Kingston Flooding Task Force
Riverview Baptist Church, Kingston, NY
March 12, 2013 * 2-6 pm

Draft Meeting Summary

Next Meeting
Tuesday April 23, 3-6pm, City Hall Council Chambers.

Action Items

- Workgroup of volunteers (Jennifer Schwartz Berky, Huntley Gill, Ann Loeding, Kevin McEvoy) – provide guidance to planning team at one meeting prior to Meeting 4 on COAST tool parameters and adaptation approaches for consideration.
- Planning Team – Develop meeting 4 agenda
- All – see meeting materials online at Kingstoncac.org, including a link to the Google Earth maps produced through the COAST model for any who wants to review the results.

Welcome and Introductions

On March 12, 2013, members of the Kingston Flooding Task Force met at the Riverview Missionary Baptist Church for their third Flooding Task Force meeting. The 34 meeting participants are listed in Appendix 1. Meeting handouts included NYS Department of State DOS) risk assessment tables, initial COAST results tables, meeting 3 agenda and a meeting evaluation. Meeting handouts, presentations and the compiled map showing the work by meeting participants can be found at Kingstoncac.org. Participants introduced themselves. Sacha Spector (Scenic Hudson) and Kristin Marcell (NYSDEC) introduced the goals and timeline of the Kingston Flooding Task Force process.

DOS Tool Results and COAST Introduction and First Results

Barry Pendergrass (NYS DOS) thanked a small working group of Task Force members who met with the Planning Team since the last meeting to share their local knowledge and experience and to develop risk assessments for all local assets of interest in the flooding zone using the DOS risk assessment tool. He reminded people how the tool weighs risk based on hazard, exposure and vulnerability (described in greater depth at meeting 2). For example, a riverside park might experience frequent flooding but recover quickly and therefore have a relatively low risk score.

Maps produced by Scenic Hudson in cooperation with DOS were distributed. They show the Kingston Rondout and Hudson waterfronts depicting the three DOS risk areas: extreme, high and moderate, along with assets outside of risk zones that were identified as having flooded in the past. Sacha Spector noted that this tells him that the elevation-based risk zones do not fully

capture all of the flood prone areas, since the source of flooding is also from upstream (precipitation in the basin (watershed).

Participants were given a handout showing the risk score of all identified local assets, which was developed by the working group, see Appendix 2. The Emergency Service Marine Station had the highest risk score of 75 out of 100 for both the 10- and 100-year flood levels. Barry pointed out that the Kingston Lighthouse's risk score jumps from 17 to 70 between the two storm levels, indicating that the worse storm would cross some threshold for the lighthouse causing significantly more damage than the 10-year storm.

The Task Force can use this tool to better understand and prioritize relative risks across Kingston's waterfront assets. Barry recommended that the Task Force go back and apply the tool to calculate risk scores with an additional three feet of sea level rise (the high sea level rise scenario for 2060 and low for 2100).

Introduction to and Preliminary Results of the COAST Tool

JT Lockman (Catalysis) introduced the Coastal Adaptation to Sea-Level rise Tool (COAST), which his consulting firm will be employing for the Task Force's process. The COAST tool allows people to see the likely economic impact of various future situations. COAST was initially developed in Maine by the Environmental Finance Institute and funded by the EPA. For Kingston, the tool uses values for property parcels and then calculates the monetary value of damage at varying flooding heights using the Army Corps of Engineer's Depth Damage Function. Water elevation for various sea-level rise and storm events situations are used. For this initial analysis, JT used land elevation map layers from NYSDEC (LiDAR data). He also used assessed values of individual land parcels, and produced a graphic – presented on large maps posted around the room – showing the likely expenses due to damage of a 100-year storm in 2100 with high sea level rise.

Scenarios

2013	
SLR	Flood
none	10 -yr
none	100-yr
2060	
SLR	Flood
Low	10 -yr
High	10 -yr
Low	100-yr
High	100-yr
2100	
SLR	Flood
Low	10 -yr
High	10 -yr
Low	100-yr
High	100-yr

JT distributed three handouts. Appendix 3 shows the vulnerability assessment results; estimated cumulative damage numbers for all buildings and improvements and for the waste water treatment plant alone under ten different scenarios (years 2013, 2060 and 2100, high, low and no sea-level rise, and 10- and 100-year flood levels). These 10 scenarios are summarized in the table at the right. The other two handouts listed the individual damages for each property parcel for 2100 with just sea level rise and with an added 100-year flood (these are available at Kingstoncac.org).

This worst-case scenario 2100 with high sea-level rise and a 100-year storm, predicted $34.5 million in damage along the Kingston waterfront, with $25 million of that representing the waste water treatment plant alone. These costs were displayed on large maps on

the meeting room walls; see Appendix 4 for an example. JT thinks it is clear that the treatment plant is the most expensive improved land in the waterfront area and so represents the greatest financial risk. Cumulative damage from multiple storms plus sea level rise with no management action taken to address the situation would produce $88.3 million in damage by 2100.

These COAST model results allow people to see the proportion of damage resulting from sea-level rise alone (35% by 2100) in red, which will be permanently inundated (underwater at least twice a day), see Appendix 4. Because these calculations do not include flooding from Rondout Creek watershed or other run-off from the land, they might also underestimate future flooding problems.

Participants raised some concerns about problems with the assessed land values of certain parcels, noting these may not be representative of the value that certain assets bring to the community. They suggested analyzing income and cultural value as well. Sam Merrill (Catalysis) said that the tool is just a calculator and you can input any data you choose and correct for discrepancies during the interpretation phase, noting that in this case assessed land value was chosen as one of the inputs. Other communities use economic activity indicators like hotel receipts. The calculation only needs to be robust enough to serve the public process. Gregg Swanzey (Kingston Economic Development) said Kingston recently complete a re-valuation, so assessed values should be fairly accurate.

Examples of these images showing COAST damage projections are in appendix 4. They are available in Google Earth format and use parcel height to graphically represent relative damage.

For the next phase of this process, JT Lockman will use input from the Task Force to complete a cost-benefit analysis of specific adaptation approaches.

<u>Introduction to Flooding Adaptation Strategies</u>

Kristin Marcell (NYS DEC Estuary Program) began the discussion of adaptation strategies by presenting information on what Kingston has done already to respond to flooding.

- Kingston's zoning requires stormwater management in the riverfront district.
- Kingston has a flood overlay zoning district in which the lowest floor of new buildings must be two feet above the 100-year storm, electrical and HVAC must be elevated to this same height, and waterways with a regulated floodway – like Rondout – must show that new construction will not result in any increase in flood levels during occurrence of the 100-year storm.
- Kingston is currently updating its comprehensive plan for 2025.
- And, Kingston has a Local Waterfront Revitalization Plan.

Some property owners are taking steps themselves – the Steel House restaurant in Kingston is an excellent example of how a building retrofit can improve a building's resilience. It is designed to take on floodwaters with minimal damage and return to operation quickly after floodwaters

recede. The newly constructed Clearwater boathouse is designed to allow water to flow through it and can be up and running 24 hours after a flooding event.

Kristin then presented different climate change adaptation strategies (aka "ways you can prepare for climate change impacts"): accommodation, fortification and retreat, and illustrated each by showing examples of what communities around the globe have done. Kristin also highlighted the importance of scale; on a site, neighborhood or waterfront level. Some accommodation strategies can be used separately or in conjunction with others.

Discussion of Kingston's Adaptation Options and Geographic Areas

Kristin asked the Task Force to consider what they wanted their waterfront to look like long-term and what functions and uses it would serve. What infrastructure is new? What infrastructure is near the end of its useful life? Which assets must be protected at all cost? Which might be possible to move? Can a flexible set of strategies be envisioned that evolve as water levels rise?

Participants discussed the viability of the three adaptation strategies in Kingston. Participants' immediate reaction was to question whether state regulations would allow fortification and to say that relocation of assets seemed unlikely. The contribution of flooding from the watershed could be controlled upstream. Sacha mentioned the difference between Hurricanes Irene and Sandy; the water velocity and debris from upstream affected total damage. Gregg recommended the group distinguish between water-dependent and water-independent uses for businesses and the importance of Kingston as a viable port. For example, Millen's Scrap Yard is not water-dependent and benefitted from moved out of the flooding zone and Rondout waterfront. He also mentioned the vulnerability of the pylons for the railroad bridge that allows 50 trains to cross every day. Members agreed on the importance of the waterfront as a destination with recreation, culture, history, restaurants and a deepwater port. There was a call for innovative and out of the box thinking.

Participants discussed creative and non-traditional ways to approach the issue of sea level rise and flooding, looking at the area as a whole and what could be possible and not immediately dismissing some types of development and land use as not sustainable. There was agreement by several members to look beyond traditional economics and consider quality of life and creation of new types of value. The idea of deeded riparian rights was mentioned.

A. Fortification

A participant noted that fortification presents regulatory and aesthetic issues and might not address the fact that water comes from both sides, the land (surface run-off from watershed) and the river. It was suggested that the option of fortifying the sewage treatment plant be looked at, given its high value and the difficulty of relocating it. Concerns were expressed that floodplain laws and brownfield issues that could complicate fortification. It was suggested that

fortification could improve usability of Island Dock. Task Force members also expressed interest in evaluating fortification for the following assets or areas:

Fortify	# votes
Waste water treatment Plant	4
Restaurants and Cornell building	4
Deepwater port	3
Elevating East Strand	2
Island Dock	1
Jetty and lighthouse	1
Heritage Energy tanks and road access	1
Trolley tracks	0
Lower Ponckhockie	0
Road access: Abeel St to 213 at Eddyville	0
Train tracks	0
Eddyville Dam	0

B. Relocation

Relocation is undesirable given the historic and cultural value of Kingston's waterfront. Several Task Force members expressed interest in relocating the sewage treatment plant out of the flood risk zone. Task Force members also expressed interest in evaluating relocation for the following assets:

Retreat	# votes
Waste water treatment Plant	7
Heritage Energy oil tanks	7
Scrap yards, non water-dependent use	4
Maritime Museum	2
Central Hudson Gas plant	1
Sources of fuel oil contamination	1
Houses on South side of North St	1
Kingston Point beach and playgrounds	0
North St. & Delaware for wetland migration	0

C. Accommodation

Allan said the group should consider that buildings could float on water. Some members were interested in creating more storage for upstream water, perhaps creating wetlands or using the NYC water supply reservoir. Task Force members expressed interest in evaluating accommodation for the following assets and gave specific suggestions for some:

Accommodate	# votes
All vacant land along waterfront	7
Vertical pilings to hold floating docks	4
Controlling upland flooding	3
Maritime Museum	2
Marinas	1
Kingston Point Beach	0

Selection of COAST Adaptation Strategies

Participants expressed concern that they needed more examples and explanations of possible adaptations strategies before selecting specific approaches for COAST analysis.

Flip charts were used to capture the discussion on the strategies and assets. Using six colored dots, Task Force members voted with two dots per strategy, see results in the three tables above.

Wrap Up and Next Steps

Facilitator Ona Ferguson (Consensus Building Institute) wrapped up the meeting with a discussion of next steps. Several Task Force members offered to work with the planning team on COAST tool parameters before the next meeting: Jennifer Schwartz Berky, Huntley Gill, Ann Loeding, Kevin McEvoy, and Allan Shope. Task Force members were asked to complete a brief evaluation of this meeting.

Appendix 1: Meeting Participants

Task Force Members
Dennis Doyle, Ulster County
Doris Edwards, Riverview Baptist Church
Huntley Gill, Guardia Architects
Sandy Henne, Hudson River Cruises
Tom Hoffay, City of Kingston - Common Council Ward 2
Gayle Johnson, New Central Baptist Church
Ann Loeding, Friends of Kingston Waterfront
Kevin McEvoy, Kingston Land Trust
Steve Schabot, City of Kingston - Parks and Rec Board
Jennifer Schwartz-Berky, Kingston Resident
Allan Shope, Clearwater
Art Snyder, Ulster County Emergency Management

Project Team Members
Jeff Anzevino, Scenic Hudson
Betsy Blair, NYSDEC HRNERR
Sue Cahill, City of Kingston – Planning
Bonnie Devine, NYS Department of State
Ona Ferguson, Consensus Building Institute
Emilie Hauser, NYSDEC HRNERR
Mark Lowery, NYSDEC Office of Climate Change
Kristin Marcell, NYSDEC HREP Cornell
Libby Murphy, NYSDEC HREP Cornell
Julie Noble, City of Kingston - CAC
Barry Pendergrass, NYS Department of State
Sacha Spector, Scenic Hudson
Gregg Swanzey, City of Kingston - Economic Development
Christina Tobitsch, NYSDEC HRNERR and SCA

Others Present
JT Lockman, Catalysis Adaptation Partners, LLC
Sam Merrill, Catalysis Adaptation Partners, LLC
Jim Murac, Milone and MacBroom
David Railsback, ARCADIS
Deanna Roberston, Rondout Business Association
Steve Rosenberg, Scenic Hudson
Nancy Schneider, Earth People, Consultant
Joan Washington, Kingston Resident

Appendix 2: NYS DOS Risk Assessment Scores

Asset Class Key: Rec= Recreation Cul=Cultural Econ=Economic Trans=Transportation Res=Residential Com=Commercial Hum=Human Services

MAPPING		*INVENTORY of ASSETS*			*RISK ASSESSMENT - Current Conditions*						
No.	**Risk Area**	**Asset Name**	**Asset Class**	**Critical Facility**	**Hazard Score**		**Exposure Score**	**Vulnerability Score**		**Risk Score**	
					100-year	10-year		100-year	10-year	100-year	10-year
67	E	Emergency Svcs Marine Sta	Hum	y	5	5	3.76	4	4	75	75
72	E	Clearwater	Cul	n	5	5	3.76	4	3	75	56
11	E	Kingston Power Boat Assn	Com	n	5	5	3.64	4	4	73	73
57	E	Lighthouse	Cul	n	5	5	3.48	4	1	70	17
111	H	New Ulster Marine area	Com	n	4	3	3.92	4	3	63	35
6	H	Hud Riv Maritime Museum	Cul	n	4	3	3.86	4	3	62	35
91	E	Feeney's shipyard	Com	n	5	5	3.76	3	1	56	19
8	H	Riverview Baptist Church	Cul	n	4	3	3.42	4	4	55	41
84	E	*Cornell Bldg. (Zone H to E)	Com	n	5	5	3.64	3	3	55	55
2	E	Rondout Yacht Basin	Com	n	5	5	3.52	3	3	53	53
9	H	New Central Baptist Church	Cul	n	4	3	3.22	4	4	52	39
43	E	Hide Away Marina	Com	n	5	5	3.1	3	3	47	47
117	H	Rositas	Com	n	4	3	3.76	3	3	45	34
86	E	Great Harbor	Tra	y	5	5	2.92	3	3	44	44
114	H	North Street Residential	Res	n	4	3	2.72	4	1	44	8
115	H	St Marys Benevolent Assocs	Cul	n	4	3	2.72	4	1	44	8
65	H	Trolley Museum	Cul	n	4	3	2.46	4	1	39	7
1	H	Block Park	Rec	n	4	3	3.22	3	2	39	19
5	E	* Historic Kingston Tug Shop (Expos. From #84, est. Vul.)	Com	n	5	5	3.64	2	1	36	18
46	E	City docks	Trans	y	5	5	3.64	2	2	36	36
89	E	Kingston Point Park	Rec	n	5	5	3.46	2	1	35	17
113	H	Wilbur Neighborhood	Res	n	4	3	2.86	3	1	34	9

18	M	Broadway apartments	Res	n	3	1	2.68	4	1	32	3
10	E	Delaware Ave.	Trans	y	5	5	3.16	2	2	32	32
110	H	Steelhouse	Com	n	4	3	3.76	2	1	30	11
7	E	Tomkins Building	Econ	n	5	5	2.98	2	2	30	30
108	H	*Mariner's (chg. Zone M to H)	Com	n	4	3	1.83	4	3	29	16
22	H	Wastewater Treatment Plant	Trans	y	4	3	3.6	2	1	29	11
4	H	Gallo Park	Rec	n	4	3	3.42	2	2	27	21
112	H	West Kingston Recycling	Com	n	4	3	3.16	2	1	25	9
51	E	wetlands	Rec	n	5	5	3.64	1	1	18	18
68	E	Old gas plant	Tra	n	5	5	3.64	1	1	18	18
32	E	Kingston Point Beach	Rec	n	5	5	3.52	1	1	18	18
48	E	Old Kosco tanks	Com	n	5	5	3.52	1	1	18	18
49	E	Sunken canal boats natural vegetation	Rec	n	5	5	3.46	1	1	17	17
58	E	Foot Bridge	Rec	n	5	5	3.42	1	1	17	17
50	E	Sleightsburg launch	Rec	n	5	5	3.28	1	1	16	16
3	E	Island Dock	Rec	n	5	5	3.1	1	1	16	16
39	H	Heritage oil tanks	Com	y	4	3	3.84	1	1	15	12
118	E	Wetland - Kingston Pt marsh	Rec	n	5	5	3.04	1	1	15	15
101	H	Iannucci Parcel	Com	n	4	3	3.76	1	1	15	11
62	E	CSX Railroad Bridge	Tra	y	5	5	2.9	1	1	15	15
119	H	Wetland jetty	Tra	n	4	3	3.52	1	1	14	11
69	E	*East Strand (no zone to E)	Tra	y	5	5	2.74	1	1	14	14
121	H	*Dock St (added to list)	Tra	n	4	3	3.42	1	1	14	10
60	H	Brickyard	Res	n	4	3	3	1	1	12	9
61	H	Future Promenade Site	Rec	n	4	3	3	1	1	12	9
120	H	Sailors Cove	Res	n	4	3	3	1	2	12	18
70	H	*North Street (no zone to H)	Tra	y	4	3	2.8	1	1	11	8
99	H	Catherine St.	Tra	y	4	3	2.74	1	1	11	8
55	H	Millen's Dumpster Storage	Com	n	4	3	2.62	1	1	10	8
56	H	Old Millen's Recycling	Com	n	4	3	2.3	1	1	9	7
42	M	*Fitch Building (no zone to M)	Res	n	3	1	2.54	1	1	8	3
82	M	*Ship to Shore Rest. (Expos. From #108, estim. Vul.)	Com	n	3	1	1.83	1	1	5	2
45		Frank Sass Field (In Block Park, see #1)								0	0

78		Spring St.	Tra	y						0	0
81		Apartment building sites	Res	n						0	0
88	E	Rotary Park	Rec	n	5	5				0	0
94		Gill and Strand	Tra	y						0	0
98		Tomkins St.	Tra	y						0	0
104	H	Jeff's Yacht Haven	Com	n	4	3				0	0
107		*Savona (no flood damages)	Com	n						0	0
116		Willow Cordts Delawar Neigh	Res	n						0	0

COAST Model for City of Kingston - Modeled Water Levels and Vulnerability Assessment Results

Year	Sea Level Rise Scenario	Storm Intensity (return period in years)	Predicted Elevation of Flood Height from FEMA Flood Insurance Study, 2007 NAVD88 (ft.)[1]	COAST Model of Sea Level Rise Above MHHW in 2013 Selected by Kingston (in./ft)[2]		COAST Model Total Flood Elevation for Each Scenario NAVD 88 (ft.)	COAST Model Expected Damage to the Value of All Buildings & Improvements From This Single Storm Incident in the Scenario Year ($ Million)	COAST Model Expected Damage to the Value of Waste Water Treatment Plant Only From This Single Storm Incident in the Scenario Year ($ Million)	COAST Model Cumulative Expected Damage to the Value of All Buildings & Improvements From All Storms, 2013 to Scenario Year ($ Million)[3]	COAST Model Percent of Cumulative Expected Damage to the Value of All Buildings & Improvements From 2013 to Scenario Year Attributable to Sea Level Rise Only (Percent)[3]
2013	1 No SLR	10 yr	6.0	0	0	6.0	**12.0**	**8.7**	**n/a**	**n/a**
2013	2 No SLR	100 yr	8.2	0	0	8.2	**21.7**	**16.8**	**n/a**	**n/a**
2060	3 Lo SLR	10 yr	6.0	20	1.67	7.7	**18.8**	**14.4**	**69.0**	**26.8%**
2060	4 Lo SLR	100 yr	8.2	20	1.67	9.9	**24.7**	**18.8**	**69.0**	**26.8%**
2060	5 Hi SLR	10 yr	6.0	36	3	9.0	**22.0**	**16.8**	**73.5**	**31.7%**
2060	6 Hi SLR	100 yr	8.2	36	3	11.2	**29.5**	**22.2**	**73.5**	**31.7%**
2100	7 Lo SLR	10 yr	6.0	33	2.75	8.8	**21.9**	**16.8**	**82.7**	**28.6%**
2100	8 Lo SLR	100 yr	8.2	33	2.75	11.0	**27.5**	**20.6**	**82.7**	**28.6%**
2100	9 Hi SLR	10 yr	6.0	68	5.67	11.7	**29.7**	**22.2**	**88.3**	**34.8%**
2100	10 Hi SLR	100 yr	8.2	68	5.67	13.9	**34.5**	**24.8**	**88.3**	**34.8%**

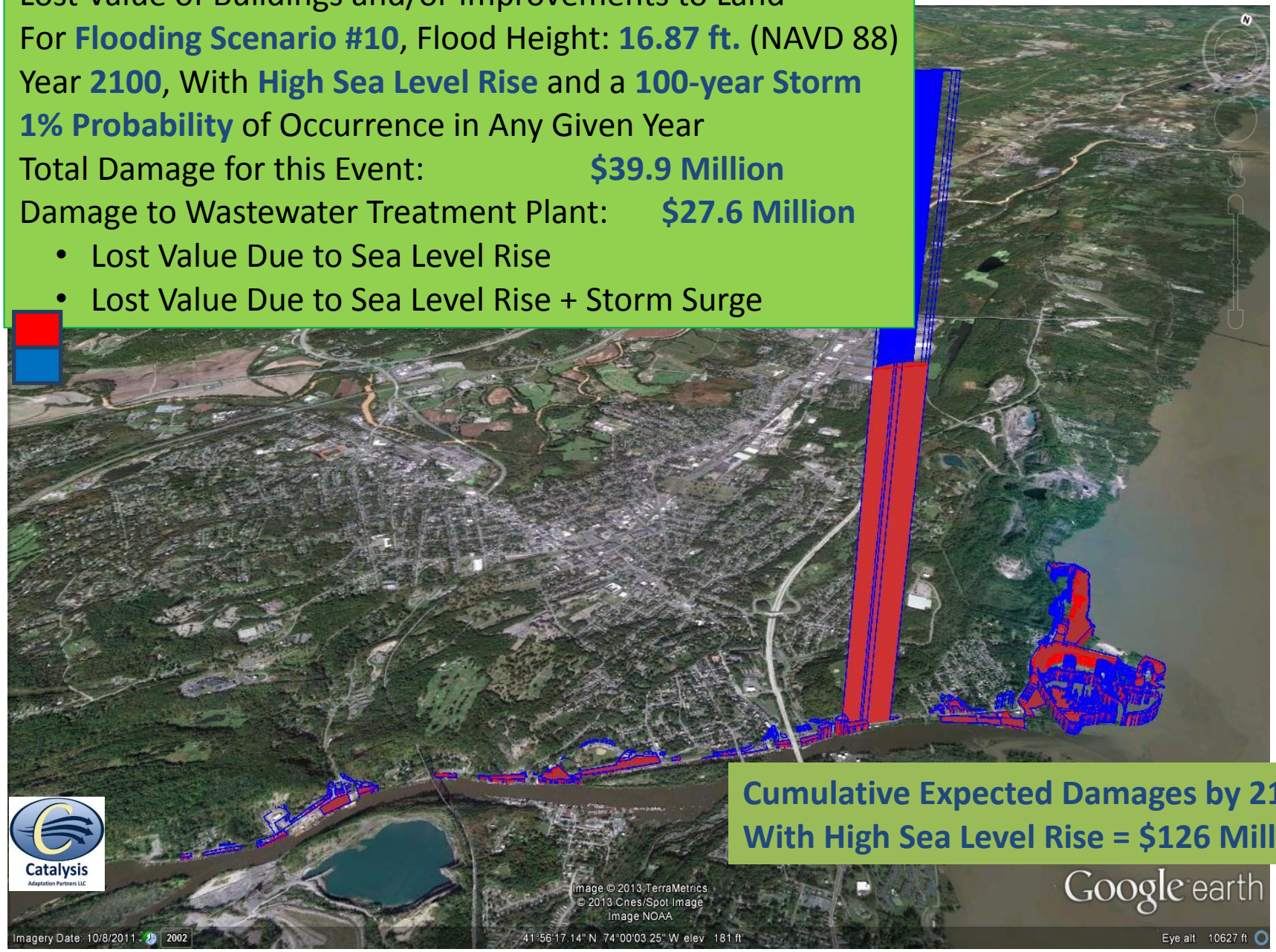
[1] *Tidal state is included in FEMA FIS predicted flood elevations for the 10 year and 100 year storms.*

[2] *Elevation of Mean Higher High Water (MHHW) in year 2013 is 3.0 feet (NAVD 88).*

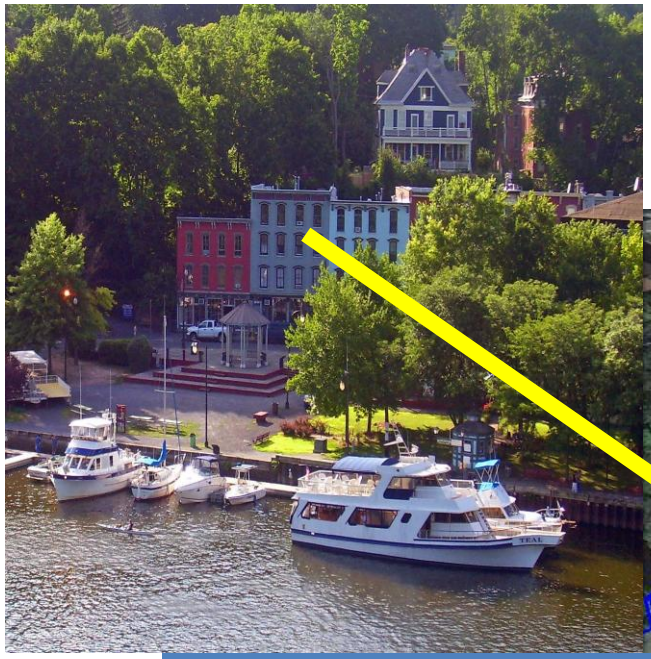
[3] *Discount Rate of 3.3 percent applied.*

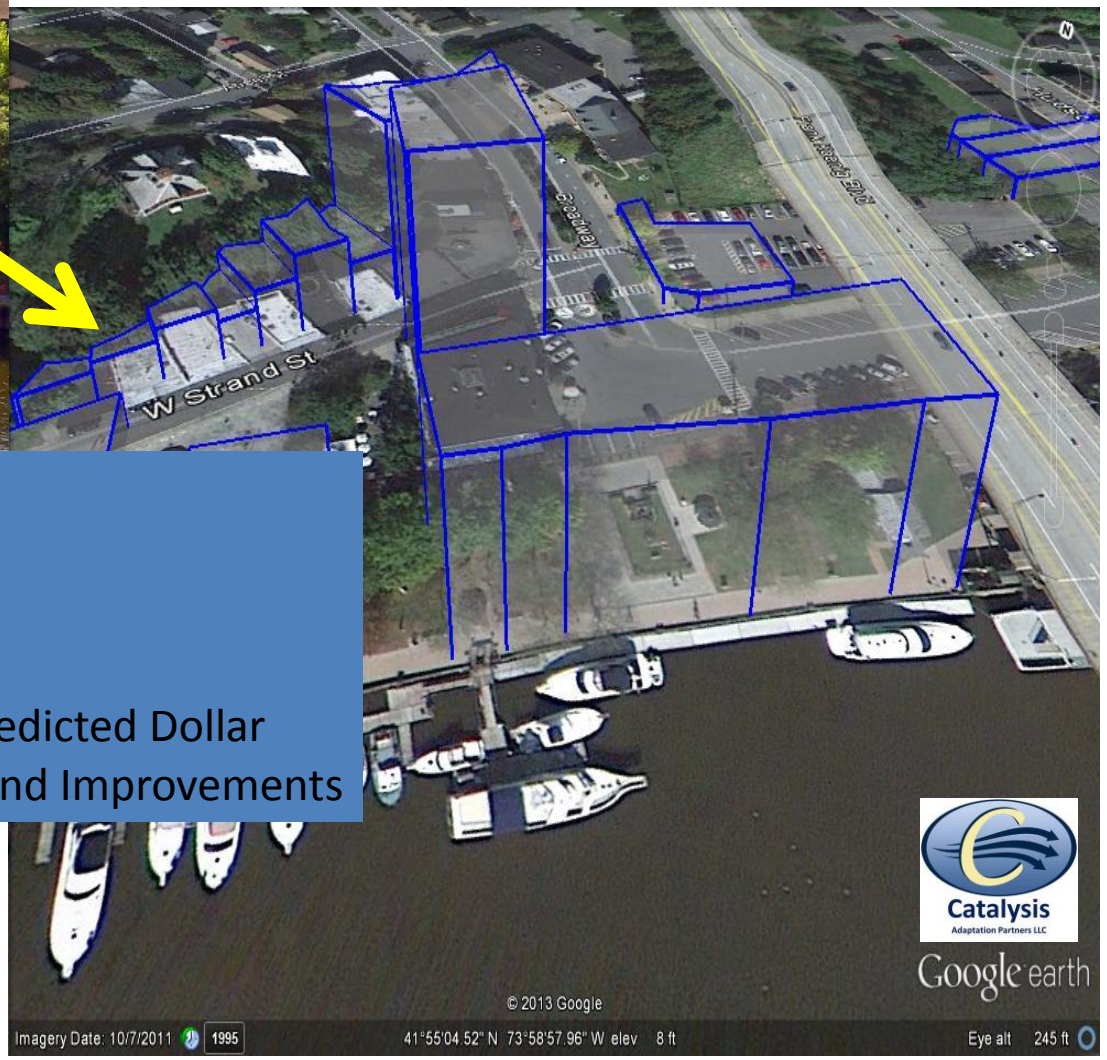
Lost Value of Buildings and/or Improvements to Land
For **Flooding Scenario #10**, Flood Height: **16.87 ft.** (NAVD 88)
Year **2100**, With **High Sea Level Rise** and a **100-year Storm**
1% Probability of Occurrence in Any Given Year
Total Damage for this Event: **$39.9 Million**
Damage to Wastewater Treatment Plant: **$27.6 Million**

- Lost Value Due to Sea Level Rise
- Lost Value Due to Sea Level Rise + Storm Surge



Cumulative Expected Damages by 2100
With High Sea Level Rise = $126 Million





West Strand Street
Rondout Landing Area
COAST Output
Relative Height of
Blue Boxes Indicates Predicted Dollar
Damages to Buildings and Improvements