CDM

## Kingston, Massachusetts

**Public/Private Reuse Partnership Proves Successful**

**November 2005**

## Comprehensive Wastewater Facilities Plan

- Evaluate need for sewers for the entire town
- Assess suitability of WWTP sites
- Consider disposal options
- Select appropriate treatment technology
- Initiate public information programs
- Develop an acceptable plan

## Location


## Initial Recommendations

- Provide sewers to problem areas
- Construct new Wastewater Treatment plant
- Groundwater discharge at transfer station site

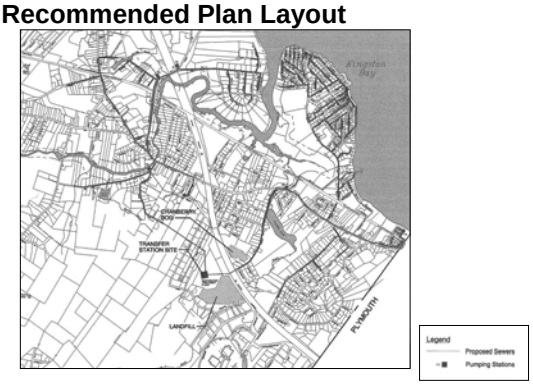
## Project Objectives

- Curb pollution in the Jones River and Kingston Bay
- Address failing septic systems
- Title 5 relief
- Recommend a long-term, cost effective solution
- Obtain community support

## Disposal Site Selection Rationale

- Town owned
- Few abutters
- Sandy soils
- Low groundwater
- Level topography
- Central location

## Recommended Plan Layout




## Nearby Cranberry Bog

## MEPA Required EIR

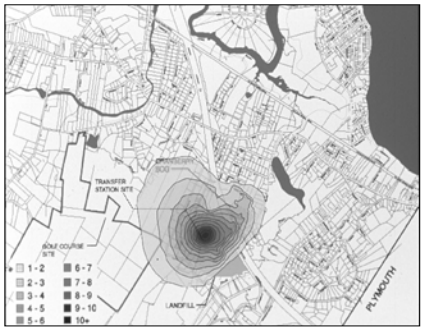
- Concerns with GW rise into adjacent landfill
- Depth of waste unknown
- Concern with nitrogen and hydraulic loading to nearby cranberry bog

## EIR Tasks

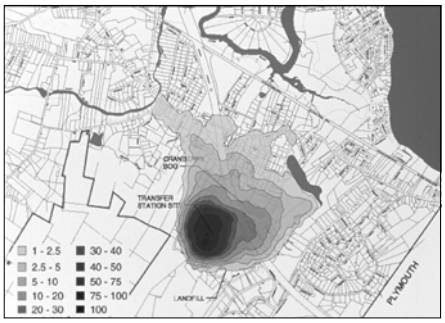
- Landfill borings to verify waste depth
- Development of a 3-D groundwater flow model
- Nutrient transport model
- Water table mounding analysis
- Water quality impacts to cranberry bog

## Adjacent Landfill

## Predicted Water Table Rise (Feet)



## Contours of Percent Effluent Concentration




## Reuse Plan - Advantages

- No-cost to town for land
- Initially eliminates public concerns with transfer station site (landfill and cranberry bog)
- Possible site use later on
- Possible expansion at golf course
- No need to relocate existing transfer station

## EIR Conclusions

- Water table rise would not impact waste
- Nitrate concentration at bog would be diluted between 5 and 10:1.
- Increased GW flow to bog would be drained away
- Increased nitrate load would not impact crop production

**RECOMMENDATION: Continue with initial recommendation of Groundwater disposal at the transfer station site**

## Reuse Plan – Potential Disadvantages

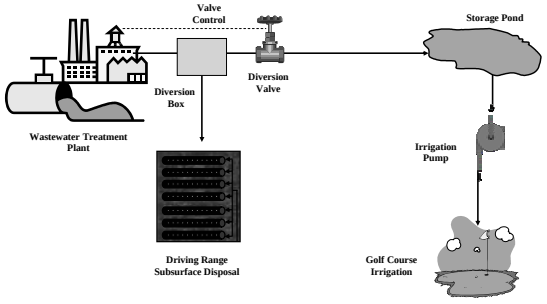
- Reuse new to Massachusetts
- Initial capital cost more
- Need to establish disposal/reuse protocol

**CONCLUSION: Reuse plan should be investigated further. Need EIR modification**

## Public Concerns Remain – Gives Rise to New Reuse Plan

- Plant remains at transfer station site
- Year-round disposal at proposed country club
  - Leaching field under driving range
- Reuse for irrigation at golf course
  - Seasonally
  - Storage required
  - Public health concerns

## Regulated Disposal



## Regulatory Reporting

- Town holds GW discharge permit
- MOA with golf course
- Town not required to deliver water


## Kingston Wastewater Plant

## Groundwater Discharge Permit

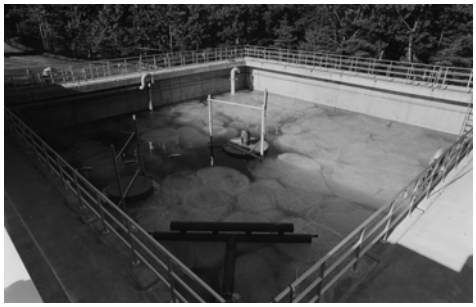
**Non Reuse**

- 375,000 gpd average, 1.5 mgd peak
- BOD & TSS: 30 mg/l
- Total N: 10 mg/l
- Fecal: no requirement (non reuse)

**Reuse**

- BOD: 10 mg/l
- TSS: 5 mg/l
- Turbidity: < 2 NTU
- Total N: 10 mg/l
- Fecal: 7-day median = 0 colonies, Max 14 colonies

## Sequencing Batch Reactors



## Project Approval

- Project cost: $29.5 M
- Construction began 1999
- Completed 2001
- Developer constructed town-owned infrastructure at country club
- Developer provided easements

## Leaching Field Construction

## Leaching Field/Driving Range

## Questions

## Storage Pond

## Conclusions

- Consider alternate solutions
- Least costly alternative not always best
- Public education is key
- Reuse can be a solution in Massachusetts