This project is a health and wellness campus in Sunset Park centered around water culture.

The proximity of the NYU hospital offered a critical entry point to this project. The hospital is a leading trauma and stroke rehabilitation center, but lacks enough space to provide ample care to its surrounding district. The program proposes to expand and extend this hospital and supporting programs from 1st avenue out to the water through a network of landscaped and built features. The site retrofits and renovates existing industrial warehouses along the waterfront and new sustainable innovations collect, redirect, filter, and sequester water.
Hao Chang
Melissa Chervin
Ashley Esparza
Florencia Yalale
Sarah Zamler

High Asthma Rate (>9.5%)
Long Commute Time (>45min)
Industrial Zone

AVERAGE INCOME

$60,000 - $27,000
> $60,000
< $27,000

SITE

OVERVIEW development map
INTRODUCTION

site axon: existing
INTRODUCTION

site axon: hospital expansion

- Buildings for Reuse
- Existing Hospital
- Hospital Addition
INTRODUCTION

site axon: proposed additions
INTRODUCTION

site axon: proposed transit
INTRODUCTION

site axon: overall proposed
INTRODUCTION

site visitor: tourist
INTRODUCTION

site visitor: patient
MOBILITY existing conditions

Sunset Park/Brooklyn Army Yards

bus route
walk path
bike path
MOBILITY proposed conditions

Sunset Park/Brooklyn Army Terminal
MOBILITY street section analysis

A

B

C

D

MOBILITY street section analysis

Hao Chang
Melissa Chervin
Ashley Esparza
Florencia Yalale
Sarah Zamler

16
MOBILITY

E types street sections: 1st ave

1st Ave
MOBILITY

F types street sections: 53rd and 55th
MOBILITY 1st ave & entrance

1st Ave

MOBILITY 1st ave & entrance

55th St. 55th St.
BUILDING SCALE
hospital housing
WATER SYSTEMS

CSO Facility
WATER SYSTEMS
sources and uses

CLEAN WATER
GROTON & CATSKILL-DELAWARE WATERSHED
WATER TOWERS
CONSTRUCTED WETLANDS
BIOSWALE
SEWER DRAINS
CSO HOLDING TANK
RAINWATER
RAINWATER CISTERNS
WASTE WATER TREATMENT

GREY WATER
RAINFALL
CONSTRUCTED WETLANDS
BIOSWALE
SEWER DRAINS
ROOF COLLECTION
CSO HOLDING TANK
RAINWATER CISTERNS

BLACK WATER
SOURCES AND USES
WATER SYSTEMS
WATER TOWERS
CONSTRUCTED WETLANDS
BIOSWALE
SEWER DRAINS
CISTERNS

USE
POOLS
PLUMBING USE
FILTRATION
OUTDOOR PLAY
AQUAPONICS
IRRIGATION
TOILETS

FILTRATION
FILTRATION
FILTRATION

USE / REUSE
POOLS
POOLS
PLUMBING USE
AQUAPONICS
IRRIGATION
TOILETS
WATER SYSTEMS

existing watersheds & flood map

623 ACRES

351 ACRES

1874 ACRES

50' 100' 200' 400'

OH-004

OH-003

OH-002

004 OUTFALL

003 OUTFALL

002 OUTFALL

3 mil gal/y

255 mil gal/y

363 mil gal/y
PROPOSAL FOR COMBINED SEWAGE OVERFLOW MITIGATION

NORMAL CONDITIONS

70% of New York City has a combined sewer system.

CURRENT OVERFLOW CONDITION

Mitigated Condition

IN NYC, AN AVERAGE OF...

OWLS HEAD CSO OUTFALL SITES:

<table>
<thead>
<tr>
<th>Site</th>
<th>Annual Events</th>
<th>Triggered by (in. of rainfall)</th>
<th>Volume (gallons/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OH-002</td>
<td>34</td>
<td>0.37&quot;</td>
<td>363 million</td>
</tr>
<tr>
<td>OH-003</td>
<td>43</td>
<td>0.28&quot;</td>
<td>255 million</td>
</tr>
<tr>
<td>OH-004</td>
<td>11</td>
<td>0.8&quot;</td>
<td>3 million</td>
</tr>
</tbody>
</table>

CSO DISCHARGE INTO NYC LOCAL WATERWAYS

Results in a CSO Event

NOMAL CONDITIONS

NORMAL CONDITIONS

CURRENT OVERFLOW CONDITION

MITIGATED CONDITION

INTERCEPTOR CATCHMENT

POOLS

EXCESS TO

OF NEW YORK CITY has a combined sewer system.

WATER SYSTEMS

CSO explanation & data
WATER SYSTEMS pool types & calculations

POOL VOLUME AND OPERATING FACTORS

Olympic (1/2) lap pool
303,200 gallons

Olympic (full) lap pool
606,414.6 gallons

wave pool
384,367.45 gallons

rehabilitation pool
10,014 gallons

water sports pools
13,983.84 gallons

water sports pools
28,769.06 gallons

cold plunge pools
0.681.22 gallons

cold plunge pools
13,177.68 gallons

kiddie pool
43,462.44 gallons

kiddie pool
19,942.46 gallons

heat therapy pool
1,007.61 gallons

heat therapy pool
773.2 gallons

Treatment facility tanks are sized to reduce volume and frequency of CSOs by mitigating storm water runoff while meeting the water demands of our site.

Outfall per event

- **OH-002**: 10 mil gal
- **OH-003**: 5.9 mil gal
- **OH-004**: 16.91 mil gal

The storage facility tank is sized to make up for pool operating factors over dry months and for back up holding capacity in heavy rainfall events.

VOLUME OF RAINFALL PER MONTH

<table>
<thead>
<tr>
<th>Month</th>
<th>Average Rainfall (in)</th>
<th>Average Rainfall (ft)</th>
<th>Catchment Area (sqft)</th>
<th>Rainfall per month (gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>3.17</td>
<td>0.264166667</td>
<td>124,058,880.00</td>
<td>245,136,211.58</td>
</tr>
<tr>
<td>Feb</td>
<td>2.76</td>
<td>0.23</td>
<td>124,058,880.00</td>
<td>213,730,897.19</td>
</tr>
<tr>
<td>Mar</td>
<td>3.97</td>
<td>0.339093033</td>
<td>124,058,880.00</td>
<td>367,960,239.74</td>
</tr>
<tr>
<td>Apr</td>
<td>4</td>
<td>0.333333333</td>
<td>124,058,880.00</td>
<td>309,320,140.80</td>
</tr>
<tr>
<td>May</td>
<td>3.79</td>
<td>0.315833333</td>
<td>124,058,880.00</td>
<td>293,080,833.41</td>
</tr>
<tr>
<td>Jun</td>
<td>3.94</td>
<td>0.328333333</td>
<td>124,058,880.00</td>
<td>304,680,338.69</td>
</tr>
<tr>
<td>Jul</td>
<td>4.5</td>
<td>0.375</td>
<td>124,058,880.00</td>
<td>347,985,158.40</td>
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<tr>
<td>Aug</td>
<td>4.12</td>
<td>0.343333333</td>
<td>124,058,880.00</td>
<td>318,599,745.02</td>
</tr>
<tr>
<td>Sep</td>
<td>3.73</td>
<td>0.310833333</td>
<td>124,058,880.00</td>
<td>286,441,031.30</td>
</tr>
<tr>
<td>Oct</td>
<td>3.78</td>
<td>0.315</td>
<td>124,058,880.00</td>
<td>292,307,533.06</td>
</tr>
<tr>
<td>Nov</td>
<td>3.41</td>
<td>0.284166667</td>
<td>124,058,880.00</td>
<td>263,695,420.03</td>
</tr>
<tr>
<td>Dec</td>
<td>3.56</td>
<td>0.296666667</td>
<td>124,058,880.00</td>
<td>275,294,025.31</td>
</tr>
</tbody>
</table>
The addition of 155 bioswales soaks up 387,500 gallons of rainwater runoff per storm event.
OTHER SYSTEMS  vegetation plan
ADAPTIVE REUSE

selected buildings
ADAPTIVE REUSE

Strategies:

- Structural Improvements / Repairs
  - Hurricane Retro-Fitting
- Relocate Vulnerable Systems: Out of Flood Plain
- Increase Accessibility: Elevators, Ramps
- Enhance Envelope: Windows and Insulation
Embodied Energy in Daycare Building: 4,609,600 kg CO₂

Concrete
- Carbon per kg: 1.0 kg CO₂
- Volume of Material: 11,100 ft³
- KG per Volume: 68 kg / ft³
- Total Weight: 754,800 kg

Steel
- Carbon per kg: 2.7 kg CO₂
- Volume of Material: 800 ft³
- KG per Volume: 220 kg / ft³
- Total Weight: 176,000 kg

Aluminum
- Carbon per kg: 11.5 kg CO₂
- Volume of Material: 2,900 ft²
- KG per Volume: 76 kg / ft³
- Total Weight: 220,400 kg

Asphalt
- Carbon per kg: 2.6 kg CO₂
- Volume of Material: 5,000 ft³
- KG per Volume: 65 kg / ft³
- Total Weight: 325,000 kg
Strategies for Passive Design: ~20% Reduction in Energy Use

- Daylighting
- Shading from Building Overhangs
- Continuous Insulation
- Ceiling Ventilation
- Cross Ventilation
- Shading from Vegetation
Solar Thermal Area: 23,000.0 (ft²)
Energy Produced: 774.0 (Btu/ft²/day)
Energy Produced: 17,802,000.0 (Btu/day)
Energy Produced: 6,497,730.0 (kBtu/yr)

PV Solar Area: 6,350.0 (m²)
Solar Radiation: 5.3 (kWh / m² / day)
Energy Produced: 5,035,662,519.7 (Btu/yr)
Energy Produced: 5,035,662.5 (kBtu/yr)

Building Area 176,000.0 (ft²)
Outdoor Design Temp: 15 / 92 °F
Building Load: 4258 / 7318 (Btu/hr)
Reduction: 698,200.0 (kBtu/yr)

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Area (ft²)</th>
<th>EUI: CBECs (kBtu/ft²)</th>
<th>Energy Demand (kBtu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>96,000.0</td>
<td>89.6</td>
<td>8,601,600.0</td>
</tr>
<tr>
<td>Commercial (enclosed mall)</td>
<td>35,100.0</td>
<td>65.7</td>
<td>2,306,070.0</td>
</tr>
<tr>
<td>Pool</td>
<td>44,900.0</td>
<td>50.8</td>
<td>2,280,920.0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>176,000.0</strong></td>
<td></td>
<td><strong>13,188,590.0</strong></td>
</tr>
</tbody>
</table>
NOTES: Pie charts are intended to illustrate proportions of energy generated. Surpluses cannot necessarily cover deficits in other categories. In event of surplus, energy type will be distributed to site pools and buildings. In event of deficit, energy will be drawn from the city.

**SOLAR THERMAL**

**WATER HEATING**

49.27% OF BUILDING ENERGY USE

**GEOTHERMAL**

68°F

5.29% OF BUILDING ENERGY USE

**PV SOLAR**

38.18% OF BUILDING ENERGY USE

**BUILDING ELECTRICITY**

7.26% Grid

7.26% Grid

7.26% Grid
SITE PERSPECTIVES

hospital housing
SITE PERSPECTIVES
outdoor pools