The Institute for
SUSTAINABLE CITIES
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"Adaptation to Future Risks in Coastal Megacities" - Household Survey

NEW YORK CITY CASE STUDY:

Red Hook, Brooklyn & Edgemere, Queens - January/February 2016

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Cover image: *NYCHA public housing projects rise behind a vacant lot, Edgemere, Rockaway Peninsula, Queens. (Photo: Joshua Eli)*

OVERVIEW

From January through February 2016 household surveys were conducted in Red Hook, Brooklyn and Edgemere/Arverne, Queens, two neighborhoods similar in their proximity to – and affinity for – the water, yet distinctly different in terms of culture, housing stock, and disaster response. On the one hand, Red Hook is a formerly industrial waterfront neighborhood currently poised between gentrification and equitable development, a diverse patchwork of brick row houses, public housing complexes, and derelict warehouses. Development seems to be taking place on every block, and many residents are newcomers, attracted to the area despite its startling brush with Sandy. Community organizations are very involved in daily life, including disaster preparedness efforts, and overall residents seem to have an optimistic view of the future.

Edgemere, on the other hand, seems far removed from its early beginnings as a beachside resort community. Though still dotted with vacation bungalows, public housing complexes rise prominently throughout the neighborhood, interspersed with raised single-family homes and the occasional Build It Back elevated home; abandoned homes and vacant lots are scattered throughout the neighborhood. Construction crews at work on the boardwalk are a reminder of how much Sandy-repair remains to be done, and residents (long-term, for the most part) are exasperated at the thought of future storms, in an area where even a simple rainstorm inundates the streets.

Though quite visually and culturally distinct from one another, Red Hook and Edgemere/Arverne are similar in that they are quite representative of the current state of New York City's waterfront. Both are home to an economically diverse population, ranging from the very low-income to the relatively well-off. Both are windows into the potential future of the waterfront – development and hardening, as in Red Hook, or managed relocation and ecosystem-based resilience, as in Edgemere? And both are located at the relative fringes of the city center, home to proud, diverse, self-reliant communities.

This report is organized into neighborhood overviews describing the areas' histories, geographic properties, infrastructure, and demographic information, as well as brief overviews of how each were affected by Hurricane Sandy. These are followed by a description of our research methodology and issues we experienced administering the survey. Maps and preliminary survey results are found in the appendix.

An Edgemere street, flanked by vacant lots, terminating at Jamaica Bay. (Photo: Joshua Eli)
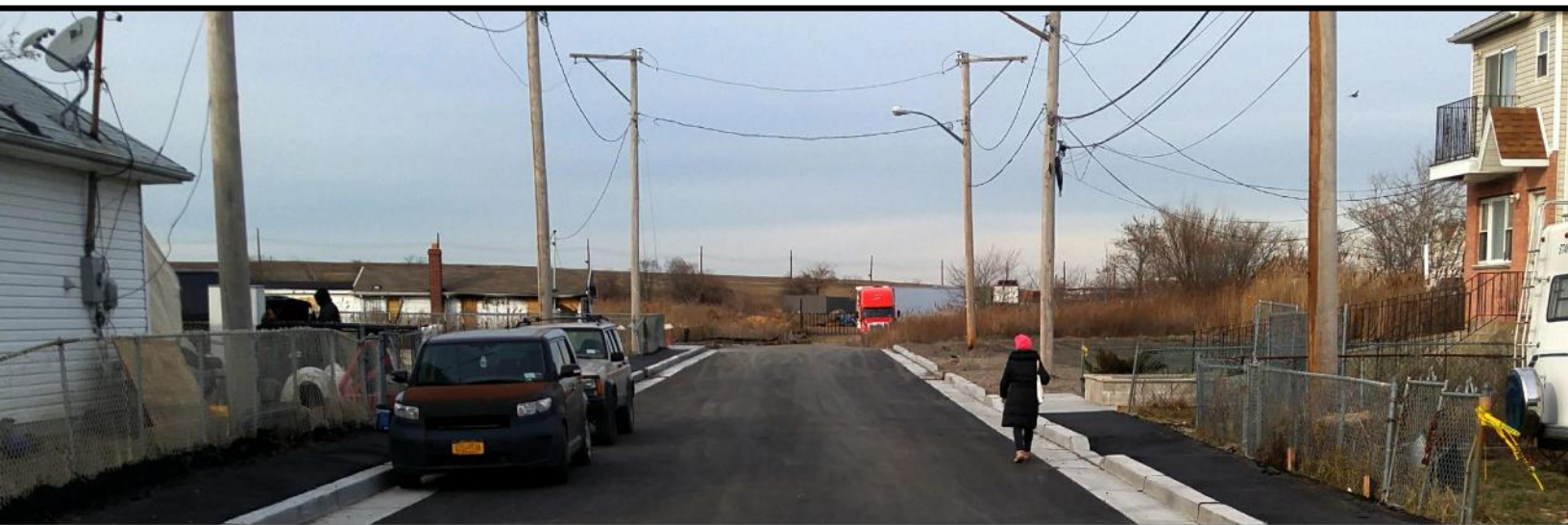
NEIGHBORHOODS

Red Hook, Brooklyn
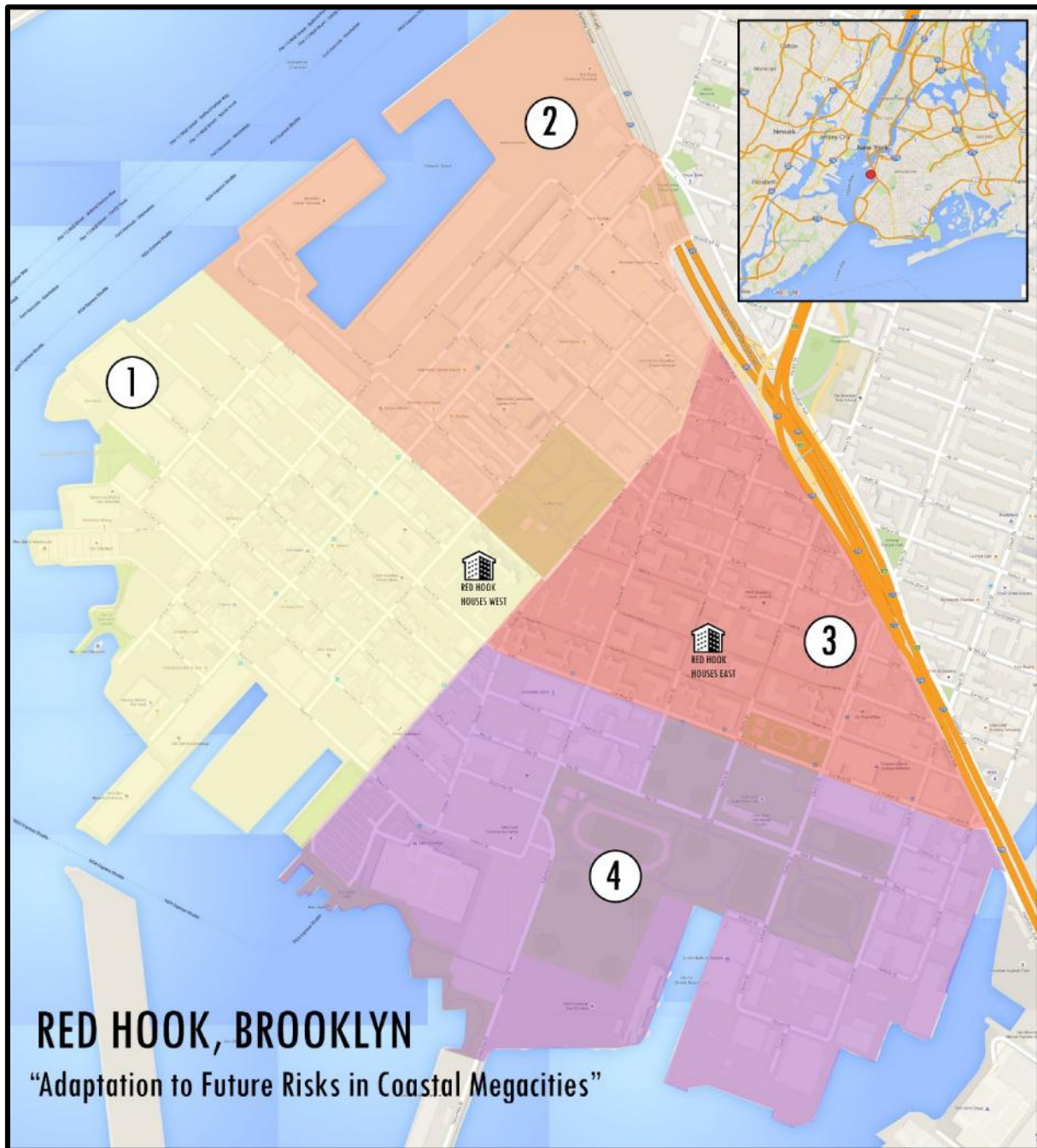
Red Hook, Brooklyn, divided into surveying areas.

Red Hook is a peninsular neighborhood in western Brooklyn bordered by the Upper New York Bay and Buttermilk Channel to the west, Gowanus Canal to the south, and the neighborhoods of Carroll Gardens and Downtown Brooklyn to the northeast. It is separated quite distinctly, both physically and culturally, from the latter neighborhoods by the Gowanus Expressway and Hugh L. Carey Tunnel, an elevated highway running the

length of the neighborhood's northeast border. It is serviced by the B61 and B57 bus lines, as well as an IKEA Ferry Shuttle service to and from Manhattan; the Mayor's office has announced tentative plans for a streetcar system that would link Red Hook with other waterfront neighborhoods in Brooklyn and Queens[1].

Red Hook is a part of Brooklyn Community Board 6 and comprises three Census tracts: 53, 59, and 85. In 2013 the median household income for the neighborhood was $43,850. Tract 85, however, which is comprised entirely of the NYCHA Red Hook Houses (public housing), had a median household income of $18,390. (Tracts 53 and 59 averaged $67,054 and $61,106, respectively)[2]. The Red Hook Houses are the largest public housing development in Brooklyn, and house approximately 6,000 residents. Residents are serviced by the Joseph Miccio Community Center, as well as a number of local community-based organizations such as Red Hook Initiative and the Red Hook Community Justice Center.

Red Hook Demographics, 2013

Total Population: 10,670	
Median Household Income: US$43,850.00	
Foreign Born: 2,681 (abt. 25%)	
High School Graduate or more: 4,419 (abt. 73%)	
In Labor Force: 5,092 (abt. 70.5%)	
Owner Occupied: 240 (abt. 9%)	

Information taken from American Community Survey 2013

The residential areas surrounding the NYCHA campus are characterized by a diverse mix of housing types, including multifamily apartments, row houses (with basement apartments), fixed-income apartment complexes, and formerly industrial spaces converted into lofts. These areas are concentrated primarily in the center of the neighborhood and to the west, with the southern and northwestern waterfront areas still largely industrial.

Examples of housing in Red Hook (clockwise from top left): Brick row houses on Coffey St., NYCHA public housing high rise, attached multifamily homes on Wolcott St., and converted loft apartments on Verona St. (Photos: Chris Barrett)

Hurricane Sandy

Like much of the City, Red Hook was caught unawares by Hurricane Sandy, despite being categorized as Zone A, or at high risk from flooding during hurricane strength storms. Approximately 5 feet of water swept through the neighborhood, inundating basements and ground floors as well as various businesses, including the Fairway Market – the area's primary grocery store.
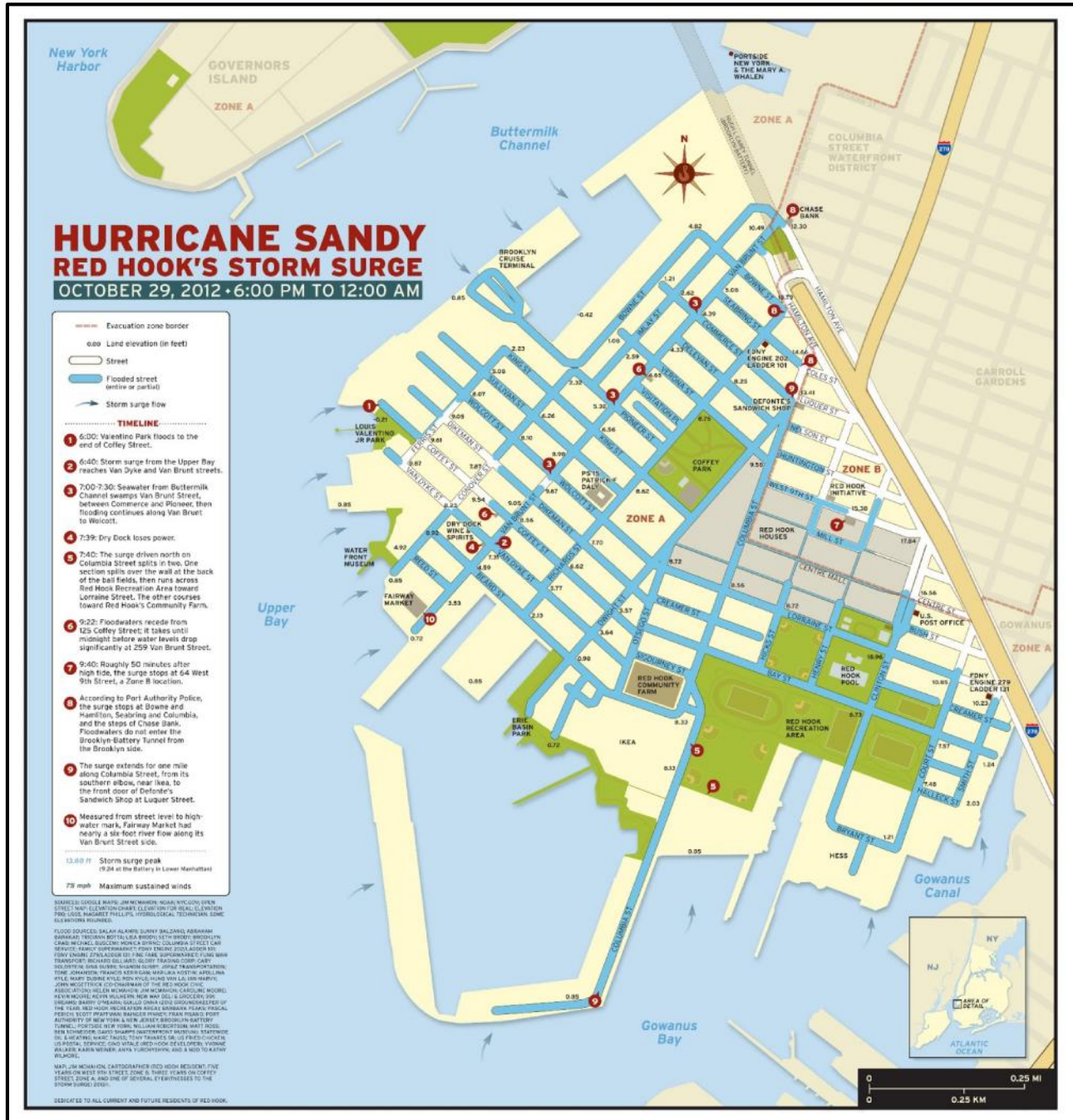
Storm Surge in Red Hook during Hurricane Sandy. Streets in blue were either completely or partially flooded. (Map: Jim McMahon, cartographer and Red Hook resident)

In the NYCHA Red Hook Houses, approximately 3,600 residents lost power for an extended period of time following the storm, and over 4,000 residents lost heat and water[3]. NYCHA has since been working

collaboratively with neighborhood organizations and other City agencies to increase infrastructural resiliency of their Red Hook buildings[4], though some residents we spoke with expressed frustration at the process, stating "People are getting a salary to come out here and talk to us, but they're not listening to what we're saying."

Local community organizations, particularly Red Hook Initiative (RHI), played a significant role in the disaster response, distributing food, blankets, medicine, and flashlights to residents of the Red Hook Houses, in particular homebound and elderly tenants. Volunteers organized by RHI also assisted in the cleanup of streets and local businesses.

Edgemere, Queens
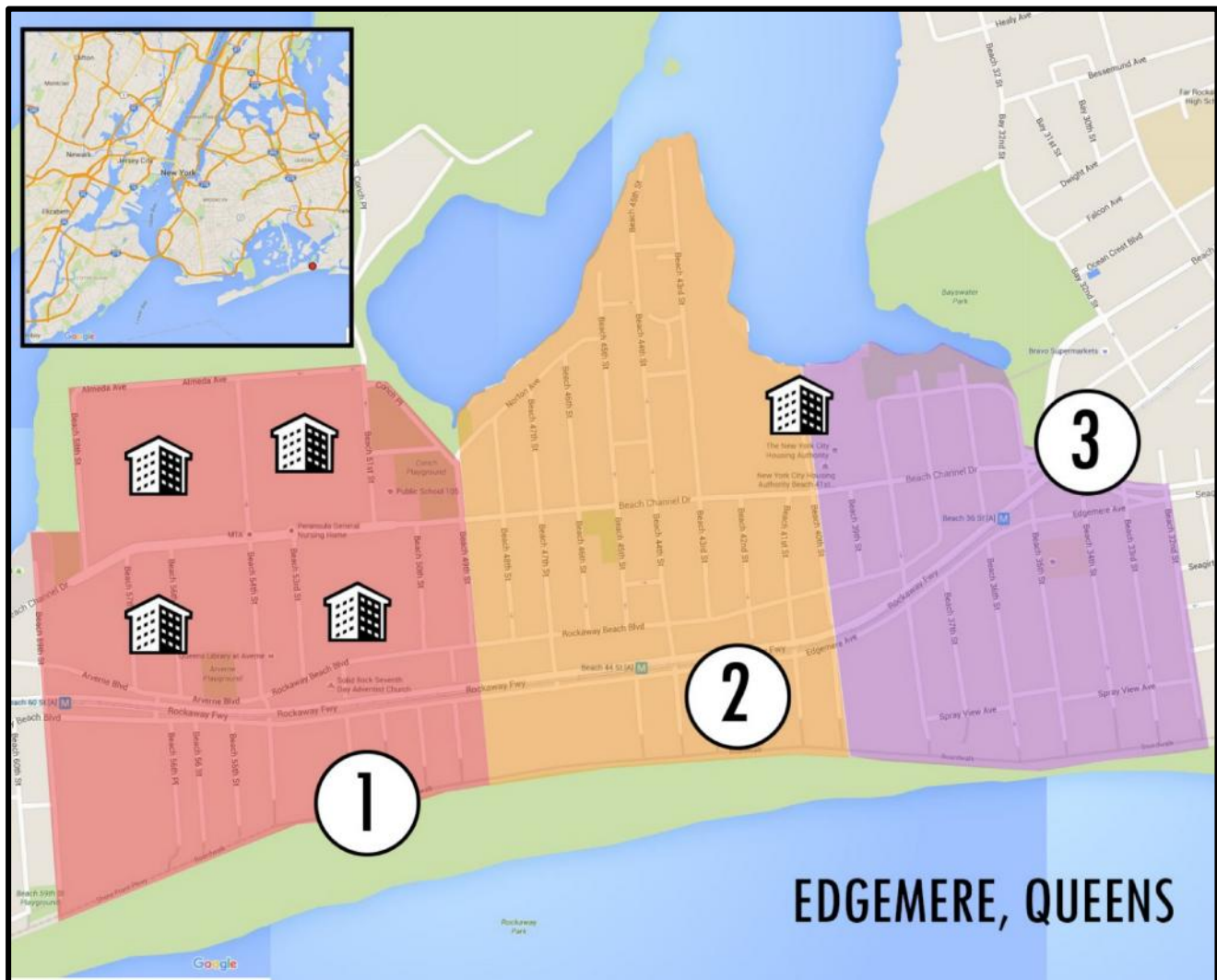
Edgemere, Queens, divided into surveying areas.

Edgemere, founded in 1892 as a beachside resort community, is located on the eastern half of the Rockaway Peninsula in Queens. It is bordered by the Atlantic Ocean to the south, Jamaica Bay to the north, Far Rockaway to the east, and the relatively more affluent Arverne to the west. Rockaway Community Park, jutting into Jamaica Bay, is a rezoned landfill that was closed in 1995, after nearly 60 years of use; in 1990 7,000 drums of toxic waste were removed from the site, which is still monitored for pollution[5]. On the neighborhood's

southern border lie 81 acres of City-owned beachfront, the largest unused plot of land in New York (see *Arverne East* call-out below).

Edgemere is serviced by the elevated A train, which separates the residential areas from the beach and has its terminus in nearby Far Rockaway, where a Long Island Rail Road station with service to Manhattan is also located. A trains are infrequent and

Edgemere Demographics, 2013

Total Population: 13,303	
Median Household Income: US$28,316.00	
Foreign Born: 2,863 (abt. 23%)	
High School Graduate or more: 4,760 (abt. 67.2%)	
In Labor Force: 4,635 (abt. 48.7%)	
Owner Occupied: 427 (abt. 11.8%)	

Information taken from American Community Survey 2013

do not connect to the western half of the Peninsula, reinforcing the neighborhood's general sense of isolation. This was especially true in the immediate aftermath of Hurricane Sandy, when train service (which spans a narrow bridge over Jamaica Bay) was disrupted for seven months until a sea wall was constructed[6]. The Q22 and Q52 bus lines, as well as privately-operated "dollar vans" (common in transit-poor eastern Queens) connect residents to the western half of the Peninsula and Far Rockaway.

The neighborhood is a part of Queens Community Board 14 and, like Red Hook, is comprised of three Census tracts: 972.02, 972.03, and 972.04. Tract 972.02, fronting the Atlantic, is composed primarily of the aforementioned 81 vacant acres, with the Arverne View affordable housing apartments making up the only real residential area at its westernmost end. Its median income in 2013 was $22,366. Tract 972.03, facing the Bay, averaged $17,763 in 2013, and is where most of the area's abandoned homes are to be found. Tract 972.04, composed mostly of newer multifamily homes, runs horizontally along the center of the neighborhood and averaged $44,821 median household income in 2013.

Many homes in Edgemere have been abandoned, or completely razed to make way for new, 'resilient' development. Some homes, though in complete disrepair, still house tenants. (Photos: Joshua Eli and Chris Barrett).

The westernmost third of the neighborhood is defined primarily by the Ocean Bay, Bayside, and Oceanside Apartments (NYCHA public housing), in addition to the aforementioned Arverne View affordable housing apartments. Arverne View underwent substantial renovations after Hurricane Sandy[7], though residents still express concerns over crime, and there is great disparity between buildings in terms of upkeep. Other building types in the neighborhood include beach bungalows, attached multifamily homes, detached single family homes, and a handful of houses elevated under the Build It Back program.

Examples of housing in Edgemere (clockwise from top left): Arverne View affordable housing high rise apartments, single family home recently elevated by Build It Back program, and attached multifamily homes. (Photos: Chris Barrett)

Hurricane Sandy

Edgemere, and the entire Rockaway Peninsula in general, was hit particularly hard by Hurricane Sandy, with storm surge reaching heights of 11 feet in some areas. Tenants of single-story bungalows in the neighborhood described flood waters completely submerging their homes, as water from the Atlantic Ocean merged with Jamaica Bay; indeed, standing in the center of the neighborhood, one can see both the ocean and the bay from a single vantage point, and tidal flooding is a common occurrence even in non-storm conditions. Seven of the City's 44 deaths occurred on the Rockaway Peninsula, from drowning or injuries sustained during the surge.

Many residents we spoke with expressed regret at not evacuating earlier, despite the City's warnings. Others, particularly in the Arverne View apartments, stayed to guard their homes from looters in the aftermath of the storm. Approximately 100 apartments, we were told, were broken into during and after the storm – a problem prevalent across the Peninsula, where looters impersonated Long Island Power Authority (LIPA) employees to gain access to homes[8]. Residents in single-family homes petitioned the NYPD to set up floodlights along the streets to deter looters.

Rockaways: Hurricane Sandy Flood Extent and Housing

Neighborhood	Number of Residential Units	Number of Residential Units in Storm Surge Area	Percentage of Residential Units in Storm Surge Area
Breezy Point, Rockaway Point	2,424	2,424	100%
Roxbury	411	411	100%
Neponsit	536	508	95%
Belle Harbor	2,738	2,716	99%
Rockaway Park	3,440	2,926	85%
Seaside, Rockaway Beach, Hammels	7,521	7,479	99%
Broad Channel	996	996	100%
Arverne not Edgemere or Somerville	4,545	4,358	96%
Somerville	2,004	2,004	100%
Edgemere	1,702	1,702	100%
Far Rockaway	21,260	13,008	61%
Totals	**47,577**	**38,532**	**81%**

Legend:
- City Street
- Vehicle Only Street
- Private Street
- Addressable Path
- Housing Units
- Storm Surge Area

Note: neighborhood names and boundaries taken from DCP, Google Maps, and Wikipedia. Parcels considered within storm surge if more than 10% of property lies within storm surge zone.

Created by: Pratt Center for Community Development, January 2013. Sources: FEMA Modeling Task Force, DCP PLUTO 2011

One hundred percent of homes in Edgemere were located in the storm surge area, though vulnerability differed vastly depending on housing type. (Map: Pratt Center for Community Development)

Arverne East — to develop or not to develop?

Stretching from Beach 56th Place to Beach 32nd Street and wedged between the ocean and elevated subway tracks lie 81 undeveloped acres of scrub, dunes, and garbage. Originally home to the neighborhood of Arverne East, the area was razed in 1969 as part of an urban renewal project, though the housing planned for the area was ultimately never developed. Today, it is the largest single tract of vacant City-owned land in New York, and the debate over its future perfectly encapsulates the larger debate regarding the future of urban coastal development.

In 2013 the FAR ROC Design Competition was announced to elicit development proposals for a new Arverne East, focusing on coastal resiliency (in light of Hurricane Sandy) and integration with existing adjacent communities. The winner, "Small Means & Great Ends," by Swedish architecture firm White Arkitekter, "aims not only to better weather future natural disasters, but also to create a stronger socio-economic environment – moving beyond resilience and becoming 'antifragile,' where both the design and community benefit and improve after enduring stress."[9] The proposal is an ideological cousin to nearby Arverne By The Sea, a luxury housing development begun under the Bloomberg administration and designed specifically to withstand a storm like Sandy[10]. The question posed by many, however – from planners to developers to local residents – is whether anything should be built at all, resilient or not[11].

Right, above: Arverne East near Beach 32nd Street in 2010. (Photo: Nathan Kensinger). Right, below: Rendering of potential future residential street at Arverne East. (White Arkitekter)

Arverne, Queens

Arverne, to the west of Edgemere, is a comparatively wealthier suburban neighborhood divided into the Somerville area (facing Jamaica Bay) and the aforementioned Arverne By The Sea, fronting the beach. Its median income in 2013 was $67,227. The area was included in the survey in order to reach more respondents. Arverne By The Sea, however, due to its uncommon resiliency to the storm, was not included.

METHODOLOGY

Surveys were conducted by five graduate assistants and four undergraduate assistants working in groups of two or three, during the months of January and February 2016. Neighborhoods were divided beforehand into clearly defined surveying "zones," which research teams were assigned to in order to avoid overlapping. Each household we attempted was entered into a Google Map (see Appendix) and labelled according to their response (completed a survey, took an online link, mailed back a survey, or declined to participate). Surveying times ranged from the morning to the early evening, and took place on both weekdays and weekends.

An online version of the survey was created using the Qualtrics platform, and links were given to households that didn't have time to complete the survey face-to-face. Fliers with links were also created and distributed in the mailboxes of households that didn't answer their door, or left in local businesses, libraries, etc. In total only about 21 online responses were received, although online respondents gave considerably longer, more detailed responses to the qualitative questions. Respondents who answered online may have been predisposed to participate in such a survey, or have a deeper awareness of climate issues. Online responses came predominantly from Red Hook (17 out of 21), with only 4 from Edgemere/Arverne.

The online survey was promoted via social media, as well as on community information sites such as Red Hook Hub. The environmental non-profit Rockaway Waterfront Alliance (located in Edgemere) shared the link via their social media, and handed fliers out to clients.

NYCHA residents and community stakeholders in Red Hook discuss proposed resiliency measures for the public housing campus with City employees. (Photo: Chris Barrett)

In addition to online promotion, some research assistants attended community resilience events (primarily in Red Hook) to share the survey with community stakeholders. These events included the Red Hook Integrated

Flood Protection System (IFPS) public meeting on January 21st at the Miccio Community Center, as well as a NYCHA Public Housing Sandy Update meeting, also at the Miccio Center, on February 8th. Although we were prevented from conducting surveys during the meetings, some participants completed them on their own during the meeting or mailed them back afterwards.

Face-to-face surveys, which made up the bulk of our responses, took anywhere between 20 minutes and an hour to complete, depending on a) how talkative the respondent was, or b) their understanding of the questions. Most surveys were conducted inside the home, while others took place outside (i.e. on the front stoop). Some respondents (particularly in high rise apartment buildings), opted to complete the survey on their own for us to pick up at the end of the day. Respondents were relatively split between those who completed the survey on their own *in our presence*, and those who preferred to be walked through question by question.

Obstacles and Respondents

Overall, reaching potential respondents proved difficult, even after the creation of the online survey. For this reason we abandoned our "every-other-house" or "every-other-apartment" approach and instead knocked on as many doors as possible. More than anything, respondents were put off by the length of the survey; more generally, New Yorkers are wary of door-to-door solicitors. In many cases respondents simply weren't home, even when we shifted to more weekend and late afternoon/early evening outings. In order to compensate we extended the surveying area to include nearby Arverne (described above), canvassed community resiliency meetings, and asked certain respondents with clout in their communities (i.e. tenants' association members, or charismatic neighbors) to share the survey with other interested friends and family.

Residents we spoke with (both those who participated and those who declined) varied greatly in their demeanor, awareness of climate change and sustainability, openness to participating, and reasons for participating or declining. In general there were three distinct responses when we told residents we were conducting a survey regarding disaster preparedness and (in New York's case) Hurricane Sandy: 1) they'd been greatly affected by the storm and wanted to discuss it at length (though sometimes this meant simply describing their personal experience verbally, then declining to complete the actual survey); 2) they'd been affected by the storm, and were so exhausted by the experience and fed up with disaster recovery efforts that they refused to discuss it any further (we experienced this particularly in Edgemere, where the effects of the storm are still very much evident); or 3) their home had not been flooded, and so they didn't think they could participate. When we explained that the survey dealt with future preparedness as well, some relented and participated. Many of our successful attempts to complete the survey were thanks to our affiliation with CUNY (where respondents were either alumni, current students, or their children were current or recent students).

A very small minority of respondents in all three neighborhoods demonstrated a keener understanding of sustainability, resiliency, and climate change, and participated enthusiastically (these included a flood insurance affordability specialist from Red Hook and former Occupy Sandy volunteers in Edgemere). Many respondents were aware of the risk of flooding in their neighborhood, even if they didn't necessarily attribute it to climate change or sea level rise. Residents of Edgemere and Arverne in particular noted the frequency of flooding (both tidal and from rainfall) in the neighborhood, and dismissed it as an (expensive) fact of life in the area. Red Hook residents, on the other hand, expressed more shock at the flood, as the neighborhood had never been so exposed/affected prior to Sandy.

Issues with Questions

A few questions raised issues with respondents consistently. These included:

1.13 In your household, how many people work (include only full-time workers)? Many respondents work only part-time, an option that is not reflected in the data mask.

3.7 Can you remember any period of abnormally high temperatures in the city? Unlike flood events, which stand out distinctly in people's minds, respondents had difficulty recalling the specific years of heatwaves (except where the heatwave resulted in major power outages).

3.11 What factors led to this action, or prevented you from doing something else? Very few respondents answered this question.

5.5 In this scenario, assuming you have the same income and family as now, please rank [...] what you would want to do and what you think you would actually be able to do. This question by far tripped up respondents the most, and many skipped it altogether. Surveyors found it difficult to explain, and unfortunately it was often filled out incorrectly (for example, three of the options in the "Wish" column would be ranked "1", or the "Reality" column would be left blank, etc.). Surprisingly (and maybe because of formatting), this question was answered correctly more often online than in-person.

6.6 How would you rate consumption of water and energy in your neighborhood/residential area? Respondents often felt that they couldn't speak for others regarding this question. If they did answer, their answers often reflected their general view of the neighborhood; i.e., those with a dim view of their neighbors and residential area often gave low marks, while those with a favorable view gave higher marks. Respondents familiar with climate change and sustainability often gave high marks, indicating perhaps that they were thinking of their own social circles in the neighborhood, who live similar lifestyles.

7.1 Who should be responsible for direct disaster response in case of a flood? This question was also unclear to respondents (in terms of how to answer), though slightly less so than question 5.5. Many respondents failed to rank from 1 to 5; for instance, many selected "local government and disaster management agency" as number 1 in importance, but failed to rank 2 through 5. Others would select, for instance, 1) local government, 2) relatives, neighbors, and friends, and 3) every household for itself, but not rank the last two options, not believing them to have any responsibility.
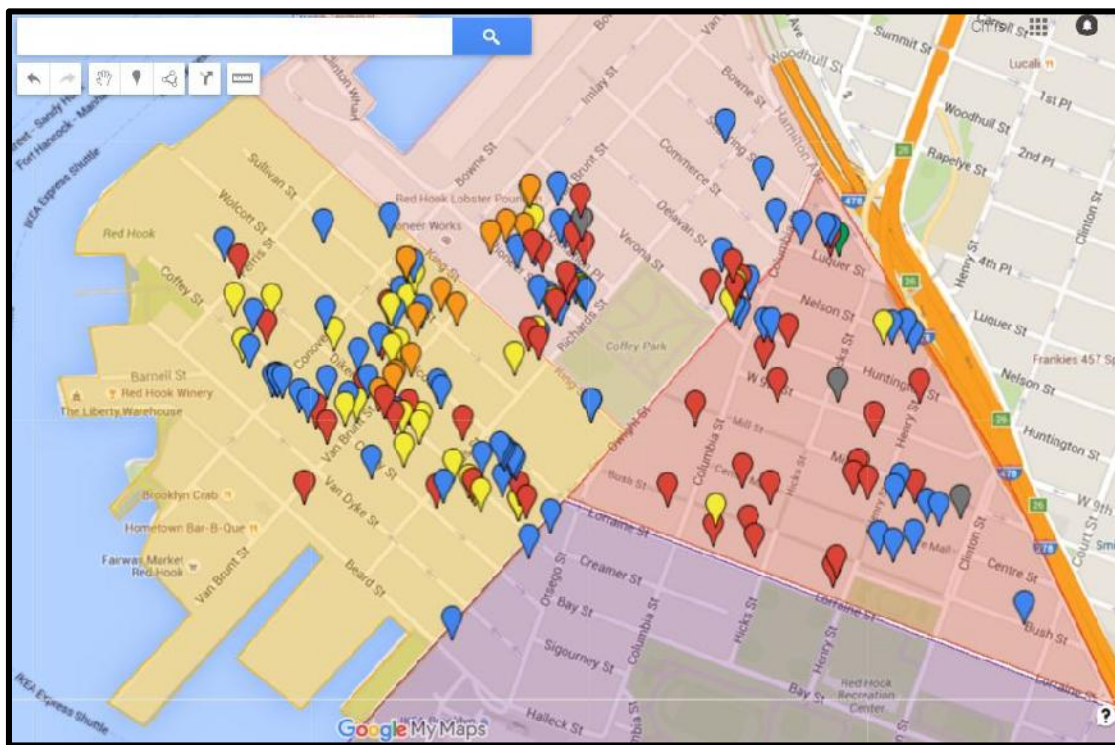
Angry graffiti adorns a construction site in Red Hook, Brooklyn. (Photo: Chris Barrett)

APPENDIX

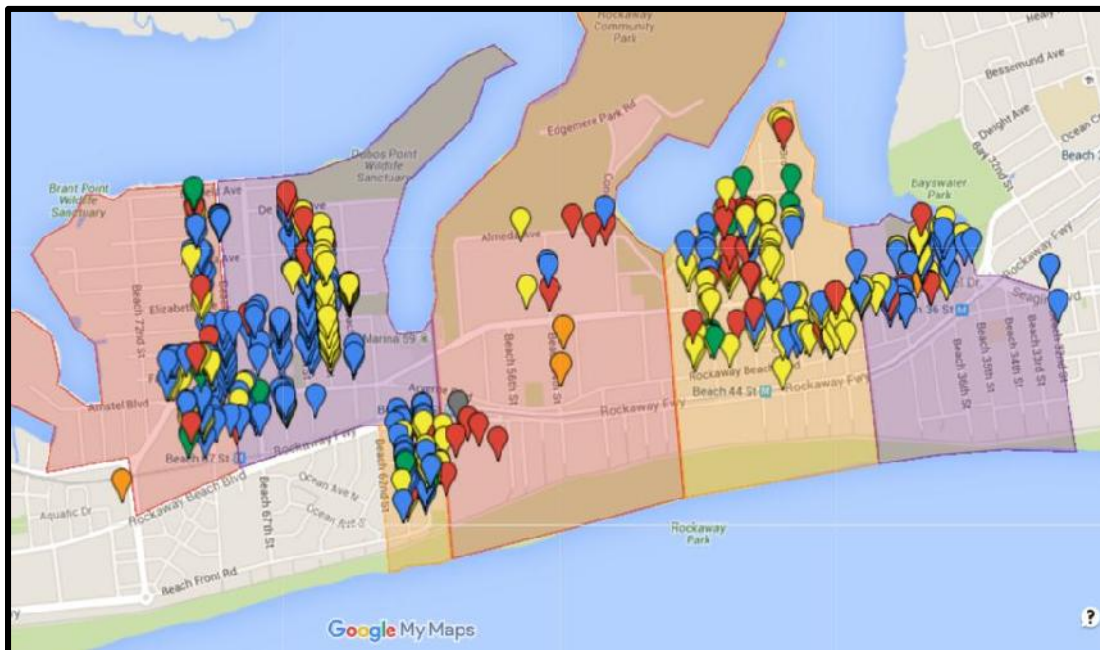## Map 1: Red Hook Responses (Google Maps)

Map 2: Edgemere/Arverne Responses (Google Maps)

Key: Red = completed survey, **Blue** = took online link, **Yellow** = declined, **Orange** = canvassed business, **Green** = offered to mail survey back, **Dark Gray** = community organization contacted.

	Red Hook (n=63)	Edgemere (n=47)	Arverne (n=26)	Uncertain (n=6)	Total (n=142)
1.1 Condition of dwelling	Deteriorated: 0 (0%) Poor: 10 (16%) Average: 14 (22%) **Good: 19 (30%)** Excellent: 13 (21%) N/A: 7 (11%)	Deteriorated: 0 (0%) Poor: 3 (6%) Average: 11 (23%) **Good: 22 (47%)** Excellent: 3 (6%) N/A: 8 (17%)	Deteriorated: 0 (0%) Poor: 1 (4%) Average: 8 (31%) **Good: 11 (42%)** Excellent: 4 (15%) N/A: 2 (8%)	Deteriorated: 0 (0%) Poor: 1 (17%) **Average: 2 (33%)** Good: 1 (17%) Excellent: 1 (17%) N/A: 1 (17%)	D: 0 (0%) P: 15 (11%) A: 35 (25%) **G: 53 (37%)** E: 21 (15%) N/A: 18 (13%)
1.4 Gender	**Female: 44 (70%)** Male: 17 (27%) N/A: 2 (3%)	**Female: 28 (60%)** Male: 17 (36%) N/A: 2 (4%)	Female: 10 (38%) **Male: 15 (58%)** N/A: 1 (4%)	Female: 2 (33%) **Male: 4 (67%)** N/A: 0 (0%)	**F: 84 (59%)** M: 53 (37%) N/A: 5 (4%)
1.6 Mobile phone	**Yes: 58 (92%)** No: 4 (6%) N/A: 1 (2%)	**Yes: 42 (89%)** No: 2 (4%) N/A: 3 (6%)	**Yes: 21 (81%)** No: 5 (19%) N/A: 0 (0%)	**Yes: 6 (100%)** No: 0 (0%) N/A: 0 (0%)	**Yes: 127 (89%)** No: 11 (8%) N/A: (3%)
1.7 Internet	**Yes: 52 (83%)** No: 10 (16%) N/A: 1 (2%)	**Yes: 42 (89%)** No: 3 (6%) N/A: 2 (4%)	**Yes: 24 (92%)** No: 2 (8%) N/A: 0 (0%)	**Yes: 4 (67%)** No: 2 (33%) N/A: 0 (0%)	**Yes: 122 (86%)** No: 17 (12%) N/A: 3 (2%)
1.9 Tenant or Owner	**Tenant: 45 (71%)** Owner: 17 (27%) N/A: 1 (2%)	**Tenant: 29 (62%)** Owner: 16 (34%) N/A: 2 (4%)	Tenant: 9 (35%) **Owner: 17 (65%)** N/A: 0 (0%)	**Tenant: 5 (83%)** Owner: 1 (17%) N/A: 0 (0%)	**T: 88 (62%)** O: 51 (36%) N/A: 3 (2%)
1.10 Main language(s)	**English: 61 (97%)** Spanish: 11 (17%) Creole: 0 (0%) Russian: 0 (0%) Yoruba: 0 (0%) Ibo: 0 (0%) Edo: 0 (0%) ASL: 2 (3%) German: 2 (3%) N/A: 1 (2%)	**English: 42 (89%)** Spanish: 8 (17%) Creole: 0 (0%) Russian: 0 (0%) Yoruba: 2 (4%) Ibo: 1 (2%) Edo: 0 (0%) ASL: 0 (0%) German: 0 (0%) N/A: 4 (9%)	**English: 26 (100%)** Spanish: 2 (8%) Creole: 1 (4%) Russian: 1 (4%) Yoruba: 0 (0%) Ibo: 0 (0%) Edo: 0 (0%) ASL: 0 (0%) German: 0 (0%) N/A: 0 (0%)	**English: 5 (83%)** Spanish: 1 (17%) Creole: 0 (0%) Russian: 0 (0%) Yoruba: 1 (17%) Ibo: 0 (0%) Edo: 1 (17%) ASL: 0 (0%) German: 0 (0%) N/A: 1 (17%)	**Eng: 134 (94%)** Sp: 22 (15%) Cr: 1 (<1%) Ru: 1 (<1%) Yo: 3 (2%) Ib: 1 (<1%) Ed: 1 (<1%) ASL: 2 (1%) Ger: 2 (1%) N/A: 6 (4%)
1.12 Avg. household income	<25: 16 (25%) 25-35: 6 (10%) 35-45: 3 (5%) 45-55: 0 (0%) 55-65: 2 (3%) 65-75: 4 (6%) **>75: 26 (41%)** N/A: 6 (10%)	**<25: 19 (40%)** 25-35: 6 (13%) 35-45: 1 (2%) 45-55: 3 (6%) 55-65: 2 (4%) 65-75: 2 (4%) >75: 6 (13%) N/A: 8 (17%)	<25: 3 (12%) 25-35: 2 (8%) 35-45: 0 (0%) 45-55: 0 (0%) 55-65: 1 (4%) 65-75: 1 (4%) >75: 6 (23%) **N/A: 13 (50%)**	<25: 1 (17%) 25-35: 1 (17%) 35-45: 1 (17%) 45-55: 0 (0%) 55-65: 0 (0%) 65-75: 0 (0%) >75: 1 (17%) **N/A: 2 (33%)**	**<25: 39 (27%)** 25-35: 15 (11%) 35-45: 5 (4%) 45-55: 3 (2%) 55-65: 5 (4%) 65-75: 7 (5%) **>75: 39 (27%)** N/A: 29 (20%)
1.18 Education completed	Primary: 11 (17%) Secondary: 10 (16%) Polytechnics: 3 (5%) **Bachelors: 19 (30%)** Masters: 13 (21%) PhD: 5 (8%) None: 2 (3%)	Primary: 6 (13%) **Secondary: 18 (38%)** Polytechnics: 2 (4%) Bachelors: 15 (32%) Masters: 5 (11%) PhD: 0 (0%) None: 1 (2%)	Primary: 7 (27%) Secondary: 7 (27%) Polytechnics: 0 (0%) **Bachelors: 8 (31%)** Masters: 2 (8%) PhD: 2 (8%) None: 0 (0%)	**Primary: 3 (50%)** Secondary: 2 (33%) Polytechnics: 0 (0%) Bachelors: 1 (17%) Masters: 0 (0%) PhD: 0 (0%) None: 0 (0%)	P: 27 (19%) S: 37 (26%) Po: 5 (4%) **BA: 43 (30%)** MA: 20 (14%) PhD: 7 (5%) None: 3 (2%)
2.1 Avg. household health status	8.28/10 (N/A: 2)	7.85/10 (N/A: 0)	8.00/10 (N/A: 0)	6.17/10 (N/A: 0)	7.58/10 (N/A: 2)
2.2 Avg. healthy diet	8.69/10 (N/A: 1)	7.66/10 (N/A: 0)	8.19/10 (N/A: 0)	7.50/10 (N/A: 0)	8.01/10 (N/A: 1)
2.3 Avg. satisfaction with housing	6.98/10 (N/A: 1)	6.72/10 (N/A: 0)	7.50/10 (N/A: 0)	6.50/10 (N/A: 0)	6.93/10 (N/A: 1)
2.4 Avg. personal safety	7.15/10 (N/A: 1)	6.17/10 (N/A: 0)	6.54/10 (N/A: 0)	6.17/10 (N/A: 0)	6.51/10 (N/A: 1)

	Red Hook (n=63)	Edgemere (n=47)	Arverne (n=26)	Uncertain (n=6)	Total (n=142)
2.5 Avg. environmental conditions	5.92/10 (N/A: 1)	5.83/10 (N/A: 0)	6.77/10 (N/A: 0)	5.50/10 (N/A: 0)	6.01/10 (N/A: 1)
3.12 Avg. Exposure to flood events	6.31/10 (N/A: 1)	6.36/10 (N/A: 0)	7.04/10 (N/A: 1)	7.50/10 (N/A: 0)	6.80/10 (N/A: 2)
3.13 Avg. Exposure to high temperatures	4.97/10 (N/A: 0)	4.91/10 (N/A: 0)	4.29/10 (N/A: 2)	5.00/10 (N/A: 0)	4.79/10 (N/A: 2)
4.4 Did you change your behavior?	**Yes: 34 (54%)** No: 20 (32%) N/A: 9 (14%)	**Yes: 29 (62%)** No: 13 (28%) N/A: 5 (11%)	**Yes: 17 (65%)** No: 7 (27%) N/A: 2 (8%)	**Yes: 5 (83%)** No: 1 (17%) N/A: 0 (0%)	**Yes: 85 (60%)** No: 41 (29%) N/A: 16 (11%)
4.7.1 Do you feel prepared re: another major event?	5.42/10 (N/A: 6)	6.34/10 (N/A: 3)	6.12/10 (N/A: 0)	6.00/10 (N/A: 0)	5.97/10 (N/A: 9)
5.1 Would you wish to continue living here?	**Yes: 32 (51%)** No: 29 (46%) N/A: 2 (3%)	Yes: 16 (34%) **No: 31 (66%)** N/A: 0 (0%)	Yes: 7 (27%) **No: 17 (65%)** N/A: 2 (8%)	**Yes: 5 (83%)** No: 1 (17%) N/A: 0 (0%)	Yes: 60 (42%) **No: 78 (55%)** N/A: 4 (3%)
5.3 Would you expect help from government?	**Yes: 46 (73%)** No: 11 (17%) N/A: 6 (10%)	**Yes: 33 (70%)** No: 10 (21%) N/A: 4 (9%)	**Yes: 17 (65%)** No: 6 (23%) N/A: 3 (12%)	**Yes: 5 (83%)** No: 1 (17%) N/A: 0 (0%)	**Yes: 101 (71%)** No: 28 (20%) N/A: 13 (9%)
6.2 Avg. access to warning messages	7.90/10 (N/A: 3)	8.58/10 (N/A: 2)	9.16/10 (N/A: 1)	8.33/10 (N/A: 0)	8.49/10 (N/A: 6)
6.3 Avg. ability to change livelihood	6.88/10 (N/A: 4)	6.64/10 (N/A: 3)	6.92/10 (N/A: 2)	6.50/10 (N/A: 0)	6.74/10 (N/A: 9)
6.4 Avg. neighborhood awareness	6.84/10 (N/A: 5)	5.88/10 (N/A: 5)	6.48/10 (N/A: 1)	6.67/10 (N/A: 0)	6.47/10 (N/A: 11)
6.5 Avg. household risk reduction	6.25/10 (N/A: 6)	7.20/10 (N/A: 2)	7.48/10 (N/A: 1)	6.17/10 (N/A: 0)	6.78/10 (N/A: 9)
6.6 Avg. water and energy consumption	6.88/10 (N/A: 7)	5.68/10 (N/A: 3)	5.96/10 (N/A: 3)	5.83/10 (N/A: 0)	6.09/10 (N/A: 13)
6.7 Avg. improvement by local authorities	5.04/10 (N/A: 11)	5.93/10 (N/A: 4)	6.26/10 (N/A: 3)	5.50/10 (N/A: 0)	5.68/10 (N/A: 18)
7.2 Will maintain, reduce, or increase?	**Maintain: 19 (30%)** Reduce: 6 (10%) Increase: 18 (29%) Other: 13 (21%) N/A: 7 (11%)	Maintain: 11 (23%) Reduce: 4 (9%) **Increase: 16 (34%)** Other: 12 (26%) N/A: 4 (9%)	Maintain: 8 (31%) Reduce: 1 (4%) **Increase: 10 (38%)** Other: 4 (15%) N/A: 3 (12%)	Maintain: 0 (0%) Reduce: 0 (0%) Increase: 2 (33%) Other: 2 (33%) N/A: 2 (33%)	M: 38 (27%) R: 11 (8%) **I: 46 (32%)** O: 31 (22%) N/A: 16 (11%)
7.3 Has maintained, reduced, or increased?	**M: 22 (35%)** R: 4 (6%) I: 20 (32%) O: 10 (16%) N/A: 7 (11%)	**M: 15 (32%)** R: 8 (17%) I: 10 (21%) O: 11 (23%) N/A: 3 (6%)	M: 8 (31%) R: 1 (4%) **I: 9 (35%)** O: 5 (19%) N/A: 3 (12%)	M: 2 (33%) R: 0 (0%) I: 1 (17%) O: 2 (33%) N/A: 1 (17%)	**M: 47 (33%)** R: 13 (9%) I: 40 (28%) O: 28 (20%) N/A: 14 (10%)

Map 3: Vacant lots in Edgemere (Google Earth)

ENDNOTES

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