

Water, Energy & Smart Growth

“Smart Sewering”

Town of Littleton

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www.charlesriver.org

Water, Energy & Smart Growth Summary

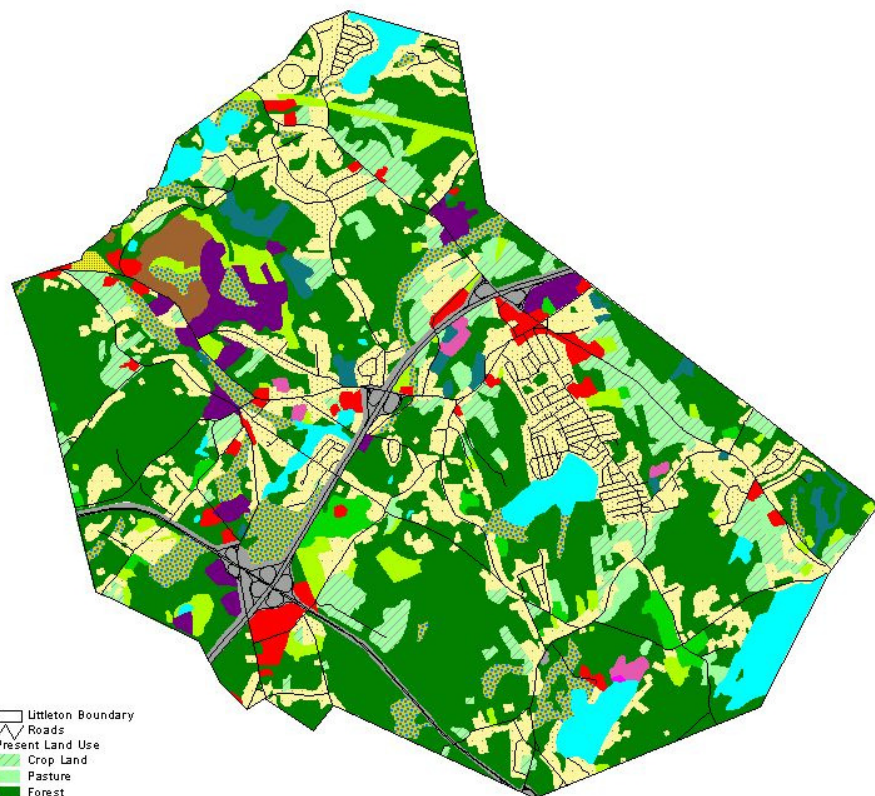
- CRWA has received \$100k anonymous grant to work with Littleton
- One-year project starting October 1, 2010
- Broad goals are:
 - improve water management
 - look for energy generation opportunities
 - promote smart growth
- Technical and economic analysis

Water, Energy & Smart Growth

Earlier GIS Analysis

- performed in 2001 as training for other watershed groups
- Environmental/REAL Planning
 - Resources, Environment and Land
- Water Budgets
 - net human impact on low flows in subbasins

Present Land Use in Littleton

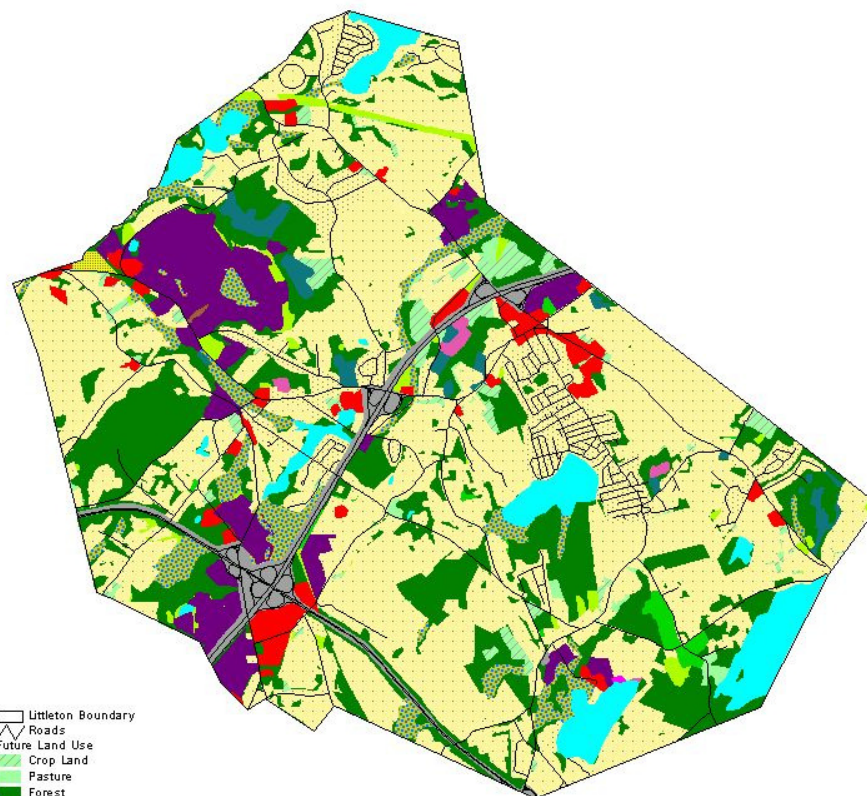


- Littleton Boundary
- Roads
- Present Land Use**
- Crop Land
- Pasture
- Forest
- Non-Forested Wetland
- Mining
- Open Land
- Participation Rec.
- Spectator Rec.
- Water-based Rec.
- Multi-Fam. Res.
- High Density Res.
- Medium Dens. Res.
- Low Dens. Res.
- Salt Water Wetland
- Commercial
- Industrial
- Urban Open
- Transportation
- Waste Disposal
- Water
- Woody Perennial

0.5 0 0.5 1 1.5 Miles



Future Land Use in Littleton



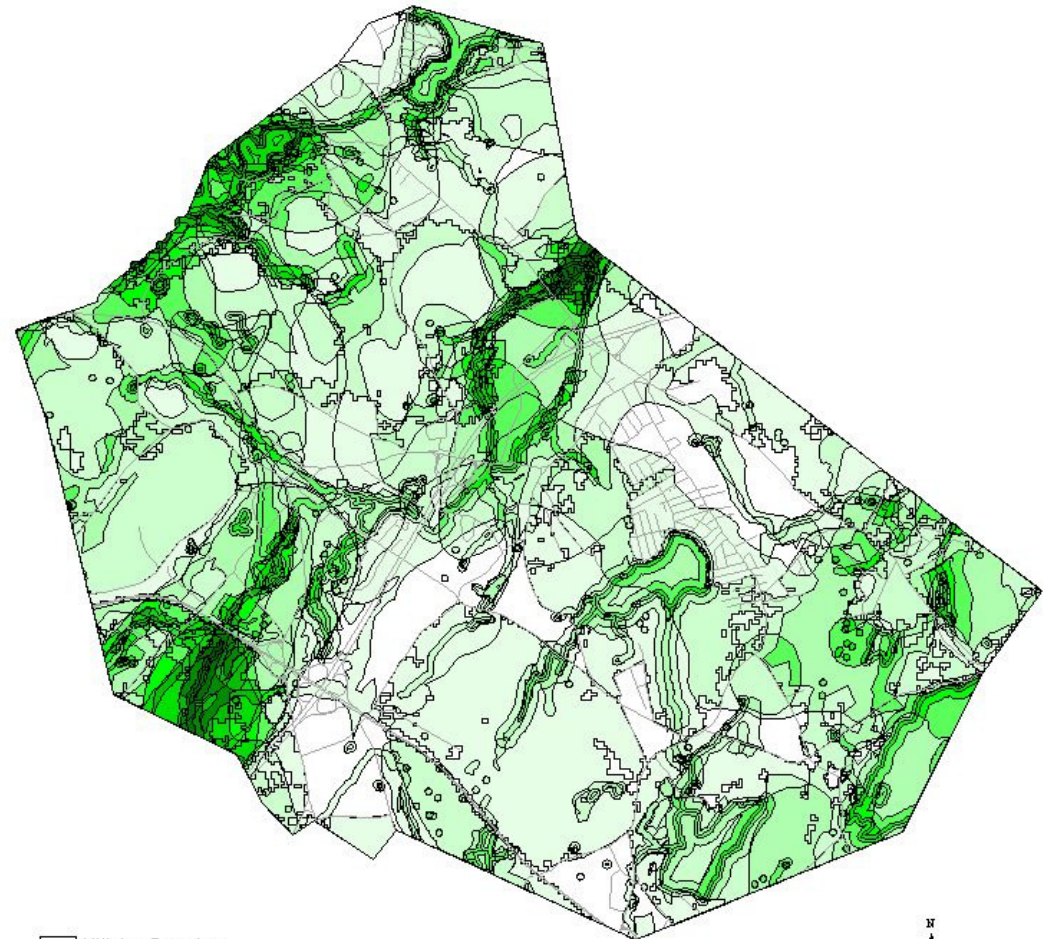
- Littleton Boundary
- Roads
- Future Land Use**
- Crop Land
- Pasture
- Forest
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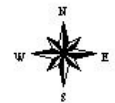
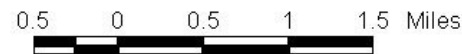


- Overlay of habitat and water resources layers
- Green means high priority for protection
- White means more suitable for development

Priority Lands in Littleton



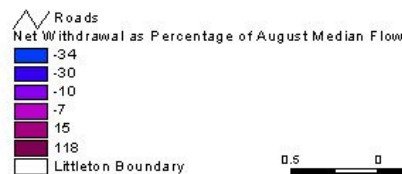
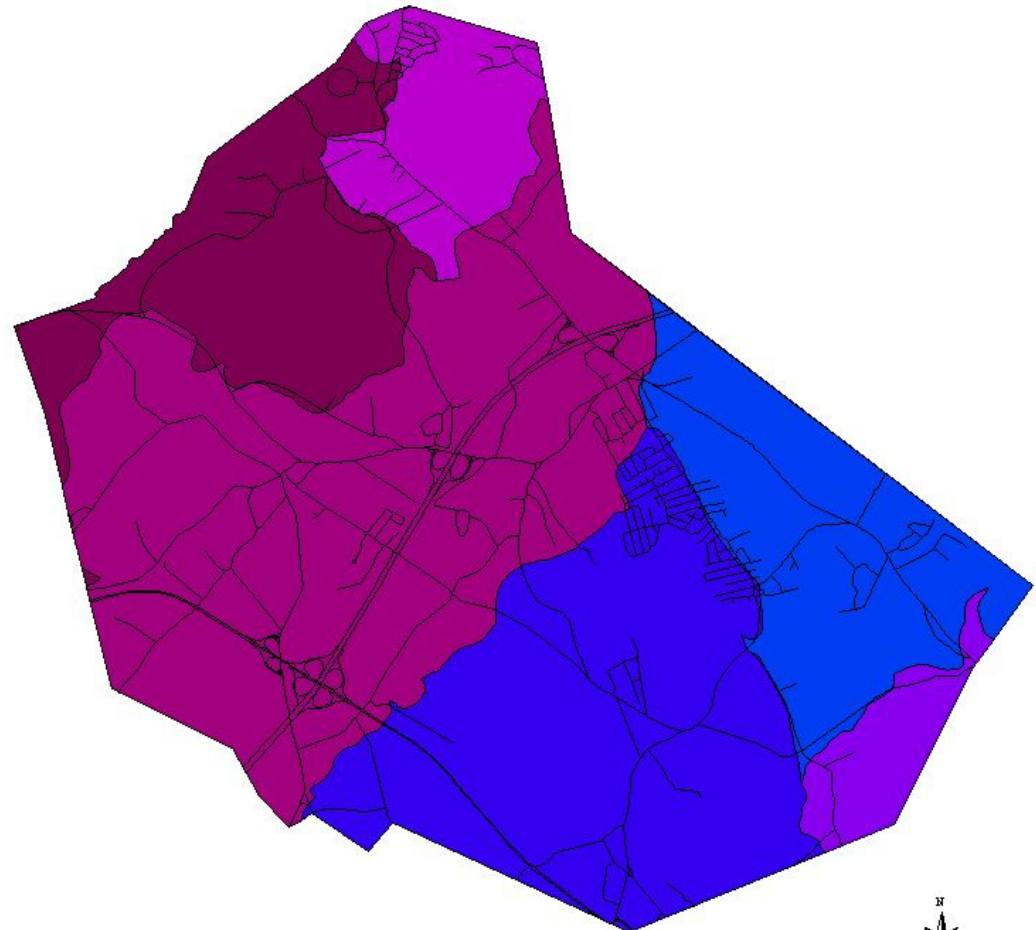
Cum ulative ranking of priority lands based on locations of: rivers, lakes, aquifers, sand & gravel deposits, Zone II wellhead protection areas, interim wellhead protection areas, certified & potential vernal pools, priority habitat, supporting natural landscapes, and scenic landscapes.



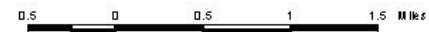
Note: Data was obtained from MassGIS and NHESP.

- Withdrawals, discharges, piped water, evaporation, impervious areas
- Maroon/pink means net withdrawal
- Blue/purple means net surcharge

Net Water Withdrawal in Littleton
(As Percentage of August Median Flow)



Note: Based on Zone II delineations.



Water, Energy & Smart Growth

Water Management

- water conservation*
- stormwater treatment & recharge*
- wastewater treatment & recharge
 - sewer downtown
 - pump to water deficit region in west
 - treat and recharge groundwater
 - setup a septic utility to minimize failures

* not explicitly part of this project

Water, Energy & Smart Growth

Wastewater Discharge

- Technical feasibility
 - approx. 170 permitted wastewater discharges to groundwater in MA
 - many national projects (e.g. CA & NY)
- Preliminary site selection
 - maximum water budget deficit
 - best physical factors
- Lag time analysis
 - lag time to nearest stream
 - well proximity

Soils Characteristics Scores

Preliminary Analysis

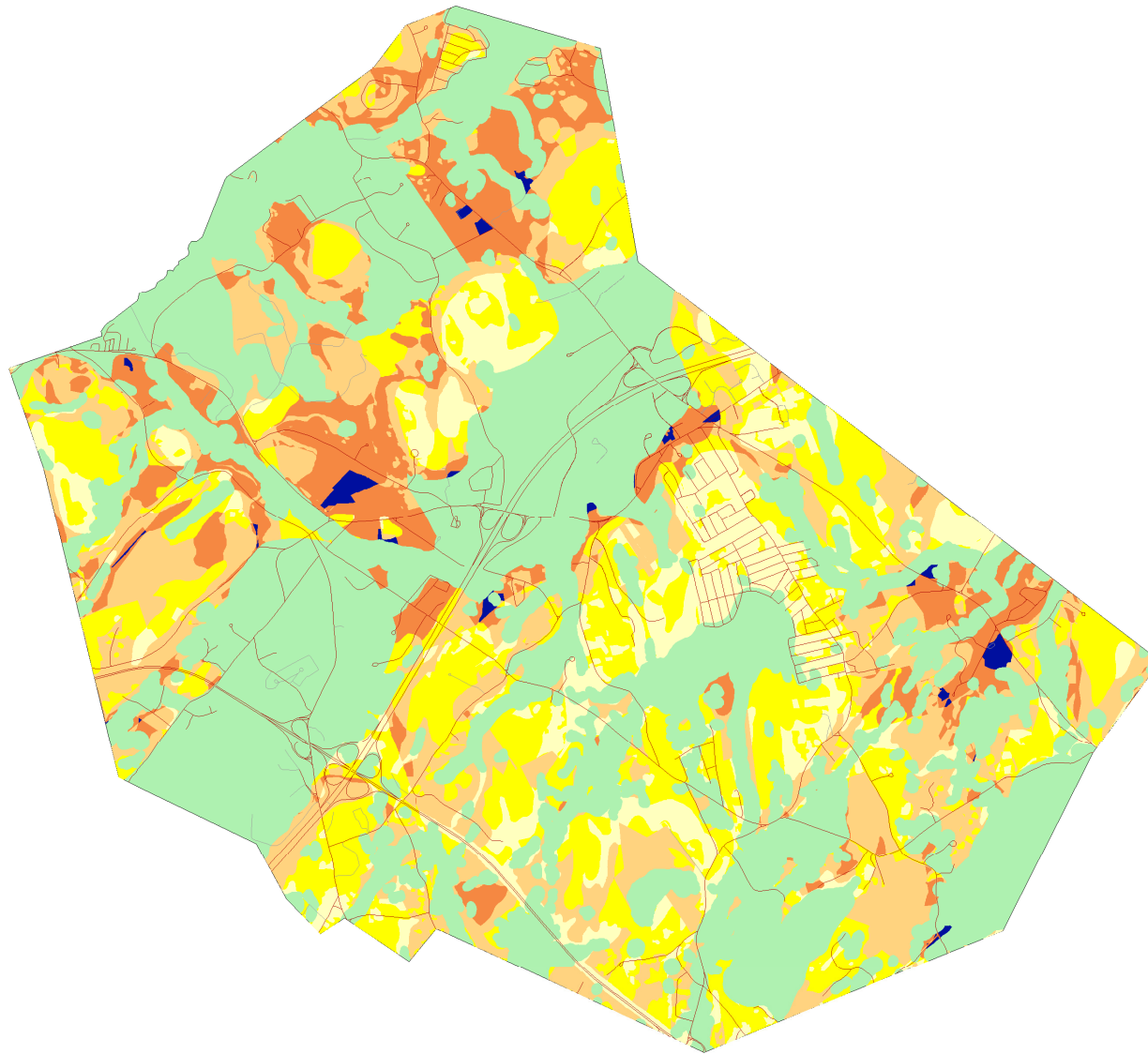
Drainage class	Score
Excessively drained	5
Somewhat drained	4
Well drained	3
Moderately drained	2
Poorly drained	1
Very poorly drained	0
Not rated or not available	0

Hydrologic Soil Group	Score
A	5
B	4
C	2
D	1

Depth to water table (April)	Score
0 cm	0
1-25 cm	1
26-50 cm	2
51-100 cm	4
101-201 cm	5

Depth to Restrictive Layer	Score
25 cm	1
26-50cm	2
51-100 cm	4
101-201 cm	5

Suitability Analysis For Waste Water Discharge In Littleton, MA

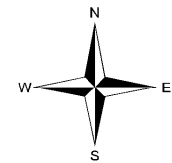


Legend

Site selection

Accumulative score

- Very low (11 - 17)
- Low (18 - 21)
- Medium (22 - 27)
- High (28 - 32)
- Best (33 - 38)



Layers included

Land Use	By category
Open space	By ownership
Surficial geology	Sand and Gravel or Bedrock
	Depth to water table in April
	Depth to restrictive layer (bedrock)
Soils	Soil slope %
	Hydrologic soil group
	Drainage class
	Septic tank absorption
Aquifers	Yield

Layers excluded

Wetlands	100 feet buffer
Waterlines	200 feet buffer
Zone II areas	

Sources:
MassGIS
Soil data viewer NRCS



Charles River Watershed Association



Water, Energy & Smart Growth

Energy Generation

- Wastewater as an energy resource
 - anaerobic digestion → methane
 - fuel cells
- Wind energy
 - state's maps show low wind power
 - more localized analysis needed

Water, Energy & Smart Growth

Promote Smart Growth

- Smart Sewering
 - implicitly focuses growth in sewerred area
- Development rights
 - focuses growth in certain zones and protects open areas
- Development Zones
 - special permitting to promote growth in certain zones

Water, Energy & Smart Growth Economic Analysis (with consultant)

- Costs
 - Setup of (sewered) development overlay district
 - Wastewater design and construction
- Benefits
 - Energy generation from wastewater (methane, possibly wind)
 - Sprawl contained - less utility costs
 - Open space protection - resource value
 - Tax revenues from overlay district and development rights

Water, Energy & Smart Growth Funding Possibilities (with consultant)

- Incremental financing
- State and federal smart growth funding
- Low interest loans (SRF)

Water, Energy & Smart Growth

Town of Littleton

CRWA welcomes the opportunity to
work with Town of Littleton on this
new and innovative project 😊