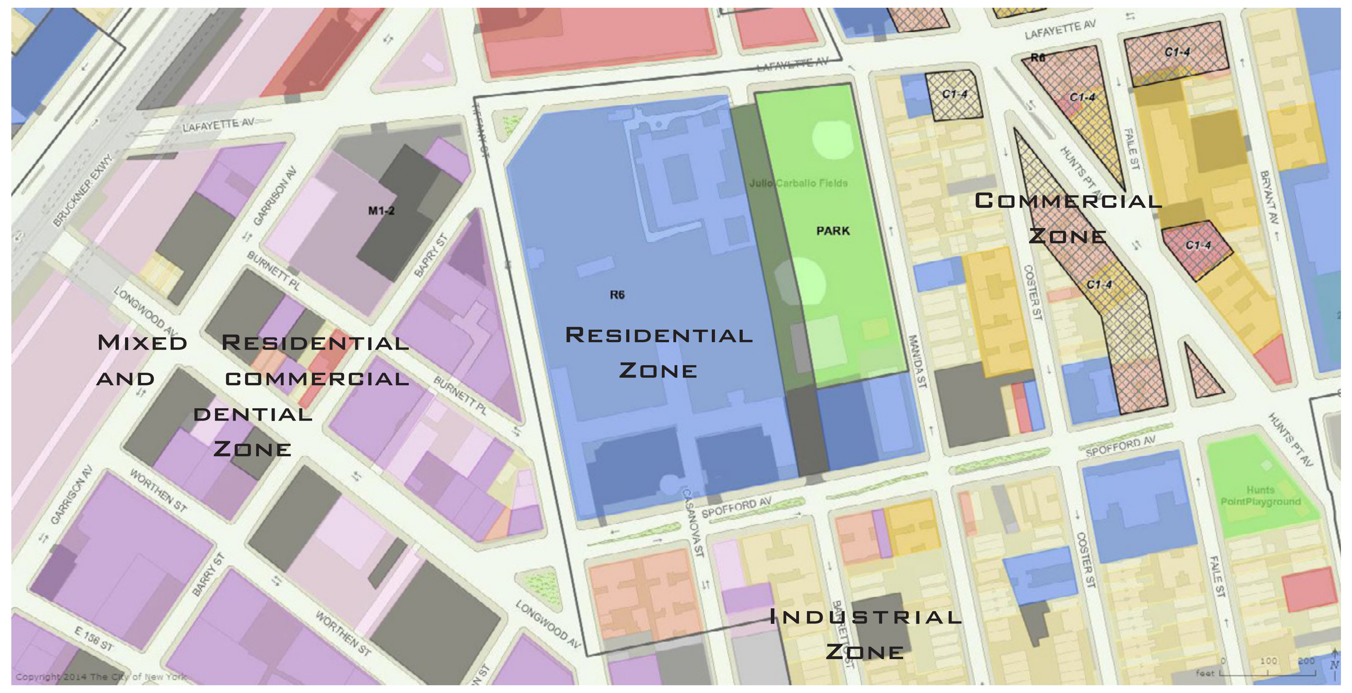
Biophilic BRONX

Site analysis took place at the end of December 2013. The weather was cold and dry. The existing conditions of the site were abandoned. Parking lots were closed off, and there was no access to the buildings, except for the childrens daycare center on the corner of Spofford Avenue and Manida Street. The greatest feature of the area was the landscape. Although mostly hardscaped, the slope running west on Spofford Avenue from Manida Street to Tiffany Street was tremendous. If there were snow on the ground let alone ice, it would be nearly impossible to walk on. There's no chance a typical wheelchair user could access one side of the block to the other without going around the entire plot. Nevertheless, the YMCA building was impressive, and sparked a great potential precedent for what commercial and community buildings can look like in Hunts Point.

From climatic simulation results, I focussed graphically more on radiation as New York gets little sunshine due to overcast conditions. Therefore, based on the Daylighting analysis, the Lux recordings on the modeled masses were interesting. There is great potential for urban farming as long as the crop has maximum exposure to sunlight. With that being said, I strongly consider green roof construction, as well as a green wall. Furthermore, there is sufficient radiation for PV-panel absorption, and I propose cellular panels be integrated with shading louvres for flexible and maximum performance. Indoor thermal comfort can be exceptional if trombe wall systems are utilized, especially on the south and western exterior walls.



Current Land Use Survey of Site and Surrounding Context

Occupancy User Table

SPACE	SQ FT INSIDE	SQ FT OUTSIDE	LEVELS	OCCUPANTS	PROGRAMS	INTEGRATE WITH	PRIORITY	TIME OPEN	TIME CLOSE	NIGHT ACTIVITY
EVENT SPACE	8100	6000	1 or 2	300	Special Events	Commercial Kitchen	Weekends and Evenings			
COMMERCIAL KITCHEN	5700	0	1	23	Instruction, Event, Rental	Event Space, Nursery, Grocer	24 hours a day			
CULINARY SCHOOL	4400	0	1	23	Instruction	Nursery, Grocer	Mon-Fri			
PERFORMANCE SPACE	18000	?	2 or 3	?	Events, Instructional, Rental	Event Space, Nursery	Weekends and Evenings			
PRE-K SCHOOL (NURSEY)	13500	5000	1	350	Instruction	Event Space	Mon-Fri and Evenings	08:00:00 AM	06:00:00 PM	6-9pm
OFFICE/CO-WORKING SPACES	8000	0	2	?	Business, Community, Site	Residential	Mon-Fri	08:00:00 AM	08:00:00 PM	
FRESH FOODS GROCER	6500	0	1	?	Merchant	Cafe	24 hours a day or 7/11?	09:00:00 AM	08:00:00 PM	
CAFE	1500	0	1	25	Merchant, Take Out	Grocer	Every day	07:00:00 AM	08:00:00 PM	
RESIDENTIAL BUILDING	550000	0	10	680 max	Residential, Public Space	Office, Grocer, Cafe	24 hours a day			

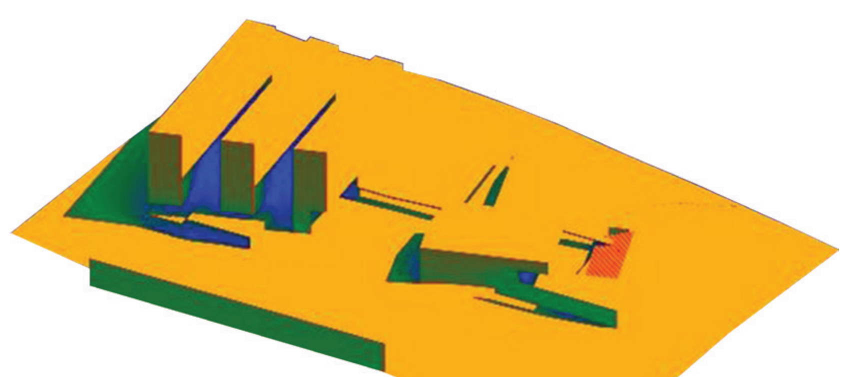
NOTES: Red = Undecided or need to research code to provide answer.

Daylighting Analysis

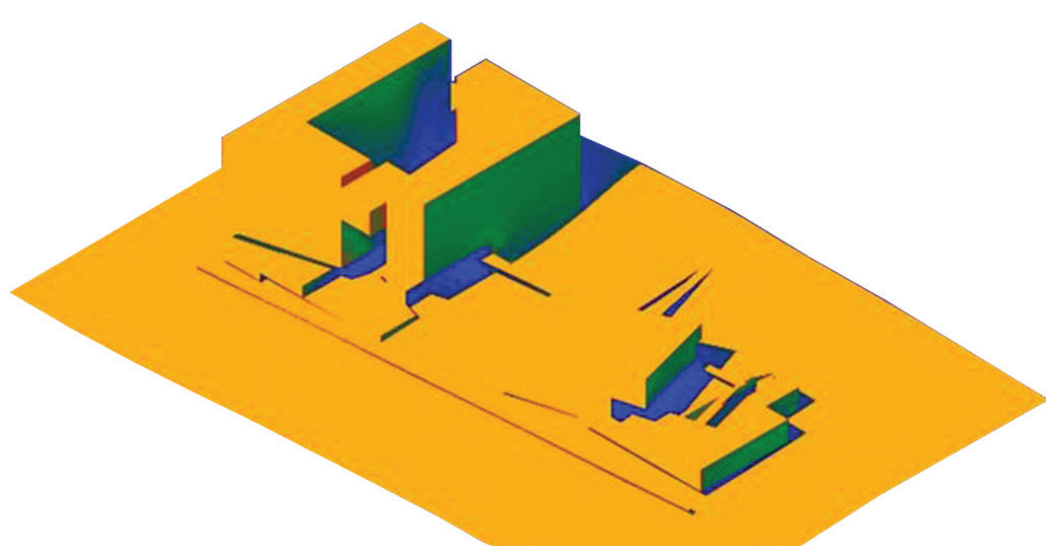
YEAR	2013											
MONTH	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SUNRISE	07:20:00 AM	06:45:00 AM	06:35:00 AM	06:15:00 AM	05:40:00 AM	05:25:00 AM	05:40:00 AM	06:05:00 AM	06:35:00 AM	07:15:00 AM	06:45:00 AM	07:10:00 AM
SOLAR NOON	12:05:00 PM	12:09:00 PM	12:45:00 PM	12:55:00 PM	12:52:00 PM	12:55:00 PM	01:00:00 PM	12:59:00 PM	12:50:00 PM	12:40:00 PM	12:15:00 PM	11:50:00 AM
SUNSET	04:45:00 PM	05:30:00 PM	06:30:00 PM	07:35:00 PM	08:05:00 PM	08:25:00 PM	08:22:00 PM	07:50:00 PM	07:05:00 PM	06:20:00 PM	05:00:00 PM	04:30:00 PM
DAY LENGTH	9.5 HOURS	10.5 HOURS	11.5 HOURS	13.5 HOURS	14.5 HOURS	15 HOURS	14.75 HOURS	13.5 HOURS	12 HOURS	11 HOURS	10 HOURS	9.25 HOURS

NOTE: These numbers are averages taken from data received from the 2013 calender year. The exact times are not what's important, but the ballpark estimated time is substantial evidence to conduct an occupant schedule for each space to be designed.
From these recordings, it is evident that June offers the most daylight and December offers the least.
It is crucial to know what time it gets dark at the site, because it can be a dangerous area. Therefore, having a prepared user schedule will allow for occupants to plan their day accordingly and safely.

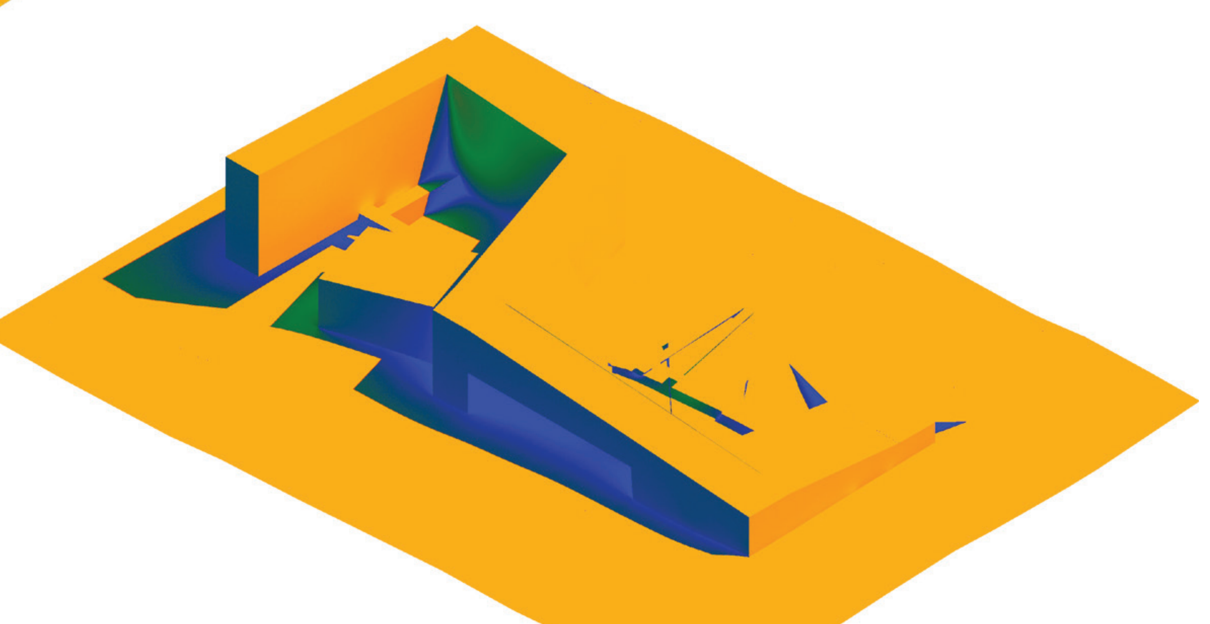
Radiation of Mass Surfaces with Max. Sun at Noon



1st Iteration

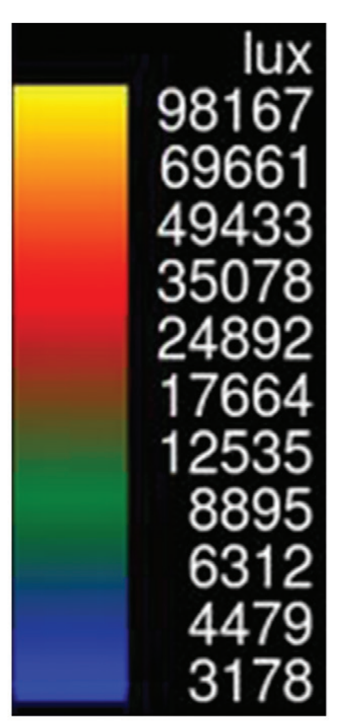


2nd Iteration



3rd Iteration

Key



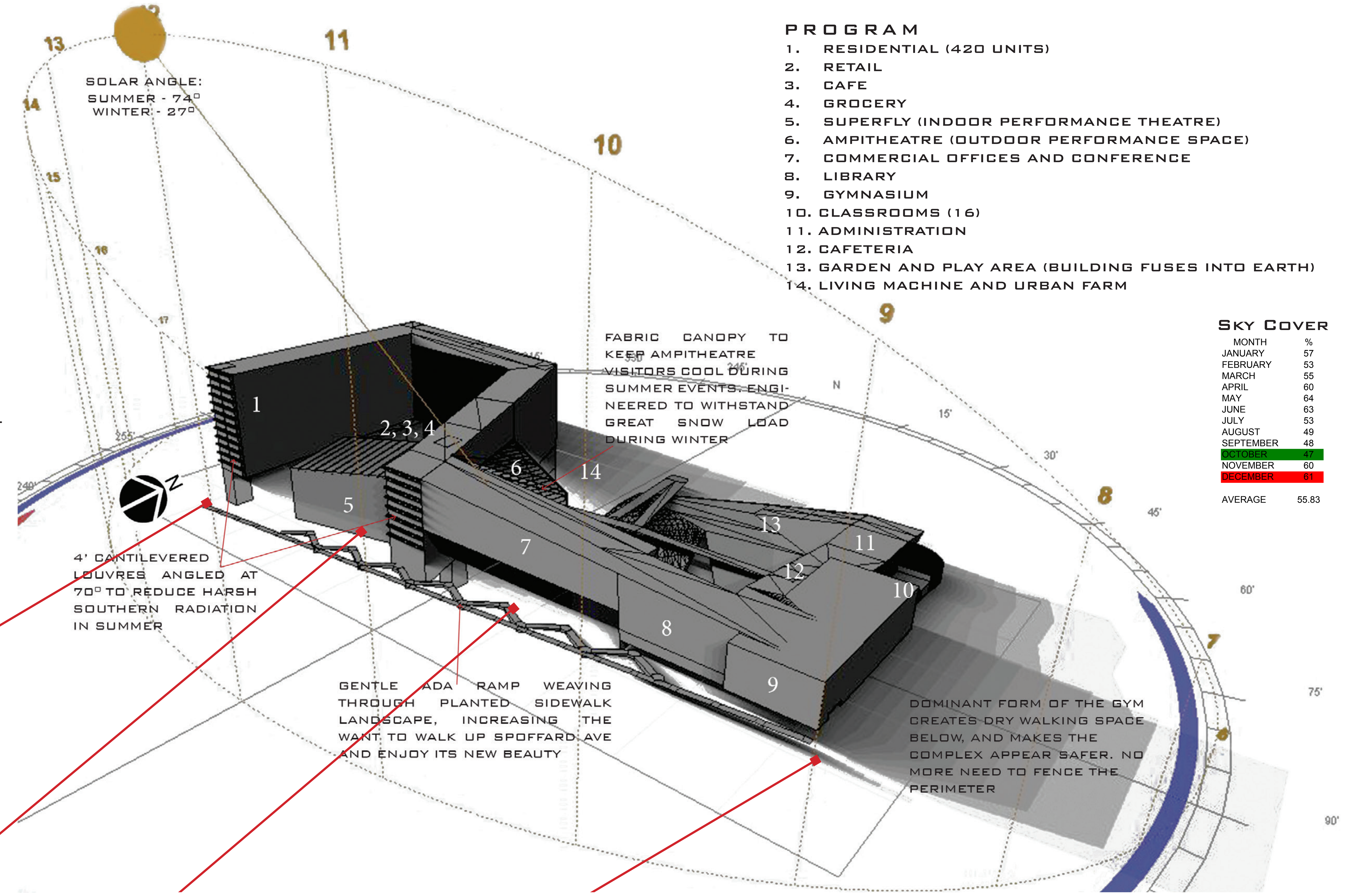
The massing iteration process generated very similar simulation results as noticed above. However, if you understand the Lux Key to the left, the higher the lux, the more direct solar radiation a surface is receiving. Therefore if you had to select a design considering mostly daylighting, heat gain, and passive indoor thermal comfort based on the above three images, which one would you choose?
The 2nd iteration should have a blue southern facade on like one, and three because there are tall buildings across the street.
Decide which iteration would be best taking your original answers to the first set of questions, and now add - accessibility, safety, connectivity, and circulation.
Can you see that my thought process of creating a continuous and narrow building that opens and closes up to the context, answers all the above questions? Finally, is it appealing to the community?

Program

1. Residential (420 units)
2. Retail
3. Cafe
4. Grocery
5. Superfly (indoor performance theatre)
6. Ampitheatre (outdoor performance space)
7. Commercial offices and conference
8. Library
9. Gymnasium
10. Classrooms (16)
11. Administration
12. Cafeteria
13. Garden and play area (building fuses into earth)
14. Living machine and urban farm

Sky Cover

MONTH	%
JANUARY	57
FEBRUARY	53
MARCH	55
APRIL	60
MAY	64
JUNE	63
JULY	53
AUGUST	49
SEPTEMBER	48
OCTOBER	47
NOVEMBER	60
DECEMBER	61
AVERAGE	55.83



Axonometric Butterfly Diagram showing Shadow Ranges

Analysing a design in axonometric is key to an architect and/or urban planner, because it reveals many significant areas that are crucial to acknowledge under climatic conditions, not to mention spatial qualities and adjacencies. Here I wanted to see how much shadow area potential this form could display. Thankfully the shadows will only be large in two directions: the East and certainly the West - where the building rises to 150'-0". My main goal was to allow as much natural light as possible into every facade, and this could only achieved by keeping the building narrow and linear. The Sky Cover table shows how only three months out of the year, the sky is less than 50% covered, meaning not much sunlight reaches the site all year round. Designing the complex in this way became the efficiency guiding solution to accomodate the design strategies implemented on the swatches board. Compare the photograph images of the existing site (left), to the renderings in the following presentation boards. Although they are just an interpretation, the idea and reality of the possibilities is extraordinary compared to currently.

Wind Analysis

SOURCE DIRECTION		DEC, JAN, FEB	MAR, APR, MAY	JUN, JUL, AUG	SEP, OCT, NOV
	N	26+ (7.8%)	26+ (5.7%)	23 max (5%)	26+ (9.9%)
	NNE	23 max (5%)	26+ (4.8%)	23 max (4%)	26+ (8.5%)
	NE	26+ (5.3%)	26 max (8.8%)	23 max (5%)	26+ (11%)
	ENE	19 max (4%)	26+ (8.1%)	23 max (4%)	26 max (3.5%)
	E	26 max (3%)	26 max (7.7%)	23 max (3.9%)	19 max (3.9%)
	ESE	15 max (3%)	26 max (4.2%)	19 max (3%)	15 max (2.9%)
	SE	11 max (1.9%)	26 max (4.4%)	15 max (3.5%)	19 max (4.1%)
	SSE	26 max (3%)	26 max (4.8%)	23 max (9.2%)	19 max (5%)
	S	26 max (2.2%)	26+ (11.1%)	26+ (14.2%)	15 max (5.2%)
	SSW	19 max (4%)	26+ (9.7%)	26+ (11.3%)	26 max (4.4%)
	SW	23 max (7.9%)	26 max (6.8%)	23 max (7.2%)	26+ (9.5%)
	WSW	23 max (7%)	23 max (3%)	26+ (7.8%)	26+ (6.8%)
	W	26+ (12.1%)	26 max (3.2%)	19 max (6.5%)	26+ (6.8%)
	WNW	26+ (17.8%)	26+ (6.8%)	26+ (5.9%)	26+ (5.9%)
	NW	26+ (12.1%)	26+ (8.9%)	26+ (6.9%)	26+ (8.2%)
	NNW	26 max (5.8%)	26+ (2.5%)	19 max (3.2%)	26+ (4.3%)
		Km/h (% OF DAY)	Km/h (% OF DAY)	Km/h (% OF DAY)	Km/h (% OF DAY)
	TOTAL SPEED	367	413	363	373
	TOTAL %	101.9	100.50	100.60	99.90
	AVERAGE SPPED	22.94	25.81	22.69	23.31
	AVERAGE %	6.37	6.28	6.29	6.24
	26+ Km/h Wind Totals	5	8	5	9
	26+ Km/h Wind West	3	4	4	6
	27+ Km/h Wind East	1	2	0	2

NOTES
It appears that the average speed for each season is above 22 Km/h but less than 26 Km/h, with these average speeds occurring Only 6% of the time, which is roughly 43 hours a month or 1.5 hours a day.
However, the wind can reach speeds of well over 26 Km/h, and are random. Therefore it is okay to assume for this study that typical wind conditions are constant around these findings.
In conclusion, the wind is at its maximum from the West all year round.

Psychrometric Chart