Stream Protection and Stormwater Management Criteria

Red Brook Watershed
Scarborough, ME

Horsley Witten Group
Sustainable Environmental Solutions

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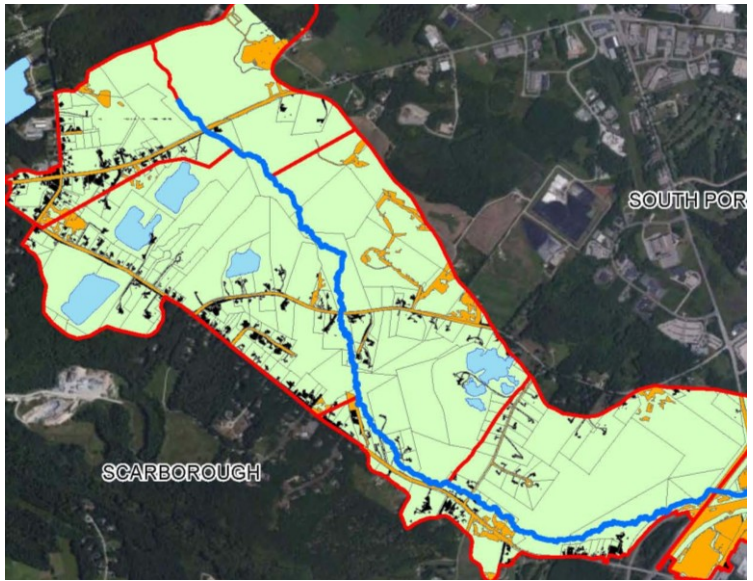
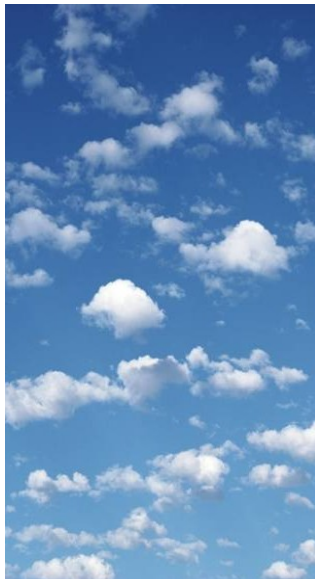
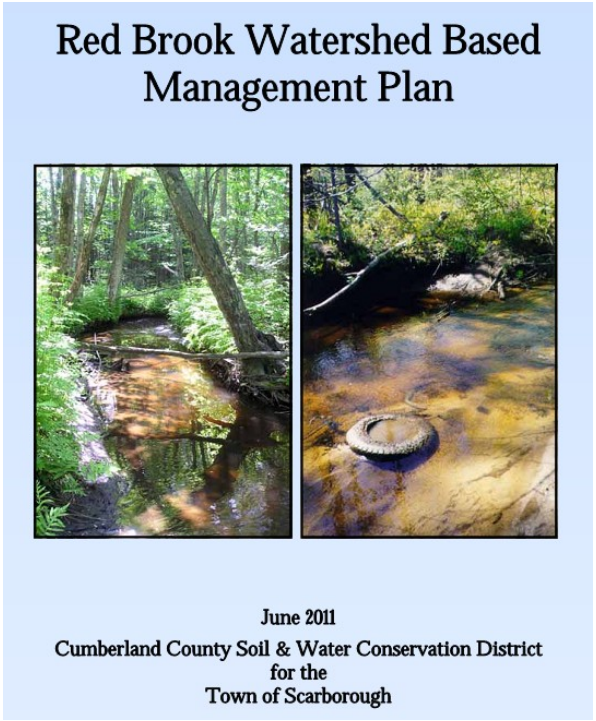




Red Brook Impairments

- Red Brook is listed as an impaired water body on the Maine Clean Water Act Section 303(d) List of Impaired Waters (2010):
  - Water Quality (Polychlorinated Biphenyls)
  - Stream Habitat (channel instability, floodplain alteration)



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Overview of Current Planning Effort

- **Recommendations** *(June 2011 Plan)*:
  - Implement a 75-foot buffer for all perennial streams and tributaries;
  - Implement stormwater management standards; and
  - Implement an *efficient comprehensive approach* for development review.
- **Current Activities:**
  - Local Administration of Chapter 500 (Sec. 9 - Municipal Stormwater Management Program (MSMP))
  - Draft Stormwater Ordinance Language
  - *Stream Protection Criteria*
  - *Stormwater Management Criteria*

Must develop standards/program that "will result in Water Quality in Red Brook that is as good, or better," than under State's program.

Developing Effective Criteria

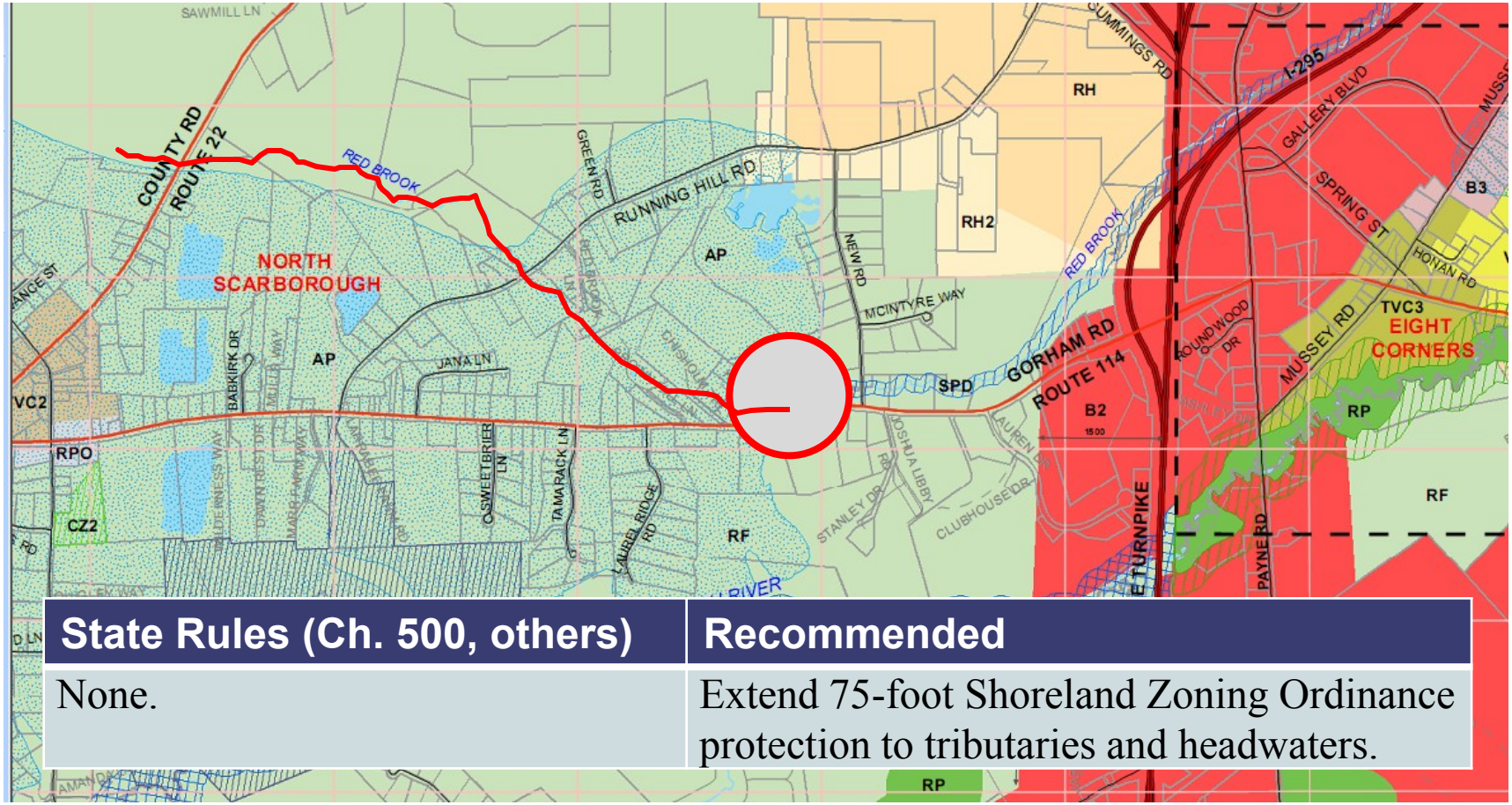
Stream Protection Criteria

- *Stream Buffer*
- *Stream Crossing Standards*
- *Environmentally Sensitive Site Design*

Stormwater Management Criteria

- *Project Review Threshold*
- *Water Quality Treatment*
- *Cooling*
- *Channel Protection and Flood Protection*
- *Infiltration*
- *Redevelopment Projects*

Stream Protection: Stream Buffer



State Rules (Ch. 500, others)	Recommended
None.	Extend 75-foot Shoreland Zoning Ordinance protection to tributaries and headwaters.

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Stream Protection: Stream Crossing

- Maine DOT Policy: 1.2 times bankfull width & natural bottom substrates
- Similar standards considered by DEP in 2010
- No local standards
- Red Brook Standards *(under consideration)*:
  - Bridges and open–bottom arches preferable
  - Embedded culverts
  - 1.2 times bankfull width
  - Natural bottom substrate
  - Openness ratio (area/crossing length) >0.25m
  - Non-corrugated HDPE prohibited, unless embedded
  - Distinction between new and replacement projects

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Stream Protection: Environmentally Sensitive Site Design

- Design sites to:
  - Avoid wetland impacts
  - Preserve green space and buffers
  - Preserve areas for infiltration
  - Disconnect and minimize impervious areas
- Emphasize design approach in local requirements: *provide guidance*
- Require applicants to document the design process (plan submittals)

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Stormwater Management Application Thresholds

- Red Brook Watershed
- Projects with 5,000 s.f. of impervious area (new or redeveloped)
- Current Chapter 500 thresholds:
  - Stormwater Management Law: greater than 1 acre of disturbance
  - Site Law in urban impaired watershed: 20,000 s.f. of impervious area or 5 acres of developed area

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Stormwater Management: Water Quality Treatment

- No New Untreated Discharges.
- Practices designed to treat 1 inch of runoff from impervious areas and 0.4 inches of runoff from landscaped areas.
- Practices must capture runoff from at least 95% of impervious area (75% for linear projects).
- Designate target pollutants as TSS, bacteria and nutrients.

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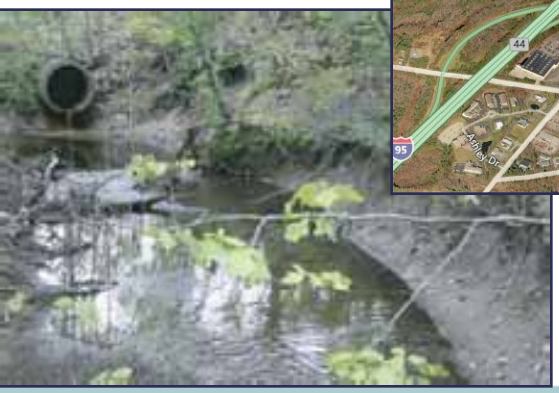
Stormwater Management: Cooling

- Stormwater discharged to streams must be cool.
  - Practices must cool the runoff before discharging, or
  - Site is designed to avoid heating of stormwater

Stormwater Management: Channel Protection Criteria

- Goal is to reduce the amount of time a downstream channel is exposed to erosive forces
- More impervious surface generally results in more runoff and greater downstream flows.
- Control: Design stormwater outlets to provide 12 hours of extended detention (slow release) for the 1-year, 24-hour design storm



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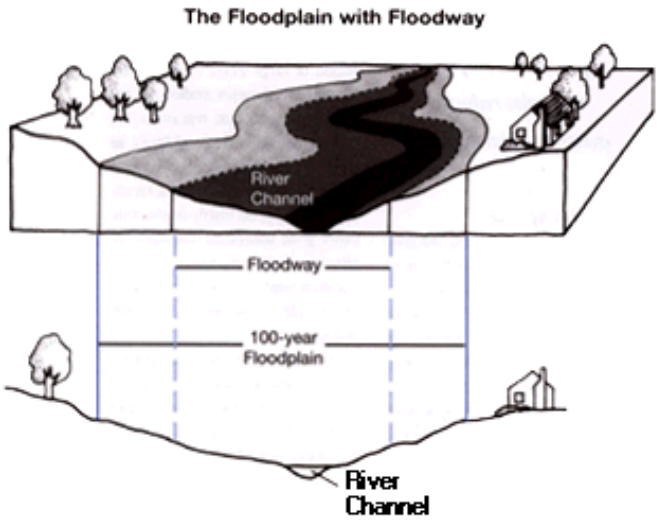
Stormwater Management: Flood Control Criteria

- Overbank Flood Protection: Post-development peak flows must meet pre-development peaks for 10- and 25-year, 24-hour design storms
- Extreme Flood Control: Ensure safe passage of the 100-year, 24-hour design storm



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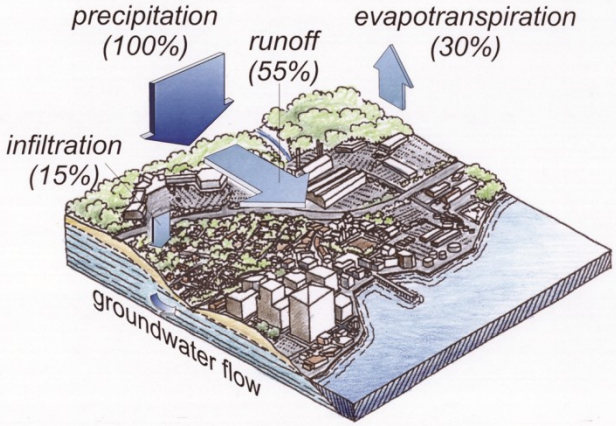
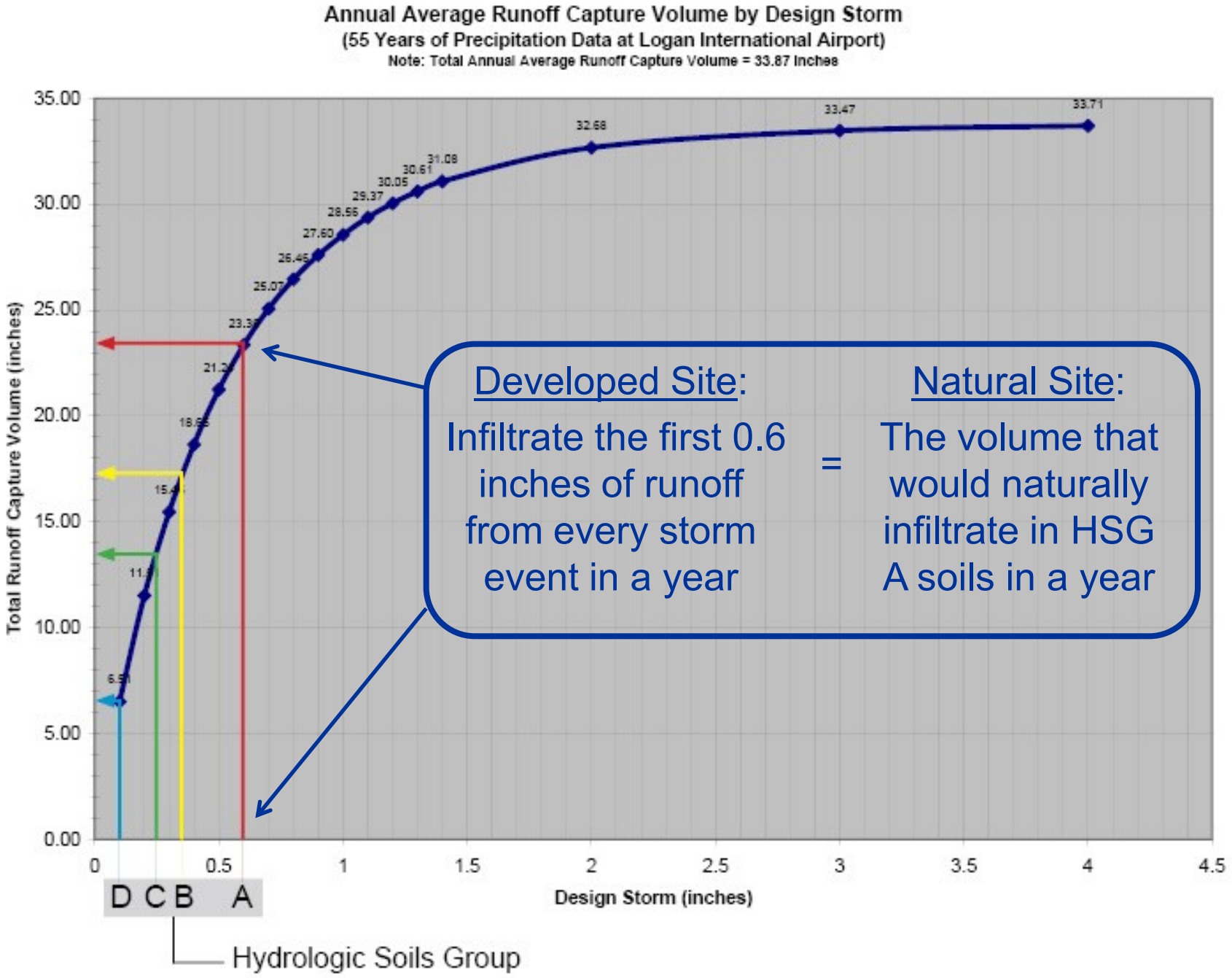
Stormwater Management: Infiltration

- Maintain the natural water balance on the site
- Infiltrate the same annual volume of runoff onsite as would naturally infiltrate on undeveloped site



Hydrologic Soil Group	Massachusetts and Rhode Island Requirement (Runoff Depth in inches)
A (low runoff potential)	0.60
B	0.35
C	0.25
D (high runoff potential)	0.10


Annual Average Runoff Capture Volume by Design Storm
(55 Years of Precipitation Data at Logan International Airport)
Note: Total Annual Average Runoff Capture Volume = 33.87 Inches
Total Runoff Capture Volume (inches)
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Design Storm (inches)
33.47
33.71
32.68
31.08
30.61
30.05
29.37
28.56
27.60
26.45
25.07
23.38
21.2
18.6
15.4
11.5
6.5
D C B A
Hydrologic Soils Group
Developed Site:
Infiltrate the first 0.6 inches of runoff from every storm event in a year
=
Natural Site:
The volume that would naturally infiltrate in HSG A soils in a year

Stormwater Management: Redevelopment Criteria

- Meet all other criteria to the maximum extent possible.
- Document why criterion is not achievable.
- At the least, must improve stream conditions.
- Redevelopment provides an opportunity to correct prior mistakes, achieve improvements over status quo.

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Next Steps

- DEP Review of MSMP & Stormwater Management Criteria
- Local Ordinance Process
- Additional Watershed Planning Activities

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Questions and Discussion

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