DuPont Site RFI Results

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South River Science Team Meeting

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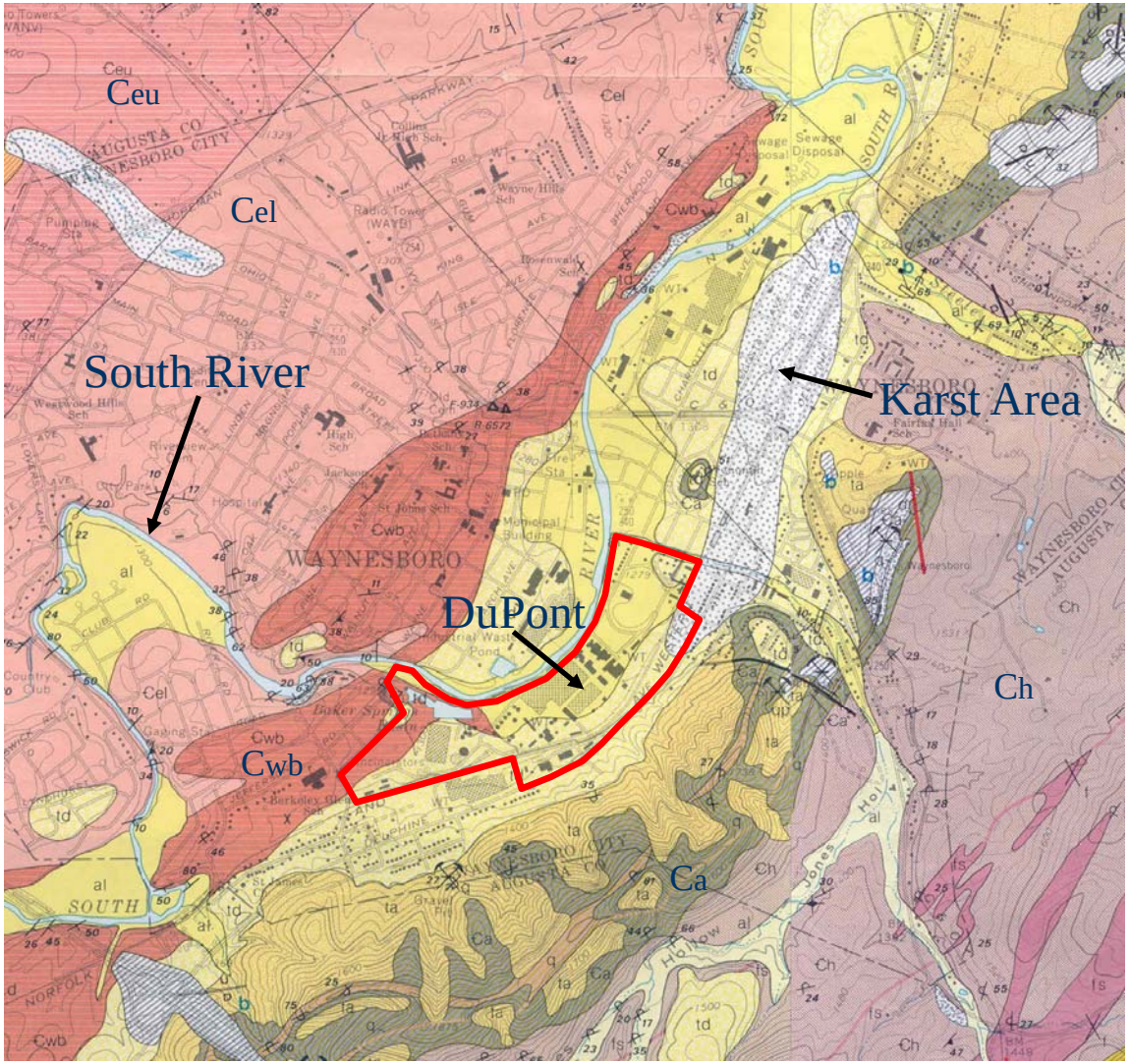
RFI Objectives

- Further characterize the site's geology, hydrogeology, and groundwater migration pathways
- Characterize site-wide soil and groundwater quality
- Evaluate current releases and potential for future releases to the South River

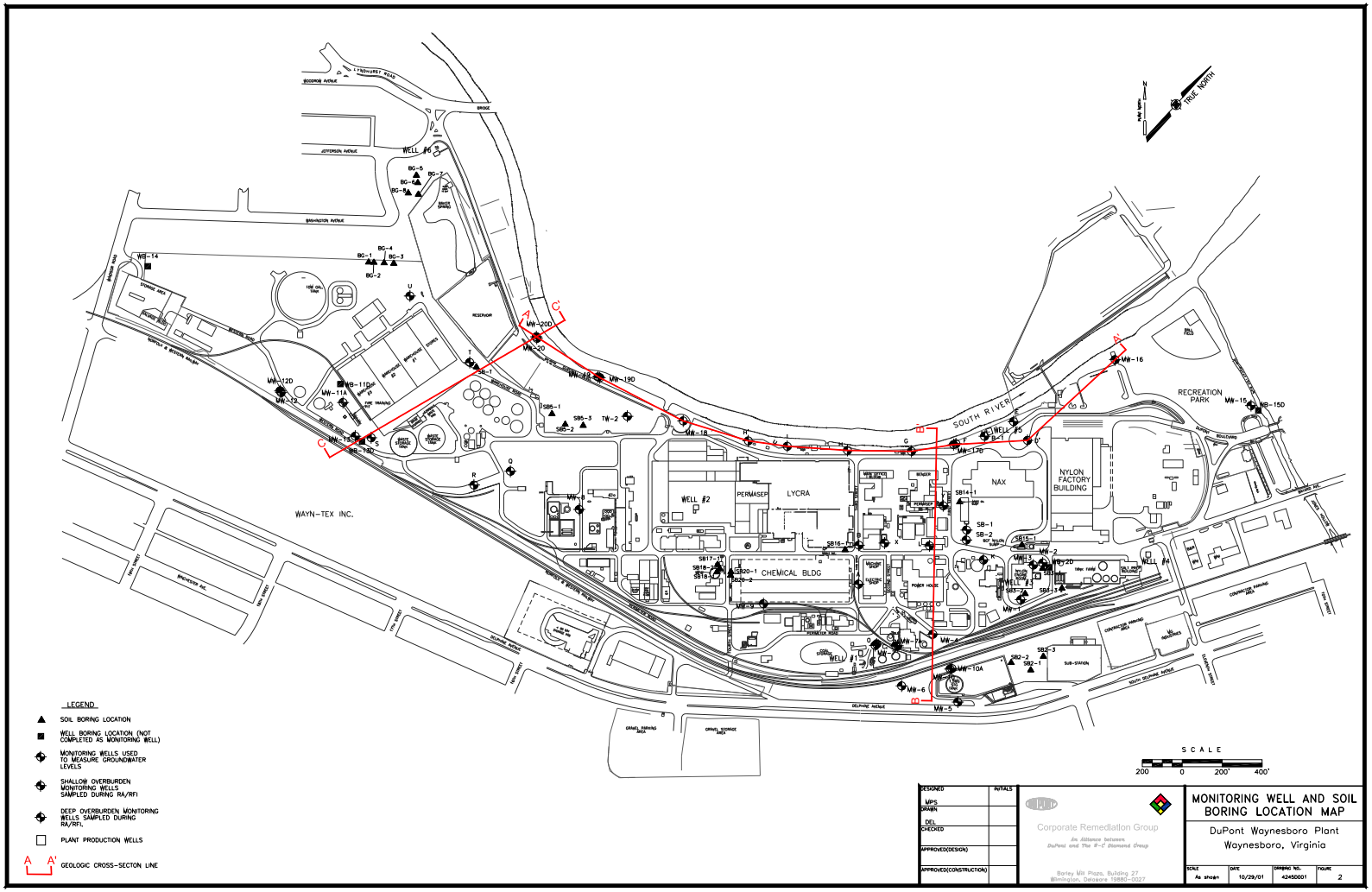
Site Geology

- Overburden Sediments - Shallow Aquifer
  - Alluvial sand, gravel, silt, and clay overlying bedrock
  - Up to 18 feet thick across most of the site
  - > 60 ft thick in karst area (NE)
  - Absent in SW
  - Overlies weathered Waynesboro Formation
- Bedrock
  - Waynesboro Formation - highly weathered mudstone, siltstone, argillite and phylite (very stiff, silty clay, with shale, mudstone, siltstone) over limestone and sandstone
  - Shady Formation - dolomite, in NE portion of the site, subsurface only - inferred from karst features

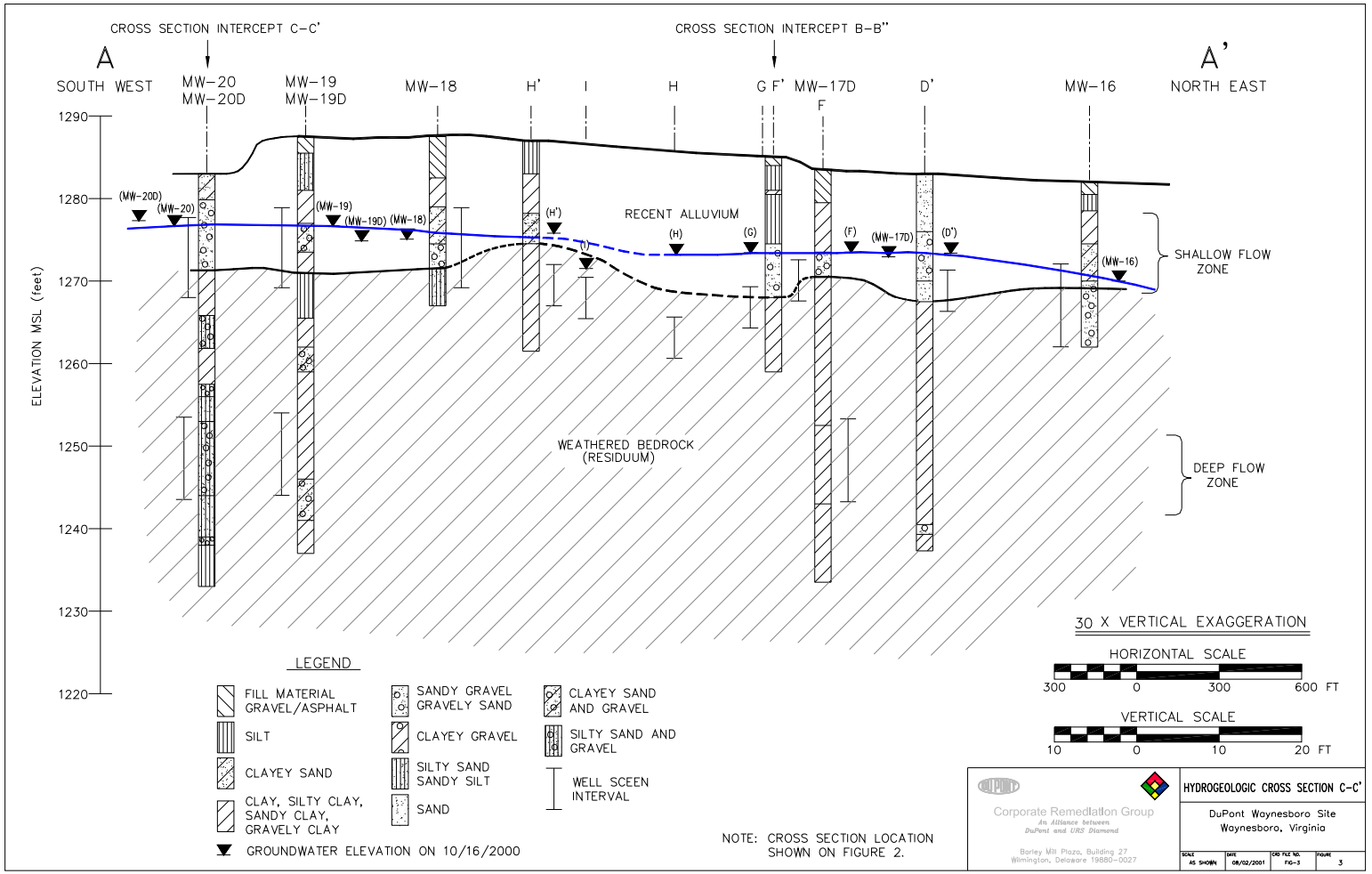
Regional Geologic Map



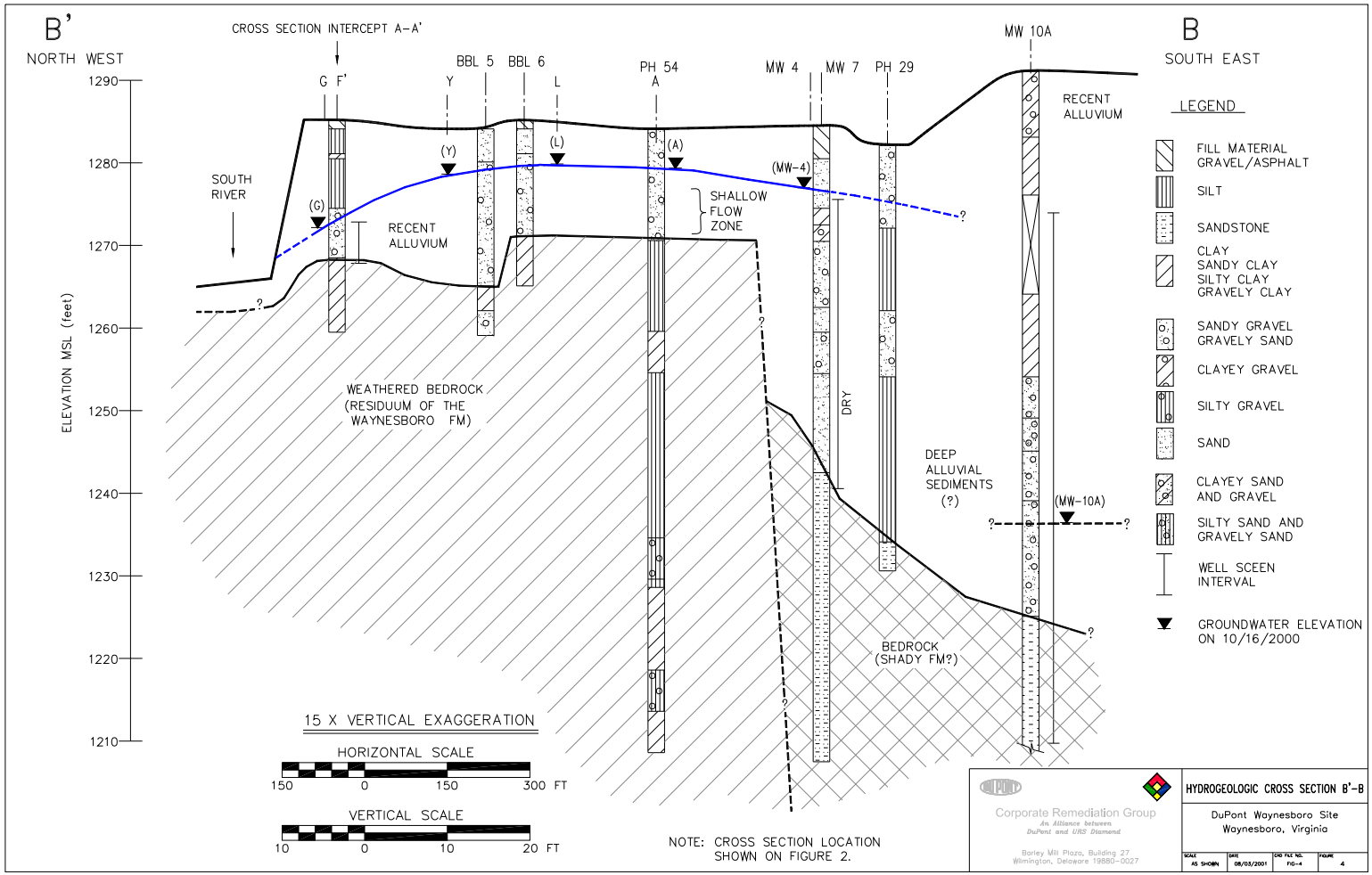
Site Geology - Cross Section Lines



Site Geology - Cross-Section A-A’



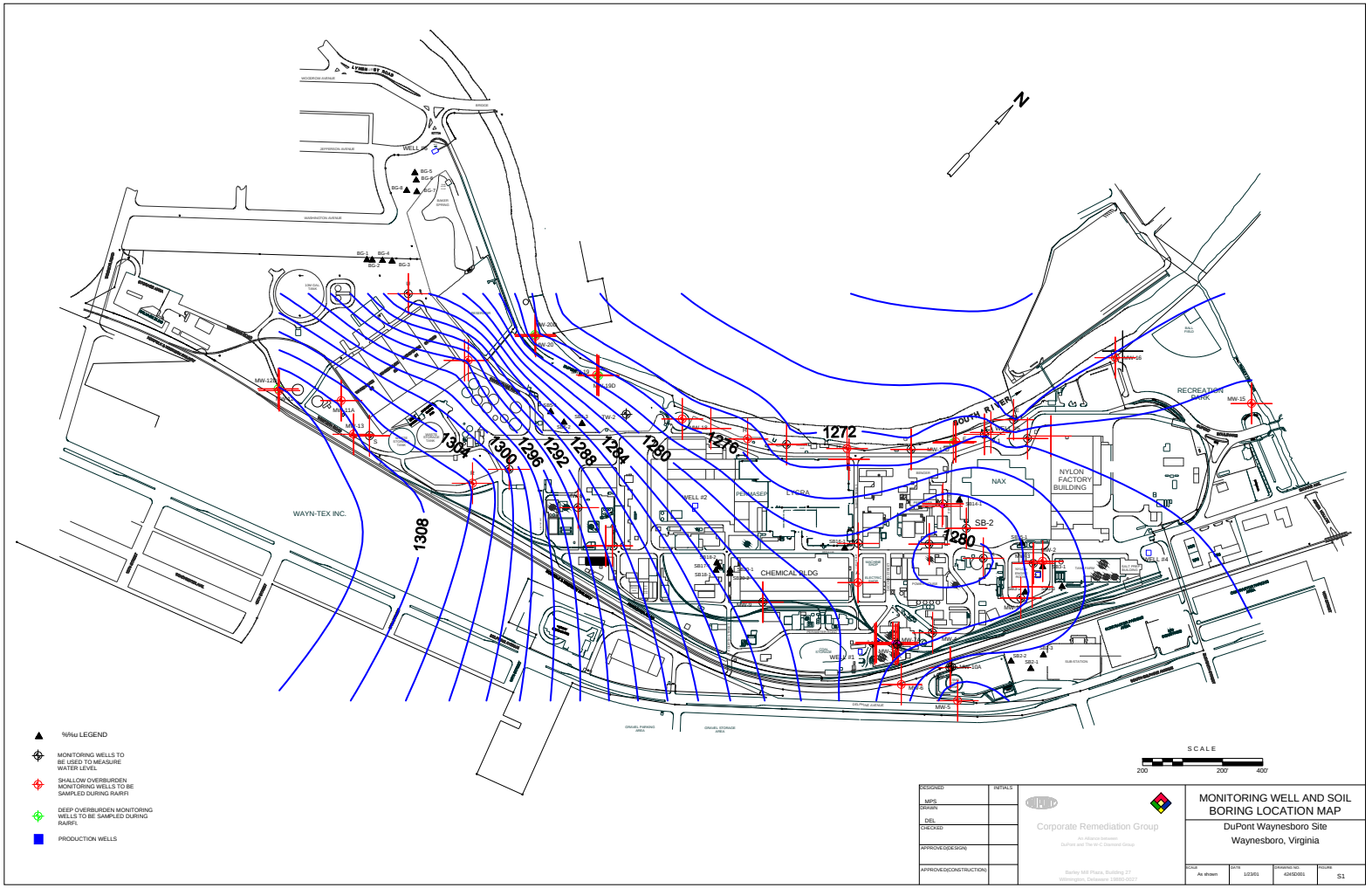
Site Geology - Cross-Section B-B’



Site Hydrogeology

- Shallow aquifer
  - Discharges to the South River to the NW and N
  - May discharge to karst area in NE
- Deep bedrock aquifer
  - Groundwater source for plant
  - Discharge location unknown
  - Not a focus of the RFI
- Karst area
  - Deep water table - shallow water table may also be present
  - May be in communication with bedrock aquifer
  - Unlikely to discharge to South River
    - GW elevation at MW-10A = 1235 ft aMSL
    - South River elevation ~ 1270 ft a MSL (at plant)
  - Captured by plant production wells?

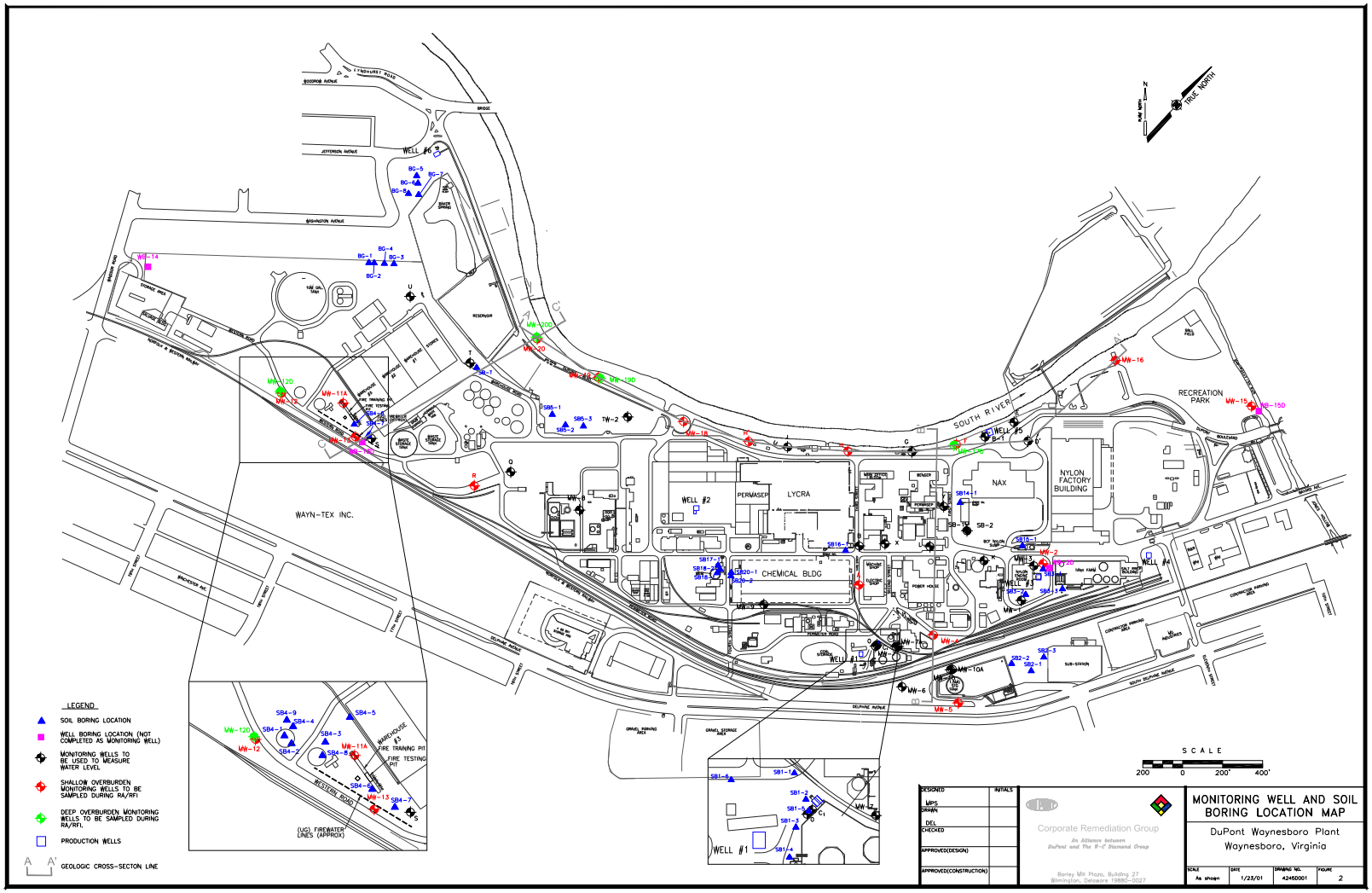
Shallow Zone Groundwater Elevations - Aug-00



Summary of RFI Sampling Activities Completed

- Soil Sampling
  - 10 SWMUs
    - SWMU 1 - Hg Recovery
    - SWMU 4 - Incineration Area
  - Background sampling
  - 86 soil samples + QA/QC
  - VOCs, SVOCs, metals, SPLP Hg, meHg, dioxins/furans, HMD, DMF, DMAC
- Groundwater Sampling
  - 40 samples (20 Wells, 2 Rounds) + QA/QC
  - VOCs, SVOCs, metals, meHg, HMD, DMF, DMAC
- Other Activities
  - Groundwater level measurements
  - Aquifer slug testing

Monitoring Well and Soil Boring Locations



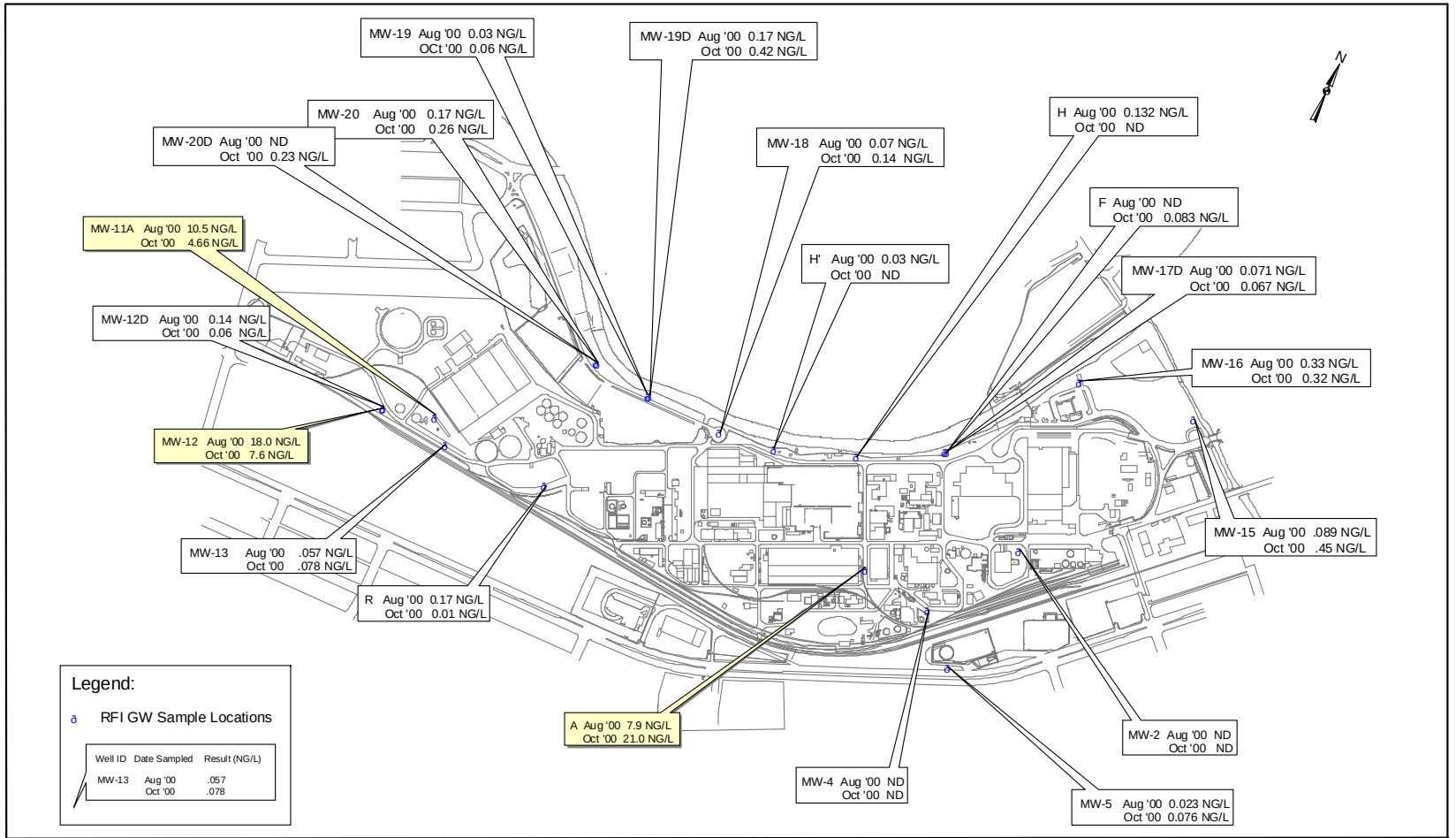
Hg / meHg Results - Soil

- Hg
  - Low ppm levels throughout plant area
    - Up to 100 ppm in Hg Recovery Area (generally low ppm levels)
    - Up to 300 ppm in Incineration Area
    - Elemental Hg observed in buried burning pit accumulation layer (12 ft BGS) in Incineration Area
  - Good erosion control over the site - gravel or asphalt ground cover
  - Buried burning pit is within clay - isolated from groundwater
- meHg
  - Sampled soils for meHg at Hg Recovery and Incineration Areas only
  - Detected ppt levels across the site
  - Low ppb levels in 2 source areas
  - 5.7 ppm at Incineration Area (associated with elemental Hg)

Hg / meHg Results - Groundwater

- Hg (dissolved)
  - Plant area - MW-A (0.5 ppb)
  - Incineration Area - MW-11A (0.2 ppb), MW-12 (0.17 ppb)
  - Down-gradient boundary - MW-20D (0.12 ppb)
- meHg
  - Sub-ppt levels at all but 2 locations (0.03 to 0.45 ng/l along South River)
  - Ppt levels at 3 wells in sources areas (21.0 to 4.66 ng/l)

MeHg Results - Groundwater



Corporate Remediation Group
An Alliance between
DuPont and URS Diamond
Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

TITLE:
RFI Groundwater Sampling Results- Methyl Mercury (NG/L)
DuPont Waynesboro Plant

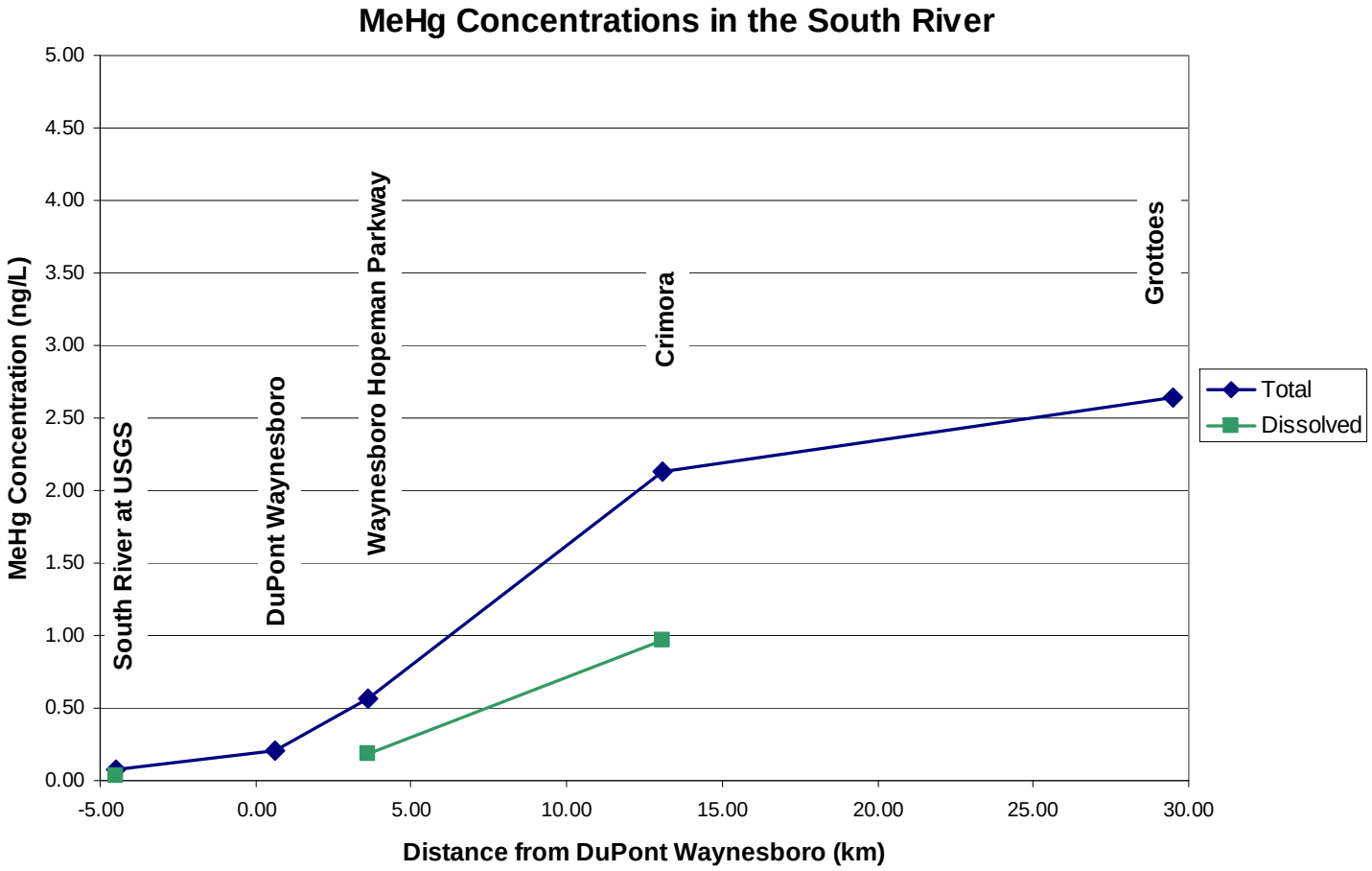
0 400 800 Feet

DWN.:	DES.:	FILE NUMBER:
AMB	AMB	wayneri.apr
CHKD.:	APPD.:	RELEASE NO.:
MS	MS	18B
DATE:	REV.:	
7/5/01	0	

MeHg Mass Flux to South River

- Volumetric groundwater flux (Q) to South River:
  - = 5.13 x 10^5 l/d (94 gpm)
  - Based on length of river boundary along plant and mean aquifer conductivity (K), gradient (i), and saturated thickness (t)
- Mass Flux of meHg to South River:
  - = 232 ug/d
  - Based on highest concentration detected in shallow wells along the river (0.45 ng/l; MW-15)
- Predicted increase in concentration (above background) down-stream of plant after mixing:
  - = 5.5 X 10^{-3} ng/l
  - Assumes WORST CASE - **lowest daily mean flow** in South River between 1953 and 1995 (17 ft^3/s; Aug 8, 1966) and **highest concentration** detected along the river

MeHg South River Water Column Data



- Shows steady increase in concentration with distance down-stream
- Suggests a diffuse source

Phase II RFI Objectives

- Confirm nature and extent of soil and groundwater impacts
  - mainly source areas
- Further characterize groundwater flow and quality in the karst area
- Storm event surface-water discharge sampling
- Initiate annual groundwater monitoring program

Conclusions

- Shallow overburden aquifer
  - Discharges to South River along plant boundary
  - Discharges to karst area in NE
- Karst area
  - Deep groundwater table not likely to be in communication with South River - perched water table may also be present
  - Depressed groundwater level suggests capture by plant production wells
  - Needs further evaluation - flow and GW quality
- MeHg
  - Contribution to South River via shallow groundwater appears to be negligible
  - Sub-ppt levels detected in GW along South River
  - Ppt concentrations localized to source areas in plant interior