CRWA

Smart Growth plus Sewer Collection

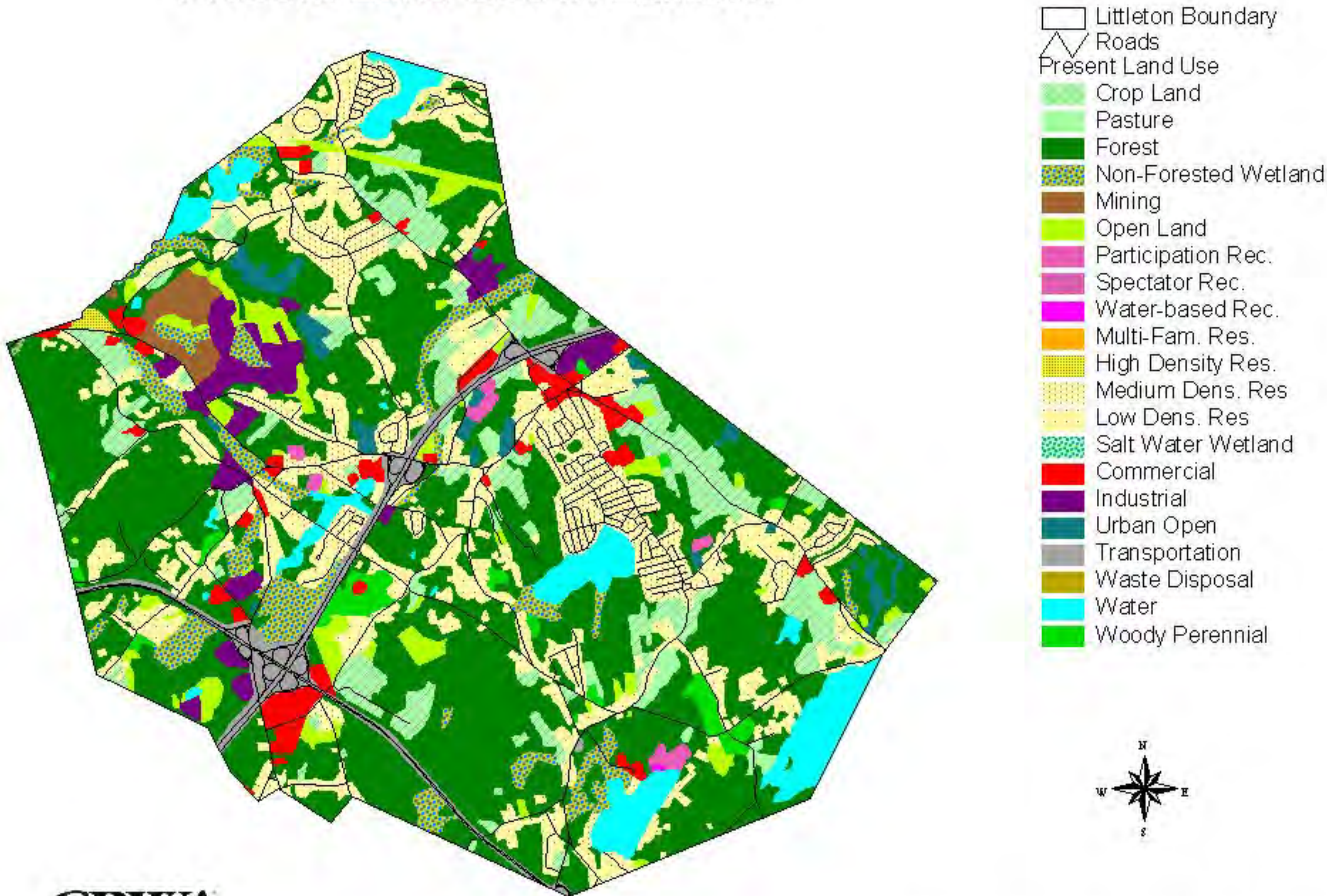
Equals

Smart Sewering

Smart Sewering Principles

- Sewer using smart growth objectives, allowing for greater density in commercial and industrial zones without sewering residential, agricultural, and open space, containing and directing development.
- Return treated effluent to the ground near where it was withdrawn as drinking water and/or reuse treated effluent, enhancing recharge to and reducing demand on source waters.
- In built-out areas, *mine* wastewater as a resource and mix with food waste to produce energy, locate the treatment plant to use the power generation, reuse water, and heating and cooling capabilities of the plant to spike surrounding redevelopment.
- Pursue all opportunities for reuse, from water to sludge.

Present Land Use in Littleton



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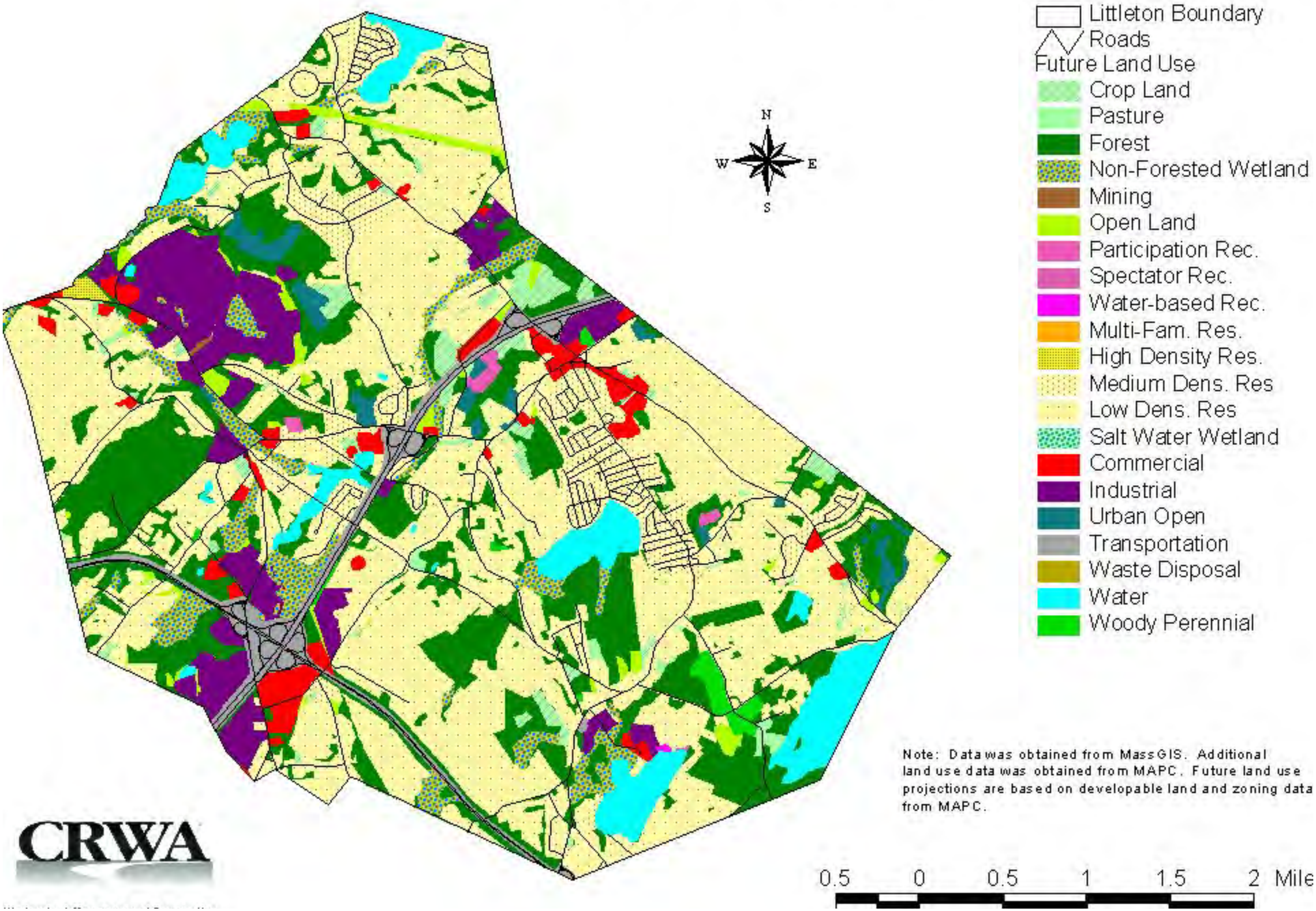
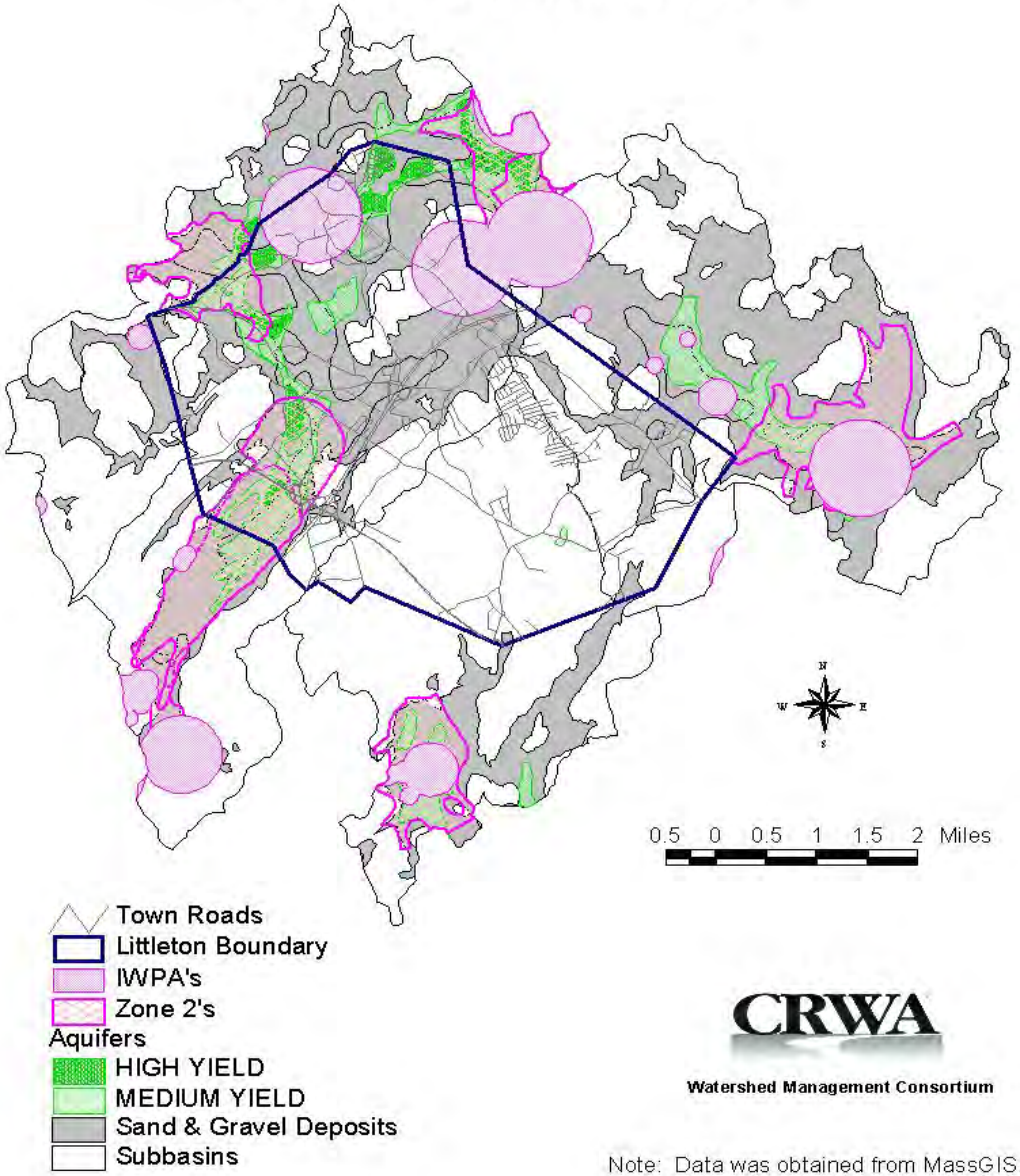
Note: Data was obtained from MassGIS. Additional land use data was obtained from MAPC.

0.5 0 0.5 1 1.5 Miles

Future Land Use in Littleton



Ground Water Resources



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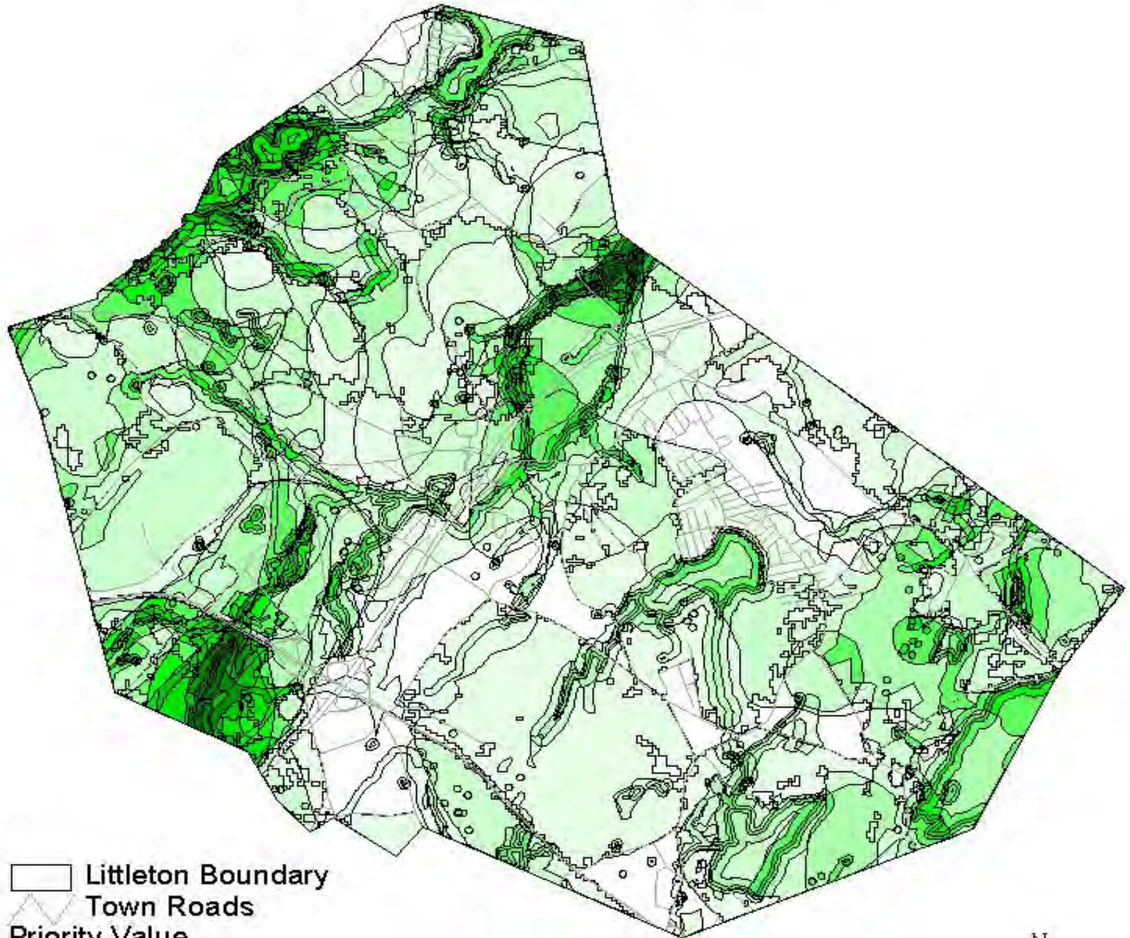
Note: Data was obtained from MassGIS.

Priority Lands in Littleton



Cumulative 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, core habitat, supporting natural landscapes, scenic landscapes, contiguous natural lands, and natural land riparian corridors.

Note: Data was obtained from MassGIS and NHESP.

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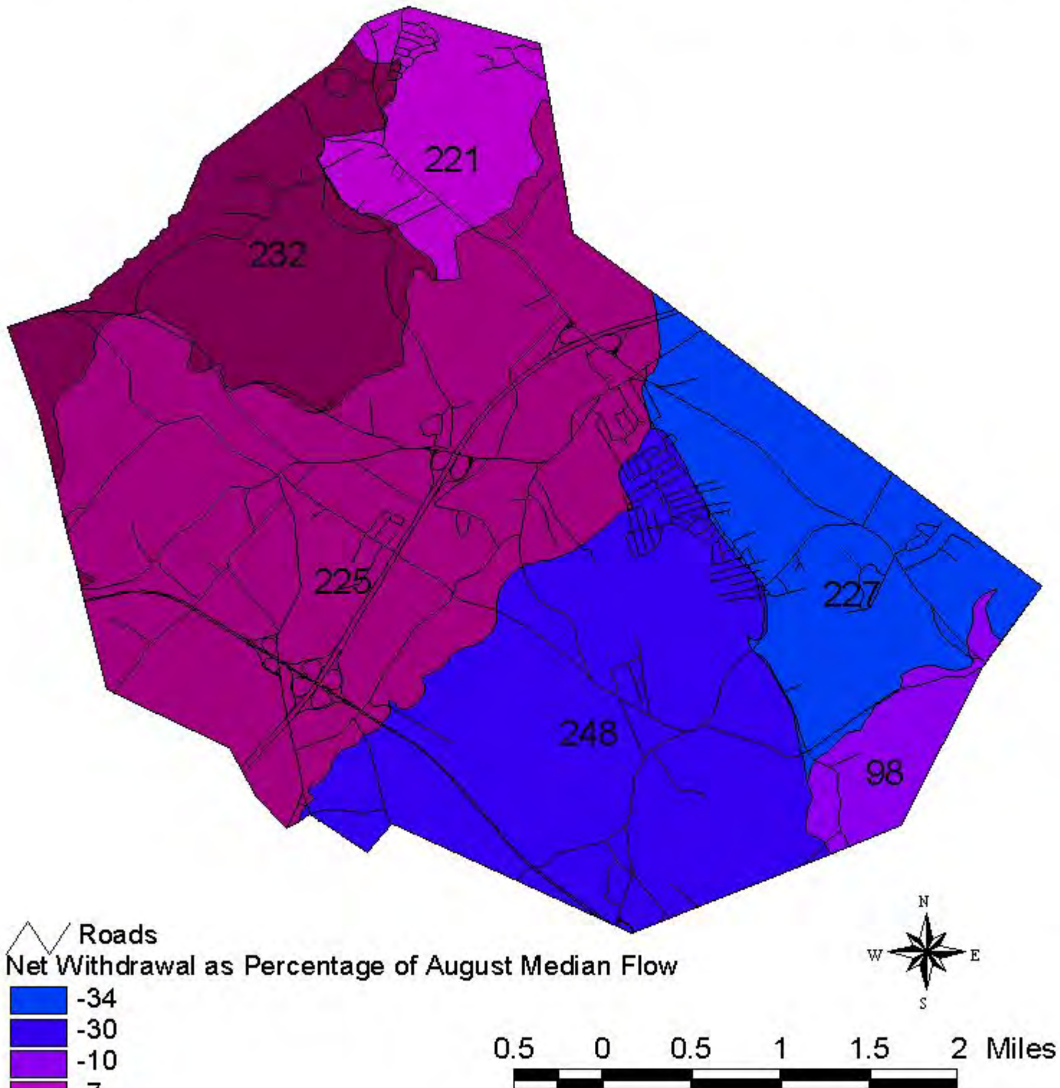
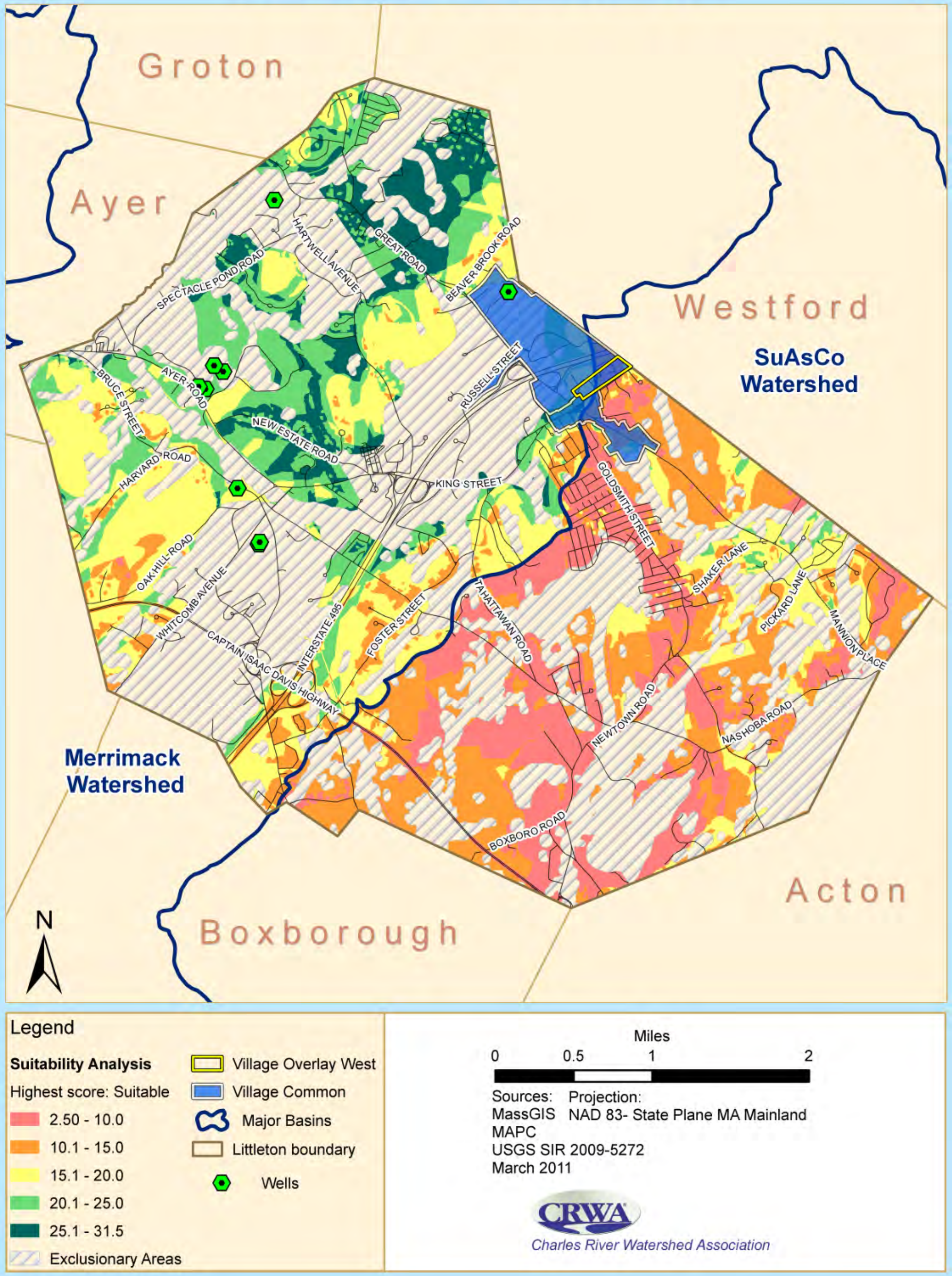
Net Water Withdrawal in Littleton
(As Percentage of August Median Flow)



Note: Based on Zone II delineations.

CRWA
WATERSHED MANAGEMENT CONSORTIUM

SUITABLE LOCATIONS FOR WASTE WATER DISCHARGE IN LITTLETON, MASSACHUSETTS



Conventional Sewer Design

Definition: Systems that are traditionally used to collect municipal wastewater in gravity and/or pressure sewers and convey it to a central primary treatment plant, before discharge on receiving surface waters. Large capital expenses are typically born bonds paid by the general fund all taxpayers contribute whether or not they are served by the system.

Typical process with conventional sewer:

- Target sewer district/area
- Calculate maximum flows and capacity
- Preliminary Design
- Design system for full build out and capacity
- Apply to State for Permit
- Town Meeting Approve Construction Contracts
- Bid documents and bid award
- System construction
- System operational and property connections

Conventional Sewer

- Examples of conventional sewer:
- Chelmsford
- South Acton
- Tewksbury

Smart Sewers

- Smart Sewer Overview
  - Wastewater is a resource
  - Smart Growth
    - Enhances economic growth
    - Reduces overall energy
    - Increases short term affordability
    - Optimizes benefits to environment

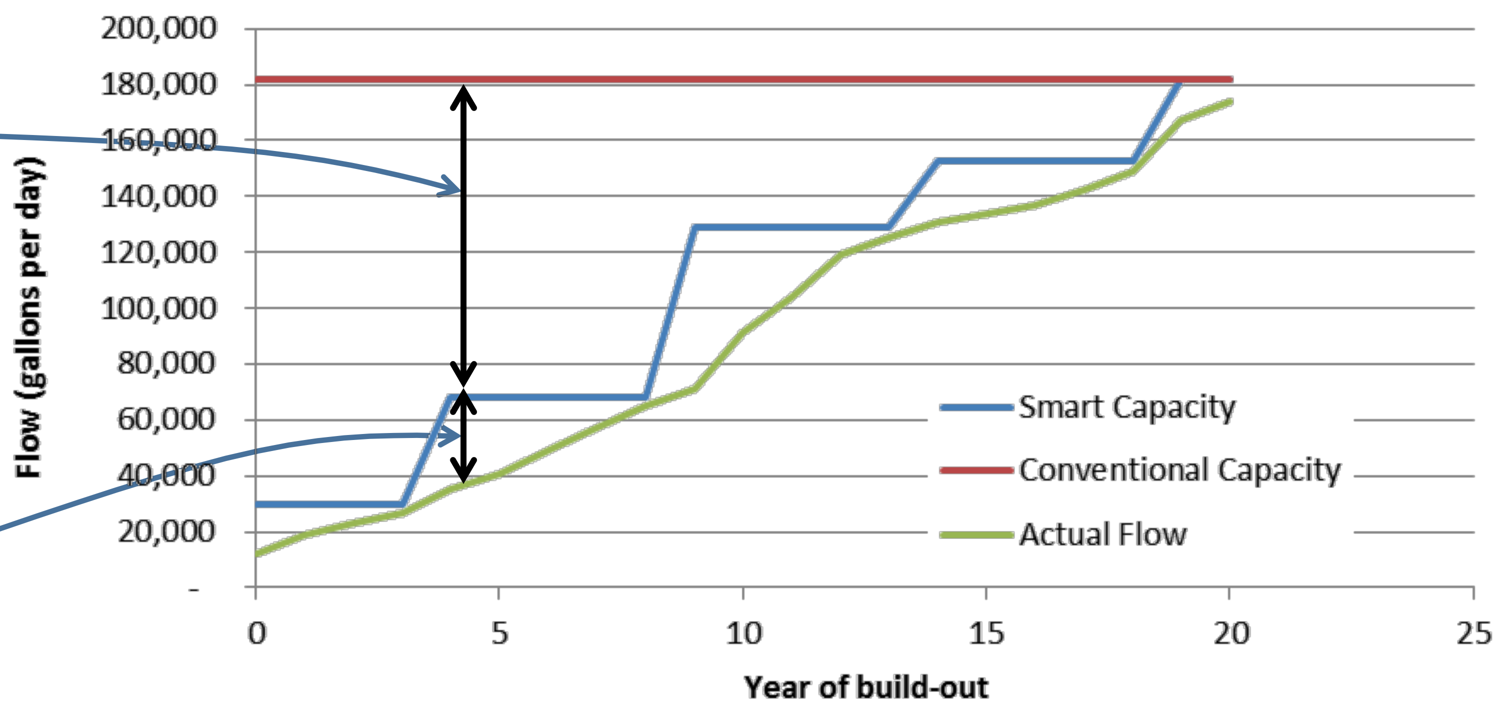
Smart Sewers

- Economic Component of Smart Sewers
  - Sewer districts
    - Installed in response to growth/demand
    - Focuses development
  - Reduces risk of conventional sewer
    - Reduced upfront capital
      - Installed in response to demand
    - Paid by users
      - Betterment
      - User fees

Conventional vs. Smart Sewering

- Reducing carrying costs by using technologies that are affordable at small scale and then installing capacity in phases to match growth – "just-in-time, "fit-for-purpose"

Large carrying costs – higher risk or tax increase to subsidize user rate



Small carrying costs – reduced risk to tax base and user

Smart Sewers

- Economic and Environmental benefits (Potential future phases)

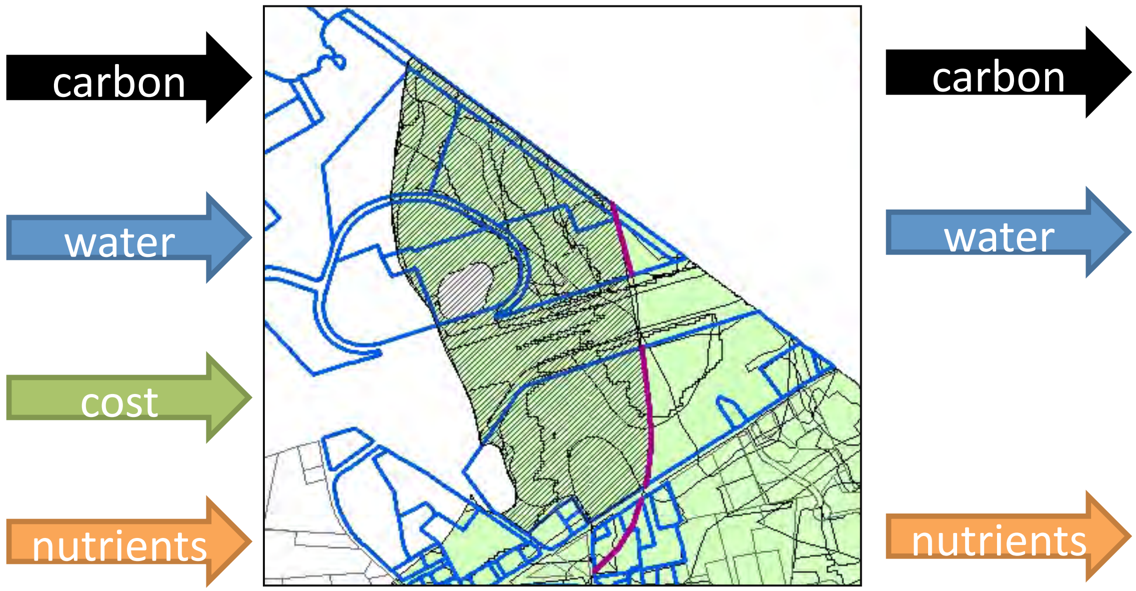
    - Subsidizing service from:
        - Water reuse
        - Energy generation
            - Anaerobic digestion of organic matter
                - Reduces methane gases in environment
                - Reduces carbon dioxide in environment

    - Reduced Disposal Fees
        - Septage
        - Food waste

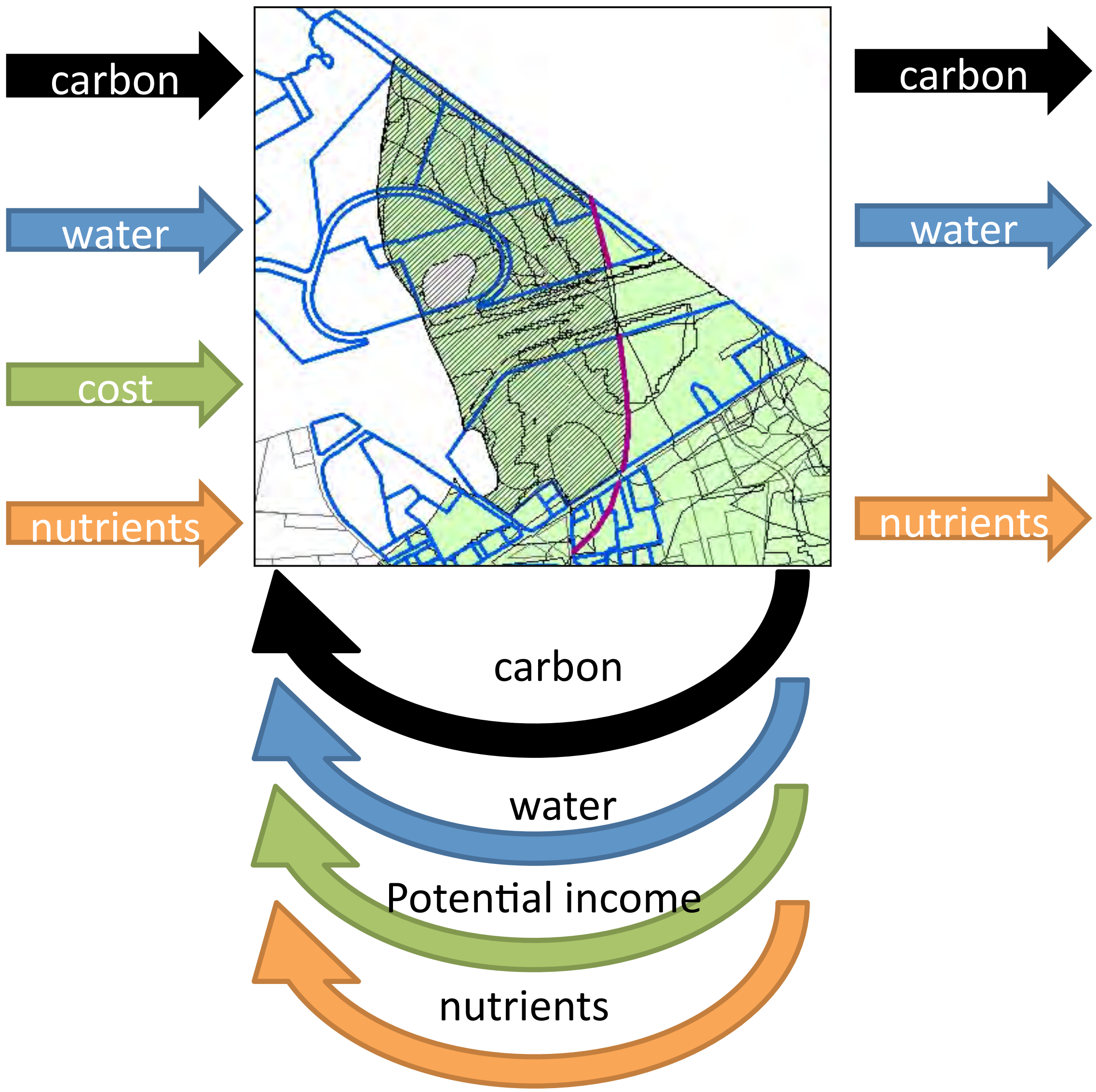
Smart Sewers

- Environmental Benefits
  - Water goes back to the source
    - Preserves natural flows
  - Improves water quality (eliminates septic)
    - Reduces nitrate burden

Conventional Treatment Process



Conceptual Smart Sewer Process



Community Benefits

- Property improvements
- Variety of businesses
  - High density mixed use
- Increase in tax base
  - Improved buildings leads to property tax increase
- Revenue generated by sewer district
- Development is confined to service area
- Minimal risk to tax payers outside of district
  - Construction paid by betterments
  - Operation and maintenance paid by user fees
  - Funds paid out by town roll into district expenses

Water, Energy & Smart Growth
Economic Advantages

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