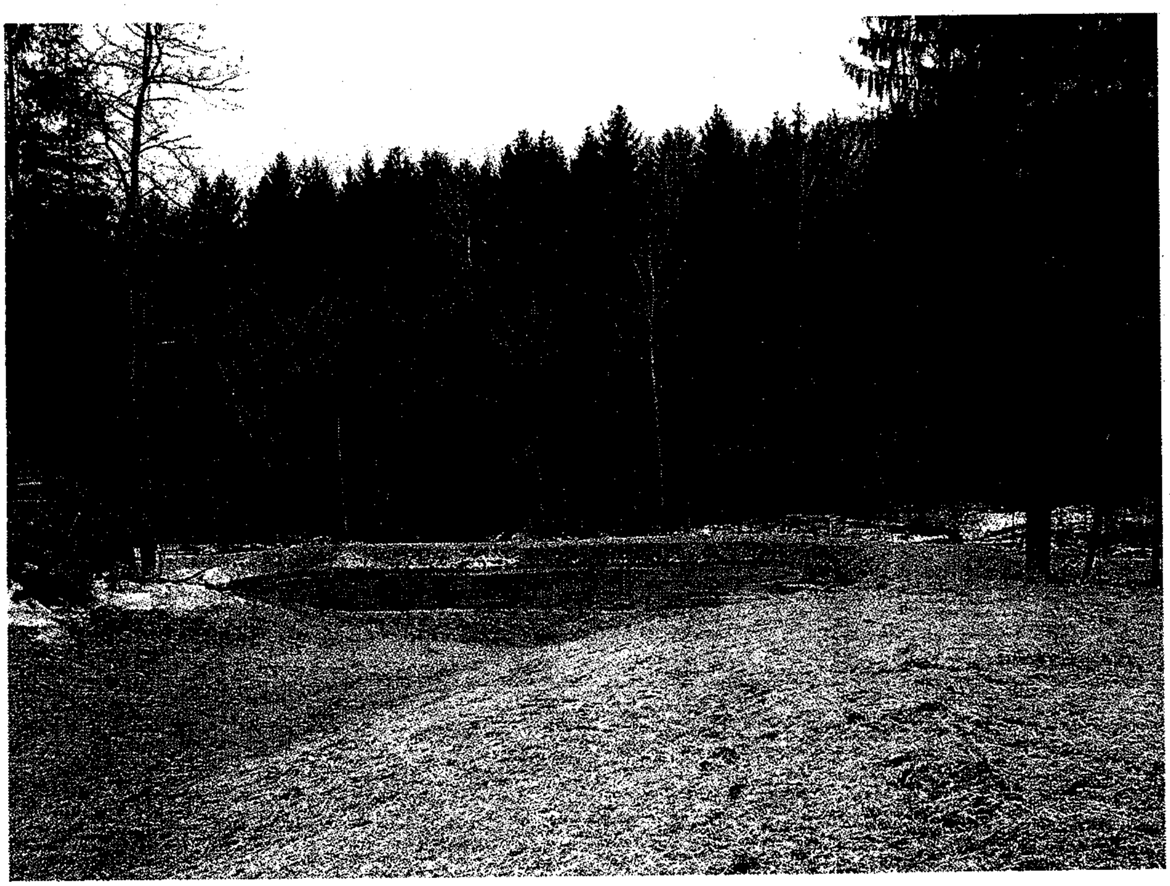
Montour Run Watershed Association
Pittsburgh, Pennsylvania

Clinton Road Site AMD Passive Treatment System Construction Report

July 2006



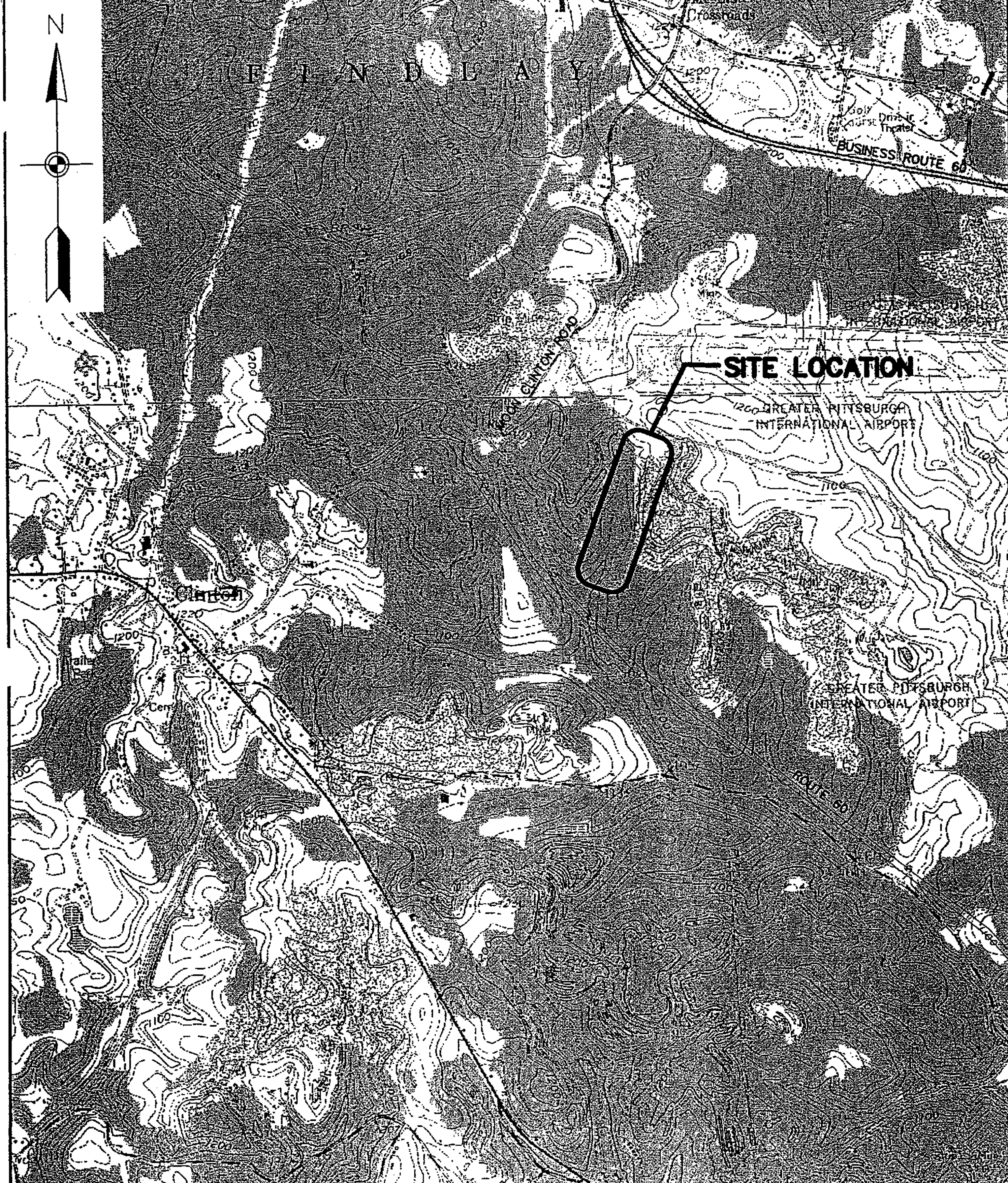
Montour Run Watershed Association
Clinton Road Site – Construction Report
AMD Passive Treatment System

Section 1
Project Description

This report describes the construction activities related to the installation of the acid mine drainage (AMD) remediation system on the Pittsburgh International Airport (PIA) property near Old Clinton Road and new Route 60 that has been designated the "Clinton Road Site." The AMD discharge at this site is characterized by relatively high acidity and dissolved metals, specifically aluminum.

The site is located on an isolated portion of the PIA property adjacent to a small, unnamed contributory valley to an unnamed stream to Enlow Run (see Topo location figure). The valley has been impacted by surface and underground mining activities, and much of the area either has not been reclaimed or has been graded for other purposes by the Allegheny County Airport Authority. The objective of the project was to improve the water quality discharging into a low area of the valley depression characterized by mine seeps and degraded wetlands. A passive, flow-through treatment system was constructed to reduce the amount of aluminum and provide some neutralization of the acidity in the mine discharges. The total flow into the valley area consists of several relatively small mine seeps and a more significant upwelling flow through partially regraded mine spoil.

The remediation system consists of two vertical flow ponds (VFPs) that have been designed to handle the average flow of the two main discharges. These vertical flow ponds are basically lime- and mulch-filled depressions that will neutralize the acidity and precipitate dissolved aluminum. The base flow/average dry weather flow portion of the AMD is conveyed into the VFPs through diversion structures and distributed throughout the VFPs via a piping network in the lime and mulch. The systems are designed to provide enough retention time for partial neutralization and enough pH adjustment to cause sufficient aluminum to precipitate out. Ultimately the flow is returned to the degraded wetland area where continued improvement will be achieved by the biological activity of the lowland vegetation. No formal wetland creation was included in this project. However, the existing degraded wetland areas, are utilized in the treatment process. Further down slope from the project area are two established wetland areas that are also beneficially utilized because of their position downstream of the treatment system.



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NA WATERSYSTEMS

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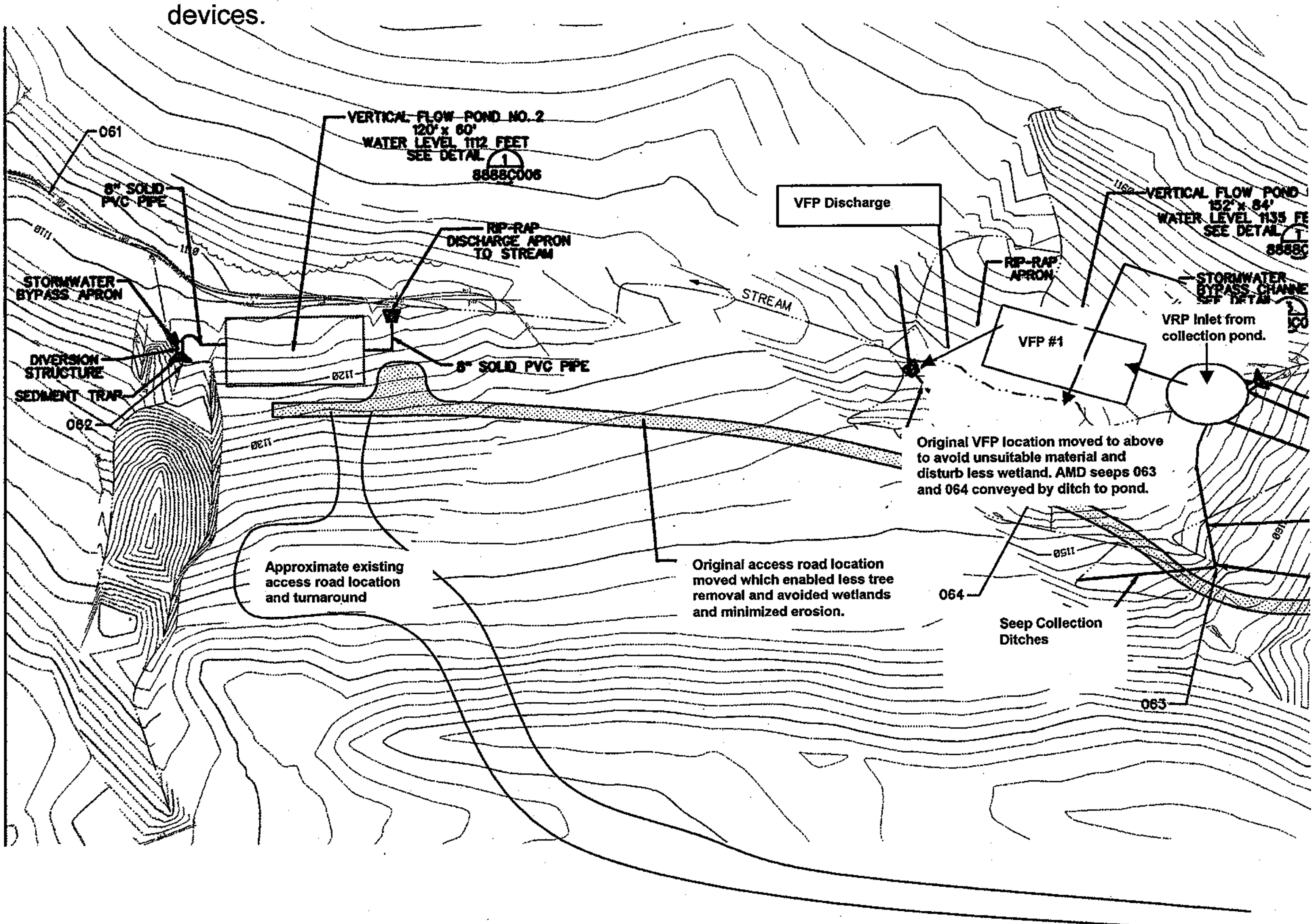
LOCATION MAP
CLINTON, PA
USGS GUADRANGLE
7.5 MINUTE SERIES
(TOPOGRAPHIC)

A series of drawings are included in the text of this document which show the construction details of the diversion structures and VFPs. Construction of the system followed the original design virtually throughout the project and the modification and exception are noted in this document. The VFPs are designed for neutralization of the median range of flows monitored at the site over the last several years by various entities. The original design flow for the upper VFP was 50 gallons per minute (gpm), and the lower VFP was designed for 20 gpm. Subsequent flow measurements resulted in a lower average flow. Therefore, the design basis for the upper VFP was revised to between 15 and 35 gpm. Stormwater diversion structures will be used to divert flow directly to the stream when flow amounts are exceeded. Diversion channels have been included to handle excess flow and prevent erosion as water moves past the VFP collection devices.



VFP LOCATION DRAWING TAKEN FROM DESIGN DRAWING SHOWING THE GENERAL AS-CONSTRUCTED CONFIGURATION OF VFP #1 AND VFP#2 WITH THE MAJOR ASSOCIATED CONVEYANCE AND COLLECTION STRUCTURES (SEE DESIGN FOR ORIGINAL LAYOUT)

Section 2
Construction Sequence

The following information provides a brief outline of the construction tasks (and sequence) that were conducted to construct the Clinton Road AMD Passive Treatment System. These tasks include:

- Mobilization
- Install E&S controls
- Clear/Grub to allow site access
- Begin grading work
- Construct access road (segments as needed)
- Install the upstream diversion structure
- Construct stormwater bypass channel to isolate area for VFP No. 1
- Construct VFP No. 1
- Construct discharge riprap apron for VFP No. 1
- Install 8-inch perforated pipe to collect seeps (or equivalent collection/conveyance feature)
- Install downstream diversion structure
- Construct VFP No.2
- Install AMD conveyance channels associated with VFP No. 1 and VFP No. 2
- Remove diversions and allow VFP No. 1, retention pond, and VFP No. 2 to fill with AMD water
- Adjust diversion structures to design flow requirements
- Finalize remaining grading work
- Re-vegetate where directed
- Remove E&S controls
- Demobilize

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Section 3

Modification from Original Design

The following minor modifications were incorporated into the actual construction due to reduced flow considerations and to limit access disturbance:

1. Extent of disturbed area for access roads has been reduced due to right-of –way clearance by the gas company. Future consideration for more permanent road should consider adverse weather conditions. The Airport Authority has assisting in providing access roads to the VFP structures.

2. As a result of 1, there was not the need for as much filter fence since disturbed area, including tree removal, was significantly reduced.

3. Eliminated HDPE liner. Geosynthetic was used with native clay and other excavated material to provide sufficient liner material.

4. VFP#1 has been reduced in size to more accurately address more average flow considerations. It was shifted slightly to the northwest (other side of valley) to avoid encountering unsuitable material and due to access constraints. This has lessened the amount of impact to the existing wetlands and enabled the AMD seeps to be collected more easily.

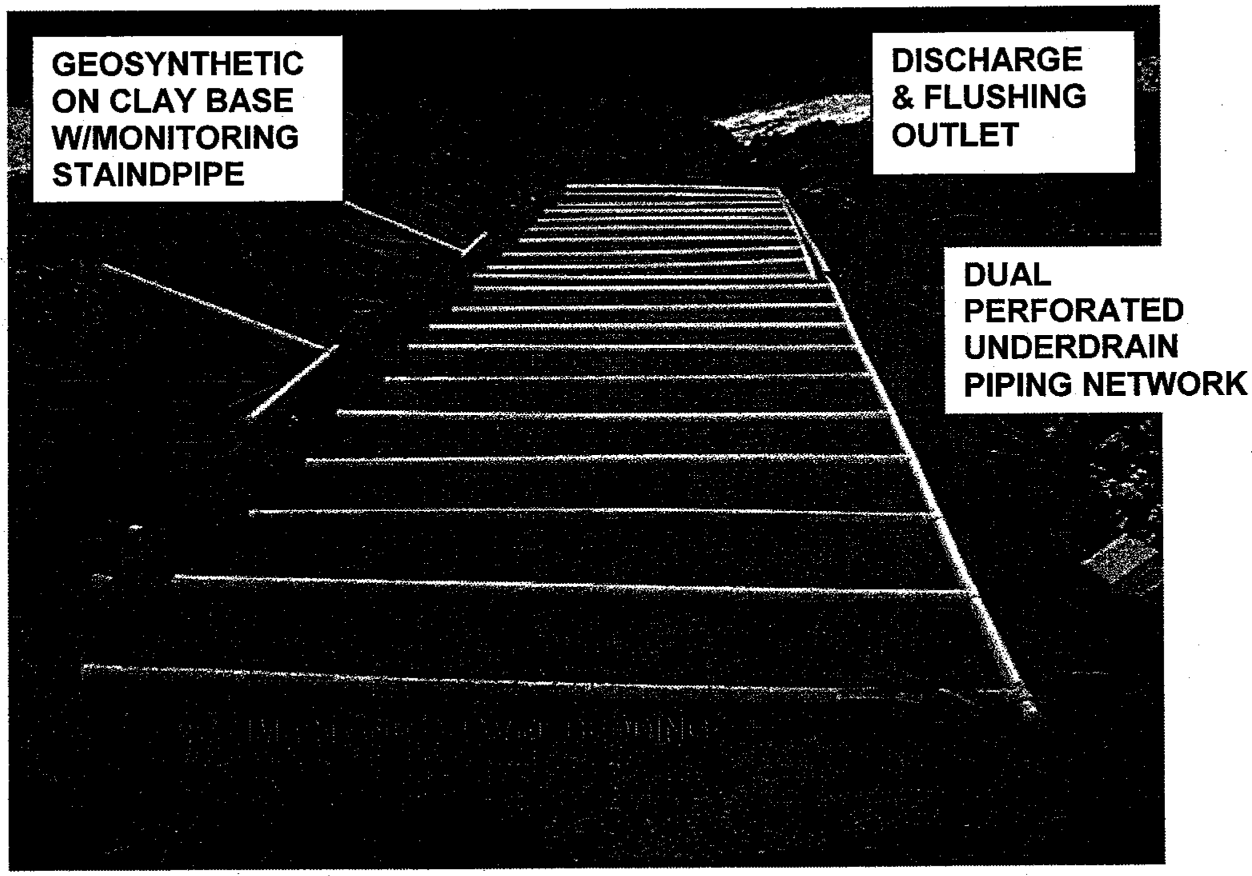
5. The auxiliary iron precipitation pond near VFP #1 was eliminated. In shifting the pond, the feature was deemed unnecessary. Most iron will precipitate in VFP or adjacent wetlands.

6. VFP#2 has been built to size specifications. The access road was configured to impact as minimal an area as possible given the room and material constraints across and around the gas line.

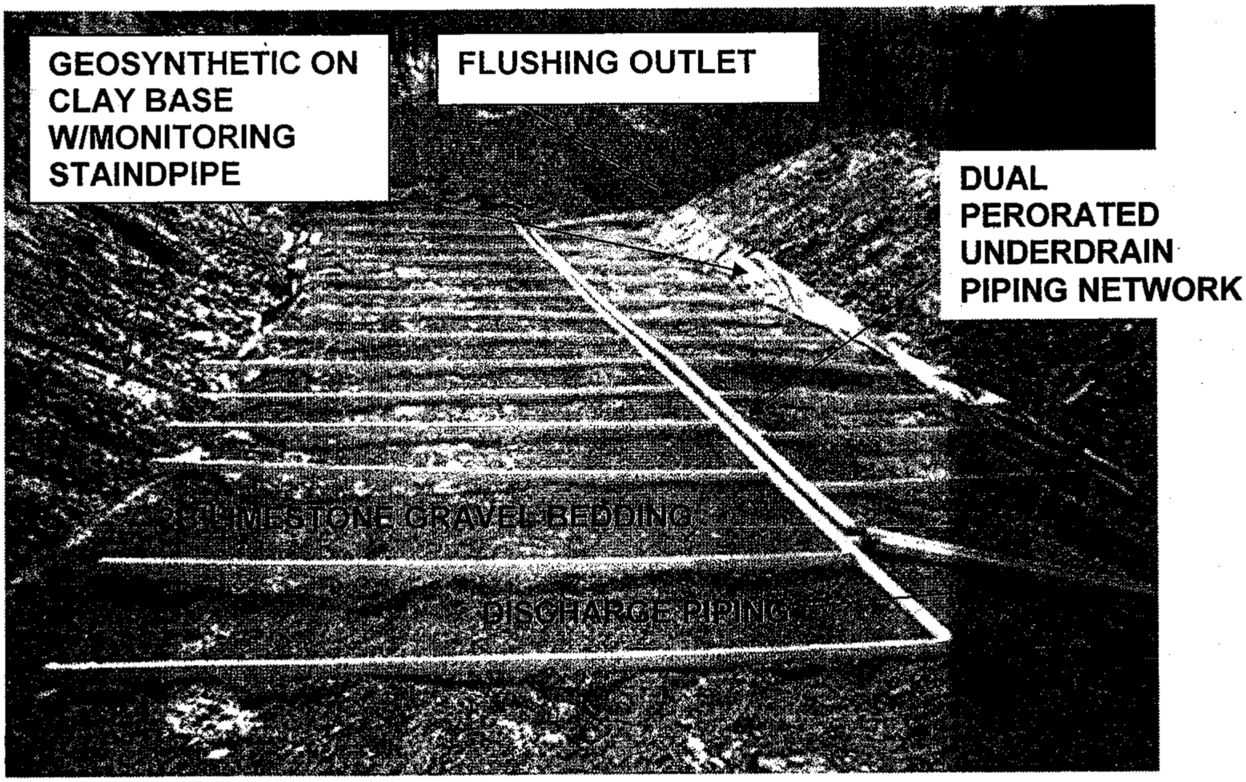
7. Flow control structures to VFPs were adjusted to the design flow as the ponds filled. Most of the flow was initially diverted to fill the VFPs and then scaled back to match the design flow.

8. The length and dimensions of the upstream stormwater diversion has been modified based on the adjusted configuration of VFP #1. The pre-existing watercourse has been used as much as possible for the storm water by-pass.

9. Final configurations of the PVC piping network at each VFP was based on size modifications and flow condition. At least 2 piping segments at each utilized at each VFP, see diagrams below.



VERTICAL FLOW POND #1 LOOKING DOWNSTREAM

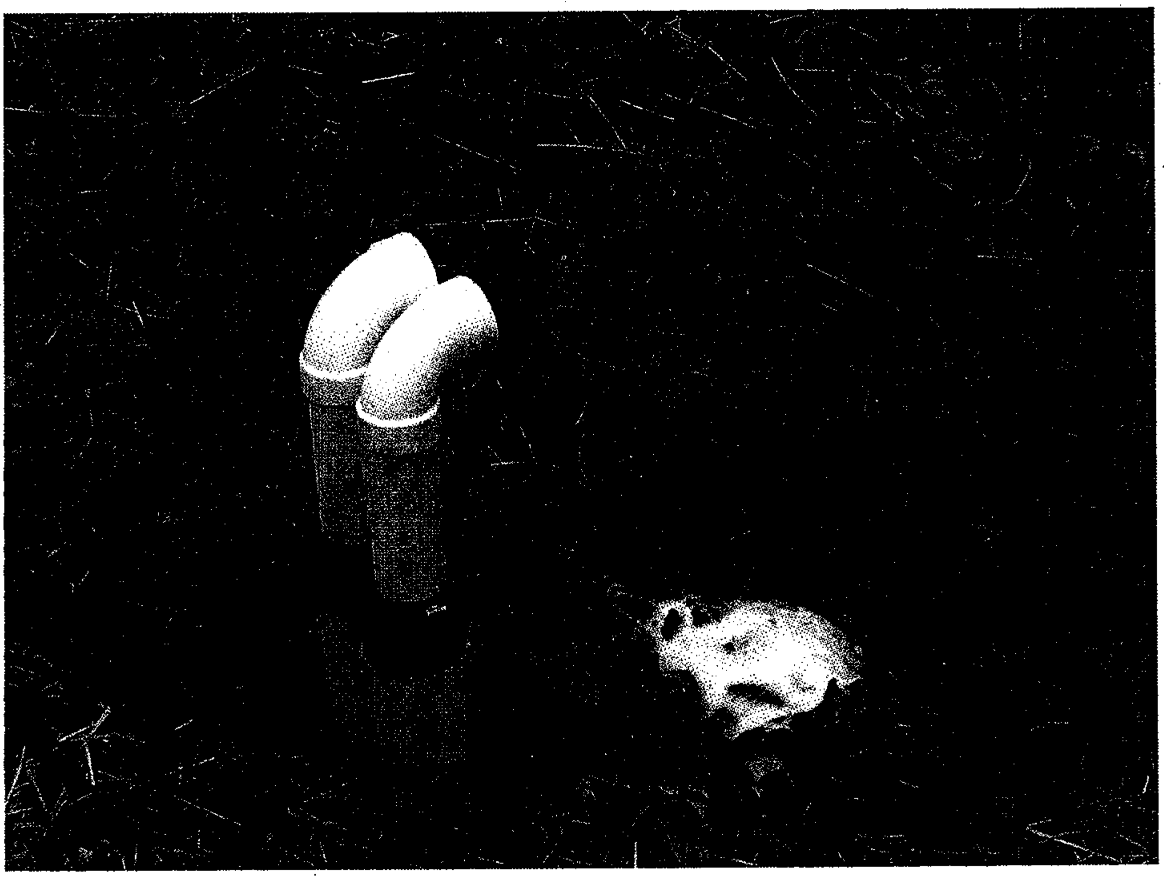


VERTICAL FLOW POND #2 LOOKING DOWNSTREAM

Once the piping networks had been completed, the vertical flow ponds were filled with #3 limestone to the appropriate depth. The limestone was covered with compost and wood chips and then the ponds were filled until the mulch was covered.

Mulch Covering Limestone in Both VFPs

The acid mine drainage seeps were conveyed through drainage channels to a small collection pond at the head of each VFP. A valved inlet pipe was used to convey flow to the VFPs and control the flow rate from the collection pond. The water level in the VFP was controlled by telescoping discharge pipes that enabled each of the underdrain piping networks to be monitored, see figure below:



Discharge Piping and VFP Water Level Control

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Section 4

Operation, Maintenance and Replacement

The ponds are designed to operate continuously at the design flow. Stormwater will by-pass the VPF intakes and be diverted around the structures. Periodic inspection of the ponds will consist of keeping obstructions from plugging the intake piping and valve at the collection ponds. When the quality of the discharge starts to show consistent degradation, the ponds can be flushed by opening the discharge valves (see figure) that are located at the toe of the downstream side of the ponds. There is flush valve for both piping segments of the underdrain network. The progression of precipitation of the metals within the pond can also monitored through the riser staindpipes which transverse along the slopes of the ponds. A piece of extension pipe with a coupling may have to be emplaced so that a bailer can be used at the monitoring pipes.

Flush Valves

Sizing of the ponds (neutralization/retention calibrations) was calculated on up to a 20 year life. However, it is projected that most of the metals precipitation will take place within the VFP itself. Other than periodic flushing, a significant retrofit should not be needed for at least 7-8 years. During periodic inspections, the integrity of the impoundments and the discharge pipes will be observed so that routine maintenance and repairs can be made if required.

Performance Results

The Army Corps of Engineers has requested that the performance of the remediation system will be monitored quarterly for the first 5 years. As of the preparation of this report, one round of data has been collected. Samples are collected from at least three sampling points. The monitoring network will include the main influent point for the system, designated 066, plus the upstream and downstream point on the receiving stream designated R-U and R-D, respectively. The locations of these point are include on the following figure.

The results of the initial round of sampling in comparison to the background sampling data is as follows:

	R-U	R-U	R-D	R-D	066
	10/11/2005	3/31/2006	10/11/2005	3/31/2006	3/31/2006
Flow	<5 gpm	25 gpm	30 gpm	95 gpm	65 gpm
pH	7.38	6.83	3.74	5.87	2.8
TSS	12	<2	27	22	<2
Sulfate	305	308	967	1010	826
T. Iron	2.3	1.97	58.5	0.7	5.3
Mn	2.4	0.57	19.4	10.1	3.2
T. Al	0.863	0.62	32.3	5.28	31.5
D. Al	NA	0.37	NA	<0.10	31.4
Acidity	BDL	<1	270	13.8	307
Alkalinity	137	90.3	BDL	9.7	<1

Notice the significant reduction in aluminum downstream receiving stream sample from the background data and from the main seep 066. There is even some alkalinity to the water which was a secondary objective of the project. Subsequent monitoring will determine the consistency of these results.

MRWA – Clinton Road AMD

Site Contours