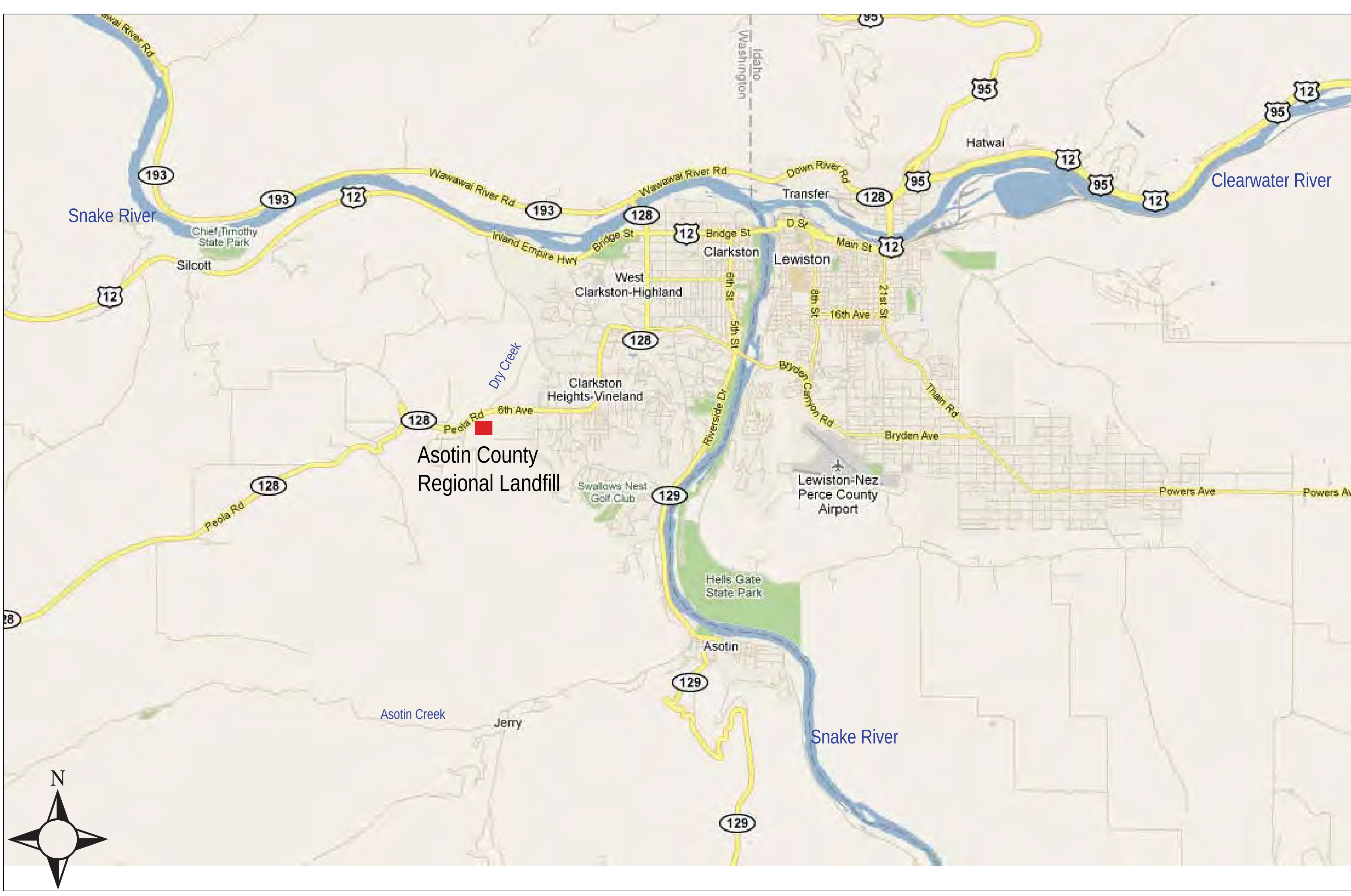
VICINITY MAP

SITE LOCATION MAP



0 2 4 MILES

SCALE 1 INCH = 2 MILES

Source: Google Maps

Figure 2-1
Vicinity Map
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

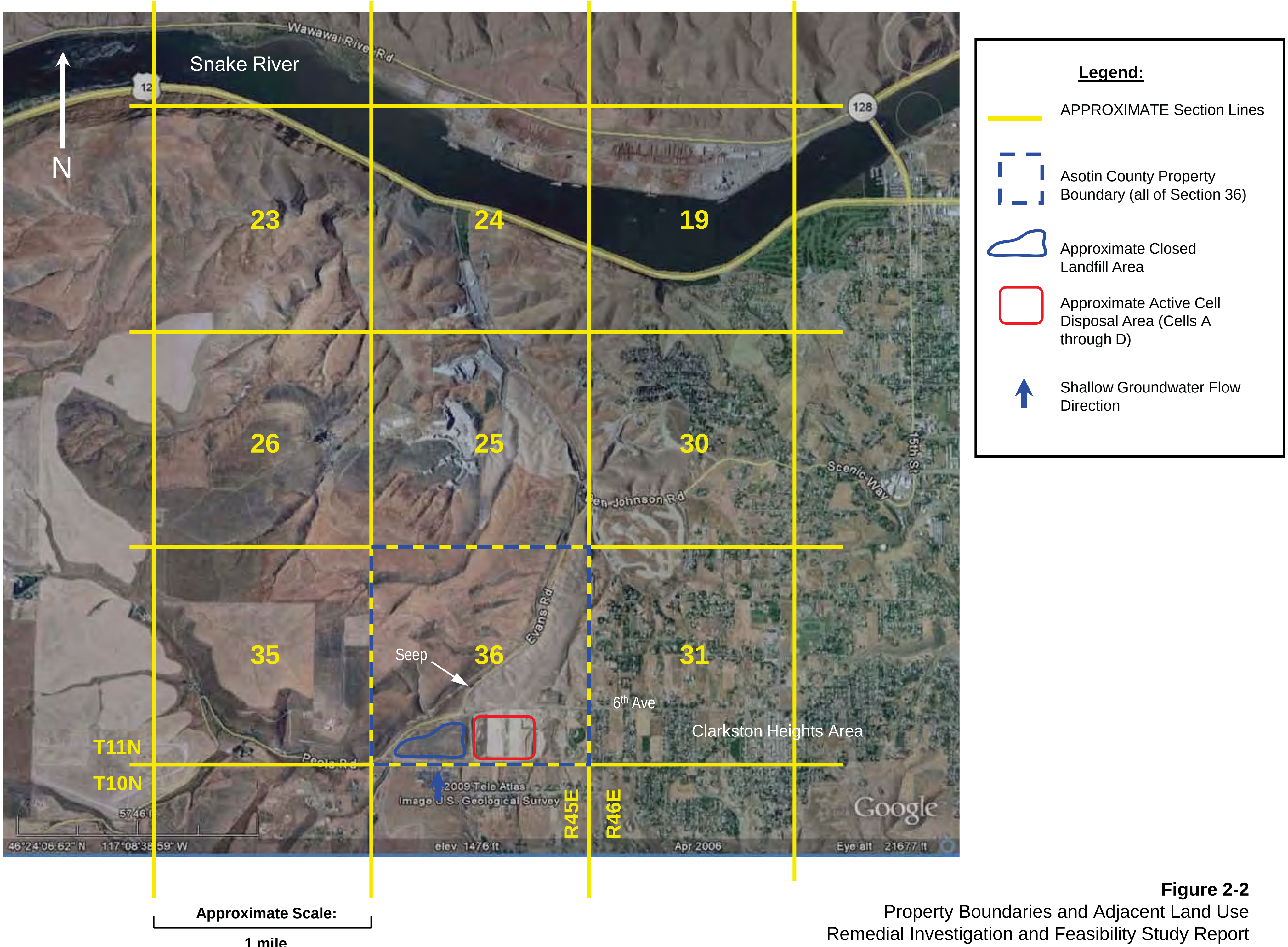


Figure 2-2
Property Boundaries and Adjacent Land Use
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

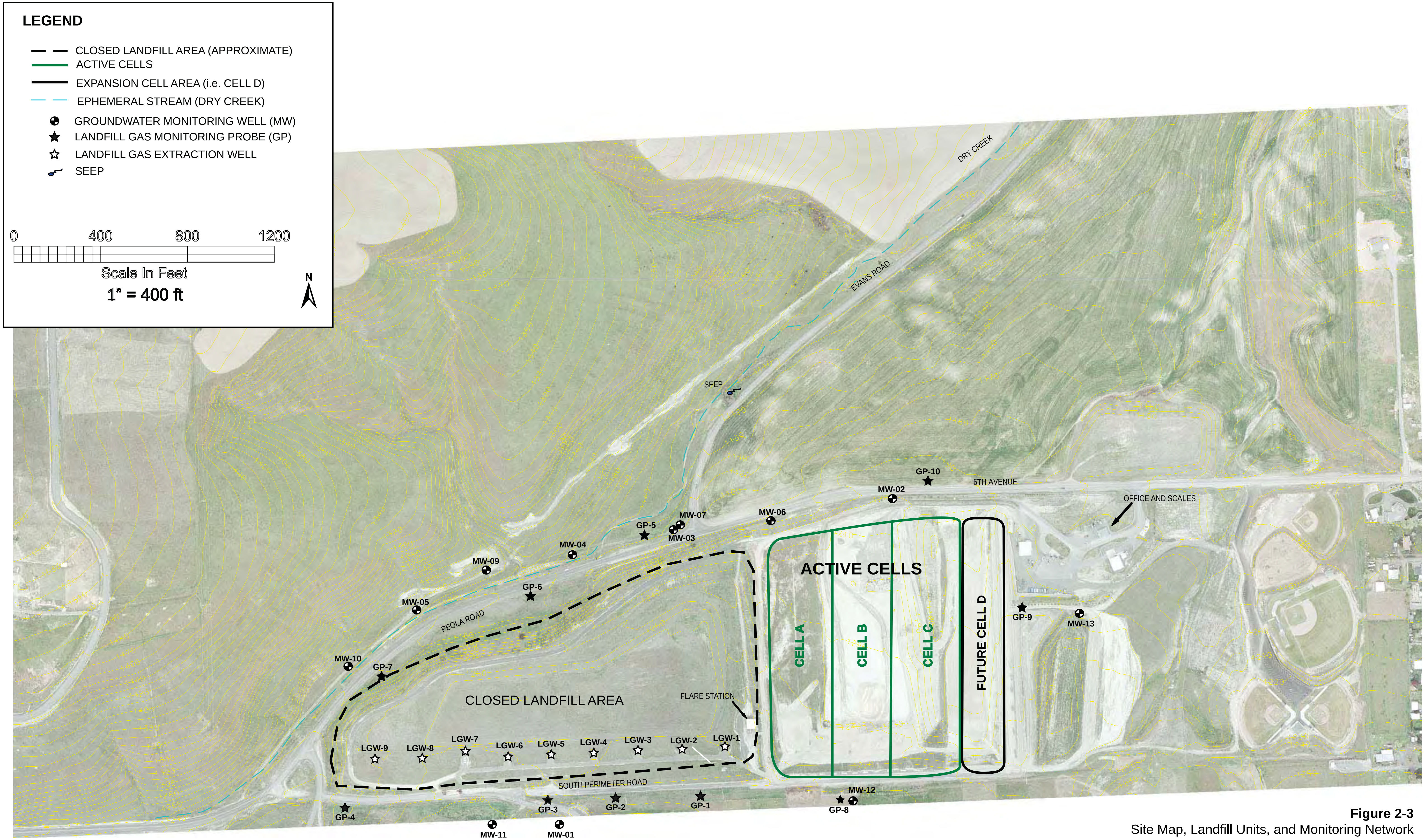


Figure 2-3
Site Map, Landfill Units, and Monitoring Network
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

Note:
Map illustrates active groundwater monitoring network per Chapter 173-351, WAC; and active explosive gasses monitoring network per Chapter 173-351-200, WAC.

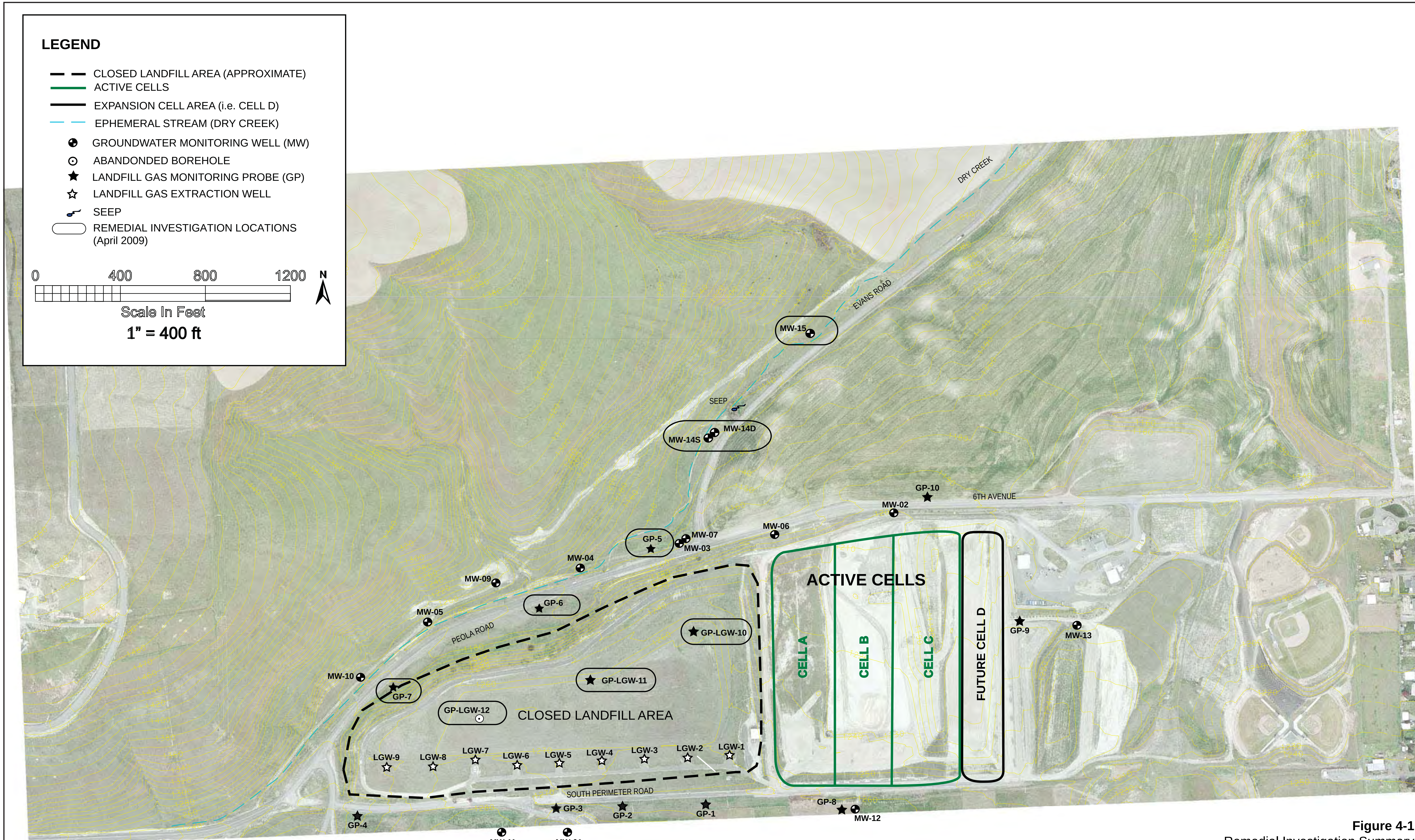


Figure 4-1
Remedial Investigation Summary
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

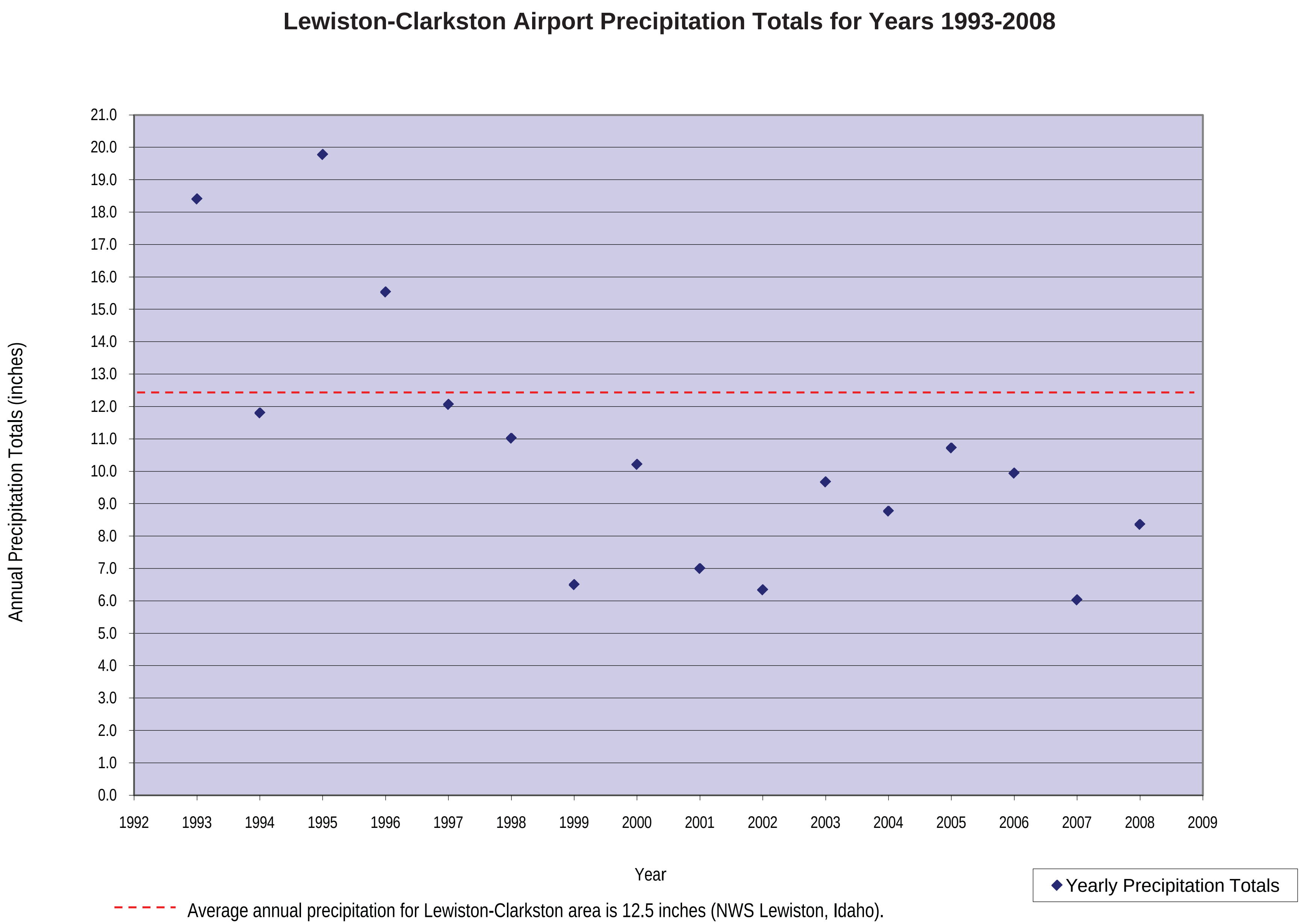


Figure 5-1
Average Annual Precipitation
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

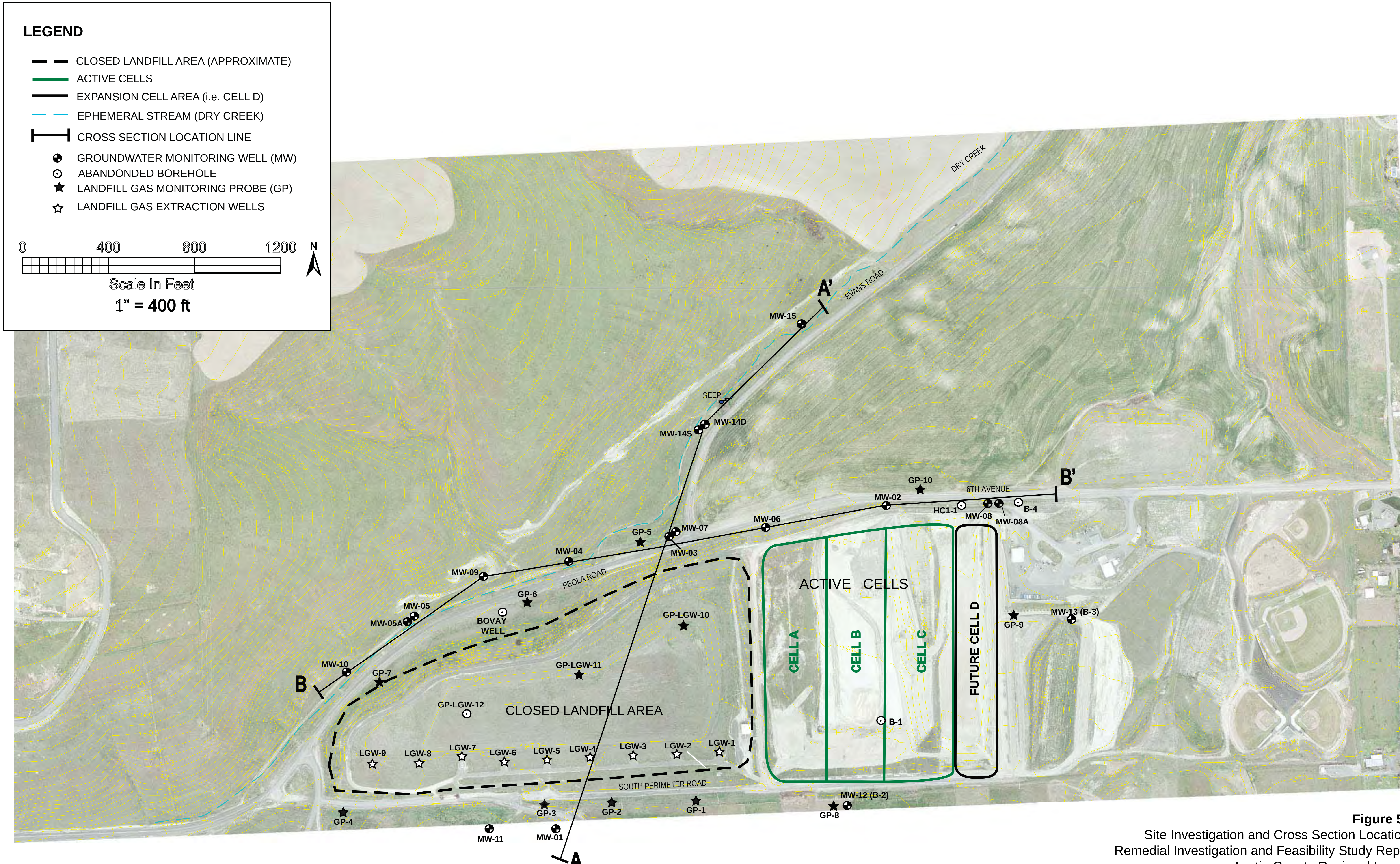
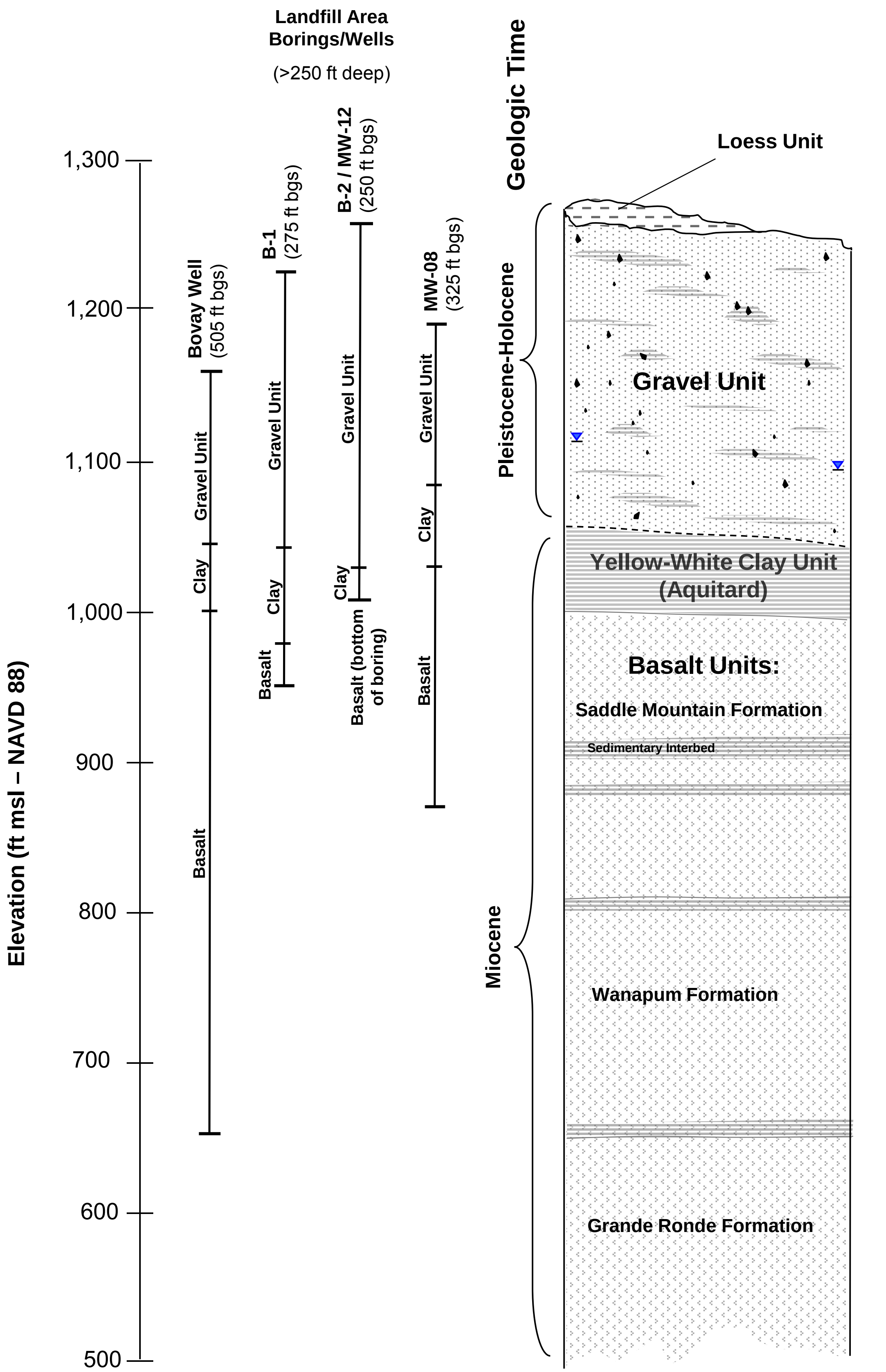


Figure 5-2
Site Investigation and Cross Section Locations
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

Regional Hydrostratigraphic Units:



Regional Hydrostratigraphic Units and Related Site-Specific Observations:

Loess Unit: [Holocene to Pleistocene]

- Depositional environment is glacial loess (CH2M HILL, 1995).
- Unit is comprised of fine sand to silt size particles based on laboratory testing and field classification.
- Unit thickness ranges from 0 to 20 ft thick; unit is absent at many locations due to erosion. Presence/absence of unit is difficult to distinguish from underlying fine-grained zones in upper Gravel Unit. Unit is believed absent within the Dry Creek drainage due to erosion.

Gravel Unit: [Pleistocene]

- Depositional environment is a combination of Clarkston Heights Gravel and uppermost sedimentary interbed of the Saddle Mountains Formation (Howard Consultants, 1990 and 1992; Asotin County, 1994; and CH2M HILL, 1995).
- Unit is characterized as "highly interbedded and interfingered poorly graded gravel and sand with varying amounts of silt and clay" (CH2M HILL, 1995). Materials encompassing almost the entire range of unconsolidated materials in the Unified Soil Classification System (USCS) are interbedded within the Gravel Unit. The Gravel Unit stratigraphy is indicative of an alluvial depositional environment; coarser deposits of gravel and sand are associated with high to medium energy environment, while finer-grained deposits (i.e., silts and clays) are associated with low-energy or "back-water" environments. Color typically logged as grey to tan with dark grey to black basalt gravels.
- Regional unit thickness ranges from 100 to 220 ft thick (Howard Consultants, 1992); local unit thickness observed at in the vicinity of the landfill ranges from 90 to 200 ft thick.
- Unit is saturated at it's base interval immediately overlying the fine-grained clay unit (described below); the potentiometric surface elevation at the base of the gravel unit suggests a saturated thickness of approximately 60 ft; however, saturated intervals (and thus groundwater flow) are believed to occur within preferential flow zones (i.e., coarser materials) within the ~ 60 ft thick sequence.
- Depth to groundwater (or "first-water") at the site ranges from 10 to 160 ft bgs depending upon well location and topography; groundwater elevation at the site ranges from approximately 1128 ft msl in upgradient locations to 1090 ft msl at locations downgradient along Dry Creek.
- Groundwater flow characteristics have been assessed from subsurface soil conditions, groundwater yield during air-rotary drilling, slug tests, groundwater levels/hydraulic gradient, and laboratory test data. Gravel Unit exhibits a wide-range of hydraulic conductivity values given the depositional history and interbedded nature (range of 10-2 to 10-5 cm/sec). Recharge to this unit is inferred to originate from precipitation and surface runoff along Dry Creek.

Clay Unit: [Miocene]

- Depositional environment of clay unit represents a fine-grained sedimentary interbed of the Saddle Mountain Formation (described below).
- Clay unit is characterized by visually distinct yellow-white color with low plasticity and greater than 80 percent "fines" passing No. 200 sieve. Unit is lithologically homogenous and laterally continuous beneath the closed landfill.
- Thickness of unit ranges from approximately 40 to 60 ft in the vicinity of the landfill. Structure of clay unit in the vicinity of the landfill generally slopes to the north at approximately a 2 percent slope due to regional syncline (Howard Consultants, 1990).
- Fine-grained clay unit effectively acts as an aquitard and marks the lower limit of uppermost groundwater (i.e., "first-water") which is the target monitoring zone for the landfill. Given that saturated conditions are observed immediately above the clay unit suggests the Gravel Unit (above) is relatively coarser-grained than the clay unit. Vertical hydraulic conductivity of the clay unit is estimated at 1X10^{-8} cm/sec based on laboratory testing results (CH2M HILL, 1995).

Basalt Units: [Miocene]

- Basalt units are identified as belonging to the Yakima Basalt Subgroup of the Columbia River Basalt Group (Salami, 1978; Hooper, 1985). The Yakima Basalt Subgroup has been subdivided (from youngest to oldest) into three formations: Saddle Mountain, Wanapum, and Grande Ronde.
- Sedimentary interbeds are observed in upper sequence in the Saddle Mountain and Wanapum Formations; whereas the Grande Ronde basalt flows were deposited in massive sequence and lack sedimentary interbeds.
- The Yakima Basalt Subgroup is on the order of 2,500 ft thick and underlies the entire Clarkston-Lewiston Basin; thickness of the Grand Ronde is estimated at 1300 ft; and the thickness of the Wanapum and Saddle Mountain Formation is on the order of 400 ft in the vicinity of the landfill. Top elevation of the basalt unit in the vicinity of the landfill is observed in four wells at approximately 1,000 ft msl. Structure of the basalt units slope to north at 2 percent due to regional syncline; east-west axis of syncline found to north of landfill.
- Municipal water supply wells withdraw water from the the Grande Ronde unit; the regional resource is referred to as the *Lewiston Basin Aquifer* (formerly the Russel Aquifer). Grande Ronde basalts are interpreted to have high horizontal permeability and low vertical permeability (IDEQ, 2005). Hydrostratigraphic confining zones found below the Gravel Unit and above the Grande Ronde basalt include the Clay Unit, sedimentary interbeds from and basalt flow interiors of Saddle Mountains and Wanapum Formations. Recharge to the Lewiston Basin Aquifer occurs in the Snake and Clearwater River Canyons (including Asotin and Lapwai Creek) where the structural elevation of the basalt flows outcrop and permit infiltration into the basalt rock; the nearest recharge area is along the Asotin Creek drainage approximately 3 miles southeast of the landfill (up and cross-gradient from the landfill area).

Figure 5-3
Regional Units and Site Characteristics
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

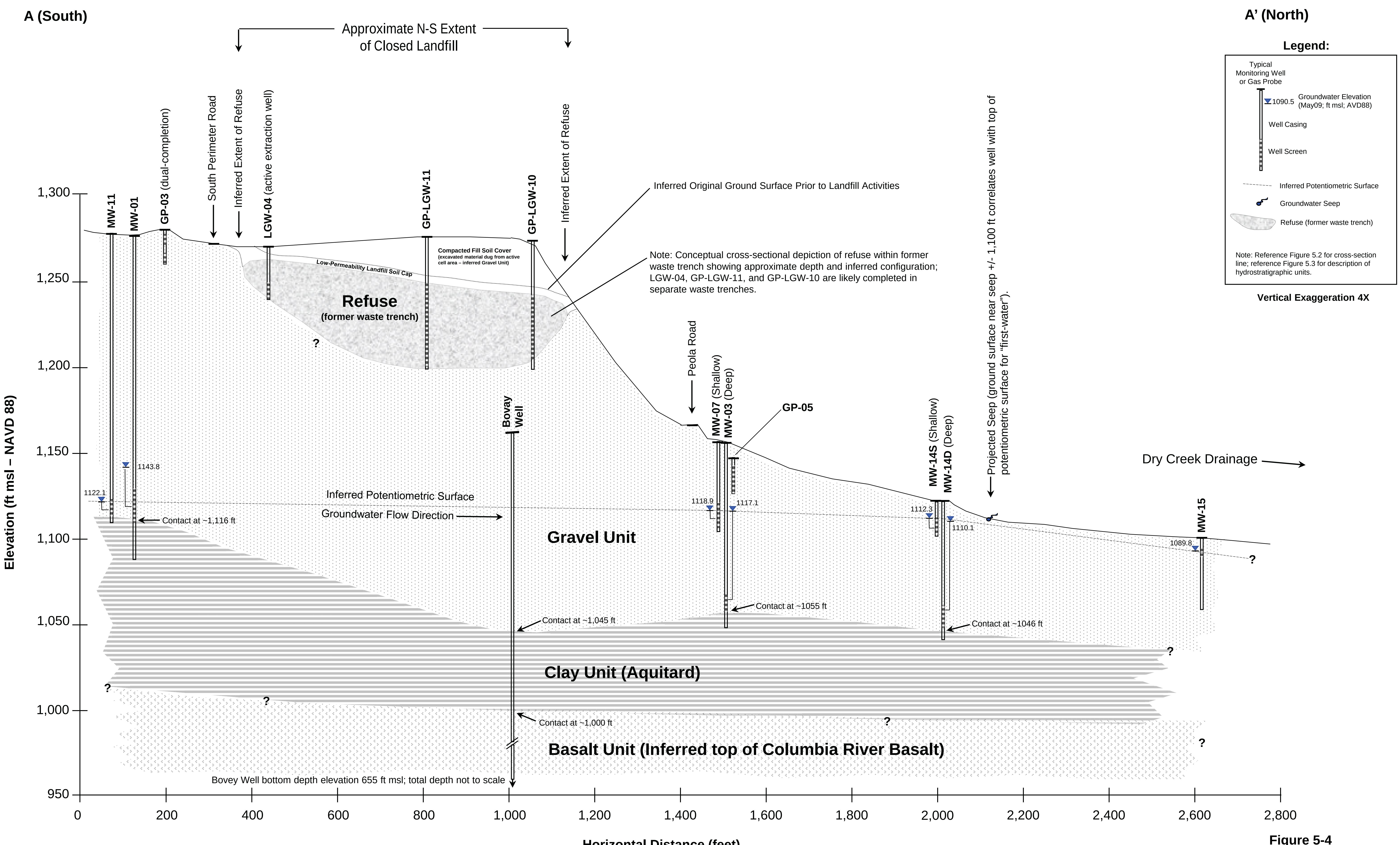


Figure 5-4
Hydrogeologic Cross-Section A-A' (south to north)
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

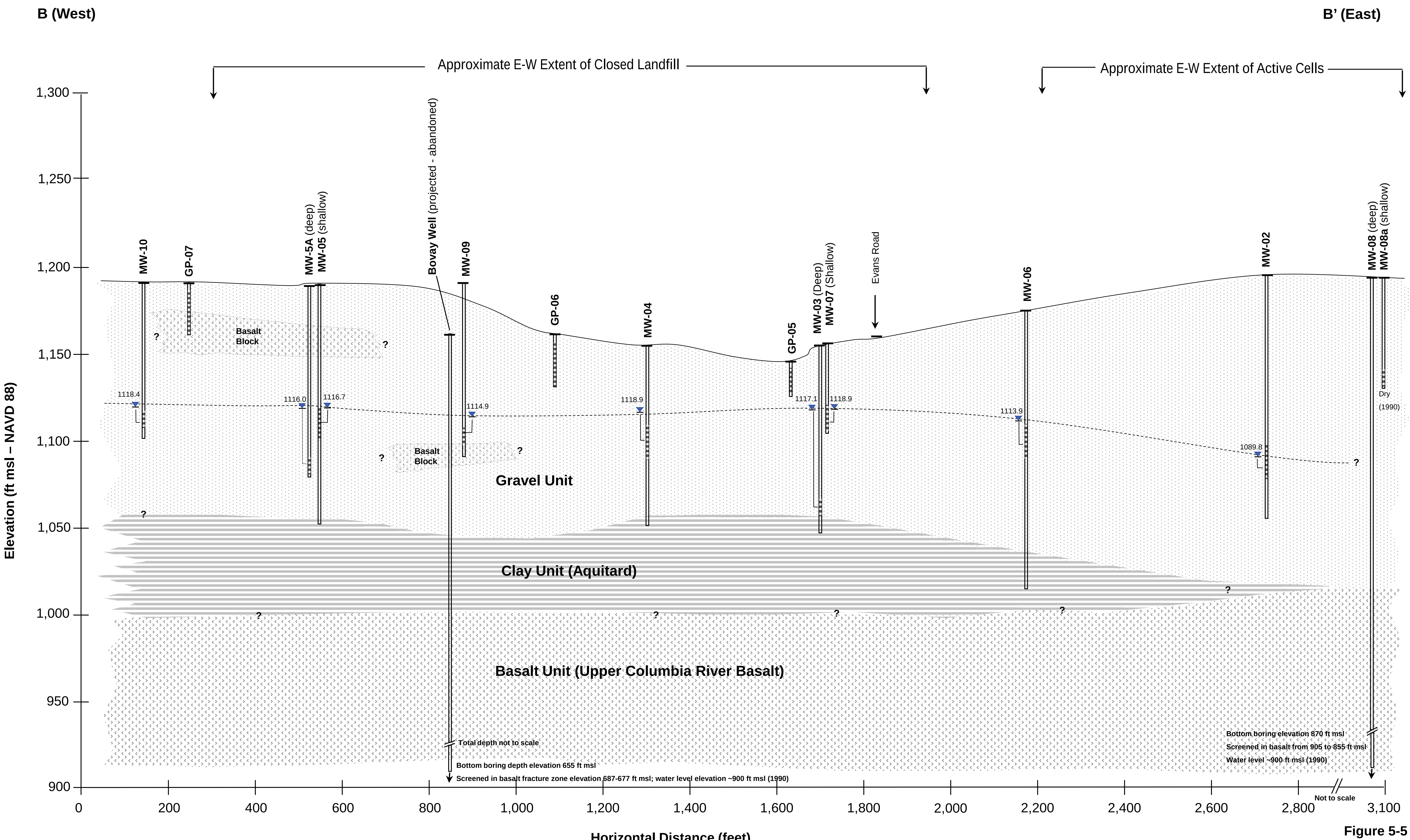
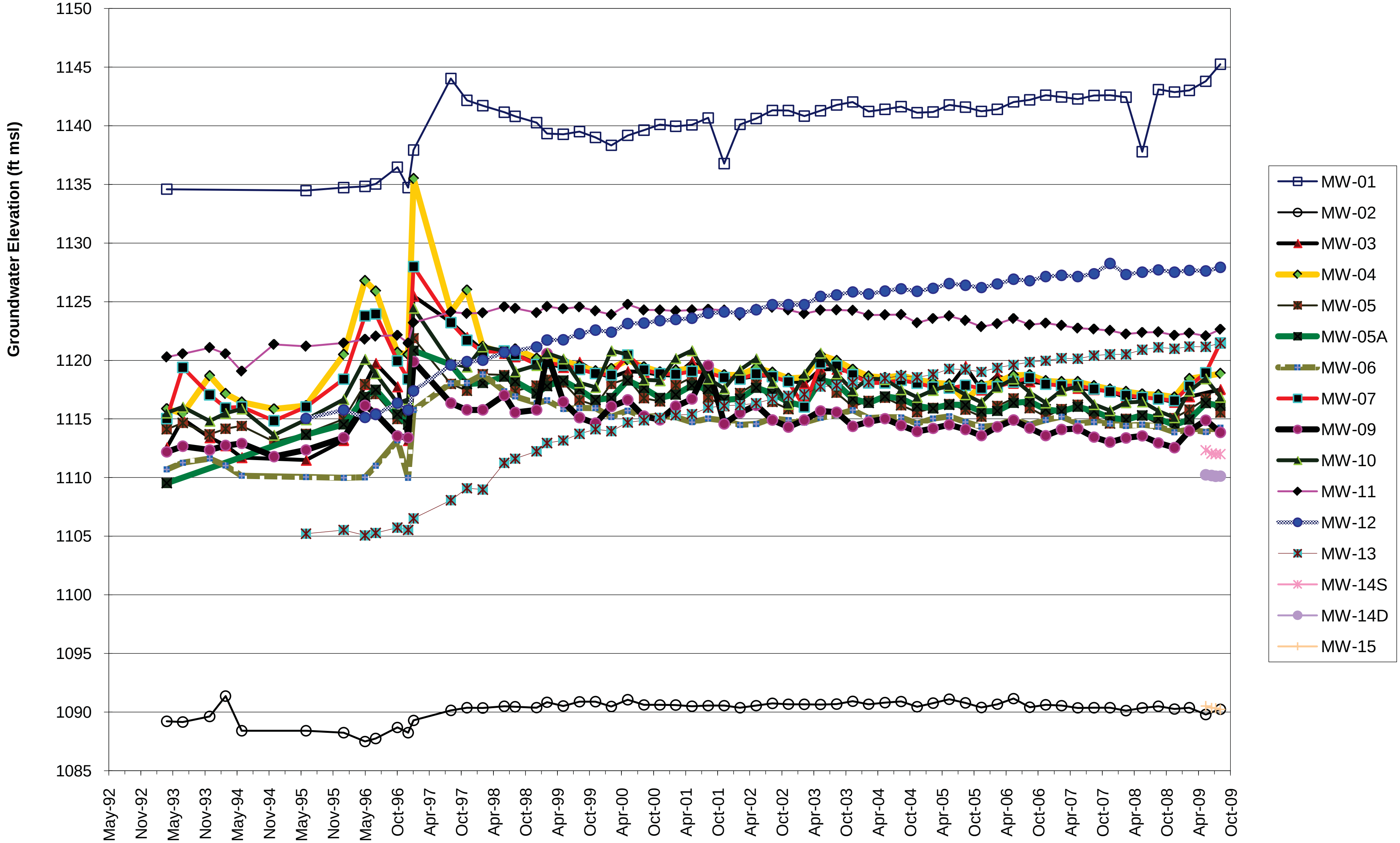


Figure 5-5
Hydrogeologic Cross-Section B-B'
(west to east - downgradient perimeter wells)
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

Note:

See Figure 5.2 for section location; see Figure 5.3 for unit description.



CH2MHILL

Figure 5-6
Site Hydrograph (all wells - 1993 to 2009)
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

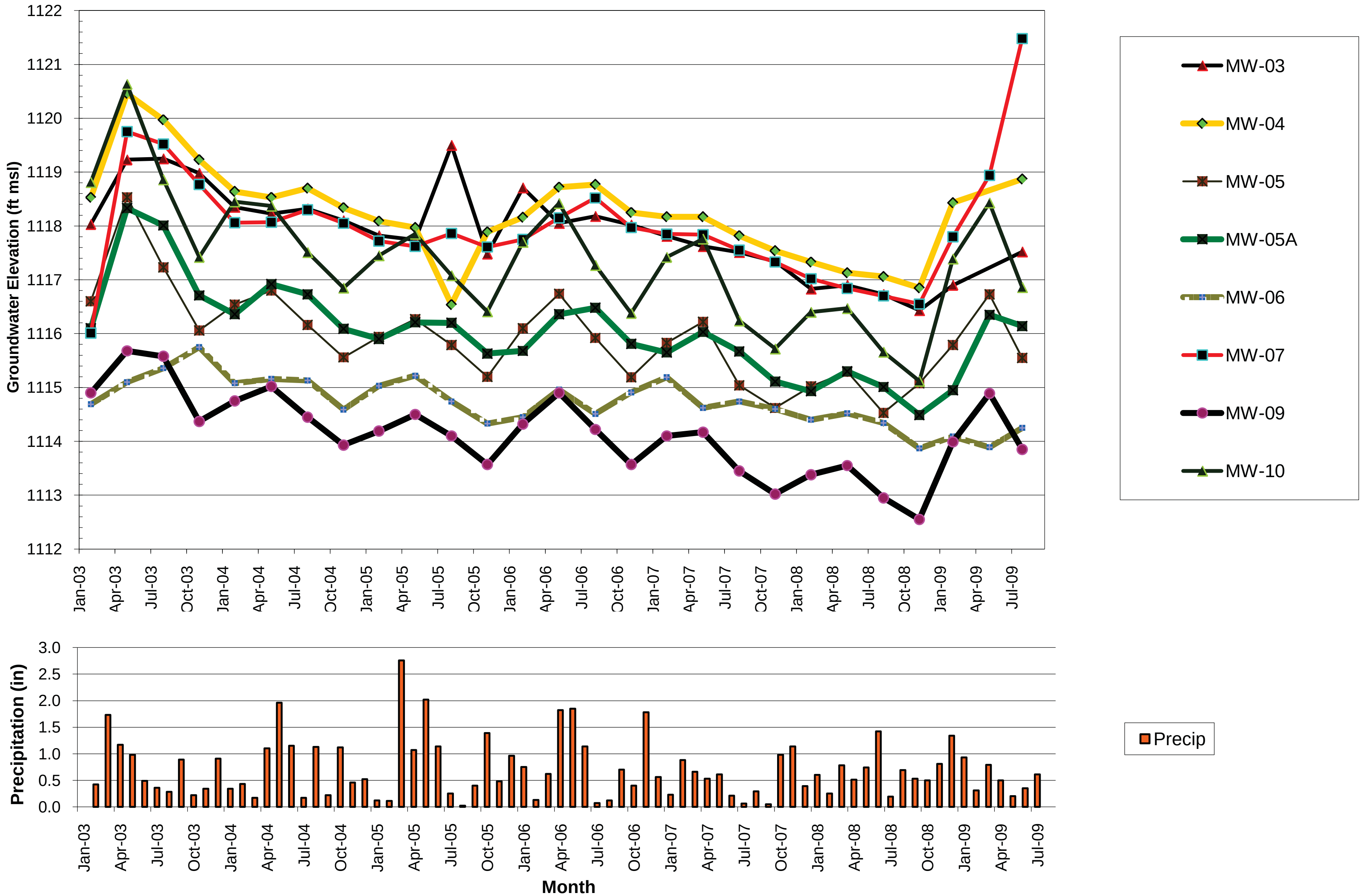


Figure 5-7
Site Hydrograph (select wells - 2003 to 2009)
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

CH2MHILL

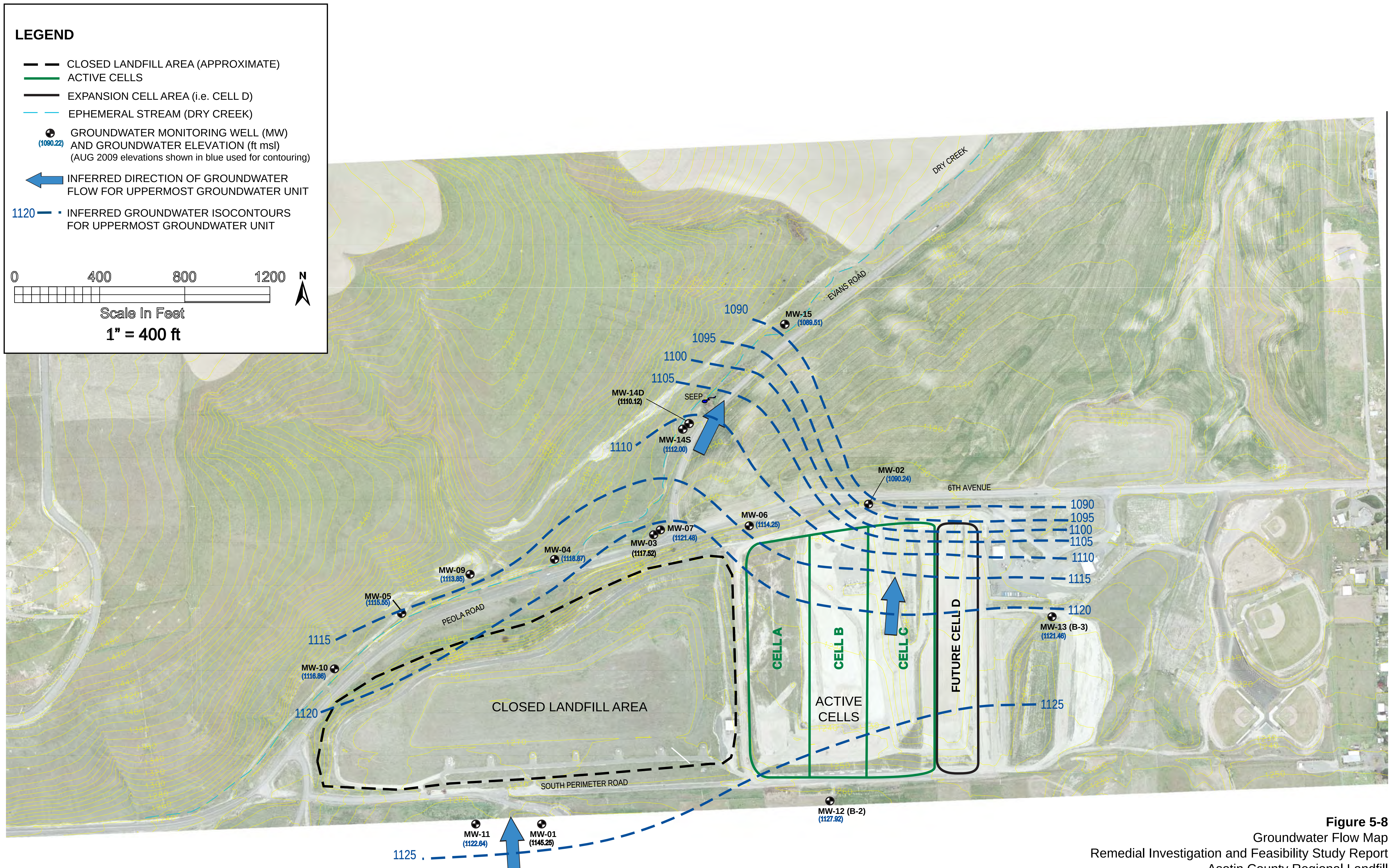


Figure 5-8
Groundwater Flow Map
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

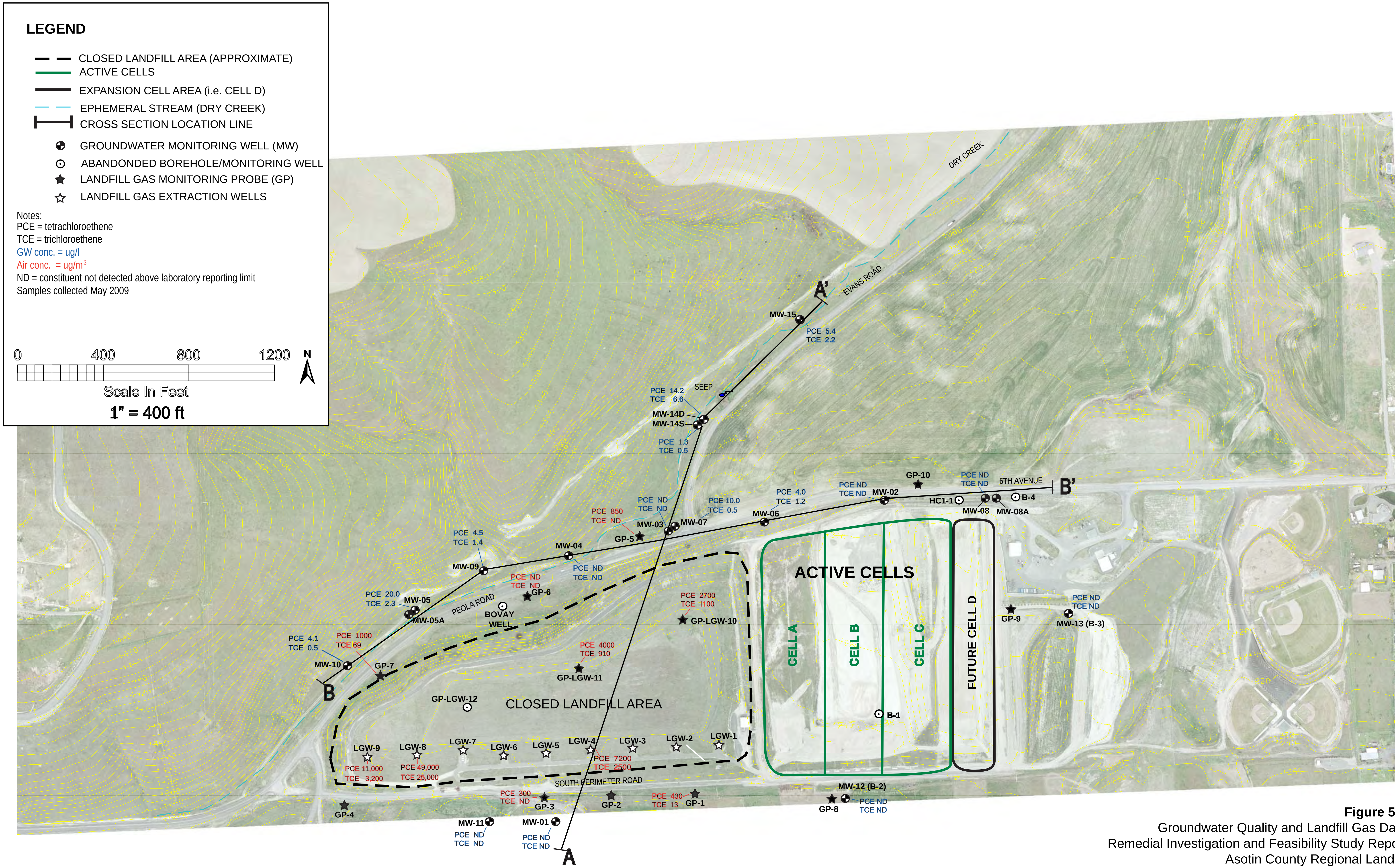


Figure 5-9
Groundwater Quality and Landfill Gas Data
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

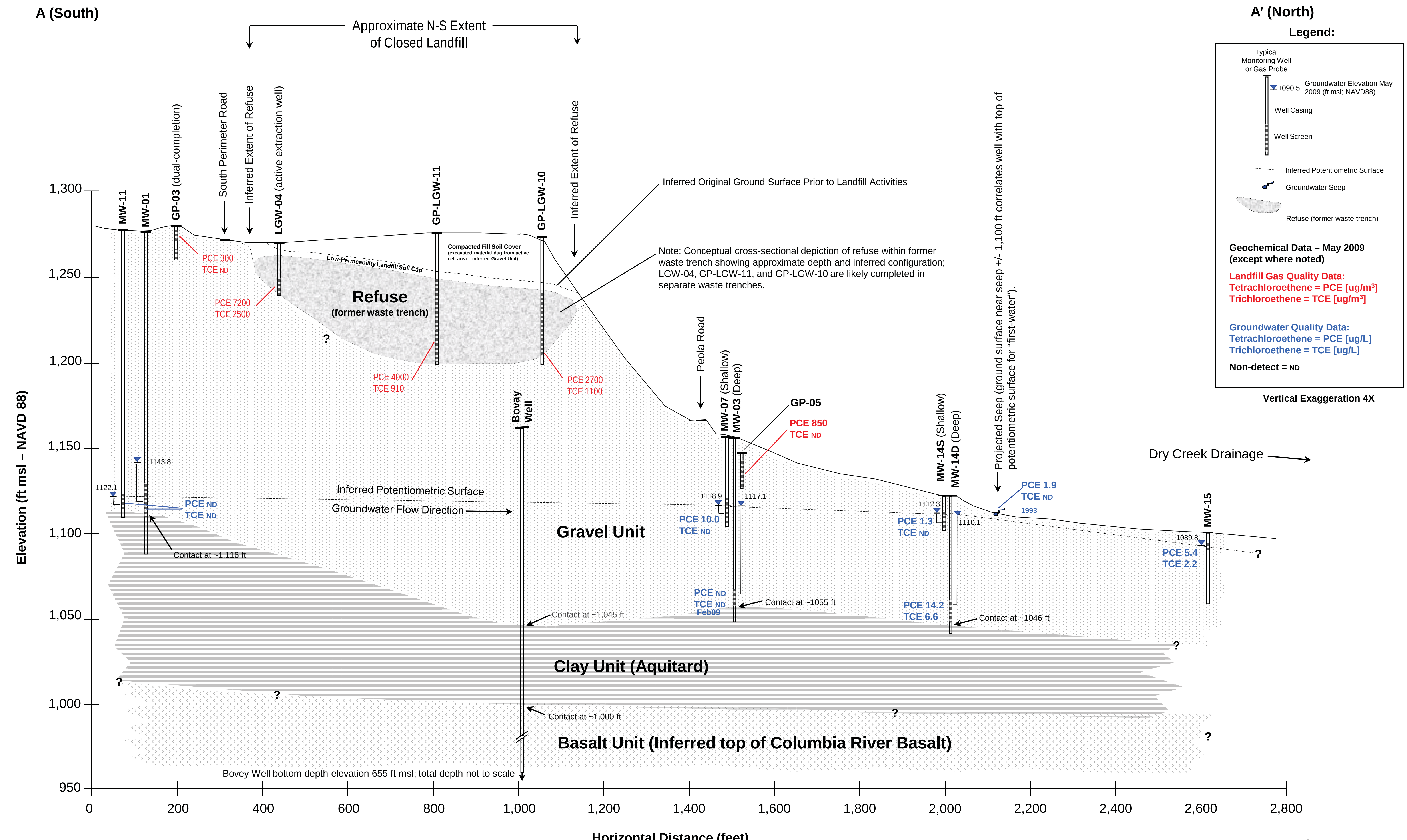


Figure 5-10
Groundwater and Landfill Gas Analytical Results
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

NOTE:
Reference Figure 5.2 for section location; reference Figure 5.3 for description of hydrostratigraphic units.

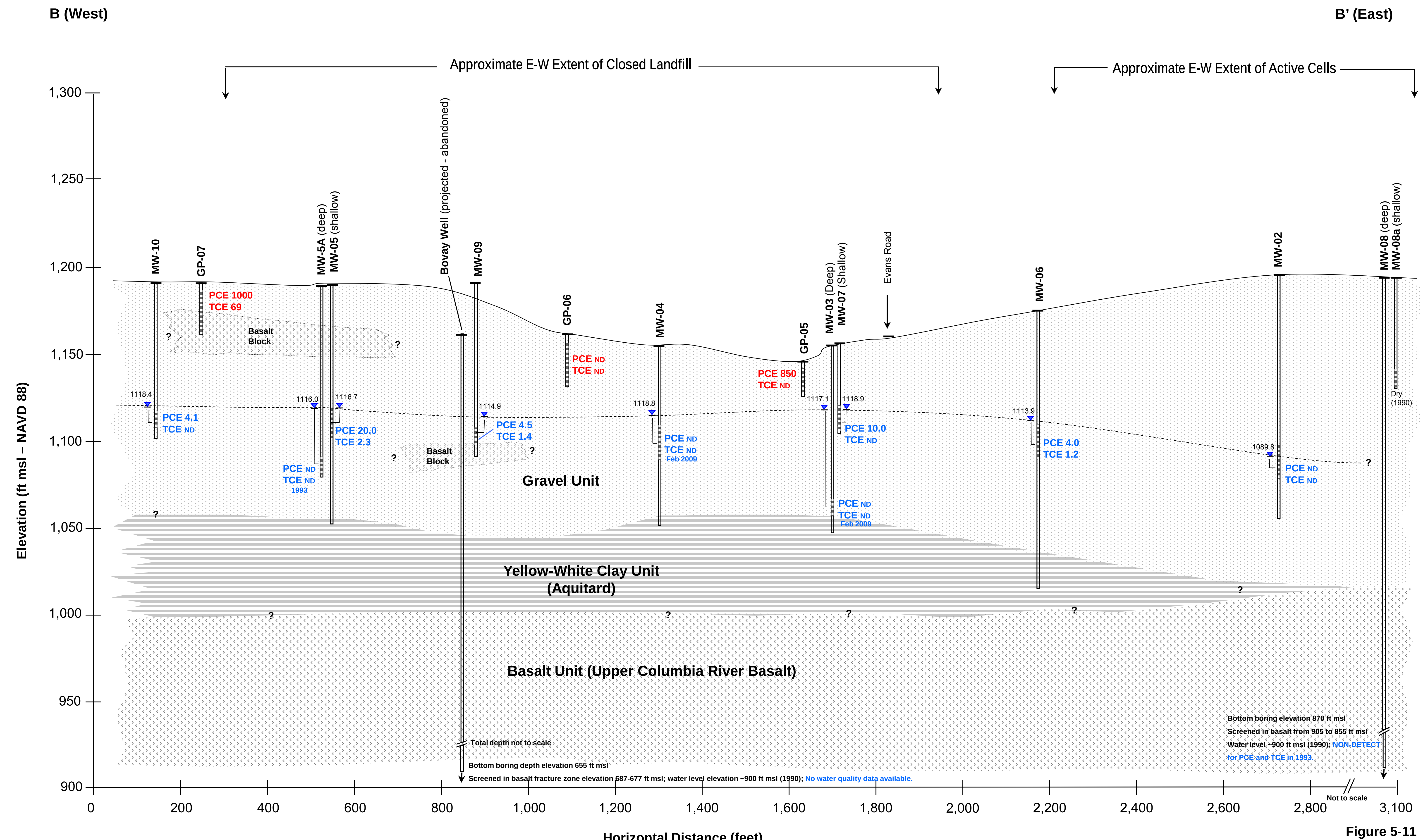
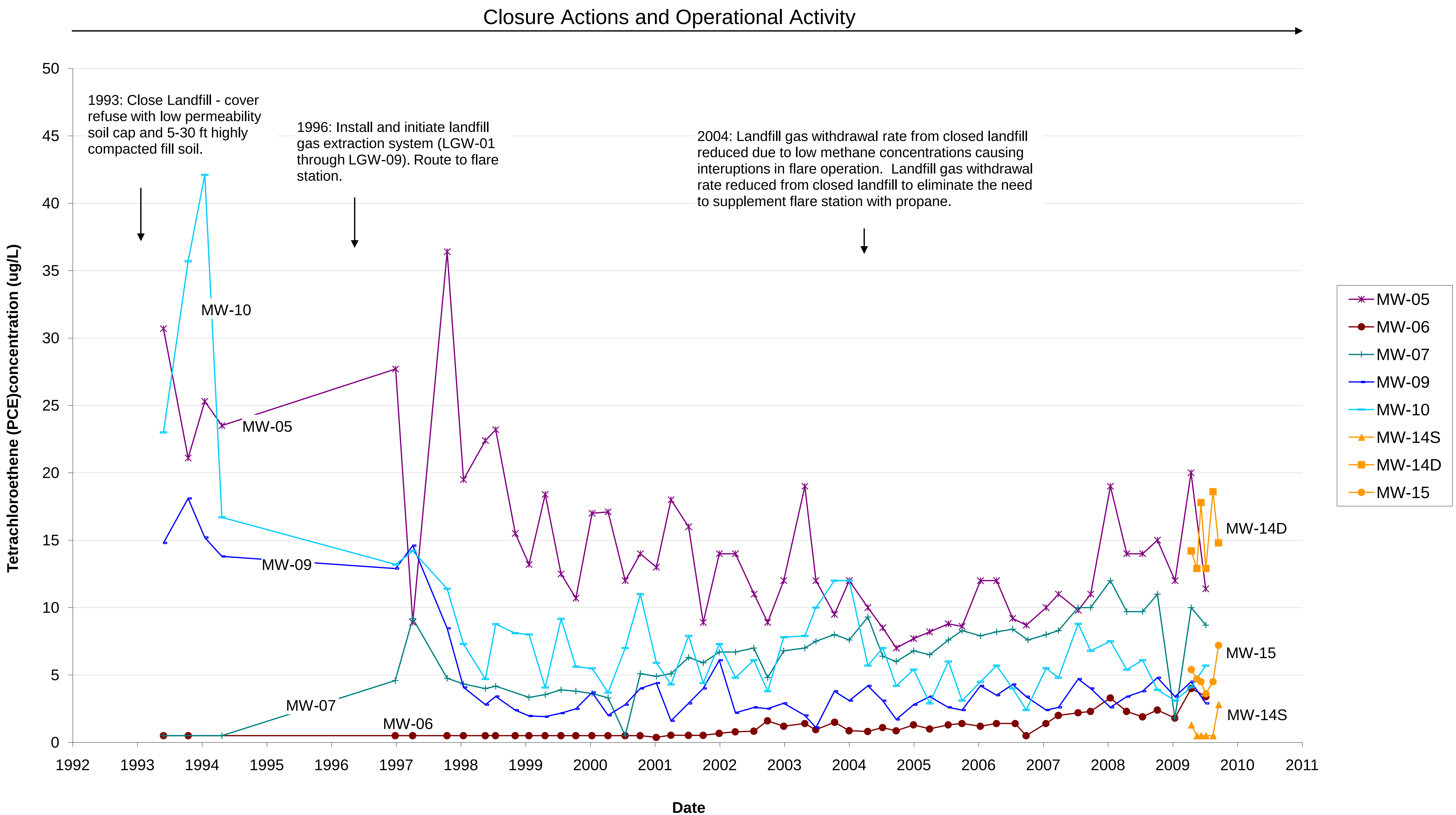


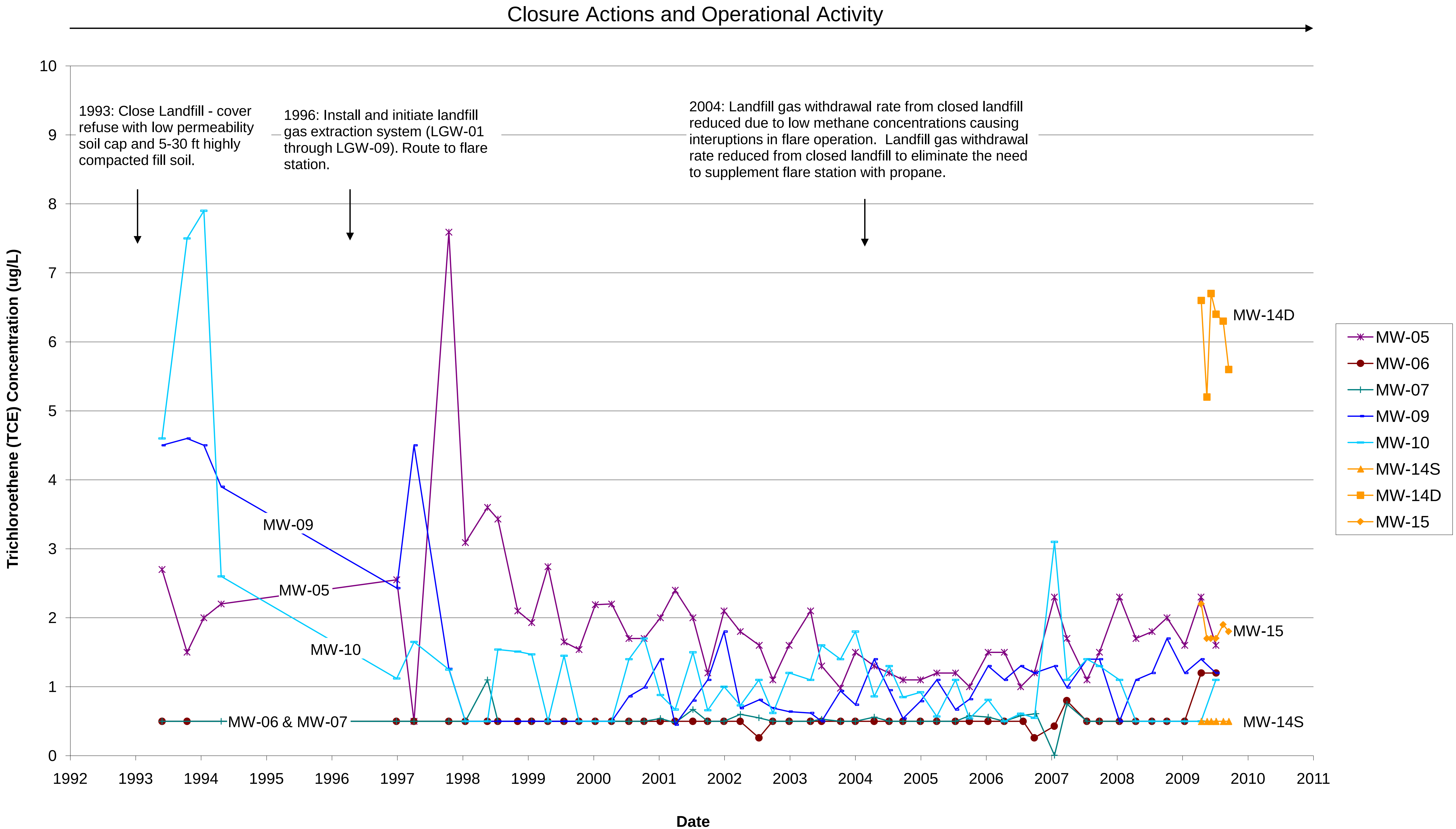
Figure 5-11
Groundwater and Landfill Gas COC's
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

NOTE:
Reference Figure 5.2 for section location; reference Figure 5.3 for description of hydrostratigraphic units.
Analytical data represents May 2009 data except where noted.



Notes:
"U" values (non-detect) ploted as 1/2 the reporting limit
"J" values (detections below reporting limit) plotted as reported

Figure 5-12
Tetrachloroethene (PCE) Concentrations in Groundwater
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill



Notes:
"U" values (non-detect) ploted as 1/2 the reporting limit
"J" values (detections below reporting limit) plotted as reported

Figure 5-13
Trichloroethene (TCE) Concentrations in Groundwater
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

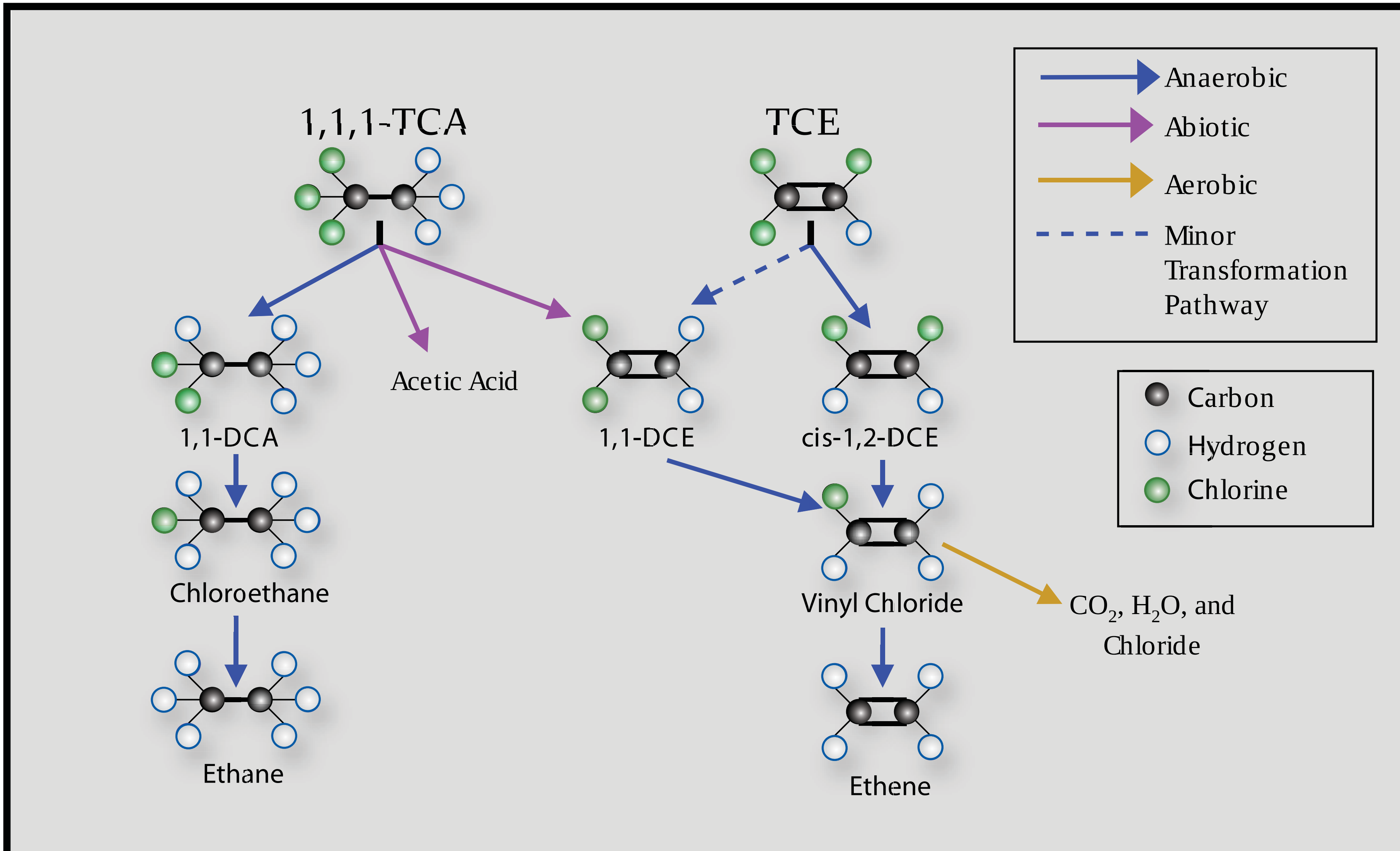


Figure 5-14
Degradation Process of PCE and TCE
Remedial Investigation and Feasibility Study Report
Asotin County Regional Landfill

SOURCE: Honeywell