

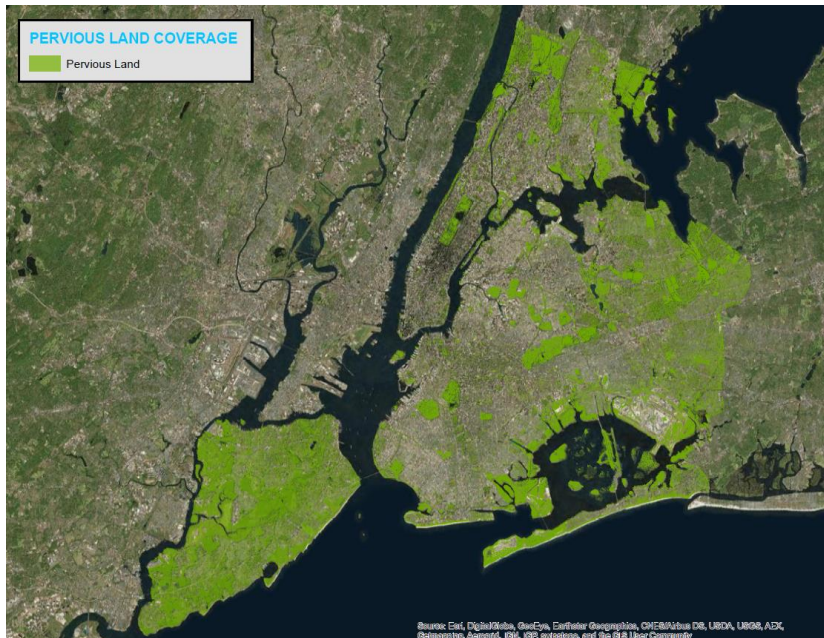


New York City's Green Solutions to Urban Drainage and Resilient Neighbourhoods

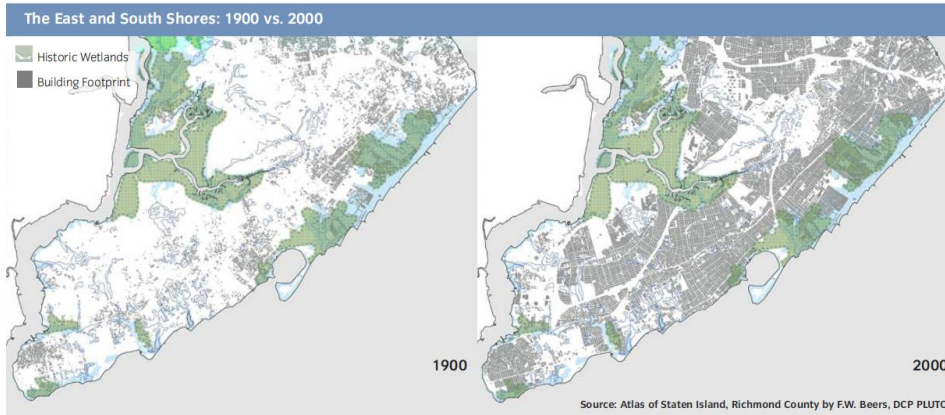
Alan Cohn, Climate Program Director
NYC Department of Environmental Protection

Adaptation Futures
11 May 2016

NYC's Pervious Land Coverage



Development vs. Open Space



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NYC's First Green Drainage Solution



- DEP began the Bluebelt program in the 1990s to build natural drainage corridors, including streams, ponds, and wetland areas, that convey, store, and filter stormwater
- 400 acres of Bluebelts drain 14,500 acres (5.868 hectares), or approximately 39% of Staten Island's total land mass

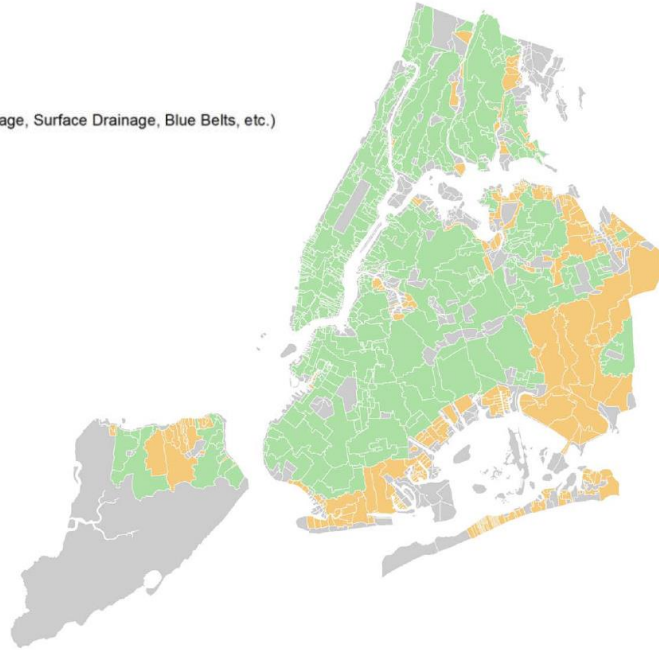


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Today's Sewer System in NYC




- COMBINED
- SEPARATE
- OTHER (Direct Drainage, Surface Drainage, Blue Belts, etc.)



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Combined Sewage Overflows



 = does not meet water quality standards (pathogens/DO)



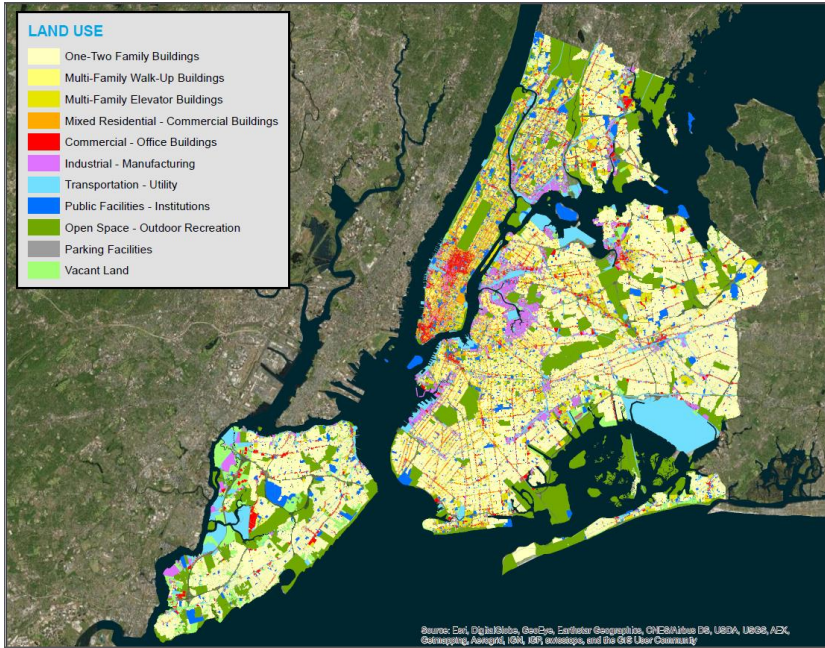
75% meets pathogen standards for swimming

18% meets standards for boating and fishing

7% tributaries that do not meet secondary contact standards

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Managing Runoff from Impervious Areas

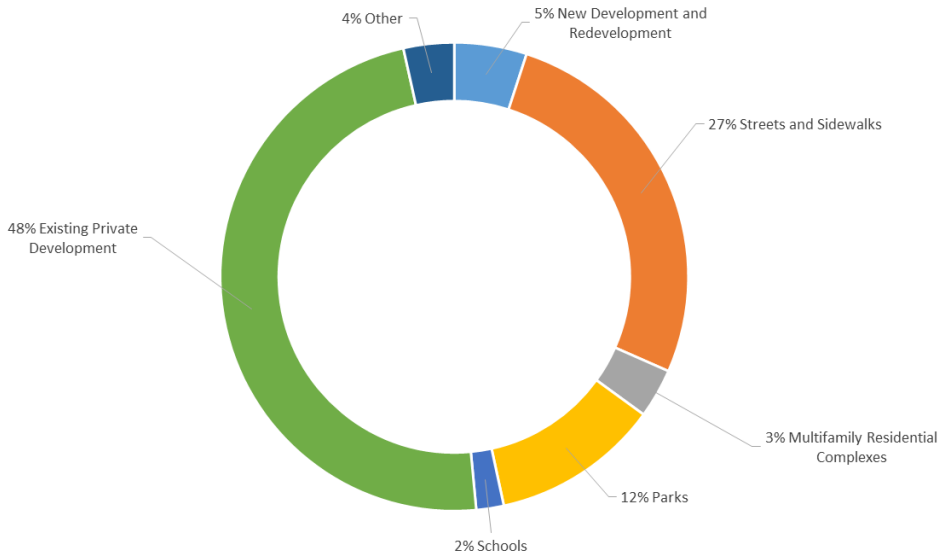


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Managing Runoff from Impervious Areas



Land Use Distribution in NYC Combined Sewer Areas







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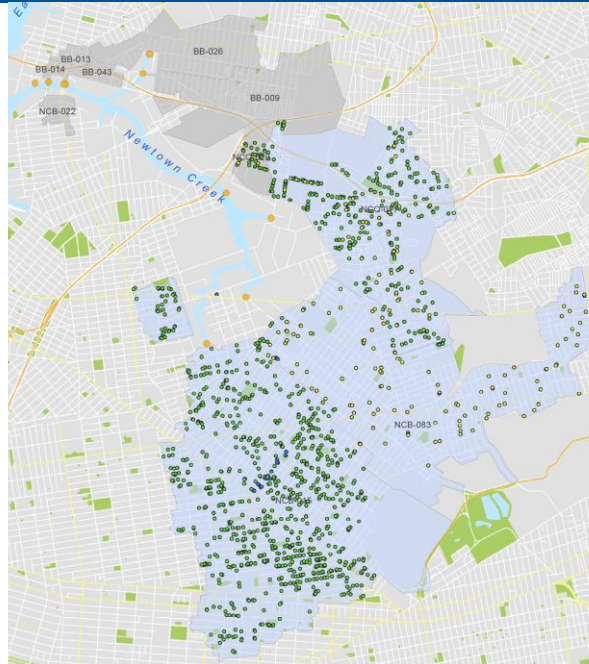
Managing Runoff from Streets



Green Infrastructure Strategy



-  Area-wide Contracts in Construction
-  Area-wide Contracts in Design
-  Bioswales in Construction
-  Preliminary Bioswales



Managing Runoff from Public Property



PS 261, Brooklyn – Before

Managing Runoff from Public Property



PS 261, Brooklyn – After

Managing Quality vs. Quantity



A September 2004 storm flooded 9th Street in Brooklyn.

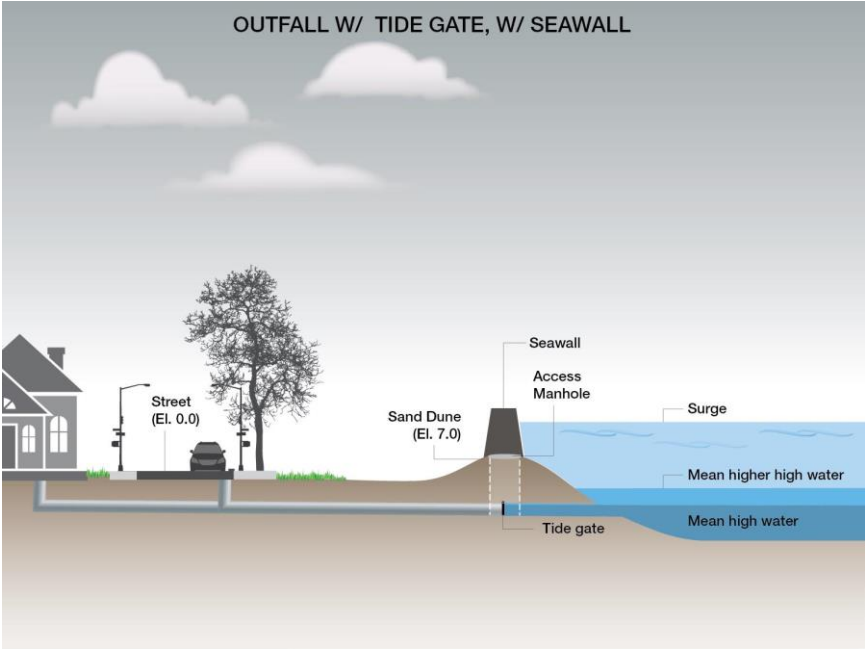
Credit: Seth Wenig/The New York Times

Storm Surge from Hurricane Sandy - 2012



Rockaway Beach

Managing Surge + Cloudbursts



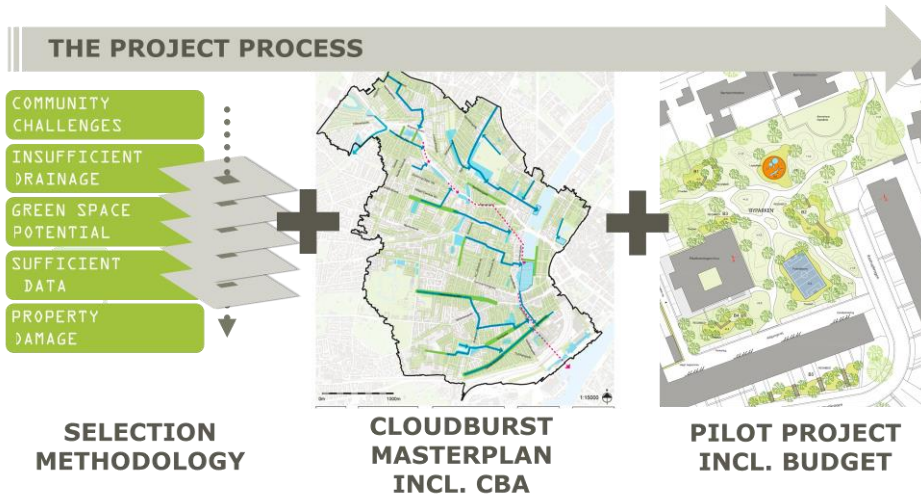
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Partnering on Cloudbursts



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Cloudburst Management in NYC



Source: Ramboll

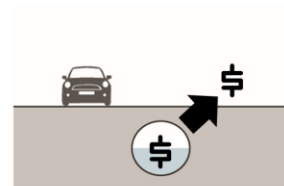
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Cloudburst Management in NYC



SYNERGIES WITH SEWER RENOVATION INCREASED CAPACITY

- Maintain functionality and good state
- Meet regulation – MS4 and Long term control plan
- Increase hydraulic functions to meet present service level and future precipitation projections
- Maximize benefit from public budgets across departments and agencies (and potentially include private partnerships)
- Maximize urban quality of life through synergies to other plans and strategies in the urban space



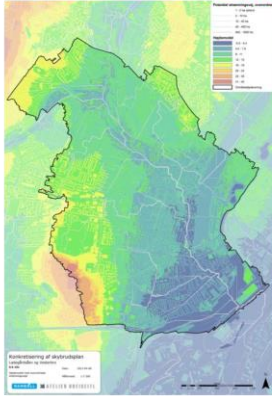
Source: Ramboll

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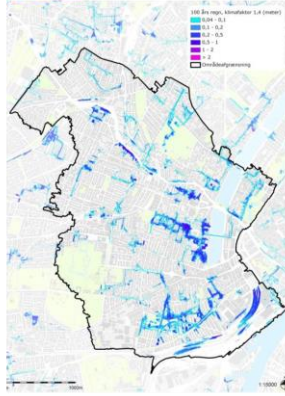
Cloudburst Management in NYC



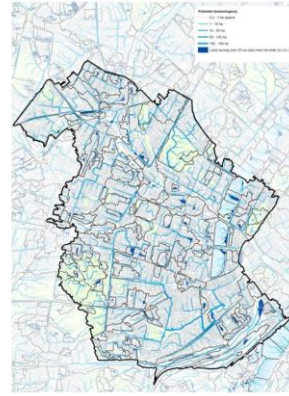
DEFINING PROJECTS HYDROLOGICAL ANALYSIS



Topography



Flooding drainage and DTM

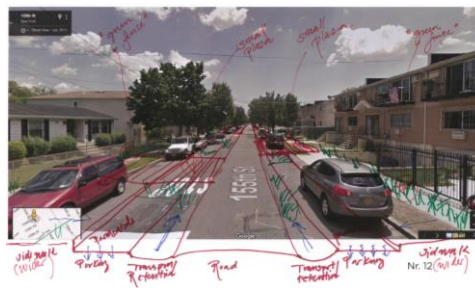
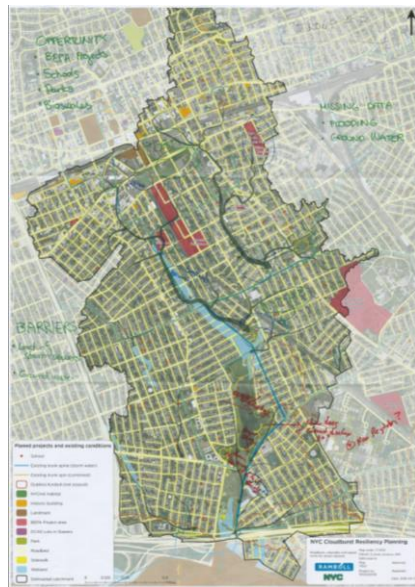


Flowpaths

Source: Ramboll

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Cloudburst Management in NYC



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Cloudburst Management in NYC



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