EXHIBIT P7

VALLEY FORGE SEWER AUTHORITY
ACT 537 PLAN DOCUMENTS

Valley Forge Sewer Authority

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Environmental Protection by Caring Professionals

MUNICIPALITIES

Charlestown
Easttown
East Pikeland
East Whiteland
Malvern
Schuylkill
Tredyffrin
Willistown

TRANSMITTAL

TO: Mr. Kevin Kuhn, Board Chairman, Charlestown Township
Ms. Kimberly Moretti, Manager, East Pikeland Township
Mr. Gene Williams, Manager, Easttown Township
Ms. Terry Woodman, East Whiteland Township
Ms. Sandra Kelley, Manager, Borough of Malvern
Mr. Norman Vutz, Board Chairman, Schuylkill Township
Ms. Mimi Gleason, Manager, Tredyffrin Township
Mr. Hugh Murray, Manager, Willistown Township

FROM: Martin Goldberg

DATE: April 26, 2007

ENCLOSED HEREWITH ___X___ UNDER SEPARATE COVER_____ARE THE FOLLOWING:

One (1) disk copy of Valley Forge Sewer Authority Act 537 Sewage Facilities Plan Update in PDF Format. This includes agency comments and comment responses. There were no additional comments received during the public comment period.

Martin F. Goldberg, PE
Operations Manager

Regional Act 537 Plan

for

Valley Forge Sewer Authority

November 2006

BUCHART HORN, INC.

Gannett Fleming

Table of Contents

Executive Summary

Section 1 – Previous Planning

Section 2 – Physical and Demographic Analysis

Section 3 – Existing Sewage Facilities

Section 4 – Future Growth and Land Development

Section 5 – Alternatives for Proposed Wastewater Disposal Facilities

Section 6 – Evaluation of Alternatives

Section 7 – Institutional Evaluation

Section 8 – Justification for Selected Alternatives

Table of Contents

Appendices:

A. Valley Forge Sewer Authority Article of Incorporation

B. Member Municipality Report

C. Member Municipality Validation Report

D. Preliminary Effluent Criteria

E. Detailed Cost Breakdown of Alternatives

F. PNDI Correspondence

G. PHMC Correspondence

H. Member and Partner Municipality Flow Projections

I. Planning Agencies and Municipalities Correspondence

J. Proof of Public Notice and Comments

K. Member and Partner Municipality Plan Adoptions

Executive Summary

Table of Contents **Page No.**

A.	Plan Summary	E-1
B.	Sewage Treatment Plant Alternatives	E-3
C.	Implementation Schedule	E-4
D.	Resolutions of Adoption	E-5
E.	Comments from Planning Agencies and Municipalities	E-5
F.	Public Notice	E-5
G.	Resolution of Inconsistencies	E-5

Appendices:

H. Member and Partner Municipality Flow Projections

I. Planning Agencies and Municipalities Correspondence

J. Proof of Public Notice and Comments

K. Member and Partner Municipality Plan Adoptions

Figures:

None

Exhibits:

None

A. PLAN SUMMARY

This Regional Act 537 Plan presents the basis for establishing and implementing the long-term wastewater treatment needs for the areas served by the Valley Forge Authority (VFSA). The VFSA is comprised of the Townships of Schuylkill, East Pikeland and Charlestown and provides wastewater treatment services to Easttown, East Whiteland, Tredyffrin and Willistown Townships and Malvern Borough. Herein, this group of eight (8) Municipalities is referred to as the Service Area Municipalities. The Pennsylvania Department of Environmental Protection (PADEP) approved a two-part process whereby the individual municipalities would assess service area needs and determine wastewater flow projections. Once approved by the municipalities and the PADEP, this information would be used by the VFSA to perform an alternative analysis and select an alternative for serving the long-term needs of the communities in their service area. The goal of the process was to best meet the needs of the communities while addressing the PADEP rules and regulations along with local issues. The VFSA has been actively addressing the many and varied issues of this process since the mid 1990's.

In 1993 the VFSA determined that wet weather flows revealed a potential hydraulic overload of the plant by 1995. The PADEP required the VFSA to adopt a management plan to "ration" EDUs to the municipalities. The PADEP also required the initiation of the regional planning process to address the future wastewater treatment needs of the VFSA service area.

The preparation of the Regional Plan began in 1994. The VFSA retained a consultant to compile the information prepared by the communities and address the long term conveyance and treatment needs of the region. Sections 1 through 3 of this Plan were based on information that originally was prepared in 1993 and earlier by Gannett Fleming, Inc. Due to the nature of the regional planning process, it has taken to the year 2006 to complete the process, which is elaborated in Section 5 authored by the VFSA staff and their engineer of record, Buchart Horn, Inc. (B-H). Obviously population projections made in 1993 are now actual numbers and differ, some less some more, from the original projections. In order to keep this plan as current as possible, the sections dealing with wastewater flows and loadings have utilized up-to-date flow projection information from the individual municipalities which can be seen in Table 4-8 and

Appendix H. Sections 5 through 8 reflect those numbers. The PADEP recognizes the issues associated with having to redo the first portion of the Plan and has indicated that as long as the flow projection data is as current as possible, no revision to the first four (4) sections is required. For clarity, minor updates have been interjected into the first three (3) sections, and Section 4 has been updated based on the latest growth estimates in each community served. In these instances, dates of pertinent data are included so that the update is apparent.

Associated Planning

Wastewater from portions or all of Charlestown, Easttown, East Whiteland, Tredyffrin, and Willistown Townships and Malvern Borough is transported through the Valley Creek Trunk Sewer (VCTS), which is owned and operated by Tredyffrin Township, to the VFSA wastewater treatment plant. Tredyffrin Township is conducting Act 537 planning for the VCTS and the Wilson Road Pumping Station, which is a critical component of the VCTS, to determine if the conveyance facilities have adequate capacity to convey the projected wastewater flows to the VFSA wastewater treatment plant.

With the exception of the Wilson Road Pumping Station, the VCTS has adequate capacity to convey the projected wastewater flows for the next five years. The capacity of the Wilson Road Pumping Station, however, will need to be expanded within the next 5 or 6 years. Act 537 planning for the Wilson Road Pumping Station and VCTS is nearing completion and is expected to be approved in March 2007.

Various alternatives were considered for increasing the capacity of the Wilson Road Pumping Station, including installing larger pump impellers, installing larger pump impellers and motors, installing a fourth pump and motor, peak flow storage and off-peak pumping of excess flows, locating and removing excessive infiltration/inflow, and no action. The recommended alternative is to install larger pump impellers and motors. The changes will increase pumping station capacity to 20.16 mgd (peak flow rate), which will be sufficient to meet the wastewater conveyance needs of the municipalities through the year 2025. The increased pumping station capacity matches the current capacity of the Wilson Road Pumping Station force main.

B. Sewage Treatment Plant Expansion Alternatives

Three (3) main alternatives and nine (9) subalternatives were identified as viable options or interim options to satisfy the wastewater management needs established by the Service Area Municipalities. The following alternatives were considered for treatment and discharge of a portion or all on the additional projected wastewater flow from the VFSA member municipalities.

1. Divert flow to other existing treatment facilities.

1A. Divert French Creek Pump Station discharge to Phoenixville.

1B. Divert Pickering Creek Pump Station discharge to Phoenixville.

2. Construct satellite wastewater treatment facilities.

2A. Locate a satellite plant at Cromby and divert French Creek Pump Station discharge.

2B. Locate a satellite plant at French Creek Pump Station and divert effluent to Cromby outfall.

3. Upgrade/expand the existing wastewater treatment facilities.

3A. Upgrade existing plant with step feed, primary chemical feed and UV disinfection.

3B. Same as alternative 3A but add a 4th final clarifier.

3C. Same as alternative 3E but add a 3rd primary clarifier.

3D. Innovative alternatives

3E. Same as alternative 3B but add a 3rd aeration tank.

These alternatives can be implemented individually or in combination to meet the wastewater treatment needs of the study area. Section 5 provides descriptions and preliminary analyses of each of the nine (9) subalternatives identified.

The selected alternative from Section 5 is 3E (Expand the existing wastewater treatment plant by upgrade it with complete mix, activated sludge, UV disinfection, adding a 3rd aeration tank, and a

4th final clarifier). A PADEP approved screening process of the alternatives was utilized for evaluation. The reasons for elimination of the other alternatives are presented in Section 5.

Cost of Implementation

Table 6-4 includes a present worth evaluation of the forward flow portions of the alternatives considered. Conceptual level capital costs based on 2006 dollars for upgrading capacity for treating forward flow, sludge processing, and plant improvements are $10.35 million, $3.62 million, and $6.91 million, respectively. Capital expenditures for expansion and improvements identified in this Plan will be shared by the Partners on a flow based cost allocation. The Partners will provide funds for the pending project from funds on hand or through loans or bond issues.

C. Project Implementation Schedule

Table E-1. Implementation Schedule

Date	Task
November 2006	VFSA Approval (November Board Meeting)
December 2006	Submit 537 Plan to Municipalities and County Planning Agencies and Health Department
February 2006	Public Advertisement of Plan
March 2007	Approval obtained from all Agencies
May 2007	VFSA Adopts
July 2007	Submit to PADEP
October 2007	PADEP approval
January 2008	Design Contract
December 2008	Complete Design
April 2008	Obtain Permits
August 2009	Award Contract
September 2009	Begin Construction
December 2010	Begin Operations

The VFSA is committed and has the organizational structure in place to implement this project. The individual municipalities have expressed their desire to finalize this planning document, adopt, and implement the selected alternatives.

D. Original, signed sealed Resolution of Adoption by Municipalities

The partner and member municipalities were provided the opportunity to review and adopt the recommendations of this Plan Update. Appendix K provides copies of each municipal Resolution of Plan Adoption.

E. Comments from the various planning agencies

The VFSA has submitted this plan and requested comments from the various municipal and county planning agencies. Correspondence documenting plan submission and responses are provided in Appendix I of this Plan Update.

F. Proof of Public Notice and results of 30 day written comment period

On XX/XX/XXXX the recommendations of this Plan Update are to be listed in The Phoenix. Proof of this publication, which also established a 30 day written public comment period is provided in Appendix J of this Plan Update. Any written comments received as a result of the publication of the Plan Update will be addressed and included in Appendix J.

G. Resolution of Inconsistencies

As documented in Section 6 of this report, the recommendations of this Plan Update are basically consistent with the environmental regulations associated with wastewater disposal and plan development.

Section 1

Previous Wastewater Planning

Table of Contents **Page No.**

A. Introduction and Planning Objectives 1-1

B. Summary of Existing Wastewater Planning 1-5

C. Summary of Municipal and County Planning 1-13

Appendices:

A. Valley Forge Sewer Authority Article of Incorporation

B. Member Municipality Report

C. Member Municipality Validation Report

Figures:

1-1. Public Sewered Areas, Chester County, PA

Exhibits:

None

A. Introduction and Planning Objectives

History

The Valley Forge Sewer Authority (VFSA) was organized in the late 1960s by the Townships of Schuylkill, East Pikeland, and Charlestown in Chester County, Pennsylvania for the purposes of acquiring, constructing, maintaining, owning or leasing sewer systems and sewage treatment works. On November 1, 1970 VFSA entered into an agreement to provide wastewater treatment services to the following municipalities in Eastern Chester County: Easttown Township, East Whiteland Township, Malvern Borough, Tredyffrin Township and Willistown Township (Valley Creek Trunk Sewer (VCTS) Municipalities). The VFSA and each VCTS Municipality has a specific reserved capacity at the Valley Forge Sewage Treatment Plant (STP), located in Schuylkill Township. The initial reserve capacities were established in the Valley Forge STP Agreement of 1970. The VCTS Municipalities and the municipalities comprising the VFSA are hereafter defined and referred to as the Service Area Municipalities.

The Valley Forge STP is the largest wastewater treatment plant in terms of treatment capacity in Chester County. The plant was constructed in 1977 to meet a projected design year (1985) capacity requirement of 8.0 million gallons per day (MGD). The construction of the treatment plant and collection and conveyance systems resulted in cleaning up the surface water and groundwater in the region by collecting domestic wastes from malfunctioning and failing on-lot sewage disposal systems. The wastewater facilities were designed to correct this situation first in the areas where the problems were most severe, and then to eliminate the existing and potential water quality problems in other areas within the Service Area Municipalities. These facilities were also intended to eliminate severe odors, which had been arising from saturated leach fields and cesspools. The construction of public sewers substantially mitigated these problems in the Service Area Municipalities.

Through the mid 1980s, the Valley Forge STP's average daily flows remained below its maximum treatment capacity. The original design flow was not realized in 1985 due to a general regional slow down in development in the early 1980's, but as development within the Service Area Municipalities increased during the later part of the 1980's, the VFSA recognized the importance of initiating a regional planning process to examine future wastewater needs.

The Regional Planning Process

In October 1987, a two-part regional planning process was developed and agreed upon by the Service Area Municipalities. In the first part of the planning process, the Service Area Municipalities were asked to prepare individual Act 537 Sewage Facilities Plans for the purpose of providing the VFSA and the Pennsylvania Department of Environmental Protection (PADEP) with information concerning development potential, proposed expansions to the service area boundaries, and other documentation related to the development of wastewater flow projections. The intent was to allow each individual Service Area Municipality to evaluate its development potential and determine its wastewater needs and priorities within the Act 537 framework. One of the VFSA's policies is that it will not, on its own, initiate extension of the service area boundaries; each municipality must initiate any service area revisions.

In the second part of the process, the information prepared by the Service Area Municipalities would be used by the VFSA to prepare a regional wastewater facilities plan which in turn, would be adopted by each Service Area Municipality. PADEP approved this two part plan in a letter dated May 31, 1988. The municipalities also approved this approach through a series of documents, copies of which are included in Appendix A. From 1987 to the present, each of the Service Area Municipalities prepared Act 537 plans, and they have either initiated the approval process within their own municipality, or have submitted plans to the PADEP for approval. The status of the Service Area Municipalities' plans at is summarized in Table 1-1.

Table 1-1. Status of Municipal Act 537 Plans Valley Forge Sewer Authority Partner Municipalities

Municipality	Plan Reviewed	Municipal Adoption	DEP Status	Comments
Charlestown Township	4/1989	6/05/1989	Approved 6/17/2002	Plan indicates that no additional capacity needed based on projected development until 1999.
Easttown Township	3/07/88, rev. to 9/92	7/06/1992 last approval	Approved 3/13/2000	Agreement with Tredyffrin for transmission of 1.484 MGD through Valley Creek Trunk Sewer (VCTS).
East Pikeland Township	8/26/1991	1/1991	Submitted 12/2/1991 – conditionally approved 12/9/1994	Plan does not clearly indicate how flow projections were estimated.
East Whiteland Township	8/12/91	No	Approved 11/27/2002	Township plans to obtain further capacity when VFSA increases treatment capacity at plant.
Malvern Township	11/1993	11/16/1993	Approved 5/12/1995	Borough plans to sell 85,000 gpd of its reserved capacity to Easttown Township.
Schuykill Township	10/1994	Yes	Approved 1996	DEP granted conditional approval in 1996 because of the incomplete regional plan.
Tredyffrin Township	5/1993	12/13/1993	Approved 12/12/1994	Township maintains agreements with Easttown, E. Whiteland, and Malvern for use of VCTS.
Willistown Township	7/03/1990 rev. to 2/06/1991	5/1991	Approved 3/28/2000	Plan notes that Township has elected to purchase an additional allocation of 200,000 gpd to provide buffer against any changes in land use policy.

In the spring of 1993, the VFSA reviewed the flow projections provided by the Service Area Municipalities in the 1992 Chapter 94 Report and determined they did not portray a realistic projection of wet weather flows. Average daily flows exceeded 8.0 MGD (the then current capacity) during early 1993. On September 22, 1993, the VFSA provided revised hydraulic loading projections to PADEP. These projections indicated a potential hydraulic overload by 1995. In response to the revised projections, PADEP acknowledged the projected overload and directed the VFSA to follow a planning module processing procedure based upon individual Service Area Municipalities' EDU commitment lists, first developed in 1991. PADEP also directed the VFSA to submit a schedule for the preparation and implementation of the regional Act 537 Plan. The schedule was submitted in December 1993, and the VFSA initiated the second part of the regional planning process.

The VFSA continues to monitor the remaining STP capacity, and work with the Service Area Municipalities to encourage infiltration/inflow (I/I) reduction. The I/I reduction effort has been successful and is having a tangible positive effect upon the VFSA system. This is especially true in Easttown where the projected capacity requirements have been reduced down to their original reserve capacity of about 1.5 mgd. The planning module procedure plan approved by the Service Area Municipalities and required by PADEP continued until the STP was rerated to 9.2 MGD in 2000. Since the rerate, new planning modules have been processed on a first come, first serve basis and are incorporated into each municipalities current Chapter 94 Report.

Planning Objectives

In accordance with the approved plan of study, this Act 537 Regional Plan is being prepared to meet the following objectives:

1. Identify wastewater planning related to the VFSA that has been previously undertaken or is planned.
2. Address future treatment plant capacity requirements for the VFSA Service Area Municipalities.
3. Analyze the existing conveyance system owned and operated by the VFSA to identify available capacity and problem areas in the system.

4. Gather and analyze data supporting wastewater flow projections to the VFSA system for short and long-term planning horizons, prepared by the municipalities.
5. Identify future public sewer service areas in the overall region, based on Service Area Municipalities' Act 537 plans.
6. Analyze alternatives for additional VFSA conveyance facilities and VFSA wastewater treatment facilities.
7. Evaluate the feasibility of implementing alternative treatment and disposal methods.
8. Recommend a plan and its implementation schedule.

The VFSA was selected by the municipalities as the lead agency to develop the regional plan, and after PADEP approval, implement it. The intent of the regional planning process is to produce a regionally approved and viable document, which supersedes previous wastewater planning, documents and provides a tool for wastewater facilities management. Toward this end, the Authority has made every effort to address the comments, suggestions, and concerns of the Service Area Municipalities, as well as the numerous parties, agencies and groups who have expressed an interest in this process.

Additionally the VFSA is coordinating their planning efforts with the Service Area Municipalities involved with the Valley Creek Trunk Sewer System.

B. Identify and summarize all existing wastewater planning and management activities previously undertaken and determine consistency status.

Existing Wastewater Planning Documents

- **Master Sewer Plan, Revised Edition 1970, for Chester County, Pennsylvania**
  The Chester County Master Sewer Plan, 1970 revised edition, was prepared by Roy F. Weston Engineers. It was originally published in 1968 and was revised, in part, to address the planning of a regional system to serve Tredyffrin, Easttown, Willistown, and East Whiteland Townships and Malvern Borough.

The alternative proposed was the construction of a new wastewater treatment plant in Upper Merion Township, Montgomery County, PA. It was estimated that the proposed regional wastewater treatment plant would receive a flow of 3.53 MGD by 1978 and 5.97 MGD by 1988.

Due to the relatively great distance of three (3) of the western most municipalities (East Whiteland Township, Willistown Township and Malvern Borough) from the proposed regional plant, an alternative plan was suggested. The alternative proposed that Tredyffrin and Easttown Townships follow the regional plan and have Willistown, East Whiteland, and Malvern share a joint plant on Little Valley Creek. An additional alternative proposed for Easttown Township involved conveying sewage to the Radnor-Haverford-Marple Authority facilities.

As stated previously in this report, the VFSA was organized in the late 1960's by the Townships of Schuylkill, East Pikeland, and Charlestown and on November 1, 1970 VFSA entered into an agreement to provide wastewater treatment services to the communities of Easttown Township, East Whiteland Township, Malvern Borough, Tredyffrin Township, and Willistown Township. All of these Service Area Municipalities have portions of their township served by the Valley Forge STP, which was constructed in 1977.

- **Final Environmental Impact Statement (EIS), Valley Forge Area Wastewater Treatment Facility, Chester County, Pennsylvania (September, 1974)**

  An Environmental Impact Statement was prepared for the Valley Forge STP in September 1974 by the United States Environmental Protection Agency (USEPA), Region Three. The purpose of the EIS was to give meaningful consideration to the environmental issues involved in the project, rather than dictate the ultimate solution to water quality management for the area. The EIS examined the relationship of the proposed treatment plant to land use plans, policies and controls of the affected area. The report presents population and growth assumptions used to support the project and to determine secondary population and growth impacts resulting from the proposed action

and its alternatives. The EIS also addresses how the project would conform or conflict with the objectives of approved or proposed Federal, state and local land use plans, policies and controls, and the positive and negative impacts of the project on the environment.

As a result of the analysis of all possible alternatives, including environmental effects, costs, and risks of each such alternative, the EPA concluded that the most appropriate alternative was an 8 MGD wastewater treatment plant utilizing a completely mixed activated sludge process with the processed sludge to be landfilled. The report further concluded that the proposed systems would alleviate existing health hazards, prevent surface and subsurface water contamination, and with adequate planning of land use and the publicly owned treatment facilities, provide ways to prevent urban sprawl and insure orderly future growth.

- **Individual Act 537 Sewage Facilities Plans - Summary of VFSA Participation Information**

  The following are excerpts from or summaries of the information provided in the most recent versions of the VFSA Service Area Municipalities' Act 537 Plans. Please note that as of this writing; only three of the VFSA Service Area Municipalities have plans approved by PADEP. Therefore, there may be minor revisions to the information presented in this document, as each municipality moves closer to approval; however, this will not impact upon the conclusions of this Regional Plan.

  Charlestown Township (Approved 6/17/2002)

  Wastewater disposal needs will be primarily related to future residential land use and industrial development in areas zoned for Planned Residential Development (PRD) and industrial and commercial land use in the southern portion of the Township near and primarily south of the Turnpike. This area is projected to be serviced by the VFSA sewer system.

The majority of Charlestown's residences and businesses will continue to employ conventional or alternate subsurface absorption area systems. As the cost of extending community sewerage systems outside the original VFSA Service Area is appreciably higher than within the VFSA Service Area, reliance on the on-lot methods will continue during the major part of the time frame considered in their Plan.

East Pikeland Township (Approved 12/9/1994)
East Pikeland is a member municipality of the VFSA. The public sewer system in the Township is designed, monitored, maintained and owned by the VFSA. The majority of residents in East Pikeland Township are connected to the VFSA. With the exception of two community systems, the remaining residents rely on individual on-site systems. A minor portion of West Vincent enters the VFSA system through East Pikeland. This was approved by agreement in order to alleviate potential public health issues from on-lot system malfunctions from existing homes outside VFSA's service area.

Easttown Township (Approved 3/13/2000)
Easttown Township's Act 537 Plan was last revised September, 1992 and adopted by the Township July 6, 1992. It was approved by PADEP on November 6, 1992.

Easttown Township is well established with respect to sanitary sewage facilities. The Township areas planned for eventual public sewer service include a number of residential infill developments, institutional or school facilities, and households currently using on-lot disposal systems. The majority of the collection systems in the Township drain to a network of 13 pump stations for conveyance through Tredyffrin Township to the Valley Forge STP. Some small peripheral areas of the Township drain by gravity to Tredyffrin and Radnor Townships.

Approximately sixty percent of the remaining parcels in the Township that are planned for eventual inclusion into the public sewer system are in the planning or construction phases. The development of these parcels necessitates the retrofitting and/or expansion of some pump stations in the system and associated gravity line extensions.

All multi-family dwelling areas are connected, or are planned for connection, to the public sewer system. That being the case, and since all other undeveloped areas in the Township are zoned for single-family dwellings on very large lots, there is no necessity for any community on-lot systems.

East Whiteland Township (Approved 11/27/2002)
East Whiteland Municipal Authority owns the sewage collection system and leases its operation to East Whiteland Township. The eastern two-thirds of the Township including all of Route 30 is now served by the public sewer system. The Township needs more capacity to accommodate development in western areas of the Township.

Seven private package treatment plants operate in East Whiteland Township. These treatment plants are generally located in the southern and western portions of the Township. One community on-lot sewage disposal system is operated at the K.D. Markley Elementary and Intermediate School.

Approximately one third of the East Whiteland Township land area relies on individual on-lot disposal systems. The two concentrated areas of on-lot disposal systems are: the area between Swedesford Road and U.S. Route 30 from Penflex to the Township line, and the area east of PA Route 352, and north of Summit Road.

Malvern Borough (Approved 5/12/1995)
Malvern Borough's Act 537 Plan was last revised November 1993 and adopted by the Borough on November 16, 1993. It was submitted to PADEP and is currently under review. The Borough is almost completely served by the public sewer system. The Valley Forge STP treats all wastewater flows.

There are no public sewage facilities provided south of First and Second Avenue. This area, which is made up of the property owned by Malvern Prep and Malvern Retreat and a few single-family residential units, is served by on-lot sewage disposal systems. The Borough does not intend to construct a public sewer system in this specific area.

There are also unsewered areas located in the northeast and northwest corners of the Borough. There are no dwelling units located in these areas. Future wastewater flow from both of these areas is proposed to be connected to the public sewer system and conveyed to the Valley Forge STP. The remainder of the Borough is connected to the public sewer system, which is maintained by the Borough.

Schuylkill Township (Approved 1996)

Schuylkill Township's Act 537 Plan was last updated in October 1994. The Plan describes anticipated township development by watershed area from 1998 to 2002. In addition, the Plan describes the number of equivalent dwelling units (EDU's) expected to be added to the VFSA system.

Two treatment plants serve the public sewage areas of the Township. The majority of sewered EDUs (approximately 96%) are treated by the Valley Forge STP. Approximately four percent (4%) of the sewered EDU's are treated at the Phoenixville Borough's STP.

Overall, seventy percent (70%) of existing dwelling units located within Schuylkill Township are connected to public sewers. The balance of the Township's residential units is served by individual on-lot disposal systems.

Tredyffrin Township (Approved 12/12/1994)

Tredyffrin Township's Act 537 Plan was revised in May 1993, adopted by the Township on December 13, 1993 and approved by PADEP. The Tredyffrin Township Municipal Authority's Paoli Area sewerage project (public sewers connected to the VFSA system) was completed and placed into operation in 1978, thereby eliminating many documented, malfunctioning on-lot sewage disposal systems and providing that area of Tredyffrin Township with public wastewater facilities. The Paoli Area project, the Authority's largest to date, included over 30 miles of sewers and four wastewater pumping stations. Many miles of sewers, and an additional pumping station, have been constructed in this area since 1978 by various developers.

In 1987, to help alleviate a hydraulic overload at a treatment plant in Upper Merion, the Cassatt Road pumping station was constructed to divert flow from the Township's Trout Run drainage area to the Valley Forge STP. This flow has been redirected back to the Upper Merion plant.

Furthermore, a small portion of the northern section of the Township, which is currently served by individual on-lot disposal systems, may be connected to the public sewer system.

Willistown Township (Approved 3/28/2000)
Willistown Township's Act 537 Plan was last revised February 6, 1991 and adopted by the Township in May, 1991. It was conditionally approved by PADEP on October 16, 1991.

The Township's public sewer system connected to the Valley Forge STP is located in the northern portion of the Township. The system crosses the ridge separating the Crum and Valley Creek Watersheds. In addition to this system the Township has nine private or community treatment facilities. Those areas not served by public or community system rely on private on-lot disposal systems. According to the Chester County Health Department (CCHD) there is evidence of on-lot malfunctions in these areas.
The plan recommends that additional capacity be acquired from the VFSA necessary to meet the future wastewater treatment needs of the northern portion of the Township.

- **Municipal Wasteload Management Annual (Chapter 94) Reports**
  Municipal Wasteload Management Annual Reports are intended to provide a review of the hydraulic and organic loads on sewerage facilities for the past year and insure that there is sufficient time to plan and construct needed additions to wastewater treatment plants. Each Chapter 94 Report provides wastewater flow estimates for a five year planning horizon.

The VFSA maintains current records regarding the future growth expectations of the eight communities that are served. Near term growth projections are identified by the communities and utilized to project the five year future needs, described in the Chapter 94 reports prepared by the VFSA and submitted to the PADEP on a yearly basis. Each community's submittal is included as an appendix to VFSA's yearly submittal to the PADEP.

The eight communities have maintained a dialogue with the VFSA in order to prepare for the longer term wastewater needs that are addressed in this Act 537 Plan. Although these communities are not entirely built out, the future growth courses of these municipalities have been fairly well defined over the years, and therefore, although the rates of development may vary based on market conditions, the EDU estimates summarized and presented in this subsection provide a high degree of confidence.

Adequacy of Previous Planning for Service Area

The Chester County Sewage Plan of 1970 recognized the need to provide regional systems to serve the entire Pickering Creek, French Creek, and Valley Creek Drainage Basins. The recommended feasibility studies for the individual municipalities were completed. Due to the age and general scope of this document, this regional plan will replace the 1970 study as the official Act 537 Planning study for the VFSA Service Area.

The Valley Forge STP EIS noted that, "the provision of less than 8 MGD capacity for the treatment plant would not be prudent." In addition it recommended that revised comprehensive land use plans and 537 sewage facility plans should be completed as soon as possible to guide development in the Design Service Area to meet projected 1985 sewer service demands. The plant was constructed and each of the Service Area Municipalities has prepared revisions to their individual Act 537 Plans. Although the EIS provides valuable information on the natural and physical characteristics of the service area, its main emphasis was to evaluate impacts of the plant at its design year of 1985. Therefore, this document will not be utilized for evaluating future capacity needs of the service area.

Sewage facilities planning which has been implemented through official plan revisions (planning modules) and addenda are referenced in the individual municipal Act 537 Plans, where appropriate.

C. Identify and summarize all existing municipal and county planning documents, including land use plans and zoning maps and regulations.

Municipal Planning Documents

The population and wastewater flow estimates prepared by the individual Service Area Municipalities reflect a number of different variables which impact local development. These variables include each community's comprehensive land use plan, zoning ordinance, and land development and subdivision regulations. Each municipality designates a sewer service area boundary or boundaries, depending on the number of public sewer service areas and infrastructure needs. The basis for this regional plan is the projections and wastewater facilities needs identified by the Service Area Municipalities in their Act 537 Plans. As part of the regional planning process these projections and methods were reviewed for consistency with the Act 537 planning guidelines and the protection of environmentally sensitive areas. Issues concerning individual plans were discussed with the municipal representatives during the development of the regional plan.

County Planning Documents

- **Landscapes: Managing Land in Chester County (1996-2020)**
  Landscapes is the land use policy plan for Chester County and was first adopted in 1996, which includes the County's vision for the year 2020. Landscapes and its associated Livable Landscapes map were updated in 2000. It recommends that development be encouraged in designated "Suburban" and "Urban" Landscapes, or "Suburban" or "Rural Centers" instead of in "Rural" and "Natural" Landscapes.

  The Suburban Landscape is to contain a mix of uses and higher densities of development than those found in the Rural Landscape. In order for this pattern to occur, Landscapes

supports the provisions of infrastructure and public services, such as public sewer systems. VFSA's draft Regional Plan supports Landscapes Policies to:

- Encourage coordination between municipalities and authorities to ensure consistency with land use plans.
- Maintain or expand existing sewer and water facilities to support development in Urban and Suburban Landscapes.

- **Sewage Facilities Inventory - 1991**

  The Chester County Planning Commission prepared this document to update its Community Facilities Inventory of 1985. The inventory shows the geographic location of sewage collection, conveyance, and treatment facilities in the County, as of 1991 (see Figure 1-1). According to the document, approximately 60% of the Chester County population relies on public sewage facilities for the collection, treatment and disposal of wastewater (1990 Census). The inventory also notes that the most thoroughly sewered areas of the County are in the central and eastern sections of the County along Routes 30 and 202. The Valley Forge STP is noted as being the largest treatment facility in the County in terms of sewage flows.

  Growth has been significant in recent years. Whereas VFSA Service Area sewered EDUs totaled 19,400 in December of 1993, the VFSA now services 25,540 as of year end 2005.

Public Sewered Areas (1991)

Chester County, Pennsylvania

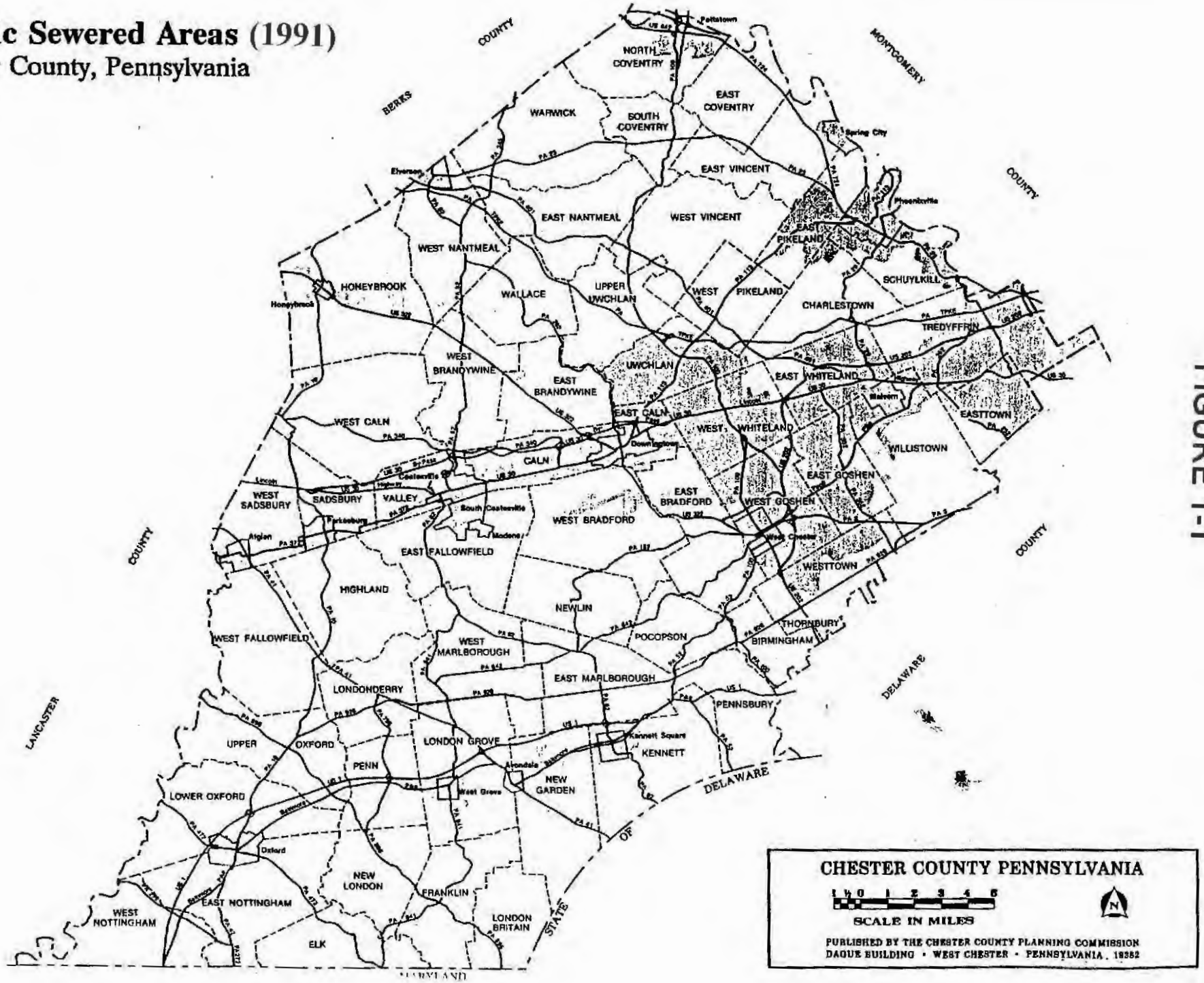


FIGURE 1-1

Section 2

Physical and Demographic Analysis

Table of Contents **Page No.**

A/B. Municipal Borders and Sewer Service Areas	2-1
C. Soils	2-4
D. Geography	2-5
E. Topography	2-7
F. Potable Water Supplies	2-8
G. Wetlands	2-10

Appendices:

None

Figures:

Figure 2-1. VFSA service area

Figure 2-2. Designated and potential connection areas in Service Area Municipalities to Valley Forge STP

Figure 2-3. Major surface water bodies and drainage basins

Exhibits:

None

A/B. Prepare exhibits depicting planning areas, municipal boundaries, and sewer service areas utilizing USGS topographic maps, municipal comprehensive maps, and sewer service maps.

Regional Setting

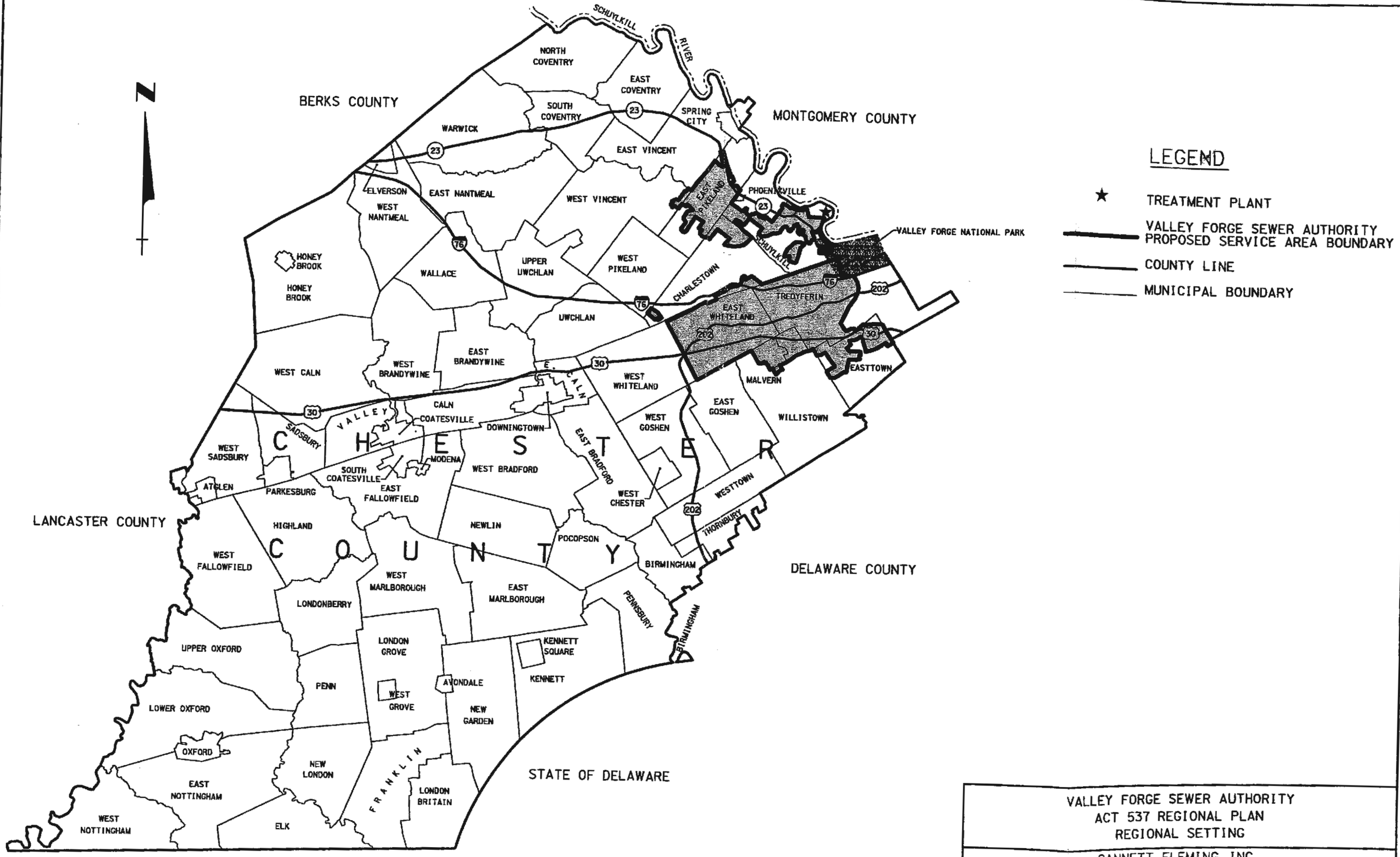
The VFSA Service Area is regionally located in Eastern Chester County, adjacent to Montgomery and Delaware Counties in Southeastern Pennsylvania. Figure 2-1 shows the regional setting of the VFSA service area and illustrates the area's proximity to the Schuylkill River, Valley Forge National Historical Park and major transportation routes such as the Pennsylvania Turnpike, Schuylkill Expressway, and State Routes 202, 422 and 23. The area's proximity to the City of Philadelphia and its access to a major transportation network have contributed to its desirability for residential as well as commercial/office development.

Sewer Service Area

The extent of the VFSA Service Area is shown in more detail on Figure 2-2 and includes areas currently designated or proposed by the Service Area Municipalities for connection to and treatment by the Valley Forge STP. Prior to construction of the STP in 1977, the U.S. Environmental Protection Agency (USEPA) prepared an Environmental Impact Statement (EIS) to address the plant's projected impacts and to define areas requiring corrective action. The EIS identified two service areas: The Initial Service Area and the Design Service Area. The Initial Service Area contains the most severe health hazards and activities that were degrading water quality in the area. The Design Service Area was defined as the minimum area to which service was intended to be extended by 1985, the design year of the treatment plant. A few areas within Charlestown Township and a small area in West Vincent Township are the only changes to the Design Service Area projected in the 1974 EIS.

At the start-up of the plant, in October 1977, the estimated number of equivalent dwelling units (EDUs) to be connected was approximately 3,000. As of December 1993, the VFSA Service Area included approximately 19,400 EDUs.

The 2005 year end EDUs totaled 25,540.

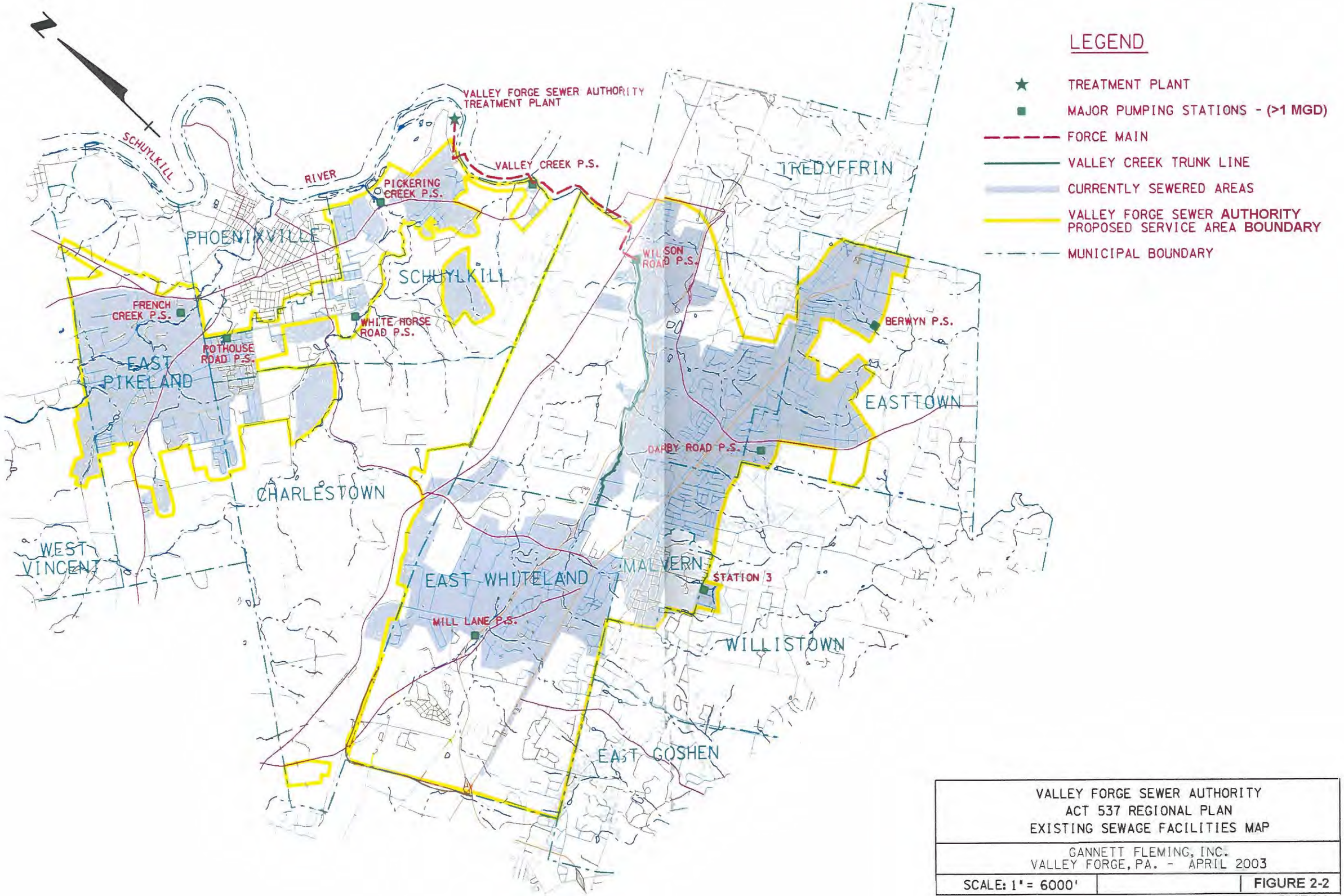


VALLEY FORGE SEWER AUTHORITY
ACT 537 REGIONAL PLAN
REGIONAL SETTING

GANNETT FLEMING, INC.
VALLEY FORGE, PA. - NOVEMBER 2000

SCALE: 1" = 20000'

FIGURE 2-1



VALLEY FORGE SEWER AUTHORITY
ACT 537 REGIONAL PLAN
EXISTING SEWAGE FACILITIES MAP

GANNETT FLEMING, INC.
VALLEY FORGE, PA. - APRIL 2003

SCALE: 1" = 6000'

FIGURE 2-2

C. Soils

The service area has six soil associations, or general groups. The following gives the typical characteristics of these associations:

- Penn-Croton-Bucks Association - Deep, silty soil.
- Glenelg-Manor-Chester Association - Generally shallow to deep, silty and channery soils, ranging from level to steep, but primarily gently to moderately sloping.
- Edgemont Association - Moderately deep, well drained.
- Hagerstown-Conestoga-Guthrie Association - Deep, silty soils.
- Neshaminy-Chrome-Conowings Association - Moderately deep and silty.
- Neshaminy-Glenelg Association - Moderately deep to deep, well-drained, silty, channery and gravelly.

The soil types are influenced by the geologic formation(s) which underlie them. Graphitic gneisses and grandiorite are generally overlain by deep and well-drained soils like those in the Glenelg-Manor Soil Association. The Stockton Formation is primarily overlain by a thin soil layer, typically of the Penn-Croton-Bucks series. Due to the solution channels which form in limestone and dolomite in Chester Valley, the soils overlying the Conestoga, Elbrook and Ledger Formations are generally well-drained and of the Hagerstown-Conestoga-Guthrie Association. The Chickies Formation is overlain by deep, often strong, well-drained soils, e.g., the Edgemont Association. The Serpentinite and Wissahickon Schist have deeply weathered rock which generally improves the percolation characteristics of the overlying soil. Soils such as those in the Neshaminy-Chrome-Conowings Association overlay these formations.

Specific descriptions of the local soil types found in the VFSA Service Area Municipalities may be found in the individual municipalities' plans.

Major Drainage Basins

The VFSA service area is divided into two major drainage basins. The majority of the service area is within the Schuylkill River Basin with the smaller southern portion within the Delaware River Basin. The area is further divided into sub-major drainage basins: French Creek, Pickering

Creek, Valley Creek, Darby Creek, Crum Creek, and Stony Run. The major surface water bodies and drainage basins are shown on Figure 2-3.

The French and Pickering Creeks are located in the northern portion of the service area. French Creek flows in an east, southeast direction through the central portions of West Vincent and East Pikeland Townships and through the northern portion of Schuylkill Township. Pickering Creek flows eastward through the southern portion of East Pikeland and the northern portion of Charlestown Township, and then eastward, then north through the central portion of Schuylkill Township. Flow from these creeks empties into the Schuylkill River. The Valley Creek watershed flows in a northeast direction through East Whiteland and Tredyffrin Townships and empties into the Schuylkill River.

The Darby and Crum Creek watersheds are located in the southern portion of the service area. Darby Creek flows southeasterly through the central portion of Easttown Township. Crum Creek flows southeasterly through the central and eastern portions of Willistown Township. Both creeks continue to flow in a southeasterly direction and empty into the Delaware River.

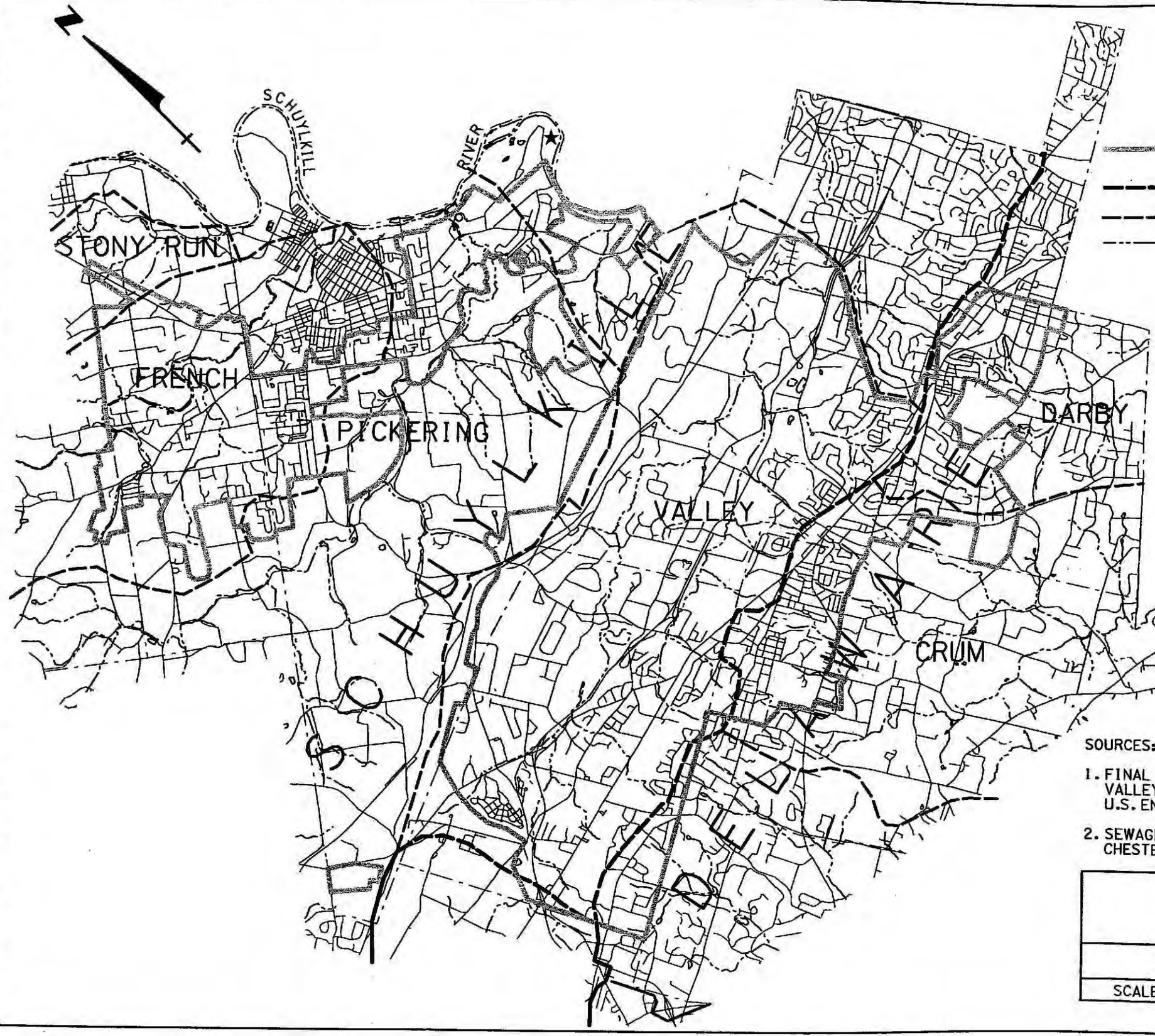
The Stony Run Drainage Basin is found in the northwestern edge of the service area, adjacent to French Creek and located in East Pikeland Township.

Descriptions of the smaller streams, lakes and impoundments located in the VFSA Service Area Municipalities may be found in the individual plans.

D. Geologic Features

The geologic features underlying the service area are made up of complex, folded and altered rocks of varying ages and of igneous, metamorphic and sedimentary origins. The following is a brief summary of the major rock formations underlying the service area.

The northwestern portion of the sewer area is primarily underlain by graphitic gneiss and granodiorite. These formations characteristically have low permeability. The Stockton



LEGEND

- ★ TREATMENT PLANT
- VALLEY FORGE SEWER AUTHORITY PROPOSED SERVICE AREA BOUNDARY
- MAJOR DRAINAGE BASIN AREAS
- SUB-MAJOR DRAINAGE BASIN
- WATER BODIES

SOURCES:

1. FINAL ENVIRONMENTAL IMPACT STATEMENT
   VALLEY FORGE AREA WASTEWATER TREATMENT FACILITY
   U.S. ENVIRONMENTAL PROTECTION AGENCY, SEPTEMBER 1974
2. SEWAGE FACILITIES INVENTORY 1991
   CHESTER COUNTY PLANNING COMMISSION

VALLEY FORGE SEWER AUTHORITY ACT 537 REGIONAL PLAN MAJOR DRAINAGE BASINS/WATERBODIES		
GANNETT FLEMING, INC. VALLEY FORGE, PA. - NOVEMBER 2000		
SCALE: 1" = 6000'		FIGURE 2-3

Formation is located in the northeastern portion of the service area and is comprised of layers of sandstone, siltstone and conglomerates. It has moderate to high porosity and permeability, and provides good surface drainage.

The central portion of the service area is underlain primarily by the Conestoga, Elbrook and Ledger Formations, which are comprised of limestone and dolomite. These formations commonly contain solutions channels. The north-central portion of the service area is underlain by Chickies Formation, which is composed of quartzite, which resists erosion and weathers very slowly.

The southeastern portion of the VFSA service area is underlain by felsic gneiss, which is highly resistant to weathering. The central southern portion of the VFSA service area is predominately underlain by the Wissahickon Formation and Serpentine. Wissahickon Schist and Serpentinite are moderately to high weathered rocks that provide good surface drainage.

The above-mentioned formations and rocks underlay the majority of the service area. More detailed descriptions of the underlying geologic formations may be found in the individual municipalities' plans along with the required mapping.

E. Topography

The service area lies within the Piedmont Province of the Appalachian Highlands. Most of the ridges tend northeast-southwest. The Piedmont is an area of fairly deep, sharp valleys. The service area's most steeply sloping land is primarily along the North and South Valley Hills. The moderately sloping land is predominately in the Pickering Creek Basin. The gentle slopes are located mainly within Chester Valley.

The service area is comprised of three major physiographic regions: the Schuylkill Valley, Triassic Lowland, Chester Valley, and West Chester-Paoli Plain. The Schuylkill Valley and Triassic Lowland, which includes portions of the French and Pickering Creek drainage basins, is characterized by relatively level, gentle lowlands. Chester Valley, which includes the Little Valley Creek and Valley Creek drainage basins, extends northeast and southwest across the

middle of Chester County. In particular, the southern portions of Charlestown, East Whiteland, Tredyffrin, and the northern-most portions of Malvern Borough and Willistown Township fall in the Chester Valley. The West Chester-Paoli Plain, which includes the Crum and Darby Creek drainage basins, consists of gently rolling terrain.

The topography in the study area is affected by the geologic formation underlying the area. The topography of the land overlying the graphitic gneiss and granodiorite depends upon the local variation of the rock hardness, but is generally hilly with medium relief and has natural slopes which are fairly steep and stable. The Stockton Formation is comprised of rock which erodes easily and therefore forms gently rolling hills or relatively flat lowlands.

The Conestoga, Elbrook and Ledger formations provide topography with rolling valleys, hills of low relief, and natural, gentle and stable slopes. Felsic gneiss provides topography of rough hills of medium to high relief, and natural slopes, which are fairly steep and stable. Serpentinite weathers easily and has topographic characteristics including undulating hills of low relief having gentle, stable slopes. The Wissahickon Formation provides undulating hills of medium relief, and natural slopes which are moderately steep and stable.

Detailed local topography and, in particular, identification of steep slopes in the VFSA Service Area Municipalities is provided in the individual plans.

F. Potable Water Supplies

The population in the VFSA Service Area obtains drinking water from public water suppliers and private wells. Major water supply systems in the VFSA Service Area are summarized in Table 2-1.

Groundwater availability in the VFSA Service Area is limited by the low porosity and permeability of most of the underlying rock formations. These crystalline rock formations in the county provide some available groundwater in the fractures and fissures. The Triassic sediments located in the Stockton Formation provide the best groundwater yields in the area. Groundwater

pollution is possible in areas where the sandstones are particularly permeable. The limestone underlying the Chester Valley has variable groundwater yields. The channels create the potential for groundwater contamination to be carried long distances in unpredictable patterns.

Table 2-1. Major Water Systems Servicing VFSA Service Area Municipalities

Major Water Supply Systems	Location of Supply Area within VFSA Service Area	Population Served	Water Source(s)
Philadelphia Suburban Water Company	Easttown, Tredyffrin, Schuylkill, Charlestown East Whiteland and Willistown Townships	N/A (Serves more than VFSA Service Area Municipalities)	Crum, Perkiomen, and Neshaminy Creeks and Schuylkill River intakes
Nichols MHP Water System	Schuylkill Township	27	One well
Phoenixville Water System	Schuylkill and East Pikeland Townships	N/A (Serves more than VFSA Service Area Municipalities)	Schuylkill River intake
Phoenix MHP Water Systems Nos. 1 and 2	East Pikeland Township	171	Three wells
Citizens Utilities Home Water Company	East Pikeland Township	10,768	Schuylkill River intake Three wells
Merlin Hills Water System (owned by Citizens Utilities)	East Pikeland Township	313	One well
Fox Knoll Water Company	Small portion of south central East Pikeland Township	N/A	One well
Deerfield Knoll Water System	Willistown Township	260	Two wells
Plumsock Road Homeowners Assoc.	Willistown Township	100	Two wells
Malvern Courts Water System	East Whiteland Township	220	Two wells
Philadelphia Suburban Water Company	Malvern Borough	3,100	Three wells

N/A - Not Available
Source: Chester County Planning Commission, Water Facilities Inventory, 1991

G. Wetlands

A review of the National Wetland Inventory quadrangles that include the VFSA Service Area (Phoenixville, Collegeville, Malvern, Valley Forge, West Chester and Media) has shown that Palustrine wetlands are scattered throughout the Service Area due to the presence of a number of surface water bodies. The individual municipalities' plans provide more detailed information on the wetlands located in the Service Area.

Section 3

Existing Sewage Facilities

Table of Contents **Page No.**

A. Description of Existing Sewage Facilities
   a. Wastewater Treatment 3-1
   b. Collection System 3-7

B. Description of Areas Using Onlot Sewage Disposal Systems 3-10

C. Solids Handling 3-13

Appendices:

None

Figures:

3-1. Treatment Plant Site Layout

3-2. Treatment Plant Schematic

Exhibits:

None

A. Identify, map, and describe municipal and non-municipal, individual and community sewerage systems in the planning area.

VFSA Wastewater Treatment System

The Valley Forge STP is owned and operated by the VFSA and is located in Schuylkill Township, Chester County, Pennsylvania. A site plan of the treatment plant is included as Figure 3-1. The VFSA finances, owns and operates the Valley Forge STP in accordance with the provision of the agreements signed on November 1, 1970; the Valley Forge Sewage Treatment Plant Agreement; the Valley Creek Trunk Sewer Agreement; and the East Whiteland Trunk Line Agreement.

Treated effluent is discharged into the Schuylkill River at a point located approximately 2000 feet upstream from Pawling Road. The plant's National Pollutant Discharge Elimination System (NPDES) Permit No. 0043974 is dated July 19, 2004 and expires on July 31, 2009. It states that the average monthly flow of effluent discharged from the plant shall not exceed 9.2 MGD. The permit also establishes effluent discharge limits and requirements. These parameters are summarized in Table 3-1.

TABLE 3-1. Discharge Parameters for the Valley Forge Wastewater Treatment Plant

Discharge Parameter	Average Monthly (lbs/day)	Average Weekly (lbs/day)	Average Monthly (mg/l)	Average Weekly (mg/l)
CBOD-5 (5-1 to 10-31)	1535	2302	20.0	30
CBOD-5 (11-1 to 4-30)	1918.0	3069.0	25.0	40
Suspended Solids	2302	3453	30.0	45
Ammonia as N (5-1 to 10-31)	614	---	8.0	---
Ammonia as N (11-1 to 4-30)	1228	---	16.0	---
Fecal Coliform	(200 colonies/100 ml as a geometric average)			
pH	(Within limits of 6.0-9.0 standard units at all times)			
Dissolved Oxygen	(Minimum of 5.0 mg/l at all times)			
Total Residual Chlorine	---	---	0.5	---

In addition, the following parameters are required to be monitored only: total lead, zinc, arsenic, cadmium, selenium, silver, mercury, copper, free cyanide, and hex chromium.

Description of Treatment Process

The Valley Forge Sewer Authority Sewage Treatment Plant (STP) was constructed in the mid-1970's with a design hydraulic capacity of 8.0 MGD. Design constituents loadings were 16,680 lbs/day [250 mg/L] for carbonaceous biochemical oxygen demand (CBOD-5); 16,680 lbs/day [250 mg/L] for total suspended solids [TSS]; and 2,000 lbs/day [30 mg/L] for ammonia nitrogen (NH_4-N). Presently, the plant is permitted at a not-to-exceed monthly average flow of 10.4 MGD, and a not-to-exceed average annual flow of 9.2 MGD. Hydraulic capacity is defined as "the rated hydraulic capacity of the treatment facility and is used to help determine whether a

hydraulic overload exists. Monthly average effluent discharge limitations are 20/25 mg/L for CBOD-5; 30 mg/L for TSS; and 8/16 mg/L for NH_4-N.

Mainstream wastewater processing as depicted in Figure 3-2, consists of influent metering/distribution, primary clarification, mechanically aerated activated sludge, final clarification, and chlorination for effluent disinfection. Sludge stream processing consists of primary underflow degritting, gravity co-thickening of primary and waste activated sludge, centrifuge dewatering, and dewatered cake stabilization via post-lime addition. Stabilized bio-solids disposal is by contracted hauling/disposal services.

The original plant design is unique in that it allows for operation of two parallel mainstream treatment trains. At the influent/metering structure, control gates and two parallel Parshall flumes distribute and measure flow to Side No. 1 and Side No. 2 of the plant, each side consisting of a primary clarifier, aeration tank, and final clarifier in the original design. In 1992, a third, larger final clarifier was built and is aligned with Side No. 2 and the original two final clarifiers are now aligned with Side No. 1. The aeration tanks effluent distribution chamber was also modified to accommodate flow splitting to the final clarifiers, and a new return activated sludge distribution chamber was constructed to maintain segregation of RAS for the two treatment trains. A weir box was added to the influent/metering structure to allow for distribution of in-plant recycle flow to Side No. 1 and Side No. 2 by weir gate settings. Previously, the side-stream recycle flow was dedicated to Side No. 2.

The original designed and constructed plant included a pressure filtration system for clarified effluent suspended solids removal and a heat treatment system for biosolids stabilization. These have since been decommissioned. The pressure filtration tanks are in place in the Operations Building basement and are available for reuse for hauled-in wastewater storage/feeding. Most of the heat treatment equipment has been removed. The decant tank (DT) and the decant aeration tank (DAT) have been retained and serve as receiving/storage tanks for hauled-in wastewaters. Original piping/pumping equipment associated with these tanks remains and serves for transport of the stored hauled-in wastewaters to the process application points.

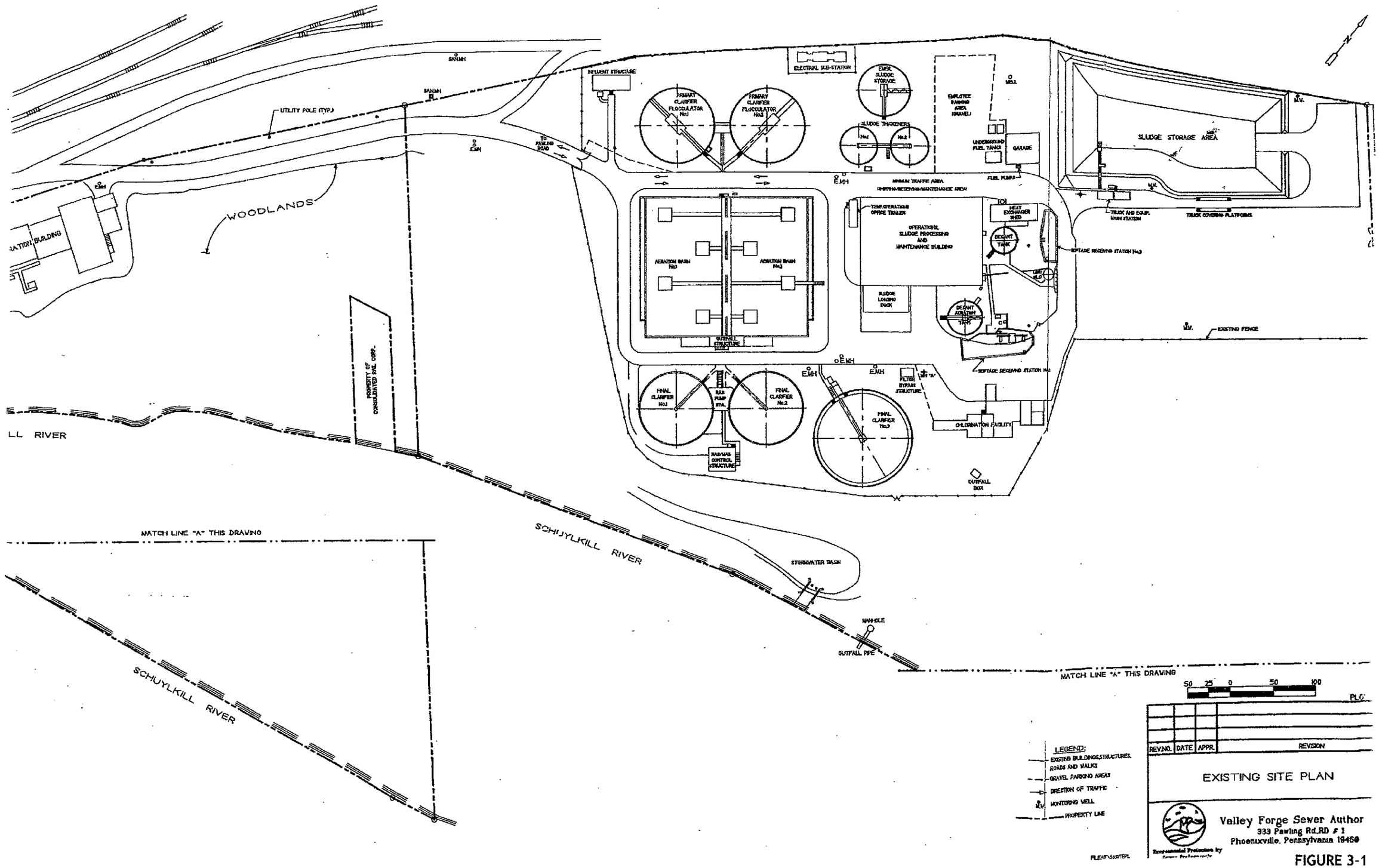

SANMH
UTILITY POLE (TYP.)
WOODLANDS
TO PAWLING ROAD
INFLUENT STRUCTURE
ELECTRICAL SUB-STATION
PRIMARY CLARIFIER FLOCCULATOR No.1
PRIMARY CLARIFIER FLOCCULATOR No.2
EMER. SLUDGE STORAGE
SLUDGE THICKENERS
EMPLOYEE PARKING AREA (RAMEL)
UNDERGROUND FUEL TANKS
GARAGE
FUEL PUMPS
SLUDGE STORAGE AREA
MAIN TRAFFIC AREA
SHIPPING/RECEIVING/MAINTENANCE AREA
TEMP. OPERATIONS OFFICE TRAILER
OPERATIONAL, SLUDGE PROCESSING AND MAINTENANCE BUILDING
HEAT EXCHANGER SHED
DECANT TANK
TRUCK AND EQUIP. WASH STATION
TRUCK COVERING PLATFORMS
SEPTAGE RECEIVING STATION No.3
SEPTAGE RECEIVING STATION No.2
AERATION BASIN No.1
AERATION BASIN No.2
OUTFALL STRUCTURE
SLUDGE LOADING DOCK
DECANT AERATION TANK
EXISTING FENCE
FINAL CLARIFIER No.1
RAS PUMP STA.
FINAL CLARIFIER No.2
FINAL CLARIFIER No.3
FILTER BYPASS STRUCTURE
CHLORINATION FACILITY
RAS/WAS CONTROL STRUCTURE
OUTFALL BOX
PROPERTY OF CONSOLIDATED RAIL CORP.
L.L. RIVER
SCHUYLKILL RIVER
STORMWATER BASIN
MANHOLE
OUTFALL PIPE
MATCH LINE "A" THIS DRAWING
SCHUYLKILL RIVER
MATCH LINE "A" THIS DRAWING
50 25 0 50 100
LEGEND:
EXISTING BUILDINGS, STRUCTURES, ROADS AND WALKS
GRAVEL PARKING AREAS
DIRECTION OF TRAFFIC
MONITORING WELL
PROPERTY LINE
REV.NO. DATE APPR. REVISION
EXISTING SITE PLAN
Valley Forge Sewer Author
333 Pawling Rd.RD # 1
Phoenixville, Pennsylvania 19460
Environmental Protection by Design Professionals

FIGURE 3-1

VALLEY FORGE SEWER AUTHORITY
WASTEWATER TREATMENT PLANT
FLOW SCHEMATIC

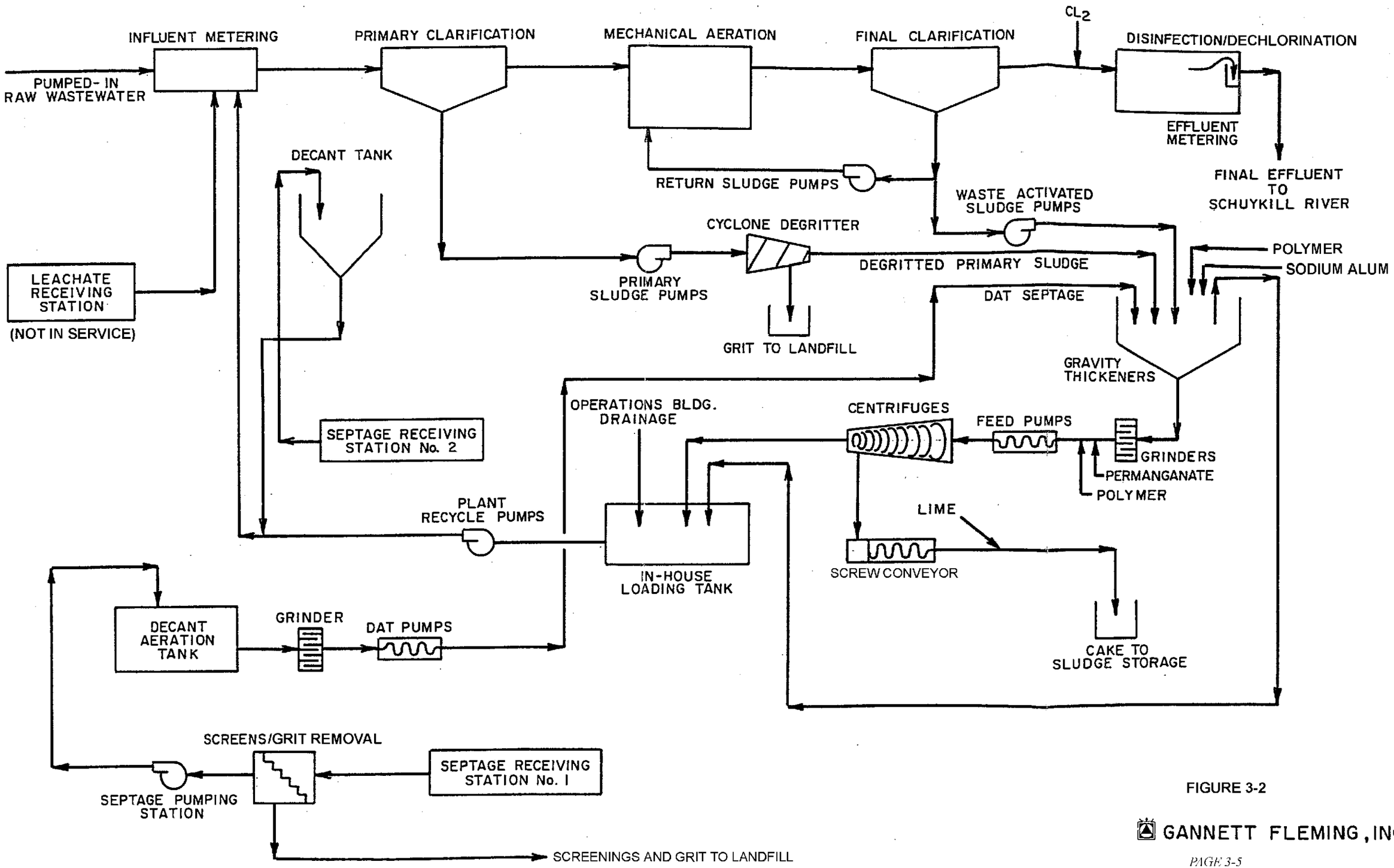


FIGURE 3-2

GANNETT FLEMING, INC.

Influent wastewater streams enter the plant through an influent metering chamber. Compatible liquid wastewaters are accepted from tank trucks at a septage acceptance facility where this wastewater receives pretreatment consisting of screening and grit removal. Following equalization it is pumped to the existing gravity thickening. Trucked wastes are accepted during normal working hours.

Description of Problems

There were no significant problems with the existing facilities at the Valley Forge STP during 2005 and this excellent performance was documented in the 2005 Engineer's Annual Report.

Upgrading or Expansion of Treatment Facilities

The Valley Forge STP was upgraded by the addition of a final clarifier and upgrading the chlorine contact tanks. This work was completed during 1992 and placed into service in December of 1992. The clarifier and contact tank remained in service in 1993 and refinement of the operation of the instrumentation occurred in 1993. Since the initial preparation of this document, the VFSA has accomplished the plant re-rate to 9.2 mgd, which was completed in 2000. Several improvements have been made in recent years including:

- Upgrading plant controls with improvements such as variable frequency drives (VFDs), and process logic controllers (PLCs).
- Adding a biosolids mixing and conveyance system to mix hydrated lime with bio-solids cake and convey the material from centrifuges to tractor trailers.
- Replacement of the plant's main motor control centers with new modern equipment.

Description of Operation and Maintenance Requirements

According to the VFSA's 2005 Engineer's Annual Report, operation and maintenance of the Valley Forge STP was performed adequately. The treatment plant is staffed 16 hours per day, five days per week. The operation of the treatment plant is monitored on weekends and staffed five hours per day on Saturday and Sunday. Remote alarms acknowledge emergency conditions that alert the staff to respond to the facility during unattended hours.

The plant's Operations and Maintenance Manual is routinely maintained. Ongoing improvements to the preventive/predictive maintenance and annual treatment unit inspection programs are continuing. Short and long-range planning is formalized for machinery rehabilitation, upgrades and replacements; facility repair and upgrades; and vehicle replacement and upgrades. The implementation of a computerized Operations and Maintenance Management System is complete. This system automatically creates schedules for planned and preventative maintenance work.

Major VFSA Service Area Sewer System Components (Collection System)

The VFSA finances, owns and operates its collection and transmission facilities in East Pikeland, Charlestown and Schuylkill Townships' independent of the 1970 Agreement. The other VFSA Service Area Municipalities are responsible for the financing, ownership and operation of their collection and conveyance system independent of any agreements, and are also parties to agreements where they use facilities in downstream municipalities.

Two major agreements have been signed with respect to sewer system components within the VFSA Service Area: the Valley Creek Trunk Sewer (VCTS) Agreement and the East Whiteland Trunk Line (EWTL) Agreement. In accordance with the VCTS Agreement, Tredyffrin is responsible for financing, ownership and operation of the VCTS within Tredyffrin, the main pumping station and the force main to the Valley Forge STP. East Whiteland, in accordance with the EWTL Agreement, is responsible for the financing, ownership and operation of the EWTL within East Whiteland.

Trunk Lines

The two major wastewater trunk lines that convey flow to the Valley Forge STP are the VCTS and EWTL. The portion of the VCTS located in Tredyffrin Township was financed, and is owned and operated by Tredyffrin. All of the wastewater flow to the Valley Forge STP from Tredyffrin, Easttown, East Whiteland, Willistown Townships, Malvern Borough, and a portion of the VFSA flow from Charlestown is conveyed to the plant via Tredyffrin's VCTS facilities. These facilities include gravity sewers and force mains, the Little Valley Intercepting Sewer and the Wilson Road Pumping Station and force main. The 1993 flow through the Wilson Road

Pumping Station was 5.192 mgd. The 2005 flow through the Wilson Road pumping station was 6.126 mgd.

The EWTL is financed, owned, and operated by East Whiteland Township. The EWTL conveys flow from East Whiteland, Malvern and Charlestown. The 1993 flow through the EWTL was 1.67 mgd.

Pumping Stations

Wastewater generated by the sewered service areas in East Whiteland, Easttown, Malvern, Tredyffrin, Willistown, West Vincent, Charlestown, East Pikeland, and Schuylkill Township is ultimately discharged to the common influent chamber of the plant's influent/metering structure from two main pumping stations --- the Wilson Road Pump Station in Tredyffrin (30-inch force main) and the Pickering Creek P.S. in Schuylkill Township (20-inch force main). **Note:** The Wilson Road Pumping Station is the subject of a separate Act 537 Plan by Tredyffrin Township.

Pickering Creek P.S. has a firm discharge capacity of 5.6 MGD, and an installed pumping capacity of 12.6 MGD. Comminutors at these pumping stations macerate solids prior to pumping. A composite sampler at the plant's influent/metering structure samples the combined pumped-in raw wastewater.

The major pumping stations within the area have been identified in the following table. Their locations have been identified on Figure 2-2, Existing Sewage Facilities.

Table 3-2. Major Service Area Pumping Stations

Pumping Station	Owner	Rated Maximum Daily Capacity (MGD)	1993 Average Daily Flow (MGD)	2005 Average Daily Flow (MGD)
Pickering Creek	VFSA	4.750	0.780	1.165
White Horse Road	VFSA	4.600	0.681	0.874
Pot House Road	VFSA	3.200	0.592	0.690
French Creek	VFSA	2.900	0.440	0.600
Mill Lane	East Whiteland	2.073	0.415	0.967
Station 3	Malvern	1.710	0.396	0.269
Berwyn	Easttown	1.526	0.630	0.858
Wilson Road P.S.	Tredyffrin	16.272	1.706	6.131
Darby Road	Tredyffrin	1.008	0.479	0.385

* Major pumping stations were identified as those having a rated capacity of 1.0 mgd or more.

Force Mains

The Wilson Road force main receives wastewater flow from Tredyffrin, Easttown, East Whiteland, Willistown Townships, Malvern Borough, and a portion of the VFSA flow from Charlestown. The design capacity of the force main is 8.393 MGD.

VFSA System Compliance with Municipal Wasteload Management Regulations

According to the VFSA 1993 Chapter 94 Report, none of the 1993 average daily flows at the major pumping stations within the VFSA exceeded their rated capacities. Also, none of the highest daily flows exceeded the major pumping stations' capacities. The projected maximum daily flows for the major pumping stations were determined for ultimate build out of the service areas.

More recently the report entitled, "Validation of the Member Municipality Collection System Portion of the Regional Act 537 Plan," November 2005, stated that the VFSA flow projections do not exceed the flow allocation of any pump station capacity. Any long term capacity Issues may be addressed as the 30-plus-year-old pumps stations are modernized.

Description of Operation and Maintenance Requirements of Major VFSA Service Area Sewer System Components

A formal predictive/preventative maintenance program covers all VFSA-owned pumping stations, which are visited routinely, several times per week. Each pumping station has on-site emergency power and portable bypass pumping capability. All stations have auto transfer electrical back up systems.

In the VFSA owned collection system, problem sewer lines are routinely flushed. The VFSA has annual contracts for right-of-way clearing and I/I correction. The annual I/I study and corrective action plan includes: key manhole monitoring, plug and weir testing in problem areas, internal video inspection and cleaning and grouting where necessary.

VFSA has sufficient staffing assigned to maintain the collection system. Repair maintenance activities are supported by a plant maintenance staff assigned to duties at the VFSA treatment plant and collection system.

B. Identify, map, and describe areas that utilize individual and community onlot sewage discharge and, unpermitted collection and disposal systems.

The following are summaries of or excerpts from the municipalities' most recent Act 537 plans regarding on-lot sewage disposal systems. More detailed information can be found in the individual plans.

Charlestown Township

A large portion of the Township is serviced by on-lot disposal or alternative systems. The greatest concentration of the sewage disposal problem areas was in the northern portion of the Township in the Tyrone Farms neighborhood, an area which was served by a community sewerage system. Further discussion on malfunctions of the systems and soil limitations in the Township is included in Sections 3 (C) and (D) of the Township's Act 537 Plan.

East Pikeland Township

The majority of residents in East Pikeland Township are connected to the VFSA. With the exception of two community systems, the remaining residents rely on individual on-site systems. According to East Pikeland's Act 537 Plan, after considering the cost of extending sewer lines, many Township residents will not be connected to the VFSA. These residents, for the most part, will utilize individual on-lot systems. The Township has been divided into five study areas in the Plan. The Plan provides information on the current wastewater disposal methods used and the alternatives and proposed recommendations for future wastewater planning in each of the study areas.

Easttown Township

Four areas in the Township are not planned for public sewers. All are large lot zoning (80,000 sf) and all have soils suitable for on-site sewage. The first area is Waynesborough Country Club. The second area is the YMCA tract, located in the northwest portion of the Township. These two tracts have existing uses served by public sewer. However, future use and capacity issues dictate that on-lot systems be considered. The other two areas are in the southern portion of the Township. One is the southwest corner of the Township around White Horse Road. The second is in the south central portion of the Township in the vicinity of the easterly portion of Waterloo Road. All multi-family (community) systems are already connected, or are planned for connection, to the public sewer system.

East Whiteland Township

Approximately one third of East Whiteland Township relies on individual on-lot disposal systems. Existing systems have operated with few reports of malfunction. According to the Act 537 Plan, the Chester County Health Department reported two concentrations of on-lot disposal system malfunctions in the Township: the area east of PA Route 352, north of Summit Road, and the area between Swedesford Road and U.S. Route 30 from Penflex to the Township line. The malfunctions are primarily due to shallow depth to bedrock and other soil characteristics which prevent adequate percolation.

Malvern Borough

The area in the Borough that does not have public sewers is owned by Malvern Prep, Malvern Retreat, and a few single-family residential units located along Paoli Pike and on South Warren Avenue just south of Second Avenue. These areas utilize on-lot sewage disposal facilities for wastewater disposal. A small area of ground located in the far northeast corner of the Borough that abuts Willistown Township and an area of ground in the northwest corner of the Borough that is located north of the railroad tracks and that abuts East Whiteland Township both do not have public sewers. Currently, there are no buildings on the latter two parcels of land. There are no known malfunctioning on-lot sewage disposal facilities in the Borough.

Schuylkill Township

According to the Township's Act 537 Plan Update, approximately 30% of the residential units located within Schuylkill Township utilize individual on-lot disposal systems. These systems include cesspools, conventional septic system with absorption fields, and elevated sand mounds.

There is one area in the Township which is experiencing on-lot system malfunctions. Approximately four to five existing malfunctioning units are located in the vicinity of Route 29 and Creek Road. The Plan indicates that these units will be connected to the planned Charlestown Hunt interceptor.

The Township is currently updating its 1976 holding tank ordinance and intends to adopt an individual on-lot management ordinance and implement an on-lot management program this year.

Tredyffrin Township

There are approximately 500 on-lot sewage systems in Service Area A of Tredyffrin Township. All but about 10 to 15 of the 500 serve individual homes. It has been assumed, based on permit records that approximately half of these systems were constructed since Act 537 and Chapter 73 regulations were enacted. Most of the malfunctions occurred due to the age of the systems and because over one-half of the original systems predated present design standards and are approaching the end of their life expectancies. In 1991, Gannett Fleming, Inc. met with

representatives of the Chester County Health Department to discuss the existing problem areas in Service Area A. As a result of these discussions, ten specific areas were identified as having permitting problems or malfunctions. More detailed information can be found in Section 6.1.1 of Tredyffrin Township's 1993 Act 537 Update.

Willistown Township

The distribution of on-lot system malfunctions shows a concentration in the central portion of the township directly south of Malvern Borough. Comparing the soil suitability for on-lot disposal systems to the concentration of failing systems indicates soils, which are severely limited by flood plain and high water table areas. Remaining sites of on-lot malfunctions were not concentrated in any one area although most occur in the northern half of the municipality. These failures can be attributed to poor soil conditions, age of systems, and a lack of maintenance.

C. Identify wastewater bio-solids and septage generation, transport, and disposal methods.

Primary bio-solids, waste activated sludge, and hauled-in-septage are co-thickened in the plant's two gravity thickeners, which supply thickened bio-solids to the centrifuge feed pumping system. Concentrated bio-solids from each thickener flows through an in-line grinder prior to pumping by its associated progressive-cavity feed pump. Two solid-bowl centrifuges located on the upper level of the Operations Building dewater thickened bio-solids. Centrate from the dewatering operation is discharged to the plant's side stream storage tanks, referred to as the in-house loading tanks (IHLT). Centrate is returned to the head of the plant for processing. Centrifuge feed bio-solids is conditioned prior to dewatering by polymer addition from the dry-polymer/solution makeup and feed system. Dewatered bio-solids cake discharged from the centrifuges drops down to a screw conveyor system whose purpose it is to mix the bio-solids cake with the hydrated lime while carrying it outside of the building to a trailer attached to a jockey truck. The lime conditioned bio-solids are piped to a trailer located on a jockey truck. Trailers are removed from the site on a daily basis so as to minimize odors. The trailers are transported by tractor-trailer by a private contractor to permitted farmland where it is used as a natural fertilizer.

VFSA secures its own landfill disposal approvals. The current biosolids disposal contractor, Synagro, hold permits for agricultural, landfill, and compost disposal sites. Synagro is responsible for coordinating biosolids disposal to any of these sites to satisfy its overall biosolids management program.

Section 4

Future Growth and Land Development

Table of Contents **Page No.**

A. Municipal and County Planning Documents 4-1

B. Future Growth Areas and EDU Projections 4-1

Appendices:

None

Figures:

None

Exhibits:

None

A. Identify and briefly summarize all municipal and county planning documents adopted pursuant to the Pennsylvania Municipalities Planning Code.

See Section 1 for summaries of this information.

B. Future growth areas and EDU projections

The VFSA Service Area includes parts of eight (8) municipalities and provided wastewater collection, conveyance and treatment to approximately 25,511 EDUs as of the end of 2005. The Service Area is located in Eastern Chester County, an area whose growth continues to be influenced by suburban expansion outward from Philadelphia through Chester, Delaware, and Montgomery Counties.

The VFSA maintains current records regarding the future growth expectations of the eight (8) communities that are served. Near term growth projections are identified by the communities and utilized to project the five-year future needs, described in the Chapter 94 reports prepared by the VFSA and submitted to the PADEP on a yearly basis. Each community's submittal is included as an appendix to VFSA's yearly submittal to the PADEP. The eight (8) communities have maintained a dialogue with the VFSA in order to prepare for the longer term wastewater needs that are addressed in this Act 537 Plan. Although these communities are not entirely built out, the future growth courses of these municipalities have been fairly well defined over the years, and therefore, although the rates of development may vary based on market conditions, the EDU estimates summarized and presented in this subsection provide a high degree of confidence. The following discussion provides a summary of these short and long term estimates of growth rates which were used to establish the EDU and long term capacity needs of the VFSA.

Some historical perspective on development patterns and growth is provided in Appendix B, which is from the draft Act 537 report prepared in 1994.

Partner Municipalities (Easttown, East Whiteland, Malvern, Tredyffrin, Willistown)

Easttown Township

As of the end of 2005 Easttown had a total of 3,511 EDUs contributing about 1.4 mgd to the VFSA wastewater treatment plant. Easttown estimates that by 2010, there will be an additional 240 EDUs served by the VFSA. The compilation of the near term subdivision growth is listed in Easttown's latest Chapter 94 Report Submittal. The corresponding average daily flow rate projected in 2010 is 1.423 mgd. Thirty years later, by year 2035, Easttown Township projects a total of 4,115 EDUs that will contribute 1.523 mgd to the VFSA system roughly equaling its current treatment plant reserve capacity. Therefore, Easttown projects that additional capacity is not needed to serve their long term growth needs. Table 4-1 is the long term EDU and average daily flows projected by Easttown Township for the next 30 years.

Table 4-1. Easttown EDU/Flow Growth Estimates

Year	Easttown EDU's	Average Daily Flow (mgd)
2005	3,511	1.357
2010	3,751	1.423
2015	3,824	1.443
2025	3,973	1.484
2035	4,115	1.523

It is noted that Easttown has made and is making significant progress is reducing infiltration and inflow (I/I) within their service area.

East Whiteland

At the end of 2005 East Whiteland had a total of 5,393 EDUs contributing about 1.97 mgd to the VFSA wastewater treatment plant. East Whiteland estimates that by 2010, there will be an additional 1,622 EDUs served by the VFSA. The compilation of the near term subdivision growth is listed in Easttown latest Chapter 94 Report Submittal. Virtually the entire area encompassed by East Whiteland will be served by the VFSA at total build out, and East Whiteland expects that the growth rate will be relatively steady for the next 30-years.

Table 4-2 presents East Whiteland's projected EDU and average daily flow rates to the VFSA treatment plant.

Table 4-2. East Whiteland EDU/Flow Growth Estimates

Year	East Whiteland EDU's	Average Daily Flow (mgd)
2005	5,393	1.963
2010	7,015	2.409
2015	8,469	2.809
2025	10,288	3.309
2035	12,469	3.909

The current reserved capacity for East Whiteland is 1.940 mgd compared to an average daily flow of 3.909 mgd. Therefore at build out, East Whiteland will require an additional 1.97 mgd of treatment plant reserve capacity to serve their long term needs.

Malvern Borough

As of the end of 2005 Malvern Borough had a total of 1,658 EDUs contributing about 0.329 mgd to the VFSA wastewater treatment plant. Malvern estimates that by 2010, there will be an additional 52 EDUs served by the VFSA. The compilation of the near term subdivision growth is listed in Malvern's latest Chapter 94 Report Submittal. Malvern's future growth rates are outlined below in Table 4-3.

Table 4-3. Malvern EDU/Flow Growth Estimates

Year	Malvern EDU's	Average Daily Flow (mgd)
2005	1,658	0.329
2010	1,710	0.352
2015	1,730	0.358
2025	1,850	0.391
2035	1,973	0.425

Malvern's current reserve capacity is 0.543 mgd; therefore at build out, Malvern Borough will not exceed its current reserve capacity.

Tredyffrin

At the end of 2005, the total number of EDU's connected to the VFSA system from Tredyffrin was 5,967.

By 2035, Tredyffrin expects additional growth to result in an average daily flow 2.1 mgd resulting from EDU growth of an additional approximate 2,900 EDUs. Tredyffrin's current reserve capacity at the VFSA treatment plant is 2.001 mgd; therefore Tredyffrin will require an additional 0.099 mgd of reserve capacity.

Willistown

As of the end of 2005, the total number of EDU's connected to the VFSA system was 2,521, contributing an average daily flow of about 1.2 mgd. Most of Willistown's growth is expected to occur over the next 5 years and the specific developments are described in Willistown's latest Chapter 94 report. The growth is expected to occur as detailed in Table 4-4.

Table 4-4. Willistown EDU Growth Estimates

Year	Additional Willistown EDUs
2006	285.5
2007	208
2008	242
2009	240.5
2010	59

In the longer term, Willistown estimates their ultimate EDU count to increase by about 10% to 3,075 EDU's in 2035, resulting in an average daily flow rate of 1.348 mgd. The current reserve capacity for Willistown Township is 1.064 mgd, resulting in the need for an additional 0.284 mgd of reserve capacity at the treatment plant.

Member Municipalities (Charlestown, East Pikeland, and Schuylkill Townships)

Charlestown

The VFSA treatment plant serves approximately 549 EDU's in Charlestown Township. Projected future growth in Charlestown Township is outlined by subdivision in Table 4-5. It is expected that by 2015, there will be an additional 336 EDUs and by 2020 there will be another additional 409 EDUs resulting in a total of 1,294 EDUs by 2020. At build out, expected to occur by 2025, it is estimated that there will be another 389 EDUs added, resulting in a total of 1,683 EDUs served by the VFSA treatment plant.

Table 4-5. Charlestown EDU Projection by Subdivision

Drainage Basin	2004 Yr. End EDUs	Platted EDUs as of 12/2004	5 Yr Proj.	Proposed EDUs	10 Yr. Proj.	Undeveloped Land	20 Yr. Proj.	Total EDUs
Lee Tire Blvd. (3010)	301	Commons @ GV	28	Volpi	60	Behind Spring Oak	15	
		DeVault Meats	34	Griffin	33	Across from Spring Oak	6	
		Late Spring Dev.	10	Cellucci	11	Yellow Spring's Road	7	
		Laurabrooke	20	Warner Lane	12	Rte 29 & Chrlstwn. Rd	35	
		Spring Oak Bus. Center	53	Charlestown Saloon	10	North Side of School Farm Residence	1	
				Charlestown Elementary	13	Adj. To Laurabrooke-Phoenix Pike	25	
				20 Single Family	20	DeVault Meats (add'l)	65	
				*DeVault Areas	250	Remaining Acreage throughout basin	198	
Route 401		Charlestown Meadows	191					
Sidley Road	248					Adj. To Chas. Oaks	32	
VALLEY CREEK DB	**549**		**336**		**409**		**389**	**1,683**

Zoning Amendment under consideration by Charlestown Twp.

East Pikeland

The VFSA treatment plant serves approximately 2,600 EDU's in East Pikeland. Projected future growth in East Pikeland Township is outlined by subdivision in Table 4-6. It is expected that by 2015, there will be an additional 260 EDUs and by 2020 there will be an additional 157 EDUs resulting in a total of 3,015 EDUs by 2020. At build out, expected to occur by 2025, there will be a total of 3,117 EDUs served by the VFSA treatment plant.

Table 4-6. East Pikeland EDU Projection by Subdivision

Drainage Basin	2004 Yr. End EDUs	Platted EDUs as of 12/2004	5 Yr Proj.	Proposed EDUs	10 Yr. Proj.	Undeveloped Land	20 Yr. Proj.	Total EDUs
Rte 724 North of Rte 23 - New Act 537 Service Area – added by East Pikeland Twsp		Kimberton Meadows	23	Phoenixville Crossing Schuylkill Rd. Corp.	112 2	Rte 724 @ Rte 23	20	
Kimble Drive (2008)	77	Barn at				Croft	3	
Kimble Drive (3008)	22	Kimberton	2	Campbell Tract	35			
French Creek (2009)	2,384	Brimful Farm	2	Cornerstone Bank	1.0	Emery Oil Co.	3	
French Creek (3009)						Fish & Game		
West Vincent (4009)	88	Coldstream		Fitzsimmons	1.0	Frog Hollow Miller Rd	0	
	27	Crossing	141	French Creek Inn	6	N.	20	
						Hares Hill @ Camp Council		
		Deer Run Lane *	3					
		Henry Co.	3					
		Heritage Coccia	25			Rte 113 - Shelly's	6	
		Kimberbrae	3			Steimer	5	
		Kimberton Square	10			Weinstein	45	
		Kimberton Valley Homes	6					
		Main Line Animal Rescue						
		Miller Machine Shop						
		Pothouse Road	7					
		Shick	3					
		St. Basil	1					
		Western Road	3					
		Yentis	6					
		Kimberton Elementary School	22					
FRENCH CREEK PS	**2598**		**260**		**157**		**102**	**3,117**

Schuylkill

The VFSA treatment plant currently serves approximately 3,058 EDUs in Schuylkill Township. Consistent with the Draft Regional Plan, the Board of Schuylkill Township approved amending EDU projections to include an additional 294 EDUs at build out, plus an additional 63 EDU's for commercial development resulting in about 360 additional EDU's at build out. The Plan estimates this growth to occur at the rate shown in Table 4-7.

Table 4-7. Schuylkill EDU Growth

Time Frame	Additional Schuylkill Twp. EDUs
2005-2010	149
2010-2015	132
2015-2035	76
Total	357

Member Municipality Reserve Capacity

The Member Municipalities' projected capacity requirement at build out of 1.957 mgd, based on the historical flow rate of 240 gpd per EDU, is less than the current reserve capacity of 2.128 mgd. Therefore the Member Municipalities will not require additional reserve capacity at the treatment plant at build out.

Summary

Table 4-8 summarizes the projected EDU counts and corresponding flow rates for the 5, 10, 20 and 30-year projections. Based on the growth estimates presented in the foregoing discussion, in 10-years the capacity required at the treatment plant of approximately 9.73 mgd will exceed the existing plant rated capacity of 9.2 mgd by about 0.5 mgd. Similarly, the plant's rated capacity will be exceeded by 1.41 mgd in 20 years and by 2.24 mgd in 30 years. At that time the capacity needed will be 11.44 mgd.

Table 4-8. EDU and flow projection (Present – 2035)

Municipality	Current Reserved Capacity	Present		5-year		10 year		20 year		30 year	
		2005		2010		2015		2025		2035	
		gpd	Edu	gpd	edu	gpd	edu	gpd	edu	gpd	edu
Partner Municipalities											
Easttown	1,523,000	1,357,000	3,511	1,423,000	3,751	1,443,000	3,824	1,484,000	3,973	1,523,000	4,115
East Whiteland	1,940,350	1,963,000	5,393	2,409,000	7,015	2,809,000	8,469	3,309,000	10,288	3,909,000	12,469
Malvern	543,650	329,000	1,666	352,000	1,710	358,000	1,730	391,000	1,850	425,000	1,973
Tredyffrin	2,001,000	1,128,000	5,996	1,540,000	6,853	1,840,000	7,849	1,970,000	8,432	2,100,000	8,904
Willistown	1,064,000	1,221,000	2,785	1,235,000	2,817	1,281,000	2,922	1,324,000	3,020	1,348,000	3,075
Partner subtotal	7,072,000	5,998,000	19,351	6,959,000	22,146	7,731,000	24,794	8,478,000	27,563	9,305,000	30,563
Member Municipalities											
Charlestown			549	212,400	885	310,560	1,294	403,920	1,683	403,920	1,683
East Pikeland			2,598	685,920	2,858	723,600	3,015	748,080	3,117	748,080	3,117
Schuylkill			3,058	769,680	3,207	801,360	3,339	819,600	3,415	819,600	3,415
VFSA subtotal	2,128,000	1,479,635	6,205	1,668,000	6,950	1,835,520	7,648	1,971,600	8,215	1,971,600	8,215
Trucked waste (365 day basis)		140,000		165,000		165,000		165,000		165,000	
Total Average Daily Flow (mgd)	**9.20**	**7.62**	**25,556**	**8.79**	**29,096**	**9.73**	**32,442**	**10.61**	**35,778**	**11.44**	**38,751**
Additional Capacity Needed (mgd)				**(None)**		**0.532**		**1.41**		**2.24**	

Section 5

Alternatives for Proposed Wastewater Disposal Facilities

Table of Contents **PageNo.**

A1 and A2. Potential for Extending Conveyance Facilities And Providing Treatment to Future Development Areas And Unsewered Areas Within the Planning Area 5-1

A3, A4, and A5. Alternatives for Collection and Treatment Facilities 5-1

- Eliminated Alternatives 5-3
- Retained Alternatives 5-4
- Evaluation of Retained Alternatives 5-10
- Selected Alternative 5-30
- Solids Thickening and Dewatering Capacity 5-30
- STP Improvements 5-37

Appendices:

Appendix D. Preliminary Effluent Criteria

Appendix E. Detailed Cost Breakdown of Alternatives

Figures:

5-1. Centrifuge Production Based on Feed Concentration

5-2. Aerial View of Proposed Modifications to STP

Exhibits:

None

A.1. Perform an evaluation to address the potential for providing sewage treatment service to future development areas and existing development areas, not currently served by public sewer, within the planning areas for the wastewater treatment and disposal facilities.
and
A.2. Perform an evaluation to address the potential for extension of existing Borough conveyance facilities to provide sewer service to future development areas and existing developed areas, not currently served by public sewer, within the planning area.

See section 4 of the Regional Act 537 Plan for the summary of each individual municipality's Act 537 Plan, and refer to each report for more in-depth information.

A.3. Perform an evaluation of the potential for continued use of existing sewage treatment facilities through repair, upgrading, reduction of hydraulic or organic loadings, or improved operation and maintenance practices.
and
A.4. Perform an evaluation to address the potential need for the construction of new sewage treatment or conveyance facilities.
and
A.5. Perform an evaluation to address the potential for repair or replacement of existing collection and conveyance system components.

Background

Section 5 of the Regional Act 537 Plan describes and evaluates a number of alternatives, which would satisfy the future wastewater management needs of the Valley Forge Sewer Authority (VFSA). This section was originally completed in April 2003. Due to age of the flow projections when the Regional Plan was completed, the flow projections of the Member and Partner

municipalities needed to be reviewed and updated. In conjunction with the flow analysis, the Authority elected to review, update and supplement the various wastewater management alternatives previously presented in Section 5 of the 2003 Plan. Due to the comprehensive nature of the new evaluation, Section 5 was completely rewritten.

In 2005, an Ad Hoc committee was formed for the purpose of reviewing and assisting the VFSA in establishing future capacity needs in accordance with the Act 537 planning process, and in the selection of the optimal strategy for subsequent engineering and implementation. The committee consisted of representatives from Schuylkill Township as well as VFSA staff, Authority members, and the engineer of record, Buchart-Horn, Inc.

Flow projections have been updated in Section 4 of this Regional Act 537 Plan and describe the projected capacity needs over the next 30-years. The original design of the VFSA wastewater treatment plant was based on a capacity of 8 MGD. In 2000, the plant was rerated to 9.2 MGD. Future average flow rates are projected by this Act 537 Plan to be as follows:

Table 5-3. Projected Average Flowrates.

Years	Projected Flow Capacity Needed (MGD)
Current	7.6
10	9.7
20	10.6
30	11.52

Section 5 describes the process by which the concept strategy for the optimal alternative was determined. A series of committee meetings were held in 2005 for the purpose of identifying potential alternatives for the required capacity. This list, known as the "long list", was finalized at a committee meeting on June 29, 2005.

Screening of Alternatives

Following the establishment of the "long list", the committee met Thursday, August 11, 2005 at VFSA with the objective of reviewing the draft flow projections and screening out those alternatives which were not worthy of further study because they were either not feasible, too costly, or in some other way, not practical. The result of this work was a manageable "short list" of alternatives requiring a more detailed technical evaluation.

Technical reasons for screening from the long list were identified and discussed to assure that there were no alternatives eliminated unless the committee could say with reasonable certainty, that further evaluation was not warranted. The long list is summarized below along with the results of the screening evaluation performed on August 11, 2005. The alternatives are presented in two categories: Eliminated Alternatives, and Retained Alternatives (those considered viable for further evaluation).

Eliminated Alternatives

Alternative 1 - Enter into an agreement for a privately owned and operated wastewater treatment plant (partial capacity need alternative)

This alternative consists of utilizing a privately owned treatment plant to provide service to VFSA customers. While developers have constructed such facilities elsewhere, there are no such treatment plants that can provide the needed capacity to the VFSA at the present time. Plans for any such future facilities are too undefined to evaluate in detail. Accordingly, Alternative 4 was eliminated from further evaluation.

Alternative 2 - Construct a satellite facility at Church Farm School and spray irrigate the property

This alternative consists of a new satellite wastewater treatment plant to be located at the location of the Church Farm School near Route 30 in East Whiteland Township. The treated wastewater effluent would be used to spray irrigate the property.

This alternative was eliminated from further evaluation for the following reasons:

1. Conveyance distances would require significant construction costs.
2. The amount of property needed to meet spray irrigation requirements and store wastewater during the winter is significant and would not be cost effective or practical.
3. Public acceptance of such a facility will be difficult to obtain due to concerns for airborne aerosols from wind action.

Alternative 3 - Encourage the sale of capacity among partner municipalities

This alternative consists of selling or exchanging existing treatment capacity from those partners with excess capacity to those who require capacity. Such exchanges would make more efficient use of the existing STP's capacity. This alternative was eliminated from further consideration, because even if the most efficient use of capacity were accomplished through agreements between partners, this alternative would not provide a sufficient amount of needed capacity to meet the VFSA's future needs.

Alternative 4 - Encourage the partner municipalities to divert their flows to other Townships

This alternative consists of partner municipalities (East Whiteland, Easttown, Malvern, Tredyffrin, and Willistown Townships) diverting wastewater flows that would have otherwise been conveyed to the VFSA for treatment, to other townships that are not part of the VFSA. Based on conversations with Partner representatives it does not appear that the partners of the VFSA would support such an alternative. Accordingly, this alternative was eliminated from further consideration.

Retained Alternatives

The following alternatives identified by the Ad-Hoc committee were considered feasible for further evaluation.

Alternative 1 – Purchase Capacity at another Wastewater Treatment Plant

Alternative 1 consists of diverting wastewater from the VFSA to another treatment plant owned and operated by a nearby authority. This alternative would be accomplished by diverting existing

wastewater pumping station flow through a new conveyance line toward the treatment facilities of the nearby authority. An inter-municipal agreement for the required conveyance and treatment service would be established with the nearby authority.

Authorities considered as candidates for a municipal agreement consisted of Phoenixville, Oaks, Spring City, Upper Merion, and East Vincent.

Advantages

- The existing VFSA wastewater treatment plant stays essentially the same. Rented capacity means that the VFSA will be paying for another authority to treat some or all of our additional wastewater treatment capacity needs.
- Odor potential can be kept to existing locations where it can be most cost effectively controlled. Odors resulting from the additional flows are off loaded to a "landlord."
- Bureaucratic and siting difficulties may be minimized, since the treatment plant for which the VFSA would be purchasing capacity already exists.

Disadvantages

- Costs will be established by the "landlord," and will escalate based on their management capability. VFSA would lose this degree of cost control. Costs will potentially escalate at a higher rate than those alternatives where VFSA operates all of their own wastewater treatment facilities for the needed capacity.
- Depending on the specific alternative, significant capital costs will be incurred for new wastewater conveyance lines and pumping station modifications.
- Right-of-Ways and condemnation costs for new wastewater conveyance could be significant and time consuming.
- This alternative may not provide sufficient capacity to meet the VFSA's long term needs.

Alternative 1 – Results of Screening

Capacity from Phoenixville was retained for further evaluation. Phoenixville's management staff indicated that they would supply the required information for the VFSA to do a feasibility study. Flows may be diverted from either VFSA's French Creek Pump Station or the Pickering Creek

Pump Station to Phoenixville, resulting in capacity of about 0.6 MGD or 1.0 MGD, respectively. Eliminated from further evaluation were the following variations of Alternative 1:

- Lower Perkiomen Valley Regional Sewer Authority (Oaks)
  Although discharging some or part of the wastewater flow to the Lower Perkiomen Valley Regional Sewer Authority (LPVRSA) would be feasible, the LPVRSA Board of Directors decided that they were not interested in pursuing this option in detail. Their position is documented in a Letter from Barbara Cepko to the VFSA dated August 15, 2005.
- Upper Merion
  The pumping distance was (approximately 6.8 miles) considered too great to make this option economically feasible.
- East Vincent
  The pumping distance (approximately 5.8 miles) was considered too great to make this option economically feasible.
- Spring City
  This treatment facility does not have the capacity to accommodate the quantities of wastewater that would be needed if the French Creek Pump Station (FCPS) were diverted to Spring City. The FCPS is the closest VFSA pumping facility to the Spring City plant.
- Wilson Road Pumping Station Location
  Treated wastewater would have to be discharged into a high quality stream (Valley Creek), or a new conveyance line leading to a Schuylkill River outfall would have to be constructed at a considerable expense. This option would not be economically feasible compared to the other available alternatives.

Alternative 2 – Construct a Satellite Treatment Facility – Discharge near Cromby

This alternative consists of constructing a satellite wastewater treatment plant at a location that is separate from the existing plant and in one of the incorporating municipalities. Potential sites consist of the area around the FCPS and at or near the Cromby electrical power generating plant. If the satellite treatment plant were constructed near the FCPS, then the treated effluent would be pumped to the Cromby site where it would be discharged to the Schuylkill River after being combined with the treated discharge from the electrical power plant. If the treatment plant were

constructed at the Cromby site, untreated wastewater would be pumped from the FCPS to the Cromby site where it would be combined with the power plant's untreated wastewater and treated by a new satellite wastewater treatment plant.

Constructing a new treatment plant near the FCPS with discharge to the French Creek was considered as a separate alternative, but it was not considered to be feasible because of the higher quality requirements for the treated wastewater that would be imposed for new treated wastewater discharges to the French Creek. Accordingly, this alternative was eliminated from further consideration.

Advantages

- The VFSA would maintain control of all its capacity and does not relinquish this to a "landlord." This assures stability of management and control.
- The existing wastewater treatment plant would stay essentially the same for a period of time until the capacity of the existing plant and the Cromby plant is exceeded. The expected time period is approximately 10 years. All initial improvements would be at the new location.
- Some electrical and other operating costs would be saved because pumping distances and "cascade" pumping would be reduced. Currently, the FCPS discharge is pumped through three additional pumping stations before it reaches the existing VFSA treatment plant.

Disadvantages

- There would be administrative considerations to locating a new wastewater treatment plant such as permitting and siting.
- The new treatment plant location would only address a portion of the ultimate needs of the VFSA. Approximately 0.6 MGD could be delivered from the FCPS compared to the capacity needs of about 3 MGD as outlined in Replacement Section 5.
- There would be significant capital costs for construction of a new wastewater treatment plant, which would probably be greater on a cost per gallon basis than most of the plant expansion strategies outlined in the description of Alternative 3.

- Odors could be a potential problem from two locations and not just one. This is especially true if the satellite wastewater treatment plant were constructed near the FCPS, which is in close proximity to an outdoor shopping mall and a fished stream.
- The scale economy of one large treatment plant would not be enjoyed; instead, the Authority would be constrained to two separate facilities, including a smaller plant that would be generally less efficient on the cost to treat per gallon.
- Laboratory services would have to practically double in number of analysis performed. In addition, samples would have to be transported to the existing laboratory.
- Transport of sludge to the existing treatment plant would result in additional truck traffic, labor costs, and additional operating costs for the VFSA versus alternatives that do not include two wastewater treatment plants.
- In general, operating costs would be higher with two treatment plants versus one treatment plant.

Alternative 2 - Results of Screening

Alternative 2 was retained for further evaluation.

Alternative 3 - Increase capacity at the existing treatment plant maintaining a single discharge point

This alternative consists of providing additional capacity to the existing treatment plant through some combination of newly installed and constructed process equipment, or technological improvements to existing equipment. Several variations on this approach could be used to meet either long term or short-term capacity needs depending on the time frame of implementation. Variations on this alternative could be implemented to provide either partial or the total additional capacity needed. The options within this approach may range from converting the existing process to a more efficient process thereby gaining more capacity without adding in kind additional tanks and process equipment thereby gaining capacity while using the same technology.

Advantages

- The operating costs are likely to be less than those alternatives that are being evaluated which include a satellite plant. Maintenance costs will be reduced since all preventative and repair functions will be carried out in one location with a smaller staff.
- Management control would be kept in the hands of the VFSA. This is an advantage versus those alternatives that include an inter-municipal agreement where future pricing would be in the control of those providing the service.
- Sludge processing would be operated and maintained at the one existing location where there is existing capacity versus other alternatives where sludge may have to be processed at a separate location.
- Odor potential resulting from VFSA wastewater can be kept to one location where it can be most cost effectively controlled. This is an advantage over alternatives that include a satellite treatment plant where expenses and problems resulting from odors may result from two separate treatment plant locations.
- Potential for permit violations is minimized with one discharge point and one permit. Similarly environmental liability is limited to one location and controlled entirely by VFSA.
- Laboratory analysis and monitoring/permitting administration efforts are minimized. Assuming that the discharge permits conditions for monitoring would be similar to VFSA's existing permit, the monitoring requirements and associated expense for a satellite plant may nominally double.
- Discharge to the Schuylkill River is the least restrictive alternative from a regulatory perspective.

Disadvantages

- The existing wastewater treatment plant would get marginally larger depending on the specific alternative that is selected.
    - There could be as many as one more primary clarifier, aeration tank and secondary clarifier.
    - A third primary clarifier, assuming no additional process changes, may result in the potential of creating more odors.

- Additional sludge processing would result in the potential of generating additional odors, although these sources can be readily controlled.

Alternative 3 - Results of Screening

Alternative 3 was retained for further evaluation. It was decided to evaluate a broad range of Alternative 3 capacity upgrade strategies - from those that upgrade the technology to provide additional capacity while minimizing additional tankage and mechanical equipment, to those that use the same technology and expand upon the existing plant "in kind".

Evaluation of Retained Alternatives

The results of the evaluation identified alternatives that would be evaluated in further detail. This section presents the analysis of the retained alternatives, which are as follows:

Alternative 1 – Pump wastewater from the member municipalities (Schuylkill, East Pikeland, and Charlestown Townships) to the existing Phoenixville wastewater treatment facility for treatment. Such a strategy would require that appropriate conveyance facilities be constructed by VFSA at their expense. A contract for service would be negotiated and executed between the VFSA and Phoenixville. The two (2) options considered within this study include:

Alternative 1a - Diversion of flows from the French Creek Pump Station to Phoenixville's French Creek Interceptor, and

Alternative 1b - Diversion of VFSA's Pickering Creek Pump Station flow directly to the Phoenixville Wastewater Treatment Plant.

Alternative 2 – Construction of a new "satellite" wastewater treatment plant. Two options were considered within the Alternative 2 strategy.

Alternative 2a - Locating the plant near the French Creek Pump Station and conveying the treated wastewater to the Exelon's Cromby Facility for commingling and discharge with Exelon's existing wastewater treatment plant effluent.

Alternative 2b - Conveying the untreated wastewater from the French Creek Pump Station to the Cromby site. The new satellite treatment plant would be located at the Cromby site.

Alternative 3 – Expand the capacity of the existing VFSA wastewater treatment plant by providing the improvements and capacity upgrades that would be required to meet additional capacity requirements. Within Alternative 3, this study considers a range of capacity upgrade strategies ranging from conversion of the existing complete mix process to step feed, to expansion of the existing treatment process in kind by way of adding more primary, aeration, and secondary settling tanks. The sub-alternatives are described as alternatives 3a, through 3e.
Alternative 3a - Conversion of the existing complete mix activated sludge process to a step feed process.

Alternative 3b - Conversion of the existing complete mix activated sludge process to a step feed process and add a 4th secondary clarifier.

Alternative 3c -Add a 2nd aeration tank, a 4th secondary clarifier, and a 3rd primary settling tank.

Alternative 3d - Innovative alternatives such as the use of media processes

Alternative 3e - Add a 2nd aeration tank and a 4th secondary clarifier.

The alternatives described above are general strategies intended to provide a technically sound basis for a conceptual evaluation. Once a general strategy is selected, the specific concept needs to be developed to an appropriate level of detail prior to beginning implementation and the detailed design.

For this evaluation, the preliminary effluent criteria provided by PADEP, included in Appendix D, is used for evaluation of the alternatives. The present treatment plant's discharge permit has requirements for the removal of carbonaceous biochemical oxygen demand (BOD), total suspended solids (TSS), and ammonia. These limits require nitrification to take place in the

treatment plant and nitrification is the current limiting factor in the biological treatment process at the Authority's existing facility.

At this time, the Authority understands that PADEP has not imposed denitrification requirements on any wastewater treatment plants located along the Schuylkill River. However the potential for additional denitrification was considered in the detailed evaluation of alternatives.
It is important to note that the existing gravity thickeners are generally overloaded on the basis of solids load mainly as a result of trucked wastewaters. Sludge thickening and dewatering capacity is discussed later in Section 5. In spite of the present shortfall condition in thickening capacity because of trucked in wastewaters, the VFSA has been routinely meeting its discharge permit requirements. However it is noted that the current shortfall in thickening capacity is an item that should be addressed in any expansion capacity strategy. In 2005, approximately one-half (½) of all solids processed at the VFSA wastewater treatment plant originate from trucks discharging to the treatment plant's septic dump station. Accordingly any plant expansion alternative should consider in detail, the impact that trucked wastewaters have on the treatment process. At a minimum, additional gravity thickening and a 3rd dewatering device should be utilized if VFSA is to expand its capacity while maintaining or growing its current level of trucked wastewaters accepted at the plant.

Such consideration of solids handling and processing should also include a detailed evaluation of what ancillary upgrades, if any, need to be implemented if a technology upgrade is to be utilized for biological wastewater treatment. For example, use of Integrated Fixed Film Activated Sludge (IFAS), discussed in a following subsection may be optimal; however this option may require additional separate treatment of septage, and pretreatment to eliminate screenable wastes. Such factors need to be considered in greater detail than what is provided in the context of this conceptual alternatives analysis.

VFSA also has the ability to reduce the amount of trucked wastes accepted at the treatment facility. Although this may not be preferred, but it offers the Authority some flexibility in the evaluation of alternatives associated with solids handling.

Existing Wastewater Treatment Plant Capacity

PADEP approved capacity of the VFSA STP at 9.2 MGD. This capacity was the result of the plant rerate from 8.0 MGD to 9.2 MGD approved by the PADEP in 2000. To support the rerate to 9.2 MGD, Buchart-Horn (B-H) prepared a report entitled, "Re-rate Feasibility Evaluation for the Valley Forge Sewer Authority, July 1997". The evaluation included an assessment of the capacity and recommended upgrades of each individual component of the existing wastewater treatment plant to achieve a capacity upgrade from 8.0 MGD to 9.2 MGD. The results of the assessment are summarized in Table 7 of the report, reprinted as Table 5-1, below.

Table 5-1. Process Unit Capacity

Process Unit	Actual Capacity	Proposed Capacity for Re-rate	Comments
Influent Structure	21.4 MGD	9.2 MGD	No modifications required
Primary Clarifiers	10.0 MGD	9.8 MGD	No modifications required
Aeration Basins	12.0 MGD	9.5 MGD	Requires additional oxygen supply to satisfy nitrification requirements. Consideration to be given to baffling the tank to provide plug flow versus complete mix.
Final Clarifiers	10.3 MGD	9.5 MGD	Modify return sludge drawoff nozzles on FC Nos. 1 and 2.
Chlorine Contact Tank	11.0 MGD	9.4 MGD	Raise effluent weir to increase sidewater depth and use additional available tankage and pipe at tank inlet for contact time.
Gravity Thickeners	44,964 ppd 2.997MGD	34,847 ppd 0.66 MGD	Convert the existing decant tank for use as a third gravity thickener.
Primary Sludge Pumps	10.5+ MGD	9.6 MGD	No modifications required
Return Sludge Pumps	84%	45-70%	No modifications required
Waste Sludge Pumps	10.5+ MGD	9.5 MGD	No modifications required
Sludge Dewatering	43,200 ppd	31,657 ppd	No modifications required

The 1997 evaluation included recommended upgrades to be considered or needed to rerate the plant to 9.2 MGD, as follows:

1. Consider baffling the aeration tanks to achieve more efficient plug flow conditions versus the existing complete mix system.
2. Modify the return sludge draw off nozzles on final clarifiers No. 1 and 2.
3. Convert the existing decant tank for use as a third gravity thickener.
4. Raise the effluent weir of the chlorine contact tank to increase side water depth and use additional available tankage and tank inlet pipe to provide additional contact time.

Following that evaluation, a field study was performed to document that there is sufficient aeration capacity for a rated treatment plant capacity of 9.2 MGD with no tank modifications. The results of this evaluation, indicating that no additional aeration tanks were needed at an average daily flow of 9.2 MGD, were approved by PADEP.

Items 2 through 4, above were designed by B-H for the VFSA and installed under a construction permit issued by PADEP. Following the conversion of the decant tank (DT) to a thickener, this tank was then converted to a septage holding tank for better solids equalization capacity for trucked in wastewaters. This conversion reduced thickening capacity back to pre-rerate levels. As a sludge thickener, the DT tank did not achieve underflow sludge concentration sufficient for its continued use as a thickener.

After completion of the re-rate improvements, the "actual" capacities of the individual process units within the existing plant range from 9.2 MGD to 21.4 MGD. The current limiting processes consist of the aeration tanks, final clarifiers, and chlorine contact tank, each with an "actual" capacity of about 9.5 MGD. The next limiting process is the primary clarifiers, which have an "actual" capacity of 9.8 MGD. However starting in 2002 through mid-April of 2004, the VFSA operated consistently at an annual average flowrate of about 7 MGD with only one primary clarifier in service while producing effluent that consistently met effluent requirements.

For the purposes of this plant expansion evaluation, it is assumed that all alternatives would include new ultraviolet (UV) disinfection to replace the existing chlorination/dechlorination

system. Although VFSA has operated the chlorination system with no major incidents since the facility was started up in the mid-70s, future regulatory requirements relating to risk management have motivated many similar facilities to upgrade to UV disinfection. VFSA would require additional chlorination/dechlorination capacity to meet its long term future needs, and it would therefore be timely to upgrade their disinfection system concurrent with the capacity expansion.

Alternative 1 – Construct a New Satellite Wastewater Treatment Plant

Alternative 1 consists of constructing a new wastewater treatment facility that would treat wastewater flows from the French Creek pumping station's service area. This treatment plant would contain all capability to treat wastewater and discharge the treated wastewater into the Schuylkill River at or near the existing Exelon Cromby wastewater treatment plant outfall. Because of the relatively small size of the satellite treatment plant, there would be no solids treatment other than thickening to about three (3) percent solids. The solids from the satellite plant would be trucked to the existing plant for processing and dewatering. Processing and dewatering of sludge at the satellite plan would require additional facilities. It would also require more operating labor to manage biosolids processing at two separate locations, and therefore this option was not considered in detail.

For purposes of defining the costs associated with this alternative, it is assumed that:

- A fully automated sequencing batch reactor treatment plant would be utilized at the satellite facility. This is a fairly common technology for new wastewater treatment facilities of this size.
- Liquid sludge at a production rate of about 5,000 gallons per day would be trucked from the satellite plant to the VFSA treatment plant for processing.
- The existing plant laboratory would perform routine effluent analysis, and the VFSA would have to maintain a second discharge permit for the satellite facility, resulting in additional laboratory labor and supply costs.

For estimating lifecycle costs, it has been assumed that Alternative 1a would require the following upgrades at the existing VFSA plant after 10 years of operation:

- New UV disinfection.

- A fourth secondary clarifier.
- Conversion of the aeration system to step feed similar to Alternative 3a.

Further, it was assumed that operating costs would not vary significantly between this alternative and Alternative 3 (existing plant expansion) because of increased flows from growth that would occur 10 years into the future and beyond.

Advantages

- The major advantage of this alternative is that there would be less expansion needed at the existing plant.
- There would be some marginal power savings associated with pumping wastewater from the French Creek pumping station to the new satellite plant instead of to the existing VFSA treatment plant by way of four pumping stations in a cascading series.

Disadvantages

- The costs to operate and maintain two treatment plants would be greater than one treatment plant. The potential economy of scale of one treatment plant versus two would be lost. Additional operating cost items consist of:
  1. Trucking sludge from the satellite plant to the existing plant. This operation would require either VFSA to pay a licensed tank truck driver or contract for this service.
  2. Travel time for personnel to operate and maintain the satellite plant.
  3. Maintenance of two discharge permits, including the required laboratory services and the related regulatory risks.
  4. The potential of the satellite plant as a second odor source. In addition, the existing Pothouse, Whitehorse, and Pickering pump stations would have to be modified to accept flow rates that were well below their design capacity. Failure to adequately address this problem would result in the pumping stations becoming problematic sources of odor and potential increase in corrosion of concrete wet wells and other concrete structures.
  5. An average flow of only about 0.7 MGD could be delivered from the French Creek station. This rate is not sufficient to meet VFSA's long-term needs. Such an

approach would be marginal in meeting VFSA's 10-year needs and is a disadvantage of this alternative.

Alternative 2 – Pump Wastewater to Phoenixville for Treatment

Alternative 2 consists of rerouting the wastewater that is currently pumped to the existing VFSA WWTP to the existing Phoenixville Wastewater treatment plant. There are 2 subalternatives considered:

Alternative 2a – Pump wastewater from the existing French Creek Pump Station to Phoenixville's French Creek Intercepting Sewer, which feeds the Phoenixville Wastewater Treatment Plant

Alternative 2b – Pump wastewater from the existing Pickering Creek Pump Station to the Phoenixville Wastewater Treatment Plant.

Alternative 2a - Pump Wastewater from the Existing French Creek Pump Station to Phoenixville's French Creek Intercepting Sewer which feeds the Phoenixville Wastewater Treatment Plant

Alternative 2a would require the following components:

- Construction of a conveyance line from the existing French Creek Pump Station to Phoenixville's French Creek Intercepting Sewer.
- Modifications of the VFSA's French Creek pump station to divert flows to the new conveyance line.
- Construction of additional capacity at the Phoenixville WWTP.

Buchart-Horn estimates that the construction costs for the conveyance line and pump station modification would be approximately $2 million. All detailed cost estimates are in Appendix D.

In addition, an average flow of only about 0.7 MGD could be delivered from the French Creek station to Phoenixville. This would be insufficient to meet VFSA's long-term needs. Such an

approach would be only marginal at best in meeting VFSA's 10-year needs, and inadequate for long-term needs without additional capacity from another source.

Phoenixville provided the following estimates for connection and treatment costs for their system:

Tapping Fee	$7.40/gallon
Treatment Cost	$2.56/1000 gallons

These costs were used in calculating this alternatives capital and life cycle cost. For estimating lifecycle costs, it has been assumed that Alternative 2a would require the following upgrades at the VFSA plant after 10 years of operation:

- New UV disinfection.
- A fourth secondary clarifier.
- Conversion of the aeration system to step feed similar to Alternative 3a (plant expansion).

Further, it was assumed that operating costs would not vary significantly between this alternative and Alternative 3 because of increased flows from growth that would occur 10 years into the future and beyond.

Advantage

- VFSA's needs for expansion at the existing treatment plant would be delayed. As discussed above, it does not appear as if there would be sufficient capacity provided from diverting wastewater flows from the French Creek Station away from the VFSA treatment plant.
- There would be some marginal savings in operating costs related to power saved from eliminating the multiple pumping of the French Creek Pump Station flow through the VFSA cascading system.

Disadvantages

- A major disadvantage of this alternative is the higher capital and operating cost. The commercial rates charged by Phoenixville based on their rate schedule results in capital

and operating cost that are prohibitive relative to the alternatives that include an expansion in capacity at the VFSA treatment plant.

- As a customer of another municipality, VFSA would lose some control over the service that is provided to their customers. There is a risk that cost for service would escalate at a higher rate than for those alternatives where VFSA provides all of the wastewater conveyance and treatment service.
- This alternative does not completely satisfy the long-term wastewater management needs of the VFSA without providing future expansion facilities at the VFSA plant.

Alternative 2b - Pump Wastewater from the Existing Pickering Creek Pump Station to the Phoenixville Wastewater Treatment Plant

Alternative 2b would require the following components:

- Construction of a conveyance line from the existing Pickering Creek Pump Station to Phoenixville's Wastewater Treatment Plant.
- Modifications of the VFSA's Pickering Pump Station to divert flows to the new conveyance line.
- Construction of additional capacity at the Phoenixville WWTP.

Buchart-Horn estimates that the construction costs for the conveyance line and pump station modification would be approximately $2 million. If flow were diverted from the Pickering Creek Station, adequate capacity would exist for VFSA's service capacity for more than 10 years. The total capacity of the existing plant and the Pikering diversion provides 10.6 MGD and the 10-year need is 9.9 MGD. This only provides a marginal amount of safety factor at best.

The cost to connect and treat wastewater at Phoenixville under this alternative is the same as that for Alternative 2a.

For estimating lifecycle costs, it has been assumed that Alternative 2b would require the following upgrades at the VFSA Plant after 10 years of operation:

- New UV disinfection.

- A 4th secondary clarifier.

Further, it was assumed that operating costs would not vary significantly between this alternative and Alternative 3 because of increased flows from growth that would occur 10 years into the future and beyond.

Advantages

The advantages of Alternative 2b are that the VFSA's needs for expansion at the existing treatment plant would be delayed and reduced.

Disadvantages

- A major disadvantage of this alternative is the higher capital and operating cost. The commercial rates charged by Phoenixville as indicated in their rate schedule would result in capital and operating costs that were prohibitive relative to the alternatives that include an expansion in capacity at the existing VFSA treatment plant.
- As a customer of another municipality, VFSA would lose some control over the service that is provided to their customers. There is a risk that cost for service would escalate at a higher rate than for those alternatives where VFSA provides all of the wastewater conveyance and treatment service.
- Unlike Alternative 2a, there would not be any savings resulting from lower power usage at the pump stations. All four components of the cascade pumping system (i.e., French Creek, Pothouse, Whitehorse, and Pickering Creek pump stations) would still be necessary.

Alternative 3 – Expand Capacity of Existing VFSA STP

As noted previously, there are a number of ways that capacity expansion can be achieved, ranging from conversion to step feed, the use of fixed media processes, use of membrane processes, and/or provisions of additional tanks in kind. For this study, the following options were included for evaluation:

Alternative 3a - Conversion of the existing complete mix activated sludge process to a step feed process.

Alternative 3b - Conversion of the existing complete mix activated sludge process to a step feed process and add a 4th secondary clarifier.

Alternative 3c - Add a 2nd aeration tank, a 4th secondary clarifier, and a 3rd primary settling tank.

Alternative 3d - Innovative alternatives such as media processes.

Alternative 3e - Add a 2nd aeration tank and a 4th secondary clarifier.

Alternative 3a – Step Feed Process Conversion

Alternative 3a consists of the converting the existing complete mix process to step feed. As described in the "Biological Process Evaluation" by BCM Engineers prepared August 2004, "Step feed is a modified operating procedure that is feasible in the existing activated sludge tankage."

A similar strategy was proposed by Buchart-Horn in their "Rerate Feasibility Study". The BCM study concluded that if the existing process were converted to step feed, then the existing treatment plant could adequately treat up to 11 MGD of wastewater with the same or more operating flexibility as exists at present. However, while this is readily possible from a biological kinetics perspective, an increase of influent flow beyond current levels will present difficulties in the operation of the secondary clarifiers. Conversion to step feed would require that the current mixed liquor suspended solids (MLSS) concentrations be maintained at approximately the same levels while average daily influent flows increased to 11 MGD. There would be potential losses in operating flexibility in the secondary clarification process which is likely to result in risks to consistently meeting effluent permit requirements for total suspended solids (TSS).

It is noted that if the treatment plant were converted to a step feed process, according to the PADEP's "Domestic Wastewater Facilities Manual", additional secondary clarification will be necessary to treat an average daily flow of 11 MGD.

As discussed previously, trucked wastewaters also present potential impact to the aeration and secondary clarification process that would not exist if the treatment plant only treated its connected customers. Alternative 3a is the plant expansion alternative with the least operating flexibility and as a result would be impacted the greatest.

While the potential for loss of operating flexibility exists, implementation and testing of the step feed process can be performed well before the time additional capacity is actually needed. By implementing this alternative in the near future, the VFSA will be able to gain a better idea as to whether the loss of operating flexibility will be significant.
Alternative 3a may be feasible for flow rates of up to 10 MGD if chemical precipitation is added in the primary tanks in addition to a conversion to step feed. Ferric chloride can be added to the treatment plant influent. Chemical addition with appropriate detention time and mixing upstream of the primary settling process would serve to precipitate additional amounts of colloidal biochemical oxygen demand material which would normally pass through the primary settling process and require biological treatment in the aeration system. Instead of passing through the primary treatment process, these precipitated solids would be settled, collected, and removed upstream of the biological process thereby reducing the biochemical oxygen demand on the downstream secondary system. This strategy would provide additional biological treatment capacity without an increase in additional new tanks and their associated capital cost. However, the operating costs associated with chemical addition are significant.

Enhanced primary treatment by chemical addition will reduce the amount of waste activated sludge (WAS) that is produced in the process since the loading to the aeration system is reduced. WAS is generally difficult to dewater, however the additional precipitated metal-containing solids that occur in the primary settling process are similarly difficult to dewater. For this evaluation, it was assumed that these two changes would offset each other. However, the specific impact that plant expansion has on the solids processing would need to be evaluated in detail in the context of the long-term solids management plan at VFSA.

For estimating lifecycle costs, it has been assumed that Alternative 3a would require the addition of a fourth secondary clarifier after 10 years of operation.

Advantages

- The advantage of this alternative is that it may be initially implemented without the addition of new tanks and their associated capital cost up to an average daily flow of 10 MGD. According to the evaluation performed by BCM engineers, the process will provide 11 MGD of rated capacity for the aeration tank, not including any additional capacity that may be gained by improvement to primary settling via chemical addition. According to the Regional Act 537 flow projections, 11 MGD would provide for VFSA's capacity needs up to about 2030. However, treating influent flow beyond 10 MGD (about 2020) without a fourth secondary clarifier poses an unacceptable risk.
- Capital costs are delayed or avoided for an extended period of time if growth projections do not materialize as planned.
- Alternative 3a utilizes technologies that are the same or similar to those currently used at the wastewater treatment plant. No major operating or maintenance changes would need to be implemented.
- Alternative 3a may be implemented and tested before the capacity is actually needed. If it is found to be acceptable to meet the VFSA's intermediate term capacity needs, then additional wastewater treatment plant upgrades may be postponed or only constructed when long-term development occurs. Implementation of Alternative 3a may enable VFSA to meet its long-term capacity needs without additional tanks and with minimal chemical addition for an extended period of time; especially if development growth does not occur at the rate that is projected. However, it is important to evaluate whether this alternative will be able to consistently meet effluent quality requirements.

Disadvantages

- From an operating perspective, Alternative 3a may be acceptable as an interim step, however, assuming that long-term growth projections materialize as projected, plant additions beyond those included in Alternative 3a would be needed in the future.
- This alternative has the least operating flexibility and therefore is the Alternative with the most risk. It is also subject to negative effects resulting from the trucked wastewater business.

- Alternative 3a is unlikely to provide sufficient treatment plant capacity if a future regulatory requirement for denitrification is imposed by PADEP. A significant plant upgrade would be needed at that time.
- Operating costs would increase due to chemical costs which are significant. Process optimization may result in lower costs for chemicals, however increases in chemical costs, due to increasing commodity prices may also offset this process optimization.
- The potential for chemical costs to increase over time are a disadvantage compared to those alternatives that include higher capital cost but lower operating costs. The chemical sludge could also impact upon VFSA's successful land application program for biosolids.
- The biological treatment process increase in capacity would be gained from conversion by a complete mix to step feed. Although the gain in capacity would be achieved according to biological kinetics, the step feed process is not as resistant to upsets compared to the present complete mix process which is the optimal process for avoiding process upsets. Some loss of operating flexibility would occur.
- This alternative may be subject to upsets in the biological system from trucked wastewaters due to fluctuating organic loads. The present complete mix system is more forgiving to inconsistent influent characteristics as compared to step-feed.

Alternative 3b - Conversion of the existing complete mix activated sludge process to a step feed process and add a 4th secondary clarifier.

Alternative 3b is the same as 3a, except that Alternative 3b includes the addition of a 4th secondary clarifier that is similar in capacity to secondary clarifier No. 3. With the fourth clarifier there would not be a loss in operating flexibility from additional hydraulic loading to the secondary clarification system. Provided the conversion to step feed maintains nitrification with no loss of operating flexibility, the VFSA would be able to achieve a rated capacity of 11.3 MGD which is sufficient to meet its capacity needs until about 2030.

<u>Advantages</u>

- Alternative 3b includes all of the advantages as Alternative 3a. The process would utilize processes that are similar to those that are currently practiced at the present wastewater

treatment plant. Alternative 3b would readily achieve the capacity needed through 2024 of 11.3 MGD.

- Alternative 3b is not expected to require chemical addition to the primary tanks, and therefore these significant operating costs could be avoided.
- The presence of a 4th secondary clarifier provides a considerable amount of operating flexibility, which would not exist with alternative 3a. Therefore it is inherently less risky.

Disadvantages

- The biological treatment process increase in capacity would be gained by conversion from a complete mix to step feed. Although the gain in capacity would be achieved according to biological kinetics, the step feed process is not as resistant to upsets compared to the present complete mix process. Some loss of operating flexibility would likely occur.
- Alternative 3b which includes conversion to step feed, would be subject to upsets to the biological system from trucked wastewaters. To some extent the impacts would be partially mitigated by additional secondary settling capacity, but not entirely. The present complete mix system is more forgiving to inconsistent influent characteristics compared to step-feed.
- The inclusion of a fourth secondary settling tank is a significant capital cost compared to Alternative 3a.
- Alternative 3b would not provide the capability of denitrification. If future denitrification were required, additional aeration tank capacity would have to be provided in the future.
- Alternative 3b does not include additional primary settling capacity. However, it is noted that in 2002 through mid April of 2004, the VFSA STP routinely operated with one of the two primary clarifiers out of service at an annual average daily flow of about 7 MGD. Therefore the operating data suggests that additional primary clarification is not needed.

Alternative 3c - Add a 2nd aeration tank, a 4th secondary clarifier, and a 3rd primary settling tank

Alternative 3c is the same as Alternative 3e except that it includes the addition of a third primary clarifier. This alternative would essentially increase the primary clarification capacity by 50%,

aeration capacity by 50%, and the secondary clarification capacity by 33%. This alternative nominally provides the treatment plant with a rated capacity that is well beyond the 30-year projected capacity requirement. It would do so utilizing the same flexible technology extended air activated sludge that was part of the original plant design. No significant different O&M procedures would be needed.

Advantages

- Alternative 3c would enable VFSA to upgrade to a denitrification plant with minimum future changes, should this become a future effluent permit requirement.
- Of all the options considered within Alternative 3, 3c is the alternative that features the maximum amount of operating flexibility.
- If Alternative 3c is implemented, it is unlikely that VFSA would ever need to add additional tanks into the foreseeable future.

Disadvantages

- Although providing the maximum operational flexibility, Alternative 3c would have the highest capital cost.
- The addition of a 3rd primary clarifier may result in the potential for more odors since primary clarifiers are more likely to be sources of odor.
- For a future conversion to a denitrification plant, it may be desirable to maintain BOD loadings to the aeration system by reducing BOD removal in the primary clarifiers.

Alternative 3d - Innovative Alternatives

Alternative 3d consists of an upgrade of the current complete mix activated sludge system to an innovative process designed to increase system capacity without the construction of additional tanks. Integrated Fixed Film Activated Sludge (IFAS) is a process that may be applicable to a capacity expansion at the VFSA. The IFAS process combines fixed and suspended biological growth in one reactor by adding fixed or suspended media to an existing activated sludge basin. The suspended growth continues to behave like a conventional activated sludge process, while the fixed growth on the added media effectively increases sludge age, so complete nitrification

can occur. The fixed growth remains in the reactor, so solids loading on the final clarifiers are not increased. Essentially the concept includes making the aeration system more concentrated while using the media for increasing activated sludge age. While the concept would work well for increasing capacity without the increase of the aeration tanks a 4th secondary clarifier should be provided. In addition, there would need to be several capital changes to the existing treatment plant to make it work effectively.

Such changes include:

- Improved influent screening and grit removal. This system would also require odor control.
- Replacement of the existing surface aeration system with a diffused air blower system, either coarse or fine bubble. Some of the existing surface aeration may be usable as a supplement.
- Plant hydraulics must be evaluated in detail. There may be changes required to make the process work hydraulically.
- The optimal IFAS process must be evaluated and selected.
- It is likely that the plant instrumentation would need significant upgrades.
- Changes in biosolids characteristics could impact the solids handling processes.
- Trucked waste characteristics would have the potential to adversely affect the process; therefore, additional monitoring and/or regulation of loads may be required. Alternatively separate facilities to treat trucked wastes may be required thereby reducing the capital cost advantage of this alternative. It is likely that implementation of an IFAS process would need to be implemented only concurrent with a reduction of trucked wastewaters or the installation of separate facilities to biologically treat trucked wastewaters.

If VFSA were to pursue Alternative 3d, it would be necessary to perform a detailed conceptual study to establish the optimal IFAS process and equipment additions and upgrades that would be required.

For this evaluation a detailed analysis of the various IFAS processes and associated capital costs was not performed. These processes are typically used where a capacity increase and/or effluent

requirement upgrade of an existing facility are needed and additional tanks cannot be constructed because of space requirements or some other reason. It appears that the VFSA has adequate space for the plant expansion alternatives described above; however, if there is an objective to upgrade the plant's capacity without adding tanks, then it would be appropriate to evaluate the various IFAS alternatives in detail along with the supplemental process changes and trucked wastewater acceptance changes that would be needed to accommodate IFAS.

Advantages

The advantage of an IFAS process is that it would be designed to make use of the existing treatment plant footprint. In concept, the required additional capacity could be added without adding any additional large process tanks.

Disadvantages

- The IFAS strategy would result in significant changes from the current activated sludge process and the overall stability of the system could potentially be lessened compared to other expansion strategies.
- Implementation of an IFAS process would require a detailed evaluation as to the optimal specific process, ancillary equipment and instrumentation changes needed to make it work dependably. There is the potential that the trucked waste would need to be more carefully regulated or pretreated so as to maintain the stability of the treatment process. Alternatively separate treatment facilities could be added for trucked wastewaters.
- While it has not yet been rigorously established, the costs for conversion of the present process to an IFAS process are expected to be significant. In their August 2004 process evaluation, the engineering firm BCM estimated the equipment costs to convert the current WWTP aeration basins to a Moving Bed Biological Reactor (MBBR) system at $1.8 million for equipment alone. This estimate did not include the equipment necessary to upgrade the pretreatment system. Total capital costs to convert to an IFAS process may be more than $5 million.

Alternative 3e - Add a 2nd aeration tank and a 4th secondary clarifier – Retain the current complete mix activated process

Alternative 3e maintains the current treatment process and includes the addition of a 3rd aeration tank and 4th secondary clarifier. The 3rd aeration tank will enable VFSA to maintain the stable complete mix system while providing the needed capacity for its future growth. For this evaluation, it is assumed that the new aeration tank would be sized similarly to the two existing aeration tanks and the 4th secondary clarifier would be sized to match secondary clarifier No. 3, therefore maintaining hydraulic symmetry throughout the treatment plant.

Advantages

- Alternative 3e would enable VFSA to maintain the same technologies that are currently used to treat its influent wastewaters. With excess tank capacity resulting from expanding with similarly sized tanks, the VFSA would meet its future capacity needs and maintain operating a sufficient level of flexibility.
- The additional aeration tank, although a significant capital cost, will enable VFSA to take tanks out of service for routine maintenance without a significant amount of risk of effluent permit violations.
- As with Alternative 3b, 3e would not require chemical addition to the primary clarifiers thus avoiding significant chemical costs.
- Primary clarifiers have a higher potential for odors compared to secondary clarifiers and aeration tanks. The lack of an additional primary clarifier assures that odor potential will not increase.
- If there were a future requirement to provide denitrification, Alternative 3e should have sufficient aeration tank capacity to provide denitrification without the addition of more tankage by utilizing one of the integrated fixed film activated sludge systems.

Disadvantages

- Alternative 3e does not include additional primary settling capacity. However, it is noted that in 2002 through mid April of 2004, the VFSA STP routinely operated with one of two primary clarifiers out of service, an annual average daily flow of about 7 MGD thereby indicating an excess of operating capacity on a routine basis. This capacity would need to be documented and approved by the PADEP.

- The inclusions of a fourth secondary clarifier and a third aeration tank are significant capital costs.

Alternative 4 – No Action

The final alternative considered was the "no action" alternative. This would not allow for the treatment of any of the additional projected flow to be generated in the VFSA Service Area.

Table 5-2. Advantages and Disadvantages of Alternative 4.

Advantages	Disadvantages
- No cost.	- Future wastewater flows in the service area indicate that additional wastewater facilities will be necessary to address the needs of the service area municipalities.

Selected Alternative

Alternative 3e is the recommended alternative because it is the alternative that provides the optimal combination of operating flexibility, minimal risk, and appropriate capital costs considering the short and long term capacity needs of the VFSA.

Solids Thickening and Dewatering Capacity

In addition to the need to address the liquid treatment capacity, it is also necessary to address the capacity of the sludge and biosolids treatment processes. This section provides a summary of the solids thickening and dewatering needs of the VFSA wastewater treatment plant. Additional capacity and upgrades are recommended as follows:

- Provide an additional gravity thickener for a total of three (3) gravity thickeners.
- Provide two (2) new state-of-the-art dewatering devices that each have a capacity of 1,350 lb/hour.
- Provide all associated appurtenances to accommodate this equipment.

The existing solids thickening and dewatering system consists of a splitter box, two (2) 40-foot diameter gravity thickening tanks with mechanical sludge withdrawal, two centrifuge feed pumps, a bulk polymer tank, two (2) centrifuges (each with a polymer feed system), a hydrated lime storage silo, two (2) lime day tanks with feed conveyors, and a dewatered biosolids conveyor/mixing system.

When the plant was rerated from an average daily design capacity of 8.0 to 9.2 MGD in 2000, there was no additional dewatering equipment installed. Extending the hours that the equipment was operated accommodated dewatering additional biosolids beyond the original design intent. Extended hours of dewatering equipment operation were also used to accommodate services for the septage and trucked wastewater hauling service. Thickening was address by converting an existing decant tank (DT) to a thickener.

The existing equipment was well built and is well maintained; however, the existing centrifuges have been in continuous service for over 30 years and are not state-of-the-art technology. Based on the original plant design concept, the expansion of the gravity thickening capacity would be approximately 53% to accommodate an increase in average flow from 8.0 to the long-term projected flow. This increase would result in the need for a 3rd gravity thickener that is approximately the same diameter as the existing thickeners. A larger new thickener could be added at a relatively small increase in construction cost to provide additional operational flexibility. Such a larger thickener would also enable VFSA to more easily accommodate trucked wastewaters, as well as maintenance outages without significant process disruption.

The VFSA currently operates two (2) centrifuges to dewater the gravity thickened biosolids. Each centrifuge has a capacity of approximately 900 dry pounds per hour, resulting in a total plant capacity of 1,800 dry pounds per hour. Similarly, assuming additional thickening capacity and future acceptance of trucked wastewaters, the VFSA would have to operate up to 3 shifts per day with existing dewatering equipment. Without trucked wastewaters, VFSA could meet its long term future dewatering needs without additional capacity, and overtime levels could actually be reduced versus current levels. The continued acceptance of various types of trucked

wastewaters is a decision. The VFSA needs to make this decision based on the overall operating philosophy and market conditions. Such factors have the potential to change over time.

Since the existing centrifuges are over 30-years old, it would be beneficial to add new state-of-the-art equipment, which could provide additional capacity and increased efficiency thereby reducing operating and maintenance costs in the long run. In addition to modernizing the plant, new equipment would enable VFSA to provide excess dewatering capacity, which would both provide operating flexibility as well as enable VFSA to accept trucked wastewaters, while reducing operating costs for overtime..

Based on the original plant design concept, the expansion of the dewatering capacity would be approximately 50% to accommodate an increase in average flow from 8.0 to the long-term projected flow. Replacement of the 2 centrifuges with new dewatering devices with 50% additional capacity each would result in providing the needed capacity while also upgrading the dewatering equipment to the most modern technology.

Thickening

The VFSA currently operates two (2) gravity thickeners, each 40 feet in diameter. An analysis of the hydraulic and solids' loading to the thickener indicates that sufficient hydraulic capacity exists, but the thickeners have inadequate solids loading capacity. This solids loading thickening capacity shortfall exists whether or not the VFSA continued acceptance of trucked wastewaters; however, because solids from the trucked wastewater business amounts to almost half (½) of the total solids processed, the capacity shortfall will be much greater with the continued future acceptance of trucked wastewaters.

<u>Hydraulics</u>

On a daily average basis (based on May 2005 through April 2006 data) VFSA's thickeners receive a typical loading of 675,000 gpd. The two (2) tanks have an area of approximately 2,500 square ft, resulting in a hydraulic loading of 240 gpd/square foot. According to WPCF MOP 8, "thickeners generally are designed on a rise rate of 400 to 800 gpd/square foot. Excessive liquid detention time is to be avoided as septic conditions can result and cause odors." Therefore our

current loading of 240 gpd/square foot is well below the design criterion of 400 to 800 gpd/square foot, and additional hydraulic capacity is not needed.

Solids Loading

Below are the VFSA's average solids loadings from May 2005 through April 2006 data, along with design criteria per the Water Environment Federation's Manual of Practice for Design (WEF MOP 8):

Table 5-4. VFSA's Average Solids Loading, May 2005 – April 2006.

Source	Average lb/day	Required Area lb/ft^2 (Per WEF MOP 8)	Required Area (ft^2)
Waste Activated Sludge	6,143	Secondary Sludge 2.65	2,318
Primary Sludge	5,463	Primary Sludge 10	546
Subtotal (Waste Activated and Primary Sludge	11,606		2,864
Trucked Waste (DAT/DT)	17,704	Primary sludge 10	1,770
Total Required (includes trucked waste)	24,947		4,634
Available with DT			3,210
Available w/o DT			2,500

The current capacity with the DT utilized as a thickener is 3,210 square feet of surface area. Even if the VFSA eliminated trucked waste receipt and put the DT into service as a thickener, the present solids loading requirement would only be met only marginally. Please note that the DT tank does not contribute very much capacity because of its relatively small diameter. The thickener system is overloaded in terms of solids loading and additional capacity is needed.

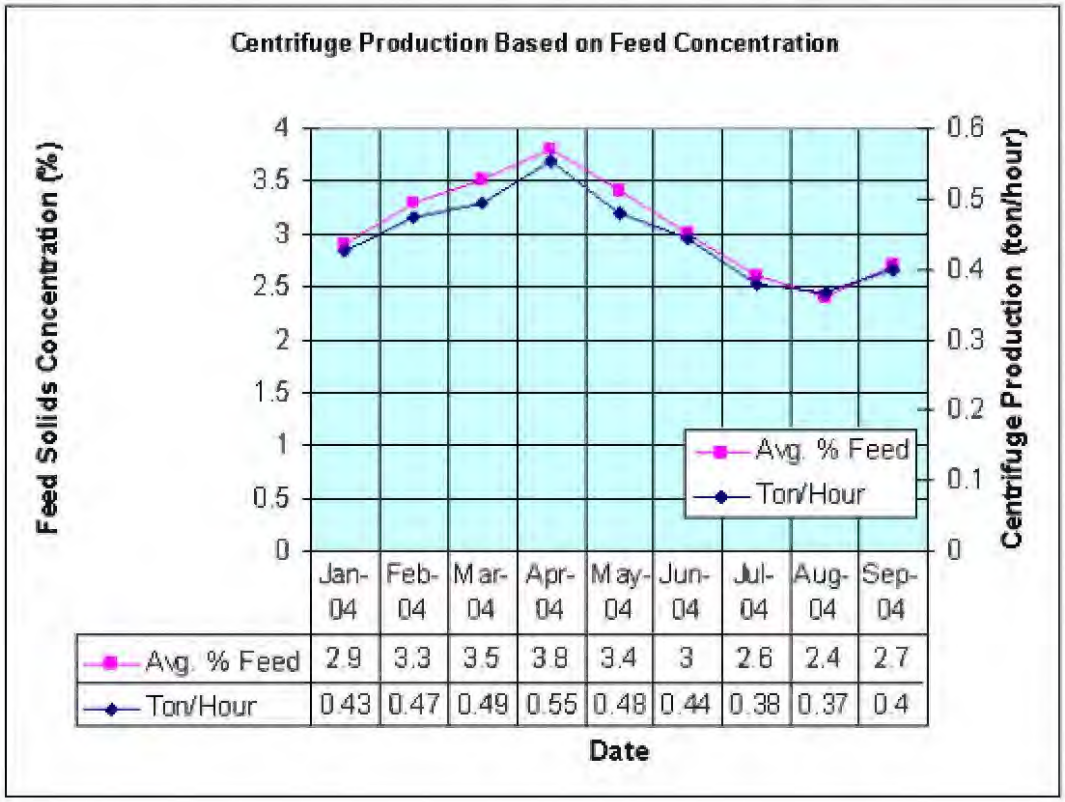
The VFSA is able to operate the treatment plant successfully at present loadings, because of the excess of organic capacity that currently exists in the remainder of the treatment system. Overloading the thickeners results in excess organic discharge over the thickener effluent weirs into the plant internal recycle stream. This organic discharge is recycled back to the head of the

plant for treatment. Although this operating flexibility enables VFSA to manage the capacity shortfall in an acceptable manner, their may be negative implications with regard to odor. As the numbers of connected customers increase according to the growth projected in this Act 537 plan, this excess organic treatment capacity will decrease and the deficit of thickening capacity will result in substantial risk of process upsets. As a result, effluent quality will suffer.

The recommended thickening capacity is 4,045 square feet of surface area for a connected flow of 11.3 MGD with no trucked waste. To include the existing trucked waste business volume and an assumed increase of 10% overall growth of the business, the recommended thickening surface area is 6,045 square feet. The two 40-foot diameter units and one (1) additional 57.5-foot diameter unit are needed to meet this requirement. Without inclusion of the septage business, the existing gravity thickening capacity is marginal, and a third thickener is recommended to allow for maintenance outages of one thickening tank to prevent solids handling disruptions.

Furthermore, additional gravity thickening capacity could improve the efficiency of the centrifuges by providing higher centrifuge feed solids concentrations. This claim is clearly demonstrated in the chart below of monthly 2004 data. The correlation of higher thickened solids content to dewatered cake solids is clear.

Figure 5-1. Centrifuge Production Based on Feed Concentration.



	Jan-04	Feb-04	Mar-04	Apr-04	May-04	Jun-04	Jul-04	Aug-04	Sep-04
Avg. % Feed	2.9	3.3	3.5	3.8	3.4	3	2.6	2.4	2.7
Ton/Hour	0.43	0.47	0.49	0.55	0.48	0.44	0.38	0.37	0.4

In summary:

- The existing thickening capacity is marginal at present without inclusion of trucked wastewaters. With the presence of trucked wastewaters, the VFSA's thickening capacity is insufficient for current loadings.
- Additional thickening capacity is needed to accommodate future connected customers.
- A third thickener sized at about 57.5 feet in diameter could accommodate future growth while providing the necessary flexibility to handle maintenance outages with a minimum of operational disruption.
- To add operational flexibility, a thickener could be added.

Dewatering Capacity

The available dewatering capacity is 17,520 hours per year based on both centrifuges operating continuously. The actual 2005 dewatering hours was approximately half (½) of that total or 8,790 hours. The actual operating hours include both machines operating 5 days per week

between two (2) and three (3) shifts per day, depending upon trucked waste loading. During 2005, the VFSA processed approximately 4,700 dry tons of biosolids products.

Based on data from the last 5 years recorded in the "Valley Forge Sewer Authority Annual Summary", the average solids production from connected customers versus trucked waste are as follows:

Table 5-5. Average Solids Production From Connected Customers Versus Trucked Waste.

Year	Dewatered Solids from Connected Customers (dry tons per day)	Dewatered Solids from Trucked Wastewater Business (dry tons per day)	Total Dewatered Solids (dry tons per day)
2005	6.2	5.9	12.1
2004	10.1**	5.5	15.6**
2003	7.2	5.7	12.9
2002	7.0	4.2	11.2
2001	6.3	4.2	10.5
Average	6.7	5.1	11.8

**Outlier. Not included in average

The data indicates that about 43 percent of the solids dewatered at VFSA originate from the septage business.

The following are the estimated sludge dewatering capacity requirements for the projected growth estimated to occur 10, 20, and 30 years into the future:

Table 5-6. Estimated Sludge Dewatering Capacity Requirements.

Years	Projected Flow Capacity Needed (MGD)	Dewatered Solids From Connected Customers (dry tons per day)	Dewatered Solids From Trucked Waste Business (dry tons per day)	Total Dewatered Solids (dry tons per day)
Current	7.6	5.8	5.1	10.9
10	9.7	7.4	6.0	13.4
20	10.6	8.1	6.0	14.1
30	11.4	8.7	6.0	14.7

Table 5-6 above indicates the VFSA can meet its dewatering capacity requirements into the distant future for its connected customers if the current operating time is maintained. If the septage business is maintained, additional run time is required or the dewatering capacity per hour must be increased with an additional machine or with machines of greater capacity.

Considering the existing centrifuges are over 30 years old, there may be benefit in replacing the units with new larger units. Such an upgrade will provide the operating flexibility to maintain or even grow the trucked wastewater business. Increased dewatering capacity will also provide VFSA with the flexibility to reduce operating hours to less than two (2) full shifts.

Replacement of the two (2) centrifuges with new dewatering devices each with 50 percent additional capacity would provide the needed capacity while also upgrading the dewatering equipment to the most modern technology.

Plant Improvements

This section outlines the improvements that would logically be made to the VFSA STP concurrently with an expansion of the existing STP. The items described in this section are not required to meet future connected capacity needs; however, these items will serve to upgrade and modernize the plant. The improvements described in this section are considered conceptual and subject to more detailed engineering evaluation.

The existing STP, constructed in the mid-1970's, was well-built and has been well-maintained. However, the available technology features and advancement in equipment have improved over the last 30 years and it would be appropriate to upgrade the treatment in order to provide state-of-the-art equipment and automation. Some of these improvements, if implemented, will also provide savings in operating and maintenance costs.

In summary, the recommended upgrades are as follows:

- Influent chamber modifications
- New centralized plant automation.
- Upgrades to the existing chlorine building.
- Additions and modifications to the Control Building odor control system.
- Additions and modifications to the influent and primary influent odor control system.
- Operations and Maintenance Building upgrades.
- In-house loading tank system and recycle stream handling improvements.
- A day bin for biosolids.
- A blend tank for dewatering feed.
- Existing biosolids conveyor system upgrade.

The following describes in conceptual terms, the recommended improvements and rational basis for these recommendations.

Influent Chamber Modifications

Several modifications are needed to be conducted to prepare for the increased flows in the future. These constructions items include but are not limited to:

- Forcemain changes and upgrades
- Bypassing around influent meters and channels, and connection to existing site piping downstream
- Gate replacement

Centralized Plant Automation

The existing treatment control system consists of the original 1970's technology plus advances that were made by the VFSA staff in recent years. Allen Bradley process logical controllers (PLCs) are used to control the aeration, dewatering, and polymer systems. To modernize, centralize and expand the plant's control systems, the following upgrades are recommended:

- Ethernet data highway. Graphical interface with the network, which includes indication of parameters and control. Access to data highway via the internet for access of data as well as control.
- Implementation of a user-friendly graphical interface package such as Wonder Wear®
- Monitoring parameters online such as pH, temperature, D.O. (upgraded technology for measurement) TSS, Organic Load (or other BOD derivative), Ammonia, others as required. And indication on network graphic interface.
- Wireless data transmission from remote plant locations where this is found to be cost effective and needed.
- Capability to easily access key process data for analysis from authorized PCs.
- An upgraded maintenance software package.

Chlorine Building Renovation

The existing building contains three rooms that house chlorine and sulfur dioxide storage, chlorine and sulfur dioxide feed equipment, effluent sampling equipment, and utility water (treated effluent) pumps.

The plant expansion alternative includes the conversion from gaseous chlorine disinfection to ultraviolet light (UV) disinfection. This conversion will allow renovation of the building use to include the following:

- UV system maintenance room for UV module lifting hoists, a space to clean UV bulbs, spare parts storage area, local instrument indicators and controls.
- Chemical storage of liquid sodium hypochlorite and feed equipment for periodic return sludge chlorination.
- The utility water pump system is 1970 technology and has been a source of maintenance problems. It should be replaced with more modern equipment with increased capacity.

- A new effluent monitoring station with appropriate online analyzers is also recommended.

Added Odor Control for Control Building

The off gasses from the Control Building recycle tanks, existing centrifuges, degrit area, DT tank, and DAT tank are treated in an activated carbon treatment system. This system is effective in removing the compounds that cause most of the odor from the treatment plant – sulfur containing compounds (including hydrogen sulfide). However, the more complex compounds and those derived from ammonia (amines) are not entirely removed by the existing system. Therefore, additional controls are recommended for treating odors from the Operations Building. For the purposes of this study, a two stage chemical wet scrubber system is considered as the needed improvement. The specific components and design will be evaluated in further detail prior to implementation.

Permanent Installation of Primary Settling Tank Odor Control

Previous odor studies suggest that a significant portion of the potential odors associated with the normal operation of the STP may come from the quiescent surfaces of the primary tanks. The VFSA staff has conducted tests utilizing iron salts to oxidize hydrogen sulfide and thereby reduce odors in the influent to the WWTP. These tests showed promise in the summer of 2005. The additional testing being conducted in the spring and summer of 2006, indicates that potential for excess light solid precipitants from the process. Accordingly alternate odor control chemicals that do not produce precipitated solids are being evaluated.

It is recommended that upgrades to this system be added concurrently with the required capacity upgrades. Such upgrades would consist of a permanent installation of chemical addition equipment, including chemical storage tanks and metering equipment.

Additionally, covers for the open sections of the tanks could be added to the primary clarifiers; however, these must be designed to enable safe and easy routine maintenance of the tanks, as well as providing ventilation that is adequate to prevent corrosion beneath the covers of the tanks.

The specific type of odor control upgrades for the influent should be evaluated in more detail. If a permanent system for odor control chemical addition is decided upon, then an optimal dosing philosophy should be established that balances considerable chemical costs with the potential for odor in the surrounding communities.

Upgrade Operations Building

The existing Operations Building is over 30 years old and there has not been a renovation of the building since the plant was commissioned. Renovating the building would update the operations and maintenance areas while providing a safe and pleasant working environment for the VFSA employees. The renovation would encompass the existing Control Room, lunch room, locker room, and maintenance shop. It would include upgrading the appearance and ventilation system in these rooms as well as providing better functionality therein. Such renovations would include upgrading lifting cranes, compressors, and equipment.

In addition, there is a large potential work area that is currently occupied by pressure filters that were built but never commissioned. These filters were converted to trucked wastewater storage, but this converted system has not been used to date due to lack of need. Improvements to the Operations Building should include the removal of these large pressure filters and conversion of the space to a usable workspace for maintenance activities and parts storage.

In-House Loading Tank Improvements

Recycle flows consisting of gravity thickener overflow and centrifuge centrate are routed by gravity to a sloped-bottom rectangular "in-house" loading tank located below the ground level of the operations building. There is a larger operating tank and a smaller spare tank. Four (4) pumps operated in parallel to return the internal wastewater flows back to the plant influent structure. These tanks were originally designed to store treated water as part of the pressure filter system. However, they were converted to handle these generally high strength wastewater streams.
Off gas from the in-house is presently routed to the existing Phoenix activated carbon system. This odor control system also treats odors from the degrit cyclone area, conveyor system and centrifuge vent.

Although the system works satisfactorily, it is not without certain operating and maintenance problems. The ceilings of these tanks, which are a portion of the buildings first floor, were not designed for high strength wastewater. Corrosion of the ceiling has occurred and it must be coated on a regular basis. There is some risk of structural failure.

In addition, these tanks do not have a means for easily removing solids that accumulate at the bottom and top of the tank. As a result, the VFSA must pay a contractor to clean the tank on a yearly basis, and this could cost about $15,000 per cleaning, or more.
The recommended improvement for this system includes:

- Adding a pumped mixing system.
- Replacing the concrete ceiling.
- Adding larger access hatches
- Improving the ventilation.

Solids Processing Improvements

The current solids processing consists of gravity thickening followed by centrifuge dewatering, mixing with hydrated lime, and daily loading onto trailers for hauling to land application sites. This appears to be a viable means of processing and utilization into the foreseeable future.

In addition to adding capacity via new state-of-the-art dewatering devices, there are several improvements to this system that are recommended:

Day Bin for Biosolids

Currently, dewatered biosolids fall from the centrifuges into an existing shaftless screw conveyor system. There, the solids are mixed with hydrated lime and conveyed into a 40 cubic yard contractor-owned trailer that is positioned with a VFSA-owned Jockey Truck. This system requires the trailer to be jockeyed every 20 minutes or so to evenly load the biosolids. This operation is a labor-intensive task. The installation of the new day bin would eliminate this task as trailers could be loaded by the contractor's drivers. This improvement would free up an operator for other O&M duties. In addition, with appropriate odor controls, a day bin could practically eliminate the truck loading operation as a significant source of plant odor.

The day bin would be sized for the volume of biosolids that would be generated over a two or three day period, resulting in a capacity of about 200 wet tons.

The day bin would contain additional mechanical equipment such as the loading mechanisms on the bottom that would require normal maintenance. This additional maintenance would be offset by the reduced O&M costs for the existing jockey truck.

In addition to the day bin, modifications to the existing conveyor system would be necessary to properly load the bin. At the least, one of the existing conveyors would have to be extended in order to reach the top of the bin.

Blend Tank for Dewatering Feed

The existing gravity thickener bottoms are used to feed the centrifuges. The gravity thickeners are subjected to variability in their influent characteristics that result from three separate sources of influent (primary, waste activated and trucked sources). The variability in influent characteristics also affects the consistency of the thickener bottoms, and makes it more difficult to produce a consistently dry cake and optimize use of chemicals. The function of a blend tank will be to take in thickener bottoms, and mix it thereby producing a consistent dewatering process feed.

Conveyor Modifications

The existing conveyor system has adequate capacity to meet the additional dewatering equipment that is being considered. An extension, as described in the forgoing subsection would be needed to feed the day bin. As with VFSA's existing system, most conveyor system designs used at other plants do not include replication of the conveying equipment, because any failure could be fixed relatively quickly. However, some replication of equipment would provide a margin of safety to keep the dewatering process operating during conveyor liner replacement and repair activities. Appropriate conveyor modifications should be considered as part of the specific changes that are being considered to increase and upgrade the solids handling system.

Figure 5-2 depicts a general aerial view of the existing treatment plant with the proposed modifications.

Figure 5-2. Proposed wastewater treatment plant layout

No Action Alternative

The No Action Alternative is rejected, because it fails to satisfy objectives of Act 537 Plan, and it is inconsistent with objectives and policies of municipal planning documents and state regulations.

Section 6

Evaluation of Alternatives

Table of Contents **Page No.**

A. Consistency 6-1

B. Resolution of Inconsistencies 6-3

C. Water Quality Standards 6-3

D. Capital and Operating Costs/Present Worth Analysis 6-3

E. Funding Methods 6-4

F. Phased Implementation 6-13

G. Legal Authority 6-13

Appendices:

D. Preliminary Effluent Criteria

F. PNDI Correspondence

G. PHMC Correspondence

Figures:

None

Exhibits:

None

A. Perform an evaluation of all viable alternatives identified in the previous section of the Plan for consistency with all related municipal, county, and state planning documents and programs including copies of notification and responses from all appropriate planning agencies.

As discussed in Section 5, Alternative 3e was the selected alternative, which involved the construction of a second aeration tank and a fourth secondary clarifier.

Table 6-1. Consistency Evaluation of Selected Alternative from Section 5.

Evaluation Category	Consistency		Comments
	Yes	No	
Plans developed under the Clean Streams Law or Section 208	X		All water discharged into the waters of the Commonwealth must satisfy the requirements assigned by Pennsylvania Department of Environmental Resources (DEP). Alternative 3e will be constructed and operated within the requirements of DEP. The selected alternative is consistent with the objectives of the Clean Stream Laws.
Municipal Wasteload Management Plans (Chapter 94)	X		The alternative is associated with treatment of projected flow not the creation of new flow. This alternative will aid in the prevention of an overload hydraulically or organically resulting from the projected connections; therefore, the alternative does not conflict with Chapter 94. The selected alternative is consistent with the objectives of the Chapter 94.
Plans developed under the Clean Water Act	N/A		Not applicable. No federal funding anticipated.
Chester County Landscapes 1996-2020-Comprehensive Plan – Policy Element.	X		The Comprehensive Plan indicates that improvements shall be consistent with land use policy to maintain and upgrade existing sewer and water facilities, to address problems, and to support revitalization and development activities. The alternative should not adversely impact that plan. The selected alternative is consistent with the objectives of Chester County's Comprehensive Plan.
Municipal Comprehensive Plans	X		This Act 537 Plan addresses the maximum wastewater load associated with the eight Townships that comprise the region in the vicinity of VFSA. The values associated with the plan were determined from the zoning requirements of each township. The selected alternative is consistent with Municipal Comprehensive Plans.

Evaluation Category	Consistency		Comments
	Yes	No	
Antidegradation requirements (Chapters 93, 95, 102)	X		No exceptional or high quality streams will be impacted by the alternatives. Construction activities associated with expansion of existing facilities would be subject to statewide Erosion and Sedimentation controls. Preliminary effluent criteria have been established by PADEP and are included in Appendix E. The selected alternative is consistent with Antidegradation requirements.
State Water Plan (Subbasin #2)	X		The Schuylkill River in the vicinity of the proposed improvements is listed as impaired in the State Water Plan. The impact of this listing is not yet known because TMDLs for the river have not been established. PADEP will control the TMDL by the limits established for the permit. The selected alternative will not produce non-point pollution. Therefore, the alternative will not adversely impact the intent of the State Water Plan. The selected alternative is consistent with the State Water Plan.
Pa. Prime Agricultural Land Policy	X		All of the construction associated with the selected alternative would occur on property owned by the VFSA. Therefore, agricultural land will not be impacted. The selected alternative is consistent with the PA Prime Agricultural Land Policy.
Chester County Stormwater Management Plans (Act 167)	X		All construction will be permitted in accordance with applicable stormwater management plans. Currently, there is no reason to suspect that the selected alternative cannot satisfy the requirements of these plans. Therefore, there will be no impact upon the stormwater management plans Each alternative is consistent with Chester County Stormwater Management Plan.
Wetland Protection (Chapter 105)	X		A review of the wetlands maps indicated that there are no wetlands in the vicinity of construction. Therefore, the impact upon wetland should be none. Additionally, all construction will be designed and permitted in accordance with Chapter 105. The selected alternative is consistent with Chapter 105.
PNDI Review	X		A PNDI Project Environmental Review was conducted on March 27, 2006 and the results showed three (3) potential impacts with the U.S. Fish and Wildlife Service, PA Department of Conservation and Natural Resources, and PA Fish and Boat Commission. The receipt of this search is included in Appendix F. Information was sent to these agencies for further review and responses were received indicating no potential effect as long as there is no disturbance within any wetland. For the PA Fish and Boat Commission, if there will be any direct or indirect on any wetland, a habitat suitability assessment for bug turtles must be completed. The responses are included also in Appendix F. The selected alternative is consistent with the PNDI.

Evaluation Category	Consistency		Comments
	Yes	No	
PHMC Review	X		A request was sent to the Pennsylvania Historical and Museum Commission for analysis of potential impacts on archaeological resources as a result of the construction activities. A reply was received indicating a high probability exists that archaeological resources may occur with the proposed permit area, and can be seen in Appendix G. If federal funding were being pursued for the construction an appropriate survey would need to be conducted to determine the exact potential of effect. There is no federal funding being pursued for the construction of the selected alternative; therefore, the selected alternative is consistent with the requirements of PHMC.

B. Provide copies of correspondence indicating resolution of any inconsistencies with appropriate planning agencies.

No inconsistencies were noted. All correspondence regarding the PNDI and PHMC can be seen in Appendix F and G, respectively.

C. Perform and evaluation of all identified viable alternatives with respect to applicable water quality standards, effluent limitations, other technical, legislative, or legal requirements.

The VFSA STP currently discharges effluent to the Schuylkill River under NPDES Permit No. PA 0043974. In preparation for the evaluation of alternatives to expand the STP, a request was made to PADEP for effluent criteria at the new design flow rate. Preliminary effluent limits for the expanded STP were provided by PADEP, as referenced previously and are included in Appendix D. The selected alternative is capable of meeting the specified criteria.

D. Prepare opinions of probable construction costs, including allowances for soft costs such as engineering, legal, and administrative costs, for each of the identified viable alternatives. Prepare operating cost estimates for each alternative and perform a present worth analysis to finance the alternative.

and

E. Prepare an analysis of funding methods available to finance the identified viable alternatives, including documentation to support which alternatives and financing scheme, in combination, is most cost effect.

Expansion Alternative Capital Costs

Conceptual level construction costs for each alternative were estimated by Buchart-Horn and included a 25% contingency. Buchart-Horn's documentation to support these estimates is included as Appendix D. Note that the estimates do not include Alternative 3d, which is the construction of an IFAS process. A more detailed evaluation would be necessary to establish reliable construction costs for IFAS. Table 6-2, below summarizes the estimated project costs for the expansion alternative. All of the alternatives listed as "Alternative 3" (i.e., b, c, d) include the addition of UV disinfection. Estimated project costs for a 3rd thickener, dewatering devices and other plant improvements are presented in separate tables later in this section. For evaluating capital costs and the present worth of alternatives, a 25% factor is applied for associated project costs such as engineering, legal, finance and other administrative expenses.

The capital cost comparison is based on a flow rate of 11.4 MGD. The cost of delayed expansion items for each alternative is added in so an equal comparison can be made.

Table 6-2. Estimated Project Cost for the Expansion Alternatives

Alternative No.	Alternative Description	Estimated 2006 Construction Cost (million $)	Associated Project Cost @ 25% of Construction	Estimated Total Capital Cost (2006)
1a	Locate a Satellite Plant at Cromby	$10.02	$2.50	$12.52
1b	Locate a Satellite Plant at French Creek, Discharge at Cromby	$10.65	$2.66	$13.31
2a	Divert French Creek pump station and discharge to Phoenixville, including Phoenixville Tapping Fee	$7.43	$1.86	$9.29
2b	Divert Pickering Creek pump station to Phoenixville, including Phoenixville Tapping fee.	$6.46	$1.62	$8.08
3b	Alt. 1a plus add a 4th Clarifier	$4.65	$1.16	$5.81
3c	Alt 1c plus add a 3rd Primary Clarifier	$10.10	$2.53	$12.63
3e	**Current process plus add a 3rd Aeration Tank and 4th Clarifier**	**$8.28**	**$2.07**	**$10.35**

Based on the conceptual project cost estimates, Alternative 3b is the least costly.

Expansion Alternatives Estimated Operating Costs

Table 6-3, presents the estimated operating costs of each expansion alternative. This comparison was based on the projected 10-year flow rate of 10 MGD to provide the expected average annual cost for the 20-year period. Beyond the 10-year flow projection, the alternatives that include flow diversion of the French Creek pump station (Alternatives 1a, 1b, and 2a) would require additional capital and operating costs to meet longer term capacity requirements. This is because an average flow of only about 0.7 MGD could be delivered from the French Creek station. This would be insufficient to meet VFSA's long-term (20-year) needs. In addition, such an approach would be only marginal in meeting VFSA's 10-year needs.

Table 6-3. Estimated 2006 Annual Operating Costs (Expressed per $1,000 unless otherwise noted)

Alternative No.	Null	1a	1b	2a	2b	3b	3c	3e
Operating Expenditures:								
Administrative Operating Costs	244	314	314	244	244	244	244	244
Benefits	77	100	100	77	77	77	77	77
Administrative Insurance	4	4	4	4	4	4	4	4
Operating & Maintenance Admin. Supplies	83	85	85	85	85	85	85	85
Operating and Maintenance Salaries	851	922	922	851	851	867	872	869
Operating and Maintenance Benefits	301	326	326	301	301	307	308	307
Electricity and Energy	370	398	398	398	398	398	398	398
Pump Station Power	156	48	48	48	168	168	168	168
Chemicals	324	385	385	385	385	385	385	385
Laboratory Supplies	96	117	117	97	97	97	97	97
Miscellaneous Supplies	34	39	39	34	34	34	34	34
Solids Transportation and Disposal	590	693	693	613	613	613	613	613
Corrosion and Odor Control	211	267	267	227	227	227	227	227
Predictive Maintenance	71	86	86	71	71	71	71	71
Landscaping	21	26	26	21	21	21	21	21
Maintenance Materials	43	53	53	43	43	43	43	43
Annual Services and Special Projects	69	79	79	69	69	69	69	69
Property and Liability Insurance	56	69	69	57	57	57	57	57
Metered Sewer usage to Phoenixville (~0.7 MGD)	0	0	0	654	654	0	0	0
ANNUAL EXPENDITURES (2006 Million $)	**3.44**	**4.01**	**4.01**	**4.28**	**4.40**	**3.77**	**3.77**	**3.77**
Difference vs. No Action Alternative	0	565	565	835	954	322	328	324

NULL = OPERATIONS BASED ON CURRENT PLANT CONDITIONS (2006)

Operating costs for alternative 3d were not developed.

Highlights of the operating cost summary include:

- Operating cost increases for various alternatives that include modifications and upgrades of the wastewater treatment plant are generally related to treating additional wastewater flows such as increased power, chemical addition, and solids transportation and disposal.
- Alternative 3d - IFAS processes should be considered in further detail. Operating costs (not presented in Table 6-3) are likely to be competitive with the other plant expansion alternatives.

- Relatively higher operating costs for the Phoenixville wastewater diversion (Alts. 2a & 2b) are due to the high-metered rates charged by the Borough. These are the rates listed in their rate schedule.
- There is some pump station power operating cost savings in Alternatives 1a, 1b, and 2a that include diverting wastewaters from the French Creek pump station; however, this is not enough to offset other increased operating costs.
- The satellite treatment plant alternatives' higher operating costs are related to increased O&M labor (2 additional O&M employees were estimated); laboratory costs (in order to accommodate 2 separate permits and associated monitoring); and solids transport and disposal (routine trucking from the satellite plant to the existing STP would be needed).
- For alternatives requiring additional capacity 10-years into the future, it was assumed that operating costs would escalate similarly (differences between alternatives are likely to be negligible), and therefore incremental operating cost differences between alternatives in the distant future are not considered in this comparison.

Present Worth Comparison

Table 6-4 presents a summary of the capital, operating and present worth of each alternative using a 20-year project life and 4 percent annual discount rate. The summary is shown in graphic form in Figure 1. Alternatives 3b, and 3e appear to be the most cost effective from a present worth perspective. Note that although alternatives 1a and 1b are comparable in present worth to Alternative 3e, but they would only provide the capacity that is needed for a limited time frame. After that time, additional capacity may be needed.

Table 6-4. 2006 Present Worth Analysis (Costs are in million dollars)

Alternative No.	Null	1a	1b	2a	2b	3a	3b	3c	3e
Construction Cost ($million)	0	4.57	5.2	1.98	2.01		4.65	10.1	8.28
Tapping Fee – Phoenixville	0	0	0	5.9	5.9		0	0	0
Engineering & Admin @ 25% ($ million)	0	1.14	1.3	0.55	0.5		1.16	2.52	2.07
Capital Cost (MM$)	0	**5.75**	**6.5**	**8.38**	**8.41**		**5.81**	**12.63**	**10.35**
Additional Operating Cost ($million/year)	0	0.56	0.56	0.83	0.95		0.32	0.33	0.32
Present Worth Factor (P/A, 4.0%, 20 years)	13.6	13.6	13.6	13.6	13.6		13.6	13.6	13.6
Present Worth of Annual Costs	0	**7.69**	**7.69**	**11.3**	**13**		**4.38**	**4.46**	**4.4**
Annualized Cost Factor (A/P, 4%, 20 years)	0.07	0.07	0.07	0.07	0.07		0.07	0.07	0.07
Annualized Capital Cost	0	0.37	0.42	0.59	0.59		0.38	0.82	0.67
Future Construction Cost in 10-years	0	6.45	6.45	6.45	5.27		0	0	0
Future Capital Cost (includes 25% Eng and Admin)	0	8.07	8.07	8.07	6.59		0	0	0
Present Worth Factor (P/F, 4% 20 years)	0.676	0.676	0.676	0.676	0.676		0.676	0.676	0.676
Present Worth of Future Costs		**5.45**	**5.45**	**5.45**	**4.45**				
Present Worth Cost of Alternative ($million)	**0**	**18.84**	**19.63**	**25.16**	**25.83**		**10.19**	**17.08**	**14.75**

Although alternative 3e is more costly in present worth than 3a and 3b, it would provide additional operating flexibility while meeting all long-term capacity needs. Alternative 1d provides the most operating flexibility, but at the highest capital cost of the plant expansion alternative. IFAS costs are expected to be at the higher range of the plant alternatives and this

strategy would warrant further study if additional tanks at the plant was not considered to be a viable option.

While IFAS is promising, an additional study would be required to establish whether such a design (including all pretreatment components that would be required) is the optimal design in terms of reliability and cost.

While Alternatives 1 and 2 have some favorable aspects, they would only provide some of the long-term future capacity needed. Accordingly the need to expand the existing plant in the future results in these alternatives being higher in present worth costs compared to alternatives consisting of expansion of the existing plant.

Biosolids Handling Capacity Improvements

Table 6-5 below outlines the estimated capital costs for additional gravity thickening and dewatering. The construction estimates are conceptual and include a 25 percent contingency. When additional engineering is performed, the capital costs can be estimated to a higher degree of accuracy. The associated project costs for engineering, legal, finance and other administration fees are estimated at 25 percent of construction. Documentation of construction cost estimates is included in the Appendix D.

Table 6-5. Estimated 2006 Capital Costs – Solids Thickening and Dewatering

Thickening and Dewatering Addition	Estimated 2006 Construction Cost ($ million)	Associated Project Cost @ 25% of Construction	Estimated Total Project Cost (2006) ($M)
One Additional Gravity Thickener including ancillary equipment	$0.9	$0.22	$1.12
Two New Dewatering Devices including ancillary equipment	$2.0	$0.50	$2.50
Subtotal	**$2.9**	**$0.72**	**$3.62**

Plant Upgrades

Table 6-6 outlines the estimated capital costs for the improvements described in Section 5. The construction estimates are conceptual and include a 25 percent contingency. When additional engineering is performed, the capital costs can be estimated to a higher degree of accuracy. The associated project costs for engineering, legal, finance, and other administration fees are estimates at 25 percent of construction. Documentation of capital cost estimating is included the in Appendix D.

Table 6-6 Estimated Capital Costs – Wastewater Treatment Plant Improvements

Proposed WWTP Improvement	Estimated 2006 Construction Cost ($ million)	Associated Project Cost @ 25% of Construction	Estimated Total Project Cost (2006) ($M)
Influent Chamber Modifications	$0.80	$.200	$1.000
Centralized Plant Automation.	$0.66	$0.165	$0.825
Renovation of Chorine Building	$0.08	$0.020	$0.100
Utility Water System Replacement and Upgrade	$0.31	$0.076	$0.386
Control Building Odor Control System	$0.47	$0.118	$0.588
Influent Odor Control System (chemical addition, assumed)	$0.10	$0.025	$0.125
Upgrade Operations Building	$0.90	$0.226	$1.126
Improve Recycle Stream Handling	$0.22	$0.056	$0.276
Day Bin for Biosolids Staging and Truck Loading	$1.00	$0.250	$1.250
Addition of a Blend Tank for Dewatering Feed	$0.366	$0.0925	0.458
Replicate Biosolids Conveyor System	$0.62	$0.155	$0.775
Subtotal – Plant Improvements	**$5.53**	**$1.384**	**$6.909**

Conclusions

This section presented a conceptual analysis of the capacity expansion alternatives that were retained for evaluation as well as other non-capacity-related plant improvements. Conclusions of this analysis:

- The alternatives that include expansion of capacity at the existing VFSA treatment plant appear to be the most viable, because they are the lowest in present worth cost and allow for meeting both the short and long-term future capacity needs.
- The specific plant expansion strategy needs to be determined. In general, those alternatives that include the additional aeration tank provide more operating flexibility at a higher capital cost.
- Any expansion strategy should include the impact that trucked wastewaters have on the treatment process. At a minimum, additional gravity thickening and dewatering capacity should be provided if VFSA is to expand its service capacity while maintaining (or growing) its current level of trucked wastewaters at the plant.

The cost analysis presented in Section 6 is conceptual only and should not be used as stand alone budget for the anticipated expansion project. It does, however, provide the necessary comparative analysis to identify focus in on the most cost effective solution for the expansion.

Project Funding Sources

The selected alternative will be financed by tax-exempt municipal bonds. The individual municipalities will be given the option to make capital contributions to offset the borrowing. The cost sharing for each partner municipality and the VFSA can be seen in Table 6-7.

Table 6-7. Project Cost Sharing

Plant expansion

Estimated total	$13,970,000		
	MGD *	Percent of expansion	Est. $ share expansion cost
Easttown	0.000	0.00	$0
East Whiteland	1.969	80.30	$11,217,768
Malvern	0.000		
Tredyffrin	0.199	8.12	$1,133,942
Valley Forge	0.000		
Willistown	0.284	11.58	$1,618,290
	2.460	100.00	$13,970,000

Plant upgrade

Estimated total	$5,909,000		
		Percent of upgrade	Est. $ share upgrade cost
Easttown	1.523	0.1655	$1,143,740
East Whiteland	1.940	0.2109	$1,456,898
Malvern	0.544	0.0591	$408,532
Tredyffrin	2.001	0.2175	$1,502,708
Valley Forge	2.128	0.2313	$1,598,082
Willistown	1.064	0.1157	$799,041
	9.200		$6,909,000

Grand total	**Upgrade**	**Expansion**	**Total Contribution**	**Overall Percent of the Project**
Easttown	$1,143,740	$0	$ 1,143,740	0.055
East Whiteland	$1,456,898	$11,217,768	$ 12,674,666	0.607
Malvern	$408,532		$ 408,532	0.020
Tredyffrin	$1,502,708	$1,133,942	$ 2,636,650	0.126
Valley Forge	$1,598,082		$ 1,598,082	0.077
Willistown	$799,041	$1,618,290	$ 2,417,331	0.116
	$6,909,000	$13,970,000	$ 20,879,000	1

1. MGD* = Projected ultimate capacity less current owned

Example: East Whiteland projected need 3.909 less current reserved capacity 1.940 equals 1.969 mgd

2. Overall percent of the project is to be utilized in calculating planning and engineering expenses
3. The cost estimates presume that the existing treatment plant is expanded and upgraded utilizing existing technology

F. Prepare an analysis of the need for immediate or phased implementation of each identified viable alternative including descriptions for any activities to abate critical public health hazards, or for any advantages to phasing implementation of the sewage management program.

No immediate actions are necessary to abate critical public health hazards. There is no need for phased implementation according to connection projections.

G. Evaluate administrative organizations and legal authority necessary for plan implementation. Provide a narrative description.

Refer to Section 7A for evaluation of administrative organizations and legal authority necessary for plan implementation.

Section 7

Institutional Evaluation

Table of Contents **Page No.**

A. Financial Status and Resources 7-1

B. Institutional Alternatives 7-2

C. Administrative and Legal Activities 7-3

D. Chosen Institutional Alternative 7-3

Appendices:

None

Figures:

None

Exhibits:

None

A. Provide a narrative description of the Authority's financial status, operating, and administrative resources and legal authority to implement the selected alternative based upon information provided by the Authority.

Overview of the VFSA

The Townships of Schuylkill, East Pikeland, and Charlestown in Chester County, Pennsylvania organized the Valley Forge Sewer Authority (VFSA) in the late 1960s for the purposes of acquiring, constructing, maintaining, owning or leasing sewer systems and sewage treatment works. On November 1, 1970 VFSA entered into an agreement to provide wastewater treatment services to the following municipalities in Eastern Chester County: Easttown Township, East Whiteland Township, Malvern Borough, Tredyffrin Township and Willistown Township (VCTS Municipalities). These five municipalities, along with the three VFSA organizing municipalities are collectively referred to as the VFSA Partner municipalities. The VFSA and each VCTS Municipality has a specific reserved capacity at the 9.2 million gallons per day (MGD) Valley Forge Sewage Treatment Plant (STP), located in Schuylkill Township.

Table 7-1 Current Capital Cost Sharing Summary for 2005

Partner Municipality	Reserve Capacity Available		2005 Capacity Utilized (MGD)	2005 Capacity Rented (MGD)
	Percentage	MGD		
Easttown	16.55%	1.523	1.357	0
East Whiteland	20.87%	1.94	1.963	0.023
Malvern	6.13%	0.564	0.329	0
Tredyffrin	21.75%	2.001	1.128	0
V.F.S.A.	23.13%	2.128	1.480	0
Willistown	11.57%	1.064	1.221	0.157
Total	**100.00%**	**9.2**	**7.478**	**0.180**

The 1970 Agreement authorizes the VFSA to provide capacity for the Partners. The cost sharing of capital improvement expenditures to date have been based on allocated percentages identified in Table 7-1. Capital expenditures for expansion and improvements identified in this Plan will be shared by the Partners by a revised cost allocation. Refer to Section 6 for the cost sharing of the selected alternative and improvements.

The VFSA finances, owns and operates its collection and transmission facilities in East Pikeland, Charlestown and Schuylkill Townships' independent of the 1970 Agreement. The other VFSA Service Area Municipalities are responsible for the financing, ownership and operation of their collection and conveyance system independent of any agreements, and are also parties to agreements where they use facilities in downstream municipalities.

Two major agreements have been signed with respect to sewer system components within the VFSA Service Area: the Valley Creek Trunk Sewer (VCTS) Agreement and the East Whiteland Trunk Line (EWTL) Agreement. In accordance with the VCTS Agreement, Tredyffrin is responsible for financing, ownership and operation of the VCTS within Tredyffrin Township, which means the main pumping station and the force main to the Valley Forge STP. East Whiteland, in accordance with the EWTL Agreement, is responsible for the financing, ownership and operation of the EWTL within East Whiteland Township.

Financial Statement

In 2004, the Authority called its bond issue which financed the original construction of the Authority's facilities as well as several upgrade projects. The bond issue was refinanced with a bank note saving the Authority $487,000 in interest over the life of the note. The remaining fee in this note is $ 1,800,000 and will be completely satisfied by 2010. The Authority will finance its share of the pending project from its Capital Improvement Fund which currently has a balance of $ 16,610,107.

The Partners will provide funds for the pending project from funds on hand or thorough loans or bond issues.

B. Provide a narrative description of the various institutional alternatives necessary to implement the selected alternative.

The selected alternative can be fully implemented by the current organization of the VFSA. The VFSA has a total of 27 employees combining full-time and part-time employees. Operation,

maintenance, collection system, and laboratory consist of 15 employees, and the other 12 employees are involved in administration and engineering. Therefore, no changes are proposed to the existing arrangement to implement the recommendations of this plan.

C. Provide a narrative description of the necessary administrative and legal activities required to ensure implementation of the selected alternative.

The VFSA, via agreements with the VFSA member municipalities has the Authority to implement the plan and has successfully undertaken projects in the past.
The following legal activities are necessary for plan implementation:

1. Obtain necessary permits including, but not limited to:
    a. Part I – NPDES permit for discharge criteria
    b. Part II – NPDES permit for construction
    c. Sediment and Erosion Control Plan (approval)
2. Obligate funds for the overall project and collect accordingly from the Partner Municipalities.

D. Identify the chosen institutional alternative for implementing the selected alternative and provide justification considering administrative issues, organizational needs and legal authority.

As stated previously, there are no proposed changes to the current institutional arrangement since Agreements already exist that allow the planning and implementation of this pending project.

The following institutional activities must be accomplished for plan implementation:

1. Obtain municipal adoptions for this plan.
2. Initiate design and permitting processes for proposed project.

Section 8

Justification for Selected Alternatives

Table of Contents **Page No.**

A. Recommended Technical Wastewater Disposal Alternative 8-1

B. Recommended Capital Financing Plan 8-2

Appendices:

None

Figures:

None

Exhibits:

None

A. Prepare a narrative to identify the recommended technical wastewater disposal alternative with justification for the recommendations based upon needs, cost effectiveness, and environmental considerations.

Based on this evaluation the following summarizes recommendations for VFSA to proceed with meeting the wastewater disposal needs established by the Service area Municipalities.

- Alternative 3e, expansion of the existing wastewater treatment plant from 9.2 MGD to a permitted capacity of 11.52 MGD is the recommended alternative. This alternative is comprised of the upgrade and expansion of the exiting wastewater treatment plant including UV disinfection and the addition of a 4th clarifier and a 3rd aeration basin. Alternative 3e provides an adequate amount of operational flexibility, with a minimal amount of risk, and the capital cost is appropriate to the level of capacity that will be added. It meets VFSA's capacity needs into the distant future. It will also enable VFSA to upgrade to a denitrification plant if needed due to future regulatory requirements without major structural additions.
- Capacity additions that are required for dewatering should be added. The analysis presented in this report suggests that two new dewatering devices, each at a capacity of 150% of the existing centrifuges are appropriate. This will provide VFSA with sufficient dewatering capacity to dewater its connected customers' solids during a one-shift working day. This was the same basis as was used for sizing the existing wastewater treatment plant and will provide adequate capacity into the long-term future.
- Additional gravity thickening capacity is marginal at the present time and therefore more capacity is needed and should be added in a timely manner.

Potential plant improvements are presented with a discussion of the benefits in terms of operating flexibility and the potential of upgrading the existing plant from mid-1970s to state-of-the-art technology. Implement plant improvements based on an analysis of the benefits and costs.

Alternative 3e (increase Capacity at Existing Plant) was selected because it is the most cost efficient, satisfies ultimate-treatment demand for the affected area in and of itself, is consistent with objectives and policies of municipal planning documents and regulations, and is easily implemented.

The selected alternative satisfies the guidelines established in Section 6. Discharge to high quality or exceptional streams and disturbance of recreational and historical areas are avoided, and construction is minimized. All flow stays within the Schuylkill River Basin, maintaining the water balance there.

B. Prepare a narrative to identify the recommended capital financing plan selected to implement the recommended alternative.

This alternative will be financed by tax-exempt municipal bonds. The individual municipalities will be given the option to make capital contributions to offset the borrowing. A breakdown of the cost estimate is included in Appendix D. The proposed implementation schedule for this project is presented in Table 8-1.

Table 8-1. Implementation Schedule

Date	Task
November 2006	VFSA Approval (August Board Meeting)
December 2006	Submit 537 Plan to Municipalities and County Planning Agencies and Health Department
February 2006	Public Advertisement of Plan
March 2007	Approval obtained from all Agencies
April 2007	VFSA Adopts
July 2007	Submit to PADEP
October 2007	PADEP approval
January 2008	Design Contract
December 2008	Complete Design
April 2008	Obtain Permits
August 2009	Award Contract
September 2009	Begin Construction
December 2010	Begin Operations

APPENDIX A

Valley Forge Sewer Authority

Article of Incorporation

Commonwealth of Pennsylvania

Department of State

3-1-69.03 16

Office of The Secretary of the Commonwealth

To all to whom these Presents shall come, Greeting:

WHEREAS, In and by the provisions of the Municipality Authorities Act approved May 2, 1945, P. L. 382, as amended, the Secretary of the Commonwealth is authorized and required to issue a

CERTIFICATE OF INCORPORATION

evidencing the incorporation of an authority under the provisions of said Act.

AND WHEREAS, The stipulations and conditions of said Act have been fully complied with by the Municipal Authorities of the Charlestown Township, East Pikeland Township, and Schuylkill Township, all of the County of Chester

Commonwealth of Pennsylvania desiring the organization of

VALLEY FORGE SEWER AUTHORITY

THEREFORE, KNOW YE, That subject to the Constitution of this Commonwealth, and under the authority of Act No. 164, approved the second day of May, Anno Domini one thousand nine hundred and forty-five, P. L. 382, as amended, I DO BY THESE PRESENTS, which I have caused to be sealed with the Great Seal of the Commonwealth, declare and certify the creation, erection and incorporation of

VALLEY FORGE SEWER AUTHORITY

into a body politic and corporate in deed and in law by the name chosen hereinbefore specified, now to become operative with authority to transact business, and which shall exist for a term of fifty years unless sooner dissolved according to law.

Such corporation shall have and enjoy and shall be the subject to all the powers, duties, requirements, and restrictions, specified and enjoined in and by the above Act of Assembly and all other applicable laws of this Commonwealth.

GIVEN under my Hand and the Great Seal of the Commonwealth, at the City of Harrisburg, this 6th day of February, in the year of our Lord one thousand nine hundred and sixty-nine and of the Commonwealth the one hundred and ninety-third

Secretary of the Commonwealth

fmk sat

File VFSA Act 537

ARTICLES OF INCORPORATION

TO THE SECRETARY OF THE COMMONWEALTH OF PENNSYLVANIA:

In compliance with the requirements of the Municipality Authorities Act of 1945, approved May 2, 1945, P. L. 382, as amended, Charlestown Township, East Pikeland Township and Schuylkill Township, all of which are Second Class Townships situated in Chester County, Pennsylvania, pursuant to duly adopted resolutions expressing the intention and desire of the municipal authorities of said townships to organize an Authority under said Act, do hereby certify:

(a) The name of the Authority shall be VALLEY FORGE SEWER AUTHORITY.

(b) The Valley Forge Sewer Authority is formed under the Municipality Authorities Act of 1945, May 2, P. L. 382, as amended.

(c) The following authorities have been organized under the Municipality Authorities Act of 1945 or the Municipality Authorities Act of 1935 and are in existence in or for the incorporating municipalities:

Charlestown Township Municipal Authority

Schuylkill Township Sewer Authority

(d) The names of the incorporating municipalities are Charlestown Township, East Pikeland Township and Schuylkill Township. The names and addresses of their municipal authorities, being the members of the boards of supervisors of said townships are as follows:

Charlestown Township

Charles D. Glackin	27 Marion Road, Phoenixville, Pennsylvania
Charles E. Ott	Charlestown Road, R.D. #1, Malvern, Pennsylvania
Harold F. Pyle	Yellow Springs Road, R.D. #1, Malvern, Pennsylvania

East Pikeland Township

John F. Yeager	Western Road, R.D. #2, Phoenixville, Pennsylvania
William A. McCord	Valley Dell Road Phoenixville, Pennsylvania
Earl F. Emery	Cold Stream Road Phoenixville, Pennsylvania

Schuylkill Township

C. W. Bothwell, Jr.	City Line Avenue, Phoenixville, Pennsylvania
H. Brent Bamberger	87 Rossiter Avenue, Phoenixville, Pennsylvania
Charles E. Rammel	Country Club Road, Valley Forge, Pennsylvania

(e) The names, addresses and terms of office of the first members of the Board of Valley Forge Sewer Authority are:

	Name	Address	Appointing District	Term of Office Expiring
1	Michael Stevens	Mary Hill Road Phoenixville, Pa.	Charlestown Township	12/31/1969
2	Andrew Nesspor, Jr.	Route 29, R.D.#2 Phoenixville, Pa.	Charlestown Township	12/31/1970
3	John A. Gubanich	6 Glaicia Drive Phoenixville, Pa.	East Pikeland Township	12/31/1971
4	William J. Walker	1251 Township Line Rd., Phoenixville, Pa.	East Pikeland Township	12/31/1972
5	Joseph Weinstock	1234 Pothouse Road Phoenixville, Pa.	Schuylkill Township	12/31/1973
6	Richard Leeson	Ferry Lane & Pawling Road Phoenixville, Pa.	Schuylkill Township	12/31/1969

There shall be six members of the Board of said Authority. Subject to existing and future provisions of law, each Board of Supervisors of the incorporating townships shall continue to appoint two members of the Board of the said Authority.

(f) The purposes for which said Authority is organized are to acquire, hold, construct, improve, maintain, operate, own and lease, either in the capacity of lessor or lessee, sewers, sewer systems or parts thereof, sewage treatment works, including works for treating and disposing of

industrial waste, and such other purposes provided by said Municipality Authorities Act as may be incidental to the above enumerated purposes.

IN WITNESS WHEREOF, the undersigned have executed these Articles of Incorporation on behalf of the Townships above named and have caused the seals thereof to be affixed hereto as of the 28th day of October, 1968.

ATTEST:

Elizabeth G. Pyle
Secretary of Board of Supervisors
Charlestown Township

CHARLESTOWN TOWNSHIP

BY Charles D. Stroble
Chairman of the Board of Supervisors
Charlestown Township

EAST PIKELAND TOWNSHIP

Attest: Beebe S. Quinter
Secretary of Board of Supervisors of East Pikeland Township

By John F. Geyer Pres.
Chairman of Board of Supervisors of East Pikeland Township

SEAL

3-1-69.08 15

SCHUYLKILL TOWNSHIP

by

Chairman
SCHUYLKILL TOWNSHIP
BOARD OF SUPERVISORS

ATTEST:

Secretary
SCHUYLKILL TOWNSHIP
BOARD OF SUPERVISORS

Approved and filed in the Department of State on the

6th day of February, A. D. 1969.

Secretary of the Commonwealth

fmk

APPENDIX B

Member Municipality Report

VALLEY FORGE SEWER AUTHORITY
MEMBER MUNICIPALITY COLLECTION SYSTEM

SUPPLEMENT TO THE VFSA
REGIONAL ACT 537 PLAN

FINAL REPORT
SEPTEMBER 1996

REVISED
APRIL 14, 1997

BUCHART-HORN, INC.
CONSULTING ENGINEERS AND PLANNERS
445 W. PHILADELPHIA ST.
P.O. BOX 15040
YORK, PA 17405-7040

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TABLE OF CONTENTS

	Page No.
INTRODUCTION	1
EXISTING CONDITIONS	1
Pump Stations	2
Operations	5
Collection System	6
CONNECTIONS TO THE MEMBER MUNICIPALITY COLLECTION SYSTEM	7
FUTURE CONNECTIONS	8
Charlestown Township	8
East Pikeland Township	12
Schuylkill Township	15
Basis of EDU Growth Projections	17
NEEDS ANALYSIS	19
Existing Flows	19
Infiltration/Inflow	19
Future Flows	21
Sewers	21
Metered Pump Stations	26
Unmetered Pump Stations	35
PUMP STATION ALTERNATIVES	36
Perkiomen Pump Station	36
Valley Creek Pump Station	37
Pothouse Road Pump Station	38
Flows	39
Upgrade of the Pumps	40
Generator	40
EVALUATION OF ALTERNATIVES	40
CONCLUSIONS AND RECOMMENDATIONS	43
IMPLEMENTATION	45

APPENDICES

Appendix

A	VFSA EDU Count - Sewer Model EDU Count
B	Basis of EDU Growth Projections
C	I/I Analysis (1993-1995)
D	Surcharged Sewer Data
E	Pump Drawdown Test Procedures
F	Implementation Costs

LIST OF TABLES

Table No.	Title	Page No.
1	Pump Station Flows	4
2	Year End EDUs by Pump Station	7
3	Year End EDUs by Member Municipality	8
4	Comparison of Growth Projections for Charlestown Twp.	11
5	Growth Projections for East Pikeland Twp.	13
6	Comparison of Growth Projections for Schuylkill Twp.	16
7	EDU Growth Projections	17
8	Member Municipality System Flows	19
9	No. Of Months Where Flow Rates Exceeded 3,500 GPD/IN-DIA-Mi	20
10	Wastewater Flow Projections for the Member Municipalities	21
11	Drainage & Subdrainage Basin Assignment by Pump Station	22
12A	Sewer Sections Predicted to Surcharge Based on Current Wet Weather Conditions	23
12B	Sewer Sections Predicted to Surcharge Based on the Five Year Planning Horizon	24
12C	Sewer Sections Predicted to Surcharge Based on the Ten Year Planning Horizon	24
12D	Sewer Sections Predicted to Surcharge Based on Ultimate Growth Conditions	25
13	French Creek Pump Station	28
14	Pothouse Road Pump Station	29
15	Whitehorse Road Pump Station	30
16	Pickering Creek Pump Station	31
17	Perkiomen Pump Station	32
18	Valley Creek Pump Station	33
19	Existing & Projected Flows for Unmetered Pump Stations	35
20	Wet Weather Flow Projections at Pothouse Road Pump Station	39
21	Alternatives for VFSA Consideration	41

LIST OF FIGURES

Figure No.	Title	Page No.
1	Member Municipality Collection System Pump Station Relationship	3
2	537 Boundary - Charlestown Township	10
3	537 Boundary - East Pikeland Township	14

LIST OF EXHIBITS

Exhibit No.	
1	Sewer Service Boundary
2	Sewage Collection System
3	Subdivision Map
4	Sewer Segments Projected to Surcharge
5	537 Boundary - Schuylkill Township

MEMBER MUNICIPALITY COLLECTION SYSTEM

INTRODUCTION

The Valley Forge Sewer Authority (VFSA) is an operating Authority created in 1968 by Charlestown Township, East Pikeland Township and Schuylkill Township, all northern Chester County communities. This Authority is the owner and operator of the 8 million gallon per day regional wastewater treatment plant as well as an extensive sewage collection and transmission system. In addition to providing service to the creating Townships, the Authority provides wastewater treatment services for Easttown Township, East Whiteland Township, Malvern Borough, Tredyffrin Township and Willistown Township, all of which are located in Chester County, south of the Valley Forge Sewer Authority Service Area along U.S. Route 30. Recently, the VFSA has also extended sewer service to a small portion of West Vincent Township.

The three Townships forming the Valley Forge Sewer Authority are called the Member Municipalities. The other municipalities originally connected to the regional wastewater system are the Partner Municipalities.

This report is limited to the evaluation of the Valley Forge Sewer Authority collection system which serves the Member Municipalities. It is intended to serve as an appendix to the Regional Act 537 Plan which addresses the wastewater needs of both the Partner and Member Municipalities. To accomplish the Regional Act 537 Plan, each Member and Partner Municipality was requested to either develop or update its municipal Act 537 Plan detailing the community's wastewater disposal needs. The Member Municipalities each accomplished this task. As a part of the Act 537 planning process, Charlestown, East Pikeland , and Schuylkill Townships designated a sewer service boundary within their municipality. All development, existing and proposed, which is within this boundary is to be provided with public sewage collection facilities for conveyance of wastewater to the regional treatment plant for processing and disposal. The Act 537 Sewer Boundary as designated by the Member Municipalities is displayed on Exhibit No. 1.

EXISTING CONDITIONS

The member municipality collection system currently consists of approximately 68 miles of gravity sewer with pipe diameters ranging in size from 6" to 42", four major pump stations, and six minor pump stations. See Exhibit 2. The sewerage network also includes approximately 3,000 LF of low pressure sewer systems. The majority of the collection system transmits wastewater to the VFSA wastewater treatment plant, via the four major pump stations which operate in series. A small portion of the collection system, located in the southern end of Charlestown Township, transmits wastewater to the regional treatment plant via the Valley Creek Trunk Sewer and Wilson Road Pump Station in Tredyffrin Township.

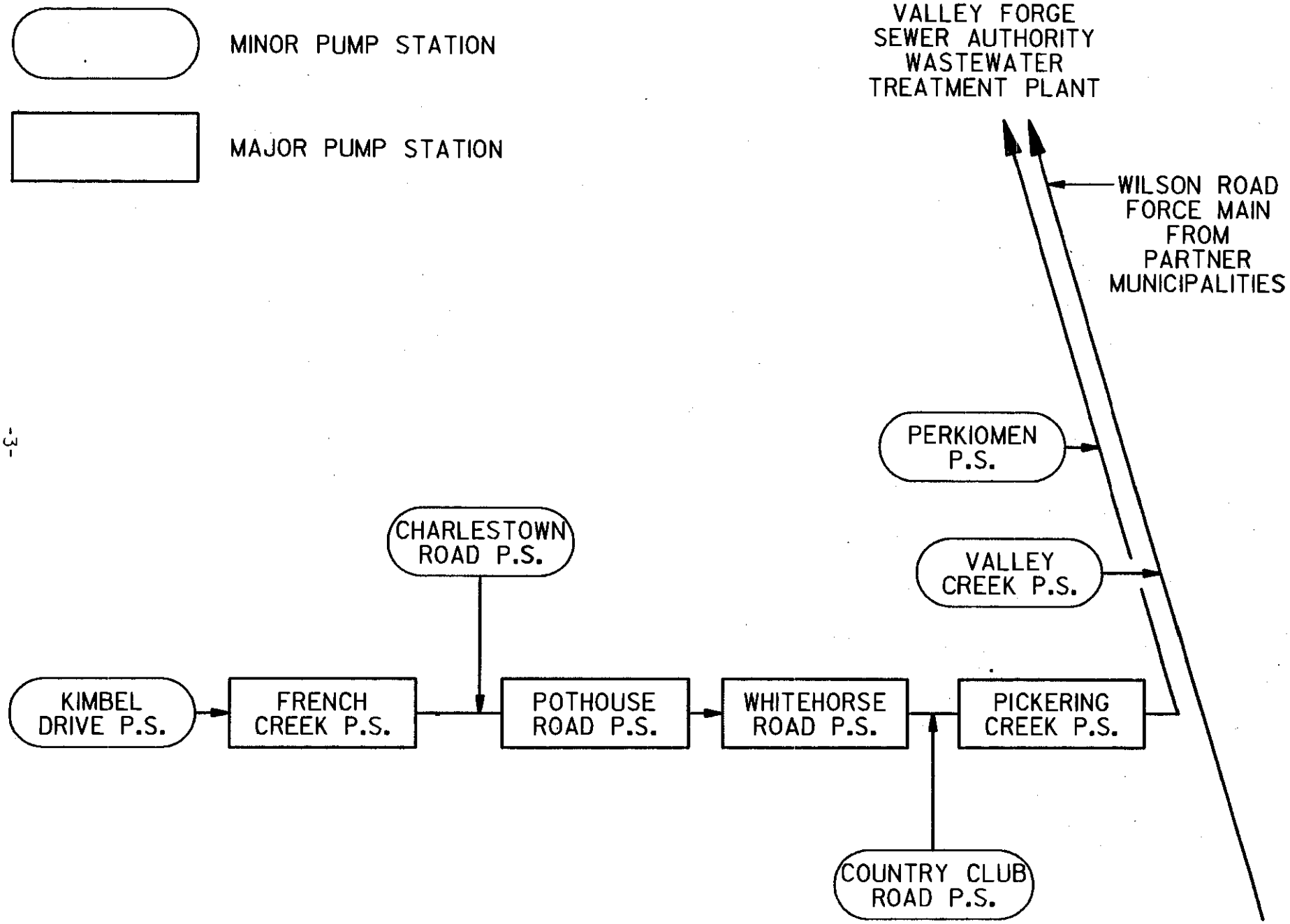
Pump Stations

Four of the minor pump stations pump to the four major pump stations. The remaining two minor pump stations pump directly to the wastewater treatment plant. The relationship between the various pump stations is described below and depicted in Figure 1.

Minor Pump Stations	Major Pump Stations
Kimbel Drive Pump Station discharges to	FRENCH CREEK PUMP STATION discharges to
Sandra La. & Charlestown Rd. Pump Station discharge to	POTHOUSE RD. PUMP STATION discharges to WHITEHORSE RD. PUMP STATION discharges to
Country Club Rd. Pump Station discharges to	PICKERING CREEK PUMP STATION discharges to VFSA WWTP
Valley Creek Pump Station discharges to	WILSON RD. PUMP STA. FORCE MAIN discharges to VFSA WWTP
Perkiomen Pump Station discharges to	PICKERING CREEK P. S. FORCE MAIN discharges to VFSA WWTP

Table No. 1 lists the capacity of each metered pump station and the average daily flow and maximum daily flow recorded at each pump station over the last three years. The gallons per day per dwelling unit for average and maximum daily flows are also provided in Table No. 1. Where known, the results of pump station drawdown testing is noted.

The Valley Forge Region experienced drought conditions in 1991 and 1992 considerably reducing the average daily flows. Therefore, the flow data for 1991 and 1992 would skew the analysis herein, so the discussion is limited to a three year duration (1993 - 1995). Additionally, in January 1996 the Valley Forge Region experienced severe flooding. Watertight manhole inserts had been removed by a contractor in French Creek Drainage Basin invalidating flow data at the four major pump stations, however, the January 1996 flow data has been incorporated into this report for Perkiomen and Valley Creek pump stations.



VALLEY FORGE SEWER AUTHORITY
MEMBER MUNICIPALITY
COLLECTION SYSTEM
PUMP STATION RELATIONSHIP

BUCHHART HORNING INC.
Consulting Engineers and Planners

ENGR/ARCH
DESIGN BY
DRAWN BY
CHECK BY
DATE

DRAWING NO FIG. 1
SHEET NO
PROJECT NO 71565

TABLE NO. 1
PUMP STATION FLOWS

Major Pump Station	Rated Capacity (MGD)	Drawdown (2 pumps on)	Year	ADF (MGD)	ADF (GPD/EDU)	MDF (GPD)	MDF (GPD/EDU)
French Creek	2.88	3.57	1995	0.455	223	1.858	919
			1994	0.475	239	2.55	1,283
			1993	0.440	223	1.759	892
Pothouse Road	3.17	3.96	1995	0.585	226	2.32	907
			1994	0.641	254	3.2	1,270
			1993	0.592	237	2.52	1,008
Whitehorse Road	4.61	6.39	1995	0.660	223	2.54	849
			1994	0.724	250	3.45	1,193
			1993	0.681	238	3.05	1,063
Pickering Creek	5.62	Unknown	1995	0.729	119	2.83	968
			1994	0.793	224	3.24	913
			1993	0.780	223	3.39	771
Perkiomen	0.216	Unknown	1996				0.280
	1,346						
			1995	0.046	221	0.117	564
			1994	0.048	230	0.166	795
			1993	0.049	226	0.186	894
Valley Creek	0.144	Unknown	1996				0.140
	2,634						
			1995	0.011	192	0.038	725
			1994	0.013	253	0.071	1,369
			1993	0.013	260	0.107	2,120

ADF - Annual average daily flow
MDF - Maximum flow day recorded for the year

MGD - Million gallons per day
GPD/EDU - Gallons per day per equivalent dwelling unit

All of the Valley Forge Sewer Authority Pump Stations are wet well/dry well configured. Each has two centrifugal pumps operating in a lead/lag mode. Pickering Creek Pump Station also has a jockey pump which handles normal average daily flows. Each of the major pump stations are equipped with variable pump speed control systems (Flow Matcher), however, these variable speed systems are set to run the pumps at the maximum constant speed. The VFSA determined the electric consumption compared to the power utility's rate structure resulted in no benefit to operating in a variable speed mode.

All of the pump stations are equipped with an emergency generator and with reliable auto transfer switch systems. In addition, each pump station includes an alarm monitoring system with automatic dialer to alert maintenance personnel of operating problems. Each pump station also has connection facilities for portable bypass pumping.

Operations

A formal predictive/preventative maintenance program covers all collection system pumping stations which are visited seven (7) days a week. The program includes routine wet well cleaning.

VFSA assigns two (2) staff members to maintain the sewage collection system. One staff member is the designated collection system maintenance supervisor, and the second position is filled by weekly rotating operators from the wastewater treatment to the collection system. This rotation expands the experience and knowledge base of the overall staff to address emergencies, vacations, and sick leave. Repair maintenance activities are supported by nine (9) plant maintenance staff and outside contractors. The wastewater treatment plant is staffed sixteen (16) hours per day, five (5) days per week. The operation of facilities is monitored on weekends and the WWTP is staffed five (5) hours per day Saturday, Sunday, and holidays. Remote alarms acknowledge emergency conditions and alert VFSA staff to respond to the facility during unattended hours.

The metered pump stations are equipped with twenty-four hour circular charts and totalizer. The metered data is recorded during the daily site visit. Although the operators usually read the meters at approximately the same time each day, various circumstances may cause readings to be delayed or shortened by several hours. Since the totalizer data is used for evaluation, the total flow, typically based on a 24 hour period, may actually cover anywhere from a 20 to 30 hour period. The 6 metered pump stations in the VFSA system need to be read on a consistent schedule. This could be resolved by reading the meter results electronically. The data could also be transmitted back to the wastewater treatment plant, considerably reducing the labor required to visit the pump stations on a daily basis. Conceptual cost $9,000 for first installation, $6,500 for subsequent installations. A pump station alarm system upgrade was accomplished in 1995. The only effort necessitating daily visits now that the alarm upgrade is complete is obtaining the flow data. The pump stations would still be routinely visited to accomplish wet well cleaning and verify system operation.

Collection System

The member municipality collection system is in satisfactory operating condition. Repairs are promptly conducted when problems are identified.

In the collection system, trouble sewer lines are routinely flushed. The VFSA has annual contracts for right-of-way clearing and I/I correction (sewer rehabilitation). The I/I study and corrective action plan includes: key manhole monitoring, plug and weir testing in problem areas, internal video inspection and cleaning and grouting where necessary.

CONNECTIONS TO THE MEMBER MUNICIPALITY COLLECTION SYSTEM

The number of connected equivalent dwelling units, EDUs, is computed quarterly by pump station drainage basin and municipality. Table No. 2 provides the number of EDUs by pump station for the past three years. The EDUs listed are exclusive of EDUs from upstream pump stations.

TABLE NO. 2
YEAR END EDUs BY PUMP STATION①

Major Pump Station②	1993 EDUs	1994 EDUs	1995 EDUs
French Creek	1,859	1,922.5	1,978
Pothouse Road	391	391	392
Whitehorse Road	351.5	435.5	330
Pickering Creek	641	652	650
Minor Pump Station			
Perkiomen	207.5	207.5	201
Valley Creek	50	53	55
Kimbel Drive	98	99	99
Sandra Lane	23	23	22
Charlestown Road	115.5	119.5	128
Country Club Road	0	27	72
②Lee Boulevard	116	154	169
Total	**3,852.5**	**4,084**	**4,096**

①Year End EDUs as counted on the first day of the following year.
② Lee Boulevard is not a pump station. It meters the flow that passes through the Valley Creek Trunk Sewer and Wilson Rd. Pump Station.

As previously noted, only three years of data are presented because 1991 and 1992 were drought years. It was determined that the earlier years would skew the projections developed herein.

The number of EDUs is also reported by member municipality. The number of EDUs connected by municipality for 1993 through 1995 is listed in Table No. 3.

TABLE NO. 3
YEAR END EDUs BY MEMBER MUNICIPALITY

	1993 EDUs	1994 EDUs	1995 EDUs
Charlestown Township	302.5	345.5	377.0
East Pikeland Township	1,886.0	1,927.5	1,975.0
Schuylkill Township	1,664.0	1,789.0	1,717.0
West Vincent Township	0.0	22.0	27.0
Total	**3,852.5**	**4,084.0**	**4,096.0**

FUTURE CONNECTIONS

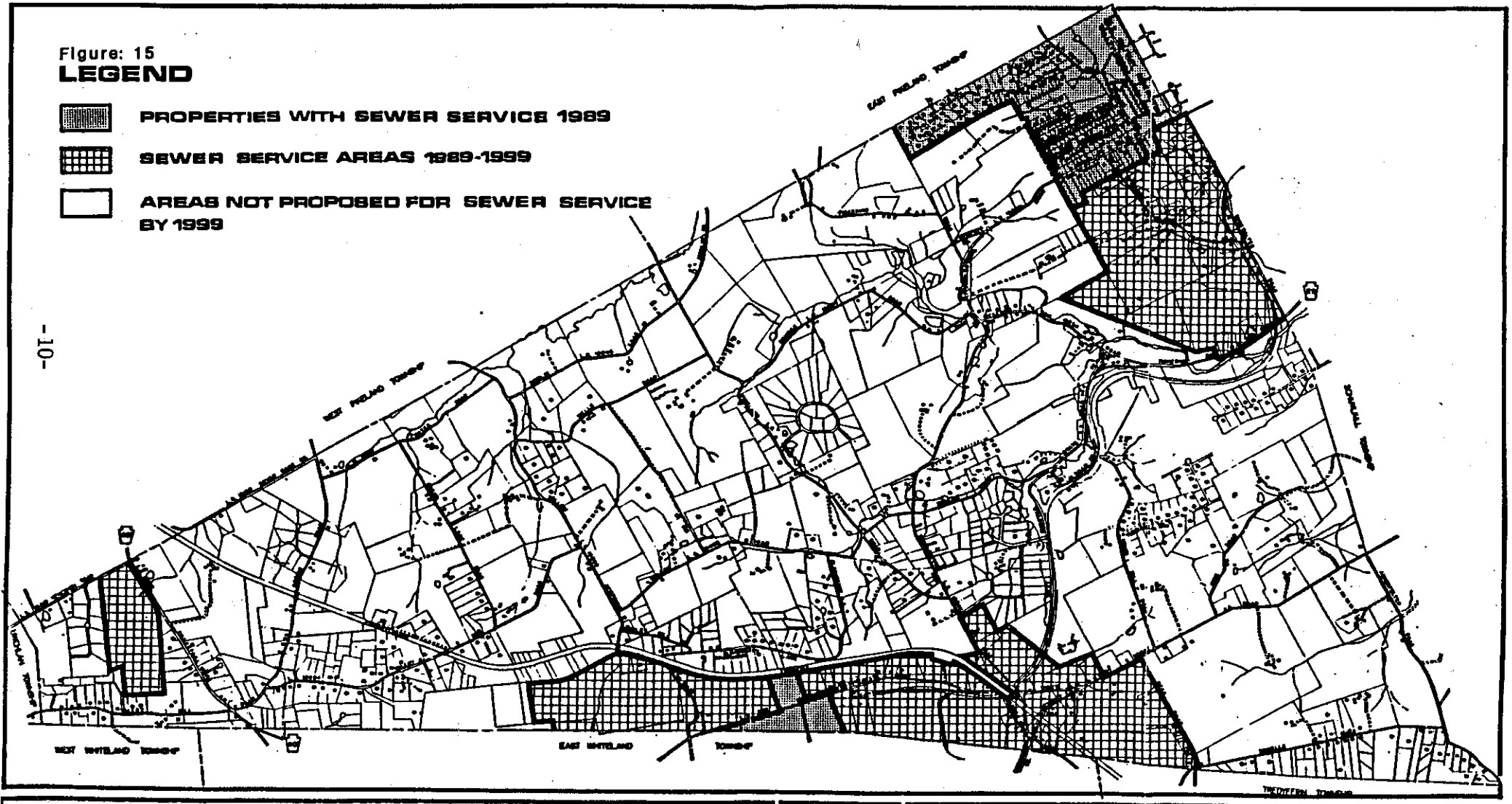
Each of the member municipalities and the Valley Forge Sewer Authority have carefully monitored development within the sewer service area. To ensure an orderly growth, sewage facilities proposed to serve new developments are sized to consider the ultimate needs of the area which the members have designated to be served. The proposed sewer routing must be situated to serve the overall sewerage objective of the Township within which the project is located. New development is typically evaluated by drainage basin. An analysis of the proposed routing is performed to determine whether adjacent properties within the Township's designated sewer service area may ultimately obtain public sewerage service through the proposed sewer. This determination may require the construction of a deeper sewer or provisions for future sewer connections, however, the intent is to eliminate the need for pump station construction in the future. Whenever possible, gravity alternatives are pursued. The Valley Forge Sewer Authority has had considerable success in evaluating proposed sewer extensions by drainage basin rather than just individual developments. Only one additional pump station has been required within the member municipality collection system since the original collection system construction.

Each of the Member Municipalities evaluated the future wastewater disposal needs of its community. As a result of this evaluation, Act 537 planning boundaries were developed. These boundaries are depicted in Exhibit 1. Additionally, each municipality identified proposed and active subdivisions within their political boundary including a development schedule. These subdivisions are depicted in Exhibit 3. This Member Municipality Act 537 Plan uses the 1995 data for the base year. The five year projection is 2000 and the ten year projection is 2005. Because of the varying time tables in which the three member plans were prepared, some adjustments to the growth projections were necessary for consistency.

Charlestown Township

Charlestown Township designated all property within its entire Act 537 sewer service boundary for public sewage service within a 10 year horizon. Figure 2 herein is a copy of Figure 15 of the April 1989 Official Plan Under the Pennsylvania Sewage Facilities Act prepared for Charlestown Township. The ten (10) year horizon depicted thereon is 1989-1999, basically the five year horizon of this document. Therefore, to be consistent with the time frame of the Member Municipality Act 537 Plan, the Township's projections are designated as a 5 year projection on Table No. 4. The developments which are indicated with an asterisk on Table No. 4 are already in some stage of planning or construction and the EDUs are based on approved planning module documentation. The remaining development EDUs were calculated by applying the Township's maximum zoning criteria to the developable acreage within the 537 sewerage boundary defined by the Township. Although there was considerable development planning activity in 1989, the momentum of some of the identified developments has slowed down. Therefore, this plan modifies growth projection to reflect the current development activity.

FIGURE 2



PROPOSED COMMUNITY SEWERAGE SYSTEM

APRIL 1989

0 1000 2000'

NORTH

CHARLESTOWN TOWNSHIP
CHESTER COUNTY, PENNSYLVANIA

DATE: April 1989

THOMAS COMITTA ASSOCIATES
PLANNING & DESIGN CONSULTANTS
WEST CHESTER, PENNSYLVANIA 19380

Figure: 16

TABLE NO. 4
COMPARISON OF GROWTH PROJECTIONS
FOR CHARLESTOWN TOWNSHIP

	VFSA/BH Projections			Charlestown Projections[1]
	5 Year	10 Year	Ultimate	5 Year
Charlestown Hunt[2]	105	244		349
Charlestown Hunt Growth	0	0	80	80
Across from Forestas	0	0	5	5
Charlestown Meade[2]	3			3
Commons at Great Valley[2]	66			66
Spring Oak Business Center[2]	73			73
DeVault Meats[2]	73			73
Laura Brooke[2]	20			20
Charlestown Oaks[2]	95	193		288
Charlestown Meadows[2]	0	0	241	241
Along Buckwalter	0	0	5	5
Behind Spring Oak	0	0	21	21
Across from Spring Oak	0	0	9	9
Yellow Springs Road	0	0	10	10
Rte. 29 & Charles Road	0	0	50	50
N. Side of the school	0	0	7	7
Farm Residence	0	0	1	1
Adj. To Laura Brooke	0	0	35	35
Adj. To Charlestown Oaks	0	0	46	46
	435	437	510	1,382
Existing EDUs (1/1/95)	345.5			345.5
Five Year EDUs	435			1,382
Ten Year EDUs	437			
Ultimate EDUs	510			
Total	**1,727.5**			**1,727.5**

1 Charlestown Township projected all growth within its Act 537 boundary to occur by 1999 (5 year horizon for this plan). The number of EDUs is based on the Township's zoning criteria.

2 Developments in some stage of planning or construction.

East Pikeland Township

The growth projections provided in the East Pikeland Township Act 537 Wastewater Facilities Plan, Phase III, dated August 26, 1991 are based on the 1989 Wasteload Management Report - Chapter 94. The Member Municipality portion of the Chapter 94 for 1989 is furnished in whole as Appendix A to East Pikeland Township's plan. Per page 43 of East Pikeland Township's Act 537 Plan, 800 EDUs were projected to develop within the Township from 1989-1994. Due to a slow down in growth, only 321 of these EDUs were developed by 1994. Although most of the projects identified in 1989 have not developed as planned, they are still active viable projects. This plan updates the East Pikeland Township growth projections based on the Act 537 sewer service boundary defined by the Township and current zoning criteria to create 5 year, 10 year and ultimate growth projections. See Table No. 5.

The East Pikeland Township Act 537 Plan also refers to an 850,000 gpd ultimate growth projection from the 201 Study, prepared in the early 1970's. The ultimate projection used in this Plan considers all potential growth in the remaining developable areas within the 537 boundary set forth by East Pikeland Township.

TABLE NO. 5
GROWTH PROJECTIONS FOR EAST PIKELAND TOWNSHIP

	VFSA/BH Projections		
	5 Year	10 Year	Ultimate
Kimberton Square	10		
Maple Lawn	76		
Huntfield	45		
Kimberbrae	4		
Kimberton Knoll	33		
Kimberton Valley Homes	21		
Deer Run Lane	3		
Townhomes @ Kimberton	150	86	
Brimful Farms	0	50	
Senior Life Choice	0	28	
Spring House Deli	2		
Barley Farms	0	43	
Rte 113 @ Huntfield			81
Rte 113 @ Shelly's			6
Rte 724 @ Rte 23			40
E. 7 Stars @ Kimberton TH			27
E. 7 Stars off Hartman			12
Frog Hollow @ Miller Rd. N.			38
Hares Hill @ Ruth			5
Hares Hill @ Camp Council			8
Hares Hill @ Prizer			15
Hares Hill @ Kimberbrae			52
Total EDUs	344	207	284

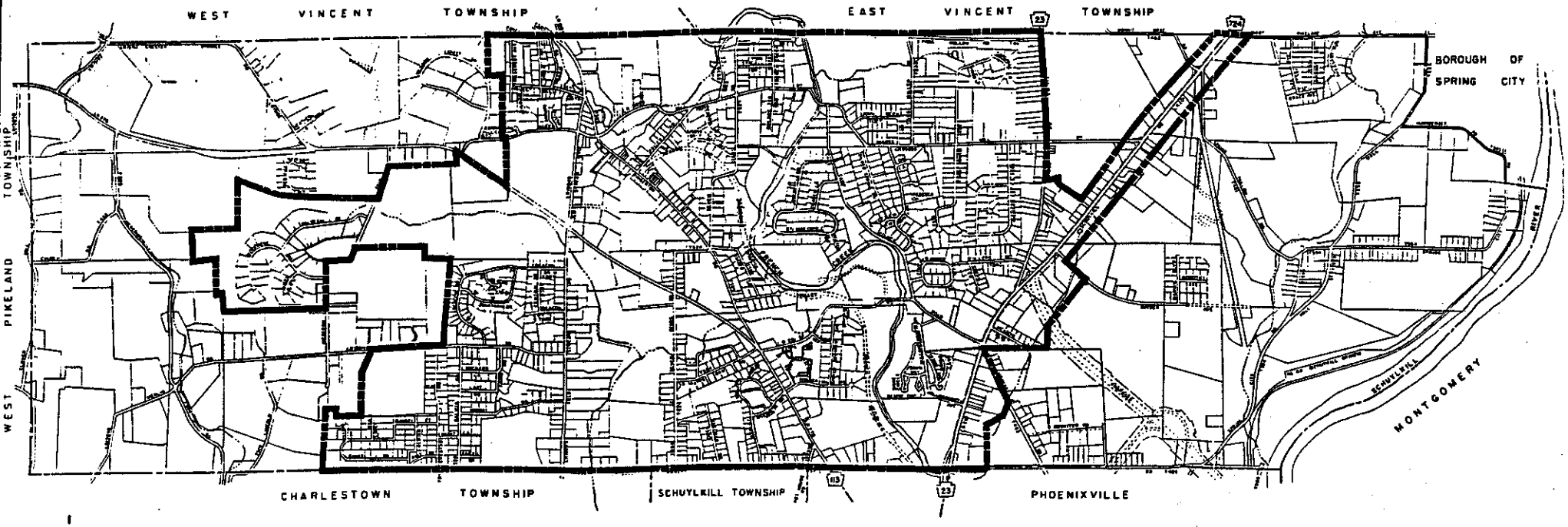
Existing EDUs (1/1/95)	1,927.5
5 Year EDUs	344
10 Year EDUs	207
Ultimate EDUs	284
TOTAL	**2,762.5**

FIGURE 3

EAST PIKELAND TOWNSHIP WASTEWATER FACILITIES PLAN

EAST PIKELAND TOWNSHIP, CHESTER COUNTY, PENNSYLVANIA

SCALE IN FEET



MAP V-1

SEWER SERVICE AREA

PROPOSED VALLEY FORGE SEWER AUTHORITY SERVICE AREA BOUNDARY

Schuylkill Township

Schuylkill Township's Act 537 Plan Update includes a Table of Anticipated Development on page 1 of the Plan Summary. It includes projections for both a five year (1995-1999) and ten year (2000-2004) planning horizon. The Township's Plan and this Plan differ by one year in their time table. Therefore, the Township's information has been updated to coincide with the planning period of this Plan. See Table No. 6. Additionally, the time frame for the MacAvoy, Rhinehart and Maisfield projects were extended to a 10 year duration due to the slow down in growth experienced in recent years.

Schuylkill Township's Act 537 boundary map titled "Act 537 Comprehensive Wastewater Plan Showing Development - 1993 - 2002, Exhibit No. 1" is included herein as Exhibit No. 5.

TABLE NO. 6
COMPARISON OF GROWTH PROJECTIONS
FOR SCHUYLKILL TOWNSHIP

	VFSA/BH Projections			Schuylkill Projections		
	5 Year	10 Year	Ultimate	5 Year	10 Year	Ultimate
Chapel View Estates	12			24		
Rte 23 Comm. (Alpha Rlty)	6			15		
Buono Tract	12			0		
MacAvoy	0	274		137	137	
Valley Forge Woods	240	85		240	85	
Rhinehart	0	130		80	95	
Maisfield	0	48		48		
French Creek - misc. (Ind.)	0	0		10	10	
Along Charlestown Hunt Inter	5			5		
Health Care Jordon	0	0		44		
Valley Creek	2			0	0	10
Miscellaneous	0	0		25	25	
Showalter Farm		0			80	
Meadowbrook Golf Course		0			58	
Mainwaring		5			5	
Thompson Tract						10
Thompson/Gold						10
Univ. Of PA						5
Misc. Resubdiv-Jug Hollow						25
Rte 23 North Corridor			29			
N. Side of Pawling Rd.			80			
North of Conrail			196			
Intersection @ Maisfield			6			126
Bull Tavern			3			
RR Tracks			36			
East Phillip			28			
By Valley Forge Woods			6			
Total EDUs	277	542	384	628	495	186
Existing EDUs	1,789	(1/1/95)		1,666	(1/1/94)	
Five Year EDUs	277			628		
Ten Year EDUs	542			495		
Ultimate EDUs	384			186		
TOTAL	**2,992**			**2,973**		

Basis of EDU Growth Projections

Table No. 7 presents the basis for the EDU growth projections developed in this report.

TABLE NO. 7
EDU GROWTH PROJECTIONS

	1994 Existing EDUs	5 Year	10 Year	Ultimate
French Creek P. S.				
Drainage Basin				
Stony Run	0	0	0	20
Kimbel Dr. P.S.	99	99	142	142
French Creek P.S.	1,922.5	2,275.5	2,439.5	2,703.5
Subtotal	2,021.5	2,374.5	2,581.5	2,865.5
Pothouse Rd. P.S.				
Drainage Basin				
Sandra Lane P.S.	23	23	23	23
Charlestown Rd. P.S.	119.5	122.5	122.5	127.5
Pothouse Rd. P.S.	391	391	391	396
Subtotal	533.5	536.5	536.5	546.5
Whitehorse Rd. P.S.				
Drainage Basin				
Whitehorse Rd. P.S.	435.5	545.5	789.5	869.5
Subtotal	435.5	545.5	789.5	869.5
Pickering Creek P.S.				
Drainage Basin				
Country Club Rd. P.S.	27	267	352	358
Pickering Creek P.S.	652	684	947	1,020
Subtotal	679	951	1,299	1,378
Perkiomen				
Drainage Basin				
Perkiomen P.S.	207.5	207.5	401.5	706.5
Subtotal	207.5	207.5	401.5	706.5
Valley Creek				
Drainage Basin				
Valley Creek P.S.	53	55	55	55
Subtotal	53	55	55	55
Valley Creek Trunk				
Sewer Drainage Basin				
Lee Tire Blvd. metering station	154	386	386	519
Route 401	0	0	0	241
Sidley Rd.	0	95	288	334
Subtotal	154	481	674	1,094
TOTAL	**4,084**	**5,151**	**6,337**	**7,515**

Future Flows

Appendix B provides the backup for these projections. Looking at the first page in Appendix B, the year end connected EDUs are as furnished from the VFSA billing department. The EDU count used was prepared as of 1/1/95, see Appendix A.

The second column in Appendix B, "remaining plotted EDUs" is EDUs predicted to develop within the next five (5) years and establish the five (5) year planning horizon.

The column titled "proposed EDUs" includes specific projects that have been identified and are in some stage of the subdivision approval process. It also includes portions of previously identified projects not expected to fully develop in the next five years. These EDUs establish the t%n (10) year planning horizon utilized in this report.

Finally, the "undeveloped land" column was created by determining developable acreage. Various maps were reviewed and site views accomplished to confirm pockets of developable land within the Act 537 sewer service boundaries designated by the Member Municipalities. The areas are identified on the second page of Appendix B. The maximum allowed zoning condition was used to quantify the development in these areas.

Each subdivision and tract of land identified was assigned an anticipated point of connection to the sewage collection network in order to analyze its impact to the system through the computer model. Identified subdivisions are depicted on Exhibit 3.

NEEDS ANALYSIS

Existing Flows

VFSA flows from the Member Municipality network over the last three years and the GPD/EDU are listed in Table No. 8.

TABLE NO. 8
MEMBER MUNICIPALITY SYSTEM FLOWS

Year	Average Daily Flow (MGD)	GPD/EDU
1995	0.815	201
1994	0.879	226
1993	0.855	223

Infiltration and Inflow

The average GPD/EDU for the entire Member Municipality system indicates flows attributed to infiltration and inflow (I/I) are minimal. Field experience, however, finds that there is still considerable inflow in the system. In 1994, the maximum day flow for French Creek Pump Station (PS) was 3.5 times the annual average daily flow; 5.3 times at Pothouse Road PS; 5.7 times at Whitehorse Rd. PS; 3.3 times at Pickering Creek PS; 3.8 times at Perkiomen PS; and 5.5 times at Valley Creek PS. These peaks are based on daily flows. Hourly peaks may be considerably greater.

During a previous review of the collection system, Buchart-Horn noted several manhole lids that were not properly bolted down and/or missing the gasket. In 1995, VFSA staff corrected many of these deficiencies in the French Creek Drainage Basin. The remainder of the system should be inspected and further corrections made.

Other inflow reduction efforts are much more difficult to implement. These include inspecting existing services for connection of sumps, roof drains and/or floor drains. At this time, effort should be concentrated on manhole repairs and sewer and lateral inspection and testing.

As previously indicated, VFSA has dedicated resources to ensure the proper upkeep of the Member Municipality collection system. With time, however, system deficiencies which lead to excessive infiltration and inflow, I/I must be expected. A cursory review of the collection system by drainage basin was performed to determine where excessive I/I might be entering the system.

Appendix C provides the tables and graphs used to evaluate the collection system. The graphs compare maximum day flows by month specified as gpd/in-dia-mi to the average, 3 month maximum, and 3 month minimum gpd/in-dia-mi for each pump station drainage basin. The

following table lists the number of months by pump station drainage basin where the gpd/in-dia-mi exceeded 3,500 gpd/in-dia-mi.

TABLE NO. 9
NUMBER OF MONTHS WHERE FLOW RATES EXCEEDED 3,500 GPD/IN-DIA-MI

	1993	1994	1995	Total
French Creek	2	1	1	4
Pothouse	4	5	2	11
Whitehorse	3	2	1	6
Pickering	2	0	1	3
Perkiomen	2	2	1	5
Valley Creek	2	1	0	3

Pothouse Road Pump Station has experienced the most flow events in excess of 3,500 gpd/in-dia-mi. It has also experienced the highest gpd/in-dia-mi flow rates; 9,854 gpd/in-dia-mi in December 1993 and 11,323 gpd/in-dia-mi in March 1994.

Whitehorse Road Pump Station and Perkiomen have the next highest quantity of flow events in excess of 3,500 gpd/in-dia-mi. I/I reduction efforts should be concentrated in these three pump station drainage basins based on average gpd/in-dia-mi flow rates as well as monthly maximum flow rates with the following priority:

1. Pothouse Rd. Pump Station
2. Perkiomen Pump Station
3. Whitehorse Rd. Pump Station

A considerable amount of I/I reduction effort has been put forth in the Pothouse Road Pump Station drainage basin and is reflected in the decrease of months with high gpd/in-dia-mi flow rates in 1995. The success of these efforts should be determined by evaluating the 1996 data for the recent wet months.

VFSA performs an annual I/I analysis of various parts of the collection system which includes flow monitoring. Where flow data indicates a high level of inflow in a particular drainage basin, a more concentrated effort to reduce inflow ***is*** accomplished with night weiring and televising.

Table No. 7 lists the projected number of EDUs for the Member Municipalities by various growth horizons. Table No. 10 provides average daily wastewater flow projections for the member municipalities.

TABLE NO. 10
WASTEWATER FLOW PROJECTIONS
FOR THE MEMBER MUNICIPALITIES

Growth Horizon	Total EDUs	Flow * Projection (MGD)
Existing	4,084	1.123
5 Yr.	5,151	1.417
10 Yr.	6,337	1.743
Ultimate	7,515	2.067

* flows based on 275 GPD/EDU

Since the creation of the Valley Forge Sewer Authority, the Member and Partner Municipalities have used 275 gallons per day as the base flow for an EDU. The historic GPD/EDU factor for VFSA has been well below 275 GPD/EDU since 1985. The ten year average, 1985-1994, is 218 GPD/EDU. Therefore, the 275 GPD/EDU flow rate is considered conservative when computing flow projections for the Member Municipality collection system and is used throughout this planning document.

The flow allocation of 2.124 MGD assigned to the Member Municipalities is adequate for all growth horizons.

Sewers

In 1986, Buchart-Horn developed nine models which analyze the member municipality collection system by pump station drainage basin. The data from upstream pump stations is incorporated into the downstream pump station's model. The model is used to simulate a "worst case" wet weather scenario. The model then identifies which sewer segments would become surcharged and by how much under this scenario.

The model was developed by entering defining data for each sewer segment. Data entry included upstream and downstream manhole number and invert, pipe diameter and slope, and the number of equivalent dwelling units connected to each pipe section.

The manhole numbering was established by subdrainage basin. There are four major drainage basins within the three municipalities, numbered 1 through 4. Each of the major drainage basins is subsequently divided into subdrainage basins. These drainage division identifications form the first three numbers of any manhole. Each manhole with a subdrainage basin is then numbered beginning with 100. Therefore, manhole 2.16-100 is manhole 100 in drainage basin 2, subdrainage basin 16.

Table No. 11 provides the drainage and subdrainage basin assignment by pump station.

TABLE NO. 11
DRAINAGE AND SUBDRAINAGE BASIN ASSIGNMENT BY PUMP STATION

Pump Station	Associated Subdrainage Basins
French Creek	2.01, 2.02, 2.03, 2.04 2.05, 2.06, 2.07, 2.08 3.02, 3.06
Pothouse Road	2.09
Whitehorse Road	3.04
Pickering Creek	2.00, 3.01, 3.02, 3.03
Perkiomen	4.02
Valley Creek	4.05
Kimbel Drive	3.07
Charlestown Road	3.06
Sandra Lane	3.05
Country Club Road	3.15

The sewer model is updated to reflect new connections and new sewer segments added to the collection system. Buchart-Horn uses a spreadsheet to track projects proposed in the VFSA system. Appendix A includes a table of connections by pump station drainage basin. This data, in conjunction with the quarterly listing of EDUs prepared by the Authority, also furnished in Appendix A, is used to establish the existing conditions for the model.

To simulate the worst case scenario, the lowest monthly average daily flow and maximum day flow in the analysis year are determined by pump station drainage basin. The lowest month average daily flow, considered the dry weather flow, is subtracted from the maximum day flow. The difference is then divided by the linear feet of sewer in the pump station drainage basin to develop an infiltration/inflow, I/I, factor expressed in gallons per day per linear feet, GPD/LF. The I/I factor and lowest monthly average daily flow are compared to the values used for the previous year's model and the highest of each of these is entered into the computer model; thus establishing the wettest event that might be seen in a 24 hour period. This event could occur once a year or might not occur for several years. This worst case scenario is used to evaluate available capacity of each sewer segment within the collection system.

Once the existing conditions are evaluated, the model is then used to determine the impact of new connections to the collection system. The model was used to evaluate the available capacity within the collection system over the 5 and 10 year growth horizons and ultimately. For each analysis period, the projected growth was entered into the computer model at the expected point of connection. The projected growth was expressed as a peak flow value and was based on the number of EDUs multiplied by 275 GPD/EDU and a peaking factor of 2.5.

Sewer segments which will surcharge under the worst case scenario were identified by drainage basin and growth horizon. Table Nos. 12A through D identify those segments. The tables also provide a conceptual construction estimate to increase the sewer capacity by planning horizon. The costs listed are construction costs only and do not include additional project costs such as engineering and legal fees. Where applicable, the future development which causes the surcharge is also identified. Appendix D provides a detailed description of the sewer segments including length, slope, diameter, capacity, and basis for the cost estimate.

Exhibit 4 depicts the sewer segments predicted to surcharge. It also identifies the planning horizon that will cause the surcharge.

TABLE NO. 12A
SEWER SECTIONS PREDICTED TO SURCHARGE
BASED ON CURRENT WET WEATHER CONDITIONS

Drainage Basin	Surcharged Section		Enlargement Detail on Exhibit 4	Conceptual Construction Est. (Present yr cost)
French Creek	2.08	118-102	3	$ 39,500
	2.04	109-108	4	24,900
	2.04	106-105	4	26,500
Pothouse Rd.	2.09	105-104	5	$ 54,500
Whitehorse Rd.	none		---	----
Pickering Creek	3.03	353-352	8	$ 19,200
	3.03	317-358	9	29,000
	3.15	104-103	10	①

① The identified surcharge at this sewer segment is minimal. The sewer should be monitored periodically under wet weather conditions. Upgrade will be necessary under the ultimate growth projection scenario.

TABLE NO. 12B
SEWER SECTIONS PREDICTED TO SURCHARGE BASED ON THE FIVE YEAR PLANNING HORIZON

Drainage Basin	Surcharged Section		Enlargement Detail on Exhibit 4	Conceptual Construction Est. (Present yr cost)
French Creek	2.06	102-101	1	$ 22,700
	2.04	110-122	4	7,700
	2.04	122-109	4	18,500
Pothouse Rd.	none		---	---
Whitehorse Rd.	3.04	446a-446	7	$ 29,700
Pickering Creek	3.03	353a-353	8	$ 11,700

TABLE NO. 12C
SEWER SECTIONS PREDICTED TO SURCHARGE BASED ON THE TEN YEAR PLANNING HORIZON

Drainage Basin	Surcharged Section		Enlargement Detail on Exhibit 4	Conceptual Construction Est. (Present yr cost)
French Creek	2.05 101 2.04 110		4	$ 29,700
Pothouse Rd.	① 2.09	102-100a	5	$ 23,300
Whitehorse Rd.	none		---	---
Pickering Creek	none		---	---

① Due to known surcharged conditions in this area, these sewer segments will be evaluated for correction now rather than in the 10 year planning horizon.

TABLE NO. 12D
SEWER SECTIONS PREDICTED TO SURCHARGE BASED ON ULTIMATE GROWTH CONDITIONS

Drainage Basin	Surcharged Section		Enlargement Detail on Exhibit 4	Development Causing Surcharge
French Creek	2.07	107-106	2	Rte. 113 @ Huntfield & @ Shellys
	2.06	105-104	1	Rte. 113 @ Huntfield & @ Shellys Hares Hill Rd. by Kimberbrae
Whitehorse Rd.	3.04	460-457	6	---
	3.04	453-452	7	---
Pickering Creek	3.03	325-324	9	---
	① 3.15	108-106	10	---

① Surcharge under ultimate scenario is minimal. Recommend monitoring prior to upgrade.

A list of the sewer segments identified in Table Nos. 12A through D were submitted to VFSA for field verification. VFSA identified known problems near Pothouse Rd. Pump Station, (segments 2.09 105-104 and 2.09 102-100a).

VFSA questioned the validity of the surcharge prediction of section 3.03 325-324. This sewer is identified for surcharge under ultimate conditions only. It appears that the slope may be steeper than that noted on the as-built plans. Before any action is taken on this section, the slope should be field verified.

Where there is no visible indication of surcharging, VFSA should monitor the identified segments during wet weather conditions. This may be accomplished by installing surcharge indicators in each manhole. It is recommended that indicators be installed in all segments identified in Table Nos. 12A through C. For estimating purposes, it is assumed that 10 indicators will be purchased allowing 5 segments to be monitored at a time. The indicators would be relocated after a significant wet weather event. Based on the extent of the surcharge identified, the sewer upgrade projects may then be prioritized. Cost $1,100. Currently, VFSA is making their own surcharge indicators for use in the system.

For the purpose of this study, it is assumed that all of the sewer segments identified as surcharging under current wet weather scenario, Table No. 12A, will require upgrade. The new pipe diameters recommended in Appendix D are sized to ensure the ultimate flow projection can be accommodated. Appendix B lists the developments predicted to occur in the five (5) and ten (10) year planning horizon and their associated drainage basin. As these developments commence, the sewer segments identified in Table Nos. 12B and C should be equipped with surcharge indicators. When surcharging is noted, a priority may be assigned for upgrading the sewer segments. In some instances, the extent of the surcharging may be insignificant compared to the cost of upgrading. The surcharge indicators will allow this to be determined. Decisions to upgrade sewer segments will be based on the field conditions observed.

The VFSA, in their field observations, has indicated that the sewer segments in the Pothouse Rd. drainage basin; 2.09 105-104 and 2.09 102-101-100a require upgrade. Simultaneously, the sharp change in flow direction at manhole 102 should be corrected. See enlargement detail 5 on Exhibit 4. It is recommended that manhole 2.09-102 be relocated 35 LF upstream of its current position for a smoother transition at both manhole 2.09-102 and 2.09-101 on the pump station site. Upgrading sewer section 2.09 105-104 would be accomplished as a part of the same project, conceptual construction cost in 1996 dollars - $77,800.

Similarly, when designed, the routing of sewer segments 2.04 110-122-109 should be evaluated to see if a smoother transition may be accomplished. See enlargement detail 4 on Exhibit 4. Manhole 2.04-110 could possibly tie directly into manhole 2.04-109 instead of 2.04-122. Sewer segment 2.04-122 would continue to flow to 2.04-109. Under the 10 year planning horizon, sewer section 2.05-101-2.04-110 is identified for potential surcharge. Although not considered a necessary project at this time, the segment should be closely monitored in conjunction with the 2.09 110-122-109 series. It could be beneficial to combine these projects if the surcharge indicators do not identify an immediate need to upgrade the 2.09 110-122-109 series.

The conceptual construction estimate to resolve the existing sewer capacity problems as well as the problems just prior to Pothouse Road pump station is $216,900 in 1996 dollars. Project costs, those additional costs required to accomplish a project including administrative, engineering and legal fees are discussed under the implementation section of this report and are not included in the conceptual construction estimate.

Metered Pump Stations

As previously stated, the flows developed in the computer model are used to predict a worst case scenario in order to ensure adequate carrying capacity within each sewer segment. These flows are considered excessive for the evaluation of pump station capacity. Therefore, a computation was developed to predict a reasonable peak flow condition for each pump station. The flow projections are presented in Tables Nos. 13-18. The methodology developed to

project pump station flows requires flow meter records. Therefore, the unmetered pump stations will be discussed separately.

For each metered pump station, the maximum GPD/EDU rate experienced within any day over the past three years was determined. See the column titled MAX GPD/EDU on Table Nos. 13-18. As previously stated, a three year analysis is being performed. The 1991 and 1992 flow data would skew the analysis due to drought conditions experienced in the region. Where available, the flow data from the flood of 1996 was incorporated into the analysis. (Note: This data was used for Perkiomen and Valley Creek pump stations only. There were several circumstances which invalidated the flow data for the four major pump stations.)

The second value necessary for the flow projections is the GPD/EDU rate for the annual average daily flow. See the column titled AVG GPD/EDU.

Existing wet weather flow conditions were established by multiplying the current EDUs by the MAX GPD/EDU. (Note: The net maximum GPD/EDU factor was used for Pothouse, Whitehorse and Pickering Pump Stations since there is a considerable flow contribution from the upstream pump stations.)

The pump station flows for the planning horizons were calculated by multiplying the EDU growth projection by the AVG GPD/EDU and by a peaking factor of 2.5. This flow was then added to the current flow calculation. Where upstream pump stations are involved, two flow projections were developed. The first projection was developed by adding the flow projection from the upstream pump station to the flow projection developed for the specific pump station. The second projection was developed by adding the actual pump rate of the upstream pump station to the projection for the specific pump station. Where the projected flow exceeds the rated capacity of the upstream pump station, the projected flow was added to the downstream pump station. Both individual pump station and cumulative EDU counts are provided for those pump stations which operate in series on Table Nos. 14-16.

To allow comparison, the flow projections developed by the computer model are presented in each table. These values were compared to the drawdown capability of the pump station, if known as a second comparison.

TABLE NO. 13
FRENCH CREEK PUMP STATION
(all flows in MGD)

	RATED CAPACITY	DRAW-DOWN	ADF	ADF GPD/EDU	MAXIMUM DAY FLOW	MAX GPD/EDU
	2.88	3.57				
1993			0.440	223	1.759	892
1994			0.475	239	1.642	826
1995			0.455	223	1.858	919

FLOW PROJECTIONS

		Current	5 yrs	10 yrs	ultimate
Computer Model - Worst Case Scenario		3.121	3.380	3.490	3.794
Computation based on max day gpd/edu for existing edus and 239 gpd/edu peaked 2.5 times for future edus.	FC @ 919 gpd/edu	1.858	2.069	2.192	2.362

1996 flood -
In 1996 the wet well flooded to approximately 2' below the top of the wet well structure, however the meters were not working and the actual flow is unknown. This event occured when several manhole watertight inserts in the drainage basin had been removed. Therefore, the flow data from this event has not been used for any of the four major pump stations.

1994 -
The maximum day flow data was considered invalid because high flow and moving ice sheared off a manhole in the drainage basin on that day. The second highest flow day in 1994 was used for the four major pump stations.

	FUTURE FC EDUS	TOTAL
CURRENT		2021.5
5 YEAR	353	2374.5
10 YEAR	560	2581.5
ULTIMATE	844	2865.5

TABLE NO. 14
POTHOUSE ROAD PUMP STATION
(all flows in MGD)

	RATED CAPACITY	DRAW-DOWN	ADF	ADF GPD/EDU	MAXIMUM DAY FLOW	NET MAX DAY FLOW	MAX GPD/EDU
	3.17	3.96					
1993			0.592	237	2.522	0.763	1436
1994			0.641	254	2.519	0.877	1650
1995			0.585	226	2.317	0.459	847

FLOW PROJECTIONS

		Current	5 yrs	10 yrs	ultimate
Computer Model - Worst Case Scenario		4.317 (fc@3.12)	4.575 (fc@3.38)	4.821 (fc@3.57)	4.989 (fc@3.794)
Computation based on max day gpd/edu for existing edus and 254 gpd/edu peaked 2.5 times for future edus. French Creek flow rate based on rated capacity and actual flow projections, see Table 13	PH @ 1650 gpd/edu & FC @	3.760 2.88 mgd	3.762 2.88 mgd	3.762 2.88 mgd	3.769 2.88 mgd
	PH @ 1650 gpd/edu & FC @	2.738 1.858 mgd	2.951 2.069 mgd	3.075 2.193 mgd	3.251 2.362 mgd

	FUTURE PH EDUS	TOTAL PH EDUS	TOTAL
CURRENT		533.5	2555
5 YEAR	3	536.5	2911
10 YEAR	3	536.5	3118
ULTIMATE	13	546.5	3412

TABLE NO. 15
WHITEHORSE ROAD PUMP STATION
(all flows in mgd)

	RATED CAPACITY	DRAW-DOWN	ADF	ADF GPD/EDU	MAXIMUM DAY FLOW	NET MAX DAY FLOW	MAX GPD/EDU
	4.61	6.39					
1993			0.681	238	3.050	0.528	1458
1994			0.724	250	2.991	0.472	1271
1995			0.660	223	2.540	0.223	607

FLOW PROJECTIONS

		Current	5 yrs	10 yrs	ultimate
Computer Model - Worst Case Scenario		4.731 (ph@4.32)	5.099 (ph@4.58)	5.345 (ph@4.69)	5.642 (ph@4.989)
Computation based on max day gpd/edu for existing edus and 250 gpd/edu peaked 2.5 times for future edus. Pothouse flow rate based on actual flow projections and flow projections with a pump station upgrade to 2600 gpm or 3.75 mgd	WH @ 1458 gpd/edu & ph @	4.385 3.75 mgd	4.454 3.75 mgd	4.606 3.75 mgd	4.675 3.769 mgd
	WH @ 1458 gpd/edu & ph @	3.373 2.738 mgd	3.655 2.951 mgd	3.931 3.075 mgd	4.156 3.250 mgd

	FUTURE WH EDUS	TOTAL WH EDUS	TOTAL
CURRENT	.	435.5	2990.5
5 YEAR	110	545.5	3456.5
10 YEAR	354	789.5	3907.5
ULTIMATE	434	869.5	4281.5

TABLE NO. 16
PICKERING CREEK PUMP STATION
(all flows in mgd)

	RATED CAPACITY	DRAW-DOWN	ADF	ADF GPD/EDU	MAXIMUM DAY FLOW	NET MAX DAY FLOW	MAX GPD/EDU
	5.62						
1993			0.780	223	3.393	0.343	536
1994			0.793	224	3.217	0.226	347
1995			0.729	199	2.828	0.288	405

FLOW PROJECTIONS

		Current	5 yrs	10 yrs	ultimate	drawdown
Computer Model - Worst Case Scenario		5.674 (wh@4.73)	6.068 (wh@5.1)	6.534 (wh@5.35)	7.019 (wh@5.642)	7.768 (wh@6.39)
Computation is based on max day gpd/edu for existing Pickering edus and 224 gpd/edu peaked 2.5 times for future edus. Whitehorse P.S. flows based on rated capacity or greater, see Table No. 15	PI @ 536 gpd/edu & WH @	4.974 4.61 mgd	5.126 4.61 mgd	5.321 4.61 mgd	5.430 4.675 mgd	7.145 6.39 mgd
	PI @ 536 gpd/edu & WH @	3.737 3.373 mgd	4.171 3.655 mgd	4.642 3.931 mgd	4.911 4.156 mgd	7.145 6.39 mgd

	FUTURE PI EDUS	TOTAL PI EDUS	TOTAL
CURRENT		679	3669.5
5 YEAR	272	951	4407.5
10 YEAR	620	1299	5206.5
ULTIMATE	699	1378	5659.5

TABLE NO. 17
PERKIOMEN PUMP STATION
(all flows in mgd)

	RATED CAPACITY	DRAW-DOWN	ADF	ADF GPD/EDU	MAXIMUM DAY FLOW	MAX GPD/EDU
	0.216					
1993			0.049	236	0.186	894
1994			0.048	230	0.166	795
1995			0.046	221	0.117	564
1996					0.280	1346

FLOW PROJECTIONS

		Current	5 yrs	10 yrs	ultimate
Computer Model -		0.226	0.226	0.362	0.569
Computation is based on max day gpd/edu for existing Perkiomen edus and 236 gpd/edu peaked 2.5 times for future edus.	PE @ 1346 gpd/edu	0.279	0.279	0.394	0.574

	FUTURE PE EDUS	TOTAL
CURRENT		207.5
5 YEAR	0	207.5
10 YEAR	194	401.5
ULTIMATE	499	706.5

TABLE NO. 18
VALLEY CREEK PUMP STATION
(all flows in mgd)

	RATED CAPACITY	DRAW-DOWN	ADF	ADF GPD/EDU	MAXIMUM DAY FLOW	MAX GPD/EDU
	0.144					
1993			0.013	260	0.107	2120
1994			0.013	253	0.071	1369
1995			0.011	192	0.038	725
1996					0.140	2634

FLOW PROJECTIONS

		Current	5 yrs	10 yrs	ultimate
Computer Model -		0.103	0.103	0.103	0.103
Computation is based on max day gpd/edu for existing Valley Creek edus and 260 gpd/edu peaked 2.5 times for future edus.	VC @ 2634 gpd/edu	0.140	0.141	0.141	0.141

	FUTURE VC EDUS	TOTAL
CURRENT		53
5 YEAR	2	55
10 YEAR	2	55
ULTIMATE	2	55

As discussed previously, two flow projections were developed for each pump station. The first is considered more realistic based on existing pump station flow data and field observations by VFSA staff. For example, although French Creek Pump Station may be pumping at 2.88 mgd, all of the maximum day flows for Pothouse Road pump station are less than 2.88 mgd, see Table No. 14. Additionally, it was reported by VFSA operations staff that the lag pump at Pothouse Road pump station turns on approximately once a year.

Based on this discussion and the data from Table Nos. 13-18, the following statements may be made.

1. **French Creek Pump Station** is not projected to exceed its rated capacity for any of the planning horizons, see Table No. 13.

2. **Pothouse Road Pump Station** is not projected to exceed its rated capacity until the ultimate growth planning horizon. When French Creek Pump Station is in operation at 2.88 mgd, even the current wet weather flow scenario projects flows in excess of the pump station rated capacity. However, Pothouse Road Pump Station can apparently handle the extreme wet weather events. The increase in flows projected from the current scenario has minimal impact to the flow projections. All of the flow projections are less than the drawdown capacity of the pump station, see Table No. 14.

3. **Whitehorse Road Pump Station** is not projected to exceed its rated capacity at all under the first projection scenario and not until the ultimate planning horizon for the second growth scenario, see Table No. 15.

4. **Pickering Creek Pump Station** is not projected to exceed its rated capacity under either growth scenario. It may experience flow problems when Whitehorse Road Pump Station operates at drawdown, see Table No. 16.

5. **Perkiomen Pump Station** could actually exceed its rated capacity based on current wet weather conditions. The majority of the additional capacity problem will be caused by the proposed MacAvoy development, the Meadows at Valley Forge, see Table No. 17.

6. **Valley Creek Pump Station** will not reach its rated capacity under any of the planning horizons presented herein, however, the projections are very close to the rated capacity, see Table No. 18.

Both Pothouse Rd. and Perkiomen Pump Stations require further evaluation to address potential capacity problems during wet weather flow conditions. Valley Creek Pump Station must also be considered as the pump station flows almost reached the rated capacity in 1993.

The Country Club Road Pump Station serves the new Valley Forge Woods and Fernleigh Townhomes project. The pump station was completed in 1994 and currently has 120 connections. Although the pump station will be metered, good meter data is not available at this time. The pump station's rated capacity of 0.454 MGD was established to serve the ultimate growth projected for the subdrainage basin. No action is required for this pump station.

The drawdown capacity of some of the pump stations was recently computed by VFSA staff. This data is included where known on Table Nos. 13-18. It is recommended that VFSA conduct additional drawdown tests at Pothouse Rd. and Valley Creek pump stations before any upgrade activities are implemented. Procedures for performing the drawdown tests are provided in Appendix E.

Unmetered Pump Stations

The three unmetered pump stations are small tributaries to the major pump stations. Kimbel Drive Pump Station feeds the French Creek Drainage Basin. Sandra Lane and Charlestown Road Pump Stations feed the Pothouse Road drainage basin. These smaller pump stations were evaluated based on same conditions as the drainage basin which they are a part of. The computer model was run for each pump station and no surcharged sewer sections were identified.

As presented in Table Nos. 13 through 18, the available capacity for each tributary pump station was calculated. See Table No. 19.

TABLE NO. 19
EXISTING AND PROJECTED FLOWS FOR UNMETERED PUMP STATIONS

(all flows in MGD)

Pump Station	Rated Capacity	Basis of Current Flows of Projections	Flow Projections Current	5 yr	10 yr	Ultimate
Kimbel Dr.	0.144	Current: 919 GPD/EDU Future: 239 GPD/EDU Peaked 2.5 times	0.091	0.091	0.117	0.117
Sandra La.	0.288	Current: 1,650 GPD/EDU Future: 254 GPD/EDU Peaked 2.5 times	0.038	0.038	0.038	0.038
Charlestown Rd.	0.288	Current: 1,650 GPD/EDU Future: 254 GPD/EDU Peaked 2.5 times	0.197	0.199	0.199	0.202

PUMP STATION ALTERNATIVES

Perkiomen Pump Station

Perkiomen pump station is located just outside of the VFSA wastewater treatment plant in the parking lot for the administration building. The pumps discharge to the Pickering Creek force main. The 7.5 HP pumps are rated for 150 GPM at 64 ft. TDH. The pumps were replaced in 1993 to facilitate pumping against a higher head.

The pump station is completely below the ground and is located within the floodway or flood fringe of the Schuylkill River. The Schuylkill River floodway was reevaluated due to the replacement of the Pawling Rd. bridge, just downstream of the site. In a conversation with the firm who prepared the hydrologic and hydraulic report for the bridge replacement, it was learned that the new bridge caused no change to the water surface elevations at the site.

It is anticipated from field observation that the first floor elevation of any above ground structure will have to be raised several feet to keep it from flooding.

The Perkiomen Pump Station has experienced surcharge conditions in the past. The pump station meter bypass had to be opened three times in 1993, five times in 1994, once in 1995 and four times as of May 1996 due to the flood conditions. The pump station capacity needs to be increased based on existing wet weather conditions experienced at the pump station.

Approximate 194 EDUs from the proposed MacAvoy Subdivision, the Meadows at Valley Forge are scheduled for connection to this pump station. A preliminary sewer layout for the subdivision was submitted to VFSA for review in 1995. In a recent conversation with the developer, VFSA learned that the developer hopes to receive final subdivision approval by the summer of 1996. VFSA signed Section H, Chapter 94 consistency determination for the Meadows at Valley Forge planning module in May 1995. The module predicts flows in excess of the Perkiomen Pump Station's rated capacity. The developer was notified that the final design of the sanitary sewer must include an upgrade of the Perkiomen Pump Station. VFSA intends to model the pump station upgrade after the recent Country Club Rd. (Fernleigh) pump station design. The pump station should be designed to accommodate at least the projected flows from the 10 year planning horizon. The design must also incorporate the ability to expand to the ultimate design flow. Most specifically, power, emergency power, wet well volume and force main diameter should be based on the ultimate flows. The pumps and remaining equipment may be based on the 10 year flows.

The details of the pump station upgrade will be handled as a part of the Meadows at Valley Forge project. The implementation will be based on the implementation schedule of the subdivision. **No connections to this pump station should be allowed until the upgrade is accomplished.**

Valley Creek Pump Station

Valley Creek Pump Station appears to be adequate for the flow projections developed herein. Two issues, however, must be noted.

1. There is a discrepancy in the EDU growth projections developed by VFSA and Schuylkill Township. There are several tracts of land in this area noted by Schuylkill Township for public sewer service, that if connected will cause a capacity problem at the Valley Creek Pump Station. As with any other development within the Member Municipality Collection System, the downstream facilities, specifically Valley Creek Pump Station, will have to be upgraded by the development causing the capacity problem. The tracts of land identified by Schuylkill Township should be reviewed so that a proper ultimate flow projection may be developed for this pump station. These discrepancies, once resolved, will not alter the conclusions and long-term recommendations of this plan.

2. In August of 1995, VFSA collection personnel noted that it may, on occasion, take considerable time (almost 15 minutes) to discharge the wet well volume through the force main. The Valley Creek force main running at 100 GPM rated capacity discharges into the Wilson Rd. force main. The Wilson Rd. Pump Station includes three (3) 250 HP pumps with a design point of 16.3 MGD; two pumps operating at 5,650 GPM each. When the three Wilson Rd. pumps and the two Valley Creek pumps are operating, the line pressure on the Valley Creek pumps increases and the check valves shut. There does not appear to be a problem when one pump from each pump station operates; the typical mode of operation. Based on existing conditions and future conditions at Valley Creek, this mode of operation does not present a problem, however, this does not consider any upgrade that may be under #onsideration for the Wilson Rd. Pump Station. Should an upgrade at Wilson Rd. be considered, the new head conditions on the Valley Creek pumps must be evaluated to ensure they will be capable of discharging to the Wilson Rd. force main.

   An appropriate evaluation of the Valley Creek Pump Station cannot be performed until an analysis of the Wilson Road Pump Station is accomplished. On April 11, 1996, the engineer for the Regional Act 537 indicated an analysis cannot be completed until the Partner Municipalities finalize their flow requirements, due by the end of April. Once this data is received, several alternatives must be evaluated should the Wilson Road Pump Station require upgrade. These alternatives may include:

   - redirecting some flow away from the Pump Station and VFSA WWTP
   - expanding Wilson Road Pump Station thus increasing the head in the force main
   - constructing a parallel force main

If an upgrade is not required or if either the first or third option is implemented, there should not be an operational problem with the Valley Creek Pump Station exclusive of increased flows to the pump station (see item *1* above). Should the second alternative be selected, an evaluation of the Valley Creek Pump Station pumps will be necessary. It must be determined whether the pumps will be capable of operating against increased head conditions in the force main.

Pothouse Road Pump Station

The Pothouse Pump Station is a wet well/dry well sewage pumping station. The station was built in 1977. The dry well portion of the pump station has three levels. Two sewage pumps, sewage piping and a seal water system are located on the lowest level. The pump electrical control panel and the discharge flow meter are located on the intermediate level. The upper level contains a lavatory and auto dialer panel. The three levels are interconnected with stairs.

The wet well consists of two hopper shaped tanks. A comminutor was originally installed in the influent channel but was later removed. The influent channel contains two bar screen racks. Originally, a blower was used to supply air to the wet well to prevent the sewage from going septic. The blower has since been removed.

The pumps are manufactured by Fairbanks Morse. They are vertical centrifugal pumps with a design point of 2200 gallons per minute (GPM) at 130 feet of head (TDH). The two pumps have 8 inch diameter suction flanges and a 5 inch diameter discharge flanges. The motors are manufactured by Continental and are 125 horsepower (HP). The motors have a totally enclosed drip proof housing.

The pumps were designed to be controlled by variable speed adjustments based on the influent flow rate. The controller is a liquid rheostat manufactured by "Flowmatcher". The "Flowmatcher" has recently been rebuilt. The pumps motors are the heavy duty slip ring wound rotor type.

The seal water system located in the lower level of the dry well consists of two pumps with a water storage tank. The seal water pumps are manufactured by Aurora and are of the centrifugal type.

Flows

The Pothouse Pump Station has a rated capacity (one pump operating) of 3.17 MGD and a drawdown capacity (two pumps operating) of 3.96 MGD. As discussed previously, the drawdown capacity must be field verified.

The flow projections developed in Table 14 are summarized in Table No. 20.

TABLE NO. 20
WET WEATHER FLOW PROJECTIONS
AT POTHOUSE ROAD PUMP STATION

Typical Wet Weather Flow	Current	5 Years	10 Years	Ultimate
MGD	2.738	2.951	3.075	3.250
GPM	1,901	2,049	2,135	2,257
Wet Weather Flow With FC P.S. in Operation				
MGD	3.760	3.762	3.762	3.769
GPM	2,611	2,613	2,613	2,617

Under a typical wet weather scenario, Pothouse Road Pump Station will be capable of accommodating the projected daily flow. It is anticipated, however, that there will be instances when the incoming flow will exceed the pump station rated capacity. Two pumps operating will accommodate these instances. As previously noted, the VFSA operators indicate the lag pump in Pothouse Road pump station turns on approximately once a year. VFSA continues to implement I/I reduction programs which should reduce the severity of the wet weather events previously experienced and predicted herein.

Further field analysis of the pump station should be accomplished to verify the conclusions drawn herein. Specifically, the impact of French Creek Pump Station flows should be evaluated by monitoring Pothouse Road Pump Station flows in 15 minute intervals over an extended wet weather period.

Upgrade of the Pumps

Should the evaluation warrant, additional capacity may be gained by upgrading the pumps. The existing Fairbanks Morse Pumps have 14.68 inch diameter impellers with a design point of 2,200 GPM at 130 ft TDH. These pumps can accept, larger impellers that would increase the pump capacity to 2,350 GPM at 150 ft TDH.

The construction cost to install the larger impellers is estimated at $9,200 in 1996 dollars.

Before the option of larger impellers would be implemented, a field study should verify the actual system curve and actual pump rate of the existing pumps with the existing impellers. The reason for this study is to identify whether or not pump cavitation would occur with the larger impellers. Based on the calculated system curve, the pumps using the existing impellers and larger impellers operate very near the end of the pump curve raising a concern for possible cavitation.

The field work requires the isolation of a pump to one of the two wet wells and a timed volume drawdown test conducted at known pump speeds. From discharge pressure readings, pump speed and calculated pump rate, the actual system curve would be determined. This actual system curve would then be used in verifying the design condition for the larger impeller.

Generator

The existing generator is a Fremont DCA, 305 KW, 480/277 volt, 3 phase diesel generator. It has an Allis-Chalmers engine. This manufacturer is no longer making engines and there is no technical information readily available for this generator.

The present wiring from the generator is eight 350 MCM wires in a 3 ½ inch conduit. This installation does not meet current code requirements and the wires should be split between two 3 ½ inch conduits. The approximate cost for this is $1,800.

EVALUATION OF ALTERNATIVES

Upon completion of the needs analysis, a draft Act 537 Plan for the Member Municipality collection system was submitted to the Authority for review. Table No. 21 was submitted to the Authority staff to facilitate an evaluation of the alternatives available for the needs identified in this plan.

TABLE NO. 21
ALTERNATIVES FOR VFSA CONSIDERATION

Issue	Alternatives
Sewer segment with existing capacity issues.	1. Upgrade all at once. 2. Upgrade by drainage basin. 3. Monitor for surcharge and meter flows.
Five Year sewer segments.	1. Monitor for surcharge now. 2. Meter flows. 3. Monitor for surcharge after development occurs.
I/I reduction efforts.	1. Determine areas of concentration. 2. Work on the sewers themselves. 3. Work on illegal connections (drains/pumps). 4. Upgrade current programs i.e. more monitoring/televising.
Install telemetry for pump station flow meters.	1. Complete all or individual pump stations. Receiver will be for all pump stations. 2. Complete major or minor pump stations. 3. Include Pothouse telemetry with pump station project.
Pothouse Change impellers.	1. Field test pumps, first. 2. Skip and perform an upgrade. 3. Intensify I/I reduction efforts.
Pothouse Upgrade.	1. Evaluate capacity - field test pumps (with new impellers if applicable). 2. Accomplish design now and hold until upgrade is absolutely necessary. (Must determine the criteria.)

Valley Creek	1. Field test pumps. 2. Wait for Gannett Fleming evaluation of Wilson Road Pump Station. 3. Resolve EDU discrepancies (developer issue).
Perkiomen	Developer issue.

Based on the alternatives presented, the Authority staff is planning the following:

1. Existing Sewer Segments with capacity issues - upgrade over the next five years. The Pothouse Road pump station segments will be first.

2. Five Year Sewer Segments - build surcharge indicators and begin to monitor these segments.

3. I/I reduction efforts - Agree on areas of concentration. (Pothouse Road, Perkiomen and Whitehorse Road pump station drainage basins are recommended.) Concentrate on those portions of the sewer within VFSA ownership.

4. Install flow meter telemetry for pump stations over the next five years.

5. Pothouse Road pump station - perform field testing of pump operation/capacity. Determine I/I reduction that can be accomplished in the drainage basin. Based on field testing, possibly upgrade pumps with larger impellers.

6. Valley Creek Pump Station - evaluate further if Wilson Road pump station is to be expanded. Confirm Schuylkill Township future growth projections in this drainage basin.

CONCLUSIONS AND RECOMMENDATIONS

This plan reviewed the operation and capacity of the Valley Forge Sewer Authority Member Municipality collection system. The overall system was found to be properly maintained by the Authority. Operation and maintenance efforts are well planned and ongoing training enhances operations. Annual contracts allow Authority staff to properly maintain the collection network and I/I studies target noted problem areas. Preventive maintenance at the pump stations keeps downtime to a minimum.

Overall, the system capacity is adequate to meet the wastewater flows projected in this report. The ultimate flow projection developed for the Member Municipalities is 2.120 mgd as stated in Table No. 10. This flow is just below the 2.124 mgd flow allocated to the Member Municipalities. Therefore, the Member Municipalities do not require any change to their flow allocation.

The majority of the pump stations have adequate capacity to handle the flow projections developed herein. Perkiomen Pump Station is operating at its capacity and will require upgrade in conjunction with the Meadows at Valley Forge Project. No connections should be allowed at this pump station until the upgrade is complete. Valley Creek may need further evaluation should Wilson Road Pump Station in Tredyffrin Township require upgrade. Pothouse Road Pump Station should be further evaluated through field flow tests prior to implementing any upgrade activities.

Some sewer segments require upgrade to accommodate the projected flows, as identified by the computer model. Surcharges should be field confirmed with surcharge indicators prior to implementing any upgrade projects. VFSA staff are in the process of making surcharge indicators for this activity.

This report includes the following specific recommendations. Note: All construction costs are listed in 1996 dollars. The implementation schedule identifies the anticipated action year and Appendix F develops the project costs.

1. Provide flow meter telemetry at each of the pump stations.
   Conceptual construction cost = $9,000 for first installation, $6,500 for subsequent installations

2. Continue the annual I/I reduction program with efforts concentrated in Pothouse Road and Perkiomen drainage basins. Evaluate the success of existing I/I efforts in Pothouse Road pump station by calculating maximum month gpd/in-dia-mi factors over the wet events experienced in 1996 and in subsequent years. Whitehorse Road pump station drainage basin is the third priority area for I/I reduction efforts. Gpd/in.dia.mi factors should be calculated over the next several years to monitor the situation. An I/I

reduction program for this drainage basin should be scheduled toward the end of the next five years.

3. Make and/or procure several surcharge indicators for use in the collection system.

4. Upgrade the following sewer segments:

	Drainage Basin	MH Segment	Projects Costs
- French Creek Drainage Basin:	2.08	118-102	$ 53,325
	2.08	109-108	33,615
	2.04	106-105	35,775
- Pothouse Road Drainage Basin:	2.09	105-104	73,575
	2.09	102-100A	31,455
- Pickering Creek Drainage Basin:	3.03	353-352	25,920
	3.03	317-358	39,150
Total - including 35% associated project costs			**$ 292,815**

5. Ensure Perkiomen pump station is appropriately upgraded as a part of the Meadows at Valley Forge development project.

6. Reevaluate Valley Creek pump station if the Wilson Road pump station is to be upgraded. Perform pump tests to verify capacity. Confirm Schuylkill Township future growth projections in this drainage basin.

7. Field verify Pothouse Road pump station operation when French Creek is in operation. Based on the field test results, consider installing larger impellers on the pumps to gain additional capacity. Conceptual construction cost $9,200.

8. Upgrade the wiring for the Pothouse Road pump station generator Conceptual construction cost $1,800.

IMPLEMENTATION

The Valley Forge Sewer Authority maintains a comprehensive plan for the member municipality collection system which plans specific maintenance and construction activities over the upcoming five years. The comprehensive plan includes system enhancements which are not a part of this Act 537 Plan; however, the projects set forth in the following implementation schedule will be incorporated into the Comprehensive Plan for budgeting and implementation. Projects are budgeted annually. The projects noted herein will be funded by the Authority from the Bond Redemption Improvement Fund.

All estimates developed in this report were based on the work being accomplished in the current year, (1996). Appendix F develops the project costs based on the year of implementation.

IMPLEMENTATION PLAN FOR PROPOSED IMPROVEMENTS
TO THE VFSA SEWER NETWORK

1996

1. Build surcharge indicators and install in the following sewer segments:

   - 2.08 118-102
   - 2.04 106-105
   - 2.04 109-108
   - 3.03 353-352
   - 3.03 317-358

2. Perform pump testing at Pothouse Road Pump Station in accordance with the procedures set forth in Appendix E.

3. Perform I/I reduction in Pothouse Road and Perkiomen pump station drainage basins:

   - Main line and manhole testing and inspection
   - Lateral testing and inspection
   - Install water tight lids
   - Flow metering
   - Televising
   - Grouting & repairs

4. Calculate and evaluate 1996 gpd/in.dia.mi data for Pothouse Road pump station.

1997

1. Subject to the results of the pump tests, upgrade Pothouse Road pump station by increasing the impeller size. Change the generator wires.

2. Upgrade the following sewer segments:

   - 2.09 105-104
   - 2.09 120-100A

3. Continue I/I reduction in Pothouse and Perkiomen pump station drainage basins.

4. Perform pump testing at Valley Creek Pump Station and reevaluate based on the outcome of the Wilson Road Pump Station Study.

2000

1. Install flow meter telemetry at all of the pump stations.

2. Upgrade the following sewer segments:

   - 2.08 118-102
   - 2.04 106-105
   - 2.04 109-108
   - 3.03 353-352
   - 3.03 317-358

3. Initiate I/I reduction efforts in Whitehorse Road pump station.

4. Install surcharge indicators in the following sewer segments:

   - 2.06 102-101
   - 2.04 110-102
   - 2.04 122-109
   - 3.04 446A-446
   - 3.03 353A-353
   - 2.05 101 - 2.04 110

APPENDIX A

VFSA EDU Count – Sewer Model EDU Count

EDU COUNT

		Total EDU	Schuylkill	E. Pikeland	Charlestown	W. Vincent
1/1/96		4,096.0				
1001	Valley Cr.		55.0			
1002	Perkiomen		201.0			
1003	Pickering		650.0			
1004	Whitehorse		325.0			
1005	Sandra Ln.		22.0			
1006	Pothouse		392.0			
1007	Country Club		72.0			
2008	Kimbel			77.0		
3008	Kimbel				22.0	
2009	French Cr.			1,898.0		
3009	French Cr.				53.0	
3004	Whitehorse				5.0	
3007	Charlestown				128.0	
3010	Lee Tire Blvd.				169.0	
4009	French Cr.					27.0
Total		**4,096.0**	**1,717.0**	**1,975.0**	**377.0**	**27.0**
1/1/95		4,084.0				
1001	Valley Cr.		53.0			
1002	Perkiomen		207.5			
1003	Pickering		652.0			
1004	Whitehorse		435.5			
1005	Sandra Ln.		23.0			
1006	Pothouse		391.0			
1007	Country Club		27.0			
2008	Kimbel			77.0		
3008	Kimbel				22.0	
2009	French Cr.			1,850.5		
3009	French Cr.				50.0	
4009	French Cr.					22.0
3007	Charlestown				119.5	
3010	Lee Tire Blvd.				154.0	
Total		**4,084.0**	**1,789.0**	**1,927.5**	**345.5**	**22.0**
1/1/94		3,852.5				
1001	Valley Cr.		50.0			
1002	Perkiomen		207.5			
1003	Pickering		641.0			
1004	Whitehorse		351.5			
1005	Sandra Ln.		23.0			
1006	Pothouse		391.0			
2008	Kimbel			77.0		
3008	Kimbel				21.0	
2009	French Cr.			1,809.0		
3009	French Cr.				50.0	
3007	Charlestown				115.5	
3010	Lee Tire Blvd.				116.0	
Total		**3,852.5**	**1,664.0**	**1,886.0**	**302.5**	

FRENCH CREEK DRAINAGE BASIN

NAME OF PROJECT	APPLICANT NAME	RECEIVING MANHOLE	ULTIMATE EDUS	EXISTING EDUS AS OF 1987	1990 EDUS	1993 EDUS	1994 EDUS	TOTAL BUILT
Adams D. Retail	Adams, Dorthy	2.02	7	7				7
Applewood	Apple Hill Developers	2.02.113/4	25	0	25			25
Barley Farms		2.07	43	0				0
Brimful Farms	Estelle Solomon	2.04.110	50					0
Burger King		2.01.109	6		6			6
Carraige Hill	Valley Hill Develop.	2.06.144/125	18	0	18			18
Coccia, Eugene		2.05.132	7	7				7
Deer Run Lane		2.05.123	9			6		6
Didomenico, Leonard	Didomenico, Leonard	2.03.191	3	3				3
Dungee	Coccia, Eugene	2.05.142	8		8			8
Edgehill Crossing	Kimberton Hunt	2.06.161	28	28				28
French Creek Estates	South Hill Dev	2.03.132/9/143	73	73				73
French Creek Manor		2.03.114/20/201	51		51			51
Frog Hollow		2.02.132	34	34				34
Hollingsworth		2.01.211	36	36				36
Hopkins & Scott Apts		2.06.147	6	6				6
Huntfield		2.06.219	51			6		6
Kimberbrae		2.06.105	48			37	1	38
Kimberton Country House		2.06.112	17	17				17
Kimberton Knoll		2.04.110	120			87		87
Kimberton Square		2.01.105	30			20		20
Kimberton Valley Homes		2.03.125/205	43	43				43
Kimberton Valley Homes		2.03.125/205	22				1	1
Macarevich		2.02.106	4	1	3			4
Maple Lawn		2.01.212	97			21		21
Minter		2.08.138	93	93				93
Monsey Products	Monsey Products	2.08.102	8	8				8
NPC Trucking Bldg	Monsey Products	2.05.135	2	2				2
Phnx Area HS E Pike		2.03.153	14	14				14
Pikeland Place		2.04.119	25	15	10			25
Powder Mill		2.03.106/4.115	143			143		143
Rapps Damm Covered		2.03.105	197	197				197
Rapps Dam Goppa		2.05.123	24			24		24
Ridge Road	Nuber, Joe	2.01.126	4	1	3			4
Senior Life Choice	Greg Stevens	2.04.110	28					0
Spring House Dell		2.03.115	9			4		4
Townhomes at Kimberton		2.05.123	236					0
West Vincent		WV101-2.06.105	31				22	22
TOTAL			1,650	585	124	348	24	1,081

VFSA REPORTED EDUS		1,874	1,923	
MODEL EDUS	1,419	1,743	1,941	

CHARLESTOWN ROAD DRAINAGE BASIN

NAME OF PROJECT	APPLICANT NAME	RECEIVING MANHOLE	ULTIMATE EDUS	EXISTING EDUS AS OF 1987	1990 EDUS	1993 EDUS	1994 EDUS	TOTAL BUILT
Pannilquin	Oak Tree	3.06.122	13				10	10
Resturant & Apts.	Smith, Robert	3.06.174	7	7				7
TOTAL			20	7	0	0	10	17

VFSA REPORTED EDUS		116	121	
MODEL EDUS	111	111	121	

POTHOUSE ROAD DRAINAGE BASIN

NAME OF PROJECT	APPLICANT NAME	RECEIVING MANHOLE	ULTIMATE EDUS	EXISTING EDUS AS OF 1987	1990 EDUS	1993 EDUS	1994 EDUS	TOTAL BUILT
McClaskey Place		2.09	5			5		5
McCann Trailer Park	Hoffman	2.09.171	32	32				32
Phnx Mobile Homes		2.09.110	47	47				47
TOTAL			84	79	0	5	0	84

VFSA REPORTED EDUS		392	391	
MODEL EDUS	338	343	363	

WHITEHORSE ROAD DRAINAGE BASIN

NAME OF PROJECT	APPLICANT NAME	RECEIVING MANHOLE	ULTIMATE EDUS	EXISTING EDUS AS OF 1987	1990 EDUS	1993 EDUS	1994 EDUS	TOTAL BUILT
Charlestown Hunt		3.04.400	349					0
Overstreet, James MHP	Adjusted in 1994	3.04.449	123	123			(40)	83
Phnx Area School		3.04.599	22	22				22
YMCA - needs to be adjusted anually		3.04.444	26	26			28	54
TOTAL			520	171	0	0	-12	159
VFSA REPORTED EDUS						362	436	
MODEL EDUS					379	379	367	

PICKERING DRAINAGE BASIN

NAME OF PROJECT	APPLICANT NAME	RECEIVING MANHOLE	ULTIMATE EDUS	EXISTING EDUS AS OF 1987	1990 EDUS	1993 EDUS	1994 EDUS	TOTAL BUILT
Bull Tavern		3.01.113	9		9			9
Buono Tract			16				5	5
Chapel View Estates		3.03.306/320	20			7	1	8
Charlestown Crossing		3.03.306	23					0
Commons at VF - Phase 1		3.01.142A	48	48				48
Commons at VF - Phase 2		3.01.146	44		44			44
Dogwood Estates		3.01.134	45	45				45
Hideaway Mobile Home		3.02.213	11	11				11
Lafayette Road		3.01.147	4	4				4
Maisfield	Westover Companies	3.15.101	48					0
McAvoy		3.01.142A	80					0
Puleo		3.01.156	4		4			4
Rhinehart	Rouse Chamberlin	3.03.306	195					0
Route 23 Commercial			6					0
South Forge Manor		3.01.130A	30	30				30
Sunwood		3.15.112	130			128		128
White Horse Farms		3.03.351	8	8				8
TOTAL			721	146	57	135	6	344
VFSA REPORTED EDUS						640	652	
MODEL EDUS					564	699	721	

PERKIOMEN DRAINAGE BASIN

NAME OF PROJECT	APPLICANT NAME	RECEIVING MANHOLE	ULTIMATE EDUS	EXISTING EDUS AS OF 1987	1990 EDUS	1993 EDUS	1994 EDUS	TOTAL BUILT
American Inn		4.02	9	9				9
Ferry Lane		4.02.119	7	7				7
Ferry Lane Extd.		4.02.119	3	3				3
Forge Hill		4.02.107/8	5	5				5
McAvoy		4.02.104	194					0
NCCC		4.02.149	13	1	12			13
Ozoroski		4.02.105	7	7				7
Pawling Wood		4.02.134	19		19			19
Weyhill		4.02.154	36		36			36
TOTAL			293	32	67	0	0	99
VFSA REPORTED EDUS						208	208	
MODEL EDUS					214	214	210	

VALLEY CREEK DRAINAGE BASIN

NAME OF PROJECT	APPLICANT NAME	RECEIVING MANHOLE	ULTIMATE EDUS	EXISTING EDUS AS OF 1987	1990 EDUS	1993 EDUS	1994 EDUS	TOTAL BUILT
Ironmaster Partners		4.05.110	14	14				14
Freedom View		4.05.126	14			9		9
TOTAL			28	14	0	9	0	23
VFSA REPORTED EDUS						50	53	
MODEL EDUS					58	67	70	

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APPENDIX B

Basis of EDU Growth Projections

RAINAGE BASIN	1994 YR END CONNECTED EDUS	REMAINING PLATTED EDUS AS OF 12/94		PROJECTED EDUS: PROPOSED EDUS		UNDEVELOP LAND	TOTAL EST. EDUS
TE 724 NORTH OF RTE 23	0.0		0		0	40	40
RENCH CREEK BASIN							
KIMBEL DRIVE (2/3008)	99.0		0	Barley Farms	43	0	142
- FRENCH CREEK (2/3009)		Deer Run Lane	3	Brimful Farm	50		
		Huntfield	45	Senior Life Choice	28		
		Kimberbrae	4	TH @ Kimberton	86		
		Kimberton Knoll	33				
		Kimberton Square	10				
		Kimberton Valley	21				
		Maple Lawn	76				
		Spring Hse. Dell	2				
		West Vincent	9				
		TH @ Kimberton	150				
	1,922.5		353		164	244	2,684
CHARLESTOWN ROAD (3007)	119.5	Charlestown Meade	3		0	5	128
SANDRA LANE (1005)	23.0		0		0	0	23
POTHOUSE (1006)	391.0		0		0	5	396
ICKERING CREEK BASIN							
WHITEHORSE (1004)	435.5	Charlestown Hunt & homes along Creek	110	Charlestown Hunt	244	80	870
COUNTRY CLUB (1007)	27.0	Valley Forge Woods	240	Valley Forge Woods	58	6	331
PICKERING CREEK (1003)		Buono Tract	12	Maisfield Farm	48		
		Chapel View	12	Rhinehart Tract	195		
		Route 23 Commercial	6	The Meadows @ VF (MacAvoy)	80		
		Sunwood	2				
	652.0		32		323	234	1,241
PERKIOMEN (1002)	207.5		0	The Meadows @ VF	194	305	707
ALLEY CREEK BASIN							
VALLEY CREEK (1001)	53.0	Freedom View	2		0	0	55
LEE TIRE BLVD (3010)		Commons at G.V.	66				
		Devault Meats	73				
		Laurabrooke	20				
		Spring Oak Bus. Cen.	73				
	154.0		232		0	133	519
ROUTE 401	0.0		0		0	241	241
SIDLEY ROAD	0.0	Charlestown Oaks	95	Charlestown Oaks	193	46	334
OTALS	4,084.0		1,067		1,219	1,339	7,709

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STIMATE OF UNDEVELOPED LAND IN THE 537 BOUNDARY

	Manhole no.		Edus
ALLEY CREEK (1001)			
ERKIOMEN (1002)	4.02.229	Rte. 23 Corridor	29
	4.02.167	N. Side Pawling Rd.	80
	P.S.	N. of Conrail	196
			305
ICKERING (1003)	3.15.101	Inter. @ Maisfield	6
	3.01.113	Bull Tavern	3
	3.03.342	Reeves Property	114
	3.03.301 or 3.01.111	By RR Tracks	36
	3.03.338	End of E. Phillip	28
	3.15.164	Patrick Henry Dr.	47
			234
HITEHORSE (1004)		PRD 1 growth area by Charlestown Hunt	80
ANDRA LANE (1005)			0
OTHOUSE (1006)		Across fm Forestas	5
IMBEL (2/3008)			
HARLESTOWN (3007)	3.06.174A	Along Buckwalter Rd	5
OUNTRY CLUB (1011)	P.S.	By VF Woods	6

	Manhole no.		Edus
FRENCH CREEK (2/3009)	2.06.202	Rte 113 - Huntfield	81
	2.04.113	Rte 113 (Shelly's)	6
	2.05.123	E Seven Stars - TH @ Kimberton	27
	2.05.107	E Seven Stars - off Hartman Dr	12
	2.02.123	Frog Hollow Miller Rd (north)	38
	2.02.132	Hares Hill @ Ruth	5
	2.02.102	Hares Hill along Camp Council	8
	2.06.161	Hares Hill - Prizer Rd/Jugan's	15
	2.06.105	Hares Hill - Adj to Kimberbrae	52
			244
LEE TIRE (3010)		Behind Spring Oak Business Cen	21
		Across Fm Spring Oak	9
		Yellow Spring's Rd	10
		Rte 29 & Charles Rd	50
		North Side of School	7
		Farm Residence	1
		Adj to Laurab. (Phoenix Pike)	35
			133
SIDLEY RD.		Adj. to Charlestown Oaks	46
ROUTE 401		Charlestown Meadows	241
RTE 724 NORTH OF ROUTE 23	2.01.120	Rte 724 - @ Rte 23	20
	2.01.119	Rte 724 - Above Snyder	20
			40

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APPENDIX C

I/I Analysis (1993-1995)

PUMP STATION

		1995 FLOW	1995 IN-DIA-MI	1995 GPD/ IN-DIA-MI	1994 FLOW	1994 IN-DIA-MI	1994 GPD/ IN-DIA-MI	1993 FLOW	1993 IN-DIA-MI	1993 GPD/ IN-DIA-MI	THREE YR AVERAGE
FRENCH CREEK	AVG	0.455	376.9	1,207	0.475	374.97	1,267	0.440	374.43	1,175	1,216
	3 MO. MAX	0.526	376.9	1,396	0.612	374.97	1,632	0.577	374.43	1,541	1,523
	3 MO. MIN	0.414	376.9	1,098	0.403	374.97	1,075	0.349	374.43	932	1,035
POTHOUSE RD	AVG	0.130	78.19	1,663	0.166	77.45	2,143	0.152	77.43	1,963	1,923
	3 MO. MAX	0.143	78.19	1,829	0.271	77.45	3,499	0.229	77.43	2,958	2,762
	3 MO. MIN	0.077	78.19	985	0.110	77.45	1,420	0.117	77.43	1,511	1,305
WHITEHORSE RD	AVG	0.075	65.2	1,150	0.083	65.32	1,271	0.089	65	1,369	1,263
	3 MO. MAX	0.097	65.2	1,488	0.124	65.32	1,898	0.151	65	2,323	1,903
	3 MO. MIN	0.069	65.2	1,058	0.070	65.32	1,072	0.058	65	892	1,007
PICKERING CREEK	AVG	0.069	175.99	392	0.069	135.5	509	0.099	135.09	733	545
	3 MO. MAX	0.073	175.99	415	0.158	135.5	1,166	0.211	135.09	1,562	1,048
	3 MO. MIN	0.073	175.99	415	0.040	135.5	295	0.025	135.09	185	298
PERKIOMEN	AVG	45,839	34.12	1,343	48,020	34.16	1,406	48,941	34.14	1,434	1,394
	3 MO. MAX	49,954	34.12	1,464	61,116	34.16	1,789	60,921	34.14	1,784	1,679
	3 MO. MIN	41,569	34.12	1,218	40,790	34.16	1,194	42,460	34.14	1,244	1,219
VALLEY CREEK	AVG	10,540	12.08	873	13,160	11.97	1,099	12,616	11.9	1,060	1,011
	3 MO. MAX	12,889	12.08	1,067	19,865	11.97	1,660	17,987	11.9	1,512	1,413
	3 MO. MIN	9,035	12.08	748	9,927	11.97	829	9,674	11.9	813	797
LEE TIRE (two year average)	AVG	29,536	11.77	2,509	25,536	10.59	2,411				2,460
	3 MO. MAX	38,000	11.77	3,229	34,850	10.59	3,291				3,260
	3 MO. MIN	26,226	11.77	2,228	19,521	10.59	1,843				2,036

TABLE NO. 1
VALLEY FORGE SEWER AUTHORITY
LF of sewer - 1993

DRAINAGE BASIN	PIPE DIAMETER 2	6	8	10	12	15	16	18	21	24	30	42	TOTAL
French Creek		118	155,610	2,320	8,312	4,333	325		4,639	480	10		176,147
Pot House			18,113	1,709	1,946	1,123		438			10		23,339
Whitehorse			18,894						6,042				24,938
Pickering	1115		41,644	4,266	1,013	3,056		1,155		5,960		10	57,104
Perkiomen	2077		17,851										17,851
Valley Creek			6,732										6,732
Sandra Lane			2,684										2,684
Charlestown			8,244	1,529				10					9,783
Kimbel			9,259										9,259
Lee Tire Blvd.			2,539	1,319									3,858
Country Club													0
TOTAL													331,693

Table 1 based on additional footage noted on Attachment B
New projects include: McClaskey Place
Fernleigh

VALLEY FORGE SEWER AUTHORITY
Inch -dia-miles of sewer

DRAINAGE BASIN	PIPE DIAMETER 2	6	8	10	12	15	16	18	21	24	30	42	TOTAL
French Creek		0.13	235.77	4.39	18.89	12.31	0.98		18.45	2.18	0.06		293.18
Pot House			27.44	3.24	4.42	3.19		1.49			0.06		39.84
Whitehorse			28.63						24.03				52.66
Pickering	0.42		63.10	8.08	2.30	8.68		3.94		27.09		0.08	113.27
Perkiomen	0.79		27.05										27.05
Valley Creek			10.20										10.20
Sandra Lane			4.07										4.07
Charlestown			12.49	2.90				0.03					15.42
Kimbel			14.03										14.03
Lee Tire Blvd.			3.85	2.50									6.35
Country Club													0.00
TOTAL													576.05

SUMMARY - IN-DIA-MILES OF SEWER

	Sewer In-Dia-Mi	1995 EDUs	Lateral In-Dia-Mi	Total In-Dia-Mi
Kimbel	14.03			
French Creek	293.18			
Subtotal	307.20	1972	67.23	374.43
Charlestown	15.42			
Sandra	4.07			
Pothouse	39.84			
Subtotal	59.33	531	18.10	77.43
Whitehorse	52.66	362	12.34	65.00
Country Club	0.00			
Pickering	113.27			
	113.27	640	21.82	135.09
Perkiomen	27.05	208	7.09	34.14
Valley Creek	10.20	50	1.70	11.90
Lee Tire Blvd	6.35			

Laterals =((30' * 4")+(10 * 6"))/5280 = 0.03

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VFSA - MAXIMUM DAY FLOW BY MONTH - 1995

MONTH	FRENCH CREEK (MGD)	GPD/ INDIA-MI (376.90)	POTHOUSE (MGD)	POTHOUSE ALONE	GPD/ INDIA-MI (78.19)	WHITE-HORSE (MGD)	WHITE-HORSE ALONE	GPD/ INDIA-MI (65.20)	PICKERING (MGD)	PICK. ALONE	GPD/ INDIA-MI (175.99)	PERKIOMEN (GPD)	GPD/ INDIA-MI (34.12)	VALLEY CREEK (GPD)	GPD/ INDIA-MI (12.08)
1/95	0.870	2,308	0.874	0.004	54	1.109	0.235	3,601	1.315	0.206	1,173	85,960	2,519	17,600	1,457
2/95	0.655	1,738	0.950	0.295	3,773	1.071	0.121	1,859	1.209	0.138	783	65,610	1,923	13,800	1,142
3/95	1.858	4,928	2.317	0.460	5,877	2.540	0.223	3,420	2.828	0.288	1,636	148,717	4,359	38,440	3,182
4/95	0.461	1,223	0.664	0.203	2,596	0.753	0.089	1,365	0.690	-0.063	-358	53,390	1,565	15,070	1,248
5/95	0.470	1,247	0.666	0.196	2,507	0.772	0.106	1,626	0.705	-0.067	-381	58,480	1,714	15,294	1,266
6/95	0.513	1,361	0.630	0.117	1,496	0.705	0.075	1,150	0.697	-0.008	-48	50,810	1,489	14,854	1,230
7/95	0.475	1,260	0.583	0.108	1,381	0.670	0.087	1,334	0.736	0.066	375	44,200	1,295	14,481	1,199
8/95	0.505	1,340	0.590	0.085	1,087	0.720	0.130	1,994	0.749	0.029	165	53,100	1,556	14,949	1,238
9/95	0.535	1,419	0.709	0.174	2,225	0.834	0.125	1,917	0.853	0.019	108	51,170	1,500	12,000	993
10/95	OUT	OUT	1.265	1.265	2,781	1.455	0.190	2,914	1.620	0.165	938	89,140	2,613	28,670	2,373
11/95	OUT	OUT	1.194	1.194	2,625	1.251	0.057	874	1.519	0.268	1,523	71,210	2,087	28,700	2,376
12/95	OUT	OUT	0.815	0.815	1,792	0.856	0.041	629	1.944	1.088	6,182	49,450	1,449	16,003	1,325
MAXIMUM	1.858	4,928	2.317		5,877	2.540		3,601	2.828		6,182	148,717	4,359	38,440	3,182
PEAKING FACTOR	4.03		3.49			3.37			4.10			2.79		2.55	

1. Rothouse (10/95-12/95) gpd/in-dia-mi based on 455.09 in-dia-mi
2. Perkiomen (3/95) max day flow = 117,100 * 1.27 based on pump operation when bypass is open - 260 gpm/205 gpm.

(L:\PROJ\71806\DOCS\95-PS)

TABLE NO. 1
VALLEY FORGE SEWER AUTHORITY
LF of sewer - 1994

DRAINAGE BASIN	PIPE DIAMETER 2	6	8	10	12	15	16	18	21	24	30	42	TOTAL
French Creek		118	155,610	2,320	8,312	4,333	325		4,639	480	10		176,147
Pot House			18,113	1,709	1,946	1,123		438			10		23,339
Whitehorse			18,894						6,042				24,936
Pickering	1115		41,644	4,266	1,013	3,056		1,155		5,960		10	57,104
Perkiomen	2077		17,851										17,851
Valley Creek			6,732										6,732
Sandra Lane			2,684										2,684
Charlestown			8,244	1,529				10					9,783
Kimbel			9,259										9,259
Lee Tire Blvd.			2,539	1,319									3,858
Country Club													0
TOTAL													331,693

VALLEY FORGE SEWER AUTHORITY
Inch -dia-miles of sewer

DRAINAGE BASIN	PIPE DIAMETER 2	6	8	10	12	15	16	18	21	24	30	42	TOTAL
French Creek		0.13	235.77	4.39	18.89	12.31	0.98		16.45	2.18	0.06		293.18
Pot House			27.44	3.24	4.42	3.19		1.49			0.06		39.84
Whitehorse			28.63						24.03				52.66
Pickering	0.42		83.10	8.08	2.30	8.68		3.94		27.09		0.08	113.27
Perkiomen	0.79		27.05										27.05
Valley Creek			10.20										10.20
Sandra Lane			4.07										4.07
Charlestown			12.49	2.90				0.03					15.42
Kimbel			14.03										14.03
Lee Tire Blvd.			3.85	2.50									6.35
Country Club			0.00										0.00
TOTAL													576.05

SUMMARY - IN-DIA-MILES OF SEWER

	Sewer In-Dia-Mi	1994 EDUs	Lateral In-Dia-Mi	Total In-Dia-Mi
Kimbel	14.03			
French Creek	293.18			
Subtotal	307.20	1988	67.77	374.98
Charlestown	15.42			
Sandra	4.07			
Pothouse	39.84			
Subtotal	59.33	531.5	18.12	77.45
Whitehorse	52.66	371.5	12.66	65.32
Country Club	0.00			
Pickering	113.27			
	113.27	652	22.23	135.50
Perkiomen	27.05	208.5	7.11	34.15
Valley Creek	10.20	52	1.77	11.97
Lee Tire Blvd	6.35	124.5	4.24	10.59

Laterals =((30' * 4")+(10 * 6"))/5280 = 0.03

L:\proj\71806\docs\lfsewer

VFSA - MAXIMUM DAY FLOW BY MONTH - 1994

MONTH	FRENCH CREEK (MGD)	GPD/ INDIA-MI (374.97)	POTHOUSE (MGD)	POTHOUSE ALONE	GPD/ INDIA-MI (77.45)	WHITE-HORSE (MGD)	WHITE-HORSE ALONE	GPD/ INDIA-MI (65.32)	PICKERING (MGD)	PICK. ALONE	GPD/ INDIA-MI (135.5)	PERKIOMEN (GPD)	GPD/ INDIA-MI (34.16)	VALLEY CREEK (GPD)	GPD/ INDIA-MI (11.97)
1/28/94	2.550	6,801	3.200	0.650	8,393	3.449	0.249	3,812	3.235	-0.214	-1,472	210,452	6,161	***	
1/94	1.014	2,704	1.166	0.152	1,963	1.359	0.193	2,955	1.523	0.164	1,128	210,452	6,161	***	
2/94	0.970	2,587	1.302	0.332	4,287	1.570	0.268	4,103	1.505	-0.065	-447	98,000	2,869	36,050	3,012
3/94	1.642	4,379	2.519	0.877	11,323	2.991	0.472	7,226	3.217	0.226	1,554	166,929	4,887	71,200	5,948
4/94	0.887	2,366	1.241	0.354	4,571	1.416	0.175	2,679	1.669	0.253	1,740	92,400	2,705	39,525	3,302
5/94	0.496	1,323	0.758	0.262	3,383	0.800	0.042	643	0.838	0.038	261	51,380	1,504	20,127	1,681
6/94	0.428	1,141	0.996	0.568	7,334	0.672	-0.324	-4,960	0.668	-0.004	-28	50,050	1,465	13,220	1,104
7/94	0.573	1,528	0.829	0.256	3,305	0.784	-0.045	-689	0.796	0.012	83	52,800	1,546	16,990	1,419
8/94	1.101	2,936	1.302	0.201	2,595	1.457	0.155	2,373	1.778	0.321	2,207	87,237	2,554	18,905	1,579
9/94	0.490	1,307	0.599	0.109	1,407	0.755	0.156	2,388	0.776	0.021	144	49,200	1,440	18,680	1,561
10/94	0.514	1,371	0.720	0.206	2,660	0.862	0.142	2,174	0.776	-0.086	-591	47,230	1,383	24,558	2,052
11/94	0.603	1,608	0.728	0.125	1,614	0.879	0.151	2,312	0.890	0.011	76	92,550	2,709	16,500	1,378
12/94	0.655	1,747	0.857	0.202	2,608	1.030	0.173	2,648	1.027	-0.003	-21	53,500	1,566	16,050	1,341
MAXIMUM	1.642		2.519			2.991			3.217			210,452		71,200	

Notes:

1. Perkiomen flows adjusted due to by pass being open: 1/94, 3/94, & 8/94
   Factor = 1.27 - based on pump operation when bypass is open - 260 gpm/205 gpm.
2. FC, PH, WH, & PI data for 1/28/94 considered invalid due to sheared off manholes in French Creek contributing considerable amounts of water.

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TABLE NO. 1
VALLEY FORGE SEWER AUTHORITY
LF of sewer - 1995

DRAINAGE BASIN	PIPE DIAMETER 2	6	8	10	12	15	16	18	21	24	30	42	TOTAL
French Creek		118	156,610	2,320	8,312	4,333	325		4,639	480	10		176,147
Pot House			18,373	1,709	1,946	1,123		438			10		23,599
Whitehorse			18,894						6,042				24,936
Pickering	1115		41,644	4,266	1,013	3,056		1,155		5,960		10	57,104
Perkiomen	2077		17,851										17,851
Valley Creek			6,732										6,732
Sandra Lane			2,684										2,684
Charlestown			8,244	1,529				10					9,783
Kimbel			9,259										9,259
Lee Tire Blvd.			2,539	1,319									3,858
Country Club			25,390										25,390
TOTAL													357,343

Table 1 based on additional footage noted on Attachment B
New projects include: McClaskey Place
Fernleigh

VALLEY FORGE SEWER AUTHORITY
Inch -dia-miles of sewer

DRAINAGE BASIN	PIPE DIAMETER 2	6	8	10	12	15	16	18	21	24	30	42	TOTAL
French Creek		0.13	235.77	4.39	18.89	12.31	0.98		18.45	2.18	0.06		293.18
Pot House			27.84	3.24	4.42	3.19		1.49			0.06		40.24
Whitehorse			28.63						24.03				52.66
Pickering	0.42		63.10	8.08	2.30	8.68		3.94		27.09		0.08	113.27
Perkiomen	0.79		27.05										27.05
Valley Creek			10.20										10.20
Sandra Lane			4.07										4.07
Charlestown			12.49	2.90				0.03					15.42
Kimbel			14.03										14.03
Lee Tire Blvd.			3.85	2.50									6.35
Country Club			38.47										38.47
TOTAL													614.92

SUMMARY - IN-DIA-MILES OF SEWER

	Sewer In-Dia-Mi	1995 EDUs	Lateral In-Dia-Mi	Total In-Dia-Mi
Kimbel	14.03			
French Creek	293.18			
Subtotal	307.20	2044.5	69.70	376.90
Charlestown	15.42			
Sandra	4.07			
Pothouse	40.24			
Subtotal	59.73	541.5	18.46	78.19
Whitehorse	52.66	368	12.55	65.20
Country Club	38.47			
Pickering	113.27			
	151.74	711.5	24.26	175.99
Perkiomen	27.05	207.5	7.07	34.12
Valley Creek	10.20	55	1.88	12.08
Lee Tire Blvd	6.35	159	5.42	11.77

Laterals =((30' * 4")+(10 * 6"))/5280 = 0.03

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MAXIMUM DAY FLOW BY MONTH

MONTH	FRENCH CREEK (MGD)	GPD/ INDIA-MI (374.43)	POTHOUSE (MGD)	POTHOUSE ALONE	GPD/ INDIA-MI (77.43)	WHITE-HORSE (MGD)	WHITE-HORSE ALONE	GPD/ INDIA-MI (65)	PICKERING (MGD)	PICK. ALONE	GPD/ INDIA-MI (135.09)	PERKIOMEN (GPD)	GPD/ INDIA-MI (34.14)	VALLEY CREEK (GPD)	GPD/ INDIA-MI (11.90)
1/93	0.504	1,346	0.626	0.122	1,576	0.800	0.174	2,677	0.845	0.045	333	69,762	2,043	14,941	1,256
2/93	0.781	2,086	0.897	0.116	1,498	0.970	0.073	1,123	1.292	0.322	2,384	61,210	1,793	15,130	1,271
3/93	1.513	4,041	2.064	0.551	7,116	2.554	0.490	7,538	3.359	0.805	5,959	172,870	5,064	60,581	5,091
4/93	1.084	2,895	1.513	0.429	5,540	1.915	0.402	6,185	2.166	0.251	1,858	98,550	2,887	32,700	2,748
5/93	0.494	1,319	0.718	0.224	2,893	0.870	0.152	2,338	0.969	0.099	733	48,470	1,420	15,064	1,266
6/93	0.407	1,087	0.579	0.172	2,221	0.679	0.100	1,538	0.671	-0.008	-59	49,590	1,453	13,022	1,094
7/93	0.417	1,114	0.580	0.163	2,105	0.655	0.075	1,154	0.663	0.008	59	47,000	1,377	13,200	1,109
8/93	0.444	1,186	0.526	0.082	1,059	0.621	0.095	1,462	0.680	0.059	437	57,400	1,681	17,100	1,437
9/93	0.446	1,191	0.588	0.142	1,834	0.697	0.109	1,677	0.747	0.050	370	53,650	1,571	19,040	1,600
10/93	0.528	1,410	0.707	0.179	2,312	0.846	0.139	2,138	1.776	0.930	6,884	49,810	1,459	17,714	1,489
11/93	0.776	2,072	1.164	0.388	5,011	1.386	0.222	3,415	1.508	0.122	903	104,775	3,069	40,767	3,426
12/93	1.759	4,698	2.522	0.763	9,854	3.046	0.524	8,062	3.393	0.347	2,569	236,411	6,925	106,305	8,933
MAXIMUM	1.759		2.522			3.046			3.393			236,411		106,305	

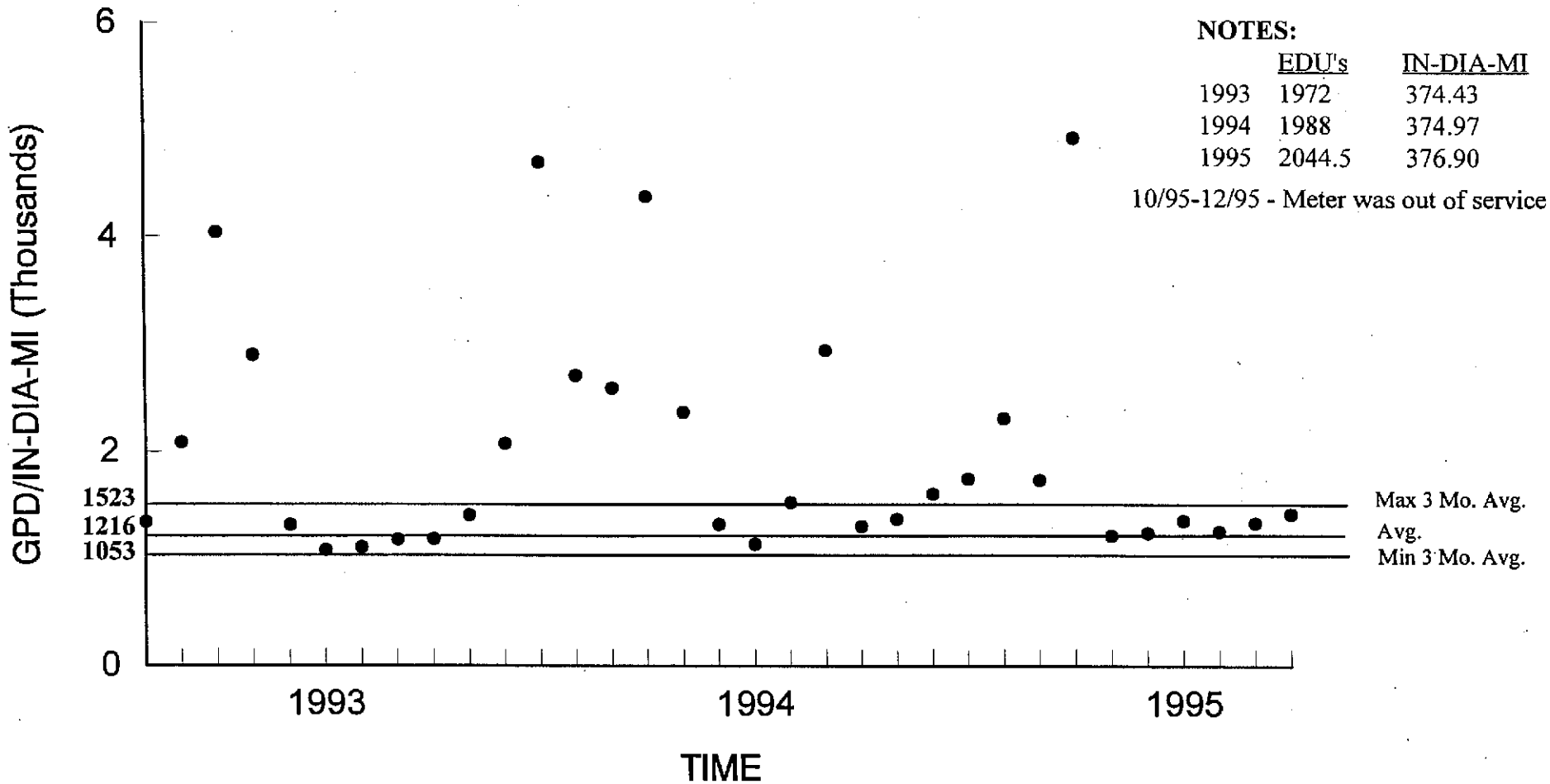
Note: Perkiomen bypass opened 1/93, 11/93, & 12/93
This table assumes the bypass was open on the max day reading.
Therefore the Perkiomen max day flowsfor Jan, Nov, & Dec have been multiplied by 1.27 (260 GPM/205 GPM based on pump operation when bypass is open).

l:\proj\71806\docs\93-ps

VFSA

French Creek Pump Station

Comparison of Avg. GPD/IN-DIA-MI to Maximum Day GPD/IN-DIA-MI



NOTES:

	EDU's	IN-DIA-MI
1993	1972	374.43
1994	1988	374.97
1995	2044.5	376.90

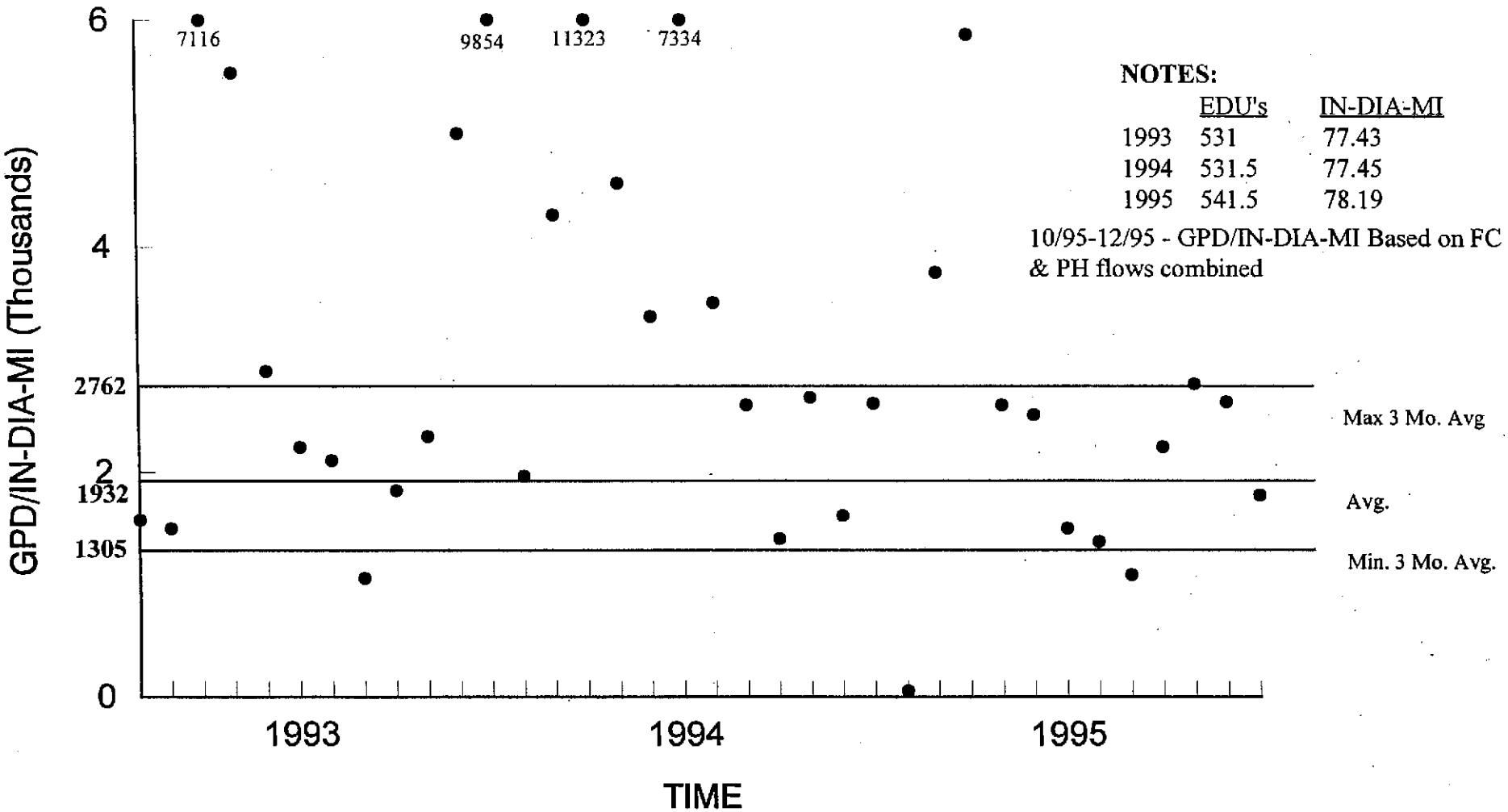
10/95-12/95 - Meter was out of service

JULY 26, 1996

VFSA

Pothouse Road Pump Station

Comparison of Avg. GPD/IN-DIA-MI to Maximum Day GPD/IN-DIA-MI



NOTES:

	EDU's	IN-DIA-MI
1993	531	77.43
1994	531.5	77.45
1995	541.5	78.19

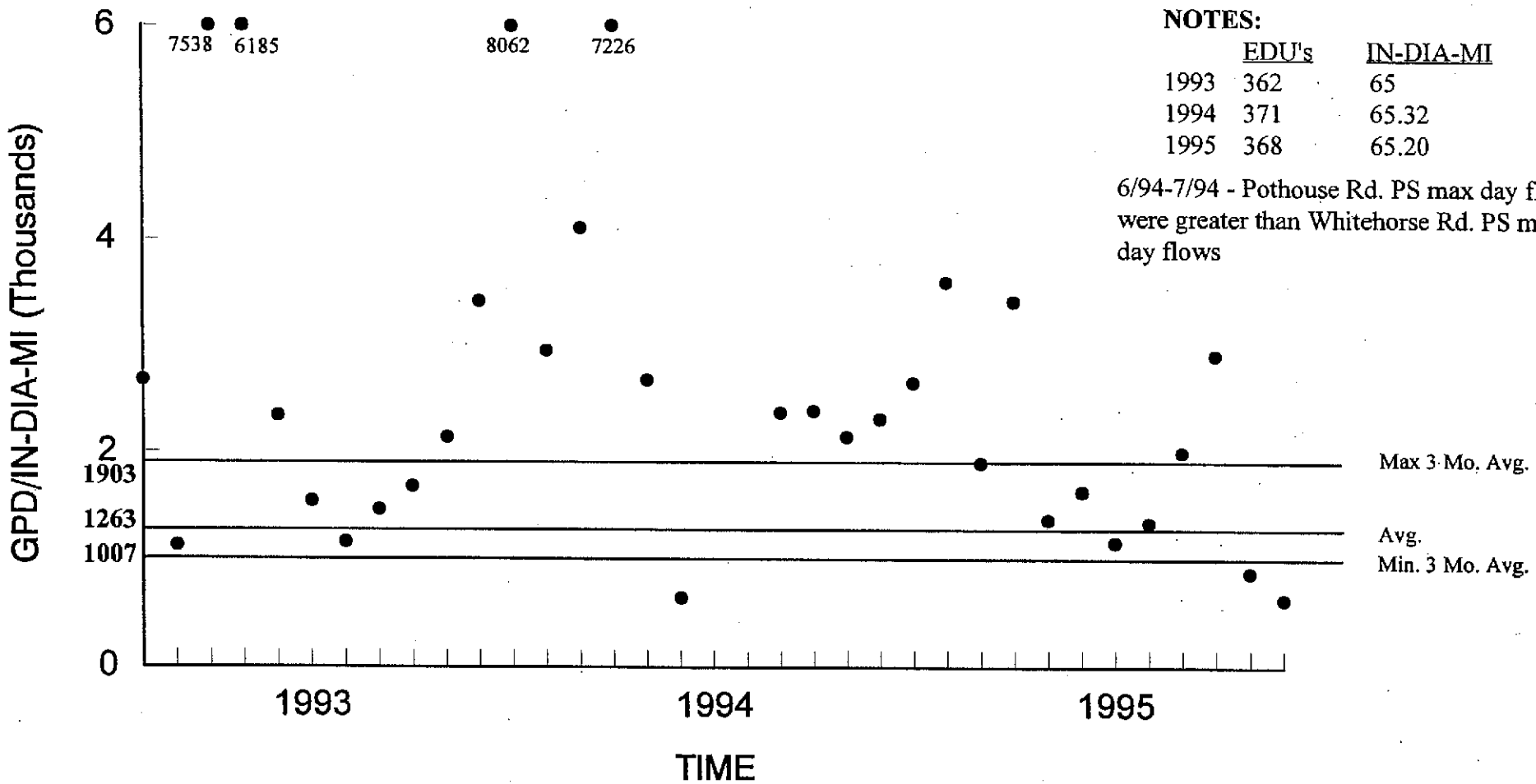
10/95-12/95 - GPD/IN-DIA-MI Based on FC & PH flows combined

JULY 26, 1996

VFSA

Whitehorse Road Pump Station

Comparison of Avg. GPD/IN-DIA-MI to Maximum Day GPD/IN-DIA-MI



NOTES:

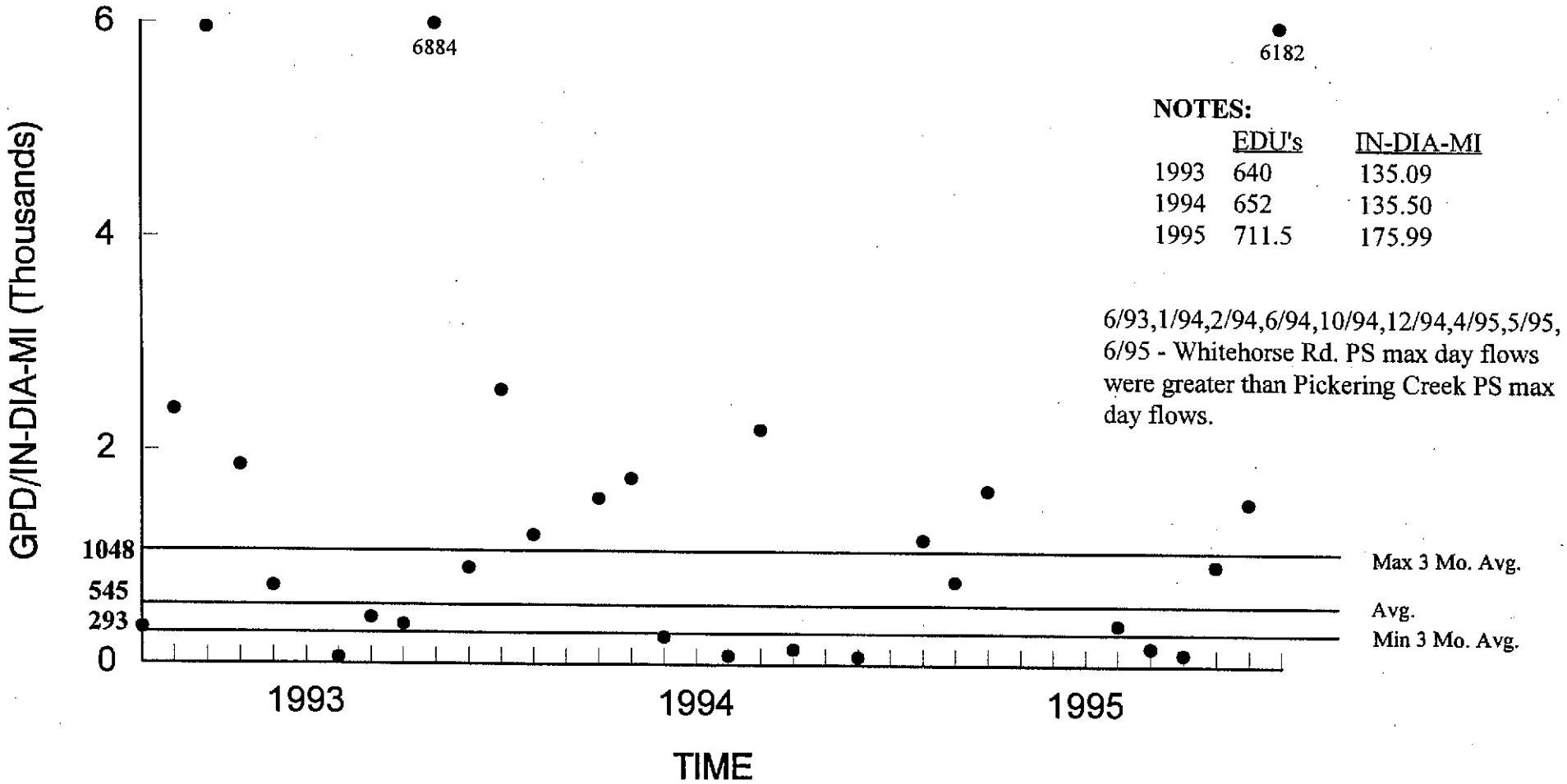
	EDU's	IN-DIA-MI
1993	362	65
1994	371	65.32
1995	368	65.20

6/94-7/94 - Pothouse Rd. PS max day flows were greater than Whitehorse Rd. PS max. day flows

JULY 26, 1996

VFSA

Pickering Creek Pump Station
Comparison of Avg. GPD/IN-DIA-MI to Maximum Day GPD/IN-DIA-MI



NOTES:

	EDU's	IN-DIA-MI
1993	640	135.09
1994	652	135.50
1995	711.5	175.99

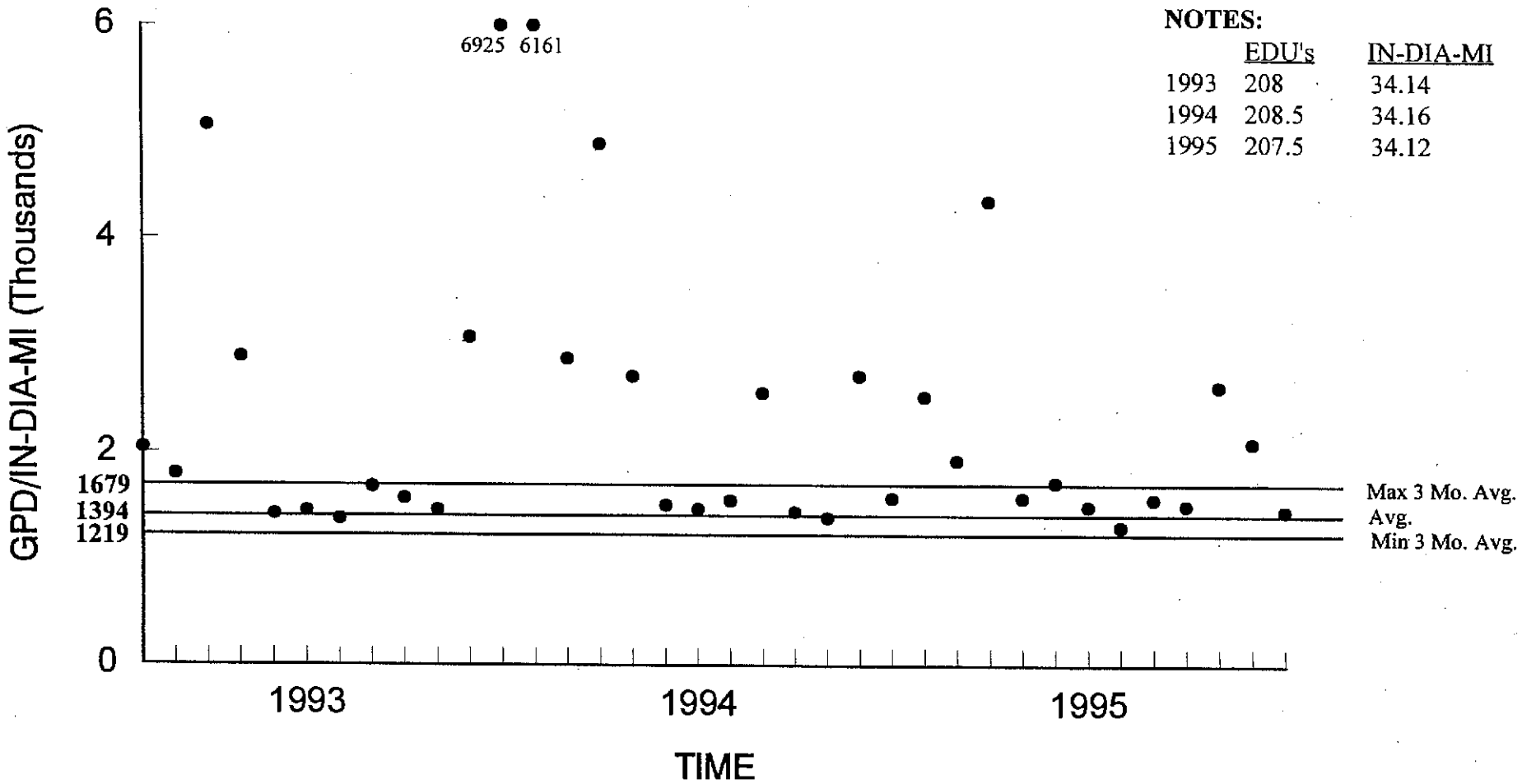
6/93,1/94,2/94,6/94,10/94,12/94,4/95,5/95, 6/95 - Whitehorse Rd. PS max day flows were greater than Pickering Creek PS max day flows.

JULY 26, 1996

VFSA

Perkiomen Pump Station

Comparison of Avg. GPD/IN-DIA-MI to Maximum Day GPD/IN-DIA-MI



NOTES:

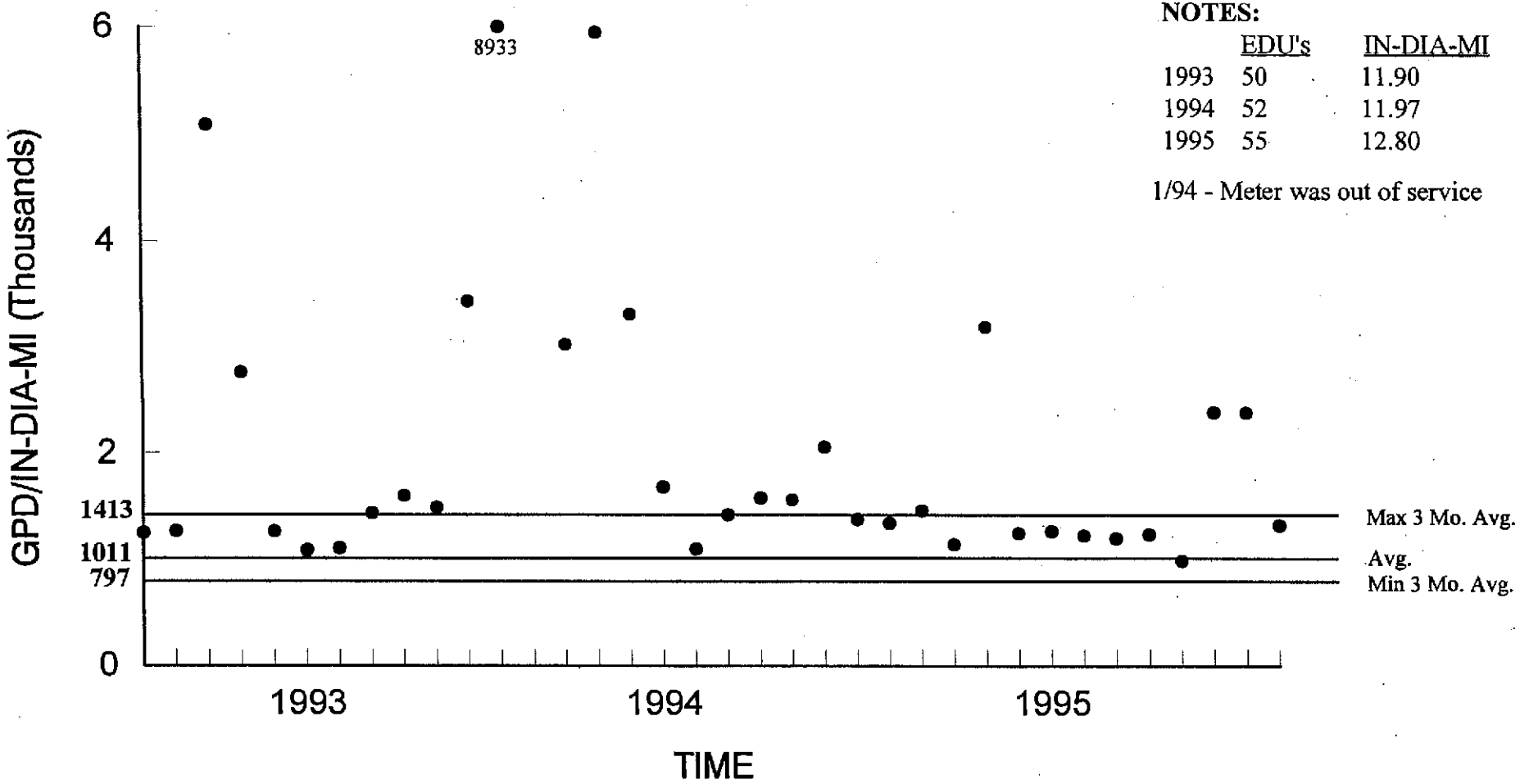
	EDU's	IN-DIA-MI
1993	208	34.14
1994	208.5	34.16
1995	207.5	34.12

JULY 26, 1996

VFSA

Valley Creek Pump Station

Comparison of Avg. GPD/IN-DIA-MI to Maximum Day GPD/IN-DIA-MI



NOTES:

	EDU's	IN-DIA-MI
1993	50	11.90
1994	52	11.97
1995	55	12.80

1/94 - Meter was out of service

JULY 26, 1996

APPENDIX D

Surcharged Sewer Data

Pump Station	Projection	Manhole Section	dia	slope	existing flow mgd	10yr flow mgd	ult flow	futr dia	futr capacity mgd
French Creek	Existing	2.08 118 - 102	8	0.004	0.49	.59	0.63	10	0.898
		2.04 109 - 108	12	0.002	1.21	1.42	1.49	14	1.558
		2.04 108 - 1.05	12	0.0022	1.22	1.44	1.51	14	1.634
	Five years	2.06 102 - 101	8	0.004		0.5	0.63	10	0.898
		2.04 110 - 122	12	0.0023		1.29	1.35	14	1.671
		2.04 122 - 109	12	0.0028		1.42	1.48	14	1.843
	ten years	2.05 101 -							
		2.04 110	12	0.0022		1.11	1.18	14	1.634
	ultimate	2.07 107 - 106	12	0.004			1.5	14	2.203
		2.06 105 - 104	8	0.0022			0.58	10	0.666
Pothouse	existing	2.09 105 - 104	18	0.0022	3.44	3.98	4.12	20	4.228
	Five years	none							
	Ten yeers	2.09 101 - 100a	15	0.008		3.97	4.13	18	6.089
	ultimate	none							
White Horse	existing	none							
	five years	3.04 446a 446	21	0.0019		4.83	5.13	24	6.389
	ten years	none							
	Ulitmate	3.04 460 459	21	0.0023			5	24	7.030
		3.04 459 458	21	0.0022			5.02	24	6.875
		3.04 458 457	21	0.0022			5.02	24	6.875
		3.04 453 452	21	0.0022			5.03	24	6.875
Pickering	existing	3.03 353 352	24	0.001		5.37	5.66	27	6.345
		3.03 117 358	24	0.001		5.75	6.14	27	6.345
		3.15 104 103	8	0.0042		0.52	0.59	10	0.921
									0.000
	five years	3.03 353a 353	24	0.0011		5.36	5.65	27	6.655
	ten years	none							
	Ultimate	3.03 325 324	24	0.0014			5.83	27	7.508
		3.15 108 107	8	0.0044			0.87	10	0.942
		3.15 107 106	8	0.0047			0.54	10	0.974
	Drawdown Whitehorse	3.03 352 346	24	0.0015			6.41	27	7.771
		3.03 359 360	24	0.0021			6.89	27	9.195
		3.03 360 360a	24	0.002			6.89	27	8.973
		3.03 328 327	24	0.0016			6.57	27	8.026
		3.03 327 326	24	0.0016			6.58	27	8.026
		3.03 326 325	24	0.0017			6.58	27	8.273
		3.03 324 323	24	0.0017			6.58	27	8.273
		3.03 323 322	24	0.0016			6.58	27	8.026
		3.03 322 321	24	0.0016			6.59	27	8.026

Description	Proj	Manhole	Section		Future Size	length LF	Existing Cost $	Five Year Cost $	Ten Year Cost $	Ultimate Cost $	manhole $2,400 each	pipe 10 in $65.00	pipe 14 in $70.00	pipe 20/21 in $85.00	pipe 18 in $75.00	pipe 24 in $100.00	pipe 27 in $110.00	bypass pumping $700.00 each	temp pav local rd $10.00 LF	Perm Pav local rd $20.00 LF	Temp Pav State Rd $22.00 LF	Perm Pav State Rd $36.00 LF	Shoulder State $1500 each	Highway Stream Crossing $400	Total
Pick.	exist	3.03	353	352	27	98	$19,220				$4,800						$10,780	$700	$980	$1,960					$19,220
		3.03	117	358	27	145	$28,990				$4,800						$15,950	$700			$3,190	$4,350			$28,990
		3.01	163	162	10	344	$38,180				$4,800	$22,360						$700	$3,440	$6,880					$38,180
	five years	3.03	353a	353	27	38		$11,656			$4,800						$4,180	$700			$836	$1,140			$11,656
	ten years								$0																
	ult	3.03	325	324	27	112				$17,820	$4,800						$12,320	$700							$17,820
		3.15	108	107	10	250				$29,250	$4,800	$16,250						$700	$2,500	$5,000					$29,250
		3.15	107	106	10	234				$25,330	$2,400	$15,210						$700	$2,340	$4,680					$25,330
	WH																								
	@	3.03	352	346	27	498				$86,176	$4,800						$54,780	$700			$10,956	$14,940			$86,176
	draw	3.03	359	360	27	226				$30,360	$4,800						$24,880	$700							$30,360
	down	3.03	360	360a	27	40				$23,500	$2,400						$4,400	$700						$16,000	$23,500
		3.03	328	327	27	350				$44,000	$4,800						$38,500	$700							$44,000
		3.03	327	326	27	384				$45,340	$2,400						$42,240	$700							$45,340
		3.03	326	325	27	140				$18,500	$2,400						$15,400	$700							$18,500
		3.03	324	323	27	180				$22,900	$2,400						$19,800	$700							$22,900
		3.03	323	322	27	188				$23,780	$2,400						$20,680	$700							$23,780
		3.03	322	321	27	213				$26,530	$2,400						$23,430	$700							$26,530
	TOTALS:						$231,811	$90,219	$61,230	$652,748															

Total: $1,036,008

Descript.	Proj.	Manhole Section	Future Size	Length	Existing Cost	Five Year Cost	Ten Year Cost	Ultimate Cost	manhole	pipe 10 in	pipe 14 in	pipe 20/21 in	pipe 18 in	pipe 24 in	pipe 27 in	bypass pumping	temp pav local rd	Perm Pav local rd	Temp Pav State Rd	Perm Pav State Rd	Shoulder State	Highway Stream Crossing	Total
			inch	LF	$	$	$	$	$2,400 each	$65.00	$70.00	$95.00	$75.00	$100.00	$110.00	$700.00 each	$10.00 LF	$20.00 LF	$22.00 LF	$30.00 LF	$15.00 each	$400 LF	
French Creek	Exist	2.08 118 - 102	10	383	$39,485				$2,400	$24,895						$700	$3,830	$7,660					$39,485
		2.04 109 - 108	14	277	$24,890				$4,800		$19,390					$700							$24,890
		2.04 106 - 1.05	14	300	$26,500				$4,800		$21,000					$700							$26,500
	five years	2.06 102 - 101	10	265		$22,725			$4,800	$17,225						$700							$22,725
		2.04 110 - 122	14	66		$7,720			$2,400		$4,620					$700							$7,720
		2.04 122 - 109	14	185		$18,450			$4,800		$12,950					$700							$18,450
	ten years	2.05 101 - 2.04 110	14	155			$37,950		$2,400		$10,850					$700						$24,000	$37,950
	ult.	2.07 107 - 106	14	215				$31,730	$4,800		$15,050					$700			$4,730	$6,450			$31,730
		2.06 105 - 104	10	174				$19,420	$4,800	$11,310						$700					$2,610		$19,420
Pot-house	exist	2.09 105 - 104	20	358	$54,546				$4,800			$30,430				$700			$7,876	$10,740			$54,546
	five years																						
	ten years	2.09 102 - 100a	18	140			$23,280		$4,800				$10,500			$700			$3,080	$4,200			$23,280
	ult.																						
White-horse	exist				$0																		
	five years	3.04 446a 446	24	159		$29,668			$4,800					$15,900		$700			$3,495	$4,770			$29,668
	ten years						$0																
	ult.	3.04 460 459	24	307				$52,164	$4,800					$30,700		$700			$6,754	$9,210			$52,164
		3.04 459 458	24	360				$57,820	$2,400					$36,000		$700			$7,920	$10,800			$57,820
		3.04 458 457	24	310				$50,220	$2,400					$31,000		$700			$6,820	$9,300			$50,220
		3.04 453 452	24	279				$47,908	$4,800					$27,900		$700			$6,138	$8,370			$47,908

APPENDIX E

Pump Drawdown Test Procedures

PUMP DRAWDOWN TEST PROCEDURE

A. PREPARATION

1. Measure inside dimensions of wet well and calculate gallons per inch of drawdown that wet well provides.

$$\text{Gal/In} = \frac{\text{Lgth (ft) x Width (Ft) x 1 Ft Depth x 7.48 Gal/Ft}^3}{\text{12"/Ft}}$$

2. Install pressure gauges on pump suction and discharge lines and measure vertical distance between centerline of gauges and the floor. Also, record static pressure on discharge gauge with pumps off.

3. Choose reference point for measuring sewage level in wet well. Usually edge of hatch opening or grating frame. Determine the elevation of this point relative to gauges and pump room floor. Obtain this from pump station drawings or measure it.

4. Flow matcher panel usually has a wet well level gauge. This level gauge could be used during test if the relationship of level gauge reading to the wet well level measuring reference point described in Item 3 above is determined. This relationship can be determined by measuring from reference point to the sewage level and at the same time have someone record the level gauge reading. Then record this relationship. Example: "37.5" on level gauge = 87.5" to W.L. from reference point". You will then be able to calculate actual wet well level relative to the pump suction and discharge pressure gauge centerlines and will be able to calculate drawdown during testing. However, the accuracy of the level gauge will now come into play. It is best to use a tape measure for calculating drawdowns, however, by checking the level gauge reading versus taped measurements at several wet well levels the level gauge accuracy can be determined.

5. Overfill the side of the wet well to be tested several feet above the pumps maximum speed operating level. The feet required is equal to the pumps theoretical capacity times two (2) minutes divided by the wet well capacity in gallons per inch. The two (2) minute run time is preferred, if available. The run time should be at least one (1) minute minimum.

6. Run several preliminary tests to:

   a. Check how long it takes from time pump is turned on to reach its maximum speed.

   b. Check pump actual maximum obtainable speed with a tach and record it. Record measured speed versus percent speed being indicated on the flow matcher panel.

   c. To verify how far the wet well must be filled to obtain the 1-2 minute run time at maximum speed required.

d. Time required to fill and isolate one of the wet wells to run the test.

e. To check pump shutoff head, slowly close its discharge valve when operating at maximum speed and record the suction pressure gauge, discharge pressure gauge and wet well level gauge readings. Make sure pump is at maximum speed.

7. Hopefully, pump will only require 10-20 seconds to reach maximum speed from a dead stop. It if takes several minutes, there may not be enough wet well volume to run the test.

B. RUNNING DRAWDOWN TESTS

1. Two or three drawdown tests should be performed. If one looks way off from the others, discard it and run another.

2. Testing:

a. Fill wet well to be tested to level that will provide sufficient run time and close influent gate. Also, isolate common suction line from the other wet well.

b. Measure distance from reference point to wet well level.

c. Start pump and stop watch.

If pump comes up to maximum speed in several seconds, continue test.

If pump takes more than 5 seconds to come up to speed, do not take initial reading and do not start the stop watch when starting pump. Wait until pump reaches 100% speed then take a level reading. Once a level is established, immediately start the stop watch.

d. Allow pump to run for 1-2 minutes, if possible, while watching pump speed making sure its always at maximum speed.

e. Record with pump running:

1) Suction Pressure
2) Discharge Pressure
3) Flow Meter Reading

f. After 1-2 minutes run time, take a level reading. Once you get a solid level reading, immediately record the stop watch reading. If you stopped the pump, it will slowly decelerate before turning off and, therefore, will affect the accuracy of the test.

g. Calculate the volume of drawdown that occurred and pump capacity =

$$\text{GPM} = \frac{\text{Wet Well Cap (Gal/In) [2nd reading (Inches)-1st reading (Inches)]}}{\text{Stop Watch Reading (Total Seconds)} \quad 60\ \text{Sec/Min}}$$

h. Calculate pump TDH.

TDH = (Disch. press.-Suct. Press.) (2.31 Ft/PSI) + (Elev. Diff. suct. & Disch. Press. Gauges)

i. Adjust TDH by adding friction losses through pump suction piping and discharge piping up to the point where discharge gauge is mounted (This friction loss will have to be calculated).

TEST NO. _____

1. Wet Well Level at Test Stop - _____ In.
2. Wet Well Level at Test Start- _____ In.

==========

Drawdown- _____ In.

Volume = _____ Gal/In x _____ In Drawdown = _____ Gal

3. Testing Duration: Minutes _____
   Seconds _____

Pumping Rate = $\frac{\text{Gal}}{\text{Min} + \frac{\text{Sec}}{60\ \text{Sec/Min}}}$ = _____ GPM

4. Discharge Pressure _____ PSI
   minus
   Suction Pressure _____ PSI

==========

Theoretical TDH = _____ PSI x 2.31 = _____

Theoretical TDH _____
Diff. Gauge Elev. + _____
Frict. Losses + _____

==========

Pump THD _____

5. Flow Meter Reading (Used to check meter accuracy)

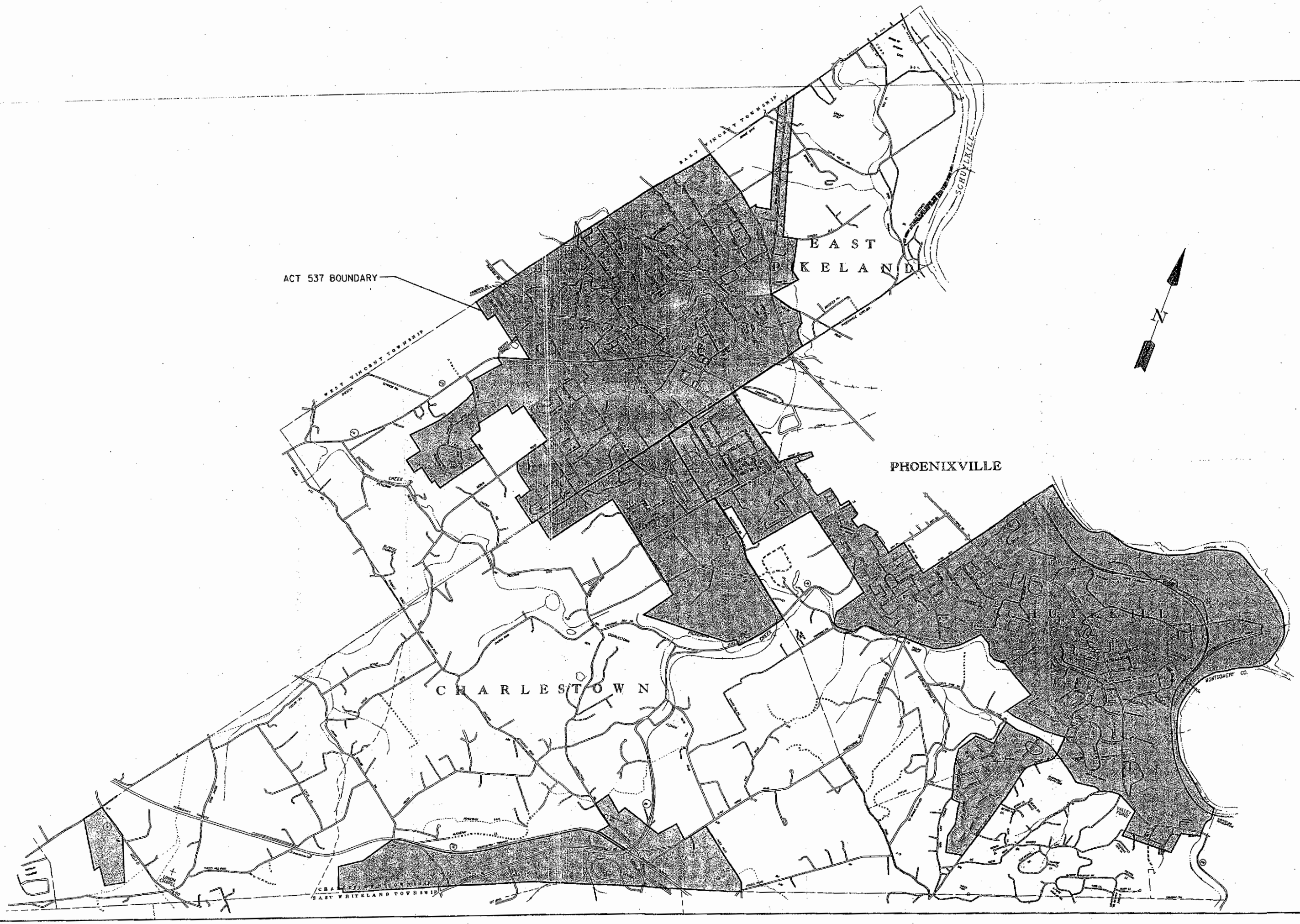
APPENDIX F

Implementation Costs

IMPLEMENTATION PLAN FOR PROPOSED IMPROVEMENTS TO THE VFSA SEWER NETWORK

	1996 Dollars	1997 Dollars	1998 Dollars	1999 Dollars	2000 Dollars	Project Costs
1996						
1. Purchase surcharge indicators	$1,100					$1,100
TOTAL						**$1,100**
1997						
1. Pothouse Road Pump Station						$14,300
Change impellars	9,200					
Change generator wires	$1,800					
	11,000					
		11,440				
Engineering (in house 25%)		2,860				
		$14,300				
2. Upgrade sewer segments						$109,231
2.09 105-104	54,500					
2.09 102-100A	23,300					
	$77,800	80,912				
Project Costs (35%)		28,319				
		$109,231				
TOTAL						**$123,500**
2000						
1. Telemetry - flow data -	67,500					$106,603
All pump statons					78,965	
Project Costs (35%)					27,638	
					106,603	
2. Upgrade sewer segments						$219,682
2.08 118-102	39,500					
2.04 106-105	24,900					
2.04 109-108	26,500					
3.03 353-352	19,200					
3.03 317-358	29,000					
	$139,100				162,727	
Project Costs (35%)					56,955	
					$219,682	
TOTAL						**$326,300**

FIGURES



NO.	REVISIONS DESCRIPTION	BY	DATE

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Engineers, Architects and Planners

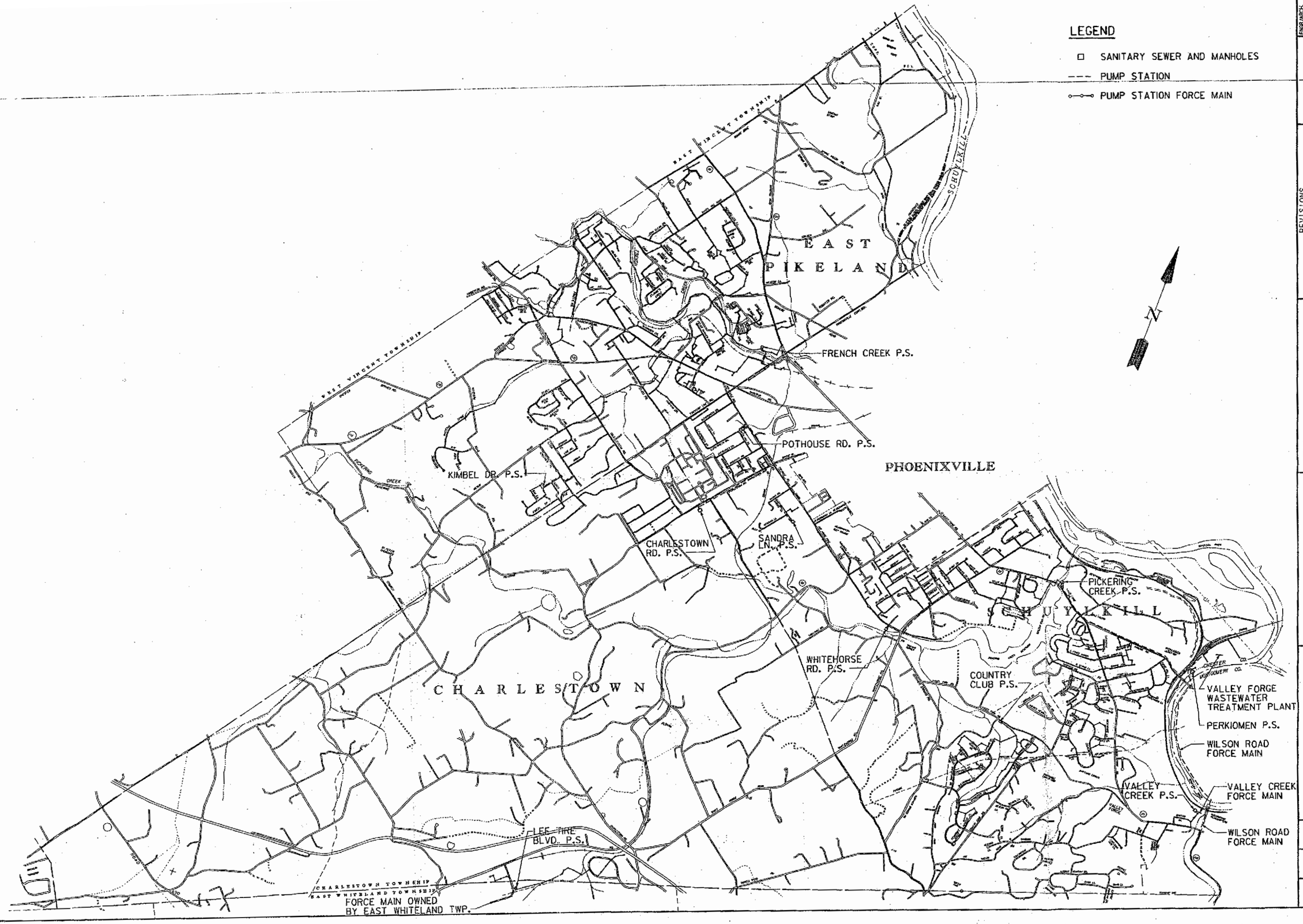
VALLEY FORGE SEWER AUTHORITY
MEMBER MUNICIPALITY COLLECTION SYSTEM
ACT 537

SEWER SERVICE BOUNDARY

EXHIBIT NO. 1

SHEET NO.

PROJECT NO. 71565



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ACT 537

SEWAGE COLLECTION SYSTEM

EXHIBIT NO. 2

SHEET NO.

PROJECT NO. 71565

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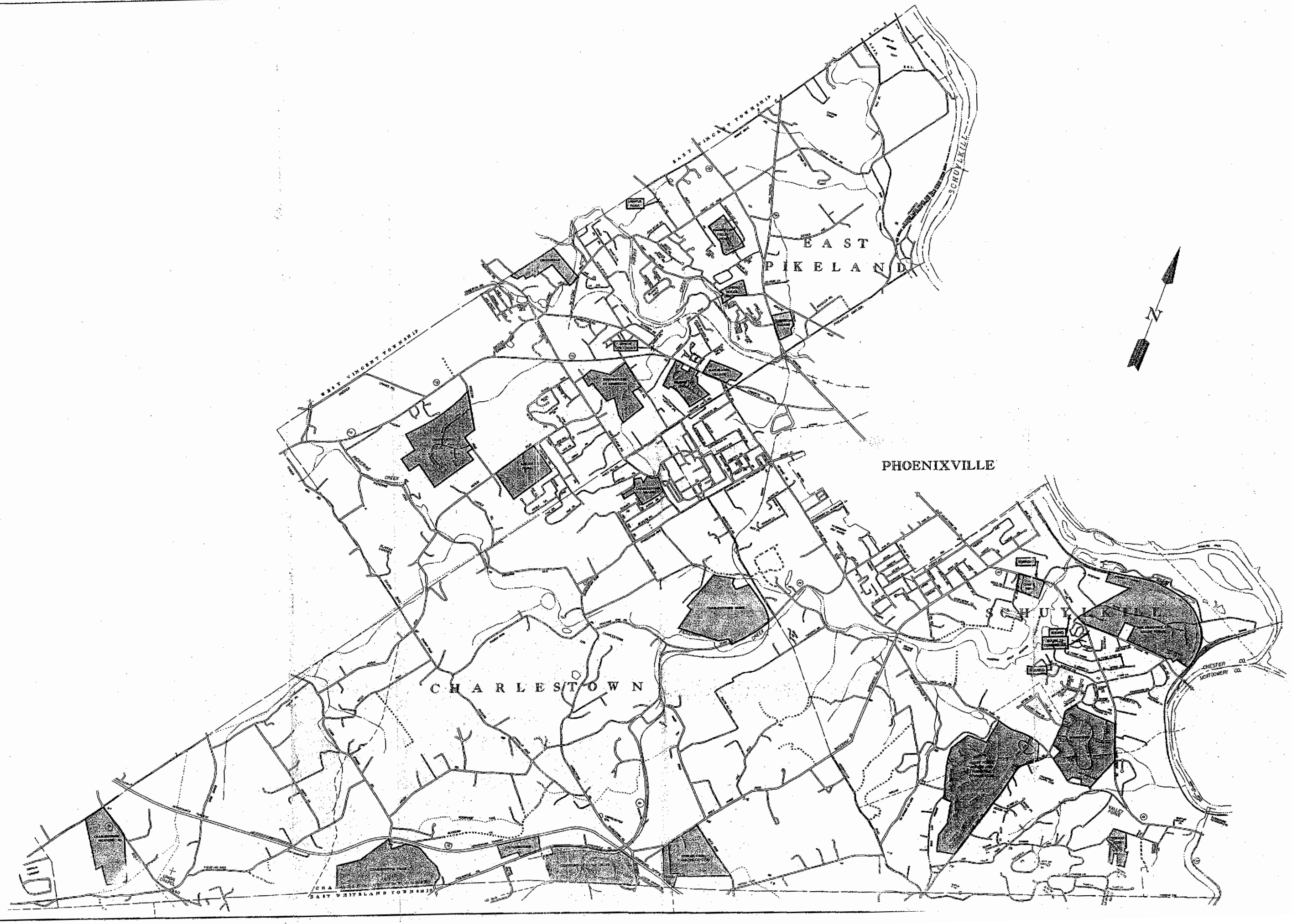

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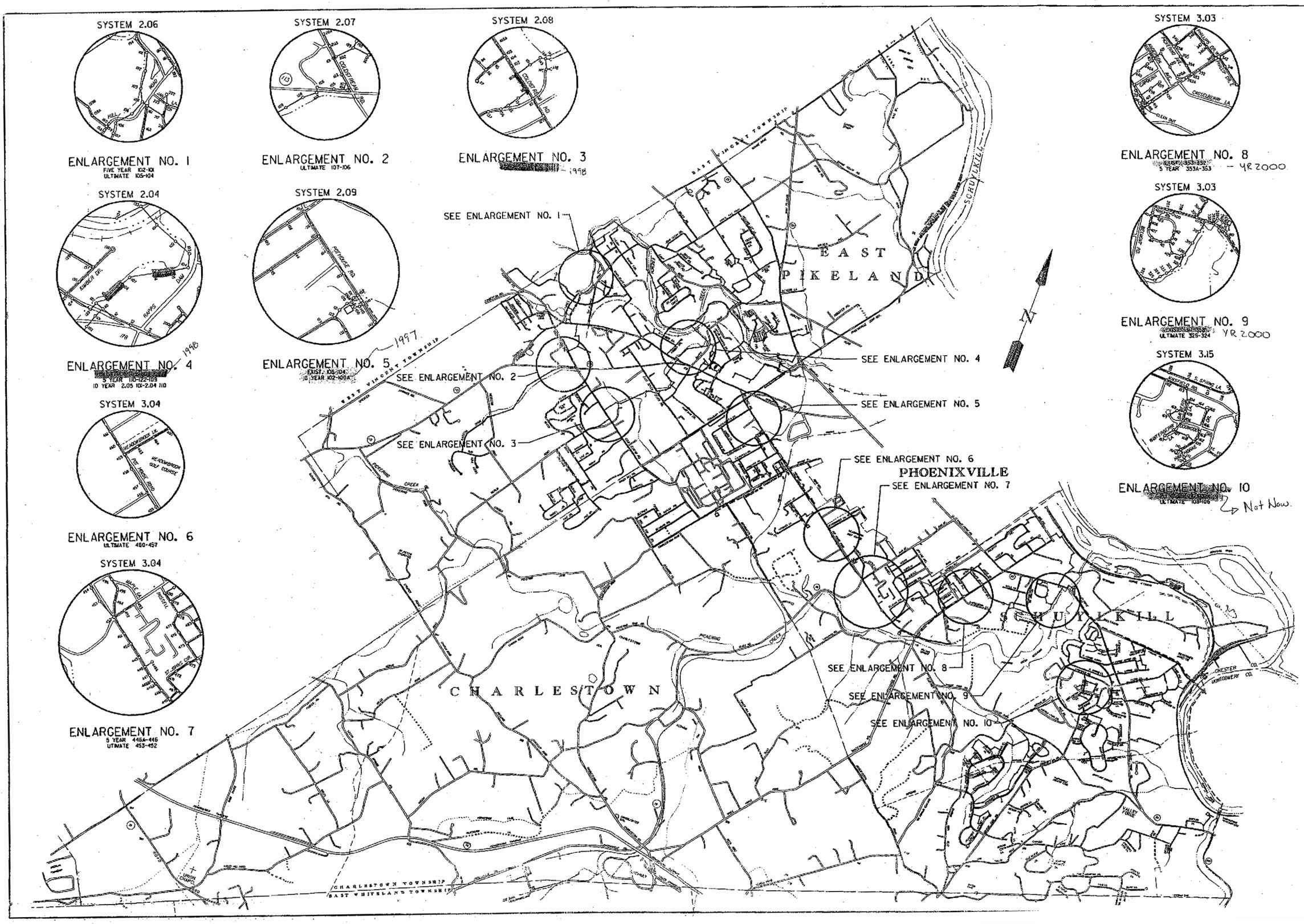
MEMBER MUNICIPALITY COLLECTION SYSTEM
ACT 537

SUBDIVISION MAP

EXHIBIT NO. 3

SHEET NO.

PROJECT NO. 71565



ENGRAVATCH

DESIGN BY

DRAWN BY

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DATE

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ACT 537

SEWER SEGMENTS PROJECTED TO SURCHARGE

EXHIBIT NO. 4

SHEET NO.

PROJECT NO. 71565

Plot: N:\proj\71565\c nv\vf537\exh4.prf
Dwg: N:\proj\71565\c nv\vf537\exh4.dgn - LV=1-63

Revisions made to the VFSA Member Municipality Act 537 Plan
as approved by the Authority April 14, 1997

1. Revised text on pages 8, 9, 11, 12 and 15.

2. Table No. 6, page 16, to VFSA BH/Projections

   - added Reeves-Mainwaring 5 EDUs to 10 yr. projection
   - deleted Patrick Henry - 47 EDUs
   - adjusted Rhinehart to 130 EDUs

3. The revisions to Table No. 6 on page 16 result in changes to:

   page 17, Table No. 7 - 10 yr. & ultimate EDUs for Pickering Creek P.S. and tot totals

   page 21, Table No. 10 - 10 yr. & ultimate EDUs and Flow Projections.

   page 25, Table No. 12D - Deleted reference to Patrick Henry Drive.

   page 31, Table No. 16 - revised 10 yr., ultimate and drawdown flow projections. Revised 10 yr. and ultimate EDUs.

   Appendix A, page 3, Pickering Creek Drainage Basin
   - deleted Charlestown Crossing
   - adjusted Rhinehart EDUs to 130

   Appendix B, page 1, Pickering Creek - Adjusted Rhinehart to 130 EDUs. Added Reeves-Mainwaring - 5 EDUs, adjusted undeveloped land to 73 EDUs.

   Appendix B, page 2 - deleted Reeves property and Patrick Henry Drive from Pickering (1003)

4. Added Schuylkill Township's Act 537 planning map as Exhibit No. 5. It is referenced on page 15 of the Plan.

The number of EDUs is also reported by member municipality. The number of EDUs connected by municipality for 1993 through 1995 is listed in Table No. 3.

TABLE NO. 3
YEAR END EDUs BY MEMBER MUNICIPALITY

	1993 EDUs	1994 EDUs	1995 EDUs
Charlestown Township	302.5	345.5	377.0
East Pikeland Township	1,886.0	1,927.5	1,975.0
Schuylkill Township	1,664.0	1,789.0	1,717.0
West Vincent Township	0.0	22.0	27.0
Total	**3,852.5**	**4,084.0**	**4,096.0**

FUTURE CONNECTIONS

Each of the member municipalities and the Valley Forge Sewer Authority have carefully monitored development within the sewer service area. To ensure an orderly growth, sewage facilities proposed to serve new developments are sized to consider the ultimate needs of the area which the members have designated to be served. The proposed sewer routing must be situated to serve the overall sewerage objective of the Township within which the project is located. New development is typically evaluated by drainage basin. An analysis of the proposed routing is performed to determine whether adjacent properties within the Township's designated sewer service area may ultimately obtain public sewerage service through the proposed sewer. This determination may require the construction of a deeper sewer or provisions for future sewer connections, however, the intent is to eliminate the need for pump station construction in the future. Whenever possible, gravity alternatives are pursued. The Valley Forge Sewer Authority has had considerable success in evaluating proposed sewer extensions by drainage basin rather than just individual developments. Only one additional pump station has been required within the member municipality collection system since the original collection system construction.

Each of the Member Municipalities evaluated the future wastewater disposal needs of its community. As a result of this evaluation, Act 537 planning boundaries were developed. These boundaries are depicted in Exhibit 1. Additionally, each municipality identified proposed and active subdivisions within their political boundary including a development schedule. These subdivisions are depicted in Exhibit 3. This Member Municipality Act 537 Plan uses the 1995 data for the base year. The five year projection is 2000 and the ten year projection is 2005. Because of the varying time tables in which the three member plans were prepared, some adjustments to the growth projections were necessary for consistency.

Charlestown Township

Charlestown Township designated all property within its entire Act 537 sewer service boundary for public sewage service within a 10 year horizon. Figure 2 herein is a copy of Figure 15 of the April 1989 Official Plan Under the Pennsylvania Sewage Facilities Act prepared for Charlestown Township. The ten (10) year horizon depicted thereon is 1989-1999, basically the five year horizon of this document. Therefore, to be consistent with the time frame of the Member Municipality Act 537 Plan, the Township's projections are designated as a 5 year projection on Table No. 4. The developments which are indicated with an asterisk on Table No. 4 are already in some stage of planning or construction and the EDUs are based on approved planning module documentation. The remaining development EDUs were calculated by applying the Township's maximum zoning criteria to the developable acreage within the 537 sewerage boundary defined by the Township. Although there was considerable development planning activity in 1989, the momentum of some of the identified developments has slowed down. Therefore, this plan modifies growth projection to reflect the current development activity.

TABLE NO. 4
COMPARISON OF GROWTH PROJECTIONS
FOR CHARLESTOWN TOWNSHIP

	VFSA/BH Projections			Charlestown Projections[1]
	5 Year	10 Year	Ultimate	5 Year
Charlestown Hunt[2]	105	244		349
Charlestown Hunt Growth	0	0	80	80
Across from Forestas	0	0	5	5
Charlestown Meade[2]	3			3
Commons at Great Valley[2]	66			66
Spring Oak Business Center[2]	73			73
DeVault Meats[2]	73			73
Laura Brooke[2]	20			20
Charlestown Oaks[2]	95	193		288
Charlestown Meadows[2]	0	0	241	241
Along Buckwalter	0	0	5	5
Behind Spring Oak	0	0	21	21
Across from Spring Oak	0	0	9	9
Yellow Springs Road	0	0	10	10
Rte. 29 & Charles Road	0	0	50	50
N. Side of the school	0	0	7	7
Farm Residence	0	0	1	1
Adj. To Laura Brooke	0	0	35	35
Adj. To Charlestown Oaks	0	0	46	46
	435	437	510	1,382
Existing EDUs (1/1/95)	345.5			345.5
Five Year EDUs	435			1,382
Ten Year EDUs	437			
Ultimate EDUs	510			
Total	**1,727.5**			**1,727.5**

1 Charlestown Township projected all growth within its Act 537 boundary to occur by 1999 (5 year horizon for this plan). The number of EDUs is based on the Township's zoning criteria.

2 Developments in some stage of planning or construction.

East Pikeland Township

The growth projections provided in the East Pikeland Township Act 537 Wastewater Facilities Plan, Phase III, dated August 26, 1991 are based on the 1989 Wasteload Management Report - Chapter 94. The Member Municipality portion of the Chapter 94 for 1989 is furnished in whole as Appendix A to East Pikeland Township's plan. Per page 43 of East Pikeland Township's Act 537 Plan, 800 EDUs were projected to develop within the Township from 1989-1994. Due to a slow down in growth, only 321 of these EDUs were developed by 1994. Although most of the projects identified in 1989 have not developed as planned, they are still active viable projects. This plan updates the East Pikeland Township growth projections based on the Act 537 sewer service boundary defined by the Township and current zoning criteria to create 5 year, 10 year and ultimate growth projections. See Table No. 5.

The East Pikeland Township Act 537 Plan also refers to an 850,000 gpd ultimate growth projection from the 201 Study, prepared in the early 1970's. The ultimate projection used in this Plan considers all potential growth in the remaining developable areas within the 537 boundary set forth by East Pikeland Township.

Schuylkill Township

Schuylkill Township's Act 537 Plan Update includes a Table of Anticipated Development on page 1 of the Plan Summary. It includes projections for both a five year (1995-1999) and ten year (2000-2004) planning horizon. The Township's Plan and this Plan differ by one year in their time table. Therefore, the Township's information has been updated to coincide with the planning period of this Plan. See Table No. 6. Additionally, the time frame for the MacAvoy, Rhinehart and Maisfield projects were extended to a 10 year duration due to the slow down in growth experienced in recent years.

Schuylkill Township's Act 537 boundary map titled "Act 537 Comprehensive Wastewater Plan Showing Development - 1993 - 2002, Exhibit No. 1" is included herein as Exhibit No. 5.

TABLE NO. 6
COMPARISON OF GROWTH PROJECTIONS
FOR SCHUYLKILL TOWNSHIP

	VFSA/BH Projections			Schuylkill Projections		
	5 Year	10 Year	Ultimate	5 Year	10 Year	Ultimate
Chapel View Estates	12			24		
Rte 23 Comm. (Alpha Rlty)	6			15		
Buono Tract	12			0		
MacAvoy	0	274		137	137	
Valley Forge Woods	240	85		240	85	
Rhinehart	0	130		80	95	
Maisfield	0	48		48		
French Creek - misc. (Ind.)	0	0		10	10	
Along Charlestown Hunt Inter	5			5		
Health Care Jordon	0	0		44		
Valley Creek	2			0	0	10
Miscellaneous	0	0		25	25	
Showalter Farm		0			80	
Meadowbrook Golf Course		0			58	
Mainwaring		5			5	
Thompson Tract						10
Thompson/Gold						10
Univ. Of PA						5
Misc. Resubdiv-Jug Hollow						25
Rte 23 North Corridor			29			
N. Side of Pawling Rd.			80			
North of Conrail			196			
Intersection @ Maisfield			6			126
Bull Tavern			3			
RR Tracks			36			
East Phillip			28			
By Valley Forge Woods			6			
Total EDUs	277	542	384	628	495	186
Existing EDUs	1,789	(1/1/95)		1,666	(1/1/94)	
Five Year EDUs	277			628		
Ten Year EDUs	542			495		
Ultimate EDUs	384			186		
TOTAL	**2,992**			**2,973**		

Basis of EDU Growth Projections

Table No. 7 presents the basis for the EDU growth projections developed in this report.

TABLE NO. 7
EDU GROWTH PROJECTIONS

	1994 Existing EDUs	5 Year	10 Year	Ultimate
French Creek P. S.				
Drainage Basin				
Stony Run	0	0	0	20
Kimbel Dr. P.S.	99	99	142	142
French Creek P.S.	1,922.5	2,275.5	2,439.5	2,703.5
Subtotal	2,021.5	2,374.5	2,581.5	2,865.5
Pothouse Rd. P.S.				
Drainage Basin				
Sandra Lane P.S.	23	23	23	23
Charlestown Rd. P.S.	119.5	122.5	122.5	127.5
Pothouse Rd. P.S.	391	391	391	396
Subtotal	533.5	536.5	536.5	546.5
Whitehorse Rd. P.S.				
Drainage Basin				
Whitehorse Rd. P.S.	435.5	545.5	789.5	869.5
Subtotal	435.5	545.5	789.5	869.5
Pickering Creek P.S.				
Drainage Basin				
Country Club Rd. P.S.	27	267	352	358
Pickering Creek P.S.	652	684	947	1,020
Subtotal	679	951	1,299	1,378
Perkiomen				
Drainage Basin				
Perkiomen P.S.	207.5	207.5	401.5	706.5
Subtotal	207.5	207.5	401.5	706.5
Valley Creek				
Drainage Basin				
Valley Creek P.S.	53	55	55	55
Subtotal	53	55	55	55
Valley Creek Trunk				
Sewer Drainage Basin				
Lee Tire Blvd. metering station	154	386	386	519
Route 401	0	0	0	241
Sidley Rd.	0	95	288	334
Subtotal	154	481	674	1,094
TOTAL	**4,084**	**5,151**	**6,337**	**7,515**

Future Flows

Table No. 7 lists the projected number of EDUs for the Member Municipalities by various

growth horizons. Table No. 10 provides average daily wastewater flow projections for the member municipalities.

TABLE NO. 10
WASTEWATER FLOW PROJECTIONS
FOR THE MEMBER MUNICIPALITIES

Growth Horizon	Total EDUs	Flow * Projection (MGD)
Existing	4,084	1.123
5 Yr.	5,151	1.417
10 Yr.	6,337	1.743
Ultimate	7,515	2.067

* flows based on 275 GPD/EDU

Since the creation of the Valley Forge Sewer Authority, the Member and Partner Municipalities have used 275 gallons per day as the base flow for an EDU. The historic GPD/EDU factor for VFSA has been well below 275 GPD/EDU since 1985. The ten year average, 1985-1994, is 218 GPD/EDU. Therefore, the 275 GPD/EDU flow rate is considered conservative when computing flow projections for the Member Municipality collection system and is used throughout this planning document.

The flow allocation of 2.124 MGD assigned to the Member Municipalities is adequate for all growth horizons.

Sewers

In 1986, Buchart-Horn developed nine models which analyze the member municipality collection system by pump station drainage basin. The data from upstream pump stations is incorporated into the downstream pump station's model. The model is used to simulate a "worst case" wet weather scenario. The model then identifies which sewer segments would become surcharged and by how much under this scenario.

The model was developed by entering defining data for each sewer segment. Data entry included upstream and downstream manhole number and invert, pipe diameter and slope, and the number of equivalent dwelling units connected to each pipe section.

APPENDIX C

Member Municipality Validation Report

VALLEY FORGE SEWER AUTHORITY

VALIDATION OF THE MEMBER MUNICIPALITY COLLECTION SYSTEM PORTION OF THE REGIONAL ACT 537 PLAN

NOVEMBER 2005

Prepared by:
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TABLE OF CONTENTS

	Page No.
Introduction and Summary of Findings	1
Section 1 Summary of Flow Projections & Review of the 1997 Report	3
Section 2 Improvements & Changes to the VFSA Collection System Since 1997	4
Section 3 EDU Growth & Resulting Flow Projections	4
Section 4 Wet Weather Analysis of the Member Municipality Collection System	8

EXHIBITS:
4.1 Capacity Issues – Small Rain Event
4.2 Capacity Issues – Average Rain Event
4.3 Capacity Issues – Large Rain Event
4.4 Capacity Issues – Small Rain Event / French Creek Pump Station At Capacity

INTRODUCTION AND SUMMARY OF FINDINGS

The purpose of this report is to develop current 5 and 10 year flow projections based on updated member municipality growth projections and validate / update the ultimate flow projections established in the previous 1997 Report.

On April 14, 1997, the Valley Forge Sewer Authority (VFSA) approved the "Member Municipality Collection System Supplement to the VFSA Regional Act 537 Plan." The purpose of the plan was to evaluate the portion of the VFSA collection system that supports the three member municipalities, Charlestown Township, East Pikeland Township and Schuylkill Township. Additionally, the plan presented the future growth projections of the member municipalities as documented within the individual municipal Act 537 Plans and the calculated wastewater flow projections based on the 5 year, 10 year and ultimate growth horizons. The 5 and 10 year planning horizons developed in the 1997 plan were for the years 2000 and 2005 and based on year-end 1994 data.

The following summarizes the recommendations resulting from this study:

1. Sewer expansions or upgrades are **not** recommended as a result of this analysis.
2. Ongoing monitoring of key system locations is recommended.
3. Address project pump station capacity issues as the pump stations are modernized.
4. Identify and elevate all manholes located in or beside creeks.

This Plan Validation is divided into five sections:

- Section 1 summarizes the flow projections and recommendations presented in the 1997 Report.
- Section 2 describes improvements and changes to the VFSA collection system since the 1997 Report.
- Section 3 presents updated EDU and resulting flow projections for the 5 year, 10 year, 15 year and ultimate growth scenarios.
- Section 4 presents the computer results of wet weather flow analysis for the VFSA collection system based on the 10-year and ultimate growth scenarios.

Based on the evaluation performed the following summarizes the overall findings:

Future average daily flow projections for the member municipalities are: (correct per new table).

- 5 year flow: 1.651 MGD
- 10 year flow 1.780 MGD
- 20 year flow 1.916 MGD
- Ultimate flow (30-yr) 1.916 MGD

Flow Projections do not exceed Flow Allocation

The flow projections do not exceed the Member Municipalities' flow allocation of 2.124 MGD.

Wet weather flow analysis identified sewer segments that will be at or approaching capacity based on a desk top static model for three different rain event scenarios: small, average, and large. However, the VFSA staff has visited and evaluated the portions of the system where the static model indicates the potential for flows that are greater than 100% of design capacity and has found no evidence of surcharging. The field installation of surcharge indicators is recommended to monitor the extent of any potential sewer surcharging in these areas over a long term period of time.

As growth occurs and if / when surcharging or sewer capacity issues are identified, then it is recommended that the affected areas be evaluated in more detail. Where necessary, appropriate sewer capacity upgrades should be provided before service is adversely affected.

According to the model, all four major pump stations, French Creek, Pothouse Road, Whitehorse Road and Pickering Creek, already experience some minor capacity issues under average and very heavy rain/wet weather conditions. Conditions where a second (lag) pump kicked on have been confirmed in VFSA's flow records. However, for the most part, flow rates just exceed the pump station capacity with one pump operating. Yet strict adherence to PADEP regulations indicates that pump stations must be adequately sized to transfer the expected flows without requiring a standby (in this case, the lag) pump.

Both Pothouse Road and Pickering pump stations are predicted to exceed the overall pump station capacity with two pumps running under the ultimate growth scenario during heavy rain events and/or snow melts. Although this condition is well beyond the growth horizons that apply to this 537 Plan, these projections should be considered when the applicable pump stations are upgraded. Buchart-Horn understands that VFSA is considering modernizing their pump stations from existing Flow Matcher controls to variable frequency drives (VFD) and VFD-rated motors Buchart-Horn, Inc. (B-H) concurs with this long-term strategy and recommends that the PADEP capacity requirements be incorporated into the pump station modernization projects as they occur.

SECTION 1
SUMMARY OF FLOW PROJECTIONS & REVIEW OF THE 1997 REPORT

The April 1997 report projected an ultimate average daily flow (ADF) of 2.120 MGD compared to the Member Municipalities Allocated Capacity of 2.124 MGD. Therefore, no change in the Allocated Capacity was proposed.

VFSA has been actively executing the recommendations from the 1997 Plan.

The 1997 plan also reported that the majority of the pump stations had adequate capacity to handle the projected flows. The following recommendations were made:

- Perkiomen P.S. to be upgraded in conjunction with the Meadows Subdivision construction
- Valley Creek P.S. to be evaluated in light of a potential upgrade to the Wilson Road Pump Station
- Pothouse Road P.S. to be field-tested to determine capacity prior to implementing any upgrading activities.

The pump stations were evaluated based on the maximum daily GPD/EDU measured in each pump station drainage basin with future flows based on a long term average GPD/EDU peaked 2.5 times. Table 1.1 summarizes the maximum day and average daily flow rates utilized in the 1997 pump station and collection system analysis.

Table 1.1
PUMP STATION FLOWS
for analysis per the1997 Member Report

Pump Station	Max Day Flowrate	Average Daily Flowrate
French Creek	919	239
Pothouse	1650	254
Whitehorse	1458	250
Pickering	536	224
Perkiomen	1346	236
Valley Creek	2635	260
Kimble	919 (based on FC)	
Charlestown	1650 (based on PH)	

* Maximum average daily flow – applied to existing system EDUs
** Average daily flow – multiplied by 2.5 and applied to future system EDUs

The collection system was evaluated using the Authority's original computer model. The wet weather analysis was based on the same flowrates calculated for the various pump station drainage basins listed in Table 1.1. The model identified specific sewer segments for monitoring.

An implementation plan was developed by B-H and executed as appropriate by VFSA.

Upgrades to the VFSA collection system have been documented by B-H in the respective yearly Engineer's Reports for the VFSA system. The improvements that have been accomplished since 1997 are summarized in Section 2. The remainder of this report addresses updated 5 year, 10 year, and ultimate flow projections and provides recommendations for system monitoring activities in the future.

SECTION 2
IMPROVEMENTS & CHANGES TO THE VFSA COLLECTION SYSTEM SINCE 1997

Improvements to the VFSA collection system, primarily associated with capacity issues, that have occurred since the original Member Municipality Act 537 Plan was approved include:

- Prior to 2000 - Expanded and realigned sewer feeding Pothouse Road Pump Station
- 2000 – Performed Drawdown Testing of Pickering Creek Pump Station
- 2001 – Decommissioned Sandra Lane Pump Station. This area is now served by gravity sewers
- 2001 – Replaced pump #1 impeller – Pothouse Road Pump Station
- 2001 –2003 Performed aggressive I/I reduction in the Sandra Lane / Pothouse Road Pump Station drainage basins.
- 2002 - Upgraded Perkiomen Pump Station, which was required to accommodate additional EDU connections from the Meadows Subdivision. (Primarily Developer Funded)
- 2002 – Replaced French Creek P.S. – Pump No. 1
- 2003 – Upgraded Valley Creek Pump Station. Replaced both pumps with higher head pumps which was required to allow flow to enter the Wilson Road force main
- 2004 - Replaced Pump No.2 - Pothouse Road Pump Station

SECTION 3
EDU GROWTH & RESULTING FLOW PROJECTIONS

Table 3.1 provides an historic summary of EDU growth and corresponding flows. The table also presents the 5 year and 10 year connection and flowrate averages. These averages were utilized to develop the growth and flow projections presented herein.

Table 3.1
Historic summary of EDU Growth and Corresponding Flows

Year	Year-end EDUs	No. of Connections	Average Flow (MGD)	Flowrate GPD/EDU
1993	3852		0.855	223
1994	4084	232	0.879	226
1995	4096	12	0.815	201
1996	4231	135	1.210	286

Year	Year-end EDUs	No. of Connections	Average Flow (MGD)	Flowrate GPD/EDU
1997	4383	152	1.030	235
1998	4624	241	1.290	279
1999	4959	336	1.220	246
2000	5546	587	1.346	249
2001	5672	126	1.226	216
2002	5893	221	1.186	201
2003	5985	92	1.707	285
2004	6160	175	1.480	240
5 yr avg.		240		238
10 yr. avg.		207		253

Table 3.2 is an update to the 1997 Member Municipality Report, Appendix B, Basis of EDU Growth Projections. This table is presented by pump station drainage basin to facilitate further evaluation of the Member Municipality Collection System and Pump Stations which is discussed in Section 4. The Table provides the following information:

- 2004 year-end EDUs as reported by the VFSA billing department.
- 2009 (5-year) EDU growth projection as reported in the Member Municipality Act 537 Plan. This projection is at a growth rate of 142 EDUs per year.
- 2014 (10 year) EDU growth projection based on an annual average growth rate of 101 EDUs per year.
- 2024 (20 year & Ultimate) EDU growth projection based on an annual average growth rate of 91 EDUs per year. The ultimate growth projection is based on the current Act 537 Sewer Service Boundary, developable land and expanding industry, and vacant land reviewed per Member Municipality zoning.

Table 3.2
Basis of EDU Growth Projections

Drainage Basin	2004 Yr. End EDUs	Platted EDUs as of 12/2004	5 Yr Proj.	Proposed EDUs	10 Yr. Proj.	Undeveloped Land	20 Yr. Proj.	Total EDUs
Rte 724 North of Rte 23 - New Act 537 Service Area – added by East Pikeland Twsp		Kimberton Meadows	23	Phoenixville Crossing Schuylkill Rd. Corp.	112 2	Rte 724 @ Rte 23	20	
Kimble Drive (2008) Kimble Drive (3008) French Creek (2009) French Creek (3009) West Vincent (4009)	77 22 2,384 88 27	Barn at Kimberton Brimful Farm Coldstream Crossing CVS Pharmacy Deer Run Lane FC Bus. Park Henry Co. Heritage Corcia Kimberbrae Kimberton Square Kimberton Valley Homes St. Basil Yentis	2 2 141 3 3 25 3 25 3 10 6 1 6	Miatolia Campbell Tract Cornerstone Bank Fitzsimmons French Creek Inn	7 14.0 1.0 1.0 6	Croft Davis / PASD Emery Oil Co. Fish & Game Frog Hollow Miller Rd N. Hares Hill @ Camp Council Intersection of 7 Stars & Rte 113 Rte 113 - Shelly's Stimer Weinstein	3 22 3 0 20 8 2 6 5 45	
FRENCH CREEK PS	**2,578**		**307**		**143**		**139**	**3,167**

Drainage Basin	2004 Yr. End EDUs	Platted EDUs as of 12/2004	5 Yr Proj.	Proposed EDUs	10 Yr. Proj.	Undeveloped Land	20 Yr. Proj.	Total EDUs
Charlestown Rd. (3007)	132					Along Buckwalter Rd.	5	
Pothouse Road (1006)	430	Potters Pond	35			Across from Forestas	5	
POTHOUSE ROAD PS -excludes FC	**562**		**35**		**0**		**10**	607
Sandra Lane (1005)	23	Pickering Glen	1					
Whitehorse Rd. (1004)	363	Schuylkill Elem.	5					
Whitehorse Rd. (3004)	336					PRD 1 by Chas. Hunt	80	
WHITEHORSE RD. PS -excludes FC & PH	**722**		6		**0**		**80**	**808**
Country Club (1007)	325					By VF Woods	6	
Pickering Creek (1003)	944	Buono Tract	4			Inters. @ Maisfield	6	
		Chapel View	5			Bull Tavern (adjacent)	3	
		G.S. Council	4			End of E. Phillip	28	
		Mill Lane	3			End of E. Phillip (Reeves)	30	
		Moorehall @ VF	1			RR.Tracks (@ 2nd Ave.)	36	
		Reeves Property	3					
		Rte 23 Comm.	2					
		Second Ave.	4					
		Sunwood	0					
		WaWa - to Phoenixville	0					
PICKERING CREEK PS – excl. FC, PH & WH	**1,269**		**26**		**0**		**109**	**1,404**
Perkiomen (1002)	426					Rte. 23 Corridor (Jordan Tract)	10	
						N. Side of Pawling Rd.	80	
PERKIOMEN	**426**		**0**		**0**		**90**	**516**
Valley Creek (1001)	54							
Lee Tire Blvd. (3010)	301	Commons @ GV	28	Volpi	60	Behind Spring Oak	15	
		DeVault Meats	34	Griffin	33	Across from Spring Oak	6	
		Late Spring Dev.	10	Cellucci	11	Yellow Spring's Road	7	
		Laurabrooke	20	Warner Lane	12	Rte 29 & Chrlstwn. Rd	35	
		Spring Oak Bus. Center	53	Charlestown Saloon	10	North Side of School Farm Residence	1	
				Charlestown Elementary	13	Adj. To Laurabrooke-Phoenix Pike	25	
				20 Single Family	20	DeVault Meats (add'l)	65	
						Remaining Acreage throughout basin	198	
Route 401		Charlestown Meadows	191					
Sidley Road	248					Adj. To Chas. Oaks	32	
VALLEY CREEK DB	603		336		159		389	1,487

Drainage Basin	2004 Yr. End EDUs		5 Yr Proj.		10 Yr. Proj.		20 Yr. Proj.	Total EDUs
FRENCH CREEK PS	2,578		307		143		139	3,167
POTHOUSE RD PS	562		35		0		10	607
WHITEHORSE RD PS	722		6		0		80	808
PICKERING CR. PS	1,269		26		0		109	1,404
PERKIOMEN P.S.	426		0		0		90	516
VALLEY CREEK	603		336		159		389	1,487
TOTALS	**6,160**		**710**		**302**		**817**	**7,989**

Table 3.2 presents a slower growth than has been experienced in previous years but is considered reasonable based on the current development activity and the reduced creation of new developments. However, should an acceleration of growth be experienced, it is expected that it will be contained within the total number of EDUs identified in Table 3.2. Therefore the flow projections and wet weather analysis consider not only the 10-year EDU growth projection, but also the 20-year / ultimate growth projection, so that the necessary collection / conveyance facilities may be constructed where required as the development occurs.

The ultimate growth projection of 7,989 EDUS is approximately 470 EDUs greater than that projected in the 1997 Member Municipality Plan and in general is attributed to the following:

- The inclusion of the Route 724 area north of Route 23 in the 537 Boundary covering Phoenixville Crossing and Kimberton Meadows *+ 200 EDUS*
- Greater industrial growth within the Lee Tire Drainage Basin *+ 110 EDUs*
- Christopher Crossing & Heritage Coricia *+ 160 EDUs*

The ultimate growth projection presented herein is not expected be exceeded unless one of the Member Municipalities would elect to revise their established sewer service boundary. Should this occur, a Revision to the Act 537 Plan would be required to accommodate such changes.

As presented in Table No. 3.1, the 5-year and 10- year average flow rates are 238 gpd/edu and 253 gpd/edu respectively. Since 1993, the highest average daily flowrate has been 286 gpd/edu experienced in 1996 and 2003. The lowest flowrate, 201 gpd/edu, was experienced in 1995 and 2002. Table 3.3 presents future ultimate average daily flow projections within the Member Municipality Act 537 Plan Drainage basin based on the 10-year average 253 gpd/edu flowrate and the more conservative highest annual average flowrate of 286gpd/edu. These flowrates have been applied to the projected EDUs and then added to the current 2004 average flow.

Table 3.3
Ultimate Flow Projections in Million Gallons per Day (MGD)

Year	Total EDUs	ADF based on 253 gpd/edu	ADF based on 286 gpd/edu
Current - 2004	6,160	1.480	1.480
2009 – 5 year	6,870	1.651	1.683
2014 – 10 year	7,172	1.780	1.769
2024 – 20 year & Ultimate	7,989	1.916	2.003

In either instance, the ultimate flow projection remains within the VFSA member municipality flow allocation of 2.124 MGD, concluding that additional capacity is not required.

SECTION 4
WET WEATHER ANALYSIS OF THE MEMBER MUNICIPALITY COLLECTION SYSTEM

Section 3 of this report projects future average daily flows within the VFSA collection system for the established growth horizons. The evaluation is appropriate to establish the overall capacity required by the Member Municipalities for Wastewater Treatment Capacity. The flow projections however are based on system averages and the overall collection system will experience flow rates much greater and much less that these averages based on a number of factors, primarily diurnal flows and wet weather / high ground water conditions. The collection system (pipe network and pump stations) must be capable of transmitting these higher flows at any time to avoid possible overflows within the system. Therefore, this section evaluates the wet weather capacity of the collection system based on the 10-year and ultimate growth data developed within Section 3.

In 1999, VFSA performed a detailed analysis of the collection system utilizing a computer model of the system. Although the Authority has been evaluating the collection system using a computer model for over 10 years, the installation of telogers has allowed the VFSA to capture detailed flow data of the system at the various pump stations throughout the collection system. Based on the data that was available at that time, a rain event that occurred in 1999 provided good meteromg data to allow a wet weather analysis of the collection system. Based on an analysis of wet weather in the region, the March 1999 rain event appeared to represent a 10-year storm event. This analyzed rain event indicated that the collection system needed to be able to transmit approximately 900 gpd/edu during the storm event.

To support this Plan Validation, the Authority's 2003 and 2004 flow data was analyzed. Based on the rain gage data as well as the peak hourly and peak daily flows that have been experienced in 2003 and 2004, it is apparent that the March 1999 rain event previously studied is more representative of a typical rain event which will be experienced by the VFSA system on a regular basis. Over the past 2 years, 12 rain events were analyzed. The Large Pump Stations chart on the following page depicts the recorded flows at the 4 major pump stations during these 12 rain events. As depicted, Pickering Creek Pump Station experienced 4 rain events during which its discharge rate was approximately 7 MGD for several hours. There are 4 more rain events where Pickering Creek Pump Station discharged at a rate over 5 MGD. The three largest wet weather events where Pickering Creek Pump Station exceeded a pumping rate of 7 MGD were not utilized in the system analysis because:

- Extenuating circumstances impacted one of these excessive rain events. This occurred when French Creek exceeded the rim elevation of an interceptor manhole allowing Creek water to enter the system. The rim elevation of manholes located in and beside Creeks should be reviewed and elevated to avoid this type of occurrence.
- Two of the rain events occurred in hurricane weather conditions which the system could not be expected to handle.

Four flow scenarios were developed for wet weather system analysis utilizing both 10-year and ultimate EDU growth projections. For each event described, the flowrate experienced by Pickering

Creek Pump Station was applied to all four major pump stations (Pickering Creek, Whitehorse Road, Pothouse Road and French Creek) and the two minor pump stations feeding that system(Charlestown Road and Kimble Drive). The flowrates for each scenario are:

- Small rain event experienced in March 1999 – 900 gpd/edu.
- Average rain event based on Pickering Creek Pump Station operating at 5.6 MGD (occurring 7 times in past 2 years) – 1090 gpd/edu
- Large Rain event based on Pickering Creek Pump Station operating at 6.8 MGD (occurring 4 times in past 2 years) – 1314 gpd/edu
- Small rain event with French Creek Pump Station operating at capacity (4.65 MGD).

Perkiomen and Valley Creek pump station were evaluated separately as they do not contribute flows to the Pickering Creek drainage basin and due to location appear to be influenced by other rain events than those affecting the eastern portion of the system. Again, based on a review of the flow data, flowrates were assigned to these pump stations for three types of rain events. The flowrates used are as follows:

Perkiomen Pump Station

- Small rain event (average of data from 2/22/03, 10/29/03, 11/28/04 rain events)– 943 gpd/edu
- Average rain event (average data from 6/20/2003 rain event) – 1200 gpd/edu
- Large rain event (average data from, 9/28/2004 rain event) – 1507 gpd/edu

Valley Creek Pump Station

- Small rain event (average of data from 12/14/03 & 12/17/03 rain events)– 343 gpd/edu
- Average rain event (average of data from 12/11/03 & 11/28/04 rain events) – 537 gpd/edu
- Large rain event – (average data from 9/28/04 rain event - 722 gpd/edu

Note: Valley Creek pump station flowrates are less than other system flows. As noted in Section 2, the Valley Creek pump station pumps were replaced in 2003 with higher head pumps allowing the flow to overcome high head from the Wilson Road pump station. Since the pumps have been replaced, a drastic reduction in flows has been noted. Therefore, all data prior to the pump replacement was excluded from this evaluation.

In all instances, the future EDUs are assumed to not contribute further system inflow, and therefore only a diurnal flow has been projected for these EDUs. Since 1993, the maximum annual system wide average daily flowrate of about 285 gpd/edu occurred twice. This flowrate, peaked 2.5 times, (712.5 gpd/edu) was therefore applied to all future EDUS in these wet weather analyses.

The Tables 4.1, 4.2 and 4.3 summarize the results of this analysis for a small rain event, an average rain event and a large rain event respectively. Exhibits 4.1, 4.2 and 4.3 depict the information presented in these tables. The tables provide a summary of those pipe segments that, according to the sewer model are at capacity now under the described wet weather condition or that will exceed the theoretical capacity under the 10 year and ultimate EDU growth scenarios. Hydraulically a pipeline is flowing full when it reaches 80% of its design capacity and therefore, all segments at greater than 80% capacity are included in the tables. Several points must be made prior to reviewing and discussing the results in these tables.

Insert Pickering 12 rain event flow chart here – see PDF file forwarded with e-mail

- According to the static model, a sewer segment that is over its capacity may experience some surcharging within the manhole; however this does not mean that the manhole is overflowing its rim. A "capacity" condition is established as a pipe flowing full according to the static model.
- The desk top analysis was performed using a static sewer model which cannot evaluate flows as they move through a dynamic network of gravity sewers.
- VFSA staff has inspected the manholes identified to be greater than 100% of their design capacity as indicated by the static model and has observed no signs of surcharging. This confirms the results obtained by the VFSA staff using surcharge indicators over the last few years.
- The model, however, does identify the segments within the system that, as a result of anticipated growth, warrant attention in the context of long-term facilities planning.

Table 4.1
Sewer Segments at or Approaching Capacity During a
SMALL RAIN EVENT - Per Static Model

General Area	Manhole Run	Dia. (inches)	Percent of Capacity
SEGMENTS @ CAPACITY NOW			
None			
SEGMENTS @ CAPACITY WITH 10 YEAR EDU GROWTH			
None			
SEGMENTS @ GREATER THAN 80% CAPCITY WITH 10 YR GROWTH Note: Segments in bold text will be at capacity with ultimate EDU Growth			
Pickering Creek West Interceptor	3.03.317-358	24	91%
	3.03.353-352	24	83%
	3.03.353A-353	24	82%
Pickering Creek East (Dogwood)	3.15.104-103	8	82%
Pothouse Road	2.09.105-104	18	84%
FC Tributary Trunk Sewer	2.04.109-108	12	95%
	2.04.106-105	12	90%
	2.04.110-122	12	81%
	2.04.122-109	12	80%
FC Interceptor	**2.06.102-101**	**8**	**89%**
	2.06.105-104	8	81%
	2.06.108-107	8	80%

Table 4.2
Sewer Segments at or Approaching Capacity During an
AVERAGE RAIN EVENT - Per Static Model

General Area	Manhole Run	Dia. (inches)	Percent of Capacity
SEGMENTS @ CAPACITY NOW			
Pickering Creek West Interceptor	3.03.317-358	24	102%
FC Tributary Trunk Sewer	2.04.109-108	12	110%
	2.04.106-105	12	105%
SEGMENTS @ CAPACITY WITH 10 YEAR EDU GROWTH			
Pothouse Road	2.09.105-104	18	101%
FC Interceptor	2.06.102-101	8	103%
SEGMENTS @ GREATER THAN 80% CAPCITY WITH 10 YR GROWTH Note: Segments in bold text will be at capacity with ultimate EDU Growth			
Pickering Creek West Interceptor	**3.03.353-352**	**24**	**98%**
	3.03.353A-353	**24**	**96%**
	3.03.325-324	24	84%
Pickering Creek East (Dogwood)	**3.15.104-103**	**8**	**99%**
	3.15.107-106	8	90%
	3.15.109-108	8	85%
	3.15.108-107	8	82%
Pickering Creek East (Sunwood)	3.15.112-111	8	93%
	3.15.111-110	8	93%
	3.15.110-109	8	81%
Whitehorse Road West	3.04.446A-446	21	87%
FC Tributary Trunk Sewer	2.04.110-122	12	97%
	2.04.122-109	12	95%
FC Interceptor	**2.06.105-104**	**8**	**94%**
	2.06.108-107	8	93%
	2.06.106-105	8	89%
	2.06.109-108	8	83%

Table 4.3
Sewer Segments at or Approaching Capacity During a
LARGE RAIN EVENT – Per Static Model

General Area	Manhole Run	Dia. (inches)	Percent of Capacity
SEGMENTS @ CAPACITY NOW			
Pickering Creek West Interceptor	3.03.317-358	24	122%
	3.03.353-352	24	112%
	3.03.353A-353	24	110%
Pickering Creek East (Dogwood)	3.15.104-103	8	120%
	3.15.107-106	8	109%
	3.15.109-108	8	103%
Pickering Creek East (Sunwood)	3.15.112-111	8	112%
	3.15.111-110	8	112%
Pothouse Road	2.09.105-104	18	114%
FC Tributary Trunk Sewer	2.04.109-108	12	133%

General Area	Manhole Run	Dia. (inches)	Percent of Capacity
SEGMENTS @ CAPACITY NOW - Continued			
FC Tributary Trunk Sewer	2.04.106-105	12	126%
	2.04.110-122	12	114%
	2.04.122-109	12	112%
SEGMENTS @ CAPACITY WITH 10 YEAR EDU GROWTH			
Pickering Creek West Interceptor	3.03.325-324	24	100%
Whitehorse Road West	3.04.446A-446	21	103%
FC Interceptor	2.06.102-101	8	120%
	2.06.105-104	8	109%
	2.06.108-107	8	108%
	2.06.106-105	8	103%
SEGMENTS @ GREATER THAN 80% CAPCITY WITH 10 YR GROWTH Note: Segments in bold text will be at capacity with ultimate EDU Growth			
Pickering Creek West Interceptor	**3.03.352-346**	**24**	**96%**
	3.03.323-322	**24**	**95%**
	3.03.322-321	**24**	**95%**
	3.03.327-326	**24**	**94%**
	3.03.328-327	**24**	**94%**
	3.03.324-323	24	93%
	3.03.326-325	24	92%
	3.03.360-360A	24	92%
	3.03.359-360	24	89%
	3.03.339-338	24	85%
	3.03.338-337	24	84%
Pickering Creek West	3.03.304-305	10	90%
Pickering Creek East (Dogwood)	**3.15.108-107**	**8**	**99%**
	3.15.110-109	8	98%
	3.15.102-101	8	91%
	3.15.106-105	8	90%
Country Club	3.15.302-301	8	85%
	3.15.303-302	8	85%
Whitehorse Road West	3.04.453-452	21	93%
	3.04.458-457	21	92%
	3.04.459-458	21	92%
	3.04.460-459	21	90%
	3.04.447-446B	21	86%
	3.04.444-443	21	84%
	3.04.446-445	21	83%
FC Tributary Trunk Sewer	2.04.107-106	12	96%
	2.05.101-2.04.110	12	91%
	2.05.123-122	8	81%
	2.05.102-101	12	81%
FC Interceptor	**2.06.109-108**	**8**	**96%**
	2.03.143A-143	**15**	**91%**
	2.06.104-103	8	83%
FC East Basin	**2.01.101-100**	**8**	**88%**
FC Cold Stream Road	2.08.118-102	8	81%

Table 4.4 and accompanying Exhibit 4.4 summarize a fourth flow scenario that was evaluated. In this instance, the system was analyzed based on French Creek pump station operating at capacity during a small rain event. This scenario has occurred on several occasions and identifies some additional interceptor segments where the static model indicates flows may exceed their theoretical design capacity. Again, system inspections of actual field conditions suggest that manhole surcharging **does not** occur.

Table 4.4
Sewer Segments at or Approaching Capacity During a SMALL RAIN EVENT
With French Creek Pump Station Operating @ Capacity
10 Year Growth Scenario – Per Static Model

General Area	Manhole Run	Dia. (inches)	Percent of Capacity
SEGMENTS @ CAPACITY WITH 10 YEAR HDU GROWTH			
Pickering Creek West Interceptor	3.03.317-358	24	135%
	3.03.353-352	24	127%
	3.03.353A-353	24	125%
	3.03.325-324	24	109%
	3.03.352-346	24	105%
	3.03.323-322	24	103%
	3.03.322-321	24	103%
	3.03.327-326	24	102%
	3.03.328-327	24	102%
	3.03.324-323	24	101%
Whitehorse Road West	3.04.446A-446	21	120%
	3.04.453-452	21	110%
	3.04.458-457	21	109%
	3.04.459-458	21	109%
	3.04.460-459	21	107%
Pothouse Road	2.09.105-104	18	149%
SEGMENTS @ GREATER THAN 80% CAPCITY WITH 10 YR GROWTH			
Pickering Creek West Interceptor	3.03.326-325	24	99%
	3.03.360-360A	24	97%
	3.03.359-360	24	94%
	3.03.339-338	24	92%
	3.03.338-337	24	92%
Pickering Creek East (Dogwood)	3.15.104-103	8	82%
Whitehorse Road West	3.04.447-446B	21	100%
	3.04.444-443	21	96%
	3.04.446-445	21	96%
FC Tributary Trunk Sewer	2.04.109-108	12	95%
	2.04.106-105	12	90%
	2.04.110-122	12	81%
	2.04.122-109	12	80%
FC Interceptor	2.06.102-101	8	89%
	2.06.105-104	8	81%
	2.06.108-107	8	80%

No sewer upgrades or expansions are recommended as a result of this analysis. As previously noted, VFSA staff has inspected most of the segments that have been identified as having flows of greater than 100% of their design capacity according to the static model and has found no signs of surcharging. It is therefore recommended that those segments identified as "at capacity now" under all types of wet weather events should either have surcharge indicators placed in the upstream manhole or be inspected during a significant rain event. In addition, monitoring of these segments is recommended as the anticipated growth occurs. Upgrade of the larger diameter interceptor pipes is a costly endeavor and could have significant impact on the surrounding community. Therefore these activities should be planned well in advance. Proper monitoring of the sewer segments of concern as well as reevaluating the sewer system when new developments are constructed will facilitate the planning and implementation process.

Dynamic modeling of the system interceptors could also be accomplished as a part of the monitoring process. The model would calculate the hydraulic grade line depicting the liquid level in the manholes under various rain events. The modeling effort would also require extensive system flow monitoring to validate flows entering the various portions of the interceptor. Because of the significant time, effort and costs required to validate these models, it is recommended that system surcharge indicators and inspections be implemented as the first step in monitoring any areas of concern. If surcharges are noted, dynamic sewer modeling would be performed as the next step to determine the extent of surcharging and the effect of anticipated future growth. The data collected from the surcharge indicators would be used to help calibrate the dynamic sewer model. The modeling would also assist in determining the necessary pipe diameter for any sewer line expansions if any are required.

The affect of system flows (from the various rain events under the 10 year and ultimate growth scenarios) on the major pump station was also evaluated. Table 4.5 summarizes this information. Under average and heavy rain and snow melt events, existing EDUs, all four of the major pump stations have some capacity concerns with 1 pump operating. VFSA data indicates that the lag pump has been required during significant rain events. Per PADEP requirements, a pump station must be adequately sized to be able to pump the expected flows without the operation of the standby (in this case, the lag) pump. As a practical matter, VFSA's current routine practice of assuring that both lead and lag pumps are serviceable 100% of the time should be continued. During major maintenance events, VFSA's practice of renting a back up pump assures that adequate and uninterrupted service is provided to its customers at all times.

Both Pothouse Road and Pickering pump stations are predicted to exceed the overall pump station capacity with two pumps running under the ultimate growth scenario during large rain events. Although this is well beyond the growth horizons that apply to this 537 Plan, these projections should be considered when the applicable pump stations are upgraded and/or modernized. It is recommended that VFSA begin to plan / budget for the upgrade of each of the four major pump stations within the next 10 years. These upgrade recommendations are focused on the system pumps only. Other upgrades / improvements, such as those to improve energy usage, monitoring, and controls could be accomplished simultaneously.

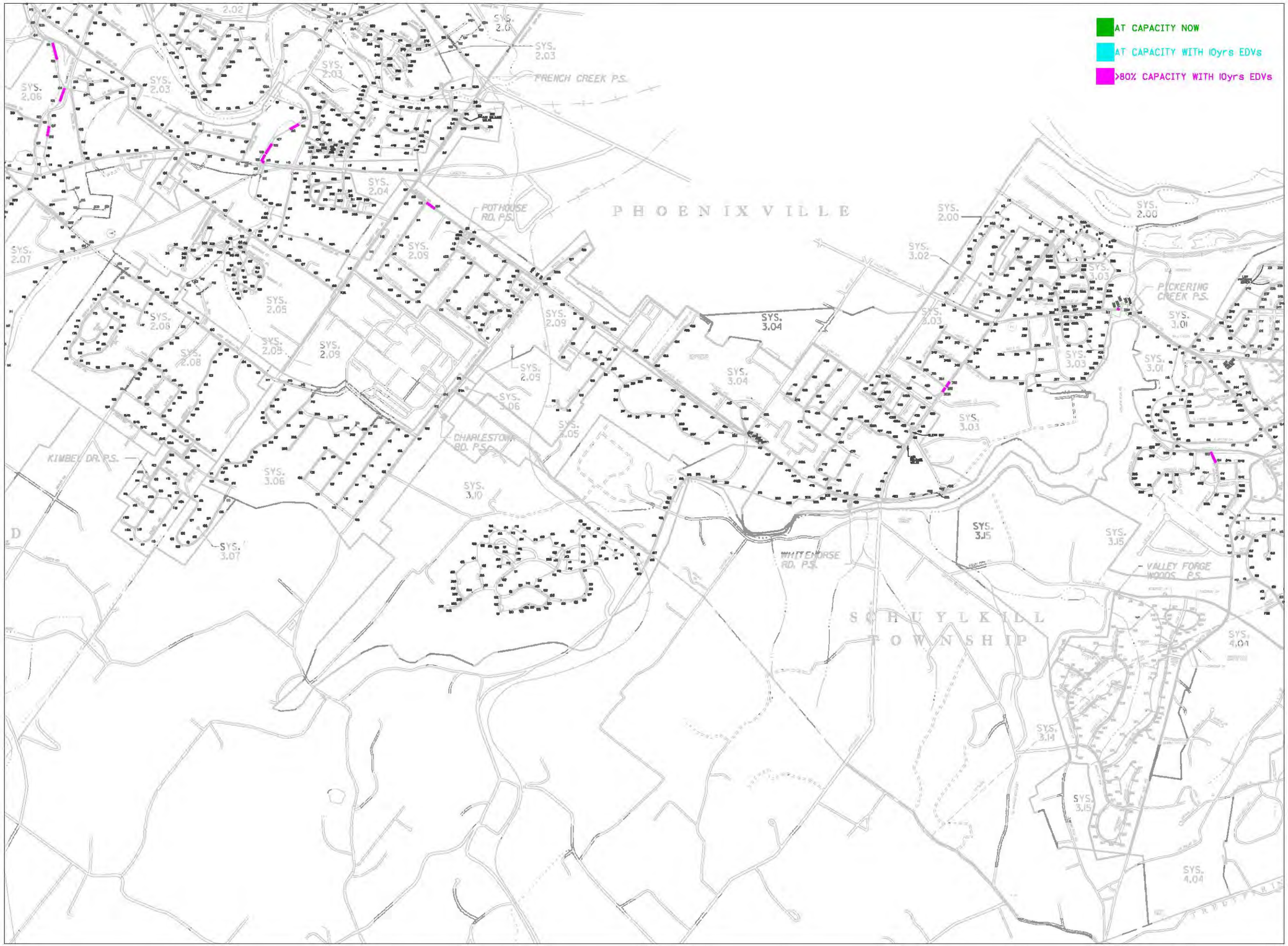
Table 4.5
Pump Stations with Capacity Concerns

	Station Capacity *		Observed Peak Hourly		Flows From Model Runs (MGD)									
			(2003-2004)		Small Rain Event			Average Rain Event			Large Rain Event			FC @ 2-pump on
	1-pump (MGD)	2-pump (MGD)	Flow MGD	Date	Ex. EDU	10-yr	Ultimate	Ex. EDU	10-yr	Ultimate	Ex. EDU	10-yr	Ultimate	Small Rain 10-yr.EDU
French Creek	2.86	4.65	4.43	6/03	2.356	2.580	2.804	2.877	3.082	3.306	3.468	3.673	3.897	4.644
Pothouse Road	3.20	4.39	4.71	9/04	2.845	3.090	3.321	3.470	3.694	3.926	4.183	**4.408**	**4.639**	**5.154**
Whitehorse Rd.	4.08	6.78	6.57	6/03	3.545	3.792	4.081	4.317	4.545	4.834	5.204	5.432	5.721	5.856
Pickering Creek	4.75	7.41	7.41	9/04	4.691	4.953	5.320	5.706	5.947	6.315	6.878	7.120	**7.487**	7.017
Perkiomen	0.86	**	1.02	9/04	0.389	0.389	0.607	0.496	0.496	0.713	0.622	0.622	0.840	n/a
Valley Creek	0.27	**	0.15	6/03	0.023	0.023	0.023	0.035	0.035	0.035	0.048	0.048	0.048	n/a
Kimble Drive	0.15	.017	0.18	2/03	0.089	0.094	0.094	0.108	0.113	0.113	0.130	0.135	0.135	n/a
Charlestown	0.37	0.46	0.44	9/04										n/a
Country Club	0.45				0.292	0.292	0.296	0.353	0.353	0.357	0.426	0.426	0.430	n/a

All station capacity values are from drawdown tests except:

- Pickering Pump Station – Two pump capacity is from measured peak pumping rates during several rain events.
- Country Club, Perkiomen and Valley Creek Pump Stations - capacity based on design curves. Drawdown testing has not been performed

Note: Shaded values indicate those flows in excess of pump station capacity (1 pump operating). Shaded values with bold text indicate those flows that are in excess of the pump station 2-pump operating flow rates.



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VALLEY FORGE SEWER AUTHORITY

MEMBER MUNICIPALITY
COLLECTION SYSTEM

ACT 537 PLAN VALIDATION

NO.	REVISION	BY	DATE

PROJECT NO.:
CAD FILE:
ENGR./ARCH.:
DESIGN BY:
DRAWN BY:
CHECKED BY:
DATE: 11/05

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SHEET TITLE

CAPACITY ISSUES

SMALL RAIN EVENT

EXHIBIT NO.
4.1

SHEET 1 OF 4

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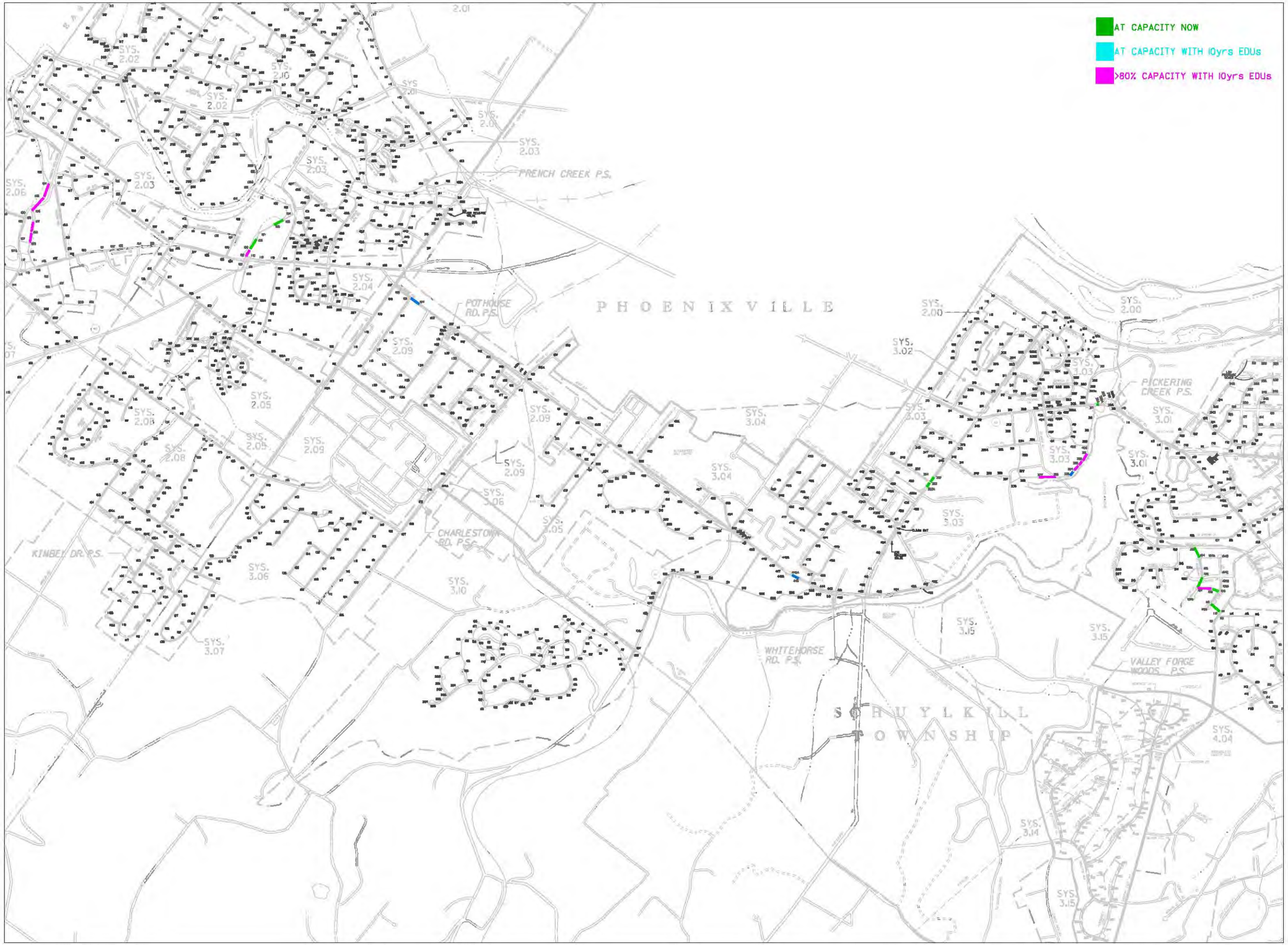

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MEMBER MUNICIPALITY
COLLECTION SYSTEM

ACT 537 PLAN VALIDATION

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CAPACITY ISSUES

AVERAGE RAIN EVENT

EXHIBIT NO.
4.2

SHEET 2 OF 4

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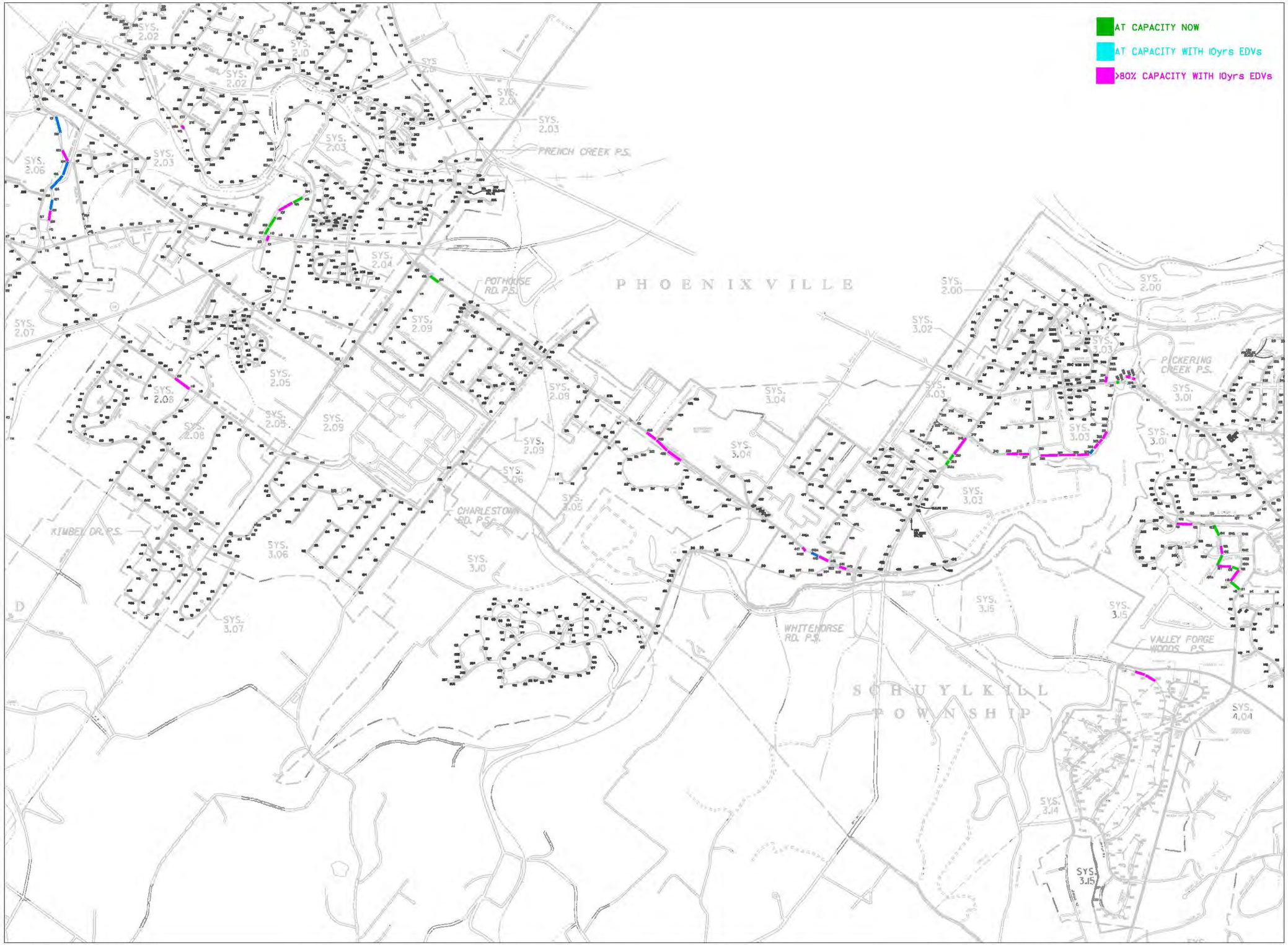

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VALLEY FORGE SEWER AUTHORITY

MEMBER MUNICIPALITY
COLLECTION SYSTEM

ACT 537 PLAN VALIDATION

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CAPACITY ISSUES

LARGE RAIN EVENT

EXHIBIT NO.
4.3

SHEET 3 OF 4

10/20/2006
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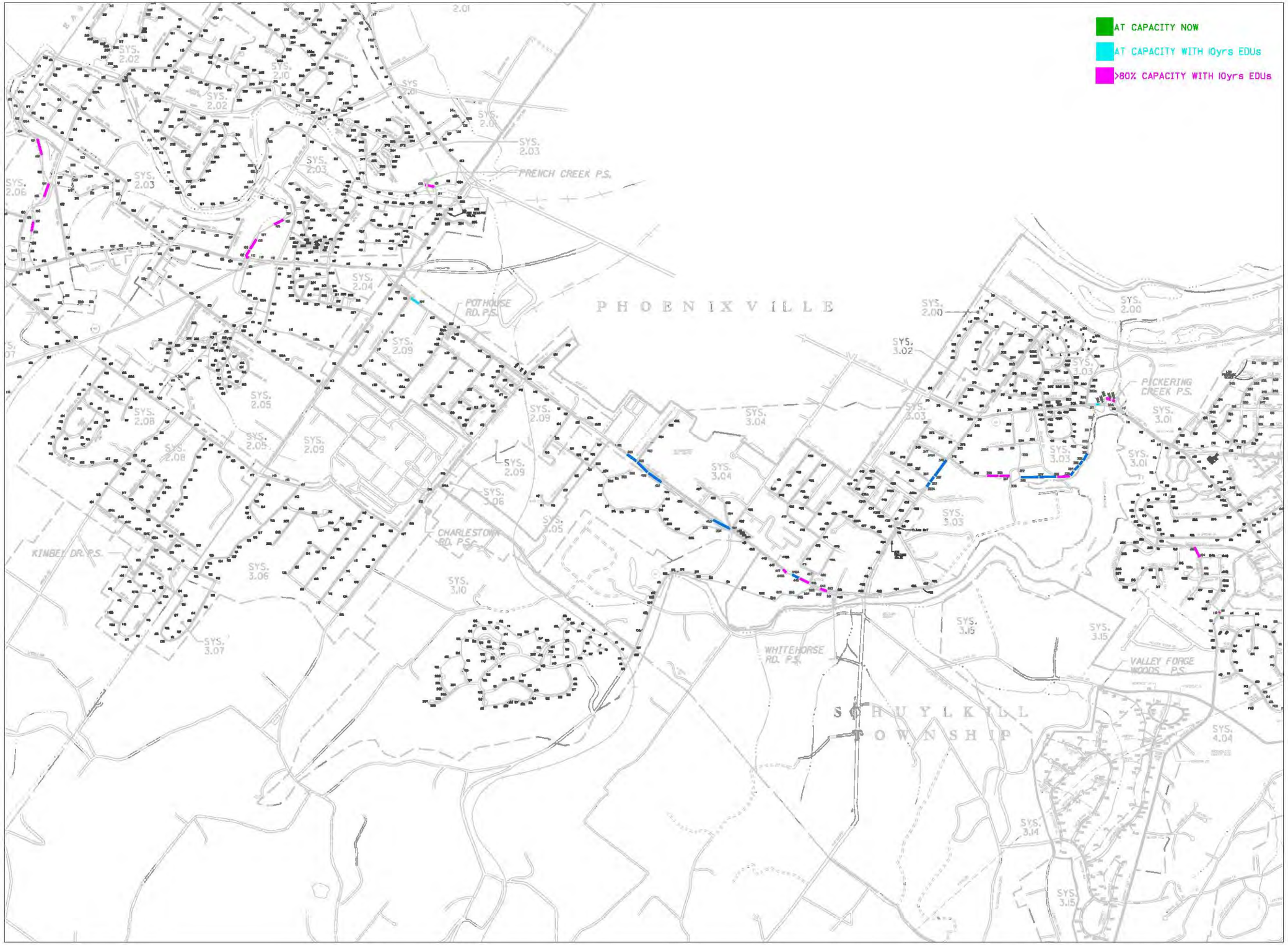

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VALLEY FORGE SEWER AUTHORITY

MEMBER MUNICIPALITY
COLLECTION SYSTEM

ACT 537 PLAN VALIDATION

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CAPACITY ISSUES

SMALL RAIN EVENT AND FRENCH CREEK PUMP STATION AT CAPACITY

EXHIBIT NO.
4.4

SHEET 4 OF 4

10/20/2006
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APPENDIX D

Preliminary Effluent Criteria

Pennsylvania Department of Environmental Protection

2 East Main Street
Norristown, PA 19401

July 25, 2006

Southeast Regional Office

Phone: 484-250-5970
Fax: 484-250-5971

Mr. Edward L. Woyden
Gannett Fleming, Inc.
P.O. Box 80794
Valley Forge, PA 19484-0794

Re: Preliminary Treatment Requirements
Valley Forge Sewer Authority
Schuylkill Township
Chester County

Dear Mr. Woyden:

This is in reply to your May 12, 2006, request for Preliminary Treatment Requirements for a discharge of expanded flow of 11.3 MGD from 9.2 MGD to the Schuylkill River, with a proposed expansion of the treatment plant on 333 Pawling Road, Phoenixville, PA.

NPDES Permit PA0043974 was issued on July 19, 2004, for the flow of 9.2 MGD. Effluent limits were calculated based on "the Schuylkill River Reallocation Study" for POTWs in the reach from Black Rock Dam to Norristown Dam stream segment of the Schuylkill River.

A summary of the Department of Environmental Protection's (Department) preliminary treatment requirements for flow of 11.3 MGD are as follows:

$CBOD_5$ (05/01-10/31) = 19.3 mg/l
$CBOD_5$ (11/01-04/30) = 25 mg/l
TSS = 30 mg/l
NH_3-N (05/01-10/31) = 7.7 mg/l
NH_3-N (11/01-04/30) = 16.0 mg/l
DO – 5 mg/l, minimum
Fecal Coliform = 200/100 ml geometric mean
Total Residual Chlorine = 0.5 mg/l

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ENGINEERS & PLANNERS

Note: All limits above are monthly average limits, unless otherwise noted.

Please note that these limits are preliminary in a nature and are subject to review based on a detailed review of the information provided in a formal application for an NPDES permit.

If you have any questions, please call Mr. Ketan Thakor at 484-250-5193. You may also wish to contact the Sewage Planning Specialist for information on Act 537 sewage facilities planning requirements for this project.

Sincerely,

Sohan L. Garg

Sohan L. Garg, P.E.
Chief, Permits Section
Water Management

cc: Schuylkill Township
Planning Section
Re 30 (GJE06)139-15

Gannett Fleming

GANNETT FLEMING, INC.
P.O. Box 80794
Valley Forge, PA 19484-0794
Location:
Valley Forge Corporate Center
1010 Adams Avenue
Audubon, PA 19403-2402
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www.gannettfleming.com

May 12, 2006

Sohan Garg P.E., Chief
Water Management Permits Section
Department of Environmental Protection
Southeast Regional Office
2 East Main Street
Norristown, PA 19401

RECEIVED
MAY 16 2006

RE: Valley Forge Sewer Authority
Wastewater Treatment Plant – Act 537
Preliminary Discharge Criteria

Dear Sohan:

The Valley Forge Sewer Authority has been in the process of preparing a regional Act 537 Plan. The Plan is nearing completion and submission to the PADEP. One of the short listed options being investigated is expansion of the existing facility. Based on the projected flows, we anticipate that the plant will have to be expanded to increase the capacity from 9.2 MGD to approximately 11.3 MGD (AADF). This corresponds to the AADF capacity projected to be needed in approximately 20 years. The plant's hydraulic capacity is currently 10.4 MGD.

We are writing this letter to request preliminary discharge criteria for the expanded plant. The outfall discharges to the Schuylkill River at Latitude 40°07'05" and Longitude 75°27'56". We have attached a portion of the Valley Forge USGS quadrangle with the outfall location indicated.

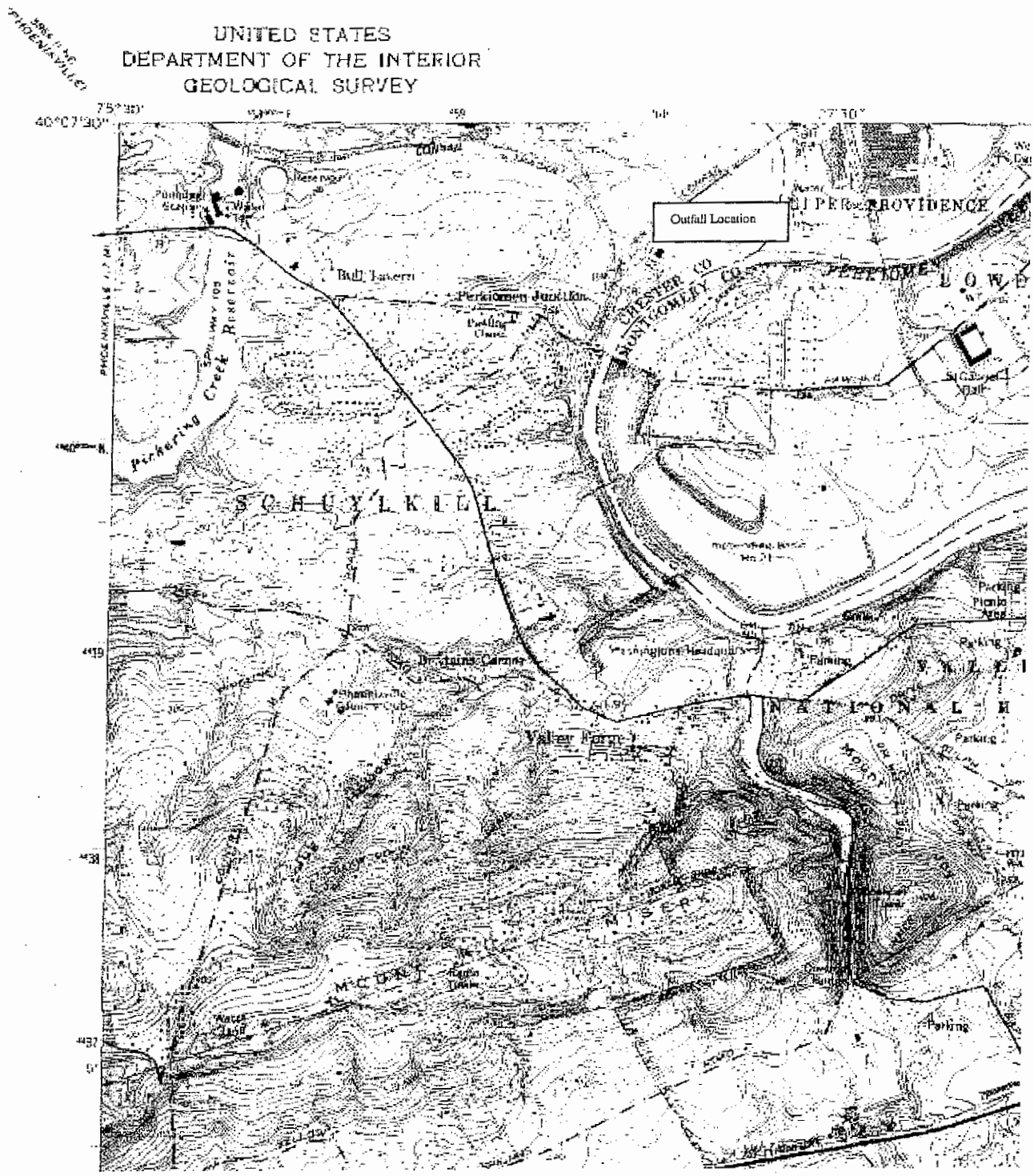
If you have any questions or require any additional information, please contact me.

Very truly yours,

GANNETT FLEMING, INC.

Edward L. Woyden

ELW:PLK
C: M. Goldberg - VFSA



Valley Forge USGS quadrangle

APPENDIX E

Detailed Cost Breakdown of Alternatives

Item	Estimated Construction Cost	Estimated Associated Project Cost 25%	Estimated Total Project Cost
Site Work Allowance	$ 559,000	$ 139,750	$ 698,750
Yard Piping Allowance	$ 955,200	$ 238,800	$ 1,194,000
Improved Recycle Stream Handling	$ 183,100	$ 45,775	$ 228,875
Upgrade Operations Building			
Lunch Room	$ 29,238	$ 7,309	$ 36,547
Restroom/Showers	$ 26,145	$ 6,536	$ 32,682
Control Room	$ 21,077	$ 5,269	$ 26,347
Upgrade Maintenance Shop	$ 74,052	$ 18,513	$ 92,565
Upgrade Lighting	$ 92,565	$ 23,141	$ 115,706
Upgrade HVAC	$ 462,825	$ 115,706	$ 578,531
Painting	$ 15,428	$ 3,857	$ 19,284
Door Replacement	$ 20,828	$ 5,207	$ 26,034
Subtotal:	$ 742,158	$ 185,539	$ 927,697
Chlorine Building Renovations	$ 66,000	$ 16,500	$ 82,500
Plant Automation	$536,200	$ 134,050	$ 670,250
Utility Water System	$ 259,500	$ 64,875	$ 324,375
Total:	**$ 3,301,158**	**$ 825,289**	**$ 4,126,447**

k:\proj\7529761\cost estimates\Additional 537 Cost Est. May 2006

OPINION OF PROBABLE CONSTRUCTION COST

Client: VFSA
Location: VALLEY FORGE, PENNA.
Subject: SITE WORK ALLOWANCE - 537

Estimate No.: **75297 61**
Estimator: EGW
Checker: LAL

27-Oct-06

Burdens:
State Sales Tax: 6.0%
Labor Burden (Payroll Taxes & Insur.): 55%

05/01/06

Approx. cost = $559,000

DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE MATERIAL	TOT. EST. MATERIAL	UNIT PRICE LABOR	TOT. EST. LABOR	UNIT PRICE EQUIPMENT	TOT. EST. EQUIPMENT	UNIT PRICE SUBCONT.	SUBCONT.	TOTAL W/ BURDENS
Site Work Allowance				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
stormwater system	1	ls		$0		$0		$0	35,000.00	$35,000	$53,996
				$0		$0		$0		$0	$0
erosion and control	1	ls		$0		$0		$0	8,000.00	$8,000	$12,342
				$0		$0		$0		$0	$0
earthwork				$0		$0		$0		$0	$0
excavation	25000	cy		$0	2.62	$65,500	4.60	$115,000		$0	$334,044
backfill	12000	cy		$0	1.00	$12,000	1.00	$12,000		$0	$47,208
				$0		$0		$0		$0	$0
finish grading and seeding	10000	sy	0.36	$3,600	1.39	$13,900	0.23	$2,300		$0	$42,674
				$0		$0		$0		$0	$0
pavement	700	sy		$0		$0		$0	30.00	$21,000	$32,398
				$0		$0		$0		$0	$0
fencing	600	lf	31.00	$18,600	3.66	$2,196	0.75	$450		$0	$36,362
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				==========		==========		==========		==========	==========
				$22,200		$93,596		$129,750		$64,000	$559,024
Mean's Local Cost Adjustment			0.00%	$0	0.00%	$0	0.00%	$0		n/a	
				==========		==========		==========		==========	
				$22,200		$93,596		$129,750		$64,000	
Taxes & Insurance				$1,332		$51,478		n/a		n/a	
				==========		==========		==========		==========	
				$23,532		$145,074		$129,750		$64,000	

ESTIMATE SUMMARY:

MATERIAL:		$23,532
LABOR:		$145,074
EQUIPMENT:		$129,750
SUBCONTRACTS:		$64,000
		==========
ADD-ONS:		$362,356
GEN. CONDITIONS & OVERHEAD:	10%	$36,236
		==========
		$398,591
PROFIT:	10%	$39,859
		==========
		$438,451
BONDING & INSURANCE:	2%	$8,769
		==========
		$447,220
CONTINGENCY:	25%	$111,805
		==========
		$559,024
INFLATION - ONE YEAR:	0%	$0
		==========
		$559,024
OPINION OF PROBABLE CONSTRUCTION COST		**$559,000**

OPINION OF PROBABLE CONSTRUCTION COST

Client: VFSA
Location: VALLEY FORGE, PENNA.
Subject: YARD PIPING ALLOWANCE - 537

Estimate No.: **75297 61**
Estimator: EGW
Checker: LAL

27-Oct-06

Burdens:
State Sales Tax: 6.0%
Labor Burden (Payroll Taxes & Insur.): 55%

05/01/06

Approx. cost = $955,200

DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE MATERIAL	TOT. EST. MATERIAL	UNIT PRICE LABOR	TOT. EST. LABOR	UNIT PRICE EQUIPMENT	TOT. EST. EQUIPMENT	UNIT PRICE SUBCONT.	SUBCONT.	TOTAL W/ BURDENS
				$0		$0		$0		$0	$0
Yard Piping Allowance				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
36" PCCP	2000	lf	85.00	$170,000	18.00	$36,000	10.00	$20,000		$0	$394,944
excavation/backfill	2000	lf		$0		$0		$0	40.00	$80,000	$123,420
fittings	1	ls		$0		$0		$0	100,000.00	$100,000	$154,275
				$0		$0		$0		$0	$0
14" DIP	500	lf	37.00	$18,500	14.00	$7,000	5.50	$2,750		$0	$51,235
excavation/backfill	500	lf		$0		$0		$0	35.00	$17,500	$26,998
fittings	1	ls		$0		$0		$0	2,500.00	$2,500	$3,857
				$0		$0		$0		$0	$0
12" DIP	500	lf	29.00	$14,500	13.00	$6,500	5.00	$2,500		$0	$43,112
excavation/backfill	500	lf		$0		$0		$0	35.00	$17,500	$26,998
fittings	1	ls		$0		$0		$0	2,500.00	$2,500	$3,857
				$0		$0		$0		$0	$0
10" DIP	500	lf	24.00	$12,000	12.00	$6,000	5.00	$2,500		$0	$37,828
excavation/backfill	500	lf		$0		$0		$0	35.00	$17,500	$26,998
fittings	1	ls		$0		$0		$0	2,500.00	$2,500	$3,857
				$0		$0		$0		$0	$0
6" DIP	500	lf	16.00	$8,000	9.00	$4,500	4.00	$2,000		$0	$26,929
excavation/backfill	500	lf		$0		$0		$0	35.00	$17,500	$26,998
fittings	1	ls		$0		$0		$0	2,500.00	$2,500	$3,857
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				==========		==========		==========		==========	==========
				$223,000		$60,000		$29,750		$260,000	$955,163
Mean's Local Cost Adjustment			0.00%	$0	0.00%	$0	0.00%	$0		n/a	
				==========		==========		==========		==========	
				$223,000		$60,000		$29,750		$260,000	
Taxes & Insurance				$13,380		$33,000		n/a		n/a	
				==========		==========		==========		==========	
				$236,380		$93,000		$29,750		$260,000	

ESTIMATE SUMMARY:

MATERIAL:		$236,380
LABOR:		$93,000
EQUIPMENT:		$29,750
SUBCONTRACTS:		$260,000
		==========
ADD-ONS:		$619,130
GEN. CONDITIONS & OVERHEAD:	10%	$61,913
		==========
		$681,043
PROFIT:	10%	$68,104
		==========
		$749,147
BONDING & INSURANCE:	2%	$14,983
		==========
		$764,130
CONTINGENCY:	25%	$191,033
		==========
		$955,163
INFLATION - ONE YEAR:	0%	$0
		==========
		$955,163
OPINION OF PROBABLE CONSTRUCTION COST		**$955,200**

OPINION OF PROBABLE CONSTRUCTION COST

Client: VFSA
Location: VALLEY FORGE, PENNA.
Subject: IMPROVE RECYCLE STREAM HANDLING - 537

Estimate No.: **75297 61**
Estimator: EGW
Checker: LAL

27-Oct-06

Burdens:
State Sales Tax: 6.0%
Labor Burden (Payroll Taxes & Insur.): 55%

05/01/06

Approx. cost = $183,100

DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE MATERIAL	TOT. EST. MATERIAL	UNIT PRICE LABOR	TOT. EST. LABOR	UNIT PRICE EQUIPMENT	TOT. EST. EQUIPMENT	UNIT PRICE SUBCONT.	SUBCONT.	TOTAL W/ BURDENS
Mixing System				$0		$0		$0		$0	$0
pumps	1	ls		$0		$0		$0	40,000.00	$40,000	$61,710
nozzles and piping	1	ls		$0		$0		$0	23,000.00	$23,000	$35,483
electrical	1	ls		$0		$0		$0	9,000.00	$9,000	$13,885
				$0		$0		$0		$0	$0
Rehab Tank				$0		$0		$0		$0	$0
clean tank	1	ls		$0		$0		$0	4,000.00	$4,000	$6,171
hatches 4' x 4'	2	ea	1,025.00	$2,050	213.00	$426		$0		$0	$4,371
ladders	24	vlf	92.00	$2,208	26.00	$624	1.79	$43		$0	$5,169
coating inside of tank no 1	3900	sf		$0		$0		$0	3.00	$11,700	$18,050
remove concrete slab	1100	sf		$0	1.82	$2,002	0.20	$220		$0	$5,127
disposal	1	ls		$0		$0		$0	500.00	$500	$771
new concrete slab	30	cy		$0		$0		$0	700.00	$21,000	$32,398
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				==========		==========		==========		==========	==========
				$4,258		$3,052		$263		$109,200	$183,135
Mean's Local Cost Adjustment			0.00%	$0	0.00%	$0	0.00%	$0		n/a	
				==========		==========		==========		==========	
				$4,258		$3,052		$263		$109,200	
Taxes & Insurance				$255		$1,679		n/a		n/a	
				==========		==========		==========		==========	
				$4,513		$4,731		$263		$109,200	

ESTIMATE SUMMARY:

MATERIAL:		$4,513
LABOR:		$4,731
EQUIPMENT:		$263
SUBCONTRACTS:		$109,200
		==========
ADD-ONS:		$118,707
GEN. CONDITIONS & OVERHEAD:	10%	$11,871
		==========
		$130,578
PROFIT:	10%	$13,058
		==========
		$143,636
BONDING & INSURANCE:	2%	$2,873
		==========
		$146,508
CONTINGENCY:	25%	$36,627
		==========
		$183,135
INFLATION - ONE YEAR:	0%	$0
		==========
		$183,135
OPINION OF PROBABLE CONSTRUCTION COST		**$183,100**

OPINION OF PROBABLE CONSTRUCTION COST

Client: VFSA
Location: VALLEY FORGE, PENNA.
Subject: UPGRADE OPERATIONS BUILDING - 537

Estimate No.: **75297 61**
Estimator: EGW
Checker: LAL

27-Oct-06

Burdens:
State Sales Tax: 6.0%
Labor Burden (Payroll Taxes & Insur.): 55%

05/01/06

Approx. cost = $742,200

DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE MATERIAL	TOT. EST. MATERIAL	UNIT PRICE LABOR	TOT. EST. LABOR	UNIT PRICE EQUIPMENT	TOT. EST. EQUIPMENT	UNIT PRICE SUBCONT.	SUBCONT.	TOTAL W/ BURDENS	
Lunch Room				$0		$0		$0		$0	$0	$29,238
demolition	2	days		$0	1,112.00	$2,224		$0		$0	$5,318	
disposal	1	ls		$0		$0		$0	250.00	$250	$386	
				$0		$0		$0		$0	$0	
new ceiling	490	sf	2.20	$1,078	1.03	$505		$0		$0	$2,970	
new floor - tile	490	sf	1.50	$735	0.55	$270		$0		$0	$1,846	
paint walls	850	sf	0.09	$77	0.29	$247		$0		$0	$715	
cabinets	20	lf	250.00	$5,000	23.00	$460		$0		$0	$9,277	
sink	1	ea	480.00	$480	128.00	$128		$0		$0	$1,091	
plumbing	1	ls		$0		$0		$0	1,000.00	$1,000	$1,543	
tables	4	ea	250.00	$1,000		$0		$0		$0	$1,635	
chairs	16	ea	45.00	$720		$0		$0		$0	$1,177	
oven	1	ea	450.00	$450	75.00	$75		$0		$0	$915	
refrigerator	1	ea	1,000.00	$1,000	25.00	$25		$0		$0	$1,695	
microwave	1	ea	300.00	$300	75.00	$75		$0		$0	$670	
				$0		$0		$0		$0	$0	
Restroom/Showers				$0		$0		$0		$0	$0	$26,145
demolition	2	days		$0	1,112.00	$2,224		$0		$0	$5,318	
disposal				$0		$0		$0	250.00	$0	$0	
				$0		$0		$0		$0	$0	
redo restroom	450	sf		$0		$0		$0	30.00	$13,500	$20,827	
2 toilets				$0		$0		$0		$0	$0	
2 urnials				$0		$0		$0		$0	$0	
2 sinks				$0		$0		$0		$0	$0	
shower				$0		$0		$0		$0	$0	
18 lockers				$0		$0		$0		$0	$0	
bench				$0		$0		$0		$0	$0	
				$0		$0		$0		$0	$0	
Control Room				$0		$0		$0		$0	$0	$21,077
demolition	1	day		$0	1,112.00	$1,112		$0		$0	$2,659	
disposal				$0		$0		$0	250.00	$0	$0	
				$0		$0		$0		$0	$0	
lab bench	15	lf	300.00	$4,500	30.00	$450		$0		$0	$8,435	
chairs	3	ea	200.00	$600		$0		$0		$0	$981	
desks	3	ea	850.00	$2,550		$0		$0		$0	$4,170	
new floor - tile	970	sf	1.50	$1,455	0.55	$534		$0		$0	$3,655	
paint walls	1400	sf	0.09	$126	0.29	$406		$0		$0	$1,177	
				$0		$0		$0		$0	$0	
				$0		$0		$0		$0	$0	
Upgrade Maintenance Shop	3200	sf		$0		$0		$0	15.00	$48,000	$74,052	$74,052
				$0		$0		$0		$0	$0	
Upgrade Lighting	30000	sf		$0		$0		$0	2.00	$60,000	$92,565	$92,565
				$0		$0		$0		$0	$0	
Upgrade HVAC	30000	sf		$0		$0		$0	10.00	$300,000	$462,825	$462,825
				$0		$0		$0		$0	$0	
Painting	1	ls		$0		$0		$0	10,000.00	$10,000	$15,428	$15,428
				$0		$0		$0		$0	$0	

Door Replacement				$0		$0		$0		$0	$0	$20,828
				$0		$0		$0		$0	$0	
mandoors	3	ea	1,000.00	$3,000	185.00	$555		$0		$0	$6,233	
				$0		$0		$0		$0	$0	
garage doors - 12' wide	2	ea	3,000.00	$6,000	1,000.00	$2,000		$0		$0	$14,594	
				$0		$0		$0		$0	$0	
				$0		$0		$0		$0	$0	
				==========		==========		==========		==========	==========	
				$29,071		$11,288		$0		$432,750	$742,158	$742,158
Mean's Local Cost Adjustment			0.00%	$0	0.00%	$0	0.00%	$0		n/a		
				==========		==========		==========		==========		
				$29,071		$11,288		$0		$432,750		
Taxes & Insurance				$1,744		$6,209		n/a		n/a		
				==========		==========		==========		==========		
				$30,815		$17,497		$0		$432,750		

ESTIMATE SUMMARY:

MATERIAL:		$30,815
LABOR:		$17,497
EQUIPMENT:		$0
SUBCONTRACTS:		$432,750
		==========
ADD-ONS:		$481,061
GEN. CONDITIONS & OVERHEAD:	10%	$48,106
		==========
		$529,168
PROFIT:	10%	$52,917
		==========
		$582,084
BONDING & INSURANCE:	2%	$11,642
		==========
		$593,726
CONTINGENCY:	25%	$148,432
		==========
		$742,158
INFLATION - ONE YEAR:	0%	$0
		==========
		$742,158
OPINION OF PROBABLE CONSTRUCTION COST		**$742,200**

OPINION OF PROBABLE CONSTRUCTION COST

Client: VFSA Estimate No.: **75297 61** **27-Oct-06**
Location: VALLEY FORGE, PENNA. Estimator: EGW
Subject: DAY BIN FOR BIOSOLIDS STAGING AND TRUCK LOADING Checker: LAL

Burdens:
State Sales Tax: 6.0% 04/05/06 **Approx. cost = $820,000**
Labor Burden (Payroll Taxes & Insur.): 55%

DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE MATERIAL	TOT. EST. MATERIAL	UNIT PRICE LABOR	TOT. EST. LABOR	UNIT PRICE EQUIPMENT	TOT. EST. EQUIPMENT	UNIT PRICE SUBCONT.	SUBCONT.	TOTAL W/ BURDENS
				$0		$0		$0		$0	$0
Day bin	1	ls	300,000.00	$300,000	70,000.00	$70,000	30,000.00	$30,000		$0	$704,265
				$0		$0		$0		$0	$0
Electrical	1	ls		$0		$0		$0	75,000.00	$75,000	$115,706
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				==========		==========		==========		==========	==========
				$300,000		$70,000		$30,000		$75,000	$819,972
Mean's Local Cost Adjustment			0.00%	$0	0.00%	$0	0.00%	$0		n/a	
				==========		==========		==========		==========	
				$300,000		$70,000		$30,000		$75,000	
Taxes & Insurance				$18,000		$38,500		n/a		n/a	
				==========		==========		==========		==========	
				$318,000		$108,500		$30,000		$75,000	

ESTIMATE SUMMARY:

MATERIAL:		$318,000
LABOR:		$108,500
EQUIPMENT:		$30,000
SUBCONTRACTS:		$75,000
		==========
ADD-ONS:		$531,500
GEN. CONDITIONS & OVERHEAD:	10%	$53,150
		==========
		$584,650
PROFIT:	10%	$58,465
		==========
		$643,115
BONDING & INSURANCE:	2%	$12,862
		==========
		$655,977
CONTINGENCY:	25%	$163,994
		==========
		$819,972
INFLATION - ONE YEAR:	0%	$0
		==========
		$819,972
OPINION OF PROBABLE CONSTRUCTION COST		**$820,000**

OPINION OF PROBABLE CONSTRUCTION COST

Client: VFSA Estimate No.: **75297 61** **27-Oct-06**
Location: VALLEY FORGE, PENNA. Estimator: EGW
Subject: CONTROL BUILDING ODOR CONTROL SYSTEM REPLACEMEI Checker: LAL

Burdens:
State Sales Tax: 6.0% 05/01/06 **Approx. cost = $1,723,400**
Labor Burden (Payroll Taxes & Insur.): 55%

DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE MATERIAL	TOT. EST. MATERIAL	UNIT PRICE LABOR	TOT. EST. LABOR	UNIT PRICE EQUIPMENT	TOT. EST. EQUIPMENT	UNIT PRICE SUBCONT.	SUBCONT.	TOTAL W/ BURDENS
				$0		$0		$0		$0	$0
blowers and accessories	1	ls	500,000.00	$500,000	50,000.00	$50,000		$0		$0	$937,221
diffusers	1	ls	80,000.00	$80,000	16,000.00	$16,000		$0		$0	$169,085
air mains	1	ls		$0		$0		$0	125,000.00	$125,000	$192,844
				$0		$0		$0		$0	$0
building - 30' x 40'	1200	sf		$0		$0		$0	125.00	$150,000	$231,413
				$0		$0		$0		$0	$0
electrical	1	ls		$0		$0		$0	125,000.00	$125,000	$192,844
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				==========		==========		==========		==========	==========
				$580,000		$66,000		$0		$400,000	$1,723,406
Mean's Local Cost Adjustment			0.00%	$0	0.00%	$0	0.00%	$0		n/a	
				==========		==========		==========		==========	
				$580,000		$66,000		$0		$400,000	
Taxes & Insurance				$34,800		$36,300		n/a		n/a	
				==========		==========		==========		==========	
				$614,800		$102,300		$0		$400,000	

ESTIMATE SUMMARY:

MATERIAL:		$614,800
LABOR:		$102,300
EQUIPMENT:		$0
SUBCONTRACTS:		$400,000
		==========
ADD-ONS:		$1,117,100
GEN. CONDITIONS & OVERHEAD:	10%	$111,710
		==========
		$1,228,810
PROFIT:	10%	$122,881
		==========
		$1,351,691
BONDING & INSURANCE:	2%	$27,034
		==========
		$1,378,725
CONTINGENCY:	25%	$344,681
		==========
		$1,723,406
INFLATION - ONE YEAR:	0%	$0
		==========
		$1,723,406
OPINION OF PROBABLE CONSTRUCTION COST		**$1,723,400**

OPINION OF PROBABLE CONSTRUCTION COST

Client: VFSA
Location: VALLEY FORGE, PENNA.
Subject: RENOVATIONS - CHLORINE BUILDING - 537

Estimate No.: **75297 61**
Estimator: EGW
Checker: LAL

27-Oct-06

Burdens:
State Sales Tax: 6.0%
Labor Burden (Payroll Taxes & Insur.): 55%

05/01/06

Approx. cost = $66,000

DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE MATERIAL	TOT. EST. MATERIAL	UNIT PRICE LABOR	TOT. EST. LABOR	UNIT PRICE EQUIPMENT	TOT. EST. EQUIPMENT	UNIT PRICE SUBCONT.	SUBCONT.	TOTAL W/ BURDENS
				$0		$0		$0		$0	$0
demolition	5	days		$0	800.00	$4,000	456.00	$2,280		$0	$13,083
disposal	1	ls		$0		$0		$0	500.00	$500	$771
				$0		$0		$0		$0	$0
install liquid chlorine				$0		$0		$0		$0	$0
tank - 1200 gallon	1	ls	800.00	$800	250.00	$250	200.00	$200		$0	$2,215
pumps	2	ea	2,000.00	$4,000	200.00	$400	75.00	$150		$0	$7,729
piping and valves	1	ls	750.00	$750	500.00	$500		$0		$0	$2,422
				$0		$0		$0		$0	$0
electrical	1	ls		$0		$0		$0	10,000.00	$10,000	$15,428
				$0		$0		$0		$0	$0
yard piping - replace existing pipe				$0		$0		$0		$0	$0
PVC - pipe	400	lf	2.00	$800	1.50	$600		$0		$0	$2,743
trenching/backfill	400	lf		$0		$0		$0	35.00	$14,000	$21,599
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				==========		==========		==========		==========	==========
				$6,350		$5,750		$2,630		$24,500	$65,989
Mean's Local Cost Adjustment			0.00%	$0	0.00%	$0	0.00%	$0		n/a	
				==========		==========		==========		==========	
				$6,350		$5,750		$2,630		$24,500	
Taxes & Insurance				$381		$3,163		n/a		n/a	
				==========		==========		==========		==========	
				$6,731		$8,913		$2,630		$24,500	

ESTIMATE SUMMARY:

MATERIAL:		$6,731
LABOR:		$8,913
EQUIPMENT:		$2,630
SUBCONTRACTS:		$24,500
		==========
ADD-ONS:		$42,774
GEN. CONDITIONS & OVERHEAD:	10%	$4,277
		==========
		$47,051
PROFIT:	10%	$4,705
		==========
		$51,756
BONDING & INSURANCE:	2%	$1,035
		==========
		$52,791
CONTINGENCY:	25%	$13,198
		==========
		$65,989
INFLATION - ONE YEAR:	0%	$0
		==========
		$65,989
OPINION OF PROBABLE CONSTRUCTION COST		**$66,000**

OPINION OF PROBABLE CONSTRUCTION COST

Client: VFSA | Estimate No.: **75297 61** | **27-Oct-06**
Location: VALLEY FORGE, PENNA. | Estimator: EGW
Subject: PLANT AUTOMATION - 537 | Checker: LAL

Burdens:
State Sales Tax: 6.0% | 05/01/06 | **Approx. cost = $536,200**
Labor Burden (Payroll Taxes & Insur.): 55%

DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE MATERIAL	TOT. EST. MATERIAL	UNIT PRICE LABOR	TOT. EST. LABOR	UNIT PRICE EQUIPMENT	TOT. EST. EQUIPMENT	UNIT PRICE SUBCONT.	SUBCONT.	TOTAL W/ BURDENS
PLC Hardware											
Controllogix Processor 4 M Memory	1	ea	4,300.00	$4,300		$0		$0		$0	$7,594
Ethernet Module	1	ea	1,050.00	$1,050		$0		$0		$0	$1,854
Controlnet Bridge Module	2	ea	800.00	$1,600		$0		$0		$0	$2,826
24 VDC Digital Input Modules	13	ea	200.00	$2,600		$0		$0		$0	$4,592
I/O Terminal Block	13	ea	30.00	$390		$0		$0		$0	$689
120 VAC Digital Output Modules	7	ea	350.00	$2,450		$0		$0		$0	$4,327
I/O Terminal Block	7	ea	30.00	$210		$0		$0		$0	$371
Analog Input - 16 Channel Single Ended	5	ea	900.00	$4,500		$0		$0		$0	$7,948
I/O Terminal Block	5	ea	40.00	$200		$0		$0		$0	$353
Analog Output - 8 Channel	5	ea	1,100.00	$5,500		$0		$0		$0	$9,714
I/O Terminal Block	5	ea	30.00	$150		$0		$0		$0	$265
17 Slot CLX Chassis	2	ea	500.00	$1,000		$0		$0		$0	$1,766
Power Supply	2	ea	600.00	$1,200		$0		$0		$0	$2,119
Controlnet Taps	2	ea	70.00	$140		$0		$0		$0	$247
Tools, Software, Misc											
RS Logix 5000 - Professional Edition Include: RS Linx - Professional, RS Emulate 5000, RS Test Stand Lite, PIDE Autotune, RS Networx, Function Block, Sequencial Function Charts, Structured Text, and Ladder Logic	1	ea	5,400.00	$5,400		$0		$0		$0	$9,537
RS-LOGIX 5000 Function Block Editor	1	ea	700.00	$700		$0		$0		$0	$1,236
RS View SE Server 100 Display	1	ea	4,200.00	$4,200		$0		$0		$0	$7,418
RS View SE Client	2	ea	2,000.00	$4,000		$0		$0		$0	$7,065
RS Studio	1	ea	1,800.00	$1,800		$0		$0		$0	$3,179
Controlnet Modules for SLCs	2	ea	600.00	$1,200		$0		$0		$0	$2,119
Controlnet Taps	2	ea	70.00	$140		$0		$0		$0	$247
Spare Parts											
Controlnet Bridge Module	1	ea	800.00	$800		$0		$0		$0	$1,413
Controlnet Taps	2	ea	70.00	$140		$0		$0		$0	$247
24 VDC Digital Input Modules	2	ea	200.00	$400		$0		$0		$0	$706
I/O Terminal Block	2	ea	30.00	$60		$0		$0		$0	$106
120 VAC Digital Output Modules	2	ea	350.00	$700		$0		$0		$0	$1,236
17 Slot CLX Chassis	1	ea	500.00	$500		$0		$0		$0	$883
Power Supply	1	ea	600.00	$600		$0		$0		$0	$1,060
Analog Input - 16 Channel Single Ended	2	ea	900.00	$1,800		$0		$0		$0	$3,179
Spring Terminal Block	2	ea	40.00	$80		$0		$0		$0	$141
Analog Output - 8 Channel	2	ea	1,100.00	$2,200		$0		$0		$0	$3,886
Controllogix Processor 4 M Memory	1	ea	4,300.00	$4,300		$0		$0		$0	$7,594
Industrial Compact Flash Card	1	ea	70.00	$70		$0		$0		$0	$124
Space Fillers	6	ea	12.00	$72		$0		$0		$0	$127
				$0		$0		$0		$0	$0
Construction Costs (wire, conduit, modifications to existing equipment and duct banks as required)											

				$0		$0		$0		$0	$0
Costs per I/O point	350	per unit	200.00	$70,000	250.00	$87,500		$0		$0	$349,604
				$0		$0		$0		$0	$0
Programming and Graphics Development											
Costs per I/O point	350	per unit		$0	100.00	$35,000		$0		$0	$90,390
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0

OPINION OF PROBABLE CONSTRUCTION COST

Client: VFSA
Location: VALLEY FORGE, PENNA.
Subject: HEADWORKS WITH SCREENING AND GRIT REMOVAL

Estimate No.: **75297 61**
Estimator: EGW
Checker: LAL

27-Oct-06

Burdens:
State Sales Tax: 6.0%
Labor Burden (Payroll Taxes & Insur.): 55%

04/05/06

Approx. cost = $1,905,300

DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE MATERIAL	TOT. EST. MATERIAL	UNIT PRICE LABOR	TOT. EST. LABOR	UNIT PRICE EQUIPMENT	TOT. EST. EQUIPMENT	UNIT PRICE SUBCONT.	SUBCONT.	TOTAL W/ BURDENS
				$0		$0		$0		$0	$0
headworks building	2000	sf		$0		$0		$0	200.00	$400,000	$617,100
				$0		$0		$0		$0	$0
bar screen	1	ls		$0		$0		$0	300,000.00	$300,000	$462,825
				$0		$0		$0		$0	$0
grit removal	1	ls		$0		$0		$0	130,000.00	$130,000	$200,558
				$0		$0		$0		$0	$0
odor control system	1	ls		$0		$0		$0	100,000.00	$100,000	$154,275
				$0		$0		$0		$0	$0
electrical	1	ls		$0		$0		$0	150,000.00	$150,000	$231,413
				$0		$0		$0		$0	$0
site work	1	ls		$0		$0		$0	80,000.00	$80,000	$123,420
				$0		$0		$0		$0	$0
miscellaneous	1	ls		$0		$0		$0	75,000.00	$75,000	$115,706
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				==========		==========		==========		==========	==========
				$0		$0		$0		$1,235,000	$1,905,296
Mean's Local Cost Adjustment			0.00%	$0	0.00%	$0	0.00%	$0		n/a	
				==========		==========		==========		==========	
				$0		$0		$0		$1,235,000	
Taxes & Insurance				$0		$0		n/a		n/a	
				==========		==========		==========		==========	
				$0		$0		$0		$1,235,000	

ESTIMATE SUMMARY:

MATERIAL:		$0
LABOR:		$0
EQUIPMENT:		$0
SUBCONTRACTS:		$1,235,000
		==========
ADD-ONS:		$1,235,000
GEN. CONDITIONS & OVERHEAD:	10%	$123,500
		==========
		$1,358,500
PROFIT:	10%	$135,850
		==========
		$1,494,350
BONDING & INSURANCE:	2%	$29,887
		==========
		$1,524,237
CONTINGENCY:	25%	$381,059
		==========
		$1,905,296
INFLATION - ONE YEAR:	0%	$0
		==========
		$1,905,296
OPINION OF PROBABLE CONSTRUCTION COST		**$1,905,300**

OPINION OF PROBABLE CONSTRUCTION COST

Client: VFSA
Location: VALLEY FORGE, PENNA.
Subject: UTILITY WATER SYSTEM

Estimate No.: **75297 61**
Estimator: EGW
Checker: LAL

27-Oct-06

Burdens:
State Sales Tax: 6.0%
Labor Burden (Payroll Taxes & Insur.): 55%

04/05/06

Approx. cost = $259,500

DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE MATERIAL	TOT. EST. MATERIAL	UNIT PRICE LABOR	TOT. EST. LABOR	UNIT PRICE EQUIPMENT	TOT. EST. EQUIPMENT	UNIT PRICE SUBCONT.	SUBCONT.	TOTAL W/ BURDENS
				$0		$0		$0		$0	$0
utility water system	1	ls		$0		$0		$0	90,000.00	$90,000	$138,848
				$0		$0		$0		$0	$0
8" DIP	400	lf	17.00	$6,800	10.00	$4,000	4.00	$1,600		$0	$23,154
excavation/backfill	400	lf		$0		$0		$0	32.00	$12,800	$19,747
paving restoration	150	lf		$0		$0		$0	36.00	$5,400	$8,331
				$0		$0		$0		$0	$0
electrical	1	ls		$0		$0		$0	25,000.00	$25,000	$38,569
				$0		$0		$0		$0	$0
miscellaneous	1	ls		$0		$0		$0	20,000.00	$20,000	$30,855
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				==========		==========		==========		==========	==========
				$6,800		$4,000		$1,600		$153,200	$259,503
Mean's Local Cost Adjustment			0.00%	$0	0.00%	$0	0.00%	$0		n/a	
				==========		==========		==========		==========	
				$6,800		$4,000		$1,600		$153,200	
Taxes & Insurance				$408		$2,200		n/a		n/a	
				==========		==========		==========		==========	
				$7,208		$6,200		$1,600		$153,200	

ESTIMATE SUMMARY:

MATERIAL:		$7,208
LABOR:		$6,200
EQUIPMENT:		$1,600
SUBCONTRACTS:		$153,200
		==========
ADD-ONS:		$168,208
GEN. CONDITIONS & OVERHEAD:	10%	$16,821
		==========
		$185,029
PROFIT:	10%	$18,503
		==========
		$203,532
BONDING & INSURANCE:	2%	$4,071
		==========
		$207,602
CONTINGENCY:	25%	$51,901
		==========
		$259,503
INFLATION - ONE YEAR:	0%	$0
		==========
		$259,503
OPINION OF PROBABLE CONSTRUCTION COST		**$259,500**

OPINION OF PROBABLE CONSTRUCTION COST

Client: VFSA
Location: VALLEY FORGE, PENNA.
Subject: HEADWORKS WITH SCREENING ONLY

Estimate No.: **75297 61**
Estimator: EGW
Checker: LAL

27-Oct-06

Burdens:
State Sales Tax: 6.0%
Labor Burden (Payroll Taxes & Insur.): 55%

04/05/06

Approx. cost = $1,550,500

DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE MATERIAL	TOT. EST. MATERIAL	UNIT PRICE LABOR	TOT. EST. LABOR	UNIT PRICE EQUIPMENT	TOT. EST. EQUIPMENT	UNIT PRICE SUBCONT.	SUBCONT.	TOTAL W/ BURDENS
				$0		$0		$0		$0	$0
headworks building	1500	sf		$0		$0		$0	200.00	$300,000	$462,825
				$0		$0		$0		$0	$0
bar screen	1	ls		$0		$0		$0	300,000.00	$300,000	$462,825
				$0		$0		$0		$0	$0
odor control system	1	ls		$0		$0		$0	100,000.00	$100,000	$154,275
				$0		$0		$0		$0	$0
electrical	1	ls		$0		$0		$0	150,000.00	$150,000	$231,413
				$0		$0		$0		$0	$0
site work	1	ls		$0		$0		$0	80,000.00	$80,000	$123,420
				$0		$0		$0		$0	$0
miscellaneous	1	ls		$0		$0		$0	75,000.00	$75,000	$115,706
				$0		$0		$0		$0	$0
				$0		$0		$0		$0	$0
				==========		==========		==========		==========	==========
				$0		$0		$0		$1,005,000	$1,550,464
Mean's Local Cost Adjustment			0.00%	$0	0.00%	$0	0.00%	$0		n/a	
				==========		==========		==========		==========	
				$0		$0		$0		$1,005,000	
Taxes & Insurance				$0		$0		n/a		n/a	
				==========		==========		==========		==========	
				$0		$0		$0		$1,005,000	

ESTIMATE SUMMARY:

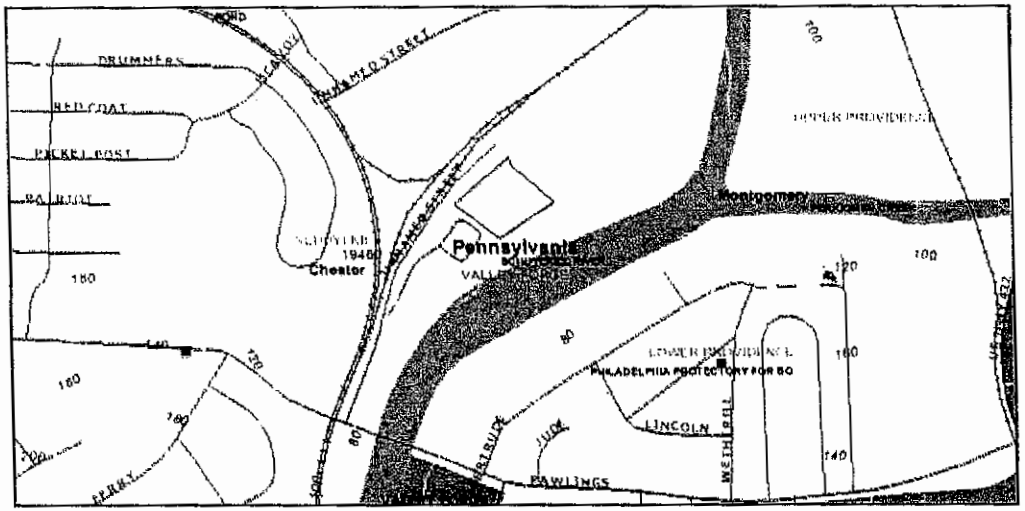
MATERIAL:		$0
LABOR:		$0
EQUIPMENT:		$0
SUBCONTRACTS:		$1,005,000
		==========
ADD-ONS:		$1,005,000
GEN. CONDITIONS & OVERHEAD:	10%	$100,500
		==========
		$1,105,500
PROFIT:	10%	$110,550
		==========
		$1,216,050
BONDING & INSURANCE:	2%	$24,321
		==========
		$1,240,371
CONTINGENCY:	25%	$310,093
		==========
		$1,550,464
INFLATION - ONE YEAR:	0%	$0
		==========
		$1,550,464
OPINION OF PROBABLE CONSTRUCTION COST		**$1,550,500**

APPENDIX F

PNDI Correspondence

PNDI Project Environmental Review Receipt
Project Search ID: 20060327026464
Project Name: VFSA Regional Act 537 Plan
Date: 3/27/2006 8:58:28 AM

Project Location



Project Name: VFSA Regional Act 537 Plan
On behalf of: County Agency
Project Search ID: 20060327026464
Date: 3/27/2006 8:57:21 AM
# of Potential Impacts: 3
Jurisdictional Agency: US Fish and Wildlife Service,Pennsylvania Department of Conservation and Natural Resources,Pennsylvania Fish and Boat Commission
Project Category: Waste Transfer, Treatment, and Disposal,Liquid waste/Effluent,Sewage module/Act 537 plan
Project Coordinates (Lambert): 708184.59903173, 418196.00480814 ft

ZIP Code: 19460
Township/Municipality: SCHUYLKILL
County: Chester
USGS 7.5 Minute Quadrangle ID: 287
Quadrangle Name: VALLEY FORGE
Project Size: 4.962 ac

Location Accuracy

Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Receipt is solely responsible for the project location and thus the correctness of the Project Review Receipt content.

3 Potential Impacts

Under the Following Agencies' Jurisdiction: US Fish and Wildlife Service,Pennsylvania Department of Conservation and Natural Resources,Pennsylvania Fish and Boat Commission

 APPLICANT INITIALS: Mkg

PNDI Project Environmental Review Receipt

Project Search ID: 20060327026464
Project Name: VFSA Regional Act 537 Plan
Date: 3/27/2006 8:58:28 AM

Project Name: VFSA Regional Act 537 Plan
On behalf of: County Agency
Project Search ID: 20060327026464
Date: 3/27/2006 8:57:21 AM
# of Potential Impacts: 3
Jurisdictional Agency: US Fish and Wildlife Service,Pennsylvania Department of Conservation and Natural Resources,Pennsylvania Fish and Boat Commission
Project Category: Waste Transfer, Treatment, and Disposal,Liquid waste/Effluent,Sewage module/Act 537 plan
Project Coordinates (Lambert): 708184.59903173, 418196.00480814 ft

ZIP Code: 19460
Township/Municipality: SCHUYLKILL
County: Chester
USGS 7.5 Minute Quadrangle ID: 287
Quadrangle Name: VALLEY FORGE
Project Size: 4.962 ac

Pennsylvania Natural Diversity Inventory (PNDI) records indicate there are potential impacts on special concern species and resources within the project area. If the project is pursued, the jurisdictional agency/agencies indicated require that the instructions below regarding potential impacts and/or avoidance measures be followed in their entirety.

Q1: Aquatic habitat (stream, river, lake, pond, etc.) is located on or adjacent to the subject property and project activities (including discharge) may occur within 300 feet of these habitats
Your answer is: **1. Yes**
Please initial here signifying that you have provided the most accurate answer to the question as possible.

APPLICANT INITIALS: MKY

Q2: Accurately describe what is known about wetland presence in the project area or on the land parcel. "Project" includes all features of the project (including buildings, roads, utility lines, outfall and intake structures, wells, stormwater retention/detention basins, parking lots, driveways, lawns, etc.), as well as all associated impacts (e.g., temporary staging areas, work areas, temporary road crossings, areas subject to grading or clearing, etc.). Include all areas that will be permanently or temporarily affected -- either directly or indirectly -- by any type of disturbance (e.g., land clearing, grading, tree removal, flooding, etc.). Land parcel = the lot(s) on which some type of project(s) or activity(s) are proposed to occur .
Your answer is: **2. The project area (or land parcel) has not been investigated by someone qualified to identify and delineate wetlands, or it is currently unknown if the project or project activities will affect wetlands.**
Please initial here signifying that you have provided the most accurate answer to the question as possible.
APPLICANT INITIALS: MKY

These determinations were based on the project-specific information you provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the information you provided does not accurately reflect this project, or if project plans change, DEP and the jurisdictional agencies require that another PNDI review be conducted.

This response represents the most up-to-date summary of the PNDI data files and is <u>good for one(1) year</u> from the date of this PNDI Project Environmental Review Receipt.

 APPLICANT INITIALS: MKY

1 potential impact
The Applicant should MAIL a copy of this Project Environmental Review Receipt, a cover letter with project narrative, acreage to be impacted, how construction/maintenance activity is to be accomplished, township/municipality and county where project is located, and a USGS 7.5 minute quadrangle with project boundary and quad name marked on the map.

US Fish and Wildlife Service.
Endangered Species Biologist
315 South Allen Street,Suite 322.
State College, PA 16801

1 potential impact
The Applicant should MAIL/FAX a copy of this Project Environmental Review Receipt, a cover letter with project narrative, acreage to be impacted, how construction/maintenance activity is to be accomplished, township/municipality and county where project is located, and a USGS 7.5 minute quadrangle with project boundary and quad name marked on the map.

Ecological Services Section
Pennsylvania Department of Conservation and Natural Resources
Bureau of Forestry
P.O. Box 8552
Harrisburg, PA 17105-8552
Review Coordinator: (717) 772-0258
FAX Number: (717) 772-0271

1 potential impact
The Applicant should MAIL/FAX a copy of this Project Environmental Review Receipt, a cover letter with project narrative, acreage to be impacted, how construction/maintenance activity is to be accomplished, township/municipality and county where project is located, and a USGS 7.5 minute quadrangle with project boundary and quad name marked on the map.

Natural Diversity Section
Pennsylvania Fish and Boat Commission
Division of Environmental Services
450 Robinson Lane
Bellefonte, PA 16823
FAX Number: (814) 359-5175

Please mail only one (1) copy of the project review request. Do not email the project information. Allow 30 days for completion of the project review from the date of PFBC receipt of the project review request.

DISCLAIMER

The PNDI environmental review website is a preliminary environmental screening tool. It is not a substitute for information obtained from a field survey of the project area conducted by a biologist. Such surveys may reveal previously undocumented populations of species of special concern. In addition, the PNDI only contains information about species occurrences that have actually been reported to the Pennsylvania Natural Heritage Program.

Pennsylvania State Programmatic General Permit (PASPGP)

Please note that regardless of PNDI search results, projects requiring a Chapter 105 DEP individual permit or GP 5, 6, 7, 8, 9 or 11 in certain counties (Adams, Berks, Bucks, Chester, Cumberland, Delaware, Franklin, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Schuylkill and York) are required by DEP to comply with the bog turtle habitat screening requirements of the PASPGP.

 APPLICANT INITIALS: _____

TERMS OF USE

Upon signing into the PNDI environmental review website, and as a condition of using it, you agreed to certain terms of use. These are as follows:

The web site is intended solely for the purpose of screening projects for potential impacts on resources of special concern in accordance with the instructions provided on the web site. Use of the web site for any other purpose or in any other way is prohibited and subject to criminal prosecution under federal and state law, including but not limited to the following: Computer Fraud and Abuse Act of 1986, as amended, 18 U.S.C. § 1030; Pennsylvania Crimes Code, § 4911 (tampering with public records or information), § 7611 (unlawful use of computer and other computer crimes), § 7612 (disruption of service), § 7613 (computer theft), § 7614 (unlawful duplication), and § 7615 (computer trespass).

The PNHP reserves the right at any time and without notice to modify or suspend the web site and to terminate or restrict access to it.

The terms of use may be revised from time to time. By continuing to use the web site after changes to the terms have been posted, the user has agreed to accept such changes.

This review is based on the project information that was entered. The jurisdictional agencies and DEP require that the review be redone if the project area, location, or the type of project changes. If additional information on species of special concern becomes available, this review may be reconsidered by the jurisdictional agency.

PRIVACY and SECURITY

This web site operates on a Commonwealth of Pennsylvania computer system. It maintains a record of each environmental review search result as well as contact information for the project applicant. These records are maintained for internal tracking purposes. Information collected in this application will be made available only to the jurisdictional agencies and to the Department of Environmental Protection, except if required for law enforcement purposes—see paragraph below.

This system is monitored to ensure proper operation, to verify the functioning of applicable security features, and for other like purposes. Anyone using this system consents to such monitoring and is advised that if such monitoring reveals evidence of possible criminal activity, system personnel may provide the evidence to law enforcement officials. See Terms of Use.

In order for this project to be considered for subsequent review, a signed and initialed copy of this receipt is required by the agency or agencies indicated. DEP requires that a signed and initialed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted in applications for permits requiring PNDI review. See DEP PNDI policy at www.naturalheritage.state.pa.us or visit the following websites for further information.

Regional Offices
Http://www.dep.state.pa.us/dep/deputate/fieldops/map.pdf

District Mining Operations
Http://www.dep.state.pa.us/dep/deputate/minres/Districts/homepage/Default.htm

 APPLICANT INITIALS: MKg

PNDI Project Environmental Review Receipt

Project Search ID: 20060327026464
Project Name: VFSA Regional Act 537 Plan
Date: 3/27/2006 8:58:28 AM

Oil and Gas Management
Http://www.dep.state.pa.us/dep/deputate/minres/OILGAS/CustomerNeeds.htm

Print this Project Review Receipt using your Internet browser's print function and keep it as a record of your search.

Signature: Martin L Goldberg

Date:

Project applicant on whose behalf this search was conducted:

APPLICANT

Contact Name: Valley Forge Sewer Authority Martin Goldberg

Address: 333 Pawling Rd.

City, State, Zip: Phoenixville, PA 19460

Phone: 610-935-1553

Email: mgoldberg@VFSA.com

PERSON CONDUCTING SEARCH (if not applicant)

Contact Name: Diane Vesely

Address: 445 W. Philadelphia St. PO Box 15040

City, State, Zip: York, PA 17405-7040

Phone: 717-852-1340

Email: dvesely@bh-bu.com

The following contact information is for the agencies involved in this Pennsylvania Natural Diversity Inventory environmental review process. Please read this entire receipt carefully as it contains instructions for how to contact these agencies for further review of this particular project.

US Fish and Wildlife Service.
Endangered Species Biologist
315 South Allen Street,Suite 322.
State College, PA 16801

Ecological Services Section
Pennsylvania Department of Conservation and Natural Resources
Bureau of Forestry
P.O. Box 8552
Harrisburg, PA 17105-8552
Review Coordinator: (717) 772-0258
FAX Number: (717) 772-0271

Natural Diversity Section
Pennsylvania Fish and Boat Commission
Division of Environmental Services
450 Robinson Lane
Bellefonte, PA 16823
FAX Number: (814) 359-5175

 APPLICANT INITIALS: MLG

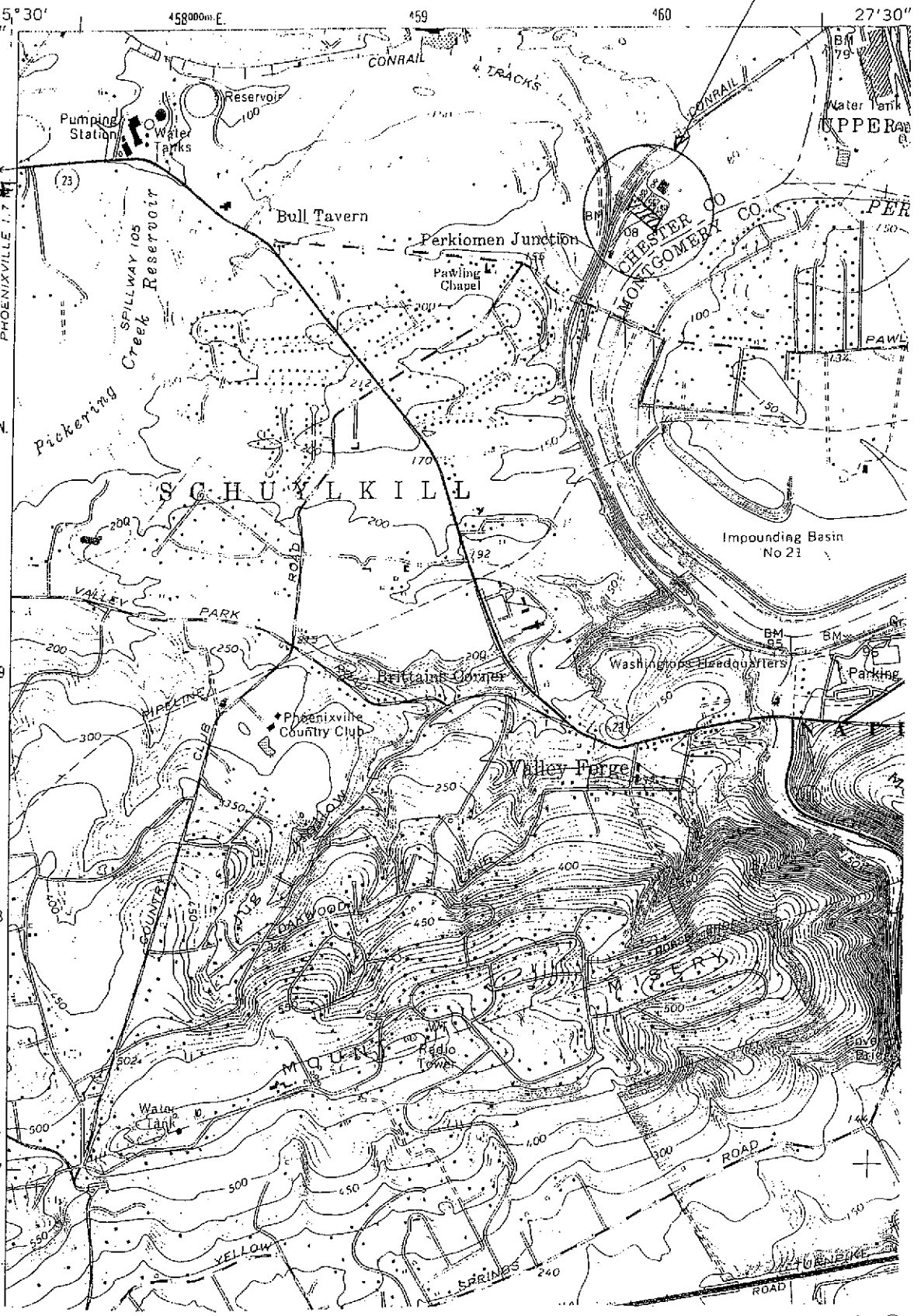
PROJECT NARRATIVE

Valley Forge Sewer Authority is in the process of updating its Regional Act 537 Sewage Facilities Plan. The Authority's existing treatment facilities which are located in Schuylkill Township, Chester County along the Schuylkill River serve 8 surrounding Townships and Boroughs. Several of the alternatives presently under evaluation include the potential for constructing additional treatment tanks on the existing site in an area situated between the existing tankage and the Authority's administrative facilities. Should all of the tankage need to be constructed, it is anticipated that the disturbed area will be a 350' x 1100' area just southwest of the existing tankage as depicted on the attached USGS quad (Valley Forge) and site plan.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Project Site

Max. area to be disturbed 385,000 SF (350' x 1100') SW of existing tankage



VALLEY FORGE, PA.

N4000—W7522.5/7.5

1966
PHOTOREVISED 1981
DMA 5964 III SW—SERIES V831

SCALE 1:24 000

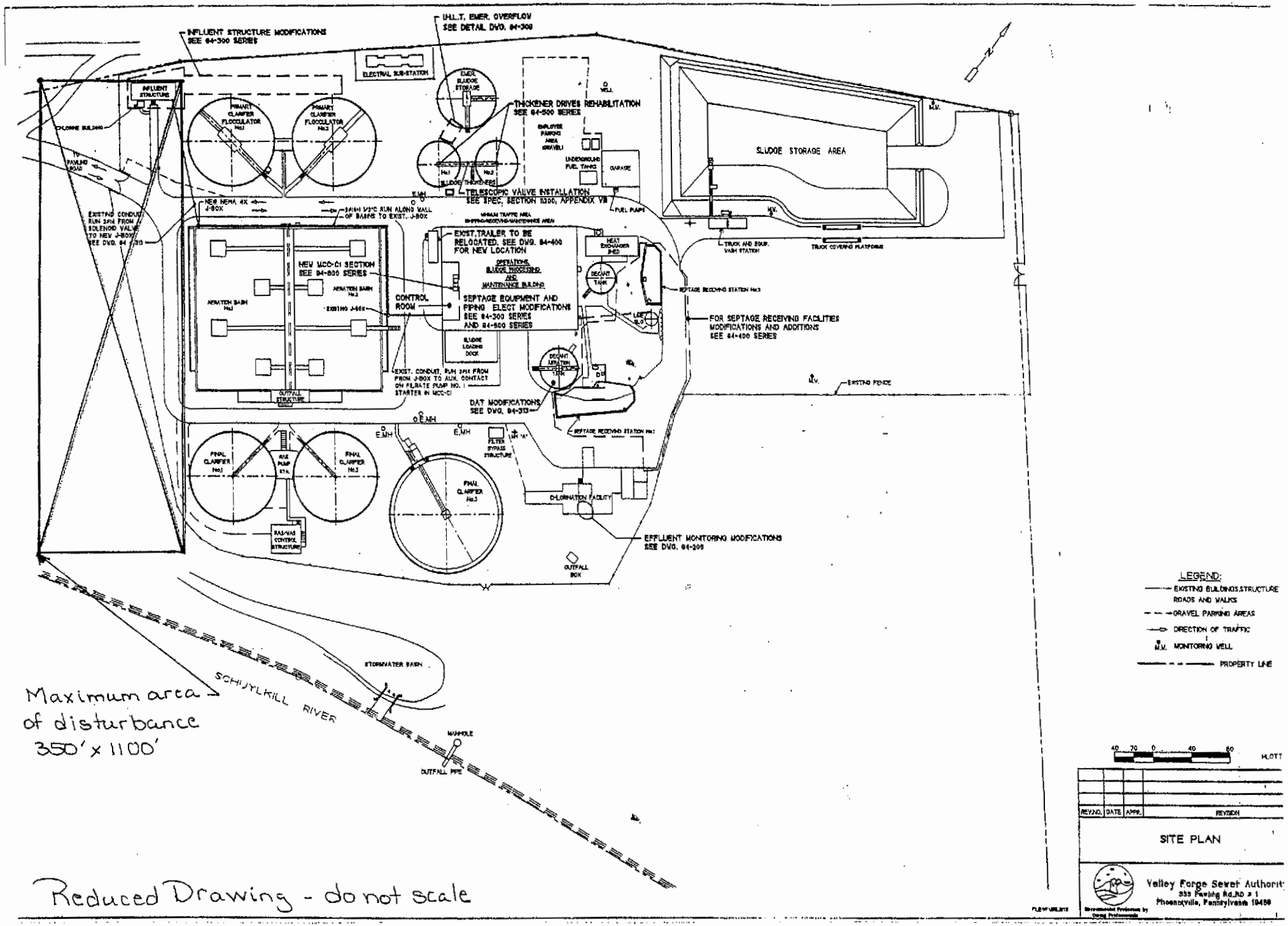
1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

CHANGE 23


INFLUENT STRUCTURE MODIFICATIONS SEE 84-300 SERIES
U.H.L.T. EMER. OVERFLOW SEE DETAIL DWG. 84-309
ELECTRICAL SUB-STATION
EMER. SLUDGE STORAGE
THICKENER DRIVES REHABILITATION SEE 84-500 SERIES
INFLUENT STRUCTURE
CHLORINE BUILDING
PRIMARY CLARIFIER FLOCCULATOR No.1
PRIMARY CLARIFIER FLOCCULATOR No.2
SLUDGE THICKENERS
EMPLOYEE PARKING AREA (GRAVEL)
UNDERGROUND FUEL TANKS
GARAGE
FUEL PUMPS
SLUDGE STORAGE AREA
TELESCOPIC VALVE INSTALLATION SEE SPEC. SECTION 11300, APPENDIX VII
NEW NEMA 4X J-BOX
EXISTING CONDUIT RUN 2#14 FROM SOLENOID VALVE TO NEW J-BOX SEE DWG. 84-315
VEHICULAR TRAFFIC AREA SHIPPING/RECEIVING/MAINTENANCE AREA
EXIST. TRAILER TO BE RELOCATED. SEE DWG. 84-400 FOR NEW LOCATION
OPERATIONS, SLUDGE PROCESSING AND MAINTENANCE BUILDING
NEW MCC-C1 SECTION SEE 84-800 SERIES
AERATION BASIN No.1
AERATION BASIN No.2
CONTROL ROOM
SEPTAGE EQUIPMENT AND PIPING ELECT MODIFICATIONS SEE 84-300 SERIES AND 84-600 SERIES
HEAT EXCHANGER SHED
DECANT TANK
SEPTAGE RECEIVING STATION No.3
LOAD SLD
FOR SEPTAGE RECEIVING FACILITIES MODIFICATIONS AND ADDITIONS SEE 84-400 SERIES
TRUCK AND EQUIP. WASH STATION
TRUCK COVERING PLATFORM
SLUDGE LOADING DOCK
EXIST. CONDUIT, RUN 2#14 FROM FROM J-BOX TO AUX. CONTACT ON FILTRATE PUMP NO. 1 STARTER IN MCC-C1
OUTFALL STRUCTURE
DECANT UPLIFTING TANK
DAT MODIFICATIONS SEE DWG. 84-313
EXISTING FENCE
SEPTAGE RECEIVING STATION No.2
E.MH
FINAL CLARIFIER No.1
AUX PUMP STA.
FINAL CLARIFIER No.2
FINAL CLARIFIER No.3
FILTER BYPASS STRUCTURE
CHLORINATION FACILITY
RAS/WAS CONTROL STRUCTURE
EFFLUENT MONITORING MODIFICATIONS SEE DWG. 84-200
OUTFALL BOX
STORMWATER BASIN
SCHUYLKILL RIVER
MANHOLE
OUTFALL PIPE
LEGEND:
EXISTING BUILDINGS, STRUCTURE ROADS AND WALKS
GRAVEL PARKING AREAS
DIRECTION OF TRAFFIC
M.W. MONITORING WELL
PROPERTY LINE
Maximum area of disturbance 350' x 1100'
Reduced Drawing - do not scale
REV.NO. DATE APPR. REVISION
SITE PLAN
Valley Forge Sewer Authority
835 Pawling Rd. RD # 1
Phoenixville, Pennsylvania 19460

Item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

U.S. FISH AND WILDLIFE SERVICE
ENDANGERED SPECIES BIOLOGIST
315 SOUTH ALLEN ST., SUITE 322
STATE COLLEGE PA 16801

X Pamela Shellenberger ☐ Agent ☐ Addre

B. Received by (Printed Name) Pamela Shellenberger C. Date of Deli 3/31/2

D. Is delivery address different from Item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchan
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7004 2510 0004 7530 9722

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-

7004 2510 0004 7530 9722

U.S. Postal Service
CERTIFIED MAIL RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at www.usps.com

OFFICIAL USE

Postage	$
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Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Post	$ 5.12

D. Veselly

Postmark Here
MAR 29 2
USPS 17043 PARK PA

Sent To U.S. FISH AND WILDLIFE SERVICE
ENDANGERED SPECIES BIOLOGIST
Street, Apt or PO Box 315 SOUTH ALLEN ST., SUITE 322
City, State STATE COLLEGE PA 16801

PS Form 3

Pennsylvania Fish & Boat Commission

established 1866

Division of Environmental Services
Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823-9620
(814) 359-5147 Fax: (814) 359-5175
April 21, 2006

IN REPLY REFER TO:
SIR# 22400

BUCHART HORN
DIANE VESELY
445 W PHILADELPHIA ST
P.O. BOX 15040
YORK, PA 17405

RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
PNDI Search Number: 20060327026464
VALLEY FORGE SEWER AUTHORITY REGIONAL ACT 537 PLAN
SCHUYLKILL Township, CHESTER County, Pennsylvania

Dear Ms. VESELY:

I have reviewed the maps for the above-referenced project. Based on records maintained in the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files, the bog turtle (*Glyptemys muhlenbergii*, state endangered, federal threatened) and red-bellied turtle (*Pseudemys rubriventris*, state threatened) are known from the vicinity of the proposed project site.

The bog turtle (*Glyptemys muhlenbergii*) is a small (up to a 4 inch carapace) semi-aquatic, omnivorous turtle that prefers open marshy wetlands associated with springs and groundwater, specific vegetative communities and mucky soils for burrowing. This species is restricted to the southcentral and southeast portions of Pennsylvania. However, due to the lack of pristine habitat found in its range from disturbance and successional processes, the bog turtle has had in some case become accustomed to disturbed, low quality wetland complexes often with semi-closed canopies. Bog turtles are also known to be transients in forested habitat that are associated with springs and small streams leading to more open marshes. They use these habitats as dispersal corridors to other wetlands. The bog turtle is threatened by habitat destruction, poor water quality and poaching.

Based on the proximity of your proposed project to known bog turtle habitat, there may also be suitable bog turtle habitat on the proposed project site. **Therefore, if there will be *any* direct (e.g., filling; earth disturbance) or indirect (e.g., runoff) impacts to any wetlands within or adjacent to the project area (including access roads), we request that a habitat suitability assessment (Phase 1 survey) for bog turtles be conducted by a qualified herpetologist.** A list of qualified surveyors is enclosed for your convenience. Bog turtle habitat surveys are to be conducted in accordance with the methods outlined in the enclosed "*Guidelines for Bog Turtle Surveys*."

Upon completion of the Phase 1 bog turtle survey, the herpetologist is to send a report documenting the survey results to this office (Natural Diversity Section) for our review and comment. The report should include the following information: descriptions of the wetland vegetation, soils, and hydrology on the site; color photographs and maps of suitable habitat; and a list of all herpetofauna observed during the survey. If

any bog turtles are observed during the survey, their location(s) should be mapped, and they should be photographed, aged, sexed, and measured. Following our review of the habitat survey, an additional biological survey to determine bog turtle presence (Phase 2) may be required. **However, if there will be no direct or indirect impacts to wetlands from the proposed project, then I do not foresee any adverse impacts to the bog turtle.**

Due to the federal status of the bog turtle, future correspondence should also be directed to the Endangered Species Biologist of the U.S. Fish and Wildlife Service at their field office in State College, Pennsylvania. Also, please note that the Pennsylvania Fish & Boat Commission conducts Species Impact Reviews only for reptiles, amphibians, fishes and aquatic invertebrates. Reviews concerning other natural resources should be directed to the appropriate agencies.

The PNDI and file search of rare species in the project vicinity also detected the red-bellied turtle (PA threatened) in the vicinity of the proposed project. The red-bellied turtle is one of Pennsylvania's largest native aquatic turtles. This turtle species is known to inhabit relatively large, deep streams, rivers, ponds, lakes and marshes with permanent water and ample basking sites. Red-bellied turtles are restricted to the southcentral and southeastern regions of the Commonwealth. The existence of this turtle species is threatened by habitat destruction, poor water quality, and competition with aggressive non-native turtle species that share its range and habitat (e.g., red-eared slider, *Trachemys scripta elegans*).

Red-bellied turtles are known from near the project area. It is possible that they could also occur in any wetlands and water bodies on-site. **Therefore, if wetlands with open water areas, streams or ponds are to be disturbed from the project activity, we will need to conduct a more thorough evaluation of the potential adverse impacts to the red-bellied turtle.** Items including detailed project plans, project narrative, aerial photographs of the general area, general habitat descriptions, and color photographs of the project area, wetlands identification and delineation, stream characterization (flow velocity, width, depth, substrate type, pools and riffles, identification of basking areas, logs, woody debris, presence of aquatic vegetation) would expedite our review process. Pending the review of this information, a survey targeting the presence of the species of concern may be warranted.

However, if wetlands or water bodies are not to be disturbed in any way by the proposed activity, and provided that best management practices are employed and strict erosion and sedimentation measures are maintained, I do not foresee any adverse impacts to red-bellied turtle or any other rare or protected species under Pennsylvania Fish & Boat Commission jurisdiction. If no wetlands or waterways will be disturbed, no further action on your part will be necessary.

Note that this office performed no field inspection of the project area. Consequently, comments in this letter are not meant to address other issues or concerns that might arise concerning matters under Pennsylvania Fish and Boat Commission jurisdiction or that of other authorities. If you have any questions regarding this response, please contact Nevin Welte at 814-359-5234 and refer to the SIR number at the top of this letter. Thank you for your cooperation and attention to this matter of endangered species conservation and habitat protection.

Sincerely,

Christopher A. Urban, Chief
Natural Diversity Section

CAU/NW/dmc
c: B. Dershem, USFWS
Enclosures (3)

U.S. FISH AND WILDLIFE SERVICE
& PENNSYLVANIA FISH AND BOAT COMMISSION

QUALIFIED BOG TURTLE SURVEYORS

The following list includes persons known by the U.S. Fish and Wildlife Service and Pennsylvania Fish and Boat Commission to have the skills and experience to search for and successfully find bog turtles and their habitat. Any individuals handling or conducting surveys for bog turtles must first obtain a Scientific Collector's Permit from the Commission. All permitted collector's encounters with bog turtles must be reported in writing to the Commission and Service within 48 hours. Bog turtle surveys and research should be overseen by a qualified surveyor, who should be present in the field at all times during the investigation. Surveys should be carried out in accordance with the Service's *Guidelines for Bog Turtle Surveys* (dated May 2001); exceptions should be reviewed and approved by the Service and Commission.

This information is not to be construed as an endorsement of individuals or firms by the Service, Commission, or any of their employees. Persons not on this list, but who have documented experience in conducting scientific studies of, or successful searches for, bog turtles and their habitat may submit their qualifications to the Service and Commission for review. The submission must include documentation that the requestor has experience successfully locating and identifying bog turtle habitat, and successfully locating and identifying bog turtles in their wetland habitat. Additions to and deletions from this list are at the sole discretion of the Service and Commission. This list is subject to revision at any time without prior notice.

Andrew Brookens, Teresa Amitrone & Ben Berra
Skelly and Loy, Inc.
2601 North Front Street
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717-232-0593 or 800-892-6532
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814-883-8635 (cell)
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610-960-5631 (cell)
610-280-0278 (fax)
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aquaterra1@aol.com

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AMT_Inc@comcast.net

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Owings Mills, MD 21117
410-902-1421; fax: 410-902-8856
jmorrow@admarble.com

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1981 Lake Minsi Drive
Bangor, PA 18013
Tel.: 610-250-0773, ext. 22
Fax: 908-788-6788
sangus@amygreene.com

GUIDELINES FOR BOG TURTLE SURVEYS[1]

(revised April 2006)

RATIONALE

A bog turtle survey (when conducted according to these guidelines) is an attempt to determine presence or probable absence of the species; it does not provide sufficient data to determine population size or structure. Following these guidelines will standardize survey procedures. It will help maximize the potential for detection of bog turtles at previously undocumented sites at a minimum acceptable level of effort. Although the detection of bog turtles confirms their presence, failure to detect them does not absolutely confirm their absence (likewise, bog turtles do not occur in all appropriate habitats and many seemingly suitable sites are devoid of the species). Surveys as extensive as outlined below are usually sufficient to detect bog turtles; however, there have been instances in which additional effort was necessary to detect bog turtles, especially when habitat was less than optimum, survey conditions were less than ideal, or turtle densities were low.

PRIOR TO CONDUCTING ANY SURVEYS

If a project is proposed to occur in a county of known bog turtle occurrence (see attachment 1), contact the U.S. Fish and Wildlife Service (Service) and/or the appropriate State wildlife agency (see attachment 2). They will determine whether or not any known bog turtle sites occur in or near the project area, and will determine the need for surveys.

- If a wetland in or near the project area is *known* to support bog turtles, measures must be taken to avoid impacts to the species. The Service and State wildlife agency will work with federal, state and local regulatory agencies, permit applicants, and project proponents to ensure that adverse effects to bog turtles are avoided or minimized.

- If wetlands in or adjacent to the project area are *not* known bog turtle habitat, conduct a bog turtle habitat survey (Phase 1 survey) if:

  1. The wetland(s) have an emergent and/or scrub-shrub wetland component, or are forested with suitable soils and hydrology (see below), *and*

  2. Direct and indirect adverse effects to the wetland(s) cannot be avoided.

     See *Bog Turtle Conservation Zones*[2] for guidance regarding activities that may affect bog turtles and their habitat. In addition, consult with the Fish and Wildlife Service and/or appropriate State wildlife agency to definitively determine whether or not a Phase 1 survey will be necessary.

---

[1] These guidelines are a modification of those found in the final "Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan" (dated May 15, 2001). Several minor revisions were made to facilitate survey efforts and increase searcher effectiveness. As additional information becomes available regarding survey techniques and effectiveness, these survey guidelines may be updated and revised. Contact the Fish and Wildlife Service or one of the state agencies listed in Attachment 1 for the most recent version of these guidelines.

[2] See Appendix A of the "Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan" (dated May 15, 2001).

however, that one or more of these criteria may be absent from portions of a wetland or wetland complex supporting bog turtles. Absence of one or more criteria does not preclude bog turtle use of these areas to meet important life functions, including foraging, shelter and dispersal.

- If these criteria (suitable soils, vegetation and hydrology) are present in the *wetland*, then the *wetland* is considered to be potential bog turtle habitat, regardless of whether or not that portion of the wetland occurring within the project boundaries contains all three criteria. If the *wetland* is determined to be potential habitat and the project will directly or indirectly impact *any portion* of the wetland (see *Bog Turtle Conservation Zones*), then either:

  - Completely avoid all direct and indirect effects to the wetland, in consultation with the Service and appropriate State wildlife agency, OR

  - Conduct a Phase 2 survey to determine the presence of bog turtles.

- The Service and appropriate State wildlife agency (see list) should be sent a copy of survey results for review and comment including: a USGS topographic map indicating location of site; project design map, including location of wetlands and stream and delineation of wetland type (PEM, PSS, PFO, POW) and "designated survey areas"[3]; color photographs of the site; surveyor's name; date of visit; opinion on potential/not potential habitat; a description of the hydrology, soils, and vegetation. A phase 1 report template and field form are available from the States and Service.

BOG TURTLE SURVEY (= Phase 2 survey)

If the wetland(s) are identified as potential bog turtle habitat (see Phase 1 survey), and direct and indirect adverse effects cannot be avoided, conduct a bog turtle survey in accordance with the specifications below. Note that this is *not* a survey to estimate population size or structure; a long-term mark/recapture study would be required for that.

Prior to conducting the survey, contact the appropriate State agency (see attached list) to determine whether or not a scientific collector's permit valid for the location and period of the survey will be required.

The Phase 2 survey will focus on the areas of the wetland that meet the soils, hydrology and vegetation criteria, as defined under the Phase 1 survey guidelines. Those areas that meet the criteria are referred to as "designated survey areas" for Phase 2 and Phase 3 survey purposes.

I. Surveys should only be performed during the period from April 15-June 15. For the Lake Plain Recovery Unit (see Recovery Plan), surveys should only be performed during the period from May 1 to June 30. This coincides with the period of greatest annual turtle activity (spring emergence and breeding) and before vegetation gets too dense to accurately survey. While turtles may be found outside of these dates, a result of no turtles would be considered inconclusive. Surveys beyond June also have a higher likelihood of disruption or destruction of nests or newly hatched young.

[3] "Designated survey areas" are those areas of the wetland that meet the soils, hydrology and vegetation criteria for potential bog turtle habitat. These areas may occur within the emergent, scrub-shrub or forested parts of the wetland.

8. Walk quietly through the wetland. Bog turtles will bask on herbaceous vegetation and bare ground, or be half-buried in shallow water or rivulets. Walking noisily through the wetland will often cause the turtles to submerge before they can be observed. Be sure to search areas where turtles may not be visible, including under mats of dead vegetation, shallow pools, underground springs, open mud areas, vole runways and under tussocks. Do not step on the tops of tussocks or hummocks because turtle nests, eggs and nesting microhabitat may be destroyed. Both random opportunistic searching and transect surveys should be used at each wetland.

   The following survey sequence is recommended to optimize detection of bog turtles:

   - Semi-rapid walk through the designated survey area using visual encounter techniques.
   - If no bog turtles are found during visual survey, while walking through site identify highest quality habitat patches. Within these highest quality patches, begin looking under live and dead vegetation using muddling and probing techniques.
   - If still no bog turtles are found, the rest of the designated survey area should be surveyed using visual encounter surveys, muddling and probing techniques.

9. Photo-documentation of each bog turtle located will be required; a macro lens is highly recommended. The photos should be in color and of sufficient detail and clarity to identify the bog turtle to species and individual. Therefore, photographs of the carapace, plastron, and face/neck markings should be taken of each individual turtle. Do not harass the turtle in an attempt to get photos of the face/neck markings; if gently placed on the ground, most turtles will slowly extend their necks if not harassed. If shell notching is conducted, do the photo-documentation after the notching is done.

10. The following information should be collected for each bog turtle: sex, carapace length-straight line and maximum length, carapace width, weight, and details about scars/injuries. Maximum plastron length information should also be collected to differentiate juveniles from adults as well as to obtain additional information on recruitment, growth, and demography.

11. Each bog turtle should be marked (*e.g.*, notched, PIT tagged) in a manner consistent with the requirements of the appropriate State agency and/or Service. Contact the appropriate State wildlife agency prior to conducting the survey to determine what type of marking system, if any, should be used.

12. All bog turtles must be returned to the point of capture as soon as possible on the same day as capture. They should only be held long enough to identify, measure, weigh, and photograph them, during which time their exposure to high temperatures must be avoided. No bog turtles may be removed from the wetland without permission from the Service and appropriate State agency.

13. The Fish and Wildlife Service and appropriate State agency should be sent a copy of survey results for review and concurrence, including the following: dates of site visits; time spent

Attachment 1

CONTACT AGENCIES - BY STATE

(April 2006)

STATE	FISH AND WILDLIFE SERVICE	STATE AGENCY
Connecticut	U.S. Fish and Wildlife Service New England Field Office 22 Bridge Street, Unit #1 Concord, NH 03301	Department of Environmental Protection Env. & Geographic Information Center 79 Elm Street, Store Floor, Hartford, CT 06106 *(info about presence of bog turtles in or near a project area)* Department of Environmental Protection Wildlife Division, Sixth Floor 79 Elm Street, Store Floor, Hartford, CT 06106 *(to get a Scientific Collectors Permit or determine what type of marking system to use)*
Delaware	U.S. Fish and Wildlife Service Chesapeake Bay Field Office 177 Admiral Cochrane Drive Annapolis, MD 21401	Nongame & Endangered Species Program Delaware Division of Fish and Wildlife 4876 Hay Point Landing Road Smyrna, DE 19977
Maryland	U.S. Fish and Wildlife Service Chesapeake Bay Field Office 177 Admiral Cochrane Drive Annapolis, MD 21401	Maryland Department of Natural Resources Wildlife & Heritage Division PO Box 68, Main Street Wye Mills, MD 21679
Massachusetts	U.S. Fish and Wildlife Service New England Field Office 22 Bridge Street, Unit #1 Concord, NH 03301	Division of Fisheries and Wildlife Dept. Fisheries, Wildlife and Env Law Enforcement Rt. 135 Westboro, MA 01581
New Jersey	U.S. Fish and Wildlife Service New Jersey Field Office 927 North Main Street, Bldg. D-1 Pleasantville, NJ 08232	New Jersey Division of Fish and Wildlife Endangered and Nongame Species Program 143 Van Syckels Road Hampton, NJ 08827
New York	U.S. Fish and Wildlife Service 3817 Luker Road Cortland, NY 13045	New York Natural Heritage Program Department of Environmental Conservation 700 Troy-Schenectady Road Latham, NY 12110-2400 *(info about presence of bog turtles in or near a project area)* NY Department of Environmental Conservation Special Licenses Unit 50 Wolf Road, Albany, NY 12233 *(for endangered species permit applications)*
Pennsylvania	U.S. Fish and Wildlife Service Pennsylvania Field Office 315 South Allen Street, Suite 322 State College, PA 16801	Natural Diversity Section Pennsylvania Fish and Boat Commission 450 Robinson Lane Bellefonte, PA 16823

PENNSYLVANIA FISH & BOAT COMMISSION
Division of Environmental Services
Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823-9620

QUALIFIED RED-BELLIED TURTLE BIOLOGISTS

The following list includes persons known to the Pennsylvania Fish and Boat Commission whom possess skills and have experience in properly searching for and finding red-bellied turtles (*Pseudemys rubriventris*) and in identifying their critical habitat. This information is not to be construed as an endorsement of individuals or firms by the Pennsylvania Fish and Boat Commission or any of its employees. Persons not on this list but who have documented experience in conducting scientific studies of, or successful searches for, red-bellied turtles and their critical habitat may submit their qualifications to the Natural Diversity Section for review and possible inclusion as a recognized biologist/surveyor. Each person added to or deleted from this list shall be at the sole discretion of the Pennsylvania Fish and Boat Commission. This list is subject to revision at any time without prior notice. Any individuals handling, collecting, or otherwise removing red-bellied turtles from their natural habitat, even if on a temporary basis for relocation, must first obtain a Scientific Collector's Permit from the Pennsylvania Fish and Boat Commission. All permitted collector's encounters with red-bellied turtles must be reported in writing to the Pennsylvania Fish and Boat Commission's Natural Diversity Section.

Dr. Rudolf G. Arndt
Richard Stockton College of New Jersey
Jim Leeds Road, P.O. Box 195
Pomona, NJ 08240-0195
(609) 652-4432

Mr. Gian Rocco, Ph.D. Candidate
509 Orlando Avenue
State College, PA 16803
(814) 237-2313
E-mail: gxr124@psu.edu

Mr. Scott E. Bush
Mr. Donald F. Knorr
Conestoga Rovers & Associates
Route 113
559 West Uwchlan Avenue, Suite 120
Exton, PA 19341
(610) 280-0277
FAX (610) 280-0278

Ms. Andrea M. Teti
ANDREA M. TETI, Inc
31 Boulder Drive, Suite A
Sellersville, PA 18960
Office: (215) 258-2862
Cell for Andrea: (609) 457-1370
E-mail: AMT_Inc@comcast.net

Ms. Deborah Poppel
ENSR
2005 Cabot Boulevard West
Langhorne, PA 19047
(215) 757-4900
E-mail: dpoppel@ensr.com

Mr. Robert Zappalorti
Mr. Raymond Farrell
Herpetological Associates, Inc.
575 Toms River Road
Jackson, NJ 08527 (732) 833-8600
E-mail: Rzappalort@aol.com

Marlin Corn, Bucks County Naturalist
315 Swamp Rd.
Newtown, PA 18940
(215) 357-4005, ext. 10
Cell: (215) 869-0482
Email: mdcorn@co.bucks.pa.us

PNDI # 20060327026464 USFWS Project # 2006-1528

U.S. FISH AND WILDLIFE SERVICE

315 South Allen Street, Suite 322, State College, PA 16801

This responds to your inquiry about a PNDI Internet Database search that resulted in a potential conflict with a federally listed, proposed or candidate species.

PROJECT LOCATION INFORMATION

County: Chester

Township: Schuylkill

Quad: Valley Forge

MISC INFORMATION

Date of PNDI search: 3-27-06

Date received by FWS: 3-31-06

Project Type (FWS code #): NT - sewer lines

Status: ☑ IC ☐ IP FA: ☐ none ☑ UND ☐ _____

Fax #: _____

Affiliation: Valley Forge Sewer Authority

USFWS COMMENTS ☐ FAXED ☑ MAILED

To: Martin Goldberg

SPECIFIC PROJECT: VFSA Regional Act 537 Plan

FISH AND WILDLIFE SERVICE COMMENT(s):

✓ ***NOT LIKELY TO ADVERSELY AFFECT***

The federally listed bog turtle occurs or may occur in or near the project area. However, based on our review of the information provided, including the project description and location, no adverse effects to this species are likely to occur if the following recommendations are implemented:

- No wetland impacts

If there is any change in the location, scale, scope, layout or design of the project, further consultation or coordination with the Service will be necessary.

____ This response supersedes our comments of _____, based on our review of the additional project information that was submitted to us on _____.

The above determination is valid for two years from the date of this letter. In addition, this response relates only to federally listed, proposed, and candidate species under our jurisdiction, based on an office review of the proposed project's location and anticipated impacts. No field inspection of the project area has been conducted by this office. Consequently, comments on this form are not to be construed as addressing other Service concerns under the Fish and Wildlife Coordination Act or other authorities. *Please reference the above PNDI # and USFWS Project # in any future correspondence regarding this project.*

This review was conducted by the biologist listed below. He/she can be contacted at 814-234-4090.

✓ Pamela Shellenberger (x241) ___ Jennifer Dombroskie (x 242) ___ Bonnie Dershem (x 234)
___ Robert Anderson (x 228)

SIGNATURE: Cindy L. Tibbott DATE: 4-20-06

Asst. Supervisor, Pennsylvania Field Office

Pennsylvania Department of Conservation and Natural Resources

Bureau of Forestry

July 26, 2006

Diane C. Vesely
Buchart-Horn, Inc.
FAX: 717-852-1615 (hard copy will NOT follow)

***Pennsylvania Natural Diversity Inventory Review, PNDI* Number**	**20060327026464**
VSFA Regional Act 537 Plan	
Schuylkill Twp; Chester County	

Dear Ms. Vesely,

This responds to your request about a Pennsylvania Natural Diversity Inventory (PNDI) ER Tool "Potential Impact" or a species of special concern impact review. **We screened this project for potential impacts to species and resources of special concern under the Department of Conservation and Natural Resources' responsibility, which includes plants, natural communities, terrestrial invertebrates and geologic features only.**

☒ ***NO PROJECT IMPACT ANTICIPATED***

☐ PNDI records indicate that no known occurrences of species or resources of special concern under DCNR's jurisdiction occur in the vicinity of the project. Therefore, we do not anticipate the project referenced above will impact plants, natural communities, terrestrial invertebrates and geologic features of special concern. No further coordination with DCNR is needed for this project.

☒ PNDI records indicate special concern species or resources are located in the vicinity of the project. However, based on the information submitted to us concerning the nature of the project, the immediate location, and our detailed resource information, we determined that no impact is likely. No further coordination with DCNR is needed for this project.

☐ ***POTENTIAL PROJECT IMPACT - UNDER FURTHER REVIEW***

Based on our PNDI map review we determined potential impacts to species and/or resources of special concern. This project has been passed on to our review committee. The committee will contact the applicant/consultant directly if more information is needed to assess the project's potential impacts. Response time is typically less than a month after the date on this notification.

COMMENTS:

This response represents the most up-to-date summary of the PNDI data files and is good for one (1) year from the date of this letter. An absence of recorded information does not necessarily imply actual conditions on-site. A field survey of any site may reveal previously unreported populations. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered.

This finding applies to impacts to plants, natural communities, terrestrial invertebrates and geologic features only. To complete your review of state and federally-listed species of special concern, please be sure the U.S. Fish and Wildlife Service, the PA Game Commission and the Fish and Boat Commission has been contacted regarding this project either directly or by performing a search with the online PNDI ER Tool found at www.naturalheritage.state.pa.us

Ellen Shultzabarger, Environmental Review Specialist FOR Chris Firestone, Plant Program Mgr
DCNR/BOF/PNDI, PO Box 8552, Harrisburg, PA 17105 ~ Ph: 717-772-0258 ~ F: 717-772-0271 ~ e-eshultza@state.pa.us

Stewardship **Partnership** **Service**

APPENDIX G

PHMC Correspondence

0120-PM-PY0003 Rev. 6/2002

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

CULTURAL RESOURCE NOTICE

DEP USE ONLY
Date Received

Read the instructions before completing this form.

SECTION A. APPLICANT IDENTIFIER

Applicant Name: Valley Forge Sewer Authority

Street Address: 333 Pawling Road

City: Phoenixville State: PA Zip: 19460

Telephone Number: 610-935-1553

Project Title: Regional Act 537 Plan - Valley Forge Sewer Authority

SECTION B. LOCATION OF PROJECT

Municipality: Schuylkill Township County Name: Chester DEP County Code: 15

SECTION C. PERMITS OR APPROVALS

Name of Specific DEP Permit or Approval Requested: Act 537 Sewage Facilities Plan Approval

Anticipated federal permits:

- ☐ Surface Mining
- ☐ Army Corps of Engineers
- ☐ 401 Water Quality Certification
- ☐ 404 Water Quality Permit
- ☐ Federal Energy Regulatory Commission
- ☒ Other: NPDES

SECTION D. GOVERNMENT FUNDING SOURCES

- ☐ State: (Name) _____
- ☐ Local: (Name) _____
- ☐ Federal: (Name)
- ☐ Other: (Name) None

SECTION E. RESPONSIBLE DEP REGIONAL, CENTRAL, DISTRICT MINING or OIL & GAS MGMT OFFICE

DEP Regional Office Responsible for Review of Permit Application

- ☐ Central Office (Harrisburg)
- ☒ Southeast Regional Office (Conshohocken)
- ☐ Northeast Regional Office (Wilkes-Barre)
- ☐ Southcentral Regional Office (Harrisburg)
- ☐ Northcentral Regional Office (Williamsport)
- ☐ Southwest Regional Office (Pittsburgh)
- ☐ Northwest Regional Office (Meadville)
- ☐ District Mining Office:
- ☐ Oil & Gas Office:

SECTION F. RESPONSIBLE COUNTY CONSERVATION DISTRICT, if applicable.

County Conservation District: Chester

Telephone Number, if known:

SECTION G. CONSULTANT

Consultant, if applicable: Buchart-Horn, Inc.

Street Address: 445 West Philadelphia St. PO Box 15040

City: York State: PA Zip: 17405

Telephone Number: 717-852-1340

SECTION H. PROJECT BOUNDARIES AND DESCRIPTION

REQUIRED

Indicate the total acres in the property under review. Of this acreage, indicate the total acres of earth disturbance for the proposed activity.

Attach a 7.5' U.S.G.S. Map indicating the defined boundary of the proposed activity.

Attach photographs of any building over 50 years old. Indicate what is to be done to all buildings in the project area.

Attach a narrative description of the proposed activity.

Attach the return receipt of delivery of this notice to the Pennsylvania Historical and Museum Commission.

REQUESTED

Attach photographs of any building over 40 years old.

Attach site map, if available.

SECTION I. SIGNATURE BLOCK

Applicant's Signature	Date of Submission of Notice to PHMC

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

PA HISTORICAL &
MUSEUM COMMISSION
BUREAU OF HISTORIC PRESERVATION
400 NORTH ST., 2nd FLOOR
HARRISBURG PA 17120-0093

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number
(Transfer from service label) 7004 2510 0004 7530 9739

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

PLACE STICKER AT TOP OF ENVELOPE TO THE RIGHT OF THE RETURN ADDRESS, FOLD AT DOTTED LINE

CERTIFIED MAIL™

7004 2510 0004 7530 9739

7004 2510 0004 7530 9739

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at www.usps.com®

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Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To
Street, Apt. N
or PO Box N
City, State, Z

PA HISTORICAL &
MUSEUM COMMISSION
BUREAU OF HISTORIC PRESERVATION
400 NORTH ST., 2nd FLOOR
HARRISBURG PA 17120-0093

PS Form 3800 ...ons

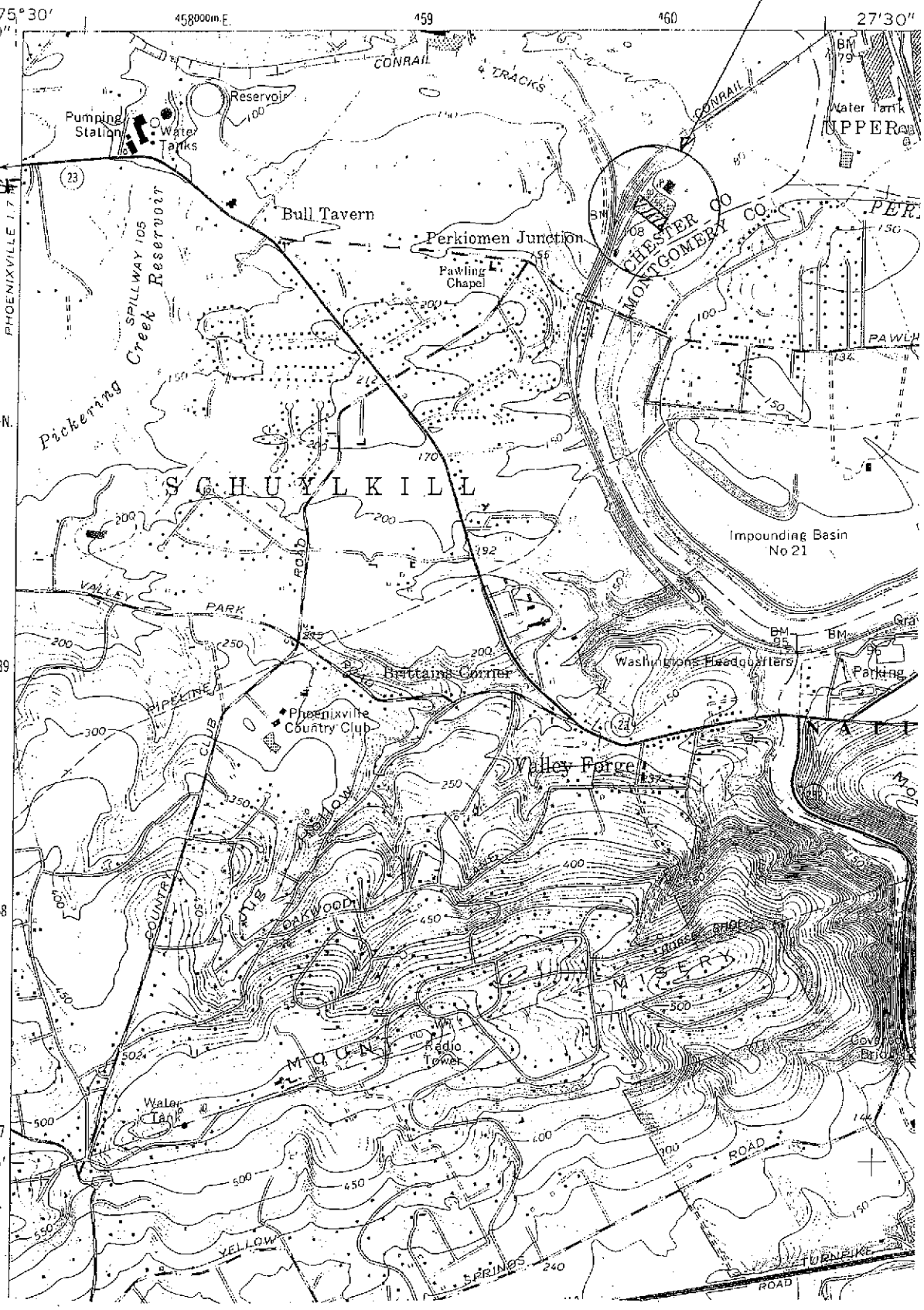
PROJECT NARRATIVE

Valley Forge Sewer Authority is in the process of updating its Regional Act 537 Sewage Facilities Plan. The Authority's existing treatment facilities which are located in Schuylkill Township, Chester County along the Schuylkill River serve 8 surrounding Townships and Boroughs. Several of the alternatives presently under evaluation include the potential for constructing additional treatment tanks on the existing site in an area situated between the existing tankage and the Authority's administrative facilities. Should all of the tankage need to be constructed, it is anticipated that the disturbed area will be a 350' x 1100' area just southwest of the existing tankage as depicted on the attached USGS quad (Valley Forge) and site plan.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Project Site

Max. area to be disturbed 385,000 SF (350' x 1100') SW of existing tankage



VALLEY FORGE, PA.

N4000—W7522.5/7.5

1966
PHOTOREVISED 1981
DMA 5964 III SW—SERIES V831

SCALE 1:24 000

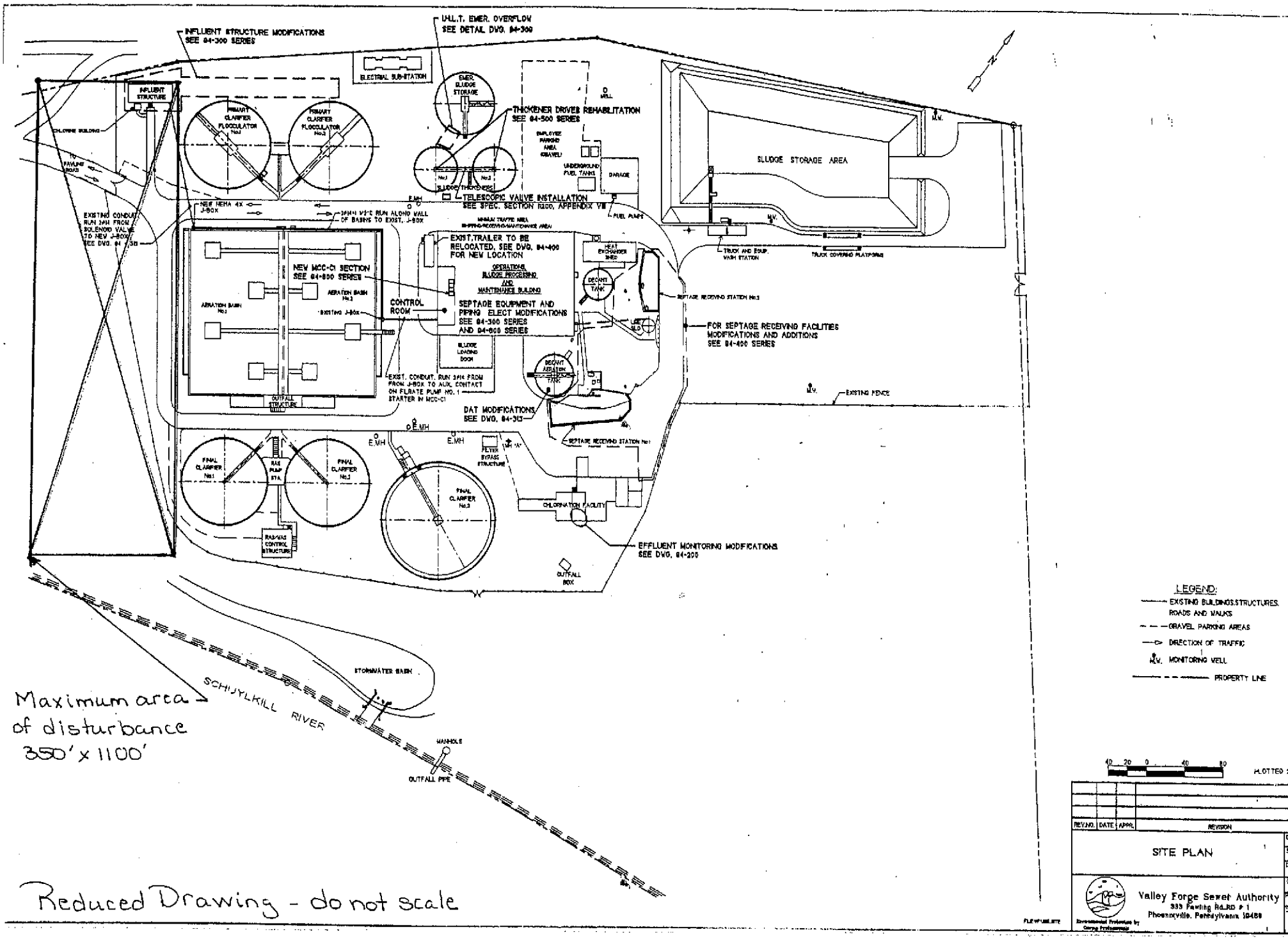
1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CHANGE 23

CONTOUR INTERVAL 10 FEET



Maximum area of disturbance 350' x 1100'

Reduced Drawing - do not scale

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

A. Signature

X R M Donald ☐ Agent ☐ Addres

B. Received by (Printed Name) C. Date of Deli MAR 3 1 200

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

1. Article Addressed to:

PA HISTORICAL &
MUSEUM COMMISSION
BUREAU OF HISTORIC PRESERVATION
400 NORTH ST., 2nd FLOOR
HARRISBURG PA 17120-0093

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchanc
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number
(Transfer from service label) 7004 2510 0004 7530 9739

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-

7004 2510 0004 7530 9739

U.S. Postal Service
CERTIFIED MAIL RECEIPT

For delivery information visit our website at www.usps.com®

OFFICIAL USE

Postage	$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 4.88

D. Vesely

Postmark Here
MAR 29 2006
USPS 17404-4900

Sent To
Street, Apt. N or PO Box N
City, State, Z

PA HISTORICAL &
MUSEUM COMMISSION
BUREAU OF HISTORIC PRESERVATION
400 NORTH ST., 2nd FLOOR
HARRISBURG PA 17120-0093

PS Form 3800 ... ons

Commonwealth of Pennsylvania
Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120-0093
www.phmc.state.pa.us

May 2, 2006

Buchart-Horn, Inc.
445 West Philadelphia Street
PO Box 15040
York, PA 17405

Re: File No. ER 06-1641-029-A
DEP 537 PROGRAM: Act 537 Sewage Facilities Plan Approval, Regional Act 537 Plan-Valley Forge Sewer Authority, Schuylkill Twp., Chester Co.

Dear Sir:

The Bureau for Historic Preservation has reviewed the above named project under the authority of the Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988). This review includes comments on the project's potential effect on both historic and archaeological resources.

A HIGH PROBABILITY EXISTS THAT ARCHAEOLOGICAL RESOURCES MAY OCCUR WITHIN THE PROPOSED PERMIT AREA

Based on an evaluation by our staff, there is a high probability that significant archaeological sites are located in this project area and could be adversely affected by project activities. Although there are no recorded archaeological sites within the project boundaries, the soil type, topographic setting, slope direction, and distance to water of the project area are similar to the settings of known archaeological sites in the vicinity. A Phase I archaeological survey of the project area to locate potentially significant archaeological resources is recommended but not required.

If a survey is not conducted and you encounter archaeological resources during construction, you must stop the project, notify the Pennsylvania Historical and Museum Commission's Bureau for Historic Preservation and the Department of Environmental Resources and allow the Bureau for Historic Preservation 60 days to conduct a survey to determine the significance of the archaeological resources. If the Bureau determines that the resources are significant, you must submit a mitigation plan to protect the significant resources on the site. We will review the plan within 30 days.

There may be historic buildings and/or structures eligible for the National Register of Historic Places located in the project area. However, due to the nature of the activity, it is our opinion that there will be no effect on these properties. Should the applicant become aware, from any source, that unidentified historic resources are located at the project site, or that the project activities will have an effect on these properties, the Bureau for Historic Preservation should be contacted immediately.

FOR YOUR INFORMATION

Pennsylvania Historical and Museum Commission will keep the Determination Notice and the materials you submitted in its files. Please attach this letter to your copy of the Notice and materials then submit the entire package of materials to DEP.

If this project will require any federal permits or will receive federal funding, the federal agency, under the National Historic Preservation Act of 1966, may require the appropriate surveys to be conducted. If the project will need an Army Corp of Engineers permit, this would be a **Category III** activity. We suggest that you consider conducting the survey early in the development or planning process to avoid delays in the future. Guidelines and instructions for conducting Phase I surveys are available from our office upon request.

Thank you for notifying us of your proposed activity.

If you need further information in this matter please consult Mark Shaffer at (717) 783-9900.

Sincerely,

Douglas C. McLearen, Chief
Division of Archaeology &
Protection

Cc: DEP, Southeast Regional Office

DCM/tmw

APPENDIX H

Partner Municipality Flow Projections

Easttown Township

October 3, 2006

Mr. Martin Goldberg, P.E.
VALLEY FORGE SEWER AUTHORITY
333 Pawling Road
Phoenixville, PA 19460

Mr. Thomas S. Brown
GANNETT FLEMING, INC.
P. O. Box 80794
Valley Forge, PA 19484-0794

Re: **Valley Creek Trunk Sewer Act 537 Planning**
Waste Water Flow Projections
Easttown Township

Revised – 10/23/06

Dear Mr. Goldberg and Mr. Brown:

In accordance with your letter request dated September 7, 2006, herein please find the flow projections which shall be used in both the VSFA Act 537 Plan and the Tredyffrin Township Wilson Road Pump Station.

Year 2005	-	1.357 MGD	3510.83 EDUs
Year 2010	-	1.423 MGD	3750.83 EDUs
Year 2015	-	1.443 MGD	3823.56 EDUs
Year 2025	-	1.484 MGD	3972.65 EDUs
Year 2035	-	1.523 MGD	4114.50 EDUs

If you have any further questions, please contact me.

Very truly yours,

Surender S. Kohli, P.E.
Township Engineer
Easttown Township

SSK:cpw

cc: Gene R. Williams
Paul A. Dorais

East Whiteland Township

October 3, 2006

Mr. Martin Goldberg, P.E.
VALLEY FORGE SEWER AUTHORITY
333 Pawling Road
Phoenixville, PA 19460

Mr. Thomas S. Brown
GANNETT FLEMING, INC.
P. O. Box 80794
Valley Forge, PA 19484-0794

Re: **Valley Creek Trunk Sewer Act 537 Planning**
Waste Water Flow Projections
East Whiteland Township

Revised – 10/23/06

Dear Mr. Goldberg and Mr. Brown:

In accordance with your letter request dated September 7, 2006, herein please find the flow projections which shall be used in both the VSFA Act 537 Plan and the Tredyffrin Township Wilson Road Pump Station.

Year 2005	-	1.963 MGD	5393.10 EDUs
Year 2010	-	2.409 MGD	7014.91 EDUs
Year 2015	-	2.809 MGD	8469.45 EDUs
Year 2025	-	3.309 MGD	10,287.63 EDUs
Year 2035	-	3.909 MGD	12,469.45 EDUs

If you have any further questions, please contact me.

Very truly yours,

Surender S. Kohli, P.E.
Township Engineer
East Whiteland Township

SSK:cpw

cc: Terry H. Woodman
William H. Steele

Malvern Borough

EDWARD B. WALSH & ASSOCIATES, INC.
Complete Civil Engineering Design / Consultation Services
Lionville Professional Center
125 Dowlin Forge Road
Exton, PA 19341

October 10, 2006

Mr. Thomas S. Brown
Gannett Fleming, Inc.
PO Box 80794
Valley Forge, PA 19484-0794

Re: Malvern Borough
Wastewater Flow Projections - Act 537 Planning

Dear Mr. Brown,

As per your September 7, 2006 letter to Malvern Borough, I have reviewed the Malvern Borough Wastewater Flow Projections indicated on Table 6 of the letter. The flows projections provided to Gannett Fleming on June 21, 2006 for the Wilson Road Pump Station Act 537 Planning are the flows that should be utilized for Malvern Borough in the Valley Creek Trunk Sewer Act 537 Planning.

If you should have any questions or require additional information, please do not hesitate to contact me.

Very truly yours,
EDWARD B. WALSH & ASSOCIATES, INC.
Malvern Borough Engineers

Daniel H. Daley, P.E.

cc: Sandra L. Kelley, Malvern Borough
Martin Goldberg, Valley Forge Sewer Authority

REGISTERED PROFESSIONAL ENGINEERS & LAND SURVEYORS
Pennsylvania, New Jersey, Delaware, Maryland & North Carolina
610-903-0060 FAX 610-903-0080
www.ebwalshinc.com
Established 1985

MALVERN
Borough

October 28, 2004

Joseph S. Bateman
General Manager
Valley Forge Sewer Authority
333 Pawling Road
Phoenixville, PA 19460

Dear Mr. Bateman:

Please be advised that the Borough of Malvern has reviewed the information contained in the April 2003 version of the Draft Regional Act 537 Plan as it pertains to our municipality. We are satisfied with this information and with the flow projections contained in this draft and do not wish to make any additions or corrections.

We look forward to completion and adoption of the Regional Act 537 Plan.

Sincerely,

Sandra L. Kelley
Borough Manager

One East First Avenue ■ Suite 3 ■ PO Box 437 ■ Malvern, Pennsylvania 19355
Phone 610.644.2602 Facsimile 610.644.4504 Email malvern@malvern.org

TABLE 2.0

BOROUGH OF MALVERN 30-YEAR FLOW PROJECTIONS February-05

VALLEY FORGE SEWER AUTHORITY

2004 CHAPTER 94 REPORT

WASTEWATER FLOW PROJECTIONS

	PRESENT 2004	5-YEAR 2009	10-YEAR 2014	20-YEAR 2024	ULTIMATE 30-YEAR 2034
GPD	346,797	357,797	360,547	393,547	427,372
EDUs	1658	1698	1708	1828	1951

NOTES:

1. **Includes unmetered flow into Willistown Township** and excludes 2 EDU's from East Whiteland Twp and Erin Glen Flow from East Whiteland Twp.
   Malvern Borough has 27 EDUs that flow unmetered into Willistown Twp.
   15 EDUs - Malvern Prep= 4,125 gpd
   12 EDUs - Vintage Development = 3,300 gpd
   Total = 7,425 gpd
2. Projected flows based upon a flow of 275 gallons per day (gpd) per equivalent dwelling unit (EDU).

Tredyffrin Township

BOARD OF SUPERVISORS
TREDYFFRIN TOWNSHIP

Supervisors:
Judy L. DiFilippo, *Chairman*
Paul W. Olson, *Vice Chairman*
Guy L. Ciarrocchi
Bill DeHaven
Warren E. Kampf
E. Brooks Keffer
Robert W. Lamina

CHESTER COUNTY
1100 DuPortail Road
Berwyn, PA 19312

(610) 644-1400 FAX (610) 993-9186
Email: *tredyffrin@tredyffrin.org*
Website: *www.tredyffrin.org*

Joseph A. Janasik
Township Manager

Lamb McErlane PC
Solicitor

RECEIVED
FEB 18 2005

February 17, 2005

Mr. Joseph Bateman, Manager
Valley Forge Sewer Authority
333 Pawlings Road
Phoenixville, PA 19460

Re: Tredyffrin Township Flow Estimates through 2036

Dear Mr. Bateman:

The flow estimates, including EDU counts, through 2039, are as follows:

	2009	**2019**	**2929**	**2039**
MGD (AADF)	1.54	1.84	1.97	2.10
EDU's	6853	7849	8432	8904

2004 reported EDU's: 5973.3

Based on yesterday's conversation, the estimated EDU requirement does not match the estimated flow, based on an EDU equivalent of 275 gpd. This is due to the method used in calculating Tredyffrin Township's annual flow, among other factors. As stated yesterday, if this discrepancy between EDU's and AADF causes a problem in your submission to DEP, let me know and I can re-evaluate the estimates.

Sincerely,

Stephen F. Norcini

Stephen F. Norcini
Director of Authority Operations

Cc: Joseph A. Janasik
Mimi Gleason
William J. Bryant, P.E.
Tom Brown, P.E.
File

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CHESTER COUNTY
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Berwyn, PA 19312

(610) 644-1400 FAX (610) 993-9186
Email: tredyffrin@tredyffrin.org
Website: www.tredyffrin.org

Joseph A. Janasik
Township Manager

Lamb McErlane PC
Solicitor

February 4, 2005

Mr. Joseph Bateman, Director
Valley Forge Sewer Authority
333 Pawlings Road
Phoenixville, PA 19460

Re: Valley Forge Sewer Authority Regional Act 537 Flow Estimates

Dear Mr. Bateman:

Our studies have indicated Tredyffrin Township's estimated flows to the VFSA STP are as follows:

2009 - 1.54 MGD (AADF)
2019 - 1.84 MGD (AADF)
2029 - 1.97 MGD (AADF)

The Township's current treatment plant capacity allocation of 2.01 MGD (AADF) is adequate for the time period through construction of the plant expansion and beyond. We will not purchase additional capacity through the plant expansion.

It is my understanding that in the event of a plant upgrade, the Township is contractually bound to pay for our proportional share of that upgrade. Subsequently, we will receive our proportional share of additional capacity acquired through the upgrade.

I can be reached at 610-408-3623 with any questions.

Sincerely,

Stephen F. Norcini
Director of Authority Operations

Cc: Joseph A. Janasik
Mimi Gleason
William J. Bryant, P.E.
Tom Brown

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Willistown Township

Board of Supervisors of Willistown Township
Chester County

688 Sugartown Road Malvern, PA 19355
(610) 647-5300 Fax (610) 647-8156
www.willistown.pa.us

RECEIVED
JUN 10 2005

June 7, 2005

Valley Forge Sewer Authority
333 Pawlings Road
Phoenixville, PA. 19460

Attn: Mr. Joseph Bateman, Manager

Dear Joe,

After reviewing the draft of the regional 537 plan, I see no area where comments are needed from Willistown Township.

Thank you for your work on this.

Sincerely,

Hugh J. Murray Sr.

Hugh J. Murray, Sr.
Township Manager

File

APPENDIX I

Planning Agencies and Municipalities

Correspondence

BUCHART HORN, INC.

Buchart-Horn, Inc
445 W Philadelphia St.
York, PA 17401-3383
(717)852-1400
FAX#717-852-1401
www.bh-ba.com

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King of Prussia, PA
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Baltimore, MD
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Morgantown, WV
Memphis, TN
Nashville, TN
Baton Rouge, LA
New Orleans, LA
Olive Branch, MS
Pensacola, FL
Frankfurt/Main, Germany
Kaiserslautern, Germany

March 12, 2007

Mr. Martin Goldberg
Valley Forge Sewer Authority
333 Pawling Road
Phoenixville, PA 19460

Reference: **Act 537 Sewage Facilities Plan Update**
BH #75297-61

Dear Mr. Goldberg:

Provided are the comments received from the Chester County Planning Commission, East Whiteland, Charlestown, Schuylkill, and Tredyffrin Townships, and the corresponding responses prepared by Buchart-Horn on behalf of the Authority. These comments and responses are to be inserted into Appendix I of the Act 537 Sewage Facilities Plan Update. The comments and responses are organized as follows:

1. Chester County Planning Commission comments
2. Chester County Planning Commission responses to comments
3. East Whiteland Township comments
4. Charlestown Township comments
5. Schuylkill Township comments
6. Tredyffrin Township comments
7. Response to all municipalities comments

Respectfully yours,

BUCHART-HORN, INC.

Lawrence A. Lutter, P.E.
Vice President

BLB
Enclosures

cc: All Plan Holders

Recycled Paper

THE COUNTY OF CHESTER

COMMISSIONERS
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Donald A. Mancini
Patrick C. O'Donnell

RONALD T. BAILEY, AICP
Executive Director

PLANNING COMMISSION
Government Services Center, Suite 270
601 Westtown Road
P.O. Box 2747
West Chester, PA 19380-0990
610-344-6285
Fax: 610-344-6515

February 15, 2007

Martin Goldberg
Valley Forge Sewer Authority
333 Pawling Road
Phoenixville, PA 19460

Re: Valley Forge Sewer Authority Regional Act 537 Plan

Dear Mr. Goldberg:

The Chester County Planning Commission (CCPC) has reviewed the Draft 537 Plan dated November 2006, as required by Section 71.31 (b) of the Pennsylvania Sewage Facilities Act (Act 537). The Plan was prepared by Buchart Horn, Inc. and Gannett Fleming. The Plan was received on December 15, 2006.

This Plan was prepared to identify and select an appropriate alternative to increase the wastewater disposal capabilities of the Valley Forge Sewer Treatment Plant (VFSTP), Schuylkill Township, to meet the long-term growth needs of the communities Valley Forge Sewer Authority (VFSA) serves.

The CCPC supports the corrective measures of this Plan as they relate to the Treatment Plant expansion to accommodate the needs of the Service Area Municipalities. The CCPC would like to commend both the VFSA and its Service Area Municipalities for satisfying the requirements of Act 537, by requiring municipalities to initiate service area revisions through the municipal planning process and needs analysis evaluations. The CCPC recommends the Plan be adopted after addressing comments in this letter.

The following comments are offered based on review of the draft Plan:

A. Consistency with the County Plan – ***Landscapes***:

1. ***Landscapes***, through use of the *Livable Landscapes Map*, identifies four general land patterns, or Landscapes, of future development in the County – urban, suburban, rural and natural. The Suburban Landscape, in which the Service Area Municipalities and the VFSTP are located, is to contain a mix of uses and higher densities of development than those found in the Rural Landscape. In order for this pattern to occur, ***Landscapes*** supports the provision of infrastructure and public services, such as public sewer systems. VFSA's draft Regional Plan supports ***Landscapes*** Policies:

6.1.1 Encourage coordination between municipalities and authorities to ensure consistency with land use plans.

6.1.2 Maintain or expand existing sewer and water facilities to support development in Urban and Suburban Landscapes.

2. ***Watersheds***, through its goals and objectives, identifies Part 6, *Planning for Future Water and Wastewater Needs*, as a means to assist municipalities and utilities providers to consider and develop Integrated Water Resources Planning to more effectively integrate infrastructure and land use planning. Objective 6-9 of ***Watersheds*** states, "Locate large water withdrawals and wastewater effluent disposal facilities where they provide the greatest benefit and least impact to watershed aquifers and streamflows." The VFSA Service Area is located in portions of the Valley Creek and Pickering Creek, and tributaries to the Schuylkill River, where the treated effluent for the VFSA is disposed of through stream discharge. Though it is unclear in the Plan where water is being drawn from, the CCPC recommends that the VFSA discharge only the amount of treated effluent equivalent to the amount of water drawn from any one watershed to maintain the stream flow and water balance for that watershed, through groundwater recharge of the aquifer, where possible.

B. Selection of Alternative:

1. We commend the VFSA and its member municipalities for addressing the need for increased capacity at the VFSTP to the year 2025, and beyond. In June 1999, the CCPC supported the re-rating of the VFSTP from 8.0 million gallons per day (mgd) to 9.2 mgd, just as we support the expansion of the treatment plant (Alternative 3e) to accommodate 11.52 MGD, to meet the needs of the VFSA municipalities and their partner municipalities, as outlined in section 4 "Future Growth and Land Development."

C. General Comments

1. For clarity, please include in the Plan Summary what the existing capacity of the VFSA treatment plant is, as well as what the proposed capacity will be.

2. Please include information as to the location of the discharge point into the Schuylkill and its proximity to both the Philadelphia Water Department's drinking water intake.

3. If applicable, please include information as to the VFSA withdrawal point and its relationship to the Aqua PA intake.

4. Please include in the Appendices the actual sections of the municipal Act 537 Plans that outlines their Needs Analysis that is included in Section 3 of the Regional Plan.

5. Page E-1. Plan Summary. Please clarify the difference between the VFSA Townships and the Member Municipalities, as they relate to the overall Service Area Municipalities.

6. Page E-1. Plan Summary. While the CCPC is aware that the planning efforts for this regional plan began in 1994, and that projections are considered up-to-date, please include any information as to the sources and dates that information was obtained for clarity and correctness.

7. Page E-2. Plan Summary. Please provide any information from DEP, as to why the first four sections did not require revision. The CCPC feels that population projections as well as additional needs and up-to-date information on on-lot systems on behalf of the Service Area Municipalities should have been considered in this portion of the plan where information available is more recent than 1994.

8. Page E-2. Associated Planning. The Plan states that Tredyffrin Township is conducting Act 537 Planning for the Valley Creek Trunk Sewer (VCTS) to determine if the conveyance facilities have adequate capacity to convey the projected wastewater flows to the VFSA treatment plant. Has the VFSA considered how the selected alternative will be affected if this planning effort shows that the conveyance facilities cannot handle the proposed capacity? If so, please include this information in the body of the Plan.

9. Page E-2. Associated Planning. The Plan states that Act 537 planning for the Wilson Road pumping station and the VCTS are near completion and expected to be approved in March of 2007. The CCPC has not reviewed this Plan to date. If there is a delay in the approval process, is the VFSA in a position to wait for the planning efforts to come to a close before needing additional capacity in these systems, and how will this planning effort be incorporated into the Regional Plan?

10. Page E-4. Cost of Implementation. The Plan states that the Partners will share the cost of the expansion and improvements; please clarify whether the Partners are the VFSA municipalities, the Member municipalities, or both.

11. Page E-5. The text specifies that the partner and member municipalities were provided the opportunity to review and adopt the recommendations of the Update. For clarity, CCPC recommends changing the text to read the Service Area Municipalities.

12. Page 1-2. The Regional Planning Process. The CCPC would like to commend the VFSA for satisfying the requirements of Act 537, by requiring municipalities to initiate service area revisions through the planning process and needs analysis evaluations.

13. Page 1-3. Table 1-1 Please include the date that this table was compiled to ensure that the most up-to-date information has been included for review in the development of this Regional Act 537 Plan.

14. Page 1-4. Previous Wastewater Planning. The CCPC would like to commend the VFSA for examining ways to reduce I/I in the system.

15. Page 1-7. Individual Act 537 Sewage Facilities Plans – Summary of VFSA Participation Information. The text states that "as of this writing; only three of the VFSA Service Area Municipalities have plans approved by PADEP." However, Table 1-1 shows that all of the municipalities have full or conditional approval from DEP, with dates ranging from 1994-2002. Please clarify this discrepancy.

16. Pages 1-7 to 1-11. Individual Act 537 Sewage Facilities Plans – Please include the dates of the municipal plans as they were approved by DEP for reference and clarity.

17. Page 1-9. Individual Act 537 Sewage Facilities Plans – The information for Malvern Borough does not reflect that the Plan was adopted in 1995 as Table 1-1 shows. Please clarify this discrepancy.

18. Page 1-10. Individual Act 537 Sewage Facilities Plans – Schuylkill Township. This section states that the Plan describes the number of EDU's expected to be added to the VFSA system, in the 1996 DEP approved plan, but does not clearly state how many EDU's it expects the Authority to treat. Please clarify this information, as it affects the total flows to the VFSA treatment plant.

19. Page 1-13. County Planning Documents. For reference purposes, the Livable Landscapes map was last updated in 2003. Please update the text to reflect this change.

20. Page 1-13. County Planning Documents. ***Watersheds***, through its goals and objectives, identifies Part 6, *Planning for Future Water and Wastewater Needs*, as a means to assist municipalities and utilities providers to consider and develop Integrated Water Resources Planning to more effectively integrate infrastructure and land use planning. Please include consistency information with ***Watersheds*** in this section of the Plan.

21. Page 1-14. Sewage Facilities Inventory 1991. Please clarify in the 2nd paragraph as to what the VFSA is equating 1 EDU to, in gallons per day, so that it is clear what the gallons per day is for the 25,540 EDU's being served by the VFSA.

22. Page 2-4. Major Drainage Basins. Please include text stating that the Darby Creek has a DEP approved Act 167 Plan for the watershed.

23. Page 2-8. Potable Water Supplies. ***Watersheds*** Objective 3-2 deals with natural instream resources and includes key strategies regarding base stream flow and the impacts of withdrawals and discharges. Please include information on the overall water balance and how both the receiving waters as well as the source waters, if not public water, will be affected by the discharge and withdrawal of an additional 2.3 MGD.

24. Page 3-1. VFSA Wastewater Treatment System. The text states that effluent is discharged into the Schuylkill River upstream from Pawling Road. For clarity, please include language stating that Pawling Road is where the VFSA treatment plant is located.

25. Page 3-1. VFSA Wastewater Treatment System. Please include text that states where the water that is being used for the system is being drawn from.

26. Page 3-7. Major VFSA Service Area Sewer System Components. Please include additional text outlining how the funding for the proposed expansion will be divided amongst the Service Area Municipalities.

27. Pages 3-10 to 3-13. For clarity, please include the adoption dates for all municipal plans or their approval dates from DEP.

28. Pages 3-10 to 3-13. For clarity, please include the total EDU's that each municipality is currently using.

29. Page 3-10. Charlestown Township. The text states that the Tyrone Farms neighborhood was served by a community sewer system. Please clarify how this neighborhood is currently being treated, whether it is through a replacement system, through a tie-in to the VFSA system, or otherwise.

30. Page 3-11. East Whiteland Township. Please include in the text the number of failing systems reported by the Chester County Health Department, as well as whether these two areas are planned for connection to the VFSA system.

31. Page 3-12. Malvern Borough. Although there are no current developments planned for the latter two parcels of land, please include any information as to what will be required if these parcels are ever planned for development. If public sewer connections will be required, please include information as to how that connection will be funded.

32. Page 3-12. Schuylkill Township. Please include any additional information on the holding tank ordinance that the Township is intending to adopt, as well as which year the on-lot management program is to be implemented. The CCPC recommends that all municipalities adopt an ordinance requiring regular management, inspection and pump-out of individual sewage systems, established in a legally enforceable manner.

33. Page 3-13. Willistown Township. Please include the number of failing systems, as well as the date the information was obtained. If this information is outdated, it is possible that the systems have since been repaired.

34. Page 3-14. The text states that VFSA has its own landfill disposal approvals. Please include any agreements or permitting information in the Appendix.

35. Page 4-1. Please include information as to what the VFSA is using as 1 EDU in gallons per day, so that it is clear what the gpd is for the 25,511 EDU's being served by the VFSA at the end of 2005.

36. Page 4-2 to 4-4-7. Please define what the VFSA defines "build out" to be. Is this the total capacity allocated to the municipalities before the VFSA would need to explore additional capacity and expansion option? Or is this build out for municipalities? Please clarify.

37. Page 4-2 to 4-4-7. For clarity, please format this section to have the EDU projections and the associated narrative for the municipalities appear together on the same page.

38. Page 4-3. Malvern Borough. For clarity, please include information on the most recent Chapter 94 Report submitted by the Borough and any information on its approval.

39. Page 4-7. Summary. Please clarify the discrepancy between the use of 2025 and 2035 as the end point of this study. This summary identifies 2035 as the end point of this study, but earlier points use the date of 2025.

40. Page 5-2. The Plan states that an Ad Hoc committee was formed for the purpose of reviewing and assisting the VFSA in establishing future needs. Please include information concerning the members of this committee and what their affiliations are - to the Authority, the Service Area Municipalities, or other groups.

41. Page 5-3. This draft Regional Plan lists the option of spray irrigation and satellite facilities as an eliminated alternative. While the CCPC realizes the associated issues with constructing a land disposal facility, we feel that further consideration should be given to drip irrigation, if not for all the additional flows, for new developments that are being proposed, where conditions are appropriate. We understand the need to provide additional sewage treatment capacity to meet future needs, and support your efforts in this regard. The CCPC realizes that this draft Regional Plan has been under development for over 10 years and that the Service Area Municipalities would like to see the completion of the Plan, however, we feel that further consideration should be given to this alternative. Not only has the technology and understanding of land application of wastewater progressed in the 11 years since VFSA sent out letters to municipalities assessing the viability of obtaining lands for spray irrigation, there have been changes in the members of the municipal boards and current board members may be more open to the idea of land application of wastewater, especially with the option of drip irrigation versus spray irrigation.

42. Page 5-12. Alternative 3. The CCPC would like to commend the VFSA for examining additional denitrification measures, even though they have not been imposed. We recommend that the VFSA continue to explore these options for Total Maximum Daily Load (TMDL) purposes.

43. Page 5-13. Existing Wastewater Treatment Plant Capacity. The text states that there was an assessment of the capacity and recommended upgrades of each individual component of the existing plant. Please provide information on who assessed the system.

44. Page 6-1. Table 6-1. Consistency Evaluation of Selected Alternative from Section 5. Please update the table to include consistency with ***Watersheds***.

45. Page 6-1. Table 6-1. Consistency Evaluation of Selected Alternative from Section 5. Please update the table to include the adoption/approval dates of the municipal comprehensive plans.

46. Page 6-2. Table 6-1. Consistency Evaluation of Selected Alternative from Section 5. Under the Evaluation Category for Antidegradation requirements, no information is provided as to the source of water supplied to the VFSA for their system. If it is Valley Creek or French Creek, then an HQ/EV stream is being impacted and this information should be included.

47. Page 6-2. Table 6-1. Consistency Evaluation of Selected Alternative from Section 5. Under the Evaluation Category for Chester County Stormwater Management Plans (Act 167). At the current time, Chester County Act 167 Plans have been prepared and adopted by the Chester County Commissioners for the Chester Creek Watershed Stormwater Management Plan, the Darby-Cobbs Creek Watershed Stormwater Management Plan, and the Conestoga River Watershed Stormwater Management Plan, and Act 167 Plans are underway for the Valley Creek Watershed and the Crum Creek Watershed. Portions of the Service Area lie within the Darby Creek watershed. The CCPC recommends referring to municipal documents to ensure that all up-to-date stormwater ordinances are being followed.

48. Page 6-6. Table 6-3. Estimated 2006 Annual Operating Costs. The Plan states that no operating costs for alternative 3d were developed. Please explain why no estimates were prepared for this alternative.

49. Page 6-8. Table 6-4. 2006 Present Worth Analysis. The Table shows that a present worth analysis was not created for alternative 3a. Please explain why an analysis was not prepared for this alternative.

50. Page 6-12. Table 6-7 Project Cost Sharing Based on 2006 Dollars. Please include in this section any letters of agreement from the municipalities, in particular East Whiteland Township, to show that they agree and are willing to fund their portion of the expansion, at approximately $12.4 million.

We trust that these comments will be of assistance to you as you prepare the final document for submission to PADEP. Thank you for the opportunity to offer comments on this plan.

Sincerely,

Ronald T. Bailey, AICP
Secretary

RTB/CJC/kp

cc: Clinton Cleaver, PADEP
Ralph DeFazio, CCHD
Linda Csete, Township Administrator, Charlestown Township
Kimberly Moretti, Manager, East Pikeland Township
Gene R. Williams, Manager, Easttown Township
Terry Woodman, Manager, East Whiteland Township
Sandra Kelley, Manager, Borough of Malvern
Mary R. Bird, Secretary, Schuylkill Township
Mimi Gleason, Manager, Tredyffrin Township
Hugh Murray, Manager, Willistown Township

Responses to Chester County Planning Commission General Comments

Comment 1. The existing plant capacity is 9.2 MGD, and the proposed capacity is 11.52 MGD.

Comment 2. The Philadelphia Water Department's intake for the Queen Lane Plant is on the Schuylkill River approximately 0.5 miles below the confluence with the Wissahickon Creek and on the bank of the same side of the Schuylkill River as the Wissahickon Creek. The Belmont Plant is located in Wynnefield and its water also comes from the Schuylkill River. Its intake is located along Martin Luther King, Jr. Drive (formerly West River Drive).

The WWTP's discharge to the Schuylkill River is at:
Latitude - 40° 07' 05" Longitude - 75° 27' 56"

Comment 3. See Table 2-1, page 2-9 for information on withdrawl points.

Comment 4. The Valley Forge Sewer Authority's (VFSA) Act 537 Plan Update is a compilation of the Service Area Municipalities (SAM) individual Act 537 Plans. For information from the SAM 537 plans, see the approved plans.

Comment 5. The member municipalities are: Charlestown, East Pikeland, and Schuylkill Township. The partner municipalities are: Easttown, East Whiteland, Malvern, Tredyffrin, and Willistown. The SAM's are the combination of the member and partner municipalities.

Comment 6. The flow projections for this Act 537 Plan were validated by the individual municipalities as included in Appendix H.

Comment 7. This Act 537 Plan is based solely on information from the individual SAM Act 537 Plans, so the information in this plan is updated based on information provided by the individual municipalities.

Comment 8. See information related to the Valley Creek Trunk Sewer (VCTS) and Wilson Road Pump Station on page E-2.

Comment 9. The VFSA is in a position to wait for the planning efforts to come to a close before needing additional capacity in these systems. The VFSA's 537 Plan Update addresses treatment of the wastewater once it reaches the WWTP. The individual municipalities are responsible for the planning for the system.

Comment 10. Both the partner municipalities and the member municipalities will share the cost of the expansion and improvements. The Partners requiring additional capacity will share in the cost of the expansion.

Comment 11. This recommendation is accepted.

Comment 12. No response is required.

Comment 13. The table is current as of November 2006.

Comment 14. No response is required.

Comment 15. The table was updated to show the approval dates, but the text of the section was not updated.

Comment 16. See Table 1-1 for the dates that the municipal plans were approved by the Pennsylvania Department of Environmental Protection (PADEP).

Comment 17. Section one was not updated per PADEP, and at the time of the initial writing, the Malvern Borough plan was submitted and under review. The Borough's plan was then later approved after the VFSA's plan was written.

Comment 18. Schuylkill Township expects a growth of 357 EDU's between 2005 and 2035.

Comment 19. The comment that the Livable Landscapes map was last updated in 2003 is noted.

Comment 20. The Act 537 Plan Update is consistent with the County planning document, Watersheds.

Comment 21. The sentence is referring to the number of billing records for EDU count as opposed to actually flows.

Comment 22. The comment that Darby Creek has a PADEP approved Act 167 Plan for the watershed is so noted.

Comment 23. The water balance will stay consistent with the amount of water withdrawn and the amount discharged.

Comment 24. For clarification, the VFSA WWTP is located on Pawling Road.

Comment 25. The water that is being used for the system is drawn from locations throughout the VFSA service area as identified in Table 2-1.

Comment 26. See Section 6 of the Act 537 Plan Update for information on how the funding for the proposed expansion will be divided amongst the Service Area Municipalities.

Comment 27. See Table 1-1 for the individual Act 537 Plan approval dates by PADEP.

Comment 28. See Table 4-8 for the total EDU's that each municipality is currently using.

Comment 29. Tyrone Farms is not serviced by a community service system. The Charlestown Road and Coldstream area have their sewer linked to the Charlestown Road Pump Station in Schuylkill Township. The sewer servicing the dwellings in the Maryhill Road and Pine Drive neighborhoods are linked to the Kimble Drive Pump Station in East Pikeland Township.

Comment 30. East Whiteland Township does not know the number of failing onlot systems. However, due to the age of systems and soils, the area adjacent to Bacton Hill Road, Planebrook area, and areas around the intersection of Rt. 352 and King Road are susceptible to failure. There were five (5) onsite replacements and 13 onsite repairs between June 2002, and July 2006, within the above noted areas.

Comment 31. The developer will be required to connect the sewer system of the development to the existing conveyance system.

Comment 32. Schuylkill Township does not have a holding tank ordinance. With regard to on-lot sewage disposal, the Township has always deferred to the Chester Co. Health Department concerning permitting and enforcement of on-lot systems. The Township does get involved with making sure that the pump & haul systems that are used in the winter by developers meets all the necessary requirements.

Comment 33. Failing connections in Willistown Township is estimated at between 10 and 20 according to Ross Fisher, of the Chester Co. Health Dept.

Comment 34. As of last year, the VFSA was approved for disposal at the following landfills, but please note the VFSA has not disposed of biosolids in any landfill since the May-June reporting period of 1998:

A) Chester County Solid Waste Authority (Lanchester Landfill), PO Box 476, Honey Brook, PA, 19344.
B) BFI-Conestoga Landfill, 420 Quarry Road, PO Box 128, Morgantown, PA, 19543.
C) Waste Management (G.R.O.W.S. Landfill, Pottstown Landfill), 1000 New Ford Mill Road, Morrisville, PA, 19067.

Comment 35. Each municipality uses billing records for their EDU counts, as the actual flow the WWTP is approximately 300 gpd/EDU. Each municipality is responsible for their own flow projections.

Comment 36. The VFSA defines "build out" in terms of build out of the Act 537 service area in each municipality, not in regard to the total capacity allocated to the municipalities at the WWTP.

Comment 37. The comment is noted about formatting, see Table 4-8 for the overall projections.

Comment 38. At the time of this Act 537 Plan Update, the most recent information from Malvern Borough's Chapter 94 Report is included.

Comment 39. 2025 projections were prepared for the study, but design of the WWTP upgrade and expansion, and cost breakdown is based on 2035 projections.

Comment 40. The committee consisted of representatives of Schuylkill Twp, the VFSA, and their engineer of record, Buchart-Horn Inc.

Comment 41. Comment and suggestions noted.

Comment 42. Comment noted, as no response is required.

Comment 43. The assessment of the capacity and recommended upgrades of each individual component of the existing plant was completed by Buchart-Horn, Inc. of York, PA.

Comment 44. The Act 537 Plan Update is consistent with the concepts of the County document, Watersheds.

Comment 45. The individual Act 537 Plan's for the Service Area Municipalities are consistent with their comprehensive plans, therefore the VFSA Act 537 Plan Update is consistent with the comprehensive plans as it is a compilation of all the individual plans.

Comment 46. The water systems that feed the VFSA system is provided in Table 2-1.

Comment 47. The comment is noted.

Comment 48. No operation costs were developed for alternative 3d, because it would be difficult to assess the costs for innovative alternatives that are still in developmental stages. Insufficient information is available on their systems to make a reasonable cost estimation.

Comment 49. The present worth of alternative 3a is the same as 3b without adding the cost of the 4th secondary clarifier.

Comment 50. Municipalities have agreed to pay their portion of the upgrade and expansion, and no comments were received from the municipalities in regard to this question during their review of the Plan.

KOHLI AND ASSOCIATES, INC.

49 LLOYD AVENUE MALVERN, PA 19355 (610) 644-5591 FAX (610) 647-9212

CONSULTING ENGINEERS

SURINDER S. KOHLI, P.E.
PRESIDENT

January 8, 2007

Terry H. Woodman
Township Manager
EAST WHITELAND TOWNSHIP
209 Conestoga Road
Frazer, PA 19355

Re: **Regional Act 537 Plan for**
Valley Forge Sewer Authority
Dated November, 2006

Dear Terry:

I have reviewed the above referenced document and found that the EDU/Flow Growth Estimates as noted in Table 4-2 are in compliance with our projected flows submitted with my letter dated October 3, 2006, and are satisfactory. The Plan notes (see Page E-2 - Associated Planning) that Act 537 planning for the Valley Creek Trunk Sewer and the Wilson Road Pumping Station is a critical component of the VCTS, to determine if the conveyance facilities have adequate capacity to convey the projected wastewater flows to the Valley Forge Sewer Authority wastewater treatment plant.

It is further noted that Act 537 planning for the Wilson Road Pumping Station and VCTS is nearing completion and is expected to be approved in March, 2007. As conveyance is a critical component, it is important that the 537 Plan for VFSA and VCTS be reviewed simultaneously. No information regarding the VCTS Act 537 Plan has been submitted.

Table 1-1, Page 1-3, under Municipal Adoption for East Whiteland Township, shall be revised to note the adopted date of June 12, 1995.

Page 4-2, 4th line under "East Whiteland," shall be revised to read, East Whiteland latest Chapter 94, in lieu of Easttown.

Under Eliminated Alternatives, Alternate 1 on Page 5-3 shall be revised to note Alternative 1 was eliminated in lieu of Alternative 4. I would recommend that you review the Project Cost Sharing as shown on Table 6-7, Institutional Evaluation Section 7, and Capitol Financing Plan Section 8 for their acceptability.

If you have any further questions, please contact me.

Very truly yours,

Surender S. Kohli, P.E.
Township Engineer
East Whiteland Township

SSK:cpw

KOHLI AND ASSOCIATES, INC.

42 LLOYD AVENUE MALVERN, PA 19355 (610) 644-5591 FAX (610) 647-9212

CONSULTING ENGINEERS

SURENDER S. KOHLI, P.E.
PRESIDENT

January 8, 2007

Mr. Kevin R. Kuhn, Chairman
BOARD OF SUPERVISORS
CHARLESTOWN TOWNSHIP
P. O. Box 547
Devault, PA 19432

Re: **Regional Act 537 Plan**
For Valley Forge Sewer Authority

Dear Kevin:

I have reviewed the Charlestown EDU projections by subdivision as noted on Table 4-5 and found that the EDU numbers are consistent with the information previously reviewed and transmitted to the Valley Forge Sewer Authority in September, 2006 and are satisfactory.

If you have any further questions, please contact me.

Very truly yours,

Surender S. Kohli, P.E.
Township Engineer
Charlestown Township

SSK:cpw

cc: Martin Goldberg, P.E. – V.F.S.A.

Bakner, Brent

From: Martin Goldberg [mgoldberg@vfsa.com]
Sent: Friday, February 16, 2007 3:13 PM
To: Bakner, Brent
Subject: FW: Act 537 Comments

From: SCHUYLKILLOFFICE@aol.com [mailto:SCHUYLKILLOFFICE@aol.com]
Sent: Thursday, February 15, 2007 4:44 PM
To: Martin Goldberg
Subject: Re: Act 537 Comments

Marty:

I just unearthed the message that you called. Sorry. Dealing with snow issues today. To date, I do not have any comments from the Supervisors regarding the Act 537.

Mary

Gannett Fleming

GANNETT FLEMING, INC.
P.O. Box 80794
Valley Forge, PA 19484-0794
Location:
Valley Forge Corporate Center
1010 Adams Avenue
Audubon, PA 19403-2402
Office: (610) 650-8101
Fax: (610) 650-8190
www.gannettfleming.com

March 12, 2007

Mr. Martin Goldberg, P.E.
Valley Forge Sewer Authority
333 Pawlings Road
Phoenixville, PA 19460

Re: VFSA Regional Act 537 Plan

Dear Mr. Goldberg:

On behalf of Tredyffrin Township, we have reviewed the referenced Act 537 Plan. We have the following comments:

1. On page 1-3, Table 1-1, on the Tredyffrin Township line, add Willistown Township as one of the municipalities with which Tredyffrin maintains an agreement.

2. On page 3-9, the Force Main paragraph: The design capacity of the Wilson Road force main is as follows:

    a. Instantaneous peak flow rate = 20.2 mgd

    b. Equivalent average daily flow = 8.78 mgd

3. Tredyffrin and Gannett Fleming have revised Tredyffrin's flow projection from what is shown in the Act 537 Plan. The anticipated 2035 wastewater flow is 2.3 mgd, rather than 2.1 mgd. The revised flow projection table is attached.

If you have any questions about our comments, please contact me.

Very truly yours,
GANNETT FLEMING, INC.

Thomas S. Brown, P.E.
Senior Project Manager

Cc: Stephen Norcini

TABLE A

Future Connections and Flows
Service Areas A and B

Location	Total EDUs	Total Flows (gpd)	2010 EDUs	2015 EDUs	2025 EDUs	2035 EDUs
Paoli Transportation District (Amtrak)	200	55,000	100	100	-	-
Paoli Town Center District	250	68,750	100	100	50	
O'Neil Property	200	55,000	200	-	-	-
Atwater	766	210,650	250	250	266	-
Liberty Ridge	69	18,975	69	-	-	-
Vanguard (80 acres)	35	9,625	-	35	-	-
Unsewered Area A - Commercial	110	30,250	50	50	10	-
Fox Properties (Chesterbrook)	60	16,500	60	-	-	-
Redevelopment	150	41,250	50	100	-	-
Northwest Portion of Twp. (Shadow Oak & vicinity)	320	88,000	-	160	160	-
Misc. - 15 EDUs/year	450	123,750	75	75	150	150
Change of Use -10 EDUs/year	300	82,500	50	50	100	100
Totals	2,910	800,250	1004	920	736	250

Estimated Flow Increase (gpd)		800,250	276,100	253,000	202,400	68,750
Total Estimated Flow (gpd)		Base Flow 1,500,000	1,776,100	2,029,100	2,231,500	2,300,250
Rounded Flow (gpd)		Base Flow 1,500,000	1,776,000	2,029,000	2,232,000	2,300,000

TABLE B

Tredyffrin Township Flows to Valley Forge Sewer Authority

Year	AADF
1995	1.44
1996	2.03
1997	1.61
1998	1.31
1999	0.99
2000	1.21
2001	1.20
2002	1.48
2003	1.50
2004	1.10
2005	1.13
2006 (to date)	1.17

Tredyffrin Township current treatment plant capacity = 2.001 mgd

Tredyffrin Township's Base Flow = Highest annual flow since 2000 = 1.50 mgd

Gannett Fleming

GANNETT FLEMING, INC.
P.O. Box 80794
Valley Forge, PA 19484-0794

Location:
Valley Forge Corporate Center
1010 Adams Avenue
Audubon, PA 19403-2402

Office: (610) 650-8101
Fax: (610) 650-8190
www.gannettfleming.com

March 12, 2007

Mr. Martin Goldberg, P.E.
Valley Forge Sewer Authority
333 Pawlings Road
Phoenixville, PA 19460

Re: Wilson Road Pumping Station and
Valley Creek Trunk Sewer
Act 537 Plans
Charlestown Township Flows

Dear Mr. Goldberg:

We are incorporating Tredyffrin Township's comments into the Wilson Road Pumping Station Act 537 Plan. The revised Plan will be distributed to the Valley Forge Sewer Authority (VFSA) and the Valley Creek Trunk Sewer (VCTS) municipalities within the next few weeks.

We are still uncertain, however, as to how much of Charlestown's wastewater flow is expected to be conveyed through the VCTS. Charlestown's ultimate wastewater flow projection to the Valley Forge Wastewater Treatment Plant will be approximately 404,000 gallons per day (gpd) by 2035, according to information contained in VFSA's Regional Act 537 Plan. We understand that part of the flow is and will be conveyed through the East Whiteland Trunk Line to the VCTS and the remainder will be conveyed to the Valley Forge WWTP by other means.

Please provide an estimate of the projected Charlestown wastewater flow that is to be conveyed through the VCTS for the years 2010, 2015, 2025, 2035. This is needed for the refinement of the Wilson Road Pumping Station and VCTS capacity evaluations.

If you have any questions about our data request, please contact me.

Very truly yours,
GANNETT FLEMING, INC.

Thomas S. Brown, P.E.
Senior Project Manager

Cc: Stephen Norcini

Comment from Municipalities Review

East Whiteland Township – Kohli and Associates, Inc.

1. Table 1-1, Page 1-3, under Municipal Adoption for East Whiteland Township, shall be revised to note the adopted date of June 12, 1995.
2. Page 4-2, 4th line under "East Whiteland," shall be revised to read, East Whiteland's latest Chapter 94, in lieu of Easttown.
3. Under Eliminated Alternatives, Alternative 1 on Page 5-3 shall be revised to note Alternative 1 was eliminated in lieu of Alternative 4. Project cost sharing, institutional evaluation, and capital financing have all be reviewed for acceptability.

Charlestown Township – Kohli and Associates, Inc.

Comment noted that Charlestown Township accepts the EDU numbers presented in Table 4-5.

Schuylkill Township – Mary Bird

Email received On February 15th stating that no comments are made by the Supervisors of Schuylkill Township.

Tredyffrin Township - Gannett Fleming, Inc.

1. On page 1-3, Table 1-1, on the Tredyffrin Township line, add Willistown Township as one of the municipalities with which Tredyffrin maintains an agreement.
2. On page 3-9, add the design capacity of the Wilson Road force main is as follows:
    a. Instantaneous peak flow rate = 20.2 mgd
    b. Equivalent average daily flow = 8.78 mgd
3. The revised flow projection for Tredyffrin affects the cost sharing for the plant expansion. See revised Table 6-7 attached for the updated cost sharing.

Wilson Road Pumping Station and Valley Creek Trunk Sewer - Gannett Fleming, Inc.

The projected wastewater flow from Charlestown Township that is to be conveyed through the VCTS in gpd is listed below. It is clarified that 578 existing EDUs allocated to East Pikeland and Schuylkill Townships are actually Charlestown Township EDUs. The correction to Table 4-8 as presented below does not impact the flow projections or cost allocation to the Member Municipalities.

Table 4-8 EDU and flow projection (Present – 2035) as revised

Municipality	Current Reserved Capacity	Present (2005)		5-Year (2010)		10-year (2015)		20 & 30 Year (2025 / 2035)	
		gpd	EDU	gpd	EDU	gpd	EDU	gpd	EDU
Member Municipalities									
Charlestown	n/a		1,127	351,120	1,463	449,280	1,872	542,640	2,261
East Pikeland	n/a		2,488	659,520	2,748	697,200	2,905	721,680	3,007
Schuylkill	n/a		2,590	657,360	2,739	689,040	2,871	707,280	2,947
VFSA Subtotal	2,128,000	1,479,635	6,205	1,668,000	6,950	1,835,520	7,648	1,971,600	8,215
Member flow to VCTS			549	212,400	885	310,560	1,294	403,920	1,683

Table 6-7. Project Cost Sharing Based on 2006 Dollars

Plant expansion

Estimated total	$13,970,000		
	MGD *	Percent of expansion	Est. $ share expansion cost
Easttown	0.000	0.00	$0
East Whiteland	1.969	73.99	$10,336,403
Malvern	0.000		
Tredyffrin	0.299	11.24	$1,570,228
Valley Forge	0.000		
Willistown	0.393	14.77	$2,063,369
	2.661	100.00	$13,970,000

Plant upgrade

Estimated total	$5,909,000		
		Percent of upgrade	Est. $ share upgrade cost
Easttown	1.523	0.1655	$978,196
East Whiteland	1.940	0.2109	$1,246,028
Malvern	0.544	0.0591	$349,402
Tredyffrin	2.001	0.2175	$1,285,208
Valley Forge	2.128	0.2313	$1,366,777
Willistown	1.064	0.1157	$683,389
	9.200		$5,909,000

Grand total	**Upgrade**	**Expansion**	**Total Contribution**	**Overall Percent of the Project**
Easttown	$978,196	$0	$ 978,196	0.049
East Whiteland	$1,246,028	$10,336,403	$ 11,582,431	0.583
Malvern	$349,402		$ 349,402	0.018
Tredyffrin	$1,285,208	$1,570,228	$ 2,855,436	0.144
Valley Forge	$1,366,777		$ 1,366,777	0.069
Willistown	$683,389	$2,063,369	$ 2,746,758	0.138
	$5,909,000	$13,970,000	$ 19,879,000	1

1. MGD* = Projected ultimate capacity less current owned

Example: East Whiteland projected need 3.909 less current reserved capacity 1.940 equals 1.969 mgd

2. Overall percent of the project is to be utilized in calculating planning and engineering expenses
3. The cost estimates presume that the existing treatment plant is expanded and upgraded utilizing existing technology

BUCHART HORN, INC.

Buchart-Horn, Inc
445 W. Philadelphia St.
York, PA 17401-3383
(717)852-1400
FAX#717-852-1401
www.bh-ba.com

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Hershey, PA
King of Prussia, PA
New Cumberland, PA
Pittsburgh, PA
State College, PA
Stroudsburg, PA
Baltimore, MD
Marlton, NJ
Charleston, WV
Morgantown, WV
Memphis, TN
Nashville, TN
Baton Rouge, LA
New Orleans, LA
Olive Branch, MS
Pensacola, FL
Frankfurt/Main, Germany
Kaiserslautern, Germany

March 15, 2007

Mr. Martin Goldberg
Valley Forge Sewer Authority
333 Pawling Road
Phoenixville, PA 19460

Reference: **Act 537 Sewage Facilities Plan Update**
BH #75297-61

Dear Mr. Goldberg:

Provided are the comments received from Malvern Borough, and the corresponding responses prepared by Buchart-Horn on behalf of the Authority. These comments and responses are to be inserted into Appendix I of the Act 537 Sewage Facilities Plan Update. These comments and responses should be inserted behind the comments and responses with a cover letter dated March 12, 2007.

Respectfully yours,

BUCHART-HORN, INC.

for

Lawrence A. Lutter, P.E.
Vice President

BLB
Enclosures

cc: All Plan Holders

Recycled Paper

EDWARD B. WALSH & ASSOCIATES, INC.
Complete Civil Engineering Design / Consultation Services
Lionville Professional Center
125 Dowlin Forge Road
Exton, PA 19341

MEMORANDUM

DATE: March 14, 2007 (revised)

TO: Martin Goldberg, VFSA

CC: Sandra Kelley, Malvern Borough Manager
Lawrence Lutter, P.E., Buchart-Horn

FROM: Daniel H. Daley, P.E.
E. B. Walsh & Associates, Inc.
Malvern Borough Engineers

SUBJECT: VFSA Regional Act 537 Plan

As requested, the Borough and my office has reviewed the Regional Act 537 Plan for the Valley Forge Sewer Authority, dated November 2006, prepared by Buchart Horn, Inc. and Gannett Fleming. As requested by Malvern Borough, the following minor comments are offered for your consideration:

- Page 1-3: Malvern Township should be Malvern Borough.
- Page 1-9: 5th paragraph indicates the PADEP is currently reviewing the Borough's 537 plan. In accordance with Page 1-3, the Borough's 537 plan was approved in May of 1995.
- Page 2-9: Reference to Philadelphia Suburban Water Co. should be changed to Aqua Pennsylvania, Inc.
- Page 3-12: Paragraph #1 indicates the Malvern Prep and Malvern Retreat do not have public sewer. Both sites have connected to public sewers within the last ten years or so. Malvern Prep has 15 EDU's that flow into Willistown Township and Malvern Retreat has 19 EDU's that connect into the Borough's sewer system. Page 1-9 also references these two parcels as being served by on-lot facilities.
- As an FYI, a developer is currently considering a significant amount of condominium units on a four lot parcel that originally had 5 EDU's. We will know by mid-week next week how many units they will be proposing. These additional units were not included in our original flow estimates.

If you require any additional information, please do not hesitate to contact me.

Responses to Municipalities Comments

Malvern Borough - Edward B. Walsh & Associates, Inc.

1. On page 301, Malvern Township shall be revised to be Malvern Borough.
2. In relation to page 1-9, 5th paragraph, the Borough's plan was approved in May of 1995 as seen in Table 1-1, but the text of Section 1 was not updated per PADEP.
3. The reference to Philadelphia Suburban Water Co. on page 2-9 shall be revised to Aqua Pennsylvania, Inc.
4. It is recognized that Malvern Prep and Malvern Retreat are connected to public sewers, and that their flows have been accounted for in the projections approved by Malvern Borough.
5. It is noted that a developer is currently considering a significant amount of condominium units on a four lot parcel that originally consisted of 5 EDU's, and that these additional EDU's were not included in the original flow estimates. Even with these additional units, Malvern Borough will remain within their reserved capacity.

APPENDIX J

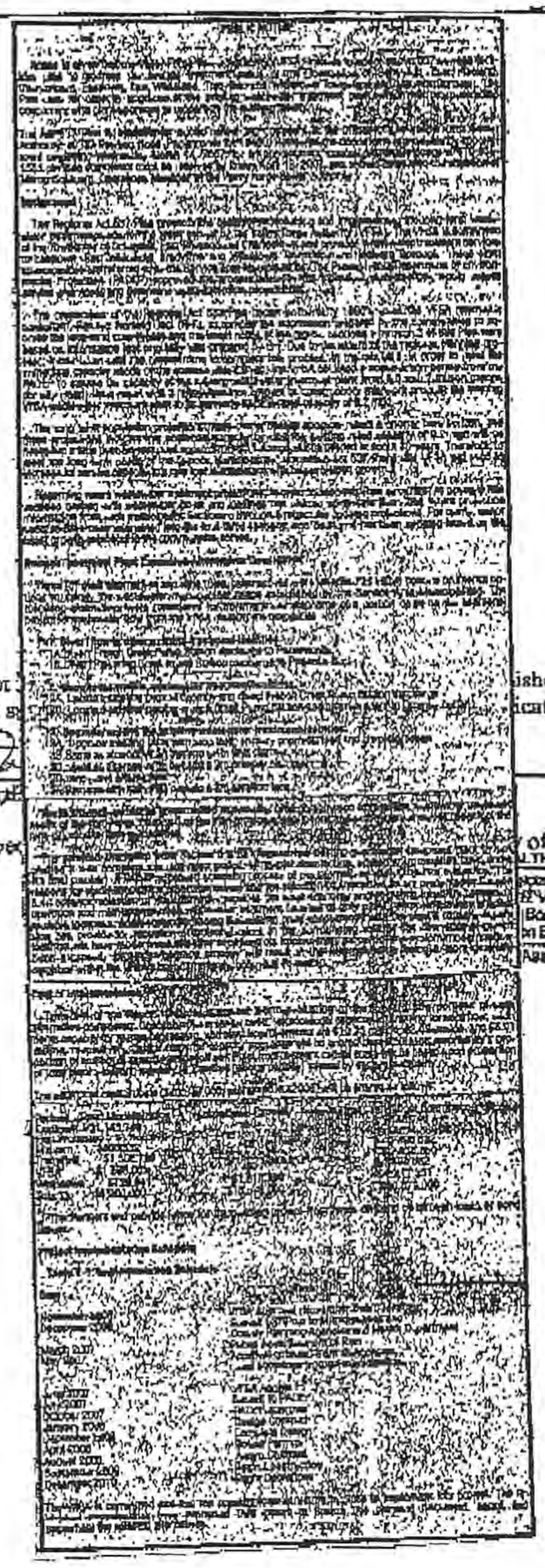
Proof of Public Notice and Comments

Phoenixville Newspapers
225 Bridge Street
PO Box 689
Phoenixville, PA 19460
(610) 933-8926

State of Pennsylvania
County of Chester SS:
Michael Doyle

Being duly affirmed according to law, declares and says that he is the Advertising Director of The Phoenix, a daily publication established in 1888, printed and published in the Borough of Phoenixville, in the said County and State, that the printed notice, a copy of which is securely attached hereto, was published in said paper on the following dates.

3/10/2007



That your affiant is not ... ished and that all of the allegations of this s... ication are true.

Michael Doyle, Advert...

Affirmed and subscribe... of March 2007

...LTH OF PENNSYLVANIA
...otarial Seal
...Notary Public
...Boro, Chester County
...n Expires Feb. 27, 2011
...Association of Notaries

APPENDIX K

Member and Partner Municipalities Plan Adoptions

RESOLUTION NO. 2007-01

RESOLUTION OF THE BOARD OF VALLEY FORGE SEWER AUTHORITY, CHESTER COUNTY, PENNSYLVANIA (hereinafter "the Authority").

WHEREAS, Section 5 of the Act of January 24, 1966, P.L. 1535, No. 537, known as the "Pennsylvania Sewage Facilities Act," as amended, and the Rules and Regulations of the Department of Environmental Protection (Department) adopted hereunder, Chapter 71 of Title 25 of the **Pennsylvania Code,** requires municipalities to adopt an Official Sewage Facilities Plan providing for sewage services adequate to prevent contamination of waters and/or environmental health hazards with sewage wastes, and to revise said plan whenever it is necessary to meet the sewage disposal needs of the municipality, and

WHEREAS, Schuylkill Township is the host community since it contains the wastewater treatment plant which meets wastewater treatment needs of Malvern Borough, and Charlestown, East Pikeland, Tredyffrin, Easttown, East Whiteland, Schuylkill and Willistown Townships, and;

WHEREAS, Malvern Borough, and Charlestown, East Pikeland, Tredyffrin, Easttown, East Whiteland, Schuylkill and Willistown Townships agreed to a two-part regional planning process whereby the municipalities each prepared and adopted an individual municipal Act 537 Plan and then charged the authority to develop a regional wastewater facilities plan that would be adopted by each of the municipalities and the authority; and

WHEREAS, the authority has prepared an Act 537 Sewage Facilities Plan Update dated November 2006 which provides conceptual descriptions for sewage facilities in Malvern Borough, and Charlestown, East Pikeland, Tredyffrin, Easttown, East Whiteland, Schuylkill and Willistown Townships, and;

WHEREAS, the Plan includes expansion, additions and improvements to an existing wastewater treatment plant located in Schuylkill Township, and;

WHEREAS, the alternative of choice to be implemented is an upgrade and expansion of the existing wastewater treatment plant including primary chemical feed, UV disinfection, and the addition of a 4th clarifier and a 2nd aeration basin, and;.

WHEREAS, the authority finds that the Facility Plan described above conforms to a comprehensive program of pollution control and water quality management, and;

WHEREAS, the authority has agreed that the facilities will comply with all zoning, subdivision, and other ordinances, not withstanding any exemptions in Act 167 or otherwise;

NOW, THEREFORE, BE IT RESOLVED that the Board of the Valley Forge Sewer

Authority hereby adopt and submit to the Department of Environmental Protection for its approval as a revision to the "Official Plan" of the authority, the above referenced Facilities Plan provided such plan provides for compliance with all municipal ordinances. The authority hereby assures the Department of the complete and timely implementation of the said plan as required by law. (Section 5, Pennsylvania Sewage Facilities Act as amended).

RESOLUTION NO. 2007-**01**

ADOPTED this 9th day of July, 2007.

VALLEY FORGE SEWER AUTHORITY

Attest:

Authority Secretary

, Chairperson

Daniel M. Roese

(SEAL)

CERTIFICATION

I, Michael Rodgers, Secretary, Valley Forge Sewer Authority hereby certify that the foregoing is a true and correct copy of Resolution No.2007-**01** duly adopted at a regular meeting of the Board held on 7-9-07, 2007.

(SEAL)

By: Michael J. Rodgers

, Authority Secretary

Date: July 9, 2007

RESOLUTION

Tredyffrin Township
Chester County, Pennsylvania

RESOLUTION OF THE BOARD OF SUPERVISORS OF TREDYFFRIN TOWNSHIP, CHESTER COUNTY, PENNSYLVANIA (hereinafter "the municipality"),

WHEREAS, Section 5 of the Act of January 24, 1966, P.L. 1535, No. 537, known as the "Pennsylvania Sewage Facilities Act", as amended, and the Rules and Regulations of the Department of Environmental Protection (Department) adopted thereunder, Chapter 71 of Title 25 of the **Pennsylvania Code**, requires the municipality to adopt an Official Sewage Facilities Plan providing for sewage services adequate to prevent contamination of waters and/or environmental health hazards with sewage wastes, and to revise said plan whenever it is necessary to meet the sewage disposal needs of the municipality, and

WHEREAS, the Valley Forge Sewer Authority has prepared an Act 5357 Sewage Facilities Plan Update dated November 2006 which provides for sewage facilities in a portion of Tredyffrin Township, and

The alternative of choice to be implemented is an upgrade and expansion of the existing wastewater treatment plant including primary chemical feed, UV disinfection, and the addition of a 4th clarifier and a 3rd aeration basin.

WHEREAS, Tredyffrin Township finds that the Facility Plan described above conforms to the applicable zoning, subdivision, other municipal ordinances and plans and to a comprehensive program of pollution control and water quality management.

NOW, THEREFORE, BE IT RESOLVED that the Supervisors of the Township of Tredyffrin hereby adopt and submit to the Department of Environmental Protection for its approval as a revision to the "Official Plan" of the municipality, the above referenced Facility Plan. The municipality hereby assures the Department of the complete and timely implementation of the said plan as required by law. (Section 5, Pennsylvania Sewage Facilities Act as amended).

I, Mimi Gleason, Secretary, Township Board of Supervisors, hereby certify that the foregoing is a true copy of the Township's Resolution, adopted May 7, 2007.

AUTHORIZED SIGNATURE

TOWNSHIP SEAL

Judy L. D'Filippo
Chairman

Mimi Gleason
Secretary

WILLISTOWN TOWNSHIP
CHESTER COUNTY, PENNSYLVANIA

RESOLUTION 22 OF 2007

RESOLUTION OF THE BOARD OF SUPERVISORS OF WILLISTOWN TOWNSHIP, CHESTER COUNTY, PENNSYLVANIA (hereinafter "the municipality").

WHEREAS, Section 5 of the Act of January 24, 1966, P.L. 1535, No. 537, known as the "Pennsylvania Sewage Facilities Act," as amended, and the Rules and Regulations of the Department of Environmental Protection (Department) adopted thereunder, Chapter 71 of Title 25 of the **Pennsylvania Code,** requires the municipality to adopt an Official Sewage Facilities Plan providing for sewage services adequate to prevent contamination of waters and/or environmental health hazards with sewage wastes, and to revise said plan whenever it is necessary to meet the sewage disposal needs of the municipality, and

WHEREAS, the Valley Forge Sewer Authority has prepared an Act 537 Sewage Facilities Plan Update dated November 2006 which provides for sewage facilities in a portion of Willistown Township, and

The alternative of choice to be implemented is an upgrade and expansion of the existing wastewater treatment plant including primary chemical feed, UV disinfection, and the addition of a 4th clarifier and a 3rd aeration basin.

WHEREAS, Willistown Township finds that the Facility Plan described above conforms to applicable zoning, subdivision, other municipal ordinances and plans and to a comprehensive program of pollution control and water quality management.

NOW, THEREFORE, BE IT RESOLVED that the Supervisors of Willistown Township hereby adopt and submit to the Department of Environmental Protection for its approval as a revision to the "Official Plan" of the municipality, the above referenced Facility Plan. The municipality hereby assures the Department of the complete and timely implementation of the said plan as required by law. (Section 5, Pennsylvania Sewage Facilities Act as amended).

I, Dorothy E. McClintock, Secretary, Willistown Township Board of Supervisors, hereby certify that the foregoing is a true copy of the Willistown Township's Resolution Number 22 of 2007 adopted June 25, 2007 .

AUTHORIZED SIGNATURE

TOWNSHIP SEAL

Dorothy E McClintock

Easttown Township

RESOLUTION OF ADOPTION 06.18A.07

RESOLUTION OF THE BOARD OF SUPERVISORS OF EASTTOWN TOWNSHIP, CHESTER COUNTY, PENNSYLVANIA (hereinafter "the municipality").

WHEREAS, Section 5 of the Act of January 24, 1966, P.L. 1535, No. 537, known as the "Pennsylvania Sewage Facilities Act," as amended, and the Rules and Regulations of the Department of Environmental Protection (Department) adopted thereunder, Chapter 71 of Title 25 of the **Pennsylvania Code,** requires the municipality to adopt an Official Sewage Facilities Plan providing for sewage services adequate to prevent contamination of waters and/or environmental health hazards with sewage wastes, and to revise said plan whenever it is necessary to meet the sewage disposal needs of the municipality, and

WHEREAS, the Valley Forge Sewer Authority has prepared an Act 537 Sewage Facilities Plan Update dated November 2006 which provides for sewage facilities in a portion of Easttown Township, and the alternative of choice to be implemented is an upgrade and expansion of the existing wastewater treatment plant including primary chemical feed, UV disinfection, and the addition of a 4th clarifier and a 3rd aeration basin, and

WHEREAS, Easttown Township finds that the Facility Plan described above conforms to applicable zoning, subdivision, other municipal ordinances and plans and to a comprehensive program of pollution control and water quality management.

NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of Easttown Township hereby adopts and submits to the Department of Environmental Protection for its approval as a revision to the "Official Plan" of the municipality, the above referenced Facility Plan. The municipality hereby assures the Department of the complete and timely implementation of the said plan as required by law. (Section 5, Pennsylvania Sewage Facilities Act as amended).

I, Gene R. Williams, Secretary, Easttown Township, hereby certify that the foregoing is a true copy of the Township's Resolution No. 06.18A.07, adopted June 18, 2007.

EASTTOWN TOWNSHIP
BOARD OF SUPERVISORS

William F. Connor, III, Chairman

Richard T. Frazier, Vice Chair

James G. Spofford

Edward M. Strogen, Jr.

Vincent J. Rogusky

Attest:

Gene R. Williams, Secretary

RESOLUTION NO. 567

RESOLUTION TO ADOPT THE OFFICIAL SEWAGE FACILITIES PLAN
REGIONAL ACT 537 PLAN

WHEREAS, Section 5 of the Act of January 24, 1966, P.L. 1535, No. 537, known as the "Pennsylvania Sewage Facilities Act," as amended, and the Rules and Regulations of the Department of Environmental Protection (Department) adopted thereunder, Chapter 71 of Title 25 of the Pennsylvania Code, requires the municipality to adopt an Official Sewage Facilities Plan providing for sewage services adequate to prevent contamination of waters and/or environmental health hazards with sewage wastes, and to revise said plan whenever it is necessary to meet the sewage disposal needs of the municipality; and,

WHEREAS, Buchart-Horn, Inc., has prepared an Act 537 Sewage Facilities Plan Update for the Valley Forge Sewer Authority dated November 2006, which provides for sewage facilities in a portion of the Borough of Malvern; and,

The alternative of choice to be implemented is an upgrade and expansion of the existing wastewater treatment plant including primary chemical feed, UV disinfection, and the addition of a 5th clarifier and a 3rd aeration basin

WHEREAS, the Borough of Malvern finds that the Facility Plan described above conforms to applicable zoning, subdivision, other municipal ordinances and plans and to a comprehensive program of pollution control and water quality management.

NOW, THEREFORE, BE IT RESOLVED that the Council of the Borough of Malvern hereby adopt and submit to the Department of Environmental Protection for its approval as a revision to the "Official Plan" of the municipality, the above referenced Facility Plan. The municipality hereby assures the Department of the complete and timely implementation of the said plan as required by law (Section 5, Pennsylvania Sewage Facilities Act as amended).

Passed by Borough Council this 5th day of June, 2007.

Henry Briggs
President, Borough Council

(signatures continued on next page)

EAST WHITELAND TOWNSHIP

CHESTER COUNTY, PA

RESOLUTION NO. 21-2007

VALLEY FORGE SEWER AUTHORITY REGIONAL ACT 537

WHEREAS, Section 5 of the Act of January 24, 1966, P.L. 1535, No. 537, known as the "Pennsylvania Sewage Facilities Act," as amended, and the Rules and Regulations of the Department of Environmental Protection (Department) adopted thereunder, Chapter 71 of Title 25 of the Pennsylvania Code, requires the municipality to adopt an Official Sewage Facilities Plan providing for sewage services adequate to prevent contamination of waters and/or environmental health hazards with sewage wastes, and to revise said plan whenever it is necessary to meet the sewage disposal needs of the municipality, and

WHEREAS, the Valley Forge Sewer Authority has prepared an Act 537 Sewage Facilities Plan Update dated November 2006 which provides for sewage facilities in a portion of East Whiteland Township, and

The alternative of choice to be implemented is an upgrade and expansion of the existing wastewater treatment plant including primary chemical feed, UV disinfection, and the addition of a 4th clarifier and a 3rd aeration basin.

WHEREAS, East Whiteland Township finds that the Facility Plan described above conforms to applicable zoning, subdivision, other municipal ordinances and plans and to a comprehensive program of pollution control and water quality management.

NOW, THEREFORE, BE IT RESOLVED that the Supervisors of the Township of East Whiteland hereby adopt and submit to the Department of Environmental Protection for its approval as a revision to the "Official Plan" of the municipality, the above referenced Facility Plan. The municipality herby assures the Department of the complete and timely implementation of

the said plan as required by law. (Section 5, Pennsylvania Sewage Facilities Act as amended).

BOARD OF SUPERVISORS
EAST WHITELAND TOWNSHIP

John A. Mott, Chair

P. Joseph Corrigan

Virginia McMichael

ATTEST:

Township Secretary

CHARLESTOWN TOWNSHIP
CHESTER COUNTY, PENNSYLVANIA

RESOLUTION 2007- 683

1. Section 5 of the Pennsylvania Sewage Facilities Act , Act of January 24, 1966, P.L. 1535, No. 537, as amended, and the Rules and Regulations of the Pennsylvania Department of Environmental Protection adopted thereunder, Chapter 71 of Title 25 of the Pennsylvania Code requires municipalities to adopt an Official Sewage Facilities Plan providing for sewage services adequate to prevent contamination of waters and/or environmental health hazards with sewage wastes, and to revise said plan whenever it is necessary to meet the sewage disposal needs of any municipality; and

2. Charlestown Township has enacted an Official Sewage Facilities Plan under the Pennsylvania Sewage Facilities Act dated June 5, 1989, as revised (the "Township Act 537 Plan"); and

3. Valley Forge Sewer Authority has prepared an Act 537 Sewage Facilities Plan Update dated November 2006 (the "Authority's Act 537 Sewage Facilities Plan Update"), which provides for sewage facilities in a portion of Charlestown Township and implements an update and expansion of the Authority's existing wastewater treatment plant including primary chemical feed, UV disinfection, and the addition of a 4th clarifier and a 3rd aeration basin.

4. Charlestown Township is a member municipality of the Valley Forge Sewer Authority; and

5. Charlestown Township has determined that the Authority's Act 537 Sewage Facilities Plan Update is consistent with and conforms to the Township Act 537 Plan, the Charlestown Township Zoning Ordinance, the Charlestown Township Subdivision Ordinance and all other applicable ordinances and plans of the Township.

BE IT AND IT IS HEREBY RESOLVED that the Board of Supervisors of Charlestown Township, Chester County, Commonwealth of Pennsylvania, adopts and submits to the DEP the Authority Act 537 Sewage Facilities Plan Update and submits the same to the DEP as a revision to the Charlestown Township Act 537 Plan. The Township hereby assures the DEP of the complete and timely implementation of the said Plan as required by law. (Section 5, Pennsylvania Sewage Facilities Act, as amended)

BE IT FURTHER RESOLVED that this Resolution shall be effective immediately upon adoption.

ADOPTED this 7th day of May, 2007.

BOARD OF SUPERVISORS

Kevin R. Kuhn, Chairman

Michael J. Rogers, Vice Chairman

Paul J. Hogan, Member

Hugh D. Willig, Member

Charles Philips, Member

ATTEST

Linda Csete, Secretary

EAST PIKELAND TOWNSHIP
CHESTER COUNTY, PENNSYLVANIA

RESOLUTION 2007-09

RESOLUTION OF THE BOARD OF SUPERVISORS OF EAST PIKELAND TOWNSHIP, CHESTER COUNTY, PENNSYLVANIA (hereinafter "the municipality").

WHEREAS, Section 5 of the Act of January 24, 1966, P.L. 1535, No. 537, known as the "Pennsylvania Sewage Facilities Act," as amended, and the Rules and Regulations of the Department of Environmental Protection (Department) adopted thereunder, Chapter 71 of Title 25 of the **Pennsylvania Code,** requires the municipality to adopt an Official Sewage Facilities Plan providing for sewage services adequate to prevent contamination of waters and/or environmental health hazards with sewage wastes, and to revise said plan whenever it is necessary to meet the sewage disposal needs of the municipality, and

WHEREAS, the Valley Forge Sewer Authority has prepared an Act 537 Sewage Facilities Plan Update dated November 2006 ("Facility Plan") which provides for sewage facilities in a portion of East Pikeland Township, and

The alternative of choice to be implemented is an upgrade and expansion of the existing wastewater treatment plant including primary chemical feed, UV disinfection, and the addition of a 4th clarifier and a 3rd aeration basin. If this alternative of choice cannot be implemented, Valley Forge Sewer Authority shall present an alternate Facility Plan to East Pikeland Township for approval.

WHEREAS, East Pikeland Township finds that the Facility Plan described above conforms to applicable zoning, subdivision, other municipal ordinances and plans and to a comprehensive program of pollution control and water quality management.

NOW, THEREFORE, BE IT RESOLVED that the Supervisors of the Township of East Pikeland hereby adopt and submit to the Department of Environmental Protection for its approval as a revision to the "Official Plan" of the municipality, the above referenced Facility Plan. The municipality hereby assures the Department of the complete and timely implementation of the said plan as required by law. (Section 5, Pennsylvania Sewage Facilities Act as amended). If the Facility Plan cannot be implemented, the Valley Forge Sewer Authority shall present an alternate Facility Plan to the Township for approval.

BOARD OF SUPERVISORS OF
EAST PIKELAND TOWNSHIP

Russell L. S.

RUSSELL L. STRAUSS, Chairman

J. BENSON CAMPBELL, Vice Chairman

MARK W. BROOKS, Member

I, Kimberly Moretti, Secretary to the East Pikeland Township Board of Supervisors hereby certify that the foregoing is a true copy of the Township's Resolution No.2007-09, adopted May 15, 20 07.

Attest: Kimberly Moretti, Township Manager

Kimberly Moretti

RESOLUTION OF ADOPTION

RESOLUTION NO. 2007-04

RESOLUTION OF THE BOARD OF SUPERVISORS OF SCHUYLKILL TOWNSHIP, CHESTER COUNTY, PENNSYLVANIA (hereinafter "the municipality").

WHEREAS, Section 5 of the Act of January 24, 1966, P.L. 1535, No. 537, known as the "Pennsylvania Sewage Facilities Act," as amended, and the Rules and Regulations of the Department of Environmental Protection (Department) adopted thereunder, Chapter 71 of Title 25 of the **Pennsylvania Code,** requires the municipality to adopt an Official Sewage Facilities Plan providing for sewage services adequate to prevent contamination of waters and/or environmental health hazards with sewage wastes, and to revise said plan whenever it is necessary to meet the sewage disposal needs of the municipality, and

WHEREAS, Schuylkill Township is also the host community since it contains the wastewater treatment plant which meets wastewater treatment needs of Charlestown, East Pikeland, Tredyffrin, Easttown, East Whiteland, Malvern, and Willistown Townships, and;

WHEREAS, the Valley Forge Sewer Authority has prepared an Act 537 Sewage Facilities Plan Update dated November 2006 which provides conceptual descriptions for sewage facilities in a portion of Schuylkill Township, and;

WHEREAS, the Plan includes expansion, additions and improvements to an existing wastewater treatment plant located in Schuylkill Township, and;

WHEREAS, the alternative of choice to be implemented is an upgrade and expansion of the existing wastewater treatment plant including primary chemical feed, UV disinfection, and the addition of a 4th clarifier and a 3rd aeration basin, and;.

WHEREAS, Schuylkill Township finds that the Facility Plan described above conforms to a comprehensive program of pollution control and water quality management, and;

WHEREAS, the Authority has agreed that the facilities will comply with all zoning, subdivision, and other ordinances, not withstanding any exemptions in Act 167 or otherwise;

NOW, THEREFORE, BE IT RESOLVED that the Supervisors of the Township of Schuylkill hereby adopt and submit to the Department of Environmental Protection for its approval as a revision to the "Official Plan" of the municipality, the above referenced Facilities Plan provided such plan provides for compliance with Schuylkill Township Ordinances. The municipality hereby assures the Department of the complete and timely implementation of the said plan as required by law. (Section 5, Pennsylvania Sewage Facilities Act as amended).

RESOLUTION NO. 2007-04

ADOPTED this 6th day of June, 2007.

SCHUYLKILL TOWNSHIP
BOARD OF SUPERVISORS

Norman Vutz, Chairman

Marietta M. Marquart, Vice-Chair

Lee Ledbetter

Daniel Keogh

Sandra Henzie

Attest:

Mary R. Bird, Twp. Secretary

(SEAL)

CERTIFICATION

I, Mary R. Bird, Secretary, Schuylkill Township Board of Supervisors hereby certify that the foregoing is a true and correct copy of Resolution No.2007-04 duly adopted at a regular meeting of the Board of Supervisors held on June 6, 2007.

(SEAL)

By: _____

Mary R. Bird, Twp. Secretary

Date: 6/25/07