050361c

Review of Proposed Hampton Lane Development located at 2502 Northwest 16th Avenue

Petition 99SUB-05DB
City Commission Hearing Date: 12 Sept. 2005

Citizen Presenter: John J. Sansalone
(1708 NW 24th Street, within 400 feet of Hampton Ln.)

Synopsis

The 3.29 acres is an urban ecological crown jewel; why make this a losing proposition for all parties? Environmental justice, safety & good economics are possible with knowledge, good design/construction, and also provide benefits to the neighborhood.

- As planned, Hampton Ln. <u>increases</u> annual site direct surface runoff ≈ +2,000,000 gal. <u>increases</u> pollution, temperatures and imperviousness
- As planned, Hampton Ln. violates the Comprehensive Plan
- The lots should be reduced to 4 or 5, in keeping with neighborhood, natural hydrology and ecology
- Reduce impervious area, add LID systems such as porous pavement
- Save mature vegetation and tree canopy resulting in a significant ecological, environmental and hydrologic benefit to the citizens
- Consider more enlightened planning, design, scientific, review, and construction practices that utilize sound fundamental understanding, and implement LID practices – it is time to change.

Background

Sansalone's background with respect to this case

PROFESSIONAL ENGINEERING (P.E.) AND LAND USE EXPERIENCE:

- (1983-86) Design/Build Engineer at Sanso Inc. (Cincinnati)
- (1986-89) Design Engineer at JRS and Company (Cincinnati)
- (1986-89) Co-Owner of Sylvan Hills Inc. (Cincinnati)
- (1991-93) Senior Engineer at JRS and Company (Cincinnati)
- (1994-) Consulting Engineer and Inventor (Ohio, LA, Florida)

ACADEMIC EXPERIENCE (College of Engineering):

- (1997-98) Research Assistant Professor (University of Cincinnati)
- (1998-) Visiting Professor (University of Calabria, Italy)
- (1998-2005) Assistant → Associate Professor (Louisiana State University)
- (2000-2005) Louisiana Land & Exploration Prof. (Louisiana State University)
- (2002-2005) Assoc. Director of LWRRI (Louisiana State University)
- (2005-) Associate Professor (University of Florida)

ACADEMIC CREDENTIALS:

- B.S. Civil Engineering (1983) (Christian Brothers University)
- M.S. Geotechnical Engineering (1992) (N.C. State University)
- Ph.D. Environmental Engineering (1996) (University of Cincinnati)

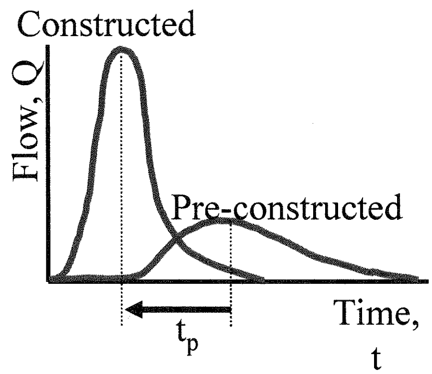
STORMWATER RESEARCH CREDENTIALS:

- 8 Ph.D., 2 MSc students; in addition to 7 Ph.D. & 7 MSc. students completed
- 41archival manuscripts, 2 book chapters, 3 patents, 150 presentations, 1 Editorial Bd

Rainfall-Runoff Hydrologic Challenges

The "Constructed" (i.e. suburban and urban) environment modifies 3 Primary attributes of the stormwater hydrograph compared to the pre-constructed environment:

1. **Peak flow**, Q_p increases,
2. **Runoff volume**, V increases,
3. **Temporal behavior**, t_p of the hydrograph is decreased,

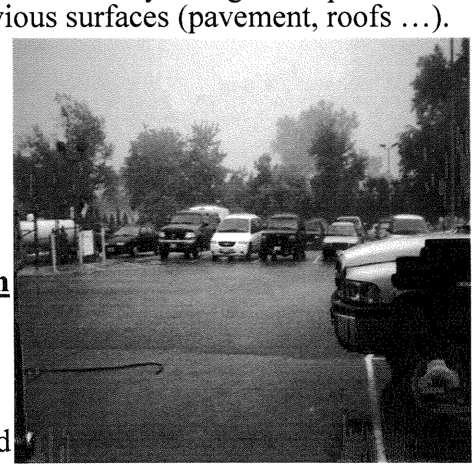


The constructed environment alters the local hydrologic cycle with significant and complex control implications for both water quantity and water quality.

- i.e., a 12-hour rainfall-runoff event generating 3 inches (7.6 cm) of runoff over a 200-acre constructed site can generate over 16 million gallon of storm water volume. Consider the treatment infrastructure required to "control" and "treat" such volumes intermittently.

Hydrologic Cycle and Impervious Surfaces

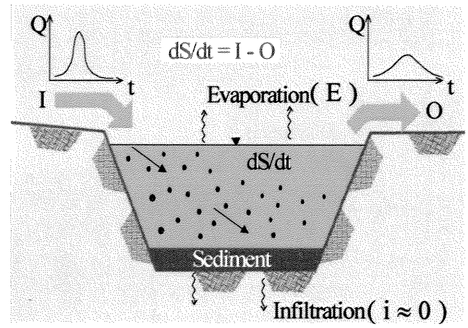
- A number of characteristics of the local hydrologic and pollutant cycles are modified by impervious surfaces (pavement, roofs …).
- **Infiltration** is significantly ***reduced***. Depending on soil characteristics and impervious areas this can be the most important component modification,
- **Evaporation** & **transpiration** are significantly reduced
- **Depressional Storage** is significantly ***reduced***
- **Pollutant mass transport** and loads are greatly ***increased***,



As a result, peak flow, volume, pollutant mobilization, and urban temperatures increase; while attenuation of runoff/loads decreases

Volumetric Impoundments:

- **Vault Structures**
  - ***below grade (no E or i)***
- **Detention Basins**
  - ***temporary impoundment***
- **Retention Basins**
  - ***permanent impoundment***
- **Equilization Basins**
- **Water Quality Basins**



ADVANTAGES:

- On-site quantity control (Q_p,t_p and V)
- Sediment control w/ proper design
- Passive operation with proper design
- Potential evaporation (E) for retention systems as a function of radiation energy, wind, humidity
- If planted, impoundments can provide evapotranspiration
- Low construction costs **excluding** land costs

DISADVANTAGES:

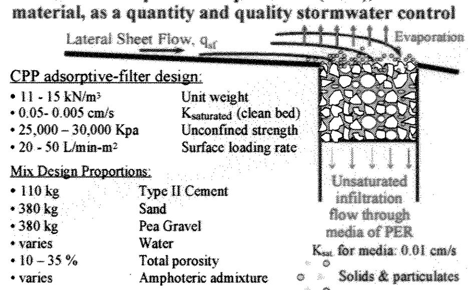
- Safety, nuisance, serious vector issues
- Rapid clogging of basin subsurface
- Soil contamination, pollutant scouring
- Problematic for regional control
- Anaerobic issues w/low diss. oxygen
- Not effective for soluble pollutants
- Pollutant leaching, repartitioning
- Potential long-term toxicity issues
- Maintenance is costly and is rare

Low Impact Development:

(in-situ restoration of hydrologic cycle)

- **Engineered infiltration systems**
  - *Unsaturated flow, reactive media*
- **Permeable pavement (CPP)**
  - *Engineered material and systems*
- **Vegetated infiltration systems**
  - *combine w/engineered filtration*
- **Mature trees** (see next slide)
- **Combined LID systems**

Cementitious permeable pavement (CPP), an LID material, as a quantity and quality stormwater control



ADVANTAGES:

- Quantity control (Q_p,t_p and V)
- Water quality w/ proper design
- Passive, sustainable w/ proper design
- No standing surface water impoundments
- Solute and particle control w/ proper design
- CPP maintainable w/ pavement cleaners
- Can combine natural systems, engineered materials, and urban planning on a site
- Systems such as permeable pavement are multi-purpose environmental infrastructure

DISADVANTAGES:

- Little familiarity by stakeholders
- Scientific papers relatively sparse
- Requires design education; systems not well understood by stakeholders (for that matter, neither are BMPs)
- Requires scientific understanding as compared to rule-of-thumb concepts
- Maintenance must be identified so stakeholders can sustain systems
- Regulators uncertain how to monitor; and quantify benefits of such systems

Example of benefits for mature vegetation as a LID
(on a **single** mature tree basis in an urban area)

- Consumes 20 to 50 lbs of CO_2 annually
- Evaporates/stores up to 80 gallons H_20 daily and promotes infiltration through root zone
- 10 year old tree w/ 20 foot crown intercepts 80-100 gallons H_2O for ½ inch rainfall event (this is 60 to 70% interception)
- Contributes > $50,000 value to reduce urban pollutants over a 50 year lifetime of a tree
- Releases 50 ft^3 of oxygen daily
- Consume 50,000 BTUs of heat daily
- Filter urban air particulates from 10,000/L to 3,000/L, reduces sulfur dioxide, nitrogen dioxide, ozone, and carbon monoxide
- Increases property values 5 to 20%
- Can you identify an impoundment or best management practice (BMP) remotely capable of a fraction of these attributes ? (and these statistics are on a per tree basis !)

Results for proposed Hampton Lane and surrounding environs