City of Chattanooga

Runoff Reduction Integrating Incentives into New Stormwater Regulations

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TDEC NPDES Permit Requirements

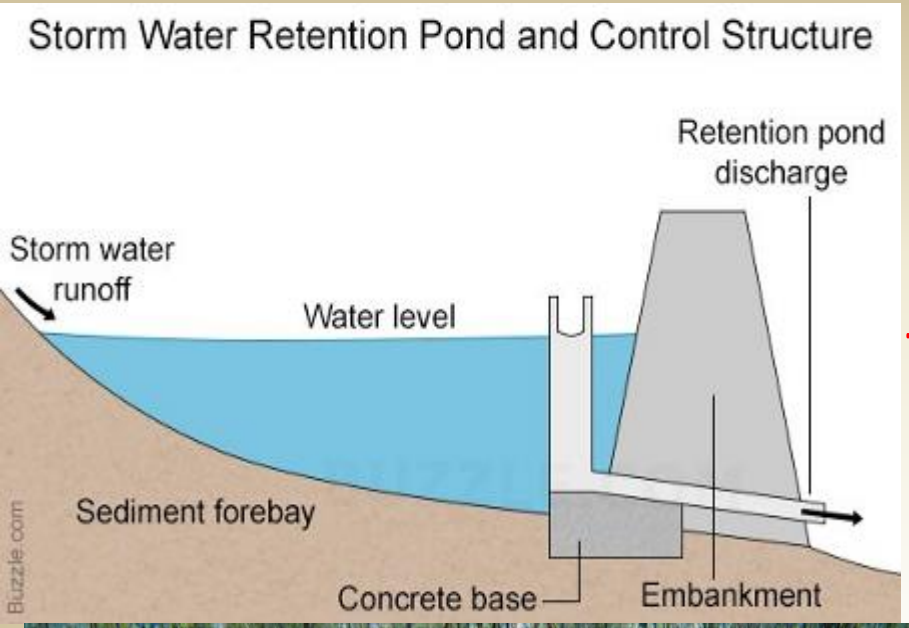
Permit Language:

- Managing TMDLs
- Protecting Endangered and Threatened Species
- Volume control or "runoff reduction"
- 1" minimum standard for water quality
- Green .vs. grey infrastructure
- Small dispersed volume controls .vs. centralized detention
- Capture and treatment .vs. conveyance and flood control
- Incentive options to promote green infrastructure
- Permanent stream buffer protection
- More engineered & natural control options
- Water reuse included
- Hardships/site limitations recognized

Former Regs -
Conveyance First, then Treatment

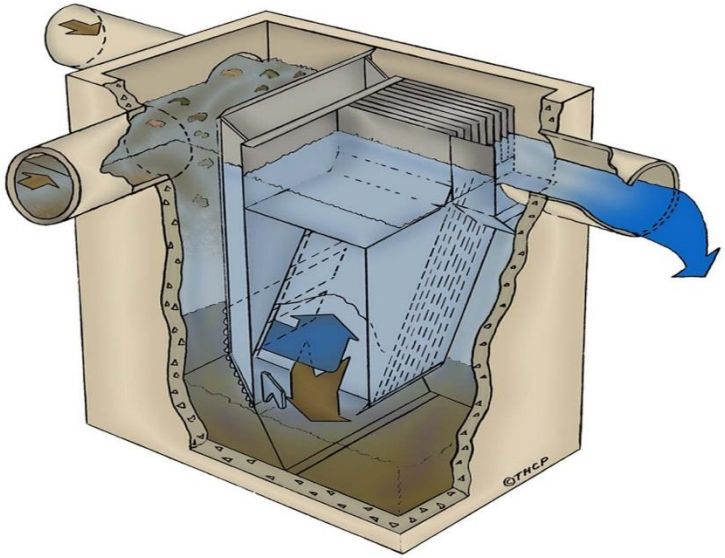

Former Regs -
Large, Centralized, Stand-Alone Detention Facility

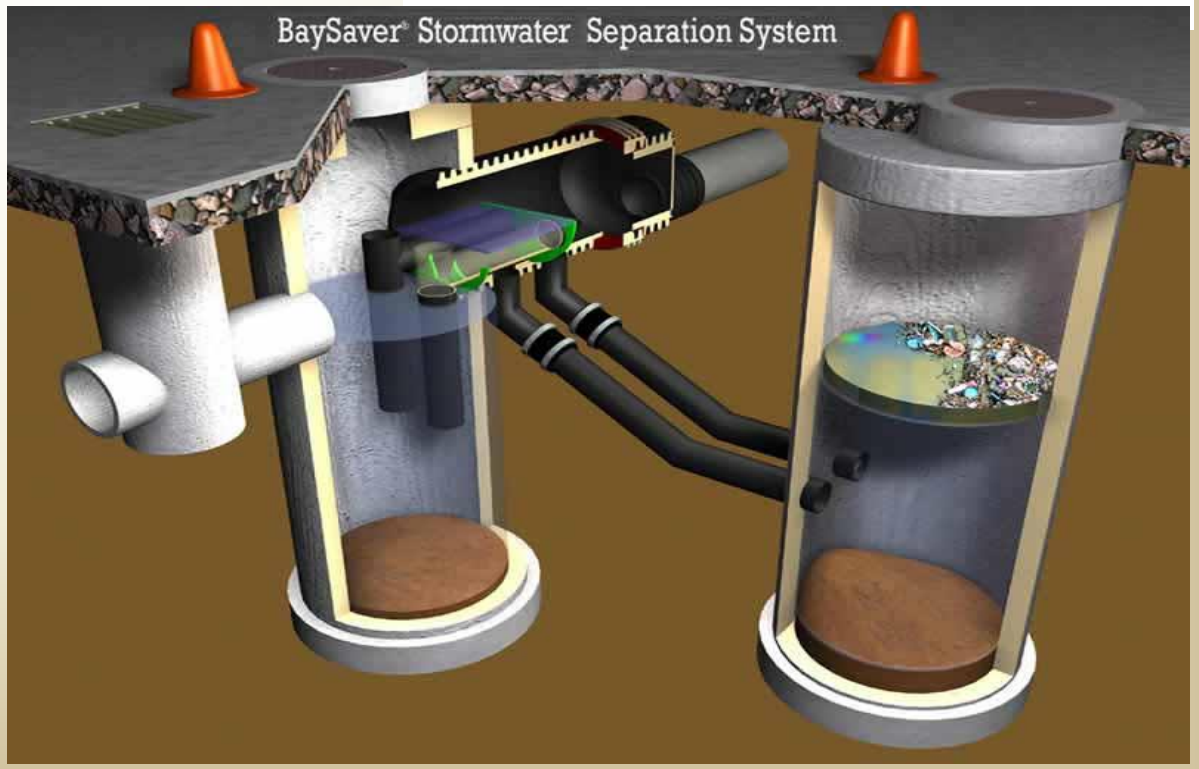
Former Regs -
Large Centralized Stand-Alone Detention Facility



Former

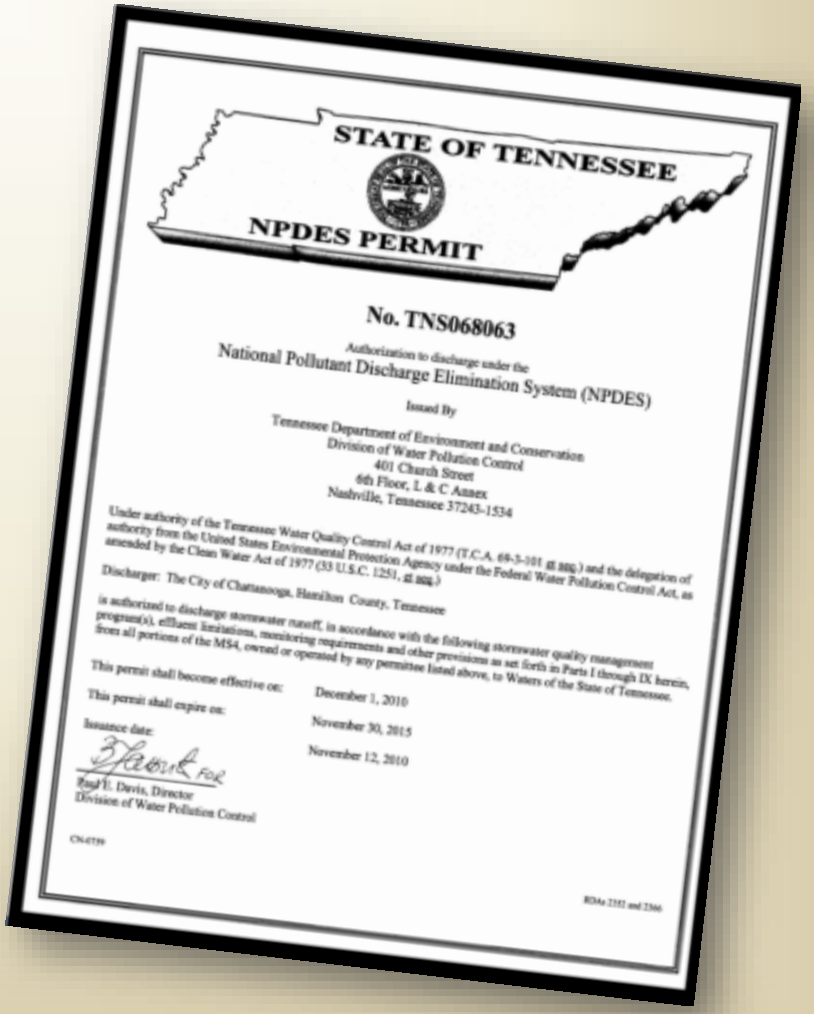
TSS as Primary Control





Menu of New Options

- Bio-retention,
- Infiltration Trenches & Beds,
- Pervious Pavement,
- Vegetated Swales,
- Cisterns,
- Green Roofs,
- Water Reuse,
- Planter Boxes,
- Restorative Practices, etc.



STATE OF TENNESSEE

NPDES PERMIT

No. TNS068063

Authorization to discharge under the
National Pollutant Discharge Elimination System (NPDES)

Issued By

Tennessee Department of Environment and Conservation
Division of Water Pollution Control
401 Church Street
6th Floor, L & C Annex
Nashville, Tennessee 37243-1534

Under authority of the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101 et seq.) and the delegation of authority from the United States Environmental Protection Agency under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 U.S.C. 1251, et seq.)

Discharger: The City of Chattanooga, Hamilton County, Tennessee

is authorized to discharge stormwater runoff, in accordance with the following stormwater quality management program(s), effluent limitations, monitoring requirements and other provisions as set forth in Parts I through IX herein, from all portions of the MS4, owned or operated by any permittee listed above, to Waters of the State of Tennessee.

This permit shall become effective on: December 1, 2010

This permit shall expire on: November 30, 2015

Issuance date: November 12, 2010

Paul E. Davis, Director
Division of Water Pollution Control

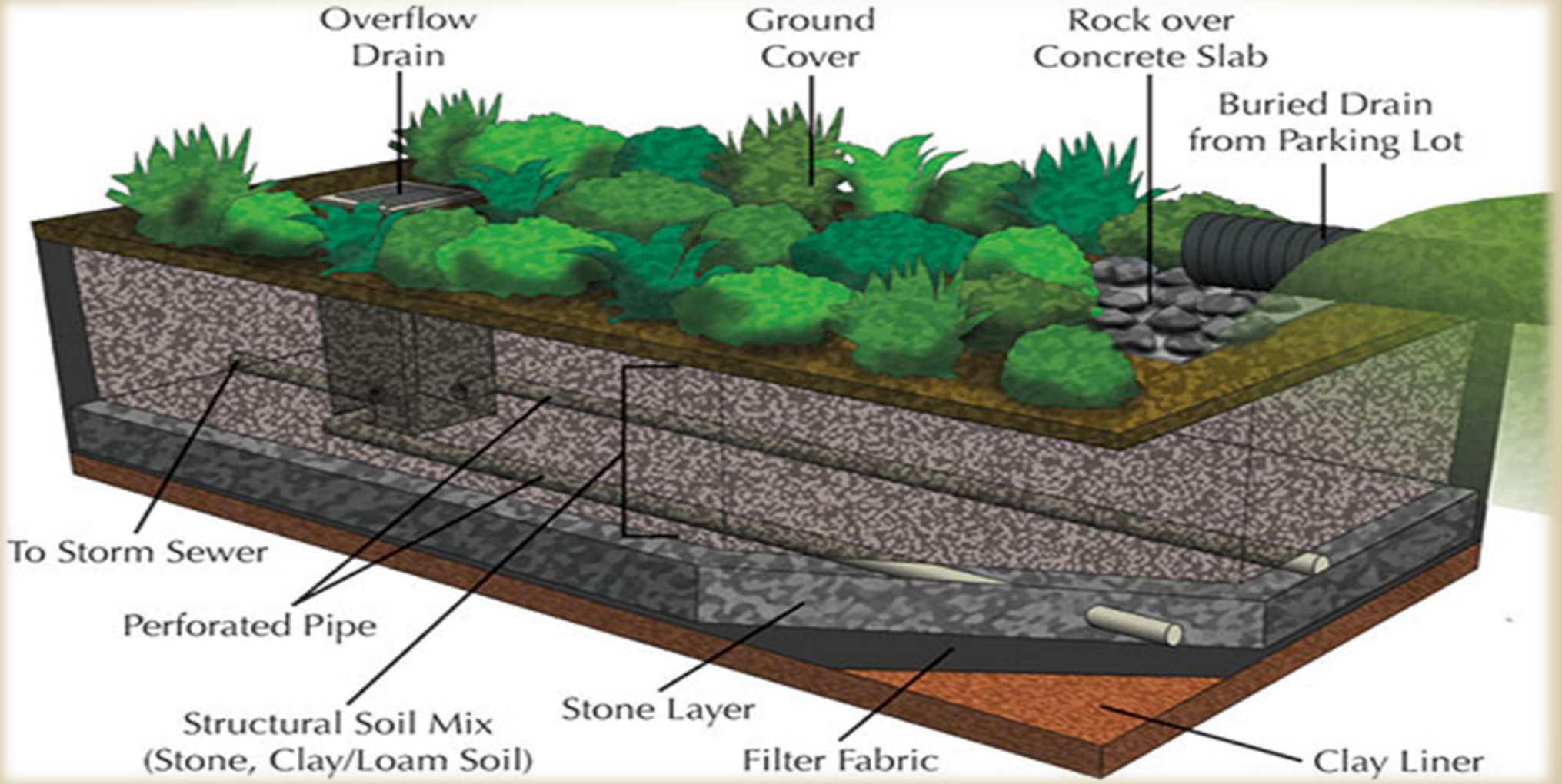
CN-0759

RDAs 2352 and 2366

De-centralized Pocket Detention or Stay on Volume

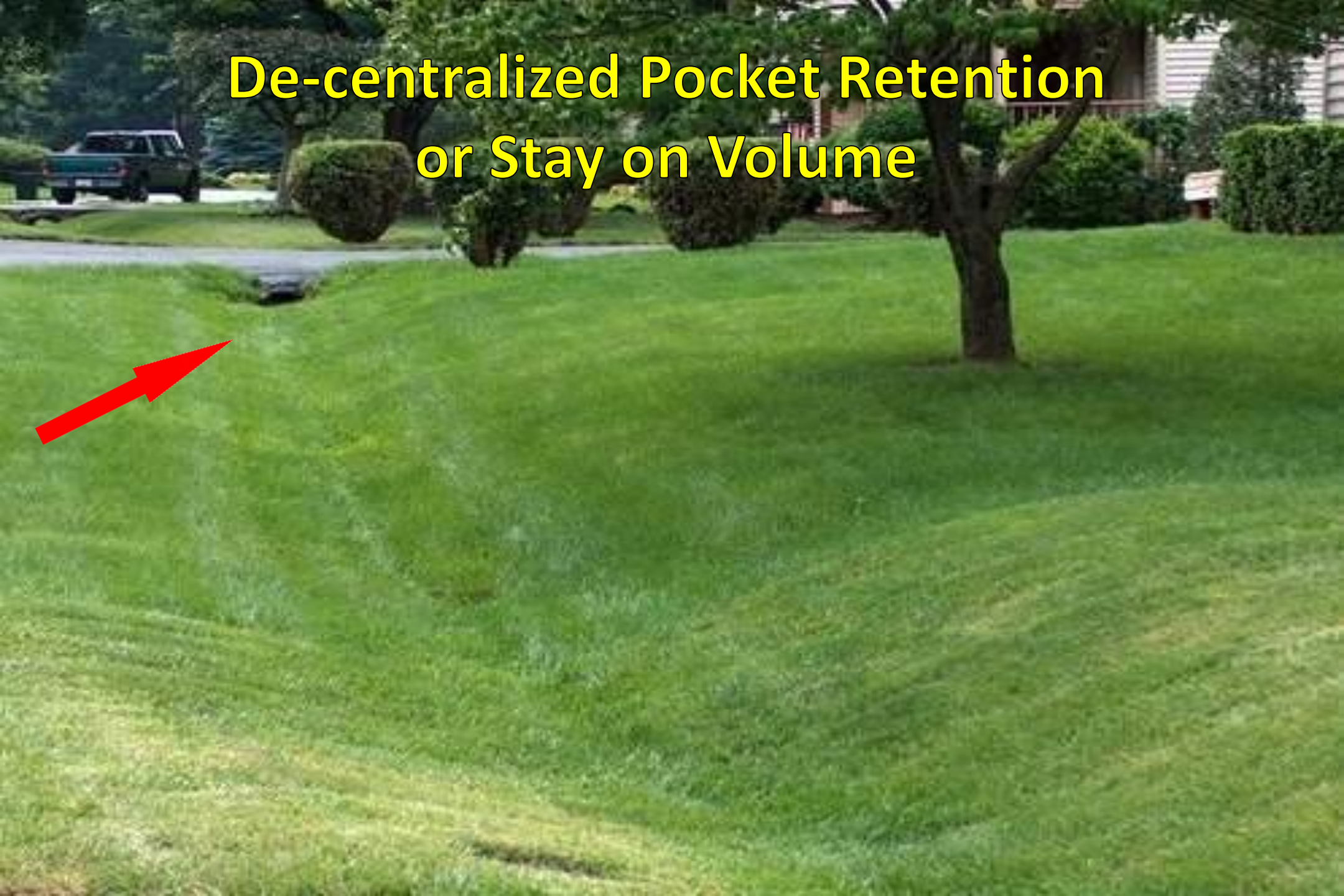
Roadside Bio-Retention

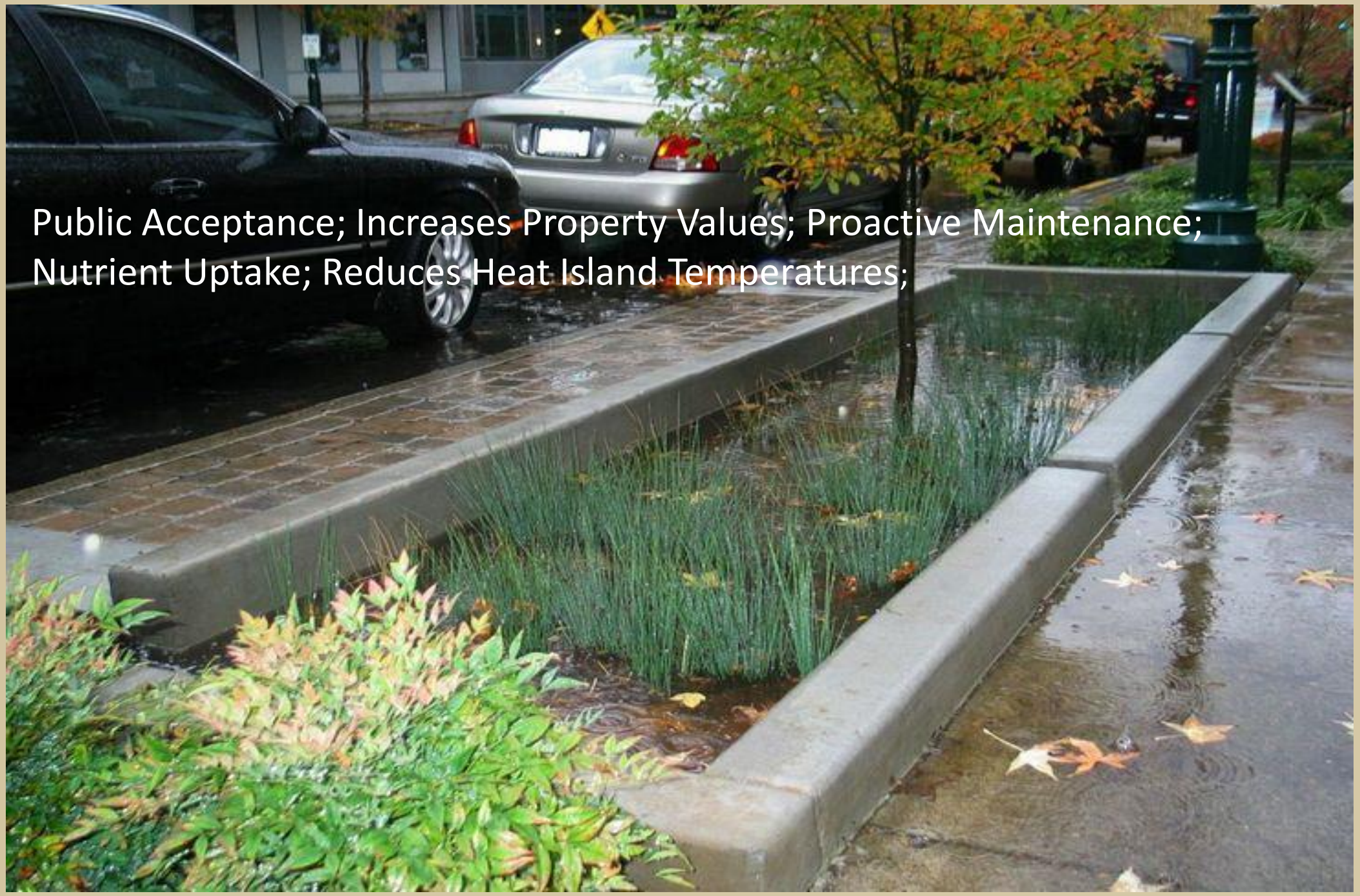
How RR & GI work – Runoff capture, nutrient uptake, reuse, infiltration, evapotranspire, harvest, etc. Sized for runoff from the 1st inch of rainfall; System empty in 72; No site discharge (of this volume) to surface waters.




Usable Flood Control
Vegetated Swale


Infiltration Trench


De-centralized Pocket Retention
or Stay on Volume


Public Acceptance; Increases Property Values; Proactive Maintenance;
Nutrient Uptake; Reduces Heat Island Temperatures;

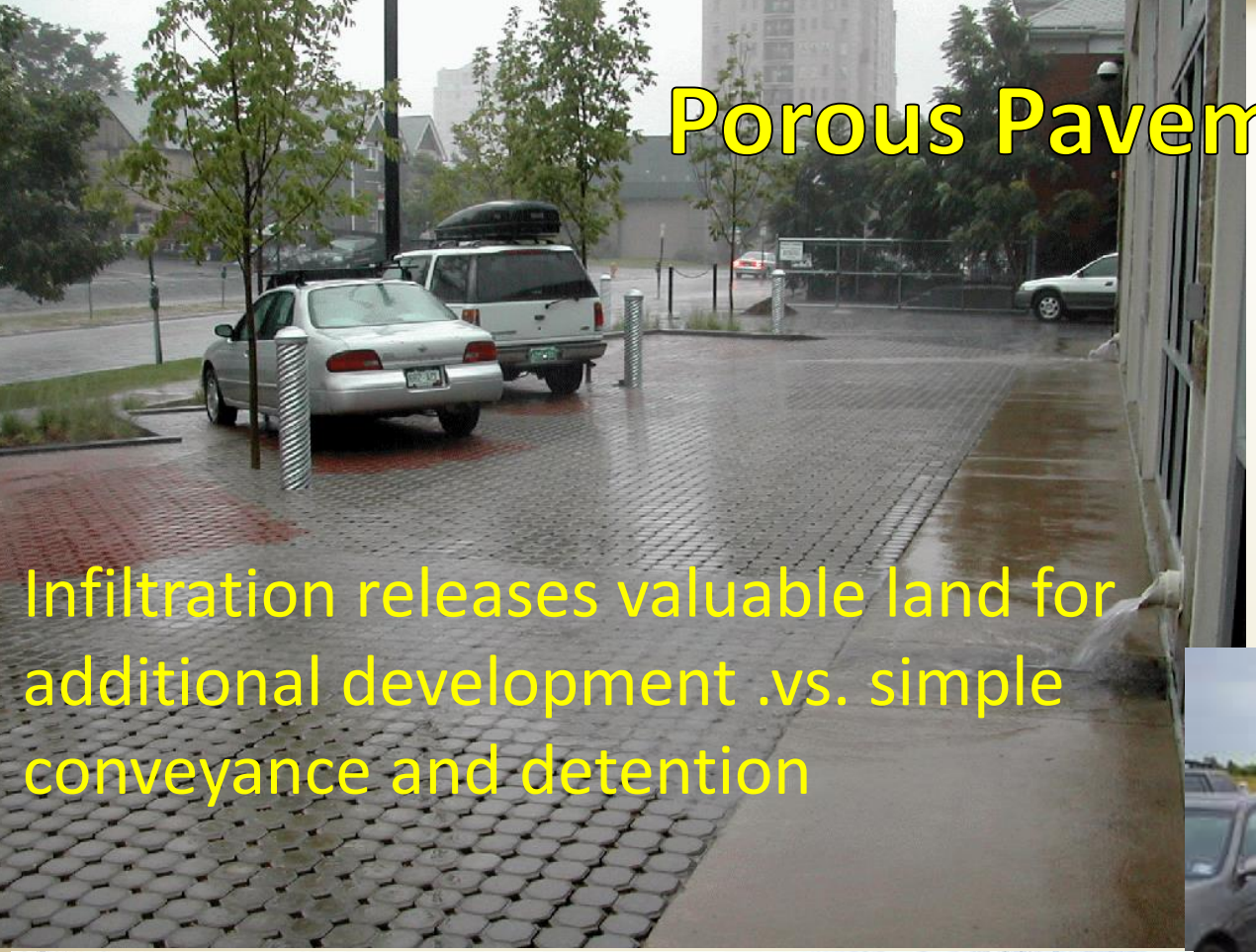
Overland Flow
No Need For Addnl. Irrigation

Finishing Touches

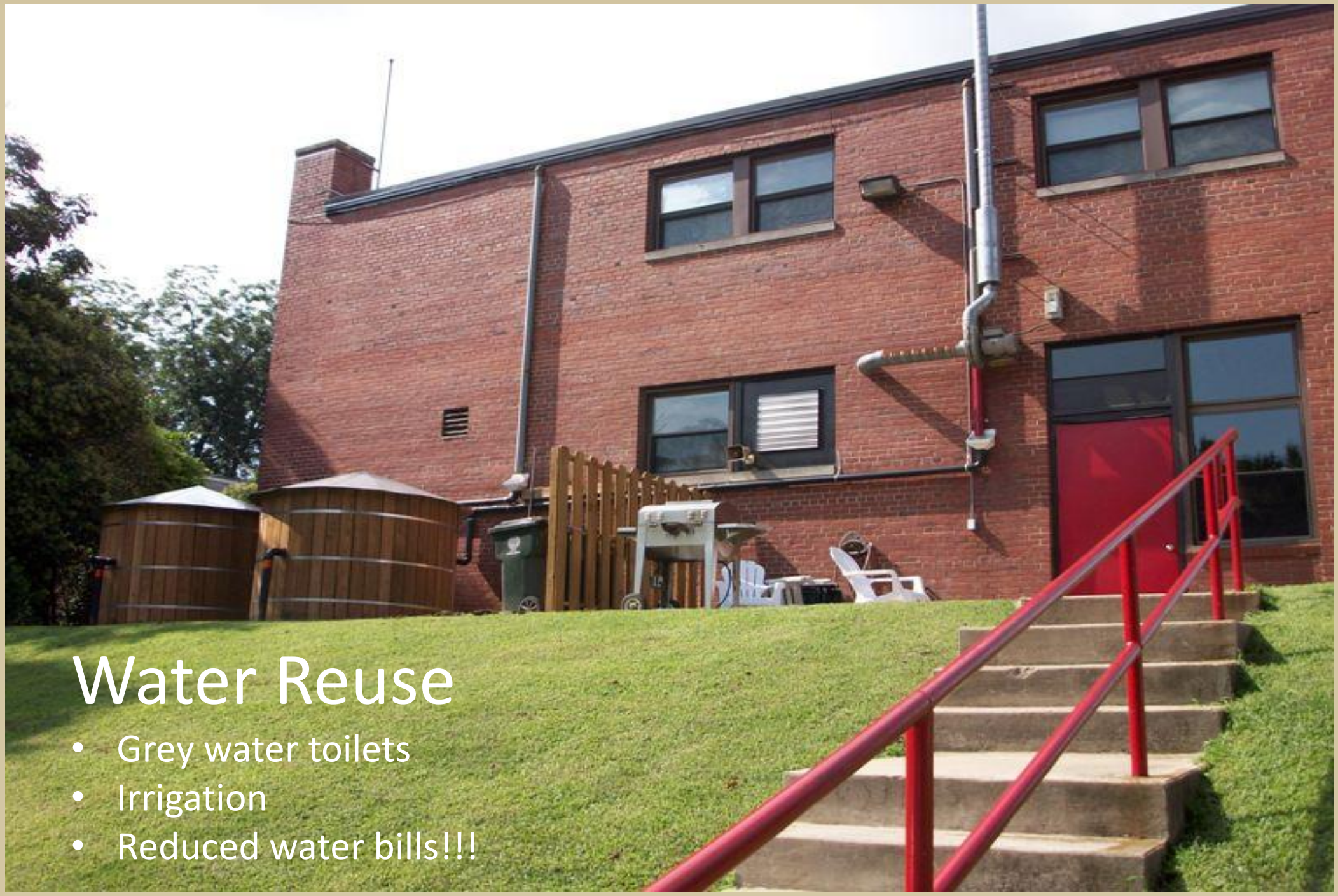
Reduces:

- Piping
- Velocities
- Offsite Erosion
- Volume
- Ambient & Downstream Temps
- Land

Porous Pavements



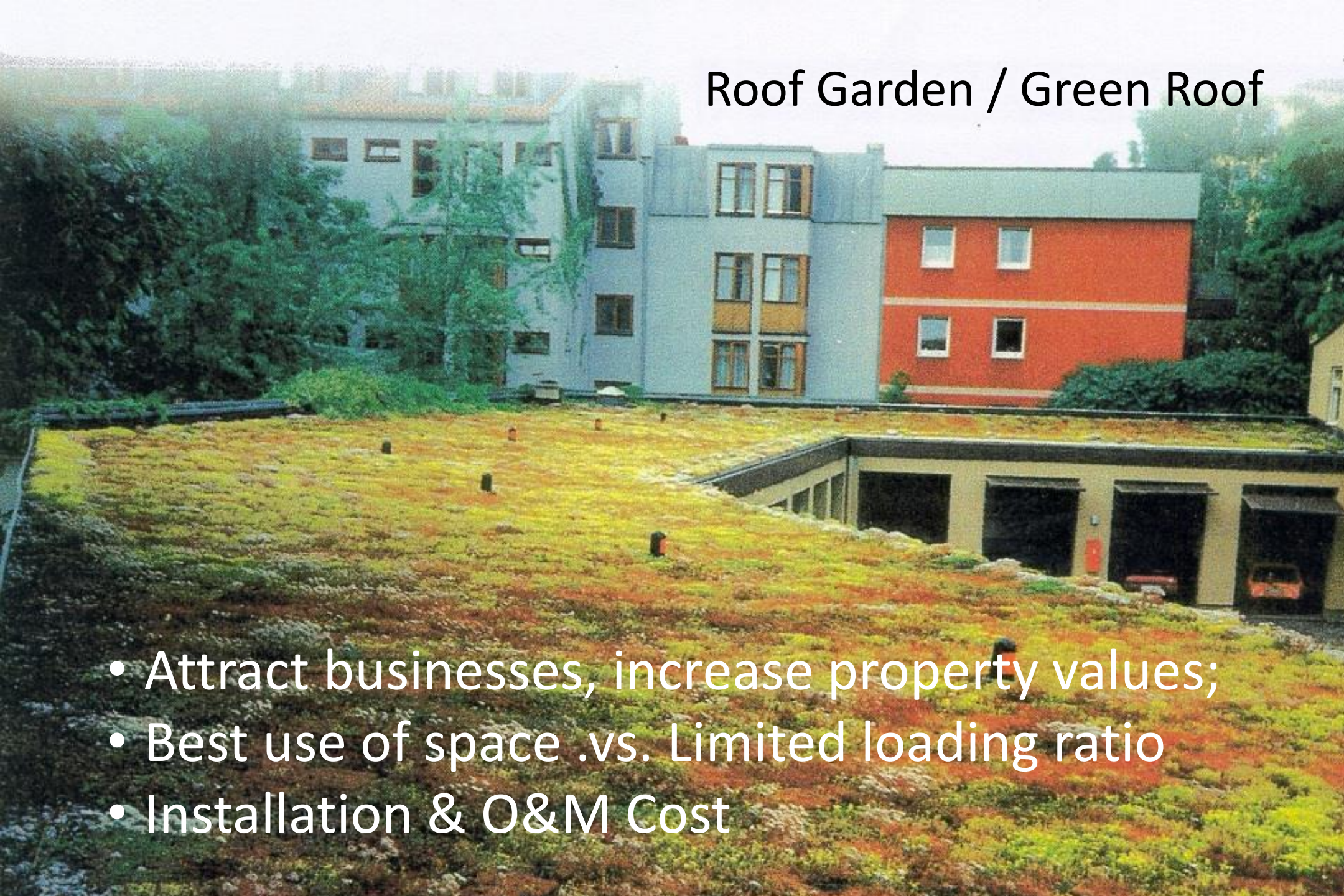
Infiltration releases valuable land for additional development .vs. simple conveyance and detention



Water Reuse

- Grey water toilets
- Irrigation
- Reduced water bills!!!

Roof Garden / Green Roof



- Attract businesses, increase property values;
- Best use of space .vs. Limited loading ratio
- Installation & O&M Cost

Stay on Volume Calculation

$$\text{SOV } (ft^3) = Disturbed\ Area\ (ft^2)\ x\ \frac{Adjusted\ P(in)}{12}\ x\ R_v$$

(Not Capturing 1" or 1.6" of Rain)

R_v Table

Small Storm Hydrology Coefficients (Rv) for Urban Land Uses

Precipitation (inches)	0.5	0.6	0.7	0.8	0.9	1.0	1.6	2.1
Flat Roof	0.790	0.802	0.814	0.826	0.838	0.850	0.880	0.900
Pitched Roof	0.950	0.954	0.958	0.962	0.966	0.970	0.990	0.990
Large Impervious Areas	0.970	0.972	0.974	0.976	0.978	0.980	0.990	0.990
Small Impervious Areas	0.640	0.652	0.664	0.676	0.688	0.700	0.790	0.850
Sandy Soils	0.020	0.022	0.024	0.026	0.028	0.030	0.050	0.080
Typical Urban Soils	0.100	0.104	0.108	0.112	0.116	0.120	0.150	0.180
Clayey Soils	0.190	0.194	0.198	0.202	0.206	0.210	0.240	0.270

64% runoff
36% self-managing

12% runoff
88% self-managing

Notes:

Small Impervious Areas - roads or sm. parking lots w/o curbs, sidewalks

Credits & Incentives

- SOV Reduction Incentives
- Offsite Mitigation Option
- Mitigation Fee Option
- Water Quality Fee Discounts
- Credit Coupons

vs **SHALL**

SOV Reduction Incentives

- Additive 10% reductions off the SOV requirement for Redevelopments:
  1. Redevelopments (0.9" standard or lower throughout the City)
  2. Brownfield Developments
  3. High Density (>7 units per acre)
  4. Vertical Density (FAR=2 or >18 UPA)
  5. Mixed-use/Transit Oriented (w/n a ½ mile of mixed transit route)

Including South Chickamauga Creek

Baseline SOV as low as 0.5"

Hardships

- Unable to meet SOV?
  - Must be technically infeasible to achieve
    - Economic hardship or lack of space are not a basis for site infeasibility
  - Acceptable reasons may include:
    - <2' to limiting layer (bedrock, groundwater, etc.)
    - Contaminated or Non-Perking Soils (< 0.1 in/hr)
    - Karst features
  - Flood Control & Water Quality still required
    - "In system" conveyance of 25-yr event
    - "Safe" conveyance of 100-yr event
    - 80% TSS removal for 2.1" storm event

Offsite Mitigation Option

- Installed at 1.5x the unmet SOV
- Installed in same watershed
- Applicant responsible for land acquisition, design, construction, and long-term O&M
- Surety bond required in the amount of total equivalent mitigation fee
- Fee discounts and coupons can be earned

Mitigation Fee Option

- Fee is payment in lieu of not meeting the full onsite SOV requirement
  - Achieved SOV = Installed SOV + Applied Coupons
- Permit requires a minimum of 1.5x the cost
  - Estimated cost = $30/CF
    - Includes Land acquisition, Design, Installation, Operation & Maintenance, & Administration
  - 1.5 x $30 = $45 per cubic foot
- Paid into a public stormwater project fund

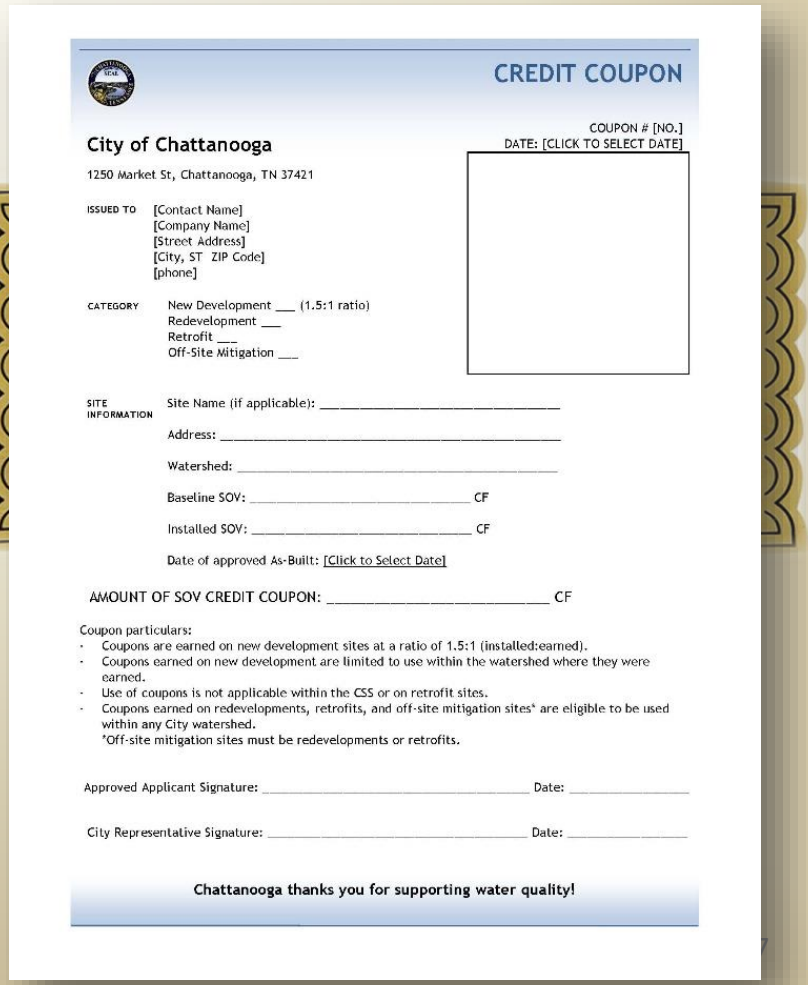
WQ Fee Discounts

- For SOV baseline exceedance
- For commercial and multi-family residential
- Annual discount
  - Property owner's bill
- Maximums
  - 40% for New development
  - 60% for Redevelopment
  - 70% for Retrofit
- Minimum = 10%

Credit Coupons

- Earned in cubic ft. of SOV > Baseline
- Max credit up to 2.1" design
- Issued as "credit coupons"
  - Issued to approved applicant
- Implementation Period
  - 2015 = 100% usage w/o hardship
  - 2016 = 50% usage w/o hardship
  - 2017+ = must demonstrate hardship

Except S. Chick where the 0.6" premium can always be met with coupons w/o having a hardship



CREDIT COUPON

City of Chattanooga

1250 Market St, Chattanooga, TN 37421

COUPON # [NO.]
DATE: [CLICK TO SELECT DATE]

ISSUED TO [Contact Name]
[Company Name]
[Street Address]
[City, ST ZIP Code]
[phone]

CATEGORY
New Development ___ (1.5:1 ratio)
Redevelopment ___
Retrofit ___
Off-Site Mitigation ___

SITE INFORMATION
Site Name (if applicable): _____
Address: _____
Watershed: _____
Baseline SOV: _____ CF
Installed SOV: _____ CF
Date of approved As-Built: [Click to Select Date]

AMOUNT OF SOV CREDIT COUPON: _____ CF

Coupon particulars:
- Coupons are earned on new development sites at a ratio of 1.5:1 (installed:earned).
- Coupons earned on new development are limited to use within the watershed where they were earned.
- Use of coupons is not applicable within the CSS or on retrofit sites.
- Coupons earned on redevelopments, retrofits, and off-site mitigation sites* are eligible to be used within any City watershed.

*Off-site mitigation sites must be redevelopments or retrofits.

Approved Applicant Signature: _____ Date: _____

City Representative Signature: _____ Date: _____

Chattanooga thanks you for supporting water quality!

Credit Coupons

- No expiration date
- Coupon Multiplier
  - When earned on retrofits/redevelopments…
    - Applied at 1:1 ratio (installed:earned)
    - Used in any watershed except CSS
  - When earned on new developments…
    - Applied at 1.5:1 ratio (installed:earned)
    - Used w/n same watershed where earned

		Water Quality Fee Discounts		Mitigation Credits		Mitigation Fees [d]	Off-Site Mitigation [d]
Development Category	SOV Baseline	Discount [f]	Max Discount	Max Earned [c]	Max Applied [d]	Max Fee	Required Volume
New Development (not in S. Chick.)	1.0"	1% per 1% SOV > Baseline	40%	1.1"	0.5"	Baseline minus SOV achieved [e]	Baseline minus SOV achieved [e]
New Development (other watersheds)	1.6"	1% per 1% SOV > Baseline	40%	0.5"	0.8"	Baseline minus SOV achieved [e]	Baseline minus SOV achieved [e]
Incentivized Development / Redevelopment [a]	0.5-0.9"	1% per 1% SOV > Baseline	60%	1.2-1.6"	0.25-0.45"	Baseline minus SOV achieved [e]	Baseline minus SOV achieved [e]
Retrofit / Existing [b]	0.1"	1% per 0.01” SOV > Baseline	70%	2.0"	NA	NA	NA

[a] Redevelopments are eligible for reductions in accordance with permit TNS068063, Sec. 3.2.5.1

[b] Existing properties are those with approved credit prior to 12/1/2014

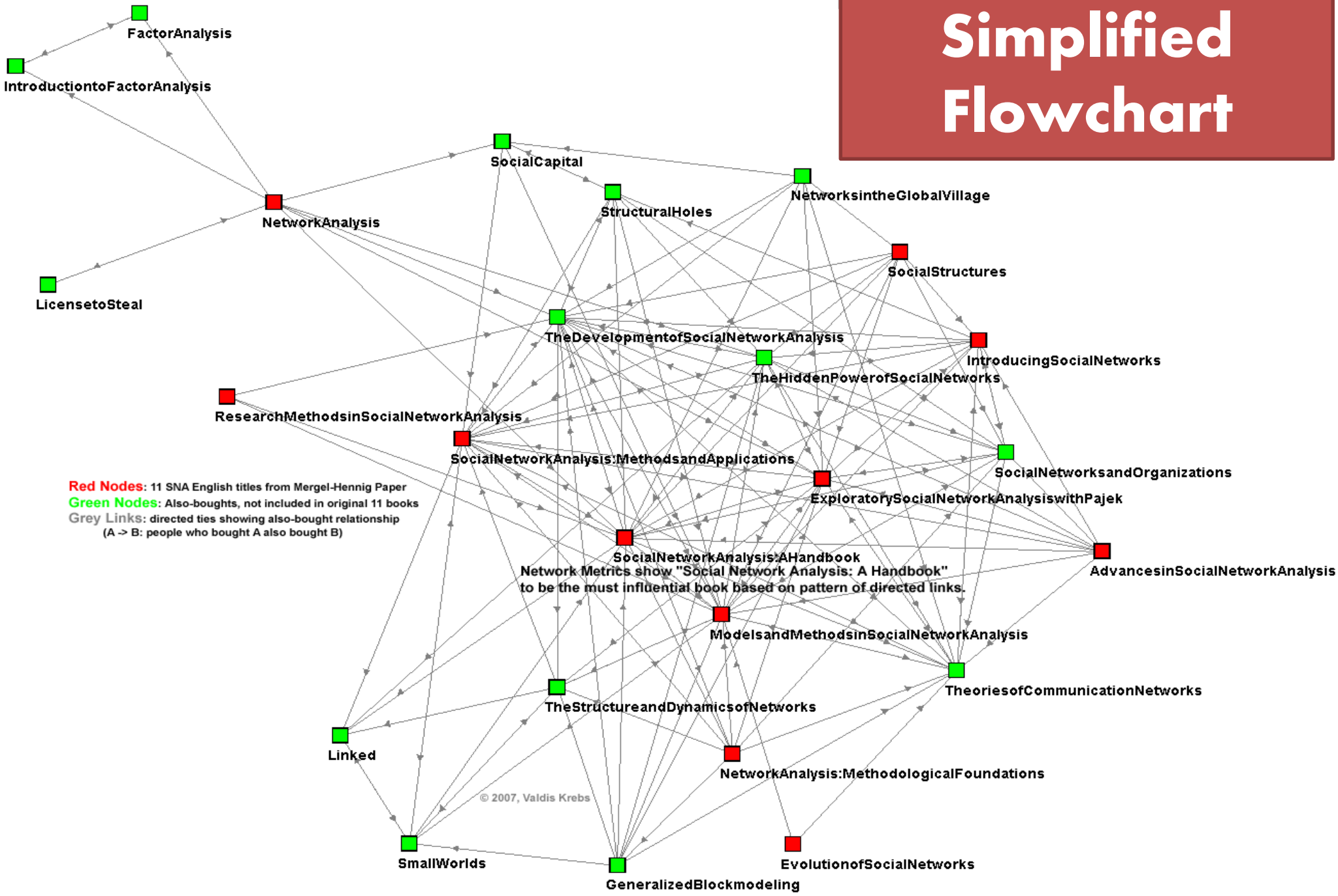
[c] Limit based on the 2.1" water quality volume

[d] 50% of SOV may be met with credits without demonstrating a hardship

[e] SOV achieved is the sum of the onsite SOV plus applied mitigation credits

[f] Minimum WQFD is 10%

Simplified Flowchart



In-house Calculators

- Green Infrastructure Sizing
  - Excel Spreadsheet
  - Easily determine material costs afterwards
  - Compare Grey .vs. Green or Green .vs. Green
  - When GI is sufficient enough to forgo a Pond!
  - When you've met the minimum criteria
  - Coupon value of your overdesign

- Property Owner's $ & % WQ Fee Reduction
- # Coupons Earned
- CSS Area Combined Discharges
  - # hotel rooms, # fixtures, change in hardscape, etc.
- Offsite Mitigation volume or Fee in Lieu
- Infiltration Trench Cost Scenarios (Green .vs. Grey)
- Unending Technical Support from LDO & PW Staff.

Thank You!