

# **SCREENING LEVEL ASSESSMENT OF PINELANDS AREA LANDFILLS**

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Pinelands Municipal Council  
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# Pinelands Comprehensive Management Plan

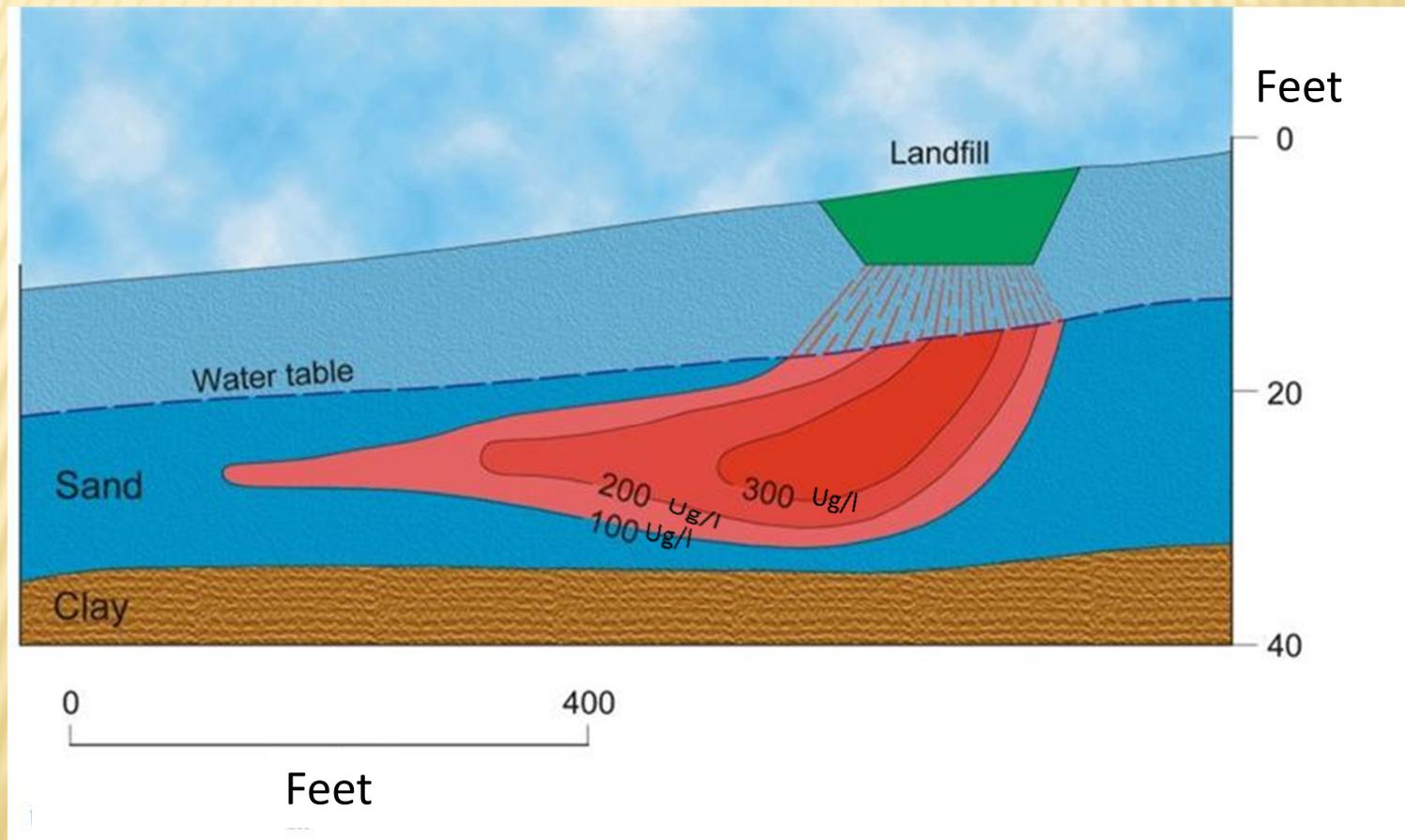
## N.J.A.C 7:50

### N.J.A.C 7:50-6.75 Landfills

- (a) and (b) address vegetative waste (only) landfills associated with agricultural operations are not subject to the impermeable capping (or similarly protective engineering controls) requirement.
- (c) Generally requires that all landfills that ceased operation on or after September 1980 and January 1981, (depending on Pinelands Management Area) and from which a leachate plume is detected, must be capped or covered with an impermeable material or provided with similarly protective engineering controls to protect Pinelands surface and groundwater resources.

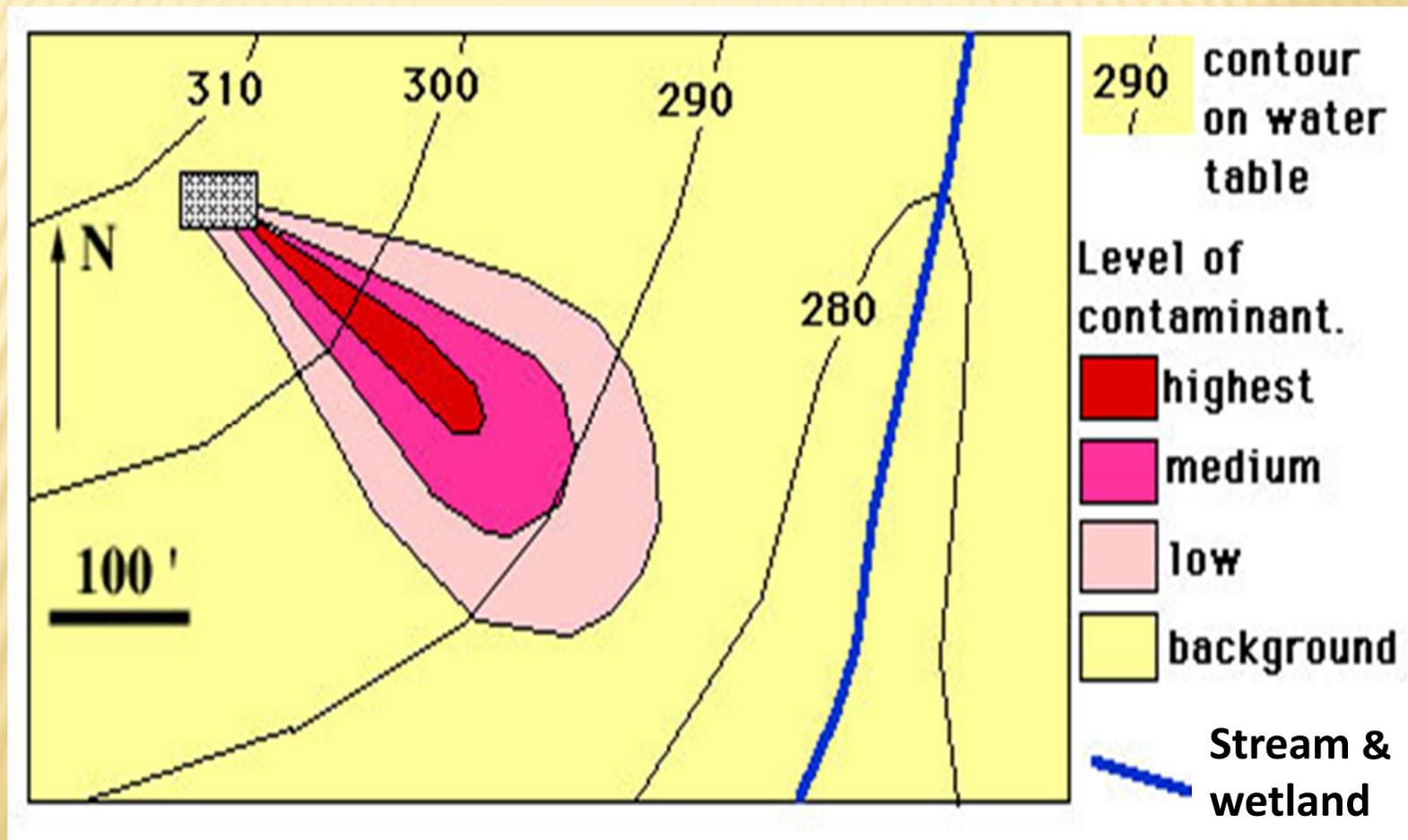


## Screening Tool to Evaluate the Vulnerability of Down-gradient Receptors to Groundwater Contaminants from Uncapped Landfills





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# Project Drivers



- Evaluate groundwater conditions at uncapped landfills to assess the level of contamination and refocus efforts to remediate those posing the greatest level of concern.
- Facilitate / expedite redevelopment on uncapped landfills where mitigation requirements are minimal.

# USGS Review of NJDEP Landfill Files

Landfills in the Pinelands with groundwater monitor well data on file.

- Ancora Psychiatric Hospital Landfill
- Bass River Township Landfill
- Berkeley Township Landfill
- Buena Borough Landfill
- Buena Vista Landfill
- Colliers Mills Wildlife Management Area Landfill
- Dennis Township Belleplain and Seaville Landfill
- Egg Harbor City Landfill
- Estell Manor City Landfill
- Folsom Borough Landfill
- Woodbine Borough (F&S) Landfill
- Galloway Township Landfill
- Hamilton Township Landfill
- Hammonton Town Landfill
- Manchester Township Landfill
- Maurice River Township Landfills No. 1 and No. 2
- Medford Township Landfill
- Port Republic City Landfill
- South Toms River Landfill
- Tabernacle Township Landfill
- Weymouth Township Landfill
- Winslow Township Landfill
- Woodland Township Landfill

# Solute Transport Model Selected by USGS

## Domenico Transport Model (1985 and 1987)

- Screening tool
- Used to predict movement of contamination from point sources to receptors (streams, wetlands, etc).
- Supported by the USEPA.
- Supported and improved upon by Penn DEP (2008)
  - Developed Quick Domenico Spreadsheet Application
  - Added retardation factor for solute carbon interactions
  - Limits dispersion to downward direction (below the water table).

# Quick Domenico Solute Transport Model Inputs

Twenty-two parameter values are required to simulate pollutant transport.

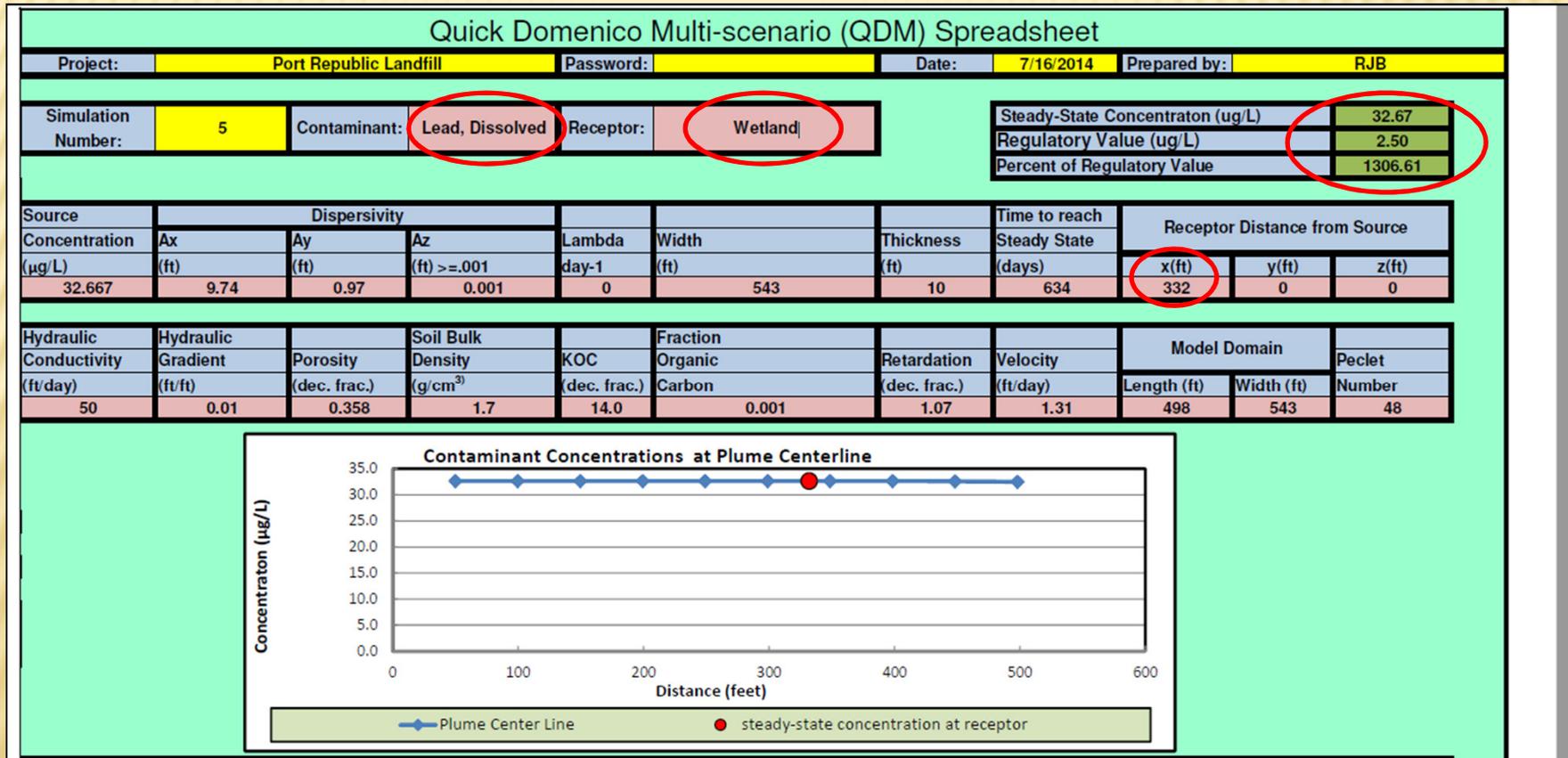
- Six inputs are literature values
  - Contaminant reaction constant (dimensionless)
  - KOC (soil organic carbon-water partitioning coefficient) - chemical adsorbed in soil (dimensionless)
  - Regulatory value (ug/l)
  - Soil bulk density (dimensionless)
  - Effective porosity (dimensionless)
  - Fraction organic carbon (dimensionless)
- Two are obtained from previous aquifer studies or regional groundwater flow models
  - Hydraulic conductivity (ft/day)
  - Hydraulic gradient (ft/foot)
- Two are distance measurements
  - Distance to receptor (wetland, stream or residential property) (ft)
  - Distance from plume centerline (ft)
- Six are calculated automatically by the spreadsheet
  - Longitudinal dispersivity (ft)
  - Lateral dispersivity (ft)
  - Vertical dispersivity (ft)
  - Simulation time (days)
  - Seepage velocity ((ft/day)
  - Length of model area (ft)
  - Width of model area (ft)
- One is from monitoring well data
  - Contaminant source concentration (ug/l)
- Three are related to landfill geometry
  - Source thickness (ft)
  - Source width (ft)
  - Depth below land surface (ft)
- One is the model simulation number (fixed counter)

# Quick Domenico Solute Transport Model Inputs

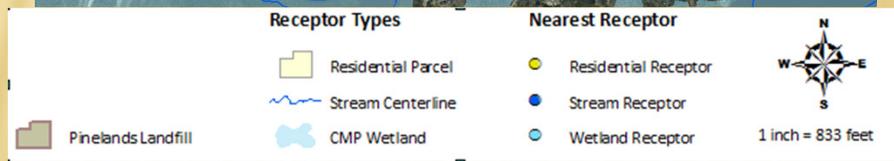
## Contaminant source data from historic laboratory monitoring well reports

MaxDesk Configuration settings 28 bytes	maxdesk.ini2 INI2 File 4.94 KB	Port Republic City_Closure_Plan Adobe Acrobat Document 1.34 MB	Port Republic City_Hydrogeo_Assessment Adobe Acrobat Document	Port Republic City_Inspection_Report_88 Adobe Acrobat Document	Port Republic City_Inspection_Report_89 Adobe Acrobat Document
Port Republic City_Inspection_Report_90 Adobe Acrobat Document	Port Republic City_Lab_01_00 Adobe Acrobat Document 733 KB	Port Republic City_Lab_01_01 Adobe Acrobat Document 776 KB	Port Republic City_Lab_01_02 Adobe Acrobat Document 949 KB	Port Republic City_Lab_01_03 Adobe Acrobat Document 917 KB	Port Republic City_Lab_01_04 Adobe Acrobat Document 899 KB
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Port Republic City_Monitoring_Results_89_91 Adobe Acrobat Document	Port Republic City_NJPDES_Permit Adobe Acrobat Document 309 KB	Port Republic City_Soil_Gas_02_04 Adobe Acrobat Document 123 KB	Port Republic City_Soil_Gas_06_04 Adobe Acrobat Document 118 KB	Port Republic City_Soil_Gas_09_04 Adobe Acrobat Document 126 KB	Port Republic City_Soil_Gas_11_03 Adobe Acrobat Document 145 KB
Port Republic City_Well_Info Adobe Acrobat Document 45.9 KB	PP11Thumbs.ptn PTN File 5.33 MB	PP11Thumbs.ptn2 PTN2 File 4.09 KB			

# Quick Domenico Solute Transport Model Run



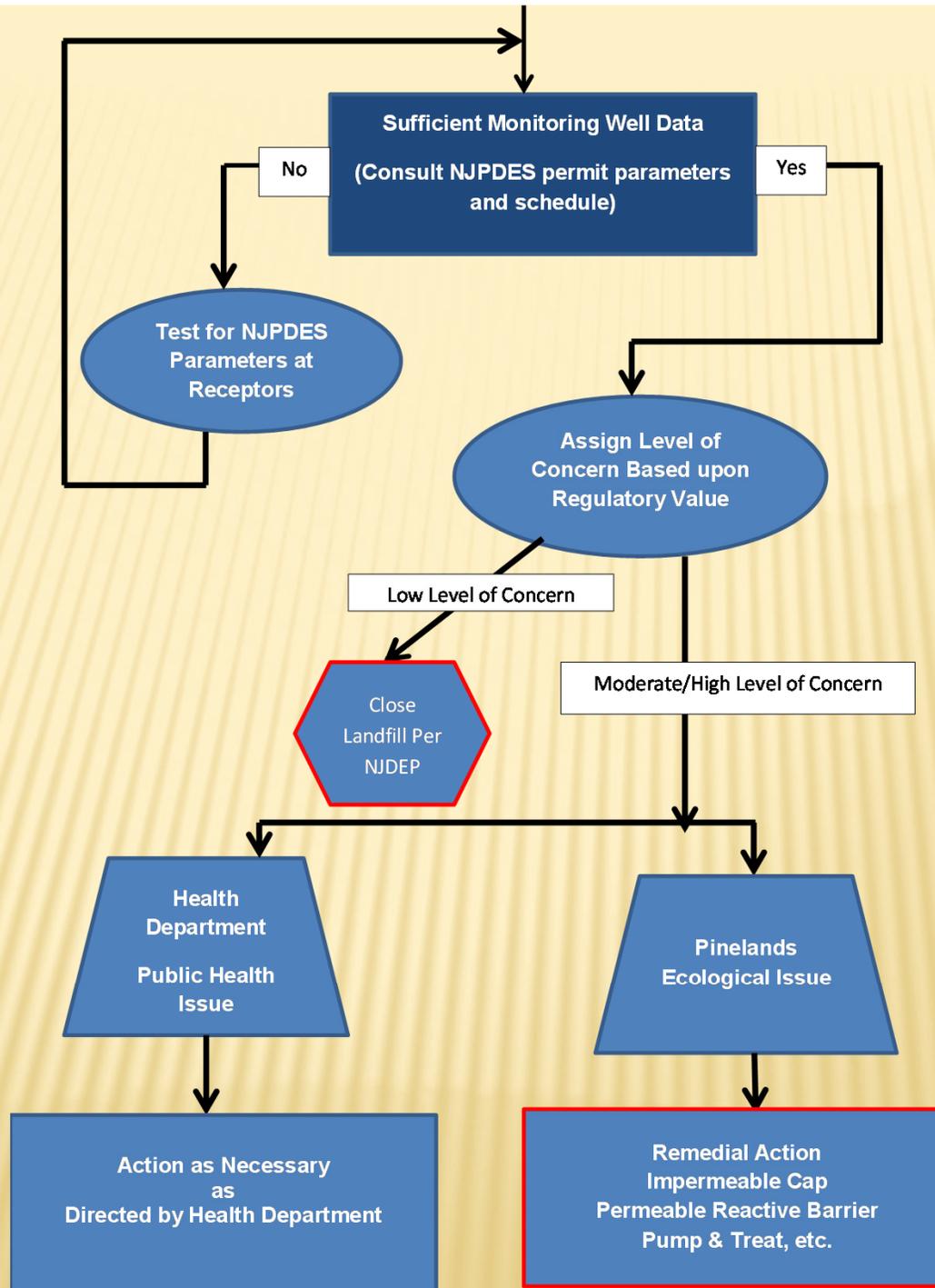
# Port Republic Landfill and Surrounding Receptors



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Port Republic Landfill Levels of Concern for Specific Analytes and Receptors								
Organics and Inorganics Excluding Nutrients					Nutrients			
	Chloride	Lead, Dissolved				Ammonia as N	Nitrate as N	Total P
Stream	High (A), but not a COC <sup>(1)</sup>	High (A)				Low	Moderate	Low
Wetland or Hydric Soil	High (A), but not a COC	High (A)				Low	High	Low
Residential	High (A), but not a COC	High (A)				Moderate	High	Low
<sup>(1)</sup> COC = Contaminant of concern								
Summary of Domenico Results: Level of Concern								
Level of Concern	Criteria					Meets criteria?		
Unknown	Data are insufficient to characterize the presence of COCs.					no		
Low	COCs do not reach receptors at concentrations greater than the practical quantitation limit (PQ).					yes		
Moderate	COCs reach receptors at concentrations greater than the PQL but less than 50% of any relevant regulatory standard.					yes		
High (A)	COCs reach receptors at concentrations greater than or equal to 50% of one or more relevant regulatory standards.					yes		
High (B)	Receptor coincides with landfill location, where COC concentration is greater than or equal to 50% of one or more relevant regulatory standards					no		

# Pinelands Landfill Assessment Flow Chart



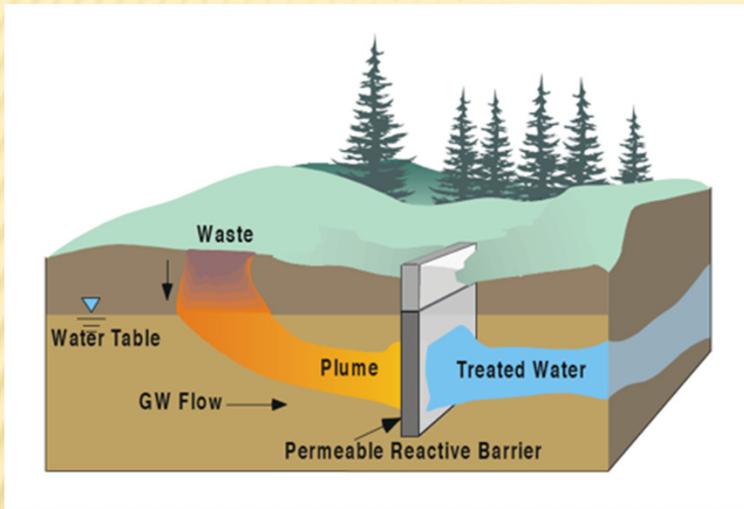


Geoprobe sampling



Conventional monitoring well  
sampling

## Select Landfill Leachate Plume Remedies



Permeable Reactive Barrier

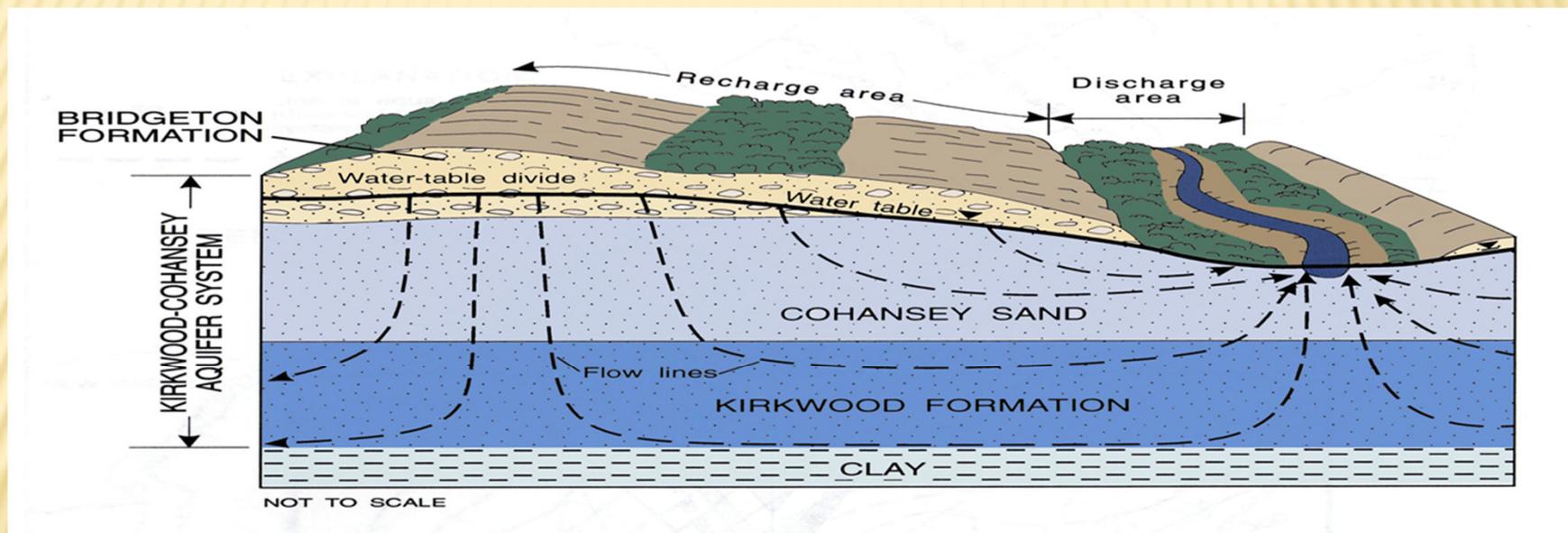


Groundwater Pump and  
Treat Equipment



Impermeable Landfill Cap

# Kirkwood Cohansey Aquifer System



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