

**HARMAR WATER AUTHORITY
ALLEGHENY COUNTY, PENNSYLVANIA**

**WATER TREATMENT PLANT BAG
FILTER FOR RESIDUAL HANDLING**

**GROWING GREENER INNOVATIVE
TECHNOLOGY GRANT**

FINAL REPORT

SEPTEMBER 2003

GANNETT FLEMING, INC.



PITTSBURGH, PENNSYLVANIA

I. PROJECT SUMMARY/OVERVIEW

The project consisted of the installation of a masonry building addition, vault, and bag filtration system at the Harmar Water Authority's Water Treatment Plant.

II. WATER CHARACTERISTICS AND FLOWS

The Authority's water system is supplied by raw water from three wells located in the Acmetonia area of Harmar Township, off of Coach Alley. The raw water is treated with ozone in a contact chamber, and then filtered through a 2 GPM/SF traveling bridge filter prior to entering the clearwell. The finished water is chlorinated and pH balanced prior to being pumped into the distribution system. The plant's rated capacity is 0.936 MGD. The treatment plant was constructed in 1991. Exhibit I shows the flow diagram of the plant. Exhibit II is the site plan, which shows the location of the bag filtration system. The water treatment plant 2002 average daily flow was 0.51 MGD. The treatment plant serves approximately 950 residential, 45 commercial, 21 public and 13 industrial connections.

III. SITE DESCRIPTION

The Authority has an industrial waste pre-treatment and wastewater discharge permit with the Allegheny Valley Joint Sewage Authority to discharge filter backwash water into the sanitary sewer. Harmar Township, who owns the collection sewers, has reported many of the sewers had an accumulation of material in the area of the water treatment plant.

The distribution system consists of approximately 30 miles of water lines ranging in size from two (2) inches to twelve (12) inches in diameter and is subdivided into four pressure districts, the Acmetonia area, Harmarville area, Harmar Heights area and Guys Run Service area. Pressure reducing valves located between the Harmar Heights and Acmetonia areas allow water to be conveyed from these areas to the Harmarville area. Water is currently fed from the Harmarville system into the Guys Run service area through the Guys Run Booster Station, serving the Locust Hill tank. A pressure reducing valve is installed at the booster station to allow water from the Locust Hill tank to back feed the Harmarville area if necessary.

IV. INNOVATIVE TECHNOLOGY DESCRIPTION

As stated above, Harmar Township reported that the sewers in the area of the water treatment plant had an accumulation of material. The Township and Authority investigated the deposits located in the sewers. The Authority proposed to filter their backwash water discharging into the sanitary sewer to eliminate the possibility that the backwash was depositing sediment in the sewers. Several alternatives were investigated for installing dewatering equipment. Based on size limitations on site and the cost to install dewatering equipment, the Authority chose to try a new innovative technology, the bag filtration system.

The bag filtration system installed is a Roediger Sludge Bagging System. The system consists of a sludge distribution and bagging device, bag-handling dolly, automatic control panel, sludge feed pump, and emulsion polymer preparation and feed system. Please refer to Exhibit III for a Machine view and Exhibit IV for a photograph of the unit.

The system is designed to dewater sludge. According to the manufacturer, the system is capable of processing 6 to 8 pounds of dry solids per day and produce a bagged sludge containing approximately 11% to 12% solids. The filter bags have a capacity of approximately 20 gallons. The bags when filled with sludge are tied and placed in the bag dolly and then stored onsite to dry before being disposed to a landfill. The removal of the solids from the backwash discharge eliminates the deposit of iron and manganese from the treatment plant from entering into the sewers. This in turns eliminates the reduction in capacity of the sewers and potential surcharges of raw sewage. The environmental benefit of removing the material from the filter backwash is the elimination of sewers surcharging and raw sewage entering the soils, groundwater, and surface water.

V. OPERATIONAL CONDITIONS FOR INNOVATIVE TECHNOLOGY

The bag filtration system is designed to dewater sludge with an average infeed of 0.23% dry solids (backwash and polymer). The polymer preparation system has an adjustable polymer pump capable of metering up to 8 gallons per hour of concentrated polymer solution. The resulting bagged sludge contains approximately 11% to 12% solids. The bagger unit is a 6 bag dewatering unit. The bagging system has a sludge feed pump that is capable of pumping approximately 20 to 25 gpm at 22 PSI. Each of the 6 sludge bag connections is 10" in diameter and is attached to the bottom side of the sludge distribution box. Each sludge bag connection has a quick-opening clasp to secure the sludge dewatering bag in place. The sludge dewatering bags (filter bags) each have a capacity of 22 gallons. When filled, the bag is closed with a bag tie and placed in the bag cart. The bag dolly is a dual wheel dolly design with a foot operated forklift to permit

easy removal of the filled bags from the dewatering unit. The filled bag is then stored onsite for drying prior to be taken to a landfill.

The treatment plant personnel will routinely check the bag filtration system to ensure its proper operation.

VI. MONITORING AND SAMPLING PLAN FOR INNOVATION TECHNOLOGY PROCESS

The Township will monitor their collection system to see if any minerals are being deposited. The Authority personnel will routinely check that the bag filtration system is operating properly and that sludge is accumulating in the filter bag.

VII. ANALYTICAL RESULTS

Sampling has not been done since observation is adequate to determine if the system is working.

VIII. COST OF TECHNOLOGY

The expenditures associated with the project and reimbursed by grant funds are as follows:

<u>Category</u>	<u>Allocated Cost</u>
Contractural	\$9,556.44
Construction	<u>\$84,443.56</u>
Total	\$94,000.00

No additional labor will be required at the existing treatment plant. Existing plant personnel will operate and maintain the system. The cost for electricity, polymer, and waste disposal is minor.

IX. CONCLUSIONS

The bag filtration system is a cost effective option to dewater filter backwash. Based on size limitations and funds available, this alternative was the best route to take for the Authority. The sludge is contained within the system and is discharged directly to a filter bag, which is a benefit to the community.

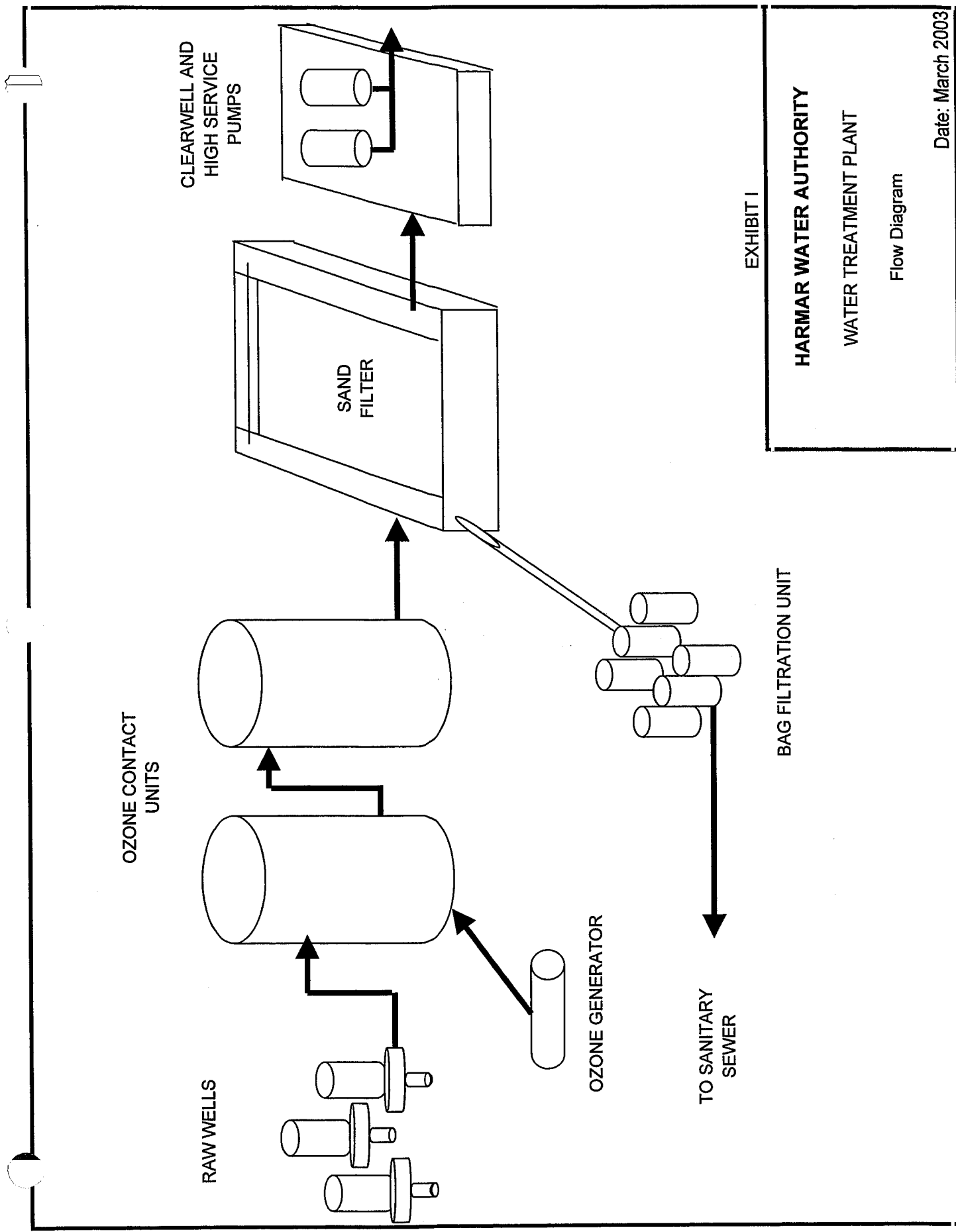


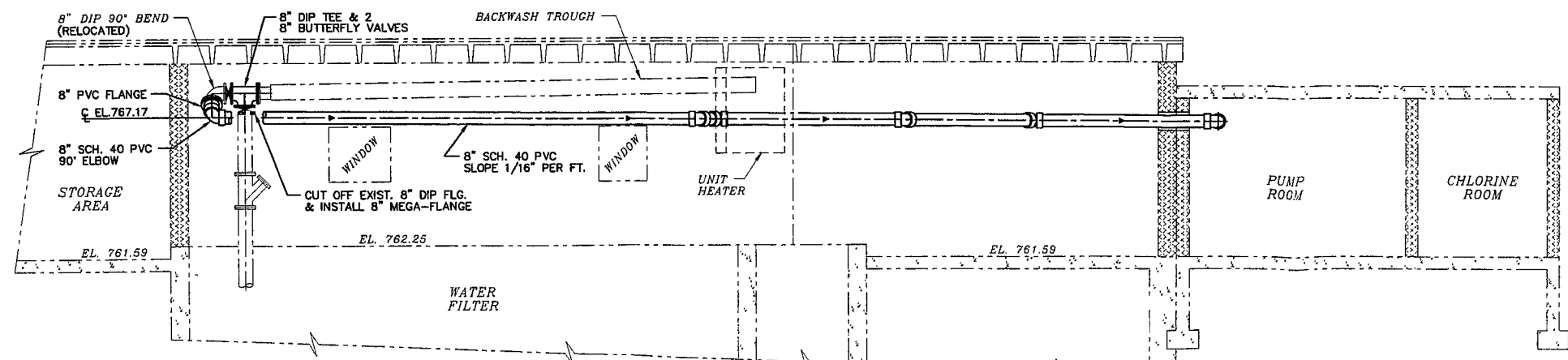
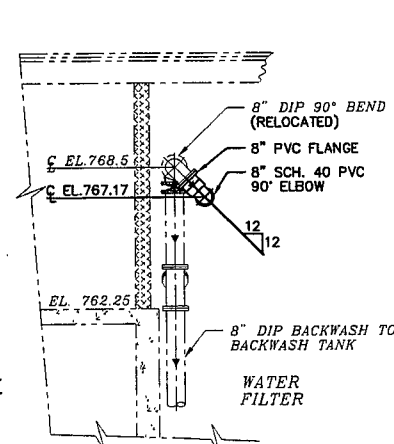
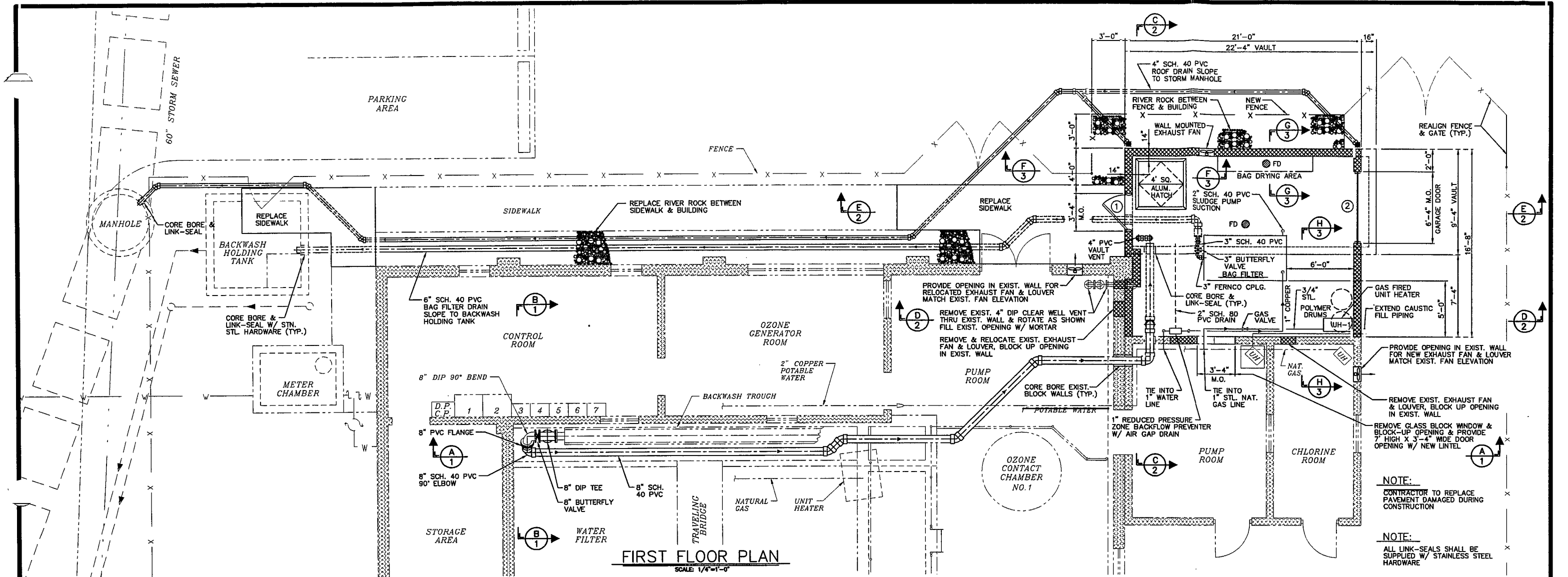
EXHIBIT I

HARMAR WATER AUTHORITY

WATER TREATMENT PLANT

Flow Diagram

Date: March 2003



ONE-CALL SYSTEM TELEPHONE
 NUMBER: 1-800-242-1776
 PROJECT ONE-CALL SERIAL
 NUMBER: 3250694

SECTION B-1
 SCALE: 1/4"=1'-0"

SECTION A-A
 SCALE: 1/4"=1'-0"

LEGEND
 - - - - - EXISTING
 ———— PROPOSED

Exhibit II

DESIGNED RSD			CADD RSD			SCALE AS SHOWN			 Gannett Fleming PITTSBURGH, PENNSYLVANIA	MUNICIPAL AUTHORITY OF THE TOWNSHIP OF HARMAR ALLEGHENY COUNTY, PENNSYLVANIA		PROPOSED BAG FILTER INSTALLATION		JOB NO. 39362	SHEET NO. 1
CHECKED TLT			APPROVED JLS			APPROVED DJG				HARMAR WATER TREATMENT PLANT		PLAN AND SECTION		DATE NOVEMBER 2002	
REVISIONS No. DESCRIPTION DATE BY															

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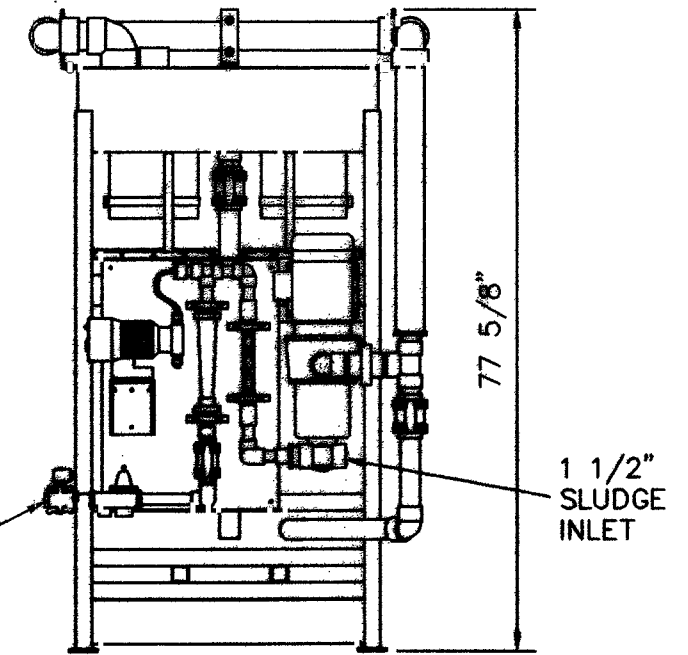
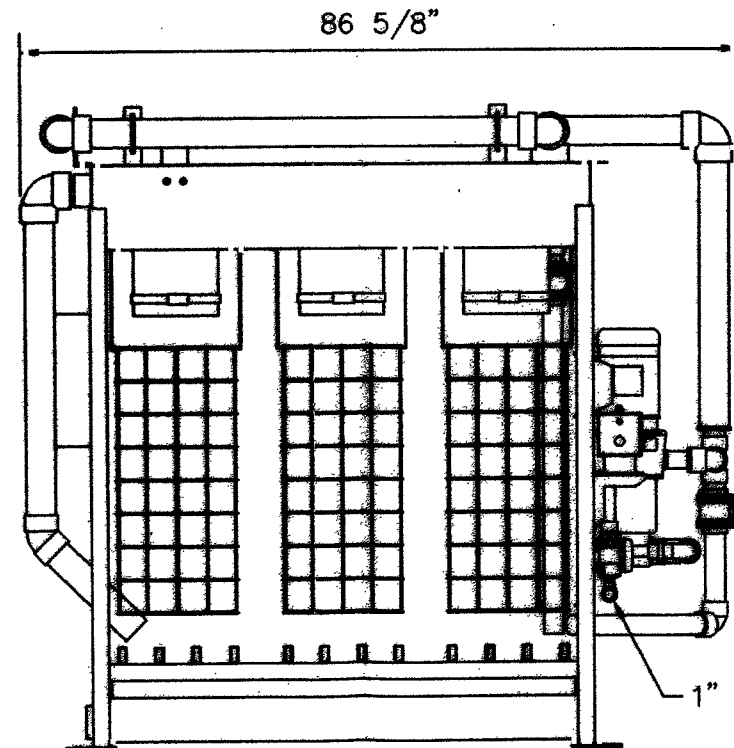
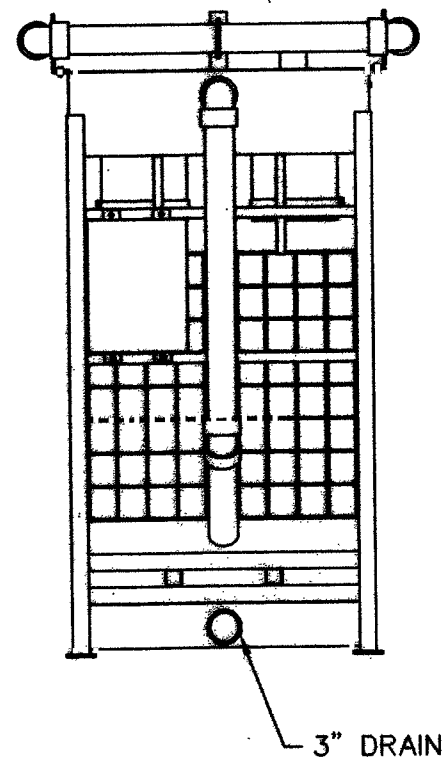
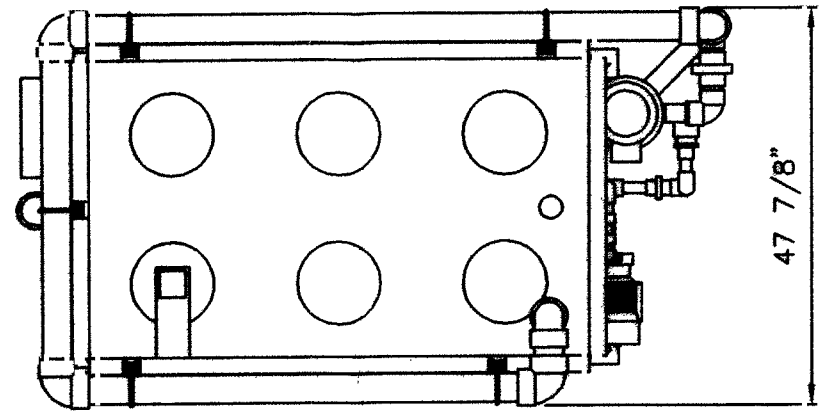



Exhibit III

This drawing and all information thereon are the property of Roediger Pittsburgh, Inc. This drawing is confidential and must not be made public or copied without prior written authorization from Roediger Pittsburgh, Inc. and is subject to return upon demand. No use of this drawing or any information or designs thereon is permitted except as is specifically authorized in writing by Roediger Pittsburgh, Inc. Acceptance of possession of this drawing constitutes full agreement with the above conditions.

PROJECT _____		 Roediger Pittsburgh, Inc. Equipment for Wastewater Treatment	
EQUIPMENT ROEBAG - 6 BAG UNIT			
TITLE MACHINE VIEWS		DWG. NO. _____	
SCALE 1/2" = 1'-0"	JOB NO. _____	REV _____	
drwn TMP	111298	chkd _____	0
rvsd _____	appd _____	F.D. _____	
Roediger Pittsburgh, Inc.		Allison Park, Pennsylvania USA	

Harmar Water Authority
Bag Filtration Unit

Exhibit IV

