

# **PRESERVING** **LAND AND WATERSHEDS**

## **Part 2**

**Land Preservation**

**Treated Sewage**

**Application**

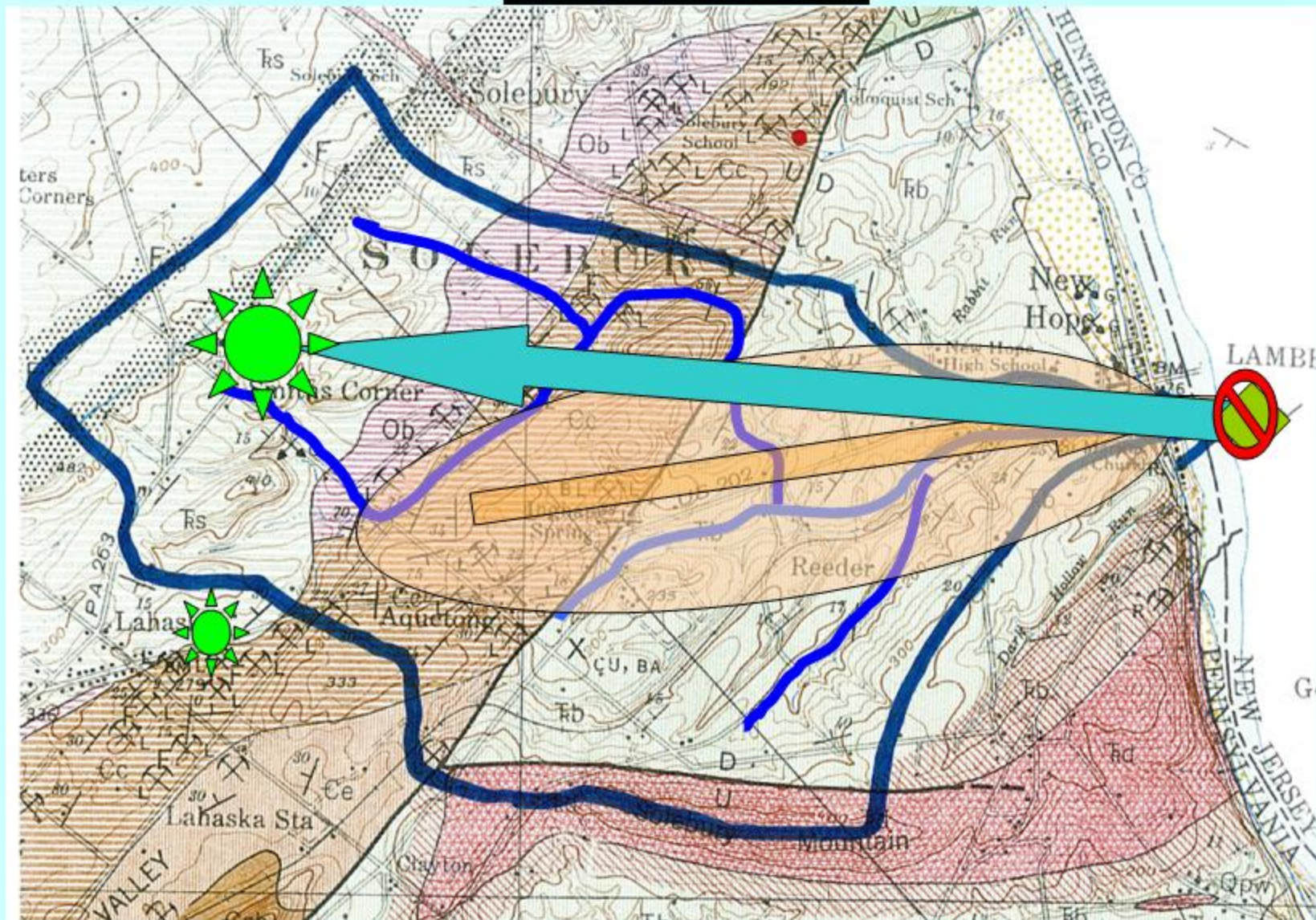
**Philip Getty**

**Environmental Hydrogeologist**

**Boucher & James, Inc.**

# Aquetong Watershed

## Water Flow





# Spray Irrigation System Examples





# Spray Irrigation System

## Buckingham Township





# Spray Irrigation: Ponds



# Spray Irrigation: Sprayfield





# Spray Irrigation: Buckingham Valley





# **Spray Irrigation: Buckingham Valley**



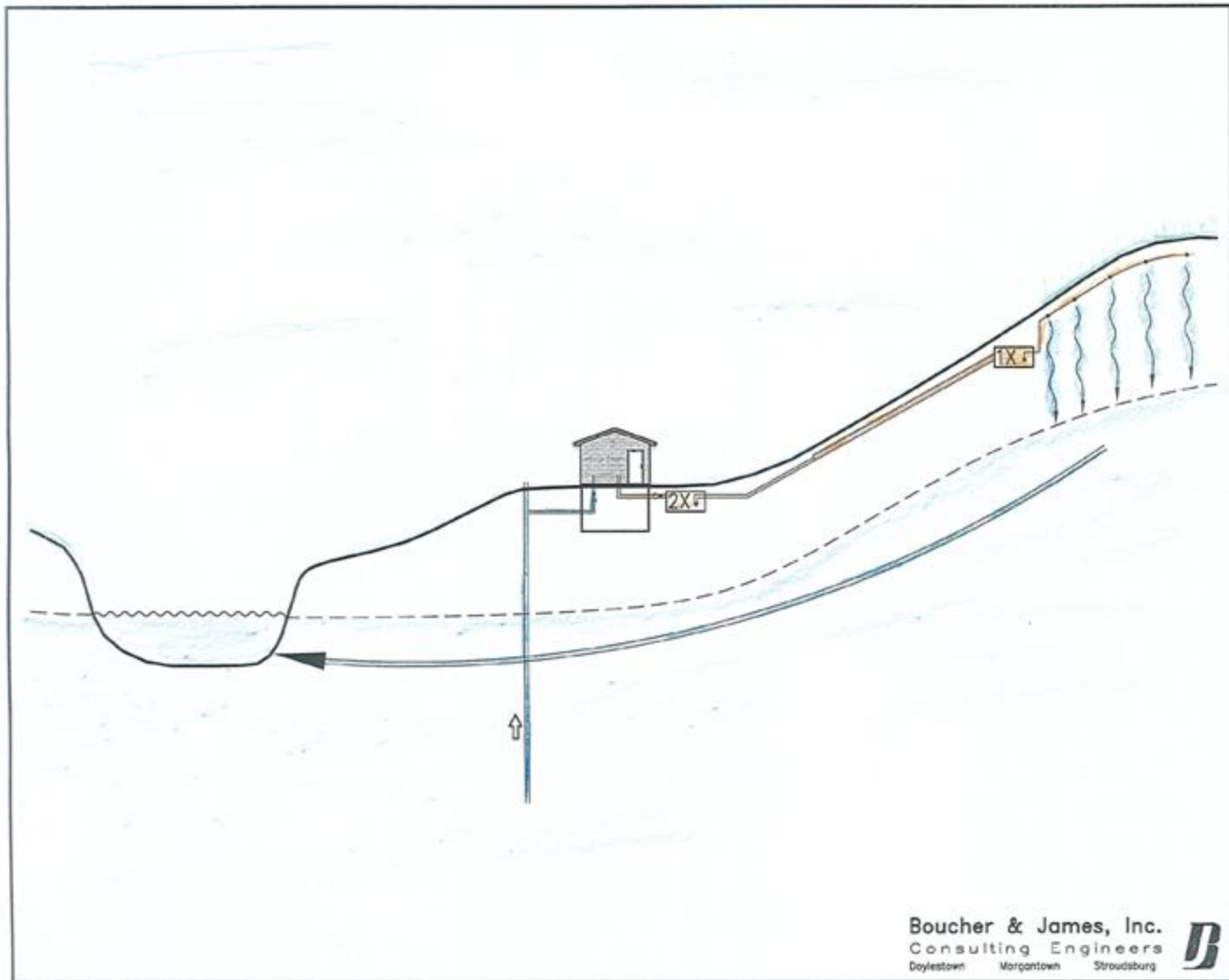


# Drip Irrigation: W. Pikeland Twp.





# Drip Irrigation: STEP System





## **Drip vs. Spray**

- Drip: Minimal Storage (No Ponds)
- Drip: STEP System Minimizes STP
  - Smaller Up Front Costs
  - Minor Structures
  - No Chlorine Disinfectants
- Drip: No mist / contact concerns: playfields
- Drip: Less chance damage
- Drip: <25% vs. <12% Spray (some runoff)
- Spray: +10" soils vs. Drip +20" soils
- Stony Soils: Concern in both cases



## Goals

- Use existing sewage treatment processes to provide additional open space for land preservation
- Retain & perhaps improve stream quality
- Recycle wastewater reuse by wells



# **Land Preservation Process**

- **Grant \$ For Parks:**
  - Dual Use May Be A Problem
- **Planning:**
  - Optimal Build Out of Township vs. HydroBudget
  - Critical Watersheds
  - Best Infiltration Soils
- **SALDO Ordinance Amend:**
  - Open Space Not For Sewage System Uses
- **Public vs. Private Sewage System?:**
  - If Public, Can Locate Fields Where Want
  - If Private, Usually Locate On Site of Development
  - Private / Public: Maintained via Sewer Plant



# **Land Preservation Process**

- **Act 537 Plan:**
  - Modify to Specify Land Application Vs. Stream
- **Municipal Ownership Option:**
  - Identify Optimal Lands: Habitat / Hydrology
  - Use of Land? Habitat / Recreation
  - Test Lands: Infiltration, Wells, Water Quality
  - Acquire Lands In Preparation for Sewage Treatment System's Full Build Out
  - Include Cost of Land in "Sewer Tap In Fee"



# Publically Owned Lands May Often Be Used for Land Application of Treated Sewage

John R. Embick, Esq.

Thorp Reed & Armstrong, LLP



THORP REED  
— & —  
ARMSTRONG

*The Lawyers Lawyers go to™*



# **Publically Owned Land for Sewage Disposal**

- Consider municipal authority structure for ownership and management**
- Land application areas must be approved in connection with the Pa Sewage Facilities Act planning process, and should be included in the Official Sewage Plan**
- Large facilities (greater than 10,000 gal/day) may require water permits**



# Publically Owned Land for Sewage Disposal

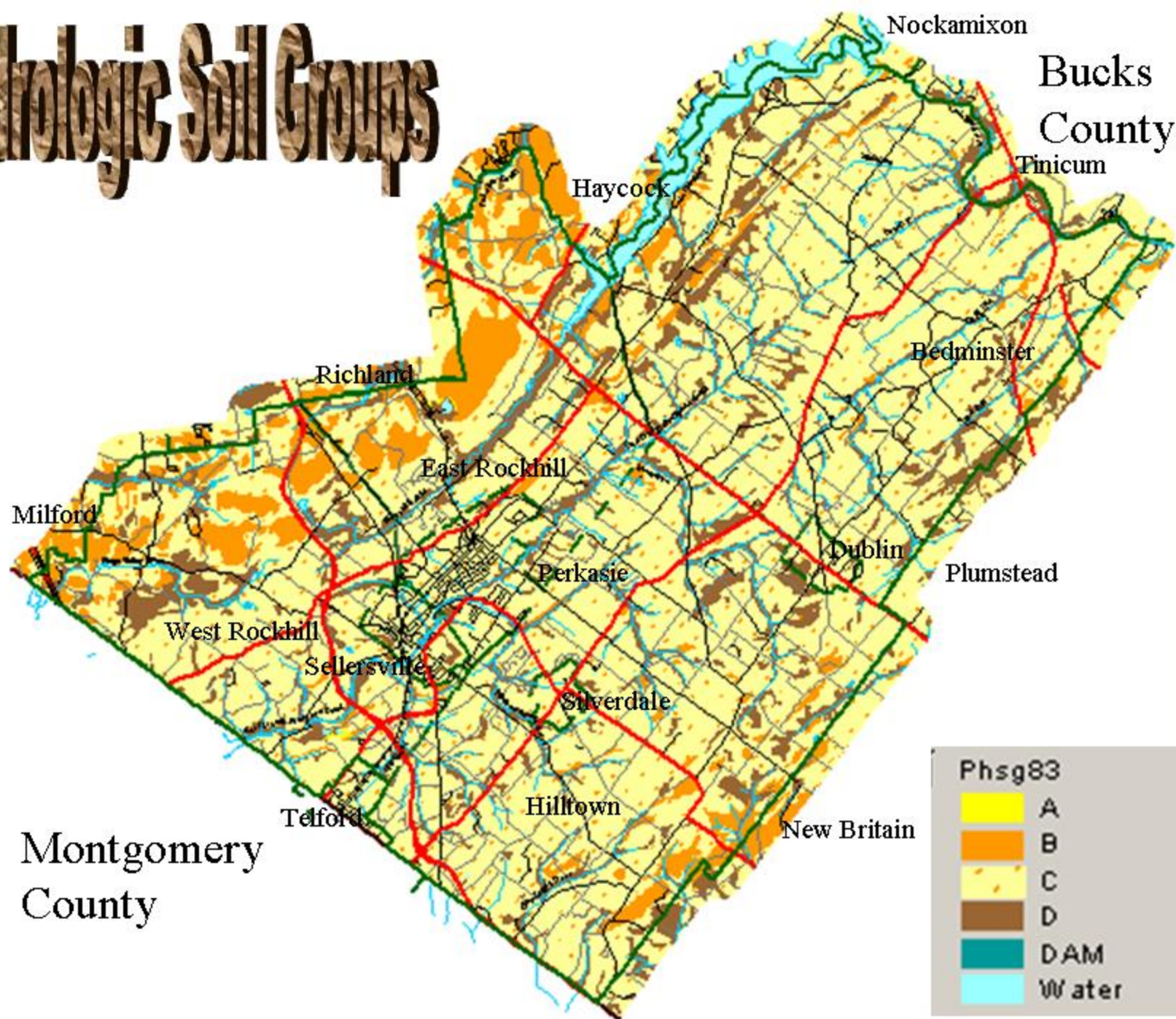
- Like most open space preservation programs, open space for land application of treated sewage must have a management plan:
  - Ownership & Administration
  - Inspection
  - Maintenance
  - Standards for operation & tributary users
  - Future use and conveyance



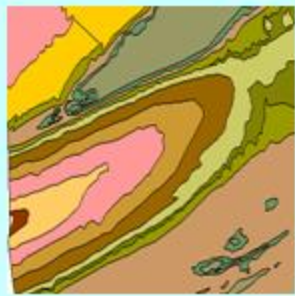
# Publically Owned Land for Sewage Disposal

- **Beware – Some State, County and Private open space preservation programs specifically bar the use of open space for sewage treatment purposes.**

# Hydrologic Soil Groups

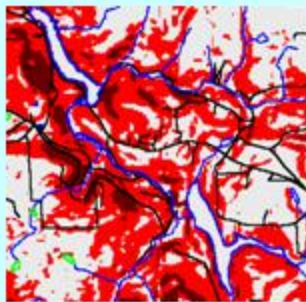






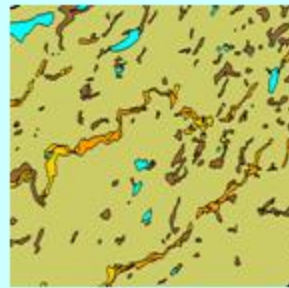
**GEOLOGY**

+



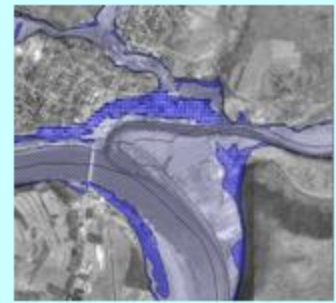
**SLOPE**

+



**SOILS/  
WETLANDS**

+



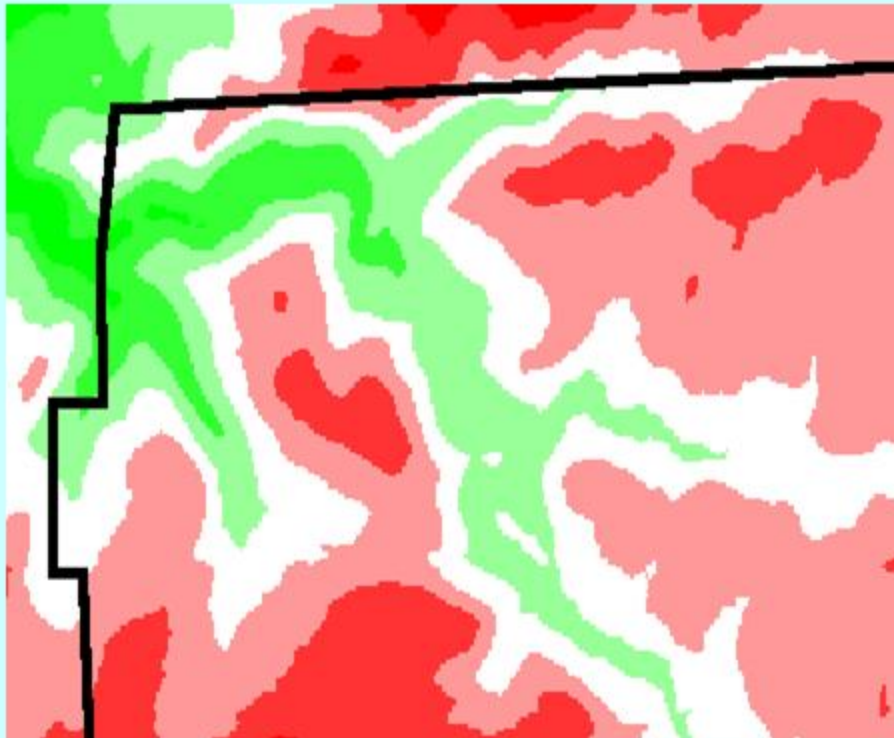
**FLOOD  
PLAINS**

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## OPPORTUNITIES AND CONSTRAINTS

 **Conservation  
Zoning**

 **Suitable for  
Development**

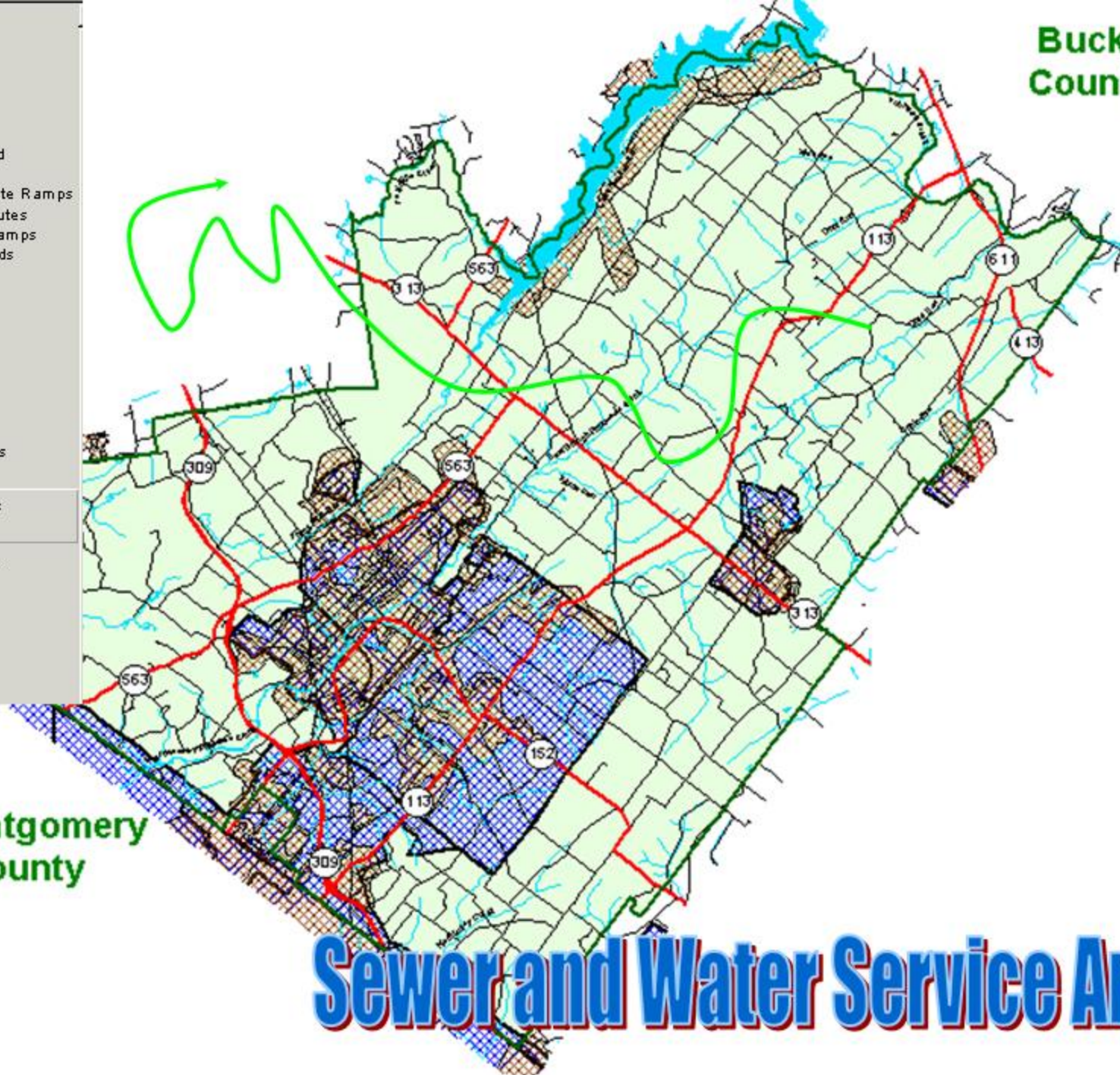


- ✓ 2000ft\_mask.shp
- ✓ Pennridge83
- ✓ Roads
  - Interstate Road
  - Other Roads
  - PA Traffic Route Ramps
  - PA Traffic Routes
  - State Route Ramps
  - Township Roads
- ✓ Railroads
- ✓ Streams
- ✓ Lakes
- Municipal Boundaries
- ✓ Sewer Service Areas
- ✓ Water Service Areas
- ✓ Bcoonty83
- ✓ Pennfill

**Bucks County**

**Montgomery County**

**Sewer and Water Service Area**

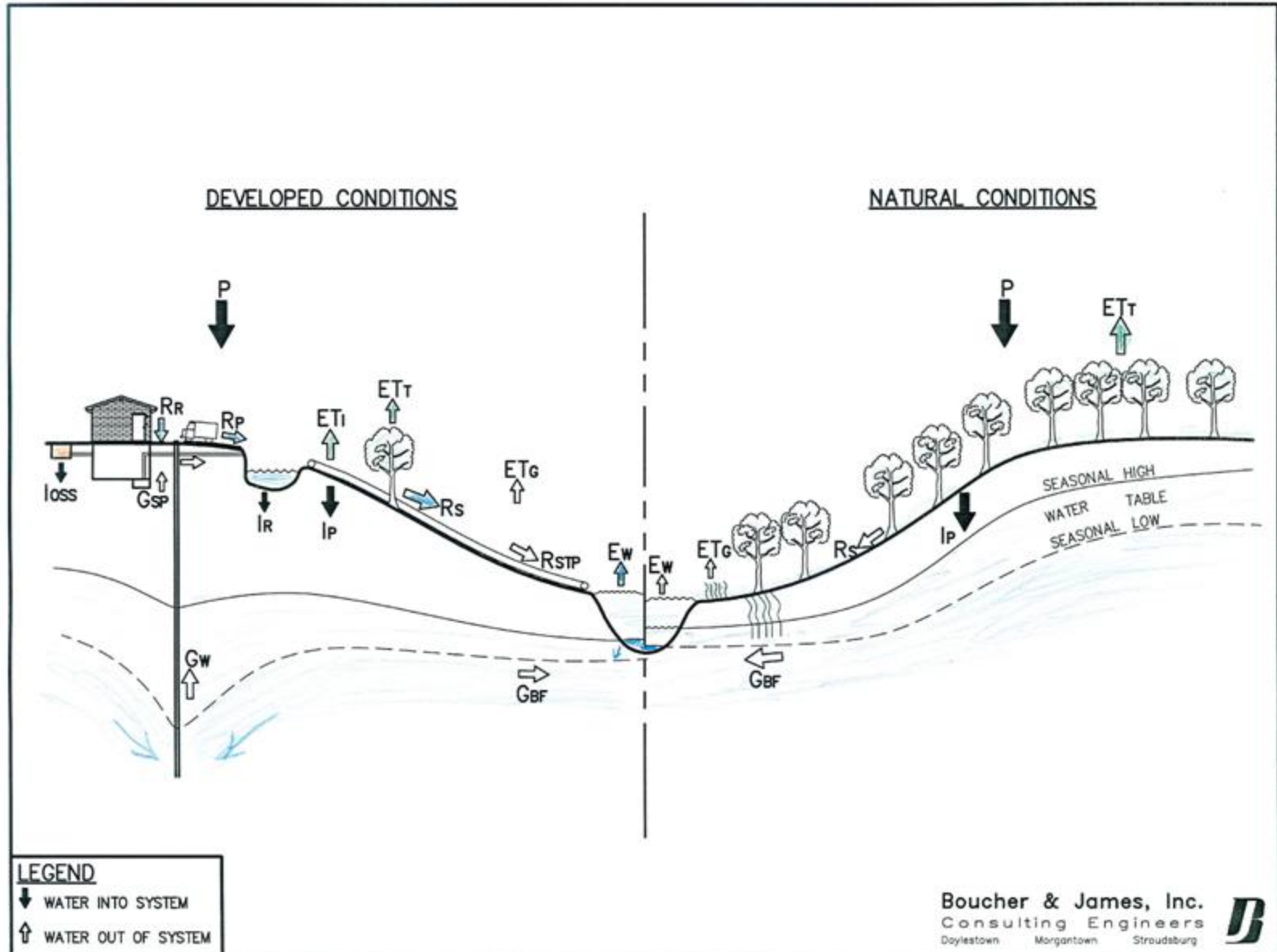




# Sewage Recycling = Preserved Land

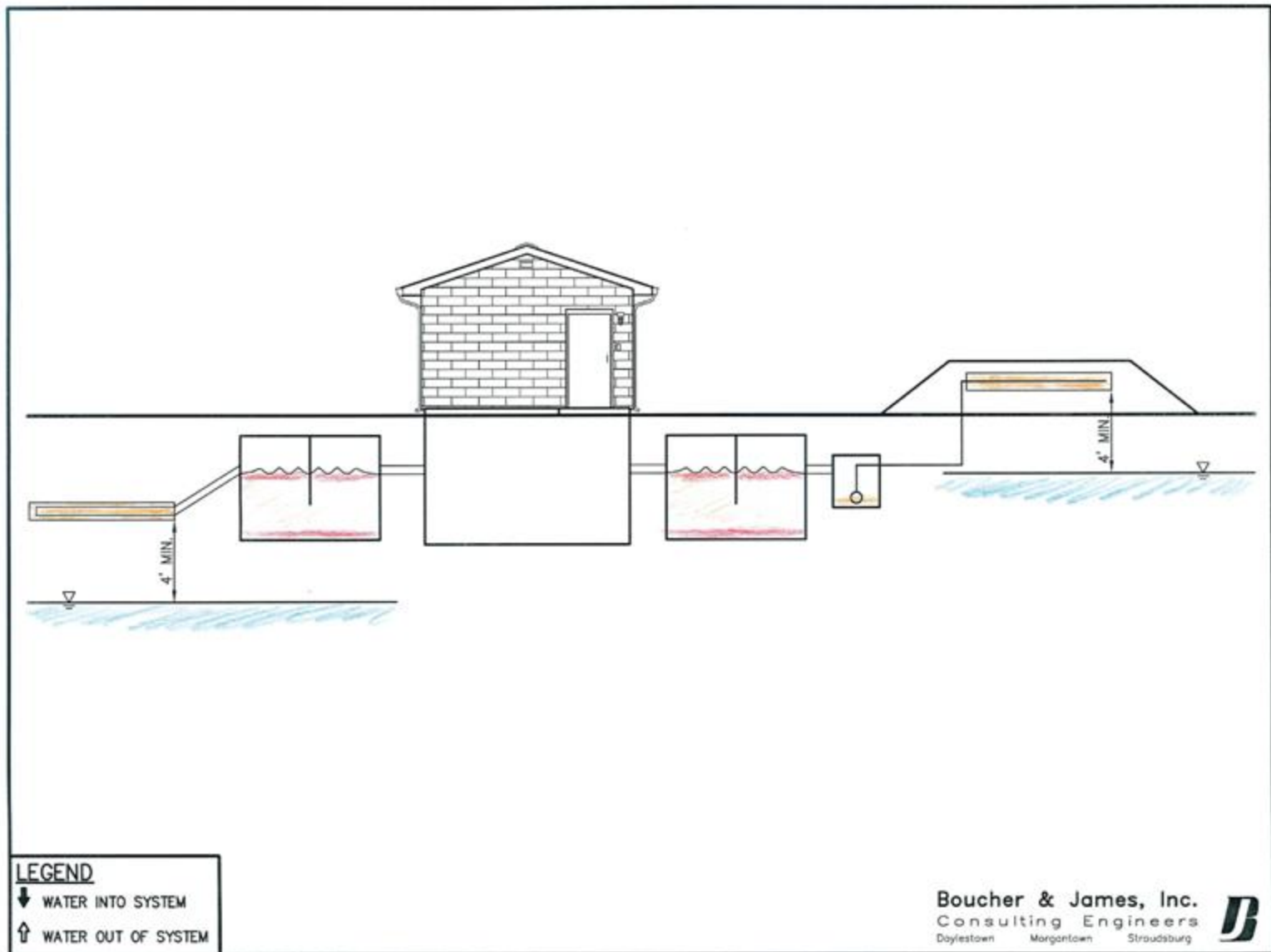


# Hydrogeologic Cycle

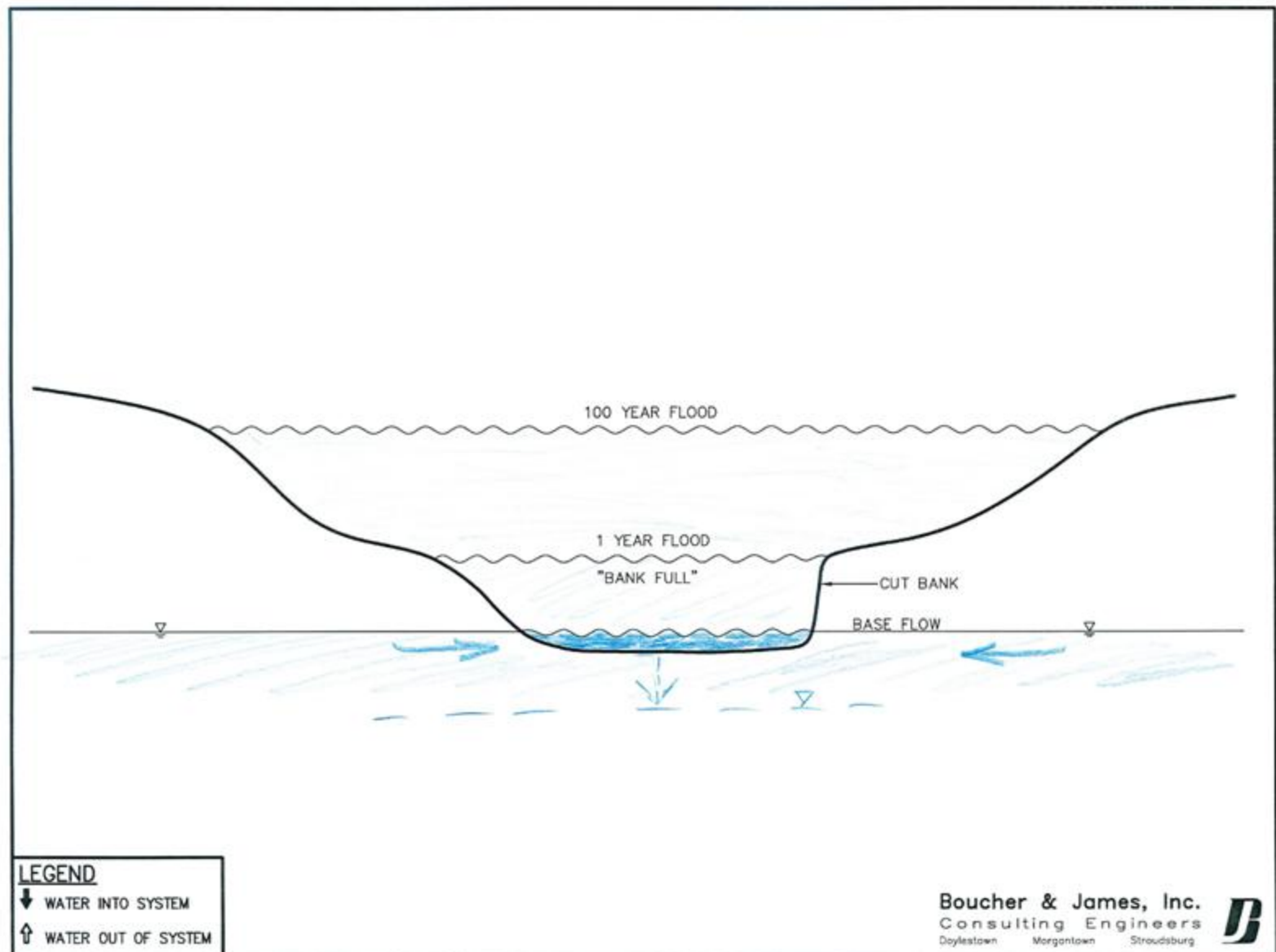




# Septic System: Land Application



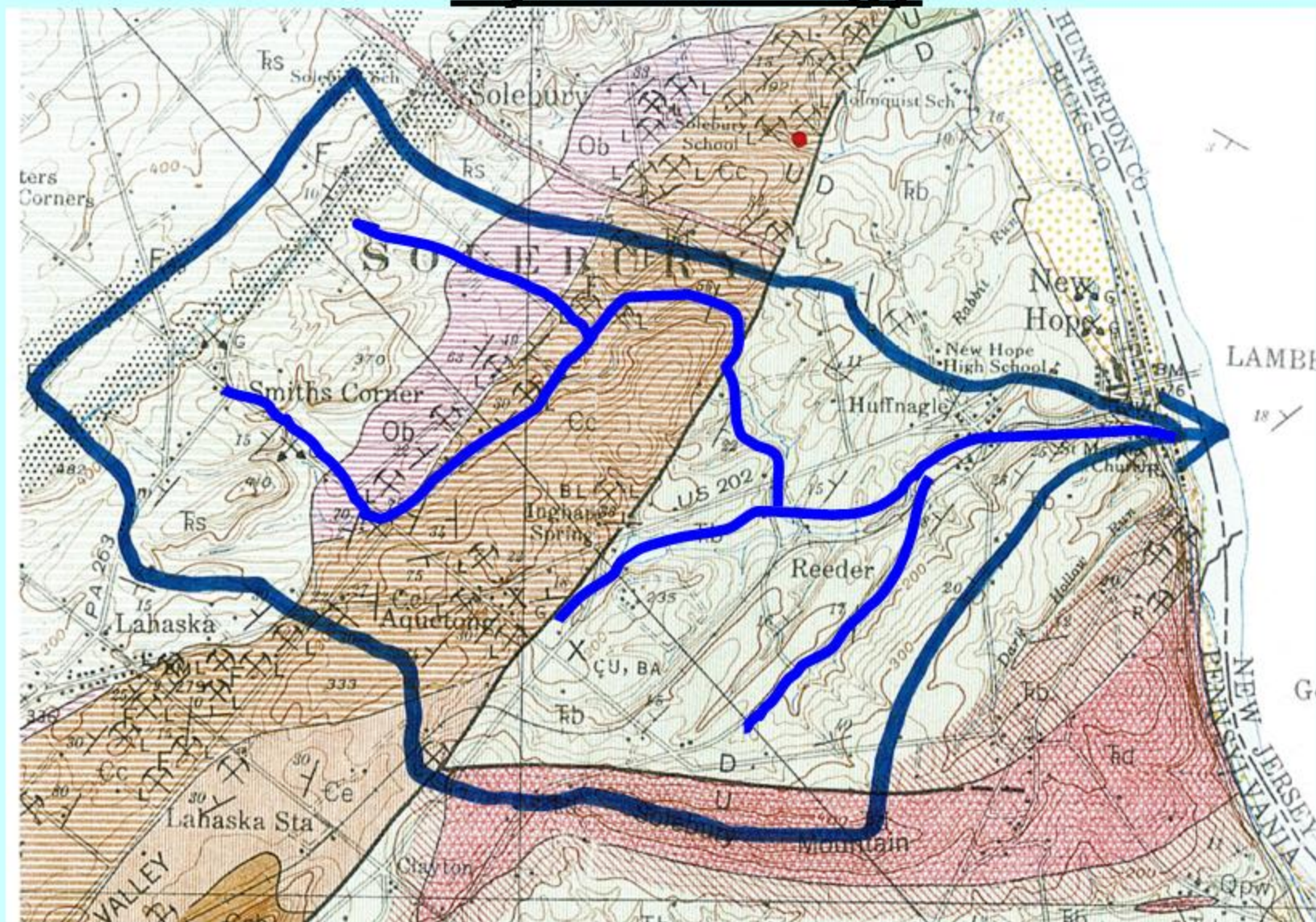
# Stream Baseflow





# Aquetong Watershed

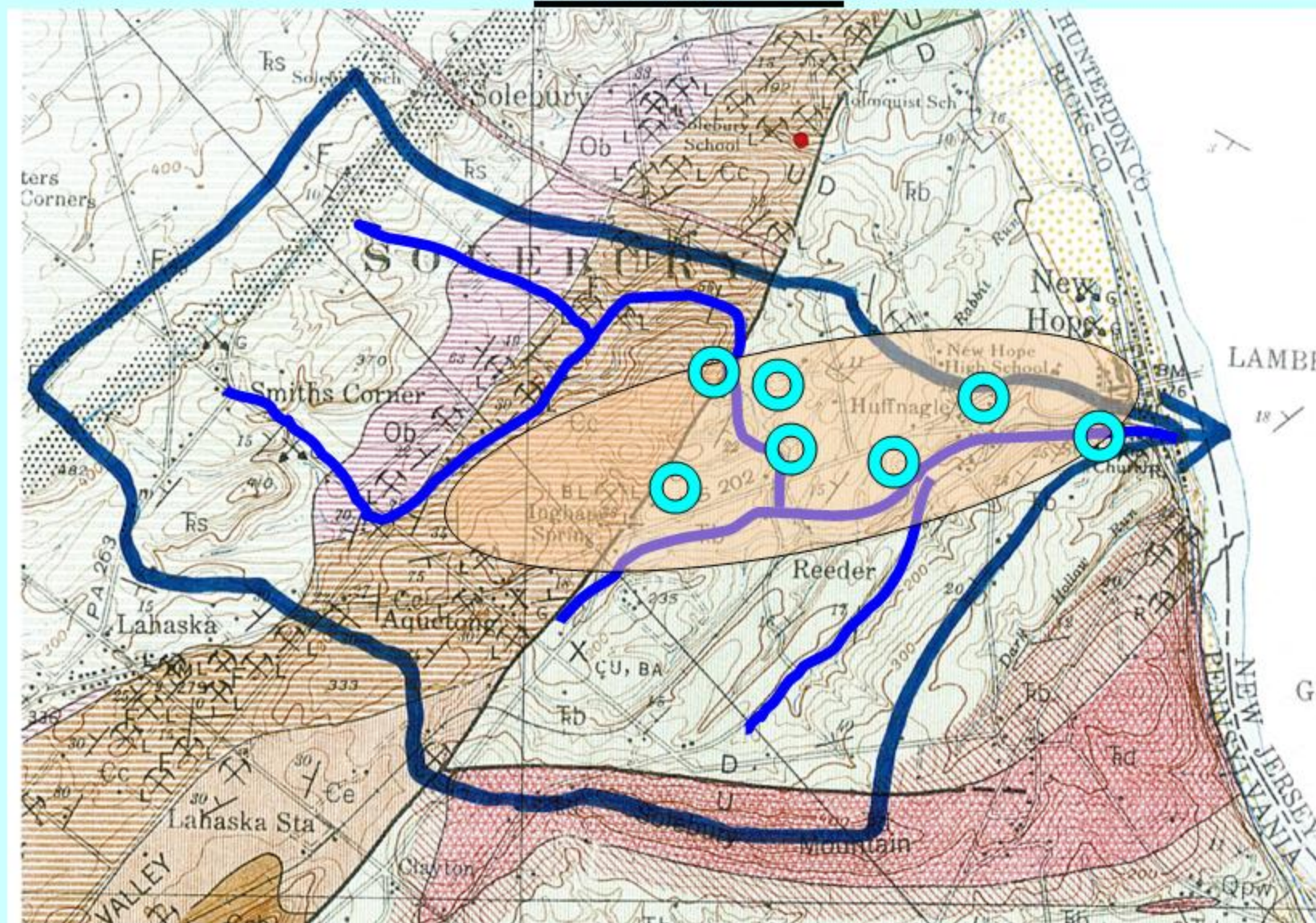
## HydroGeology





# Aquetong Watershed

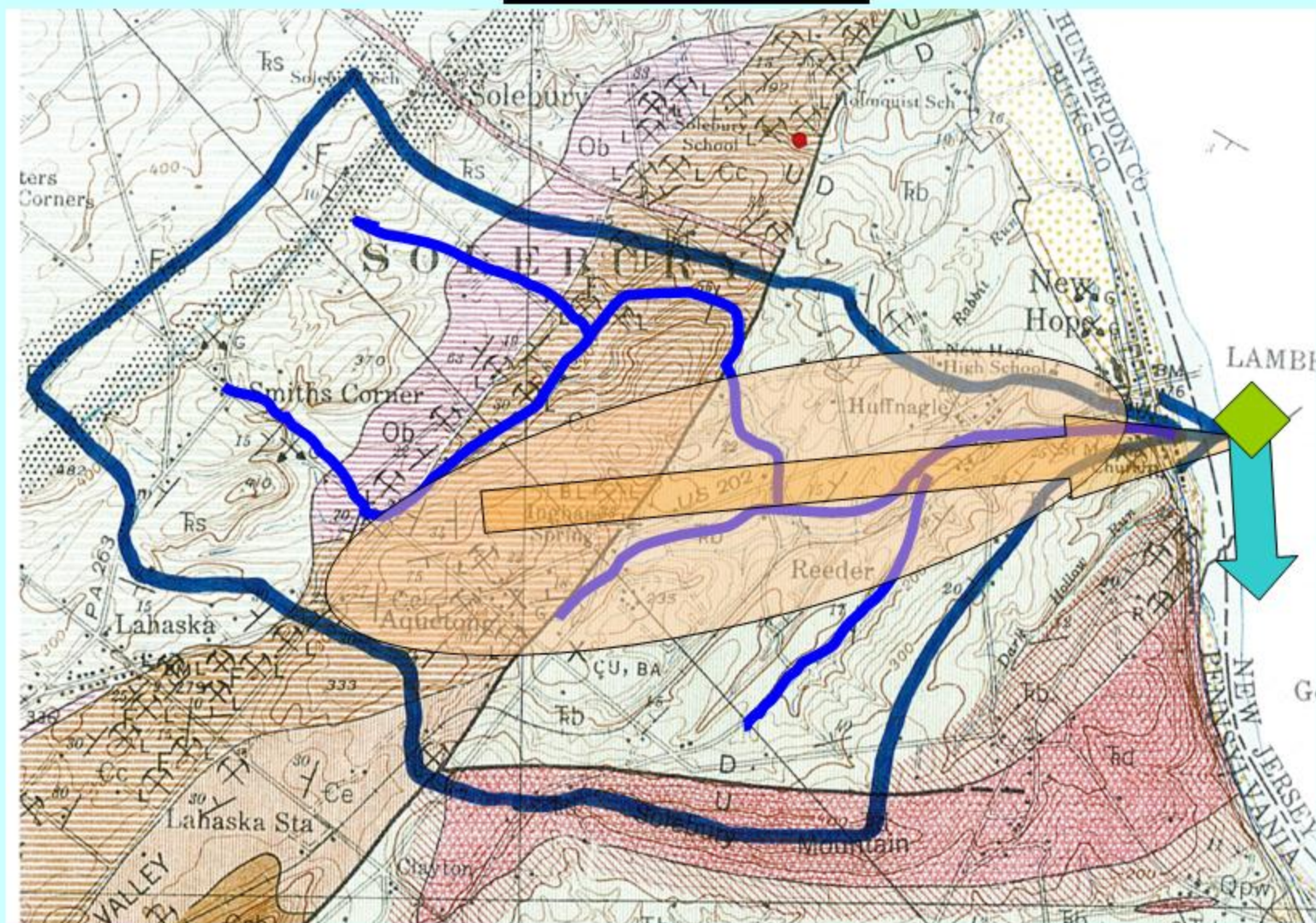
## Land Use





# Aquetong Watershed

## Water Flow





# Aquetong Watershed

## Water Flow

