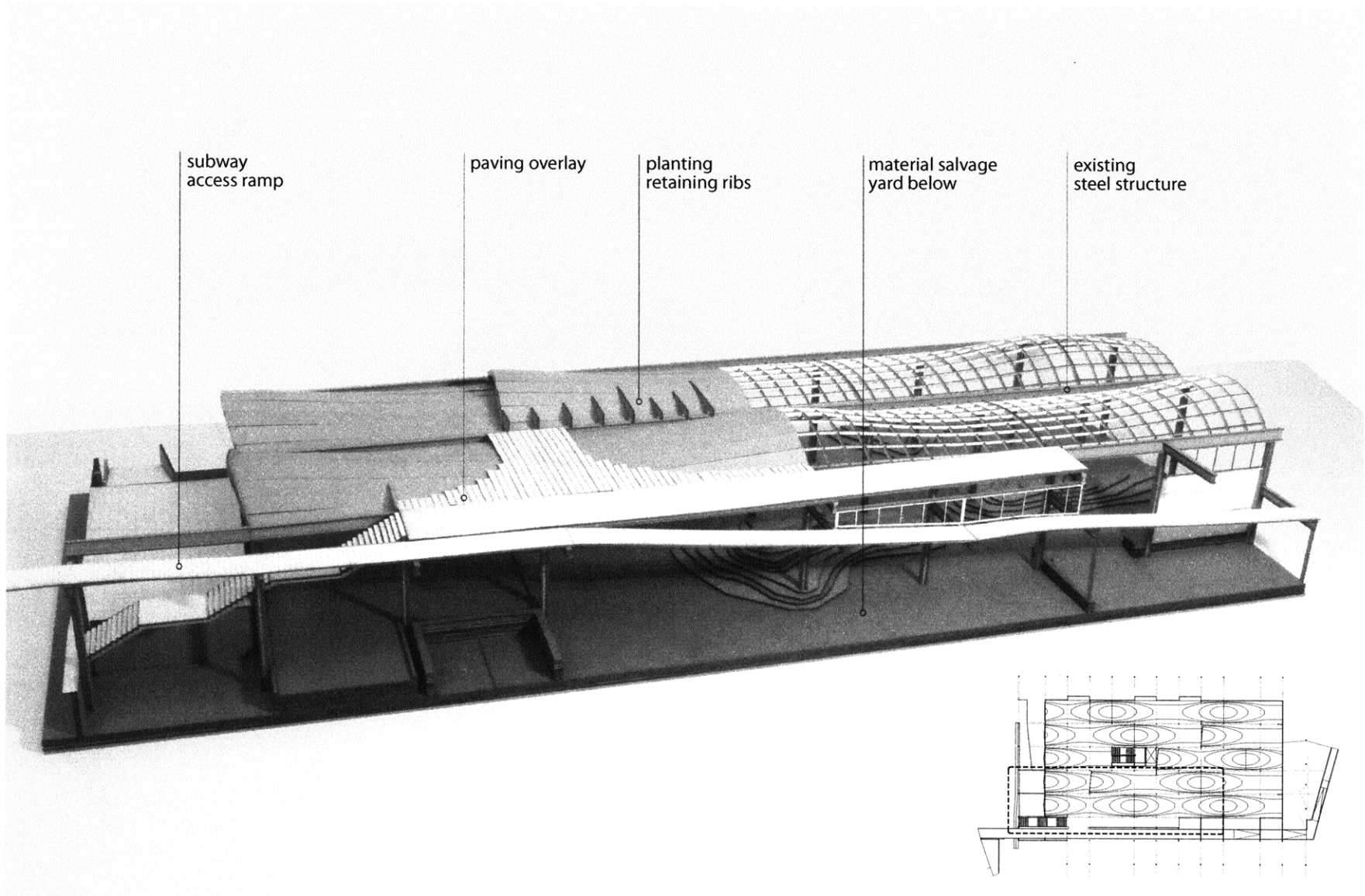


moveable salvaged steel staging

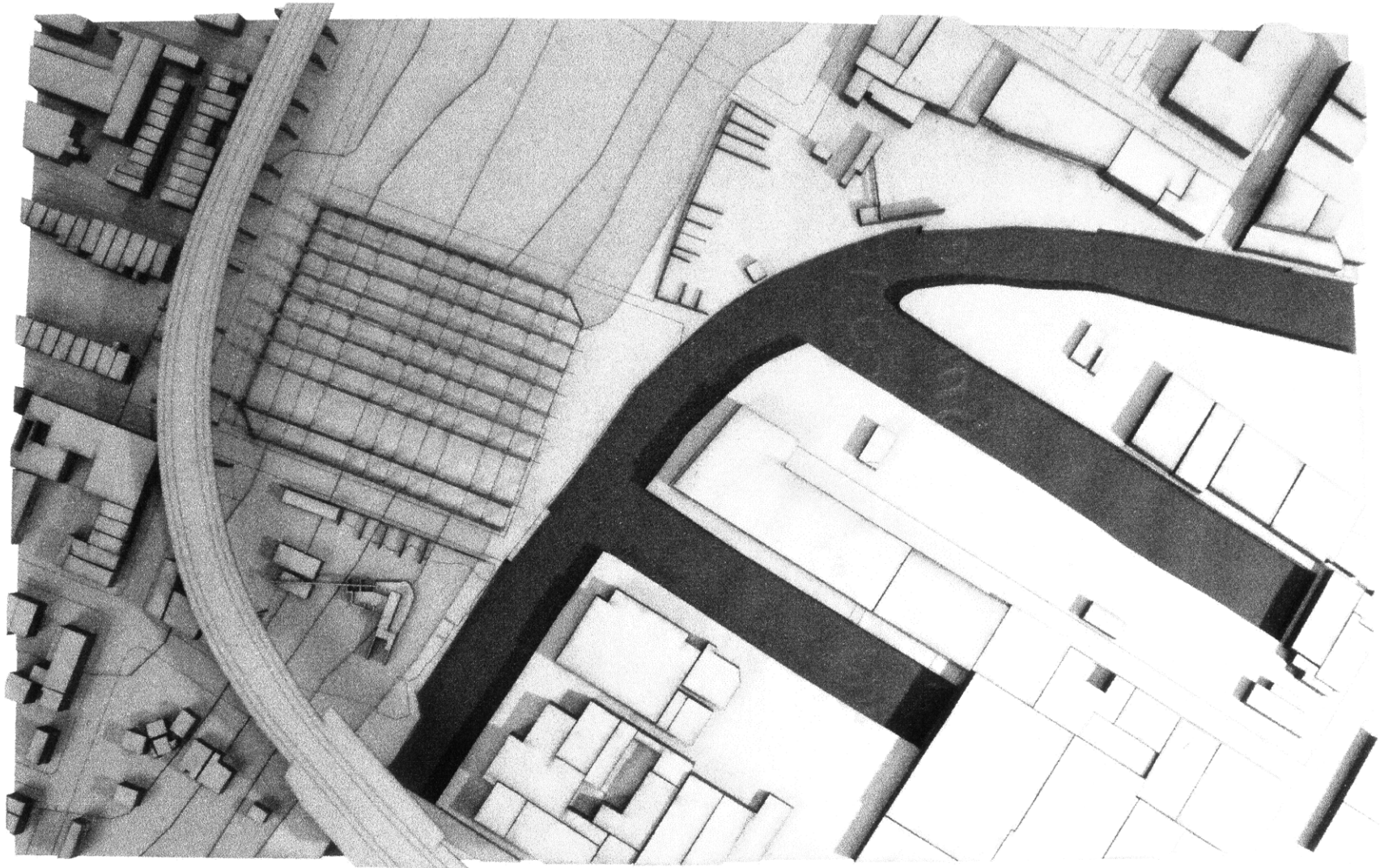


existing steel structure

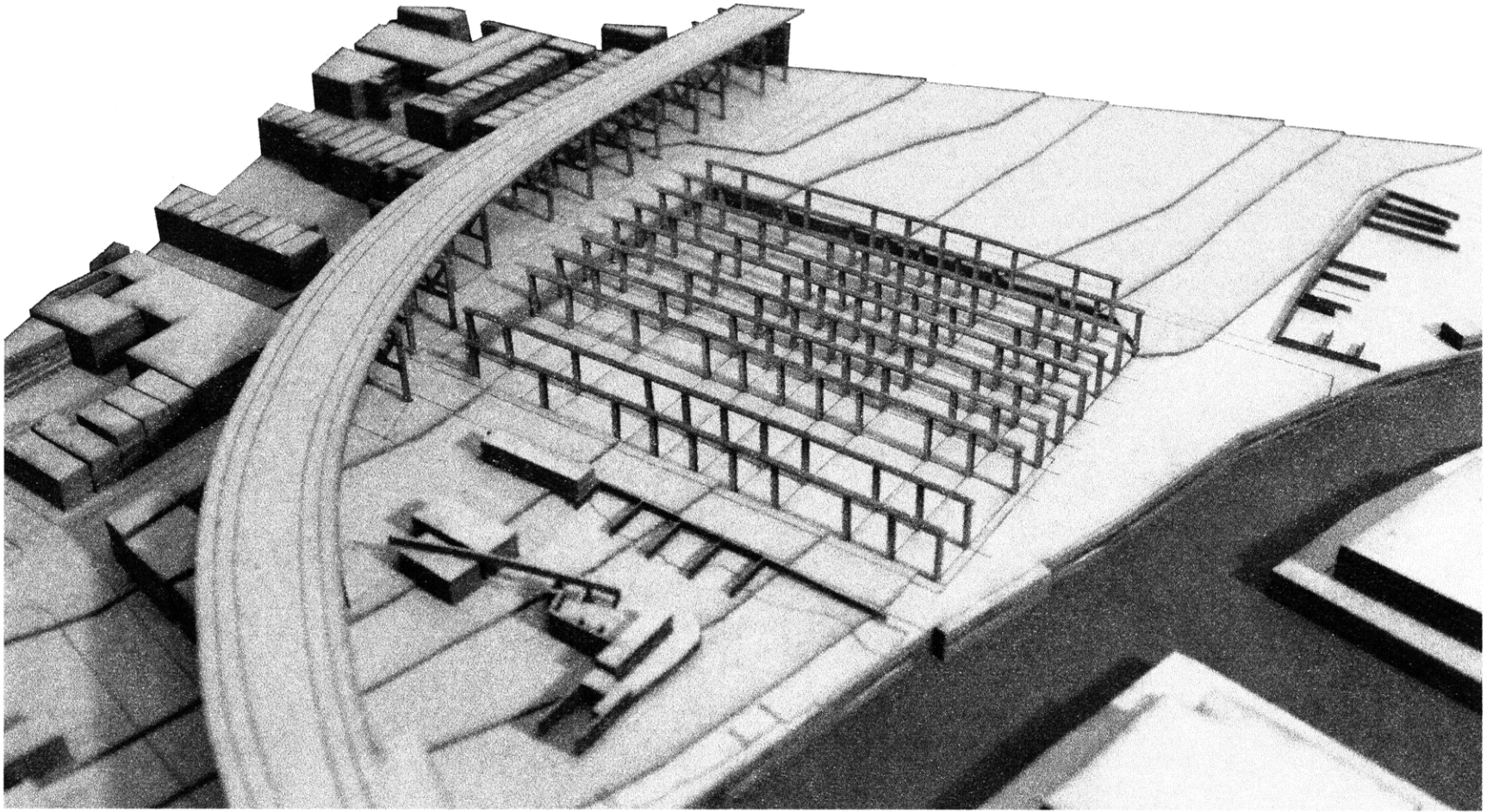
vault construction formwork



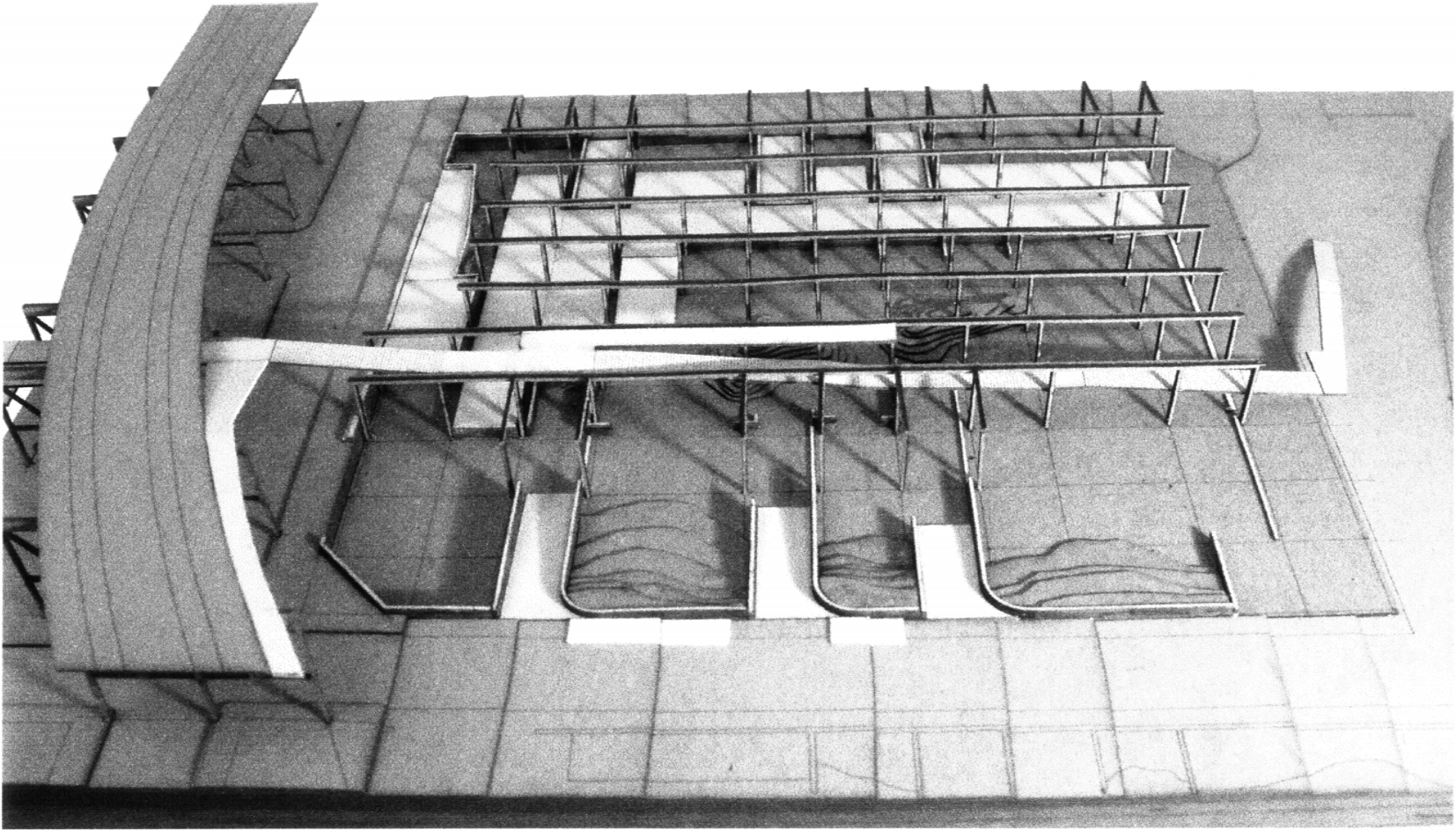
sectional model _ scale 1/8"=1'



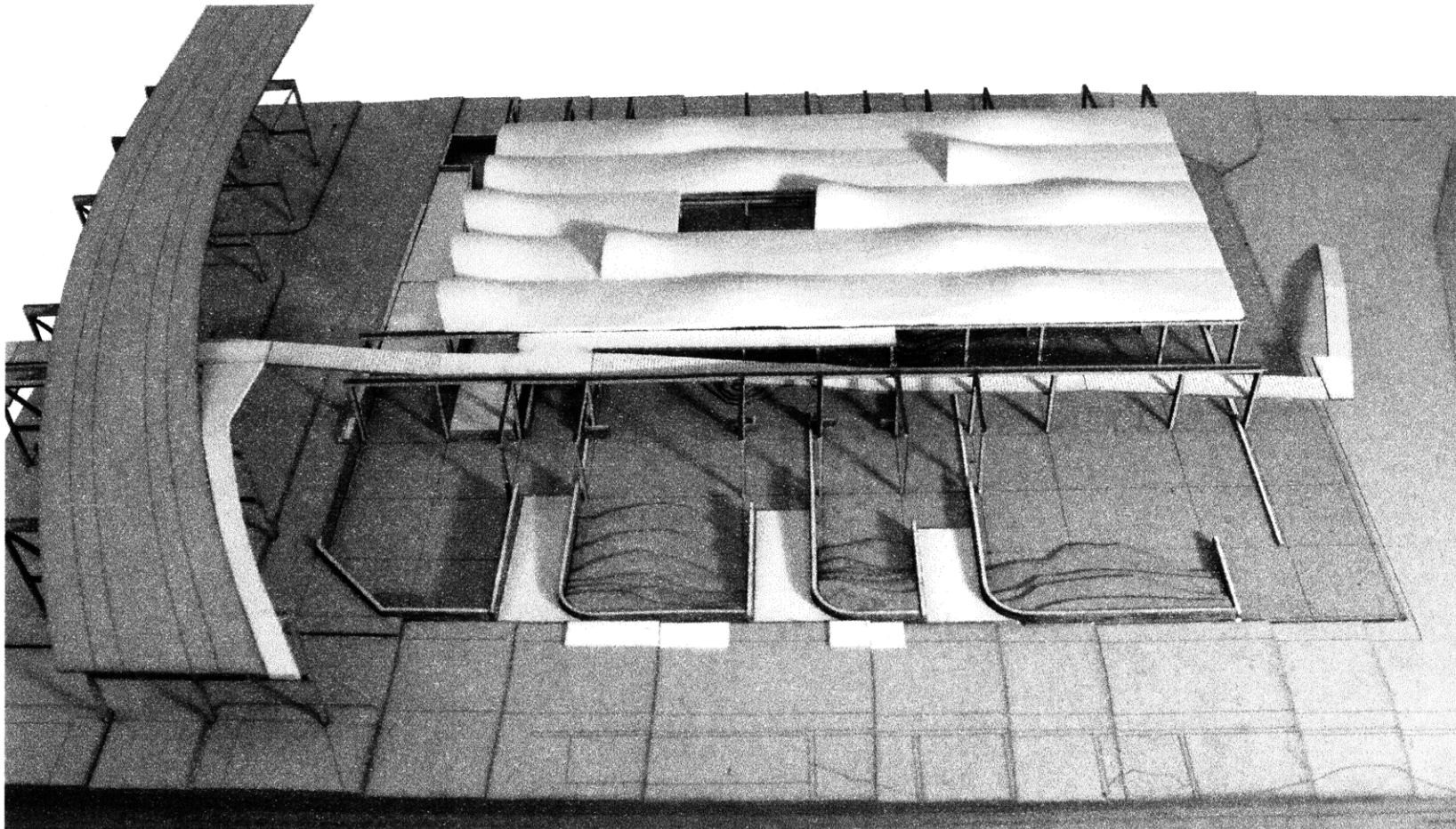
site model - existing conditions _ scale: 1:500



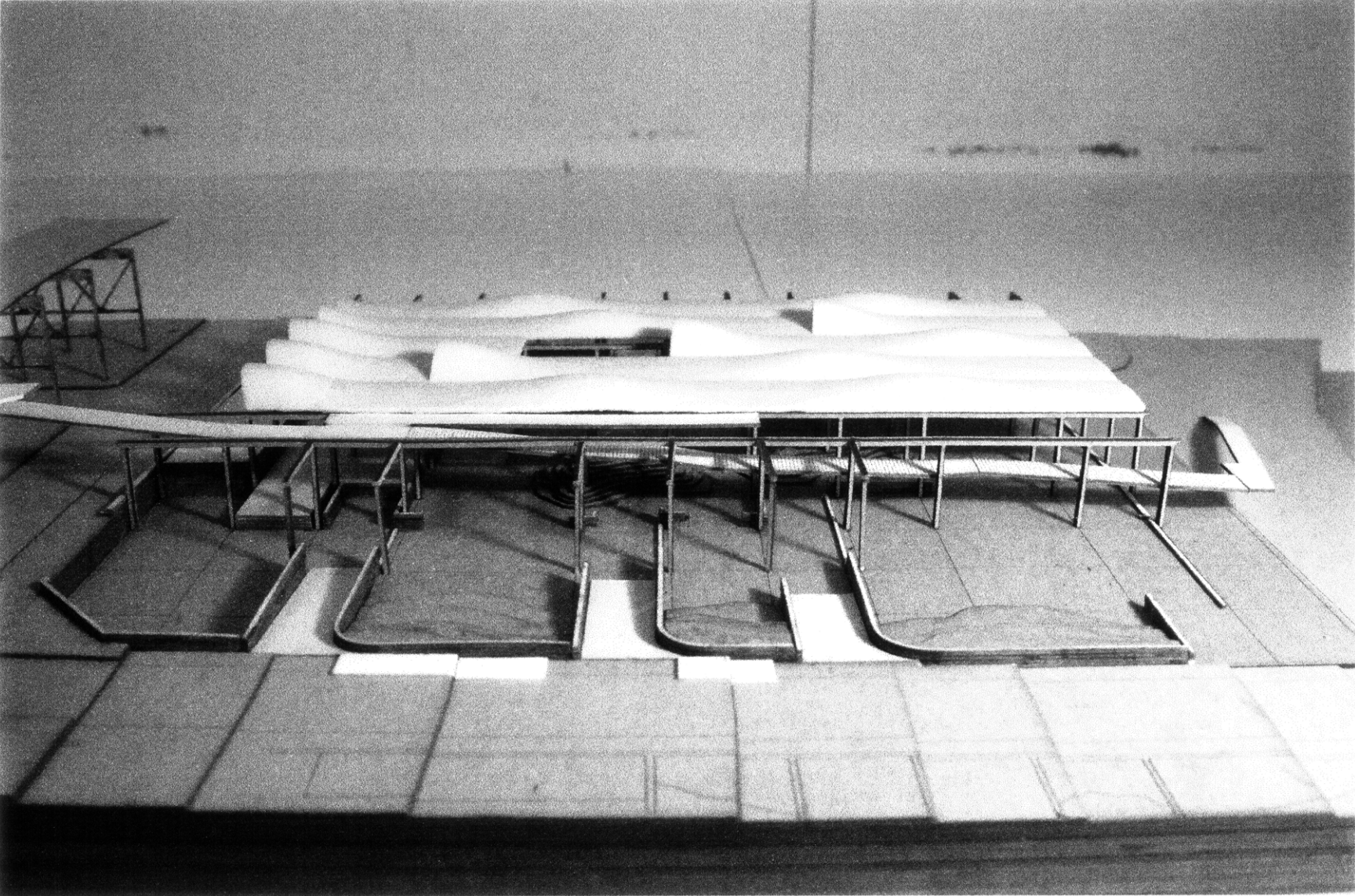
site model - existing conditions _ scale: 1:500



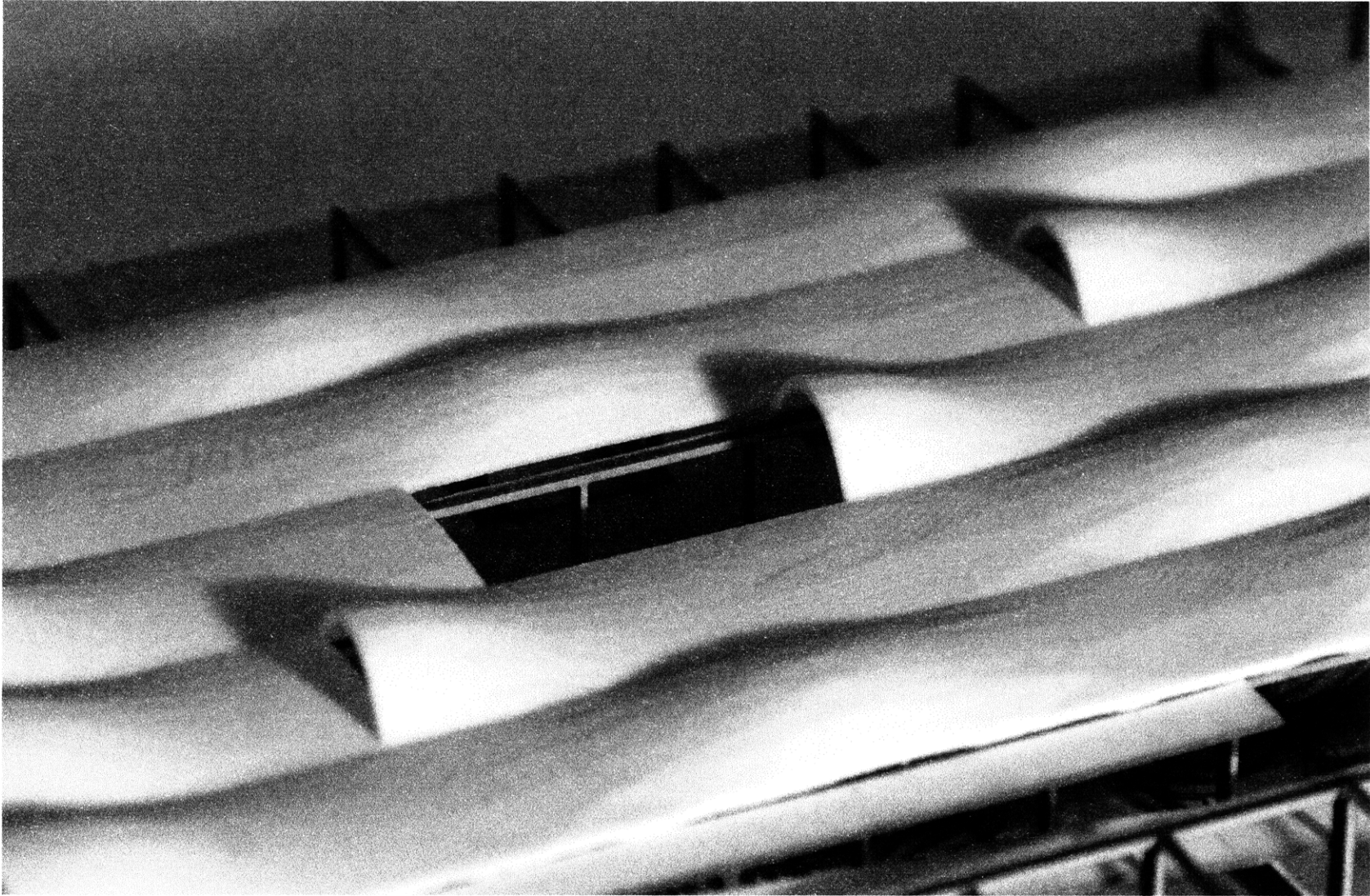
building model - ground floor _ scale: 1/32"=1'



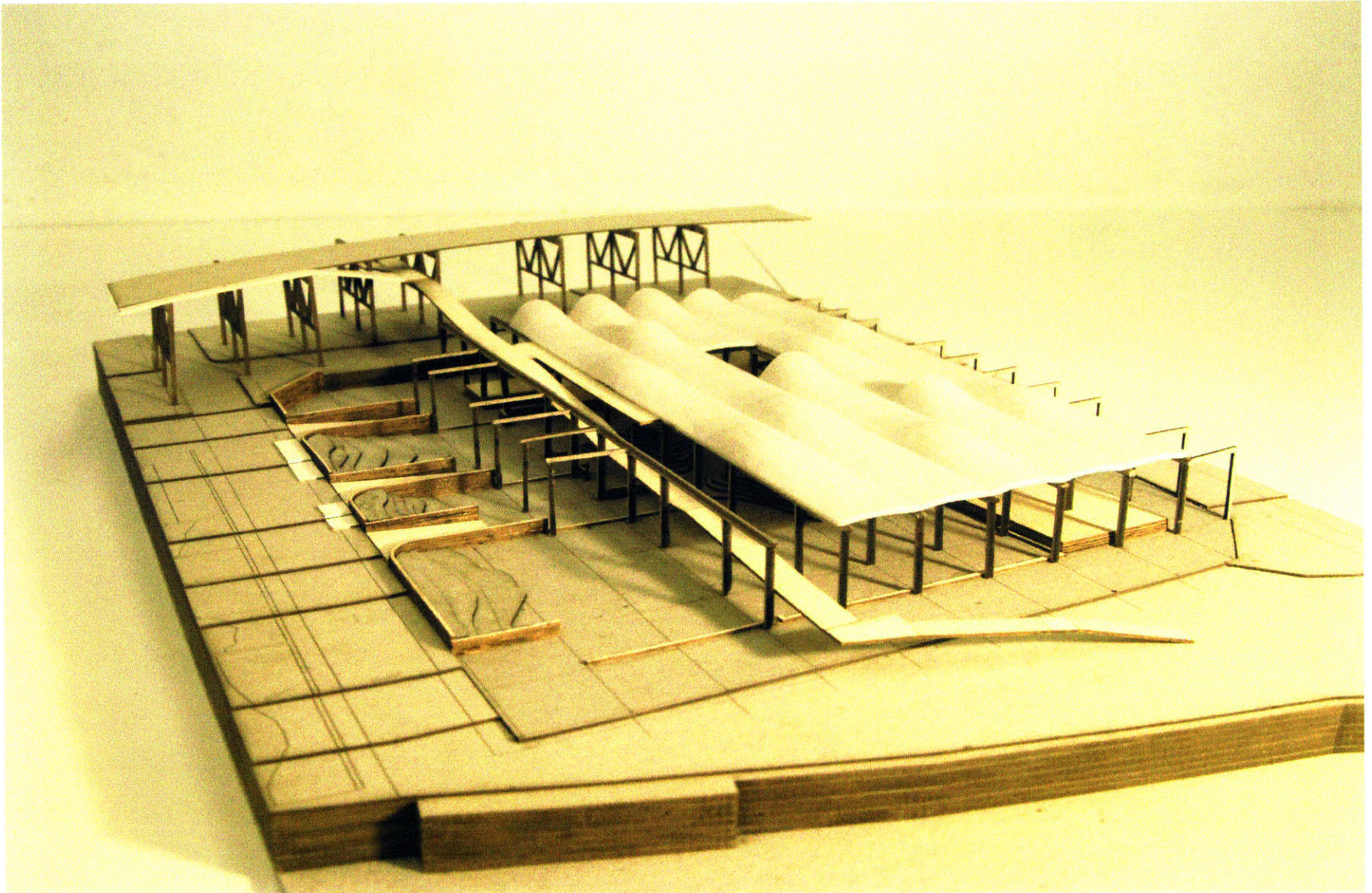
building model - roof _ scale: 1/32"=1'



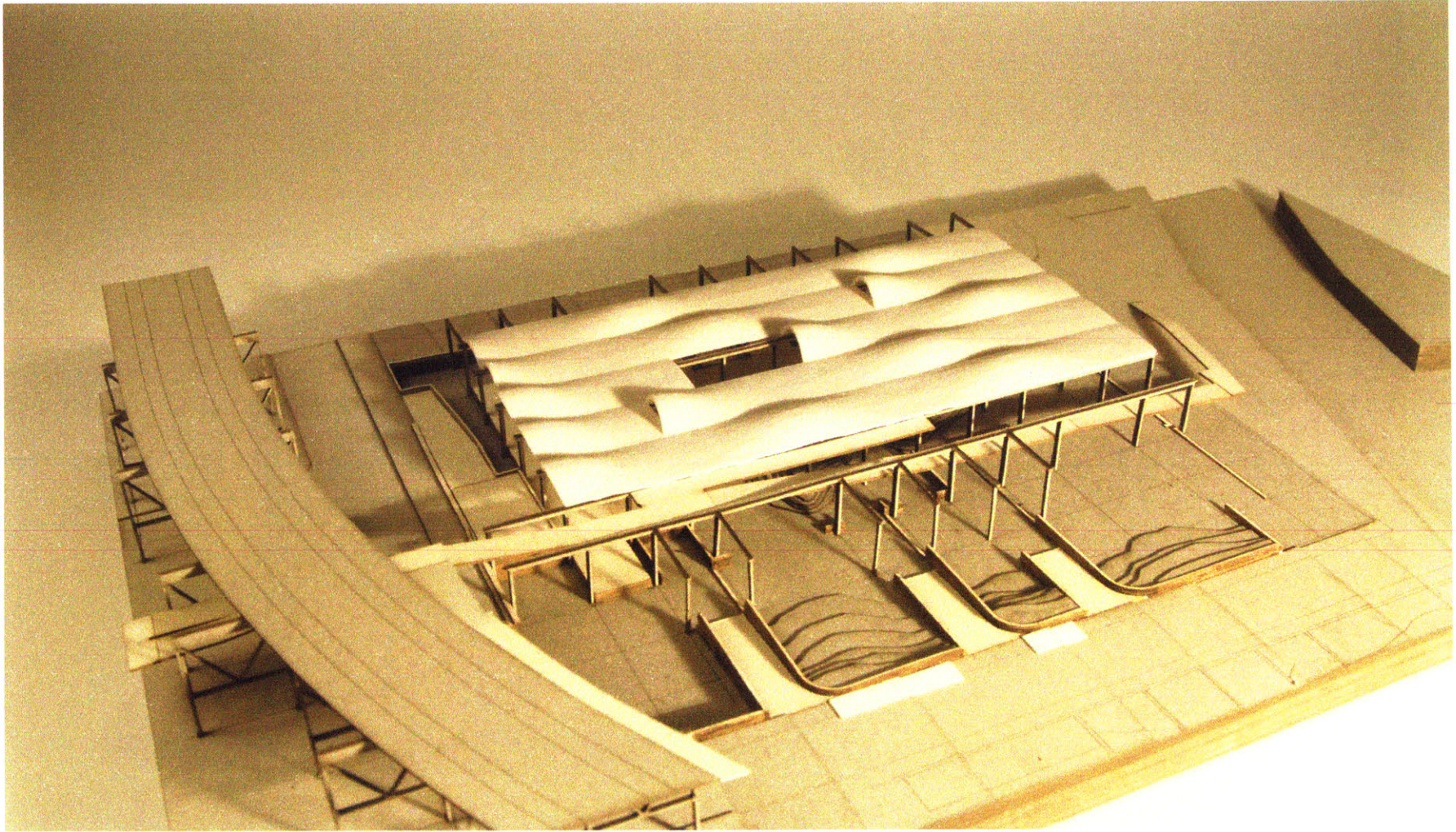
building model - south elevation _ scale: 1/32"=1'



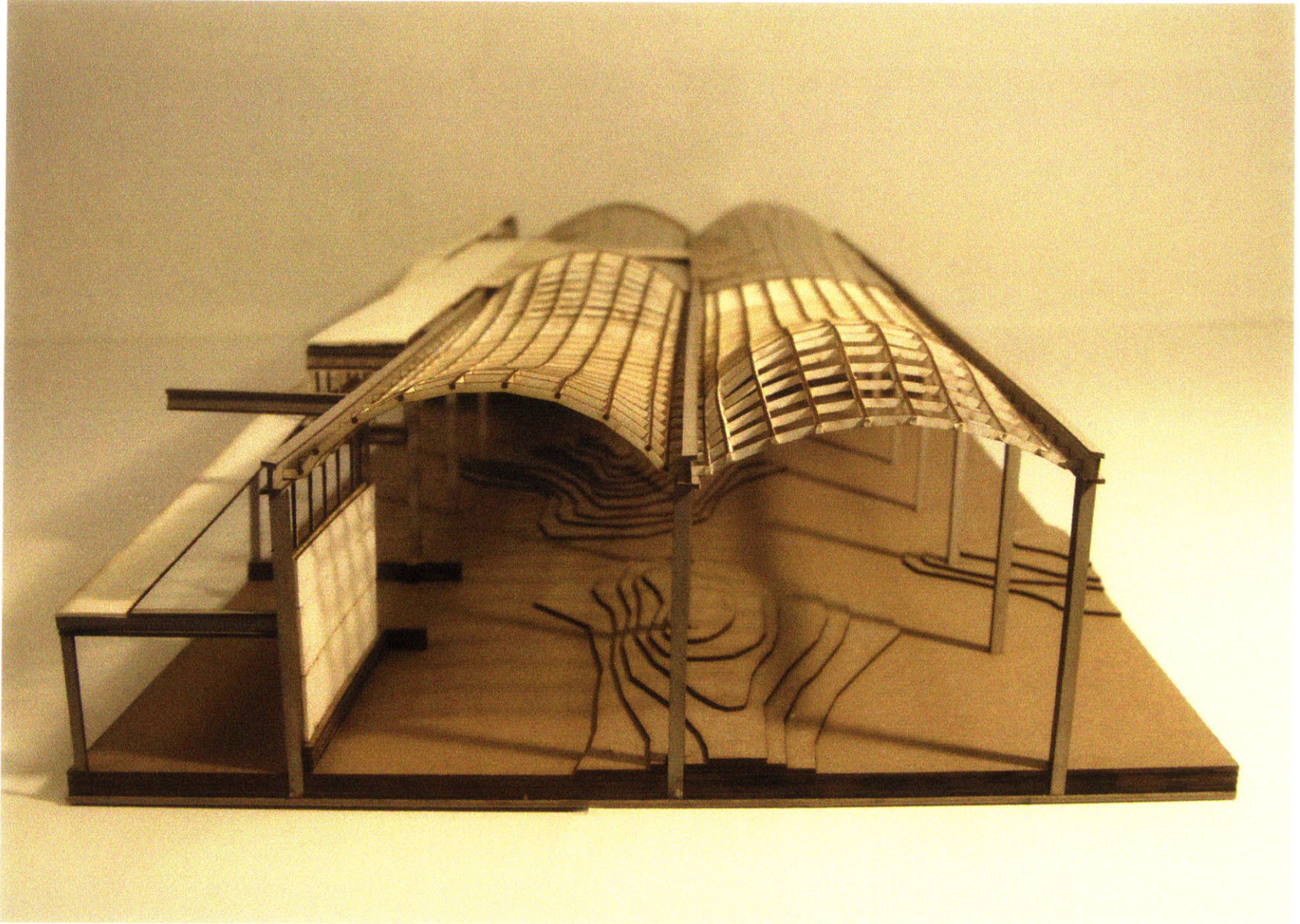
building model - vault detail _ scale: 1/32"=1'



building model - view from canal _ scale: 1/32"=1'

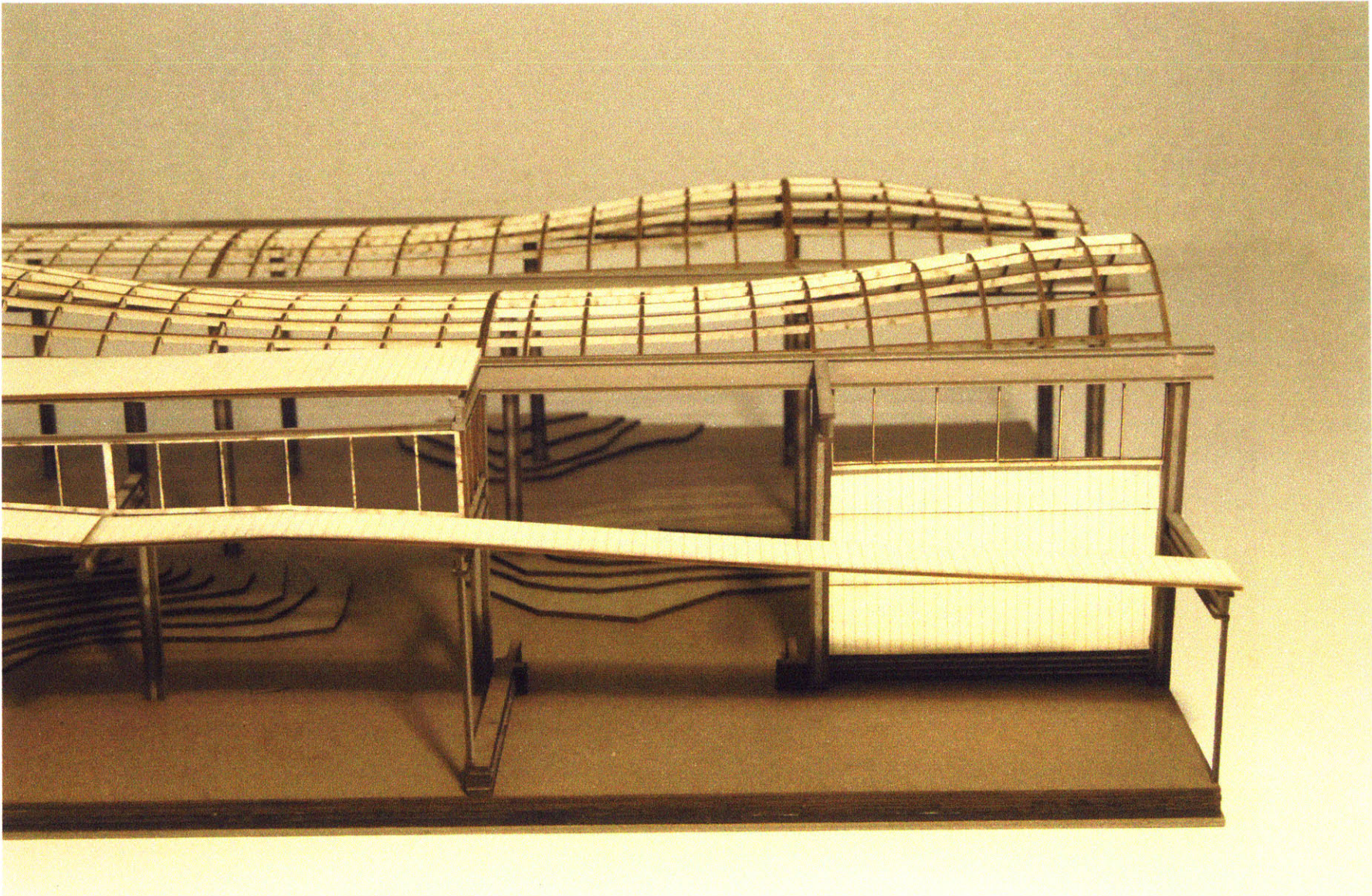


building model _ scale: 1/32"=1'

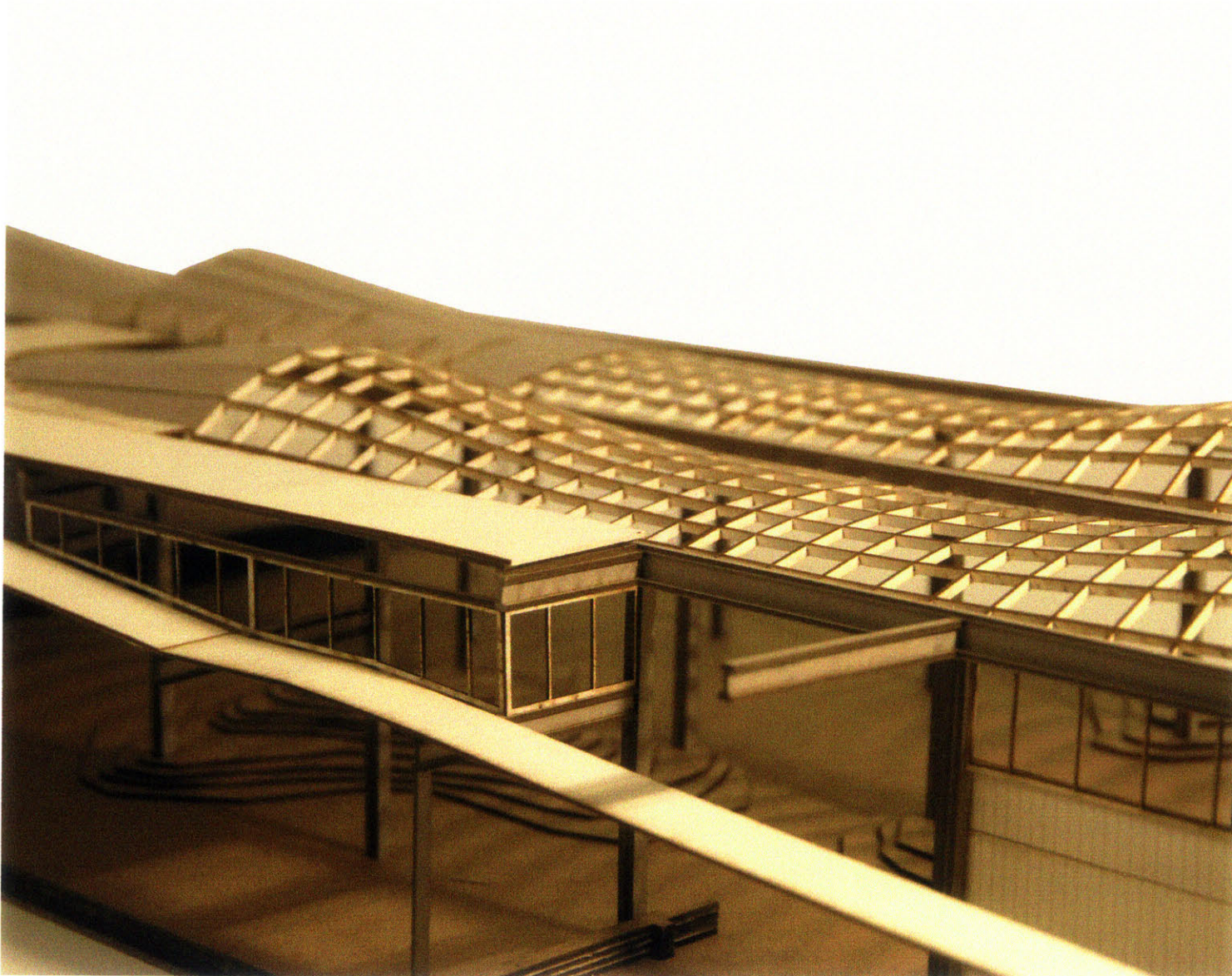


sectional model _ scale: 1/8"=1'

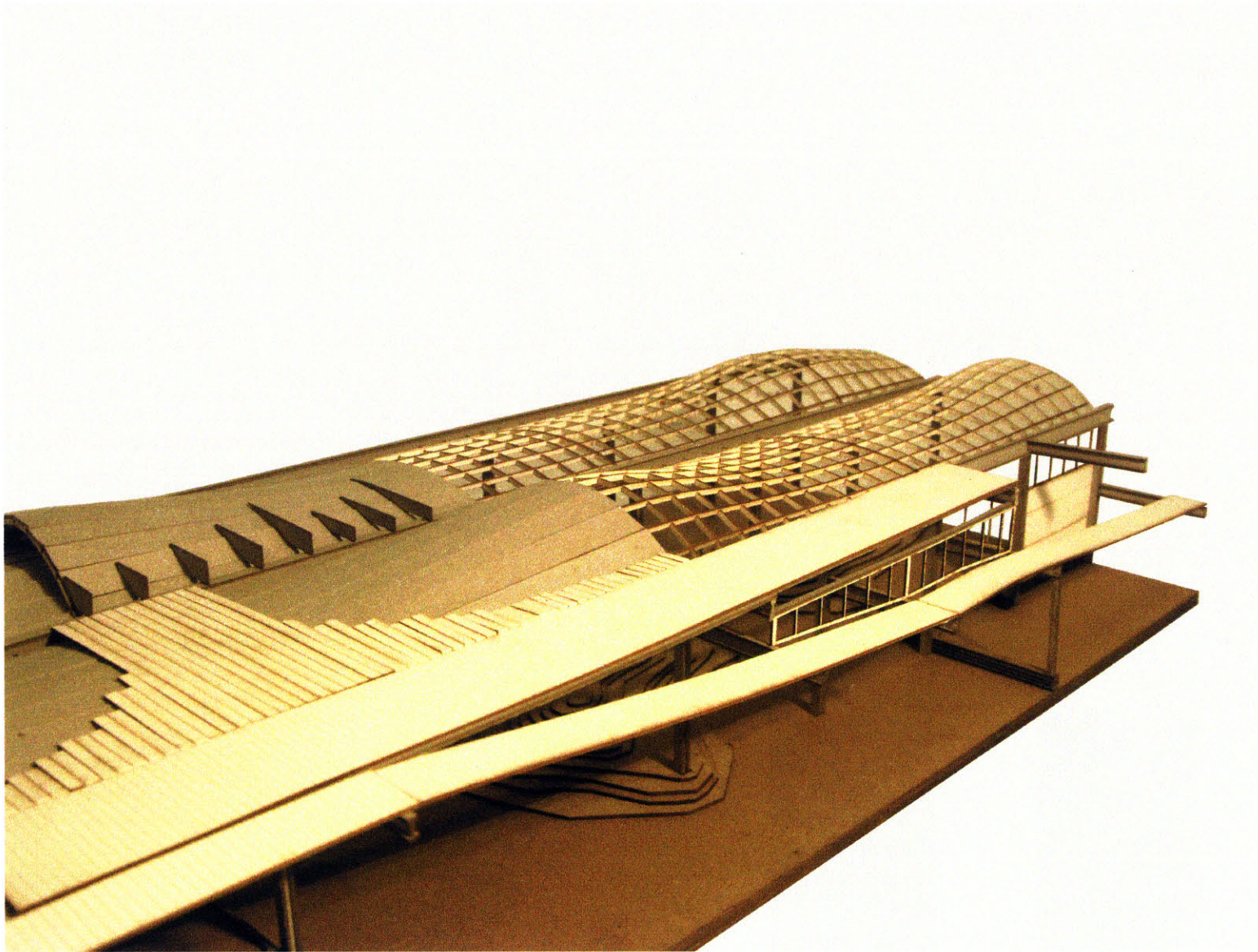
| proposal |



sectional model _ scale 1/8"=1'



sectional model _ scale: 1/8"=1'

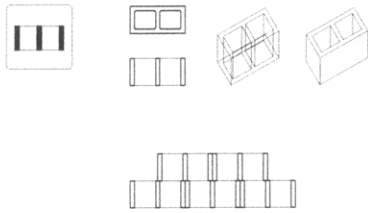


sectional model _ scale 1/8"=1'

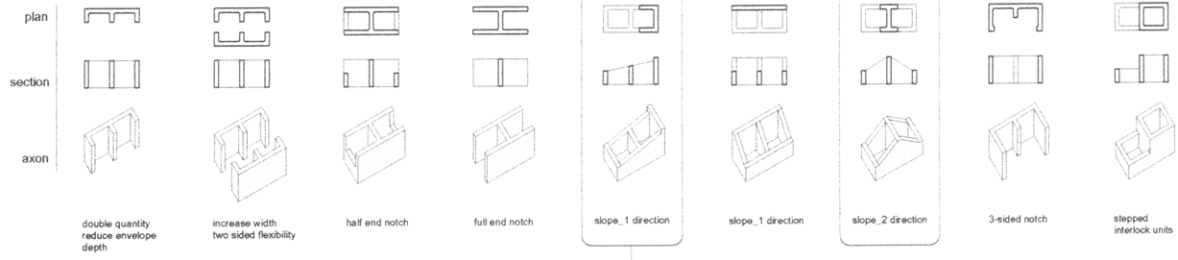
material transformations

cmu

EXISTING

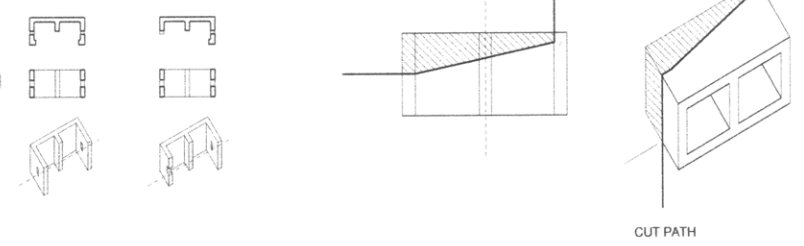
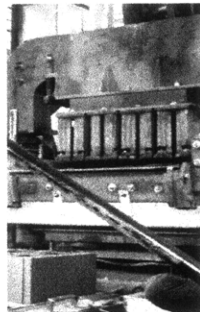
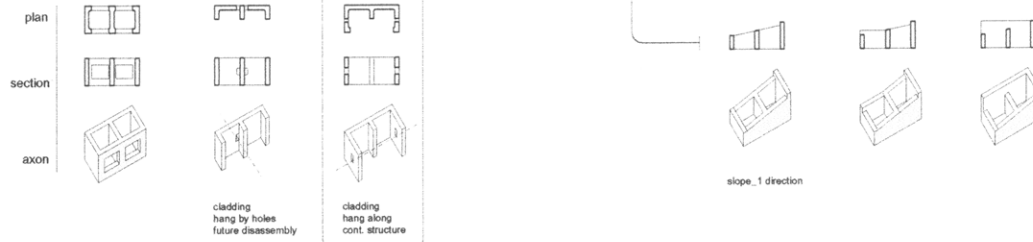


CUT



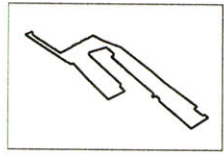
>>

cut + DRILL

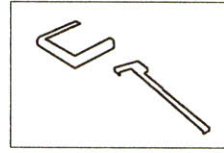


CUT PATH

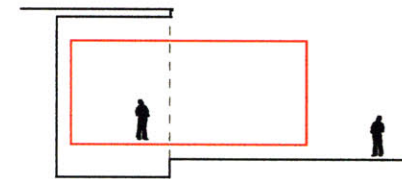
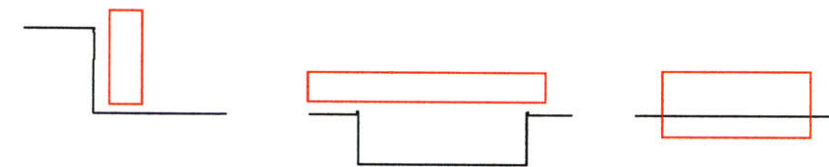
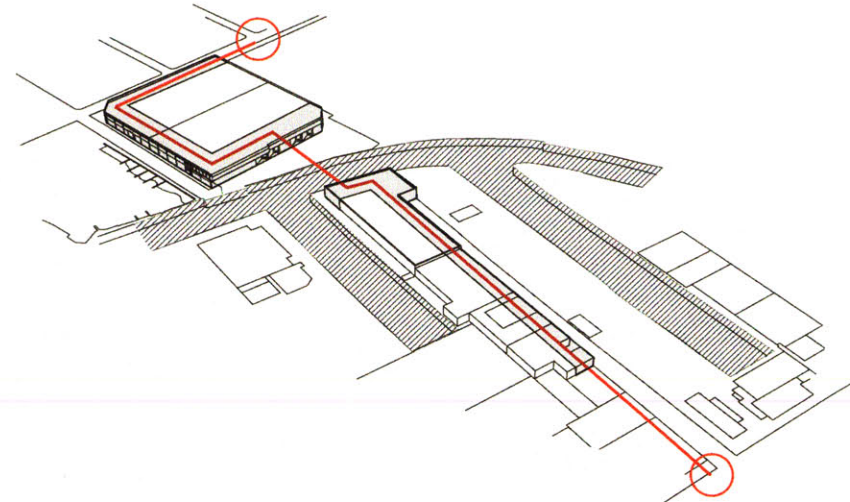
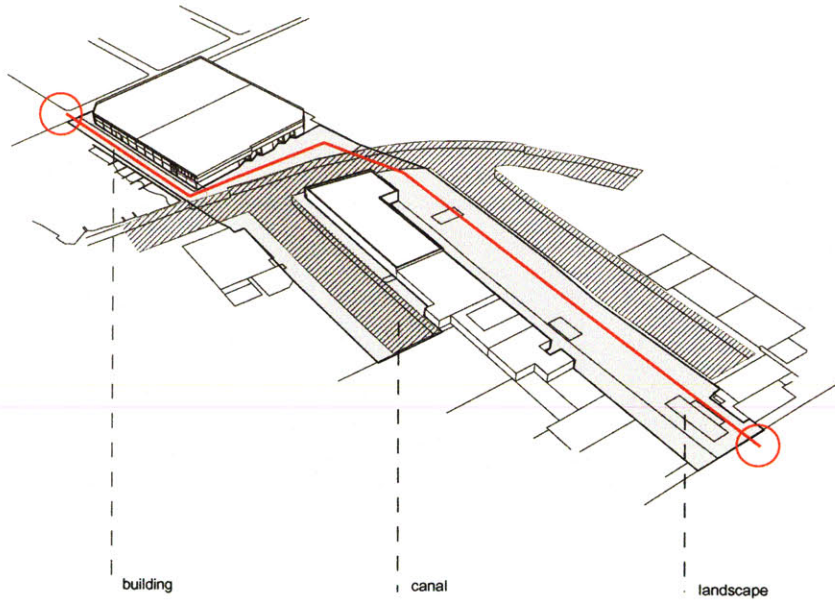
design process _ cmu material tooling studies



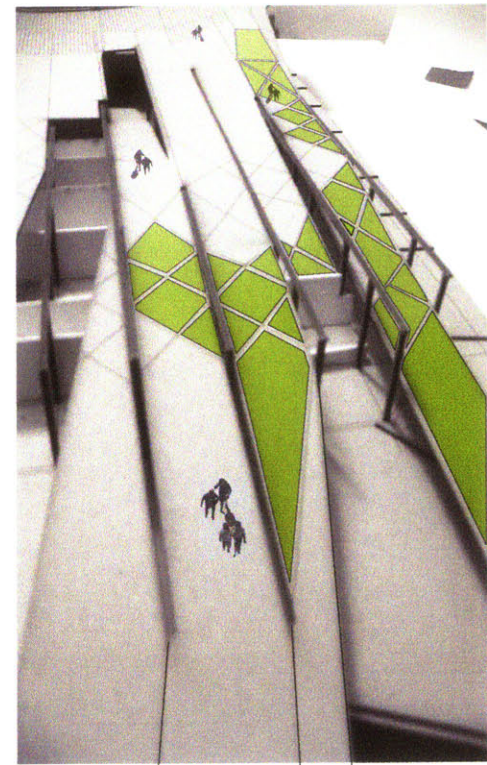
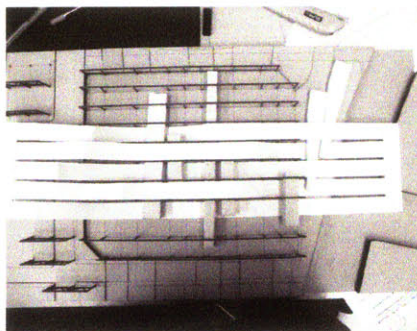
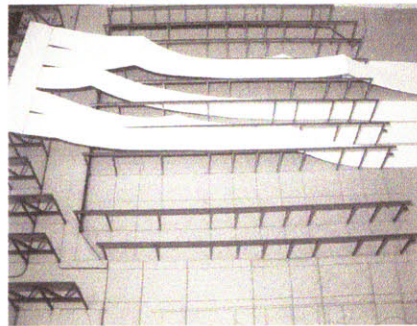
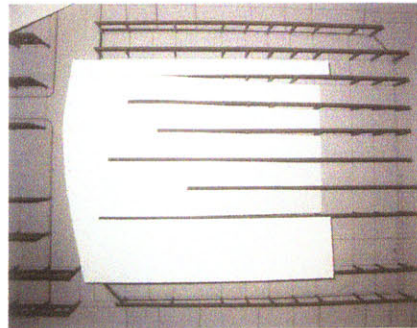
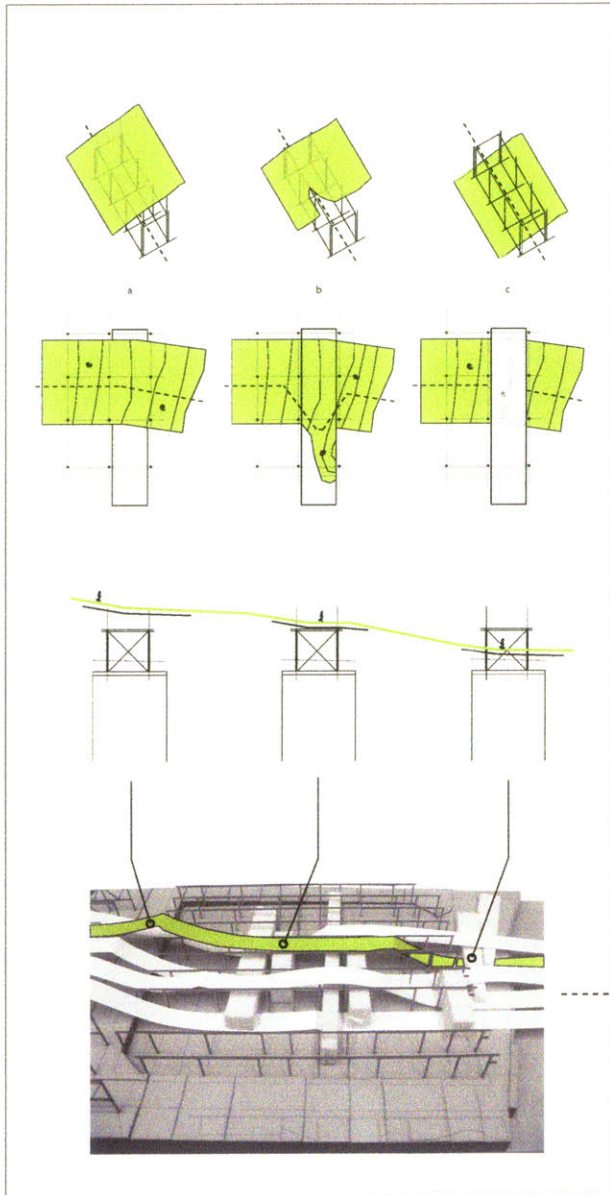
EDGE ACCESS



ENVELOPE



INCREMENTAL SITE INSERTIONS



design process _ formal studies of weaving new program and existing structure

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<http://www.gowanus.org>. Gowanus Canal Community Development Corporation

http://www.brooklyncb6.org/neighborhoods/?a=detail&content_id=58. Brooklyn Community Board 6 - Neighborhoods.