NYC Green Infrastructure Steering Committee
NYC Environmental Protection
September 8, 2011 – Agenda and Summary Minutes

Agenda

1) Stormwater Rule Update

2) Guidelines for the Design and Construction of Stormwater Management Systems

3) Reporting and Updates (15 min)
    a. GI Program Update
    b. GI Plan Annual Report
    c. Citizen's Group Meeting - Fall
    d. Sub-committee Update from Steering Committee
    e. Fourth Quarter Meeting?

Summary Minutes

Stormwater Rule Update/Guideline for the Design and Construction of Stormwater Management Systems

Julie Stein, Director of Wet Weather Planning & Water Quality Policy in DEP's Bureau of Environmental Planning & Analysis gave a presentation to the Steering Committee on the status of the Stormwater Performance Standard and Guidelines for the Design and Construction of Stormwater Management Systems.

Since the last Steering Committee meeting, DEP had solicited comments on a "peer review" draft of the rule and guidelines from a number of representatives of other city agencies and non-governmental parties for comment. That group partially overlapped with membership of the Steering Committee. Immediately prior to the Steering Committee meeting, DEP emailed to the Steering Committee a summary of comments received on the peer review draft. Ms. Stein's presentation reflected the contents of a more recent internal DEP draft, which made some changes in light of the comments received.

A PDF version of the presentation was emailed to the Steering Committee after the meeting and is attached to these minutes.

During the presentation, the Steering Committee engaged with DEP representatives on several points specifically:

- Discussion on the proposed performance standard, new MS4 permit and applicable areas of the city. DEP noted that the proposed performance standard will apply to new development and alterations in combined sewer areas only. Development in MS4 areas, however, may have to implement onsite source controls as currently is required to connect to the city's sewer system and/or to meet DEC's

stormwater requirements under the statewide Construction General Permit (if soil disturbance is one acre in size or greater), which include runoff volume reduction requirements. DEP stated that it is having discussions with DEC about a new MS4 permit for the city; as currently envisioned by DEP, that permit would apply the same performance standards as currently apply under the DEC Construction General Permit. A committee member noted, and DEP agreed, that this would mean that very few projects would be subject to a runoff reduction requirement, since application in NYC of the one acre threshold applied in the rest of the state would exclude almost all projects. The same committee member also noted, and DEP agreed, that under this approach, even for projects that meet the one acre threshold, DEC's requirements for "redevelopment" from the DEC Design Manual typically apply in the City, which is a more lenient standard than for "new development."

- In regards to data and modeling, the Steering Committee asked DEP to share any modeling that has been done post the release of the NYC Green Infrastructure Plan. DEP stated that, it has not yet completed its efforts to model projected CSO reductions attributable to the proposed maximum release rate. DEP stated that it is likely that CSO reduction equivalent to detention and delayed release would be less than that of on-site retention of an inch of runoff on an acre with no release, and modeling is ongoing. The Steering Committee also asked who is reviewing and revising the 5-year and 10-year storm data to reflect current weather conditions. Ms. Stein responded that DEP has initiated a study to review and update, if necessary, design criteria for sewers and source controls based on changing climatic conditions; specifically, DEP is approximately 6 months in to a 24 month contract with a consultant to update the definitions of a 5-year storm and a 10-year storm.

- During a discussion about combined sewer overflows (CSOs), Steering Committee members discussed when Wastewater Treatment Plants limit inflow by "throttling." Steering Committee members advised DEP to consider the "throttling" process as the kickoff for public notification. Information related to the SPDES Permit for DEP's 14 Wastewater Treatment Plants can be found online here: NYC Environmental Protection: Annual Report for Best Management Practices for Combined Sewer Overflows for the Period of January 1, 2010- December 31, 2010.

- Steering Committee and DEP representatives discussed vegetated infiltration systems such as rain gardens at length. The Steering Committee voiced concerns that the proposed rule favors detention systems and discourages innovative green infrastructure technologies. DEP explained that the rule does not prevent the use of vegetated systems but rather, through additional runoff coefficients and volume credits, encourages porous infiltration practices and recycling systems where site conditions allow. The objective of the rule is to distribute source controls throughout the city but also to protect the sewer system and enhance capacity. The companion guidelines document provides useful information on the construction of several types of stormwater management systems to ensure different development sites are able to comply with the proposed performance standard. The guidelines are intended to be a "living document" and allow for continuous updates in the future. In addition, the rule and guidelines will be reviewed as ongoing pilot data is collected and analyzed, and with future federal and/or state stormwater rulemaking processes anticipated. Finally, current challenges such as varying subsurface and soil conditions, overflow designs, and experiences with dry well failure rates will continue to be evaluated.

- With regard to the timing of a proposed rule, DEP stated that the Corporation Counsel's office is currently reviewing the draft rule and guidelines and that, following Corporation Counsel's sign-off, the rule would be published promptly in the City Record for public comment. A hearing would be scheduled for 30 days after the start of the comment period; DEP would continue to accept written comments for at least 30 days following the hearing date.

Reporting and Updates

Green Infrastructure Program

- DEP shared the list of planned construction projects for FY 12. Bioswale construction has begun on the DOT/DDC Downtown Brooklyn Traffic Calming project and will begin on the DEP/DDC Atlantic Avenue project in the coming weeks. DEP stated that a standard specification for bioswales has been developed and will be posted online, and that costs for upcoming bioswale projects have decreased substantially as compared to the cost of prior bioswale demonstration projects.

- The Green Infrastructure Grant Program has been renewed for 2012 and an official announcement with application details will be released later this year.

- DEP will release an Annual Report on green infrastructure implementation since the release of the NYC Green Infrastructure Plan. The report is expected to be released in October. DEP will present the report to a meeting of the Citizen's Group later this year.

- DEP stated that it expects to conclude negotiations and announce an agreement with NYSDEC on a modified CSO consent decree by early fall.

- The three subcommittees (Open Space, Private Lots and Right of Way) that were created during the 2nd Quarter meeting will provide an update on their recommendations and progress at the Steering Committee's 4th Quarter meeting. Steering Committee members stated that the subcommittees have not have the opportunity to meet yet, in part because many Steering Committee members had been focused on review of the peer review draft of the DEP stormwater rule and guidelines.

- The Steering Committee will hold their Fourth Quarter meeting in early December to discuss:
    - Negotiations between DEP and NYS DEC
    - Parking Lot stormwater charge pilot
    - Annual Report
    - GI Grant

Attendance

Marc Matsil	Trust for Public Land
Richard Leigh	Urban Green Council
Philip Musegass	Riverkeeper
Miquela Craytor	Sustainable South Bronx
Kate Zidar	SWIM Coalition
Shannon Fales	REBNY
Shino Tanikawa	NYC SWCD
Stuart Gaffin	Columbia University
Margaret Kieu	Columbia University
Tida Choomchaiyo	Columbia University
Hershel Weiss	Ashokan
Larry Levine	NRDC
Dwaine Lee	Horticultural Society of New York
Dan Avery	NYC Council Staff
Julie Stein	DEP Bureau of Environmental Planning and Analysis
Paul Faublas	DEP Bureau of Water and Sewer Operations
James A. Luke	DEP Bureau of Water and Sewer Operations
Magdi Farag	DEP Assistant Commissioner, Office of Green Infrastructure
Paul MacDonald	DEP Public Affairs
Tetyana Klymenko	DEP Office of Green Infrastructure
Margot Walker	DEP Office of Green Infrastructure
Mikelle Adgate	DEP Office of Green Infrastructure
Chris Hawkins	DEP Chief of Staff
Carter Strickland	DEP Commissioner

NYC Environmental Protection

Stormwater Performance Standard

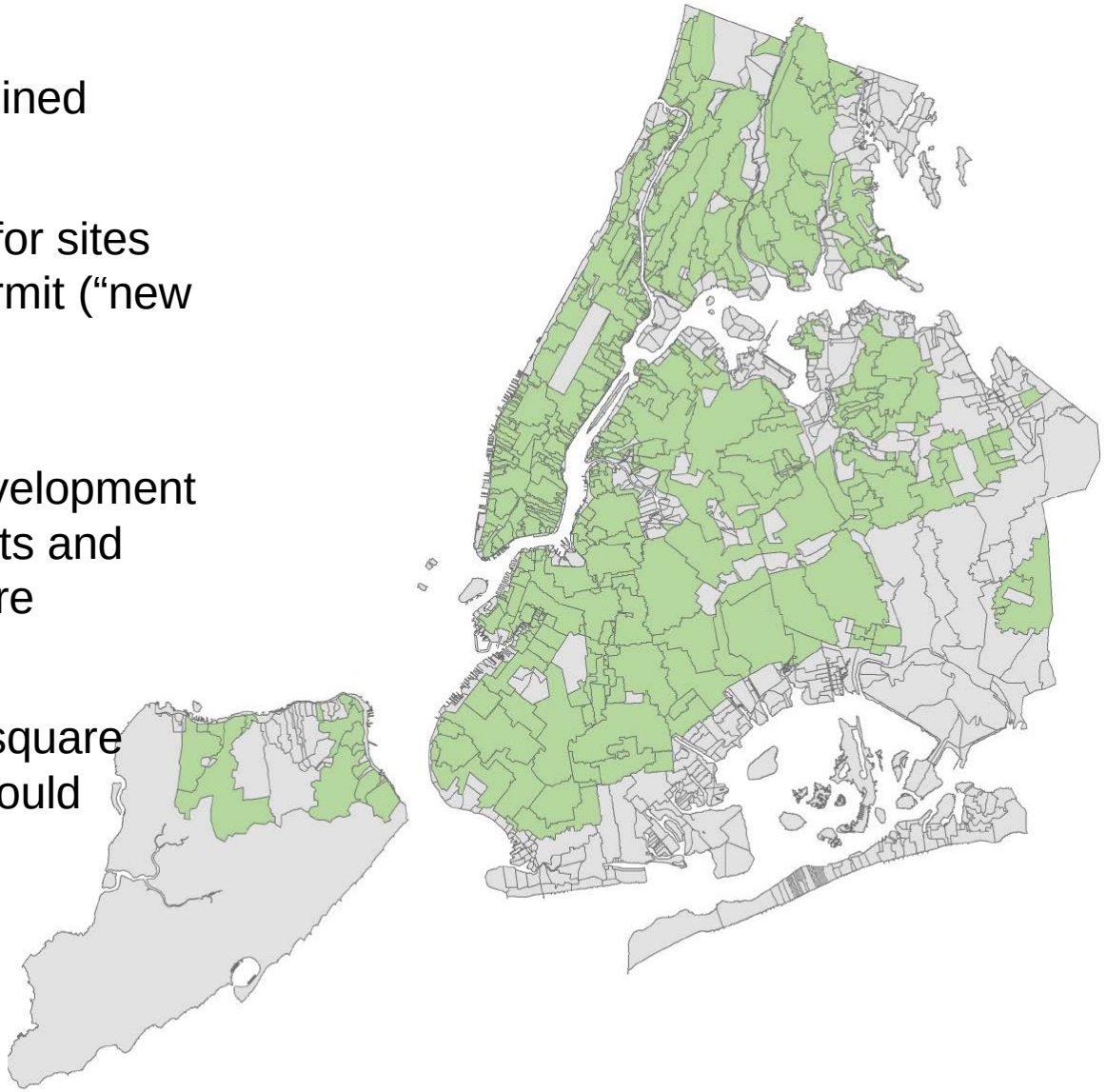
Green Infrastructure Steering Committee
September 8, 2011

Stormwater Performance Standard

- The Stormwater Release Rate must be no more than the greater of 0.25 cfs or 10% of the Allowable Flow or, if the Allowable Flow is less than 0.25 cfs, no more than the Allowable Flow.
- For Alterations, the Stormwater Release Rate for the altered area will be directly proportional to the ratio of the altered area to the total site area.
- In addition, the rule allows for reductions of required stormwater volumes to be detained for:
  - Porous infiltration practices based on the infiltration rates of below soils as determined by soil borings and a permeability test
  - Dedicated water recycling systems
- Clarifies that the overall site runoff coefficient can be reduced by maximizing open space, infiltration, and other techniques.
- Clarifies that landowners and their successors must properly maintain onsite systems, file a deed restriction, and submit triennial certification of proper operation.

Applicability

- Rule will apply across Combined Sewer Areas
- Stricter runoff release rates for sites subject to New Buildings permit (“new development”)
- Prorated release rates for enlargements of existing development subject to Alt-1or Alt-2 permits and when impervious surfaces are increased by 20%
- For most sites under 5,000 square feet, current requirements would apply



Public Participation

- Rule developed based on multiple task forces that included OLTPS, DEP, DOB, Law Department, and engineering and sustainability experts
- Series of interagency, industry, and environmental stakeholder during initial outreach period, including informal outreach and formal meetings:
  - Regional Planning Association (April 16, 2010)
  - Department of Buildings (May 27, 2010)
  - All agency meeting (July 28, 2010)
  - Development, design, and affordable housing stakeholders (September 13, 2010, November 12, 2010, and January 25, 2011)
  - Buildings Sustainability Board (November 23, 2010)
  - Green Infrastructure Steering Committee (September 8, 2011)
- CAPA process to be initiated:
  - Proposed rule and notice of public hearing to be distributed September 2011
  - Public hearing in October 2011 at DEP's Offices, 19th Floor
  - 30 days after hearing date to submit additional public comments

Companion Guidance Document

- Objective: Provide guidance to New York City's development community for the selection, planning, design and construction of onsite source controls that comply with DEP's stormwater performance standard.
- Audience: Developers, property owners, and licensed professionals including professional engineers, registered architects and landscape architects
- Authors: DEP's Bureaus of Water and Sewer Operations and Environmental Planning and Analysis with consultants from engineering and ecological design firms and in close coordination with DOB
- Contents:
  - Overview of stormwater management in NYC and objectives
  - Maximizing open space, sizing controls and volume reduction calculations
  - Siting, design and construction considerations for different source controls
  - Operations and maintenance recommendations
  - Stormwater calculator, glossary and other resources

Design Guidance: Peer Review

- Extensive comments received from technical peer reviewers including:
  - Development Community (REBNY, Durst Organization, Related Companies, Sive, Paget & Riesel)
  - Affordable Housing (Citizens for Affordable Housing
  - Engineers/Plumbers (Wohl & O'Mara, Langan Engineering, ASPE)
  - Sustainability Experts (US Green Buildings Council, Natural Systems Utilities/ Alliance Environmental, Brooklyn Grange, and Highview)
  - City Sustainability/Design Staff (NYCHA, DSNY, DCP, HPD, SCA, DDC, DPR, EDC, FDNY and OEC)
  - Others (NYSDEC, NRDC)
- Comments primarily focused on:
  - Need for specific guidance on infiltration and recycling systems
  - Application of rule in both separate and combined sewer areas
  - Review/enforcement processes
  - Compliance costs

Benefits of the Rule

- Spreads stormwater mangement systems throughout City to **control stormwater at source**
- **Slows peak flows** from development sites to sewer system during rain events, a basic stormwater management tool to simulate pre-development conditions
- Adds de facto **capacity** to the City's sewer system
- Part of **comprehensive approach** to implement *NYC Green Infrastructure Plan* that includes $190 million in public investments over next five years and other agency initiatives e.g., Million Trees, LL86, etc.
- Allows for growth and development without exacerbation of existing stormwater-related issues such as **combined sewer overflows (CSOs)**
- **Redevelopment** is a good mechanism for implementation because lower cost and fewer physical limitations compared to retrofitting for stormwater systems
- **Phased approach** for more stringent stormwater requirements expected with federal and state regulations in future and demonstration of different technologies

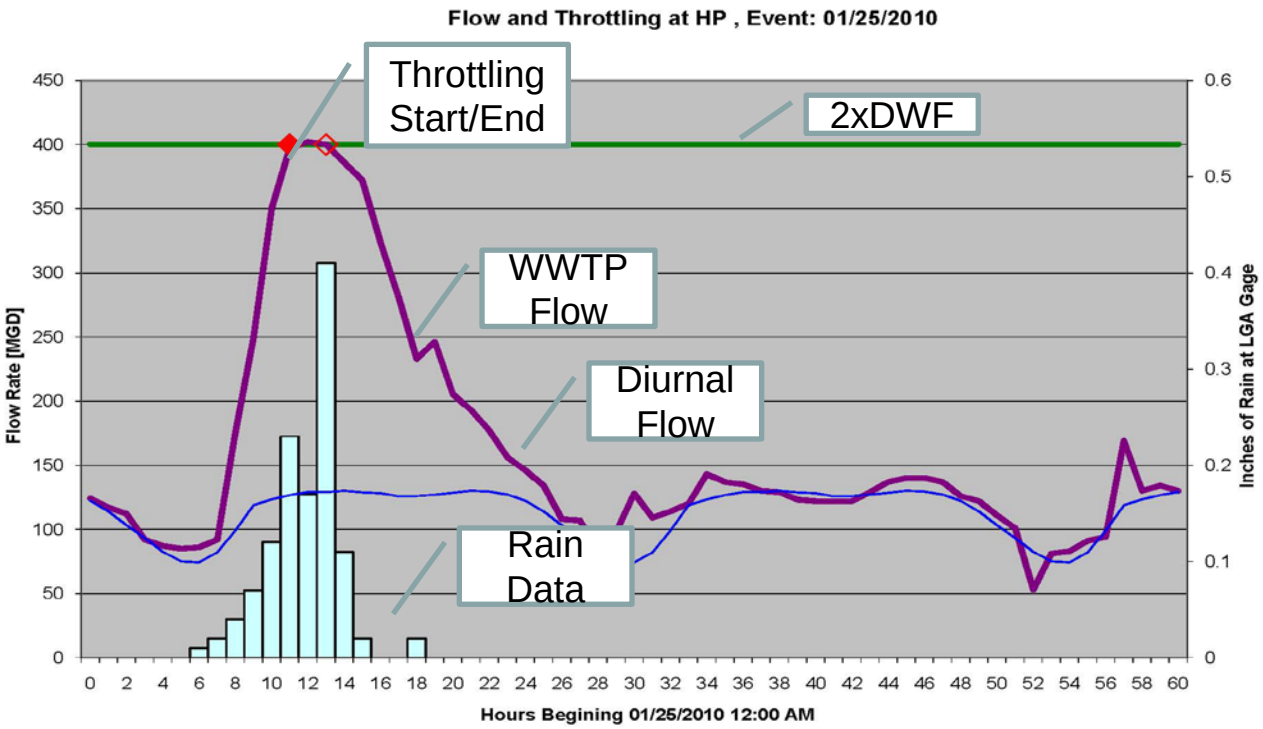
CSO Reduction

- Green Infrastructure Plan modeled an integrated, holistic approach to reduce CSOs
- Green infrastructure will reduce CSOs by 1.1 to 1.5 BGY, depending on the mix of retention and detention technologies (combination scenario at least 2/3 as effective as retention only scenario)
- Modeling will progress to reflect specific targets, and technology-based and neighborhood scale pilot studies, and modify strategies accordingly

Waterbody	Cost-Effective Grey Infrastructure Investments		PLUS Reduced Flow		PLUS Green Infrastructure (10% Capture)		PLUS Tide Gate Repair and Interceptor Cleaning		Green Strategy	
	CSO (Volume)	Delta (Volume)	CSO (Volume)	Delta (Volume)	CSO (Volume)	Delta (Volume)	CSO (Volume)	Delta (Volume)	CSO (Volume)	Delta (Volume)
AC	258	244	257	1	220	37	220	0	220	282
Berg/Thur	859	1,125	848	11	803	45	392	411	392	1,592
BR	594	346	581	13	506	75	506	0	506	434
CI	42	259	38	4	32	6	32	0	32	269
ER/OW	13,289	2,865	12,007	1,282	11,459	548	11,394	65	11,394	4,760
FB	1,824	363	1,713	111	1,499	214	1,499	0	1,499	688
FC	1,438	957	1,402	36	1,251	151	1,166	85	1,166	1,229
GC	261	143	232	29	200	32	200	0	200	204
HR	400	36	393	7	341	52	341	0	341	95
JB/CSO Tribs	399	207	370	29	321	49	317	4	317	289
NC	1,243	229	1,194	49	1,039	155	1,024	15	1,024	448
PB	555	1,278	439	116	374	65	368	6	368	1,465
WC	535	216	522	13	438	84	438	0	438	313
Total	21,698	8,267	19,997	1,701	18,482	1,514	17,896	586	17,896	12,069

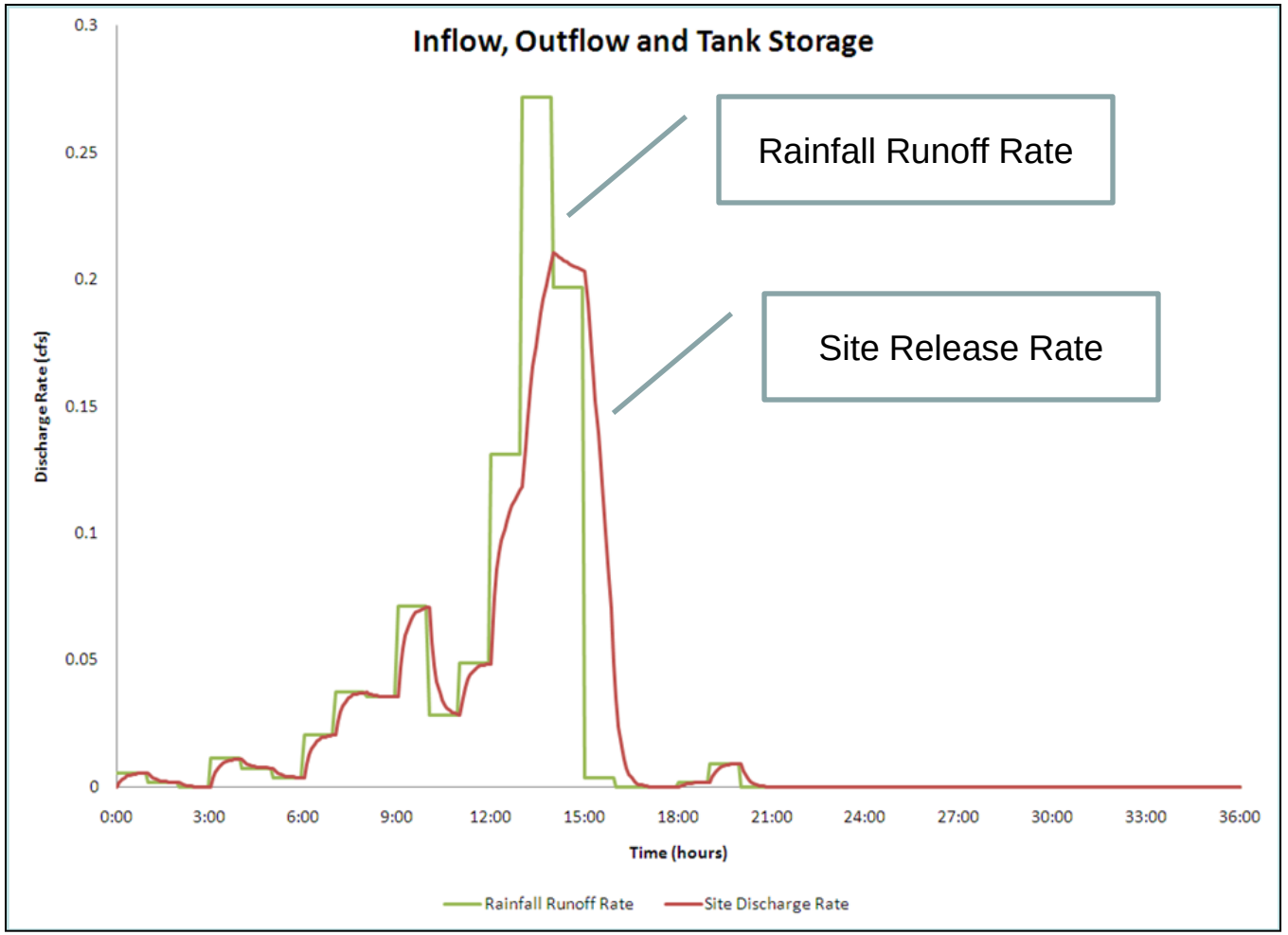
Why do CSOs Occur?

- WWTPs are sized for two times design dry weather flow; when peak flow is reached, WWTPs limit inflow by throttling.
- Throttling does not necessarily correlate to a CSO event and does not relate, in any way, to times secondary treatment capacity was exceeded but primary was not.
- Depending on the upstream conveyance system and rainfall intensity, a significant amount of runoff flows to WWTP for at least one to two hours after rainfall subsides; holding back stormwater for that length of time will minimize overflows



How do Source Controls Work?

- Stormwater storage and restricted release rates at the source shave peak runoff rates to the sewer system and effectively flattens the hydrograph of a rainfall event



How do Source Controls Work? (Cont.)

- For a half-acre property, the rule is expected to:
  - Reduce short-term peak discharges to the system by 80-90%, depending on the storm intensity
  - Reduce longer term peak discharges to the system by 20-50%, depending on the storm intensity
  - Benefits vary depending on size of property, with greater reductions for larger properties
- As source controls accumulate in a WWTP drainage area, the goal is to flatten the hydrograph of the rainfall event and peak WWTP flows that result in throttling
- Detention onsite for hours after a storm, would allow peak flows to be treated and pass through WWTP, thereby, freeing up capacity to treat runoff from entire drainage area after storm

Stormwater Release Rates

- Definition: The rate at which stormwater is released from a site, calculated in terms of cubic feet per second (cfs) or as a percentage of the Allowable Flow, which is based on existing sewer design criteria
- Requirement: “The Stormwater Release Rate must be no more than the greater of 0.25 cfs or 10% of the Allowable Flow or, if the Allowable Flow is less than 0.25 cfs, no more than the Allowable Flow.”
- Examples:

1. A typical one acre site in Brooklyn will be required to detain and release runoff at a rate of 0.25 cfs under the proposed rule compared to 2.5 cfs under existing standards
2. For a half acre site in Brooklyn, the allowable flow would be 1.25 cfs. Since 10% of the allowable flow is 0.125 cfs, the release rate would be 0.25 cfs
3. For a 3,000 sq ft site in Brooklyn, the allowable flow would be 0.172 cfs. Since this is less than 0.25 cfs, the release rate would be 0.172 cfs.

Compliance Strategies

- Range of systems available to ensure **adaptable** for various site plans and configurations, surface and subsurface conditions, and building designs, and **minimize variances** based on economic hardship

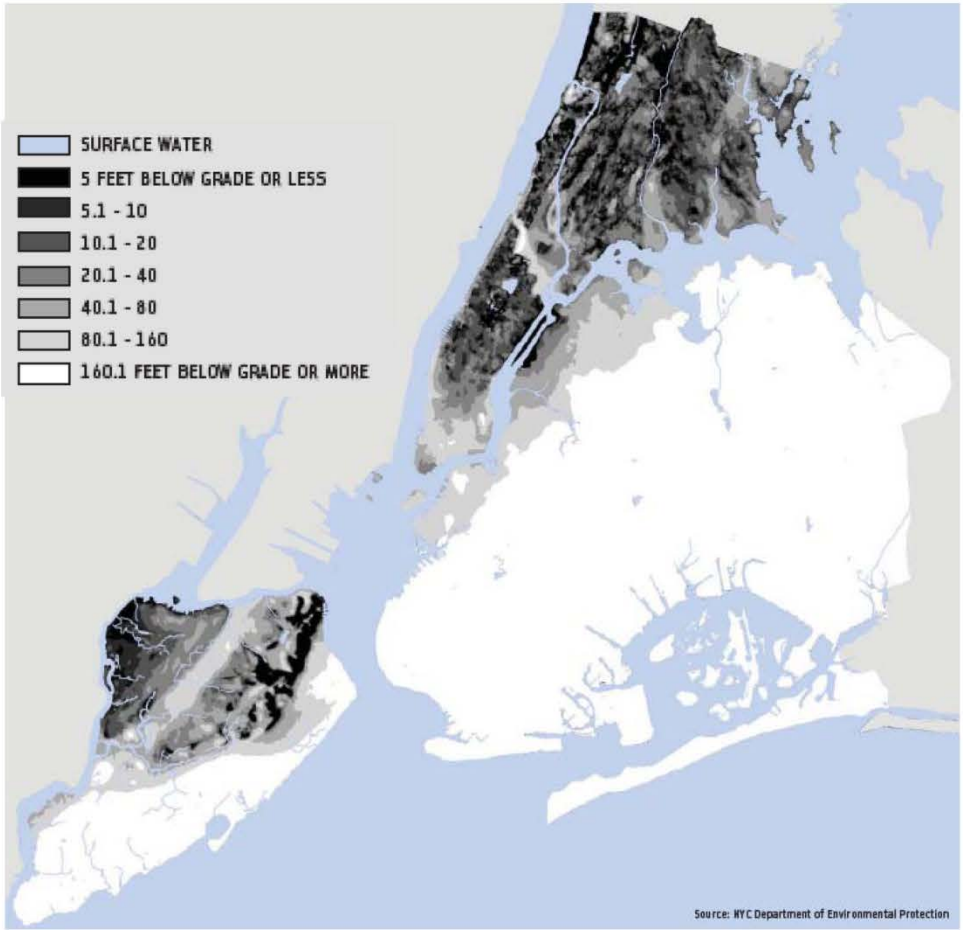
- Acceptable **source controls**:
  - Blue roofs
  - Green roofs
  - Detention tanks
  - Gravel beds
  - Storm chambers
  - Perforated pipes

- Development community should also consider **reducing impervious surfaces**, and designing source controls for **infiltration** or **recycling** to decrease system sizing, maximize development value, secure “green” financial incentives and achieve LEED certification

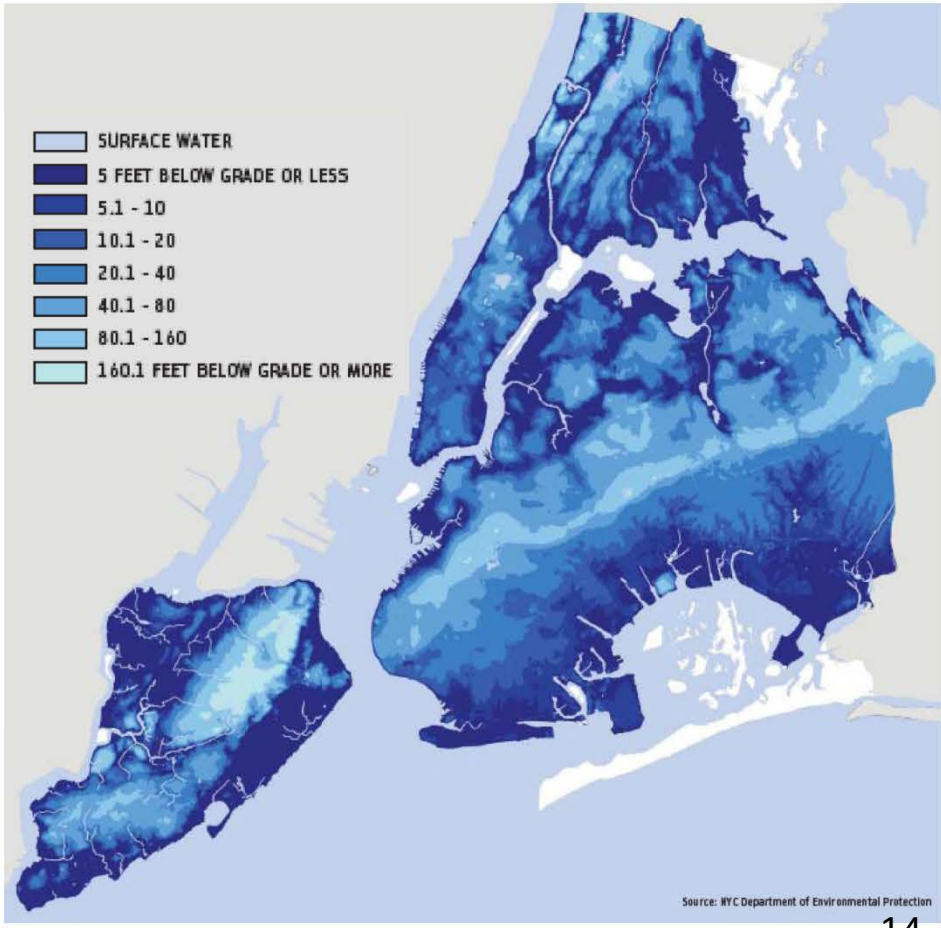
Infiltration Requirements

- Detention volume reductions must be substantiated by soil borings and a permeability test performed in situ or at a laboratory to demonstrate that the existing soil below the system has a favorable rate of infiltration.

Depth to Bedrock

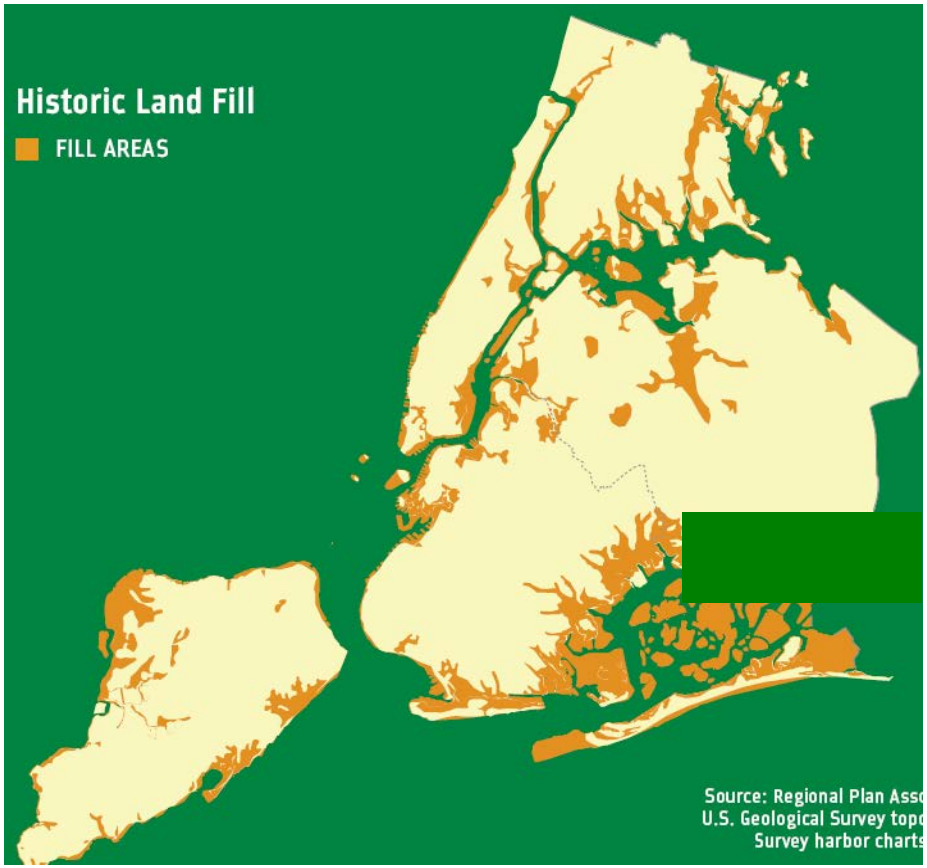


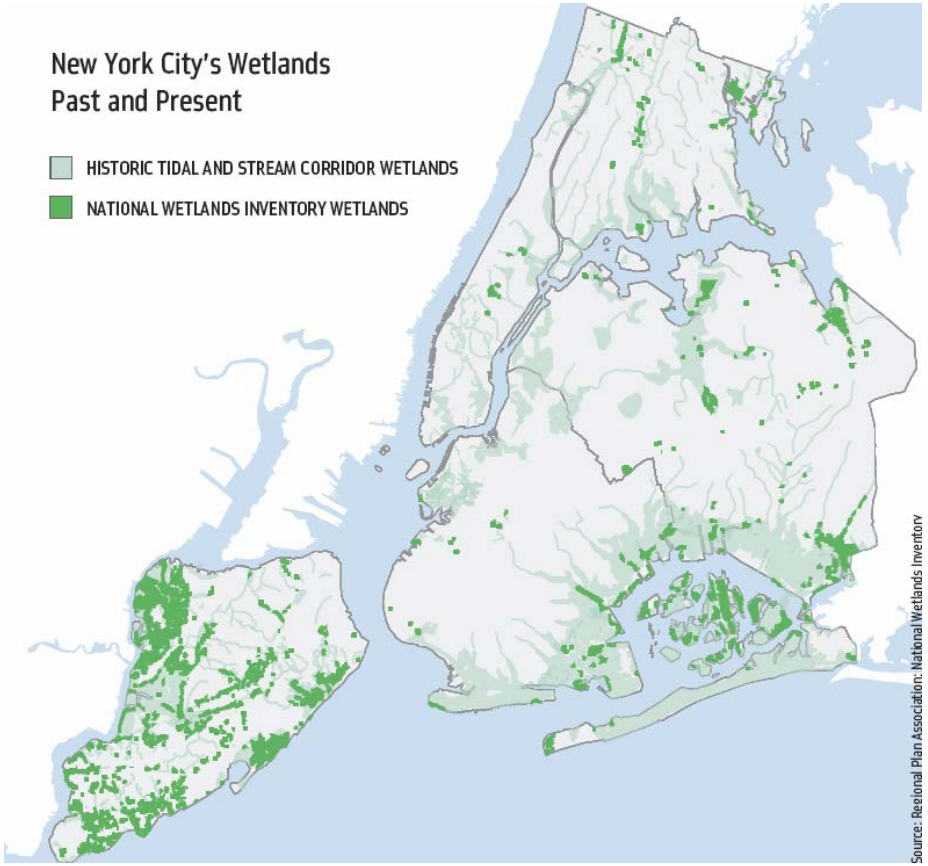
Depth to Groundwater



Variable Soil Considerations

- Ongoing pilot data collection from various GI installations across the city is providing preliminary information about subsurface conditions including undetected contaminated fill, large debris and utilities, soil types and related infiltration rates and operations and maintenance requirements





Drywells

- Drywells are an established retention practice
  - Base Line Permeation Rate of 3 inches per hr. per sq.ft for GW soil type with a minimum Permeability Coefficient of 0.025 cm. per sec
  - Perform in-situ or Lab Permeability test of the soil strata at the design depth where proposed discharge via sand column would occur to determine Permeability Coefficient.
  - Permeation rate of the subject soil type in inches per hr. per sq.ft = 3 x (Permeability Coefficient of subject soil type in cm. per sec/ 0.025)
  - The infiltration system must be designed to completely drain in a 48 hour period
- Drywells in NYC have often failed due to poor siting, poor construction, and poorly infiltrating soils
  - According to DOB's 2007 audit, 47% of completed audits included "failed" installations
  - Factors cited from audit included relocation or different configuration than shown on approved plans, undersized equipment used, and lack of engineer oversight

State Stormwater Requirements

- Today, soil disturbances over an acre in separately sewered areas of the city must submit stormwater pollution prevention plans (SWPPPS) including post-construction controls as part of DEC's SPDES permit program
- Criteria for "Redevelopment" or "reconstruction or modification to any existing, previously developed land" includes:"
  - Reduction of existing impervious cover by 25% (min) of total disturbed, impervious area, or
  - 25 % (min) of the WQv from disturbed, impervious area captured/treated by standard practices or green infrastructure techniques, or
  - Alternative practices treat 75 % of WQv from drainage area, or
  - Combo that provides a weighted average
- "Alternative practices" most commonly used in NYC today to comply include proprietary practices such as hydrodynamic separators, media filters, wet wells, and underground infiltration systems

Future Stormwater Requirements

- The City expects new Municipal Separate Storm Sewer Systems (MS4) requirements to be published within the next year
- EPA is expected to release a draft stormwater rule for new development and redevelopment in Fall 2011
- Accordingly, the City expects to revisit its stormwater rules once MS4 obligations are determined in order to add any additional stormwater requirements that may be required in separately sewered areas and to revisit the adequacy of stormwater controls in combined sewer areas

Effects on Development Costs

	Scenario 1		Scenario 2		Scenario 3		Scenario 4	
Building Type	Low-Density Residential		Office Building/Medium-Density Residential		Office Building/Medium-Density Residential		Big Box Retail	
Lot Size	5,000		10,000		20,000		43,560	
Zoning	R4		R6A/C4-2A		R6A/C4-2A		C8-1	
FAR	0.9		3.0		3.0		1.0	
Building Footprint, sq ft	1,500		6,000		12,000		21,780	
Development Size, sq ft	4,500		30,000		60,000		43,560	
Runoff Coefficient	0.7	0.9	0.7	0.9	0.7	0.9	0.7	0.9
Proposed Rule Compliance Cost	$20,000-26,000	$23,000-27,000	$35,000-37,000	$43,000-47,000	$59,000-80,000	$71,000-97,000	$98,000-127,000	$106,000-167,000
Increment of Proposed Rule	$3,000-9,000	$4,000-9,000	$15,000-17,000	$15,000-19,000	$32,000-53,000	$32,000-58,000	$44,000-73,000	$31,000-93,000
Proposed Rule/Total Development Cost (%)	1.1-1.4%	1.3-1.5%	0.3%	0.4%	0.3%	0.3-0.4%	0.6-0.7%	0.6-1.0%
Proposed Rule/Total Affordable Development Cost (%)			0.5-0.6%	0.6-0.7%	0.4-0.6%	0.5-0.7%		

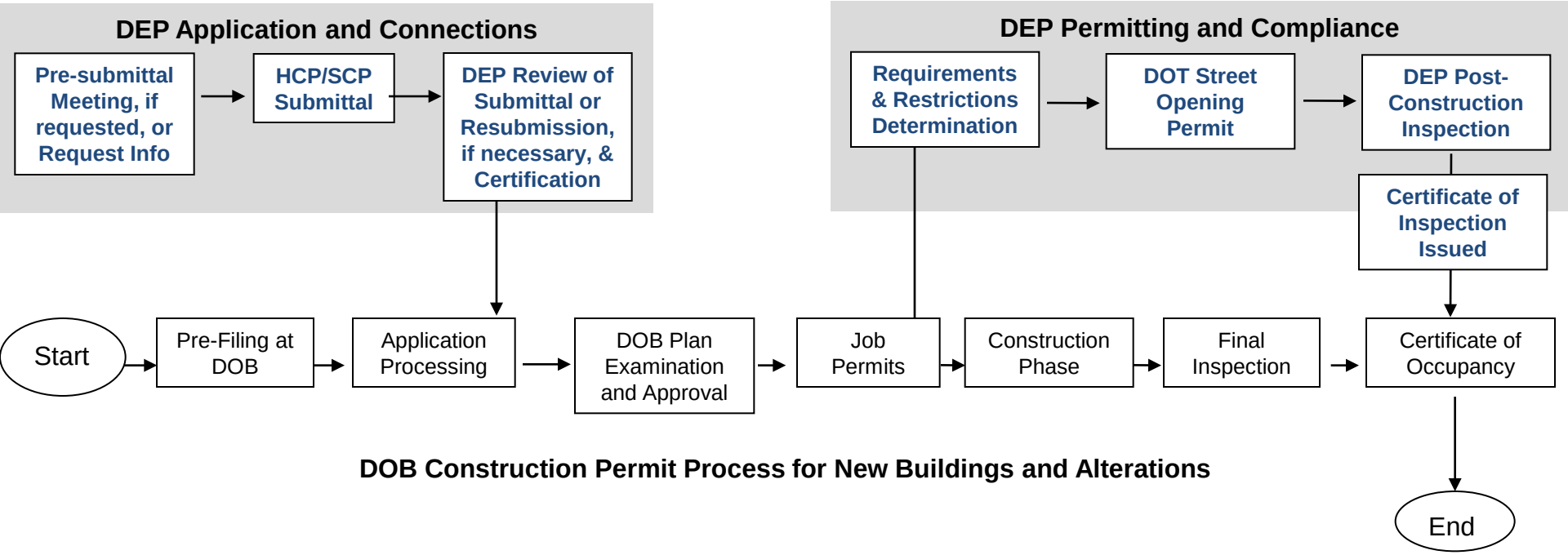
- Total costs represent small percentage of development costs (<1.5%)
- Allows for wide range of management techniques, costs and space considerations
- For lotline-to-lotline buildings, rooftop detention would be a viable option with few incremental costs

Operations and Maintenance

- Landowners and their successors must properly maintain onsite systems, file a deed restriction, and submit triennial certification of proper operation.
- Requirements:
  - Obligation must be memorialized in a deed restriction or other form satisfactory to DEP
  - Property owner must retain records and furnish proof of maintenance in the form of a certification by a qualified licensed professional submitted to DEP every three years
  - System replacement must be approved by the DEP
- Costs above include first year O&M costs to inspect and clean out system based on industry recommendations; first year O&M should be used to determine future O&M since will be different for each site and system
- Costs for triennial inspections by a licensed professional are also expected to differ based on system and site; estimated at $0.10 – 0.30 per square foot of lot area

City Development and Review Process

- General process for site/house connection applications that are not self-certified and without specific timing, fee or notification information:



DOB Construction Permit Process for New Buildings and Alterations