Instead of appearing solid and resolute, [architecture] would look like a movie set for the staging of multiple realities, and demonstrate the conflict and paradox to be the hard core of architecture rather than the contrivance of order and cohesion we customarily expect from it.
Keith Mitnick, Artificial Light
Application

Technocarpet applied to Sunnyside Yards, Queens NY
When compared to other nations such as, India, Europe, and Japan, the US population appears to be relatively spread out: and to an extent this is true. However the reason for this is also a result of large areas of preserved (30%) and agricultural or pasture lands (40%). This concentrated the population to cities and suburbs.
Yet when one looks closer, the United States can be broken into several Megalopoli. If each was isolated as its own “nation,” they have extreme densities in line with regions in India or the Netherlands. New York City is one of the top cities in terms of density, and with a 4% growth rate and goal to add 1 million residents by 2030 is at a crucial juncture with regards to population.
I looked to the largest, densest cities in the US as test cases - focusing on those with lower amounts of park space per capita, and with the greatest potential for growth. One of these areas, primed for growth, is Sunnyside Queens, New York. Queens’ population is expected to increase 18% by 2030, and the development activity underway in the Long Island City (LIC) area, just to the north of Sunnyside will soon be home to an influx of new residents.
NYC Population
+14% by 2030 (9.1M)

Queens Population
+15% by 2030 (2.56M)
When compared to other nations such as India, Europe, and Japan, the US population appears to be relatively spread out; and to an extent this is true. However, the reason for this is also a result of large areas of preserved (30%) and agricultural or pasture lands (40%). This concentrated the population to cities and suburbs.

Yet when one looks closer, the United States can be broken into several Megalopoli. If each was isolated as its own “nation,” they have extreme densities in line with regions in India or the Netherlands. New York City is one of the top cities in terms of density, and with a 4% growth rate and goal to add 1 million residents by 2030 is at a crucial juncture with regards to population.

When comparing urban areas, if one looks at the relationship between general concentration and the amount of parks per capita, there appears to be little correlation between the two.

Yet, when one looks at New York, some of the densest areas are those closest to the largest parks. These areas are some of the densest residential areas on earth.

Areas with the most density are always closest to parks.

The area also lacks public space. Queens, while not the densest area in the borough, in New York City, has the least amount public space per capita. This situation would only worsen with additional residential areas promoted in the current rezoning, and future changes to land use ordinances. It is an ideal test for the design of a new carpet; as provocateur of a wave of intense development at its edge.

Public Space

The area also lacks public space. Queens, while not the densest area in the borough, in New York City, has the least amount public space per capita. This situation would only worsen with additional residential areas promoted in the current rezoning, and future changes to land use ordinances. It is an ideal test for the design of a new carpet; as provocateur of a wave of intense development at its edge.
Site Location in Red
Park data - NYC Parks
Long Island City is on of the few fully mixed-use neighborhoods in the city; bringing together residential, commercial, and office space with manufacturing. It is well situated for “reasonably priced” office space and zoning incentives are in place that allow the area to be developed to a higher level of density than currently exists. The easy transportation access and availability of “underbuilt” sites position it to become a third (or fourth) central business district for New York City.
By 2050 climate disruption will be a massive presence in daily life - and will shape the city. Low Lying areas will be subject to flooding, and increased fuel costs will impell people to move to cities - a shift already underway, LIC itself will be host to many new residents. The Hunters Point neighborhood to the west of the site, as well as Jackson Heights to the east, are centers of growth for neighborhoods in the city; bringing together residential, commercial, and office space with manufacturing. It is well situated for "reasonably priced" office space and well developed to a higher level of density than currently exists. The easy transportation access and availability of "underbuilt" sites position it to become a third (or fourth) central business district for New York City.

In addition to the core of LIC, the site is surrounded by light manufacturing and residential zoned areas, including Sunnyside Gardens, a planned "Garden City." These areas have also been subject to zoning modifications encouraging commercial uses along major thoroughfares, and conversions of manufacturing buildings into office and residential space.

PlanNYC calls for an additional million New York City residents by 2030; yet current growth rates are on pace for an even higher number. The Hunters Point neighborhood to the west of the site, as well as Jackson Heights to the east, are centers of growth for neighborhoods in the city; bringing together residential, commercial, and office space with manufacturing. It is well situated for "reasonably priced" office space and well developed to a higher level of density than currently exists. The easy transportation access and availability of "underbuilt" sites position it to become a third (or fourth) central business district for New York City.

In addition to the core of LIC, the site is surrounded by light manufacturing and residential zoned areas, including Sunnyside Gardens, a planned "Garden City." These areas have also been subject to zoning modifications encouraging commercial uses along major thoroughfares, and conversions of manufacturing buildings into office and residential space.

PlanNYC calls for an additional million New York City residents by 2030; yet current growth rates are on pace for an even higher number. The Hunters Point neighborhood to the west of the site, as well as Jackson Heights to the east, are centers of growth for neighborhoods in the city; bringing together residential, commercial, and office space with manufacturing. It is well situated for "reasonably priced" office space and well developed to a higher level of density than currently exists. The easy transportation access and availability of "underbuilt" sites position it to become a third (or fourth) central business district for New York City.

In addition to the core of LIC, the site is surrounded by light manufacturing and residential zoned areas, including Sunnyside Gardens, a planned "Garden City." These areas have also been subject to zoning modifications encouraging commercial uses along major thoroughfares, and conversions of manufacturing buildings into office and residential space.

PlanNYC calls for an additional million New York City residents by 2030; yet current growth rates are on pace for an even higher number. The Hunters Point neighborhood to the west of the site, as well as Jackson Heights to the east, are centers of growth for neighborhoods in the city; bringing together residential, commercial, and office space with manufacturing. It is well situated for "reasonably priced" office space and well developed to a higher level of density than currently exists. The easy transportation access and availability of "underbuilt" sites position it to become a third (or fourth) central business district for New York City.

In addition to the core of LIC, the site is surrounded by light manufacturing and residential zoned areas, including Sunnyside Gardens, a planned "Garden City." These areas have also been subject to zoning modifications encouraging commercial uses along major thoroughfares, and conversions of manufacturing buildings into office and residential space.

PlanNYC calls for an additional million New York City residents by 2030; yet current growth rates are on pace for an even higher number. The Hunters Point neighborhood to the west of the site, as well as Jackson Heights to the east, are centers of growth for neighborhoods in the city; bringing together residential, commercial, and office space with manufacturing. It is well situated for "reasonably priced" office space and well developed to a higher level of density than currently exists. The easy transportation access and availability of "underbuilt" sites position it to become a third (or fourth) central business district for New York City.
Yards

Sunnyside Yards is among the last open-air train yards in New York City. Faced with increasing demands for space, several other rail yards have been developed, starting with the area directly to the north of Grand Central Terminal and including Hudson and Atlantic Yards. The site is a tangle of infrastructure; depressed 15-30' from the surrounding city fabric, the ground has been manipulated over time to serve the needs of
local and regional transportation. A current project for extending LIRR access into Grand Central Terminal has generated recent work and changes to the site, as it now is host to three additional tunnels with access to mid-town. Directly to the north and south of the site are numerous subway lines (EMR / 7 / NQ). The irony of this accessibility is the site itself, cuts away a huge swath of area from the surrounding fabric.
Constituencies

The area around the yards is rapidly changing; people are moving to the new residential areas provided as a result of Long Island City development, accompanied by daily use by new commercial activity in the new CBD. However, the majority of the area is currently zoned manufacturing; which, if following in the footsteps of many other industrial areas of the city, will eventually lead to a new mix of redevelopment.
The area around the yards is rapidly changing; people are moving to the new residential areas provided as a result of Long Island City development, accompanied by daily use by new commercial activity in the new CBD. However, the majority of the area is currently zoned manufacturing; which, if following in the footsteps of many other industrial areas of the city, will eventually lead to a new mix of redevelopment.
Land Use

The changing constituency and demand for public space is a direct function of past and present land use. Historically, the surrounding land use was primarily manufacturing, and is one of the few remaining industrial areas in New York City. This is rapidly changing as Long Island City redevelops under the provisions of a special overlay district. This greatly accelerated development in the area, a mix of residential development,
conversions, and office space in a new central business district. The site itself has been seen as a development opportunity since the 1930s (Garvin), most recently proposed in the schemes presented for the potential NYC 2012 bid for the Olympics. At roughly 8 million square feet, the site is one of the largest undeveloped parcels in the city.
New York City is an electricity load pocket. Due to limitations of the electric grid, 80% of the energy used in the city must be generated within the city. The city uses 11,000 MW annually, a figure which continues to grow. A wind farm is proposed to go online in 2030 off the coast of Long Island which could help contribute to meeting this demand. A flywheel energy storage system will smooth electricity demand and conserve electricity, reducing overall generation needs and emissions from “peaker” plants.
LIC is being redeveloped as a third Central Business District for the city: bringing with it commercial and residential growth. The area shown in black was recently rezoned to encourage development of mixed use and commercial property in addition to existing office buildings and a growing residential population at Hunter's Point. This growth will require increased transportation access to existing train and subway lines.
Since the closure of Fresh Kills, New York has been forced to export its trash, 13,000 tons per day (TPD). A tremendous economic ($1M/day) and ecological expense. The transfer facilities for the existing export system occur in various industrial zones throughout the city - however for Brooklyn and Queens, they are concentrated around the Newtown Creek, several blocks to the South of Sunnyside Yards. Shifting from transfer to processing will save money, reduce emissions, and create new resources for the city.
The existing Bowery Bay treatment plant has reached its limit due to the inability to increase the size of sewer lines, resulting in CSO releases into the East River. Long Island City development activity will exacerbate this issue. By 2030, the population of Queens as a whole is predicted to rise by over 18%. Since each new resident contributes 128.6 gallons to the wastewater stream, additional treatment capacity is required, with a dry weather capacity of 50 MGPD; a small facility proximate to the source of the wastewater it treats.
Presently:

- **Average demand** and **actual demand** are illustrated over time. The line graph shows fluctuations in consumption.
- **Energy deficit** and **energy surplus** are indicated by dashed lines.
- **Peaker Plants** and **Wasted Energy** icons are shown to highlight areas of concern.

The graph highlights how energy demand varies and the impact on consumption over a 24-hour period.
50% of New York City's electricity is generated in Queens. Flywheel energy storage systems (FESS) smooth demand in the electrical grid, by storing excess electricity and feeding it back in times of need. With its location in proximity to the subways and trains, which can, like hybrid cars, regenerate electricity when they brake, the FESS can store electricity otherwise lost in braking, and feed it back to the trains when they accelerate out of the station.
A materials reclamation facility sorts trash and recyclables into usable commodities. Starting with the color-sorted trash and recycling deposited by trucks, the largely automated system sorts the waste into its more valuable constituent parts.
DSNY TRUCK
12.5 TON CAPACITY
44' TURN RADIUS

TIPPING FLOOR
GREEN BAGS
(PAPER, CARDBOARDS, NEWSPRINT)
BLACK BAGS
(GENERAL / ORGANICS)
BLUE BAGS
(METAL, PLASTIC, CONTAINERS)

PRIMARY
270' X 110'
SECONDARY
270' X 286'
FINAL
270' X 210'

DIGESTORS
(ORGANICS)
MRF / WWTP
COMBINED DIGESTORS

DIGESTION
SOLIDS
DEWATERING
SOLIDS
SLUDGE
SOLIDS
COMPOSTING
ORGANICS + SOLID WASTE

38 TRUCKS PER HOUR
450 TONS PER HOUR

38' TRUCKS
12.5 TON CAPACITY
44' TURN RADIUS

DSNY TRUCK
12.5 TON CAPACITY
44' TURN RADIUS

38'
Wastewater

Population growth and wastewater are intrinsically correlated; each additional resident results in about 130 gallons of wastewater. This wastewater is treated in a series of settling, digestion, and treatment tanks before being released into the Newtown creek. Stacking the various stages of the process allows for a smaller footprint and gravity-fed flows of water after an initial pumping to the plant's inlet.
BOWERY BAY
Built: 1939
Capacity: 150 MGPD
Drainage Area: 16,105 Acres
Population Served: 596,326

KEY
- Lower Catchment System
- Upper Catchment System
- Proposed Area for Sunnyside WWTP
Study Models
Design

A series of study models explored different site strategies. Based on the findings of these iterative physical models, I developed the project in Rhinoceros, a computer modeling program. Each review led to changes and new ideas, which were incorporated into the final version of the drawings.
Phasing

The Park could develop over time, mirroring the changing needs of the growing LIC neighborhood. Above is the existing conditions of the site, and each successive image shows a projected stage of development at a specific date.
The first stage of the park is a linear strip over the train lines, covering them and controlling their sound output with a layer of flywheels for electrical energy storage.
The brown shaded area above represents the roof covering the materials reclamation facility, the second stage of the project. It has an expansive roof in order to cover not only the MRF, but also to cover an existing roadway, and to link the two different elevations on opposite sides of the site.
The inter modal station combines the existing strip with new covered public space enabling access from the LIRR trains below to the 7 line subway.
Finally, the wastewater treatment plant would come online, as the population reaches a peak in the area. Its (clean) outflow would be channeled along the southern end of the site and into the existing Newton Creek.
Here the park is show with each of the elements fully populated and occupied by a baseline program. The surface of the park would remain open to change over time; best seen in the model studying different possible surface conditions for different programs.