

# Enhanced Phosphorus Removal Standards

March 9, 09  
Syracuse, NY

# Purpose

- To address design standards in phosphorus-limited watersheds
  - EOH NYC Water Supplies Watersheds
  - Greenwood Lake
  - Onondaga Lake
- Enhance Criteria consistent with the existing State standards
- Provide consistency with other watershed rules and regulations

# The Project Team



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*NYCDEP*

*NYSSWCC*

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*River Keepers (CEA)*

*Insite Engineering*

# Workshop outline

- Introduction
- Onondaga Lake Background
- Enhanced Criteria - Empirical and Theoretical Background
- Break
- Design Standard – NYS Sizing and Infiltration Requirements
- Source Control - Better Site Design / Low Impact Development
- Examples - Conventional and BSD examples

# Enhanced Phosphorus Removal Design Standards

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# Enhanced Phosphorus Removal Standards

- A measurable, significant improvement in phosphorus treatment performance over the current Standards.
  - How much stormwater is prevented?
  - How much of the remaining stormwater is treated?
  - What is the effluent quality of the treated runoff?
- Based on
  - Modeling hydraulics and theoretical studies
  - Empirical and performance of practices

# Recommendation

- **1 year-24 hour Sizing Method** estimated to achieve > 80% treatment for both storage and flow through systems.
- Decreasing marginal gain in treatment performance as WQv size increases
- Results in
  - Alternative that modifies WQv sizing
  - Use of TR-55/TR-20 methods
  - Incorporate physical characteristics of the site

# Performance Goals: source control

## *Goal 1* - Reduce runoff volumes to the maximum extent practicable

- Hydrologic Source Control
- Evapotranspiration
- Infiltration

- **Infiltration Requirement**

- Infiltration credit
- Incorporate soil in sizing
- Site evaluation

Percentage of Impervious area routed through BSD	
Hydrologic Soil Group	% Impervious area
A	30%
B	20%
C	10%
D	5%

# Performance Goals: source control

- **Evaluation Requirements**
  - Imp. area disconnection
  - BSD / LID / Green infrastructure
  - Standard Infiltration



# Performance Goals: source control

- **Post Construction**
  - Increased Curve Number
  - Soil De-compaction



# Performance Goals: sizing criteria

- *Goal 2* - Achieve less than 15% effective treatment bypass of the long term runoff volume.
  - Focus on hydraulic control
  - Capture and treatment
  - Bypass
    - Simulated hydraulic function in SWMM
    - Applied design in TR-55, TR-20

# Sizing Criteria

## Sizing Criteria for Enhanced Phosphorus Removal

### Water Quality ( $WQ_v$ )

$WQ_v$  = estimated runoff volume (acre-feet) resulting from the 1-year, 24-hour design storm over the post development watershed

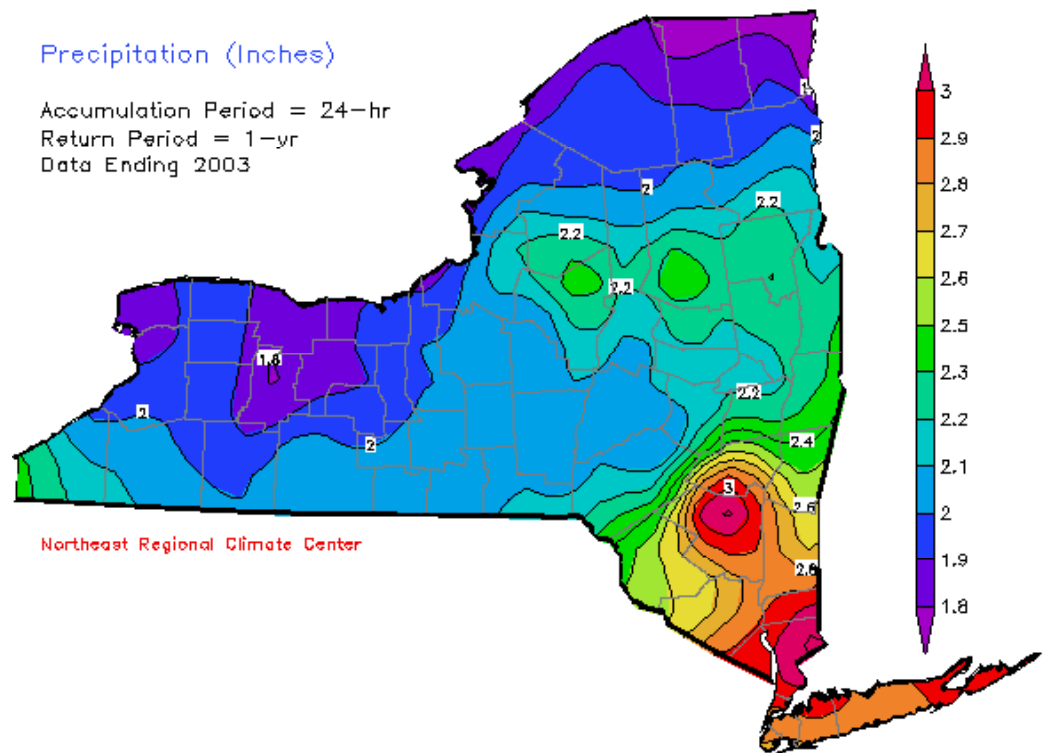
- Evaluate and implement hydrologic source control where feasible

### Quantity Controls ( $Cpv$ , $Q_p$ , $Q_f$ )

Refer to existing requirements

# Application

- Precipitation Data
  - Source of Isographs of Design Storms
    - TP-40
    - North East Climate Center *Atlas of Precipitation Extremes*
  - Storm distribution
- Examples
  - Storage
  - Flow through
  - BSD



# Quantity Controls

- **Channel Protection**
  - 24 hour detention of 1 year, 24 hr storm
    - Integrated in extended detention systems
    - Need additional storage in flow through systems.
- **Flood Control**
  - 10 & 100 year control not exceeding pre construction peak discharge.

# Performance Goals: performance criteria

- Goal 3 – median effluent concentration of particulate phosphorus shall be at or below 0.1 mg/L
- Goal 4 - median effluent concentration of dissolved phosphorus shall be at or below 0.06 mg/L
  - Effluent quality of the discharge
  - International BMP Database, Research by Pitt, et al. (Wisconsin)
  - Performance specifications
    - Practice options, media specification, optimum vegetative cover, Maintenance,..

# Questions?

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