Case Study No. 2: East Main Road, Portsmouth Sidewalk and Parking

LID, Use of Credits for Disconnecting Impervious Cover, & other Controls

Existing:
- 2 miles of existing roads (Chase Rd/E. Main & Park Ave);
- Existing narrow sidewalks both sides of the road.

Proposed:
- Sidewalk replacement and width expansion to up to 6 feet;
- New parking spaces for commuter bus stop;
- New impervious cover of just under an acre.
Stormwater Management Criteria

• What criteria apply to this project?
  - Redevelopment?
  - New development?
• How much of the stormwater management requirements can be met with QPAs?
• What other practices might make the most logic given the existing conditions?

Redevelopment Criteria Applies

• Disturbance of more than 10,000 sq ft;
• % impervious cover calculation;
  - Assume site area = total project area including roadway surface within R/W;
  - Existing impervious cover includes existing sidewalks, roadway + driveways & other paving within R/W for purpose of calculating % I;
  - Site % I > 40%; thus reduce IC within disturbed area (sidewalk) by 50% or meet Stds 2 & 3 (Re, & WQv) for 50% of Redevelopment Area
• Plus new IC.

Management Options
(for Re, & WQv)

• Sheet flow to Qualified Pervious Areas (QPAs);
• Pervious pavement (asphalt, concrete, or pavers);
• Retrofit other impervious areas with appropriate controls (e.g., bioretention, dry swale);
• Reduce unnecessary existing IC.
Other Criteria

- Does the project need to provide $C_p$?
- *Maybe, if new impervious cover >1 acre (within same catchment)*
- What information would we need to determine if the project must provide $Q_o$?
- *Discharge location to receiving waters*

Additional Criteria (continued)

Overbank Flood Protection
- $Q_o$ compares proposed to existing conditions, not natural conditions
- There are no exemptions for impervious cover or peak inflow rate
- A downstream analysis may allow for elimination of practices.

Soils
**Commuter Parking**

**Chase Road Parking Lot**

**Chase & Boyd Lane**

- Possible Bioretention

- Bioretention with Forebay

- New Bioretention managing new parking spaces
Case Study - E. Main Rd, Portsmouth

LID for Linear Transportation Projects:
RI SW Manual

**Redevelopment and LID**

Avoid/Reduce/Manage?

Reduce impervious cover?

**Stormwater for Chase Rd Parking Lot**

- Total DA (parking + sidewalk + bus stop) = 8,830 sq ft.
- Size bioretention for this IC.
  
  \[
  WQ_v = \frac{1}{12} (8,830 \text{ ft}^2) = 736 \text{ ft}^3
  \]
  
  Min Surface Area \( A_f \) = \[
  A_f = \frac{WQ_v(d_l)(d_f)(h_f + d_f)(l_f)}{(k)(h_f + d_f)(l_f)}
  \]
  
  \[
  A_f = 320 \text{ sq ft}
  \]
Case Study - E. Main Rd, Portsmouth

LID for Linear Transportation Projects:
RI SW Manual

8/25/2011

QPAs for Sidewalk Runoff
(not including Chase Rd parking)

- Total length of existing sidewalk = 19,600 lf
- Average width of 3.5 ft
- Total existing IC = 68,600 sq ft.
- Required IC for management (50%) = 34,300 sq ft.
- Proposed width (assume 6 feet).
- Proposed IC = 111,480 sq ft.
- Total IC for management (100% of new IC + 50% of existing IC) = (111,480 - 68,600) + 34,300 = 77,180 sq ft.

QPAs Quantified on CAD plans

E Main & Hillside Road

Sheet flow to QPA
R/W > 6 ft from sidewalk

Run-on

Sheet flow to QPA
R/W < 6 ft from sidewalk
QPAs provided

- Total proposed sidewalk draining to a QPA within R/W = 1,815 lf
- Total proposed IC from sidewalk draining to a QPA = 10,890 sq ft
- Required IC needing treatment from another practice = 77,180 - 10,890 = 66,290 sq ft.

E Main/Chase & Park Ave

Possible Bioretention Islands

Chase Road and Park Ave (QPA or Bioretention)

QPA for sidewalk or bioretention for intersection
**E Main north of Spague St**
(looking north)

Sheet flow to QPA within R/W (No – too narrow)

**Good terrain for QPA**
but insufficient R/W

Existing Landscaped Area

R/W

**Conversion of Landscaping**
to Bioretention?

Retrofit gas Station Runoff

Retrofit road runoff
E Main & Child Street

Sheet flow to QPA

E Main south of Child St

Sheet flow to QPA

Pervious Areas
Portsmouth Shopping Plaza
LID for Linear Transportation Projects:
RI SW Manual
E Main Near Dexter Street

Sheet flow to QPA? (no, too narrow)

E Main & Berroth Ct

Run-on

E Main and Power St

QPA? Run-on

LID for Linear Transportation Projects:
RI SW Manual
LID for Linear Transportation Projects:
RI SW Manual

E Main & Bradley Terrace

E Main & Church Ln

E Main north of Spague St (looking north)
### Summary of QPA and Other Criteria

- Total IC for management = 77,180 sq ft.
- Total IC draining to a QPA = 10,890 sq ft.
- Net IC area for additional management = 66,290 sq ft (structural controls, IC removal or QPA for non-sidewalk areas)
- Sidewalk could be moved to back of R/W?
- New impervious cover = 42,880 sq ft...so $C_p$ is not required.
- $Q_p$ will need to be addressed and compared against existing conditions.