# THE LIVE-WORK FACTORY

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# The Live-Work Factory

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**The Group's Vision:**

The industrial waterfront of Clinton Piers emerges as a site with potentials for development based from the initial site research. Despite its current industrial condition, the area possesses large potentiality in becoming an asset of Hell's Kitchen as seen in the proliferation of newer residential developments in the Northern end of the industrial blocks (fig.1). However, the area is still occupied predominantly by low-rise industries, forming a linear north-south industrial row through the entirety of the study area. Regardless of the proximity to the Hudson River, pedestrian accessibility is limited due to the intersecting nine-lanes highway, which formed a physical boundary that separates the city from its western waterfront. (fig.10.1)

The collective vision for the study area includes the idea of (re) connecting midtown with the waterfront through several strategies such as proposing new metro lines as well as the injection of public programs which could attract New York residents through the addition of public activities. Densification of industrial blocks also foster programmatic links with the city center and utilize the low-density nature of the area. Hence, the 'live-work typology' is also a part of this collective goal of densification, responding to New York's housing needs and expected population rise[1] , as well as facilitating for the global changing mode of work, which shifted from the setting of traditional offices to more flexible, mixed-use settings.

From the collective group's vision, the proposed strategies are highlighted in several locations, mostly occupying western-most waterfront of Hell's Kitchen. While many projects focus on revitalizing the piers through the addition of pubic programs and improving the accessibility, several projects allocated themselves along the industrial blocks and act as attracting nodes, contributing to the overall scheme of waterfront reactivation.

**Site Specification:**

The chosen site for the proposal of the live-work typology located at the northern edge of the Clinton Piers, situated in between West 58th Street and West 59th Street (fig.10.2). The site contains an existing building, the IRT Powerhouse, a functioning industrial heritage currently in-use as a steam production plant of ConEdison, the largest energy supplier of New York. The site is uniquely positioned in an area of a threshold between new residential developments, as exemplified by its neighbors like Via57West, and the industrial infrastructures such as storage and parking, which dominated the entire strip of blocks Moreover, its proximity to one of the proposed linear connections (fig.10.3) to midtown on West 57th Street, links the site to important nodes such as the 57th Street Metro Station and Carnegie Hall. Additionally, the site also possesses connections to both, the highway on 12th Avenue and the Hudson River, with Pier 98 being owned by the same company as the powerhouse[2] . The location of the chosen site, therefore, becomes a linking node, connecting midtown with the group's redeveloped waterfront.

Programmatically, the proposed site of the IRT Powerhouse is ideal as a live-work typology because of its setting. Locating amongst the new residential developments, which are homes to white-collar salary workers in the area, the proposed workplace in the live-work typology will not only serves the nearby office workers who are experiencing a change in the work landscape but also respond to the projected increase in New York's remote-working and freelancing culture[3] through the provision of workspaces. Furthermore, there are also a number of educational facilities in close proximity to the chosen site, most noticeably, John Jay College of Justice, hence, the provision of housing units will not only alleviate the housing need of the city but also doubled as student housing option for its immediate neighbors. The waterfront connection also suggests a logistical possibility, especially with the proposed additional 'industrial makerspace' for prototyping as part of the production sector of the overall live-work scheme. Therefore, the reserach question is consisted of two parts; *'how to create a live-work typology that responds to the changing landscape of work within an existing industrial heritage' and 'how can a mixed-use project engage with the public domain to reactivate the urban quality of a previously industrialized waterfront'*.

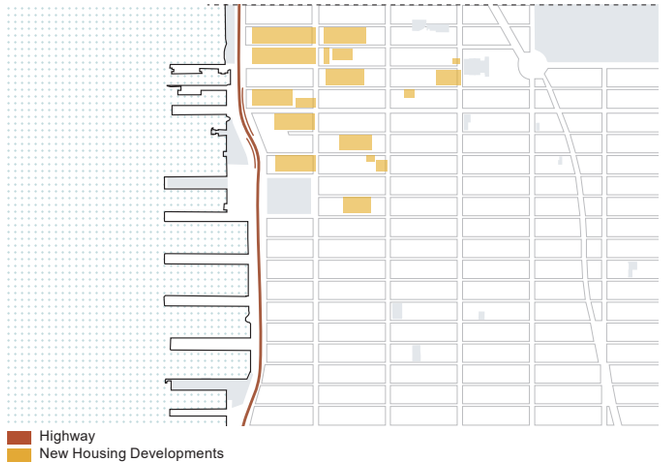



Fig.10.1. New Developments and Highway in the study area

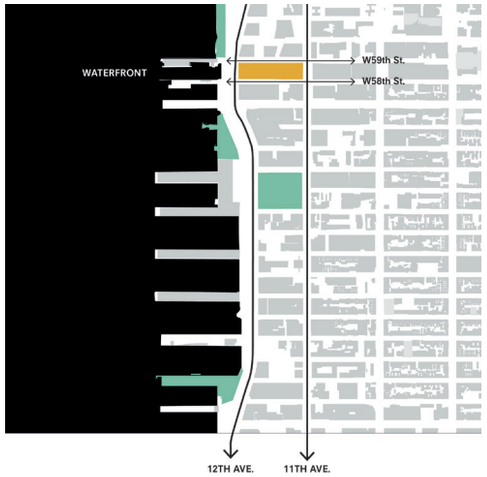



Fig.10.2. Chosen site; IRT Company Powerhouse

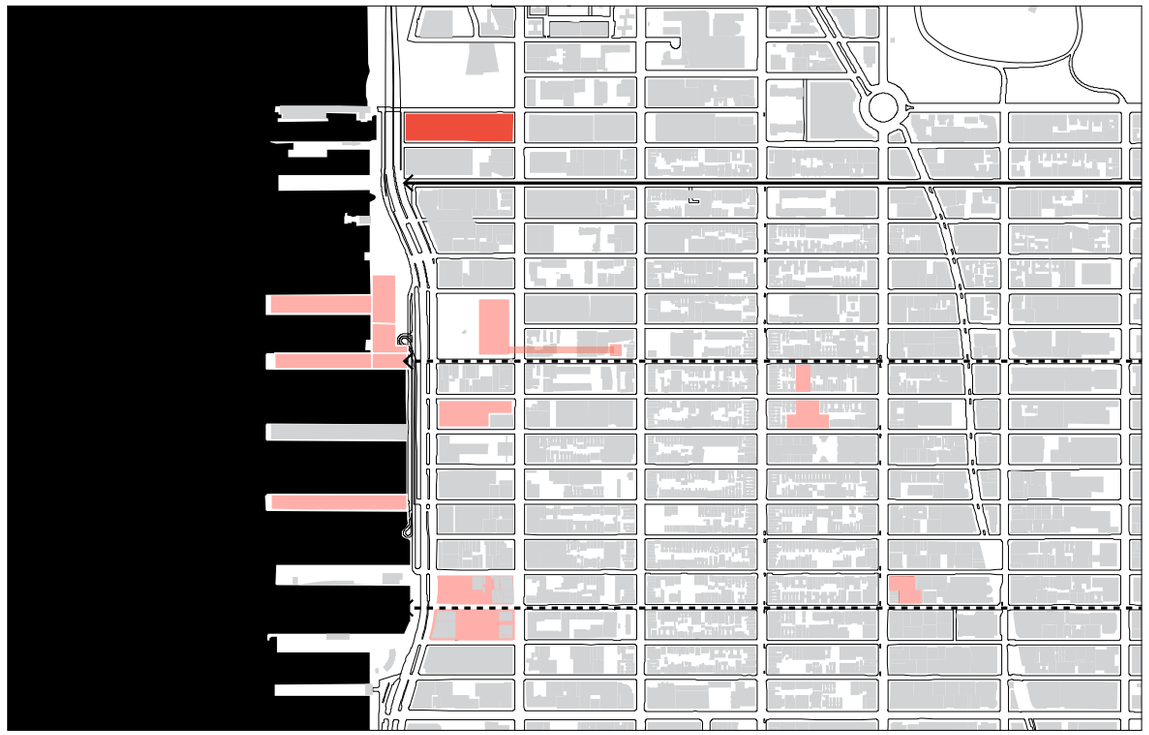



Fig.10.3. Maps of the overall project allocations of the group, the arrows ilustrates the purposed east-west linear connections from midtown to the waterfront.

# The Space Data: The IRT Powerhouse

**History:**

Opened in 1904, the IRT (Interborough Rapid Transit) Company Powerhouse (fig.10.4) was used explicitly to generate electricity to power New York's first subway system, the IRT. Designed by the architect Stanford White of Mckim, Mead & White, the building combined a functional industrial powerplant within the encasing of an elaborated neo-classical envelope (fig.10.5), resulting in an opulent expression of 'the company's presence in the city and its extraordinary feat of construction'[4]. Thus, the building became an exemplary display of the 'City Beautiful' movement, aiming at introducing beautification and monumental grandeur in cities all over North America. This expression of grandeur also indirectly served to represent the company's image, assuring New Yorkers of the time about the new mode of transportation, introduced to alleviate the traffic congestion in the late 19th century New York[5] .

Intentionally placed at the waterfront for logistical reason of coal delivery, the IRT Company Powerhouse could produce up to100,000 horsepower and holding more than 30 million pounds of coal[6] (fig.10.6). This resulted in the massive floor area of approximately 14,982 sqm, occupying the entire west blockfront of eleventh Avenue and extending for almost 700 feet along West 58th and 59th Streets. (fig.10.7) The subway system of New York expanded overtime and the IRT Powerhouse's electric production capacity became insufficient for New York's growing metro system. The city's Board of Transportation took over the IRT's operation in 1940 and the building was acquired by New York's largest energy supplier; Consolidated Edison Company (ConEdison), in 1959. Today, the IRT Powerhouse is used as a steam plant due to its proximity to a water source, generating steam energy (for cooling / heating) for buildings in neighboring districts. Although the original activity of electricity production ceased, the building still plays a partial industrial role in the city's infrastructure.

**The Future:**

Despite the on-going operation of steam production within the IRT Powerhouse, the city's steam system became an inefficient and unsustainable energy source in today's context. Even Though steam energy does not consume as much electricity as it does not require a pump for steam transferring, the system still uses natural gas in the boiling process and subsequently create emissions of nitrogen oxides, sulfur dioxide and carbon dioxide[7]. This nature of steam energy, however, is oppositional to the sustainable ambition of New York City; 'One NYC 2050'[8] released in 2019 which comprises of a comprehensive sustainable goal for the city in 2050. While the initiative emphasizes on a range of issues, the plan also includes the ambition of achieving carbon neutrality and 100% clean electricity for the city within the 2050 timeframe[9] .

In response to the city's 2050 sustainability goal, the implementation and investment in sustainable energy became more widespread in New York, ConEdison itself, has also been developing its cleaner energy option as an alternative, to stabilize its market in the forthcoming future. Recently, the company acquired solar and wind project worth $2.1 billion USD through their Clean Energy Businesses, making them the second largest solar producer in North America. The acquisitions doubled the amount of the green power they own, which will avoid 5.4 million metric tons of carbon emissions annually[10] , foreshadowing the reduction in steam-energy production to a more sustainable energy-production route aligned with the city's ambition for 2050.

With the shift to an alternative energy production process, ConEdison will need to increase their investment in sustainable energy to maintain their position as the city's largest energy provider. While this is plausible, the future usage of the IRT Powerhouse as an energy production plant became questionable after it was designated as a landmark in 2017. Despite ConEdison's constant opposition of the landmark status, the recent imposed status enacted restrictions on the expansion of the company as well as causing increased expenses from required façade maintenance, resulting in a higher expenditure for the company in a relatively limited setting. Since, steam energy production is predicted to be reduced according to the city's sustainable goal, the IRT Powerhouse possesses a large potential in fostering a new civic function that would align with the city's ambition for future New York.

Fig.10.4. The IRT Powerhouse main entrance from 11th Aveneue

Fig.10.5. Terra-cotta ornamentation on the facade of the IRT Powerhouse

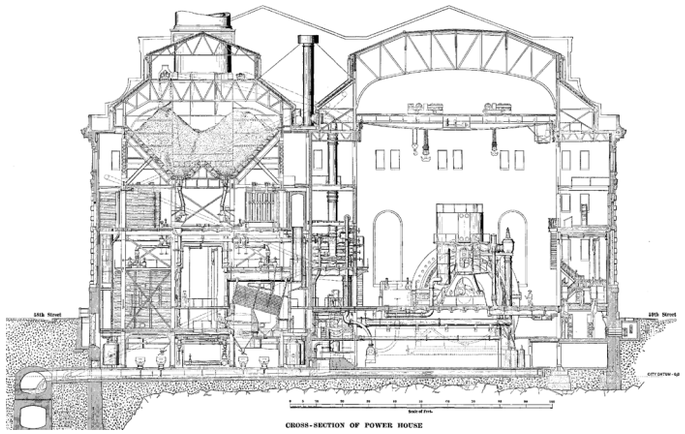



Fig.10.6. Section of the powerhouse when it was used to generate electricity for the metro system.

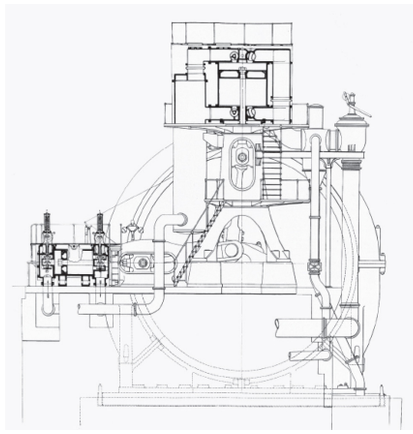


Fig.10.6.1. Allis-chalmer reciprocating steam engine.

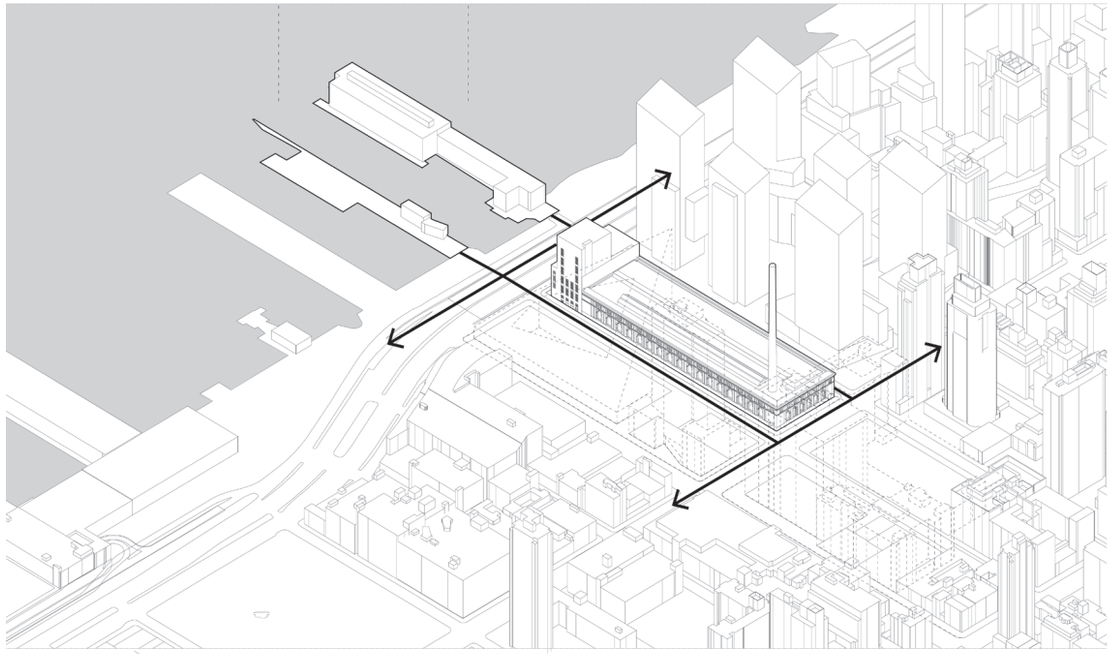
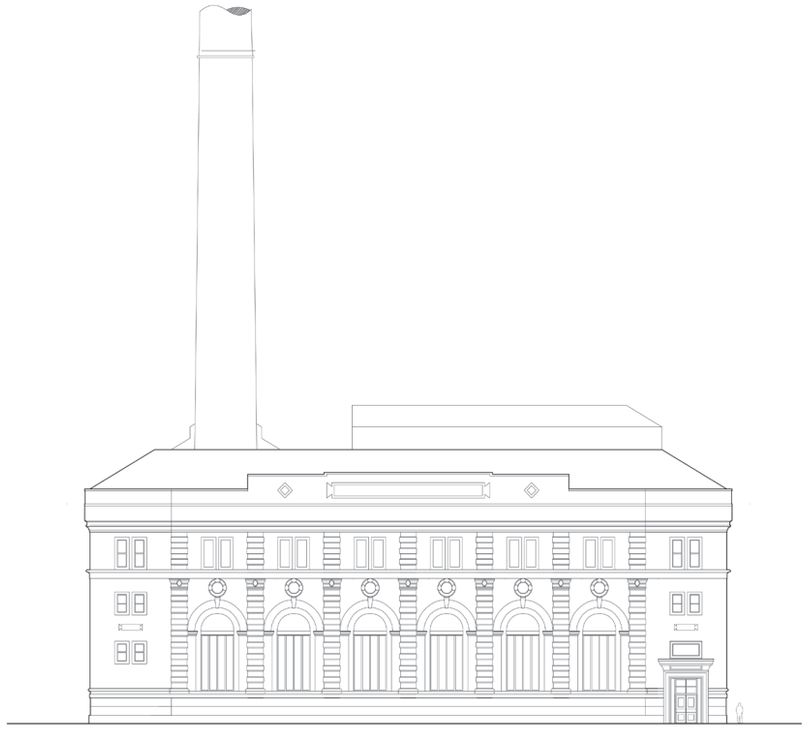
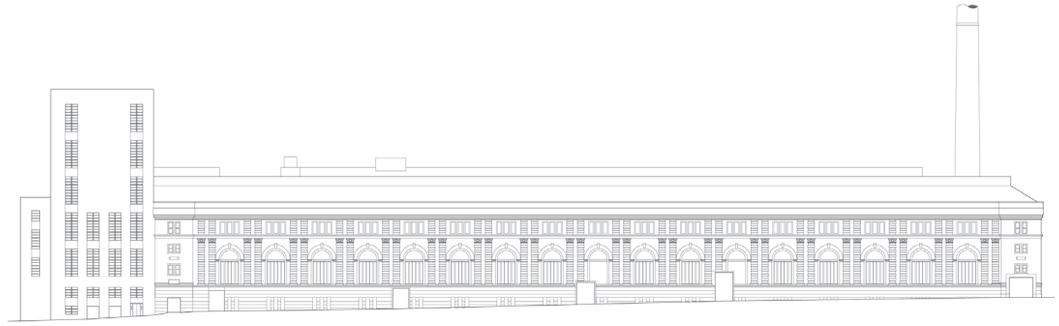


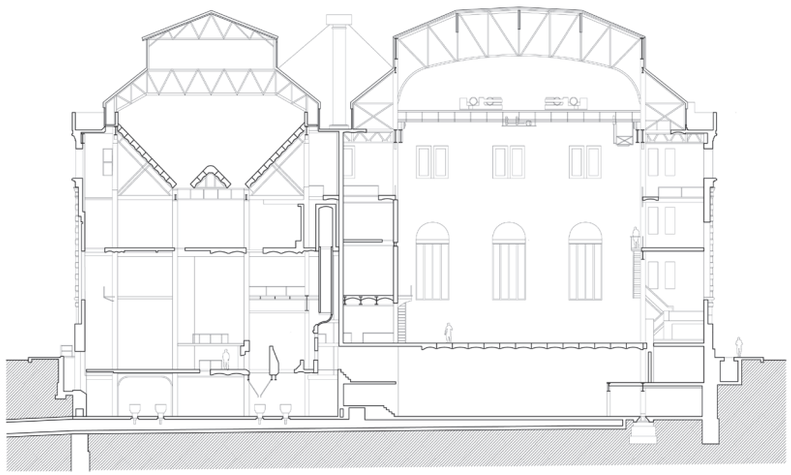
Fig.10.7. The IRT Powerhouse's current situation, occupying an entire city block next to the Hudson River.



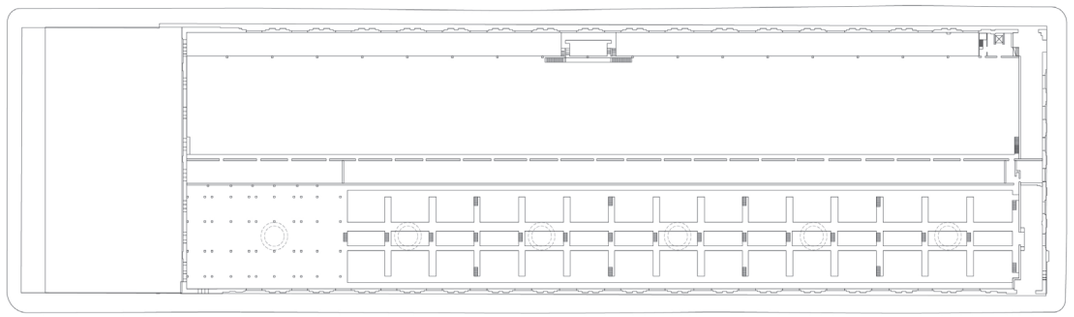
East Elevation of the Powerhouse with the Beaux-Arts facade and the main entrance.



South Elevation of the Powerhouse shows the ornated facade of the 1904 buildig and the modernist addition on the west end, which was added in the 1950s.



A section of the Powerhouse, excluding all of the machineries. The volume posesses great potentials.



Ground floor plan of the powerhouse, excludign all of the machineries.

# The Proposal: The Live-Work Typology

**Proposal:**

Occupying an entire city block adjacent to the Hudson River, The IRT Powerhouse is uniquely situated in an area that is comprised of both, significant historical fabric (the neighboring piers and the Clinton Preservation district) and emerging contemporary developments'[11]. New housing developments such as Via57West are being introduced to the industrial blocks, transforming the waterfront into a mixed zone of residential and industrial character. With the introduction of new housing developments in industrial zone, white-collar residents became a part of the current demographic of the area, in fact, up to 80% of the residents in Hell's Kitchen and Clinton piers are categorized as salary workers[12]. While the traditional mode of working establishes midtown as business center with dense clusters of offices, recent developments such as Hudson Yard and the advancement in technologies lead to an increase in remote working & freelancing, which makes up to 34% of New York's total workforce in 2019[13]. Owing to the constantly evolving technology, workplace morphology shifted from the emphasis on the physicality of a workplace to the non-physical realm, as work nowadays, can occur in various unconventional settings as exemplify in café, co-working spaces, and of course, in a home setting.

The proposal of the live-work typology is, therefore, an attempt to revitalize the industrial waterfront of Clinton Piers through the provision of work-related activities such as rentable workspaces and a makerspace in response to the mentioned changing landscape of work. The insertion of work programs placed an emphasis on the tech and the creative work sectors, which are also focused in the, 'New York Works'[14], (fig.10.8) a government initiative aiming to promote better-paying jobs for New Yorkers. The combination of the living and working in the proposed live-work typology ensures economic plausibility while also suggests integration with the existing surrounding context of the site, including the new residential developments, a cinema and educational facilities. The typology will also contribute to a more active 24/7 neighborhood, according to the collective group's vision of waterfront re-activation through the implementation of densification and injected functions to foster more programmatic connections with the rest of the city.

**Programs:**

Programs-wise, the live-work typology encompasses three main parts; the residential domain (65%), the workplace domain (20%) and the public domain (15%). The estimated total volume is approximately 52,000 – 60,000 sqm with most of the built volume dedicated to the residential domain (32,500+ sqm), the work domain (10,000+ sqm) and the public domain (7,500+ sqm) respectively. (fig.10.9)

The residential domain of the proposal will include a mixture of dwelling types, ranging from a 24 sqm studio units, intended for short-term occupants like students from the nearby institutions to larger family units consisting of two or more bedrooms to attract longer-term occupants. All units, regardless of size, will have access to a collective workspace, which is shared with seven other units. The larger dwelling types also possesses a private workspace in addition to the shared workspace.

The work domain, though smaller than the residential part, is a crucial part of the project. It encompasses a total of 10,000+ sqm, which is divided into two main sections; the 'incubator' (5,000 sqm), which includes rentable offices and co-working spaces and the 'production space'(5,000 sqm) which contains a makerspace (3,500 sqm), product testing labs (1,000 sqm) and a material library (500 sqm). Overall, the work domain of the live-work typology offers a workspace in which, freelancers, remote workers and enterprises could mingle, share knowledges and further career opportunities.

The public domain occupies the least amount of space (7,500 sqm), but it is vital in bridging the project with the public, which will promote the appreciation of the heritage value in adaptive re-use projects. The domain is sub-divided into three parts; the rentable retails (5,500 sqm) for revenue generation, the exhibition / event space (1,000 sqm) for product launching and a POPS (privately owned public space) (1,000 sqm), as leisure space for the neighborhood.

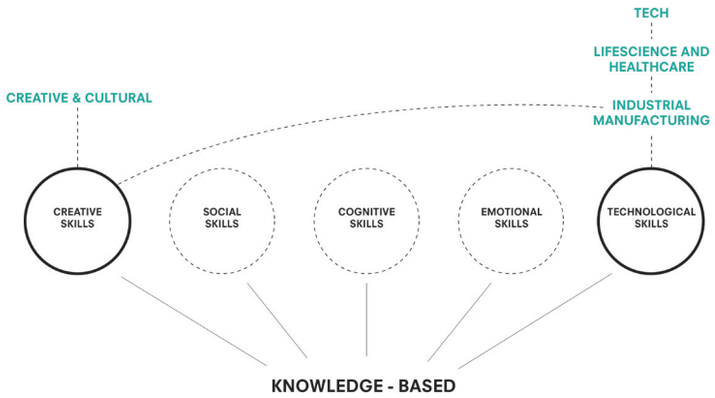



Fig.10.8 Focusing on the two out of five work sectors mentioned in the New York Works Initiative; the creative and tech sector.

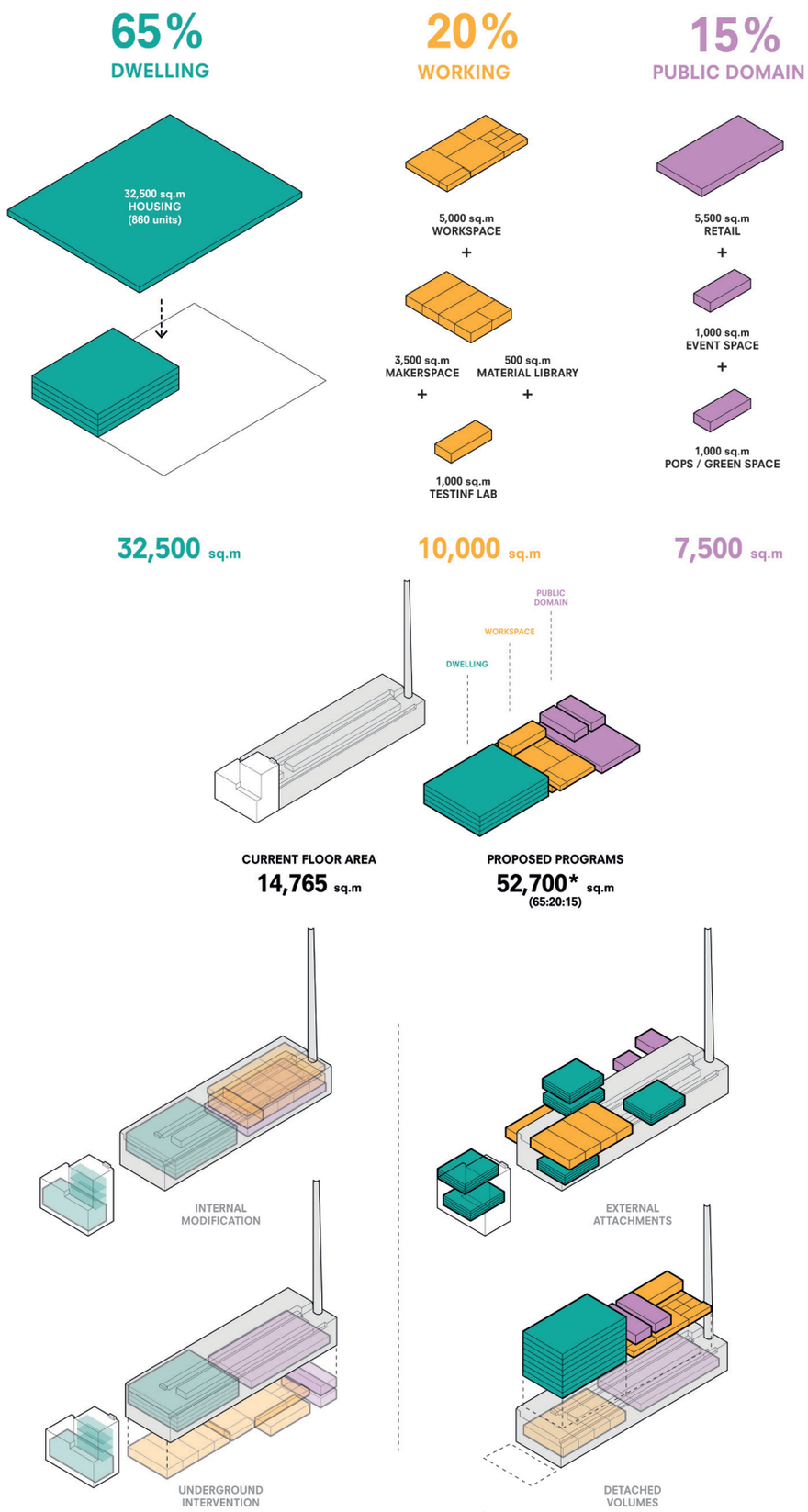



Fig.10.9. Programs spatial requirements / planning of the proposal and the possibilities in terms of massing & design strategies.

# The Ambition - Heritage Value, Materialization & Sustainability

Due to the granted landmarked status in 2017, any external alterations must be consulted with the landmark commission for permission. While the preservation mainly focuses on the original façade from 1904, the new 1950s addition (1965.7 sqm in floor area) is not landmarked and is open for modification / demolition (fig.10.10). Though the regulation appears to make the Powerhouse's facade untouchable, the building went through several alterations during ConEdison's ownership. The alterations include the removal of the original six smokestacks and the ornated cornices, not to mentioned, a number of openings were also cut into the granite plinth for logistic purposes (fig.10.11). Alterations of the external envelope will be considered if the modification will lead to an improved outcome regarding its new function of a live-work typology.

In terms of the spatial arrangements, the programs are placed according to their relationships to one another and / or relationship to external factors such as the waterfront (for the pier connection) or the main avenue (for connectivity). With the character of an industrial heritage, the proposal aims to promote the appreciation for heritage structure through the unconventional adaptive re-use project which extends beyond the typical insertion of cultural programs such as a museum. The approach to inject mixed-use 'common' amenities such as housing and workplaces, will therefore illustrate a widen potential of industrial heritage – fostering new possibilities for these structures to be reconsidered for even more uses.

The overall ambition aims to reach a certain equilibrium between working within the existing context and implementation of new designs. Material use will draw inspirations from the existing Beaux-Arts façade of buff roman bricks and the terra-cotta ornaments, while also exploring the possibility of including modern materials such as steel and glass to reflect its surrounding of new developments (fig.10.12). Internally, crossed laminated timber (CLT) is a candidate for its strength and durability, not to mention sustainability as an added benefit. In fact, the concept of sustainability should also be carried through into the provision of clean sustainable energy for its inhabitants. This can be explored through the implementation of energy-harvesting materials such as solar panels (fig.10.13) (fig.10.13.1) and / or vertical-axis wind turbines (fig.10.14) (fig.10.14.1). Not only that the use of renewable energy within the building will become exemplary for future adaptive re-use projects, but specifically for the IRT Powerhouse, the shift to a cleaner energy source also celebrates its industrial past, enacting a greener reinterpretation through the utilization of the building's own DNA.

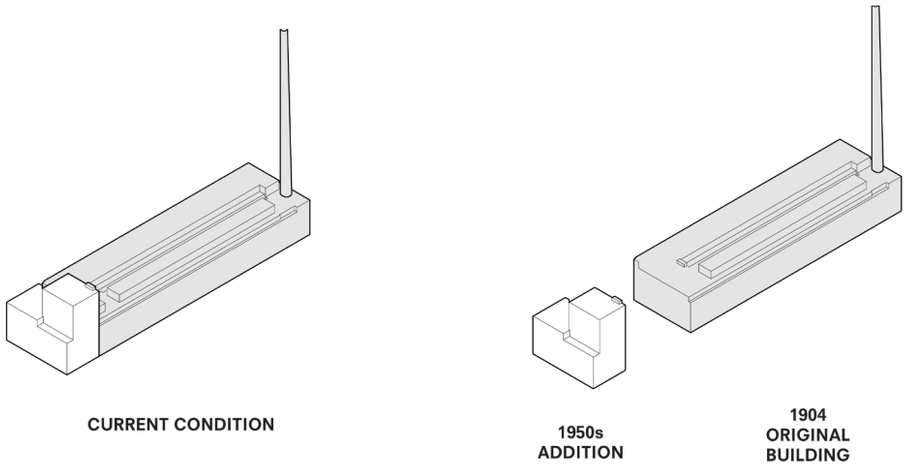



Fig.10.10. Current massing of the IRT Powerhouse.



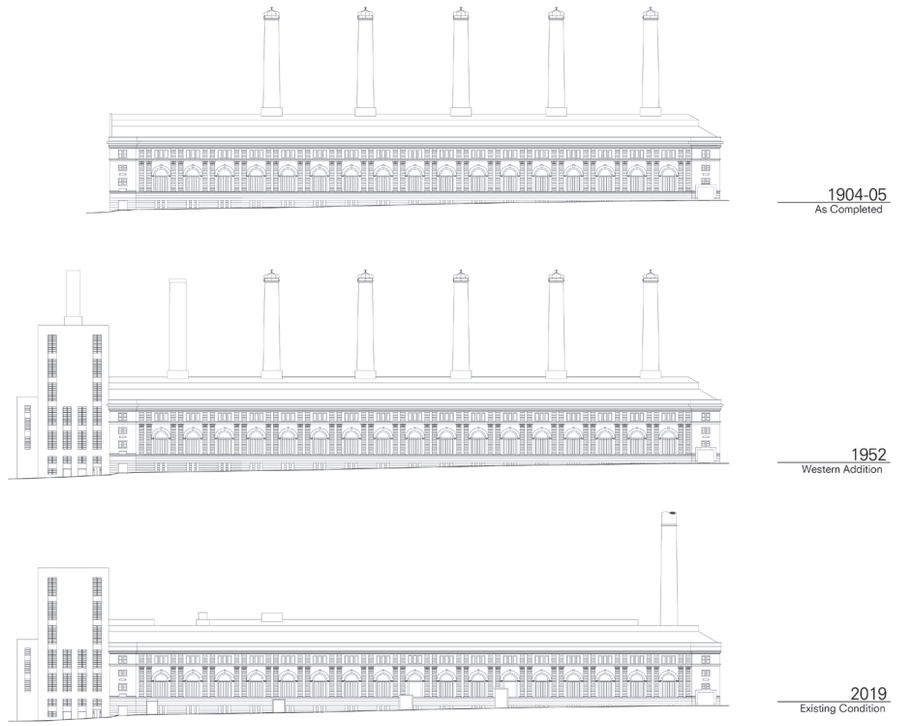



Fig.10.11. External alterations throughout the years.

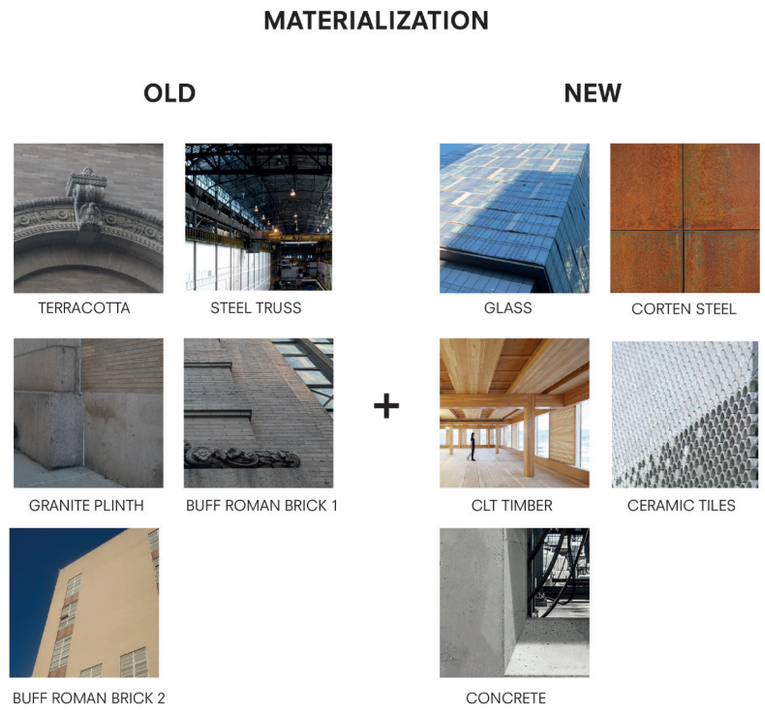



Fig.10.12 materialization initial concept

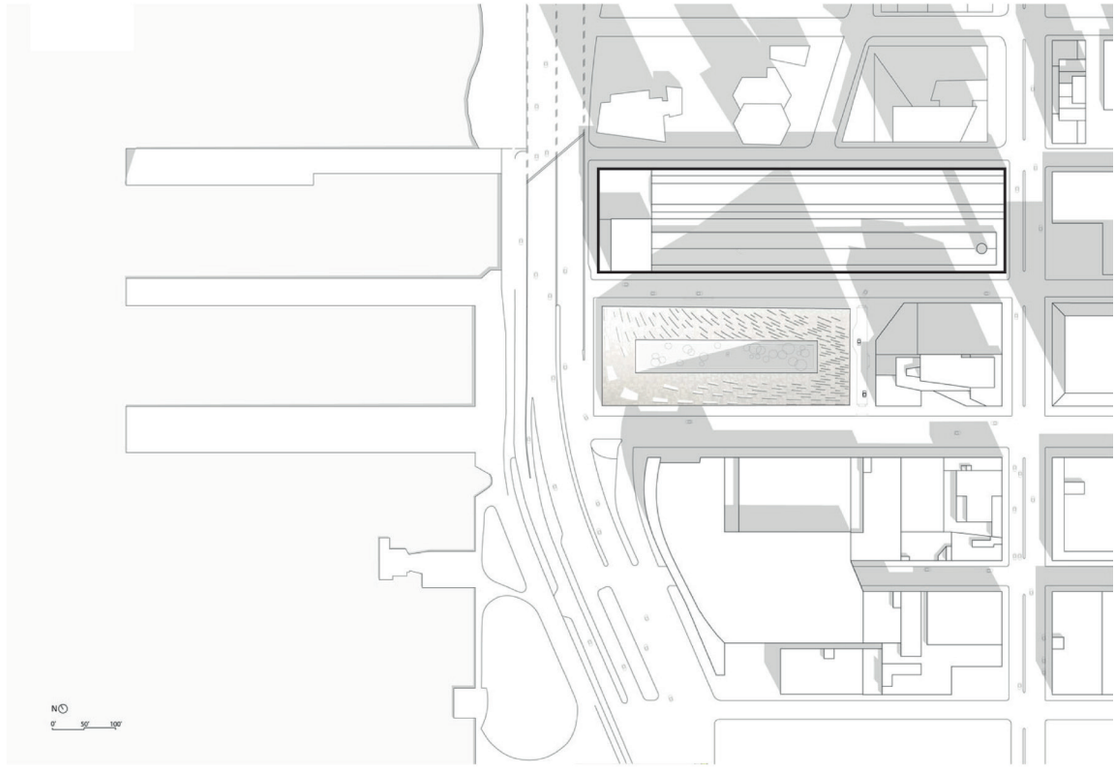



Fig.10.13 Possible overcasting shadows from surrounded buildings.

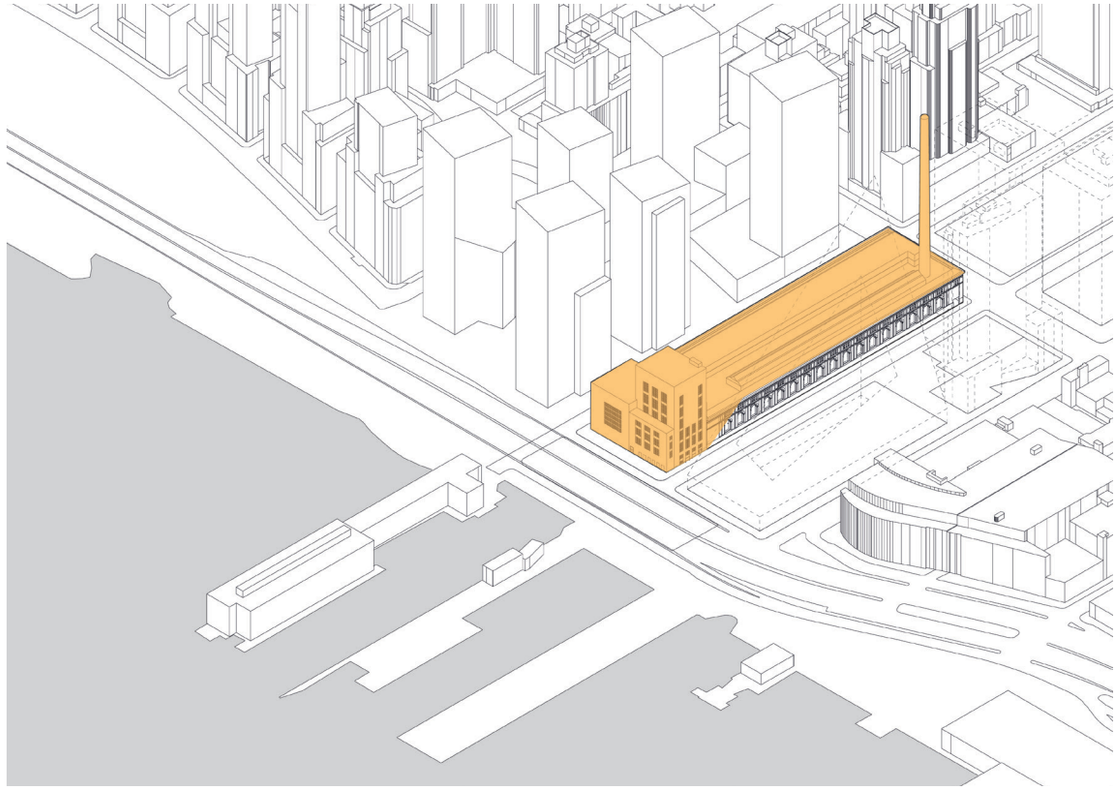


Fig.10.13.1 Estimated surfaces which could be possible for PV panels installations (estimation)



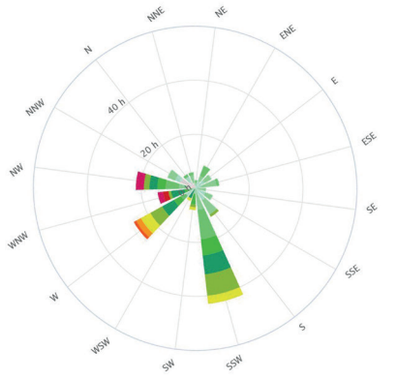




Fig.10.14.Manhattan Wind Chart

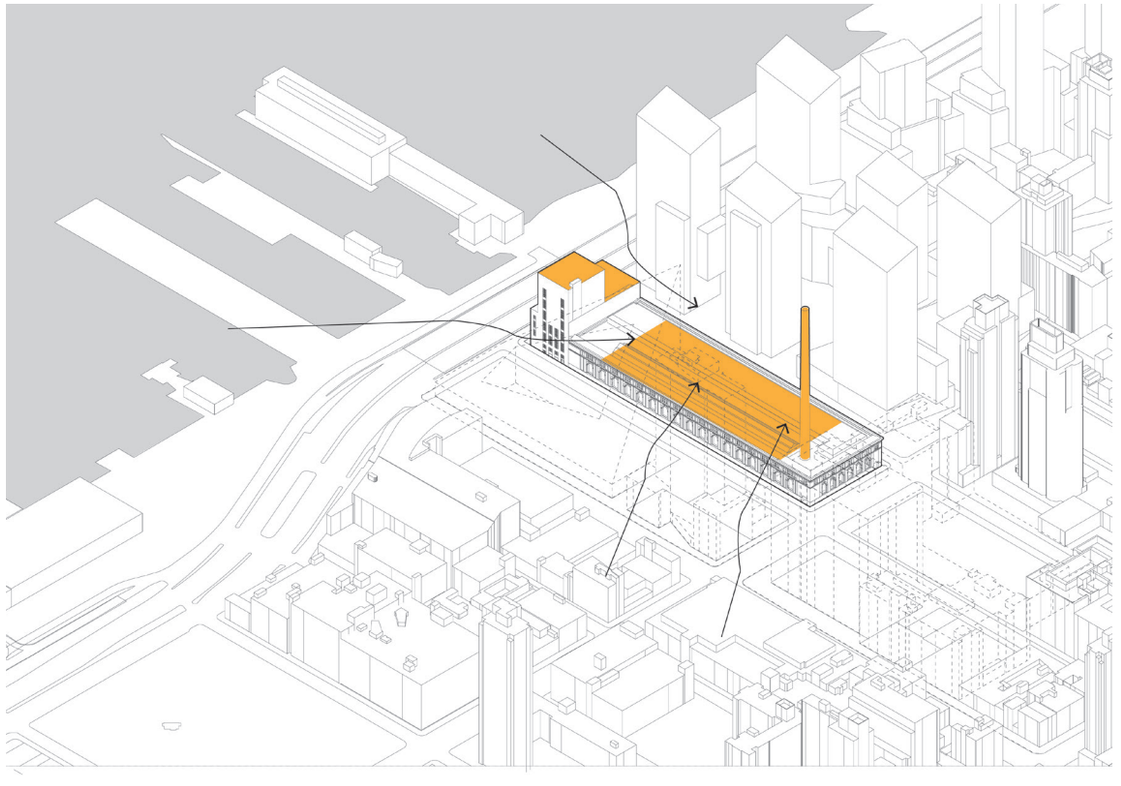


Fig.10.14.1. Possible surfaces for vertical-axis wind turbine installation

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